

# Collaborative Upper Cache la Poudre Monitoring Program

Water Quality Update | Fall 2020

Monitoring and Protecting Our Water Sources

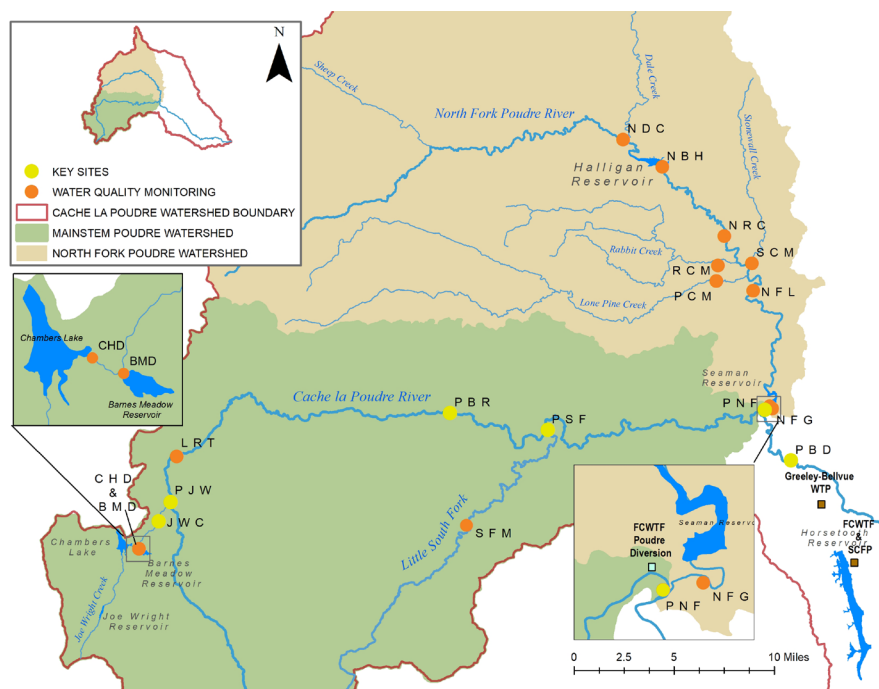
## SOURCE WATER MONITORING

The Upper Cache la Poudre (UCLP) Watershed Collaborative Monitoring Program was established in 2008 between the City of Fort Collins, the City of Greeley and Soldier Canyon Water Authority, to help meet present and future drinking water treatment goals.

Water quality monitoring of our raw, Cache la Poudre River drinking water supply is conducted from April through November. Monitoring sites are strategically located throughout the UCLP. Water quality data provide valuable information about the health of our source watershed and raw water supply.

The Fall 2020 Water Quality Update provides a seasonal summary of watershed conditions in the Upper CLP Watershed by highlighting temperature, precipitation, streamflow and water quality monitored during the fall season, as defined by the months of September, October and November.

Due to the Cameron Peak Wildfire, UCLP monitoring sites located upstream of the City of Fort Collins intake (PNF) on the Mainstem were not accessible in September or October. For the Fall 2020 Water Quality Update, results are only reported for the two key monitoring sites located near the City of Fort Collins' (PNF) and City of Greeley's (PBD) water supply intake structures (**Figure 1**). Current water quality conditions at these sites are compared to baseline water quality conditions collected over the period of 2008 to 2012.



**Figure 1** - Upper Cache la Poudre Collaborative Monitoring Program sampling 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 the Town of 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 over the 2020 fall season was 3.6°F warmer than the long-term average at the Joe Wright Snow Telemetry Station (SNOTEL) near Cameron Pass and ranked as the 2nd warmest fall on record (41 years). All fall months were much warmer than average. The month of September was 2.4°F warmer than average and ranked as the 7th warmest September on record. The months of October and November were greater than 4.0°F warmer than average and ranked as the 3rd and 7th warmest on record, respectively (**Table 1**).

**Table 1** – Monthly mean fall air temperatures measured at Joe Wright SNOTEL compared to the 30-year long-term baseline average (1991 – 2019). Note: C = coldest and H = hottest

Period of Record	Temperature			
	2020 (°F)	Average (°F)	Departure (°F)	2020 Rank
September	47.0	44.6	2.4	7 <sup>th</sup> (H)
October	39.0	34.8	4.2	3 <sup>rd</sup> (H)
November	29.0	24.6	4.4	6 <sup>th</sup> (H)
Fall	38.3	34.7	3.6	2 <sup>nd</sup> (H)

## PRECIPITATION

Precipitation measured over the fall season was only 31% of average and ranked as the 2nd driest fall on record (41 years). Precipitation in the month of September measured less than an inch and ranked as the 3rd driest September on record. The months of October and November experienced more precipitation than September but were still much lower than average (66% and 73%, respectively) (**Table 2**).

**Table 2** – Monthly accumulated precipitation totals measured at the Joe Wright SNOTEL over the 2020 fall season compared to the long-term average (1981 – 2010).

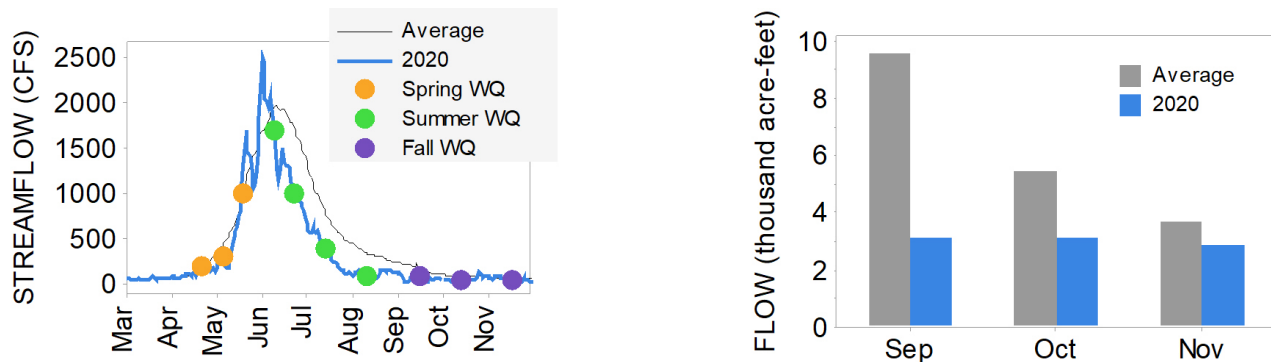
Note: W = wettest and D = driest

Period of Record	Total Precipitation			
	2020 (inches)	Average (inches)	% average	2020 Rank
September	0.9	2.9	31%	3 <sup>rd</sup> (D)
October	2.4	3.7	66%	10 <sup>th</sup> (D)
November	3.2	4.4	73%	12 <sup>th</sup> (D)
Fall	6.5	11.3	58%	2 <sup>nd</sup> (D)



## STREAMFLOW CONDITIONS

Streamflow at the Cache la Poudre River near the Canyon Mouth (CLAFTCCO) stream gage measured 9,053 acre-feet over the fall season which was less than half the long-term average (49%). Streamflow was below average in all fall months, but notably lower than average in September. Streamflow in the month of September measured only 33% of average at 3,121 acre-feet, which was the 7th lowest September streamflow on record (135 years). Streamflow improved slightly over the months of October and November but remained below average. In the month of October streamflow measured 57% of average at 3,082 acre-feet. Streamflow in the month of November measured 78% of average at 2,850 acre-feet (**Figure 2**).



**Figure 2** – Streamflow conditions on the Poudre River over the 2020 fall season (left) and monthly total water volume measured over the fall season (right).



## WATER QUALITY INDICATORS

The Upper Cache la Poudre 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 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.

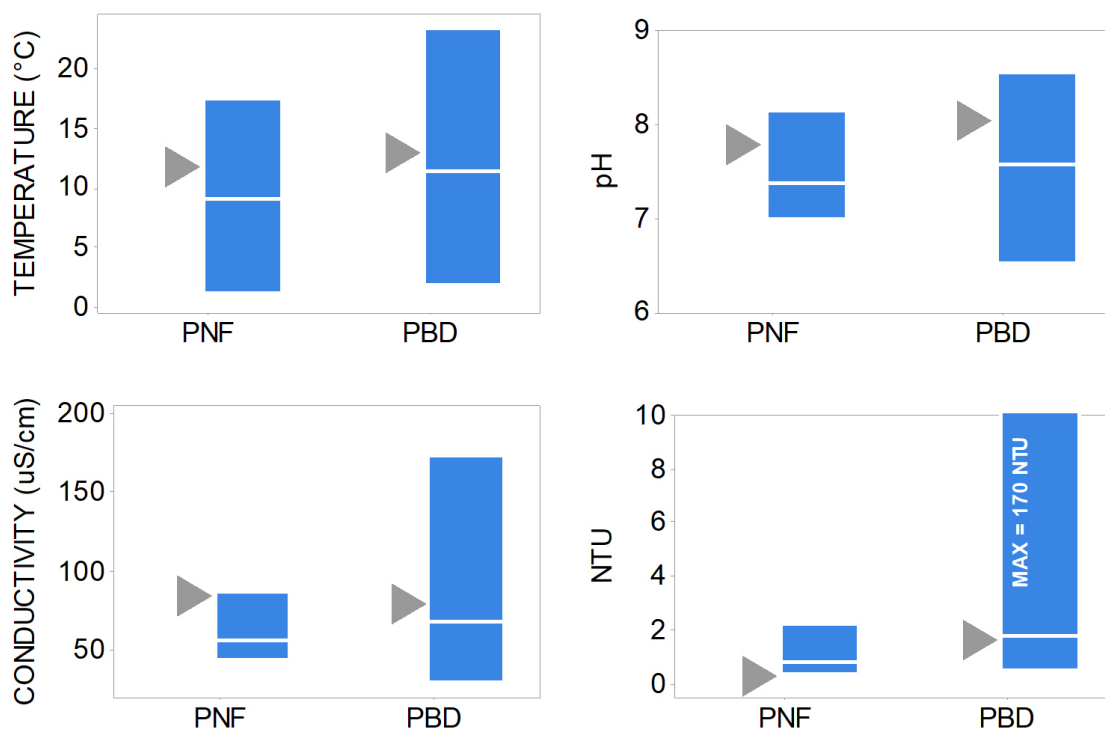
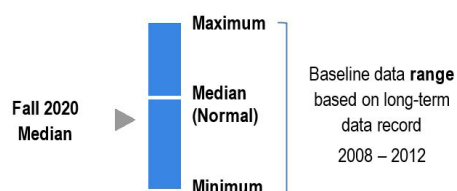


## WATER QUALITY INDICATORS CONTINUED

Fall monitoring captures water quality as streamflow on the Poudre River transitions to baseflow (or low flow) conditions. During this time of the year water quality is generally stable throughout the watershed. Water releases from high elevation water storage reservoirs and storm events may cause changes in streamflow and water quality through September and early October, although these events are temporary. Substantial water releases in the Upper CLP watershed typically cease (depending on demand) in October, and storm events this time of year are uncommon, as precipitation in the Upper CLP shifts from rain to snow. Most water quality constituents begin to concentrate under baseflow conditions and water temperature decreases, especially in the higher elevations of the watershed.

Water quality indicators on the Mainstem CLP River near the City of Fort Collins' (PNF) and City of Greeley's (PBD) water supply intakes measured within the range of baseline conditions, indicating normal water quality conditions on the Poudre River during the fall low flow season (**Figure 3**). Water temperature, pH and specific conductivity were slightly higher than baseline median at both monitoring locations. Turbidity was much lower at the City of Fort Collins' water supply intake (PNF) and measured near the baseline median at City of Greeley's (PBD) water supply intake. Fall water quality monitoring did not indicate any immediate impacts from the Cameron Peak Wildfire at these two monitoring locations.

### Graphic Explanation



**Figure 3** – Water quality indicator data collected at key monitoring sites over the 2020 fall monitoring season (September, October and November) compared to baseline fall water quality conditions.



## CAMERON PEAK WILDFIRE

The Cameron Peak wildfire ignited on Thursday, August 13th, near Chambers Lake in the upper elevations of CLP watershed near Cameron Pass. The Cameron Peak wildfire is the largest wildfire in Colorado's history, burning just under 209,000 acres across both the Cache la Poudre and Big Thompson watersheds as of Saturday, December 5th when it was declared 100% contained.

Several long-term water quality monitoring sites associated with UCLP Watershed Collaborative Monitoring Program are located either within or downstream of the area impacted by the wildfire. Water quality data collected as part of this monitoring program were very useful in understanding the impacts from the 2012 High Park Fire on water quality as well as watershed recovery.

During the winter of 2020-2021, partners within the upper CLP Watershed Collaborative Water Quality Monitoring Program will be determining whether adding additional water quality sampling study locations would be useful for monitoring post-fire impacts on water quality from the Cameron Peak wildfire. UCLP Monitoring Program partners are also working closely with the Coalition for the Poudre River Watershed and researchers from the US Forest Service's Rocky Mountain Research Station and Colorado State University to identify shared interests and concerns, align existing and future monitoring efforts, and leverage resources to address shared goals focused on post-fire water quality impacts from the Cameron Peak wildfire.



*Looking north from Long Draw Road at the Cameron Peak wildfire burn scar surrounding Chambers Lake.*