

Collaborative Upper Cache la Poudre Monitoring Program

Water Quality Update | Spring 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 Spring 2020 Water Quality Update provides a seasonal summary of watershed conditions in the UCLP watershed by highlighting snowpack and streamflow conditions, 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 from April through June. In 2020, the UCLP monitoring plan was adjusted to meet resource constraints because of the COVID-19 pandemic. For the Spring 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**). Present water quality conditions at these sites are compared to baseline water quality conditions collected over the period of 2008 to 2012.

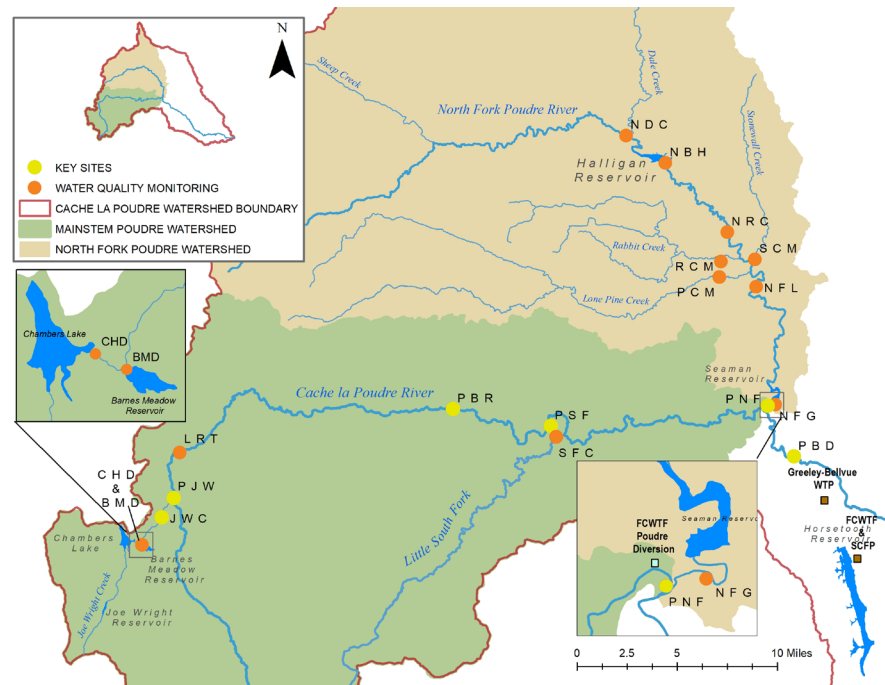


Figure 1 - Upper Cache la Poudre Collaborative Monitoring Program sampling locations

- 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 at the Joe Wright SNOTEL over the 2020 spring season was 3.1°F warmer than the long-term average and ranked as the fourth warmest spring on record. The monthly mean air temperatures for March, April and May were all above the long-term average. The months of March and May were particularly warm and ranked as the fifth and second warmest on record (**Table 1**).

Table 1 – Monthly mean air temperatures measured at Joe Wright SNOTEL over the spring months of 2020 compared to the long-term average (1990 – 2019).

Period of Record	Temperature			
	2020 (°F)	Average (°F)	Departure (°F)	2020 Rank
March	29.0	25.0	4.0	5 th (H)
April	32.0	30.5	1.5	12 th (H)
May	42.0	38.3	3.7	2 nd (H)
Spring	34.3	31.3	3.1	4 th (H)

PRECIPITATION

Precipitation measured at the Joe Wright SNOTEL over the 2020 spring season was 80% of the long-term average and ranked as the ninth driest spring on record. All spring months measured below average. The largest deficit in the monthly total precipitation was observed in the month of May, which measured 72% of average (**Table 2**).

Table 2 – Monthly accumulated precipitation totals measured at the Joe Wright SNOTEL over the 2020 spring 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
March	3.8	4.7	80%	12 th (D)
April	4.5	5.2	87%	16 th (D)
May	3.2	4.5	72%	14 th (D)
Spring	11.5	14.4	80%	9 th (D)

SNOWPACK

Snow water equivalent (SWE), the amount of water held in the snowpack, was above normal at snow telemetry stations (SNOTEL) throughout the Upper CLP watershed. The Joe Wright SNOTEL near Cameron Pass was below the long-term (1981–2010 median (normal)) for most of the snow accumulation season. A series of potent winter storms from late-January through early-February delivered 4-6 feet of snow to the mountains in the Upper CLP watershed. SWE measured above normal following this storm cycle and remained above normal through the remainder of the snow accumulation season. The maximum amount of water contained in the snowpack, referred to as peak SWE, was observed on April 28 at the Joe Wright SNOTEL and measured at 25.3 inches – 108% of normal (**Figure 2**).

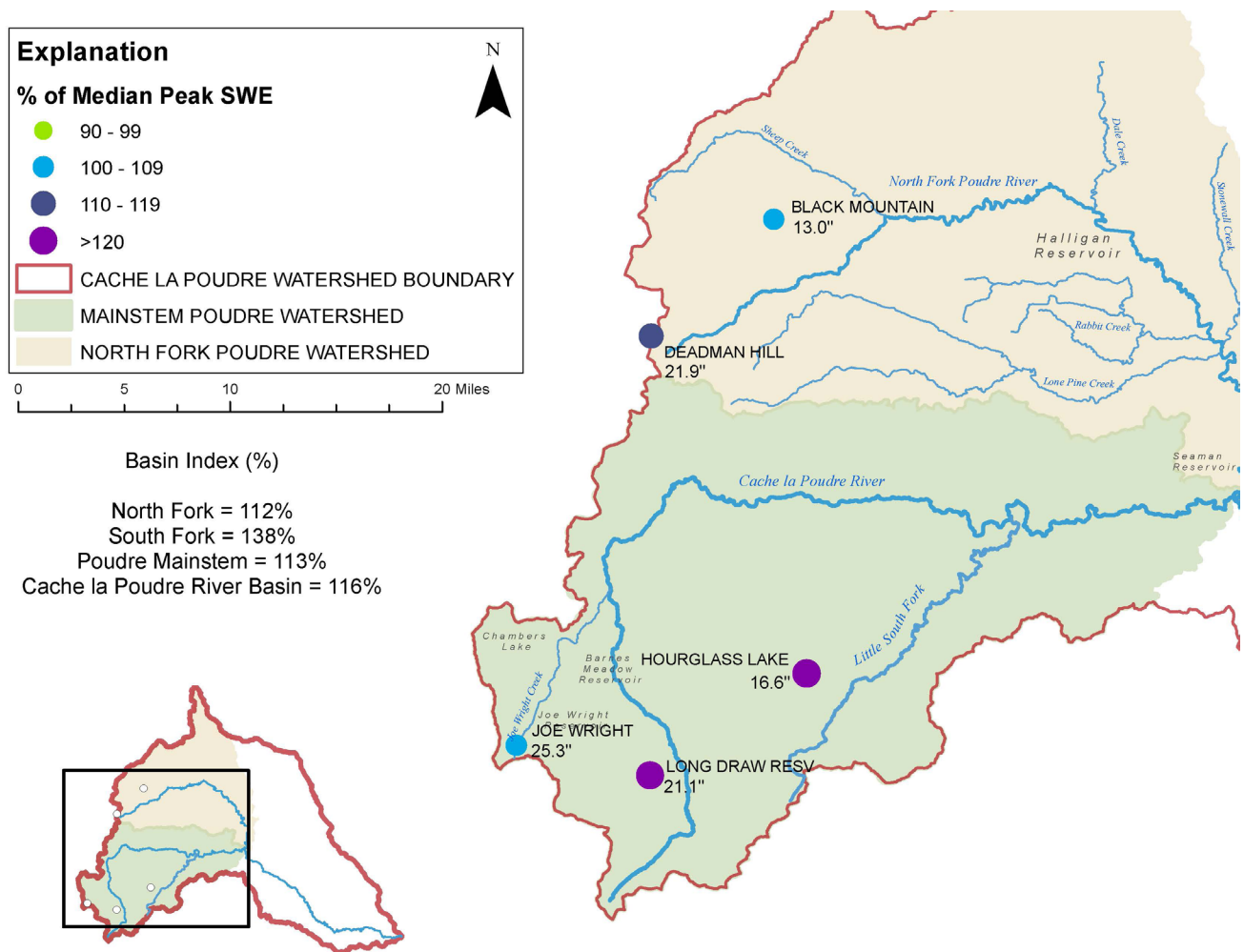


Figure 2 – Peak snow water equivalent measured at SNOTEL sites throughout the Upper Cache la Poudre River watershed in 2020.

STREAMFLOW CONDITIONS

Streamflow at the Cache la Poudre River near the Canyon Mouth (CLAFTCCO) stream gage measured 62,785 acre-feet over the spring season, which was slightly below the long-term average (93%). Streamflow was near average in March (103%) and below average in April (80%) and May (93%) (**Figure 3**). There was a slight delay in the start of snowmelt runoff in 2020, but streamflow rapidly began to rise in early May. Cooler weather in late-May briefly slowed snowmelt runoff but hot weather followed, and streamflow quickly increased above the long-term average. In 2020, peak streamflow was measured on June 1 at 3,020 cubic feet per second (cfs). Peak streamflow occurred 10 days earlier than average and measured approximately 150% of the long-term average peak streamflow.

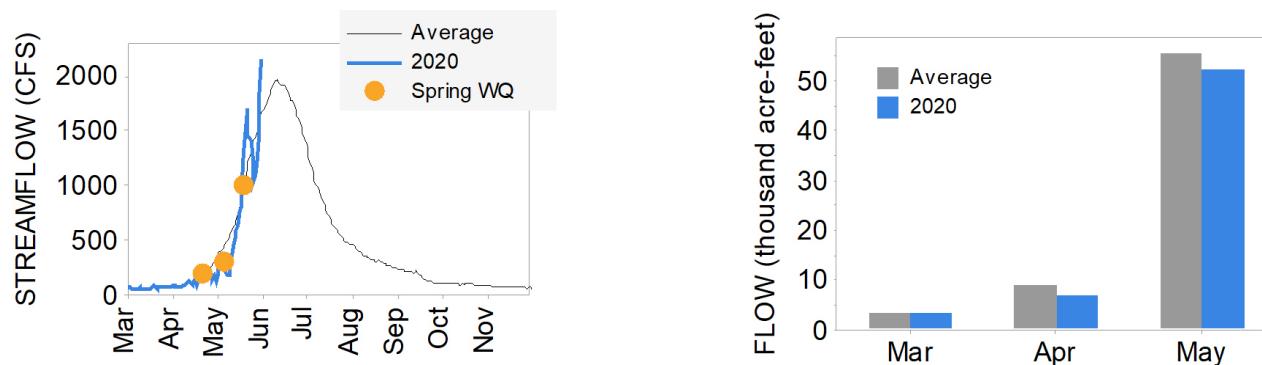


Figure 3 – Streamflow conditions on the Poudre River over the 2020 spring season (left) and monthly total water volume measured over the spring season (right).

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 2). 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 2 – 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

Spring water quality monitoring captures water quality conditions from the start of snowmelt runoff to peak streamflow. Water quality conditions vary with changes in elevation and contributing watershed area. 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 spring 2020 snowmelt runoff season (**Figure 4**). Water temperature was slightly higher than baseline. pH and specific conductivity were near baseline on the Mainstem CLP River near the City of Fort Collins' water supply intake (PNF) and higher than the baseline on the Mainstem CLP River near the City of Greeley's intake (PBD). Turbidity was higher than baseline at both monitoring locations.

Graphic Explanation

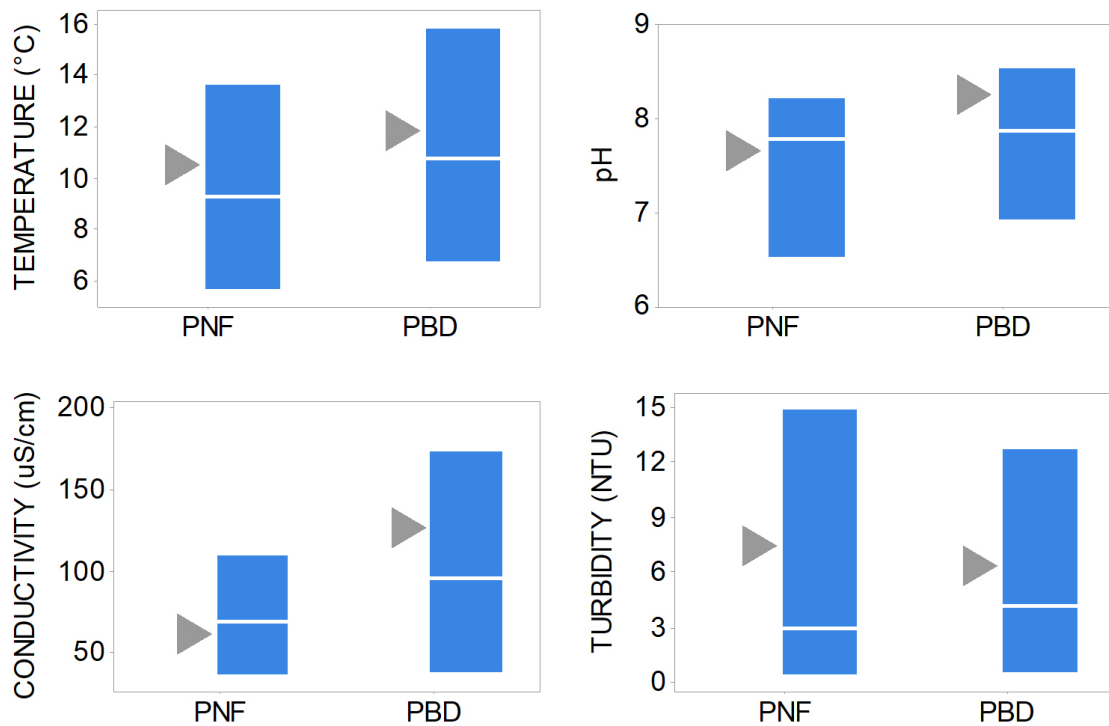
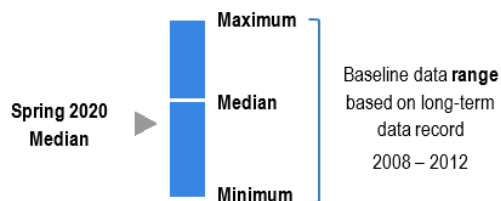


Figure 4 – Water quality indicator data collected at key monitoring sites over the 2020 spring monitoring season (April and May) compared to baseline spring water quality conditions.

TASTE AND ODOR COMPOUNDS

Geosmin and 2-Methylisoborneol (MIB) are naturally occurring organic compounds that introduce an earthy odor to water that can be detected by the most sensitive individuals at concentrations as low as 4 nanograms per liter (ng/L) or 4 parts per trillion (ppt). These compounds do not pose a public health risk but are of concern because their detectable presence can negatively affect customer confidence in the quality of drinking water. Geosmin and 2-MIB are monitored at PBR and PNF during routine UCLP monitoring events.

Geosmin was detected at the City of Fort Collins' water supply intake (PNF) on May 26, but was only slightly above the water quality laboratory's reporting limit of 2 ng/L. 2-MIB was not detected above the water quality laboratory's reporting limit (5 ng/L).



Casey Barby, Watershed Technician, collects water quality indicator data on the North Fork Cache la Poudre River in early spring using a multi-parameter water quality sonde.

2019 UPPER CACHE LA POUFRE WATERSHED WATER QUALITY REPORT

The Upper Cache la Poudre Watershed Collaborative Monitoring Program recently released its 2019 Annual Report. It summarizes climate and hydrology in the Upper CLP watershed in 2019 and water quality data collected as part of the Upper CLP Collaborative Water Quality Monitoring Program. Water quality reports can be found online at fcgov.com/source-water-monitoring/.

