

will be pursued with Towns, Denver Water, Northern Water, the Headwaters Center, and others.

- Encourage efficient indoor water use: Install low flow water fixtures and appliances whenever possible (i.e. Energy Star appliances or toilets/urinals/showerheads/faucets that use 20% less water than conventional fixtures).
- Water providers should develop and implement ongoing leak detection and repair programs.
- Water providers should consider including consumption as a component of the rate structure to encourage awareness of water usage.
- Encourage entities to implement conservation oriented tap fees/development charges that encourage new development that is smart from the start
- Maintain continual communication with water diverters to ensure compliance with the Colorado River Cooperative Agreement.

Drought Severity Indicators

Drought severity indicators can generally be divided into two categories: (1) water supply indicators and (2) political, social, environmental, and economic indicators. During a drought, the Drought Preparedness Committee will consider multiple severity indicators in choosing the appropriate drought preparedness recommendations.

- 1) Water supply indicators include but are not limited to: percent snowpack/SNOTEL snow-water equivalent, precipitation, air and stream temperature, Grand County streamflows and river administration, soil moisture, and weather forecasts. Drought indices such as the Standardized Precipitation Index, the Palmer Drought Severity Index, and the U.S. Drought Monitor Index integrate multiple measurements and can be used as drought severity indicators. If drought conditions have been declared, regardless of the water supply situation, the Drought Preparedness Committee can recommend lifting that declaration or adjusting the level of drought preparedness recommendations.
- 2) Political, social, environmental, and economic factors are indicators that fall under public perception. Although these indicators may not always be quantitative, they can be monitored and described for consideration in the Drought Preparedness Committee's decisions about drought preparedness recommendations. Listed below are definitions of the factors of the public perception indicator.
 - a. Social: Droughts affect the water supplies of neighboring West Slope and Front Range communities. Sensitivity to drought preparedness declarations of these communities is an indicator that will be used by the Drought Preparedness Committee when considering drought preparedness recommendations. The Drought Preparedness Committee should be mindful of drought conditions across Colorado.
 - b. Media Response: Much of the information Grand County residents and visitors receive comes from traditional and social media outlets. Members of traditional news media and social media outlets can be helpful in conveying factual information to residents, and they also play a key role in shaping public perception of drought in Grand County.
 - c. Political Response: Political response to drought can take many forms and can depend on residents affected. For example, Front Range water suppliers or downstream counties

already initiating drought response measures could put pressure on Grand County to initiate drought preparedness measures.

- d. Economic Impacts: After ensuring essential needs (i.e., drinking water) are met, one of the principles guiding the Drought Preparedness Plan is to maintain the economic viability of our tourist and agriculture based economy to the best extent possible. Water restrictions imposed in response to drought can affect businesses in different ways. As part of its public outreach efforts, the Drought Preparedness Committee will make all efforts to coordinate restriction programs to minimize negative economic impacts to our business community.
- e. Environmental Impacts: Reduced streamflows caused by drought can affect the environment, recreation, fisheries, and economic activity in Grand County. The Drought Preparedness Committee will monitor stream levels so that environmental effects are considered in drought preparedness decisions.

Just like other weather phenomena, forecasting a drought and knowing with certainty if one exists can be difficult. Even though droughts cannot always be accurately predicted, the Drought Preparedness Committee will continue to work with stakeholders to assure that good communication is used when making drought preparedness recommendations.

Drought Preparedness Indicators and Triggers Charts

A uniform County-wide drought response will be determined based on the Indicators listed below:

Stage	Indicator #1	Timing	Trigger
Drought Watch	Percent snowpack/SNOTEL SWE ¹ and Upper Colorado Mainstem conditions ²	April 30 – SNOTEL sites are useful for a limited time during snowpack accumulation. Once snow starts melting, look at monthly & annual precipitation ³ .	Less than 90% of average
Stage 1			Less than 80% of average
Stage 2			Less than 65% of average
Stage 3			Less than 50% of average

¹ https://www.cbrfc.noaa.gov/wsups/graph/front/esplot_dg.html?year=2020&id=KRM2

² <https://www.cbrfc.noaa.gov/wsups/pub2/outlook4.php?region=uc&month=6&year=2020#co>

³ <https://www.cbrfc.noaa.gov/lmap/lmap.php?interface=wsup>

Stage	Indicator #2	Timing	Trigger
Drought Watch	Grand County streamflows & river administration (Fraser River @ Winter Park ⁴ , Fraser River @ Granby ⁵ , Colorado River @ Windy Gap ⁶ , Colorado River @ HSS ⁷ , Colorado River near Kremmling ⁸)	June 1, July 1, August 1, September 1	Less than 90% of average
Stage 1			Less than 80% of average
Stage 2			Less than 65% of average
Stage 3			Less than 50% of average

For Indicator #3, the appropriate drought stage will be determined based on the percentage of Grand County land mass that is contained within a U.S. Drought Monitor Index intensity level. See Appendix B for more details on the U.S. Drought Monitor.

Stage	Indicator #3	Timing	Trigger
Drought Watch	U.S. Drought Monitor Index (Colorado state map ⁹ , and seasonal drought outlook ¹⁰) & 3-month outlook for temperature and precipitation ¹¹	To be evaluated at each Drought Preparedness Committee meeting	D0 abnormally dry
Stage 1			D1 moderate drought
Stage 2			D2 severe drought
Stage 3			D3 extreme drought or D4 exceptional drought

⁴ USGS gage 0902400 Fraser River at Winter Park:

<https://www.cbrfc.noaa.gov/station/flowplot/flowplot.cgi?id=FRWC2&sim=on&stats=on&pdays=20&fdays=90&him=&swin=&showflow=on>

⁵ USGS gage 0903400 Fraser River at Granby:

<https://www.cbrfc.noaa.gov/station/flowplot/flowplot.cgi?id=FRGC2&sim=on&stats=on&pdays=20&fdays=90&him=&swin=&showflow=on>

⁶ USGS gage 09034250 Colorado River at Windy Gap, Near Granby:

<https://www.cbrfc.noaa.gov/station/flowplot/flowplot.cgi?id=CAWC2&sim=on&stats=on&pdays=20&fdays=90&him=&swin=&showflow=on>

⁷ USGS gage 09034500 Colorado River at Hot Sulphur Springs:

<https://www.cbrfc.noaa.gov/station/flowplot/flowplot.cgi?id=HTSC2&sim=on&stats=on&pdays=20&fdays=90&him=&swin=&showflow=on>

⁸ USGS gage 09058000 Colorado River near Kremmling:

<https://www.cbrfc.noaa.gov/station/flowplot/flowplot.cgi?id=KRMC2&sim=on&stats=on&pdays=20&fdays=90&him=&swin=&showflow=on>

⁹ <https://www.drought.gov/drought/states/colorado>

¹⁰ <https://droughtmonitor.unl.edu/ConditionsOutlooks/Outlooks.aspx>

¹¹ <https://www.cpc.ncep.noaa.gov/>

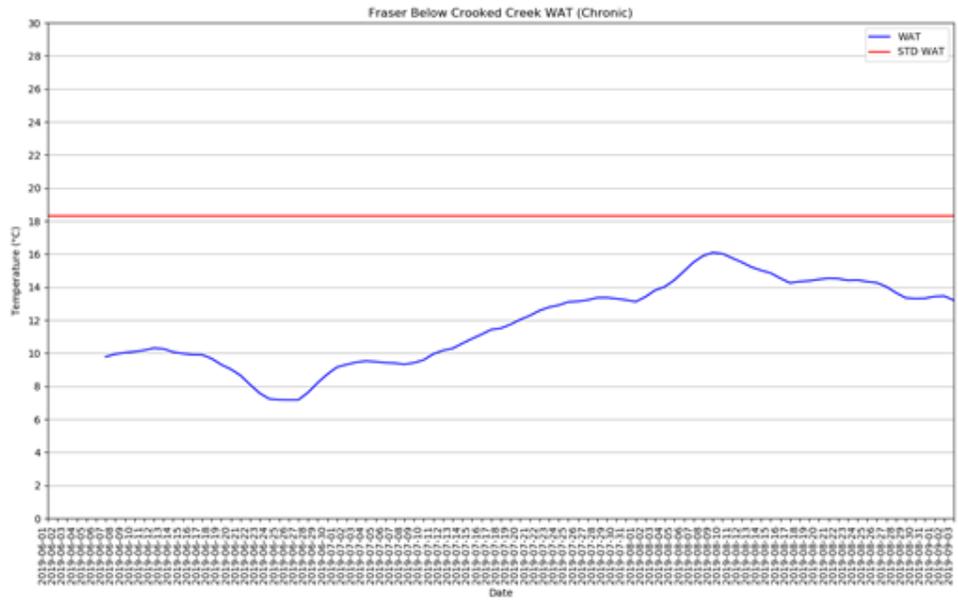
For Indicator #4, weekly average stream temperatures will be compared to the Colorado Water Quality Control Division’s chronic temperature standard for the applicable segment (COUCUC10C for the Fraser River at Crooked Creek, and COUCUC03 for the Colorado River above William’s Fork)¹². Per Regulation 33 approved on 12/31/2019, the chronic cold stream tier II standard for these segments is a maximum weekly average temperature (MWAT) of 18.3°C (64.9°F) from June through September. Temperature triggers used for Indicator #4 range from a MWAT (chronic) standard to just below the daily maximum (DM; acute) temperature standard of 24.3°C (75.7°F). The Learning By Doing Committee analyzes temperatures on a weekly basis from June – September and will share the temperature plots with the Drought Preparedness Committee.

Stage	Indicator #4	Timing	Trigger
Drought Watch	Weekly average stream temperature for Fraser River at Crooked Creek and Colorado River above Williams Fork	June 1, July 1, August 1, September 1	65 °F / 18.3 °C
Stage 1			68 °F / 20 °C
Stage 2			71 °F / 21.7 °C
Stage 3			74 °F / 23.3 °C

The figures below are examples of the MWAT standard comparison in 2019 at the two indicator sites:

¹² Colorado Department of Public Health and Environment, Water Quality Control Commission 5 CCR 1002-31, 01/31/2018, and Colorado Department of Public Health and Environment, Water Quality Control Commission 5 CCR 1002-33, 12/31/2019.

Fraser below Crooked Creek 9033300 – WAT (chronic) – Tier II



Colorado River above Williams Fork – WAT (chronic) – Tier II

