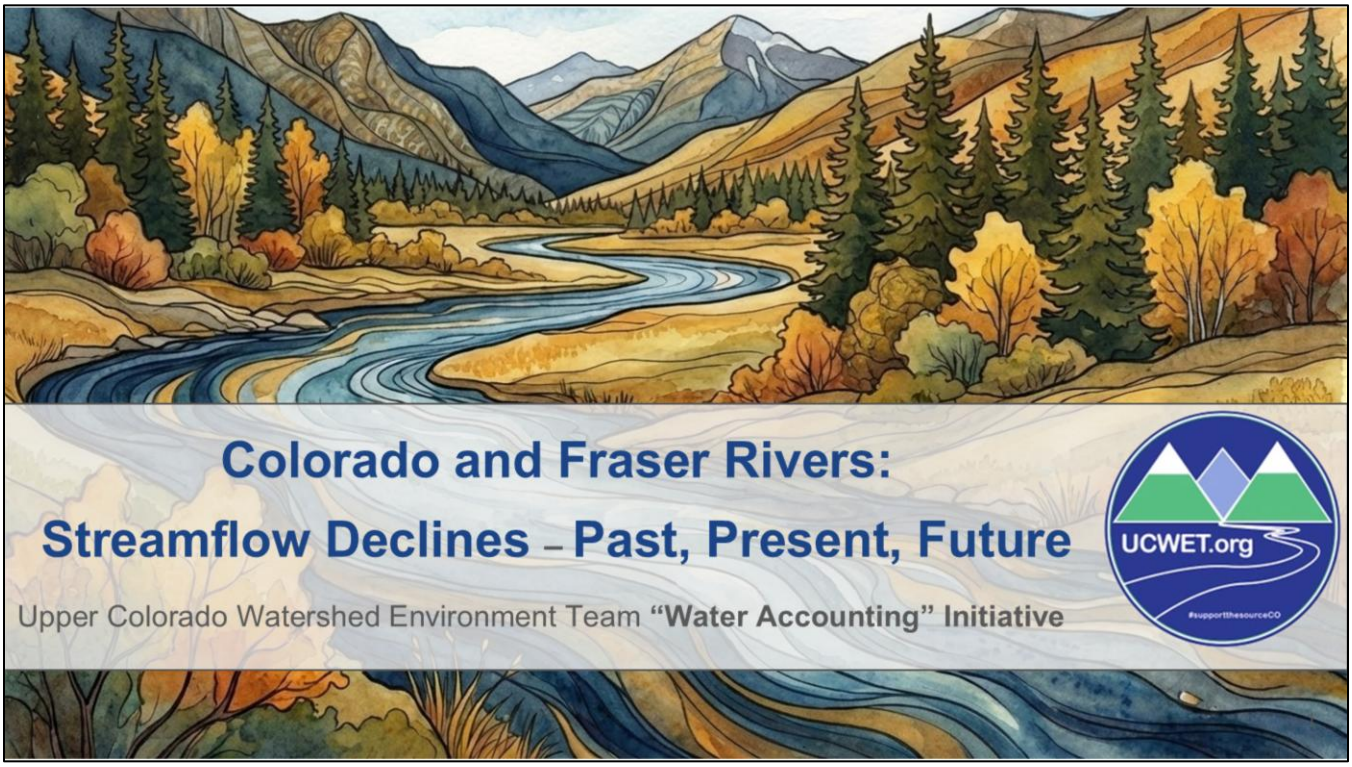
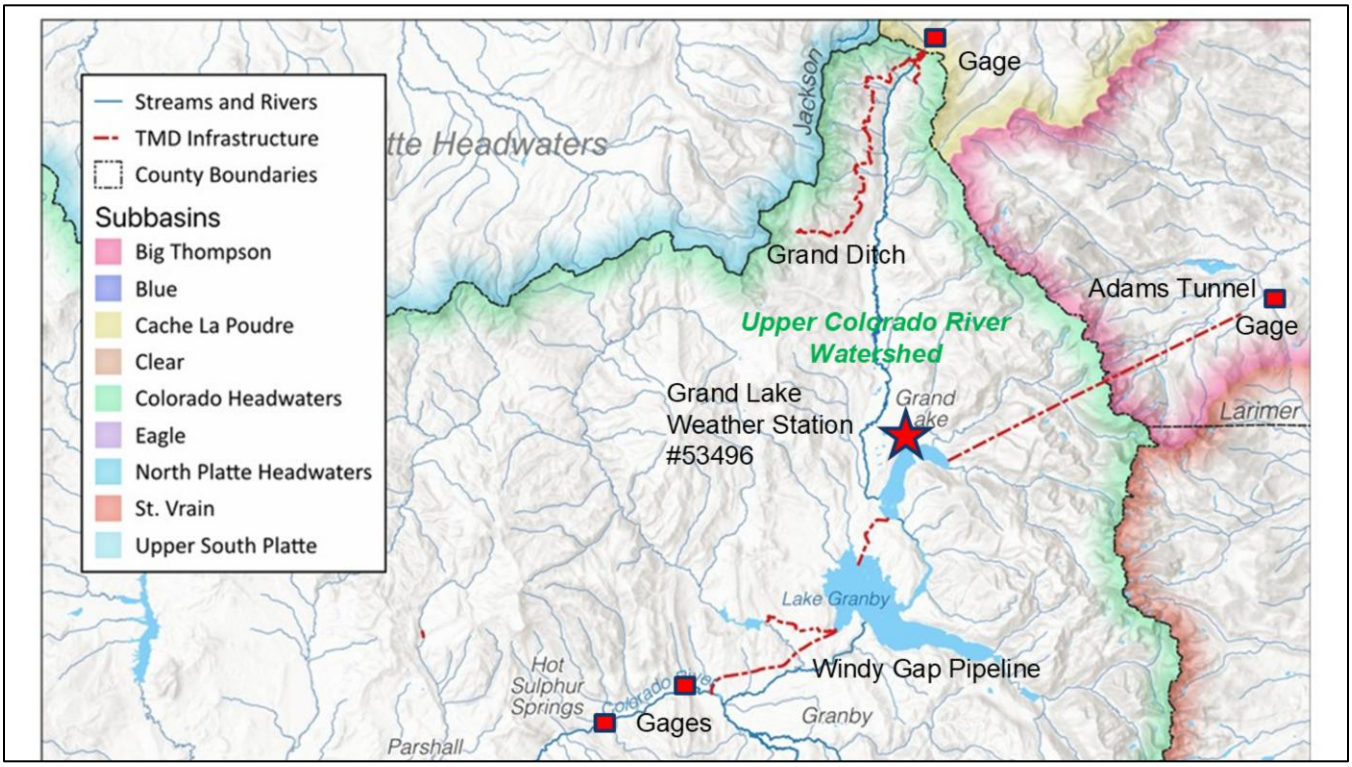


UCWET commissioned an effort to better understand how the Windy Gap Firming Project (WGFP) and Gross Reservoir Expansion Project (GREP, aka Moffat Firming) will impact streamflows in Grand County under a range of future climate conditions, and produce information regarding local water availability to support environmental streamflow targets. The original analyses used to approve the WGFP and GREP remain problematic in that they do not contemplate changes to streamflow expected from Climate Change in the way that other state-level planning models have. Due to this shortcoming, it is difficult for local stakeholders to reasonably and accurately assess the range of probable future conditions on Grand County streams resulting from cumulative impacts of projects and climate change.

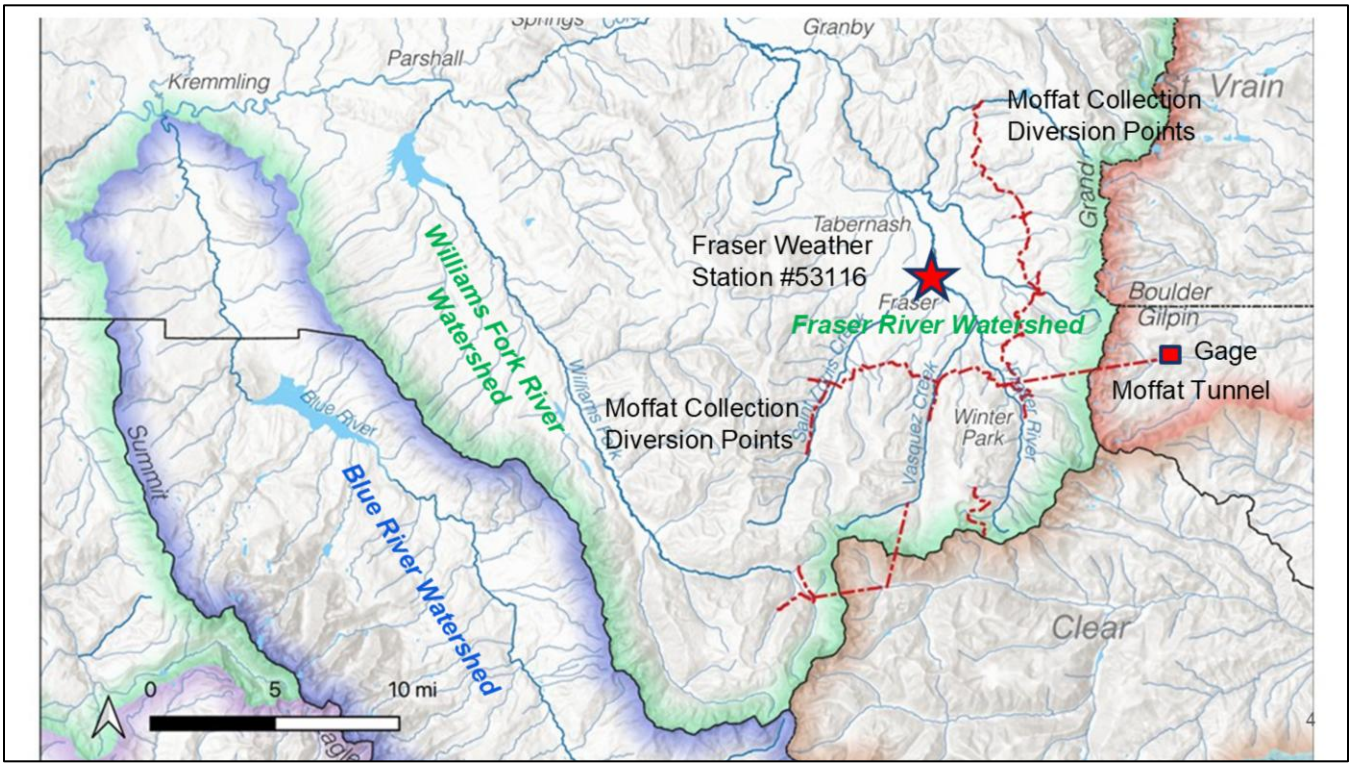
Outline

1. **Climate Trends and Water Diversions**
2. Streamflow Records and Impacts under Different Hydrologic Conditions
3. Environmental Flow Targets
4. Water Quality, Fire, and Other Impacts of Low Flows

- Reduction of river and stream flows are most obvious and noticeable. They are a result of lower precipitation and water diversions to the eastern slope.
- Therefore, to get a better understanding of the drought impact on the environment and needs for the consumers, we need to review all these factors and their quantitative relationships.
- It all starts with the climate and the water diversions out of the watershed. The following slides document these relationships.



- This map illustrates the northern portion of the Upper Colorado River watershed.
- Point out key water diversion structures: (1) Grand Ditch (1890-1915 construction; still in operation with 1/3 of Kawuneeche watershed water diverted); (2) Colorado-Big Thompson Project inclusive of Lake Granby (1941-1950), Adams Tunnel (1940-1944), Windy Gap Pipeline (1981-1985).
- First Trans Mountain Diversion (TMD) water volumes to eastern slope in 1947 through the 13.1 mi Adams Tunnel.
- First water pumping from the Colorado River at Windy Gap through the 6 mi pipeline to Lake Granby occurred in 1985.
- Grand Lake weather station with records starting in 1940 to present – Records available through CSU Climate Center website.
- Key to this presentation is the yearly trans mountain diversion (TMD) volume through Adams Tunnel and the precipitation and temperature records for the watershed

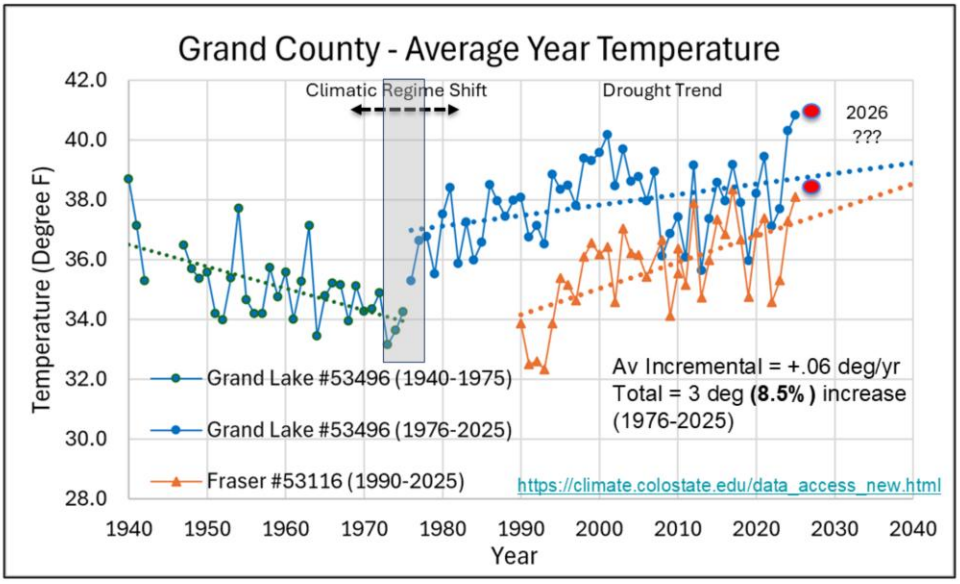


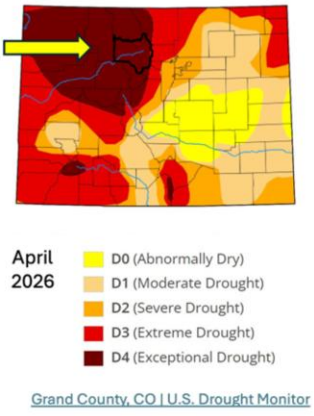
- Map illustrates the southern portion of the Upper Colorado River watershed which includes the Fraser River watershed and the Williams Fork River watershed.

- The Blue River - Green Mtn Reservoir is part of the overall Colorado- Big Thompson Project and water conservation strategy of the Colorado River.

- The key main TMD structure is the Moffat Collection System operated by Denver Water and consisting of 34 miles of canal, pipes and tunnel systems transferring water to the 6.2 mi Moffat Tunnel and the eastern slope. Gross diversion volume measurements taken from tunnel east portal gauge #

Local Temperature Trends

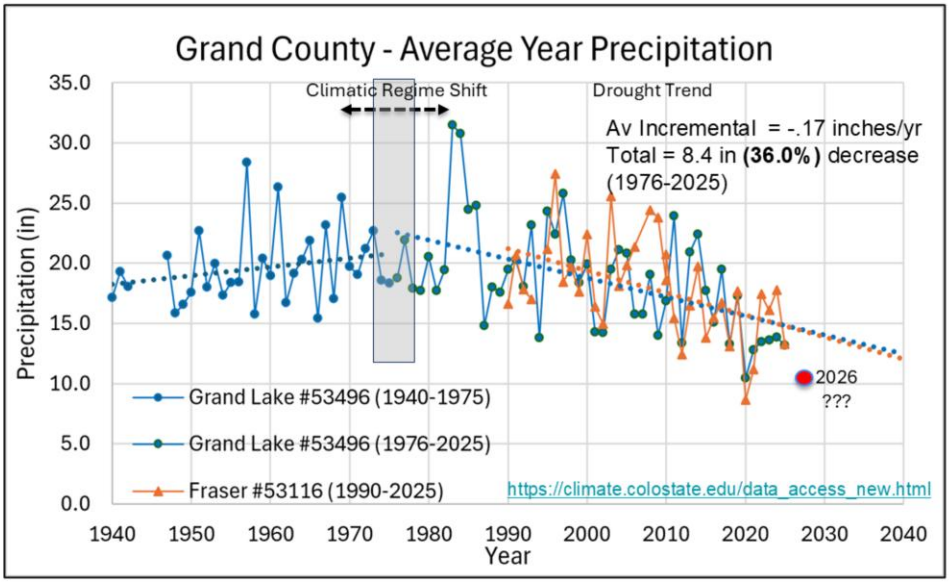


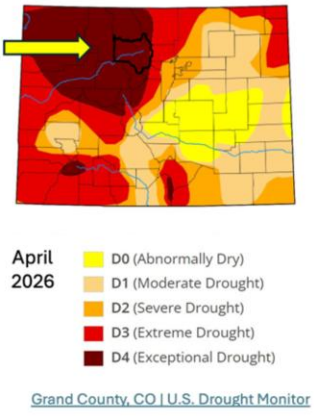


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- This graph reflects the temperature history or the watershed from 1940 thru 2025 and includes data from the two forementioned weather stations. . https://climate.colostate.edu/data_access_new.html
- The Grand Lake station (#534496) has the longest history (1940-2025) whereas the Fraser station (#53116) initiated records in 1990.
- A major world “Climate Regime Shift” has occurred in the mid 1970’s and reflects the well documented **1976–77 Pacific Decadal Oscillation (PDO) Shift.** The PDO abruptly flipped from a cool to a warm phase, altering North Pacific sea-surface temperatures and storm-track behavior.
- Since the mid 1970s, the temperature trend is steadily increasing with an average increase of 3 degrees since 1976.
- The current year (2026) is projected to be the hottest average temperature on record.
- Grand County is currently in an “Exceptional Drought” condition

Local Precipitation Trends





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- This graph reflects the precipitation history or the watershed from 1940 thru 2025 and includes data from the two forementioned weather stations. https://climate.colostate.edu/data_access_new.html
- The Grand Lake station has the longest history (1940-2025) whereas the Fraser station initiated records in 1990.
- The precipitation and temperature are inversely related. The precipitation history also demonstrates the “Climatic Regime Shift”.
- Note that there as been a decrease of annual precipitation of approximately 36 percent since the 1976. This factor will be reflected in the water diversion history and Colorado River flow to be shown in subsequent slides.
- This year (2026) is well on the verge of breaking all highest temperature and lowest precipitation on record.

Transmountain Diversions (TMD)

Water Supply & Storage TMD

1891: Water Supply Co filed for water rights

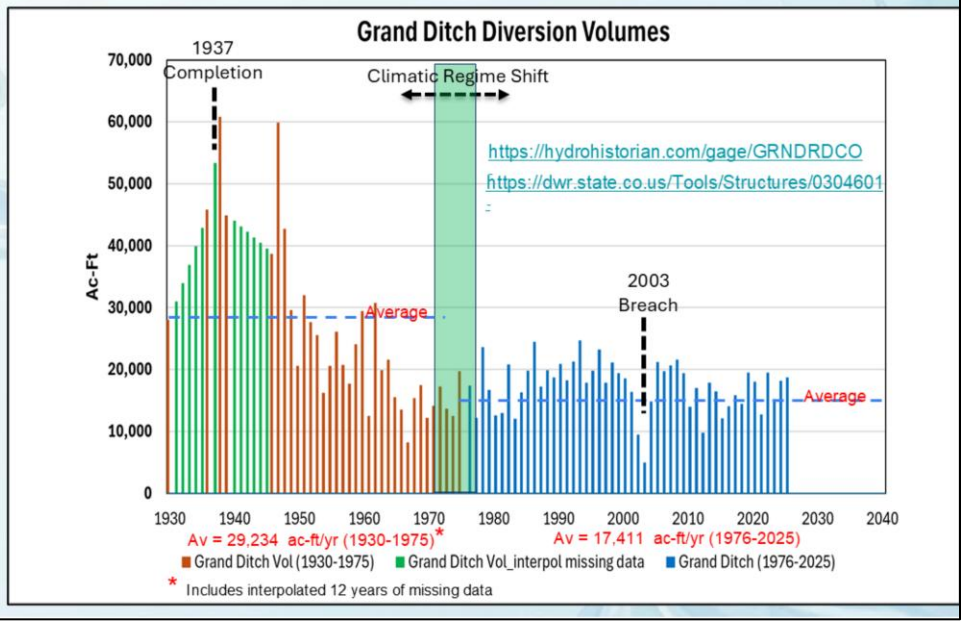
1895: Water Supply and Storage Co took over project

1898 – 1937: Construction of ditch in multiple phases

1900: First delivery of water to eastern slope

1974-1977: Improvements to the ditch included membrane liner removal of flumes and replacement of CMP pipe

1975: Nominated for the National Register of Historic Places



- Grand River Ditch (Grand Ditch) situated in the northern most portion of Grand County is the oldest trans-mountain diversion structure in the Upper Colorado River watershed .
- Initial water rights filing was by Water Supply Co of Lamier County in 1891 and in 1895 the Water Supply and Storage Company took over the project with a decreed capacity of 524.6 cubic feet per second (cfs).
- Initial construction began in 1898, and thru multiple phases was completed in 1937. The final ditch could carry 360 cubic feet of water per second or 264,000 ac-ft/year (based on the average number of days from diversion records). Grand Ditch diversion records start. in 1930, (a) there are missing data after 1930, and (b) grand ditch diversions likely started before 1930 but at much lower volumes before completion in 1937.
- Total length of the ditch is 14.3 miles and captures water from 11 tributaries from the Never Summer Mountains in Grand County, Colorado.
- Small individual intake and diversion structures sit at each crossing stream, dynamically routing high-spring runoff straight into the main ditch channel rather than letting it cascade down into the Kawuneeche Valley.
- The collective water flows north along the ditch's grade, breaching the Continental Divide at **La Poudre Pass (10,175 feet)** to empty into Long Draw Reservoir and drop down into the Cache la Poudre drainage and subsequently into the South Platte River.

- Portions of the historic ditch, including side-hill cuts and check structures, underwent massive engineering reconstruction following a notable 2003 bank breach to stabilize adjacent slopes and protect park wetlands.

- The average annual diversion volumes from 1930 thru 2025 (excluding missing 12 years) is 20,553 ac-ft/yr. Grand River Ditch at La Poudre Pass — stream gage (https://hydrohistorian.com/gage/GRNDRDCO) If the missing data is linearly interpolated, then the overall average is 23,076 ac-ft/year. The average annual diversion volumes from 1976 thru 2025 is 17,411 ac-ft/yr. GRAND RIVER DITCH RELEASE STRUCTURE (https://dwr.state.co.us/Tools/Structures/0304601).

- Note the overall decrease of water diversion from the completion of the project in 1937 to present day. Since the ditch volume is a function of available water entering the ditch with minimal controls, the changes directly reflect the overall changes in the yearly snowpack and local climate of the watershed.

Transmountain Diversions (TMD)

Denver Water TMD

1936: First Fraser River diversion through Moffat Tunnel

1956: Enlargement of Moffat Collection System completed

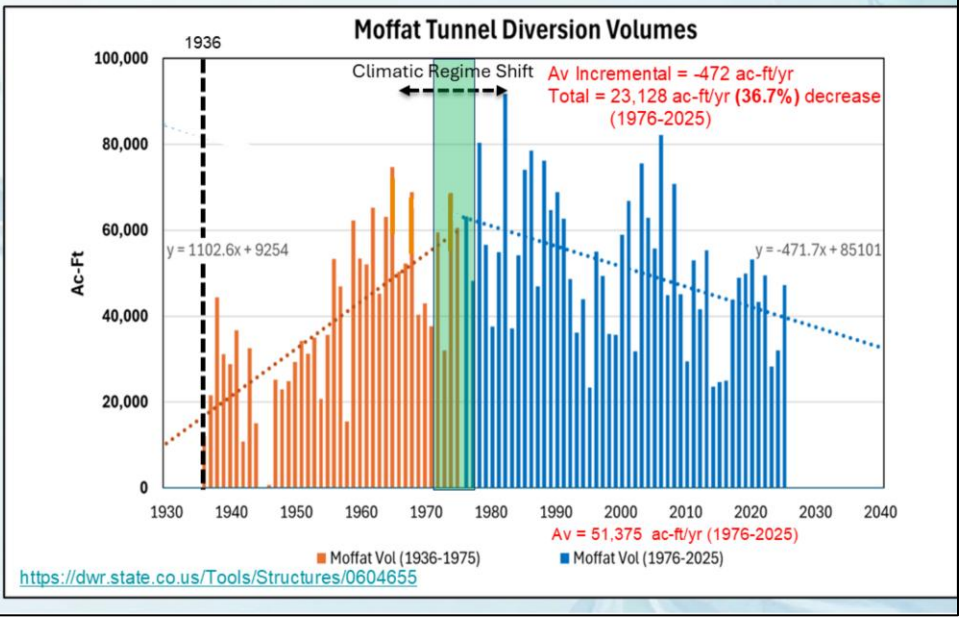
1975: Cabin-Meadow Collection System completed

2017: Gross Reservoir Expansion Project approved by U.S. Army Corps of Engineers

2022: Expansion of Gross Reservoir begins – triple existing capacity

2026: Federal ruling clears hurdle for reservoir completion

2028: Expected filling reservoir from Moffat collection system



- This column bar graph illustrates the water diversion history through the Moffat Tunnel (#0604655) and operated by Denver Water. https://dwr.state.co.us/Tools/Structures/0604655

- Diversions were initiated in 1936 and steadily increased with the various related expansion initatives until the mid 1970s and the time of the climatic regime shift. Gross water diversion volumes through the tunnel has been measured at east portal of tunnel via gage #09022500.

- Since 1976, the average decreasing trend of diversions has coincided with the decrease with the precipitation trend of an average of approximately 36 percent.

- The fluctuation of diversion volumes are dramatic (as much as 42% mid 1980s) and is a result of changes in precipitation and lacking the reservoir buffer that the Adams Tunnel and Granby Reservoir offers to maintain stability. Water stablilty for the Denver Water consumer is provided by the Gross Reservoir on the eastern slope. Expansion of Gross Reservoir will triple the current water capacity and will be filling by 2028 by capturing water from the Fraser River watershed.

- This diversion and precipitation relationship reflects the legal water rights and stream flow reduction that Denver Water must respect. The Environmental Impact Statement (EIS) of 2014 clearly states that the water flow of the Fraser River will be maintained at approximately 50 percent of the natural flow. Therefore, over several years, precipitation, diversion volumes and streamflows are all proportionate. (2026 diversions

exceeded this threshold)

In a October 2026, a report issued by Denver Water, additional cuts will reduce flows by 33% to 50% this winter and will help the utility “prepare for the possibility of another dry year.” As of Oct. 5, its reservoirs were 67% full, compared with an average of 90% for this time of year, the statement said.
Denver Water to cut Fraser River winter flows in half as drought shrinks reservoirs | 9news.com

Flows on three tributaries are also being reduced, according to Denver Water. Vasquez Creek will drop to 2 cfs starting around Oct. 13. St. Louis Creek will drop to 2 cfs, likely starting Nov. 1, though a water-right call for irrigation prevents a reduction until irrigation season ends, Denver Water said in a later email. Ranch Creek, set at 1.5 cfs, began its reduction Oct. 1.

With these 2026 additional cuts of Fraser River flows, the calculated flow reduction from pre-diversion flows will now be between 67.5 and 75 percent. With the need to fill Gross Reservoir expansion will these flow reductions remain for many years to come?

Transmountain Diversions (TMD)

Northern Water TMD

1938: Colorado-Big Thompson construction begins

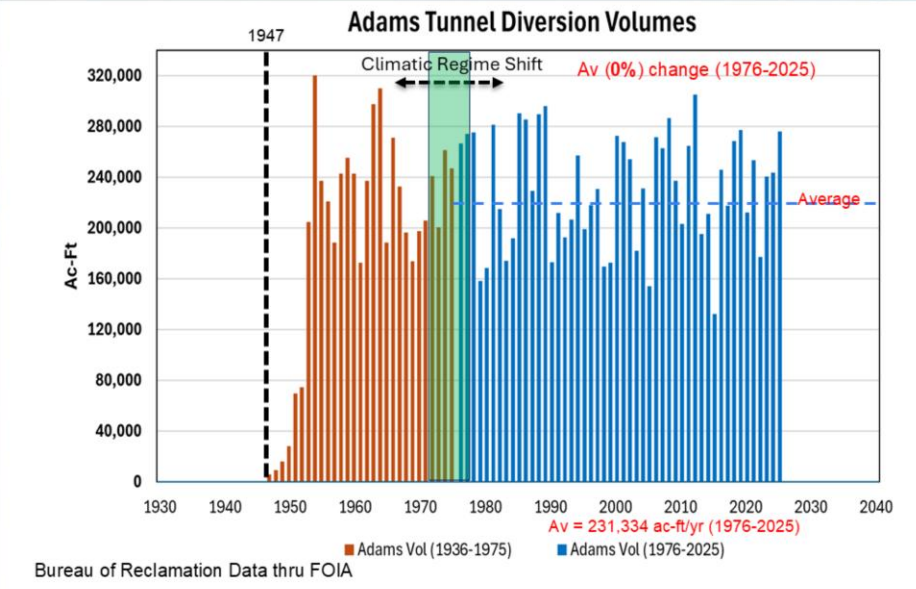
1947: First Colorado-Big Thompson diversion (Adams Tunnel)

1957: Colorado-Big Thompson Project substantially complete

1985: Windy Gap Pump Plant constructed

2017: Windy Gap Firming Project approved by U.S. U.S. Army Corps of Engineers

2021: Construction of Chimney Hollow Reservoir begins



- This slide illustrates the water diversion history through the Adams Tunnel (#0404634) and operated by Northern Water and initiated in 1947. Yearly records were obtain from the U.S. Bureau of Reclamation from 1947-2025 and was requested through the Freedom of Information Act (FOIA). Colorado Division of Water Resources (DWR) maintains records from 1994-2025 https://dwr.state.co.us/Tools/Structures/0404634 (Relatively small discrepancies exists between the two overlapping data sets 1994-2025 with an overall average difference of 0.4%)

- This chart shows the diversion volumes from 1993 thru 2025 and averages approximately 231,000 ac-ft/year at a relative constant volume. Volumes were measured from gage (#00177957) on the eastern outflow of the tunnel. Note that the Adams Tunnel diversions from 1993-2025 is approximately 4.5 times that of the Moffat diversions.

- The Granby Reservoir offers relative stability in TMD volumes for the Northern Water customers.

- Many major TMD projects continued to have paper rights to water supplies that they could not fully utilize due to the inability to store the full amount of allocated diversions. In the recent time period, a series of efforts to 'firm up' these rights resulted in the **Windy Gap Firming Project (WGFP)** and **Gross Reservoir Expansion Project (GREP)**, which is also referred to variously as the '**Moffat Firming Project**' or the Moffat Collection System Project.

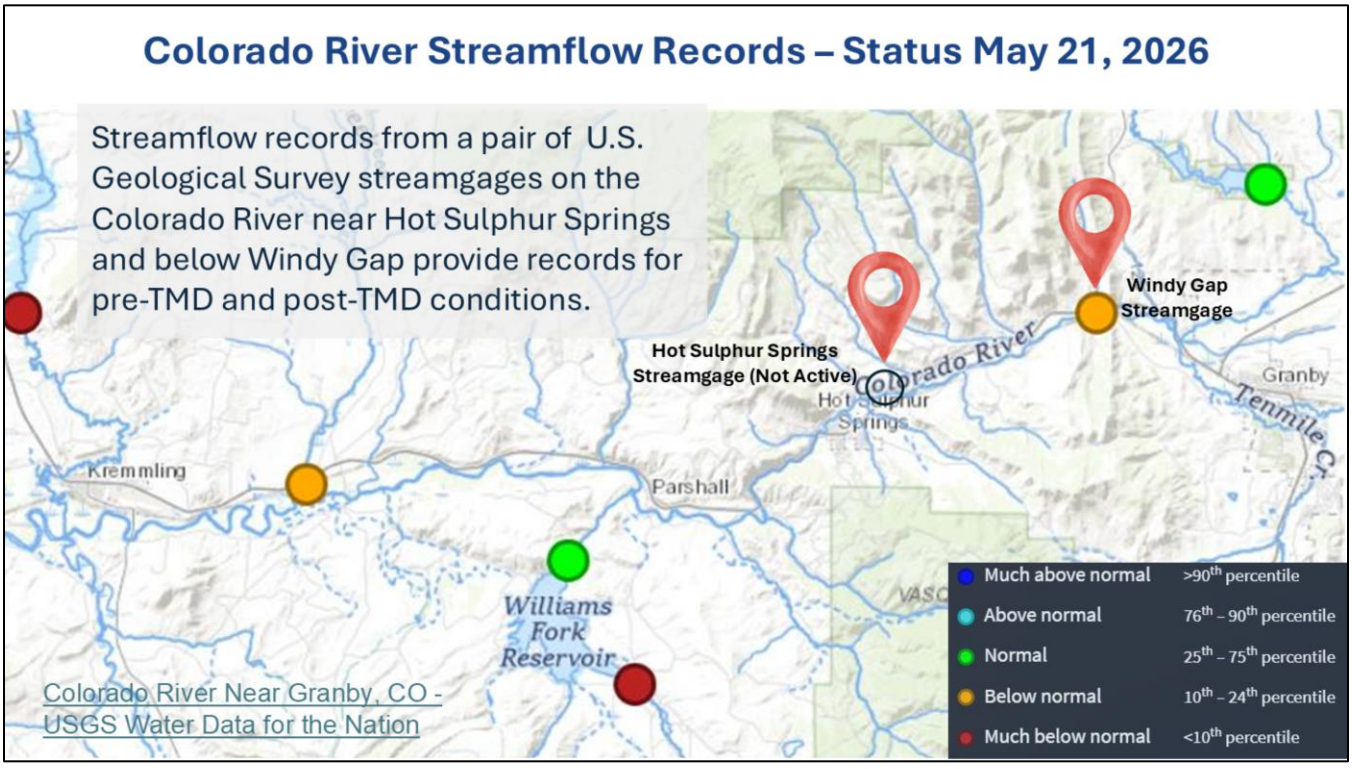
- East Slope municipalities received successful approval for the WGFP and GREP in 2017 and 2020 respectively, signaling a contemporary round of additional TMD diversions and anticipated further depletions of Grand County stream flows. Construction of the necessary storage infrastructure to initiate diversion is not yet complete, and both projects face ongoing legal and design/logistical challenges.

- When these storage projects are complete, the impact on Grand County streams will begin to move from the hypothetical/projected realm to the real world where they can be directly measured and observed over time.

Outline

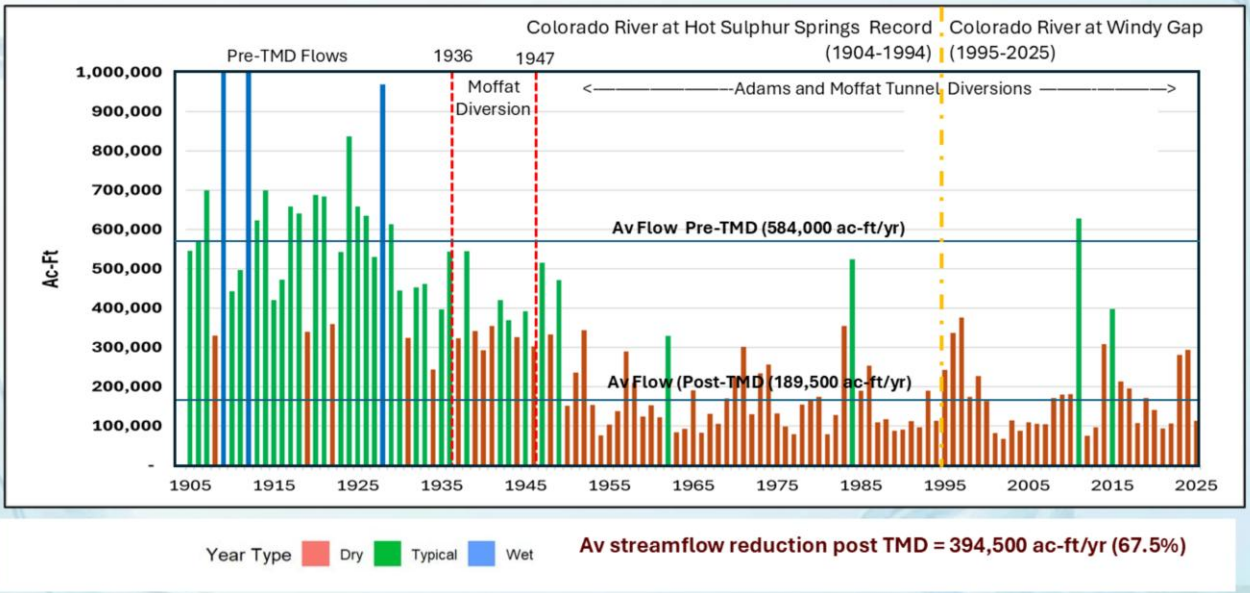
1. Climate Trends and Water Diversions
2. **Streamflow Records and Impacts under Different Hydrologic Conditions**
3. Environmental Flow Targets
4. Water Quality, Fire, and Other Impacts of Low Flows

- Streamflow records are necessary to assess the total balance of the total hydrologic system.
- Unfortunately, many of the streams have inadequate or discontinuous streamgage records. Winter below-ice flow records are commonly not available (except for sections of the Colorado River that never freeze). Discontinuities also occur due to lack of available funding needed to maintain specific streamgages in operation.
- To make sense of these discontinuous data and better assess seasonal and yearly fluctuations, UCWET commissioned a study by Lotic Hydrologic, LLC.



- This slide depicts two key streamflow guages on the Colorado River.
- Combining records from thes closely-located streamgages below Windy Gap (#09034250) and near Hot Sulphur Springs (#09034500) which span the longest and continuous records within the watershed from 1905 thru 2025.
- The combined streamflow record is a powerful tool for understanding the cumulative impacts of completing multiple TMD projects over time in the Colorado and Fraser headwaters.
- Note the streamgages indicate the relative river flow level status of May 21 this year (2026), with below normal readings on the Colorado River and is a result of the exceptional drought conditions.

Historical Streamflow Changes on the Colorado River



- Annual stream yields in the extended Windy Gap Record show distinct impacts from the major expansion of TMD projects between the 1930s and mid-1950s.
- This column bar graph represents the streamflow history of the Colorado River through those two streamgages between 1905 thru 2025 (Hot Sulphur Springs streamgage #09034500 and Windy Gap streamgage #09034250): https://dashboard.waterdata.usgs.gov/app/nwd/en/?aoi=default
- The color of bar (red, green and blue) indicates three relative hydrologic year types (statistically determined) – dry, typical or wet conditions – within the Pre TMD and Post TMD periods.
- Pre Trans Mountain Diversion (TMD) water volumes before 1936 (Moffat) are shown to have an average annual flow rate of 584K ac-ft/yr.
- Post TMD starting in 1936 (Moffat) and 1947 (Adams), the average annual flow rate drops significantly to 189.5K ac-ft/yr, a dramatic reduction or 67.5 percent of natural flow pre TMD
- Hydrologic *year types* (wet, dry, average) were classified (binned) at the 10th, 50th, and 90th percentile non-exceedance annual yield thresholds from the 1904-1935 period as baseline. This period represents the pre-TMD hydrology of the Colorado Headwaters, although in addition to TMDs and expansion of local in-basin consumptive uses, climate change has already shifted hydrology to some degree since then as well.

TMD Historical Impacts on Local Streamflows

Five statistically-established Year Type conditions: **Drought, Dry, Average, Wet, Flood**

Location	Year Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Type Averages
Williams Fork near Leal	Drought	4.5	10.5	10	13.5	26.5	29	25.5	25	22	17.5	6	11	
	Dry	11.6	11	9.2	7.2	13.4	8.2	12.6	21.2	17.4	10	12	13	
	Average	6.1	5.1	4.2	3.9	6.4	1.9	10.3	12	9.9	9.1	8.1	7.1	
	Wet	6	5	4.8	4.2	2.3	1.3	3.8	8.2	8.5	5	7.2	6	
	Flood	5.5	4	4.5	2.5	4.5	0.5	5	4	8	5.5	6	4	
Colorado River below Windy Gap	Drought	85	83	81	75.5	81	80	75	84.5	83.5	80.5	72.5	69.5	**79.3%**
	Dry	88	86.6	80.8	62.6	74	73.4	67.8	76	81	64.8	50.6	84.4	**73.9%**
67.5%	Average	78.1	78.5	75.2	49.4	48.7	44.1	63.3	64.4	67.9	58.3	43.8	78.3	**62.5%**
	Wet	83.5	82.3	70.7	39.3	37	20.7	40.3	66	70.7	52.8	38.7	74.2	**56.4%**
	Flood	82	84	64.5	45.5	30	18.5	38.5	31	61.5	43	75	73.5	**53.9%**
Fraser River below Crooked and Ranch Creeks	Drought	22	15	14	31.5	64.5	74.5	50.5	48	61.5	45	33	24	
	Dry	18.2	15.6	13.4	18	46.6	41.8	59.4	54.8	46	36.6	25.6	20	
	Average	21.9	17.9	16	15.3	33	27.5	47.4	46.7	45.7	52.1	35.8	27.1	
	Wet	19.7	16.7	12.3	10.8	35.2	30.8	34.3	40	44.7	29.5	27.7	22.5	
	Flood	18.5	14	10	7.5	31.5	11.5	29.5	31.5	36	45.5	41.5	25.5	

Percent stream flow reduction from pre TMD normal flow

0 20 40 60 80 100

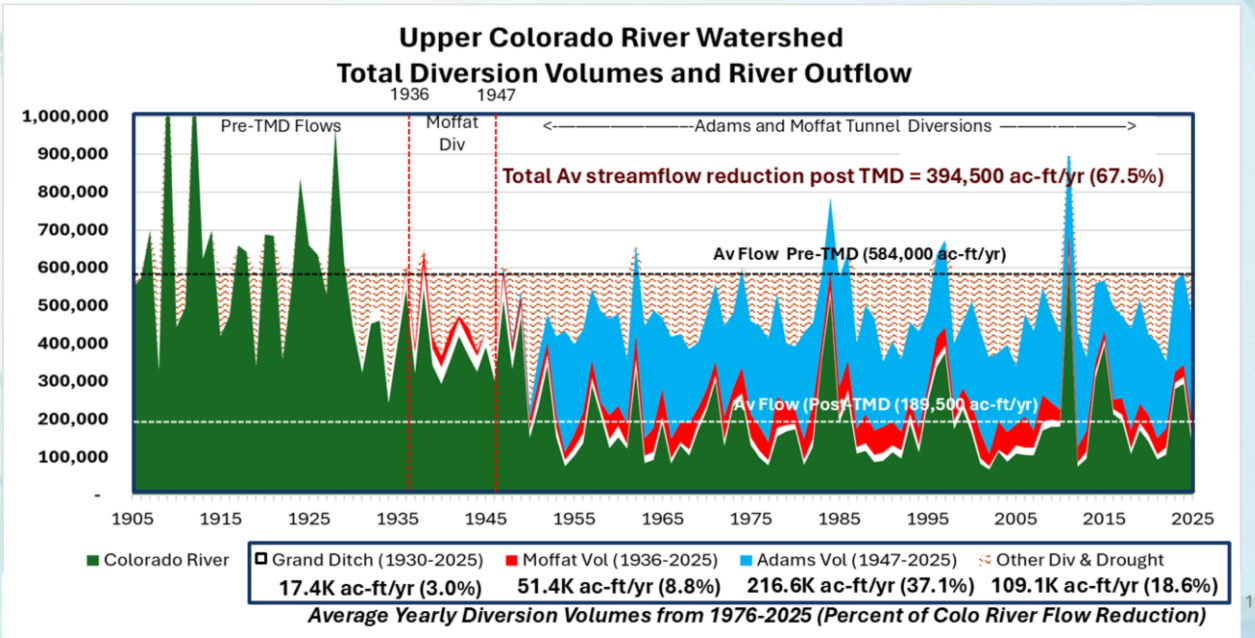
Sources: Northwest Colorado Council of Governments (2025). Estimated Transmountain Diversion Impacts to West Slope Headwaters Subbasins.

Note: For explanation of flow statistics, see Lotic Hydrological water accounting technical brief (2026) (following WGFP and GREP EIS methodology based om Big Thompson Moraine Park gauge and a 30-yr record of hydroclimatic variations).

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- Northwest Colorado Council of Governments (NWCCOG) recently produced a study that assessed the impact of TMDs on annual and monthly streamflows in headwaters communities across western Colorado.
- The table on this slide indicates the percentage of streamflow reduction for different months of the year under five different hydrological conditions (statistically determined) – - drought, dry, average, wet, flood – at three locations in Grand County.
- For the Colorado River flow presented on the previous slide, the average annual post TMD flow is 67.5 percent and correspond to Average/Typical to Dry categories shown on the cental portion of the table.
- The Colorado River has experienced the greatest impact of flow reduction when compared to the Williams Fork River (Top table) and the Fraser River (Bottom table)

Historical Streamflow & Reductions (Colorado River)



- This graphical display composites historical surface water flows out of the Upper Colorado river watershed in Grand County. This includes the natural flow of the Colorado River (green), Grand River Ditch (white), Moffat Tunnel (red) and Adams Tunnel (blue) diversions.

- Grand Ditch diversion records start. in 1930, (a) there are missing data after 1930, and (b) grand ditch diversions likely started before 1930 but at much lower volumes before final completion in 1937.

- The average Colorado River flow pre-TMD has been measured at 584K ac-ft/yr, whereas the post-TMD flow averages 189.5K ac-ft/yr. The difference of the two equals 394.5K ac-ft/year and equates to a 67.5 percent reduction of flow.

- For the years 1976-2025 (post climate regime shift), the Grand Ditch diversion accounts for 3.0 percent reduction, Moffat diversion accounts for 8.8 percent reduction and the Adams diversion volume accounts for 37.1 percent reduction of the natural Colorado River pre TMD flow.

- The total yearly volumes of these three outflows do not equal the pre TMD average flow volume.

- The discrepancy is attributed primarily to long-term declining precipitation and secondarily to other minor diversions (red and white pattern) equaling 18.6 precent

reduction.

- Precipitation decreased 36.0 percent for the same period, thus approximately 17 percent water was absorbed by plants/trees and/or evaporated via evapotranspiration (ET) before flowing down the Colorado River.

Outline

1. Climate Trends and Water Diversions
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3. **Environmental Flow Targets**
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- Environmental flow targets correspond to stream flows needed to maintain healthy streams, including for recreational fishing.
- Yearly flow reductions on the Colorado and Fraser rivers have already had major impacts, that have been mitigated to some extent by occasional reservoir releases of flow when stream flows get too low risking major fish die-offs. The timing and range of low and high flows are also important factors that affect the life cycles of fish and other aquatic species.
- Given that the natural flow volumes are greatly reduced, seasonal variations of flow become much more critical for aquatic life sustainability (including trout and other fish).
- Coupled with lower flow volumes, associated increases in stream temperatures also become significant concerns. Trout and other fish die when temperatures become too high.

Water Shortages Relative to Environmental Flow Targets

Environmental Flow Targets:

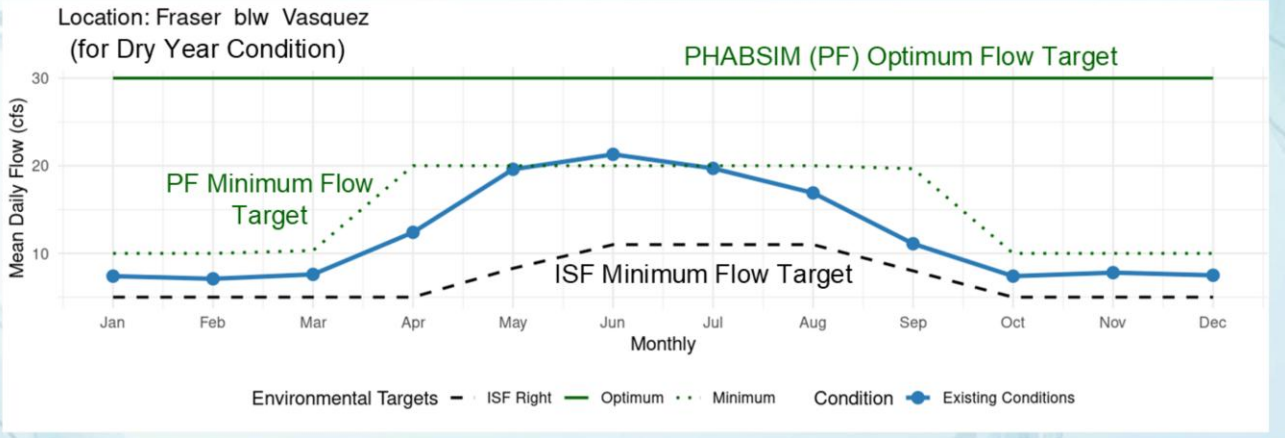
- Instream Flow Water Rights (ISF): minimum flows, based on some stream observations and policy considerations, legally established
- PHABSIM Flows (PF): established by SMP, through observations and modeling of trout species minimum and optimum flow needs, to sustain recreational fishing

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- Instream flow (ISF) water rights correspond to minimum stream flows established by a mix of scientific observations and policy and management considerations. Ignored are the needed variability in, and timing of, stream flows that are required to ensure healthy aquatic ecosystems, including trout and their prey. This variability and timing are important to (a) periodically regenerate stream habitats and rework sediment beds, and (b) to provide flow cues to aquatic species that are essential to timing reproduction and other ecological and life-cycle processes.

- PHABSIM flow targets offer a potential improvement on ISF targets because they consider not only minimum flows but also flow variability and optimum flows needed for specific fish species (esp. brown, rainbow, and brook trout).

Current Environmental Flow Shortages



ISF rights met but flow shortages exist relative to Grand County SMP targets (PF).

Decreasing precipitation & increasing temperature trends, increasing human water use means that ISF requirements will likely not be met in the future

- Comparing typical monthly average streamflows under current and future conditions at different locations in the watershed and under different hydrological conditions allows us to characterize environmental flow shortages in several different ways.

- The plot here reflects conditions on the Fraser River below Vasquez Creek. The plot displays the current statistically-expected monthly flows under dry year conditions (blue curve) and the monthly ISF minimum flow target (bottom black dashed line). Also shown are the PHABSIM optimum flow target (upper solid green horizontal line) and the PHABSIM monthly minimum flows target (dotted green curve).

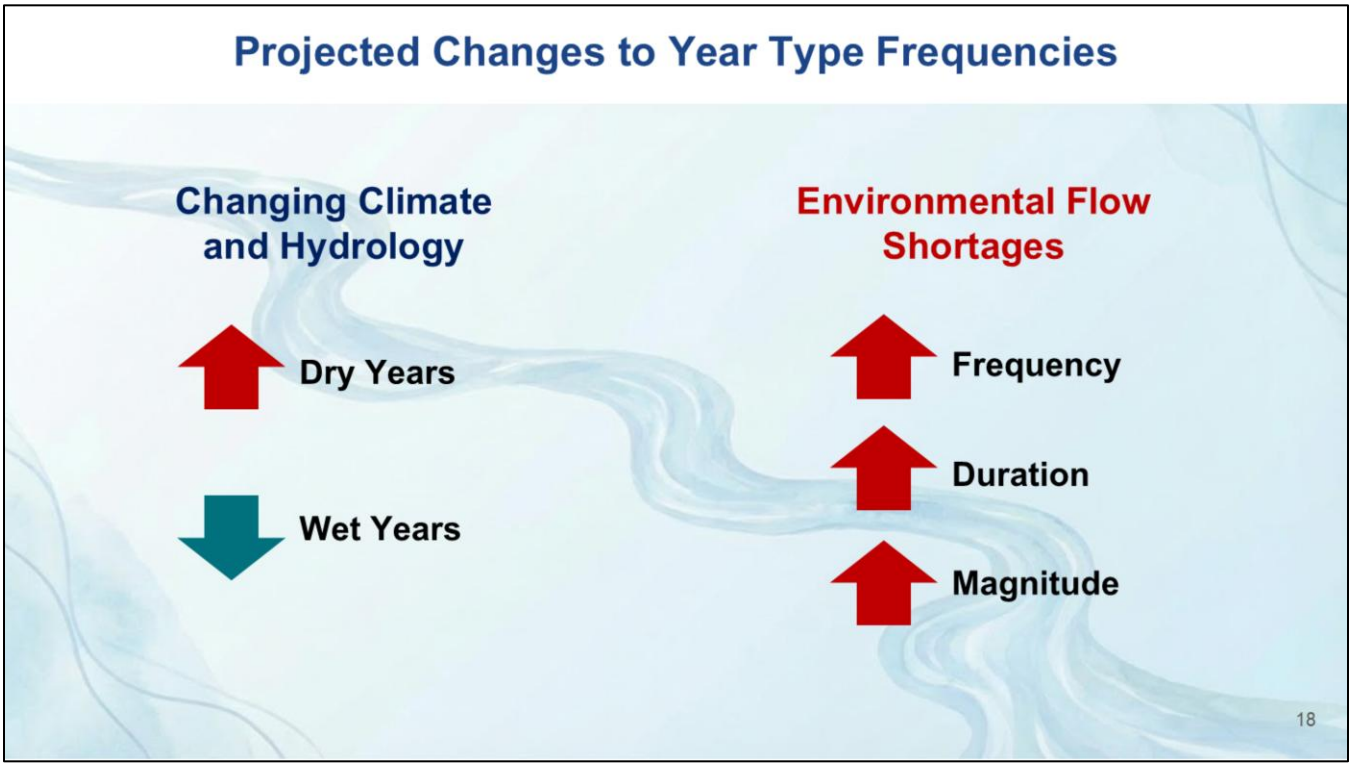
- Under typical dry-year conditions (not drought-year conditions as observed so far in 2026), statistically expected monthly flows remain above the ISF target curve – but are fully below the PHABSIM optimum flow target and also almost always below the PHABSIM minimum monthly flow targets.

The duration of a gap can be assessed as the number of days when flows are lower than one or more of the identified environmental flow targets (e.g. ISF water rights). The magnitude of the gap can be expressed as an average daily flow difference between the assessed flow and the environmental flow target or, by integrating over time, can be expressed as a total water volume deficit.

ISF thresholds set by CWCB are determined first by a scientific methodology, and then modified based on social and legal constraints that may exist for water availability on a

reach. In that regard, it is important to understand that many ISF targets in Grand County and elsewhere in the state may reflect a socially-constrained reality more so than an objectively-defined flow threshold for aquatic life. Comparatively, the PHABSIM fishery habitat flow ranges identified in the GCSMP reflect only a scientific methodology, without other social or legal constraints.

As in the example above, ISF streamflow thresholds in Grand County may frequently be much lower than ecological flow targets identified by PHABSIM or other methods; reflective of the fact that many were established only around 1990, long after TMD impacts and local consumptive use impacts had become permanent. Many ISF targets may be more reflective of the status-quo for what unappropriated water was still available in the stream at the end of the 1980s, or what compromises and negotiations surrounding past and future TMD project operations might allow, rather than what the R2C method alone suggest as an appropriate streamflow.

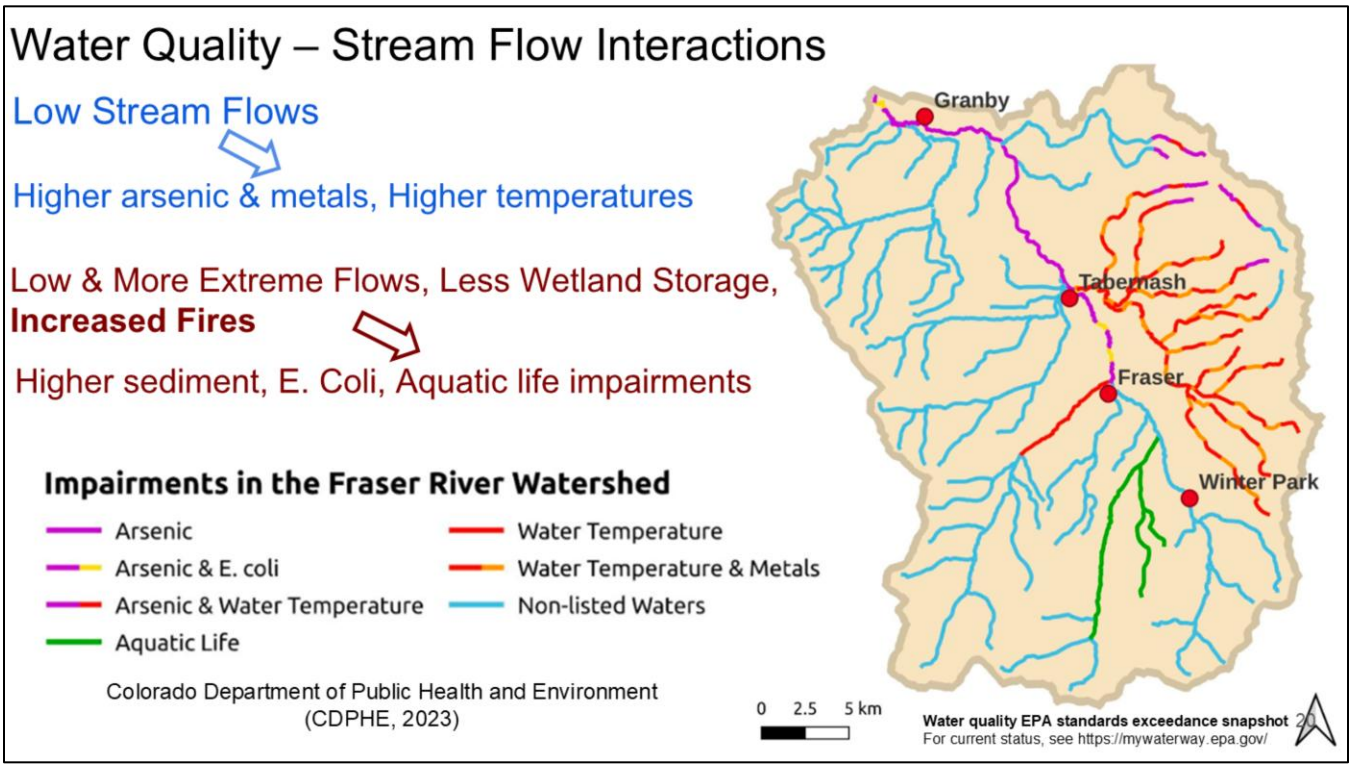


- Shifts in climate toward a hotter and drier future are expected to increase the frequency, duration and intensity of environmental flow shortages at many locations across the Colorado headwaters region.
- An increase in the frequency of dry years will place additional pressure on aquatic ecosystems by raising stream temperatures and reducing the quality and availability of aquatic habitat across a longer period of time each season, and perhaps across longer reaches of streams.
- A decrease in the frequency of wet years will alter patterns of sediment movement and storage along streambeds in a manner that will impact the way that channels maintain instream habitat quality and interact with and help maintain riparian habitats.

Outline

1. Climate Trends and Water Diversions
2. Streamflow Records and Impacts under Different Hydrologic Conditions
3. Environmental Flow Targets
4. **Water Quality, Fire, and Other Impacts of Low Flows**

- Reduction in surface water flows has many other direct and indirect consequences for the local environment and the economy – and for human health and human water use.



- Lower stream flows result in lower water quality. Many streams in Grand County show significant water quality impairments.

- The interaction of surface and groundwater is a continuous and dynamic process. Groundwater with long residency time acquires naturally occurring chemical elements such as arsenic and metals that can harm human health when present at high enough concentrations.

- Groundwater flows into streams and is essential to maintaining base flows for stream. However, without sufficient surface waters for dilution, stream water quality can be reduced or become harmful due to the chemical elements present in groundwater.

- Additionally, low stream flows or stagnant streams generally become overly warm for aquatic health.

- More extreme flows, greater runoff of rain and snow melt, and reduced opportunities for groundwater recharge and storage of water in wetlands – due for example by increasing paved surfaces and drying out wetlands –- brings another set of problems. High run-off tends to entrain excess sediment, harmful bacteria and excess nutrients into streams thereby affecting aquatic life and also affecting the cost of water treatment for human use. Drying out or destruction of wetlands – which interact and exchange water with streams and groundwater – also reduces the opportunity to naturally improve and control water quality in streams and in groundwater. Reduced or dried out wetlands also increases the risk of catastrophically spreading wildfire, potentially impacting human

infrastructure. Wetlands also serve as a natural storage and treatment areas for eroded sediments (including after wildfires) and generally act as “natural sponges” that can absorb floods during excess high flows or release water to streams during dry or drought periods.

Conclusions

The Upper Colorado watershed is critically impacted by:

- Trans-mountain diversions
- Increased human water consumption and land-use
- Declining annual precipitation
- Increasing summer temperatures (increasing evapotranspiration and water demand)

These pressures reduce water availability and quality across the region

Without large-scale restoration and conservation efforts, the water supply for all users—municipal, agricultural, and ecological—will be increasingly compromised

The water stresses listed here impact human living environments and ecosystem health in the Upper Colorado Watershed. These stresses are at the heart of UCWET efforts to improve water availability and quality and to advance environmental flow restoration in the Colorado River headwaters.

Beyond environmental consequences, decreased water availability and quality poses serious economic risks.

Water scarcity threatens local agriculture, recreation, and tourism—cornerstones of our regional economy—and could drive up costs for households and businesses alike.

Lower annual precipitation, higher temperatures, water diversions, and reductions in healthy wetlands also increases fire risk and its catastrophic impacts.

Investing in water conservation today protects not only our natural resources but also the livelihoods and economic stability of our communities.

This slide lists some of already experienced, as well as current and future, human society consequences in the Colorado River headwaters of the water stresses previously mentioned.

UCWET (https://ucwet.org/) Initiatives: "Water Accounting" & Beyond



Windy Gap Environmental Fund Example Projects (Northern Water, UCWET controlled funding):

- Grand Lake Stormwater Management Plan & Infrastructure (https://www.townofgrandlake.com/planning/page/stormwater-management-plan)
- Kawuneechee Valley Restoration Collaborative (https://www.kvcollab.org/)
- North Fork Colorado River restoration (2026, Grand Lake Metropolitan Recreation District)
- Mysis Shrimp Food Web & Harvesting Feasibility Study (Grand Lake)
- Fraser Stormwater Management Plan & Infrastructure

Other UCWET Initiatives & Projects:

- Citizen Science and Community Engagement (School & Library programs, Stream Cleanups, beaver restoration, beaver dam analog installations, forest/riparian vegetation management, wetland & firebreak & erosion mitigation improvements…)
- 2022 CDPHE North Fork water quality study: https://ucwet.org/projects#3664706f-be3f-4b1c-8523-1ed8fd4c575a
- 2027… *In preparation*…Fraser watershed groundwater and stream temperature study (with Colorado School of Mines): https://ucwet.org/your-watershed#60156673-b629-4c70-b56a-75f5b599fbc3

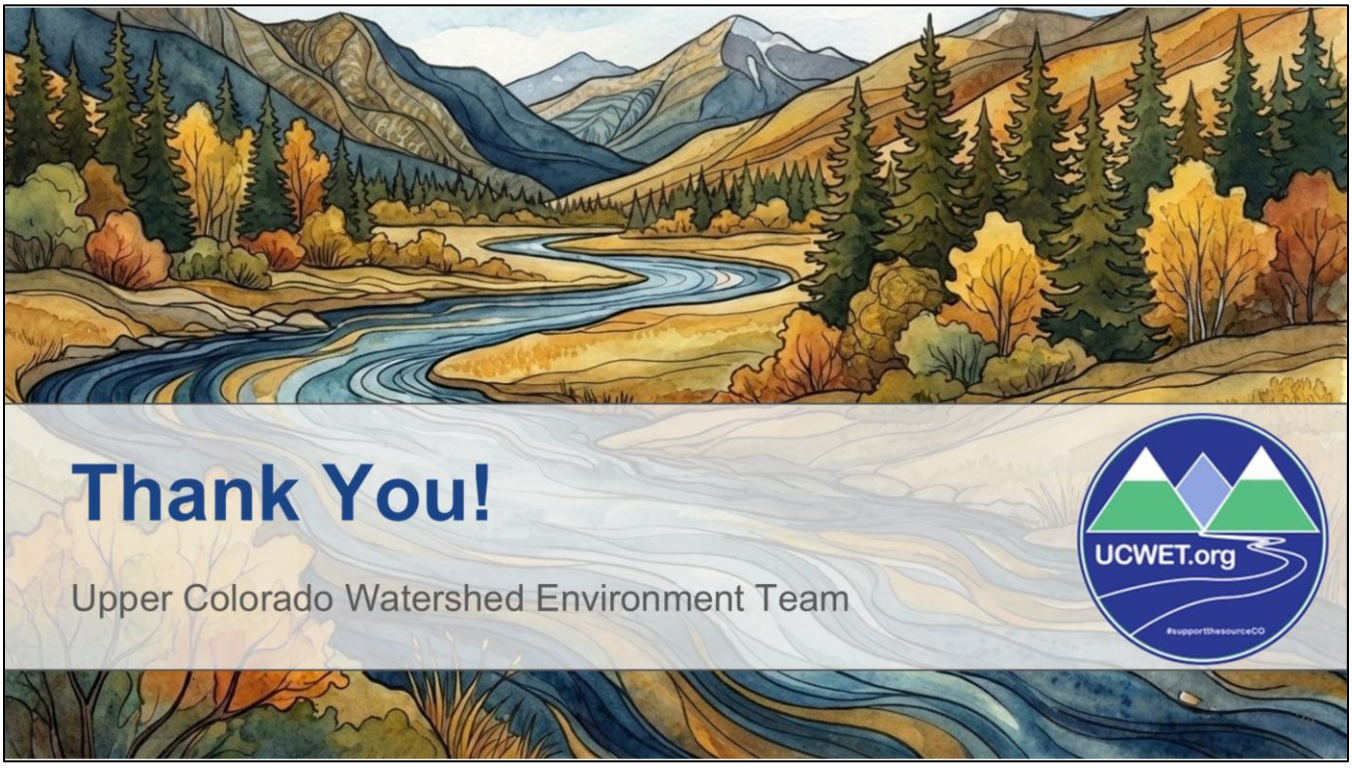
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- Listed here are a few of the current projects and initiatives that UCWET is leading or shaping to improve water availability, water quality, ecosystem health, and human living environments in the Colorado River headwaters. Community engagement and education are essential components of all UCWET projects and initiatives.

- All UCWET projects seek to improve accounting of water stocks, flows, condition (e.g., quality), transfers, and uses. UCWET strives to improve natural water storage (e.g. groundwater, wetlands, wet meadows) in Grand County and to decrease need for gray infrastructure when possible. Through this, UCWET aims to improve water availability and quality in Grand County for both human and ecosytem needs.

2022 CDPHE North Fork water quality study:
https://ucwet.org/projects#3664706f-be3f-4b1c-8523-1ed8fd4c575a

2027… *In preparation*…Fraser watershed groundwater and stream temperature study (with Colorado School of Mines):
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Thank You!

Upper Colorado Watershed Environment Team

UCWET.org

#supportthesourceCO

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