

# Upper Cache la Poudre Watershed Collaborative Monitoring Program SUMMER 2024 WATER QUALITY UPDATE

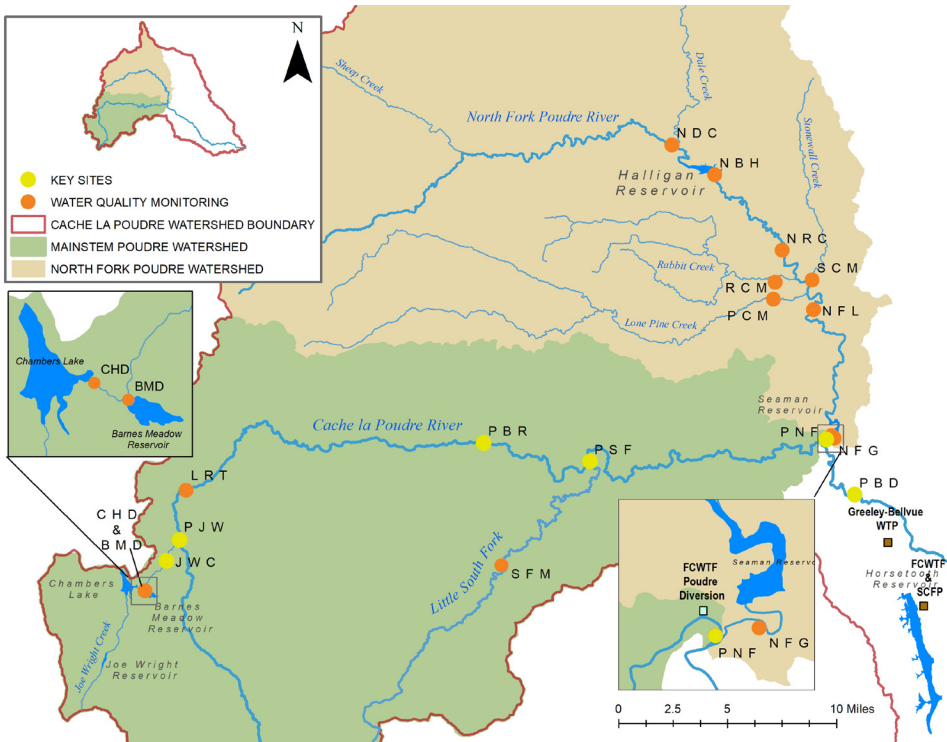
## Source Water Monitoring

The Upper Cache la Poudre (CLP) Watershed Collaborative Water Quality Monitoring Program is a partnership between the cities of Fort Collins, Greeley, and Thornton, Soldier Canyon Water Treatment Authority, and Northern Water Conservancy District. The goal of the program is to help these water providers meet present and future drinking water treatment goals.

Water quality monitoring of the CLP River drinking water supply is conducted from April through November using sites strategically located throughout the watershed. Water quality data provide valuable information about the health of our source watershed and quality of our raw water supply.

Water quality begins to stabilize following spring snowmelt runoff and routine monitoring is reduced to monthly sampling. Routine water quality monitoring results are reported for six key monitoring sites located throughout the CLP watershed. Monitoring sites capture water quality conditions above and below major tributaries and near water supply intake structures (Figure 1). Current water quality conditions are compared to baseline water quality conditions over the period of 2008 to 2012. Additionally, two water quality meters installed at Manners Bridge and Indian Meadows on the Mainstem CLP capture and report real-time water quality changes to water treatment staff.

The Summer 2024 Water Quality Update provides a seasonal summary of watershed conditions in the Upper CLP watershed by highlighting weather, drought, streamflow, and water quality conditions over the summer season (June – August).



**Figure 1** – Upper Cache la Poudre Collaborative Monitoring Program water quality sampling sites and real-time water quality instrument locations.

JWC - Joe Wright Creek above the confluence with the Poudre River  
 PJW - Poudre River above the confluence with Joe Wright Creek  
 PBR - Poudre River below Rustic  
 PSF - Poudre River below the confluence with the Little South Fork  
 PNF - Poudre River above the confluence with the North Fork at the City of Fort Collins' Intake  
 PBD - Poudre River below the confluence with the North Fork at the Bellvue Diversion



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## Temperature

Air temperature measured at the Joe Wright Snowpack Telemetry (SNOTEL) station over the 2024 summer season was 1.7°F warmer than the long-term average and ranked as the 11th hottest summer on record (out of 34 years). The monthly mean air temperature was well above average in June and August, but slightly below average in July. The months of June and August both ranked as the ninth hottest on record, while July ranked as the 10th coolest (Table 1).

	Temperature			
	2024 (°F)	Average (°F)	Departure (°F)	2024 Rank
June	50.6	47.1	+3.5	9 <sup>th</sup> (H)
July	51.9	52.5	-0.6	10 <sup>th</sup> (C)
August	52.7	50.5	+2.2	9 <sup>th</sup> (H)
Summer	51.7	50.0	+1.7	11 <sup>th</sup> (H)

**Table 1** – Monthly mean air temperatures measured at the Joe Wright SNOTEL over the summer months of 2024 compared to the long-term average (1991 – 2020)

*Note:* H = hottest and C = coldest

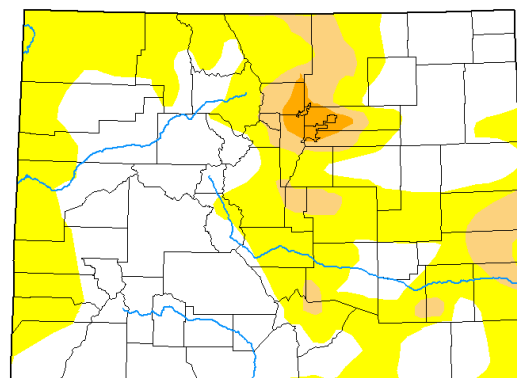
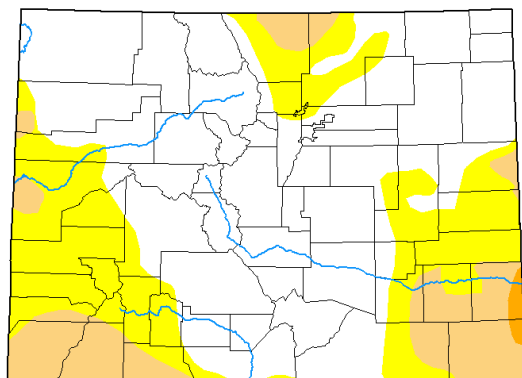
## Precipitation

Precipitation measured at the Joe Wright SNOTEL over the 2024 summer season was slightly below average and ranked as the 20th driest summer on record (out of 45 years). Precipitation was well below average in June and July and above average in August (Table 2). The month of August ranked as the 8th wettest on record. Drought conditions persisted across the Upper CLP watershed and, despite the wetter conditions in August, extended into the headwaters in the late summer (Figure 2).

**Table 2** – Monthly accumulated precipitation totals measured at the Joe Wright SNOTEL over the 2024 summer season compared to the long-term average (1991 – 2020).

*Note:* W = wettest and D = driest

	Total Precipitation			
	2024 (inches)	Average (inches)	% of Average	2024 Rank
June	1.3	2.2	58%	14 <sup>th</sup> (D)
July	1.5	2.1	70%	12 <sup>th</sup> (D)
August	3.5	2.2	157%	8 <sup>th</sup> (W)
Summer	6.3	6.6	96%	20 <sup>th</sup> (D)



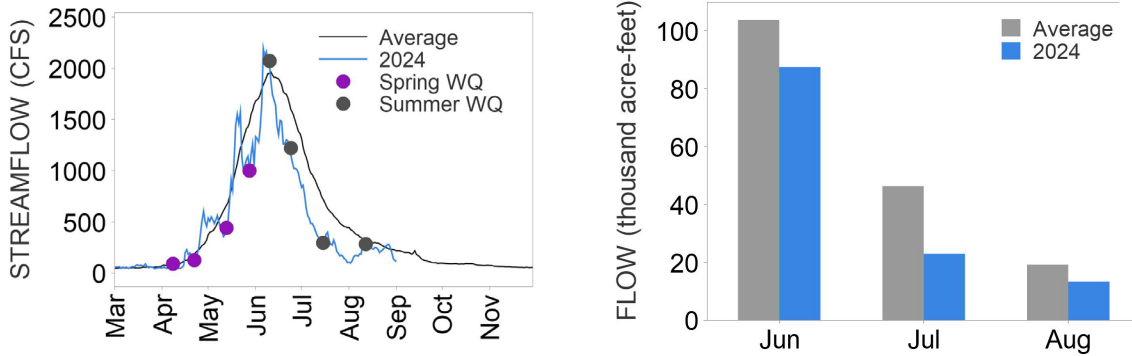
### Intensity:

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

**Figure 2** – Drought conditions for the state of Colorado as monitored by the United States Drought Monitor on June 4, 2024 (left) and August 27, 2024 (right). (Map source: <https://droughtmonitor.unl.edu/>)

## Streamflow Conditions

Streamflow at the Cache la Poudre River near the Canyon Mouth (CLAFTCCO) stream gage measured 123,627 acre-feet of water over the summer season, which was 73% of the long-term average (calculated over the 1881 – 2023 measurement period). Peak streamflow was observed on June 9th and measured 2,190 cubic feet per second – 110% of average. The timing of the 2024 peak occurred two days earlier than the long-term average. However, the duration of snowmelt runoff was notably shorter in 2024. Following peak streamflow, flows dropped quickly compared to the long-term average. Baseflow (low flow) conditions were observed earlier in the summer season than normal. The total amount of water was much lower than average in all summer months (Figure 3).



**Figure 3 –** Streamflow conditions on the Poudre River over the 2024 summer season (left) and monthly total water volume measured over the summer season (right).

## Water Quality Indicators

The Upper CLP Collaborative Water Quality Monitoring Program uses several key water quality indicators, including pH, conductivity, temperature, and turbidity, which act as surrogates for other parameters. (Table 3). These indicators provide a snapshot of water quality conditions and are useful for identifying trends or changes in water quality. Significant changes in these water quality indicators may provide an early warning of potential water pollution.

**Table 3 –** Water quality indicators measured as part of the Upper Cache la Poudre Collaborative Water Quality Monitoring Program.

Water Quality Indicator	Explanation
Temperature	Water temperature influences other water quality parameters and is a major driver of biological activity and algal growth in rivers, including certain phytoplankton species that produce the taste and odor compounds, geosmin and 2-methylisoborneol.
pH	pH is an important water quality parameter to monitor, because it influences the solubility and biological availability of chemical constituents, including nutrients and heavy metals. pH near 7 is considered neutral, with more acidic conditions occurring below 7 and more basic, or alkaline, conditions occurring above 7.
Specific Conductivity	Conductivity is an index of dissolved ionic solids in water. Conductivity is used as a general measure of water quality. Significant increases in conductivity can be used as an indicator of increased pollution.
Turbidity	Turbidity is monitored to track changes in water clarity. Clarity is influenced by the presence of algae and/or suspended solids introduced to surface waters through various land use activities, including runoff and erosion, urban stormwater runoff and drainage from agricultural lands. For water treatment, turbidity is an important indicator of the amount of suspended material that is available to harbor pollutants, such as heavy metals, bacteria, pathogens, nutrients and organic matter.

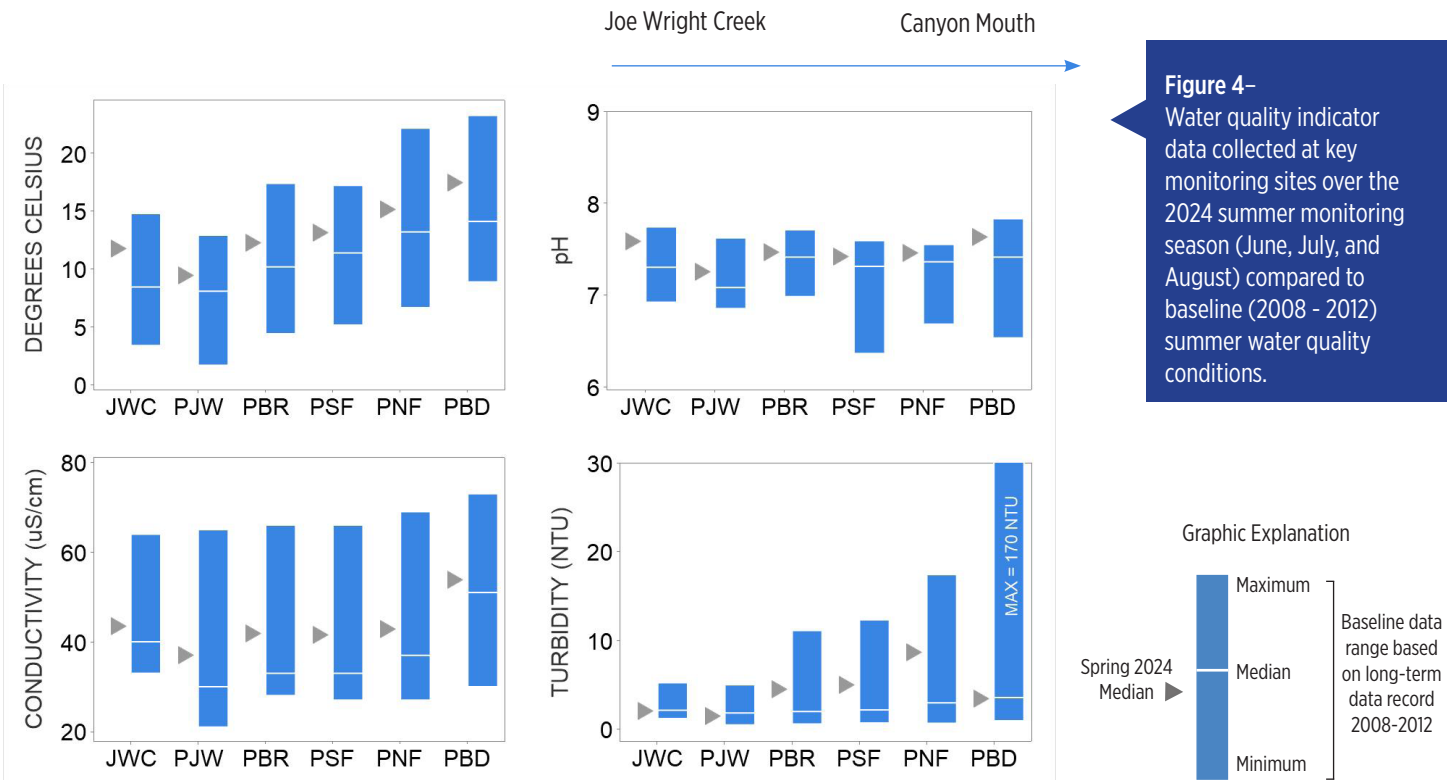
Summer monitoring captures water quality conditions during the Poudre River’s highest flow levels (peak streamflow) and when flow levels gradually decrease (the falling limb of the hydrograph) in the months following peak streamflow. Water quality conditions generally stabilize during this time of year. Constituents that were once diluted by high streamflow begin to concentrate as streamflow recedes. In general, water temperature and specific conductivity increase, while turbidity and pH levels decrease. The summer season also marks the beginning of the summer monsoon, which can lead to increased frequency and intensity of rain events. An active monsoon season, in combination with a post-fire landscape, can lead to flash flooding, debris flows, and severe impacts to water quality.

All water quality indicators at key sites along the CLP River were within the baseline range of values over the 2024 summer season (Figure 4). Water temperature was warmer than normal at all key monitoring sites – normal is defined as the median value over the baseline period of record. pH levels were near normal at nearly all key monitoring sites. The exceptions were Joe Wright Creek (JWC), the Mainstem Poudre River above Joe Wright Creek (P JW), and below the City of Greeley’s diversion (PBD) where the pH was elevated. Specific conductivity values were higher than normal at all key sites. Turbidity was elevated in the Poudre below Rustic (PBR), below the South Fork (PSF), and at the City of Fort Collins’ diversion (PNF).

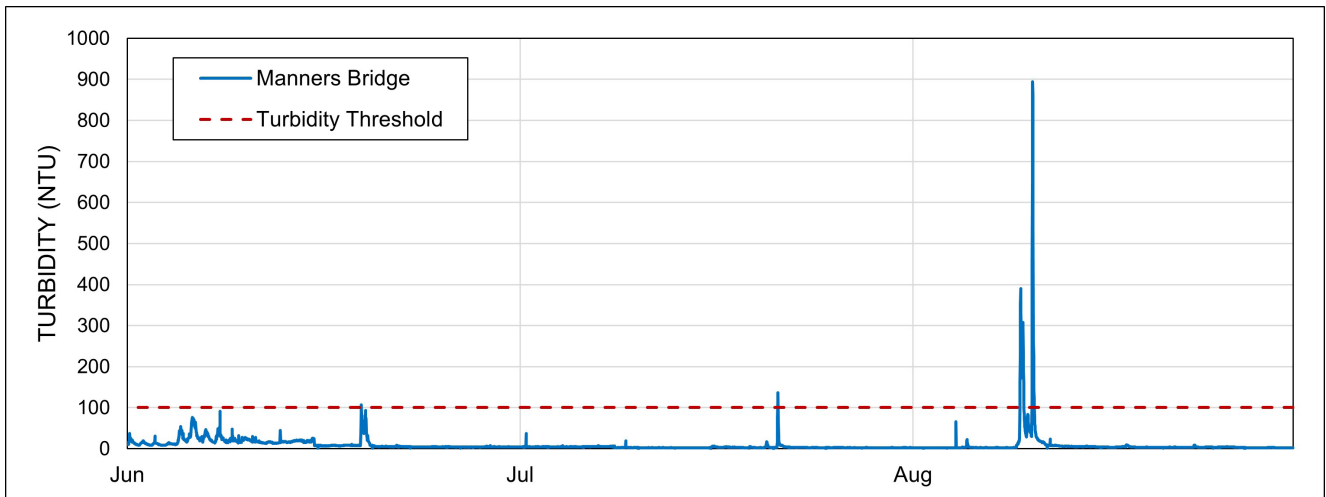
The 2024 summer season experienced periods of extended dry, hot, and drought conditions in the Upper CLP watershed. The combination of these stressors likely contributed to the rapid runoff rate, shorter runoff duration, and ultimately earlier return to low-flow conditions, resulting in higher water temperatures across the watershed. Additionally, an emerging post-fire impact observed in the watershed is a delayed nutrient response in high mountain reservoirs in the Cameron Peak burn scar. Extended hot, dry conditions paired with high nutrient concentrations in reservoirs can prompt an increase in algal activity, resulting in the observed increase in pH at sites downstream of these reservoirs. High-intensity precipitation events driven by the summer monsoon continued to cause several post-fire erosion, sedimentation, and flooding events on the Poudre River over the summer season (Figure 5). These events briefly impacted water quality, resulting in an increase in turbidity, and required water treatment plants to shut down their raw water intakes on the Poudre River. Ongoing erosion and sedimentation likely also contributed to increased pH and specific conductivity across the watershed.

City of Greeley Water Quality Technician, Lucas Lane, collecting water quality samples from the Mainstem Poudre River below the City of Greeley’s diversion (PBD).

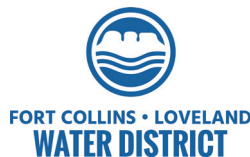




**Figure 4-** Water quality indicator data collected at key monitoring sites over the 2024 summer monitoring season (June, July, and August) compared to baseline (2008 - 2012) summer water quality conditions.



**Figure 5 -** Turbidity measured in the Poudre River at the Manners Bridge Water Quality Alert System over the summer season. The water intake shutdown threshold is 100 NTU.



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