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1  INTRODUCTION
The Drought Management Plan is designed to maximize available water supplies and reduce water use during times of shortage and provide guidelines the City of Bozeman will use to manage water supply and water use during drought. The guidelines are designed to maintain the health, safety and economic vitality of the community; to avoid adverse impacts to public activity and quality of life for the community; and to consider individual customer needs as much as possible to the greatest extent possible in the face of water shortages.

Because each drought is different, it is not practical to develop a set of hard-and-fast rules to apply to all droughts. Rather, these guidelines are intended to provide a framework for timely drought response while maintaining flexibility to respond to unique drought conditions. These guidelines are intended to assist the Bozeman City Commission (the Commission) in making decisions throughout the course of a drought. The Commission may adjust or refine the response based on actual drought conditions.

Drought is a natural occurring phenomenon that may affect any climate zone in any part of the world at a given time. Depending on drought severity and characteristics of the area, the repercussions of drought can be significant - impacting local economies, disrupting quality of life, and disturbing the health and welfare of a population and its environment.¹

Chronic drought is a part of the Gallatin Valley’s history and is of particular concern to the City of Bozeman as the City has experienced rapid growth in recent decades. The impact of drought on Bozeman is further compounded by its location in the headwaters of the Gallatin River watershed, the susceptibility of the City’s source waters to drought conditions and limited water storage.

This Plan was designed with input from the City of Bozeman Drought Management Team and community stakeholders. Drought Team Members comprise a diverse group of water supply experts in the community and City staff. Team members are identified in Appendix A.

The Plan is based on an analysis of Bozeman’s climate and available water supplies, a review of other drought plans from across the United States and lessons learned from past drought events in communities throughout the Western United States. As this is the City of Bozeman’s first Drought Management Plan, it will be updated regularly to ensure that it addresses current conditions and will be administered by the City of Bozeman’s Public Works Division (Bozeman Water).

1.1  Drought Management Plan Objectives
The following objectives were developed as a result of this process.

- Preserve essential public services during any level of drought severity.

• Reduce adverse impacts on public health, safety, economic activity, environmental resources, and quality of life during a drought event.

• Provide a complete but flexible roadmap to guide implementation and enforcement of the Drought Management Plan.

• Develop an effective public communications strategy to raise the level of drought awareness throughout the community and to provide sufficient information about the importance of drought preparedness and response and the public’s role in the effective implementation of the response measures set forth herein.

• Coordinate drought management with the City of Bozeman’s water supply planning efforts and regional policies and planning initiatives. This includes City, County, and State laws and regulations, the City of Bozeman’s Water Conservation Program and Gallatin County’s Hazard Mitigation and Emergency Response Plans.

1.2 Drought Management Plan Components

The Drought Management Plan consists of:

Drought Severity Indicators (Vulnerability Assessment and Drought Monitoring) – Factors that should be considered in choosing appropriate drought response.

Drought Mitigation and Response Actions – Guidelines for generating additional water supplies and reducing water use during times of drought.

Drought Response Program – Strategies for reducing water use during each stage of drought and enforcement actions for violations. The authority to enforce the water reduction targets provided in the Plan and Bozeman Water customers’ violations of the response measures is provided for in the Bozeman Municipal Code and can result in fines or, in some cases, the potential for water shut off.

1.3 Defining Drought

While drought is a widely-used term, there is no single universally-accepted definition of drought. From a meteorological perspective, drought is defined as an extended period of below average precipitation for a given region. Hydrologic drought refers to reduced stream flows, reservoirs, lakes and groundwater to below-normal levels and tend to lag behind the onset of low precipitation due to the buffering effects of soil moisture, groundwater and snowpack. Droughts are most often discussed from this perspective when water shortages begin to impact people in terms of water supply, loss of hydropower production, loss of fisheries, agricultural production losses and food shortages. Thus, drought is most commonly thought of as an interplay between climate and water-dependent processes. Often, drought is defined by its effects rather than its causes.

For the City of Bozeman, a drought is a condition of insufficient water supplies caused by deficits in precipitation and hydrologic conditions. When the amount of water flowing in streams and into
reservoirs is less than average, the City of Bozeman will more closely monitor its water supply outlook. If continued low stream flows stress water supplies, Bozeman Water will seek Commission approval to implement the Drought Management Plan. The extent and duration of implementation will depend on actual drought conditions. Unfortunately, no one can predict how long drought conditions will last once they begin.

1.4 Water Supplies
Drought indicators are based on quantification of available water supplies which are set forth in the City of Bozeman’s Integrated Water Resources Plan (IWRP) and the estimated amount of water available from its collection system to meet customer demand. Bozeman Water’s collection system is designed to dependably meet the needs of customers over the next twenty years. Figure 1-1 depicts Bozeman’s existing water supply sources.

![Figure 1-1: Regional Map of the City of Bozeman's Water Supply Sources](image)

The water supply data set forth in the IWRP is incorporated into monitoring near and long-term water availability, with the goal of providing a framework for predicting future drought probability, or confirming the intensity of an existing drought. A robust monitoring plan is critical to recognize and respond as soon as possible to the onset of a drought event. This is of particular importance in light of the fact that

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3 Id.
Currently, year over year storage is not part of reservoir management practice, which can rapidly change the severity of impacts from drought events.

As a part of this Drought Management Plan, it is recommended that upon approval by the Commission, the City develop a strategic water reserve from Bozeman’s water supplies to provide protection against circumstances such as climate change or drought conditions of greater severity than have been projected to occur within the thirty year planning horizon. Implementation and operation of the strategic water reserve will be determined by the Commission, subsequent to the adoption of this Plan.

1.5 Strategic Water Reserve
Strategic water reserves are volumes of water set aside by a utility or water purveyor for use in a drought or other water shortage emergency. In recent years, several utilities have established water reserves to provide water resiliency in the event of a prolonged or severe drought event. The development of a strategic water reserve necessitates that water is set aside and removed from the accounting used to determine the water supply available for additional population growth.

Consideration of a strategic water reserve is recommended for the City of Bozeman to reduce future drought vulnerability. This reserve could comprise existing water rights stored from Hyalite Reservoir or from aquifer storage, from water saved as a result of water conservation measures or established via private agreement with interested parties. If a drought was especially severe and persistent, having a drought reserve that could ensure enough water to provide minimum water usage to the next wet weather period would be prudent. The volume of a reserve will be determined by the City Commission after review of additional information specific to the City of Bozeman’s water supplies in order to facilitate the development of a strategic water reserve.

1.6 Long Term Drought Mitigation Efforts
The drought response actions set forth in this Plan should not be confused with long term drought mitigation. Bozeman Water engages in long term drought mitigation through on-going water conservation efforts and supply projects outlined in Bozeman’s Integrated Water Resources Plan.

The City of Bozeman’s semi-arid climate requires water efficiency become a way of life. The City of Bozeman’s Water Conservation Program has been effective in reducing water consumption and is committed to water efficiency and customer outreach. While the City of Bozeman has a separate water conservation program and water conservation savings goal, water conservation program development is directly linked to drought mitigation. For more information about how water conservation is an integral

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4 Id. At Appendix A: Climate Change Adjustments to Firm Yield and Demand for Bozeman, MT, Technical Memorandum.
5 Examples include Albuquerque, Bernalillo County Water Utility Authority, Santa Fe, Denver Water, Truckee Meadows Water Authority.
component of long-term drought management and what Bozeman Water is doing to increase water resiliency, please visit www.bozemanwater.com.

Despite these long term water planning efforts, because of drought, there will be times when further water use reductions are needed in addition to standard water conservation efforts. Drought restrictions that are part of a response plan indicate urgency and are not intended for long-term application.

Because it is unknown how customers will respond during declared droughts, the reduction targets presented in this Plan have been established based on documented achievable reductions in other drought-prone communities in the Western United States, best practice and what is achievable and necessary to mitigate economic impacts from drought and to preserve public health and safety.

1.7 Drought Communications
Drought communications are an integral component of this Plan and will be closely coordinated with the Water Conservation Division to provide information regarding water resiliency and conservation. Messaging will promote the importance of conserving water and achieving water savings in both normal and drought years.

During non-drought years, drought communications will consist of resources and information regarding customer-driven long-term drought mitigation efforts, general drought information and drought preparedness tools to the community.

During a drought, the messages will increase in frequency and will include information on the stages of drought declared by the Commission and the various response actions requested or required from Bozeman residents in order to reduce impacts from drought.

Drought messaging will provide clear and effective drought information to Bozeman Water customers and the media, adjust the scope of public education and outreach efforts pursuant to the drought stage, and coordinate public communication efforts with county planning and hazard mitigation personnel, nearby municipal entities, state agencies, and other conservation-focused organizations to convey, where appropriate, a consistent drought message.

2 DROUGHT SEVERITY INDICATORS
Drought severity indicators identify risks to critical resources during drought and the factors that contribute to those risks. This Plan divides these indicators into two categories: (1) vulnerability assessment and (2) drought monitoring. During a drought, the Commission will consider drought severity indicators in choosing the appropriate drought response actions. The Drought Response Actions section below shows how the drought severity indicators align with the suggested drought response framework.
2.1 Vulnerability Assessment

Risks to critical water resources in the Bozeman area combine the frequency of occurrence, magnitude and severity, and consequences of drought. The vulnerability assessment drives the development of potential drought mitigation and response actions. Assessing the level of risk requires a review of past drought impacts, and an analysis of historical water supply and water use trends which demonstrates how trends may change over time.

The City of Bozeman is extremely vulnerable to drought due to a long history of drought in the region, increased potential for impacts from climate change, increased risks for wildfire, rapid population growth, dramatic increases in water use during the summer months, and the needs of other water users in the watershed.

2.1.1 Drought History

Southwestern Montana has experienced severe drought in its recorded history and is located in a region that appears to be relatively prone to drought conditions according to historical Palmer Drought Severity Index data. Figure 2-1 represents the historical Palmer Drought Severity Index. Based on the figure, southwestern Montana has been in severe or extreme drought 15% to 19.9% of the time between 1895 and 1995, which is significant given only two other areas of the continental U.S. in southwest Wyoming and south central Colorado appear to be more susceptible to drought conditions.

![Palmer Drought Severity Index](image)

**Figure 2-1: Palmer Drought Severity Index for the United States (1895-1995)**
In addition, recent improvements in paleoclimate data examination using tree-ring analysis indicate that more severe and prolonged droughts have occurred in the region than are reflected by recorded history. Figure 2-2 shows the historical snow water equivalent from tree ring data in the Upper Missouri Basin for the last six hundred years. The historical data indicate that prolonged and severe drought in the area is chronic, and the importance of adequately preparing for such periods via the completion of this Drought Management Plan is a necessary step to increasing water security for the City of Bozeman.

![Reconstructed Average Annual SWE (Upper Missouri Basin)](image)

**Figure 2-2: Historical Streamflow and Snow Water Equivalent Trends from Tree-Ring Data for the Upper Missouri Basin**

In the more recent past, the Bozeman area experienced moderate to extreme drought in several months between 2000 and 2006. Figure 2-3 illustrates rainfall and temperature in the Bozeman region from 1990-2012, and while it does not evaluate snowpack, it is still a very relevant illustration of water impacts in Bozeman as late spring and early summer precipitation and evapotranspiration rates are strongly correlated to Bozeman water demand.

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7 National Drought Mitigation Center Drought Risk Atlas: [http://droughtatlas.unl.edu/](http://droughtatlas.unl.edu/)
2.1.2 Potential Climate Change Impacts

Climate change models predict warming in the region and longer dry spells which could reduce snowfall and result in earlier melting of the snowpack and increased evapotranspiration in the area.\(^8\) Even without any changes in precipitation intensity, this could lead to a shift in peak stream runoff to early spring or even late winter, away from the mid to late summer when water demand is greatest. Warming temperatures could also cause more precipitation to occur in the form of rain instead of snow.

All of the City’s water supply sources are heavily reliant on snowpack, which has generally been decreasing in the region since approximately 1980.\(^9\) Climate change models predict snowpack will decrease substantially in coming years due to early spring warming.\(^10\) Additionally, climate models demonstrate increased climate variability rather than a linear trend due to a combination of climate change and natural variability as shown in Figure 2-4.\(^11\)


\(^{10}\) UW Climate Impacts Group – [http://cese.washington.edu/cig/](http://cese.washington.edu/cig/)

Climate variability must be taken into account with future consideration of drought management and response due to the increased probability of long-term drought, and an increase in the magnitude and related impacts of short-term drought. Due to current limitations on accounting for storage of water from a previous water year and the reliance on snowpack, a severe short-term drought could have significant impacts.

Figure 2-5 shows the historical April snowpack for the Missouri River headwaters area, as well as the United States Geological Survey’s projection of future snowpack based on two levels of solar radiation. Regardless of solar radiation levels, the overall estimates predict substantial reductions in April snowpack.

Figure 2-6 is a compilation of Hyalite snowpack snow water equivalent data with non-exceedance projections based on historical values depicted on the graph. The term non-exceedance is used to describe a method of cumulative frequency analysis and refers to how likely various changes in the current snowpack are to occur based on historical data. The graph in Figure 2-6 displays non-exceedance projections which correspond to the amount of time that the snowpack has historically held more water on the same date as the current measurement.
The graph projects that over time the snowpack snow water equivalent will decrease as less snow water is present in the snowpack, and what is present melts earlier in the spring.

Figure 2-6: Hyalite Creek Snowpack Snow Water Equivalent

An early snowpack melt occurred in 2016, and local spring rains contributed to that occurrence. Regionally, early snowpack melt has been occurring with what appears to be increasing frequency. The early occurrence of winter and spring snowmelt is anticipated to place increased strain on the adequacy of the City of Bozeman’s water supplies in the late summer and fall months. The arrow in Figure 2-6 illustrates the predicted trend for future snowpack and timing of snowmelt.

2.1.3 Wildfire Risks and Impacts

Climate change models also predict increased wildfire frequency and duration, as well as longer wildfire seasons. Wildfire risk has a tendency to follow drought conditions. All of the City’s watersheds (Sourdough, Hyalite and Lyman) are forested and therefore susceptible to wildfire, which would likely

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reduce the amount and quality of water available from the municipal watersheds for an extended period of time. Regionally, wildfire has already been occurring with more frequency. A warming climate leads to increased rates of evapotranspiration resulting in drier forests in the late summer and fall months. Figure 2-7 depicts increased risks of very large wildfires in the contiguous United States.¹⁴

![Figure 2-7: Relative Increased Risk of Very Large Wildfires in Contiguous United States](image)

Wildfires negatively impact water sources by increasing ash and sediment mobilization, thus reducing water quality as a result of ash and sediment-laden reservoirs and streams. A fire in the Hyalite watershed could result in substantial increases in sediment deposition reducing the capacity of Hyalite Reservoir.

Water utilities impacted by wildfire have reported that intense rains subsequent to a wildfire event caused massive sediment accumulations that damaged infrastructure and resulted in power outages, long-term reduction in source water quality, short-term contamination of drinking water sources, loss of source water, and water demand in excess of water production.¹⁵ Due to the fact that Bozeman Creek and Hyalite Creek watersheds are at risk of high severity fire, Bozeman Water’s new water treatment plant was specifically designed to function even with some sediment loading from a wildfire event. However, it is

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not equipped to handle the aftermath of large and prolonged fires. As a result, fuel reduction measures in these source watersheds are necessary to reduce wildfire impact severity.\textsuperscript{16}

### 2.1.4 Population Growth

A rapidly growing population (3% to 6% growth rate in recent years) increases vulnerability to drought. The City of Bozeman’s Integrated Water Resources Plan (IWRP) determined that without substantial conservation Bozeman will likely experience a water supply and demand gap within the next 30 years.\textsuperscript{17}

Figure 2-8 shows the population growth of Bozeman from 1950 to 2015. Rapid population growth in an area without a large, stable raw water source (large river, groundwater aquifer, or very large raw water reservoir) increases vulnerability to drought, unless new sources are developed to accommodate growth.

![Graph showing population growth from 1950 to 2015.](image)

**Figure 2-8: City of Bozeman Population Growth from 1950 to 2015**

### 2.1.5 Increased Summer Water Usage

Water usage significantly increases during the months of June, July, and August as a result of outdoor watering. The peak summer demands for lawn watering are nearly 240% of the average winter demand. During drought, lawns become drier, prompting homeowners to irrigate more, rather than less. This practice will need to be carefully managed if drought conditions require.

Figure 2-9 shows the summer and winter per capita demands from 2006 – 2015. The summer demands are approximately two and a half times the winter demand. If the data represented in Figure 2-9 are evaluated further, a correlation between monthly demand and evapotranspiration becomes very apparent. Residents who irrigate their lawn use more water during dry years. This practice will be reduced or curtailed as a component of drought response set forth in this Plan.


\textsuperscript{17} City of Bozeman Integrated Water Resources Plan (IWRP), Advanced Engineering and Environmental Services, 2013.
2.1.6 Requirements of Neighboring Water Users

Bozeman’s vulnerability to drought is further subject to the water needs of neighboring communities and user groups. Agricultural interests, adjacent cities, towns and residential communities, and recreational and environmental interests have rightful claims to water supplies in the Gallatin Valley and are significantly impacted during drought.

Additional complications arise when drought is incorporated into the legal framework allocating water in Montana. This structure is based on the doctrine of prior appropriation in which the date the water is appropriated and placed to beneficial use determines the priority of the water right. The oldest or most senior dates of appropriation are administered first. As a result, during times of shortage, priority determines who is entitled to divert water. As increasing demands are placed on the finite amount of water available, the risks for conflicts between water users increase. An effective Drought Management Plan can reduce the likelihood for such conflicts.

2.2 Drought Monitoring

A Drought Management Plan must include a means of monitoring current drought conditions and applying the conditions to the development of an overall drought stage framework. The primary goal of drought monitoring is to recognize a drought in its early stages and accurately assess its severity over time so that appropriate responses are successfully implemented.
A transparent, quantifiable, and scientific basis for drought declaration is critical for timely decision-making, effective communication with the Commission, and managing expectations of the public. Drought monitoring allows for the use of local and national data in decision-making, implementation of appropriate restrictions at the appropriate times, and allowances for different types of uses and the needs of different water users.

For purposes of this Plan, a drought monitoring protocol was developed that incorporates data from local and national indicators such as reservoir storage, area streamflow, snow pack, precipitation, temperature, evaporation, soil moisture and weather forecasts. Bozeman Water will monitor these data with a customized monitoring tool based on the drought monitoring protocol comprising local and national indicators described in this Section. Select outputs from the drought monitoring tool are set forth in Appendix B. Calibration of Bozeman Water’s drought monitoring tool insures the accuracy and reliability of the data generated by the drought monitoring tool. A snapshot of the calibration of the tool is provided in Appendix C.

2.2.1 Local Indicators
Droughts are highly variable, complex, and specific to a region’s local climatic conditions. While multiple local indicators will be monitored, due to the fact that 80% to 85% of Bozeman’s water supply is surface water, monitoring will primarily rely on levels in Hyalite Reservoir, area streamflow and snow water equivalents.

2.2.1.1 Reservoir Storage
Because most of the water supply during drought comes from storage reservoirs, reservoir contents are an accurate indicator of a drought’s impact on supplies. Reservoir contents are the bottom line result of the factors affecting supply, including weather, snowpack, soil moisture, runoff, water rights, collection system limitations and water use.

Although Bozeman Water currently has limited storage capacity, seasonal water elevation in Hyalite Reservoir, and the corresponding volume in storage, is an immediate and direct assessment of the area’s water supply status. Reservoir levels are regularly monitored by the Department of Natural Resources and Conservation (DNRC), and the data are easily accessible. The volume of water in Hyalite Reservoir alone is not indicative of what is available to Bozeman Water at any given time, but due to the City’s reliance on Hyalite Reservoir as a source of water, the reservoir level serves as a key general indicator of drought conditions in a given year. As a result, Hyalite Reservoir volume is given a relatively significant weighting factor in Bozeman Water’s drought monitoring protocol.

The historical storage volume in Hyalite Reservoir is shown in Figure 2-10 and cycles through the year, typically reaching maximum volume in late May or June. The reservoir is drawn down to its winter pool level in mid to late fall. In order to accurately assess a drought condition at any given time, the storage volume in Hyalite Reservoir must be normalized to the time of year. This is accomplished using a
cumulative frequency analysis method referred to as “frequency of exceedance,” or the amount of time expressed as a percentage that the reservoir has historically held more water on the same date as the current measurement. This is the method that will be used to see how likely low reservoir levels will be in the future based on how often low reservoir levels occurred in the past. More specifically, an exceedance value of 90% for Hyalite storage volume indicates that 90% of historical storage volumes on that same date have been greater than the current measurement and the current measurement has been exceeded by 10% of the historical data.

Aggregate reservoir contents in Hyalite usually peak in June following spring snowmelt. Since the dam was raised in 1991-92, this metric was divided into pre- and post-1992 periods to reflect the increased storage subsequent to the dam raise.

![Hyalite Reservoir Storage](image)

**Figure 2-10: Hyalite/Middle Creek Reservoir Historic Minimum and Maximum Storage Volumes**

### 2.2.1.2 Area Streamflow

Bozeman is located near multiple streams and creeks including Lyman Creek, Sourdough Creek, Hyalite Creek, the East Gallatin River and Gallatin River, situated at the headwaters of the Gallatin River Watershed and the Missouri River Basin as shown in Figure 2-11. These streams are also indicators of local drought conditions. However, due to the lack of data on key streams, overall streamflow is not weighted as heavily as reservoir storage data in Bozeman Water’s drought monitoring protocol. As the period of record increases, these parameters will be incorporated into the Plan.

More specifically, Sourdough (Bozeman) Creek flow would likely offer the most direct assessment of the status of water availability for the City. Unfortunately, streamflow on Sourdough has not historically been
monitored. A new gage has been installed on Sourdough, but without a robust historical record, it is not possible to evaluate and compare current water status accurately with historical flows. As future data is collected, the information will become increasingly valuable.

The same is true of the East Gallatin River, which drains the portion of the Gallatin watershed that includes Lyman Creek. Due to the historical data limitations, the Gallatin River streamflow monitored at a USGS gaging station at Logan will be used as it offers a robust historical data set which provides valuable information on drought conditions throughout the entire watershed and is well suited to long-term drought monitoring. However, the usefulness of the Logan gage data is somewhat minimized as Bozeman Water’s source watersheds comprise only approximately one quarter of the total Gallatin watershed flows that are measured at the Logan gage.

Figure 2-11: Gallatin River Watershed

Hyalite Creek itself is also a water source for the City. Flow in the creek is monitored at a USGS gaging station with a reliable historical data set downstream of the dam. For this reason, Hyalite Creek flow is included in the monitoring plan. However, due to its sensitivity to dam releases, it will be given significantly less weight than the Gallatin River gage.
2.2.1.3 Snow Water Equivalents (SNOTEL)
The City’s water supply is directly influenced by snowpack; therefore, the inclusion of snowpack data is also critical to include in the drought monitoring protocol. Snow-water equivalence (SWE) provides the most accurate indication of water availability in snowpack. A map showing the general locations of the SNOTEL sites is provided in Figure 2-12. One SNOTEL site in the Bridger Range and one site from the Hyalite Range were selected for inclusion in the monitoring protocol.

Figure 2-12: Location of Bozeman Area SNOTELs
Snow Water Equivalent from the Sacajawea SNOTEL shows a very strong correlation with flows from Lyman Spring and as a result is included in the monitoring protocol.\textsuperscript{18}

Snow Water Equivalent data in the Hyalite watershed will be monitored using the Shower Falls SNOTEL site, as this SNOTEL lies above the Hyalite Reservoir and is more indicative of the water that will contribute to reservoir storage. The data from the Lick Creek SNOTEL site was not considered as high in value since it is located downstream of Hyalite Reservoir.

2.2.1.4 Groundwater
The central Gallatin Valley is underlain by a shallow, unconfined aquifer composed of alluvial and colluvial material. Groundwater levels in this aquifer generally range from 20 to 50 feet below the ground surface. It is the source of water for the majority of groundwater users in the Bozeman area. Although in some locations there are intermittent clay lenses or layers of other small-grained (fine) sediments that might alter the movement and yield of water, many of these Quaternary sediments are excellent at storing and transmitting water because of the coarseness of the material. Recharge to shallow aquifers in these sediments comes from precipitation, infiltration from irrigation and irrigation canals and ditches, and runoff (surface and subsurface) from snowmelt in the adjacent mountains.\textsuperscript{19} Therefore, fluctuations in groundwater provide useful information as to the overall status of water in the area.

The monitoring protocol incorporates depth to groundwater from a groundwater well located within City limits. The location of the groundwater well is shown in Figure 2-13. This well possesses the most advantageous combination of location and period of record (1992 – current) in relation to other area groundwater wells. It is 160 feet deep, and depth to groundwater historically fluctuates between 22 and 26 feet.\textsuperscript{20}

\textsuperscript{18} SNOTEL site correlation data 2009-2015 on file with City of Bozeman (2016).
\textsuperscript{20} Montana Bureau of Mines and Geology Groundwater Information Center.
2.2.1.5 Recommended Future Local Indicators

Due to the limited number of local indicators for monitoring purposes, valuable drought information that is not currently available could be acquired from additional monitoring devices including stream gages in Sourdough Creek and Lyman Spring and snow-water equivalence sites in the Sourdough Creek Watershed. Table 2-1 summarizes recommended additional monitoring parameters that should be considered.

<table>
<thead>
<tr>
<th>Location / Source</th>
<th>Monitoring Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sourdough Watershed</td>
<td>• A SNOTEL site in the Sourdough Watershed</td>
</tr>
<tr>
<td></td>
<td>• Real time stream gages at multiple locations</td>
</tr>
<tr>
<td>Lyman Spring</td>
<td>• Long-term automation and daily flow recording is recommended. (SCADA)</td>
</tr>
<tr>
<td></td>
<td>• SNOTEL in Lyman Canyon</td>
</tr>
</tbody>
</table>

Table 2-1: Recommended Additional/Future Local Monitoring Locations

2.2.2 National Indicators

In addition to local indicators described above, various national drought indicators are being incorporated into the monitoring protocol to more accurately gage drought conditions. Using multiple data sets provides more versatility in determining drought conditions. The weakness of one indicator may be compensated for by another.
2.2.2.1 Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is a meteorological drought index based on the water balance equation including supply, demand, and loss. The PDSI is a good tool for monitoring long-term (several months) drought conditions and is the most commonly used drought indicator in the U.S., including government agencies administering drought relief programs.21 The PDSI rating system ranges between -4.0 and +4.0, with corresponding conditions shown in Table 2-2.

<table>
<thead>
<tr>
<th>PDSI Value</th>
<th>Severity/Moisture Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4.0 and above</td>
<td>Extreme Moist Spell</td>
</tr>
<tr>
<td>+3.0 to +3.99</td>
<td>Very Moist Spell</td>
</tr>
<tr>
<td>+2.0 to +2.99</td>
<td>Unusual Moist Spell</td>
</tr>
<tr>
<td>+1.0 to +1.99</td>
<td>Moist Spell</td>
</tr>
<tr>
<td>+0.5 to 0.99</td>
<td>Incipient Moist Spell</td>
</tr>
<tr>
<td>-0.49 to +0.49</td>
<td>Near Normal</td>
</tr>
<tr>
<td>-0.99 to -0.5</td>
<td>Incipient Drought</td>
</tr>
<tr>
<td>-1.99 to -1.0</td>
<td>Mild Drought</td>
</tr>
<tr>
<td>-2.99 to -2.0</td>
<td>Moderate Drought</td>
</tr>
<tr>
<td>-3.99 to -3.0</td>
<td>Severe Drought</td>
</tr>
<tr>
<td>-4.0 and below</td>
<td>Extreme Drought</td>
</tr>
</tbody>
</table>

Table 2-2: Drought Severity Based on PDSI

2.2.2.2 U.S. Drought Monitor

The U.S. Drought Monitor is a composite index based on measurements of hydrologic, climatic, and soil conditions and accounts for the importance of snow in the hydrologic cycle of the Bozeman area via the use of snow water content information, river basin precipitation levels, and the Surface Water Supply Index (SWSI).22 A summary of the U.S. Drought Monitor and drought severity categories is included in Table 2-3.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Possible Impacts</th>
<th>Palmer Drought Severity Index (PDSI)</th>
<th>CPC Soil Moisture Model (Percentile)</th>
<th>USGS Weekly Streamflow (Percentile)</th>
<th>Standardized Precipitation Index (SPI)</th>
<th>Objective Drought Indicator Blends (Percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0</td>
<td>Abnormally Dry</td>
<td>Going into drought: short-term dryness slowing planting, growth of crops or pastures</td>
<td>-1.0 to -1.9</td>
<td>21 to 30</td>
<td>21 to 30</td>
<td>-0.5 to -0.7</td>
<td>21 to 30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coming out of drought:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drought Category</th>
<th>Severity</th>
<th>SPI Value</th>
<th>Severe / Moisture Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 Moderate Drought</td>
<td>Some damage to crops, pastures, streams, reservoirs, or wells low, some water shortages developing or imminent; Voluntary water-use restrictions requested</td>
<td>-2.0 to 2.9</td>
<td>11 to 20</td>
</tr>
<tr>
<td>D2 Severe Drought</td>
<td>Crop or pasture losses likely; Water shortages common; Water restrictions imposed</td>
<td>-3.0 to 3.9</td>
<td>6 to 10</td>
</tr>
<tr>
<td>D3 Extreme Drought</td>
<td>Major crop/pasture losses; Widespread water shortages or restrictions</td>
<td>-4.0 to 4.9</td>
<td>3 to 5</td>
</tr>
<tr>
<td>D4 Exceptional Drought</td>
<td>Exceptional and widespread crop/pasture losses; Shortages of water in reservoirs, streams, and wells creating water emergencies</td>
<td>-5.0 or less</td>
<td>0 to 2</td>
</tr>
</tbody>
</table>

**Table 2-3: Drought Severity Categories and Inputs for the U.S. Drought Monitor**

### 2.2.2.3 Standard Precipitation Index (SPI)

The Standard Precipitation Index (SPI) depicted in Table 2-4 is a probability based index that utilizes historical rainfall data. For drought management purposes, the SPIs over longer averaging periods (6-months or greater) are better indicators than the short-term SPIs.23

<table>
<thead>
<tr>
<th>SPI Value</th>
<th>Severity / Moisture Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2.0 and above</td>
<td>Exceptionally Moist</td>
</tr>
<tr>
<td>+1.6 to +1.99</td>
<td>Extremely Moist</td>
</tr>
<tr>
<td>+1.3 to +1.59</td>
<td>Very Moist</td>
</tr>
<tr>
<td>+0.80 to +1.29</td>
<td>Moderately Moist</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>SPI Value</th>
<th>Drought Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.51 to +0.79</td>
<td>Abnormally Moist</td>
</tr>
<tr>
<td>-0.50 to +0.50</td>
<td>Near Normal</td>
</tr>
<tr>
<td>-0.79 to -0.51</td>
<td>Abnormally Dry</td>
</tr>
<tr>
<td>-1.29 to -0.80</td>
<td>Moderately Dry</td>
</tr>
<tr>
<td>-1.59 to -1.30</td>
<td>Severely Dry</td>
</tr>
<tr>
<td>-1.99 to -1.60</td>
<td>Severely Drought</td>
</tr>
<tr>
<td>-2.00 and below</td>
<td>Severely Drought</td>
</tr>
</tbody>
</table>

*Table 2-4: Drought Severity based on SPI*

### 2.3 Drought Monitoring and Response

Table 2-5 illustrates the relationship between the local and national drought severity monitoring indicators and the corresponding drought response stage. The response stages in the table are illustrative only as there are no hard-and-fast relationships between the indicators and the appropriate drought response stage. This figure is a guideline, as the Commission will evaluate many factors when making its drought response decisions.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Weighting Factor</th>
<th>Response Stages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Stage 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drought Watch</td>
</tr>
<tr>
<td>Hyalite Reservoir Storage Percent Exceedance</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Stream Flow Percent Exceedance</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Hyalite Creek below the Reservoir</td>
<td>20%</td>
<td>85%</td>
</tr>
<tr>
<td>Gallatin River At Logan</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>SNOTEL Snow-Water Equivalence Percent Exceedance</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Shower Falls SNOTEL</td>
<td>75%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Table 2-5: Drought Monitoring in Relation to Response Stages

<table>
<thead>
<tr>
<th>Metric</th>
<th>5%</th>
<th>10%</th>
<th>20%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacajawea SNOTEL</td>
<td>25%</td>
<td>75%</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
</tr>
<tr>
<td>South 3rd Well (135720) Depth to Groundwater (ft)</td>
<td>10%</td>
<td>25</td>
<td>25.5</td>
<td>26</td>
<td>26.5</td>
</tr>
<tr>
<td>Palmer Drought Severity Index</td>
<td>10%</td>
<td>-1</td>
<td>-2</td>
<td>-3</td>
<td>-4</td>
</tr>
<tr>
<td>Standardized Precipitation Index</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-Month</td>
<td>80%</td>
<td>-0.5</td>
<td>-1.0</td>
<td>-1.5</td>
<td>-2</td>
</tr>
<tr>
<td>12-Month</td>
<td>20%</td>
<td>-0.5</td>
<td>-1.0</td>
<td>-1.5</td>
<td>-2</td>
</tr>
<tr>
<td>US Drought Monitor</td>
<td>5%</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Actual values subject to change based on drought conditions

2.4 Uncertainty Associated with Forecasts

Just like other weather phenomena, forecasting a drought and knowing with certainty if one exists can be difficult. When a dry year occurs, for example, it is unknown whether it is the first year of a three-, five- or 10-year drought, or if it is merely a dry year somewhere in a series of average-to-wet years. Even though droughts cannot always be predicted, Bozeman Water will continue to advise customers of the latest water supply information so they can consider it in their own planning.

3 Drought Response Actions

As reservoir levels, stream flows and snowpack decrease, efforts to add water supplies and reduce water use increase. The City of Bozeman’s response actions consists of two components – the indicators that help the Commission decide an appropriate drought response described above, and the corresponding actions recommended for that response. This Plan delineates four stages of drought severity. Each stage is based on local and national indicators described in Section 2 above.

For each stage, progressively more stringent responses are recommended. Some drought response measures, particularly those designated for mild episodes of drought, require minimal customer effort. However, as drought intensifies, measures can become mandatory, are associated with increasing costs and are sometimes intrusive.

In short, the recommended responses are as follows:
• Stage 1 – Drought Watch asks for increased communication on dry conditions;
• Stage 2 – Drought Advisory implements mandatory watering restrictions;
• Stage 3 – Drought Warning prohibits lawn watering; and
• Stage 4 – Drought Emergency rations water supplies for essential uses.

To activate the response component of this Plan, the Commission declares a drought stage and adopts an effective date for imposing applicable restrictions. Because Stage 2, Stage 3 and Stage 4 droughts involve mandatory restrictions and are currently authorized by the Bozeman Municipal Code (BMC), described further in Section 5 below, they will become enforceable pursuant to the Bozeman Municipal Code. Restrictions applied during stages as declared by the Commission are provided below.

At the onset of drought, an interdivisional team comprising City staff from the Drought Management Team will initiate drought monitoring procedures in order to advise the Director of Public Works. This team will monitor drought conditions and evaluate the effectiveness of the drought response. Recommendations for adjusting the response will be submitted to the Commission. Because every drought is different, the Commission will refine drought response actions based on actual conditions.

3.1 Increasing Water Supply

In addition to managing water use during a drought, Bozeman Water will try to increase its supplies by gaining access to other temporary water sources. Each supply alternative presents unique intergovernmental, legal and technical issues, and each will depend on the current conditions.

3.2 Reducing Water Use

Bozeman Water’s primary response to drought is to reduce water uses by customers so that existing supplies will be available for the most essential uses for the duration of the drought. A variety of actions, rather than one single approach, is generally more effective at creating an overall atmosphere that promotes water use reductions.

The actions discussed in the sections that follow are based on the drought severity indicators identified in Section 2 and include monitoring and evaluation, restrictions, water use education and enforcement, and drought rates. Generally speaking, restricting the number of days and times allowed for watering landscapes or providing a maximum water allowance, can be effective methods for reducing water use. Other methods, such as drought rates and public information efforts, complement those watering restrictions. Other restrictions may not substantially reduce water use but may eliminate discretionary uses of water or heighten public awareness of drought severity.

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25 Id.
3.3 Monitoring and Evaluation

When drought conditions emerge, Bozeman Water will intensify monitoring and evaluation activities. The monitoring and evaluation program will track information such as snowpack, soil moisture, streamflow, precipitation, water rights, reservoir levels and weather forecasts as described in Section 2. In addition, water usage and its corresponding revenue will be compared to normal use and weather-adjusted expected use. The water reduction goals are based upon what is needed in order to preserve economic vitality of the community while preserving public health and safety. If water reduction goals are not being met, the Commission may increase public outreach and/or the level of drought response.

Bozeman Water’s customized drought monitoring tool described in Section 2 will facilitate data-driven decision-making by the Commission.

The four stages of drought outlined in this Section will be utilized for the purposes of assessing, communicating, and responding to drought conditions. The drought stages will increase with worsening drought conditions and reduce progressively as conditions improve and the drought protocol criteria for the level are no longer met.

The procedures for utilization of the drought stage model to manage drought are as follows:

1. The drought monitoring tool will be updated monthly by Bozeman Water during non-drought or Drought Watch stages, and bi-weekly during Drought Advisory, Warning, and Emergency stages. The tool will provide information on recent trends during a drought and staff will update the Director of Public Works as to drought conditions.
2. The Director of Public Works will provide recommendations for drought stage declarations and response actions to the City Commission.
3. The Commission will be provided an opportunity to ask questions and make comments on the recommendations at a regularly scheduled public City Commission Meeting or other public emergency meeting to discuss drought conditions.
4. At such a meeting, the Commission will render a decision as to whether to declare drought and at what drought stage based on the Director of Public Works recommendations to the Commission.
5. If the Commission elects to declare drought, direction is given to the Director of Public Works to convey the drought declaration to City and County Emergency Management, the Montana Department of Natural Resources and Conservation and the public and response measures will be implemented.
6. If the data indicate that a Drought Watch condition is warranted, or that an already-declared drought stage needs to be modified, Bozeman Water will review the results generated by the drought monitoring tool and the status of local parameters to assess that the stage declaration or change in the status by the Commission is warranted.
7. The same procedure will be followed for any changes to the drought stage and to call an end to the drought.

3.4 Restrictions

Once the Commission has declared a drought, Bozeman Water will activate the corresponding set of recommended response measures. Bozeman Water’s goal for drought response is to maintain the
health, safety and economic vitality of the community to the greatest extent possible in the face of water shortage.

Bozeman Water follows the principles below as much as possible when restricting water use during a drought.

Implement extensive public information and media relations programs.
- Inform customers about conditions and actions they can take to reduce water use.
- Have open, clear and consistent messaging and communication.
- Maintain the trust of customers and stakeholders.

Minimize adverse financial effects.
- Be respectful of water-based businesses that will be financially affected by restrictions.
- Engage in ongoing dialogue with the landscaping industry to obtain input and to allow these businesses to plan for future months.

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.

Restrict less essential uses before essential uses.
- Curtail outdoor water use (except for trees and shrubs and potentially urban gardens) before restricting domestic indoor use.
- Eliminate water waste.

Affect individuals or small groups before affecting large groups or the community as a whole, allowing as much public activity as possible to be unaffected.
- Have a maximum allowable water allowance program for public spaces to allow those customers to prioritize water use for heavily-used landscapes.
- Preserve community pools before residential pools.

3.5 Water Use Education
Bozeman Water will develop a water use education and enforcement program based on the elements of the Plan set forth herein to educate customers about efficient water use, to enforce water waste rules and drought restrictions, and to save water. During a drought, the Bozeman Water Conservation Division will coordinate with the Water and Sewer Operations Division and the Bozeman Police Department to monitor Bozeman’s water service area for customers who are not complying with drought response measures.

The goal of the program is to educate and inform customers, not to merely penalize violators. Bozeman staff will distribute educational materials, help customers reduce their water use and answer questions
about the drought. Customers will also be able to report water waste through the Water Conservation Division’s phone number and website.

### 3.5.1 Communications Campaign

An on-going communications campaign will be a significant component of the City of Bozeman’s Drought Management Plan and closely coordinated with the Water Conservation Division’s education and outreach initiatives. When appropriate, these programs may be integrated into a single program by the Water Conservation Division. These initiatives promote the value of water, the need to conserve and ways in which to achieve water savings under normal climatic conditions and during drought events.

During non-drought years, the communication campaign will provide general information on drought and drought preparedness. During a drought event, the campaign will increase the scope and specificity of messaging to the public and will include information pertaining to drought stages and associated responses.

The objectives of the communication campaign are to:

- Provide clear and consistent drought information to City of Bozeman water customers;
- Adjust the scope and frequency of messaging in accordance with drought stage and restrictions; and
- Coordinate implementation of the campaign with Gallatin County, nearby municipalities and other affected communities to provide consistent drought messaging.

The Water Conservation Division will be responsible for developing communications campaigns identifying specific drought messaging delivered to targeted audiences before, during and after a drought event. Specific communications plans will depend upon the current and forecasted water supply and weather conditions present at the time. Outreach will primarily consist of website communications, social networking, newspapers, bill inserts, and mailers. During a drought, communications will be expanded to television, radio and social media, newspapers, emails, public meetings, presentations at community events and school programs.

### 3.6 Drought Management for Master Meter Customers

Bozeman Water’s master meter customers (e.g. MSU) are governed by Bozeman Water’s drought management guidelines. Master meter customers can make and enforce their own plans as long as they are consistent with Bozeman Water’s drought management guidelines set forth herein. Master meter customers should also assist Bozeman Water in enforcing the Drought Management Plan.

As a result, it is recommended that master meter customers have a water use education and enforcement program during drought response to ensure customers comply with operating rules. Master meter customers can choose to opt in to Bozeman Water’s water use education and enforcement program or
create their own program. If opting in to Bozeman Water’s program, Bozeman Water will work closely with the customer to facilitate proper communication with customers.

If a master meter customer chooses to create its own water use education and enforcement program, the following program elements are recommended to be considered for inclusion:

- Creating a mechanism to educate customers about drought restrictions, such as online or printed materials and personal customer interaction.
- Creating a reporting tool, such as a phone number or email, that allows customers to report violations of water waste rules.
- Monitoring for violations of water waste rules.
- Tracking customer violations.

3.7 Drought Rates

Drought rates may be implemented as a drought response action or declaration by the Commission. Drought rates are designed to increase awareness of the drought’s severity, assist in meeting water use reduction targets through pricing signals and/or maintain the financial health of the utility. Drought rates are not currently a component of Bozeman Water’s rate structure. Adoption of drought rates is subject to Commission approval as part of a cost of service and rate study that is not currently contemplated as part of this Plan.

Drought rates are different from the regular rate structures for water service in that they are temporary in nature. The drought declaration defines the criteria for implementing and removing drought rates.

If Bozeman Water receives Commission approval to proceed with the development of drought rates, several guiding principles should be considered:

- There is a relationship between price and demand.
- Drought rates 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 rate pricing signals should be developed in a manner that carefully considers the cost of water for essential uses.
- Drought rates may apply to current water demands, new service connections or other demands on the water supply.
- Drought rates should match the severity of the drought and drought response measures.
- Drought rates must be feasible for the City of Bozeman computer systems and Master Meter customers to handle.
- Public information is important in helping customers understand drought rates.
3.8 Drought Stages

Drought stages are determined by the outputs from the drought monitoring tool. The most important indicator will be storage levels in Hyalite Reservoir and is determined using the exceedance method. The exceedance value corresponds to the amount of time (expressed as a percentage) that the reservoir held more water on the same date as the current measurement.

If the reduction targets for each stage are met, drought declarations of increasing severity may be delayed or avoided.

The water reduction targets model industry best practices and reflect reductions achieved in similarly situated municipalities during drought events. If water-reduction goals are not being met, the Commission may increase public outreach and/or the level of drought response.

<table>
<thead>
<tr>
<th>Drought Stage</th>
<th>Stage 1: Drought Watch</th>
<th>Stage 2: Drought Advisory</th>
<th>Stage 3: Drought Warning</th>
<th>Stage 4: Drought Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td>System-wide Water Reduction Targets</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
</tr>
</tbody>
</table>

3.8.1 Stage 1 - Drought Watch (Abnormally Dry): Customer Outreach

Description:

A Drought Watch declaration will increase communication to customers to alert them that water supplies are below average, conditions are dry and continued dry weather could lead to mandatory watering restrictions. A Drought Watch will require a formal declaration from the Commission. The exceedance method looks at the amount of time (expressed as a percentage) that the identified source held more water, had higher flows or snow water equivalent on the same date as the current measurement.

Indicators:

1.Projected percent exceedance of Hyalite Reservoir levels on that date are at or around 70% exceedance but less than 80% exceedance. See Table 2-5 above.
2. Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate abnormal and prolonged dryness.
   a. Streamflow is at or around 80% exceedance.
b. SNOTEL sites are at or around 75% exceedance.

3. Service-area precipitation indicates abnormal and prolonged dryness.
   a. Standard Precipitation Index is - 0.5 See Table 2-4 above.

Use Reduction Target: 10% reduction of current use. This is a system-wide target, and individual or customer group-specific response measures should be implemented.

Response Measures:

Increase communication and outreach to customers and stakeholders to explain we are beginning to see indicators of drought.
- Encourage customers to continue to use water efficiently and provide suggestions for reducing water use in order to reduce the risk of progression to mandatory restrictions.
- Notify customers and prepare for the possibility of mandatory watering restrictions.
- Enhance the water use education and enforcement program.

3.8.2 Stage 2 - Drought Advisory (Severely Dry): Mandatory Watering Restrictions

Description:
A Stage 2 drought declaration imposes mandatory watering restrictions and requires effort on the part of customers. Circumstances warrant possible adverse impacts on water-dependent businesses involved in outdoor water use. The exceedance method looks at the amount of time (expressed as a percentage) that the identified source held more water, had higher flows or snow water equivalent on the same date as the current measurement.

Indicators:
1. Projected percent exceedance of Hyalite Reservoir levels on that date are at or around 80% exceedance but less than 90% exceedance.
2. Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate severe and prolonged dryness.
   a. Streamflow is at or around 90% exceedance.
   b. SNOTEL sites are at or around 85% exceedance.
3. Service-area precipitation indicates moderate and prolonged dryness.
   a. Standard Precipitation Index is - 1.0 See Table 2-4 above.
4. State water officials are engaged in drought response activities.

Use Reduction Target: 20% reduction of current use. This is a system-wide target, and individual or customer group-specific response measures should be implemented.

Spray Irrigation Watering Restrictions: Below is a recommended watering schedule for a Stage 2 drought response for watering restrictions from April 1 to October 1 unless exempted by special permission.

A. Watering shall be limited to two days per week in accordance with the following schedule:
   - Single residential properties with odd-numbered addresses: Saturday, Wednesday
- Single residential properties with even-numbered addresses: Sunday, Thursday
- All others (multi-unit, HOAs, commercial, industrial, government): Tuesday, Friday.

B. The Commission may by formal action establish a limit on the number of minutes of irrigation that each area of turf may receive or a maximum total amount of time during which irrigation at a premises may occur.

C. This subsection will not apply to athletic or playing fields, and tees and greens at golf courses, heavily used by the community so long as irrigation of such landscapes is accomplished without waste of water.

D. Watering is prohibited between the hours of 10:00 a.m. and 6:00 p.m., except when limited watering is essential to preserve turf subject to heavy public use.

E. Watering is prohibited on Mondays, except for irrigators operating under special exemptions as approved by the Director of Public Works.

F. Permissible watering shall be conducted without any water waste, pursuant to B.M.C. Section 40.02.1320.

**Strategic Water Reserve:**

Pursuant to the future adoption of a strategic water reserve by the Commission, the Commission may make water from the strategic water reserve available for use during a Stage 2 drought. Such action could reduce the severity of Stage 2 restrictions, or it could be used to delay or eliminate a Stage 3 drought response.

**3.8.3 Stage 3 - Drought Warning (Extremely Dry): Ban on Targeted Water Uses**

**Description:**

A Stage 3 drought imposes mandatory watering restrictions on Bozeman Water’s customers. Stage 3 drought restrictions are severe and will likely result in damage to or loss of landscapes. The exceedance method looks at the amount of time (expressed as a percentage) that the identified source held more water, had higher flows or snow water equivalent on the same date as the current measurement.

**Indicators:**

1. Projected percent exceedance of Hyalite Reservoir levels on that date are at or around 90% exceedance. See Table 2-5 above.
2. Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate extreme dryness.
   a. Streamflow is at or around 95% exceedance.
   b. SNOTEL sites are at or around 90% exceedance.
3. Service-area precipitation indicates severe and prolonged dryness.
   a. Standard Precipitation Index is - 1.5. See Table 2-4.
4. State water officials have declared drought conditions in the service area.

**Use Reduction Target:**
30% reduction of current use. This is a system-wide target, and individual or customer group-specific response measures should be implemented.

A. Below are recommended measures for a Stage 3 drought response.
   - Ban on all lawn watering.
   - Existing trees and shrubs and flower and vegetable gardens may be watered with hand held hose or low-volume, non-spray devices.
   - Community gardens may be watered on assigned watering days.
   - Athletic and playing fields may irrigate pursuant to a water schedule.
   - Golf courses may irrigate tees and greens only.
   - Ban on water fountains and filling private swimming pools.

B. The Commission may by formal action establish a limit on the number of minutes of irrigation that each area of turf may receive or a maximum total amount of time during which irrigation at a premises may occur.

C. This subsection will not apply to athletic or playing fields, and tees and greens at golf courses, heavily used by the community, however these landscapes will be subject to a mandatory schedule or water budget to be developed in coordination with the Water Conservation Division and based on current conditions at the time of the declaration.

D. Watering is prohibited between the hours of 10:00 a.m. and 6:00 p.m., except when limited watering is essential to preserve turf subject to heavy public use.

E. Watering is prohibited on Mondays, except for irrigators operating under special exemptions as approved by the Director of Public Works.

F. Permissible watering shall be conducted without any water waste, pursuant to B.M.C. Section 40.02.1320.

Drought Rates:
Should the Commission adopt a water rate structure that incorporates the use of drought rates, a drought rate program may be used to increase awareness of the drought’s severity, assist in meeting water-use reduction targets through pricing signals and/or maintain the financial health of the utility.

Strategic Water Reserve:
Pursuant to the future adoption of a strategic water reserve by the Commission, the Commission may make water from the strategic water reserve available for use during a Stage 3 drought. Such action could reduce the severity of Stage 3 restrictions, or it could be used to delay or eliminate a Stage 4 drought response.

3.8.4 Stage 4 - Drought Emergency (Exceptionally Dry): Rationing
Description:
A Stage 4 drought activates a rationing program for Bozeman’s Water’s customers. Conditions that would lead to a Stage 4 drought are highly unlikely. However, if conditions warrant, Bozeman Water may implement a rationing program for an indefinite period of time to ensure, to the extent possible, that there is adequate water for essential uses. No outdoor watering will be allowed. Stage 4 drought restrictions will damage the quality of life in Bozeman Water’s service area, including the long-term loss
of landscapes. The exceedance method looks at the amount of time (expressed as a percentage) that the identified source held more water, had higher flows or snow water equivalent on the same date as the current measurement.

Indicators:

1. Projected percent exceedance of Hyalite Reservoir levels on that date are at or around 95% exceedance. See Table 2-5.
2. Watershed characteristics such as precipitation, snowpack, streamflow, wind and soil moisture indicate exceptional and prolonged dryness.
   a. Streamflow is at or around 98% exceedance.
   b. SNOTEL sites are at or around 95 % exceedance.
   c. Service-area precipitation indicates severe and prolonged dryness.
      i. Standard Precipitation Index is – 1.75. Table 2-4.
3. State water officials have declared drought conditions in the service area.

Use Reduction Target: 40% reduction of current use. This is a system-wide target, and individual or customer group-specific response measures should be implemented.

Drought Rates:
Should the Commission adopt a water rate structure that incorporates the use of drought rates a drought rate program is likely to be used to increase awareness of the drought’s severity, assist in meeting water-use reduction targets through pricing signals and/or maintain the financial health of the utility.

Strategic Water Reserve:
Pursuant to the future adoption of a strategic water reserve by the Commission, due to the severity of the situation, the Commission will likely make any water remaining in the strategic water reserve available for essential uses during a Stage 4 drought.

4 DROUGHT RESPONSE PROGRAM MEASURES
The program measures table below is meant to be a guide to water uses under various levels of drought restrictions. Bozeman Water reserves the right to modify these program measures as needed to meet changing water supply conditions. Any modifications made will be presented to the City Commission as part of its drought declaration and response recommendations.

<table>
<thead>
<tr>
<th>Element</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drought Watch</td>
<td>Drought Advisory</td>
<td>Drought Warning</td>
<td>Drought Emergency</td>
</tr>
<tr>
<td></td>
<td>Customer Outreach</td>
<td>Mandatory Restrictions</td>
<td>Ban on Lawn Watering</td>
<td>Rationing</td>
</tr>
</tbody>
</table>

36
<table>
<thead>
<tr>
<th>Outdoor watering</th>
<th>Turf grass</th>
<th>No restrictions.</th>
<th>Two days/week per mandatory schedule based on customer class and address.</th>
<th>No watering permitted.</th>
<th>No watering permitted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>New seed and sod</td>
<td>Permitted with exemption signage for establishment.</td>
<td>Permitted with exemption signage for establishment.</td>
<td>No watering permitted.</td>
<td>No watering permitted.</td>
<td></td>
</tr>
<tr>
<td>Trees, shrubs, perennials</td>
<td>Water efficiently.</td>
<td>May be watered by hand-held hose or low-volume non-spray irrigation on any day, not between 10 a.m. and 6 p.m.</td>
<td>Existing trees and shrubs may be watered by means of a hand-held hose or low-volume non-spray irrigation no more than once per week on scheduled day.</td>
<td>Not permitted, or use of hand-held hose or low-volume spray may be limited to no more than one assigned day per month.</td>
<td></td>
</tr>
<tr>
<td>Flowers, vegetables, and community gardens</td>
<td>No restrictions.</td>
<td>May be watered by means of a hand-held hose or low-volume non-spray irrigation on assigned watering days, not between 10 a.m. and 6 p.m.</td>
<td>May be watered by means of a hand-held hose or low-volume non-spray irrigation on assigned watering days, not between 10 a.m. and 6 p.m.</td>
<td>No watering permitted.</td>
<td></td>
</tr>
<tr>
<td>Athletic and playing fields</td>
<td>No waste of water.</td>
<td>Irrigated per mandatory scheduling or water budget restrictions.</td>
<td>Irrigated per mandatory scheduling or water budget restrictions.</td>
<td>No watering permitted.</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>Golf courses</td>
<td>No waste of water.</td>
<td>Irrigated per mandatory scheduling or water budget restrictions.</td>
<td>Trees and greens only.</td>
<td>No watering permitted.</td>
<td></td>
</tr>
</tbody>
</table>

**Water Features**

<table>
<thead>
<tr>
<th>Swimming pools</th>
<th>No restrictions.</th>
<th>No restrictions.</th>
<th>Single-family residential pools shall not be filled or refilled. Operation of other pools will be permitted.</th>
<th>No filling of pools.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other water features (fountains, splash pads, ponds and waterfalls)</td>
<td>No restrictions.</td>
<td>All ornamental fountains on City-owned property and in City owned buildings and splash parks are turned off.</td>
<td>All ornamental and splash parks are turned off.</td>
<td>All ornamental fountains and outdoor drinking fountains and splash parks are to be turned off.</td>
</tr>
</tbody>
</table>

**Washing/Events**

| Cars-washing at home       | With bucket or handheld hose with shutoff nozzle. | With bucket or handheld hose with shutoff nozzle. | Not permitted. Must use commercial car wash. | Not permitted. Must use a commercial car wash. |
| **Cars**-commercial car washes | No restrictions. | No restrictions. | No restrictions. | No restrictions. |
| Fleet vehicle washing | No restrictions. | Washing is limited to once every two weeks. | One time per month only for health and safety. | Not allowed unless for public health and safety reasons. |
| Street cleaning | No restrictions. | No restrictions. | No restrictions. | Extreme health and safety issues only. |
| Driveway and Sidewalk Washing | Use dry clean-up methods prior to washing. | Use dry clean-up methods prior to washing. High efficiency equipment required. | Washing and spraying on impervious surfaces (driveways and sidewalks) is prohibited. | Washing and spraying on impervious surfaces (driveways and sidewalks) is prohibited. |

**Commercial-Institutional Processes**

| **Restaurants** | No restrictions. | Restaurants encouraged to install high efficiency spray nozzles. | Water served only on request. | Water served only on request. |
| **Lodging** | No restrictions. | No restrictions. | Laundry restrictions. Must comply with Bozeman Water’s signage program. | Laundry restrictions. Must comply with Bozeman Water’s signage program. |
### Table 4-1: Drought Response Program Measures

<table>
<thead>
<tr>
<th>Construction Water</th>
<th>No restrictions.</th>
<th>Conserve and prevent wasting of construction water.</th>
<th>Conserve and prevent wasting of construction water.</th>
<th>Use of all construction water is prohibited unless necessary for air quality and public health and safety reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrants</td>
<td>No restrictions.</td>
<td>Hydrant flushing is prohibited unless necessary for public safety reasons.</td>
<td>Hydrant flushing is prohibited unless necessary for public safety reasons. Use of all water for fire training and use of water from hydrants is not permitted unless necessary for public safety.</td>
<td>Hydrant flushing is prohibited unless necessary for public safety reasons. Use of all water for fire training and use of water from hydrants is not permitted unless necessary for public safety.</td>
</tr>
</tbody>
</table>

## 5 DROUGHT RESPONSE PROGRAM ENFORCEMENT

The authority to enforce the water reduction targets provided in the Plan and Bozeman Water customers’ violations of the response measures is provided for in the Bozeman Municipal Code. Specifically, BMC Section 40.02.1270 establishes that the Director of Public Works, in concurrence with the City Manager, is authorized to restrict or wholly prohibit the outdoor use of the water supply. Bozeman Municipal Code Section 40.02.1330 further allows the Director of Public Works to take steps necessary to maintain adequate health and sanitation standards.

The Bozeman Municipal Code prohibits the waste of water whenever outdoor water use restrictions are in effect with penalties that include fines and discontinuation of water service in the event of a violation. The relevant code provisions are set forth in their entirety in Appendix D. Bozeman Municipal Code Section 40.02.1260 states that all provisions addressing outdoor water use restrictions are applicable to all persons both in and out of the city and regardless of whether any person using water has a contract
for water service with the city. Bozeman Municipal Code Section 40.02.1280 states that whenever outdoor watering restrictions are in effect, certain indoor uses are also not permitted. Additional provisions pertaining to the timing of outdoor watering, installation of new landscape, seeding, sodding or planting are set forth in BMC Sections 40.02.1290-1300.

Enforcement provisions for violations of drought response measures are set forth in BMC Sections 40.02.1340 – 40.02.1350. Violation of the watering restrictions and mandatory drought response measures constitutes a misdemeanor pursuant to BMC Section 40.02.1350. Upon conviction thereof, the violator shall be fined an amount not less than $100 and not more than $500.

Violators will be located based on citizen complaints received at 406.582.2280 from 8am to 5pm or via the Bozeman Water Conservation Division Website (www.bozemanwater.com) Drought Response Page. Bozeman Water will issue a warning letter to the customer notifying the water user that there has been a complaint. Individuals with numerous complaints will receive special attention by Bozeman Water’s enforcement team.

5.1 Drought Management Plan Updates
The Drought Management Plan should be updated regularly for the following reasons:

1. This is the first Drought Management Plan for the City, and it is based on a drought monitoring protocol that relies heavily on local drought monitoring parameters. The local drought monitoring parameters should be refined over time.
2. The City has recently added monitoring on Sourdough Creek and the East Gallatin River. As these data sources become more robust, they can be utilized by the City for drought monitoring purposes.
3. Demand volumes and patterns will likely change over time.
4. The City's infrastructure, specifically its raw water supply portfolio and distribution system, will grow and change over time.
5. Response actions identified herein may be improved upon, or new response actions may be identified.

It is recommended that the City update the Drought Management Plan at a minimum of every 5 years. However, if a moderate to severe drought is encountered, and in the process of monitoring and responding to that drought the City encounters weaknesses or gaps in the Drought Management Plan, then the Plan should be updated at that time.

Updates to the Plan will necessitate the re-establishment of the Drought Management Team and other vested stakeholders to provide subject matter expertise.
APPENDIX A – Drought Management Team

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Organization</th>
<th>Title</th>
<th>Drought Team Function</th>
<th>Responsibilities</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lain Leoniak</td>
<td>City of Bozeman</td>
<td>Water Resources Manager</td>
<td>Drought Plan Coordinator</td>
<td>Manage the Drought Team and the Drought Plan.</td>
<td>406-582-2280</td>
<td><a href="mailto:lleoniak@bozeman.net">lleoniak@bozeman.net</a></td>
</tr>
<tr>
<td>Craig Woolard</td>
<td>City of Bozeman</td>
<td>Public Works Director</td>
<td>Public Works Coordination</td>
<td>City Commission Drought Plan liaison. Direct oversight of PW divisions.</td>
<td>406-582-2273</td>
<td><a href="mailto:cwoolard@bozeman.net">cwoolard@bozeman.net</a></td>
</tr>
<tr>
<td>John Alston</td>
<td>City of Bozeman</td>
<td>Water and Sewer Superintendent</td>
<td>Water Distribution Impacts and Response, Leader of City Water Crews</td>
<td>Coordinate water distribution activities and utilize crews for monitoring water use during drought.</td>
<td>406-582-3203</td>
<td><a href="mailto:jalston@bozeman.net">jalston@bozeman.net</a></td>
</tr>
<tr>
<td>Brian Heaston</td>
<td>City of Bozeman</td>
<td>Senior Engineer</td>
<td>Water/Wastewater Infrastructure Contact</td>
<td>Support coordination of the Drought Plan.</td>
<td>406-582-2282</td>
<td><a href="mailto:bheaston@bozeman.net">bheaston@bozeman.net</a></td>
</tr>
<tr>
<td>Thom White</td>
<td>City of Bozeman</td>
<td>Superintendent</td>
<td>Parks and Recreation Coordinator</td>
<td>Manage City Parks and Recreation water usage and</td>
<td>406-582-3222</td>
<td><a href="mailto:twhite@bozeman.net">twhite@bozeman.net</a></td>
</tr>
<tr>
<td>Member Name</td>
<td>Organization</td>
<td>Title</td>
<td>Drought Team Function</td>
<td>Responsibilities</td>
<td>Phone Number</td>
<td>Email Address</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>--------------------------------------------</td>
<td>-----------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Patrick Lonergan</td>
<td>Gallatin County</td>
<td>Disaster and Emergency Coordinator</td>
<td>Disaster and Emergency Services Contact and Coordination</td>
<td>Disaster and emergency coordination and drought communications coordination.</td>
<td>406-528-2395</td>
<td><a href="mailto:plonergan@bozeman.net">plonergan@bozeman.net</a></td>
</tr>
<tr>
<td>Steve Crawford</td>
<td>City of Bozeman</td>
<td>Chief of Police</td>
<td>Law Enforcement</td>
<td>Enforcement of violations in severe drought stages.</td>
<td>406-582-2031</td>
<td><a href="mailto:scrawford@bozeman.net">scrawford@bozeman.net</a></td>
</tr>
<tr>
<td>Jill Miller</td>
<td>City of Bozeman</td>
<td>Water Treatment Laboratory and Compliance Coordinator</td>
<td>Water Treatment Plant Operations</td>
<td>Monitor and report water supply and demand information.</td>
<td>406-994-0503</td>
<td><a href="mailto:jmiller@bozeman.net">jmiller@bozeman.net</a></td>
</tr>
<tr>
<td>E.J. Hook</td>
<td>Montana State University</td>
<td>MSU Environmental Services Manager</td>
<td>MSU Drought Coordinator</td>
<td>Coordinate MSU water use and assist with drought communication to MSU community.</td>
<td>406-994-7840</td>
<td><a href="mailto:Edward.hook1@montana.edu">Edward.hook1@montana.edu</a></td>
</tr>
<tr>
<td>Tammy Swinney</td>
<td>Gallatin Local Water Quality District</td>
<td>District Manager</td>
<td>Gallatin County Water Supply Monitoring</td>
<td>Provide county water supply monitoring data and support</td>
<td>406-582-3145</td>
<td><a href="mailto:Tammy.swinney@gallatin.mt.gov">Tammy.swinney@gallatin.mt.gov</a></td>
</tr>
<tr>
<td>Member Name</td>
<td>Organization</td>
<td>Title</td>
<td>Drought Team Function</td>
<td>Responsibilities</td>
<td>Phone Number</td>
<td>Email Address</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>----------------------------</td>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Sean O’Callaghan</td>
<td>Gallatin County</td>
<td>Planning Director</td>
<td>Gallatin County Drought Plan Communications Coordinator</td>
<td>Coordinate / assist with county-wide drought planning and response and assist with drought communications.</td>
<td>406-582-3136</td>
<td><a href="mailto:sean.ocallaghan@gallatin.mt.gov">sean.ocallaghan@gallatin.mt.gov</a></td>
</tr>
<tr>
<td>Fred Jones</td>
<td>USFS</td>
<td>Fire Management Officer</td>
<td>Fire Management Coordinator</td>
<td>Fire condition monitoring, planning fire communications.</td>
<td>406-522-2545</td>
<td><a href="mailto:fjones@fs.fed.us">fjones@fs.fed.us</a></td>
</tr>
<tr>
<td>Kerri Strasheim</td>
<td>DNRC</td>
<td>Deputy Regional Manager</td>
<td>DNRC Coordinator</td>
<td>Assist with drought communications and response and regional water supply coordination.</td>
<td>406-556-4504</td>
<td><a href="mailto:kstrasheim@mt.gov">kstrasheim@mt.gov</a></td>
</tr>
<tr>
<td>Scott Buecker</td>
<td>AE2S</td>
<td>Project Manager</td>
<td>Drought Management Plan Point of Contact</td>
<td>Provide short-term, as-needed support and modifications to the drought monitoring tool.</td>
<td>406-219-2633</td>
<td><a href="mailto:scott.buecker@ae2s.com">scott.buecker@ae2s.com</a></td>
</tr>
</tbody>
</table>
## APPENDIX B - Drought Monitoring Tool Snapshot

### City of Bozeman

**Drought Monitoring**

**2016 Tracking**

<table>
<thead>
<tr>
<th>Month</th>
<th>Month</th>
<th>Value</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Value</td>
<td>4.14</td>
<td>5/16/2016</td>
</tr>
<tr>
<td>February</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>March</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>April</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>May</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>June</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>July</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>August</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>September</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
</tr>
<tr>
<td>October</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
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<tr>
<td>November</td>
<td>Value</td>
<td>4.20</td>
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<tr>
<td>December</td>
<td>Value</td>
<td>4.20</td>
<td>5/25/2016</td>
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</table>
APPENDIX C - Drought Monitoring Tool Calibration Snapshots

<table>
<thead>
<tr>
<th>Weighting</th>
<th>Bulk/Mass Energy/Resistance Units</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>Standard</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
<td>99%</td>
</tr>
<tr>
<td>50%</td>
<td>Dublin</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
<td>99%</td>
</tr>
<tr>
<td>30%</td>
<td>Reserve - Middle Creek</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
<td>99%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>Depth of Storage</th>
<th>Percent Increase</th>
<th>Percent Increase</th>
<th>Percent Increase</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>3000000</td>
<td>20%</td>
<td>50%</td>
<td>80%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Depth in Units</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-01-01</td>
<td>30</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
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<td>2018-02-01</td>
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<td>D1</td>
<td>D2</td>
<td>D3</td>
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<td>15</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
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<td>D2</td>
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<td>D3</td>
<td>D4</td>
</tr>
<tr>
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<td>D1</td>
<td>D2</td>
<td>D3</td>
<td>D4</td>
</tr>
<tr>
<td>2018-12-01</td>
<td>0</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
<td>D4</td>
</tr>
</tbody>
</table>

City of Bozeman
Drought Management Plan
January 2017
APPENDIX D – Bozeman Municipal Code Outdoor Watering Restrictions

DIVISION 4. - OUTDOOR WATER USE RESTRICTIONS

Sec. 40.02.1250. - Definitions.

A. For the purposes of this division, the following terms, phrases, words, and their derivations shall have the meaning given herein.

1. “Outdoor use” means the use of water, excepting water which has been used indoors and is being recycled for outdoor use, for:
   a. Sprinkling or irrigating gardens, lawns or other outdoor vegetation;
   b. Washing automobiles, trucks, or other mobile equipment except at places of business where such are washed on every business day either with attendants, with automatic equipment or by self-service;
   c. Washing sidewalks, driveways, outside building walls or other outdoor surfaces;
   d. Washing any business or industrial equipment machinery;
   e. Operating any ornamental fountain or other similar structure not employing a recirculating system;
   f. Swimming and wading pools not employing a filter and recirculating system;
   g. Leakage or other escape outdoors through defective plumbing when a person has knowingly permitted the defective plumbing to remain in disrepair;
   h. Settling back-fill around foundations, pipes, etc.; and
   i. Other outdoor uses except use for fire protection.

2. “Water” means water from the city’s water service utility.


Sec. 40.02.1260. - Application of restrictions.

A. The provisions of this division or any restriction or prohibition in force pursuant thereto shall apply as follows:

1. To all persons using water both in and outside the city, and regardless of whether any person using water shall have a contract for water service with the city; or

2. To persons contracting for water service at a location who shall be responsible and strictly liable for all water use at that location.


Sec. 40.02.1270. - Authority to restrict outdoor use of water.

The director of public works is, with the concurrence of the city manager, authorized, directed and empowered, whenever in the director’s opinion the necessities of the situation demand such action, to restrict or wholly prohibit the outdoor use of the water supply of the water service utility.
Sec. 40.02.1280. - Restriction of particular indoor uses.

Whenever outdoor use restrictions are in effect, business establishments which serve beverages for human consumption shall be prohibited from serving water except upon request.

Sec. 40.02.1290. - Sprinkling systems; timing.

Whenever outdoor use restrictions are in effect, the director of public works may set alternative time restrictions for the use of large scale sprinkling systems or those which are equipped with a timing device.

Sec. 40.02.1300. - Landscaping; seeding; sodding; planting.

While it is not the intent of this division to place restrictions on the normal conduct of business, whenever outdoor use restrictions are in effect, the director of public works may restrict or wholly prohibit the seeding, sodding or planting of live vegetation.

Sec. 40.02.1310. - Notice required.

Restrictions or prohibitions imposed by the director of public works shall become effective at midnight immediately following the publication of notice thereof in any daily newspaper published in the city.

Sec. 40.02.1320. - Wasting water prohibited.

Whenever outdoor use restrictions are in effect, no person shall waste water which shall include but not be limited to permitting water to escape or run to waste.

Sec. 40.02.1330. - Exception to maintain sanitation.

The director of public works shall have the authority to permit a reasonable use of water in any case necessary to maintain adequate health and sanitation standards.

Sec. 40.02.1340. - Enforcement.
A. Police officers to enforce. Every police officer of the city shall, in connection with the duties imposed by law, diligently enforce the provisions of this division.

B. Discontinuance of service. The city manager shall have the authority to enforce the provisions of this division by the discontinuance of water service in the event of violation hereof.


Sec. 40.02.1350. - Penalties.

Any person who violates this division or the restrictions issued hereunder shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not less than $100.00 or more than $500.00.


Sec. 40.02.1360. - Legislative intent.

It is the intent of the city commission that the criminal offense listed in this division shall be an offense involving absolute liability. Unless specifically provided otherwise, this offense shall not require proof of any one of the mental states described in MCA 45-2-101(33), (37), and (58).