Upper Cache la Poudre Watershed Collaborative Monitoring Program

# SPRING 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. The goal of the program is to help these water providers meet present and future drinking water treatment goals.

Water quality monitoring of our raw, 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.

The Spring 2024 Water Quality Update provides a seasonal summary of watershed conditions in the Upper CLP watershed by highlighting weather, snowpack, and streamflow conditions over the spring season (March – May), as well as water quality information collected over the months of April and May.

Water quality during spring snowmelt runoff is highly variable. To better capture this seasonal variability, monitoring is conducted two times per month. Results are reported for six key monitoring sites located throughout the Upper 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 collected over the period of 2008 to 2012.

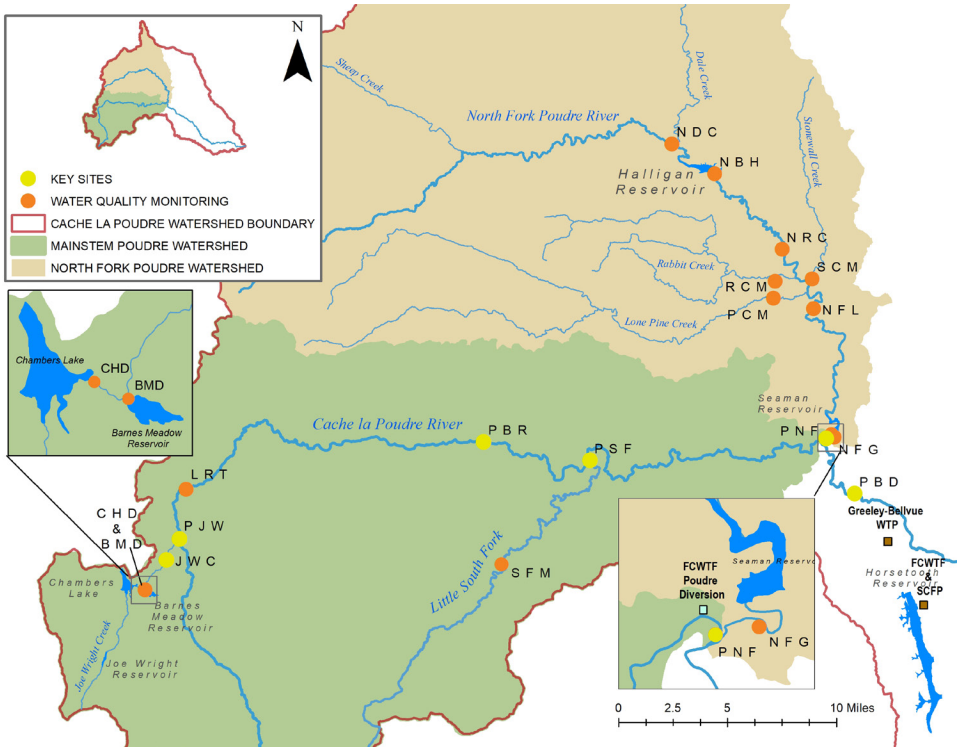



**Figure 1** – Upper Cache la Poudre Collaborative Monitoring Program water quality sampling sites and real-time water quality instrument locations.

**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

# Temperature

Air temperature measured near average at the Joe Wright Snowpack Telemetry (SNOTEL) station over the 2024 spring season. Spring temperatures were 0.4°F warmer than the long-term average and ranked as the 15th warmest spring on record (out of 34 years). The monthly mean air temperature was near average in March, above average in April, and well below average in May. The month of April ranked as the 12th warmest on record while May ranked as the 10th coldest on record (Table 1).

| | Temperature | | | |
|---|---|---|---|---|
| | 2024 (°F) | Average (°F) | Departure (°F) | 2024 Rank |
| March | 25.4 | 25.2 | 0.2 | 15th (H) |
| April | 32.9 | 30.5 | 2.4 | 12th (H) |
| May | 37.3 | 38.5 | -1.2 | 10th (C) |
| Spring | 31.9 | 31.4 | 0.4 | 15th (H) |

**Table 1** – Monthly mean air temperatures measured at the Joe Wright SNOTEL over the fall 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 spring season was near average and ranked as the 16th wettest spring on record (out of 45 years). Precipitation was above average in March (116%) and April (124%) and below average in May (80%). The month of April ranked as the 10th wettest on record (Table 2). Abnormally dry and moderate drought conditions were observed near the headwaters of the Upper CLP watershed during the month of March, and these conditions shifted to the middle and lower portions of the of the watershed by late May (Figure 2).

**Table 2** – Monthly accumulated precipitation totals measured at the Joe Wright SNOTEL over the 2024 fall 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 |
| March | 5.2 | 4.5 | 116% | 18th (W) |
| April | 7.0 | 5.7 | 124% | 10th (W) |
| May | 3.4 | 4.3 | 80% | 18th (D) |
| Spring | 15.6 | 14.4 | 108% | 16nd (W) |

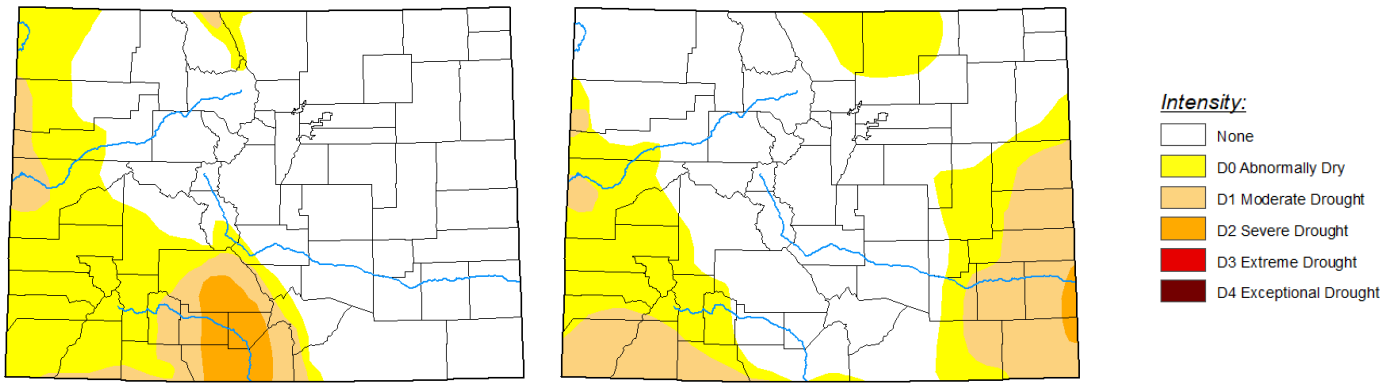



**Figure 2** – Drought conditions for the state of Colorado as monitored by the United States Drought Monitor on March 5, 2024, (left) and May 28, 2024 (right). (Map source: https://droughtmonitor.unl.edu/)

# Snowpack

Snow water equivalent (SWE), the amount of water held in the snowpack, at the Joe Wright SNOTEL station near Cameron Pass was below normal (median calculated over the 1991 – 2020 measurement period) for the snow accumulation season. Monthly maximum SWE was below normal between October and May, with the months of October, November, December, and January being well below average. Wet conditions in the months of February, March, and April contributed to near-baseline SWE in the spring months. The maximum amount of water contained in the snowpack, referred to as peak SWE, was observed on May 13th and measured 23.6 inches – 99% of normal. Peak SWE across the entire Upper CLP watershed measured near or above normal. The North Fork and South Fork CLP watersheds measured slightly above normal (111% and 110%, respectively), while the Mainstem CLP watershed measured near normal (106%) (Figure 3).

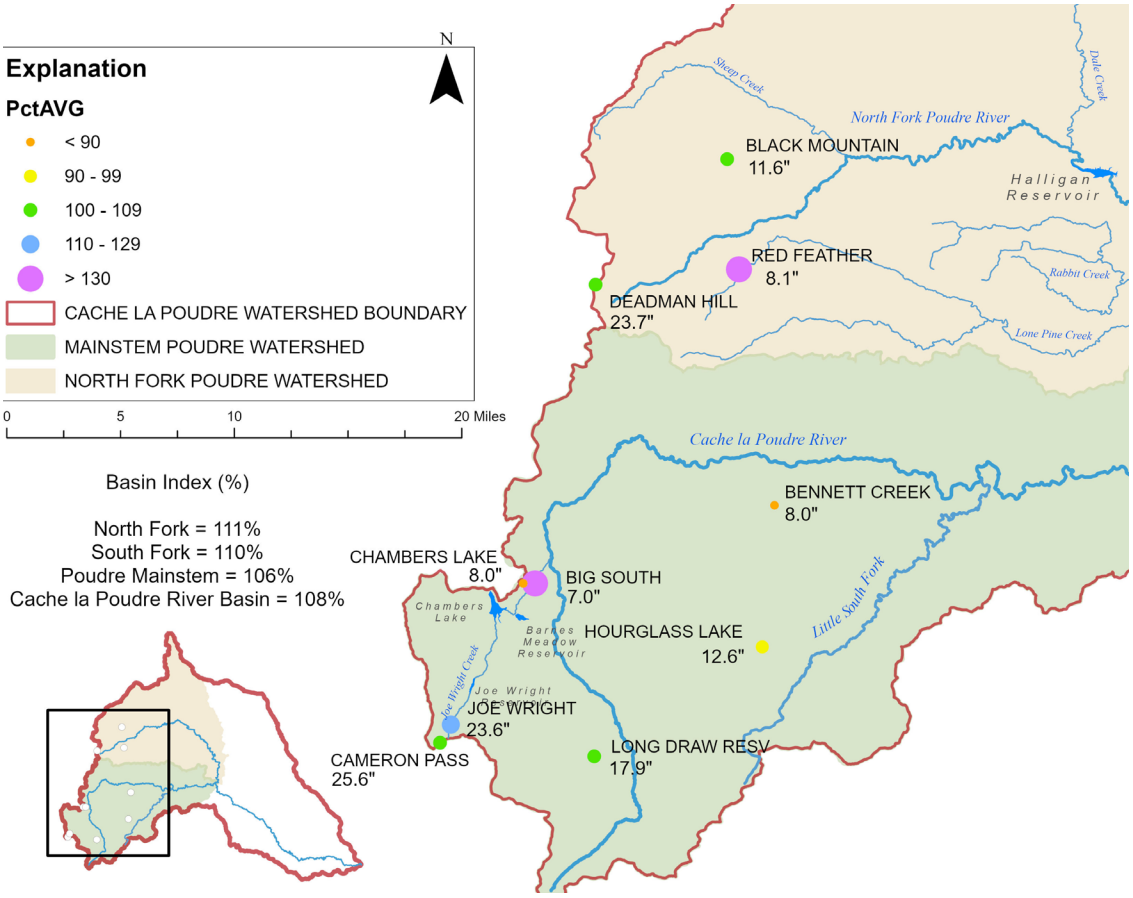



**Figure 3 –** Peak SWE measured at snowpack monitoring sites throughout the Upper Cache la Poudre River watershed in 2024.

# Streamflow Conditions

Streamflow at the Cache la Poudre River near the Canyon Mouth (CLAFTCCO) stream gage measured 66,191 acre-feet of water over the spring season, which was 97% of the long-term average (calculated over the 1881 – 2023 measurement period). Snowmelt runoff began as expected in mid-April. Streamflow increased slowly through the end of April and rose more rapidly in May. Streamflow measured above average in March (110%) and April (119%) and below average in May (93%) (Figure 4).

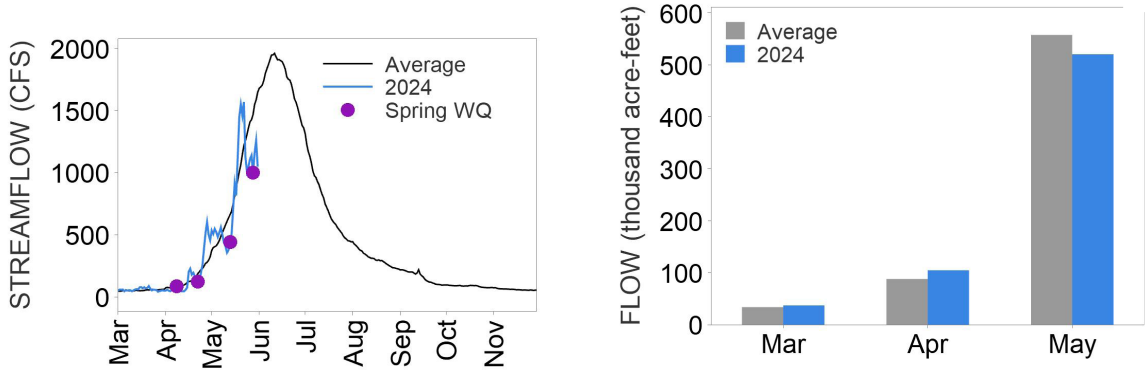



**Figure 4 –** Streamflow conditions on the Poudre River over the 2024 spring season (left) and monthly total water volume measured over the spring season (right).

# 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-methlyisoborneol. |
| 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. |

Spring water quality monitoring captures conditions from the start of snowmelt runoff to near peak streamflow in the CLP River. Water quality conditions vary with changes in elevation, contributing watershed area, and potential watershed impacts.

Water temperature measured slightly above baseline at nearly all key monitoring sites. Higher water temperatures are likely due to warmer air temperatures observed across the watershed this spring, particularly during the month of April. pH was slightly elevated at upstream sites, and below baseline at the City of Greeley's intake (PBD). A slight increase in baseline pH in the Mainstem CLP has been observed over the past several years, but the cause is unknown. Specific conductivity was slightly elevated from Joe Wright Creek (JWC) downstream to the City of Fort Collins' intake (PNF). Specific conductivity was slightly below the baseline median at City of Greeley's intakes (PBD). Turbidity levels measured near the baseline median at higher elevation monitoring sites in Joe Wright Creek (JWC) and the Mainstem above Joe Wright Creek (PJW). A notable increase in turbidity was observed in the Poudre below Rustic (PBR) downstream to the City of Greeley's intake (PBD) (Figure 5).

The elevated specific conductivity and turbidity levels at these sites imply that post-fire impacts from the Cameron Peak Wildfire continued to influence Poudre River water quality during snowmelt runoff; however, it appears that recent water quality impacts have lessened compared to previous years.

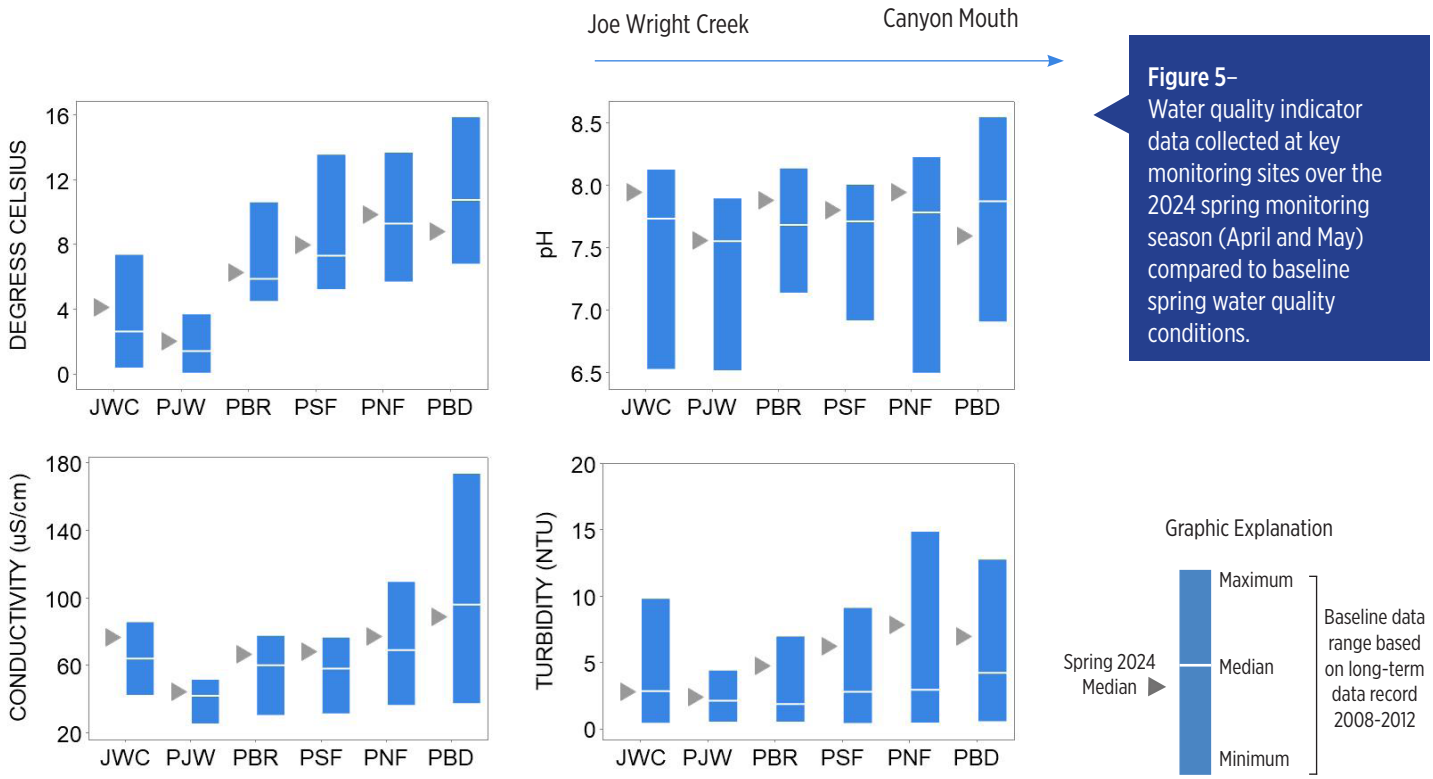
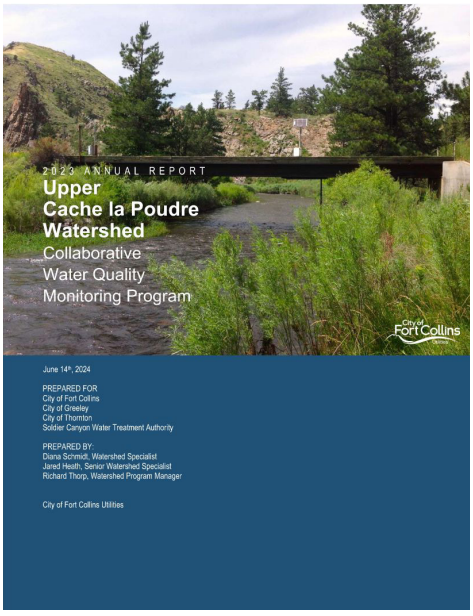



**Figure 5–**
Water quality indicator data collected at key monitoring sites over the 2024 spring monitoring season (April and May) compared to baseline spring water quality conditions.

## 2023 Upper Cache la Poudre Watershed Water Quality Annual Report

The Upper Cache la Poudre Watershed Collaborative Monitoring Program recently released its 2023 Water Quality Annual Report. The 2023 Annual Report summarizes climate and hydrology in the Upper CLP watershed over the 2023 calendar year and water quality data collected as part of the Upper CLP Collaborative Water Quality Monitoring Program. Water quality reports can be found online at http://www.fcgov.com/source-water-monitoring/.

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