Collaborative Upper Cache la Poudre Monitoring Program

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 2019 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. Results are reported for six key monitoring sites located throughout the UCLP watershed, which capture water quality conditions above and below major tributaries and near water supply intake structures ***(Figure 1)***. Present water quality conditions are compared to baseline water quality conditions collected over the period of 2008 to 2012.

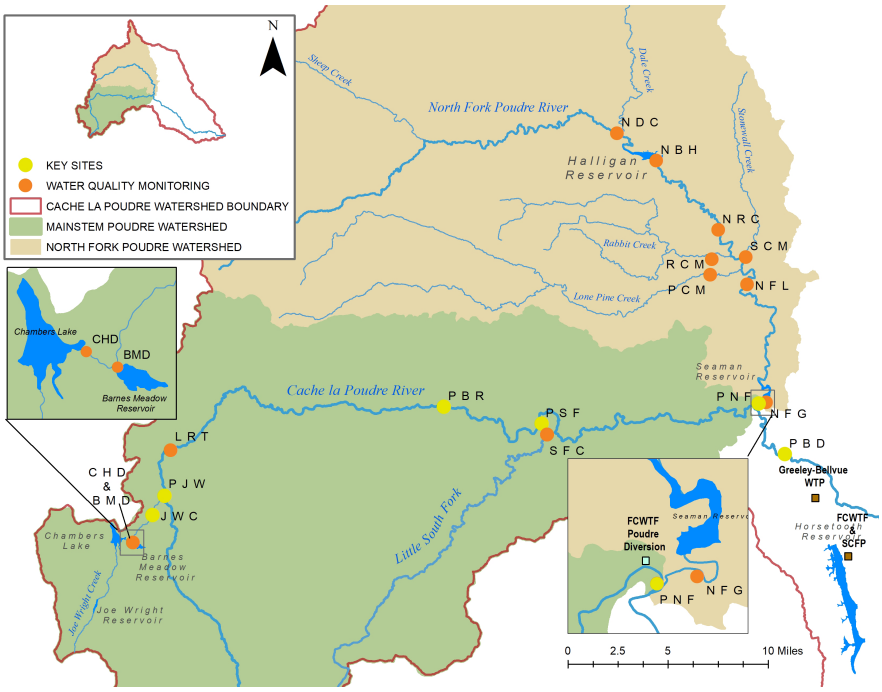

Figure 1 *- Upper Cache la Poudre Collaborative Monitoring Program sampling locations*

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 snow telemetry station (SNOTEL) over the 2019 spring season was 0.9°F cooler than average. The monthly mean air temperatures for March and May were cooler than average. The month of April was warmer than average and ranked as the third warmest on record ***(Table 1).***

Table 1 *– Monthly mean air temperatures measured at Joe Wright SNOTEL over the spring months of 2019 compared to the long-term average (1991 – 2010).*

Period of Record		Temperature (deg F)	
		Average	Departure
March	2019	24.0	-2.6
	Average	26.6	
April	2019	34.0	2.8
	Average	31.2	
May	2019	36.0	-2.8
	Average	38.8	
SPRING	2019	31.3	-0.9
	Average	32.2	

PRECIPITATION

Precipitation was measured above average at the beginning of the 2019 water year. October was the eighth wettest on record with 5 inches of precipitation and the month of November was the sixth wettest on record with 6.5 inches of precipitation. Below average precipitation was measured over the winter season with total precipitation recording 88% of average. Precipitation in the spring measured slightly above average at 104% due to a very wet March, which was the sixth wettest on record with 6.8 inches of precipitation ***(Figure 2).***

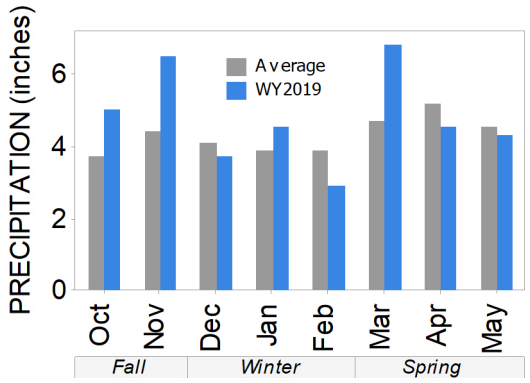

Figure 2 *– Monthly accumulated precipitation totals measured at the Joe Wright SNOTEL over the 2019 water year compared to the long-term average (1981 – 2010)*

SNOWPACK

Snow water equivalent (SWE), the amount of water held in the snowpack, measured at Joe Wright SNOTEL near Cameron Pass, was near the long-term median (1981 – 2010) for most of the snow accumulation season. The maximum amount of water contained in the snowpack, referred to as peak SWE, was observed at the Joe Wright SNOTEL on April 19 and measured at 23.4 inches – 99% of the historical median. Below average temperatures and wet weather in the spring delayed snowmelt and extended the snow accumulation season. By June 1, the snowpack measured 161% of normal at the Joe Wright SNOTEL ***(Figure 3).***

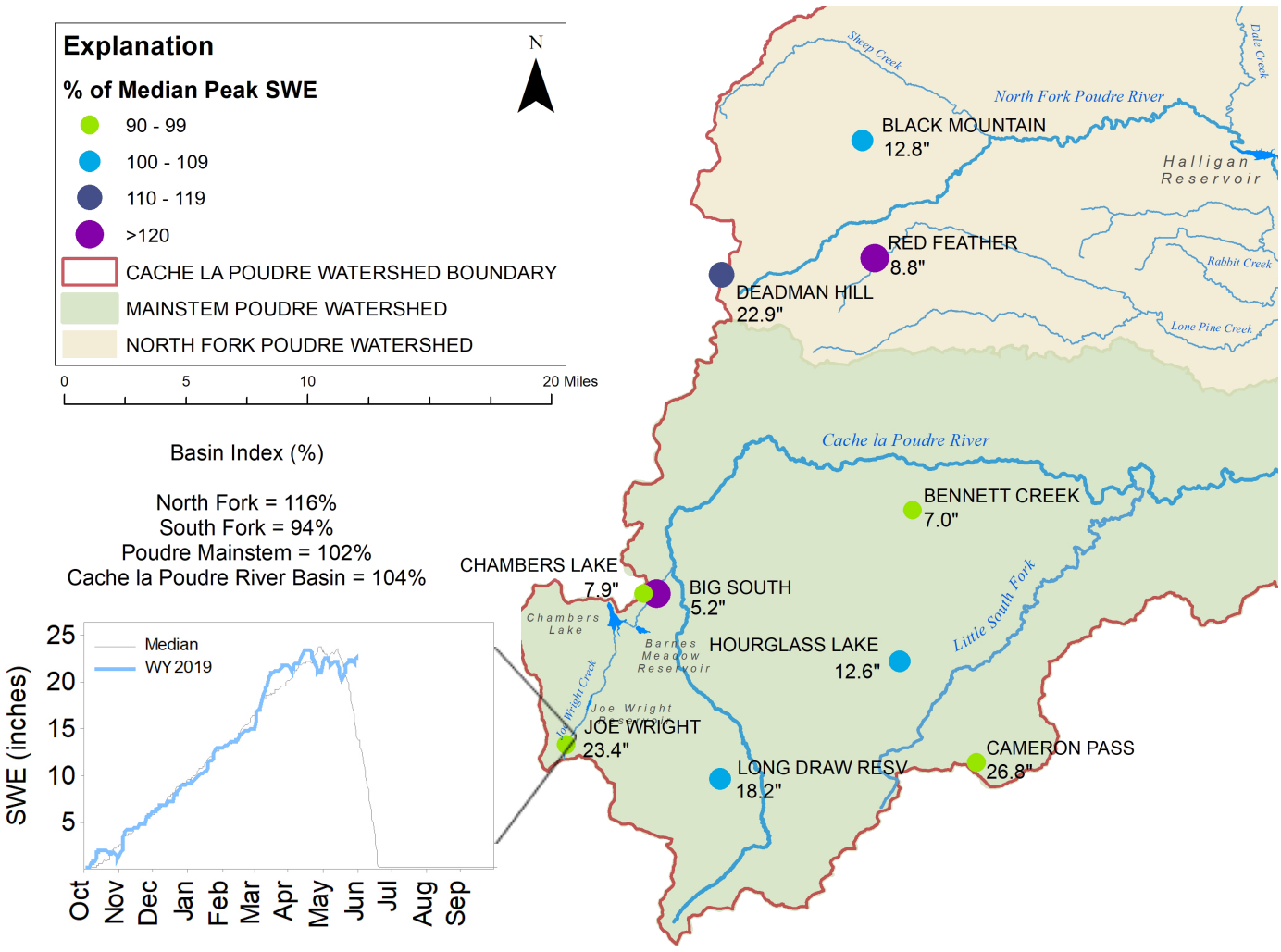

Figure 3 *– Peak snow water equivalent throughout the Upper Cache la Poudre River watershed in 2019 and snow water equivalent measured at the Joe Wright SNOTEL over the 2019 water year (inset) compared to the long-term median (1981 – 2010).*

STREAMFLOW CONDITIONS

Streamflow measured at the Cache la Poudre River near the Canyon Mouth stream gage was well below average over the spring season. Streamflow was near and below average in March and April but dropped off in early May due to colder than average temperatures throughout the watershed. Snowmelt runoff began shortly after but was stalled following another late-spring cold weather event. By the end of May, streamflow was only 30% of average. The total volume of water that flowed past the Canyon Mouth stream gage in May was less than half of the expected average water volume ***(Figure 4).***

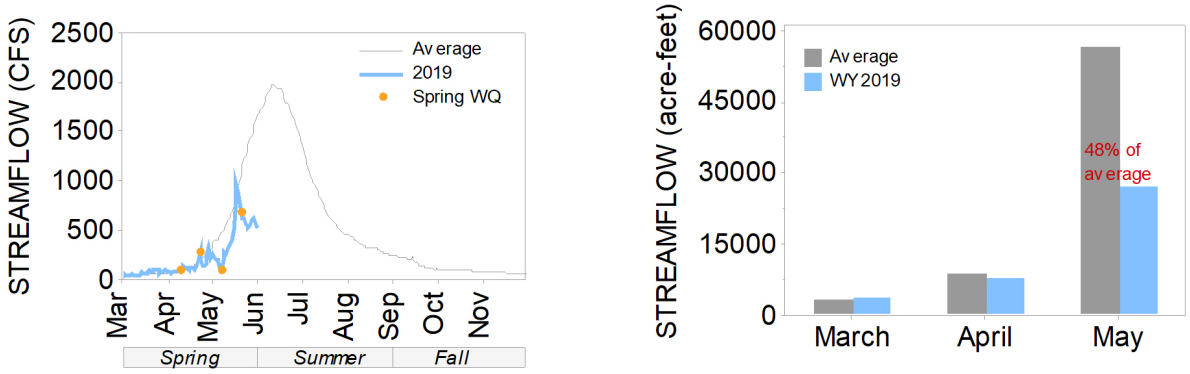

Figure 4 *– Streamflow conditions on the Poudre River over the 2019 water year (left) and total water volume measured over the spring season (right).*

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 key measurements provide a snapshot of water quality conditions, which are useful to identify trends or changes in water quality. Significant changes in water quality may provide early warning for 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 compound, geosmin.
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.
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. All water quality indicators at key sites were measured within the range of baseline conditions indicating normal water quality conditions on the Poudre River during the spring 2019 snowmelt runoff season ***(Figure 5).*** Water temperature was slightly higher than baseline from the Mainstem CLP River below Rustic (PBR) downstream to the Mainstem CLP River at the City Greeley's intake (PBD). Specific conductivity values were higher than the baseline median on the Mainstem CLP River near the City of Greeley's intake (PBD). The higher specific conductivity levels at this monitoring location are likely associated with the North Fork CLP River upstream of the City of Greeley's intake on the Mainstem. Specific conductivity values are typically higher along the North Fork CLP River due to differences in watershed hydrology, geology and land use practices. If flow contributions from the North Fork CLP River to the Mainstem CLP River are high, water quality changes may be observed downstream.

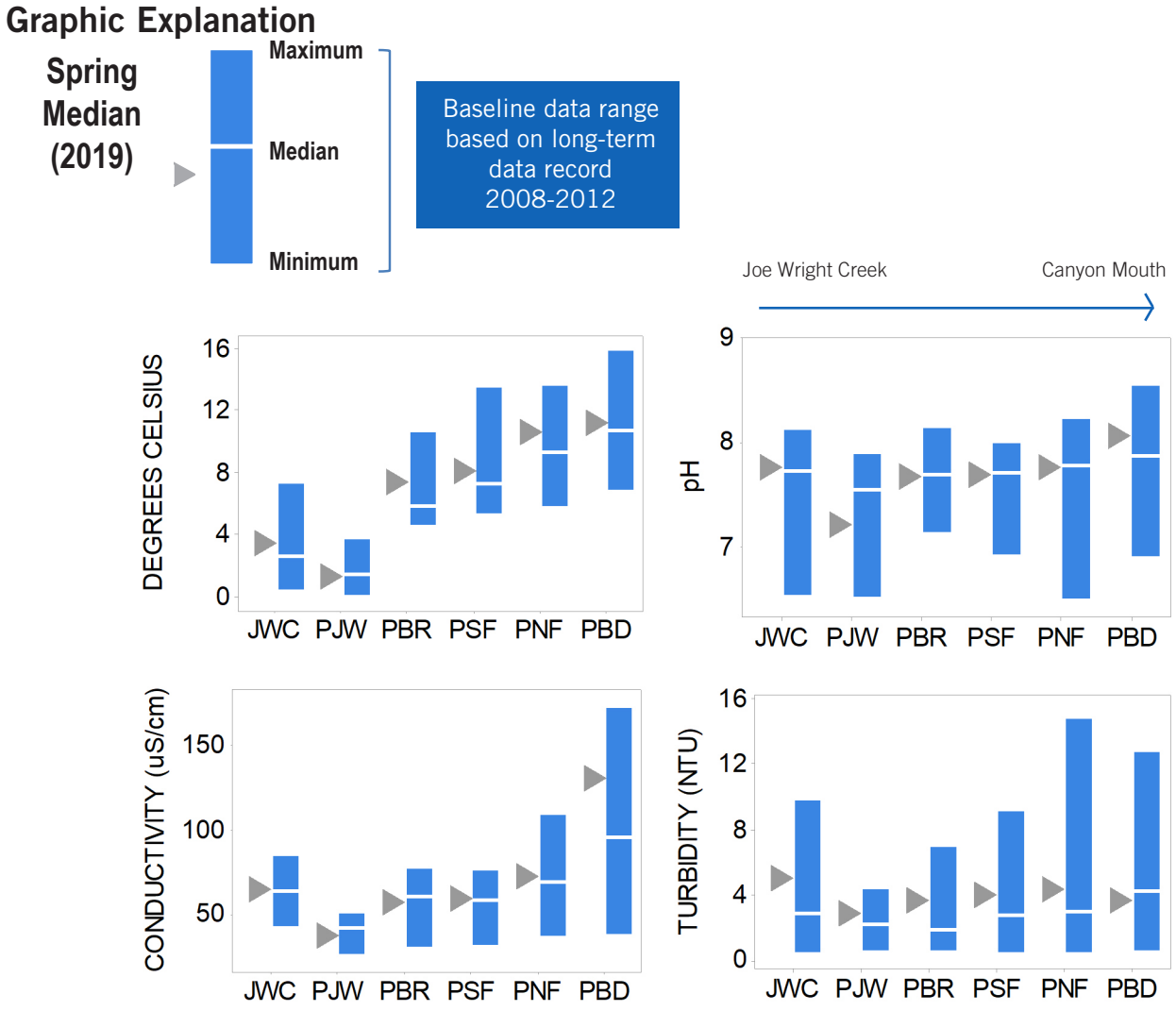

Figure 5 *– Water quality indicator data collected at key monitoring sites over the spring 2019 monitoring season (April and May) compared to baseline spring water quality conditions.*

TASTE AND ODOR COMPOUNDS

Geosmin and 2-Methylisoborneol (MIB) are naturally occurring organic compounds which 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 and 2-MIB were not detected above their respective reporting limits (2 ng/L and 5 ng/L) during the spring monitoring season.

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

2018 Upper Cache la Poudre Watershed Water Quality Annual Report

The Upper Cache la Poudre Watershed Collaborative Monitoring Program recently released its 2018 Annual Report. The 2018 Annual Report summarizes climate and hydrology in the Upper CLP watershed over the 2018 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 *fcgov.com/source-water-monitoring.*