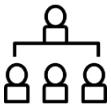
# Water and Sewer Board

Regular Meeting
City Council Chambers – City Center South
1001 11th Avenue – Greeley, Colorado
November 16, 2022 at 2:00 p.m.



Regular meetings of the Water and Sewer Board are held **in person** on the 3rd Wednesday of each month in the City Council Chambers, 1001 11th Avenue, Greeley, Colorado.

Members of the public may attend and provide comment during public hearings.

Written comments may be submitted by US mail or dropped off at the Water and Sewer office located at 1001 11th Avenue, 2nd Floor, Greeley, CO 80631 or emailed to wsadmin@greeleygov.com. All written comments must be received by 10:00 a.m. on the date of the meeting.

Meeting agendas and minutes are available on the City's meeting portal at Greeley-co.municodemeetings.com/

**IMPORTANT – PLEASE NOTE**

This meeting is scheduled as an **in-person session only**. If COVID, weather, or other conditions beyond the control of the City dictate, the meeting will be conducted virtually and notice will be posted on the City's MuniCode meeting portal by 10:00 a.m. on the date of the meeting (https://greeley-co.municodemeetings.com/).

In the event it becomes necessary for a meeting to be held virtually, use the link below to join the meeting. Virtual meetings are also livestreamed on YouTube at https://www.youtube.com/CityofGreeley.

For more information about this meeting or to request reasonable accommodations, contact the administrative team at 970-350-9801 or by email at wsadmin@greeleygov.com

# Water & Sewer Board Meeting

**November 16, 2022 at 2:00 PM**
**1001 11th Avenue, City Center South, Greeley, CO 80631**

## Agenda

1. Roll Call:
   _____ Chairman Harold Evans
   _____ Vice Chairman Mick Todd
   _____ Ms. Cheri Witt-Brown
   _____ Mr. Fred Otis
   _____ Mr. Joe Murphy
   _____ Mr. Tony Miller
   _____ Mr. Manuel Sisneros
   _____ Mayor John Gates
   _____ Mr. Raymond Lee
   _____ Mr. John Karner
2. Approval of Minutes
3. Approval of the Agenda
4. Welcome New Employees and Promotions
5. November Water Supply Update
6. Update on Section 6 - Landscape and Irrigation Criteria
7. Integrated Water Resource Plan (IWRP) - Integration and Supply
8. Approval of 3rd Amendment of Mining and Reclamation Lease for Poudre Ponds
9. Amendment to PRPA Purchase and Sale Agreement
10. Executive Session (If Necessary)
11. Legal Report
12. Director's Report
13. Such Other Business That May Be Brought Before the Board Added to This Agenda by Motion of the Board.
14. Adjournment

*If, to effectively and fully participate in this meeting, you require an auxiliary aid or other assistance related to a disability, please contact the Water and Sewer Department administrative staff at 970-350-9801 or wsadmin@greeleygov.com*

# City of Greeley
# Water and Sewer Board
## Minutes of October 19th, 2022
## Regular Board Meeting

Chairman Harold Evans called the Water and Sewer Board meeting to order at 1:59 p.m. on Wednesday, October 19, 2022.

**1. Roll Call**

The Clerk called the roll and those present included:

Board Members:

Chairman Harold Evans, Vice Chairman Mick Todd, Fred Otis, Cheri Witt-Brown, Tony Miller, Manuel Sisneros, Joseph Murphy, Deputy City Manager Don Tripp on behalf of City Manager Raymond Lee, and Finance Director John Karner

Water and Sewer Department staff:

Director Sean Chambers, Deputy Director Ty Bereskie, Utility Finance Manager Erik Dial, Deputy Director Operations Nina Cudahy, Chief Engineer Adam Prior, Water Resources Administrator II Alex Tennant, Water Resources Administrator III Cole Gustafson, Water Resource Administrator I Megan Kramer, Senior Administrative Assistant Crystal Sanchez, Interim Office Manager Gigi Allen, Water Resource Planning Manager Kelen Dowdy, Water Resource Operations Manager Leah Hubbard, and Rates and Budget Analyst Virgil Pierce

Legal Counsel:

Senior Environmental and Water Resources Attorney Jerrae Swanson, Environmental and Water Resources Attorney II Dan Biwer, Environmental and Water Resources Attorney I Arthur Sayre and Counsel to Water & Sewer Board Attorney Carolyn Burr

Guests:

Emeritus Robert Ruyle, Neil Stewart from Stantec, Brad Wind and Kyle Whitaker from Northern Water

**2. Approval of Minutes**

Ms. Witt-Brown made a motion, seconded by Mr. Miller, to approve the September 21, 2022 Water and Sewer Board meeting minutes. The motion carried 7-0.

## 3. Approval of the Agenda

Updated Agenda – the bullet point under Legal Report was moved under Executive Session as it was inadvertently placed under the wrong Agenda item.

## 4. Welcome New Employees and Promotions

Mr. Chambers provided an introduction of new Water and Sewer Department employees starting this month.

## 5. Approve and Recommend to City Council the 2022 Water Efficiency Plan

Dena Egenhoff joined the meeting virtually at 2:05 p.m.

Dena Egenhoff presented on Greeley's Water Conservation Plan. The Water Conservation Act of 2004 requires all Colorado water providers who supply more than 2,000 acre-feet of water to submit or update water efficiency plans for approval by the Colorado Water Conservation Board (CWCB) every seven years. The plans contain key information about historical and projected water demands, water supply reliability, future needs, proposed demand management activities, and monitoring processes.

This is the third update to the original 2008 Water Conservation Plan. The City of Greeley's new draft Water Efficiency Plan (WEP) is a roadmap of strategic objectives and water conservation programs to ensure future water supplies. The WEP builds on the City's current properties and includes existing codes, criteria and strategic plans with a lens on water conservation.

The main objectives of the WEP are to maximize widespread efficiency in all indoor water use, set goals for more resilient landscapes, and educate customers on water use goals. It will provide direction on how to advance water conservation efforts and build City wide capacity to:

- Create efficiencies and consistencies among policies, plans, projects and programs;
- Maximize cost-saving opportunities;
- Create goals with clear measurements for success.

The Water and Sewer Department has worked diligently to coordinate with a 60-day public comment period from August 3, 2022, through October 3, 2022. These methods included online forms, social media campaigns, two online open houses (August 18th and September 15th), Water and Sewer's monthly newsletter, press release on August 9th, presentation and information sharing to commission/advisory boards and targeted outreach for local businesses and organizations.

Colorado Water Conservation Board (CWCB) also provides a review of the WEP to ensure compliance with the Water Conservation Act.

Vice Chairman Todd moved that the Board approve the 2022 Water Efficiency Plan as part of the City's long term water plans, delegate authority to the Director of Water and Sewer or his designee to make minor changes to the WEP consistent with any subsequent recommendations from the Colorado Water Conservation Board, and recommend same for adoption by the City Council, and incorporation within the City's Comprehensive Plan. Mr. Miller seconded the motion. The motion carried 7-0.

**6. Approve Termination of GURA Augmentation Agreement**

Mr. Otis recused himself from participating in Agenda item numbers 6 and 7 due to a potential conflict of interest and left the room at 2:18 p.m.

Sean Chambers discussed that the Greeley Urban Renewal Authority ("GURA") owns a parcel of real property located just east of Highway 85 and the Wastewater Treatment and Reclamation Facility that is commonly referred to as the 8th Street Pit property. GURA has leased the 8th Street Pit property since 1999 to various parties for mining operations.

The City of Greeley entered into a Perpetual Augmentation Water Agreement with GURA on October 4, 2012, which agreement set the terms by which the City would augment the out-of-priority depletions associated with the 8th Street Pit property after the mining operations and associated reclamation activities were completed.

GURA is now under contract to sell the 8th Street Pit property, and the parties have accordingly reached an agreement to formally memorialize their termination of the Perpetual Augmentation Water Agreement and clarify that the City will have no obligation to augment the depletions associated with the 8th Street Pit property after the transfer. Staff and legal counsel recommend approval of the agreement.

Mr. Miller moved that the Board approve the Termination of Augmentation Water Agreement with Greeley Urban Renewal Authority, and delegate authority to the Director of Water and Sewer to approve minor amendments before execution, provided that the material substance of the agreement remains unchanged. Vice Chairman Todd seconded the motion. The motion carried 6-0.

**7. Approve and Recommend to City Council Leprino Development Agreement – 6th Amendment**

Erik Dial introduced the background to the original development agreement with Leprino and how raw water dedication was a key component of the incentive

package to bring the dairy manufacturing facility to Greeley. The Development Agreement required the City to provide Leprino with treated water service for all three planned phases of its development, which was then estimated at 1,344 acre feet per year at buildout. To meet Greeley's raw water requirements for the facility, the Development Agreement granted Leprino raw water credits, including credit for "Produced Water" generated from milk, and allowed Leprino to pay cash-in-lieu of providing raw water at a favorable rate.

Mr. Dial explained that as Leprino began operations and was constructing the three phases of its facility, it was apparent that the facility's original estimated demand of 1,344 acre feet per year was low. In March 2017, after negotiations between Greeley staff and Leprino, Greeley's Water and Sewer Board and City Council approved the Fourth Amendment of the Development Agreement for Leprino. The Fourth Amendment made changes to the Development Agreement that made available to Leprino additional raw water at discounted cash-in-lieu rates, but also required Leprino to match each acre foot of discounted cash-in-lieu water with a dedication of Colorado-Big Thompson (C-BT) water. Mr. Dial indicated that since the adoption of the Fourth Amendment, Leprino had dedicated 247 units of C-BT water, reflecting 190 acre feet of water, but has not purchased any of the additional discounted cash-in-lieu water. After the dedication of 190 acre feet of C-BT, Leprino's total raw water allotment is 2,134 acre feet.

In 2020, Leprino used 2,306.53 acre feet of water, exceeding their allotment by 172.53 acre feet. At the 2020 raw water surcharge rate of $10.05/kgal, this overage resulted in a total raw water surcharge of $565,001.68 due to Greeley from Leprino. Mr. Dial said that he and other city staff engaged with Leprino staff earlier in 2022 to determine the best option for Leprino to pay its raw water surcharge. He explained that the Fourth Amendment to the Development Agreement defined the options for Greeley and Leprino if the decreed volume of Produced Water resulted in a volume less than or greater than 600 acre feet of water. Because the decreed volume resulted in a volume greater than 600 acre feet of Produced Water Greeley had the option to purchase any or all of the "Excess Decreed Amount" of Produced Water. The purchase price for Greeley for the Excess Decreed Amount would be at the New Leprino Water Bank Rate. The Produced Water volume during that 36-month period was approximately 840 acre feet of water, or 240 acre feet above the original 600 acre feet of raw water credit given to Leprino. Greeley's staff notified Leprino that the City would not purchase any of the Excess Decreed Amount but would be willing to let Leprino to pay for their 2020 raw water surcharge with a portion of the Excess Decreed Amount. The Sixth Amendment to the Development Agreement reflects Greeley purchasing 38.70 acre feet of Excess Decreed Amount water, which reflects the volume of water the raw water surcharge of $565,001.68 can purchase using the 2022 New Leprino Water Bank Rate of $14,599.83/acre foot.

Vice Chairman Todd moved that the Board approve the Sixth Amendment to the Leprino Development Agreement and recommended that City Council approve the same. Mr. Miller seconded the motion. The motion carried 6-0.

Mr. Otis returned to the meeting at 2:42 p.m.
Kyle Whitaker of Northern Water joined the meeting at 2:34 p.m.
Brad Wind of Northern Water joined the meeting at 2:45 p.m.

**8. Integrated Water Resource Plan Project Update**

Kelen Dowdy and Neil Stewart, consultant from Stantec went over how the current Greeley Water Supply Master Plan is more than 17 years old. Since the creation of the last master plan in 2003, Greeley's strategies to continue to provide a robust, resilient water supply have evolved and the water market has transformed. Likewise, widely accepted strategies used to plan for water development have progressed. Consequently, the Water Resources team has been developing a new water master plan, through a process termed Integrated Water Resource Planning (IWRP). The IWRP process will evaluate Greeley's long-term water supply sustainability, develop a road map to buildout and identify near-term CIP components. As part of the process, the IWRP evaluate a suit of future conditions to plan for called "planning scenarios". These scenarios define key components of future conditions such as the state of Greeley's water supply system, demands, climates and other system risks. In order to evaluate the timing of Terry Ranch and compare future conditions, a baseline analysis must be conducted. This presentation will outline the baseline evaluation process and define baseline conditions. Furthermore, the presentation will discuss planning level of service which establishes unacceptable future conditions that will catalyze the development of new projects. Importantly, this presentation will outline the integrated and adaptive approach that will monitor system conditions to trigger CIP projects.

John Karner left the meeting at 3:05 p.m.
Neil Stewart left the meeting at 3:16 p.m.

**9. Sanitary Survey Response Update**

Nina Cudahy reported on the Sanitary Survey Findings and Resolutions. The sanitary survey is performed every three years by the Colorado Department of Public Health and Environment to require continuous improvement for Public Water Systems. The survey entails an in-depth review of the water systems recordkeeping, sampling activities, distribution system operating procedures, and water treatment processes. The survey was completed in July of this year and resulted in seven deficiencies that were corrected and notification of a violation sent to the public. The notification was to inform residents that we did not certify 100% of the backflow assemblies and that we had three reservoirs in service that had the potential to introduce contaminants into the water system. W&S staff are currently addressing all of the findings from the survey: three reservoirs are no longer in use and customers are submitting the required backflow certifications. Another finding of the survey is that our certified

operators are doing an excellent job despite the deficiencies and violations and in CDPHE's words "Greeley runs a really tight ship".

**10. Colorado River Imbalance Update**

Brad Wind and Kyle Whitaker from Northern Water presented the Colorado River Imbalance Update and discussed that over the past 18 months, the Department of Interior declared a Tier 1 Water Shortage in August of 2021, followed by and a Tier 2 shortage declaration in August of 2022. Despite a strong Western drought, Colorado River water demands continued to significantly outpace supply, further drawing down Lakes Mead and Powel to critical levels that warrant a federal response and action by Colorado River water users across the West.

Greeley's municipal water portfolio and much of the Agricultural lands around Greeley in Weld County utilize significant Upper Colorado River water supplies to supplement water in storage and the water supplies from the Cache la Poudre, Big Thompson, and Laramie River Basins. Greeley Water tracks and engages in conservations on the Colorado River and Western drought because approximately 45% of the city's water resource portfolio is sourced from transbasin Colorado River sources.

Adam Prior left the meeting at 3:57 p.m.
Brad Wind and Kyle Whitaker left the meeting at 4:14 p.m.

**11. Legal Report**

Carolyn Burr of Welborn, Sullivan, Meck & Tooley recommended the Board file statements of opposition in the following cases:

a. Case Number: **22CW3121:** The Groundwater Management Subdistrict of the Central Colorado Water Conservancy District application for diligence and to make a portion of the water right absolute for Jo Dee Reservoir. Central is claiming that 289 AF of the 1,600 AF storage right as absolute and 1.28 cfs of 5 cfs decreed to one point of diversion as absolute. Jo Dee Reservoir is located close to the Whitney and Eaton Ditch headgates.

b. Case No. **22CW3107**: Buckhorn Highline Ditch Company has filed an application for a simple change in surface point of diversion for the Buckhorn Highline Ditch, which is located on Buckhorn Creek, a tributary to the Big Thompson River. It appears that the simple change being claimed does not meet the criteria for a simple change case, and there is the possibility that the change could result in an expansion of the historic right.

Vice Chairman Todd moved that the Board authorize the filing of statements of opposition in Case Nos. 22CW3121 and 22CW3107 and for staff and legal counsel to

seek resolution of issues raised by this case consistent with Water and Sewer Board Resolution No. 3, 2015. Mr. Murphy seconded the motion. The motion carried 7-0.

Tony Miller left the meeting at 4:18 p.m.
Dena Egenhoff, Virgil Pierce, Alex Tennant, Megan Kramer, Kelen Dowdy, Crystal Sanchez, Gigi Allen left the meeting at 4:19 p.m.

## 12. Executive Session

Chairman Evans moved that the Board hold an executive session to address the following matters as provided by C.R.S. §24-6-402(4)(a) and (e) and Greeley Municipal Code Sec. 2-151 (a) (1) and (5):

1. For the purpose of determining positions relative to matters that may be subject to negotiations, developing strategy for negotiations, and instructing negotiators in potential water acquisitions based the current water market.

Mr. Murphy seconded the motion. The motion carried 7-0.

Present during the Executive Session were:

Chairman Evans, Vice Chairman Todd, Manuel Sisneros, Joe Murphy, Cheri Witt-Brown, Fred Otis, Director Sean Chambers, Deputy Director Ty Bereskie, Deputy City Manager Don Tripp, Water Resources Administrator III Cole Gustafson, Utility Finance Manager Erik Dial, Senior Environmental Water Resources Attorney Jerrae Swanson, Environmental & Water Resources Attorney II Dan Biwer, Environmental and Water Resources Attorney I Arthur Sayre, Counsel to Water & Sewer Board Attorney Carolyn Burr

Guests: Emeritus Robert Ruyle

This executive session was authorized by Subsections (a) and (e) of Section 24-6-402(4) of the Colorado Revised Statutes, and Subsections (1) and (5) of Section 2-151 (a) of the Greeley Municipal Code.

Executive Session ended at 4:31 p.m.

Erik Dial left the meeting at 4:25 p.m.
Jerrae Swanson left the meeting at 4:31 p.m.
Gigi Allen rejoined the meeting at 4:31 p.m.
Erin Maestas joined the meeting at 4:31 p.m.

## 13. Director's Report

Mr. Chambers provided a summary overview of several items of Board interest:

1. NCWCD Fall Symposium – November 15th
2. NGWA Award for Terry Ranch diligence and engineering
3. Colorado Water Plan ’23 summary information
4. Terry Ranch ASR project planning update
   a. Pipeline easements and RoW
   b. Project design and engineering
   c. Well field planning and water resources
   d. IWRP planning for long-term project integration with other water supplies

**14. Such Other Business That May Be Brought Before the Board Added to This Agenda by Motion of the Board**

There were no additional items brought before the Board and added to the agenda.

**15. Adjournment**

Chairman Evans adjourned the meeting at 4:40 p.m.

**********

_____
Harold Evans, Chairman

_____
Raymond Lee, Board Secretary

# Water & Sewer Agenda Summary

November 16, 2022

Key Staff Contact: Sean Chambers, Water & Sewer Director

***Title:*** Welcome New Water & Sewer Employees and Recognize Department Promotions

***Summary:*** New Hires:
Richard Sedlacek – Lift Station Technician
Freddy Rodriquez – Lead and Copper Specialist
Dakota Moore – Maintenance Technician I
Elias Velasquez – Utility Locator

***Recommended Action:*** Information only

***Attachments:*** None

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Alex Tennant, Water Resources Administrator II

***Title:***
November Water Supply Update

***Summary:***
Staff will provide presentation on the current water supply, weather forecast, drought forecast, and agricultural rental summary.

***Recommended Action:***
Informational item only

***Recommended Motion:***
N/A

***Attachments:***
1. Memo
2. Presentation

# 2022 Water Supply Update

Water & Sewer Board

November 16th, 2022

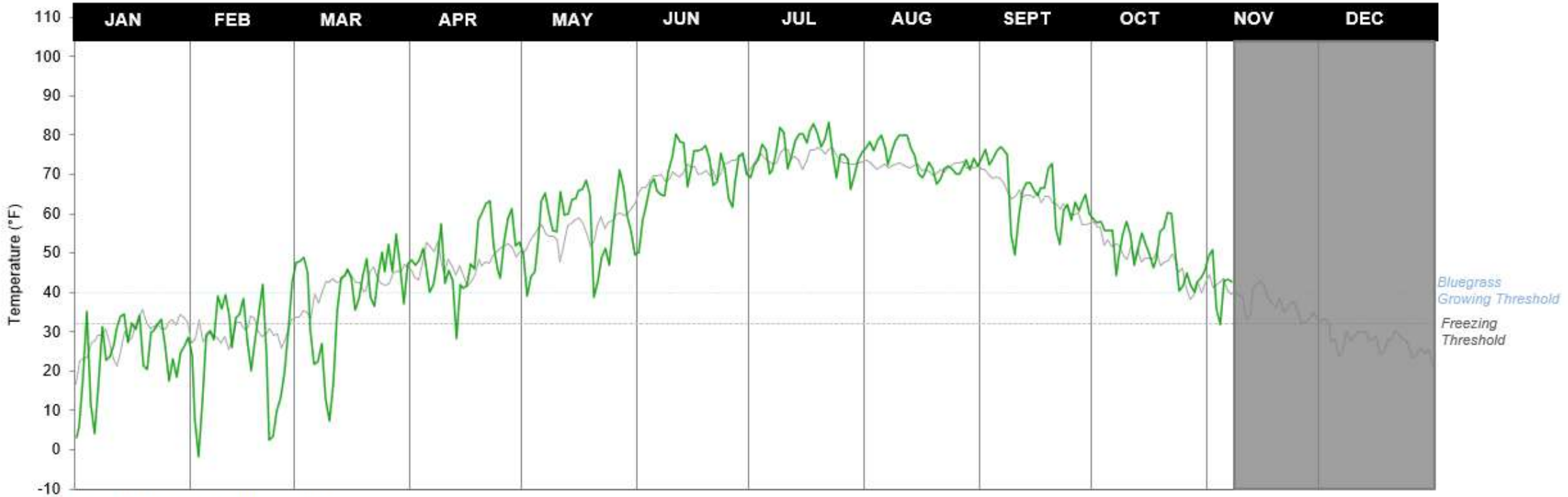
# Water Rental Summary

| | | |
|---|---|---|
| • C-BT | 8,483 | AF |
| • GLIC changed | 326 | AF |
| • GLIC unchanged | 1,881 | AF |
| • WSSC | 517 | AF |
| • NPIC | 207 | AF |
| • HMR | 775 | AF |
| • Leasebacks | | |
| ◦ WSSC | 1,808 | AF |
| ◦ GLIC | 2,637 | AF |
| ◦ L&W | 2,874 | AF |
| ◦ New Cache | 813 | AF |
| **Total** | **20,321** | **AF** |

City of Greeley Colorado

# City of Greeley: Temperature (°F) and Precipitation 2012-2022


Greeley West station (224)
Source: northernwater.org

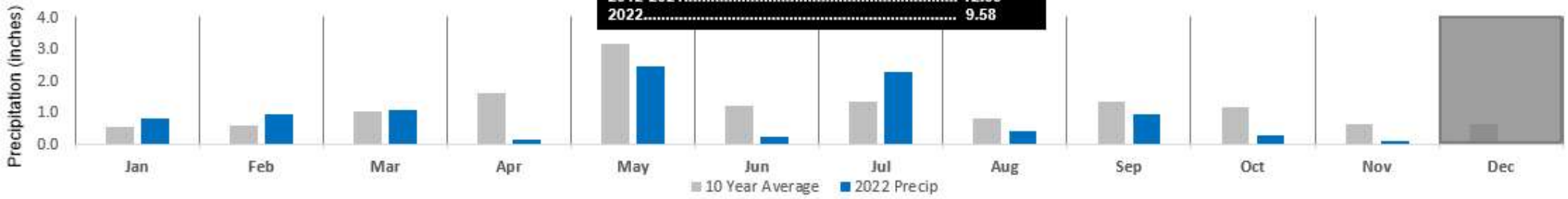



**MONTHLY AVERAGE TEMPERATURE**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEPT | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2012-2021** | 28.1° F | 29.7° F | 41.7° F | 47.8° F | 56.2° F | 70.4° F | 74.2° F | 71.9° F | 64.2° F | 48.4° F | 38.2° F | 27.6° F |
| **2022** | 23.6° F | 25.3° F | 38.9° F | 49.0° F | 56.9° F | 70.0° F | 75.8° F | 74.0° F | 65.9° F | 50.8° F | 42.4° F | 0.0° F |

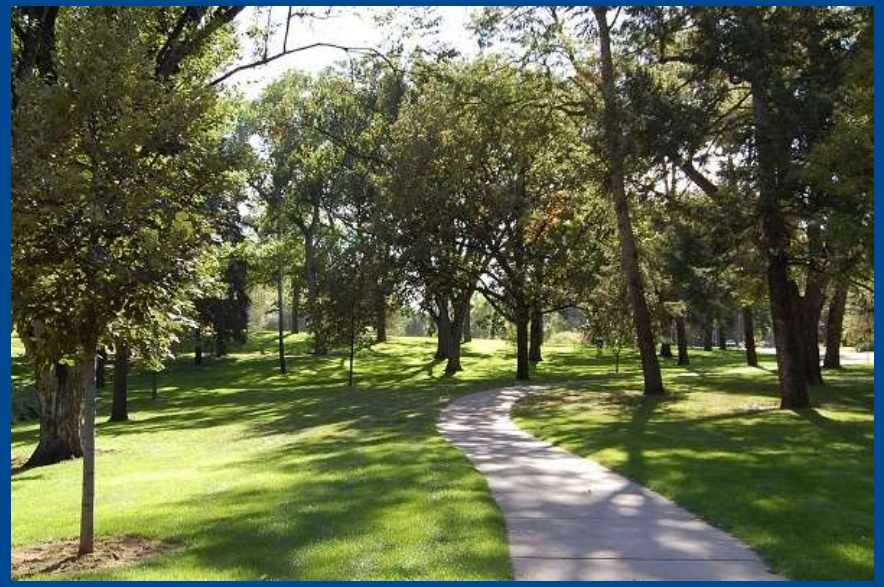
**CUMULATIVE PRECIPITATION TO DATE (INCHES)**

| | |
|---|---|
| **2012-2021** | **12.83** |
| **2022** | **9.58** |



# 2022 Weather

- Below average precipitation
- June – August: Northern Hemisphere's second-hottest meteorological summer
- Greeley precipitation is low, but the mountains are not currently in drought
- Ski resorts opening and making snow on schedule
- Snowpack on track for average SWE that we hope to see



City of Greeley Colorado

# Current Drought Conditions

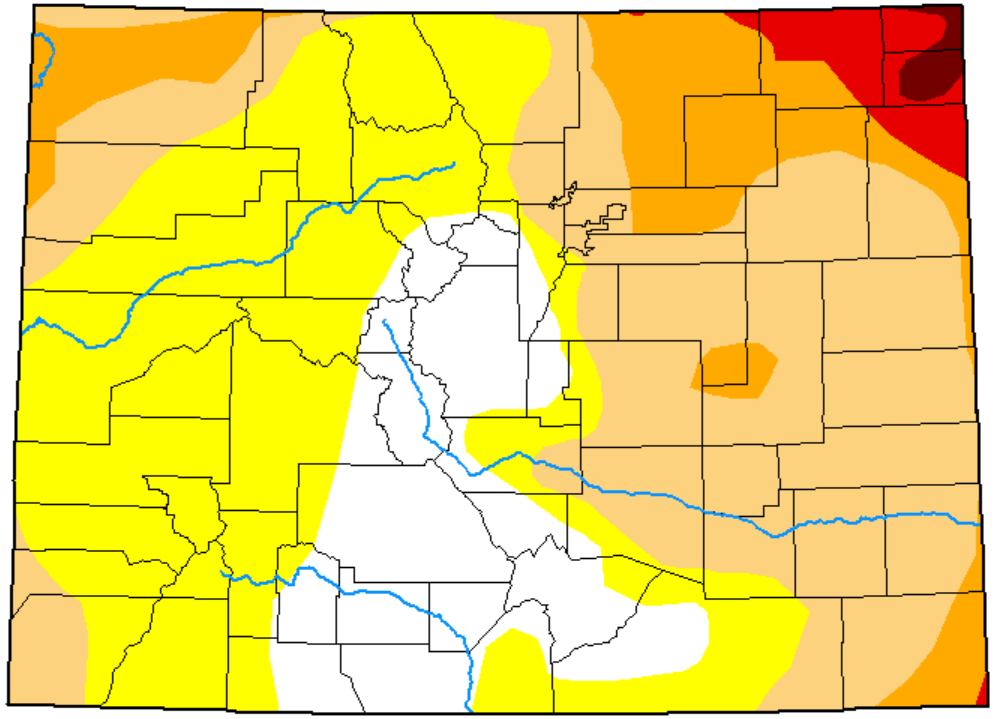
***U.S. Drought Monitor***

**Colorado**

**November 1, 2022**

***(Released Thursday, Nov. 3, 2022)***

**Valid 8 a.m. EDT**



*Intensity:*

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx*

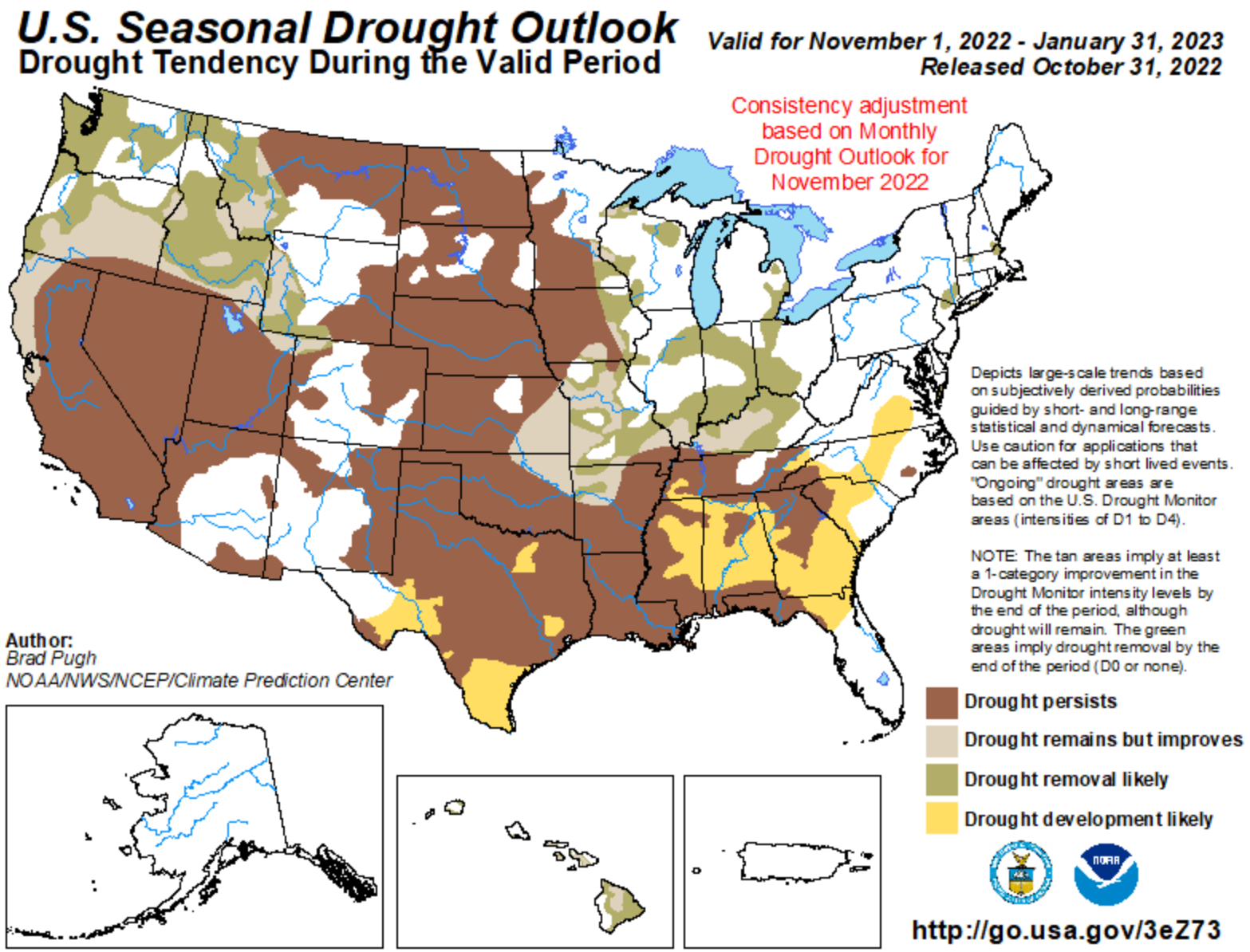
*Author:*

Brian Fuchs
National Drought Mitigation Center

**droughtmonitor.unl.edu**

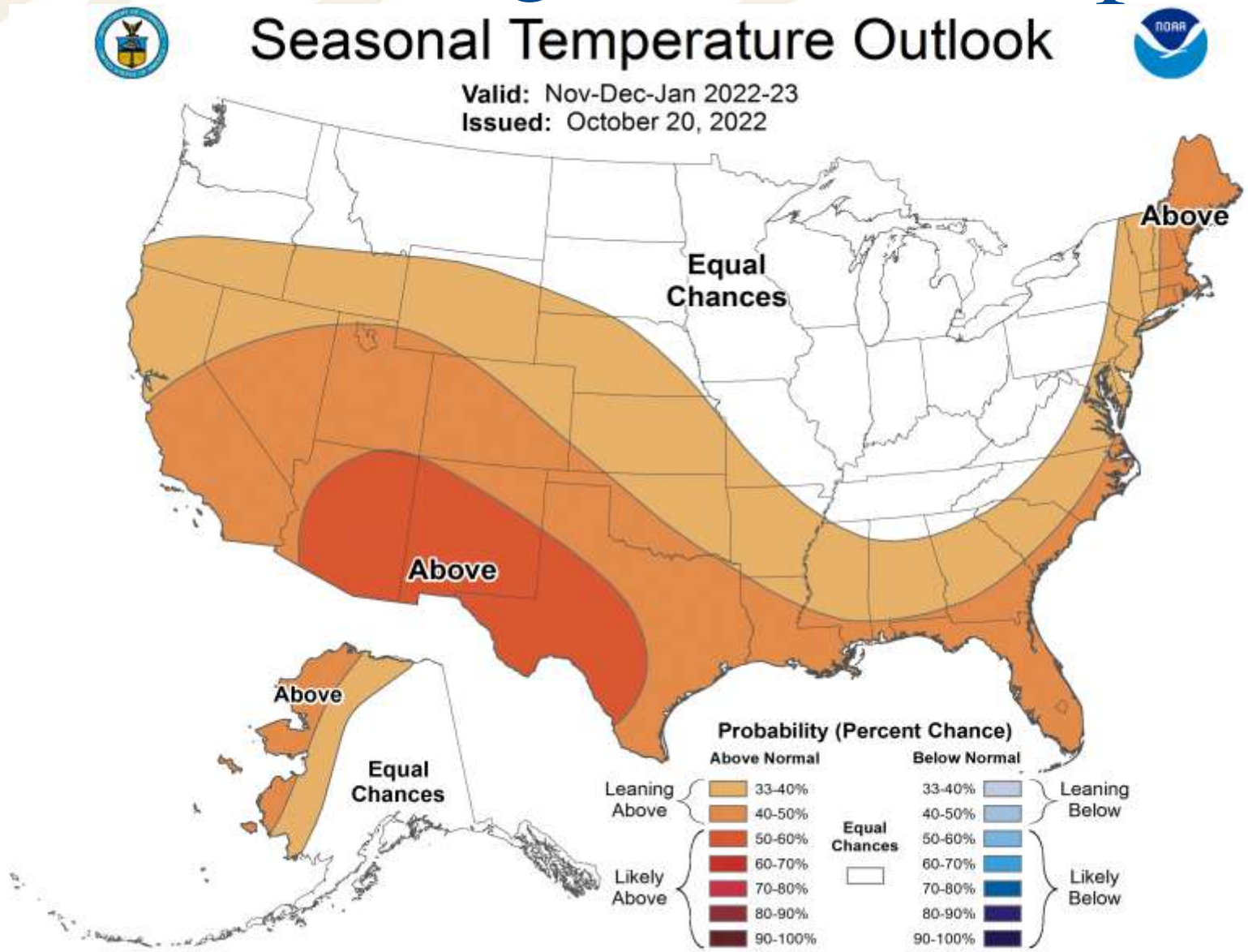
City of Greeley Colorado

# Drought Outlook



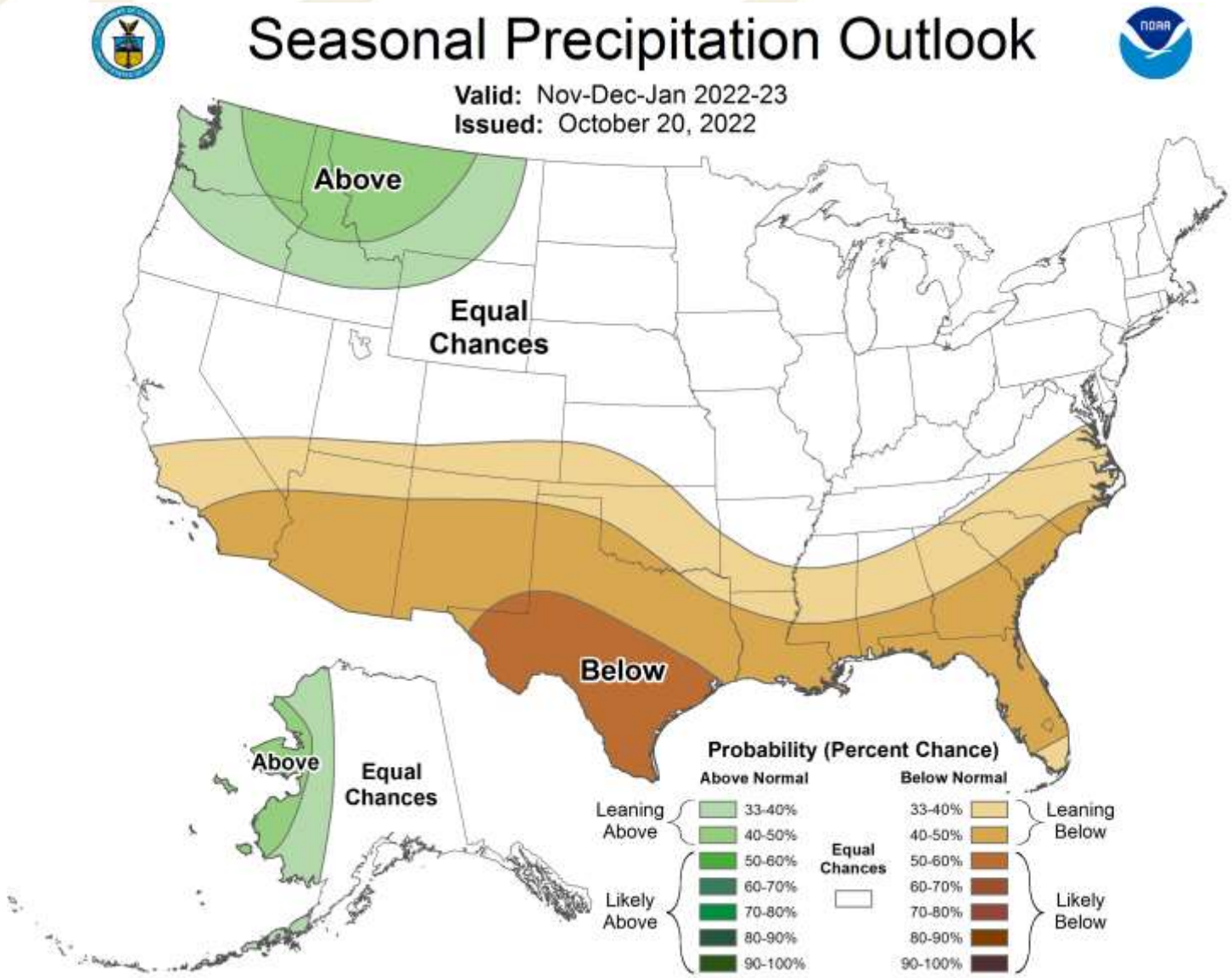

City of Greeley Colorado

# 3 month temperature outlook



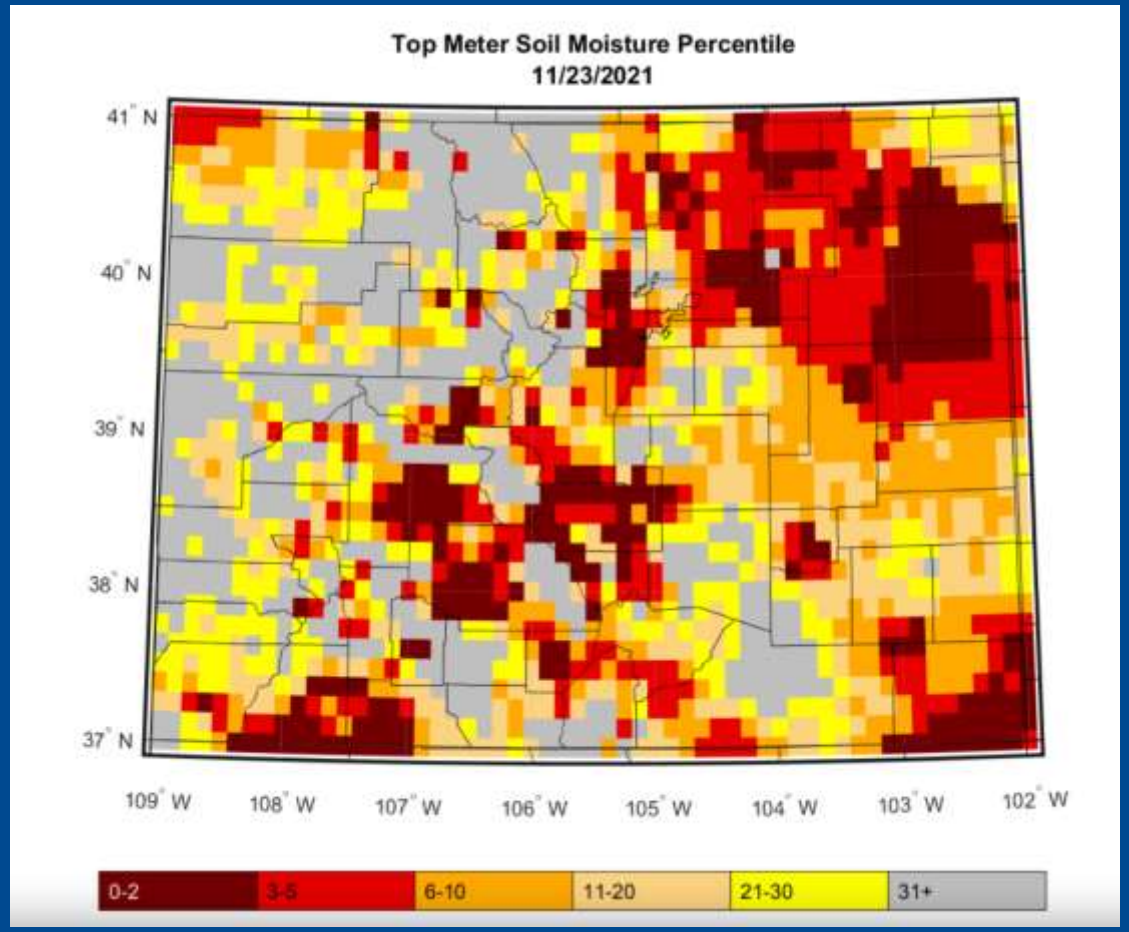

City of Greeley Colorado

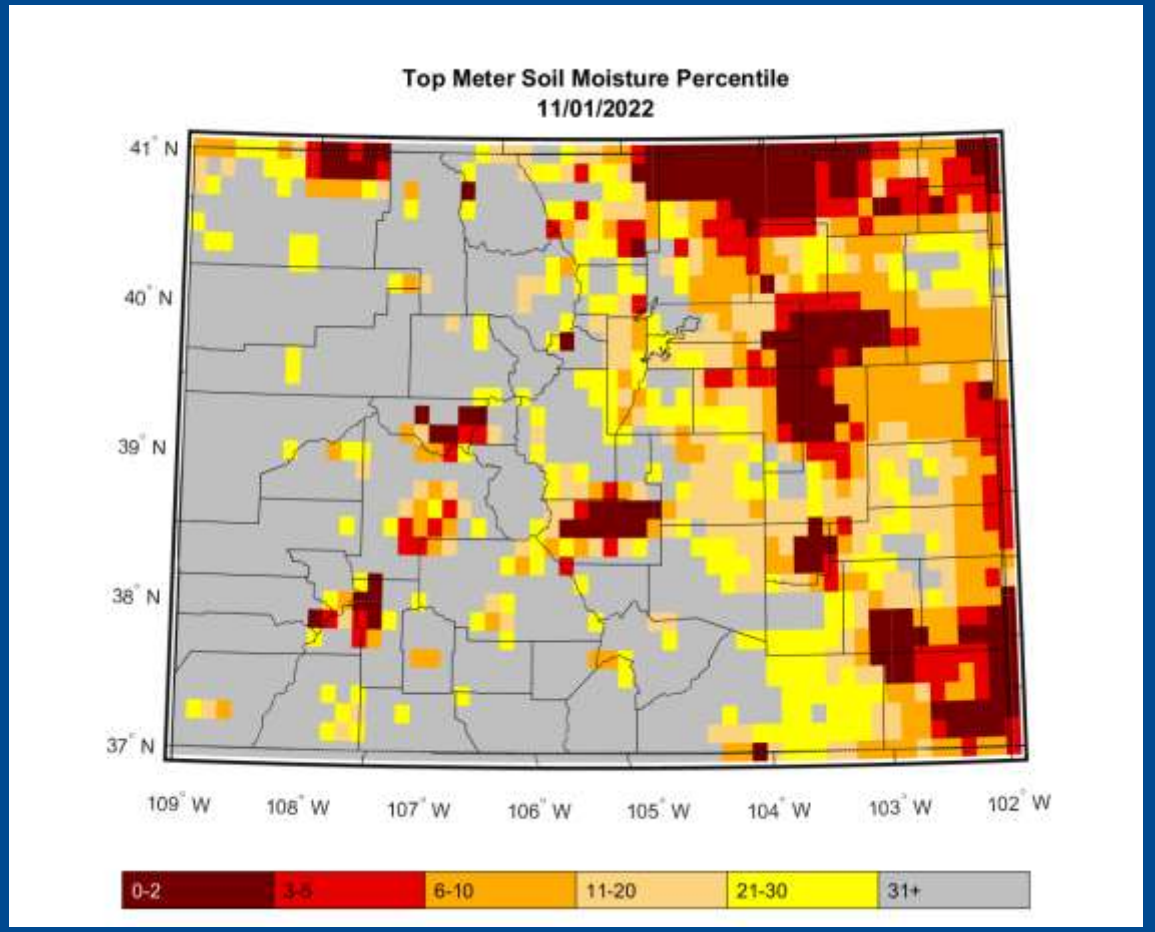
# 3 month precipitation outlook




City of Greeley Colorado

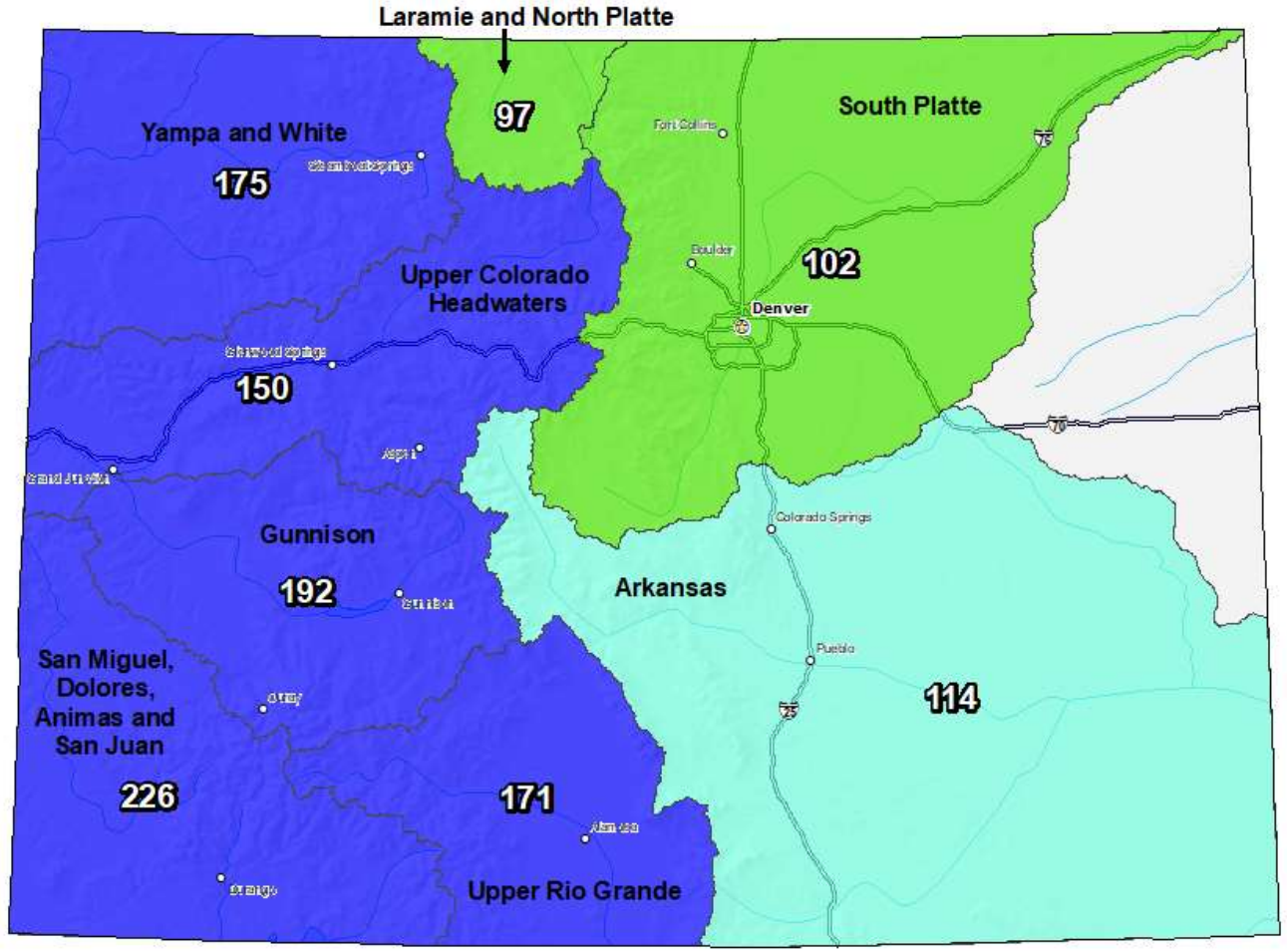
# Soil Moisture Comparison



# Colorado
## SNOTEL Current Snow Water Equivalent (SWE) % of Normal

**Nov 08, 2022**




**Current Snow Water Equivalent (SWE) Basin-wide Percent of 1991-2020 Median**

- unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

* *Data unavailable at time of posting or measurement is not representative at this time of year*

***Provisional Data Subject to Revision***

USDA NRCS

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
https://www.nrcs.usda.gov/wps/portal/wcc/home/

# Greeley System Storage

| April 1, 2023 Storage (acre-feet) | |
|---|---|
| CBT | 22,112 |
| Windy Gap | 1,000 |
| GLIC | 12,500 |
| Tunnel | 1,000 |
| ***Total*** | **36,612** |
| **Demands (April 1, 2023-March 31, 2024) (acre-feet)** | |
| CBT | 18,965 |
| Windy Gap | 4,450 |
| GLIC | 10,405 |
| Tunnel | 1,000 |
| ***Total*** | **34,820** |
| **Yields through April 2024 (acre-feet)** | |
| CBT (Nov. 2022-April 1, 2022) | 11,402 |
| Windy Gap | 4,366 |
| GLIC | 10,653 |
| Tunnel | 800 |
| ***Total*** | **27,221** |
| **April 2024 Storage by Source** | |
| CBT | 15,728 |
| Windy Gap | 0 |
| GLIC | 13,000 |
| Tunnel | 400 |
| **April 2023 Storage** | **29,128** |
| **April 2023 Storage-minus unusable GLIC** | **21,728** |
| **Target Storage Volume** | **21,300** |

# Summary

- **Drought conditions are present and likely to continue with improvement in the mountains**
- **Moving into our 3rd year of La Nina conditions**
  - **In Northern Colorado La Nina can equate to colder weather and above average precipitation but not always**
  - **Improved soil moisture will hopefully yield better runoff in Greeley's river basins**

# Moving into winter

- **Continue to maintain adequate target storage volume**
- **Monitor drought and water supply closely**

City of Greeley Colorado

# Questions?

# MEMORANDUM

TO: Sean Chambers, Water and Sewer Director

FROM: Alex Tennant, Water Resources Administrator II

DATE: November 9, 2022

RE: 2022 November Water Supply Update

**ISSUE**

In accordance with the Drought Emergency Plan, staff will report the water supply status to the Greeley Water and Sewer Board ("Board") in April, July and November of each year. This report is on the final numbers from water year 2022 and the forecast for water year 2023.

The Water Resources Division's goal is maximize rentals, maximize storage and minimize spill by closely monitoring drought conditions, associated hydrologic conditions, and storage levels. Previous modeling analysis has shown that the target storage level needed to provide adequate drought protection for the citizens of Greeley is approximately 21,300 acre-feet. When the target storage level is met, Board can declare an "adequate water year" with normal watering restrictions. As base use demands increase in the future, periodic reevaluation of the target storage level will be required to ensure it is adequate to supply the citizens of Greeley.

The Greeley System Storage Analysis MS excel application is used for projecting the target storage level over a 12-month period. The model performs an annual water balance to arrive at a forecasted April 1st carryover storage based on existing supplies and demands for the current year. The storage analysis model only includes standard operational practices and does not take into account other plans (additional drought restrictions, etc.) that may be available to Greeley.

**BACKGROUND**

In 2022, monthly temperatures were below average January through March. Beginning in April, temperatures were near average or slightly above average through November. This year's cumulative precipitation to date 9.58 inches which is 75% of the 10-year average of 12.8 inches. Monthly precipitation totals from January through July varied between above and below average and precipitation from August through November has been below average. Currently, the South Platte Basin storage is at 108% of average and the state as a whole is at 89% of average. Production through October totaled 24,817 acre-feet, which 5% higher than the 5-year average likely due to the hot, dry late summer conditions.

The Colorado drought monitor shows the majority of Colorado is abnormally dry to a moderate drought with a few areas of severe and extreme drought in the northwest and northeast. The NOAA 3-month temperature projections indicate above average temperatures throughout the state. The NOAA 3 month projection for precipitation indicates equal chance for an average precipitation year for the northernmost two thirds of the state with the southern portion being below average. Soil conditions are drier than normal for much of the state, particularly in the northeast. Snowpack levels are at 102% and 150%, for the South Platte and Colorado Basin, respectively. While storage levels are above average for the S. Platte, current conditions and projections indicate a Statewide drought that will likely persist throughout the next year with some relief in the mountains.

We are entering year three of La Nina which developed in September 2020 and La Nina is expected to be prevalent for this winter as well. For Colorado this means variable conditions across the State and from year to year, however, generally the southern portion of the state experiences warm and dry conditions and the northern part of the state sees colder temperatures, more snow and more wind.

For Water Year (WY) 2022, the High Mountain Reservoir (HMR) system yielded around 775 acre-feet of supply with the majority of that rented out to agriculture. This is significantly less than historical yield because we left Comanche and Hourglass reservoirs empty due to concerns of potential impacts from the surrounding Cameron Peak burn area. The Greeley Loveland System (GLIC) yielded 11,565 acre-feet, with 13,500 acre-feet carried over to WY 2023. Greeley rented out over 8,100 acre-feet of excess Colorado Big Thompson water (C-BT). In total, Greeley leased approximately 20,321 acre-feet in agricultural leases and high mountain reservoir water.

The Greeley System Storage Analysis table for Water Year 2023 shows the April 2024 storage level will be approximately 29,128 acre-feet. This conservatively assumes the following:

- High demands in Greeley
- No Windy Gap carryover
- No high mountain reservoir or native Seaman supplies
- 40% quota issued for the C-BT project
- Collateralizing 4,450 acre-feet of C-BT for Greeley's Windy Gap requirements
- No agricultural rentals
- Dry year yields for the GLIC system

Given GLIC cannot currently be treated and fully utilized year round, the estimated target storage volume minus the GLIC water that cannot feasibly be used is 21,728 acre-feet, which is still above Greeley's 21,300 acre-foot target.

| April 1, 2023 Storage (acre-feet) | |
|---|---|
| CBT | 22,112 |
| Windy Gap | 1,000 |
| GLIC | 12,500 |
| Tunnel | 1,000 |
| ***Total*** | **36,612** |
| **Demands (April 1, 2023-March 31, 2024) (acre-feet)** | |
| CBT | 18,965 |
| Windy Gap | 4,450 |
| GLIC | 10,405 |
| Tunnel | 1,000 |
| ***Total*** | **34,820** |
| **Yields through April 2024 (acre-feet)** | |
| CBT (Nov. 2022-April 1, 2022) | 11,402 |
| Windy Gap | 4,366 |
| GLIC | 10,653 |
| Tunnel | 800 |
| ***Total*** | **27,221** |
| **April 2024 Storage by Source** | |
| CBT | 15,728 |
| Windy Gap | 0 |
| GLIC | 13,000 |
| Tunnel | 400 |
| **April 2023 Storage** | **29,128** |
| **April 2023 Storage-minus unusable GLIC** | **21,728** |
| **Target Storage Volume** | **21,300** |

**SUMMARY**

Initial Projections show the target storage volume is greater than 21,300 acre-feet. Staff will revise the target storage volume in April after Northern declares the quota and the Board will make a determination of adequate water year at the April 2024 Board meeting.

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Dena Egenhoff

***Title:*** Update on Section 6 – Landscape and Irrigation Criteria

***Summary:*** The City of Greeley Water and Sewer Department is updating the current engineering design criteria from 2008 with new standards to accommodate new technologies, techniques, and materials. The City of Greeley is growing rapidly and updating the design standards will assist in development and ensure quality utility infrastructure into the future. This will encapsulate land use to embrace long-term water conservation. Sections 1-6 of the updated design criteria for the potable water distribution, sanitary sewer collection, non-potable irrigation system, and landscape & irrigation will guide developers and engineers in expanding and connecting to the City's utilities.

The Water and Sewer Department has worked diligently to coordinate with other internal departments including Planning and Zoning, Engineering Development Review, Culture, Parks, and Recreation, and Forestry for consistency within Section 6. Public outreach and engagement started with a presentation and discussion with the Builders, Realtors, & Developer group in July of 2021 and continued until November 2022. We have received comments and questions from engineers, developers, designers, and specific industry focused professionals such as landscape and irrigation specialists.

After review and input from the Planning Commission in March and November of 2022, and meetings with Planning and Zoning and Engineering Development Review, minor changes will be incorporated including:

- Soil amendments
- Mulch
- Removal of minor details from these criteria to checklists used during pre-planning sessions and engineering development reviews
- Adding specification on irrigation equipment
- Minor clarifications and reference materials updates.

***Attachments:*** None

# Update on Section 6 - Landscape and Irrigation Criteria

Dena Egenhoff
Water Conservation Manager

# Why a landscape and irrigation criteria?

**Colorado River water shortages highlight the urgency of reducing water waste**

**How low can the Colorado River go? Drought forces states to face tough choices about water**

Interior Secretary: Drought Demands Investment, Conservation

**Water conservation is a cornerstone of long-range supply planning.**

City of Greeley Colorado

# Why a landscape and irrigation criteria?

**Sec. 6 Design Criteria follows:**

- **CRS 1973 § 31- 23-207, revised 1977**
- **City Ordnance 40, 2015 - Landscape Policy Plan for Water Efficiency**
- **2015 Water Conservation Plan (and 2022 Draft Water Use Efficiency Plan)**
- **2018 Greeley Comprehensive Plan**
- **Supports current Greeley Municipal Code Chapter 8 - Landscape Standards**

City of Greeley Colorado

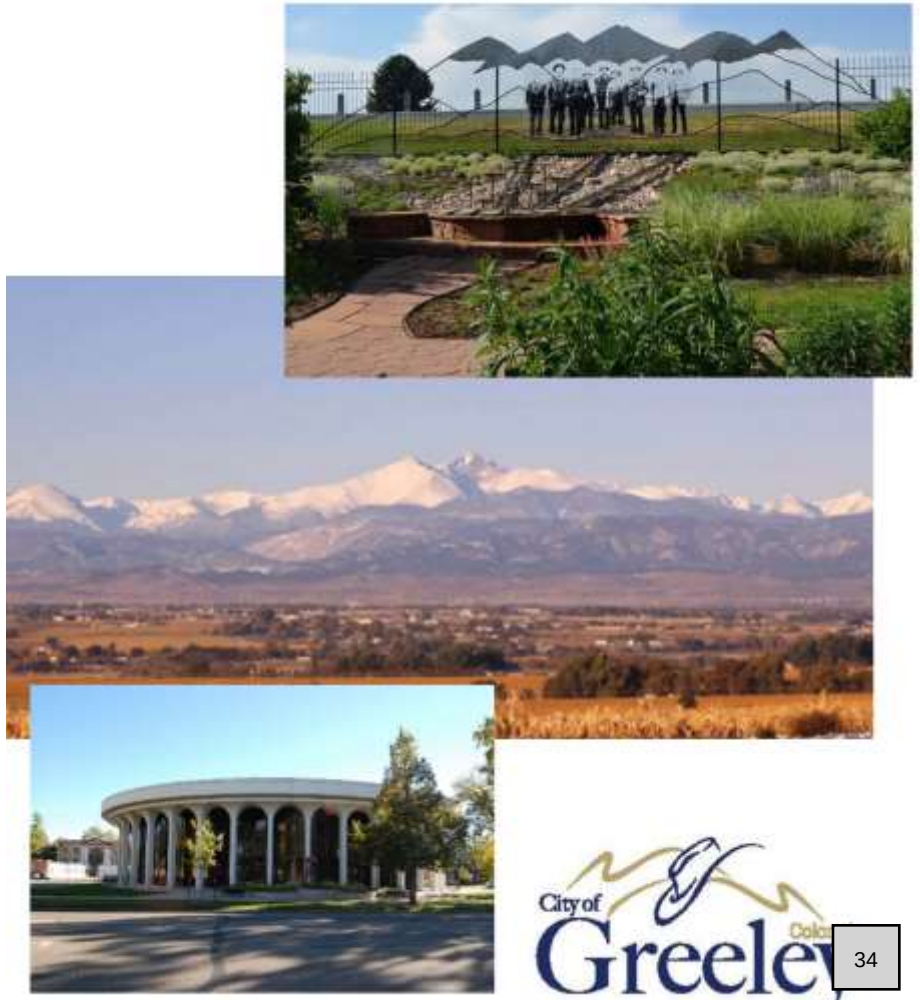
# Section 6
# Landscape and Irrigation

**New Criteria:**

- **Supports existing City Plans**
- **Promotes water conservation**
- **Guides non-residential landscape design**
- **Supports attractive and sustainable landscapes**

**Applicable to:**

- **Common areas**
- **Right-of-ways**
- **Municipal buildings**
- **Non-residential (commercial/industrial)**
- **Multi-family residential**



# Section 6-Landscape and Irrigation

## Hydrozones

- **An area within a landscape where the plant materials require a similar amount of water.**
- **Four different hydrozones:**
  - **Very Low, Low, Moderate and High**
- **Hydrozone breakdowns are the same as the irrigation water dedication requirements outlined in code**
- **Grouping plantings by hydrozone reduces overwatering**




# Section 6-Landscape and Irrigation

## Water Budget Chart

- **Upfront knowledge of average water demand for landscape.**
- **Equal the water dedication required for irrigation taps.**
- **Limits average irrigation to 15 gallons per square foot per year.**

City of Greeley

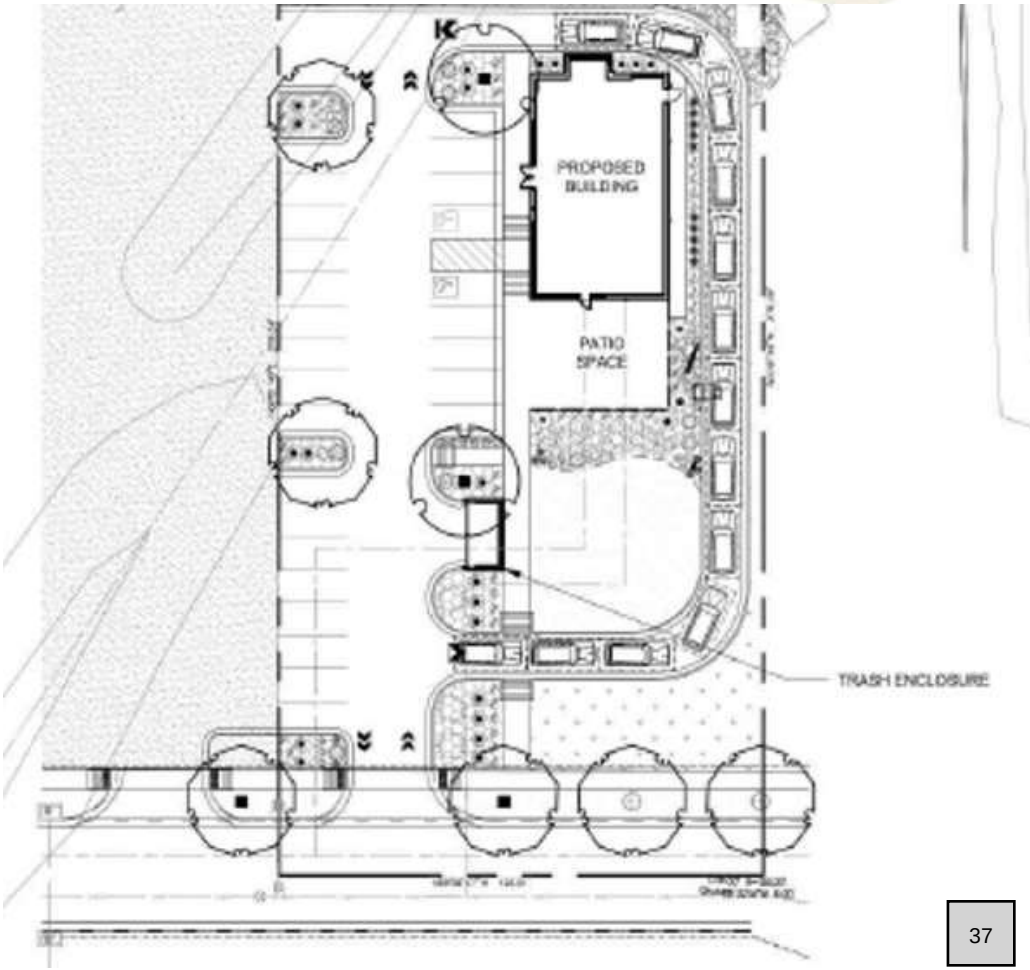
Water Budget Chart

| ZONE ID for Tap | Irrigated Area Calculated (SF) | Percentage of each zone | Hydrozone (select one) | Water Need (gallons/SF) | Annual Water Use (gallons) |
|---|---|---|---|---|---|
| | 10,000 | 25% | High | 18 | 180,000 |
| | 10,000 | 25% | Moderate | 14 | 140,000 |
| | 10,000 | 25% | Low | 7 | 70,000 |
| | 10,000 | 25% | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| | | | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| | | | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| | | | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| | | | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| | | | Very Low | 0 | - |
| | | | High | 18 | - |
| | | | Moderate | 14 | - |
| | | | Low | 7 | - |
| Subtotal | 40,000 | | | | 36 000 |
| Average (Gallons/SqFt) | | 9.8 | | | |

# Section 6-Landscape and Irrigation

## Landscape & Irrigation Design and Plans

- **Site Plan – General Landscape Plan**
- **Construction Drawings – Detailed Landscape Plan**
- **Must be stamped by Colorado registered landscape architect**
- **Methods and configurations are guided by landscape plan's hydrozones**
- **Heads and nozzles in a single zone must have matched precipitation rates**



# Section 6-Landscape and Irrigation

## Irrigation System Installation and Performance Audit

- **Required prior to final approvals and release of landscaping bonding or surety where applicable**

- **Can be performed by Water & Sewer Conservation staff or private auditor**
  - **Certified Landscape Irrigation Auditor (CLIA)**
  - **Qualified Water Efficient Landscaper (QWEL)**
  - **City staff cheaper but limited availability**

# Section 6-Landscape and Irrigation

## Maintenance

- **Landscape maintenance following:**
  - **Chapter 8- Landscape Requirements**
  - **Mow policy from Natural Areas and Trails**

- **Irrigation Maintenance**
  - **Leak repair**
  - **Replacement of damage systems**
  - **Head adjustments**
  - **Seasonal adjustments to irrigation controllers**

# Engagement & Review

- **Introduced to Builders, Realtors, Developers - July 19, 2021**
- **Reviewed and Coordinated with other City Departments throughout process**
- **Reviewed by Engineering Development Review & Civil Inspections Staff**
- **Presented to Planning Commission to get Input and Feedback - March 8, 2022 and November 8, 2022**
- **Meetings & Review Comments from Engineers, Developers, Landscape designers, & Community members - March to June, 2022**
  - **155 comments and questions tracked and addressed**

City of Greeley Colorado

# Section 6:Landscape and Irrigation

**Highlighted Changes:**

- **Soil amendments**
- **Mulch**
- **Removed minor details from these criteria to checklists used during pre-planning sessions and engineering development reviews**
  - **Plan scale, PDF requirements, etc.**
- **Added specification on irrigation equipment**
  - **Valve box branding, isolation or ball values, equipment for >1" taps, irrigation specific for non-potable versus potable systems, etc.**
- **Minor clarifications and reference materials updated**
  - **Definition of a smart controller, 2-wire versus multi wire systems removed typos, formatting changed etc.**

City of Greeley Colorado

# Design Criteria: Sections 1- 6

**Next steps:**

- **Co-creation of standard operating procedures with Planning and Zoning and Engineering Development Review**
- **December 13, 2022- City Council work session**
- **January 3, 2023- First reading with City Council**
- **January 17, 2023- Second reading with City Council**

# Questions?

City of Greeley Colorado

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Kelen Dowdy, Water Resources Planning Manager

***Title:*** Integrated Water Resources Plan update: Terry Ranch Integration

***Summary:*** The IWRP process will evaluate Greeley's long-term water supply sustainability, develop a road map to buildout and identify near-term CIP components. As part of the process, the team identified three planning horizons to plan for: 1) a near-term planning horizon, 2) When is Terry Ranch Required, and 3) Terry Ranch fully integrated at buildout. This presentation will outline key components of the Terry Ranch integration process including a project overview and a definition of sustainable use. Next steps in the project will include an analysis to determine the sustainability of Terry Ranch within each planning scenario and what projects may support Greeley's system with Terry Ranch online.

***Recommended Action:*** Information only

***Attachments:*** None

# Integrated Water Resource Plan

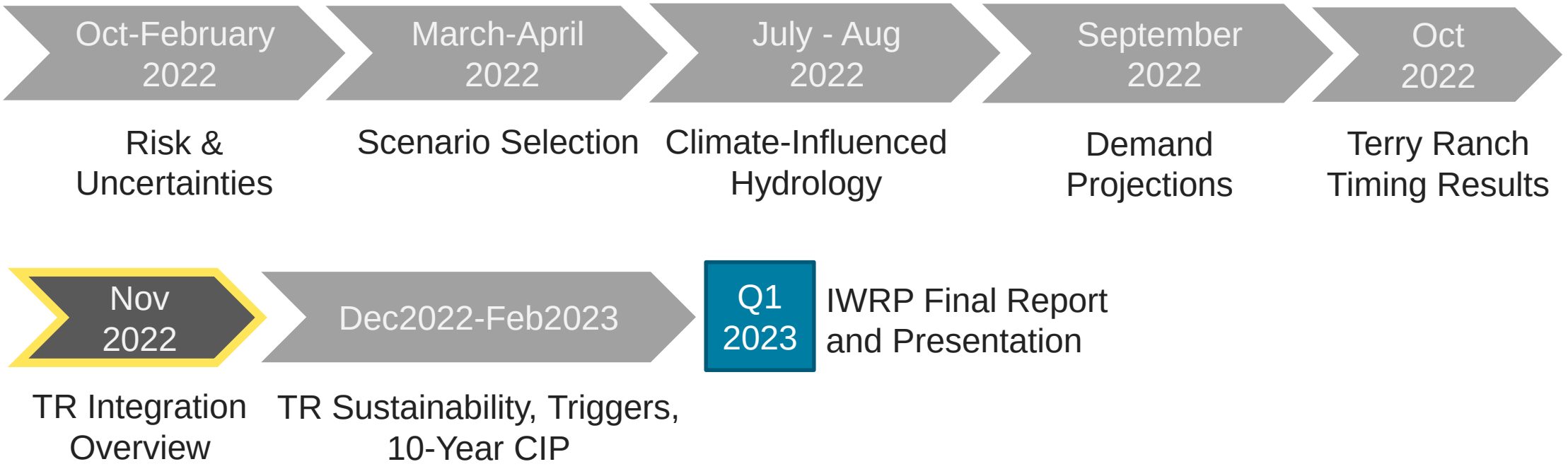
## Water and Sewer Board Update

*September 21, 2022*

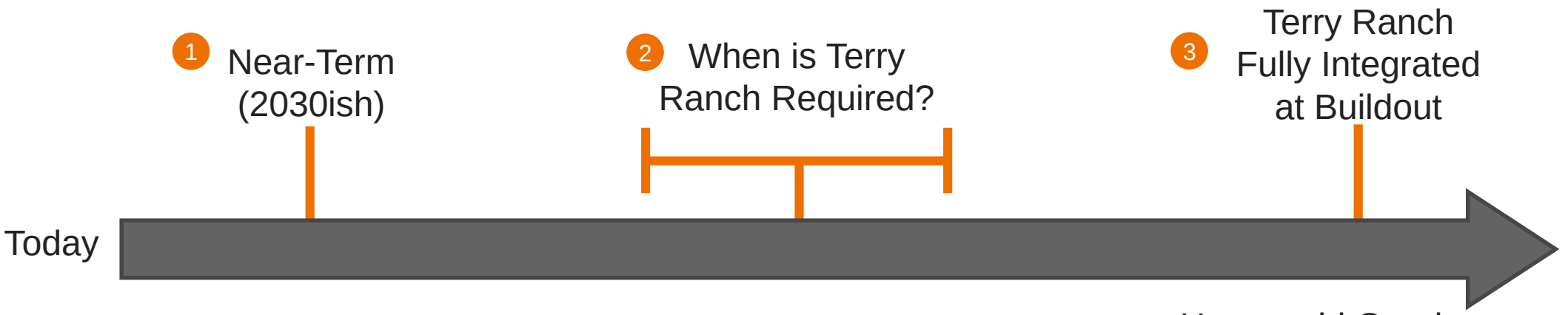
# IWRP Vision Statement

*"An actionable and adaptive master plan for Greeley's water resources that uses modern, defensible methods to develop a roadmap ensuring a reliable water supply for our community through an uncertain future."*

# IWRP Timeline



# Planning Horizons



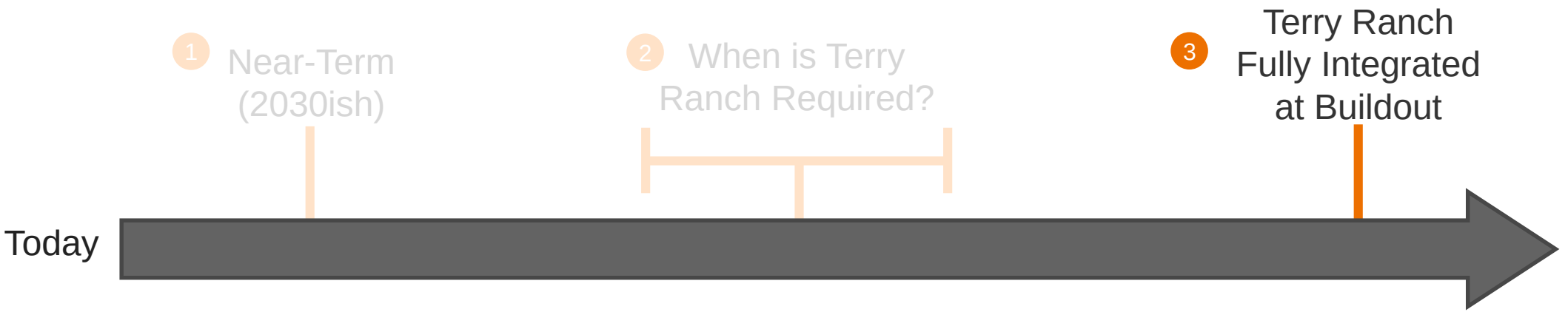

- Water resources projects for the next 10-20 years

How is the timing of Terry Ranch affected by:

- Demand growth
- Climate change
- Water rights portfolio
- Other Risks

- How could Greeley use Terry Ranch?
- What is a sustainable use of Terry Ranch?

# Planning Horizons



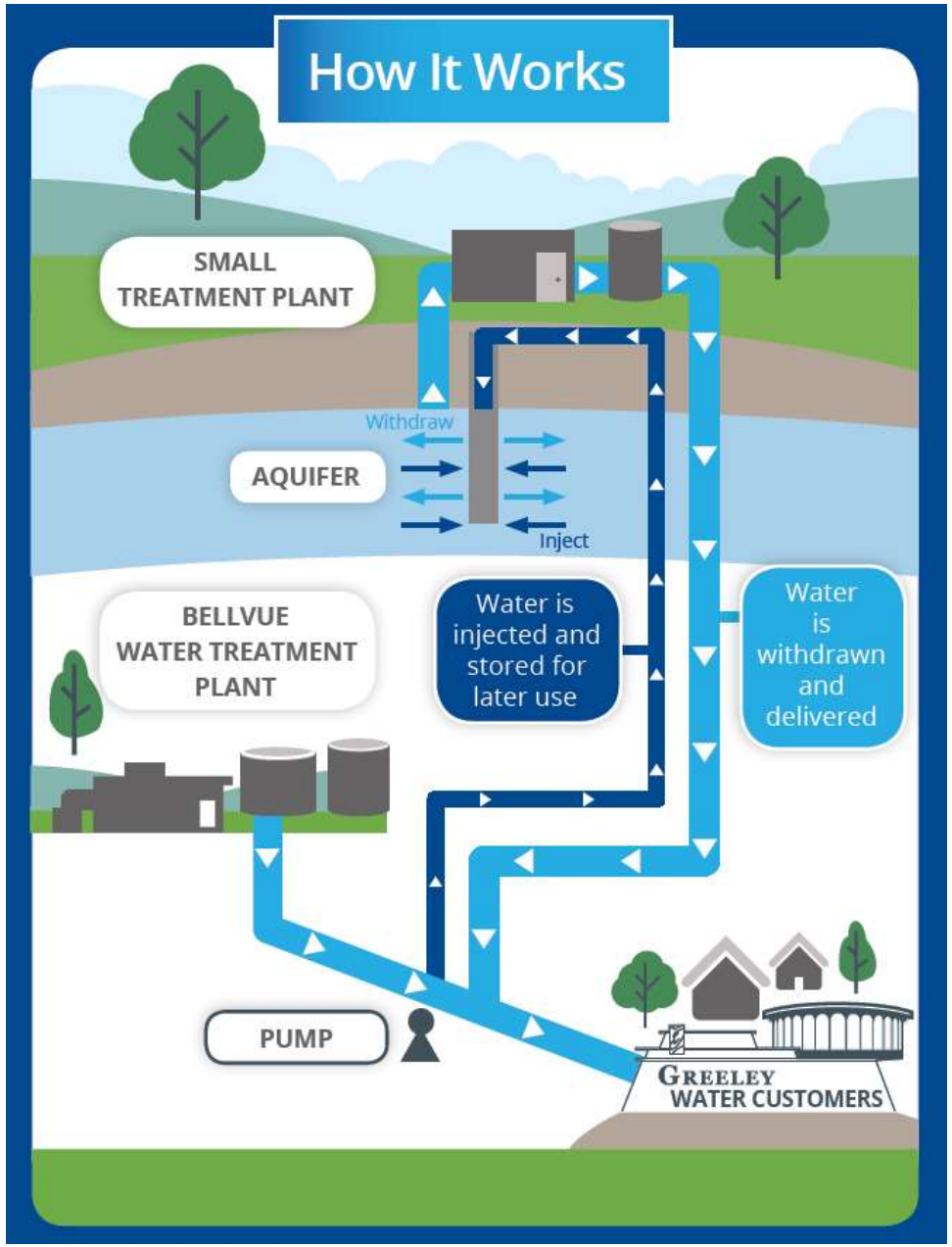

- Water resources projects for the next 10-20 years

How is the timing of Terry Ranch affected by:

- Demand growth
- Climate change
- Water rights portfolio
- Other Risks

- How could Greeley use Terry Ranch?
- What is a sustainable use of Terry Ranch?

# Terry Ranch Integration

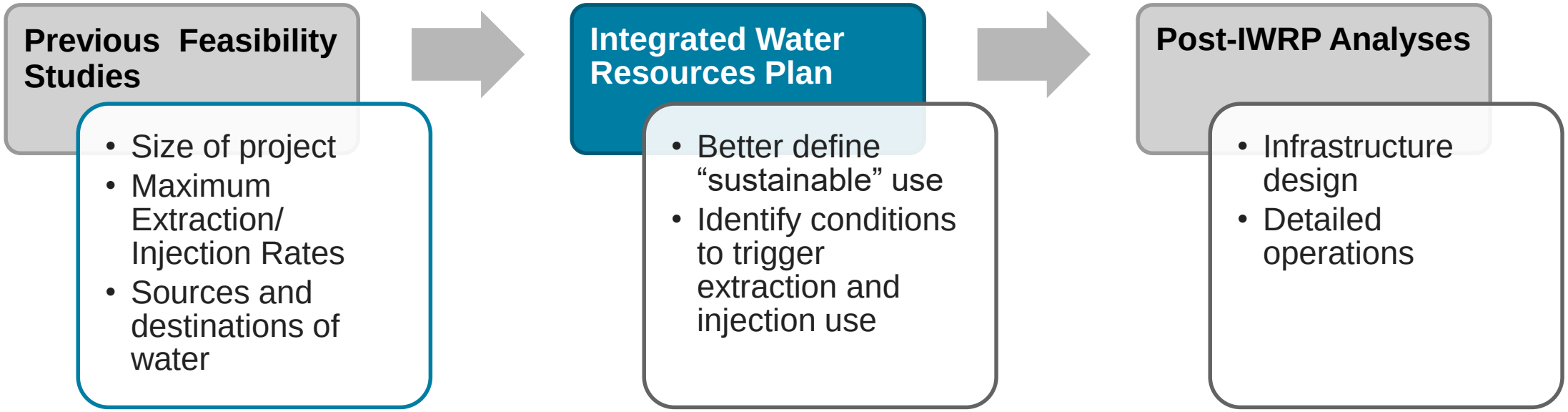



# Terry Ranch

## Key components:

- Aquifer storage and recovery project
- 1,200,000 AF decreed volume; 12,100 AF/yr decreed withdrawal
- Aquifer storage of wholly consumptive supplies
- Closed system with no functional losses (Non-Tributary Decree 11CW275)

# Terry Ranch and the IWRP



# Terry Ranch Questions the IWRP will Address

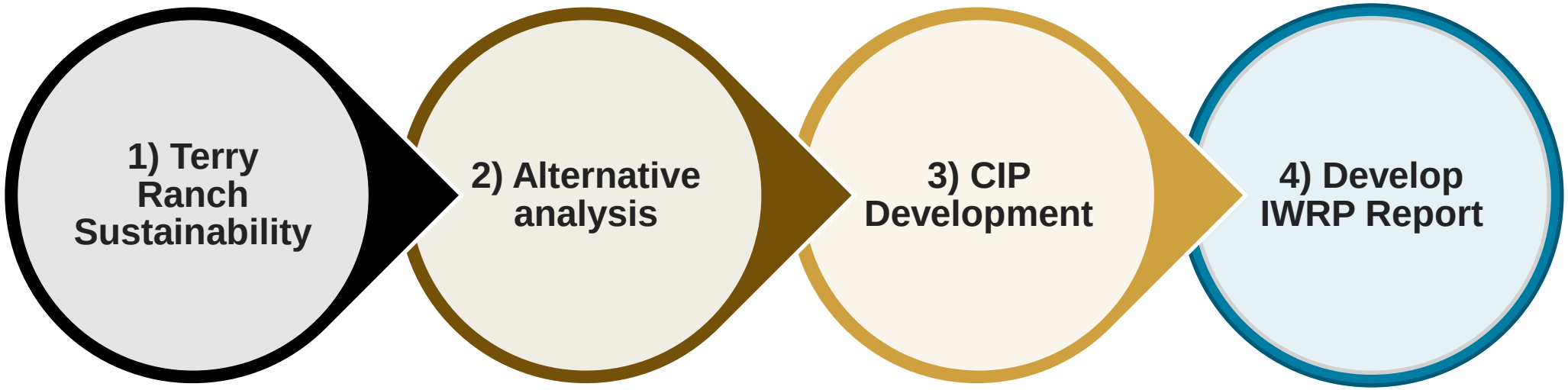
1. What is a sustainable use of Terry Ranch?
2. What does Greeley need to do to sustainably use Terry Ranch while meeting Level of Service?
   - If the “cost” is unacceptable, can redefine sustainable use

# Defining Sustainable Use

Potential Sustainability Criteria to be Evaluated in the IWRP:

- Maximum aquifer drawdown before injection infrastructure is needed
- Allowable difference (if any) between long-term extraction and long-term injection
- Balancing preserving surface storage with using Terry Ranch
- Balancing drought restrictions with using Terry Ranch
- Minimum operations – tied to operations and policy decisions
  - Number of wells
  - Well cycling

# Next Steps




- How sustainable is Terry Ranch's used in the Planning Scenarios?
- What projects support Greeley's current system and with TR online?
- What are the costs and timing for water resource projects for the next 5 years?

# Questions?

# Water & Sewer Agenda Summary

Date: November 14, 2022

Key Staff Contact: Sean Chambers, Director of Water and Sewer

***Title:***

Approve Third Amendment to Mining, Construction and Reclamation Project

***Summary:***

The City entered into an agreement with Hall-Irwin on May 10, 2011 to mine Pond B at Poudre Ponds. The term of the agreement is 15 years. The Water & Sewer Board previously approved the first amendment, on or about October 16, 2012, to acknowledge changes in project timing and work already performed, and the second amendment, on September 16, 2015, to amend the royalty provisions. The purpose of this 3rd amendment is to require mining of additional material based on a revised grading plan that will increase the storage volume and grading the pond walls to their final design slopes. Completing this work will allow the City to utilize Pond B for storage. This work will be completed at no cost to the City in exchange for Hall-Irwin not having to pay royalties to the City. The term of the amended contract is three years.

***Recommended Action:***

Approve Third Amendment to Mining, Construction, and Reclamation Project.

***Recommended Motion:***

"I move that the Board approve the Third Amendment to Mining, Construction and Reclamation Project."

***Attachments:***

Third Amendment to Mining, Construction and Reclamation Agreement By and Between the City of Greeley, Acting By and Through Its Water and Sewer Board, and Hall-Irwin Corporation.

City of Greeley Colorado
WATER & SEWER

# Third Amendment to Hall-Irwin Poudre Ponds Mining Agreement

November 14, 2022

# Hall-Irwin Mining Agreement Background

- **Original Agreement in 2011**
  - **Mine Pond B for raw water storage purposes.**
  - **Original agreement required City to pay mining costs for removal of clay and granular waste material that could not be sold.**
- **Amendment 1 on October 16, 2012**
  - **Amended several sections and start date.**
- **Amendment 2 on September 16, 2015**
  - **Amended annual adjustments to royalty rates based on Producer Price Index for the Construction Sand and Gravel Mining Industry rather than local sales from previous year.**

City of Greeley Colorado

# Hall-Irwin Mining Agreement Background

City of Greeley Colorado

# Proposed 3rd Amendment

- **3rd Amendment**
  - **Mine Pond B and complete final grading based on revised grading plan.**
  - **Anticipated Additional Capacity: 225 acre-feet**
  - **No cost to the City for mining in exchange for royalties.**

# Recommended Action

- **Water and Sewer Board approves and recommends to City Council the 3rd Amendment to the Mining, Construction and Reclamation Project Agreement with Hall-Irwin.**

# Questions?

# THIRD AMENDMENT TO MINING, CONSTRUCTION, AND RECLAMATION AGREEMENT BY AND BETWEEN THE CITY OF GREELEY, ACTING BY AND THROUGH ITS WATER AND SEWER BOARD, AND HALL- IRWIN CORPORATION

This Third Amendment to the Mining, Construction and Reclamation Agreement ("Third Amendment") is entered into this _____day of _____ , 2022, by and between the City of Greeley, a home rule municipal corporation, acting by and through its Water and Sewer Board ("Greeley"), and Hall-Irwin Corporation ("Hall-Irwin") (collectively, the "Parties").

WHEREAS, on May 10, 2011, Greeley and Hall-Irwin entered into a Mining, Construction and Reclamation Agreement ("Initial Mining Agreement") in which Greeley contracted with Hall-Irwin to perform mining, construction and reclamation work on property adjacent to the Poudre River in Section 36, Township 6 North, Range 66 West, 6'1' P.M., commonly known as Parcels B, C, E, F and the SE Remnant Parcel; and

WHEREAS, on October 16, 2012, the Parties entered into the First Amendment to Mining, Construction, and Reclamation Agreement in order to add Section 1.12, amend Sections 3.7, 4.2, 4.5, 5.5, 6.2, 6.3 and Exhibit G and delete Paragraph 5.6 to acknowledge changes in project timing and work already performed; and

WHEREAS, on September 16, 2015, the Parties entered into the Second Amendment to Mining, Construction, and Reclamation Agreement in order to amend and replace Section 9.1; and

WHEREAS, Greeley has revised the grading plan shown on Exhibit B of the Initial Mining Agreement and desires to amend and replace the same with Exhibit "B", attached hereto and incorporated herein. The revised grading plan will require Hall-Irwin to mine additional material from the existing slopes; and

WHEREAS, in lieu of paying for the additional mining associated with the revised grading plan, the Parties have also agreed that Hall-Irwin shall not pay any royalties to the City in accordance with Section 9 on the Mined Material; and

WHEREAS, the Parties desire to reduce their agreements to writing in this Third Amendment; and

WHEREAS, initially capitalized terms used herein and defined in the Initial Mining Contract shall have the meanings contained in the Initial Mining Contract unless otherwise modified or defined herein.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein and in the Mining, Construction and Reclamation Agreement, the Parties agree as follows:

**1. Exhibit B of the Initial Mining Agreement is amended and replaced with Exhibit B, attached hereto and incorporated herein**. All references to Exhibit B in the Initial Mining Agreement and subsequent amendments, including this Third Amendment (hereinafter

collectively referred to as "Mining Agreement") shall mean and refer to the Revised Grading Plan, attached hereto as Exhibit B.

**2. Section 3.8, RECLAMATION OBLIGATION, is amended and shall read in its entirety as follows:**

**3.8. RECLAMATION OBLIGATIONS:** The property shall be reclaimed in accordance with City of Greeley and Weld County requirements, as applicable, and in accordance with the DRMS permit. The DRMS Permit will be revised and amended to include the proposed grading and improvements shown on Exhibit B.

**3. Section 3.10, SURVEYING AND GEOTECHNICAL SERVICES, is amended and shall read in its entirety as follows:**

**3.10 SURVEYING AND GEOTECHNICAL SERVICES.** Within thirty days after completion of the grading in accordance with Exhibit B, Contractor shall complete a topographical survey of Parcel B and submit both survey files and a Stage Storage Table to Greeley. Greeley shall perform all other necessary surveying and geotechnical services required for completion of PreMining, Pre-Construction, Construction or Reclamation activities.

**4. Section 5.3, MINING SLOPES, is amended and shall read in its entirety as follows:**

**5.3 MINING SLOPES.** Mining Slopes utilized during the Project shall be as depicted in Exhibit B.

**5. Section 7.2, GRADING AND FILL REQUIREMENTS FOR PARCEL B, is amended and shall read in its entirety as follows:**

**7.2 GRADING AND FILL REQUIREMENTS FOR PARCEL B.** Contractor shall grade and fill the side slopes of Parcel B in accordance with the final configuration of the slope as shown in Exhibit B. Exhibit I describes the Fill Specifications.

**6. Section 14.2, TERMINATION BY GREELEY, is amended and shall read in its entirety as follows:**

**14.2 TERMINATION BY GREELEY**. In addition to Greeley's right to terminate pursuant to Section 14.1, Greeley shall have the right to terminate this Agreement in any of the following circumstances: (a) if Contractor has not commenced Project activities within 90 days of receipt from Greeley of Notice to Proceed; (b) if the amount of Mining Materials removed as reported in Project Completion Reports is less than 20% of the quantity listed in Section 2.5.3, as amended

(which as of the date of execution of this Agreement equates to 20% of 1,182,827 cubic yards or 236,565 cubic yards of sand and gravel) within five years of receipt from Greeley of Notice to Proceed and Contractor fails to cure such default within 12 months of notice of default from Greeley specifying such failure; (c) if the amount of Mining Materials removed as reported in Project Completion Reports is less than 50% of the quantity listed in Section 2.5.3, as amended (which as of the date of execution of this Agreement equates to 50% of 1,182,827 cubic yards or 591,414 cubic yards of sand and gravel) within 10 years of receipt from Greeley of Notice to Proceed and Contractor fails to cure such default within 12 months of notice of default from Greeley specifying such failure; (d) if the Contractor fails to pay any royalty and such royalty remains unpaid for more than 30 days after notice by Greeley to Contractor specifying such failure; (e) if, after, Greeley receives notice of adjustments in Pricing Scenarios for fuel and labor and equipment pricing from Contractor pursuant to Section 8.1 hereof, Greeley believes such adjusted prices no longer make the Project economically viable for Greeley; (f) if Contractor, in Greeley's opinion, fails to prosecute the Activities listed in this Agreement with diligence to insure that the Project will be completed in a timely manner; and (g) if Contractor fails to complete the grading and fill requirements for Parcel B in accordance with the New Grading Plan, attached as Exhibit B, by December 31, 2025. Notice of termination shall be given to Contractor in writing 90 days prior to the termination date. The notice of termination will specify the extent to which performance of work under the Agreement is terminated and the date upon which such termination becomes effective. If the Agreement is terminated for any of the above listed reasons, Contractor shall be entitled to payment for any portions of the Project already performed before the termination date for which Greeley was responsible for payment. Contractor shall submit to Greeley an invoice for payment detailing the activities completed and costs incurred before the termination date and Contractor will be paid or reimbursed in accordance with the procedures outlined in Section 8.9. Greeley shall be entitled to payment of any Royalties due or accrued prior to the termination date.

7. **Section 14.4, REMEDIES, is amended to include the following section 14.4.1.2:**

**14.4.1.2. Greeley's Remedies for Contractor's Failure or Refusal to Complete Grading and Fill Requirements as Specified in Exhibit B**. If Greeley terminates the Agreement for the reasons listed in either Section 14.2 (f) or 14.2 (g), Greeley may seek liquidated damages. Liquidated damages shall be in the amount of $1,000 per day. Liquidated damages shall begin to accrue on the date notice of termination is received or January 1, 2026, whichever occurs last in time, regardless of the termination date, and continue to accrue until either Contractor, or the contractor hired as Contractor's replacement after the Agreement is terminated, completes the grading and fill requirements for Parcel B in accordance with Exhibit B.

**8. Suspended obligations, payments and royalties**. Beginning the effective date of this Third Amendment, Hall-Irwin is no longer obligated to pay royalties to the City in accordance with Section 9. Moreover, Hall-Irwin is not obligated to comply with any other provision under the Mining Contract that requires Hall-Irwin, as the Contractor, to weigh, calculate and record Mining Materials mind and sold if the purpose of such provision is to calculate, document, and make royalty payments to the City.

**9. Notice to Proceed.** Upon the effective date of this Third Amendment, Hall-Irwin is authorized to begin mining Pond B in accordance with the New Grading Plan attached hereto as Exhibit B.

**10. Remaining provisions in full force and effect**. Except as specifically modified herein, all of the terms of the Initial Mining Agreement, First Amendment, and Second Amendment between the Parties, remain in full force and effect.

IN WITNESS WHEREOF, the Parties have executed this Third Amendment to the Mining, Construction, and Reclamation Agreement on the day and year first written above.

[Signature Page Follows]

**HALL-IRWIN CORPORATION**

By: Ed Lafferty
Name: Ed Lafferty
Title: President

**CITY OF GREELEY, a Colorado home rule municipal corporation**

By:_____
Name: John Gates
Title: Mayor

By:_____
Name: Heidi Leatherwood
Title: City Clerk

By:_____
Name: Harold Evans
Title: Water and Sewer Board Chairman

APPROVED AS TO SUBSTANCE

By:_____
Name:_____
Title: City Manager [or designee]

APPROVED AS TO LEGAL FORM

By:_____
Name:_____
Title: City Attorney [or designee]

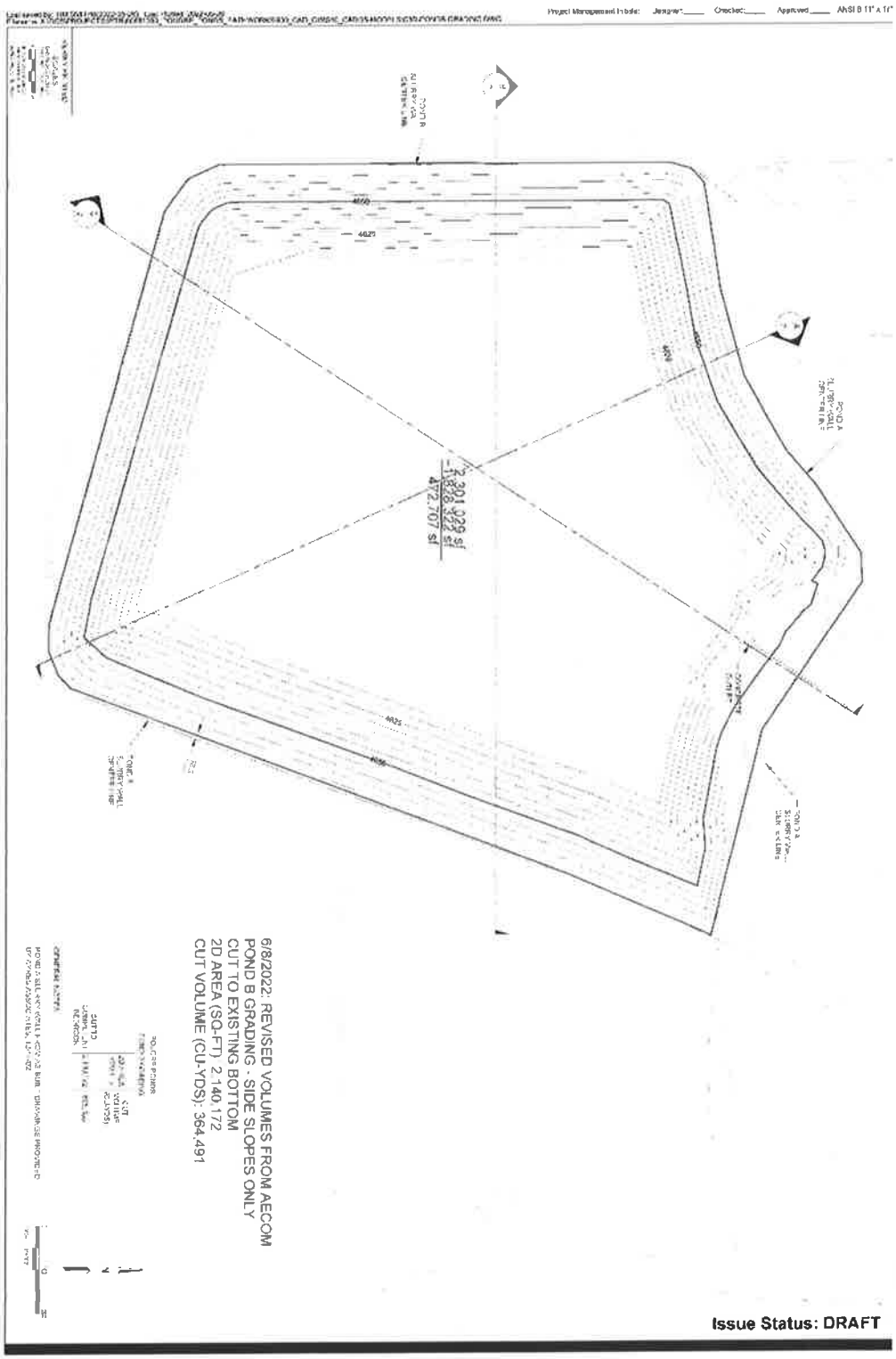
APPROVED AS TO FUNDS

By:_____
Name:_____
Title: Finance Director [or designee]

EXHIBIT "B"[1] TO THIRD AMENDMENT TO MINING, CONSTRUCTION, AND RECLAMATION
AGREEMENT BY AND BETWEEN THE CITY OF GREELEY, ACTING BY AND THROUGH ITS WATER AND SEWER BOARD, AND HALL- IRWIN CORPORATION

(See attached Revised Grading Plan)

[1] This Third Amendment does not contain an Exhibit "A". To avoid confusion, the Parties decided to use the same Exhibit "B" designation in this Third Amendment as in the Initial Mining Agreement.




**POUDRE PONDS**
**POND B GRADING**

**PLAN VIEW**

AECOM

Project No.: 60681060 Date: 5/26/2022

**Figure: 1**

Issue Status: DRAFT

POUDRE PONDS
POND B GRADING

SECTIONS

AECOM

Project No. 60681060 Date 5/26/2022

Figure 2

EXHIBIT B

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Cole Gustafson, Water Resources Asset Coordinator

***Title:*** Amendment to PRPA Purchase and Sale Agreement

***Summary:***

On August 17, 2022, the Water and Sewer Board authorized the Purchase and Sale Agreement—Water Rights, between Platte River Power Authority ("PRPA") and Greeley. The terms of the agreement are for Greeley to lease C-BT water to PRPA through 2030 in exchange for the conveyance of the Rawhide Pipeline Water Rights from PRPA to Greeley. The agreement also includes a short-term lease back of the Rawhide Pipeline Water Rights to PRPA.

During the course of Greeley's diligence review, staff determined that an additional water right, the Rawhide Reservoir Right, was integral to the historical use and operation of the Rawhide Pipeline Water Rights. Greeley desires to acquire the Rawhide Reservoir Water Right in addition to the Rawhide Pipeline Water Rights so that Greeley can maximize the yield of the water rights and is working with PRPA to amend the contract. Due to timing constraints, Staff is seeking the authority to amend the agreement in order to add the Rawhide Reservoir Water Right to the description of the defined term "Water Rights," so that it is conveyed to Greeley along with the Rawhide Pipeline Water Rights.

***Recommended Motion:***

"*I move that the Board delegate authority to the Director of Water and Sewer or his designee to (1) prepare and enter into an amendment to the Purchase and Sale Agreement between Greeley and Platte River Power Authority, that provides for a revised description of the water rights to include the Rawhide Reservoir, (2) to make other minor amendments to the agreement, including but not limited to, changes to contract deadlines and (3) to undertake all necessary and appropriate action to close on the purchase and sale of the water rights*."

***Attachments:***

*None*

# Amendment to Platte River Power Authority (PRPA) Purchase and Sale Agreement

City of Greeley Colorado

# Overview of Purchase and Sale Agreement

**Greeley:**

- Acquisition of Cache la Poudre River Water Resources
  - Rawhide Pipeline Water Right – 1977 priority
  - Rawhide Pipeline Enlargement Water Right – 1982 priority
  - Total ~ 16.8 c.f.s., Junior Directs w/ ~ 815 AF/yr. avg. use

**PRPA:**

- Secures multi-year C-BT lease needed to firm PRPA Windy Gap units between now and 2030.
  - 400 AF / yr. lease of Greeley C-BT units
  - Leaseback of Rawhide rights for next 8 years

City of Greeley Colorado

# Amendment to Purchase and Sale Agreement

- This is to include the Hamilton Reservoir Storage Right decreed in W-9322-78 and made absolute in 87CW78 in the PSA to convey to Greeley.
  - During inspection, the storage right was identified as a key component.
    - Water diverted pursuant to the Rawhide Pipeline rights is stored and consumed through reservoir evaporation. This will be relevant to future water court application to change the use of the water for Greeley's purposes.
  - The inclusion of the right in the PSA will not affect PRPA's ability to store water in Hamilton Reservoir. Greeley would not acquire the reservoir itself.

# Staff Recommendations

- **Staff recommends that the Water and Sewer Board approve the Director to negotiate and execute an amendment to the PSA to include the Hamilton Reservoir water right to be conveyed to Greeley.**

# QUESTIONS?

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Leah Hubbard, Water Resources Operations Manager

***Title:*** Outside Water Counsel Legal Report

***Summary:*** The Attached Report has been provided by Mr. James Noble, Esq. with Welborn Sullivan Meck & Tooley, P.C.

Based on our review of the September, 2022 Water Court Resume, staff and water counsel do not recommend that the Water and Sewer Board file statements of opposition to any water court applications that would be due at the end of November, 2022.

***Recommended Action:*** Informational Only

***Recommended Motion:*** Informational Only

***Attachments:***

1. Legal Report for November, 2022

# Water & Sewer Agenda Summary

Date: November 16, 2022

Key Staff Contact: Sean Chambers, Director

***Title:*** Director's Report

***Summary:*** The Director will provide a summary overview of several items of Board interest:

1. Follow up to NCWCD Fall Symposium – November 15th
2. NGWA Award for Terry Ranch diligence and engineering – December Awards
   a. The Water Report - Colorado Municipal Water Supply Evolution
3. Colorado River Water Users Association (CRWUA) annual meeting Dec. 14 – 16.
   a. CRWUA Annual Repot attached
   b. More info on CRWUA and Colorado River policy at: https://www.crwua.org/blog-2022.html

***Recommended Action:*** N/A

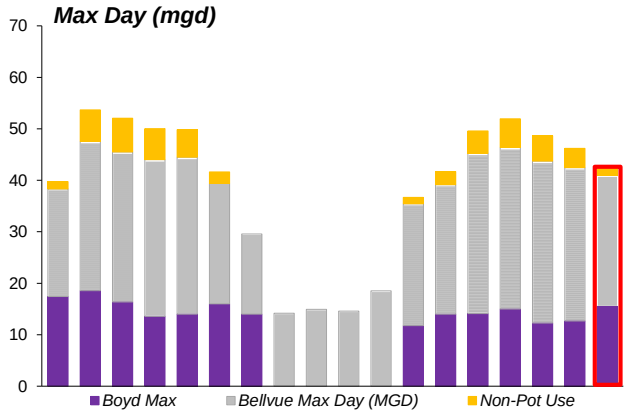
***Attachments:***
1. Monthly data charts for W&S Board
2. The Water Report – Terry Ranch Summary
3. CRWUA annual report – 2021

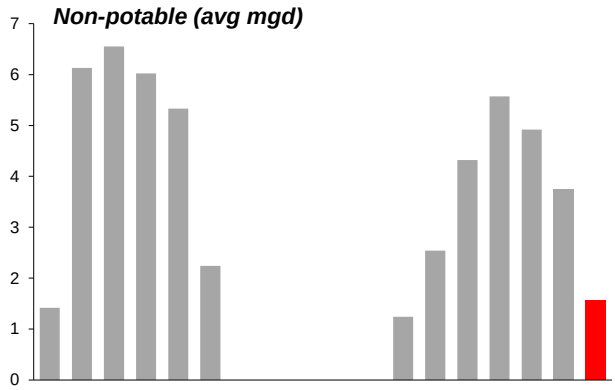
# Water Treatment

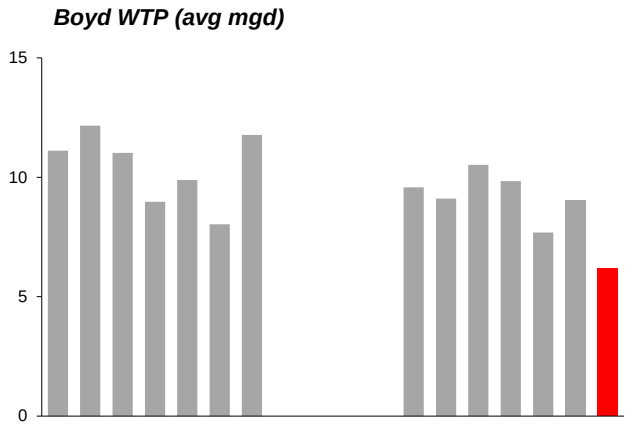
Bellvue Water Treatment Plant operates year-round with a transmission capacity of 29.1 million gallons per day (mgd) (plant capacity is 32 to 35 mgd). Water sources include Poudre River direct flows, Colorado-Big Thompson (C-BT), Windy Gap, High Mountain Reservoirs, Laramie-Poudre Tunnel, and Water Supply and Storage. Average volume is 19,000 acre-feet a year (2000-2011). The plant was built in 1907, with its last treatment upgrade in 2009. Solar panels were added in 2014.

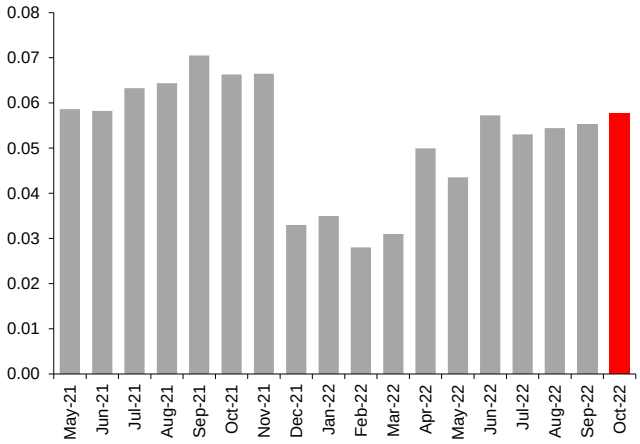
Boyd Water Treatment Plant operates normally from April to October with a plant capacity of 38 mgd (transmission capacity is 40 mgd). Water sources include Greeley-Loveland Irrigation Company, C-BT, and Windy Gap. Average Volume is 8,200 acre-feet (2000-2011). The current plant was built in 1974, with its last treatment upgrade in 1999. Solar panels were added at Boyd in 2014. In 2016, tube settlers and platte settlers were replaced in the sedimentation basins. In 2018, all old existing chemical lines were replaced with new lines and the piping was up-sized to carry more chemical. A PLC upgrade was done on the SCADA system. Sludge pumps were replaced and hooked into the Trac Vac system that pulls sludge out of the sedimentation basins.

Combined, Bellvue and Boyd can treat a maximum of 70-73 million gallons per day.



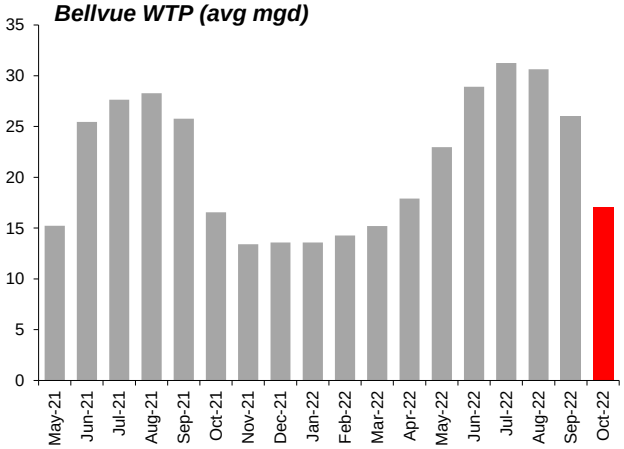




*Starting May 2016 Bellvue turbidity measurements will use a new method resulting in more accurate readings.*

**Turbidity limit: 95% of samples must be below 0.3 NTU.*

Turbidity is the measure of rel
ative clarity of a liquid. Clarity is important when producing drinking water for human consumption and in many manufacturing uses. Turbidity is measured in Nephelometric Turbidity Units (NTU).

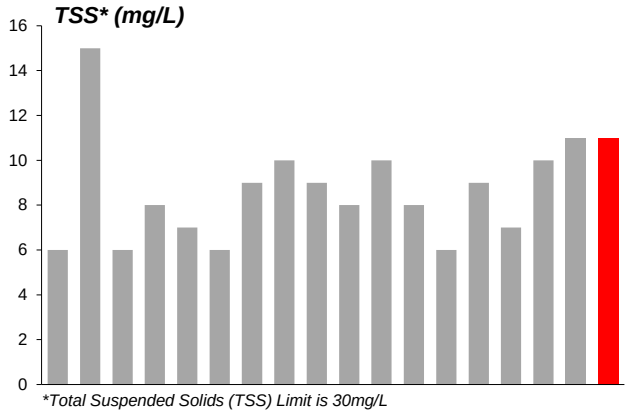


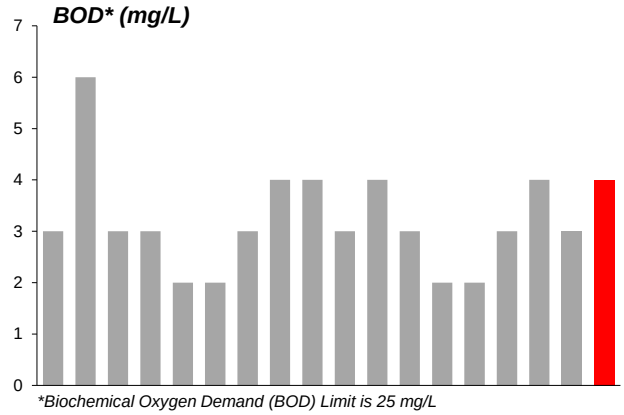
# Wastewater Treatment

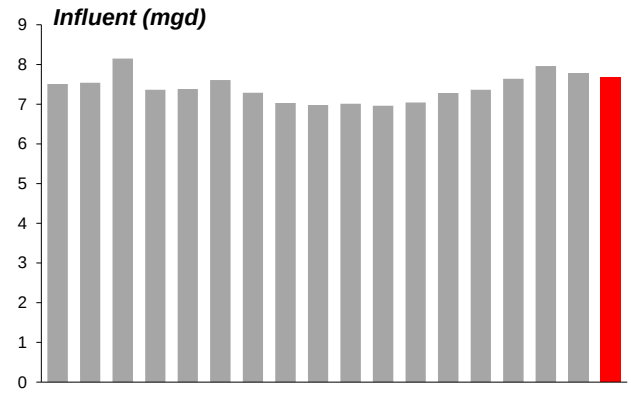
The Water Pollution Control Facility (WPCF) staff are dedicated environmental professionals who provide quality, safe and cost-effective wastewater treatment services for the citizens of Greeley. The WPCF treats wastewater to meet or exceed Environmental Protection Agency (EPA) and Colorado Department of Public Health & Environment requirements.

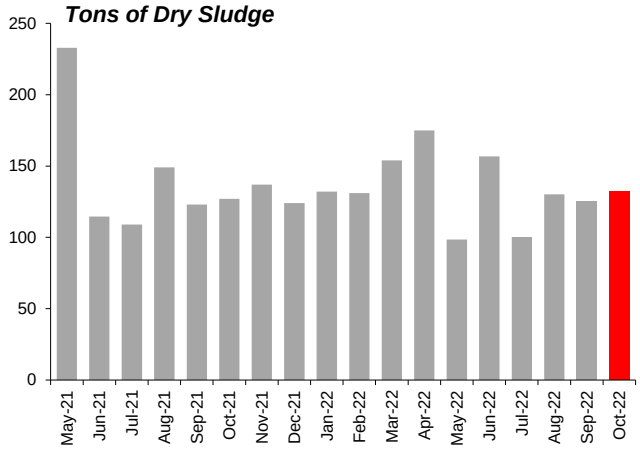
In 2011, the WPCF received an Xcel Energy Custom Efficiency Achievement Award for saving 2.78 million kWh and reducing CO2 emissions by 1,584 tons. In 2012, the WPCF received the Rocky Mountain Water Environment Association's (RMWEA) Sustainability Award for Colorado demonstrating excellence in programs that enhanced the principles of sustainability. A Certificate of Achievement from the Colorado Industrial Energy Challenge program managed through the Colorado Energy Office was received in the same year. In 2013, the plant received the City of Greeley's Environmental Stewardship Award for outstanding efforts to reduce energy (watts), conserve energy and water, reduce air and water pollution, and educate and encourage others to be environmental stewards. Also, in 2013, the plant was the recipient of a Bronze Award from the Colorado Environmental Leadership Program. In 2015, after having 5 years without a plant violation, the plant received the 2015 National Association of Clean Water Agencies (NACWA) Platinum Peak Performance award for the City of Greeley Water and Sewer Department.

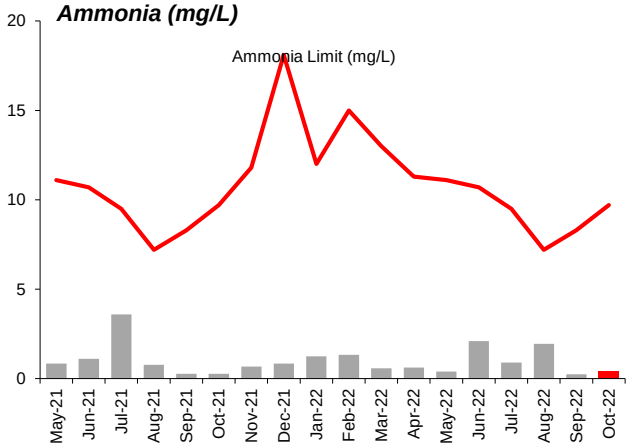
Note: the red column indicates the current month.



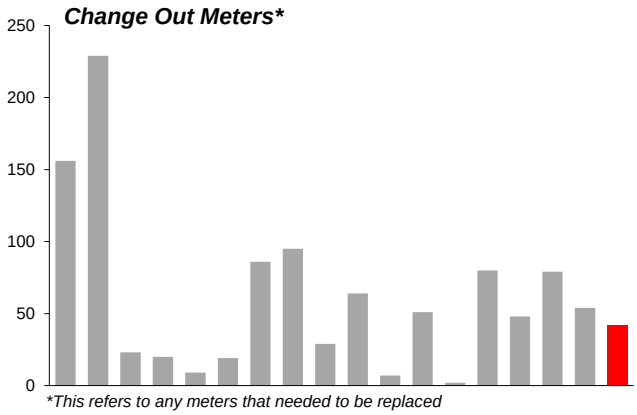
# Water Distribution

The Greeley water distribution system consists of various sizes of pipes that generally follow the streets within the City. T he distribution system serves residences and businesses in Greeley, Evans and Garden City, and the system is divided into four pressure zones.

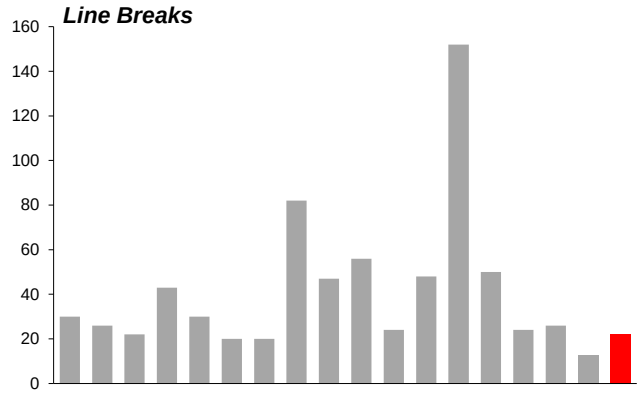
There are 69.75 million gallons of potable water storage in Greeley. The water is stored within three covered reservoirs and one elevated tank; 23rd Avenue - 37.5 million gallons, Mosier Hill - 15 million gallons, and Gold Hill - 15 million gallons. The system also has 476 miles of pipeline, 24,233 water meters and 3,378 fire hydrants.

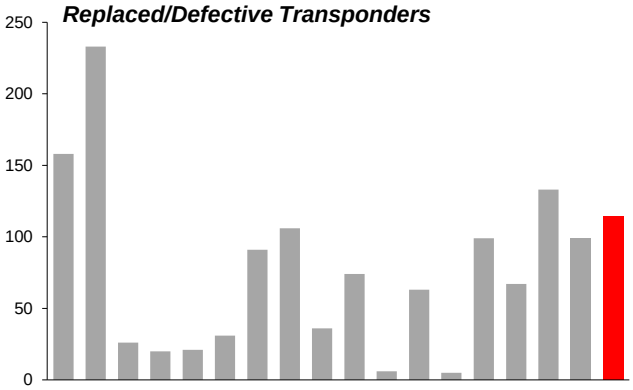
The water pipes in the distribution system vary in size from 4" to 36". Pipe material is steel, ductile iron, cast iron, or p olyvinyl chloride. The age of the pipes varies from the 1890's to new installations.

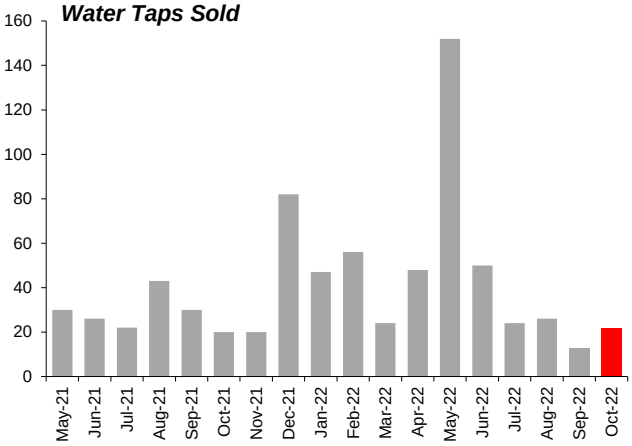
Note: the red column indicates the current month.

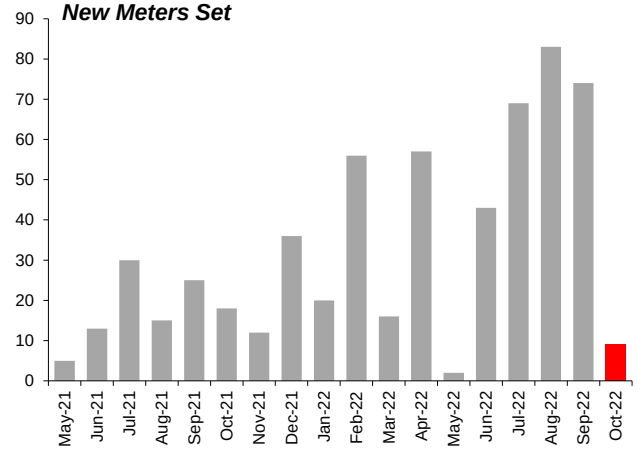



*This refers to any meters that needed to be replaced



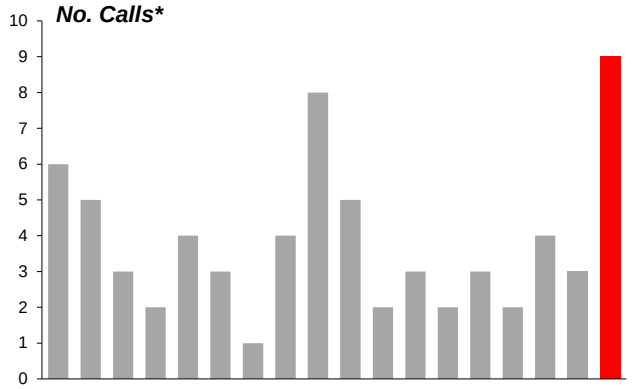
# Wastewater Collection

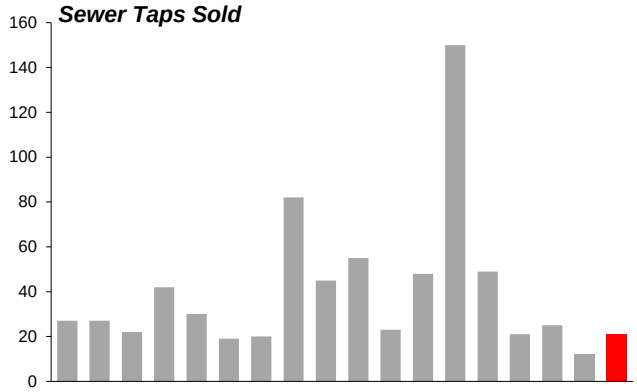
The mission of the Wastewater Collection Division of the Water and Sewer Department is to protect community health by transporting wastewater away from homes and businesses. This includes respecting property values and public safety by reducing the frequency of blockages in the sanitary sewer lines.

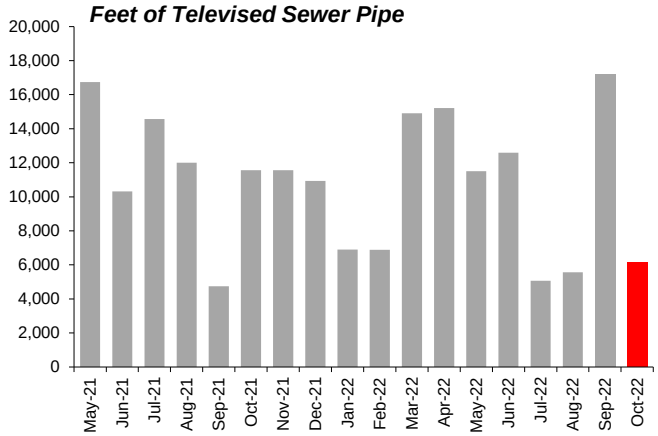
A wide variety of work is performed including routine cleaning of sewer lines, inspection of sewer lines, maintenance of the sewage pumping stations, rehabilitation of the system and responding to emergencies.

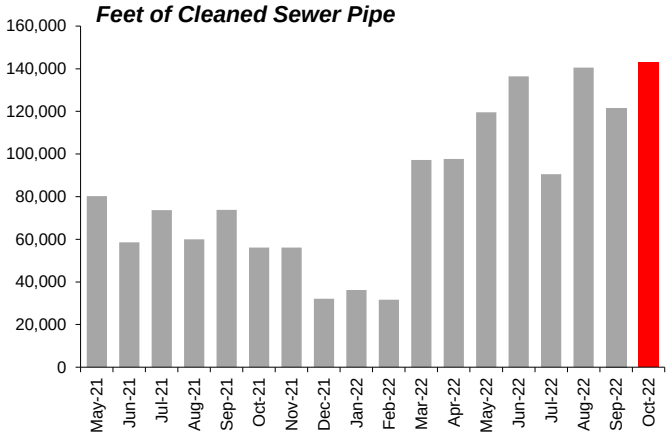
The wastewater collection system dates back to 1889. At the end of 2017, the system had a total of 364.8 miles of line and 10 sewage pumping stations. The sewer service area is approximately 51 square miles. Over the last 10 years, the system has grown by 17 miles.

Note: the red column indicates the current month.



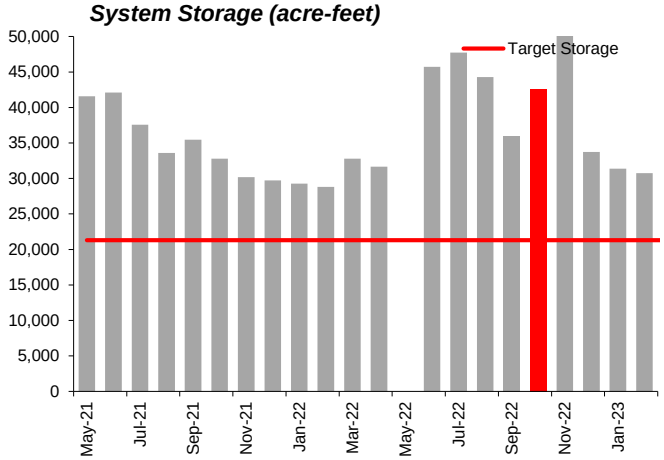
# Water Resources

Greeley has numerous water rights in four river basins; the Upper Colorado River, Cache La Poudre, Big Thompson and Laramie River. The Water Resource staff must account for all of this water and comply with the rules of the Colorado Water Court and the State Engineer's Office which is in charge of allocating all of Colorado's water resources. Approximately one-third of the City's water supply comes from agricultural water rights. These water rights must be formally changed to municipal use by a special legal process through the Water Court. In this court, Water Resource staff and attorneys also defend the City's water rights against adverse claims from other parties.

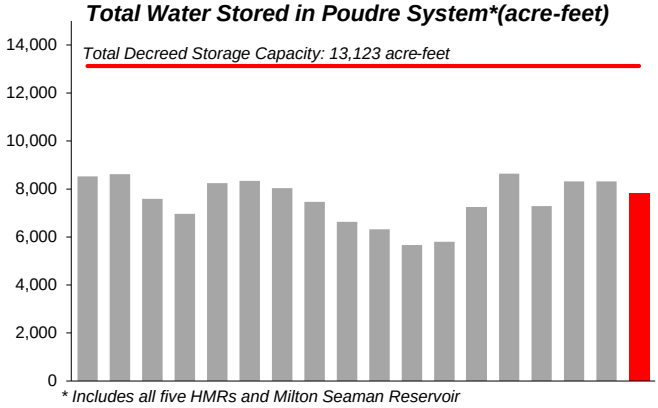
Greeley's goal is to have enough water in carry-over storage to sustain Greeley through a 50-year critical drought. Water in excess of this carry-over drought supply can be leased to agriculture, both for revenue and to support our local agricultural community. Modeling has shown that, given existing population and demand factors, Greeley will have sufficient water for citizens, if at the begininning of the 6-year long, 50-year critical drought, there is 20,000 acre-feet in storage on April 1st of the following year.

Note: the red column indicates the current month.

***System Storage (acre-feet)***

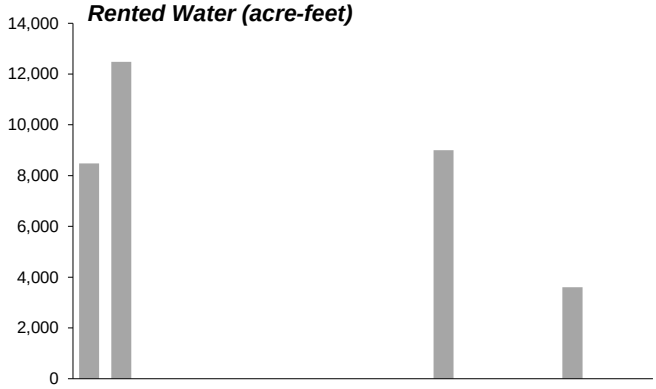



***Total Water Stored in Poudre System*(acre-feet)***

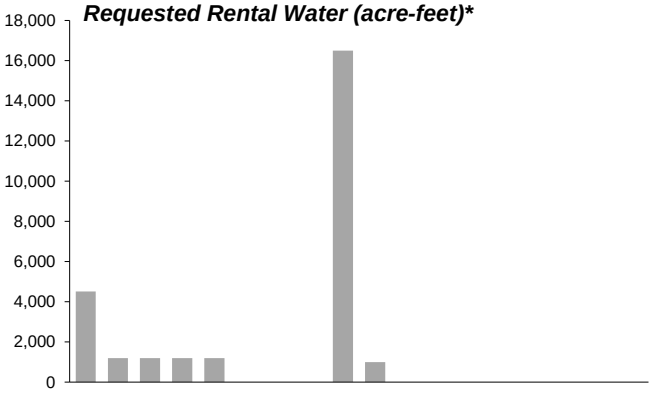



** Includes all five HMRs and Milton Seaman Reservoir*

***Rented Water (acre-feet)***

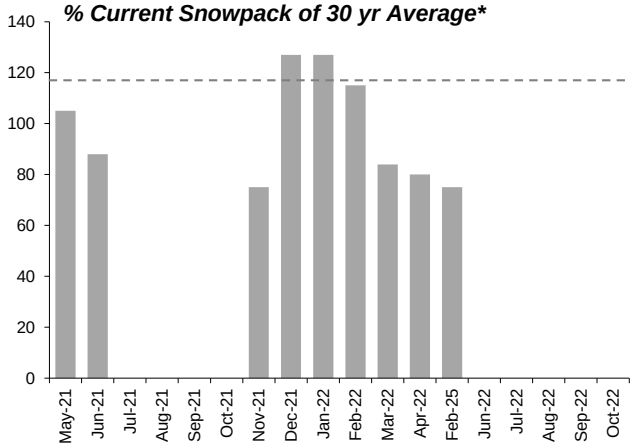



***Requested Rental Water (acre-feet)****



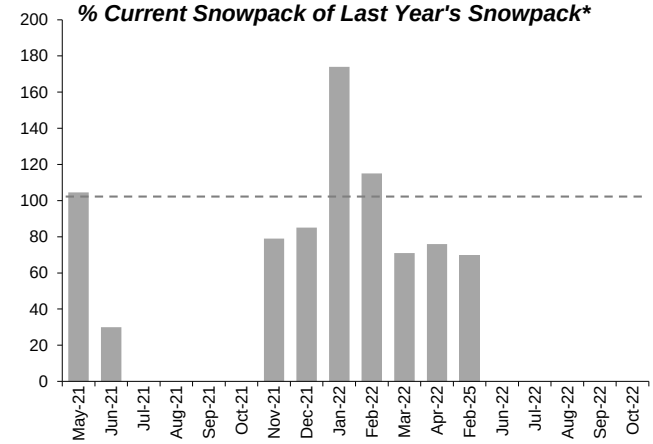

**Water that has been requested but not rented out*

***% Current Snowpack of 30 yr Average****




**Data is from the 1st of the month*
***Average of Deadman Hill and Joe Wright*

***% Current Snowpack of Last Year's Snowpack****

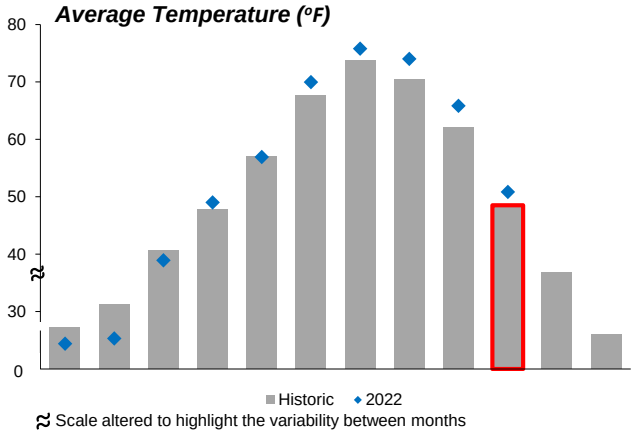


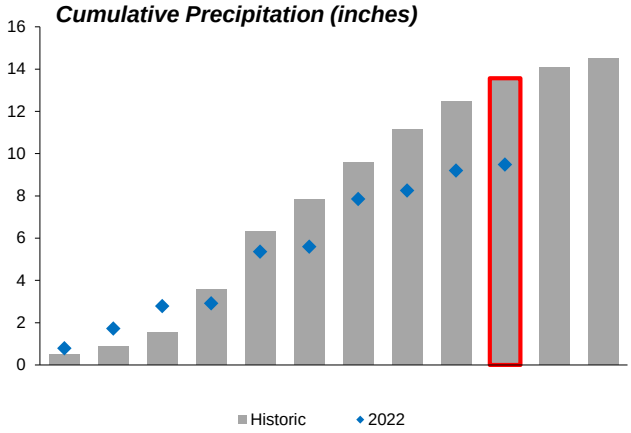

**Data is from the 1st of the month*
***Average of Deadman Hill and Joe Wright*

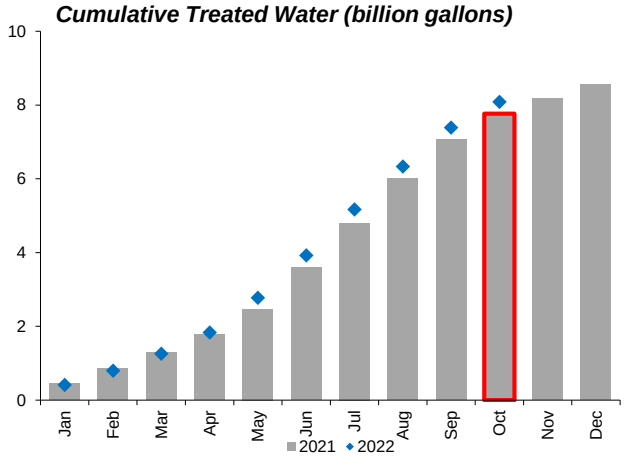
# Treated Water and Weather Data

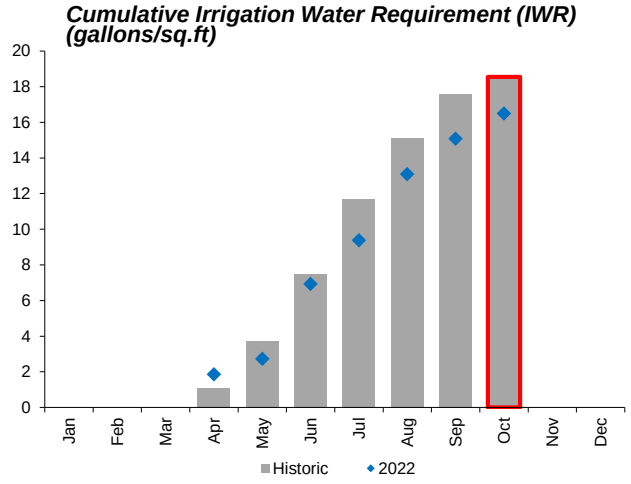
January 2022 average temperature was 24.38°F, approximately 2.8°F cooler than average. Febuary also brought colder temperatures averaging 25.23°F. In March the average temperatre was 38.94°F, slighlty cooler than the historical averge. Temperatures began to rise in April, bringing the average temperature to 49 °F, which is slighty higher that the historical average temperature of 47°F. May brought an average temperature of 56.93° F, almost exact to the historical average. The average temperatre for June was 70°F slightly above the historical average. July's average temperature was 75.81° F which was 2.1° hotter than the historical average. At 77°F, August's average temperature was 7° hotter than the historical. Septembers average temperature was 65.9° F. The average temperature in October was 50.83 °F, about 2° higher than the historical.

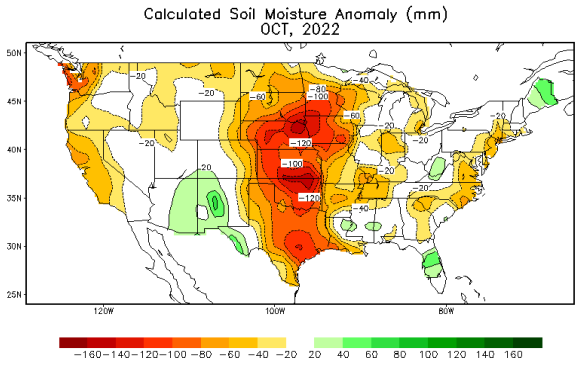
Greeley precipitation was 0.79 inches in January, which is slightly above average (0.43 inches). Febuary had high precipitation at 0.93 inches. March brought 1.07 in of precipitation, setting Greeley 1.23 inches over the historical cummulitive precipitation for March. Greeley has a very dry April with only 0.13 inches of precipitation bringing the cummulitive precipitation 0.63 inches below average. May brought 2.44 inches of precipitation. Greeley only revieved 0.2 in of precip in June, ending the month signifgicanlty lower than the historical average. July was a faily wet month for Greeley, bringing 2.25 inches of precipitation. August was a dry month this year, bringing only 0.41 inches of rain. In September, Greeley received 0.94 inches of precipitation. October had low precipitation with only 0.28 inches.

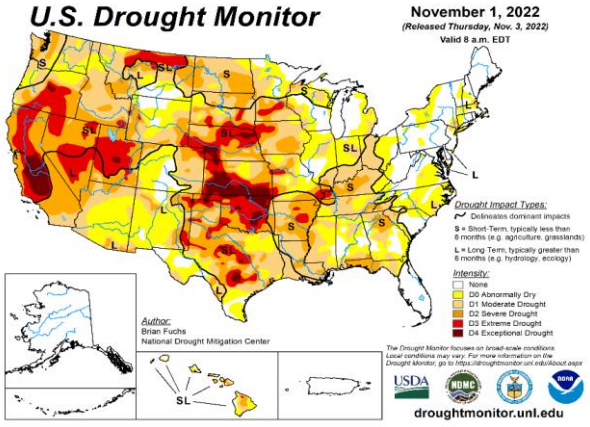



National Weather Service Climate Prediction Center

The Water Report™
Water Rights, Water Quality & Water Solutions in the West

## In This Issue:



**Erratum:**
**Author Sharon Megdal's Correct Phone Number is: 520/ 621-9591**

## Upcoming Stories:

**Federal Water Project Funding**

**Municipal Stormwater Regs**

**& More!**

# COLORADO MUNICIPAL WATER SUPPLY EVOLUTION

GROWING PAINS: THE EVOLUTION OF MUNICIPAL WATER SUPPLY DEVELOPMENT IN COLORADO

by Brett Bovee & Adam Jokerst, WestWater Research, LLC (Fort Collins, CO)

### Introduction

Developing reliable water supplies to serve anticipated growth is a challenge that will only get more difficult with limited sources of new supply, rapid escalation of water prices in some locations, and challenges of regulatory approval by Federal agencies and state regulators. These conditions are eroding the paradigm long used by municipalities in Colorado, but also throughout the Western US, of simply purchasing more of the same water assets to meet projected future water needs. Some municipal water providers are turning to less established and more creative models to develop new water supplies.

This article examines emerging challenges in Colorado and the need for creativity as municipal providers look to provide reliable and affordable water service to a growing customer base. An example is presented for the City of Greeley within the fast-growing Front Range of Colorado, as a case study for challenges impacting many areas of the Western US.

### Background

COLORADO'S FRONT RANGE: ADAPTING TO OVER 2 MILLION NEW RESIDENTS SINCE 1990

Municipal water providers strive to provide a safe and reliable water supply to every connection in their service area without interruption and at an affordable cost. Municipalities are also charged with securing new water supplies to meet growing populations and associated water demands. Successful water utilities are most often dedicated to long-range planning and are inherently risk averse. Redundancy, resiliency, and reliability are engrained in their working vocabulary. One of the tools that many municipal water providers use to ensure that they meet their mission is to craft policy that forces growth to pay its own way. This policy attempts to shield existing water customers from additional risk and/or cost that comes with the utility agreeing to serve new customers. The practical implementation of this policy varies for each municipal water utility, but the following are some common policy elements:

**Water Rights Dedication:** A land developer (or homebuilder) is often required to dedicate sufficient water rights to the water utility to match the expected average annual water demands of the planned project. The water utility often has a short-list of acceptable water rights that can be incorporated into the existing water supply system, and in Colorado these acceptable water rights are often some form of existing agricultural use right that can be converted to municipal use. In some cases, the water utility will allow the developer to pay a cash fee in lieu of dedicating water rights. The water utility will then use the cash to acquire water rights and/or increase water supplies through project investment.

**Storage & Infrastructure Fee:** In some cases, the water rights dedicated to the utility require additional reservoir storage or related infrastructure to "firm" the supply during drought periods. An additional fee may be charged by the water utility on a volumetric basis to provide the necessary funding to construct reservoir storage or to repay the costs of completed storage.

## Municipal Supply

**System Expansion**

**Population Growth**

**New Supply**

**Dwindling Pool**

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**Plant Investment Fee:** The new development will also utilize capacity in the existing municipal water system, including capacity at the water treatment plant and in the distribution pipelines. Municipal water utilities typically charge a pro-rata fee to the developer based on the use of these existing facilities while also acknowledging that system expansion may be required as new demands are being served.

Collectively, these fees ensure that the water rights (supplies) and infrastructure needed to serve potable water to new customers are secured prior to any new water taps being added to the municipal water system. These fees are typically paid by the developer and incorporated into the purchase price of a home or the development cost of a business. Importantly, the monthly water bill paid by the new customers (as well as existing customers) reflects the operating costs of supplying potable water to their taps but typically does not reflect these upfront capital cost items.

These policy elements have resulted in an established paradigm that has worked well to support population growth. The Colorado Front Range — an urban corridor located along the eastern face of the Rocky Mountains stretching from Pueblo, Colorado to the Wyoming border — has grown by 2.6% annually since 1990, with 2,257,000 new residents being provided a high-quality municipal water supply. *See*: Colorado Water Conservation Board (2021). *Analysis and Technical Update to the Colorado Water Plan*. (https://cwcb.colorado.gov/colorado-water-plan/technical-update-to-the-plan ).

The paradigm works because there have been and continue to be water rights that can be acquired to support development projects and the fees charged by municipal utilities can be accommodated in market home prices.

### Looking Forward 30 Years

#### SERVING 1.5 MILLION NEW RESIDENTS BY 2050

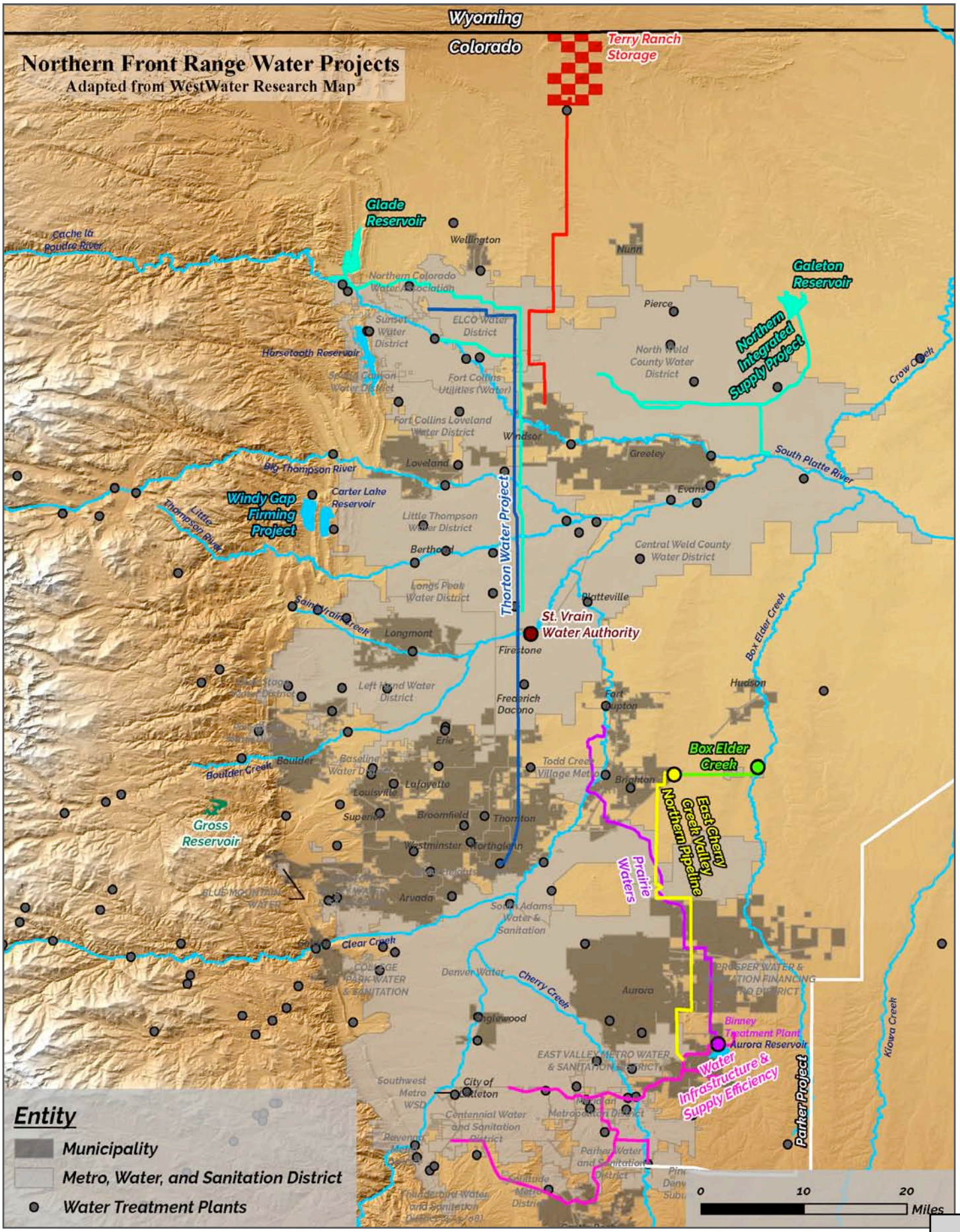
Recent planning projections estimate that the Colorado Front Range will see 1,472,000 new residents by 2050 with new municipal water demand projected to increase between 313,000 and 621,000 acre-feet per year. *Ibid*. As described above, these new residents will not have new homes to occupy unless sufficient water supplies have been secured and fees have been paid to support a municipal utility's commitment to provide water service. The municipal utility is often challenged to accommodate growth while also maintaining its bedrock commitment to provide reliable water service and maintaining affordable water rates. The following paragraphs highlight some of the challenges that will likely be faced by the historical paradigm of securing new water supplies.

**Limited New Water Supplies:** Municipal water utilities along the Colorado Front Range are facing a dwindling pool of reliable water supplies to acquire and incorporate into their water portfolios. Most rivers east of the Continental Divide in Colorado have been fully appropriated since the late 19th century. In the 20th century, utilities turned to the Colorado River Basin for additional supply, constructing numerous trans-basin diversion projects to bring West Slope water to the eastern Front Range region (see Map). Into the 21st century, water utilities have increased their ownership of these previously established trans-basin water rights and projects. While there has been some recent activity to increase Front Range storage to facilitate increased trans-basin export, there has not been a major new trans-basin project constructed in Colorado since 1985. Climate change impacts on hydrology and uncertainty in interstate management of rivers have often decreased the feasibility of and interest in new projects. Therefore, there is a dwindling pool of water rights that a developer could acquire and dedicate and also rising uncertainty as to what municipal water utilities should do with the cash it is paid in lieu of dedicated water rights.

**Rising Costs to Secure Available Water Sources:** The reduction in available water supplies has resulted in price appreciation for water rights, particularly those water rights that have a proven track record of being dedicated to a municipal utility and/or acquired by a municipal utility. The most well-documented example in Colorado are shares (units) in the Colorado-Big Thompson (CBT) Project which have long been the water currency to allow new development projects in Northern Colorado. CBT units saw prices rise from $10,000 per unit in 2011 up to over $60,000 per unit currently. Irrigation ditch company shares accepted for raw water dedication have seen similar price appreciation in recent years. As an example, prices for shares in the Water Supply and Storage Company have risen 40% annually over the last five years.

**Impractical Regulatory Timelines:** New reservoir construction, or even enlargement of existing reservoirs, can be prohibitive because of an opaque and often burdensome regulatory process. New reservoir storage projects often require decades-long federal, state, and local environmental permitting processes. Even upon successful permitting, reservoir projects often face legal challenges that can add years to the projects' schedules and significantly change costs. Such permitting and legal challenges create a level of risk and uncertainty that some municipal water providers are unwilling to endure. Further, the length of permitting and legal challenges can add significantly to project costs. For exam



## Municipal Supply

**Permit Costs**

permitting costs for the Northern Integrated Supply Project — a proposal to construct two new reservoirs and associated infrastructure benefiting 14 northern Colorado municipalities (*see*: www.northernwater.org/NISP/) — have exceeded $20 million. Delay to construction, arising from the permitting process, has added $100s of millions to overall project costs. Outside of water infrastructure projects, the regulatory timeline for completing a routine change of use for an existing water right through the state water court process is also a hurdle. Water court cases typically require at least three years and frequently cost the applicant over $100,000, with the most contested cases costing in excess of $500,000. *See*: Womble, P. and Hanemann, W. M. (2020). *Water Markets, Water Courts, and Transaction Costs in Colorado*. Water Resources Research, 56.

**Pipeline Projects**

**Resistance to Long Distance Solutions:** In some areas, municipal water utilities struggle to find proximate sources of water supply. This has led to several Front Range water pipeline projects, both planned and constructed, to convey water supplies over long distances. The cost of such pipelines can be prohibitive for small water utilities and a growing concern is the political risks of pursuing a long-distance pipeline. The communities located near the source of water supply do not like to see impacts to their local water sources while benefits are accruing to non-local communities. An example of such resistance is illustrated by the City of Thorton's Northern Project (*see*: https://thorntonwaterproject.com/), a pipeline proposed to deliver water from sources in northern Colorado south to the Denver Metro area. Communities in northern Colorado have strongly resisted the pipeline citing concerns over water export and environmental impacts. Litigation is ongoing and has resulted in delays, uncertainty, and increased costs to the project.

**"Buy-and-Dry" Opposition**

The agricultural community often opposes new municipal water projects as well, primarily in opposition to the common practice of "buy and dry" in which water is permanently removed from formerly irrigated land following a change to municipal use. Buy and dry practices have resulted in large areas taken out of irrigated agriculture and in some limited cases a collapse of small-town economies dependent on agriculture.

Given these challenges, some communities in Colorado are concerned water supply constraints will limit growth. Indeed, the cost and availability of water is often central to debates over affordable housing in the state.

### Future Growth: Creativity is Key

**New Approaches**

Past practices for developing new water supply are becoming expensive and risky — even unavailable in some cases. As a result, municipalities are increasingly pivoting away from the water supply solutions that served them well over the past decades and pursuing more non-traditional water supply projects. Some of the creative solutions that Colorado municipal water providers have developed to support growth include:

**Alluvial Groundwater**

**Use of the River Alluvium:** There are several examples of municipal water utilities developing new water supply projects sourced from alluvial groundwater along river systems.

Examples include:

Aurora Prairie Waters Project
(*see*: www.auroragov.org/residents/water/water_system/water_sources/prairie_waters)

Firestone Alluvial Supply and Treatment Project
(*see*: www.firestoneco.gov/622/Firestone-Reservoirs-Wells )

Town of Castle Rock Box Elder Project
(*see*: http://crgov.com/1793/Import)

**Short-Term Storage**

These alluvial projects recognize that there is short-term storage in the river alluvium and a broader set of water rights can be used to mitigate (augment) the alluvial pumping. This use of alluvial groundwater represents one of the last remaining "buckets" of new water supply that can be developed on the Front Range. Augmentation sources have not historically been developed because of water quality concerns and advanced treatment is often required. However, as the cost of traditional water rights have increased, the long-term operational costs of advanced treatment are now often outweighed by the savings from lower priced alluvial sources.

**Industrial Rights Transfer**

**Repurposed Industrial Water Rights:** Another sector that may hold unique and useful water supplies to support municipal growth is industry, and particularly the mineral extraction and fossil fuel sectors. Gravel mining is a robust business along the Front Range rivers, and gravel mining companies often hold useful water rights and small storage reservoirs that can be used by local municipalities. Market activity for gravel pit water rights and storage along the Front Ranch has increased over time. Water providers have also looked to former mines for sources of water, an example of which is the City of Aurora's purchase of water rights associated with the London Mine, a former gold mine (*see*: www.



## Municipal Supply

### Municipal Partnerships

auroragov.org/residents/water/water_system/water_sources/london_mine_water_rights). Coal and gas power plants are large water users in the state, and as these facilities age or are decommissioned in favor of renewable energy supplies, their water rights holdings could be transferred to municipal water utilities. For example, the Platte River Power Authority, a regional electric utility, has in recent years sold some of its water rights to municipal water providers.

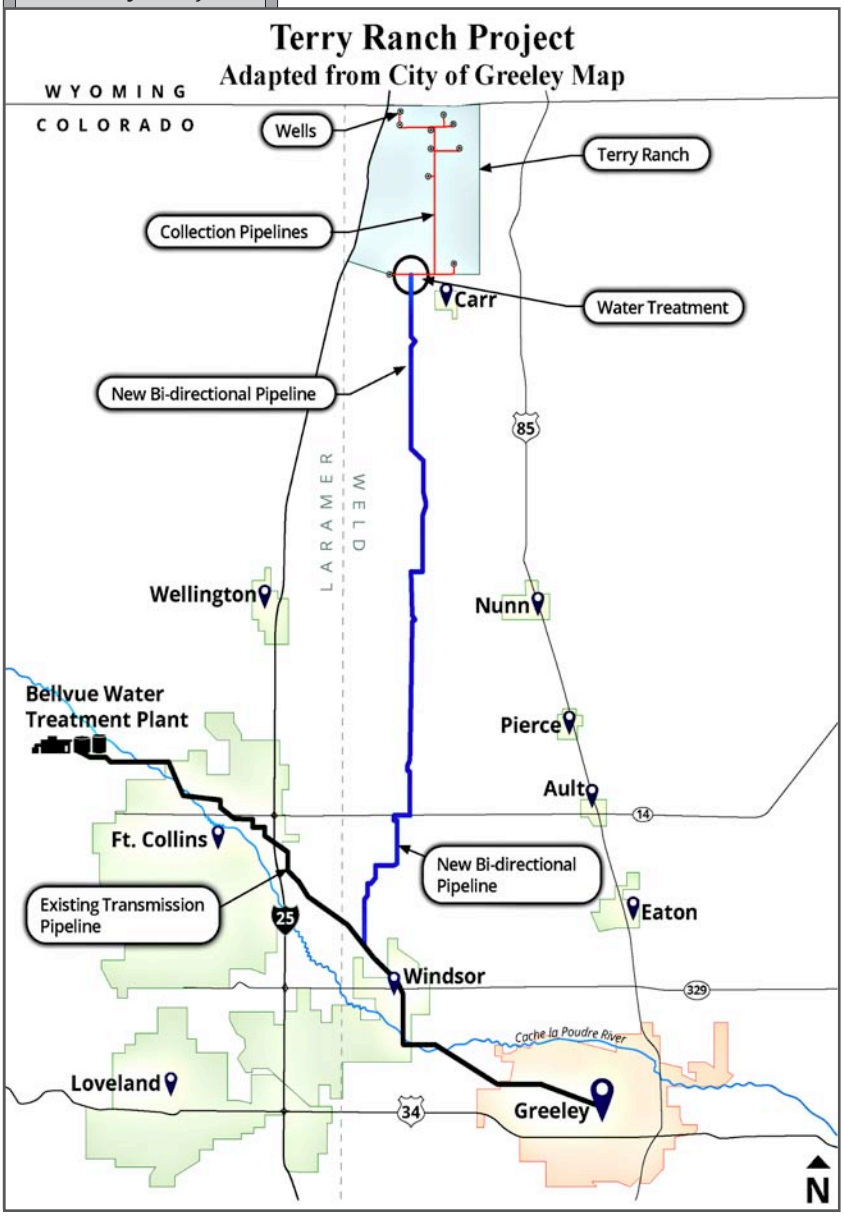
**Shared Infrastructure & Supply:** Historically, the Colorado Front Range municipal water supply has developed as a checkerboard of individual municipal water utilities including cities, towns, and water districts. For the most part, these utilities have developed independent water right portfolios and each have individually taken on the task of finding and securing new water supplies. There are roughly 50 independent municipal water providers on the Colorado Front Range. Partnerships and cooperative projects may hold promise for water providers due to economies of scale and diversifying water supplies. Examples of recent partnerships include:

The Water Infrastructure Supply Efficiency (WISE) project serving several municipal water utilities in the Denver Metro area (*see*: www.denverwater.org/your-water/water-supply-and-planning/wise)

The Arapahoe County Water & Wastewater Authority and East Cherry Creek Valley Water District partnership to develop a joint South Platte River water supply project (*see*: www.eccv.org/northernproject)

The Southern Delivery System benefiting Colorado Springs and other municipalities in the Arkansas River basin (*see*: www.water-technology.net/projects/southern-delivery-system-water-project)

### Greeley Project




**Case Study: Greeley's Terry Ranch Project**

The City of Greeley is a rapidly growing community along the Northern Front Range. The City's current population of 115,000 is anticipated to more than double in the next thirty years. While Greeley enjoys an adequate water supply to meet its near-term needs, it must develop additional water supply to meet growing residential and industrial demands. Traditionally, Greeley planned to meet growing demands through the well-established approach of acquiring agricultural water rights and constructing new reservoir water storage to firm those rights.

For over two decades, Greeley pursued an enlargement of an existing on-channel dam on a tributary to the Cache La Poudre River in northern Colorado. The City proposed raising the dam to increase reservoir storage from 5,000 acre-feet to over 50,000 acre-feet. Enlarging the reservoir would impact several environmental resources including wetlands, stream channel, and critical habitat for species protected under the Endangered Species Act. Consequently, the project required numerous permits and authorizations from federal, state, and county agencies. The City spent 15 years and $19 million within the National Environmental Policy Act (NEPA) permitting process. During this time, mitigation requirements and construction cost estimates for the project steadily rose, as did the cost of water rights needed to fill the reservoir. What was once a $100 million project in the early 2000s became a $500 million project in 2018.

Starting in 2019, the City began evaluating less established alternatives to reservoir enlargement, focusing on less costly projects that did not have a federal nexus and could be built without federal permits. Well over 100 alternatives were screened, and through that evaluation process Greeley identified the Terry Ranch Project as a potentially viable alternati

## Municipal Supply

**ASR Project**

**Conjunctive Management**

**Private Development**

**"Raw Water Credits"**

**Developer Purchases**

**City Purchase Structure**

**Repayment Risk**

The Terry Ranch Project is an aquifer storage and recovery (ASR) project located along the Colorado-Wyoming border approximately 35 miles northwest of Greeley (*see*: https://greeleygov.com/services/ws/trp). The project provides Greeley with 1.2 million acre-feet of decreed non-tributary groundwater (groundwater that is not hydrologically connected to surface waters) and associated underground storage in the Upper Laramie Aquifer. The non-tributary groundwater provides the City with a new water source while underground storage offers the ability to firm the City's existing and future surface water supplies.

Greeley has historically relied entirely on surface water supplies. The addition of groundwater to the City's portfolio through the Terry Ranch Project allows Greeley to conjunctively manage surface and groundwater to extend its supplies during droughts. Greeley will continue to rely on surface water for its base demands but can turn to groundwater during droughts and surface water supply disruptions, such as the recent wildfires that have impacted the watersheds of its source water.

The Terry Ranch water rights were initially developed by a private party, Wingfoot Water Resources, LLC. Wingfoot perfected the water rights, drilled high-volume production wells, verified water quality, and obtained the surface easements and encumbrances necessary to construct the project before marketing the project to Greeley.

Wingfoot and Greeley negotiated a unique purchase structure to acquire the project. Rather than paying cash, Greeley agreed to pay Wingfoot "raw water credits" which are redeemable to meet the City's raw water dedication requirements. Greeley issued Wingfoot approximately 12,000 raw water credits, with each credit worth one acre-foot of raw water dedication. In issuing these credits, Greeley agreed it would accept the credits as a third option for developers to meet raw water dedication for a period of 80 years.

Wingfoot will sell the raw water credit to developers, home builders, or investors at a discount to Greeley's cash in lieu of water rights rate. Developers and homebuilders will then surrender the credits to the City to receive water service just as they would water rights or cash. Wingfoot's return for sale of the project is thus paid directly by the development community. Wingfoot has accepted an uncertain, but likely greater long-term payment from developers as compared to upfront payment from the city.

By issuing the raw water credits, Greeley expects to receive less cash in lieu payments for raw water dedication in the future. In essence, the transaction structure results in Greeley foregoing future revenue in exchange for the water project upfront. However, the purchase structure eliminated the near-term capital outlay and associated bonding that would have been required with a cash purchase. Because the pace of future development is unknown, issuing revenue bonds with the expectation that development fees (in this case cash in lieu payments), will fund bond debt creates repayment risk. With the Terry Ranch Project purchase, Greeley transferred this risk to Wingfoot. Greeley's risk was further reduced as Wingfoot agreed to provide $125 million towards the construction cost for the infrastructure needed to deliver the groundwater to the City. Purchase of the Terry Ranch Project closed in early 2021, and construction of the initial phases of the project is anticipated for early 2023.

### Conclusion

#### MORE OPTIONS OUTSIDE OF THE BOX

Municipal water providers in Colorado face a myriad of constraints in developing new water supplies. Increased competition for water rights, inability to access traditional sources of supply, climate change impacts, and legal, regulatory, and political hurdles are among the factors impeding the more entrenched approaches to water supply development.

As population in the state continues to grow, municipal water utilities may benefit from considering more creative and less established sources of supply and deal structures, such as that presented for the Terry Ranch Project case study.

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**Brett Bovee** is the Operating Director for WestWater Research based in the Fort Collins office. Brett brings over 18 years of experience conducting a variety of engineering, economic, and water rights studies across the Western states. Many of these projects have been focused on water resources management and water development concepts in the pursuit, protection, and utilization of water rights. Since joining WestWater, Brett has performed dozens of focused water right valuation studies and broader economic and water market analyses. Brett brings a unique perspective to projects, combining a background in water resources engineering with a developed knowledge of water rights and economics.

**Adam Jokerst** is the Rocky Mountain Regional Director for WestWater Research and leads the Colorado office in Fort Collins. Adam brings over 15 years of experience in both the private and public sectors. He has overseen long-range water supply planning, water acquisition, water rights protection, and water conservation programs. Prior to joining WestWater, he served as Deputy Director for Water Resources at the City of Greeley, where he led a multi-disciplinary team that plans, develops, and operates water supplies serving 150,000 residents. Adam is passionate about finding innovative solutions to solve complex water problems.

# INNOVATIONS IN INTEGRATED WATERSHED MANAGEMENT

by Joe S. Whitworth, President & CEO, The Freshwater Trust (Portland, OR)

**Watershed Priorities**

**Better Investment**

**Addressing Barriers**

**Proposed Legislation**

**Public Good**

**Public "Paywalls"**

**Watershed Needs & Solutions**

**Introduction**

We should demand better returns on our water investments. Since 1960, the US has spent $2 trillion trying to improve water quality, and another $2 trillion after natural disasters. Despite this tremendous investment, a large majority of waterways remain impaired, with accelerating drought, flood, and fire risks rapidly compounding the problem. While the US is poised to make a generational infrastructure investment in water through the Infrastructure Investment and Jobs Act of 2021 (IIJA), just adding cash will not yield different results. We must address the financial and practical barriers that currently make it so difficult to implement distributed watershed projects, and thus secure watershed-scale results. Moving forward, we need to be able to combine siloed public funds into an integrated solution, direct funding toward the highest return projects identified by precision technology, and eliminate complexity for participants.

America needs an upgrade to its conservation funding and implementation systems. An upgrade that leverages tools already in broad use, takes conservation from "retail" to "wholesale," and rewards results (not just effort).

**Why We Need the Watershed Results Act & How It Works**

The Watershed Results Act (WRA), introduced by Senator Ron Wyden in 2022 (S. 3539), provides a desperately needed demonstration of what such an upgrade could provide taxpayers, watersheds, and local communities. The WRA would help maximize every taxpayer dollar invested in water, while saving on future disaster spending. The WRA approach would also drive more benefits into underserved rural areas with health and income challenges, help generate durable and enriching rural jobs, alleviate municipal ratepayer pressure — including on vulnerable communities, and provide more financial options for farmers as they attempt to grow more food with less water. In a world short on winning bipartisan solutions, the WRA offers a unique pathway forward.

Unlike functioning marketplaces where private parties invest in and produce economic goods to sell, water is a public good. This means that many of the projects that need to be implemented lack a compelling business case for those who must choose to participate (e.g., agricultural producers, irrigation districts) and for private investment. This is especially true for the small but critical resiliency projects scattered across the landscape in each watershed. As a result, the government ends up being the primary actor responsible for overcoming these challenges and it has built an extensive project funding and regulatory apparatus to address this responsibility.

In practice, public funds either go toward large, centralized projects or trickle out through multiple, hard-to-access competitive grant programs with match funding requirements and procedural "paywalls" where only the most committed or best-resourced navigate the time, risk, and cashflow challenges to secure funds. Of $139.7 billion in CWSRF investments from 1988-2020, only $5 billion went to nonpoint projects. *See*: EPA, *Clean Water SRF Program Summary*, National Summary, at 24, 28 (2021), https://www.epa.gov/sites/default/files/2021-02/documents/us20.pdf; EPA, *Financing Options for Nontraditional Eligibilities in the Clean Water SRF Programs*, at 1 (2017), www.epa.gov/cwsrf/financing-options-nontraditional-eligibilities-cwsrf.

Further, because dollars are routed through project-specific funding silos and regulatory programs that focus on a sub-element of interrelated water problems, larger regional watershed needs are not often considered or managed via a coordinated funding and implementation strategy. This means that though there is a lot of public money in the system, and lots of projects get funded, they are often not well-coordinated toward watershed resiliency. Most potential leverage ends up diluted — effectively doing good deeds in locations that do not contribute at all to watershed health.

The solution to these challenges moving forward will require:

(1) a coordinated funding approach that integrates and leverages currently siloed but interrelated conservation funding sources;
(2) use of precision watershed analytics to quickly identify the best combination of projects to invest in;
(3) better use of financing to launch and accelerate progress; and
(4) a streamlined purchasing system that rapidly delivers funds to the ground with less friction.

The WRA connects all these components into a watershed solution framework.

**Watershed Priorities**

**Clearinghouse**

**Guiding Analytics**

**Coordinated Funding**

**Defined Outcomes**

**Market Certainty**

**"Outcome Prices"**

**Legislation Benefits**

**Matching Requirement Drawbacks**

The WRA aims to address these challenges head-on with the following elements:

- **"Outcomes Fund":** Establish an Outcomes Fund (or "Bank") within the Department of Interior (Interior). Instead of managing each funding source in its own silo, program funds can be pledged to the Fund. A Fund would serve as a clearinghouse for combining, concentrating, and quickly directing funds to the best projects, and tracking quantified project outcomes. A Fund could leverage multiple types of aligned, but currently fragmented, colors of money into a powerful, unified water outcomes purchasing machine. (*See* section below, "How a Watershed Outcomes Fund Works").
- **Complete and use "advance watershed analytics" to guide effort:** in each pilot, complete analytics and identify targets based on the results, with funds then directed to the best projects. (*See* section below, "How Precision Watershed Analytics Drive the WRA").
- **New outcomes dollars, coordinated with existing funds under a coordinated funding plan:** The WRA provides $15 million/year/watershed (over six years) to buy the best project "outcomes" identified by the analytics. The WRA defines "outcomes" as quantifiable increases in surface water or groundwater quantity, measurable increases in habitat, and other quantifiable benefits that can be modeled using publicly available tools and data, such as pounds of nitrogen or sediment removed, or avoided thermal loading. In addition to the seed money, the WRA requires a coordinated cross-agency funding plan for each pilot, which must demonstrate how investments will achieve targets. As part of these plans, agencies must modify, expand, and streamline eligibility and verification for existing federal funding sources, while also waiving non-federal match requirements, so that all sources can be leveraged together in pursuit of big, fast watershed results. (*See* sidebar, "The Hurdle of Match Requirements").
- **Simple and quick purchasing tools, plus clear market signals:** Currently there is no real economy for watershed projects. To create more market certainty, the WRA calls on Interior to set minimum "outcome prices" in each pilot. These signals are critical for private partners determining whether it makes good business sense to build a project. In addition to establishing price thresholds, the WRA calls on Interior to pay a project developer within 30 days of verifying outcomes via simple "pay for performance" contracts. With these signals from the federal government, a private market economy will sprout up, with actors proactively developing good conservation projects because it makes good business sense.
- **Pilots:** Direct the Interior to pilot this new approach in 2 - 5 watersheds.

In the face of intensifying drought, water quality issues, burning forests, and more frequent "once-in-a-millennia" flood and temperature events, the status quo approach to federal match funding must be reconsidered. The WRA — with its coordinated, prioritized, outcomes-driven approach — offers an opportunity to show how a match waiver in pilot watersheds can yield bigger, better, faster results.

### The Hurdle of Match Requirements

Across dozens of federal grant programs, requirements for applicants to "match" the funding from the federal government with money from someone else are ubiquitous. The phrase "matching requirement" appears 15 times in the recent IIJA, requiring funding applicants to provide non-federal match at 15% - 50% of the government request. Matching funds are also referenced in more than 100 other pieces of legislation in this Congress. Common reasons for requiring matching funds include proof that an applicant is committed to the project (has "skin in the game"); proof of community buy-in, which could make the project more successful long-term when the funding has expired; and the belief that partially funding a diverse set of projects rather than fully funding fewer projects will satisfy political constituents.

Match requirements have become a default policy, often applied without considering unintended effects of slowing or chilling important actions. Match requirements actually make it difficult for the federal government to catalyze solutions to big, fast-moving environmental problems. Match requirements slow down "public good" projects, which prevents building watershed-level resiliency in the face of climate change. Under-resourced growers or groups that apply for funding must navigate multiple programs with uncertainty that the funding stream will be awarded. Even if awarded, the agencies can take months or years to negotiate contracts. Due to these long timelines, project partners often must move on to other projects, which can scuttle match commitments. Current match approaches lead to inequitable flow of funds to larger growers and organizations that can withstand the uncertainty. This traditional system has benefited those with the strength to wade through the process, but not necessarily those projects with the greatest environmental benefit. With new technology, using match as a screening tool is no longer needed. Instead, with precision analytics now widely available, agencies can define needed outcomes and fund projects that objectively deliver those public benefits. This quantified conservation approach means that agencies no longer need validation of a project's "worth" through its large financial match commitment.



 

**Watershed Priorities**

**Outcomes Fund**

**"Pay for Performance"**

**Leveraged Investment**

**Current Programs Accessed**

**Upfront Financing**

**Implementation Accelerator**

**Best Projects**

**Streamlined Approach**

**How a Watershed Outcomes Fund Works**

A Fund would be a one-stop "bank" for funders and farmers, with funding concentrated at the watershed level, investments prioritized by watershed analytics, simple engagement for farmers, and back-end tracking of projects, spending, and results. The following outline walks through how a Fund would work in practice.

**Funding Source Aggregator and Clearinghouse**

Instead of managing each funding source in its own silo, program funds could be pledged to an Outcomes Fund. A Fund would likely be housed within an agency. A Fund would serve as a clearinghouse for combining, concentrating, and quickly directing funds to the best projects, and tracking project outcomes. A Fund could leverage multiple types of aligned, but currently fragmented, colors of money into a powerful, unified water outcomes purchasing machine:

- **Congressional appropriations to purchase outcomes** via "pay for performance" contracts: Where a project has been completed, and has produced a verified "outcome," Fund dollars would purchase those benefits via a "pay for performance" contract with a negotiated per-unit price. This approach has been authorized by Congress in the Social Impact Partnerships to Pay for Results Act (SIPPRA) and is a streamlined version of a "fixed amount award." US Dep't of Treasury, SIPPRA – Pay for Results, https://home.treasury.gov/services/social-imact-partnerships/sippra-pay-for-results. *See* 42 U.S.C. § 1397n–1397n-13. In contrast to typical government programs, which reimburse expenses and effort without regard to results, this purchasing structure ensures that the government pays for results.
- **Leveraging with compliance investment:** US EPA can use its watershed permitting authorities to ensure point sources only invest in clean water treatment technology to the "point of diminishing returns," with remaining dollars reallocated to the Fund. This approach would protect urban ratepayers from high costs, while directing funds to watershed projects that more cost-effectively deliver results.
- **"Pile on" from other agencies and private sector:** The Bureau of Reclamation, the US Dept. of Agriculture, and other agencies can match these non-federal compliance fund pledges with commitments from current programs. Private companies/donors could also commit their funds, as can state agency corollaries.

**Use Fund Pledges to Secure Accelerating Upfront Financing**

In the face of so many conspiring challenges, time is at a premium. Instead of waiting on project dollars to flow out of agencies and utilities bit-by-bit via annual appropriations and rate collection cycles, these pledges — which would not need to be paid upfront, but rather awarded or contracted for — would be used to secure public and/or private debt, which would accelerate implementation. Public water lending and guarantee programs, including the State Revolving Funds and EPA's Water Infrastructure Finance and Innovation Act (WIFIA) lending program, could lead in underwriting this effort, which could provide the certainty necessary for private capital to engage. To date, uncertainty and scale factors have kept most "impact capital" focused on things where there is a simple payback plan, a repeatable and certain transaction model, and centralized project scale (e.g., windfarms, wastewater, industrial timber). A Watershed Outcomes Fund model would overcome many of these hurdles.

**Use precision analytics to identify the best projects, then offer "easy button" incentive packages to farmers for producing "bushels of nature"**

Far too few farmers utilize United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) conservation programs (such as NRCS's Regional Conservation Partnership Program or FSA's Conservation Reserve Enhancement Program). This under utilization arises because of the complex and slow process, match funding hurdles, and uncertainty that their applications will be selected. Instead of placing the burden on farmers to access funds, analytics can be used to identify the best projects — i.e., those with the highest environmental benefits for the lowest costs. With those high-impact projects identified, simple upfront cash offers can be made to farmers to implement conservation projects, with the payment connected to outcomes produced. For example, once a conservation practice like a riparian buffer or a wetland has been installed, well-established publicly available models would be used to calculate the environmental "uplift" generated from the practice — with payment then provided based on the pertaining unit(s) of anticipated environmental benefit. This streamlined approach would remove barriers to entry, increase participation, reward better outcomes with more dollars, and reduce regulatory pressures through faster watershed improvement.

**How Precision Watershed Analytics Drive the WRA**

## Watershed Priorities

### Uniform Comparison

The WRA calls for "advance watershed analytics." The "advance" indicates the need for insight prior to action. The second part, "watershed analytics," can evaluate distributed project benefits and costs in uniform units, enabling comparison across multiple project types. Analytics also provide the common language to coordinate multi-funder investment across large geographies by allowing for a simple, objective unit for decision-making and tracking. Using analytics helps ensure that funds flow to the highest-impact combination of projects, that every taxpayer dollar is maximized, and that progress toward watershed resilience is tracked at a meaningful scale.

Analytics use existing technology and publicly available data sets and models to identify the highest impact projects, develop a specific roadmap for local stakeholders to use and improve, and then identify superior funding strategies.

### Analytics Use

Developing and then using analytics follows three basic steps:

1) Integrate established government models and data with satellite imagery and other public data sets, as well as machine-learning technology, to remotely survey a watershed and identify specific conservation practices that could be implemented at the field level.
2) From the group of feasible practices, identify optimal combinations of practices that would produce the best ecological and economic options on the ground, and estimate costs and desired outcomes. This step also requires significant "implementability" analysis as the "best" projects may have significant social, physical, or legal obstacles.
3) Develop scenarios to identify the most efficient combination of investments to achieve watershed-level objectives (multiple objectives can be solved for).

### Analytics Tool

The Freshwater Trust (TFT), a conservation nonprofit, developed its BasinScout® Analytics tool (BSA) precisely to identify, prioritize, and implement the most impactful and cost-effective blend of distributed projects in a watershed. First, BSA utilizes up-to-date satellite data to scan large geographies and evaluate field-level features (e.g., distance and slope relative to bodies of water, current irrigation practices, cropping).

Second, BSA:

- Determines which conservation practices are feasible to implement on each field
- Quantifies the projected ecological improvements generated by implementing that practice (e.g., nutrient or temperature reductions, water savings); and
- Estimates the life-cycle cost of implementing that practice on each field.

### Prioritized Strategies

Third, with the ability to sort projects based on how cost-effectively they produce desired benefits, BSA generates targeted implementation recommendations to achieve watershed objectives. This analytical framework offers a specific roadmap for local stakeholders to use and improve and can identify superior funding strategies.

**Case Studies: Analytics Driving Watershed-Scale Conservation Outcomes**

### Case Studies

As described in the below case studies, a number of entities are already using BSA to evaluate complex collections of data in conjunction with desired outcomes. The following case studies highlight the successes that are possible when enough time and focused attention is afforded to scaling up watershed solutions. Each of these examples only succeeded after overcoming multiple practical funding, financing, deployment, participation, and supply chain barriers.

The following examples prove that this kind of success is possible. They also serve to highlight why passing the WRA could do so much more to catalyze bigger, faster, better results.

**Spending a Little to Get a Lot in Oregon's Deschutes River Basin**

### Nutrient Runoff

Central Oregon's Deschutes River watershed is facing multiple challenges. In 2021, many farmers had their water turned off due to drought, fish died from high water temperatures, and excess nutrient runoff choked the system with harmful algae blooms. TFT applied BSA to make sense of this problem. Scientists and local stakeholders agree that the Crooked River — an upstream tributary to the Deschutes River — is contributing the highest nutrient load to Lake Billy Chinook and is a primary driver of the water quality issues in the Lower Deschutes. In recent years, temperature and algal bloom issues in the Lower Deschutes have fueled concerns from recreational users, regulators, and community members. The excess nitrogen and phosphorus carried to the Lake from farms and livestock grazing in the Crooked are compounded by a hydroelectric dam and mixing tower in the Lower Deschutes. Moreover, agricultural communities in the basin remain highly exposed to drought. While multiple actors are engaged on pieces of the problem, there has not yet been a clear, consistent way to prioritize projects or create leverage.



 

## Watershed Priorities

### High Impact Identification

TFT's precision analysis determined that of 4,070 irrigated agricultural fields in the Crooked River basin, only 1,500 were feasible for implementing a productive conservation action (the majority of which involved converting from flood to center pivot irrigation). If all 1,500 potential fields had actions implemented, it would cost well over $100 million. However, by pursuing the highest impact fields, it is possible to spend just $25 million and still produce 60% of the overall potential sediment and nutrient loading reductions. Conversely, this means that if the right projects are not prioritized based on their relative reduction-per-dollar efficiency, stakeholders could inefficiently spend tens of millions of dollars without achieving additional meaningful pollutant reductions. The Crooked is a relatively small watershed; when extrapolated nationwide, this example highlights how analytics could direct hundreds of billions of dollars toward optimal outcomes.

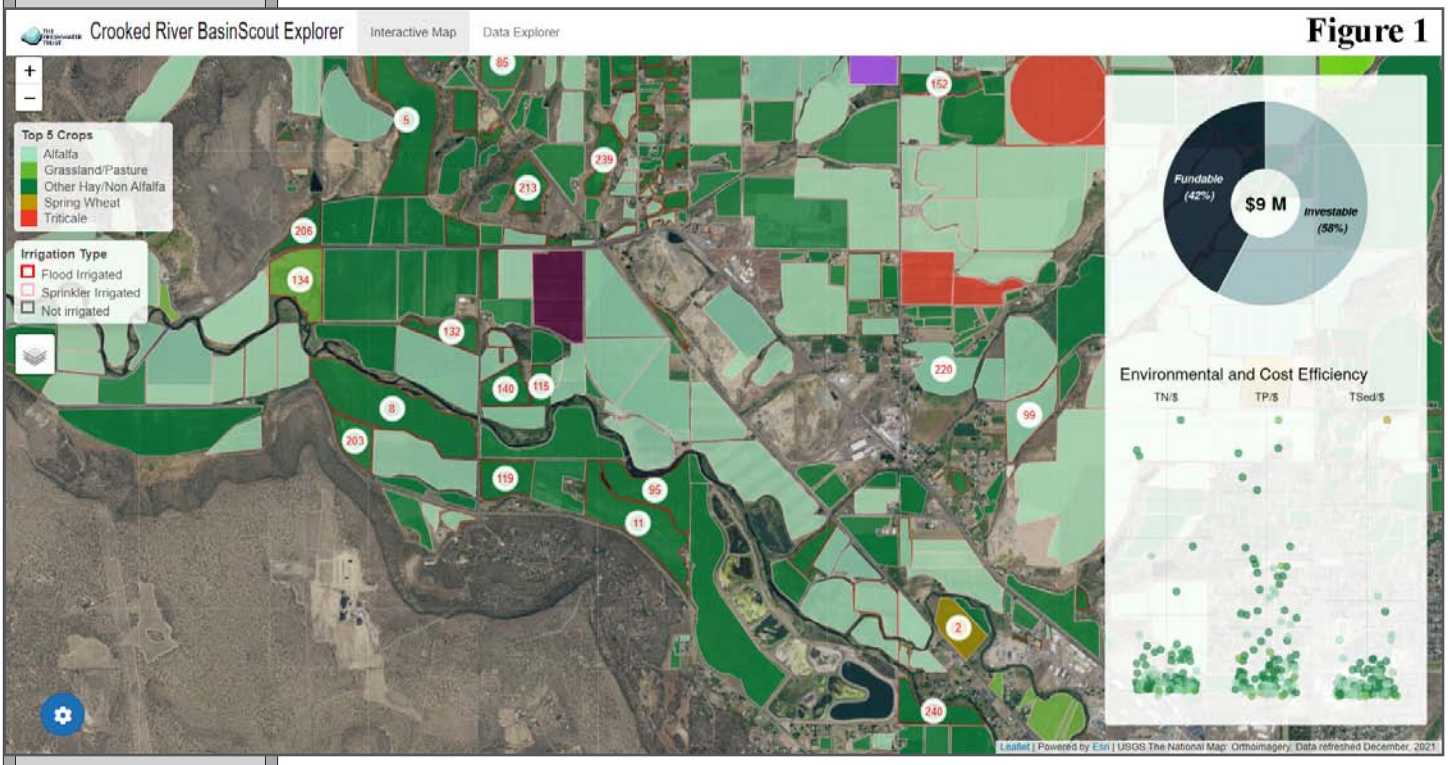


**Figure 1:** The Freshwater Trust's BasinScout Explorer showing a portion of the Crooked River basin. Circles highlight the irrigation upgrade projects that produce nutrient reductions comparatively efficiently per dollar (original in color).

### Implementability Analysis

In converting this Crooked River analysis to an implementation plan, partners determined that the water delivery system components between district-owned infrastructure and fields would preclude many farmers from upgrading to precision irrigation even if they so desired. TFT has been working with the US Bureau of Reclamation, Central Oregon Irrigation District, and Deschutes River Conservancy to co-develop a model that identifies the resulting water savings, pollution reductions, hydraulic feasibility, and economics of various infrastructure modernization scenarios that would connect district-owned infrastructure efforts through to field-level upgrades. This "implementability" analysis helps ensure that mainline infrastructure upgrades also unlock high-impact, on-farm upgrades which, when implemented together, will provide more water savings and address a major water quality impact in the watershed.

### Hydropower Certification

**Snake River Restoration Program ($350 Million)**

The same type of approach and toolkit helped the Idaho Power Company (IPC) finally achieve its Clean Water Act (CWA) certification. IPC went through 13 failed relicensing efforts for its hydropower dams in Hells Canyon (which produce 70% of the utility's hydropower). But with BasinScout analytics applied to the challenge, IPC was able to secure CWA approval from Idaho and Oregon to implement a $350 million watershed stewardship program that will reshape the mainstem Snake River to: better fit its current hydrograph; rehabilitate hundreds of miles of riparian vegetation on tributaries; and avoid significant sediment and nutrient loading due to upgraded irrigation infrastructure.

## Watershed Priorities

**Shading Credits**

**Instream Habitat**

**Temperature Compliance**

**Recycled Water for Irrigation**

**Groundwater Restoration**

**Rogue River Restoration Effort in Oregon ($25 Million): Temperance Compliance**

A similar story unfolded in Oregon's Rogue River Basin. The City of Medford had a sizeable CWA water quality challenge. As highlighted by President Obama (*see* Project in Medford Video at: https://youtu.be/-DASgiCEaZQ), TFT helped Medford implement a solution that worked for ratepayers, farmers, and native fish. In 2011, rather than invest more than twice as much in chillers or a cooling pond to address a temperature compliance issue, Medford partnered with TFT to plant native trees and shrubs in strategic places along the Rogue River and its tributaries. The new vegetation blocks solar load. Using analytics, TFT quantifies the benefits of the vegetation in the same units as technology solutions, and then recruits the projects that produce the most benefits for the least cost. Under this $6.5 million contract, TFT recruited agricultural landowners willing to host shade trees for 20 years, with credits then available for permit compliance. TFT delivered the required 600 million credits two years early, resulting in ~5.5 river miles restored.

Building on the program for Medford, TFT then leveraged its know-how and supply chain into two complementary programs in the watershed. First, a $12 million instream habitat compliance restoration program in the Rogue River basin for the Bureau of Reclamation, which resulted in more than 250 new in-river fish habitat structures and ~2.5 river miles of riparian restoration. Second, TFT is also implementing a $4 million State Revolving Fund (SRF)-financed program for the City of Ashland for temperature compliance — the first SRF-funded water quality trading program of its kind.

**Figure 2: Streamside revegetation projects block a quantified amount of solar energy to Oregon's Rogue River and its tributaries as part of a Clean Water Act compliance program**

**Groundwater Replenishment& Habitat Restoration Program in Sacramento Delta ($600-700 Million)**

In 2016, TFT began working with the Sacramento Regional County Sanitation District to secure a massive state grant that would allow the utility to pump up to 50,000 acre-feet per year of recycled, tertiary treated wastewater to a stressed area directly south of Sacramento. Farmers there will use the recycled water to irrigate more than 16,000 acres of agricultural lands instead of pumping groundwater. To complement that work, TFT also designed a unique landscape-scale conservation approach that will secure, protect, and enhance more than 5,000 acres of important groundwater-dependent habitat in the southern Sacramento Valley over the next 80 years. This $600-700 million program is expected to restore depleted groundwater levels up to 35 feet within 15 years and increase the volume of groundwater in storage by approximately 225,000 acre-feet within 10 years, thus increasing drought resilience for the entire system, and benefiting irrigators, at-risk drinking water supplies, and fish and wildlife species.



 

## Watershed Priorities

### Conclusion

With drought and water quality issues intensifying, cities growing, and food insecurity deepening, the status quo approach to managing water resources cannot get us to where we need to be. We need to catalyze dramatically more solutions at scale and speed. Achieving watershed resilience will require an integrated approach that addresses water quality, scarcity, and community concerns together, and a prioritization and procurement system capable of quickly delivering coordinated public funds to the right combination of infrastructure and watershed improvement projects.

**For Additional Information:**
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**Joe Whitworth** has led The Freshwater Trust for more than two decades, growing the organization's budget tenfold during that time. He is focused on the next generation of conservation tools at the intersection of technology and finance to get results on the ground. In addition to formal advisory roles in B Corp, foundation and government settings, he is a patented inventor and author of the book "*Quantified: Redefining Conservation for the Next Economy*". He holds a B.A. from Dartmouth College and a J.D. from Lewis & Clark College with an emphasis in natural resources and water law.

### About The Freshwater Trust

The Freshwater Trust is a systems change-focused nonprofit with 39 years of watershed-scale restoration expertise. TFT collaborates with landowners, agencies, governments, and businesses across the West to design and implement watershed-scale conservation programs using innovative technology, transaction and policy tools. For decades, TFT has navigated the gauntlet of agency funding programs, permits, and procedure to unlock more than $1 billion for optimized conservation solutions that deliver practical water solutions for farmers, cities, agencies, and rivers. We take pride in these wins but accomplishing critical work at scale shouldn't be so hard.

Dungeness Restoration

Unique Climate

Rain Shadow

# WATERSHED RESTORATION

RESTORING THE DUNGENESS

FINDING BALANCE BETWEEN FISH, FARMS, AND COMMUNITY ON WASHINGTON'S OLYMPIC PENINSULA

by Chris Czarnecki, Washington Water Trust (Seattle, WA)

## Introduction

The Dungeness Watershed, located in the northeast corner of Washington's Olympic Peninsula, is a unique watershed by western Washington standards. Local, regional, and statewide groups have been working together for years to restore the Dungeness River and other local streams. These efforts have entailed finding the right balance for the area's use of freshwater to support salmon, farms, and the local community. However, the watershed's unique climate and intensifying climate change impacts are making this effort more challenging and more urgent.

Can enough be done to build freshwater resiliency in the Dungeness watershed before it's too late?

## The Dungeness Watershed

Flowing from its headwaters in the Olympic Mountains, the Dungeness River runs more than 28 miles to the Strait of Juan de Fuca and the Salish Sea. Together, the Dungeness River, along with its main tributary, the Gray Wolf River, drains a total area of 172,000 acres (Puget Sound Salmon Recovery Plan).

What makes the Dungeness watershed so unique in western Washington is its climate. Sitting in the rainshadow of the Olympic Mountains, it receives less rainfall and more sunshine than any place in the Puget Sound region with annual rainfall totals more akin to Southern California. While other regions of the Olympic Peninsula receive the largest amounts of rainfall in the state, annual rainfall in the City of Sequim, located along the Dungeness River, averages approximately 16 inches per year — an amount comparable to annual rainfall in Los Angeles, California. In contrast, the Hoh Rainforest, just 40 miles away from Sequim, receives on average 140 inches of rainfall per year; and Port Angeles, just 16 miles away, receives about 26 inches per year.

## Dungeness Restoration

### Tribal Values

### Critical Salmon Habitat

### Irrigation Extent

### Riparian Development

### Fishery Decline

The sunny climate of the Dungeness has always attracted people. The Jamestown S'Klallam Tribe has lived, fished, and hunted in the Dungeness Watershed since time immemorial. The Dungeness and the surrounding area hold significant cultural and spiritual value for the Tribe. At the time of European contact in the late 1700's, approximately 2,100 Tribal members lived across 13 permanent S'Klallam villages from the Hoko River to Hood Canal, plus established seasonal fishing, hunting, and gathering sites throughout the area.

One of the most culturally important species for the Jamestown S'Klallam Tribe was, and still is, salmon. The Dungeness River provides critical habitat for ten species of salmonids: Chinook salmon, Chum salmon, Coho salmon, Pink Salmon, Sockeye Salmon, Bull Trout, Dolly Varden, Steelhead, Rainbow Trout, and Cutthroat Trout. Other non-salmonids include Pacific lamprey and sculpin species. Salmon fishing was one of the primary means of sustenance for the S'Klallam people. However, after the arrival of settlers, an increased demand on the area's natural resources significantly impacted the once abundant salmon populations.

In the mid 1800's, European settlers began to use land in the watershed for logging and agriculture. Water from the Dungeness River and local streams became a central resource for development. Agricultural expansion was vast in the area, and due to the dry climate, water for irrigation had to be diverted from the Dungeness River and other streams within the watershed. A system of more than 100 miles of irrigation canals (an array largely unique in Western Washington) was developed and diverted a significant portion of the river's flow in the late summer – a critical time of year for Chinook and other fish species (Puget Sound Salmon Recovery Plan).

Over the years, the irrigation system in the Dungeness continued to expand and today totals approximately 170 miles. This irrigation covers nearly 7,000 acres of land which produce a wide diversity of crops including raspberries, blackberries, and a variety of other organic fruits and vegetables. The area is also noted for raising horses, goats, llamas, and dairy cattle, and for producing hay, grains, and lavender. To commemorate the importance of irrigation to the area, there is even an annual Irrigation Festival. Currently in its 127th year, the event is touted as Washington's oldest and longest running festival (Sequim Irrigation Festival).

Along with the expansion of agriculture, development in the watershed in the mid-20th century and its effects on the river mirrored that of many watersheds across the Pacific Northwest and beyond: riparian and floodplain areas were developed and levees were constructed. The river was channelized and the river's reduced complexity proved detrimental to fish habitat.

Over time, the combined impacts of these changes contributed to the significant decrease of Dungeness River Chinook and steelhead. Annual returns of thousands of fish to the Dungeness River were reduced to just hundreds (NOAA Fisheries 2007 and 2019). Four species that inhabit the Dungeness River are now listed as threatened under the Endangered Species Act: Puget Sound Chinook; Puget Sound Steelhead; Hood Canal/Eastern Strait of Juan de Fuca Summer Chum; and Bull Trout.

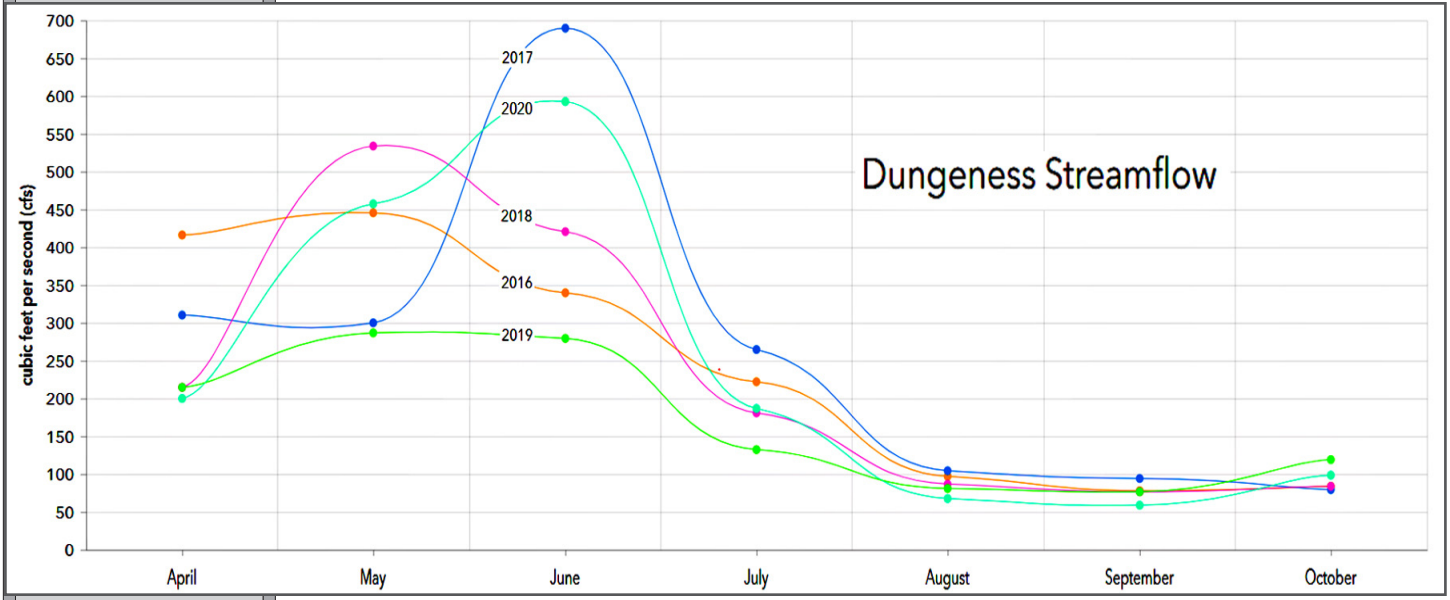
The decline of salmon is, naturally, having cascading effects throughout the greater ecosystem. Chinook salmon is the primary prey species for the endangered Southern Resident Killer Whale whose NOAA-Designated Critical Habitat includes the Dungeness near-shore area in the Strait of Juan de Fuca. NOAA cites "insufficient prey" as one of the three primary threats to the Southern Residents. NOAA, in partnership with the Washington Department of Fish and Wildlife, has determined the Northern Puget Sound Chinook salmon stock, which includes Dungeness River Chinook, to be the highest priority Chinook stock for recovery in the effort to help the Southern Resident Killer Whales.

## Dungeness Restoration

### Snowpack

**Dungeness River Stream Flows**

The Dungeness River relies heavily on a healthy snowpack in the Olympic Mountains that accumulates during the winter season then melts feeding the river throughout the dry season, when there is little to no rainfall. Flows in the Dungeness tend to be highest in the spring and decline steadily throughout the summer, reaching their lowest levels in August and September. Late fall and winter brings more variable flows due to increased rainfall and snow in the upper watershed.




### Critical Months

The critical months of the water year are from April to October, when the need for water is at its highest for both fish and humans. From July to September, as the snowpack-derived flow begins to dwindle, up to 50% of the remaining flow in the Dungeness River can be withdrawn for out-of-stream uses including agriculture. The local agricultural economy is vital for the community and local livelihoods. However, at the same time, the water that agricultural requires impacts the amount and quality of water and habitat available to migrating, spawning, and rearing fish in the Dungeness River.

Water resource managers, agricultural producers, and other groups have been working together for years to try and strike the right balance between human and environmental water needs in the watershed. Climate change impacts are making this work evermore challenging and urgent.

### Flows Regime

**How Climate Change Will Impact the Dungeness**

Climate change forecasts paint an alarming picture across Washington's Puget Sound region. A reduced snowpack and increased early season rainfall will likely result in higher winter flows and lower spring and summer flows. Peak flows will occur earlier in the spring. Overall, conditions will be more inhospitable to salmon.

### 2080s Projections

According to the University of Washington Climate Impacts Group's report *State of Knowledge, Climate Change in Puget Sound*, it is projected that by the 2080s (2070-2099, relative to 1970-1999):

- Stream temperatures in the Puget Sound region are projected to increase by 4.0°F to 4.5°F
- Total summer streamflow for the Puget Sound region is projected to decrease 32% - 40% on average
- Puget Sound rivers will more frequently exceed thermal tolerances for adult salmon (64°F) and charr (54°F), and the number of river miles with August stream temperatures in excess of these thermal tolerances is projected to increase by 1,016 and 2,826 miles, respectively
- Decreasing summertime streamflows are projected to reduce the habitat, health, and survival of Pacific salmon

### Rain/Snow Mix

In the Dungeness watershed, these changes are projected to be even more pronounced. The Dungeness is what is called a transient watershed, meaning it is a "mixed-rain-and-snow" basin. According to the Climate Impacts Group, "streamflow is projected to change the most in watersheds that are strongly influenced by both rain and snow. These 'mixed-rain-and-snow' basins, currently found on the north Olympic Peninsula and at middle elevations in the Cascades are projected to experience large increases in winter flows and flooding, and more severe declines in summer low flows. Higher-elevation 'snow dominant' basins are projected to completely disappear from the Puget Sound region by the 2080s, while many mixed-rain-and-snow watersheds transition into rain-dominated basins… ." (UW Climate Impacts Group).

### Severe Weather Increasing

## Dungeness Restoration

**Drastic Flow Shifts**

**Climate Change Impacts**

**Balancing Needs**

**Stakeholder Concerns**

**Management Team**

Peak stream flows are projected to occur earlier in the 2080s in many snowmelt-influenced rivers in the Puget Sound region. In the Dungeness, they are projected to occur 25-40 days earlier. The only other Puget Sound watershed with a projected shift as drastic is the Elwha Watershed — the next watershed over to the west of the Dungeness. Further, summer minimum streamflow (the lowest 7-day average flow that occurs on average once every 10 years) in the Dungeness is projected to decline 52% to 74% on average by the 2080s. Again, the Elwha is the only other Puget Sound watershed with a more dramatic projected decrease in summer minimum streamflow (UW Climate Impacts Group).

The Jamestown S'Klallam Tribe, in its *Climate Vulnerability Assessment and Adaptation Plan*, sums up the water challenges that the Dungeness River, its fish, and the local community are facing:

> "Climate change impacts are complicated by competing uses for water from salmon spawning habitat, which is especially true for the Dungeness River watershed. Dungeness River water itself is used for salmon habitat, as irrigation for agriculture, and drinking water is taken from the associated shallow water table aquifer. As summer flows decrease, there will be less water available for both salmon returning to spawn and agriculture uses. Warmer temperatures will increase evapotranspiration (i.e. water use of crops and vegetation), dry out soils, and increase agricultural demand for water resources. Lower flow rates will mean that the water stays in the river longer and has higher water temperatures that will add stress to salmon returning to the river" (Jamestown S'Klallam Tribe).

Already the driest watershed in the Puget Sound region, the impacts from climate change will spell trouble for the Dungeness' freshwater and the communities and fish that depend on it.

**Working Together to Restore the Dungeness**

Local groups and interests have not just sat back and watched as the demands and cumulative impacts on the Dungeness River and other local streams have increased over time. They have recognized the need to collaborate to protect the river and find a balance between the needs of the community and the needs of the native fish and wildlife species.

In 1988, a diverse group of local interests came together to form the Dungeness River Management Team to foster communication on the topic of flood management for the Dungeness River. Eventually these discussions evolved to include other natural resource concerns such as: floodplain and riparian development; logging practices; agricultural production; water quality and quantity; and fish and wildlife habitat protection. These ongoing conversations led to the creation of: watershed management plans; river restoration initiatives; and strategies to address competing interests affecting water resources, stream habitat and salmon recovery (Dungeness River Management Team).

## Dungeness Restoration

**Irrigation Efficiency**

**Minimum Instream Flow**

**Closed Basin**

**Water Bank**

**Reallocation**

**Hydrologic Connection**

**New Use Mitigation**

**Aquifer Recharge**

**"Restoration" Recharge**

In 1999, the Dungeness Water Users Association developed a Comprehensive Water Conservation Plan. The Plan identified irrigation efficiency projects that, when fully implemented, could reduce its river diversion by as much as two-thirds. Since then, Association members have converted more than two-thirds of their irrigation network from open ditches to pipes, thus improving the network's water-use efficiency and reducing the amount it withdraws from the river. In addition, the Water Users have agreed to divert no more than half of the flow in the Dungeness River during the irrigation season.

To date, Dungeness River Management Team members and other local partners have undertaken more than 50 projects to restore the Dungeness watershed.

### The Dungeness Water Management Rule and Dungeness Water Exchange

While there have been significant efforts made towards restoring the Dungeness River, low stream flows remain a major issue. Flows regularly fall well below the desired minimum instream flow level of 105 **c**ubic **f**eet per **s**econd (cfs). Climate change and development in the watershed have presented an ongoing challenge.

In 2012, in response, the Washington State Department of Ecology adopted a new instream flow rule which closed the basin to new appropriations. This rule sought to protect flow levels in the Dungeness and independent streams for ESA-listed fish species by:

- Setting instream flow levels for the Dungeness River, tributaries, and independent streams
- Requiring mitigation for any new groundwater withdrawals
- Enabling the option to close streams year-round or seasonally
- Establishing reserves for in-house domestic uses

The establishment of the Dungeness Water Management Rule, particularly the mitigation requirement for new groundwater withdrawals, led a local advisory committee to initiate a water bank called the "Dungeness Water Exchange" in 2013.

The Dungeness Water Exchange is operated by Washington Water Trust — a statewide non-profit focused on flow restoration (*see* Cronin & Fowler, *TWR* #102). The Exchange allows for new water uses by re-allocating previously beneficially-used water rights. It is a water mitigation bank to allow for rural well development outside existing water systems, and ensures that new groundwater wells for new buildings and water uses in the Dungeness basin do not negatively affect flows in the river and streams.

Rivers, streams, and groundwater in the Dungeness are all hydrologically connected. This means the withdrawal of groundwater for new buildings or water uses can negatively impact the amount of water flowing in the Dungeness River and other local streams.

The Dungeness Water Exchange was seeded with a 175 AFY water purchase from the local irrigators by the Washington Department of Ecology (AFY = acre feet per year; one acre foot equals ~326,000 gallons or enough water to cover one acre of land one-foot deep). Those seeking to develop new wells within the defined Dungeness Water Rule Area, are required to purchase mitigation from the Dungeness Water Exchange, and meter their water use.

Underlying this water bank is an extensive groundwater model, which estimates the proportional impact of new wells to the Dungeness River and independent streams. In turn, the Dungeness Water Exchange manages the impact of this new use, by infiltrating water at seven aquifer recharge sites annually (May 15-July 15) located throughout the watershed. This aquifer recharge has been made possible with the agreement of Dungeness Water Users Association members to convey the water through their pipes/ditches to the aquifer recharge sites. The water is then infiltrated into the ground where it slowly moves over the course of weeks and months restoring groundwater and boosting flows in the Dungeness River and other local streams during the driest summer months when it is needed most. Since the Dungeness Water Exchange was created, it has mitigated the impacts of more than 400 new homes and small businesses, allowing the community to grow while protecting stream flows.

The Dungeness Water Exchange not only mitigates for new water uses in the Dungeness, but also goes above and beyond by putting additional "restoration" water back into the ground to benefit the groundwater, river, and streams. In 2019, the Dungeness Water Exchange expanded the aquifer recharge program with the Water Users Association, receiving a recharge permit from the Department of Ecology to utilize spring high flow water to contribute to flow restoration and not just mitigation at the recharge sites. This permit allows for withdrawals for restoration recharge January 1-July 14 if stream flow levels are above the instream flow requirements. In 2021, for example, the Dungeness Water Exchange had to mitigate 26.42 AFY of new water uses; however, it went far beyond this mitigation requirement by restoring an extra 482.80 AFY of water to the watershed (Washington Water Trust).

## Dungeness Restoration

### Dry Year Leasing

**Responding to Drought: Dry Year Leasing**

Recently, there have been a number of glimpses into potential future conditions in the Dungeness. Since the year 2000, there have already been six major droughts or dry-years in the watershed. Drought in the Dungeness is generally a result of one or more of the following: a low winter snowpack, high winter/spring temperatures, and/or very dry summers. 2015 was one of the worst droughts on record with the entire Dungeness under "Extreme Drought" conditions. In 2009 and 2016, flows were critically low, but drought was not officially declared by the State of Washington.

| Year | Drought | Dry | Type of Drought |
|---|---|---|---|
| 2001 | X | | Low Winter Precipitation |
| 2003 | X | | Low Winter Precipitation |
| 2005 | X | | Warm Winter Temperatures |
| 2009 | | X | Low Winter Precipitation |
| 2015 | X | | Warm Winter Temperatures |
| 2016 | | X | Low Winter Precipitation |
| 2019 | X | | Low Winter Precipitation |
| 2021 | X | | High Spring/Summer Temperatures |

When these drought and dry years occur, emergency actions can be taken to help the Dungeness River. An official declaration of drought by the Governor can activate emergency funding for Washington's Department of Ecology to support drought response efforts like dry year leasing. Under this scenario, water leases are developed with irrigators and they are essentially paid not to water their acreage for the last month of the irrigation season. That water then remains in the Dungeness River for fish where it can make a critical difference to help alleviate dangerous low flow conditions.

### Forbearance Agreements

In 2001, 2003, and 2005, the Department of Ecology ran August-September leasing programs with irrigators in order to bolster late season flows. In 2009, 2015, 2016 and 2019, Washington Water Trust conducted a dry year leasing program for the last month of the irrigation season after the onset of a dry year or state-declared drought. In 2015, Washington Water Trust was able to secure forbearance-from-irrigation agreements with a number of irrigators which reduced diversions from August 15 - September 15 and left as much as 5.6 cfs instream. In 2016 with the onset of a dry spring, the snowpack quickly left the Olympics, and Washington Water Trust and irrigators mobilized to get irrigators signed-up for forbearance agreements to reduce diversions and protect instream 7.58 cfs, increasing late season flows by approximately 10%. In 2019, in response to drought, twenty farmers signed up for forbearance agreements resulting in water typically used to irrigate 1,350 acres being kept in the Dungeness River instead. This water increased the flow in the river by as much as 12% during this critical low-flow period (Washington Water Trust).

Dry year leasing in the Dungeness is an emergency action to help salmon during drought or dry years. With climate projections in mind, an expansion of the Dungeness Dry Year Leasing Program into a regular annual program has been explored as a potential way to significantly restore flows to the Dungeness annually and build climate resilience. Such a program would require the very challenging prospect of enrolling more than half of the currently irrigated acres in the basin into the forbearance program (nearly 4,000 acres) every year to have a flow restoration effect comparable to another proposed project — namely, the Dungeness Streamflow Restoration Off-Channel Reservoir, which represents the greatest remaining opportunity for Dungeness River flow restoration and freshwater climate resiliency.

### Off-Channel Reservoir

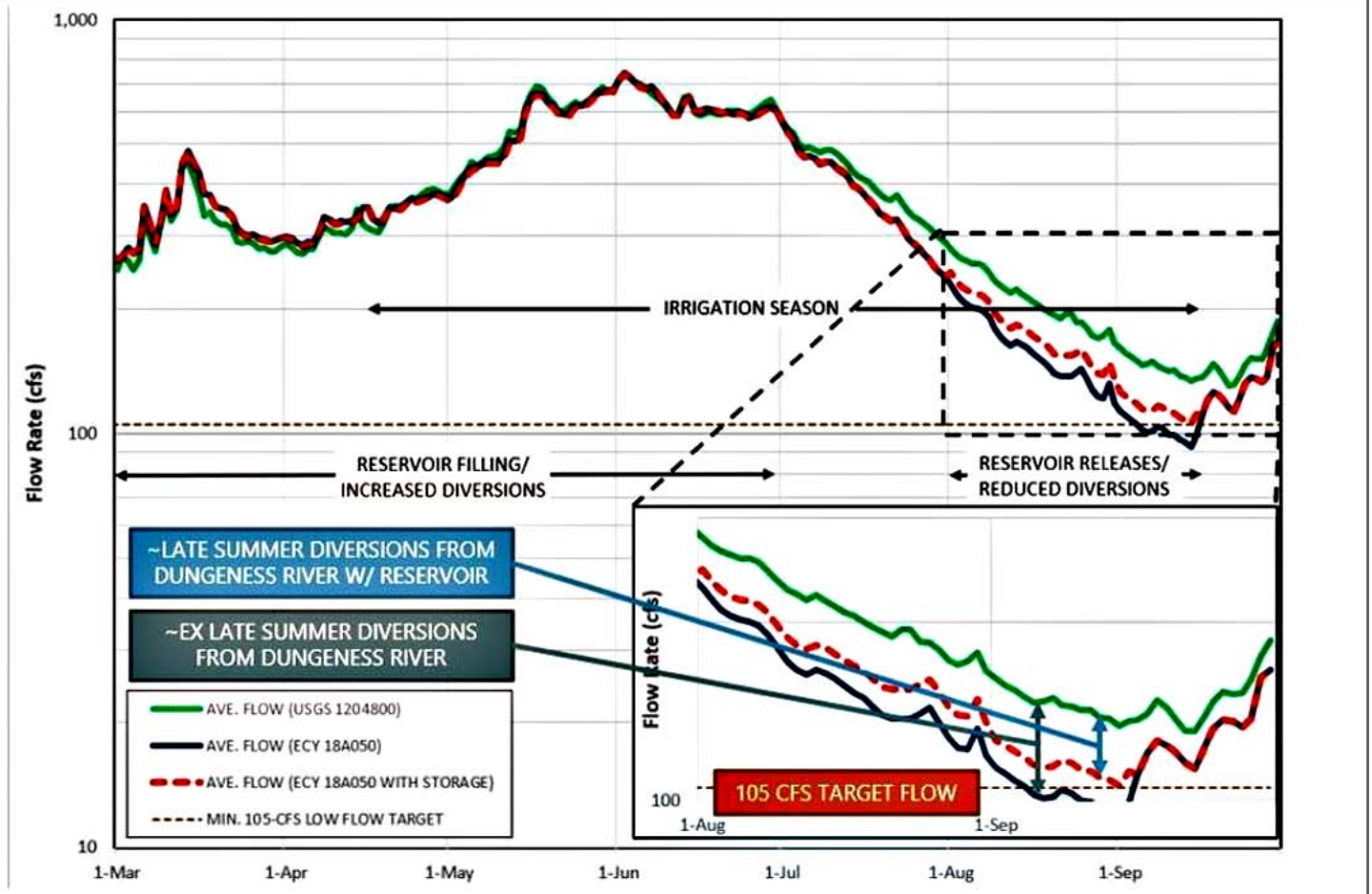
**Looking Towards the Future: the Dungeness Streamflow Restoration Off-Channel Reservoir**

The Dungeness Streamflow Restoration Off-Channel Reservoir represents the best opportunity to restore flow "in bulk" to the Dungeness River and provide freshwater climate resiliency for farmers on the eastside of the river. The Dungeness Reservoir has broad support from local and statewide entities. Clallam County has recognized the Dungeness Reservoir as its top water resources priority because of its benefits to community development, water resources, and salmon recovery. A working group focused on the reservoir has been convening regularly since 2014. This group includes: City of Sequim; Clallam Conservation District; Clallam County; Dungeness Water Users Association; Jamestown S'Klallam Tribe; Washington Department of Ecology; Washington Department of Fish and Wildlife; and Washington Water Trust.

## Dungeness Restoration

### Water Exchange

The proposed 1,600 acre-foot reservoir will be filled in the winter/spring when river flows are high with water diverted from the mainstem Dungeness via an irrigation diversion near mile 11 of the river. In August-September of each year, irrigators located on the east side of the Dungeness River will use the stored water for irrigation instead of diverting water from the river during its critical low flow period. This will allow up to 25 cfs of flow that would normally have been diverted to remain in the Dungeness River instead to support fish. This flow restoration represents as much as nearly 50% of flows in some low flow years when flows have dropped below 55 cfs, and should enable the river to meet its minimum 105 cfs low-flow target during an average year (Anchor QEA). It should be noted that water stored in the Reservoir will not be returned to the river.

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ANCHOR QEA

**Anticipated Impact of Storage on Dungeness River Flows**

Preliminary Basis of Design Report
Dungeness Off-Channel Reservoir Project

### Streamflow Benefits

According to the US Fish and Wildlife Service's *Fish Habitat Analysis for the Dungeness River Using the Instream Flow Incremental Methodology*, the stream flow restored by the reservoir in the lower Dungeness River (when calculated for flow increases from 90 cfs to 120 cfs) could increase the **w**eighted **u**sable habitat **a**rea (WUA) by roughly 10%-35% for juvenile bull trout, juvenile steelhead, juvenile Chinook, adult Chinook, spawning Chinook, and spawning pink salmon. In addition to the habitat area increases, fish will experience benefits in the form of cooler water, improved water quality, and reduced threat of impassable barriers.

### Climate Resiliency

The anticipated impacts of climate change were central to the development of the Dungeness Reservoir project as one of its primary objectives. In addition to providing climate resiliency to the Dungeness River and its ESA-listed fish, it will provide climate resiliency to the agricultural producers of the Dungeness Valley as it will serve as a reliable water source for irrigation, taking into account projected future climate change impacts and a shifting hydrograph. This need for climate resiliency in the Dungeness basin has been strongly emphasized and supported in local and regional climate change reports and adaptation



## Dungeness Restoration

### Agency Support

strategies. In addition to flow restoration and serving as a climate resilient water supply, the reservoir will provide additional benefits such as: reduction of local flood hazards from upland storm events; support for additional aquifer recharge; and a new, nearly 400-acre, community park.

Progress is being made towards the Dungeness Reservoir — and the major streamflow restoration and climate resiliency benefits it will provide — becoming a reality. The Washington Department of Ecology has provided valuable support to assist with the planning, design, land transfer, permitting, and outreach for the reservoir. However, additional federal and/or state support will be needed for the construction of the reservoir structure.

### Conclusion

Many important collaborative approaches and strategies — from floodplain restoration to irrigation ditch piping to water banking to dry year leasing — are being used to restore and build resiliency in the Dungeness, the driest watershed in the Puget Sound region, for its fish, farms, and the local community. Intensifying climate change impacts will likely keep pace. Thus, forward-thinking local solutions will need to continue to be developed. The Dungeness Streamflow Restoration Off-Channel Reservoir is one of these solutions that will not only provide its own set of benefits but will integrate with and enhance the benefits of many of the restoration projects preceding and coming after it.

**For Additional Information:**

Chris Czarnecki, Washington Water Trust, 206/ 809-3208 or chris@washingtonwatertrust.org

Restoring the Dungeness website: This article is an extension of a recent ArcGIS Storymap on the Dungeness which contains more imagery, videos, and interactive elements. To view the Storymap, please visit: https://arcg.is/1WKO4e1.

### Acknowledgements and Disclaimer

The author would like to acknowledge and give a special thanks to all of the wonderful groups that have worked hard together over the years to help the Dungeness River and watershed including but certainly not limited to: the Washington State Department of Ecology; the Washington State Department of Fish and Wildlife; Clallam County; Clallam Conservation District; Jamestown S'Klallam Tribe; City of Sequim; the Dungeness Water Users Association; and the Clallam Public Utility District. I would also like to thank my current and former Washington Water Trust colleagues who helped make the Storymap and, therefore, this article on the Dungeness possible: Aiman Shahpurwala; Jason Hatch; Nicole Gutierrez; Emily Dick; and Haley Brueckman. I am responsible for the information presented in this article, including any errors or omissions. Any questions can be directed to me at chris@washingtonwatertrust.org.

**Chris Czarnecki** is the Investments & Partnerships Officer at Washington Water Trust. Since graduating from Wake Forest University in 2007, he has worked in various capacities for conservation non-profits in Alaska, Nepal, Washington DC, and Seattle. He logged eight years of experience with organizations focused on community-based biodiversity and landscape conservation in the mountains of central and south Asia. In 2019, he joined the Washington Water Trust and is happy to be working as part of a dedicated team to restore and protect freshwater in Washington State for the fish that he passionately (and mostly unsuccessfully) loves to pursue with a fly rod during his free time.

WATER BRIEFS

# The Water Report Up for Sale

**From the Editors:**

For over eighteen years, it has been our good fortune to be engaged in covering "Water Rights, Water Quality & Water Solutions in the West" — employment which has allowed us to interact with many of the most knowledgeable, thoughtful, motivated, and innovative practitioners active in the full range of water professions. However, the time has come for us to retire.

The Water Report is a well-established, resilient business whose subscription-based model has proven able to weather a Great Recession and the global pandemic, with a resubscription rate rarely dipping below 90%. There is ample opportunity for growth.

We operate with very low overhead costs with salaries supporting two full time positions (when younger, one of your editors managed a similar operation single-handed). While a monthly publishing schedule keeps us focused, we have enjoyed considerable flexibility in scheduling our working hours and time off. While we currently handle all aspects of the business excepting the printing and mailing, a number of activities (e.g., sales, graphics, layout, etc.) could easily be done by others.

To build upon our success, we consider it imperative that the new owner(s) remain appreciative of the importance pursuing the full range of opinion and expertise at work in water management and policy. We will be available to consult with during the transition, should that prove helpful.

If interested in discussing purchase of The Water Report, please call 541/ 517-5608 or email to: TheWaterReport@yahoo.com.

## PFAS US

### EPA's new lifetime health advisories

On June 15, the US Environmental Protection Agency (EPA) released four drinking water health advisories for per- and polyfluoroalkyl substances (PFAS). EPA also announced that it is inviting states and territories to apply for $1 billion to address PFAS and other emerging contaminants in drinking water. EPA is releasing PFAS health advisories in light of newly available science and in accordance with EPA's responsibility to protect public health.

EPA's also announced forthcoming National Primary Drinking Water Regulation for PFOA and PFOS, which EPA will release in the fall of 2022.

As part of a government-wide effort to confront PFAS pollution, EPA is making available $1 billion in grant funding through the Bipartisan Infrastructure Law to help communities that are on the frontlines of PFAS contamination. This funding is the first of $5 billion available through the Law to be used to reduce PFAS in drinking water in communities facing disproportionate impacts. These funds can be used in small or disadvantaged communities to address emerging contaminants like PFAS in drinking water through actions such as: technical assistance; water quality testing; contractor training; and installation of centralized treatment technologies and systems.

EPA will be reaching out to states and territories with information on how to submit their letter of intent to participate in this new grant program. EPA will also consult with Tribes and Alaskan Native Villages regarding the Tribal set-aside for this grant program. This funding complements $3.4 billion in funding that is going through federal Drinking Water State Revolving Funds (SRFs) and $3.2 billion through the Clean Water SRFs that can also be used to address PFAS in water this year.

The four drinking water health advisories indicate the level of drinking water contamination below which adverse health effects are not expected to occur. Health advisories provide technical information that federal, state, and local officials can use to inform the development of monitoring plans, investments in treatment solutions, and future policies to protect the public from PFAS exposure.

EPA's lifetime health advisories identify levels to protect all people, including sensitive populations and life stages, from adverse health effects resulting from a lifetime of exposure to these PFAS in drinking water. EPA's lifetime health advisories also take into account other potential sources of exposure to these PFAS beyond drinking water (for example, food, air, consumer products, etc.), which provides an additional layer of protection.

EPA is issuing interim, updated drinking water health advisories for **p**er**f**luoro**o**c**ta**noic acid (PFOA) and **p**er**f**luoro**o**ctane **s**ulfonic acid (PFOS) that replace those EPA issued in 2016. The updated advisory levels, which are based on new science and consider lifetime exposure, indicate that some negative health effects may occur with concentrations of PFOA or PFOS in water that are near zero and below EPA's ability to detect at this time.

The lower the level of PFOA and PFOS, the lower the risk to public health. EPA recommends states, Tribes, territories, and drinking water utilities that detect PFOA and PFOS take steps to reduce exposure. Most uses of PFOA and PFOS were voluntarily phased out by US manufacturers, although there are a limited number of ongoing uses. These chemicals remain in the environment due to their lack of degradation.



## WATER BRIEFS

For the first time, EPA is issuing final health advisories for perfluorobutane sulfonic acid and its potassium salt (PFBS) and for **h**exa**f**luoro**p**ropylene **o**xide (HFPO) dimer acid and its ammonium salt ("GenX" chemicals). In chemical and product manufacturing, GenX chemicals are considered a replacement for PFOA, and PFBS is considered a replacement for PFOS. The GenX chemicals and PFBS health advisory levels are well above the level of detection, based on risk analyses in recent scientific studies.

EPA's new health advisories provide technical information that federal, state, and local agencies can use to inform actions to address PFAS in drinking water, including: water quality monitoring; optimization of existing technologies that reduce PFAS; and strategies to reduce exposure to these substances.

EPA encourages states, Tribes, territories, drinking water utilities, and community leaders that find PFAS in their drinking water to: take steps to inform residents and undertake additional monitoring to assess the level, scope, and source of contamination. Individuals concerned about levels of PFAS found in their drinking water should consider installing a home or point of use filter.

**Next Steps**

EPA will be moving forward with proposing a PFAS National Drinking Water Regulation in fall 2022. As EPA develops this proposed rule, the agency is also evaluating additional PFAS beyond PFOA and PFOS and considering actions to address groups of PFAS. The interim health advisories will provide guidance to states, Tribes, and water systems for the period prior to the regulation going into effect.

EPA's work to identify and confront the risks that PFAS pose to human health and the environment is a key component in the Biden-Harris Administration whole-of-government approach to confronting these emerging contaminants. This strategy includes steps by the Food and Drug Administration to increase testing for PFAS in food and packaging, by the US Department of Agriculture to help dairy farmers address contamination of livestock, and by the Department of Defense to clean-up contaminated military installations and the elimination of unnecessary PFAS uses.

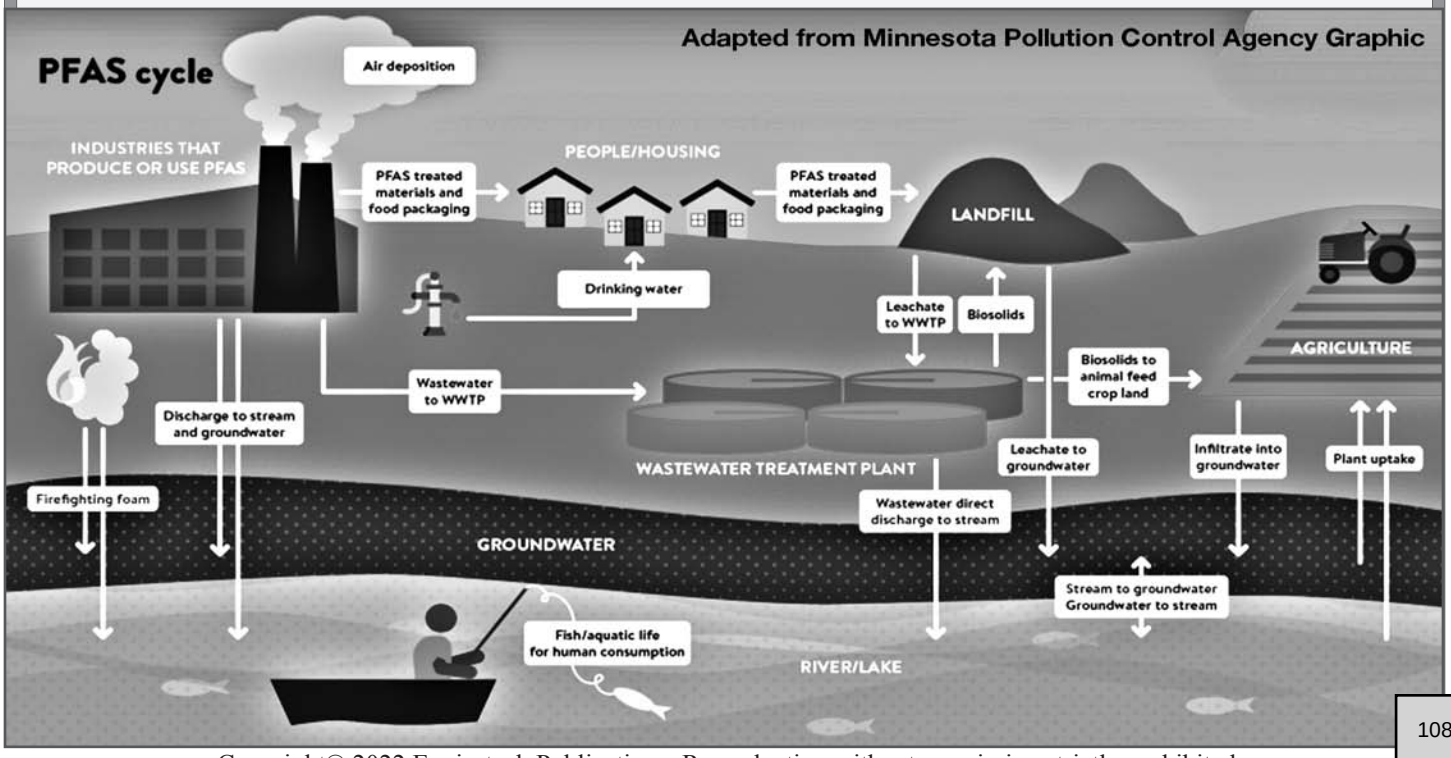
To receive grant funding announced today through the Bipartisan Infrastructure Law, states and territories should submit a letter of intent by August 15, 2022.

**PFAS Strategic Roadmap**

In accordance with EPA's "PFAS Strategic Roadmap" (see Water Brief, *TWR* #213 and Kray, et alia, *TWR* #216), the agency has undertaken a number of actions to deliver progress on PFAS including:

- Issuing the fifth Unregulated Contaminant Monitoring Rule to improve EPA's understanding of the frequency that 29 PFAS are found in the nation's drinking water systems and at what levels
- Issuing the first Toxic Substances Control Act PFAS test order under the National PFAS Testing Strategy
- Adding five PFAS to EPA's contaminated site cleanup tables
- Publishing draft aquatic life water quality criteria for PFOA and PFOS
- Issuing a memo to proactively address PFAS in Clean Water Act permitting
- Publishing a new draft total absorbable fluorine wastewater method

**For info:** EPA's PFAS website: www.epa.gov/pfas



## WATER BRIEFS

**WETLANDS FINES CA**
**MITIGATION SETTLEMENT**

On June 2, the EPA announced a settlement with California's Imperial Irrigation District (IID) for violations of the Clean Water Act (CWA) related to polluting of local wetlands. Under the settlement, IID will pay a $299,857 penalty and provide mitigation to offset the harm to the environment.

"This enforcement action reflects EPA's continued commitment to ensuring public utilities like Imperial Irrigation District comply with federal laws and prevent pollution of wetlands," said EPA Pacific Southwest Regional Administrator Martha Guzman. "Actions like this are key to protecting our waterways and surrounding communities."

On November 5, 2020, inspectors from EPA's Pacific Southwest Region and the US Army Corps of Engineers inspected IID's construction of drain banks in the area and found that activities resulted in the discharge of sediment to approximately 1 acre of wetlands. This discharge also impacted approximately 20 acres of wetlands by severing the connection with Morton Bay, which drains to the Salton Sea.

In addition to paying the penalty, IID will develop a plan for the removal of the sediment in question and the restoration of the water connection to Morton Bay. If they are unable to restore the impacted site, IID would need to reestablish 63 acres of wetlands at an alternative location.

An overarching priority of the CWA is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. A more specific CWA federal goal is "No Net Loss" of wetlands by first avoiding, then minimizing, and finally compensating for any impacts to aquatic resources caused by the discharge of dredge or fill material into waters of the United States.

EPA has proposed a Consent Agreement and Final Order and accepted public comment through July 5, 2022.

**For info:** Public Notice at: www.epa.gov/publicnotices/imperial-irrigation-district-imperial-ca-proposed-settlement-cwa-section-309g-class

**COASTAL RESILIENCE US**
**NOOA FUNDING**

On June 29th, US Commerce Secretary Gina M. Raimondo announced funding opportunities from the National Oceanic and Atmospheric Administration's (NOAA's) $2.96 billion in Bipartisan Infrastructure Law funds to address the climate crisis and strengthen coastal resilience and infrastructure. Over the next five years, NOAA's targeted investments in the areas of habitat restoration, coastal resilience, and climate data and services will advance ongoing federal efforts toward building climate resilience.

NOAA will select high-impact projects that will incentivize investments in communities, states, and regions that can drive additional funding to complementary projects. Funded projects will support three major initiatives:

Climate Ready Coasts will help coastal communities build the future they want to see, investing in natural infrastructure projects that build coastal resilience, create jobs, store carbon, remove marine debris, and restore habitat. ($1.467 billion over five years)

Climate Data and Services will support a whole-of-government effort to address the climate crisis by getting critical information and tools in the hands of decision-makers, particularly to address floods, wildfire, drought, and ocean health. ($904 million over five years)

Fisheries and Protected Resources will advance efforts to restore important fisheries habitat and promote community economic development. ($592 million over five years)

The investments will be scalable, leverage partnerships, and be responsive to the need for better climate information. NOAA will ensure the impact of this funding is equitable, coordinated, and results in projects that benefit Tribal Nations and underserved and underrepresented communities.

NOAA's Notice of Funding Opportunities for the coming year focused on habitat restoration, coastal resilience, and marine debris as part of the Climate Ready Coasts initiative including:

- Transformational Habitat Restoration and Coastal Resilience Grants ($85 million)
- Coastal Habitat Restoration and Resilience Grants for Underserved Communities ($10 million)
- Coastal Zone Management Habitat Protection and Restoration Grants ($35 million)
- National Estuarine Research Reserve System Habitat Protection and Restoration Grants ($12 million)
- Marine Debris Removal ($56 million)
- Marine Debris Challenge Competition ($16 million)
- Marine Debris Community Action Coalitions ($3 million)

These funding opportunities are designed to help coastal communities invest in and optimize green infrastructure and nature-based solutions to increase resilience to climate change and extreme weather events. The White House Coastal Resilience Interagency Working Group (IWG), co-led by NOAA and the Council on Environmental Equality (CEQ), developed a resource guide to build climate resilience in the coast, "*Compendium of Federal Nature-Based Resources for Coastal Communities, State, Tribes and Territories*" (*see*: www.noaa.gov/sites/default/files/2022-04/Nature-based-Solutions-Compendium.pdf).

These investments help advance the Biden-Harris administration's "America the Beautiful initiative" — which aims to conserve, connect and restore 30 percent of lands and waters in the US by 2030.

**For info:** www.noaa.gov/infrastructure-law

**TRUST WATER RIGHTS WA**
**POLICY & GUIDANCE**

On July 1, the Washington Department of Ecology (Ecology) announced the publication of the policy and guidance on the administration of the Trust Water Rights Program (TWRP). In addition, Ecology is sharing its new water banking form and updated water rights donation form.

These documents address the extensive comments Ecology received during two comment periods. Ecology made many changes to the drafts, and the final documents are now available on its Trust Water Rights Program and Water Banks websites.

POLICY 1010: Administration of the Trust Water Rights Program

GUIDANCE: Administering the Trust Water Rights Program

FORM: Request to Establish or Modify a Water Bank

FORM: Temporary Donation to the Trust Water Rights Program

This announcement comes after years of working toward our very first policy related to trust water and

a longstanding need to update our guidance. Thank you for your patience and for the comments you provided.
**For info:** Kelsey Collins, Ecology, 509/731-0976, Kelsey.Collins@ecy.wa.gov, or Ecology website: https://ecology.wa.gov/

**ILLEGAL CANNABIS GROW CA**
**SEDIMENT RUNOFF FINE**

On June 24, California's State Water Resources Control Board announced that three cannabis cultivators in Humboldt County are facing a $209,687 fine in connection with sediment discharged into tributaries of the Mad River that posed a risk to water quality and aquatic life, according to a formal complaint signed last week by staff of the North Coast Regional Water Quality Control Board.

Szagora LLC, Toshko Toshkoff and Rudy Chacon (the "cultivators") commercially cultivated cannabis on a 100-acre property along the Humboldt-Trinity County line between the towns of Dinsmore and Mad River. The complaint alleges the cultivators failed to obtain a permit to legally cultivate cannabis and did not respond to an enforcement order requiring them to maintain an access road on their property consistent with industry standards designed to protect water quality and beneficial uses. The road on the property has steep sections that are hydrologically connected to surface waters. North Coast Water Board staff determined the road is undersized, misaligned, and contains failed stream crossings that threaten to discharge sediment to the Mad River less than a quarter mile east of the property. "By failing to obtain a required permit, follow industry standards and adequately respond to an enforcement order, the unlicensed cultivators gained an unfair advantage over legal cultivators," said Claudia E. Villacorta, assistant executive officer. "But more importantly, they put a waterway at risk."

Sediment delivery to waterways negatively impacts the migration, spawning, reproduction and early development of cold-water fish. Excess sediment delivery to streams can smother aquatic animals and habitats; alter or obstruct flows resulting in flooding; and reduce water clarity, which makes it difficult for organisms to breathe, find food and refuge, and reproduce. The discharge of sediment in the Mad River watershed is especially problematic because it is listed as an impaired water body under Section 303(d) of the Clean Water Act due to elevated sedimentation/siltation and turbidity.

A public hearing to consider the complaint and vote on whether to approve the fine is scheduled for August 4-5 before the North Coast Water Board. A copy of the administrative complaint is available for review on the North Coast Water Board's website at: www.waterboards.ca.gov/northcoast/public_notices/public_hearings/enforcement_hearings/
**For info:** Blair Robertson, Waterboards at: blair.robertson@waterboards.ca.gov

**CAFO GENERAL PERMIT WA**
**REISSUANCE REVIEW**

The Washington Department of Ecology (Ecology) is proposing updates to the Concentrated Animal Feeding Operation (CAFO) water quality permit, which is how the agency oversees manure management at certain facilities. As part of the five-year permit review cycle, Ecology is asking for feedback on revisions to this permit, which mostly applies to large dairies. A number of the proposed updates are in response to a 2021 decision from the Washington State Court of Appeals, following appeals to an earlier version of the permit.

Currently, 24 CAFOs are regulated under Ecology's permit, out of more than 100 large CAFO facilities in the state. Ecology regulates these facilities because they have either released waste that entered surface or ground water, or they voluntarily chose to come under the permit. The Washington State Department of Agriculture is the principal inspector of dairies and partners with Ecology to implement this permit.

The proposed revisions are based on Ecology's experience implementing the current permit, including inspections and enforcement actions, updated science, permit appeal decisions, and stakeholder feedback. Ecology initially planned to propose updates to the permit in the summer of 2021, when a ruling from the Washington Court of Appeals on the permit was issued. The agency determined it made sense to incorporate the ruling in the draft permit and hold another round of listening sessions prior to releasing the draft permit for public review.

Based on the 2021 Court of Appeals decision, Ecology is proposing a number of updates, including: Monitoring; Manure Pollution Prevention; Managing Manure Lagoons; Restrictions for Applying Manure on Land; and Stream Protection Areas. Ecology is also proposing to start online reporting for this permit, so the information Ecology collects from permittees, such as annual reports, is available immediately. Previously, all permit documents were submitted to Ecology on paper.

Draft permit language and SEPA documents are available for public comment until August 3, 2022. Ecology has planned two public hearings on the permit, where attendees can hear a presentation from Ecology and provide verbal comments if they choose. Spanish language interpretation will be available at both events (*see* Calendar, this *TWR* for info on July 26 (morning) and July 28 (evening) workshops and public hearings.
**For info:** Chelsea Morris, Ecology, 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

**WATER EFFICIENCY WEST**
**RECLAMATION PROJECTS**

The Bureau of Reclamation selected 22 projects to share $17.3 million in WaterSMART Water and Energy Efficiency Grants. These competitive projects improve water use efficiency, increase renewable energy production, reduce the risk of water conflicts, and provide other benefits that will enhance water supply sustainability in the western United States.

The selected projects include: Lining and piping canals; Installing and upgrading water meters and timers; Installing solar to reduce power demand; and Adding automated gate controls. The projects will be completed in two or three years, depending on the funding received. To view all the selected projects, visit www.usbr.gov/watersmart/weeg/.

The Bard Water District, located in southern California near the Arizona border, will line a 1/2 mile section of the currently earthen upper Mohave Canal with concrete. The project is expected to result in annual water savings of 498 acre-feet, which is currently lost to seepage, evapotranspiration, and operational losses. Conserved water

will remain in the Lower Colorado River System and can be used by other water users during drought years and in times of shortage, including the Quechan Indian Reservation. The project will also allow farmers to continue to work with the Natural Resources Conservation Service's Environmental Quality Incentives Program to improve irrigation systems. The project will receive $484,340 with a total project cost of $968,680.

The Quincy-Columbia Basin Irrigation District in central Washington will line 2,500 feet of the earthen West Canal. The project will help address regional water reliability concerns, including drought, groundwater issues, and improved stream flows to assist salmon recovery. The project will receive $300,000 with a total project cost of $750,000.

The Lower Republican Natural Resources District in southern Nebraska will install near real-time telemetry equipment on 1,057 irrigation flow meters and other water management sensors for improved on-farm water management and reporting. In addition, the district will install eight solar-powered weather stations to collect evapotranspiration data to inform irrigation scheduling in the area. The project will receive $2,000,000 with a total project cost of $4,360,858.

This funding supplements the investments from the Bipartisan Infrastructure Law, which contains $400 million over five years for WaterSMART grants, including drought resiliency projects. In 2022, Reclamation is making $160 million available and will release other funding opportunities this spring.

**For info:** Reclamation's WaterSMART program webpage: www.usbr.gov/watersmart/; Bipartisan Infrastructure Law at: www.usbr.gov/bil

## WASTEWATER TA MIDWEST

**TRAINING/TECHNICAL ASSISTANCE**

On June 27, the US Environmental Protection Agency (EPA) announced up to $18 million in available federal funding to build the pipeline of Technical Assistance (TA) providers that can serve rural, small, and Tribal municipalities through the Clean Water Act Prevention, Reduction, and Elimination of Pollution Grant Program. This investment delivers on President Biden's Justice40 initiative and will support TA providers to help utilities improve vital wastewater management that is essential to healthy communities. This funding will also elevate impact from Bipartisan Infrastructure Law funding available to small, rural, and Tribal communities.

This grant program highlights EPA's priorities to advance equity, address climate change, and to help bridge the gap between community needs and federal funding. EPA is seeking applications from organizations with experience delivering results-oriented technical assistance to rural, small, and Tribal publicly owned wastewater systems and decentralized wastewater treatment systems.
Once selected, grantees will provide technical assistance in the following areas: Acquisition of financing and funding; Protection of water quality and compliance assistance; Tribal wastewater systems; Decentralized wastewater systems; and Lagoon wastewater systems.

President Biden's Justice40 initiative intends to ensure that federal agencies deliver at least 40% of benefits from certain investments, including water and wastewater infrastructure, to underserved communities.

**For info:** EPA program website at: www.epa.gov/small-and-rural-wastewater-systems/tools-training-and-technical-assistance-small-and-rural

## COLORADO WATER PLAN CO

**2023 UPDATE - COMMENT**

The first Colorado Water Plan was released in 2015 at the direction of then-Governor John Hickenlooper to serve as the state's framework for solutions to the state's water challenges (*see* Water Briefs, *TWR* #132). The Water Plan is a grassroots effort, and relies on the Colorado water community to identify and implement basin-specific and/or statewide water projects that provide multiple benefits to the state's diverse water users. The Colorado Water Conservation Board (CWCB) creates and manages the Plan's framework, and supports the state's water community with funding and technical resources to implement programs and projects. In 2020, the Water Plan celebrated its 5th Anniversary, including 76% progress on identified actions and funding for more than 240 water projects across the state — all within just five years. *See* also Ecklund, *TWR* #206.

The next, updated version of the Colorado Water Plan is currently in the development process, set for final release in early 2023. The 2023 Water Plan vision is focused into four major action areas: Vibrant Communities, Robust Agriculture, Thriving Watersheds, and Resilient Planning. This process included a robust stakeholder engagement process in a scoping phase to consider feedback and concerns with the original plan, followed by an initial drafting phase. The 2022 draft version is currently out for a 90-day public comment period from June 30 — September 30, 2022. Public comments can be submitted through engagecwcb.org.

Collaborative Water Management is highlighted in the 2023 Fact Sheet. "The Colorado Water Plan is built on decades of evolving water policy and collaboration. Our water challenges demand united focus and innovation. The institutional system governing how much water Colorado can use and consume within its boundaries is based on nine interstate compacts, two equitable apportionment decrees, and Colorado water law (called prior appropriation). State and local governments also govern water use and management with regulations, ordinances, and codes. These governing systems working together have allowed Colorado's water users and stakeholders to develop strong relationships across regional divides."

The 2023 Fact Sheet goes on the emphasize Colorado Water Values. "The spirit of collaboration that underscores our four core values, will be more critical than ever to achieve the collective vision for Colorado's water future. These values include: 1) A productive economy that supports vibrant and sustainable cities, agriculture, recreation and tourism; 2) An efficient and effective water infrastructure system; 3) A strong environment with healthy watersheds, rivers, streams and wildlife; 4) An informed public with creative, forward-thinking solutions that are sustainable and resilient to changing conditions and result in strong, equitable communities that can adapt and thrive in the face of adversity."

**For info:** Colorado Water Plan webpage at: cwcb.colorado.gov >> Colorado Water Plan; Water Plan 2023 (2022 Draft) available along with Water Plan 2023 Fact Sheet on the webpage

## CALENDAR

**July 21 WEB**
**Hazardous Waste and Sites (ELI Summer School, 2022),** 12:00pm-2:00pm Eastern Time. Presented by the Environmental Law Institute: Free - Registration Required by July 19. For info: www.eli.org

**July 21-23 CO**
**68th Annual Natural Resources and Energy Law Institute, Vail.** The Hythe. Presented by The Foundation for Natural Resources and Energy Law (formerly Rocky Mountain Mineral Law Foundation). For info: fnrel.org/programs/ai68

**July 24-26 AZ**
**WateReuse Arizona Annual Symposium, Flagstaff.** Little America Hotel. For info: www.azwater.org/events

**July 24-27 WA**
**National Association of Clean Water Agencies (NACWA) 2022 Utility Leadership Conference, Seattle.** Hyatt Regency. For info: www.nacwa.org/conferences-events/

**July 26 WEB**
**Confined Animal Feeding Operation (CAFO) General Permit Reissuance - Workshop & Public Hearing Webinar,** 10am Pacific Time. Workshop Immediately Followed by Public Hearing; Comments Accepted through August 3. For info: Chelsea Morris, Ecology 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

**July 26-28 ID**
**Western Governors Association 2022 Annual Meeting, Coeur d'Alene.** For info: www.westgov.org

**July 28 WEB**
**Confined Animal Feeding Operation (CAFO) General Permit Reissuance - Workshop & Public Hearing Webinar,** 6pm Pacific Time. Workshop Immediately Followed by Public Hearing; Comments Accepted through August 3. For info: Chelsea Morris, Ecology 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

**July 28 OR**
**WateReuse Pacific Northwest Oregon Summer Summit, Eugene.** Metropolitan Wastewater Management Commission Treatment Plant. RE: Recycled Water and its Many Benefits. Free Event. For info: https://watereuse.org/event/watereuse-pacific-northwest-oregon-summer-summit-and-social/

**August 2-5 MT**
**Western States Water Council 2022 Summer Meeting, Polson.** KwaTaqNuk Resort-Casino. For info: https://westernstateswater.org/upcoming meetings/

**August 10 CA**
**California Association of Sanitation Agencies (CASA) Annual Conference, Olympic Valley.** Resort at Squaw Creek. For info: https://casaevents.memberclicks.net/annual-conference

**August 11 WEB**
**Trying Times: Conservation Easements and Federal Tax Law 2022,** Virtual Event: 8am-Noon Pacific Time. Presented by the University of Utah College of Law: Sponsored by the Cultural Vision Fund & Utah Open Lands in cooperation with the Wallace Stegner Center. For info: www.utahopenlands.org > Events

**August 11-12 AZ**
**30th Annual Arizona Water Law SuperConference: Challenges & Collaborative Solutions, Scottsdale.** Hilton Hotel. For info: CLE International: 800/ 873-7130 or www.cle.com

**August 16-18 UT**
**2022 National Water Use Data Workshop, Salt Lake City.** Utah Dept. of Environmental Quality Bldg., 195 North 1950 West. Collaboration Between Western States Water Council Water Information Management Systems (WIMS) Group, USGS, Interstate Council on Water Policy & Internet of Water. For info: westernstateswater.org/events/2022-national-water-use-data-workshop/

**August 17-18 CA**
**7th Annual California Water Data Summit, Irvine.** UC Irvine. For info: www.cawaterdatasummit.org/

**August 17-18 DC**
**2022 Water Finance Conference, Washington.** Hilton Washington DC Capital Hill. RE: Water and Wastewater Utility Finance. For info: www.waterfinanceconference.com

**August 18 WEB**
**Regulatory Compliance for Water & Wastewater - Virtual Event,** For info: www.euci.com/events/all-conferences/

**August 18-19 WEB**
**Wastewater Collection Systems Course,** RE: Operations, Maintenance, Troubleshooting, and Technologies. For info: www.euci.com/events

**August 30-Sept. 1 TX**
**Texas Groundwater Summit, San Antonio.** Hyatt Regency Hill Country Resort. Expert Presentations on All Areas of Groundwater Management. For info: https://texasgroundwater.org/news-events/events/texas-groundwater-summit/

**September 6-8 OR & WEB**
**Oregon Conservation Education and Assistance Network (OCEAN) CONNECT+ Hybrid Conference, Seaside.** Seaside Convention Center; In-Person or Virtual Event. Training Focused on Technical & Administrative Aspects of Conservation Implementation. For info: connectoregon.net

**September 8-9 WA**
**5th Annual Water Law in Central Washington Conference, Ellensburg.** Central Washington University, 400 E. University Way. Update on Water Rights Law, Updates from Regulators, and Updates on Recent Trends and Practices. For info: The Seminar Group: 206/463-4400, info@theseminargroup.net or theseminargroup.net

**September 11-13 CA**
**WateReuse California Annual Conference, San Francisco.** Hyatt Regency Embarcadero. RE: Drought Response, Project Delivery Methods, and Inter-Agency Collaboration. For info: https://watereuse.org/sections/watereuse-california/meetings-events/

**September 13 CO**
**Colorado Water Trust's Annual Riverbank Celebration, Denver.** Denver Botanic Gardens. Includes Presentation of David Getches Flowing Water Award. For info: www.coloradowatertrust.org

**September 19-20 AZ**
**Tribal Water Law 10th Annual Conference: Water Security on the Path to Resiliency, Scottsdale.** We-Ko-Pa Casino Resort. For info: CLE International: 800/ 873-7130 or www.cle.com

**September 19-21 MT**
**Western Collaborative Conservation Network's Confluence 2022 Conference, Pray.** Chico Hot Springs Resort. RE: Collaboration and Regional Governance, Watersheds, and Cross-Cultural Collaboration. For info: https://collaborativeconservation.org/

The Water Report
Water Rights, Water Quality & Water Solutions in the West
260 N. Polk Street • Eugene, OR 97402



## CALENDAR

(continued from previous page)

**September 20 TX**
**Texas Rainmaker Award Dinner, Austin.** Bullock Texas State History Museum. Hosted by the Texas Water Foundation. For info: www.texaswater.org

**September 21-24 TN**
**SEER 30th Fall Conference, Nashville.** Renaissance Nashville Hotel. Sponsored by the ABA Section on Environment, Energy, and Resources (SEER). For info: ambar.org/SEERevents

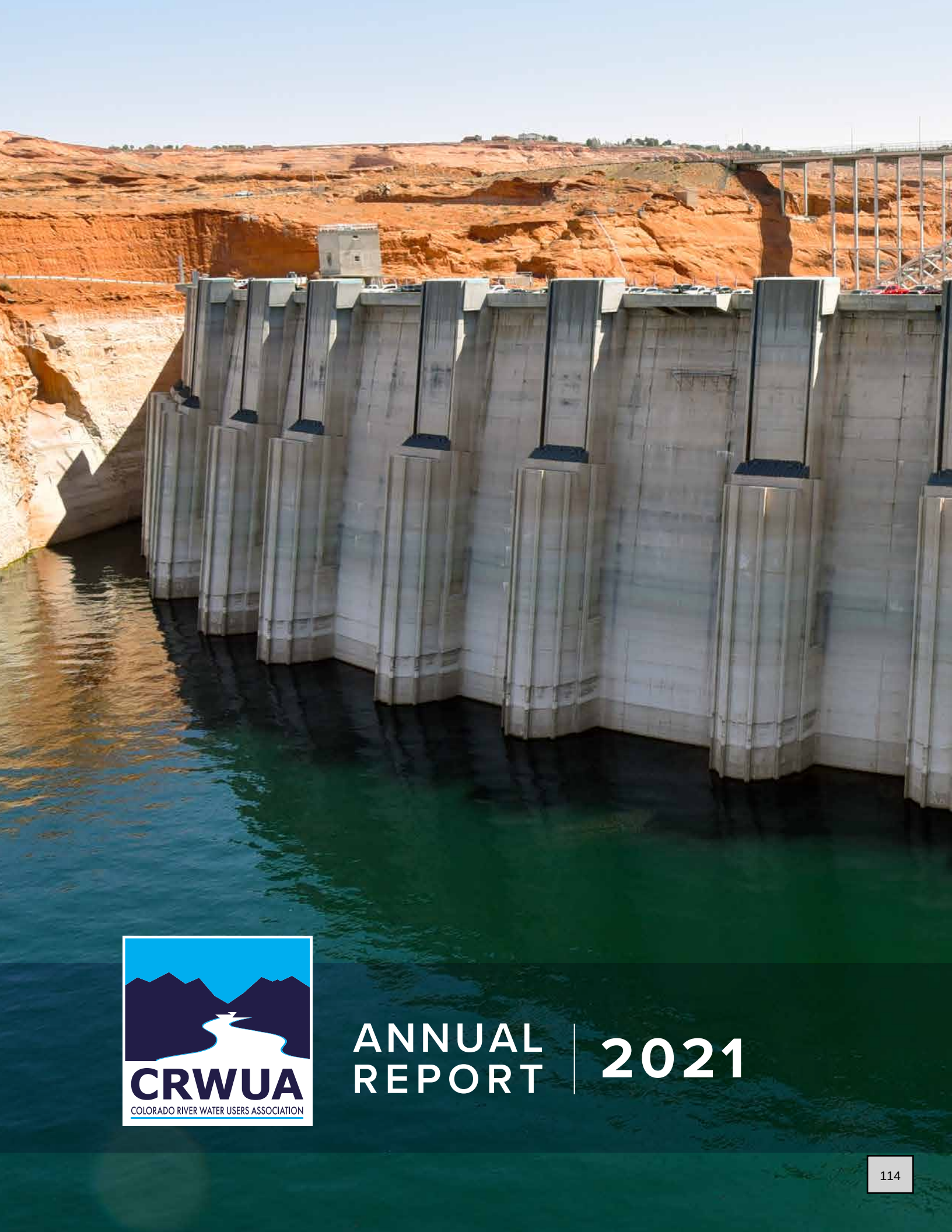
**September 22 WEB**
**Pollution Prevention Waste Management Virtual Workshop,** Hosted by Expert Staff from TCEQ, U.T. Arlington & US EPA. For info: www.tceq.texas.gov/p2/events/pollution-prevention-waste-management-workshop

**September 24 OR**
**20th Annual Celebration of Rivers, Portland.** Crystal Springs Rhododendron Garden, 5801 SE 28th Avenue. For info: htpps://bit.ly/20thgathering

**September 28-29 CA**
**World Water-Tech North America Innovation Summit, Los Angeles.** For info: worldwatertechnorthamerica.com

**September 29-30 MT**
**Buying & Selling Ranches and Farmland Conference, Billings.** Northern Hotel. For info: The Seminar Group: 206/ 463-4400, info@theseminargroup.net or theseminargroup.net

**October 5-6 MT**
**22nd Annual Montana Water Law Conference, Helena.** Great Northern Hotel. For info: The Seminar Group: 206/ 463-4400, info@theseminargroup.net or theseminargroup.net



CRWUA
COLORADO RIVER WATER USERS ASSOCIATION

# ANNUAL REPORT | 2021


This annual report does not contain the CRWUA membership directory because membership is based on attendance of the annual conference, which was canceled in 2020.

# BACKGROUND

The Colorado River Water Users Association (CRWUA) is a nonprofit, nonpartisan organization providing a forum for exchanging ideas and perspectives on Colorado River use and management with the intent of developing and advocating common objectives, initiatives and solutions.

# MISSION & RESOLUTIONS

CRWUA is an organization made up of nearly 1,000 members from throughout the upper (Colorado, New Mexico, Utah and Wyoming) and lower (Arizona, California and Nevada) basins and serves as an annual forum for openly discussing important issues on the river. The cooperative efforts that emerge from these meetings reflect the successful history of CRWUA members working together to create solutions for Colorado River challenges. CRWUA annually updates and adopts a comprehensive set of resolutions addressing the major issues affecting the sharing, use and further development of the Colorado River Basin's water supply. Resolutions can be viewed at **CRWUA.org**.

CRWUA
COLORADO RIVER WATER USERS ASSOCIATION

Arizona

# PRESIDENT'S MESSAGE

When I addressed you this time last year, there was so much uncertainty surrounding the global pandemic and a dramatic shift to all the things that we came to associate with "normal" life. Despite the cancellation of our 2020 conference, along with virtually every in-person event around the world, I promised you then that we would gather again in 2021.

And here we are, with a new-found appreciation for discussions and debates, fist- and elbow-bumps, and all the dialogue and discourse that come with tackling—together—the important issues surrounding the Colorado River Basin.

We are all keenly aware that it is a new normal. Our daily working lives now include telecommuting, face masks, vaccinations, sanitizing, social-distancing protocols, and some continued level of uncertainty. Yet even the upheavals of a global pandemic cannot stop the work that needs to be done to secure the Colorado River resources we all rely on. Together, we have embarked on innovative solutions, including cost-sharing infrastructure to secure alternative water sources, and engaging private enterprises and think-tanks to develop new technologies to extend our water supplies. Thanks to the ongoing collaboration of the Basin States and our proactive Drought Contingency Plan commitments, we will be better prepared when a federal shortage declaration takes effect in 2022.

In the coming months and years, our reputation for diligence in pursing creative, collaborative solutions will be put to the test. Even with our past successes, the ongoing pressures of climate change and other dynamics impacting the drought-stricken Colorado River drive us to continually reinvent ourselves and forge ahead to make the river more secure. The work of this organization is integral to both ensuring the sustainability of the river and the livelihood of the communities that rely upon it. As the saying goes, much has been done, yet there is much to do.

As we come together to address current and future challenges along the river, it is my hope that we can pause long enough to reflect on how good it is to be truly together again.

John Entsminger
CRWUA President

# PROFIT & LOSS

April 2020 through March 2021

**Ordinary Income/Expense**

| | | |
|---|---|---|
| **INCOME** | | |
| Interest Income | **$** | 9,523.77 |
| Program Income | | |
| Sponsorship | | 10,000.00 |
| Membership Dues | | 210.00 |
| Total Program Income | | 10,210.00 |
| **TOTAL INCOME** | | 19,733.77 |
| **EXPENSE** | | |
| Contract Services | | |
| Admin Fees | | 14,424.16 |
| Total Contract Services | | 14,424.16 |
| Travel and Meetings | | |
| Exhibits Committee | | 10,788.71 |
| Public Affairs Committee | | 8,000.00 |
| Total Travel and Meetings | | 18,788.71 |
| **TOTAL EXPENSE** | | 33,212.87 |
| **NET INCOME** | **$** | **(13,479.10)** |

Lake Mead

# BALANCE SHEET

As of March 31, 2021

| | | |
|---|---|---|
| **ASSETS** | | |
| Current Assets | | |
| Checking/Savings | | |
| US BANK | $ | 445,033.44 |
| Total Checking/Savings | | 445,033.44 |
| Total Current Assets | | 445,033.44 |
| Other Assets | | |
| TRONA VALLEY FCU CD | | 349,214.83 |
| Total Other Assets | | 349,214.83 |
| **TOTAL ASSETS** | | 794,248.27 |
| **LIABILITIES & EQUITY** | | |
| Equity | | |
| Opening Balance Equity | | 448,383.61 |
| Unrestricted Net Assets | | 359,343.76 |
| Net Income | | (13,479.10) |
| **TOTAL EQUITY** | | 794,248.27 |
| **TOTAL LIABILITIES & EQUITY** | $ | 794,248.27 |

# OFFICERS & TRUSTEES

## OFFICERS

**President** – John Entsminger

**Vice President** - Aaron Chavez

**Secretary-Treasurer** - Greg Walch

**Assistant Secretary-Treasure**r - Mitch Bishop

## TRUSTEES

**Arizona**
Tom Buschatzke
Ted Cooke
Elston Grubaugh

**California**
Bart Fisher
Glen Peterson
John Powell

**Colorado**
Jim Broderick
Stanley Cazier
Steve Wolff

**Nevada**
John Entsminger
Priscilla Howell
Sara Price

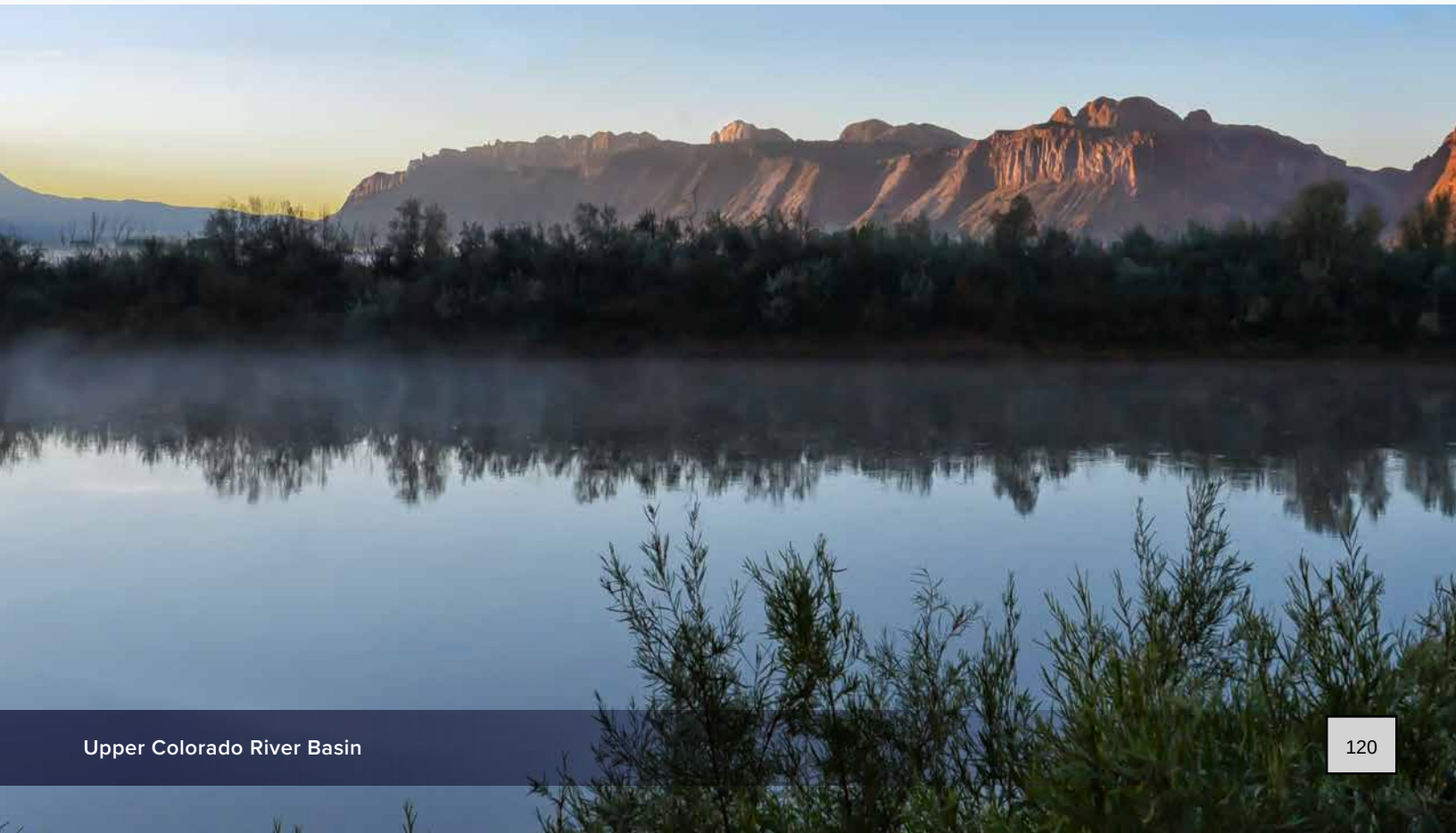
**New Mexico**
Aaron Chavez
Jim Dunlap
Keith Lee

**Utah**
Gene Shawcroft
Gawain Snow
Zach Renstrom

**Wyoming**
Keith Burron
Al Harris
Bryan Seppie

**Ten Tribes Partnership**
Rosa Long
Crystal Tulley-Cordova
Daryl Vigil

**Immediate Past President**
Jim Broderick



Upper Colorado River Basin

# COMMITTEE CHAIRS

## Audit
**Chair - Glen Peterson, California**
Andy Belanger, Nevada
Keith Burron, Wyoming
Keith Lee, New Mexico
Gawain Snow, Utah

## Budget
**Chair - Al Harris, Wyoming**
Jim Broderick, Colorado
Jay Burnham, New Mexico
John Powell, California
Dave Roberts, Arizona

## Exhibits
**Chair - Greg Gould, Nevada**
Kevin Bergschneider, Colorado
Christine Finlinson, Utah

## Housing and Arrangements
**Chair - Andy Belanger, Nevada**
Aaron Chavez, New Mexico

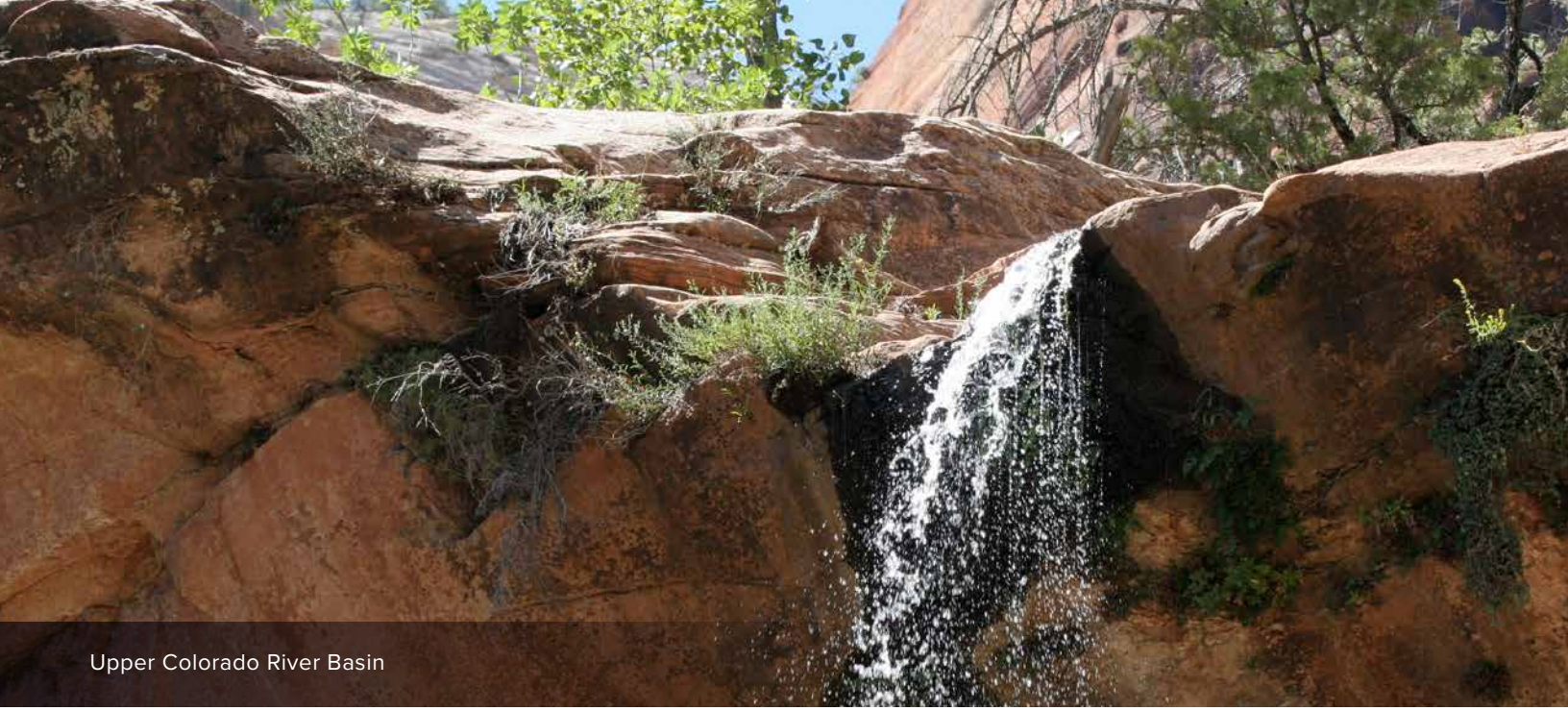
## Membership
**Chair - Jim Broderick, Colorado**
Jacqueline Allcorn, New Mexico

## Nominations
**Chair - Dave Roberts, Arizona**
Andy Belanger, Nevada
Charles Blassingame, New Mexico
Stanley Cazier, Colorado
Alan Harris, Wyoming

## Program
**Co-Chair - Christine Finlinson, Utah**
**Co-Chair - Bart Leeflang, Utah**
Mitch Basefsky, Arizona
Mitch Bishop, Nevada
Doug Bonamici, Ten Tribes Partnership
Jim Broderick, Colorado
Jordan Bunker, Nevada
Keith Burron, Wyoming
Aaron Chavez, New Mexico
Doug Echols, New Mexico
John Entsminger, Nevada
Bart Fisher, California
Taylor Hawes, Colorado
Jeanine Jones, California
Edalin Koziol, Colorado
Colby Pellegrino, Nevada
Crystal Tulley-Cordova, Ten Tribes Partnership
Debbie Vanoy, Utah
Daryl Vigil, Ten Tribes Partnership

## Public Affairs
**Chair - Crystal Thompson, Arizona**
Patti Aaron, Bureau of Reclamation
Teresa Garcia, New Mexico
Becki Bryant, Bureau of Reclamation
Bruce Hallin, Arizona
Scott Huntley, Nevada
Robert Kirk, Ten Tribes Partnership
Bob Muir, California
Karry Rathje, Utah
Bryan Seppie, Wyoming
Jeff Stahla, Colorado

## Resolutions
**Chair - Wade Noble, Arizona**
Steven Anderson, Nevada
Nathan Bracken, Utah
Keith Burron, Wyoming
Aaron Chavez, New Mexico
Joanne Curry, Ten Tribes Partnership
Morgan Drake, Utah
Jim T. Dunlap, New Mexico
Sandra Fabritz, Arizona
Jeff Gray, Arizona
Jared Hansen, Utah
Gary Hathorn, New Mexico
Laura Lamdin, California
Rosa Long, Ten Tribes Partnership
Tom Maher, Nevada
Lee Miller, Colorado
John Morris, California
Jessica Newland, Arizona
Zach Renstrom, Utah
Bridget Schwartz-Manock, Arizona
Meghan Scott, Arizona
Grant Smedley, Arizona
Liz Taylor, New Mexico
Lisa Yellow Eagle, Ten Tribes Partnership



Upper Colorado River Basin

# RECLAMATION

The Colorado River Basin continued to face multiple challenges in 2021, including the persisting COVID-19 pandemic, severe wildfires and enduring poor hydrologic conditions.

2021 marked the 22nd consecutive year of drought in the Basin and saw both Lake Powell and Lake Mead reach their lowest levels since they originally filled.

The Bureau of Reclamation recognizes the impacts of drought to partners, tribes, fisheries, wildlife, and communities across the West and is leveraging the best available science to maximize the efficient use of Colorado River water. It also is prepared to adopt further actions to protect the elevations of Lake Powell and Lake Mead.

The 2007 Interim Guidelines, Minute No. 323, and the Drought Contingency Plans (DCPs) give us a solid foundation for our short-term operations through 2026, and Reclamation is committed to collaborating with all our partners across the Basin as we work toward a viable future.

### Colorado River Basin Conditions

The Upper Colorado Basin Region (UCBR) experienced an exceptionally dry spring in 2021, with April to July runoff into Lake Powell totaling just 26% of average. Water year 2021 unregulated inflow into Lake Powell—the amount that would have flowed to Lake Mead without the benefit of storage behind Glen Canyon Dam—was approximately 32% of average. Total Colorado River system storage at the end of the 2021 water year (Sept. 30, 2021) was 39% of capacity, down from 49% at the same time in 2020.

Consistent with the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Interim Guidelines), Reclamation's August 2021 24-Month Study set the operational parameters for Lake Powell and Lake Mead for 2022. The August study projected Lake Powell's Jan. 1, 2022, elevation to be 3,535.40 feet. Lake Mead's Jan. 1, 2022, elevation was projected to be 1,065.85 feet, about 10 feet below the shortage determination threshold of 1,075 feet. Based on these projections, Lake Powell is operating in the Mid-Elevation Release Tier in water year 2022 (Oct. 1, 2021 – Sept. 30, 2022) and Lake Mead will operate in a first-ever Level 1 Shortage Condition during calendar year 2022, with water delivery reductions to Arizona, Nevada and Mexico in the amounts of 320,000 acre-feet, 13,000 acre-feet and 50,000 acre-feet, respectively.

### Implementation of the Drought Contingency Plans and Drought Response Operations

In 2019, the Upper Basin and Lower Basin DCPs were signed and approved by Congress. The DCPs outline strategies to address the ongoing historic drought in the Colorado River Basin.

The Drought Response Operations Agreement (DROA) is one element of the Upper Basin DCP.

Under the emergency provision of the DROA, Reclamation started supplemental water releases in July 2021 to Lake Powell from the upstream reservoirs of Flaming Gorge, Blue Mesa and Navajo. These releases were designed to deliver up to 181,000 acre-feet of water from these initial units of the Colorado River Storage Project from July through December 2021.

Reclamation continues to closely monitor hydrologic conditions and projections and is working with Upper Basin states on a Drought Response Operations Plan if additional water releases under DROA are necessary in 2022 and beyond to protect critical elevations at Lake Powell.

Consistent with the Lower Basin DCP, Arizona and Nevada made water savings contributions of 192,000 acre-feet and 8,000 acre-feet, respectively, in calendar year 2021. Because Lake Mead was projected to be below the Lower Basin DCP elevation threshold of 1,090 feet on Jan. 1, 2022, Arizona and Nevada will again make water savings contributions to Lake Mead totaling 200,000 acre-feet in calendar year 2022. Consistent with the Binational Water Scarcity Contingency Plan under Minute No. 323, Mexico will contribute 41,000 acre-feet of water savings to Lake Mead in calendar year 2021 and 30,000 acre-feet in calendar year 2022. These water savings contributions are in addition to the shortage reductions.

### Pilot System Conservation Program Report to Congress

In 2021, Reclamation provided a report to Congress that evaluated the effectiveness of the Pilot System Conservation Program (Pilot Program) through 2019. The Pilot Program tested new approaches to conserve water in the Colorado River System. Water conserved as a result of the Pilot Program was for the sole purpose of increasing storage levels in Lake Powell and Lake Mead and did not accrue to the benefit or use of any individual water user. According to the report, the Pilot Program successfully demonstrated that voluntary, compensated water conservation projects can preserve water in the Colorado River System and help mitigate the impacts of drought. The report concluded that widespread interest in system conservation activities and the lessons learned by participating parties through the Pilot Program will serve as a platform for future collaboration on system conservation activities and help mitigate drought in the Colorado River Basin. The Department of the Interior supports such activities and recommends they be continued.

### Review of the 2007 Interim Guidelines

Consistent with Section XI.G.7.D. of the 2007 Interim Guidelines Record of Decision, Reclamation reviewed the implementation of the guidelines (7.D. Review). The review offers a retrospective of past operations and actions under the 2007 Interim Guidelines and is not a consideration of future activities. Through this 7.D. Review, Reclamation built a solid technical foundation that informs future consideration of operations and brings partners, stakeholders and the public to common understanding of past operations and their effectiveness. The 7.D. Review was completed in December 2020.

### COVID-19 Response

Due to the COVID outbreak, Reclamation adapted operations to keep employees and the public safe and adopted a “protect the pilot” plan to protect critical dam operations staff from infection while still maintaining essential functions. Elements of the plan included staggered shifts, reduced crew sizes, controlled access, sanitization between shifts, back-up and remote operations, and use of virtual meetings through a secure internet connection.

Parria Riffle, Arizona

Lake Nighthorse Reservoir, Colorado

The visitor centers at Hoover Dam, Glen Canyon Dam and Flaming Gorge Dam were closed in March 2020 in response to COVID. In 2021, Glen Canyon Dam Visitor Center remained closed. Hoover Dam Visitor Center re-opened at 25% capacity and remained closed for tours. Flaming Gorge Dam Visitor Center operated from May to mid-October 2021 at 25% capacity but did not offer tours. These efforts allowed work and public visitation to continue and protected against the spread of COVID.

### Technical Modeling of the Colorado River System

Reclamation's Upper and Lower Colorado Basin Regions use two reservoir operation models for annual, mid- and long-term planning. The Colorado River Mid-term Modeling System and the Colorado River Simulation System are comprehensive models of the Colorado River system using the RiverWare™ commercial river modeling software, developed by the Center for Advanced Decision Support for Water and Environmental Systems at the University of Colorado Boulder. The models are updated and maintained continually by Reclamation's Upper and Lower Colorado Basin Regions.

### WaterSMART Financial Assistance

Reclamation continues to work cooperatively with states, tribes and local communities through the WaterSMART Program as it plans for and implements actions to increase water supply and promote water conservation. In 2021, Reclamation selected 125 projects to be funded with $64.6 million in WaterSMART funding across the western states. Reclamation announced the investment of $15.4 million to help communities mitigate drought and climate change impacts in the western United States.

Fifty-five new projects were selected to receive a total of $42.4 million to conserve and use water more efficiently. Reclamation announced $2.1 million for 11 collaborative watershed management projects developed by groups and stakeholders working together to address critical water supply needs and water quality concerns. Reclamation selected seven new water marketing strategy grants to receive a total of $1.1 million. Reclamation also established or expanded watershed groups, DCPs and water management option pilot programs.

### Hydropower

In February, during the extreme cold weather in Texas, and again in June, during an extreme heat wave in the Southwest, Reclamation increased hydropower generation at Hoover and Davis dams in response to these electrical emergencies and to help stabilize the grid. Reclamation adjusted water schedules so the dams could respond rapidly to electrical system emergencies and swings in demand.

Reclamation owns and operates 12 hydropower plants in the Colorado River Basin with a total capacity of 4,200 MWh. The two largest dams in the basin, Hoover and Glen Canyon, produce about 75% of that energy. Power generated at the Basin's hydropower dams is marketed by the Western Area Power Administration.

Since 2000, drought conditions have reduced total Basin hydropower generation by 13%, to an annual average of 10.5 million MWh. Because of the severity of the drought over the last two years, hydropower generation is projected to decrease by an additional 20%, to 8.4 million MWh in 2022-23.

The 2020 Hydropower Memorandum of Understanding (MOU) and resulting Action Plan, released on June 2, will enhance collaboration and coordination across the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, the U.S. Department of the Interior's Bureau of Reclamation and the Department of the Army through the U.S. Army Corps of Engineers. These three agencies create opportunities to align collective efforts and utilize expertise across agencies for federal hydropower customer participation. The Action Plan details various proposed projects within five topic areas: asset management; value of hydropower; workforce; water supply reliability; and environmental outcomes. The interagency project teams also will help inform the signatory agencies on potential future MOU projects such as research and case studies to benefit the federal hydropower program. The Action Plan is considered an evergreen document that will be updated as needed to reflect any notable changes in projects' direction or scope.

The UCBR awarded a lease of power privilege (LOPP) to the Orchard Mesa Irrigation District and Grand Valley Water Users Association to develop a new non-federal hydroelectric powerplant on the Grand Valley Project in Colorado. The existing Grand Valley Powerplant has reached the end of its operational life span and will be decommissioned upon the startup of the new Vinelands Power Plant. Negotiations on the LOPP contract are still taking place and construction began in the fall of 2021 with initial startup expected in the fall of 2022.

**Fulfillment of Reclamation's Tribal Trust Responsibilities**

Tribal engagement and consultation were at the forefront of Reclamation's Colorado River activities in 2021. In February, Reclamation and the Inter-Tribal Council of Arizona executed an MOU to establish the Colorado River Roundtable to engage Arizona tribes in intra-Arizona Colorado River shortage discussions. The goal of the MOU is to foster an open dialogue with Arizona tribes that will provide data and other information to inform decision making for individual tribes. In addition to the roundtable, communication with all Lower Basin tribes was initiated to ensure Reclamation meets both its contractual and trust responsibilities for Colorado River operations and tribal water deliveries.

The Ten Tribes Partnership, a coalition of Upper and Lower Basin mainstem Colorado River tribes, and the Water & Tribes Initiative also are coordinating with their constituents to inform decision-making on Colorado River operations.

Reclamation continues to build tribal water infrastructure authorized pursuant to Indian water rights settlements approved by Congress. The Lower Colorado Basin Region (LCBR) provided about $13.7 million in 2021 for Native American Water Rights Settlement Projects authorized pursuant to the Arizona Water Settlements Act and the Claims Resolution Act.

In the LCBR, 28 Native American tribes in Arizona, California, Nevada and Utah were consulted to help identify and protect cultural and historic resources on Reclamation lands. About 2,000 acres of land were inventoried along the Salton Sea for dust abatement and revegetation projects, and Reclamation continued to work with tribes on numerous cultural resource projects within the region.

In the UCBR, Reclamation continues to make great progress on the Navajo-Gallup Water Supply Project, making the first drinking water deliveries on the Cutter Lateral. The Cutter Lateral Water Treatment Plant (CLWTP) construction was completed in October 2020 and, as of the end of May 2021, drinking water deliveries are being made to all Navajo Tribal Utility Authority public water systems along the U.S. Highway 550 corridor, serving eight communities in seven Navajo chapters. Drinking water from the CLWTP also was introduced to the southwestern corner of the Jicarilla Apache Nation in August, and

now a total of 6,000 people or 1,500 households are the recipients of this clean, reliable and sustainable drinking water supply. In addition, Reclamation continues to construct the San Juan Lateral along the U.S. Highway 491 corridor with our project partners, including the Block 4c-8 water transmission pipeline between Little Water and Naschitti, New Mexico, the Tooh Haltsooi Pumping Plant near the community of Sheep Springs, and the Bahastl'ah Pumping Plant near the communities of Twin Lakes and Coyote Canyon. These pumping plants will convey water through the project pipeline from the San Juan River to Navajo communities and the city of Gallup, N.M. Reclamation continues design work and intends to award the construction contract in late 2021 for the Navajo Code Talkers Sublateral that will convey water from Ya-ta-hey along State Highway 264 to the Arizona state line, and when complete will provide water to the Rock Springs and Tsayatoh chapters in New Mexico and eventually to Window Rock/Ft. Defiance communities in eastern Arizona.

Reclamation is incorporating the San Juan Generating Station (SJGS) water conveyance facilities into the project water supply, which became an opportunity when the Public Service Company of New Mexico announced plans to shut down the power plant in June 2022 and integrate into the design of the San Juan Lateral water supply. SJGS facilities, including the SJGS reservoir, will provide a consistent and high-quality water supply to the San Juan Lateral and will yield capital and operation and maintenance cost savings to previous intake options. The facilities also will reduce operational risk and increase operational flexibility by allowing the intake to reservoir storage to be shut down during poor water quality in the San Juan River.

Additionally, 2021 saw the introduction and passage of new water settlement legislation. The 115th Congress ended its session without passing the Utah Navajo Settlement legislation, so Senate Bill S. 1207 by Sen. Mitt Romney, and House Bill H.R. 644 by Rep. Rob Bishop were reintroduced in the 116th Congress. These bills included the consensus language of their predecessors and were supported by the Navajo Nation and Department of the Interior. These bills were ultimately combined with the Consolidated Appropriation Act (H.R. 133), which was approved and signed into law at the end of December 2020.

Navajo Reserved Water Rights in Utah consist of 81,500 acre-feet of depletion annually, with a maximum diversion rate of 435 cubic feet per second. The water has priority dates of 1884 and 1958 and can be marketed within the Colorado River Basin in Utah. The settlement specifies a $198.3 million water development fund along with a $11.1 million operations and maintenance fund.

**Prevention of Invasive Quagga and Zebra Mussels**

Every year, invasive quagga and zebra mussels cost millions of dollars in lost economic activity and cause significant environmental impacts to water bodies in the Upper and Lower basins. In fiscal year 2021, Reclamation participated in several interagency task forces focused on addressing the potential impacts of these invasive species infestations on water-related infrastructure, including Interior's Invasive Mussels Team.

LCBR provided funding support to the National Park Service for both permanent and mobile quagga mussel decontamination stations within the Lake Mead National Recreation Area, including funds to Arizona through the U.S. Fish and Wildlife Service for mandatory inspection/decontamination stations in Arizona and support to Nevada for operation of two seasonal watercraft inspection/decontamination stations in southern Nevada.

UCBR is providing financial help to the states of Utah, Colorado, Wyoming and a contractor in New Mexico to interdict and decontaminate boats with any

Glen Canyon Dam Spillway

Colorado River below Glen Canyon Dam

mussels present prior to launching in clean waters. Reclamation supported an evaluation and installation of a dip tank to decontaminate boats leaving Lake Powell. Glen Canyon Dam is continuing efforts to monitor mussel population growth, which will help determine the magnitude of the impacts and calibrate the response.

**Environmental Programs**

Reclamation is committed to the environmental protection in the Colorado River Basin. In July, the U.S. Fish and Wildlife Service proposed reclassifying the razorback sucker from endangered to threatened under the Endangered Species Act. This follows a similar proposal from March 2020 in which the Service proposed reclassifying the humpback chub from endangered to threatened. These proposed reclassifications are based on recent assessments showing the razorback sucker and the humpback chub are no longer in danger of immediate extinction because of recovery efforts completed by the Upper Colorado River Endangered Fish Recovery Program and San Juan River Basin Recovery Implementation Program (RIPs), the Lower Colorado River Multi-Species Conservation Program, and the Glen Canyon Dam Adaptive Management Program.

Program partners work closely to enact conservation measures such as restoring river flows through water release from reservoirs and removing non-native predators. The UC and SJ RIPs have built, operate and maintain many fish passages, fish screens and fish-entrainment barriers. The two RIPs have stocked millions of razorback suckers, Colorado pikeminnow and bonytails to help reestablish populations. Reclamation and the Upper Basin RIP work together to ensure spring flows connect with floodplain wetlands to enhance entrainment of razorback sucker larvae into these productive rearing habitats, including flow and on-the-ground floodplain wetland management. The Lower Colorado River Multi-Species Conservation Program added 29 acres of new riparian and backwater habitat, bringing the total area managed for native species to about 6,840 acres since the program began in 2005. This year, over 43,000 native fish were raised and stocked below Davis Dam, bringing the totals to about 259,000 razorback suckers and 125,500 bonytail stocked in those river reaches since the program began. Experts believe that actions taken under the programs benefit other native fishes in the basin and prevent them from becoming endangered. These actions also keep Reclamation operations in compliance with environmental regulations.

**Lake Powell Pipeline Environmental Review**

On Oct. 28, 2019, the Secretary of the Interior assigned Reclamation as the lead agency to analyze the impacts of the proposed Lake Powell Pipeline project in a draft Environmental Impact Statement (EIS) that was issued in June 2020. Reclamation received approximately 14,000 comments and began addressing those comments in modifying the EIS. Major modifications being made to the EIS included clarifications and additions to the existing water exchange contract; the addition of a new conservation-based alternative; updated modeling of the Colorado River conditions; analyses of water impacts down to Lake Mead; and additional analyses for key resource areas like socioeconomics, cultural and ethnographic resources, and threatened and endangered species. The new alternative will likely require additional consultation with the affected and interested tribes in the area. As project work continues, there is no formal schedule for its completion due to the uncertainty associated

Colorado River at Lees Ferry

with the timing of the proponent's coordination and collaboration with the other affected states.

Aside from Reclamation, the proponent is working with the other states in the Upper and Lower basins to come to some agreement on the legal nature of moving Upper Basin water to the Lower Basin. The proponent is adjusting its Virgin River Daily Simulation Model in response to discussions with the Basin States, and the proponent has proposed an adaptive management plan wherein no return flows reach the river. While the proponent works with the other Basin States regarding these concerns, Reclamation is moving forward with the proponent to continue to address comments, make modifications to the EIS documents, and shepherd the project to the next phase.

**Salton Sea**

Reclamation owns about 90,000 acres of land under and adjacent to the 375 square-mile Salton Sea, located in Southern California. The agency actively participates in California's process to manage Salton Sea resources and works closely with partners to identify and prioritize projects that help reduce dust emissions, improve water quality, restore habitat, and provide local economic development opportunities.

**Safety, Security and Law Enforcement Activity**

Reclamation's Safety of Dams program assigns engineers to ensure that dams, canals and other related facilities continue to operate safely and reliably. With the onset of COVID, some work was briefly delayed, but work has commenced on upgrades to Reclamation dams and facilities. New LCBR security program elements include the installation of a full-length continuous boom line at Hoover Dam to discourage boaters, jet skiers and the general public from passing or tying up to the vessel barrier line on the lake side; the completion of a $3.5 million Hoover Dam pedestrian safety project; and the expansion of this project on the Arizona side entrance roadway, just east of the dam. Among other projects were: the near completion of a $8.5 million visitor checkpoint on the Nevada side of Hoover Dam under Reclamation's fortification account; a new mass notification system to enhance emergency notifications; and the addition of two uniformed Bureau of Land Management Patrol Rangers to the LCBR Regional Law Enforcement program to provide dedicated law enforcement services on Reclamation lands in the region. The key members of the Regional Law Enforcement program coordinate on a daily basis with the U.S. Border Patrol and other federal, state, local and tribal law enforcement agencies to ensure the safety of all Reclamation staff and contractors near the southern United States border.

The UCBR Safety Team successfully completed its onsite dam safety inspections with remote support and review by regional and headquarters-level engineers to protect staff from COVID. UCBR also is replacing and upgrading the security camera systems at the Power Office's field divisions. Under this project, Glen Canyon Dam will be the first facility to upgrade from analog to digital cameras, which will provide better surveillance,

low-light capabilities, the ability to turn video into data that detects and tracks objects of interest, and other features that will enhance security measures at Reclamation's facilities. Completion of this project is scheduled during the first quarter of 2022.

**Colorado River Water Quality**

To address Colorado River salinity, under the 2019 Funding Opportunity Announcement (FOA), Reclamation awarded $37.2 million for 11 salinity control projects in Colorado and Wyoming through its Basin-wide and Basin States Salinity Control Programs. When the salinity control features are installed, these projects will prevent about 23,426 tons of salt from entering the river system each year. A new FOA will be posted fiscal year 2022 with an estimated $40 million to be awarded for new projects to reduce salinity.

Water quality sampling and analyses in the LCBR continued with long-term monitoring of biological and water quality conditions, although some sampling trips were cancelled due to COVID travel restrictions. Sampling trips during 2021 included four Lake Mead events and six Lake Havasu events. Reclamation collaborated with Southern Nevada Water Authority and others to make data available for water quality management decisions, studies, and modeling.

Reclamation released a Final Environmental Impact Statement (FEIS) on Dec. 11, 2020, that evaluated brine disposal alternatives at the Paradox Valley Unit. Reclamation identified "no action" as the preferred alternative. The no-action alternative includes continued operation of the PVU until it becomes no longer feasible to operate. Because the existing brine injection well is nearing the end of its useful life, Reclamation investigated alternatives for disposing of the brine.

The no-action alternative achieves the best balance among the various goals and objectives outlined in the FEIS, including optimizing costs; minimizing adverse effects on the affected environment; minimizing the use of nonrenewable resources; consistency with Bureau of Land Management Resource Management Plans; and being in the best interest of the public, including considerations of health and safety.

New technically, environmentally and economically viable alternatives may be investigated in the future to continue salinity control at Paradox Valley.

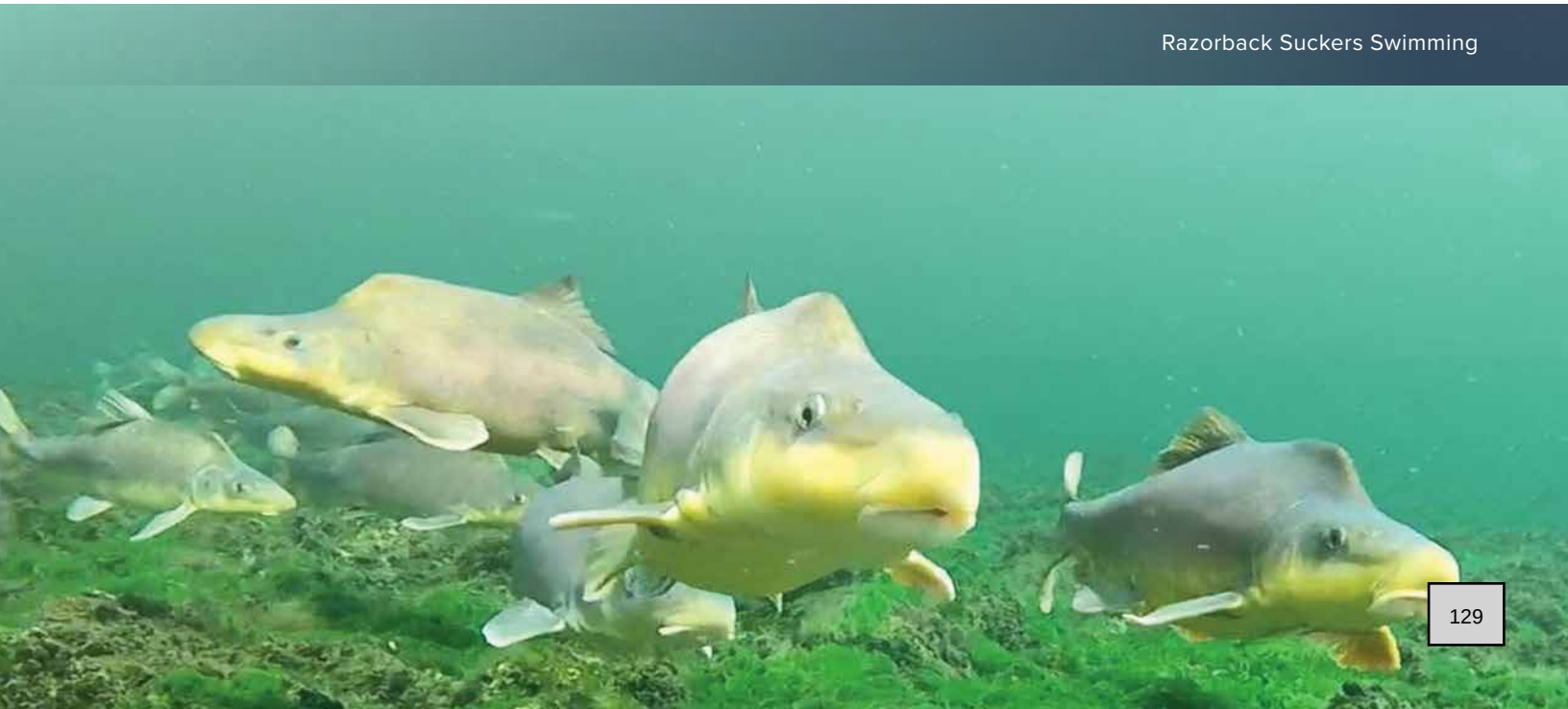
**Recreation**

Recreation along the Colorado River spans vast and diverse landscapes through many national parks, recreation areas, forests, and state and local parks. Reclamation lands and reservoirs are among the nation's most popular recreational areas and play a major role in meeting the increasing public demands for water-based outdoor recreation opportunities in the West.

In 2021, visitors were welcomed back at the outdoor areas at Hoover Dam and Flaming Gorge Dam, and other visitor services continued to be offered with limited capacity to protect both the public and Reclamation staff.

As Lake Powell and Lake Mead levels are projected to continue to decline in 2022, Reclamation continues to collaborate with recreation partners on safety and messaging efforts to recreationists.

Razorback Suckers Swimming



# ARIZONA

Based on the Bureau of Reclamation's August 24-Month Study projections, by the start of 2022, the storage level at Lake Mead is projected to be at 1,065.85 feet above sea level. Under the terms of the 2007 Guidelines, shortage reductions and incremental Drought Contingency Plan (DCP) contributions, Arizona agreed to leave 512,000 acre-feet of its 2.8 million acre-foot annual allocation in Lake Mead once the reservoir's elevation was projected to be below 1,075 feet, a Tier 1 shortage condition.

This Tier 1 shortage will cut about 30% of Central Arizona Project's normal Colorado River supply; nearly 18% of Arizona's total River supply; and approximately 8% of Arizona's total water use.

Arizona started 2021 operating under DCP's Tier Zero, which reduced Arizona's Colorado River supplies by 192,000 acre-feet, although for several years prior to the Tier Zero declaration, Arizona water users had been voluntarily leaving up to that amount in Lake Mead.

To address these Tier 1 cuts, Arizona has a DCP implementation plan to partially mitigate the impacts. The reductions to tribal communities and municipal and industrial users will be fully mitigated with substitute water supplies or financial compensation.

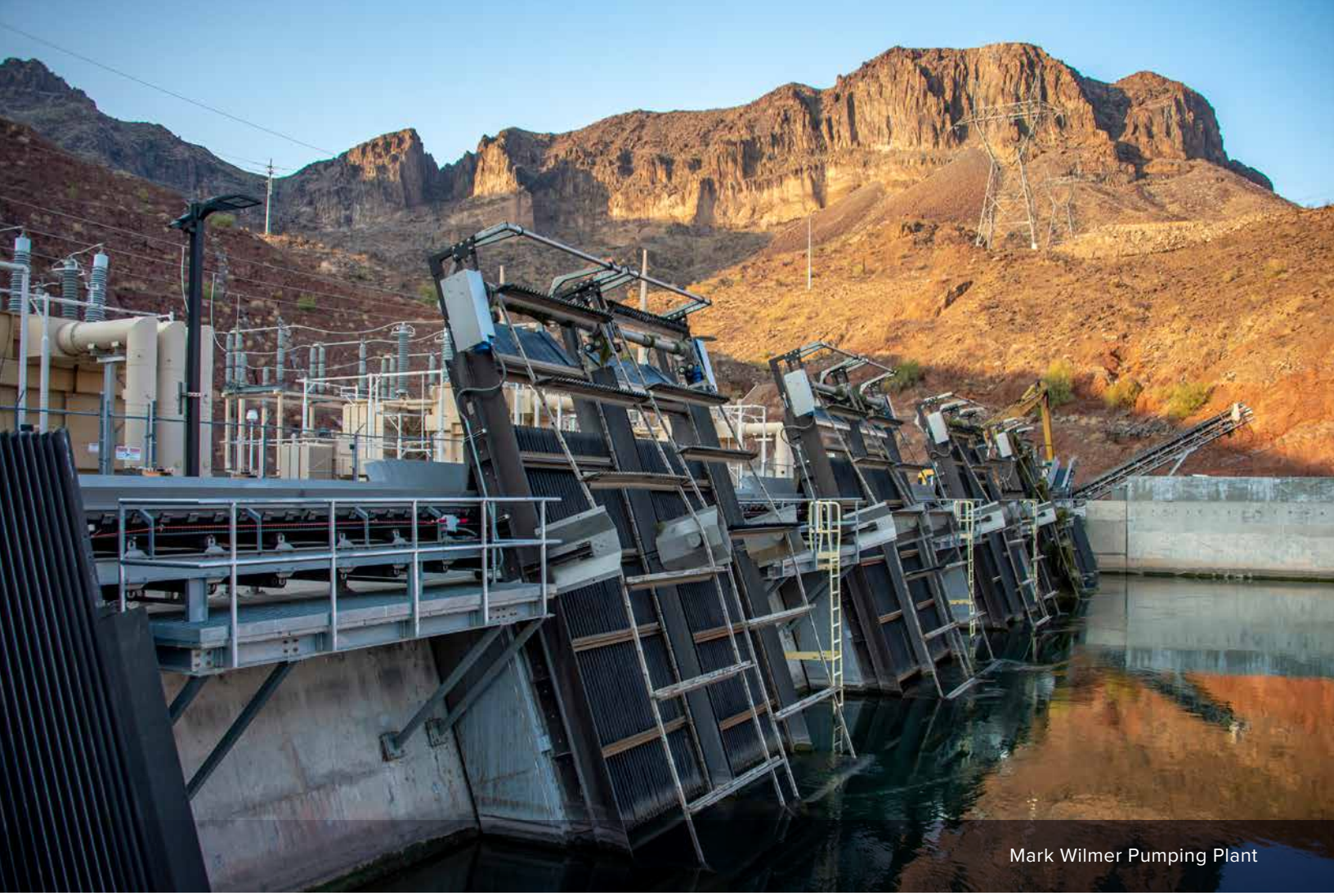
The reductions to agricultural users will be partially mitigated with substitute water supplies and money for infrastructure and efficiency improvements. The Arizona Water Banking Authority will not be mitigated.

Shortly after the Aug. 16 shortage declaration, Arizona and its Lower Basin partner states entered into discussions triggered by an adaptive-management provision in the DCP, commonly referred to as the "elevation 1,030 feet provision."

This provision requires Arizona, Nevada, California and the Department of the Interior to "consult and determine what additional measures will be taken to protect against the potential for Lake Mead to decline below elevation 1,020 feet." Actions are being developed and expected to be approved this year; the resulting program is called the 500+ Plan.

During the year, the Arizona Legislature also created a Drought Mitigation Fund and a board to administer it. The fund is designed to explore opportunities to augment Arizona's water supplies with new water from outside the state. One potential project being explored as part of the implementation of Minute No. 323 to the 1944 Mexico Water Treaty is binational desalination opportunities in the Sea of Cortez. Those discussions are ongoing.

Waddell Pump/Generating Plant



Mark Wilmer Pumping Plant

**Salt & Verde Watershed**

For the Salt and Verde watersheds, the 2021 water year began with extremely dry watershed conditions following a record dry 2020 summer monsoon season. Record low fall inflows from October to December in 2020 (38% of median) were recorded. Winter (Dec. 2020 to March 2021) precipitation on the Salt and Verde watershed at 55% of normal did not improve conditions. Total inflow into Salt River Project (SRP) reservoirs from the entire winter runoff season was a paltry 104,156 acre-feet, the second lowest on record. Not surprisingly, storage decreased at Roosevelt Lake during the winter from 82% full to 77% full between Oct. 1 and May 1 with the Verde reservoir system declining to 32% capacity by May 1.

The 2021 summer "monsoon" season experienced well above normal precipitation throughout the watershed. SRP reservoir inflow for July through Sept. 2021 was the 10th highest on record with 257,898 acre-feet or 233% of median. While the near-record dry winter across the watershed strengthened drought conditions and decreased reservoir levels through June, the wet monsoon significantly improved conditions throughout the watershed. SRP reservoir levels increased over the peak demand summer months (Verde Storage increased from 30% to 52% and Roosevelt remained at 68%). Heading into winter 2021, the storage on the Salt and Verde reservoir system is in good condition at 70% of capacity as of Sept. 30.

During the past year SRP, in partnership with the Bureau of Reclamation, initiated two projects to evaluate changes in operation and infrastructure needed to help adapt to expected impacts of climate change and improve water resiliency in the Phoenix Metropolitan Area: the Verde Reservoirs Sediment Mitigation Study (VRSMS) and the Roosevelt Flood Control Space (FCS) Operational Flexibility Project.

The two projects – being conducted in partnership with Reclamation and other federal and local agencies – look to leverage existing infrastructure to reduce reliance on non-renewable groundwater and manage impacts of Colorado River shortages. SRP and partners hope to be able to operate under enhanced operational flexibility in the Roosevelt FCS beginning in calendar year 2023 and initiate a feasibility study of options to modify Bartlett Dam as recommended by the VRSMS in calendar year 2022.

# CALIFORNIA

As drought along the Colorado River reached its 21st year, in 2021 California grappled with unprecedented drought conditions facing its water resources. Water years 2020 and 2021 were the driest two-year sequence on record for California, exemplified when Lake Oroville – the principal reservoir on the State Water Project – reached its lowest point ever since being filled in the 1970s in August and dropped to a level that could no longer generate hydropower.

Expectations are that the California Department of Water Resources will not have any water to allocate in its initial SWP allocation for 2022. And if drought conditions continue, the state could do something it has never done before – provide only enough water as deemed necessary to protect the health and safety of Californians that receive water from the State Water Project. Under this never-before-used provision of the SWP contract, the state has indicated it would constrain water deliveries to a level that may prevent any outdoor watering.

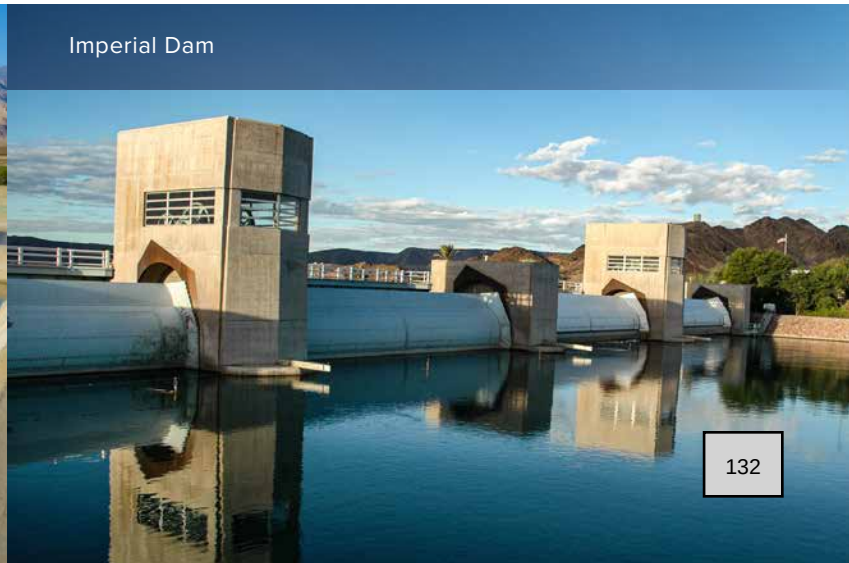
In October, Gov. Gavin Newsom expanded his Executive Order declaring a statewide drought emergency to include all citizens of California. In November, the board of directors of the Metropolitan Water District of Southern California followed up by declaring a Drought Emergency and called for increased efforts to maximize conservation, especially in communities facing the greatest challenges. The Metropolitan board action marked the latest in a series of actions Metropolitan has taken to ramp up conservation in the Southern California. In August, Metropolitan's board declared a Water Supply Alert for the region, calling for consumers and businesses to voluntarily reduce their water use and help preserve the region's storage reserves.

In August, seizing every opportunity to use Colorado River resources as efficiently and effectively as possible and to help slow Lake Mead's declining levels, water agencies across the Southwest partnered with the federal government to fund a short-term agricultural land fallowing program in the Palo Verde Valley that will conserve water on a large scale. The partnership among the U.S. Bureau of Reclamation, Metropolitan, Central Arizona Project, Southern Nevada Water Authority and Palo Verde Irrigation District (PVID) is expected to conserve up to 180,000 acre-feet of system water over the next three years, amounting to about a 3-foot increase in Lake Mead's water level.

Metropolitan reached agreement with Arizona water agencies in October to advance development of one of the largest water recycling plants in the country – a project that would help restore balance to the over-stressed river. The agreement calls for the Central Arizona Project and Arizona Department of Water Resources to all contribute up to $6 million to environmental planning of Metropolitan's Regional Recycled Water Program, a project that would purify treated wastewater to produce a new, drought-proof water supply for Southern California that could be shared with partners along the Colorado River. Southern Nevada Water Authority signed a similar agreement with Metropolitan in December of 2020. If fully developed, the $3.4 billion project would produce up to 150 million gallons daily, enough to serve more than 500,000 homes.

In September, Imperial Irrigation District (IID), California's largest agricultural user, and Metropolitan signed an agreement settling a two-year legal dispute. The agreement supports ongoing efforts to secure funding for the Salton Sea restoration and

Oasis Reservoir



Imperial Dam

Regional Recycled Water Advanced Purification Center

provides incentives for IID to conserve and store additional water in Lake Mead. The additional IID storage will not only benefit elevation building efforts at Lake Mead, but backstop IID's On-Farm Efficiency Conservation program, which has generated nearly a million acre-feet of conserved water since its 2014 rollout, by ensuring that excess conservation ultimately returns to IID's community.

Since 2003, IID has generated over 6.2 million acre-feet of conserved water from both on-farm and system efficiency programs to meet its water transfer obligations and storage objectives. IID's commitment to conservation, with program yields averaging nearly a half million acre-feet annually, will continue to enable the successful implementation of the nation's largest agriculture-to-urban water transfer, providing water supply resiliency for the benefit of California and the Lower Basin.

Coachella Valley Water District (CVWD), alongside the other Groundwater Sustainability Agencies in the region, neared completion of the 2021 Indio Subbasin Water Management Plan Update and 2021 Mission Creek Subbasin Water Management Plan Update. Both updates outline plans to meet future water demands; maintain stable groundwater levels; manage and protect water quality; collaborate with stakeholders on shared objectives; manage future costs, minimize environmental impacts; and reduce vulnerability to climate change and drought impacts. CVWD manages the groundwater basin through replenishment activities at three facilities, including the Palm Desert Groundwater Replenishment Facility, which began operations in 2019. CVWD is in the process of building the Oasis In-Lieu Recharge Project, which will reduce groundwater pumping through source substitution.

CVWD continues to engage stakeholders in the development of new programs and efforts to reduce water demand. CVWD's Agricultural Water Advisory Group includes representatives from the CVWD, the U.S. Department of Agriculture, Resource Conservation District, academia and agricultural customers. The group meets regularly to discuss studies, regulations, customer service and ideas related to water use efficiency. A similar group, the Coachella Valley Golf and Water Task Force, meets bi-monthly to discuss water use within the golf industry. CVWD also continued its rebate programs to domestic water customers, which reduces groundwater pumping and protects the groundwater basin.

PVID continued to explore additional agricultural conservation measures in the Palo Verde Valley as the district worked to complete a three-year study of deficit irrigation. Conducted by Dr. Ali Montazar of the UC Cooperative Extension program in Holtville, the study explores both water savings and impacts on crops when skipping an irrigation. If the study proves to be successful, deficit irrigation can be implemented in other places of the Colorado River Basin.

In September, Michael Mullion and Brad Robinson were elected to the PVID board, with Robinson filling the vacancy left by Danny Robinson who passed away in May. Earlier in July, Adel Hagekhalil, a national water and infrastructure leader, was named the 14th general manager in Metropolitan's 93-year history. Hagekhalil succeeded Jeffrey Kightlinger, who led Metropolitan since 2006 and maintained Metropolitan as a globally respected leader in the water industry.

# COLORADO

At the end of 2020, Colorado leaders recognized that even though the largest wildfires in the state's history had been contained and controlled, their aftermath would require attention for years to come.

In total, more than 650,000 acres burned across the state of Colorado in 2020, including the two largest fires in state history.

The East Troublesome Fire, named after the Colorado River tributary near where it started, ignited on Oct. 14, 2020, well past the traditional wildfire season at that altitude in Colorado. Just more than one week later, an unprecedented windstorm drove the fire through dry terrain with alarming speed, devouring nearly 200,000 acres of forest and rangeland in the uppermost portion of the Colorado River watershed.

Elsewhere in the Colorado River Basin, the Grizzly Creek Fire consumed more than 32,000 acres in the watershed that serves as a water supply for the city of Glenwood Springs.

In 2021, the effects of those fires and others on the landscape took center stage as water managers developed plans to mitigate them and protect infrastructure that serves a large share of Colorado's population.

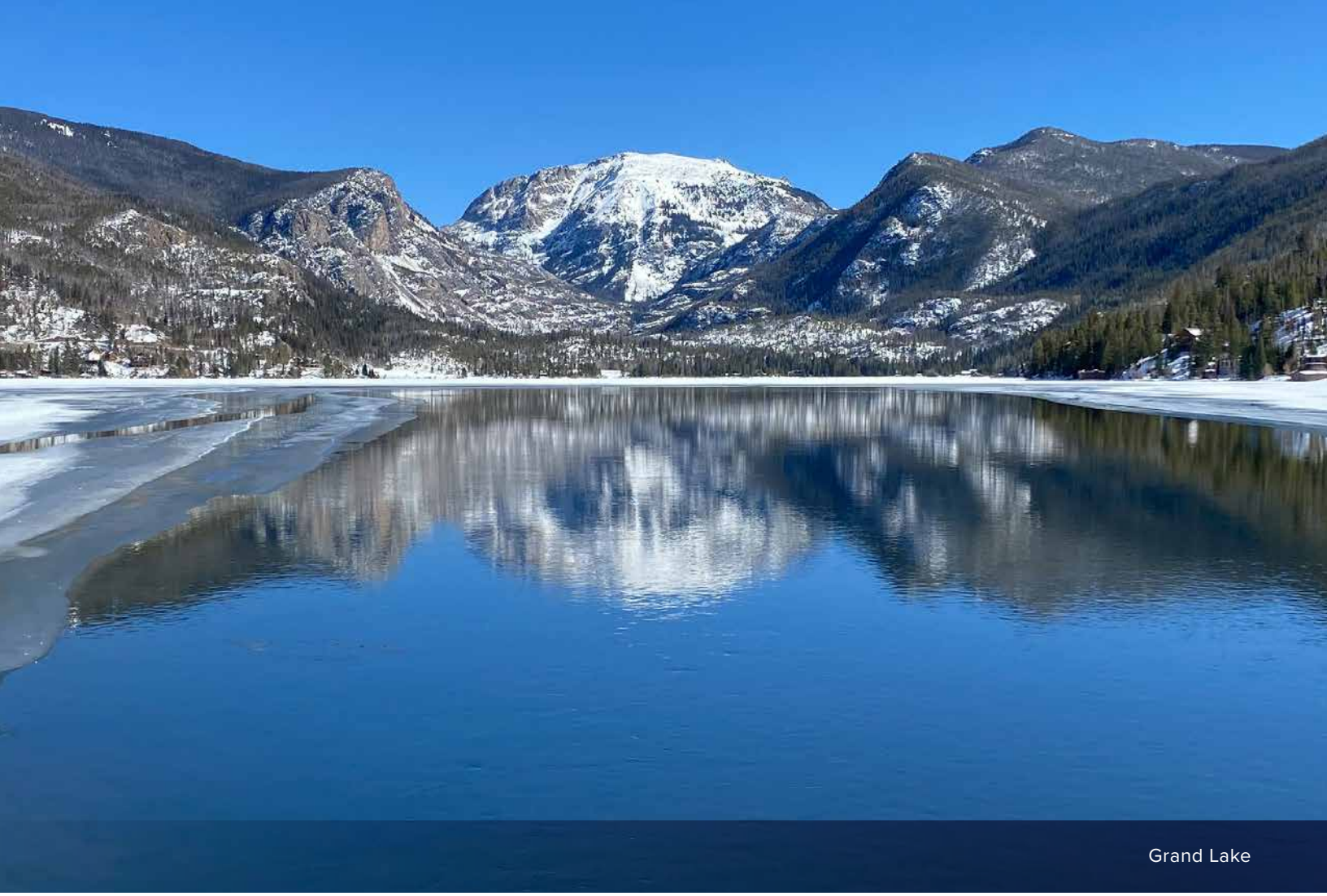
A disappointing 2020-21 snowpack, coupled with very dry soil moisture, meant the threat to water infrastructure was not from the usual spring runoff but from the monsoons that came later in the summer. As with many other locations in the American West, the summer monsoon season brought rainfall that helped to improve the overall moisture profile. However, the monsoons came at a high cost.

On July 29, a rainstorm stalled over the Grizzly Creek Fire burn scar and caused mudslides of ash and fire debris throughout Glenwood Canyon, a conduit for the Colorado River and Interstate 70, the major east-west highway in the state of Colorado. The debris carried by those mudslides forced the closure of Interstate 70 for 17 consecutive days, and the threat of additional slides prompted state officials to pre-emptively close the interstate several more times through the season, causing significant disruptions to commerce in the state.

At the same time, those slides and others from the opposite side of the Colorado River from the highway created new barriers in the river, altering its channel in places and creating concern about water quality for users downstream.

In the headwaters of the Colorado River, federal, state and local officials cooperated to stabilize the burn scar areas in critical areas. Using funds from the Emergency Watershed Protection Program offered through the Natural Resources Conservation Service, officials worked to drop stabilizing mulch on ashen

Aerial Mulching



Grand Lake

landscapes, install debris booms on West Slope storage reservoirs in the Colorado-Big Thompson Project and capture mudslides where possible on ephemeral drainages in the region.

Work will continue to mitigate fire effects well into 2022 and beyond.

Elsewhere in the state, construction work began on Chimney Hollow Reservoir, a new 90,000 acre-foot reservoir east of the Continental Divide that will firm water supplies from the Windy Gap Project at the confluence of the Fraser and Colorado rivers. Work on the $500 million reservoir should take about four years, with first fill being dependent on hydrology. In addition, mitigation work will include construction of the Colorado River Connectivity Channel to connect the river above and below Windy Gap Reservoir. Final design for that project will occur in 2022, with construction taking place in 2022 and 2023.

Reclamation and the Southeastern Colorado Water Conservancy District are moving ahead with the Arkansas Valley Conduit (AVC). To date, the AVC has $40 million in federal funding, with $10 million expected in FY2022. The Colorado Water Conservation Board has committed another $90 million in loans and $10 million in grants over the 15-year construction period. Total cost is estimated to be about $600 million for 250 miles of pipeline. Contract negotiations for the project are scheduled for late 2021, and construction will begin in 2022.

The Colorado State Water Plan is being updated by the Colorado Water Conservation Board. The update will be released to the public in summer 2022. The CWCB also is leading statewide discussions about Colorado's Drought Contingency Plans, convening numerous sessions to work toward a consensus.

Denver Water and Boulder County have reached an agreement that will allow Denver Water to move forward with its Gross Reservoir Expansion Project. Denver Water agreed to provide $13 million in environmental mitigation to settle permitting issues and allow the project to be built. Construction is set to begin in April 2022 on the $464 million project that will add 77,000 additional acre feet of storage to Gross Reservoir in Boulder County, located northwest of Denver. When completed Gross Reservoir will become the tallest dam in Colorado at 471 feet.

# NEVADA

In 2021, Southern Nevada intensified its already progressive water conservation program in preparation for reduced Colorado River water deliveries in the years ahead.

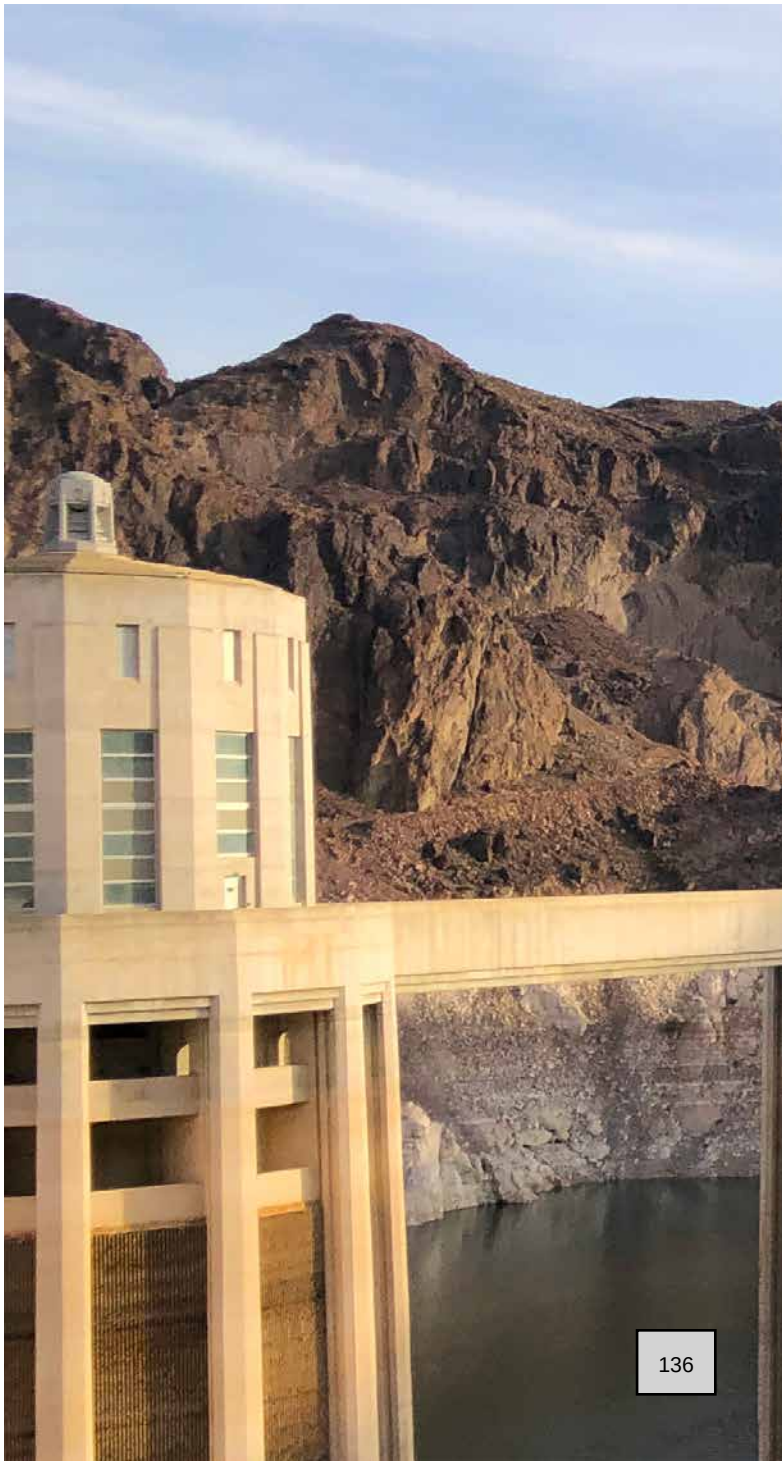
Chief among the new efforts, Nevada Gov. Steve Sisolak signed legislation to enforce the removal of nearly 4,000 acres of non-functional turf in the Las Vegas Valley by 2027. The Southern Nevada Water Authority (SNWA) appointed a citizens committee to provide recommendations to implement the new legislation, which prohibits using Colorado River water to irrigate non-functional, non-residential turf. The committee plans to present its recommendations to the SNWA Board in early 2022.

Projected to save nearly 30,000 acre-feet of water annually, the legislative mandate focuses primarily on non-functional turf surrounding business complexes, along streets and medians, and within Homeowner Association common areas. Single-family residential lawns are excluded, as homeowner participation in the popular Water Smart Landscapes rebate program has already yielded record water savings. Through this program, Southern Nevada has replaced more 200 million square feet of grass with water-smart landscaping since the rebate program began in 1999.

The SNWA continues to enforce seasonal watering restrictions, distributing more than 2 million customized watering schedules and seasonal reminders to households throughout the Las Vegas Valley this past year, as well as increasing water-waste enforcement with neighborhood patrols and a new mobile app launched to engage the community in water-waste reporting.

As part of the ongoing collaboration with our Colorado River partners to further conservation efforts along the river, the SNWA Board approved funding to participate with the Metropolitan Water District of Southern California in the development of a large-scale regional recycled water program in Southern California. The program has the potential to treat and reuse up to 168,000 acre-feet of treated wastewater, extending local water supplies and reducing demands on the Colorado River and Lake Mead.

This type of collaboration within the Colorado River Basin is vital to the health and conservation of the river system, as ongoing drought and climate change continue to influence the future availability of water supplies. SNWA researchers utilize climate change models to evaluate the long-term forecast for Colorado River flows and impacts on Lake Mead water levels. These projections are reflected in annual updates to the SNWA's Water Resource Plan, which also incorporates best practices to help ensure the long-term sustainability of the Southern Nevada community.



# NEW MEXICO

Since 2000, New Mexico like the other Upper Basin states has experienced shortages in water supply. In August 2021 the Bureau of Reclamation released its August 24-Month Study, which projects water levels in the Colorado River System, including Lakes Powell and Mead through July 2023. For this reason, the Department of the Interior and the seven Colorado River Basin states are escalating implementation of the Drought Contingency Plans (DCP) that were signed in 2019. In response to the drought situation, the Upper Basin states of New Mexico, Colorado, Utah and Wyoming, and the Bureau of Reclamation are implementing the Drought Response Operations Agreement (DROA), which is part of the Upper Basin DCP.

In July, Reclamation and the states initiated a drought response plan in accordance with the imminent need provision of the DROA. According to the current plan, Reclamation planned to release an additional 181,000 acre-feet of water from the Upper Basin reservoirs of Navajo, Aspinall and Flaming Gorge between July and December. The San Juan Basin Recovery Implementation Program Biology Committee recommendations for the Navajo Reservoir portion of the DROA called for the release of 20,000 acre-feet of water on top of normal operations over the course of 10 days rather than 60 days, from Nov. 25 to Dec. 5, 2021. This release will provide an average extra 1,000 cubic feet per second (cfs) of supplies per day, to meet the minimum target baseflow, with the release varying from 1,300 to 1,400 cfs. These releases will help protect the water level elevation at Lake Powell so the obligations under a century-old agreement are satisfied, while the power plant at Lake Powell can keep generating electricity for citizens across the Southwest, including New Mexico.

“New Mexicans benefit from the power generated at Lake Powell and from its direct revenues. While it is disappointing that the hydrology in this basin is deteriorating, the states have been preparing for this very difficult time over a number of years,” said John D’Antonio, New Mexico state engineer and Gov. Lujan Grisham’s appointed representative on the Colorado River. “New Mexico officials are working diligently and collaboratively with the other states, the Department of the Interior and our partners in the Republic of Mexico to implement the adaptive management actions contemplated under the DCPs to boost the water levels in Powell and Mead, while protecting New Mexico’s water uses for New Mexicans, including, our Native American tribes, pueblos and nations.”

Gov. Grisham tasked the New Mexico Interstate Stream Commission (NMISC) to produce a 50-Year Water Plan for the state of New Mexico. The NMISC is leading a collaborative effort to develop the long-term p plan to address the importance of water to New Mexico and the critical need to chart a course that will allow for more flexibility in managing water supplies and infrastructure development in the face of weather extremes brought on by a changing climate. As part of the development of the 50-Year plan, a team of research experts provided an assessment of changing temperature and water resource conditions and provided a description of what New Mexico’s water resources could look like over the next 50 years.

One of the most important components of the planning process has been to make the expert projections of water resource conditions in the future relatable to the public, communities and industry. Through the planning process, the intent is to learn what the public is doing today to prepare for a warmer and more variable water supply in the future. There will be a parallel outreach process with the tribes and pueblos. Ultimately, the plan will provide an update on the readiness of New Mexicans to prepare for changing water resource conditions, provide an assessment of potential water resource challenges in various sectors of the state due to expected continued warming conditions. It will bring New Mexico stakeholders to the table through Interstate Stream Commission meetings and by teaming with multiple partners including the New Mexico Water Dialogue (NMWD), New Mexico Water Resources Research Institute (WRRI), New Mexico Bureau of Geology and Mineral Resources, and the United States Army Corps of Engineers to create opportunities for dialogue between the Advisory Board, state and federal agency experts, and local experts. Water Plan goals include reducing risk and improving water resilience while creating a sustainable plan for the next 50 years. The process will include discussion of water resource issues and strategies, while ensuring inclusive water planning. Details can be found on the New Mexico Office of the State Engineer website.

The first requested water release by an Animas La-Plata Water Partner in 2020 was made on March 15. Jim Dunlap, a commissioner on the San Juan Water Commission, was given the honor of pressing the water release button for the Animas La-Plata Project’s initial release of water from Ridges Basin Dam in Durango, Colorado. The San Juan Water Commission made the request for release on behalf

Navajo Dam and Reservoir on the San Juan River

of its seven member entities - Northstar Water Users, the City of Aztec, Southside Water Users, Flora Vista Water User, City of Farmington, Lower Valley Water Users and Upper La Plata Water Users. The request was for 410 acre-feet of water for five days at 44 cfs for three days and 38 cfs for two days.

Water Year (WY) 2021 April-July runoff was poor throughout the San Juan River Basin. Navajo Modified Unregulated Inflow totaled 378 kaf which was 51% of average. There was no spring peak release. Releases varied from 300 –900 cfs throughout WY 2021. Drought conditions have improved in the Four Corners region due to rains, but drought still persists and is still at its maximum D4 level in many places. Soil moisture has also improved due to rains.

On October 11, the daily average release rate from Navajo Dam was 500 cfs while reservoir inflow was averaging 249 cfs. The water surface elevation was 6023.21 feet above sea level. At this elevation the live storage is 0.895 maf (54 % of live storage capacity) and the active storage is 0.269 maf (26% of active storage capacity). The Navajo Indian Irrigation Project (NIIP) was diverting 65 cfs while the San Juan-Chama project was diverting 0 cfs from the basin above the reservoir.

Releases from Navajo Dam are made for authorized purposes of the Navajo Unit and are pursuant to the Record of Decision for the Navajo Reservoir Operations. Releases target the San Juan River Recovery Implementation Program's recommended downstream baseflow range of 500 cfs to 1,000 cfs through the critical habitat reach of the San Juan River (Farmington, NM to Lake Powell). Current modeling shows the release will most likely vary between 250 and 500 cfs into the winter. In November and December of 2021, releases are scheduled to increase in response to a continual declining dry hydrologic condition for the Colorado River system. This drought operation is implemented under the Upper Basin Drought Response Operations Agreement. The maximum flexibility within the Record of Decision will be used to release an additional 20,000 af on top of base releases. Notification of releases will occur prior to the scheduled release change. Based on current storage and streamflows and the statistical range of likely hydrologies for WY 2022, there is a 25% chance for a spring peak release. The median runoff forecast is for 83% of average.

The San Juan River Recovery Implementation Program participants proposed amendments to the Recovery Program Authorizing Legislation during the April 2021 congressional briefings. The recovery program participants requested amendments to the authorizing legislation that would restore the authorization for annual hydropower funding that was deleted in 2019 amendments; make technical amendments to the legislation to ensure continued authorization of the programs through fiscal year 2023; and allow Reclamation to budget for the programs through FY 24. Technical amendments to the authorizing legislation are anticipated to ensure continued authorization of the programs through FY 23 and to allow Reclamation to budget for the programs through FY 24 on its three-year budgeting cycle. The necessary amendments were drafted, and with approval of participants in the two recovery programs, were submitted to Rep. Joe Neguse's office (D-CO) for introduction in the House. The amendments were introduced by Rep. Neguse and were passed and became H.R. 5001.

# UTAH

Utah is the fastest growing state in the nation, growing 18.4% over the past decade compared to the national average of 7.4%. The state also tops the list in economic rankings based on employment, business environment and growth. More than 3 million residents call Utah home – a number projected to nearly double by 2065.

The state's growing economy and population, accompanied with its arid climate and ongoing drought conditions made worse by climate change impacts, necessitate proactive planning and management of water resources to ensure Utah's future stability.

**Drought & Conservation Focus**

In May 2021, the Natural Resources Conservation Service reported that Utah "water managers should prepare for exceptionally poor to (potentially) worst-on-record water supply conditions."

In the summer, all of Utah was in extreme or exceptional drought, according to the U.S. Drought Monitor. Utah Gov. Spencer J. Cox joined water officials around the state to highlight conservation efforts and outline measures needed to plan for Utah's future. The governor's four focus areas to advance water conservation and planning include the installation of secondary water meters statewide, integrated land use and water planning, continued investments in agricultural optimization, and establishing a statewide turf buyback program.

Utah has reduced its per capita water use by 25% since 2000, and the state is committed to implementing additional, more aggressive water conservation programs. The Utah Division of Water Resources established regional water conservation goals in 2019 to decrease the state's per capita water use an additional 16% by 2030. The state is also involved in conservation pilot programs, drought planning and demand management.

Utah's water year ended with reservoirs at 48% of capacity, down 15% from 2020 and down 26% from 2019. Half of Utah's rivers are in the driest categories for streamflow and water availability indices remain at historically low levels (bottom 15th percentile) for 10 of Utah's 18 major basins.

**Colorado River Water Use**

Utah currently depletes approximately 1 million acre-feet of water annually from its Colorado River apportionment under the 1948 Upper Colorado River Basin Compact. The state has reduced the estimate of its remaining undeveloped water supply to account for uncertain hydrology and climate change in planning for future development and tribal

Dead Horse Point

water rights settlements. A portion of Utah's unused allocation will be developed along the Green River and in Washington County.

**Tribal Water Right Settlements**

The Navajo Utah Water Rights Settlement Act was approved by Congress in 2020 and effectuated by the Utah State Legislature in 2021. The settlement confirmed the Navajo Nation's right to deplete 81,500 acre-feet of water per year from Utah's Colorado River allocation and authorized approximately $220 million for drinking water for the Navajo Nation projects.

The Ute Indian Tribe has a federally decreed water right for 144,000 acre-feet of depletion from the Colorado River system. The state and Tribe finalized negotiations on a water compact in 1990 that entitles the Tribe to an additional 115,000 acre-feet of depletion annually. Although ratified by Congress in the Central Utah Project Completion Act in 1992 and by the Utah Legislature in 2018, the Tribe has yet to ratify the compact.

**Colorado River Authority of Utah**

The Colorado River Authority Act was passed by the legislature and signed into law by Gov. Cox in March 2021, creating the Colorado River Authority of Utah. The authority is composed of six members – five who represent Colorado River authority areas and one who represents the governor.

The authority has three legislatively-stated purposes:

1. To advise, support, gather information and provide input to the river commissioner
2. To protect, conserve, use and develop Utah's waters of the Colorado River system; and
3. To develop a management plan, in the discretion of the authority, to ensure that Utah can protect and develop the Colorado River system and work to ensure that Utah can live within the state's apportionment of the river.

Board members include Gene Shawcroft, who serves as the river commissioner, authority chair and representative of the Central Utah area; Dan Larsen, representing the Uintah Basin area; Jay Humphrey, of the Price and San Rafael area; Zach Renstrom of the Virgin River area; Candice Hasenyager, who represents the state of Utah; and Brian Steed serving as the governor's appointee.

# WYOMING

Just like everywhere else in the Colorado River Basin, 2021 was challenging for Wyoming. Throughout the year, Wyoming has worked with other Basin States and Reclamation to address immediate needs resulting from historically poor hydrology, while preparing to begin work on longer-term solutions to the shared risks and vulnerabilities faced in the Colorado River system.

Wyoming continued to implement the Upper Basin Drought Contingency Plan (DCP). Wyoming has worked with the other Upper Basin States and the Upper Colorado River Commission to move the Upper Basin demand management investigation forward. Additionally, Wyoming spent considerable time this year implementing the Drought Response Operations Agreement.

In July, Reclamation began making releases from the upstream initial units of the Colorado River Storage Project Act to deliver an additional 181,000 acre-feet of water to Lake Powell. Reclamation and the Upper Basin States are working together to develop and finalize, if necessary, a plan for additional releases in 2022. Wyoming is considering the potential futility, transit losses, recovery, and accounting of any additional releases. In response to worsening hydrology, and storage releases from the upstream units, Wyoming Gov. Mark Gordon convened a Colorado River Working Group that meets regularly to discuss important Colorado River matters and monitor potential impacts to Wyoming. The group is made up of representatives of key water use sectors of the Green and Little Snake river basins in Wyoming, including agricultural, municipal, industrial and environmental interests. The Working Group is a continuation of a coordinated and proactive outreach effort that has been underway in Wyoming since 2019.

Finally, Wyoming suffered a significant loss of institutional knowledge this year when Steve Wolff left to become general manager of Southwestern Water Conservation District in Colorado. Since 2006, Steve provided valuable representation for Wyoming on numerous water related issues.  Steve served as administrator of the Interstate Streams Division of the Wyoming Office of the State Engineer from June 2016 to June 2021.

Big Sandy Dam

# TEN TRIBES PARTNERSHIP

Nambe Falls Reservoir

The Colorado River Basin Tribes Partnership, also known as the Ten Tribes Partnership, is an organization formed in 1992 by 10 federally recognized tribes with reserved water rights in the Colorado River Basin. The member tribes are: Ute Indian Tribe, Ute Mountain Ute Tribe, Southern Ute Indian Tribe, Jicarilla Apache Nation, Navajo Nation, Chemehuevi Indian Tribe, Colorado River Indian Tribes (CRIT), Fort Mojave Indian Tribe, Quechan Indian Tribe and Cocopah Indian Tribe.

The tribes formed the Partnership for the purpose of strengthening tribal influence among the seven Basin States over the management and utilization of Colorado River water resources. The Partnership assists member tribes in the development and protection of tribal water resources and addresses technical, legal, economic and practical issues related to the management and operation of the Colorado River. The Partnership formally joined the Colorado River Water Users Association in 1996 with the goal of actively participating with the seven Basin States in negotiations relating to the Colorado River. In 2018, the Partnership tribes, along with Reclamation, completed the Tribal Water Study, which included information regarding each Partnership tribe's water rights, current water uses, future demands and likely impacts to the system of future development of tribal water. As documented in the Tribal Water Study, Partnership tribes collectively have water rights in the Upper and Lower Basin to roughly 20% of the mainstream flow.

Water rights for the Chemehuevi Indian Tribe, the Colorado River Indian Tribes (CRIT), the Fort Mojave Indian Tribe, the Quechan Indian Tribe, and the Cocopah Indian Tribe, whose reservations are located on the lower reaches of the mainstream of the Colorado River, were decreed in Arizona v. California, 574 U.S. 150 (2006). In that case, the Supreme Court found that the Secretary of the Interior had a statutory duty to respect existing present perfected rights as of the date the Boulder Canyon Project Act was passed. Water rights of the five Indian reservations are among those present perfected rights and are entitled to priority based on the establishment date of each reservation and dates of boundary adjustments thereto.

In 2021 CRIT continued to make water available for Lake Mead as system conservation and Intentionally Created Surplus. CRIT fallowed approximately 11,000 acres of productive agricultural lands on the reservation in Arizona as part of the intra-Arizona Drought Contingency Plan. This year was the second of three years of the agreement to leave 50,000 acre-feet a year of new system conservation in Lake Mead. This project is funded by the state of Arizona, non-governmental organizations and corporate partners.

In cooperation with the Central Arizona Project and the University of Arizona, CRIT tested the N-Drip low-pressure drip irrigation on fields within CRIT Farms, the Tribes' farming enterprise, and are working on the agreements to expand the pilot program in 2022. CRIT continues to work with the Bureau of Indian Affairs to find ways to distribute water more efficiently from the federal irrigation project to the farmers at CRIT. As part of this effort, CRIT is using tribal and Reclamation WaterSMART funds to install additional measuring devices throughout the federal project.

CRIT has worked cooperatively with the state of Arizona and the Department of Interior to develop legislation and implementing agreements to authorize them to lease water in Arizona based on the reduction in consumptive use on the reservation. CRIT leadership continues to participate and serve on committees and councils in Arizona that are addressing the hydrologic conditions in the Basin.

A portion of the Ute Indian Tribe's reserved water rights was decreed in United States v. Cedarview Irrigation Company et al., No. 4427 (D. Utah 1923), and United States v. Dry Gulch Irrigation Company, et al., No. 4418 (D. Utah 1923), with a senior priority date of 1861, the establishment date of the Uintah Valley Reservation, pursuant to the reserved water rights doctrine first articulated in Winters v. United States, 207 U.S. 564 (1908). In 1965, the United States, the Central Utah Water Conservancy District, the State of Utah (by joint resolution of the Legislature) and the Ute Indian Tribe agreed to the quantification

Sumner Dam Reservoir

Platoro Dam

of the rest of the Tribe's reserved water rights by contractual agreement. In March 2018, the Tribe commenced litigation against the United States for the mismanagement, misappropriation and diminishment of the Tribe's reserved water rights and related resources. The Tribe is seeking declaratory and injunctive relief, as well as damages, to compensate the Tribe for past harms, including mismanagement of the Uintah Indian Irrigation Project.

The water rights for the four remaining Partnership tribes have been determined to various extents through settlement agreements. However, not all of the tribes' water rights claims have been resolved or finally quantified. The 1988 Colorado Ute Settlement Act, as amended by 2000 amendments and Colorado state court consent decrees, quantified the water rights of the Southern Ute Indian Tribe and the Ute Mountain Ute Tribe in the state of Colorado. The Ute Mountain Ute Tribe also has not resolved its water rights in the states of New Mexico and Utah.

The 1992 Jicarilla Apache Tribe Water Rights Settlement Act resolved the future use water rights claims of the Jicarilla Apache Nation to the water in the Colorado River system. Since 1992, the Jicarilla Apache Nation has been actively engaged in efforts to put this water to use. The Jicarilla Apache Nation currently subleases a portion of the water to support residential communities, endangered species, and resource development. The Jicarilla Apache Nation, along with the Navajo Nation, is a project participant for the Navajo Gallup Water Supply Project, which is now delivering treated drinking water to the southern portion of the Jicarilla Apache Nation's reservation.

In 2009, Congress ratified the Navajo Nation San Juan River Basin in New Mexico Water Rights Settlement Agreement. The Omnibus Public Land Management Act of 2009 (P.L. 111-11) authorized construction of the Navajo-Gallup Water Supply Project (NGWSP).

More than 30% of Navajo families haul water to meet their daily water needs. The NGWSP will provide a clean, reliable drinking water supply to meet the future population needs of approximately 250,000 residents of northwest New Mexico and northeast Arizona.

Two laterals are being built to serve the Navajo communities: the San Juan Lateral and the Cutter Lateral. The project currently has two active construction contracts. Block 4c-8 consists of the installation of 30 miles of pipeline (48 & 42-inch diameter) between Twin Lakes and Little Water, New Mexico. The work began in January 2020 and is scheduled for completion by spring 2022. The second contract is the construction of Tooh Haltsooi Pumping Plant (Pumping Plant 4) near Sheep Springs, NM and Bahastl'ah Pumping Plant (Pumping Plant 7) near Twin Lakes, NM. Contractor Archer Western began construction in January 2021 and expects to be completed by September 2022. Reclamation will soon award a construction contract for the Navajo Code Talkers Sub-lateral. Construction will begin in early 2022.

The Navajo Nation has Financial Assistance Agreements with Reclamation in place that allows the Nation to construct portions of the project. The Cutter Lateral was completed in 2020, with initial water deliveries in fall of 2020 and full water deliveries by the summer of 2021. The congressionally mandated deadline for completion of the NGWSP is December 2024.

The Navajo-Utah Water Rights Settlement Act was included as Section 1102 of the Consolidated

Heron Reservoir

Appropriations Act, P.L. 116-94, approved by Congress on Dec. 21, 2020, and signed by President Donald Trump on Dec. 27, 2020. The Navajo Nation is actively working to secure its water rights in other basins within the states of Arizona and New Mexico.

Among the Partnership's key goals are ensuring that, within the next decade, each Partnership tribe: has been able to successfully settle or otherwise resolve its reserved water rights claims; has the ability to maximize its on-reservation use of water as well as the flexibility to explore, facilitate and implement off-reservation use and transfers; can benefit from water infrastructure projects promised or obtained through settlements or negotiations with state and federal governments and other partners in a timely fashion; and is fully supported by the United States' exercise of its trust responsibilities to protect the tribes' water rights in all of its management.

The Ten Tribes Partnership recently developed and approved the following principles to guide its work on river policy going forward:

*As indigenous people, we are closely connected to the land and natural resources and take seriously our obligation to protect and defend the Colorado River, as well as the plants, animals, people and ecosystems that rely on the river.*

*Continued drought has created extreme uncertainty for users of Colorado River water and concerns about the health of the river itself.*

*Insufficient water availability will have drastic consequences for our tribes, who rely heavily on the river for commercial, domestic, cultural and spiritual purposes.*

*Collectively, the Ten Tribes hold rights to more than 20% of the Colorado River's current estimated flow, and tribal water, therefore, plays an important role in supply and demand.*

*The Ten Tribes must be included in a meaningful way in shaping river policy going forward.*

*Part of this policy must be an acknowledgment of the extent of tribal water rights, a recognition of tribes' rights to use that water, and a commitment to assist tribes in benefitting from those water rights.*

*It is time to stop thinking about tribal water rights as a problem to be solved and start thinking about tribes and tribal water rights as integral to solving the basin's problems.*

*For the Ten Tribes, compensated forbearance, off-reservation marketing, and protection of future rights to on-reservation development, will be necessary components of any future river management system.*

*We must acknowledge that the water supply in the Colorado River was overestimated to start with and is shrinking year by year.*

*We must take steps to address supply/demand imbalances while protecting tribal water rights, the river, the reservoirs, and the plants, fish, birds and other species that depend on the river system for survival.*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