



# GRAND COUNTY DROUGHT PREPAREDNESS PLAN

July 14, 2021

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## Purpose

With climate unpredictability becoming the new norm, an increase in drought periods is predicted by climatologists to be more frequent. The purpose of drought mitigation and preparedness planning is to preserve essential public services and minimize the adverse effects of drought on public health and safety, economic activity, environmental resources, and individual lifestyles during a drought event. The Grand County Drought Preparedness Plan (“plan”) is intended to mitigate the crisis through drought preparedness efforts, reduce the hardships caused by water shortages, create a county-wide approach to drought preparedness, and raise public confidence in the actions taken to address water supply shortages. It is also important to note that this plan is effective in drought and non-drought years. Drought mitigation, monitoring drought indicators, and drought public education are implemented on an annual basis regardless of whether it is a dry or a wet year.

This plan was developed through a stakeholder process involving water districts, agricultural interests, environmental organizations, fire districts, town representatives, and Grand County government. This stakeholder group will help establish the Drought Preparedness Committee; whose purpose is to create county-wide collaboration in dealing with drought conditions.

The purpose of this plan is to prepare the water users in Grand County for times of water shortages. This plan is to be used as a guideline for the entities that adopt it to help them deal with varying drought conditions and educational possibilities. It is meant to be used as an educational tool and not a regulatory document. Each individual entity adopting this plan has the option on how they choose to use it. Each entity is encouraged to implement recommendations of the plan, in order to facilitate a uniform response throughout the County.

While this is a Grand County-wide plan, each municipal water supply will be impacted differently by the same drought circumstances. This plan is written to give each municipal water supplier or district the flexibility to respond appropriately depending on the stage of drought.

## Committee Definitions

### **Drought Preparedness Plan Membership**

All stakeholders adopting the Drought Preparedness Plan are voting members of the plan; there is no limit on voting members and each member entity gets one vote. Membership is limited to entities within Grand County and entities can join at any time. Voting will be required to amend any major component of this plan, including voting on Drought Preparedness Committee members, changes to any committee’s job description, or operating powers. To maintain this living document, membership will meet annually to review and/or approve suggested changes to this plan.

### **Drought Preparedness Committee**

This committee will consist of at least five members who look at indicators and triggers and make recommendations to its members about which level of response they feel is appropriate. Membership in this committee will be distributed among members representing Grand County, water districts, towns, agricultural interests, golf courses, and environmental groups. The committee will meet a minimum of once a month between the months of April and September.

In the event of a Stage 1, 2, or 3 drought recommendation being set, meeting frequency will be increased until conditions warrant a lower drought stage. More frequent meetings may be called by any member of the Committee when drought conditions accelerate. The Drought Preparedness Committee has the authority to make minor clarification edits to the plan if necessary. Drought Preparedness Committee members are selected by a vote of the participating Drought Preparedness Plan members. The Grand County Board of County Commissioners (BOCC) may be asked to approve drought stages upon recommendation from the Drought Preparedness Committee. The Drought Preparedness Committee may move forward with implementing appropriate drought stage actions without BOCC approval.

#### **Education and Outreach Committee**

Since education and outreach are the most effective ways to implement changes in water consumption, this committee will be an integral component in the success of this plan. This committee consists of volunteers from the Drought Preparedness Plan Membership. Participation and messaging of the Education and Outreach Committee requires approval by the Drought Preparedness Committee. All media forms will be used to educate and communicate with the water users in Grand County. Education and outreach should be a year-round effort and this committee will meet accordingly. Education and Outreach Committee members are selected by a vote of the participating Drought Preparedness Plan members.

#### **Financial Committee**

The Financial Committee will be responsible for finding funding to assist the Education and Outreach Committee and Drought Preparedness Committee in the performance of their work. This committee will establish a good line of communication with the Education and Outreach and Drought Preparedness Committees so that funding can be secured in a timely manner. They are a volunteer committee composed of Drought Preparedness Plan Membership. The Financial Committee composition will be all of the members of the Drought Preparedness Committee plus any other volunteers approved by the Drought Preparedness Plan members. Grants and donations are the most common venues for fundraising that are used by this committee. Financial Committee members are selected by a vote of the participating Drought Preparedness Plan members.

## **Drought Preparedness and Water Conservation**

Drought occurs in virtually all climate zones and is a normal, recurring aspect of climate. For Grand County, a drought is a condition of insufficient water supply caused by a deficit in precipitation and/or extensive trans-basin diversions. When the average annual snowpack is below normal or summer river levels drop below established thresholds, the Drought Preparedness Committee will more closely monitor its water supply outlook. If continued drought conditions stress water supplies or the environment, the Drought Preparedness Committee will implement this Drought Preparedness Plan.

This plan includes recommendations to establish water conservation measures that should be in place at all times to help ensure water demands are met while also encouraging efficient use of water throughout the County. This plan also establishes drought indicators to help understand what level of drought Grand County is facing. Indicators will trigger drought response recommendations based on the drought level of the indicator.

While drought planning commonly targets special districts and municipalities, it is important to recognize that a significant proportion of water users in Grand County use private wells. Private wells are regulated by the state and as such are subject to their own rules and regulations (see next paragraph). However, it is important to recognize that groundwater and surface water resources are inextricably connected, and the longer a drought persists, the greater the chances that it is also affecting groundwater levels, base-flow to streams, and even stream temperatures.

Understanding which of the conservation measures in this drought plan may apply to private well users depends upon the type of well permit. According to the Division of Water Resources, **household use only** wells cannot be used for outdoor irrigation, so indoor conservation measures would be applicable. **Domestic wells** are allowed up to one acre of home lawn and gardens, so outdoor irrigation conservation measures would apply. Similarly, **wells with a plan for augmentation** may allow for outdoor irrigation, so outdoor irrigation conservation measures may apply. In all cases, please review the well permit and/or water court decree for the legal uses of the well. For more information, see the Division of Water Resources website <https://dwr.colorado.gov/services/well-permitting>. To search for a well permit visit <https://dwr.state.co.us/Tools/WellPermits>.

**Routine Water Conservation** - These are best management practices, activities and programs that help ensure water is used efficiently and appropriately at all times.

**Drought Severity Indicators** - These are a variety of factors that should be considered in choosing an appropriate drought response

**Drought Preparedness Actions** - These are recommendations for maximizing water supplies and reducing water use during times of drought in terms of drought stages, triggers, and water reduction targets.

**Drought Preparedness Program Elements** - These are recommendations for water use during different levels of drought.

## Routine Water Conservation

While this plan is focused on drought preparedness, to ensure that we are well positioned to respond when drought conditions arise, we must first ensure that water is being used efficiently and sustainably. The following measures are recommended for use at all times for municipalities, special districts, and the communities they serve. It is important to note however that these water conservation measures could also be observed by well users as applicable per their well permit. To the extent conservation measures can be implemented up front, e.g., when landscaping and irrigation systems are initially designed and installed, that will usually be more efficient, less costly, and more effective compared to retrofitting existing development. In addition to these recommendations, individual members/participants/water providers are encouraged to develop their own water conservation plans, programs, recommendations, and requirements. Education and outreach will be the cornerstone of reducing water consumption (See Appendix A):

- Encourage efficient outdoor water use:

- Lawns and gardens should be watered no more than three days a week.
  - To reduce evaporative loss, avoid outside lawn irrigation between the hours of 10:00 am and 6:00 pm.
  - Avoid allowing water to pool in gutters or streets.
  - Incorporate soil amendments before areas are landscaped.
  - Ensure irrigation systems are properly designed and installed.
  - Adjust sprinklers to avoid spraying on concrete or asphalt to ensure efficient irrigation.
  - Set irrigation controllers to reflect seasonal irrigation demands (less water in spring and fall, more in summer).
  - Repair leaking sprinkler systems immediately.
  - Avoid cutting lawn grass shorter than three inches to better maintain moisture.
  - Install rain sensors and do not water when it is raining or during high winds.
  - Evaluate landscape and irrigation system requirements/ordinances.
  - Repair leaky head gates and ditches.
  - Household use only wells cannot be used for outdoor irrigation unless they have an established augmentation plan. Conduct education and outreach to educate homeowners.
  - Entities are encouraged to utilize resources provided by the CSU Extension Office and Towns regarding efficient outdoor water use. Subject to funding, demonstration projects 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: SNOTEL snow-water equivalent, precipitation, air temperature, soil moisture, and weather forecasts. Drought indices such as the Standardized Precipitation and Evapotranspiration Index, the Palmer Drought Severity Index, and the U.S. Drought Monitor Index integrates 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 drought conditions 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 may be determined based on the Indicators listed below and will not be used exclusively. The Drought Preparedness Committee may look at other indicators that impact drought to exercise good judgment and decision making.

## Indicator #1

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. This model is a composite based on meteorology, soil moisture, and hydrology. This index is updated weekly looking at past data.

Figure 1 is an example of the map being reviewed for this indicator. See Appendix B for more details on the U.S. Drought Monitor.

Stage	Indicator #1	Timing	Trigger
Drought Watch	U.S. Drought Monitor Index - Grand County map <sup>1</sup>	To be evaluated at each Drought Preparedness Committee meeting	D0 abnormally dry
Stage 1 - Warning			D1 moderate drought
Stage 2 - Severe			D2 severe drought
Stage 3 - Exceptional			D3 extreme drought or D4 exceptional drought

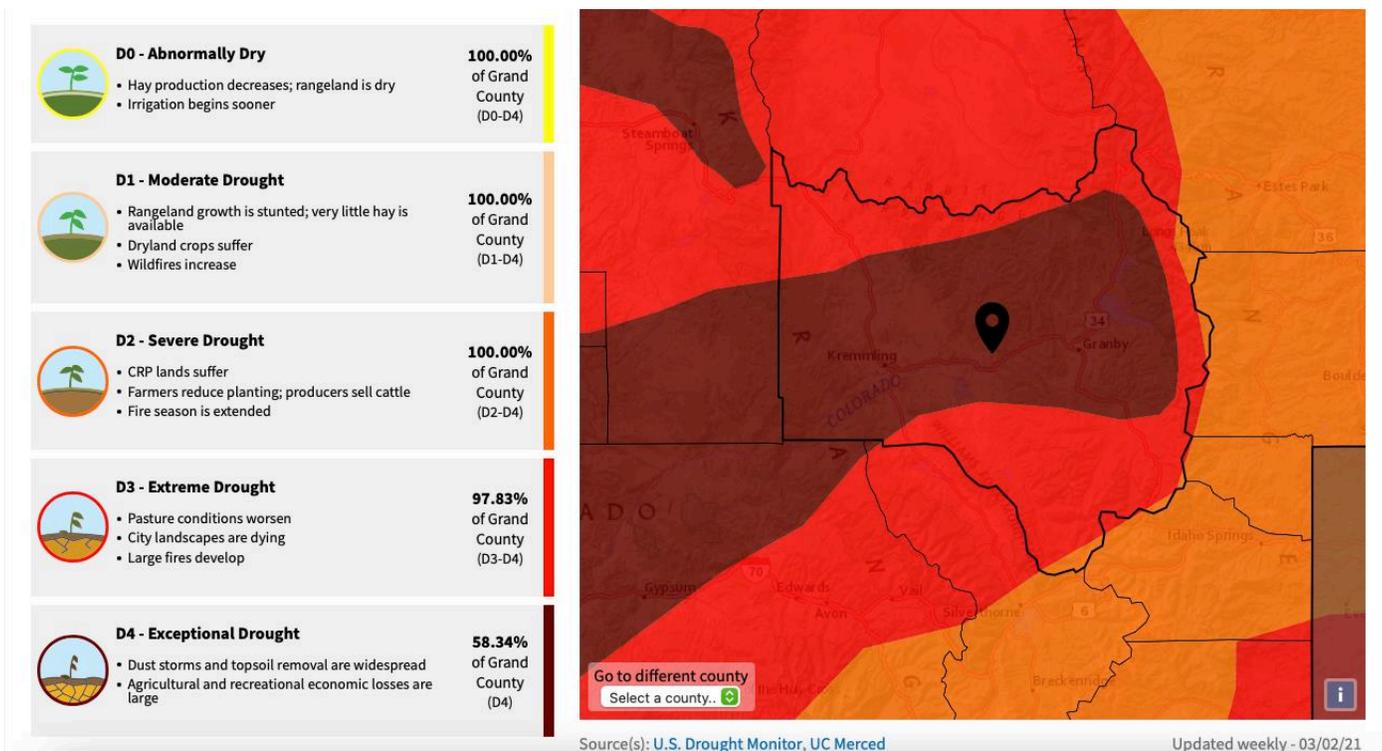


Figure 1. U.S. Drought Monitor Index - Grand County

<sup>1</sup> <https://www.drought.gov/drought/states/colorado>

## Indicator #2

The appropriate drought stage will be determined by evaluating snowpack from November through April 30<sup>th</sup>, and precipitation year-round. SNOTEL stands for Snowpack Telemetry which is measured at backcountry weather stations that are focused on measuring snow depth and snow water equivalent (SWE). SWE will be based on percent of median and precipitation will be based on percent of average. **Figure 2** and **Figure 3** are examples of the graphs being reviewed for this indicator. This indicator is based on meteorology from current conditions.

Stage	Indicator #2	Timing	Trigger
Drought Watch	Snow water equivalent <sup>2</sup> and precipitation <sup>3</sup>	To be evaluated at each Drought Preparedness Committee Meeting. SNOTEL sites are useful for a limited time during snowpack accumulation.	90% - 109% of median/average
Stage 1 - Warning			70% - 89% of median/average
Stage 2 - Severe			50% - 69% of median/average
Stage 3 - Exceptional			Less than 50% of median/average

<sup>2</sup> <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/co/snow/products/?cid=nrcseprd1432263>

<sup>3</sup> <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/co/snow/products/?cid=nrcseprd1432263>

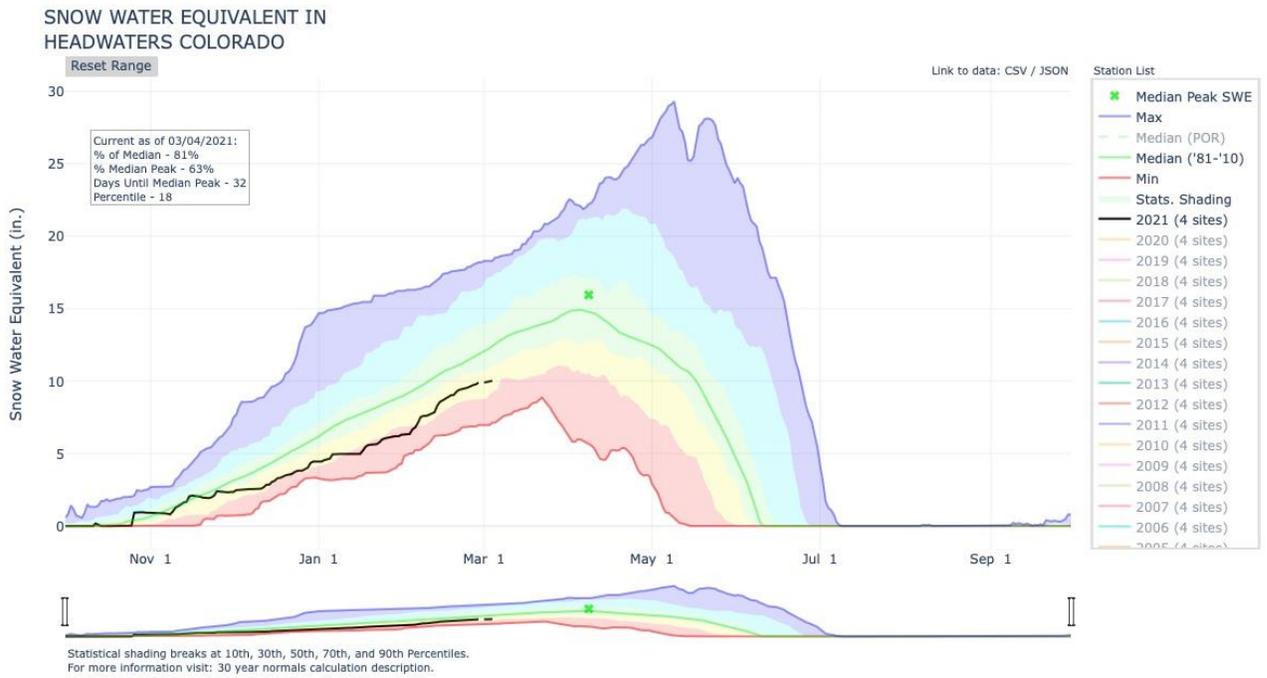


Figure 2. Snow Water Equivalent Graph

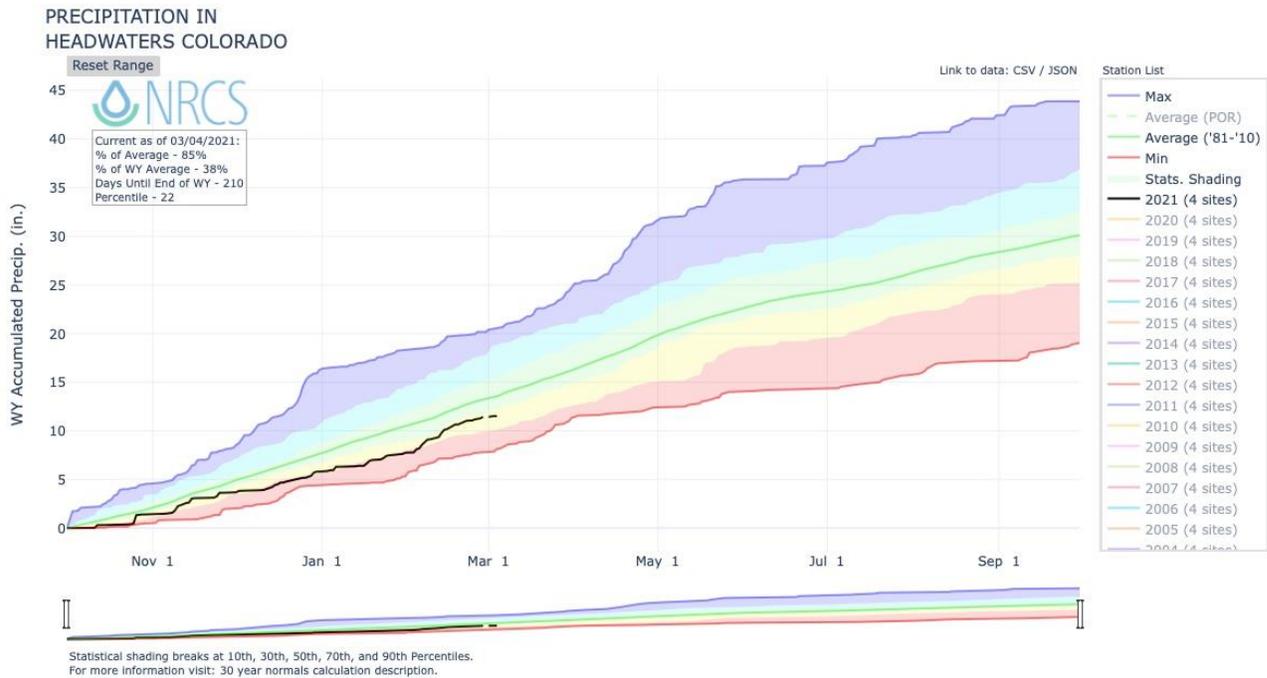


Figure 3. Precipitation Graph

### Indicator #3

The appropriate drought stage will be determined by reviewing the Standardized Precipitation and Evapotranspiration Index (SPEI). Evapotranspiration is described as, “the thirst of the atmosphere.” This multi-scalar index takes into account both precipitation and air temperature in determining drought. It captures the main impact of increased temperatures on water demand. SPEI has an intensity scale in which both positive and negative values are calculated, identifying wet (positive values) and dry events (negative values). The trigger ranges match those used on the U.S. Drought Monitor. **Figure 4**, **Figure 5** and **Figure 6** are examples of the maps being reviewed for this indicator. This model is based on climatological factors and is a monthly index looking at past data.

Stage	Indicator #3	Timing	Trigger
Drought Watch	Standardized Precipitation and Evapotranspiration Index <sup>4</sup> (1-, 6-, and 12-month maps)	To be evaluated at each Drought Preparedness Committee Meeting.	-0.5 to -0.7
Stage 1 - Warning			-0.8 to -1.2
Stage 2 - Severe			-1.3 to -1.5
Stage 3 - Exceptional			> -1.6

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<sup>4</sup> [https://climate.atmos.colostate.edu/spi\\_monthly\\_maps.html](https://climate.atmos.colostate.edu/spi_monthly_maps.html)

# 1-month SPEI from Westwide Drought Tracker, January 2021

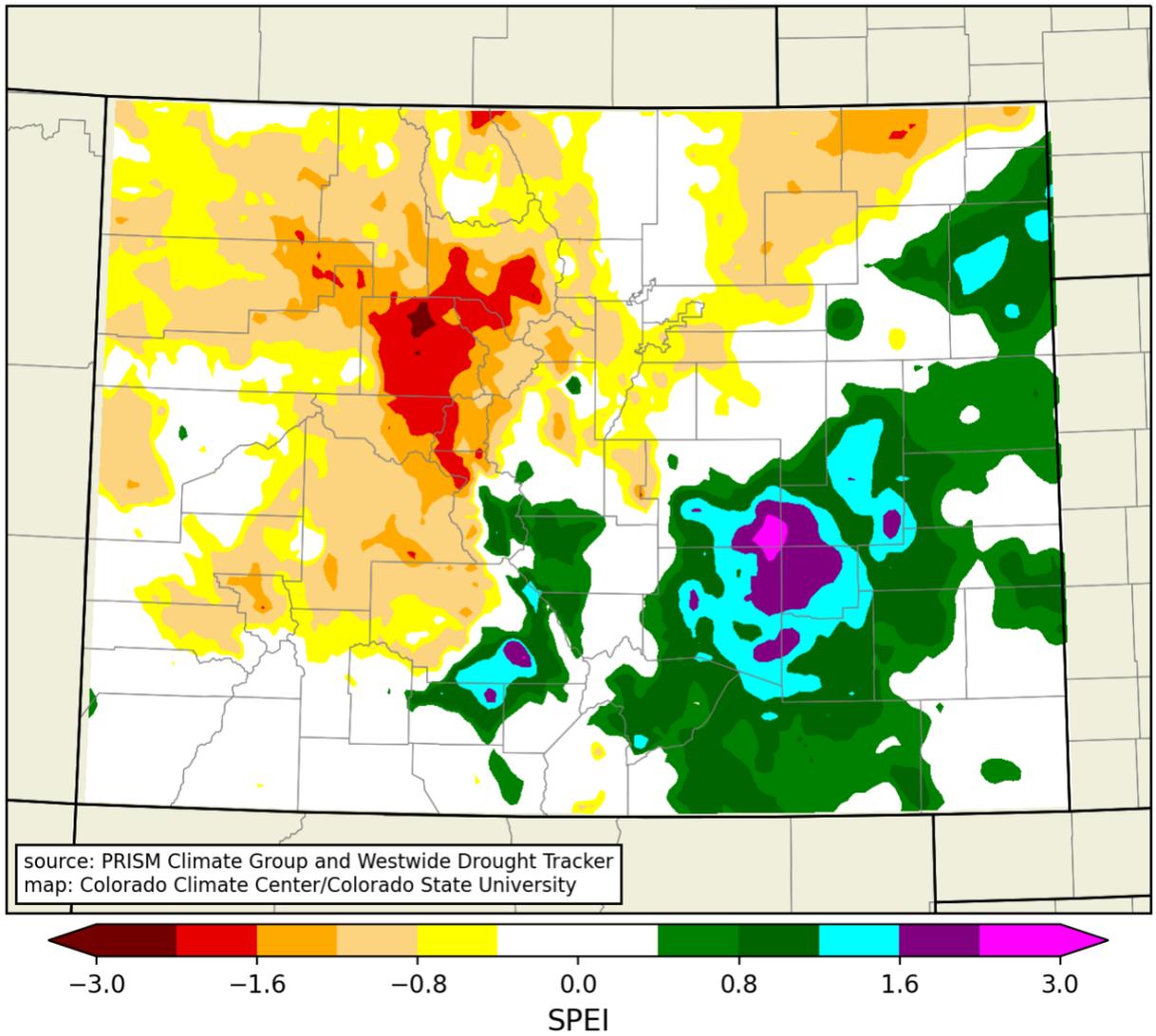


Figure 4. SPEI 1-Month Map

# 6-month SPEI from Westwide Drought Tracker, January 2021

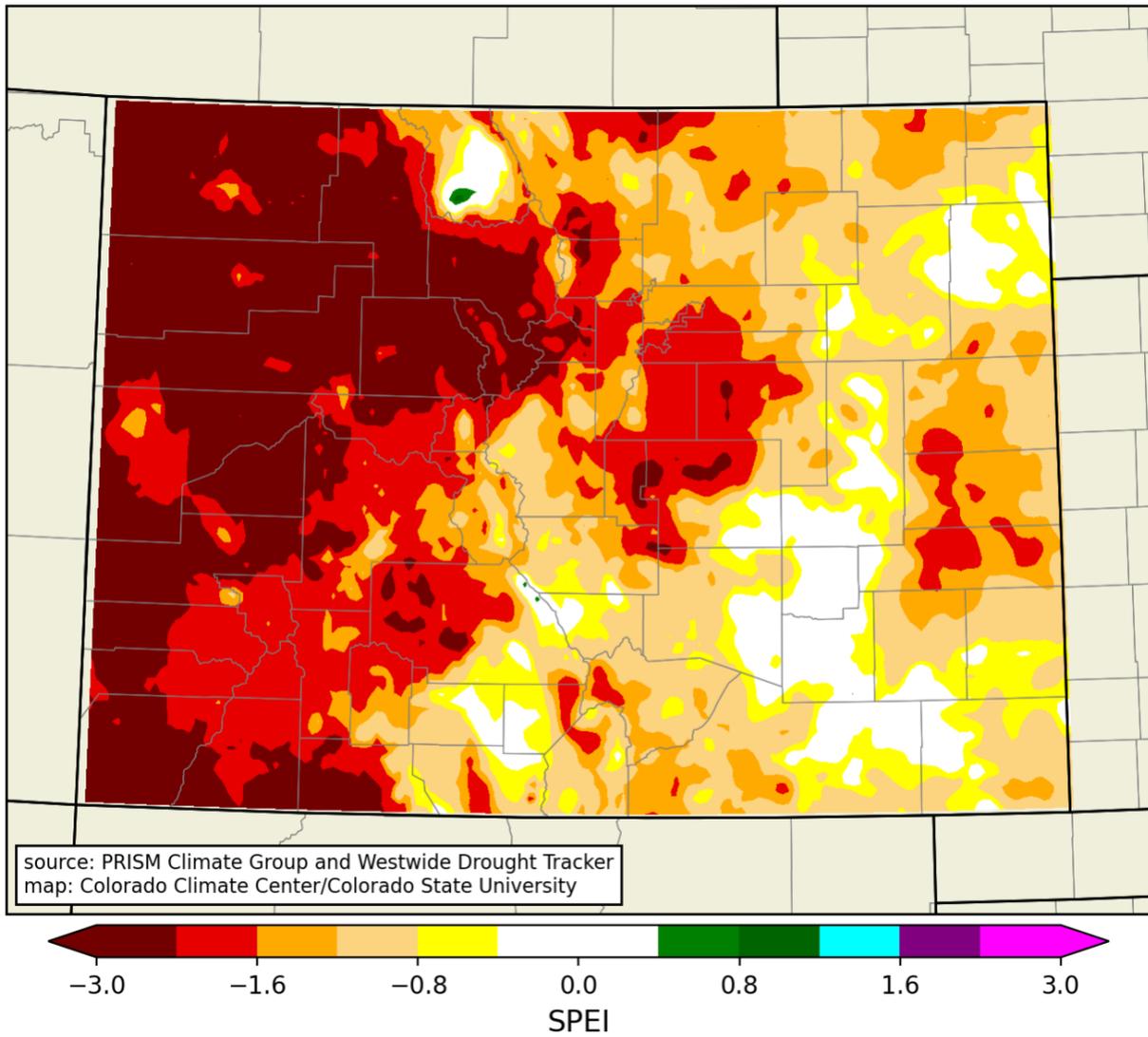


Figure 5. SPEI 6-Month Map

# 12-month SPEI from Westwide Drought Tracker, January 2021

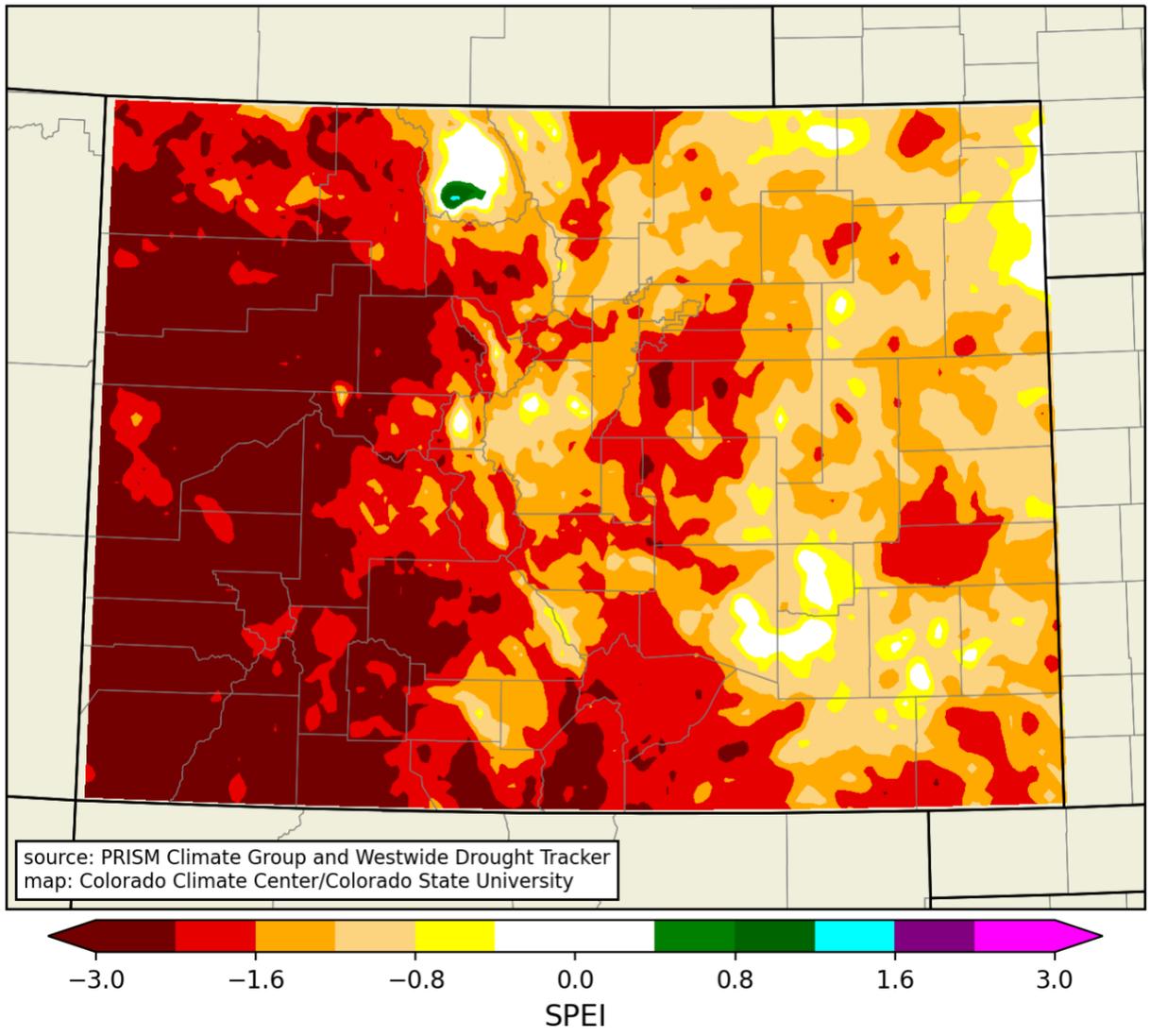


Figure 6. SPEI 12-Month Map

## Indicator #4

The drought stage will be assessed through the Quick Drought Response Index (QuickDRI) which is a shorter-term indicator for dryness. QuickDRI is calculated through the analysis of satellite and model-based observations and is designed to provide a snapshot of anomalously dry or wet conditions based on intensity. It serves as an “alarm” indicator of emerging or rapidly changing drought conditions based on intensity. **Figure 7** is an example of the map that will be reviewed for this indicator. This model is based on vegetation, hydrologic, climate, and environmental landscape. This index is updated weekly and looks at past data.

Stage	Indicator #4	Timing	Trigger
Drought Watch	QuickDRI <sup>5</sup>	April - October	White - Near Average
Stage 1 - Warning			Yellow - Intensifying
Stage 2 - Severe			Orange - Intensifying
Stage 3 - Exceptional			Red - Drier

### Quick Drought Response Index Colorado

February 28, 2021  
(Week 9)

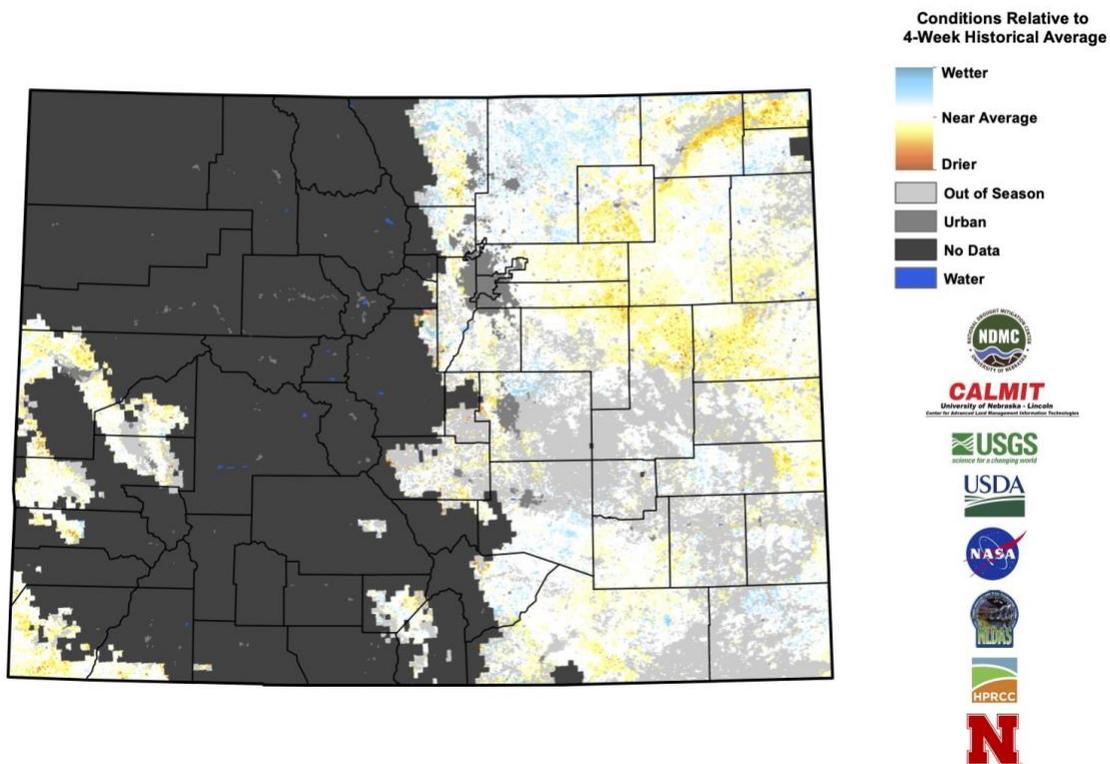


Figure 7. Quick Drought Response Index Map

<sup>5</sup> <https://quickdri.unl.edu/State.aspx?CO>

## Indicator #5

The drought stage will be assessed through the 3-month temperature and precipitation outlook. Temperature will be based on percent above normal, and precipitation will be based on percent below normal. Looking ahead will help assess whether conditions are likely to improve or not. **Figure 8** and **Figure 9** is an example of the maps that will be reviewed for this indicator. This outlook is based on meteorological predictions and models.

Stage	Indicator #5	Timing	Trigger
Drought Watch	3-month temperature and precipitation outlook <sup>6</sup>	To be evaluated at each Drought Preparedness Committee Meeting.	33% - 40% above/below normal
Stage 1 - Warning			41% - 59% above/below normal
Stage 2 - Severe			60% - 79% above/below normal
Stage 3 - Exceptional			80% - 100% above/below normal

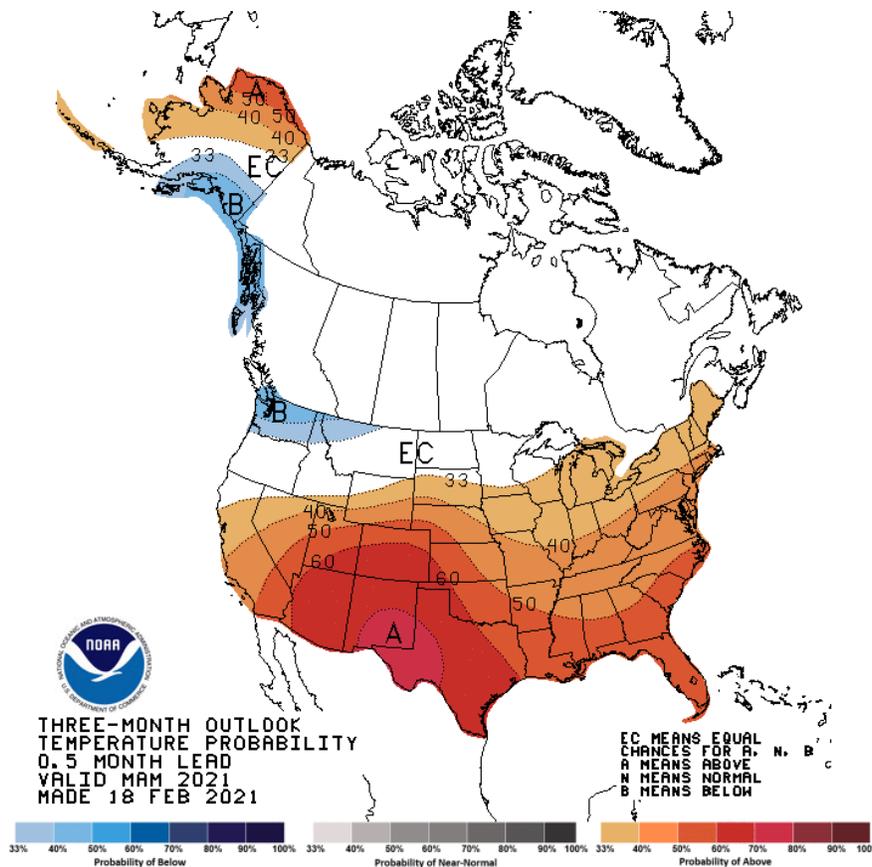


Figure 8. 3-Month Temperature Outlook

<sup>6</sup> <https://www.cpc.ncep.noaa.gov>

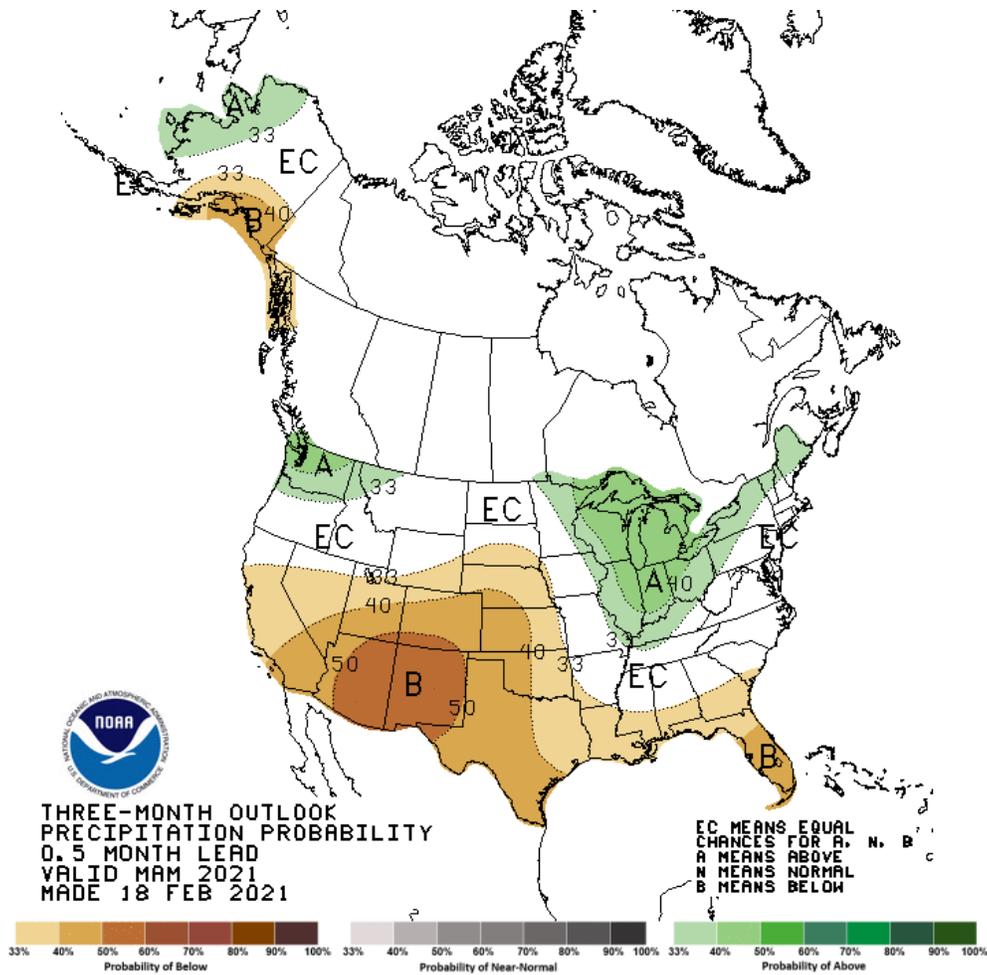


Figure 9. 3-Month Precipitation Outlook

## Drought Preparedness Actions

Grand County’s Drought Preparedness Plan consists of two components - the indicators, not limited to those shown above, and triggers that help the Drought Preparedness Committee decide the appropriate drought preparedness recommendations. This plan delineates routine recommendations, a drought watch, and three stages of drought severity. Each stage will be based on water supply indicators as well as various political, social, environmental, and economic indicators discussed in the Drought Severity Indicators section of this document.

For each stage, progressively more stringent responses are recommended per the Drought Preparedness Program Elements table. Some drought preparedness measures will require minimal effort by Grand County water users. However, as drought becomes more severe water providers may consider measures that are more costly and intrusive. The staged drought preparedness actions are based on the best available information to date and future adjustments may be necessary prior to or during drought periods to sufficiently address water shortages.

In short, the recommended preparedness actions are as follows:

- Routine water conservation measures should always be in effect, helping ensure ongoing water use is sustainable and efficient.
- A Drought Watch is for increased communication and education during dry periods and drought forecasts.
- A Stage 1 drought (Warning) will result in recommendations from the Drought Preparedness Committee that water providers and users implement outdoor watering restrictions and a voluntary irrigation reduction from agriculture and golf courses.
- A Stage 2 drought (Severe) will result in recommendations from the Drought Preparedness Committee that water providers and users further limit outdoor water use and includes a greater voluntary irrigation reduction from agriculture and golf courses.
- A Stage 3 drought (Exceptional) will result in recommendations from the Drought Preparedness Committee that water providers and users consider rationing the water supply for essential human uses only and includes the largest voluntary water reduction from golf courses and agriculture.

To activate a particular stage of drought, the Drought Preparedness Committee declares a drought stage and a recommendation for an effective date for imposing applicable recommendations.

At the onset or forecast of a drought, the Drought Preparedness Committee will initiate its drought monitoring procedures. The Drought Preparedness Committee will monitor drought conditions and evaluate the effectiveness of the drought response. Recommendations for adjusting the response will be the responsibility of the Drought Preparedness Committee. Because every drought is different, the Drought Preparedness Committee will refine drought preparedness recommendations based on actual conditions.

## Reducing Water Use

The Drought Preparedness Committee's primary response to drought is to recommend a reduction in water use so that water supplies will be available for the most essential uses during the duration of a drought. A variety of actions, rather than a single approach, is generally more effective at creating an overall atmosphere that promotes water use reductions. Recommended actions include education, restrictions, enforcement, monitoring, and evaluation.

Generally speaking, restricting the number of days and times allowed for watering landscapes or providing a water allocation can be effective methods of reducing water use. A voluntary reduction in irrigation water can also be an effective method. This includes agriculture, golf courses, public parks, sports fields, and other large, irrigated areas. Public information efforts also compliment those water restrictions. Other recommendations may not substantially reduce water use but may reduce the discretionary uses of water or heighten public awareness of drought severity.

## Drought Recommendations

Once the Drought Preparedness Committee has declared a drought, they will recommend that the corresponding set of drought preparedness actions be implemented. The Drought Preparedness Committee's goal for drought preparedness is to maintain the health, safety, and economic viability of the Grand County community to the extent possible in the face of water shortage or environmental harm. The Drought Preparedness Committee will follow the principles below as much as possible when recommending watering restrictions during a drought.

Avoid irretrievable loss of natural resources:

- Allow for watering of trees if possible.
- Avoid damaging perennial landscaping if possible.
- Tailor watering restrictions to known landscape needs as much as possible.

Consider essential uses versus non-essential uses:

- Curtail outdoor water use (except for trees, shrubs, and vegetable gardens) before restricting domestic indoor use.
- Curtail the refilling of hot tubs and pools.

Implement drought recommendations to affect the greatest good:

- Be respectful of water-based businesses that will be financially affected by restrictions.
- Engage in ongoing dialogue with the golf courses and agricultural communities to obtain input and allow these businesses to avoid serious financial impacts.

Implement extensive public information and media relations programs:

- Inform residents about conditions and actions they can take to reduce water use.
- Have open, clear, and consistent messaging and communication.
- Maintain the trust of County residents and stakeholders.

## Drought Pricing

Drought pricing may be implemented by individual water providers as part of a drought preparedness declaration. Drought pricing is designed to increase awareness of the drought's severity. Drought pricing is different from regular rate structures in that it is temporary in nature. The drought response level will define the criteria for implementing and removing drought pricing.

Water providers should consider several guiding principles in developing drought pricing:

- Communicating early and often with customers is critical to ensuring the community understands why they may need to temporarily pay more while using less.
- There is a relationship between price and demand.
- Drought pricing should not be used alone but should be incorporated into an overall program to increase customer awareness of the drought's severity and importance of saving water.

- Drought pricing may apply to current demands, new taps, or other demands on the water supply.
- Drought pricing should match the severity of the drought.

## Water Use and Education

The goal of an education program is to educate and inform residents, and to ensure the County has sufficient water supplies for critical uses during periods of shortage. Each water provider should establish their individual education programs with assistance from this plan and the Education and Outreach Committee. Public information campaigns will need to be developed for each unique water shortage. A communication plan should be developed annually, sometime during the months of April or May, that attacks the different and unique water shortages while using respective budgets at the time of adoption. Each entity is encouraged to participate in chosen communication campaigns and each entity has the option to choose how to use it. These campaign(s) will promote the importance of conserving water and achieving water savings in both normal and drought years. During non-drought years, the drought campaign component will provide a general overview on drought and the importance of drought preparedness. During a drought, the drought messages will increase in frequency and intensity and will be expanded to include information on the staged drought response program and the necessity to conserve supplies. See Appendix A for the Grand County Public Information and Drought Awareness Communications Strategy.

## Monitoring and Evaluation

When drought conditions are forecasted or emerge, the Drought Preparedness Committee will intensify its monitoring and evaluation activities. These monitoring activities will include but not limited to the indicators above. If conservation measures need to be implemented, municipalities are encouraged to track water usage and detailed reports will be encouraged to be provided to the Education and Outreach Committee.

## Drought Stages

This Drought Preparedness Plan includes Drought Watch, Stage 1, Stage 2, and Stage 3, as described below. See the Drought Preparedness Program Elements and Indicator Charts for more information.

### Drought Watch

Drought will be declared when indicators point to conditions that are abnormally dry. A drought watch will increase communication to County residents and visitors to alert them that water supplies and streamflows are below average, conditions are dry, and continued dry weather could lead to mandatory watering restrictions.

#### Indicators:

- The US Drought Monitor Index has Grand County in abnormally dry drought (D0) conditions.

- Snow-water equivalent is greater than 90% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is great than 90% of average.
- Standardized Precipitation and Evapotranspiration Index is less than -0.7.
- QuickDRI is white - near average conditions.
- Neighboring West Slope counties or Front Range entities using water diverted from Grand County rivers are in drought watch response.
- Grand County residents believe that a Drought Watch and its corresponding actions are appropriate.

**Recommended Responses:**

- Increase communication and outreach to residents and stakeholders to explain that Grand County is beginning to see indicators of drought.
- Encourage residents to continue to use water efficiently and provide suggestions for further reducing water use in order to reduce the risk of progression to mandatory restrictions.
- Warn of and prepare for the possibility of watering restrictions.
- Enhance water use education.

**Drought Watch Complete Recommendations:** [See Drought Preparedness Program Elements.](#)

## Stage 1 - Warning

Stage 1 recommends watering reductions and efforts on the part of all Grand County residents. This is the first stage during which the Drought Preparedness Committee will begin making recommendations to water providers and users.

**Indicators:**

- The US Drought Monitor Index has Grand County in moderate drought (D1) conditions.
- Snow-water equivalent is between 70% - 89% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is between 70% - 89% of average.
- Standardized Precipitation and Evapotranspiration Index is between -0.8 to -1.2.
- QuickDRI is yellow - intensifying drought conditions.
- Other West Slope counties or Front Range entities that divert water from Grand County are already in a stage 1 response.
- Grand County residents believe that a drought warning and its corresponding actions are appropriate.

**Use Reduction Target:** Sport fields, parks, golf courses, and agriculture will be encouraged through education and outreach to reduce water use.

**Stage 1 Complete Recommendations:** [See Drought Preparedness Program Elements.](#)

## Stage 2 - Severe

This is a more severe level of drought and recommendations from the Drought Preparedness Committee will be more stringent as outlined in the recommended Drought Preparedness Program Elements.

### Indicators:

- The US Drought Monitor Index has Grand County in severe drought (D2) conditions.
- Snow-water equivalent is between 50% - 69% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is between 50% - 69% of average.
- Standardized Precipitation and Evapotranspiration Index is between -1.3 to -1.5.
- QuickDRI is orange - even further intensification of drought conditions.
- Other West Slope counties or Front Range entities that divert water from Grand County are already in a stage 2 response.
- Grand County residents believe we are in a severe drought and its corresponding actions are appropriate.

**Use Reduction Target:** Sport fields, parks, golf courses, and agriculture will be encouraged to further reduce water use through education and outreach.

**Drought Pricing:** Municipal water providers may choose to use drought pricing as a tool to help reduce water use.

**Stage 2 Complete Recommendations:** [See Drought Preparedness Program Elements.](#)

## Stage 3 - Exceptional

Stage 3 indicates exceptionally dry conditions and will recommend water rationing. If conditions warrant, the Drought Preparedness Committee would make recommendations as outlined in the recommended Drought Preparedness Program Elements. Outdoor watering may not be allowed, and indoor water use may be restricted. Stage 3 drought recommendations could affect the quality of life in Grand County and will result in the long-term loss of landscapes.

### Indicators:

- The US Drought Monitor Index has Grand County in an extreme (D3) drought or exceptional (D4) drought conditions.
- Snow-water equivalent is less than 50% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is less than 50% of average.
- Standardized Precipitation and Evapotranspiration Index is greater than -1.6.
- QuickDRI is red - indicating exceptionally dry and intense conditions.
- Grand County residents believe that we are in an exceptional drought and its corresponding actions are appropriate.
- News media are sending messages that we are in exceptionally dry conditions.
- Elected officials are calling for water rationing.
- The situation suggests that severe impacts to water-dependent businesses are unavoidable.

- Other West Slope counties and Front Range entities diverting water from Grand County are already in Stage 3 restrictions.

**Use Reduction Target:** Municipal water users, sports fields, and parks will reduce water consumption by 40%. Golf courses and agriculture will reduce water use as much as possible while still maintaining the viability of their business.

**Drought Pricing:** Drought pricing is recommended for Stage 3 restrictions.

**Stage 3 Complete Recommendations:** [See Drought Preparedness Program Elements.](#)

- No outside municipal water use.
- Indoor water rationing.
- Golf courses and agriculture will reduce water use as much as possible while still maintaining the viability of their business. Agriculture interests are encouraged to participate in an instream flow program so that water rights are not endangered.
- Other recommendations to be determined at a future drought management plan meeting and/or Drought Preparedness Committee meeting

## Drought Preparedness Program Elements

This is a summary of recommendations that would be provided to water providers and users. Depending on local conditions, additional recommendations may be provided. Progressive drought stages (from Drought Watch through Stage 3) are meant to replace the previous drought stage. Each progressive drought stage includes targeted and increased education and outreach.

Element	Routine	Drought Watch	Stage 1 Warning	Stage 2 Severe	Stage 3 Exceptional
<b><i>Outdoor watering and irrigation</i></b>					
Lawn grass (residential, HOA, commercial, industrial, institutional)	Water no more than 3 days a week. To reduce evaporative loss, avoid outside lawn irrigation between the hours of 10:00 am and 6:00 pm. Do not cause water to pool in gutters/streets. Adjust sprinklers to avoid spraying on concrete or asphalt. Repair leaking sprinkler systems immediately. Avoid cutting lawn grass shorter than 3". Do not water when raining or during high winds. Install smart irrigation systems and/or sensors that measure rain and/or soil moisture.	Warn of and prepare for the possibility of mandatory watering restrictions. Voluntary two days per week lawn grass watering from 6:00 pm to 10:00 am.  Follow best management practices for Watering a Home Landscape During Drought as recommended in Appendix C.	No more than two days per week watering from 6:00 pm to 10:00 am.  Follow best management practices for Watering a Home Landscape During Drought as recommended in Appendix C.	No more than one day per week watering from 6:00 pm to 10:00 am.  Follow best management practices for Watering a Home Landscape During Drought as recommended in Appendix C.	No lawn watering.  Follow best management practices for Watering a Home Landscape During Drought as recommended in Appendix C.

Element	Routine	Drought Watch	Stage 1 Warning	Stage 2 Severe	Stage 3 Exceptional
<b><i>Outdoor watering and irrigation</i></b>					
Agricultural water <sup>7</sup> , golf courses, and vegetable gardens	Use only what you need. Repair faulty irrigation systems.	Increased education and outreach re: efficiency and funding sources.	Voluntary reductions.	Voluntary reductions.	Voluntary reductions.
Water wise landscapes, native/adaptive, Trees, shrubs, and perennials (private)	Increased education to transition landscape plants to xeriscape & native/adaptive plants.	Handheld watering or drip irrigation only.	Handheld watering or drip irrigation no more than 2 days per week between 6:00 pm and 10:00 am.	Handheld watering or drip irrigation no more than 1 day per week between 6:00 pm and 10:00 am.	Water no more than one day per month.
New landscape establishment	Encourage xeriscape and native/adaptive plants with drip irrigation systems.	Warn of potential for watering restriction under drought stages.	Not recommended.	Discouraged June through August.	Not allowed.
Municipal streetscape	Water efficiently. Repair faulty irrigation systems.	Handheld watering or drip irrigation only.	Handheld watering or drip irrigation no more than 2 days/week before 10:00 am.	Handheld watering or drip irrigation no more than 1 day/week before 10:00 am.	No watering.
Flowers gardens (private)	Water efficiently.	Water efficiently no more than three days per week using handheld and drip irrigation only between 4:00 pm and 10:00 am.	Water efficiently no more than two days per week using handheld and drip irrigation only between 4:00 pm and 10:00 am.	Water efficiently no more than one day per week using handheld and drip irrigation only between 4:00 pm and 10:00 am.	No watering.
Sport fields and parks	Water efficiently. Repair faulty irrigation systems.	Use only what you need.	Irrigated per mandatory scheduling or water budget restrictions to achieve a 10% reduction.	Irrigated per mandatory scheduling or water budget restrictions to achieve a 20% reduction.	Irrigated per mandatory scheduling or water budget restrictions to achieve a 30% reduction.

<sup>7</sup> Agricultural Impact Task Force: [https://engagecwb.org/agricultural-task-force?tool=story\\_telling\\_tool#tool\\_tab](https://engagecwb.org/agricultural-task-force?tool=story_telling_tool#tool_tab)

Element	Routine	Drought Watch	Stage 1 Warning	Stage 2 Severe	Stage 3 Exceptional
<b>Water Features</b>					
Swimming pools, hot tubs & other water features	No waste of water. Repair faulty irrigation systems.	Outreach and education to discourage frequent filling.	Discourage frequent refilling.	Single-family residential pools or hot tubs shall not be filled or refilled.	Operation of single-family residential pools and hot tubs will not be permitted. No filling of pools or hot tubs.
<b>Washing / Events</b>					
Cars - washing at home and charity events	With bucket or handheld hose with a nozzle that shuts off when not in use.	With bucket or handheld hose with a nozzle that shuts off when not in use. If possible, ensure water runs off into landscape features.	With bucket or handheld hose with a nozzle that shuts off when not in use. If possible, ensure water runs off into landscape features.	Not permitted. Must use commercial car wash.	Not permitted. Must use commercial car wash.
Fleet vehicle washing	No waste of water.	No waste of water.	Once every two weeks.	Once per month.	Not allowed.
Street cleaning	Use only what you need.	Increased education and outreach with municipalities.	Reduce water used for street sweeping.	Use water gained from flushing of hydrants.	Street sweeping for extreme health and safety issues only.
Driveway and sidewalk washing	Discourage under all circumstances: use dry clean methods.	Discourage under all circumstances: use dry clean methods.	Use dry clean methods and high efficiency equipment.	Washing and spraying on impervious surfaces is prohibited.	Washing and spraying on impervious surfaces is prohibited.

Element	Routine	Drought Watch	Stage 1 Warning	Stage 2 Severe	Stage 3 Exceptional
<b><i>Commercial-Institutional Processes</i></b>					
Restaurants	Water served only on request.	Water served only on request.	Water served only on request.	Water served only on request.	Water served only on request.
Lodging	No restrictions.	No restrictions. Education and outreach to customers.	Change linens and towels only on request.	Change linens and towels only on request.	Change linens and towels only on request.
Mag chloride application / grading	Apply in springtime.	Grade only after rain events.	Grade only after rain events.	Grade only after rain events.	Grade only after rain events.
Bulk water / Construction water	No waste of water.	No waste of water.	No waste of water.	No waste of water.	No waste of water.
Hydrants	Utilize restrictive gated devices.	Minimize water main flushing.	Utilize restrictive gated devices. Minimize water main flushing.	Hydrant flushing is prohibited unless necessary for public health and safety reasons. Use of all water for fire training and use of water from hydrants is not permitted unless necessary for public safety.	Hydrant flushing is prohibited unless necessary for public health and safety reasons. Use of all water for fire training and use of water from hydrants is not permitted unless necessary for public safety.

**Appendix A: Grand County Public Information and Drought Awareness Communications Strategy**

## Purpose and Summary

The Public Information and Drought Awareness Communication Strategy is one of Grand County's largest drought management efforts. Grand County has developed this comprehensive communication and public outreach strategy that can provide timely information explaining the drought situation and to raise awareness and solicit cooperation from the public and business community. A strong communications program is the foundation to successful implementation of the Drought Preparedness Plan (DPP).

Public information campaigns will need to be developed for each unique water shortage. A communication plan (separate from this document) should be adopted annually, sometime during the months of April or May, that attacks the different and unique water shortages at the time using respective budgets at the time of adoption. This document should serve as a guide and provides items to take into consideration when developing a campaign. Campaigns should be utilized by each DPP Stakeholder group to integrate efforts and enhance efficiencies. As mentioned in the DPP, while each stakeholder is **encouraged** to participate in chosen communication campaigns, each individual stakeholder has the option to choose how to use it. That being said, a widely adopted campaign will capitalize on synergistic opportunities to convey, where appropriate, a consistent drought message. These campaign(s) will promote the importance of conserving water and achieving water savings in both normal and drought years.

During non-drought years, the drought campaign component will simply provide a general overview on drought and the importance of drought preparedness. During a drought, the drought messages will increase in frequency and intensity and will be expanded to include information on the staged drought response program and the necessity to conserve supplies.

While this strategy includes examples of messages and tactics for the Grand County DPP Committee to adopt (such as water bill inserts, press releases, informational brochures, community presentations, example verbiage for communications regarding drought stages, social media posts, and more), these toolkits will need to be amended to reflect each water shortage. As the fields of media, communication, and education are ever-changing, the current best practices for message development and delivery will be utilized and may result in different messages that are contained in this appendix.

## Communication and Marketing

### Objectives

The objectives of the Grand County Public Information and Drought Awareness Communications Strategy are:

- Inform the Grand County community about changes in the drought status in a timely manner;
- Educate the Grand County community about their role and responsibilities during the current drought status;

- Coordinate public information campaign efforts with all DPP Stakeholder Groups;
- Increase knowledge about water demand and supply throughout the community;
- Provide resources to track updates, other drought status rules, and additional drought information;
- Promote water-saving behaviors during a drought; and encourage water-efficient behaviors during non-drought periods.

## Key Messages

Below are key messages, both primary and secondary, to help the community understand our water supply situation and the potential subsequent restrictions.

1. Education is key. Citizens can help reduce water use by educating family, neighbors and co-workers. Education is a critical first step of enforcing restrictions.
2. We can all make a difference. Everyone in our community can help conserve water at home and at work. The Grand County website will provide links to relevant programs and resources to assist our County.
3. Water Providers and Districts may go to higher levels of restrictions. Stay updated on the current status. Higher levels of restrictions include rate increases to further promote conservation and recognize the reduction in revenue due to less water use.
4. It all begins in Grand County. The Colorado River is the lifeblood of the West, and it all begins in Grand County. We demand a lot from our river - from recreation, wildlife and agriculture, to our drinking water, scenery and diversions to the Front Range. As the headwaters of the Colorado River, it is incumbent to be leaders in the conversation in being stewards to our river.
5. Drought is a naturally occurring consequence in semi-arid climates like Colorado. Droughts happen when there is not enough water in our streams and reservoirs due to low precipitation, snowpack and climate factors. Reduced water supplies cause lower storage levels, so there is less water for local residents, businesses, agriculture, and recreation. Our response strategy identifies ways to extend water supplies through a drought and is consistent with similar plans of surrounding cities and counties. To ensure we all have enough water for our most essential uses, sometimes customer restrictions are necessary, depending on which of the four stages of drought we are in.
6. Share water supply and demand information throughout the community in a single, unified source. A single, unified source of information on drought status, restrictions, and current water demand and supply provides consistent messaging to all members of the community and helps reduce confusion arising from multiple, conflicting sources. This single information source would likely live on the County's webpage, and/or a separate drought preparedness page, and on social media accounts.

## Strategies and Tactics for Messaging

A drought is not a localized event; it generally affects entire regions. When drought conditions seem possible, the message to our community can be reinforced and amplified by consistent messaging through coordination of the DPP Stakeholder network. Consistent messaging helps create a regional awareness while allowing for different responses, by provider, based on each provider's water situation.

Coordination of the provider's drought response and planning will help all measures be more effective. For instance, while individual providers must each respond based on their needs, using the same restriction base schedule recognizes that we all share a common media market. Providers will implement at different levels but at least the base schedule is consistent.

Coordination can also occur on a menu of offerings that have a record of proven savings. There is no benefit of each provider learning the same lesson individually. Care must be taken to explain the benefits of coordination to utility departments, boards, and councils. There is a benefit to all knowing the level of need across providers. When known, extra effort can be made to time announcements and implement drought response measures so that the greatest overall result is obtained.

Below are possible strategies for reaching our communication goals. These include outreach materials, advertising and media contacts. Spanish translation should be considered for strategies and tactics. This list is not comprehensive.

### **Print Collateral**

- Water restrictions brochure to explain the DPP
- Poster campaign
- Tabletop cards for "Water Served Only Upon Request" for restaurants
- Hotel/lodging cards with current DPP logo, restrictions, and encouragement to reuse linens and towels
- Utility Bill Inserts (for respective Water and Sanitation Districts and Special Districts)
- Printed coasters with water conservation messages
- Direct mail campaigns to all customers (for respective districts/towns) or targeted group mail using PO Boxes
- Door hangers to be used on multi-family projects and to be distributed door to door on each resident's door. There are higher likelihoods that these units are not used by County residents and are here on a temporary basis.

### **Internal Communication Platforms**

- Grand County's Tributary Newsletter
- BOCC Newsletter
- DPP Stakeholder Group Internal Newsletters/Intranets

### **Website**

- Create and update a webpage on [www.co.grand.co.us](http://www.co.grand.co.us)
- Spotlight on Utilities (Water and Sanitation Districts, Special Districts, etc.) website pages and respective Town and County home pages
- Update conservation tips for each stage of drought: watering, landscape/tree care, lawn dormancy, etc.

### **County News Articles/Broadcasting Networks**

- SkyHi News
- Winter Park Times

- Grand Gazette
- Grand County Television TV18

### **County Radio Networks**

- KFFR 88.3 FM
- KRKY 930AM and 101.9FM

### **Media Articles**

- News/Press releases
- Media outreach
- Advertorials

### **Other Source Advertising**

- NWCOG Newsletters
- Guest Guide Newsletters (Visit Grand County, Play Winter Park, etc.)
- Alterra Mountain Company/Winter Park
- Short Term Rental Guidance and Promotion
- Work in Grand Promotions

### **Outdoor Advertising**

- The Lift benches
- Bus shelters
- Bus panels
- Town and County parks, recreation, and other public facilities
- Signs with DPP logo placed at Berthoud Pass and other locations around town (Fire Stations, Rabbit Ears, Willow Creek, HWY 9).

### **Digital Marketing**

- Email blasts to all accounts within the DPP Stakeholder Group
- Digital ads
- Social media (Facebook, Twitter, Instagram, Nextdoor) organic advertising
- Grand County Online Garage Sale
- Interactive Voice Response (IVR) Messages on phone system
- Provide direct text messages and alerts through the Code Red System used by the County LEPC.
- Sign up to receive water efficiency tips and updates and corresponding email campaigns
- Messages in bills, usage reports and portals
- Presentation materials

### **Displays**

- Have at events and public locations, such as Town and County buildings, libraries and other venues. Messages should include information about restrictions and efficient water use.

## Other

- Graph(s) that illustrate water supplies relative to water demands to be updated regularly prior to and during a water shortage (consider using during non-water shortage times as well, to develop customer awareness)
- Door panel magnets for Utility, County, and Town vehicles with conservation message
- Distribute water conservation kits - hose nozzles, showerheads and aerators
- Internal communication plan for DPP Committee Members

## Water Restrictions Icon

- Design a graphic icon for newspapers and other media for customer awareness of restriction action levels. The icon can be updated to show different restriction levels.

## Frequently Asked Questions

- Frequently Asked Questions (FAQs) should be developed to help clarify and consistently answer questions about the restrictions. General FAQs should be on the Website.

# Recommended Messages for Drought Stages

## Routine:

It is important, regardless of Drought Stage, to encourage individuals to review the County's Drought Preparedness Plan, and interface with the DPP Committee. The Education and Public Outreach Committee shall generate public messages that promote the conservation of water that are easy to understand and are concise. Messages can stand alone regardless of stage, or the group can develop various messages that change depending on the stage of drought or reflect the current water shortage. Messages should be developed immediately to reflect this using chosen strategies and tactics chosen by the DPP Committee.

### General Public Outreach Message Example One (Regardless of Stage):

*"We understand water use is individual, and limiting your use can be a short-term inconvenience, but the long-term outcome is dependent on your conservation."*

*"Thank you for valuing your water as much as we do."*

*"For complete details, tips, and to learn more about what your specific restrictions will be for residential, businesses, events, public parks, public spaces, and other types of usage, get the complete Grand County Drought Preparedness Plan at [co.grand.co.us](http://co.grand.co.us)."*

### General Public Outreach Message Example Two (Regardless of Stage):

*"It all begins in Grand County. The Colorado River is the lifeblood of the West, and it all begins in Grand County. We demand a lot from our river - from recreation, wildlife and agriculture, to our drinking water, scenery and diversions to the Front Range. As the headwaters of the Colorado River, it is incumbent to be leaders in the conversation in being stewards to our river."*

## Drought Watch:

- The US Drought Monitor Index has Grand County in abnormally dry drought (D0) conditions.
- Snow-water equivalent is greater than 90% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is greater than 90% of average.
- QuickDRI is white - near average conditions.
- Neighboring West Slope counties or Front Range entities using water diverted from Grand County rivers are already in drought watch response.
- Grand County residents believe that a Drought Watch and its corresponding actions are appropriate.

### Recommended Messaging Response:

- Increase communication and outreach to residents and stakeholders to explain that Grand County is beginning to see indicators of drought.
- Encourage residents to continue to use water efficiently and provide suggestions for further reducing water use in order to reduce the risk of progression to mandatory restrictions. During this stage, warn residents about the following:
  - Possibility of mandatory water restrictions.
  - Voluntary watering of turf to two days per week from 6 p.m. to 10 a.m.
  - Use handheld watering or drip irrigation on municipal streetscapes and on private flower and vegetable gardens and throughout community gardens.
  - Use only what you need.
  - Discourage frequent filling of pools, hot tubs and other water features.
  - Wash cars with a bucket or using a handheld hose with a nozzle that shuts off when not in use. If possible, try to have water run-off go into landscape features.
  - Encourage restaurants to only serve water by request regardless of drought stage.
  - Warn of and prepare for the possibility of watering restrictions.
  - Enhance water use education.

## Stage 1 - Warning:

- The US Drought Monitor Index has Grand County in moderate drought (D1) conditions.
- Snow-water equivalent is between 70% - 89% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is between 70% - 89% of average.
- QuickDRI is yellow - intensifying drought conditions.
- State water officials are engaged in drought response activities.
- Circumstances warrant possible adverse impacts on water-dependent businesses.
- Other West Slope counties or Front Range entities that divert water from Grand County are already in a stage 1 response.
- Grand county residents believe that mandatory watering restrictions are appropriate.

### Recommended Messaging Response:

Generally, the Education and Public Outreach Committee shall amplify their communications by 25 percent once we reach Drought Stage One. Most importantly, officials should recommend to not waste water and stay alert to drought status changes. Subsequently, DPP Stakeholders

should start implementing recommended restrictions and communicate restrictions to their constituents.

- Do not waste water and stay alert to drought status changes.
- Do not water lawn grass more than two days per week from 6 p.m. to 10 a.m.
- Communicate more regularly with agricultural water users, golf courses, sports fields, and parks about drought conditions. Assist sport fields and parks with achieving 10% reduction in water use.
- Creation of new landscaping is not recommended.
- Encourage handheld watering and drip irrigation of landscapes, streetscapes, flowers and vegetables no more than two days per week between the hours of 6 p.m. to 10 a.m.
- Discourage frequent filling of pools, hot tubs and other water features.
- Wash cars with a bucket or using a handheld hose with a nozzle that shuts off when not in use. If possible, try to have water run-off go into landscape features.
- Reduce water for street-sweeping.

## Stage 2 - Severe:

- The US Drought Monitor Index has Grand County in severe drought (D2) conditions.
- Snow-water equivalent is between 50% - 69% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is between 50% - 69% of average.
- QuickDRI is orange - even further intensification of drought conditions.
- State water officials have declared a drought emergency.
- Other West Slope counties or Front Range municipalities diverting water from Grand County have already declared a Stage 2 drought.
- Grand County residents believe that severe water-use restrictions are appropriate.

### Recommended Messaging Response:

Generally, the Education and Public Outreach Committee shall amplify their communications by 50 percent once we reach Drought Stage Two. Most importantly, officials should describe water-use restrictions as appropriate and necessary. Subsequently, DPP Stakeholders should start implementing recommended restrictions and communicate restrictions to their constituents.

- Water-use restrictions are appropriate and necessary.
- Municipal water providers choose to use drought pricing as a tool to reduce water use.
- Communicate frequently with agricultural water users, golf courses, sports fields, and parks about drought conditions.
- Assist sport fields and parks with achieving 20% reduction in water use. Ask for reductions from golf courses and agricultural water users.
- Discourage new landscaping from June through August.
- Encourage handheld watering and drip irrigation of landscapes, streetscapes, flowers and vegetables no more than one day per week between the hours of 6 p.m. to 10 a.m.
- Single Family Dwelling pools, hot tubs and other water features should not be refilled. Public pool and hot tub operations will be permitted.
- Use only commercial car washes.
- Reduce water for street-sweeping.

- Wash fleet vehicles once per month.
- Change linens and towels only by request at short term rentals, hotels, and lodging.
- Do not water lawn grass more than one day per week from 6 p.m. to 10 a.m.
- Hydrant flushing is allowed only in the cases of public safety and health.

### Stage 3 - Exceptional:

- The US Drought Monitor Index has Grand County in an extreme (D3) drought or exceptional (D4) drought conditions.
- Snow-water equivalent is less than 50% of median on April 30<sup>th</sup> and precipitation accumulation for the water year is less than 50% of average.
- QuickDRI is red - indicating exceptionally dry and intense conditions.
- News media are sending messages that we are in exceptionally dry conditions.
- Grand County Residents believe that we are in exceptionally dry conditions.
- Elected officials are calling for water rationing.
- The situation suggests that severe impacts to water-dependent businesses are unavoidable
- Other West Slope counties and Front Range entities diverting water from Grand County are already in Stage 3 restrictions.

#### Recommended Messaging Response:

Generally, the Education and Public Outreach Committee should be at maximum communication capacity at Drought Stage Three. Most importantly, officials should already be calling for water rationing. Subsequently, DPP Stakeholders should start implementing recommended rationing restrictions and marketing tactics to their constituents.

- Water-use restrictions are appropriate and necessary.
- Municipal water providers are recommended to use drought pricing as a tool to reduce water use.
- No lawn watering.
- Communicate frequently with agricultural water users, golf courses, sports fields, and parks about drought conditions.
- Assist sport fields and parks with achieving 30% reduction in water use. Ask for reductions from golf courses and agricultural water users.
- New landscaping is not allowed.
- Handheld watering and drip irrigation of landscapes, streetscapes, shall be done no more than one day per month.
- Flowers and vegetable gardens are not allowed to be watered.
- No filling pools, hot tubs and other water features.
- Use only commercial car washes.
- Reduce water for street-sweeping.
- Fleet vehicle washing is not allowed.
- Change linens and towels only by request at short term rentals, hotels, and lodging.
- Hydrant flushing is allowed only in the cases of public safety and health.

## Public Outreach and Engagement

A well-planned public engagement program is critical to success in achieving water savings goals established by each action level. Public engagement is an extremely important step, as it asks the community to be a part of the solution during a water shortage and can minimize enforcement efforts. A wide range of engagement strategies should be pursued to inform internal and external stakeholders, and all customer types.

## Internal and External Organization Engagement

### Internal DPP Committee Communication and Engagement

Speakers Bureau: As soon as a drought is a possibility, a speaker's bureau should be established (likely reflecting members of the DPP Committee). Its members should be trained on talking points. The Speakers Bureau is then available to make presentations to the public for drought education purposes.

Internal DPP Committee Engagement: The DPP Committee has many roles in the case of a drought. The manner in which DPP representatives respond to drought sets an example for the community. All members must be kept informed so that appropriate decisions on drought response can be made. Engaging this group and having meetings internally will likely increase depending on the severity of a drought stage.

### External Organization Engagement

Presentations: Creating a slide deck of talking points with messages to fit each individual DPP Committee member's audience is key. Slides can be taken out or put in depending on the audience. Once the slide deck has been created, and a speaker's bureau has been identified, the Education and Outreach Committee will accommodate requests for presentations and will proactively offer presentations to known groups and organizations in partnership with the speaker's bureau.

Examples of organizations and existing groups that might receive a presentation are (in alphabetical order):

Certified Landscape Professionals, Colorado Headwaters Land Trust, Ducks Unlimited, East Grand and West Grand School Districts, Granby Chamber of Commerce, Grand Beginnings, Grand County Board of Realtors, Grand County Christian Academy, Grand County Historical Society, Grand County Library Foundation, Grand County Road and Bridge, Grand County Rural Health Network, Grand County Search and Rescue, Grand County Wilderness Group, Grand County Wildfire Council, Grand Lake and Fraser Valley Recreation Districts, Grand Lake Area Historical Society, Grand Lake Chamber of Commerce, Habitat for Humanity - Grand County, Headwaters Trails Alliance, Kremmling Area Chamber of Commerce, Lions Clubs, Local Trout Unlimited Chapter (Colorado Headwaters Chapter), Middle Park Conservation District, Middle Park Fair and Rodeo, Middle Park Medical Foundation, Middle Park Stockgrowers Association, Mountain Parks Electric, Mountain Family Center, Mule Deer Foundation, Open Lands Rivers and Trails Advisory Committee, Project Sanctuary, Rocky Mountain Elk Foundation, Rotary Clubs,

The Grand Foundation, Winter Park Chamber of Commerce, 4-H Programs, affordable housing providers, student organizations in existing school districts, faith based organizations, etc.

**Education and Training:** Education and training presentations are a good way to build awareness of drought conditions and describe recommended actions. Topics can include current conditions, the restrictions themselves, programming irrigation controllers, tree watering, repairing irrigation deficiencies, indoor leak detection and fixing leaks, availability of water saving appliances and fixtures as well as their installation. Locations for presentations can include the community rooms at public libraries, town and county building community rooms, Recreation Centers or throughout the County, schools, or Water Districts. Generally, any location that can facilitate training or presentations can be used for these efforts. Audiences can be the general public, businesses, students, elected officials, employees of organizations promoting water conservation messaging, or whoever else requests training. The first priority should always be employees of organizations promoting DPP messages so that they can direct immediate questions to representatives of the Speaker’s Bureau.

As the drought begins to ebb, training on landscape revival, including xeriscape and alternative turfs may be appropriate. Sources for the training may be internal staff, master gardeners, and local gardening centers. Resource Central (<https://resourcecentral.org/>) should be utilized as a training resource.

**Open Houses:** Providing opportunities for both internal and external organizations to learn more about the Drought Preparedness Plan, and to learn more about different drought stages we are in is an important consideration. These open houses can combine presentation formats, and education and training programs that have been developed.

**Digital Public Engagement:** If due to unforeseen circumstances, in-person public meetings, presentations, open houses, and education training are not suitable, offering these types of programs in a virtual format is important. This can be done via webinars, virtual meetings, and interactive online education tools.

Other Public Engagement Opportunities	
Internal	External
Develop a list of Frequently Asked Questions (FAQ) - provide on the website and to DPP Committee.	Public and National Events such as Earth Day, Watershed Tours, etc.
Give the same presentations used to the external community, to the internal DPP committee’s respective organizations.	Generate partnerships with existing groups and their respective public engagement programs such as GCWIN, Headwaters Land Trust, Trout Unlimited, etc.
Have internal presentation training meetings.	Create Water Conservation Challenges
Presentations at existing DPP meetings.	Developing a Business/Household water smart certification program that allows them to track their water use and consumption.
Provide communication materials to the entire DPP committee.	Booths at local events (craft fairs, Buffalo BBQ, Kremmling Days, Hot Sulphur Springs Days, Fairs, Rodeos, etc.)

## Business Outreach

It is likely that the business community of Grand County would be heavily impacted during a water shortage. While these businesses may be limited in what they can restrict, they should be considered a partner to provide consistent messages to the general public. Information and presentations should be provided for facilities staff and disseminated throughout their businesses. The following list of businesses should be considered for targeted engagement:

- Breweries and Distilleries
- Retail, grocery stores, and coffee shops:
  - Store visits/meetings
  - In-store flyers and posters
- Economic Development and Chamber of Commerce meetings throughout the County
- Car Washes
- Direct mail
- Power Washing Companies
- Contact Chambers of Commerce's about sidewalk washing (meeting or mailing)
- Landscapers, Nurseries, and Garden Centers
- Popular Recreational Locations and their respective businesses
- Alterra (Winter Park Resort)
- Granby Ranch
- Devil's Thumb
- YMCA of the Rockies
- Bluebird Backcountry
- Rocky Mountain National Park
- Whitewater Rafting Groups
- Fishing Tour/Tackle Shop Businesses:
  - In-store/location flyers and posters
  - Group meetings and workshops
- Certified Landscape Professionals bi-annual meeting or email:
  - Group meeting
  - Direct mailing
- Homeowner Associations (HOA)
  - Set up meeting/workshop
  - Information with HOA audits/Landscape Water Budgets
  - Direct mailing/water fountain information
  - Information at Neighborhood Service's HOA meetings
  - Property management companies - send information/fountain information
- Health Clubs and Fitness Centers
  - Meeting
  - Signage for showers, faucets
- Hotels/Motels/Short Term Rentals
  - Distribute linen and towel reuse cards
- Restaurants
  - Meeting/workshop
  - Information with pre-rinse program

## Tracking Public Outreach and Engagement

Goals for public engagement should be established and progress toward completion should be monitored and tracked. This allows activities and efforts to be reported on during a water shortage, supports successful water savings and allows the DPP Committee to evaluate whether gaps exist in engagement efforts or sectors. The following are metrics that can be used to track progress toward the goal(s):

- Number of presentations.
- Number of people present during presentations.
- Diversity of audience
- Number of ambassadors trained, including tracking ambassador efforts and considering recognizing coworkers' contributions.
- Evaluation of effectiveness with a survey or live polling during a presentation to possibly assess familiarity with the water shortage and understanding of associated restrictions.

## Budgeting for Public Outreach, Engagement, and Marketing

A communication plan (separate from this document) should be adopted annually, sometime during the months of April or May, that attacks the different and unique water shortages at the time using respective budgets at the time of adoption. It is suggested that an entity associated with the Drought Preparedness Plan apply for funding for these efforts through the Colorado Water Conservation Board, or other reputable organization within the Grand County community, or at the state-level for this type of funding annually.

## Updates to The Public Information and Communications Strategy

As the fields of media, communication, and education are ever-changing, the current best practices for message development and delivery will be utilized and may result in different messages, strategies, and tactics. Specific outreach strategies may be developed and included in this strategy at any time with the approval of the DPP Committee.

# Appendix B: U.S. Drought Monitor Brochure

# A USDM Q&A

-  D0: Abnormally dry
-  D1: Moderate
-  D2: Severe drought
-  D3: Extreme drought
-  D4: Exceptional

The U.S. Drought Monitor (USDM) is a map released every Thursday, showing parts of the U.S. that are in drought. The map uses five classifications: abnormally dry (D0), showing areas that may be going into or are coming out of drought, and four levels

of drought: moderate (D1), severe (D2), extreme (D3) and exceptional (D4).

## What agencies or organizations are responsible for the USDM?



The Drought Monitor has been a team effort since its implementation in 1999, produced jointly by the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, the National Oceanic and Atmospheric Administration (NOAA),

and the U.S. Department of Agriculture (USDA). The NDMC hosts the web home of the USDM and the associated data, and provides the map and data to NOAA, USDA and other agencies. It is freely available to the public, media and anyone else, via the web at <http://droughtmonitor.unl.edu/>.

## Who uses it, and what do they do with it?

The USDA uses the USDM to trigger disaster declarations and eligibility for low-interest loans. The Farm Service Agency uses it to help determine eligibility for their Livestock Forage Program (LFP), and the Internal Revenue Service uses it for tax deferral on forced livestock sales due to drought. State, local, tribal and basin-level decision makers use it to trigger drought responses, ideally along with other more local indicators of drought.

## Get involved!

Want to contribute your observations to the USDM process? Here are some ways:

- 1) Talk to your state climatologist. You can find his or her name at the American Association of State Climatologists ([www.stateclimate.org](http://www.stateclimate.org)).
- 2) Email [droughtmonitor@unl.edu](mailto:droughtmonitor@unl.edu).
- 3) Use the contact form on [drought.gov](http://drought.gov/drought/contact) (<http://drought.gov/drought/contact>).
- 4) Become a CoCoRaHS observer ([www.cocorahs.org](http://www.cocorahs.org)) and submit drought reports along with daily precipitation observations.
- 5) Submit reports, rain or shine, to the Drought Impact Reporter (DIR, at <http://droughtreporter.unl.edu>) at regular intervals – annually, seasonally, or monthly, as feasible. Reports submitted directly to the DIR can include photos, and we recommend a systematic technique such as using photo points to document range condition. For how-to information, please see [Tracking Drought Impacts on Rangeland](http://drought.unl.edu/ranchplan/Overview/TrackingDroughtImpacts.aspx) (<http://drought.unl.edu/ranchplan/Overview/TrackingDroughtImpacts.aspx>) or information on submitting condition reports, found on the DIR site.

**Email:** [DroughtMonitor@unl.edu](mailto:DroughtMonitor@unl.edu)

**Call:** 402-472-6707

**National Drought Mitigation Center**  
P.O. Box 830988, Lincoln, NE 68583-0988

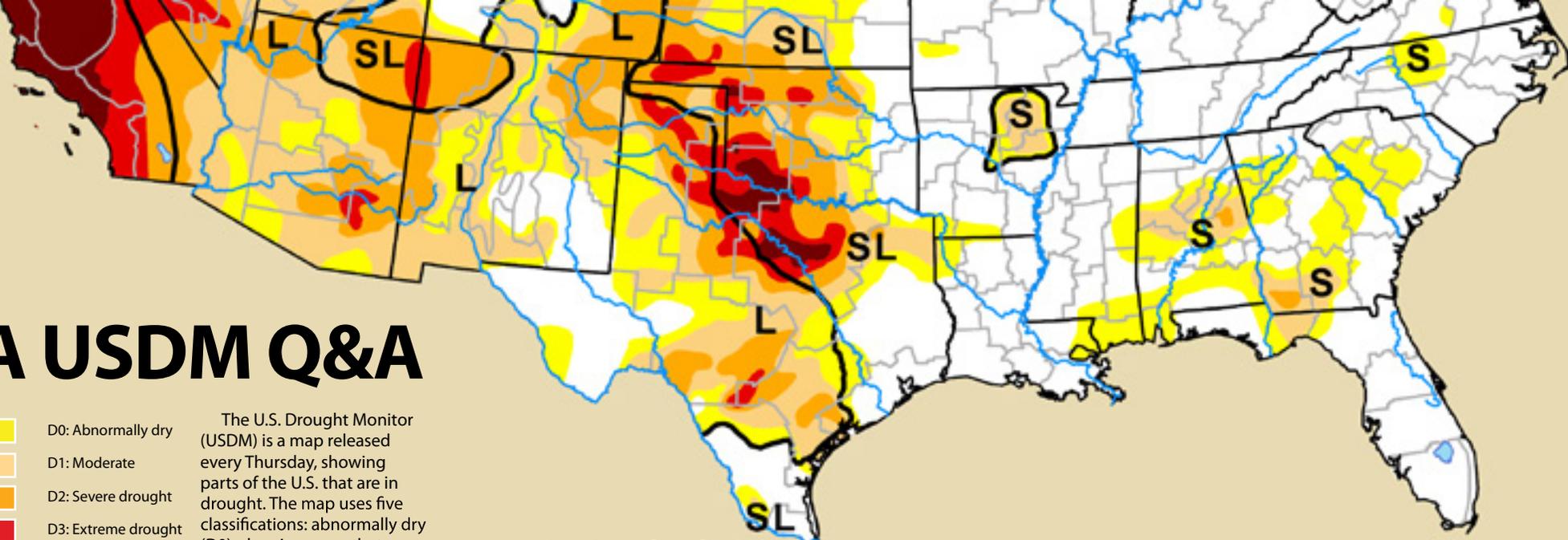


[HTTP://DROUGHTMONITOR.UNL.EDU/](http://droughtmonitor.unl.edu/)

# What is the U.S. Drought Monitor?

Maybe you've seen it in the media: that map of the U.S. painted with blobs of yellow, orange and red. It shows drought -- but how do we know which colors go where? Who decides? What does it mean for you?

[HTTP://DROUGHTMONITOR.UNL.EDU/](http://droughtmonitor.unl.edu/)



## How does drought affect the country?

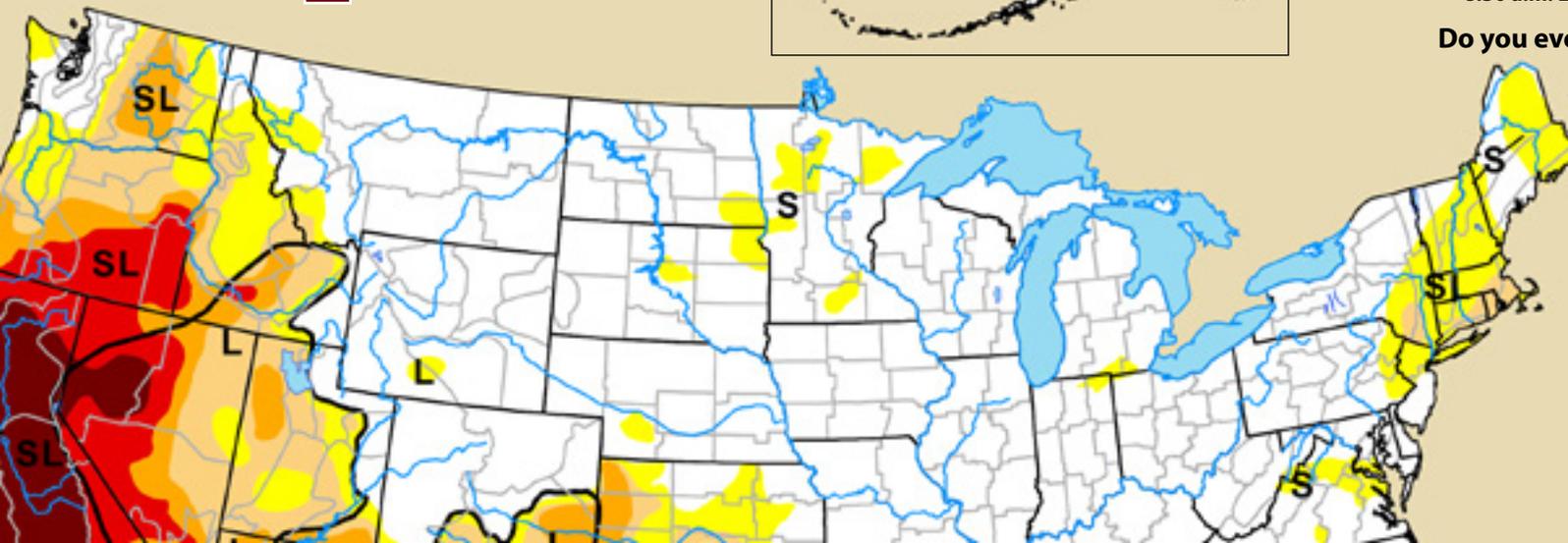
Drought is a normal part of the climate cycle. It is a slow-moving hazard, which causes people to underestimate the damage it can do, but losses from drought are as substantial as those from hurricanes, tornados and other faster-moving disasters. Drought causes losses to agriculture; affects domestic water supply, energy production, public health, and wildlife; and contributes to wildfire, to name a few of its effects.

No single federal agency is in charge of water or drought policy; response and mitigation fall to an assortment of federal authorities. The USDA leads response efforts; NOAA, through the National Integrated Drought Information System (NIDIS, online at [drought.gov](http://drought.gov)), leads monitoring; agencies such as the U.S. Geological Survey and NASA contribute data; and the Environmental Protection Agency regulates water quality. The National Drought Resilience Partnership, launched in the aftermath of widespread drought in 2012, is an effort to unify federal drought response and policy. Drought response efforts, planning, and water law vary from state to state.

## How do we know when we're in a drought?

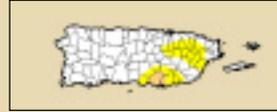
Recognizing drought before it intensifies can reduce impacts and save money. How you recognize it depends on how it affects you. Traditional ways to measure drought are by comparing observed precipitation with what's normal (climatologic), by comparing soil moisture and crop conditions with what's normal (agricultural), or by looking at how much water is contained in snow, the level or flow rate of moving water, water in reservoirs, or groundwater levels (hydrologic). NDMC recommends that decision makers adopt an operational definition of drought for their own circumstances, incorporating local data such as grazing conditions or streamflow at a nearby gauge.

	D0: Abnormally dry		D2: Severe drought
	D1: Moderate		D3: Extreme drought
			D4: Exceptional



## Who draws the map?

Eleven authors, from the NDMC, NOAA and USDA, create the map. They take turns, usually two weeks at a time.



## How do they figure out where drought is and how bad it is?

This is what makes the U.S. Drought Monitor

unique. It is not a model. The USDM relies on experts to synthesize the best available data from multiple sources and work with local observers to localize the information as much as possible. Numeric inputs are many: the Palmer Drought Severity Index, the Standardized Precipitation Index, and other climatological inputs; the Keech-Byram Drought Index for fire, satellite-based assessments of vegetation health, and various indicators of soil moisture from data assimilation systems and other models; and hydrologic data, particularly in the West, such as the Surface Water Supply Index and snowpack.

The agencies listed are a snapshot of all of those involved. [Drought.gov](http://Drought.gov) has links to many of these sources, where you can view the types of information that help the author create the map.



The USDM also reflects impacts, particularly information generated through a network of more than 350 observers across the country, including state climatologists, National Weather Service staff, Extension agents, and hydrologists. Local experts provide vital reporting of impacts, which help create the most accurate classifications on the map, particularly in areas with less monitoring capacity, such as Hawaii, Alaska and Puerto Rico.

Bear in mind that recognizing emerging drought, or knowing whether drought is over, entails understanding what is normal for a given location or season, and considering longer time frames. If an area has been in drought for a while, it typically takes more than one or two rains to end it, although one rain may be all that is needed to awaken dormant vegetation or spur crop growth.

## What is the process?

**Thursday, Friday and over the weekend:** Warmup. The author of the next week's map starts coming up to speed on the indicators, areas that are changing and any issues of concern that have carried over from the prior week(s).

**Close of business Monday:** The author emails a first draft of the map to the 350 observers across the country.

**8 a.m. Eastern time Tuesday:** Data cutoff. Condition changes after this point in time do not affect the map to be released two days later on Thursday.

**Tuesday:** The author fields reactions from dozens of email messages, several conference calls and other helpful contacts. Draft 2 of the map incorporates much of this information.

**Wednesday:** Author sends out a near-final draft of the map to the observers by lunchtime for review. A final map goes out by late afternoon to ensure there are no errors. Then the author writes a narrative for each region, highlighting the past week's weather, impacts and changes to the map. Before the author can go home, final files must be at the NDMC for processing.

**8:30 a.m. Eastern time Thursday:** The map is released.

## Do you ever release the map early?

The map is released early the week of Thanksgiving and other weeks when federal holidays affect the production schedule. Otherwise the authors stick to the schedule.

**These maps show the U.S. Drought Monitor published Thursday, Oct. 23, 2014, using data from Oct. 14-21. The black lines define areas of short- and long-term drought, indicated by the letters "S" and "L." In general, short-term drought is a recent development, within the past six months, and long-term drought has gone on longer than six months. The weekly update includes Hawaii, Alaska and Puerto Rico.**

## Appendix C: Watering a Home Landscape During Drought<sup>8</sup>

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<sup>8</sup> <https://drought.extension.colostate.edu/drought-resources/drought-topics/yard-garden-drought-resources/>

# Watering a Home Landscape During Drought

Fact Sheet No. 7.240

Gardening Series | Basics

by J.Klett and D. Buelow\*

Colorado's semiarid climate, which is prone to periods of drought, requires that homeowners and land managers care for their landscapes in a responsible water-wise manner. A drought, described as a prolonged period of time of below-average precipitation for a given area, is a serious health threat to new and existing landscapes and plants. Water is a scarce and limited resource in Colorado, and landscapes are expensive and time consuming to replace; therefore, it is critical to prepare for and practice water saving measures to maintain new and existing landscapes during drought.

Healthy landscapes featuring trees, shrubs, flowers, gardens and lawns improve the quality of life and the environment.

Landscaping:

- Increases the value of our homes and businesses aesthetically and monetarily.
- Improves air and water quality.
- Reduces home heating and cooling costs.
- Decreases carbon dioxide greenhouse gases.
- Provides noise abatement screening.
- Supplies wildlife with food and shelter.

Due to Colorado's high intensity sunlight, low humidity, temperature extremes, windy conditions, and challenging soil characteristics, growing and maintaining a healthy landscape in Colorado can be difficult even when drought conditions are not present. A common watering misconception, given Colorado's growing environment and recurring periods of drought, is to over water the landscape and not to conserve water. To create a natural, attractive, and water efficient landscape focused on maximizing water conservation and minimizing water waste,

practice the seven key Xeriscape® principles (see CSU Extension fact sheet [7.228: Xeriscaping: Creative Landscaping](#)).

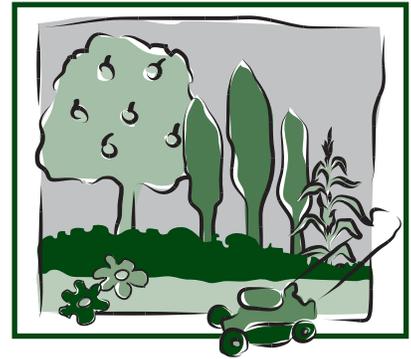
## Water Wisely and Efficiently

During periods of drought practice water conservation guidelines:

- Always check with your local water provider for the latest drought information and water use rules and regulations.
- Hand watering of trees, shrubs, perennials, annuals and vegetable gardens may occur on any day.
- Water between 6 p.m. and 10 a.m.
- Irrigate plant materials only, not hardscapes.
- Do not irrigate during rainfall or high wind.
- Apply irrigation at lower rates to avoid excess water runoff and waste.
- Drought tolerant plants are not drought tolerant until their roots are established in the soil.

Recognize the water requirements of the plants in your landscape and use only the water that they need. To achieve maximum water efficiency, it is beneficial to understand your soil's texture and moisture content, the current season, and your irrigation system's precipitation output.

Prior to each irrigation check how much moisture is present in the soil. It is important to assess the moisture in the soil because clay soils, which are common to Colorado, hold moisture for long periods of time after they become water saturated. Although the surface of a clay soil may appear dry and brittle, beneath the surface the soil may be water logged and deficient of oxygen needed for plant root growth. Irrigating a soil that is water logged will result in excess water runoff, water pools, and water puddles. To minimize water waste during the irrigation of a clay soil, cycle irrigation run times for 5 minutes on then 5 minutes off to allow



## Quick Facts

- Follow all water rules and regulations of your local water provider.
- Use only the water that is needed.
- Water between 6 p.m. and 10 a.m.
- Design landscapes with water-wise plants.
- Utilize mulch to reduce soil surface water evaporation.
- New planted trees require priority water needs.
- Do not water hardscapes.
- Do not water on windy or rainy days.

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[www.ext.colostate.edu](http://www.ext.colostate.edu)



\*J. Klett, Colorado State University Extension landscape horticulturist and professor, department of horticulture and landscape architecture; D. Buelow, undergraduate, environmental horticulture major. 04/2013.

for absorption of water deep into the soil. Water drains quickly from sandy soils and may result in the need for sandy soils to receive more frequent irrigations.

One technique to assess soil moisture is to use a 6-inch screwdriver to probe the soil. If the screwdriver inserts into the soil easily, water is often not required. Be aware that sandy soils generally do not exhibit high resistance to penetration and may need water even if screwdriver insertion is effortless. Another method to measure the soil's moisture level is to use a standard indoor/outdoor moisture meter. Keep in mind, however, that soils high in organic matter will typically result in a higher moisture reading even though not all of the moisture may be available to the plant.

Analyze your irrigation system output to determine how much water your landscape receives during each irrigation cycle and appropriately set your irrigation clock. To measure the water output of each cycle, place shallow, stable containers in various spots throughout the irrigated area. Next, run the sprinklers for a known set amount of time. Afterwards measure the depth of water in each container to calculate the precipitation rate. Use this calculation to determine how long you need to water to achieve the proper irrigation amount (see CSU Extension fact sheet no. [7.239: Operating and Maintaining a Home Irrigation System](#)).

## Prioritizing Watering Needs

Top water priority is required for young or newly transplanted trees (1 to 4 inch diameter) that have a limited root system. Supplemental irrigation is needed for these trees even when drought conditions do not exist. Establishment of newly transplanted trees in Colorado's climate requires a minimum of one year per inch of trunk diameter. Trees grown in environments where their root zone is restricted or compromised, such as those in sidewalk planters, near streets, and near construction sites require additional observation and care.

## Trees

Trees take a lot of money, resources, and years to replace; therefore, trees should receive the greatest water considerations during drought. A tree's water absorbing roots are primarily located in the top

12 inches of the soil. Apply water at an appropriate rate that allows water to soak slowly into the soil to a depth of 12 inches. Water is best applied by hand with a deep-root fork or needle, soaker hose, or soft spray wand. For use of a deep-root watering fork insert the needle into the soil to a depth of 8 inches or less and apply water at numerous sites throughout the critical root zone. This zone is found located within the dripline of the tree.

During drought, trees grown in sites without lawn irrigation need 10 gallons of water each week per inch of trunk diameter measured. The trunk diameter measurement should be taken at 6 inches above the soil for a 1 to 4 inch diameter tree and at 12 inches above the soil for a tree with a diameter greater than 4 inches. A 2-inch diameter tree, therefore, requires 20 gallons of water per week.

During the spring and summer months from May through September, water established trees weekly to two times per month depending on water restrictions, tree size and growth phase, weather, temperature, and soil conditions.

During the fall and winter months from October through April, water established trees one to two times per month and only when the air temperature is above 40 degrees F and the soil is not frozen. Apply water midday to allow water to soak into the soil before freezing at night. Check with your local water provider for days of the week when you are allowed to irrigate (see CSU Extension fact sheet no. [7.211: Fall and Winter Watering](#)).

Do not fertilize trees that are not root established in the soil or that are drought stressed. Fertilizer salts exacerbate stress when soil moisture is not available and may result in burned roots. Nutrients require a considerable amount of energy from the tree to capture and will result in further stress to the tree.

To conserve soil moisture and reduce water evaporation from the soil surface, apply mulch to a depth of 3 to 4 inches and up to 2 to 4 feet from the base of the trunk or to the dripline of the tree if this distance is shorter. Do not allow mulch to contact the trunk of the tree. Mulch that contacts the trunk directly increases the tree's vulnerability to pests and diseases and may cause rot of the trunk tissues over time by keeping the tissues too wet. Mulch volcanoes and areas where mulch is applied to a depth greater than 4 inches interfere

with the oxygen gas exchange between the soil and atmosphere and reduces the amount of moisture that reaches the roots.

## Flower Gardens

Prepare the soil prior to planting. To maximize water efficiency and plant growth, place 1 to 2 inches of organic matter or compost on the soil surface and till into the soil to a depth of 12 inches. Select and group plants together that have similar water and sunlight requirements. Before irrigation, check soil moisture. Newly planted flowers may need water daily for the first two weeks following the planting date. Irrigate between 6 p.m. and 10 a.m. Water may be applied using a hand-held hose or a low-volume nonspray irrigation device such as drip irrigation.

Spread mulch, 1 to 2 inches deep on the soil surface between and around plants to reduce water evaporation and prevent weeds.

## Vegetable Gardens

Amend the soil with organic matter before planting. Become familiar with specific critical watering periods for each of your vegetable crops. Vegetable quality and yield is directly correlated to the amount of water supplied during the growing season at critical watering periods. Typically water is most critical during the first few weeks of plant development, directly after transplanting and during flowering and fruit production. Vegetables cannot revert to dormancy to avoid drought stress; therefore, it is important not to underwater. Do not over water vegetables since they may rot.

To prevent over watering issues check the soil moisture daily before irrigation with a screwdriver as described earlier. Water by hand or use a drip, trickle, or soaker hose system. Apply irrigation during the coolness of morning before 10 a.m. Mulch garden area with organic matter such as grass clippings to depths of 3 inches or less on the soil surface to reduce water evaporation.

## Fruit Gardens

Water fruit trees as described for trees. Utilize mulch around grapes, strawberries, and raspberries. Remember to avoid direct mulch to stem contact. Apply water

by hand or use drip irrigation system technology to apply water directly to plant roots (see CSU Extension fact sheet no. [4.702: Drip Irrigation for Home Gardens](#)).

## Watering the Lawn

Understand and follow all current water rules and regulations encouraged or mandated by your local water provider. Local restrictions may specify irrigation days, times, and amounts depending on the season and the severity of drought.

When you first turn on your irrigation system in the spring, inspect all system components to verify they are in appropriate working condition. Check the automatic timer or clock and all sprinkler heads, valves, sensors, gauges, filters, mainlines and tubing if applicable. Test the system and monitor for proper sprinkler head overlap, coverage, operation, and precipitation amount (see CSU Extension fact sheet no. [4.722: Irrigation: Inspecting and Correcting Turf Irrigation System Problems](#)).

During the growing season, after each lawn mowing, inspect irrigation heads and system to ensure that all components remain accurately aligned and no damages have occurred during the mowing operations. Keep grass cut shorter directly around irrigation heads to prevent spray blockage. Monitor the irrigation system for any leaks and repair damages within 10 days.

Irrigate the lawn in spring as early as weather permits. Identify the prominent grass species in your lawn to better understand irrigation, mowing, and fertilization requirements. Develop a suitable watering schedule for each zone. Program the irrigation clock to provide the correct amount of water to each zone that minimizes water waste.

For situations that involve a sloped lawn, a soil with compaction issues, or a soil with high clay content, utilize a cycle and soak irrigation approach to avoid excess water runoff and puddles. This method requires an increase in the number of cycles per irrigation but a reduction in the duration of run time per cycle. Instead of programming for one irrigation cycle per day to run for 15 minutes, program for three irrigation cycles to run for 5 minutes each per cycle. An irrigation program of 5 minutes on then 5 minutes off allows for the water to be absorbed by the grass roots and slowly penetrate deep into the soil.

On irrigation days apply a total of  $\frac{3}{4}$  to 1 inch of water. Set control clocks to water between 6 p.m. and 10 a.m. and check that the irrigation system's rain sensor is in accurate working condition. Do not spray on concrete and asphalt or allow water to collect in gutters, streets and alleys. Only water areas in your lawn that are dry. Hand water isolated dry spots where sprinklers do not overlap. Utilize wetting agents designed for turf to temporarily assist with water infiltration into the soil.

## Lawns—January to June Care

Aerate the lawn in spring to reduce the thatch layer and provide grass roots optimal oxygen levels. Apply pre-emergent herbicides in early spring to prevent germination of weedy grass species such as crabgrass and foxtail. Fertilize once or twice between March and June with a balanced or complete fertilizer. Each grass species has a different fertilizer requirement and, therefore, performs best under a specific fertilizer schedule. Do not under or over fertilize the lawn. Over fertilization results in the need for additional lawn irrigation

and mowing, increases thatch buildup and may contaminate groundwater through excessive nutrient leaching (see CSU Extension fact sheet no. [7.202: Lawn Care](#)).

Set mower height at 2  $\frac{1}{2}$  to 3 inches and mow at the same height all season. Make sure not to remove more than  $\frac{3}{4}$  inch of the grass blades during any single mowing. Recycle grass clippings into the lawn when mowing. Grass clippings help nourish the lawn and may reduce the need for nitrogen fertilization by up to  $\frac{1}{3}$ . Clippings do not increase the thatch layer. For summer and fall lawn watering tips follow your water provider rules and regulations.

For more information on lawn watering and care recommendations visit:

- <http://csuturf.colostate.edu>

For more drought information and tips visit the following web sites:

- [www.ext.colostate.edu](http://www.ext.colostate.edu)
- [www.greenco.org](http://www.greenco.org)
- [www.planttalk.org](http://www.planttalk.org)