

WATERWISE HELENA



A practical guide to understanding water in the Helena area.
Tips to save on water, time, and money – inside and out

Adapted from the City of Bozeman's, Water Smart Planting Guide, 2020:
<https://www.bozeman.net/government/water-conservation>

Created by the City of Helena's
Citizen Conservation Board



Lewis & Clark County
Water Quality Protection District

PUBLISHED JULY, 2021

WATERWISE HELENA



What does 'Water Wise Helena' mean?

- Understanding where our water comes from;
- Distinguishing the different sources throughout the Helena area, as well as their strengths and weaknesses;
- Realizing the many benefits of conserving water, no matter where you live; and
- Taking steps to conserve and protect our water.

We are dedicated to providing the tools and resources for you to make water wise decisions both inside and outside your home.

In Helena, it is important to remember that we do not receive very much precipitation during the summer months, with a climate that is considered a semi-arid desert (about 11-13 inches of rain annually).

With 50% of Helena's summertime water use going to lawns and landscaping, the easiest and best place to start saving water is right outside your door.

Use this guide to become water wise and start making your home, yard, and garden more water efficient.





Where does our water come from?



The City of Helena

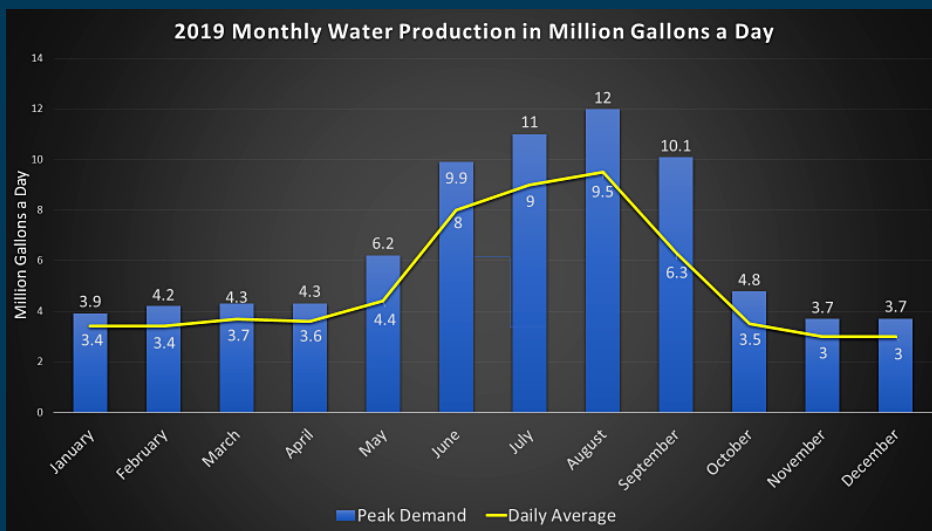
If you live within the City of Helena, your water comes from two major water sources: Tenmile Creek and the Missouri River Watersheds. For the majority of the year, your water is diverted from Tenmile Creek, treated at the city-owned-and-operated Tenmile Creek Treatment Plant, and sent to your home by gravity through a network of underground connections. During the summer when demand for water is higher, the City of Helena augments its supply with Missouri River water. This water is first pumped uphill and treated at the Missouri River Treatment Plant before making its way to your home. Because it has to be pumped uphill and because the water quality is not as high, Missouri River water costs the City upwards of 6 times more than Tenmile Creek water to deliver to residents.

Summer Water Usage

When the days are long, the weather is warmer and drier, and irrigation begins, our water usage as a community, as well as individuals, increases significantly. Improving our efficiency during the summer months is one of the most important things we can do to save on water and overall costs. There are a number of tips and tricks that you can do as an individual that we will discuss throughout this manual. The City of Helena also continues to work on a number of projects to improve its water efficiency, see page 10.

Tenmile Creek Watershed

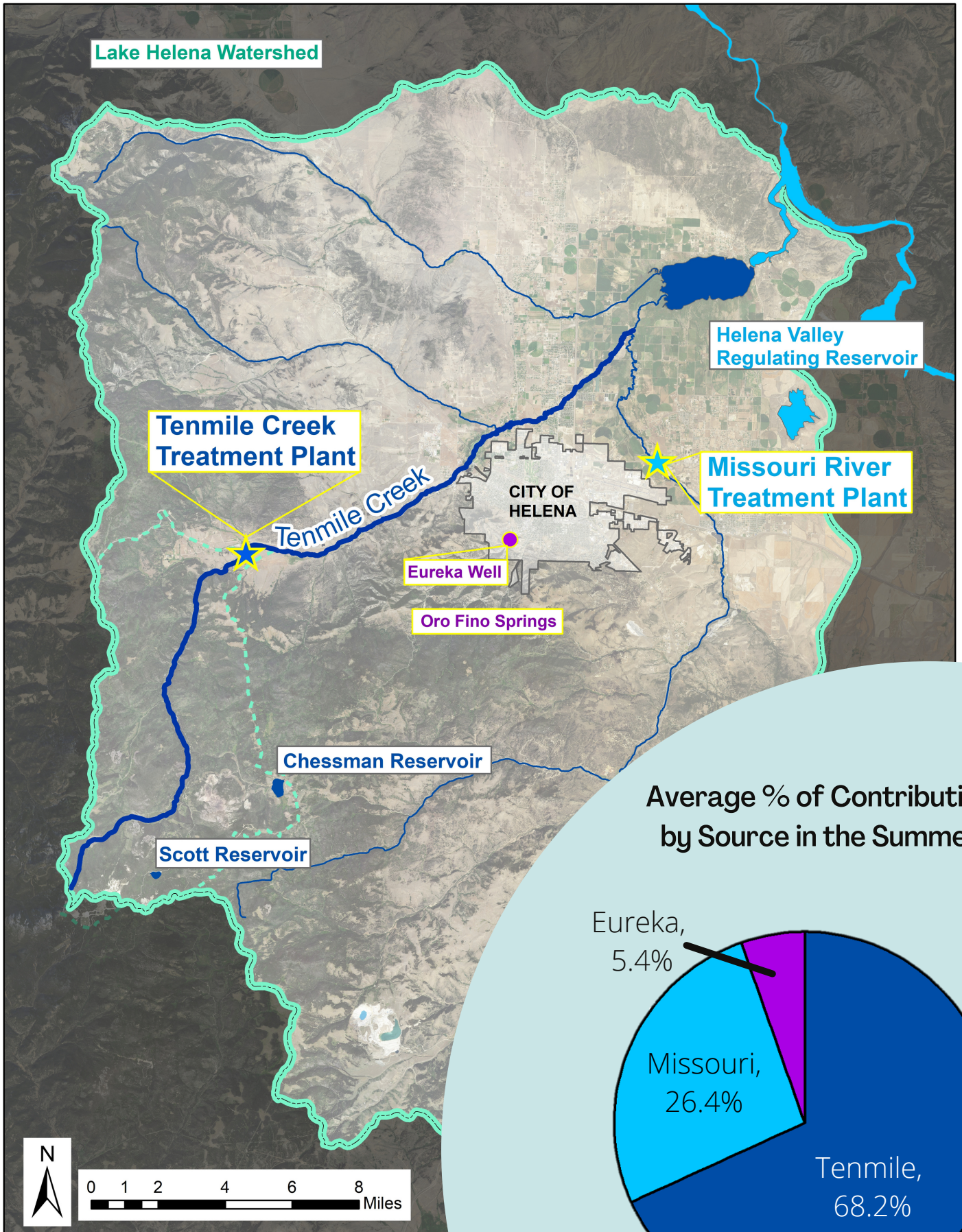
The upper Tenmile Creek Watershed was a rich place of hard rock mining primarily for gold, lead, zinc and copper, with active mining operations from the 1870s until the 1990s. Currently, there are over 150 abandoned mine sites in the Tenmile Creek Watershed. Because of the amount of contamination in soils and water from the mining activity, the upper portions of this watershed were designated by the EPA as a Superfund Site in the early 2000s. While there have been extensive monitoring, clean up, and restoration efforts completed for residential properties as well as the surrounding public lands, loading of heavy metals into Tenmile Creek and the groundwater supplies in the area remains an issue. Importantly, Helena's Water Treatment Plant meets high quality drinking water standards.



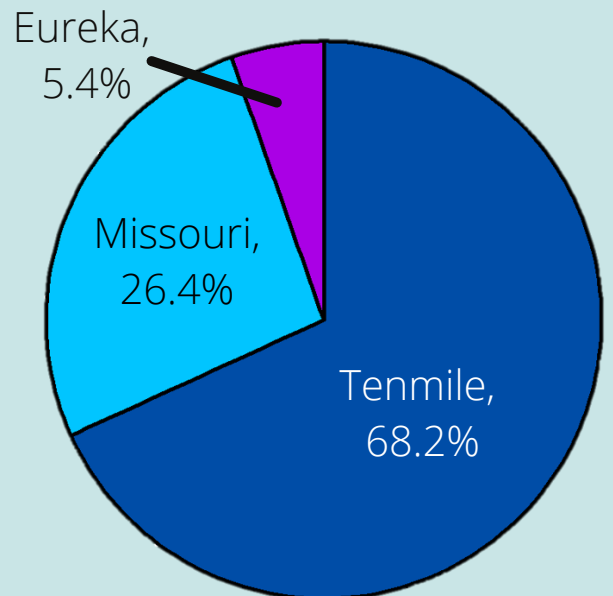
<https://www.helenamt.gov/water-quality-report>

To learn more about the Upper Tenmile and its restoration work and plans, please visit: <https://semspub.epa.gov/work/08/100001099.pdf>

Drinking Water Supplies for the City of Helena



Average % of Contribution by Source in the Summer





Water and the Helena Valley

If you live outside of the City of Helena's limits, what many of us refer to as "the valley," then your water is coming from groundwater supplies, or, 'aquifers.' You either have your own private well, or are connected to a community well and system. Both the quality and dependability of your groundwater supplies can be very different depending on where you live in the valley, and the aquifer it comes from. Community systems are regulated, and have to meet specific drinking water standards to operate. Private wells are unregulated, and it is up to the individual homeowner to make sure their well water is safe to drink.



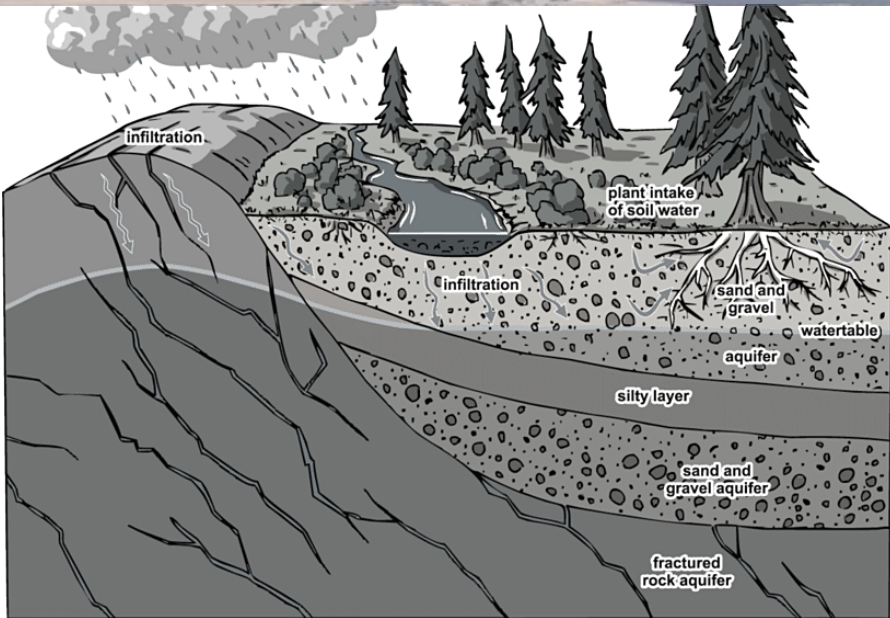
Helena Regulating Reservoir

Key Messages

from the Lewis & Clark County
Water Quality Protection District (WQPD):

- 1** Three major aquifers provide groundwater to Helena-area residents, each with different water quality and quantity risks.
- 2** Protect Yourself and Our Water.
- 3** Flooding is a natural occurrence and will occur periodically in the valley's floodplains.
- 4** Climate change is expected to impact our local water resources and our health.

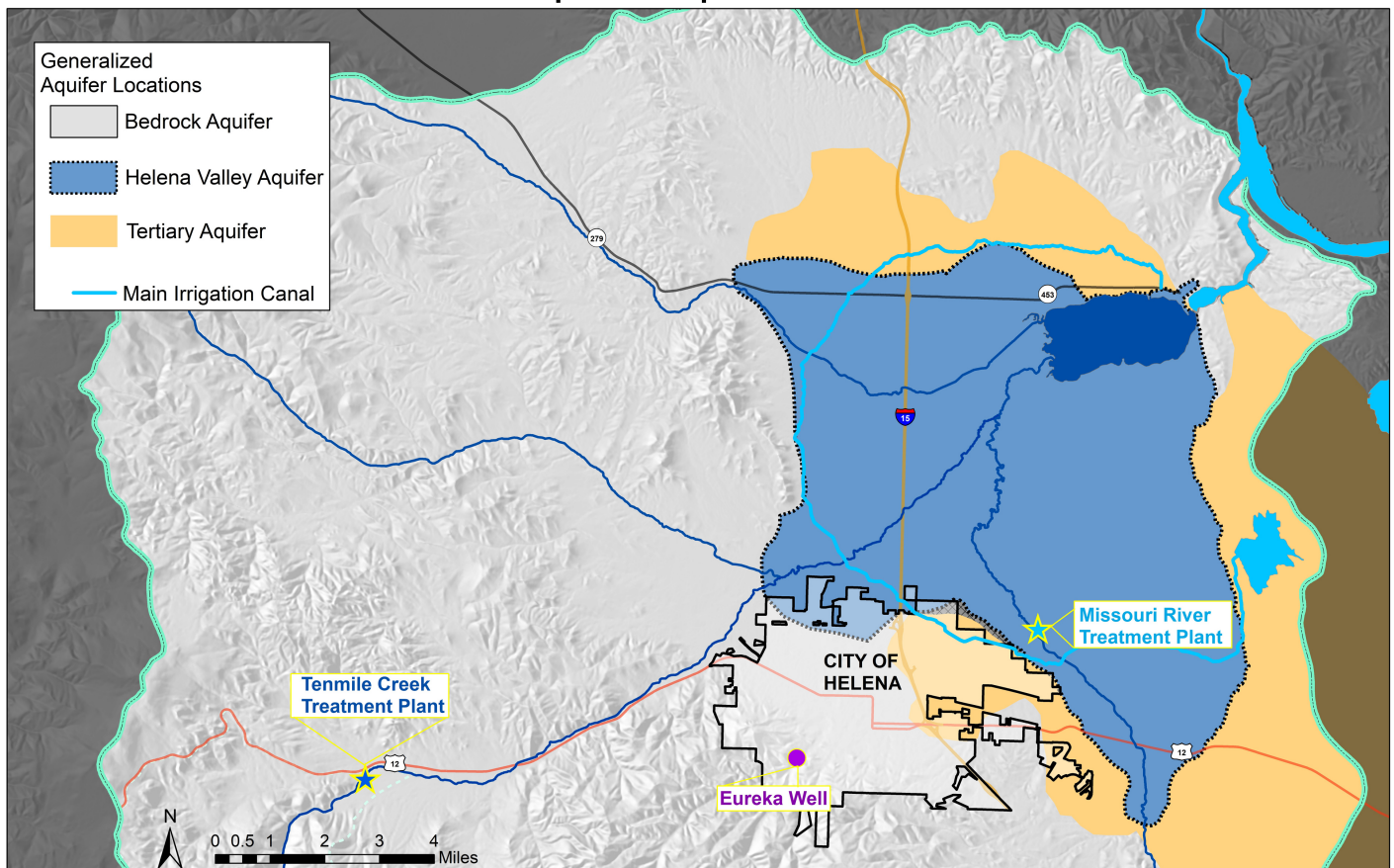
Three major aquifers provide groundwater to Helena valley residents, each with different water quality and quantity risks



Aquifer = Water stored underground in cracks and pores

Water availability for domestic-use wells in and around the Helena Valley is governed primarily by the structure and characteristics of the rock units from which the water is drawn. Because parts of the Helena Valley are different geologically, depth to groundwater and groundwater quality can vary significantly throughout the Helena Valley and adjacent areas.

Generalized Aquifer Map of the Helena Area



it is important to note that this map generalizes the aquifer locations and is only conceptual. It is not meant to be interpreted with any level of detailed accuracy

Helena Valley Aquifer (HVA)

The HVA consists primarily of sands, gravels and clays deposited over time by streams flowing through the Helena Valley.

Low Risk for water *quantity* problems

The HVA is shallow and recharged annually by streams and the irrigation canal. Depth to water is less than 30 feet.

Medium to High Risk for water *quality* problems

Shallow groundwater, shallow wells and the urban/suburban setting make the Helena Valley aquifer susceptible to contamination, particularly within floodplain areas and those areas at risk of flooding.

Recommendations: Residents should practice smart waste-management on their property, and be prepared for flooding if you live in or near the floodplains

Tertiary Aquifers

The tertiary aquifers flank the Helena Valley primarily to the North and East, and are rich in clay.

Medium to High Risk for water *quantity* problems

Depth to groundwater in this aquifer is deeper, and wells drilled in the tertiary have lower yields than the HVA. Depth to water varies from less than 100' to greater than 200'.

Low Risk for water *quality* problems

Deeper wells and clay-rich rocks make contamination of wells from surface pollutants less likely.

Recommendations: Implement water efficiency and conservation measures, particularly during summer months. Consider drilling deeper to bedrock that underlies the tertiary rocks.

Bedrock Aquifers

Bedrock aquifers are like the older rocks that you see in the mountains. They are variable in their ability to provide water, depending on the location, but are generally more reliable than the tertiary aquifers.

Low to Medium Risk for water *quantity* problems

Depending on the location, depth to water in local bedrock aquifers can be less than 50' to greater than 200'. Well yields are also variable.

Low to High Risk for water *quality* problems

Given the variability of bedrock aquifers, susceptibility to contamination from surface pollutants can be low to high based on the depth to water.

Recommendations: Residents should practice smart waste-management on their property and implement water efficiency and conservation measures, particularly during summer months.

Protect Yourself and Our Water

Test your water every other year

No matter where you live, the WQPD recommends that all residents test their water about every other year for: **E.coli, Nitrates, Arsenic, Uranium, and Fluoride**. These all have health-related concerns, and there are limits (Maximum Contaminant Levels or MCLs) for each that have been set by the Environmental Protection Agency to use as a benchmark for concern. It's important to note that anything that is close to or approaching these limits may still warrant action.

Contact the Water Quality Protection District (406-457-8584) for more information on testing, interpreting results, and possible next steps.

Protect your well-head.

Keep the area around your well clear of debris and waste, and be sure that the land slopes away from the well to help keep water and contaminants out.

Know where the water ponds and flows on your property and keep it away from your well.

Practice smart waste management on your property to protect our water

Excess fertilizers, yard clippings, as well as pet and animal waste manures contribute to nitrate pollution in our water. Keeping your yard clean of animal wastes, using fertilizers and pesticides sparingly, and composting or recycling yard waste can help reduce water pollution. It's important to properly operate and maintain septic systems to prevent failures and groundwater contamination.

Implement water conservation strategies, especially during summer months



E.coli (bacteria): presence of bacteria can cause diarrhea, stomach cramps, nausea and vomiting

Nitrates: The MCL for nitrates is 10 mg/L. Infants (under 6 months) can develop blue baby syndrome if exposed to high nitrates

Arsenic: The MCL for arsenic is 10 ug/L. Exposure to high arsenic can cause skin irritation and damage, circulatory problems, and increased risk of developing some cancers

Uranium: The MCL for uranium is 3 ug/L. Exposure to high uranium can cause kidney damage

Fluoride: has benefits to dental health (reduces cavities), but can have negative health impacts if too much is consumed over long periods of time, especially at a young age. The U.S. Public Health Service recommends keeping exposure near or less than 1 mg/L

Montana Climate Assessment

Water and Climate Change in Montana:

Wyatt F. Cross, John LaFave, Alex Leone, Whitney Lonsdale, Alisa Royem, Tom Patton, and Stephanie McGinnis

<https://montanaclimate.org/chapter/water>

KEY MESSAGES:

- Warming temperatures over the next century, especially during spring, are likely to reduce snowpack at mid and low elevations. [high agreement, robust evidence]
- Earlier onset of snowmelt and spring runoff will reduce late-summer water availability in snowmelt-dominated watersheds. [high agreement, robust evidence]
- Total annual streamflows are projected to increase slightly for most Montana rivers, but the magnitude of change across the state and agreement among models vary. [medium agreement, medium evidence]

“ A warming climate will strongly influence Montana’s snowpack, streamflow dynamics, and groundwater resources, with far-reaching consequences for social and ecological systems. [high agreement, medium evidence] ”

- Groundwater demand will likely increase as elevated temperatures and changing seasonal availability of traditional surface-water sources (e.g., dry stock water ponds or inability of canal systems to deliver water in a timely manner) force water users to seek alternatives. [high agreement, medium evidence]
- Changes in snowpack and runoff timing will likely increase the frequency and duration of drought during late summer and early fall. [high agreement, medium evidence]

Mid century and End of century

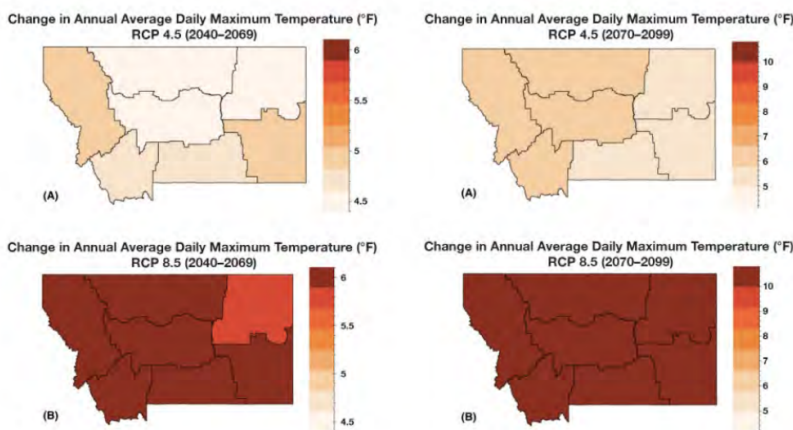
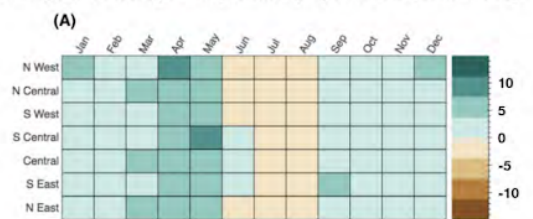


Figure III. The projected increase in annual average daily maximum temperature (°F) for each climate division in Montana for the periods 2049-2069 and 2070-2099 for (A) stabilization (RCP4.5) and (B) business-as-usual (RCP8.5) emission scenarios.

Figures from: Whitlock C, Cross W, Maxwell B, Silverman N, Wade AA. 2017. 2017 Montana Climate Assessment. Bozeman and Missoula MT: Montana State University and University of Montana, Montana Institute on Ecosystems. 318 p. doi:10.15788/m2ww8w

Change in Monthly Precipitation (in.) RCP 4.5 (2040-2069)



Change in Monthly Precipitation (in.) RCP 8.5 (2040-2069)

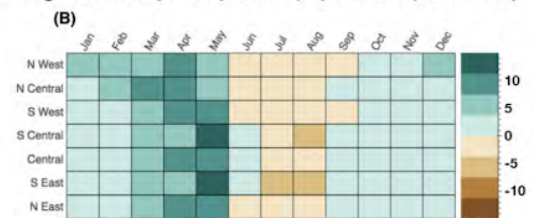


Figure 2-20. Projected monthly change in average precipitation (inches) for each climate division in Montana in the midcentury projections (2040-2069) for (A) stabilization (RCP4.5) and (B) business-as-usual (RCP8.5) emission scenarios.

Help us reach our goal!

As of 2019, the City of Helena and its users consume about **154** gallons of water for every person, every day. Our goal is to reduce that down to **100** gallons within the next 5 years.



Total City of Helena water usage by property type

40%
Commercial

16%
Multi-Family

44%
Single-Family

Source: Water Master Plan Update, Executive Summary. Advanced Engineering and Environmental Services, INC. December 2020

Take the first step: understand and begin tracking your water usage. Then, set goals for improvements.

Reading your water bill:

There are two main sections of your water bill from the City of Helena that generalizes your usage into 'units': The water (WA) service and the wastewater (SW) service. There are base fees and program fees associated with each 'Service'. The next line(s) of each section shows how much water and wastewater you use ('Consumption'). Water rates are "tiered" so you pay more as you use more (0-8, 9-15, 16+ units). See photo below.

It is important to note that 1 unit is equivalent to 748 gallons. In other words, if it displays 20 units of consumption, that may not sound like a lot, but that is equivalent to using 14,960 gallons (346 full bathtubs!) in one month's time

Tracking your Water Usage

Keeping a simple log of your units of consumption each month is one of the easiest and most informative tools to understanding your usage, and setting appropriate conservation goals for your household. Tracking your usage can also be used as a signaling system for any issues. For example, you will likely notice that your water usage has seasonal patterns, with increased usage in the summer when you water your garden and landscape, and drops during the winter months and stays relatively steady. If you see a large spike in January or February, this may be an indication of a major leak or other plumbing malfunctions. This log can be as simple as a notepad and pencil, or you can create one in an online data spreadsheet format, such as Microsoft excel.



If you have a private well or are connected to a public water supply well...

It is up to you to meter your own water usage! There are many options out there that either you or a professional plumber can install. Metering and recording the amount of water coming into your home and landscaping is the first best step to improving your home's water efficiency and water management.



Service	Period	Days	Meter Number	Consumption	
WA	5/06/21	6/10/21	35	49487504	
WA	SF WATER BASE				
WA	SF WATER USAGE 1-8			8.00	
WA	SF WATER USAGE 9-15			1.00	
WA	SF WTR LINE PROGRAM				
	TOTAL WATER				
SW	WASTEWATER BASE				
SW	WASTEWATER USAGE			2.00	
SW	WW SRVC LINE PROGRAM				
	TOTAL WASTEWATER				
	CURBSIDE RECYCLING				

The City of Helena is doing their part

The 2009 Climate Action Plan for the City of Helena identified 7 main goals:

1. Adopt water conservation rates ✓
2. Continue upgrades of water treatment facilities ✓
3. Adopt “lush and lean” landscaping practices
4. Study and develop community water conservation incentives
5. Develop an education and outreach program on water conservation ✓
6. Research and adopt a targeted program to regulate water use
7. Pursue water supply / municipal watershed protection ✓

Project Highlights

Water main line replacement

Two miles of distribution line were replaced in 2019 from the Ten Mile Water Treatment Plant to Baxendale, resulting in major water savings. Additional phases of replacing old, leaky infrastructure is on-going.

Hale Reservoir Lining

The Hale Reservoir, a brick-and-mortar building constructed in 1887, provides water to ~170 homes in Helena. In 2013, a leak test revealed a loss of 60,000 - 70,000 gallons of water each day. The City installed a liner in the system which will eliminate most of this leakage.

Wells for Parks

The City of Helena is planning to convert many of its major parks from using treated water for irrigation to utilizing groundwater wells. As of 2020, Both Hill and Women's Parks have been converted to well water for irrigation.

And you can do your part to save water too!



Over a half-million gallons per day saved from recent projects, and counting!



EPA's Checklist for Chasing Down Leaks

<https://www.epa.gov/sites/production/files/2017-02/documents/ws-ourwater-detect-and-chase-down-leaks-checklist.pdf>

The Bathroom:

- Toilets: Listen for running water and conduct the food coloring test described below.
- Faucets: Listen for drips and turn on the tap to check for water going the wrong direction.
- Showerheads: Turn on and look for drips or stray sprays that can be stopped with tape.
- In the tub: Turn on the tub, then divert the water to the shower and see if there's still a lot of water coming from the tub; that could mean the tub spout diverter needs replacing.
- Under the sink: Check for pooling water under pipes and rust around joints and edges.



The Laundry, Utility Room, and/or Basement:

- Under the sink: Check for pooling water under pipe connections.
- Clothes washer: Check for pooling water, which could indicate a supply line leak.
- Water heater: Check beneath the tank for pooling water, rust, or other signs of leakage.

The Kitchen:

- Faucet: Listen for drips and tighten aerators or replace fixtures if necessary.
- Sprayer: Check to make sure water is spraying smoothly and clean openings as needed.
- Under the sink: Check for pooling water under pipes and rust around joints and edges.
- Appliances: Check for pooling water underneath dishwashers and refrigerators with ice makers, which could indicate a supply line leak.

Toilets

Toilet leaks are the most common type of leak found inside the home, and can waste thousands of gallons a year. Fixing your leaky toilet is a cheap and easy way to save a ton of water!

Perform a Toilet Dye Test

1. Lift the tank cover.
2. Place a few drops of food coloring into the tank.
3. Wait 15 minutes (do not use the toilet).
4. If the color appears in the toilet bowl, you have a leak.

WaterSense Appliances, Faucets, and more

<https://www.epa.gov/watersense/residential-toilets>

"Whether remodeling a bathroom, starting construction of a new home, or simply replacing an old, leaky toilet that is wasting money and water, installing a WaterSense labeled toilet is a high-performance, water-efficient option worth considering."



For more details on investigating leaks, check out:

<http://www.smarthomewaterguide.org/>

<https://www.epa.gov/watersense/fix-leak-week>



Outdoor Watering and Landscaping: Best Practices for the Helena Area

7 Tips for a Water Wise Lawn

1. Use drought-tolerant sod or grass seeds

Tall Fescue blend sod is a locally available, drought tolerant cool season grass that requires less supplemental irrigation and overall maintenance than Kentucky bluegrass. Fescue blends tolerate heavy traffic, clay soils, are resistant to disease, and need less water to stay healthy.



After establishment, some drought tolerant seed mixes can survive without supplemental watering (except for extremely hot and dry conditions) and do not require regular mowing. Some options for this include:

- Sheep Fescue 'Covar'
- Fine Fescue Blends (hard, red and sheep fescues)
- Tuft Type Tall Fescue
- Native Streambank Wheatgrass

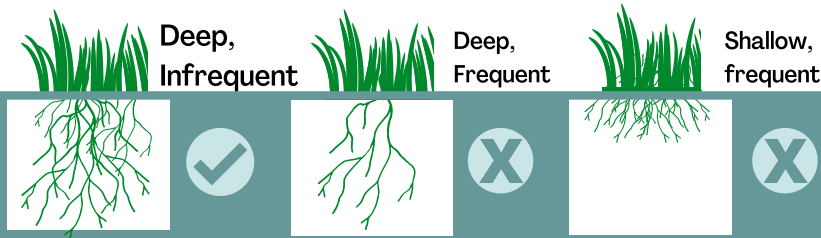


2. Make sure your sprinklers are working properly and efficiently

Check your sprinkler system for leaks, broken, and misaligned nozzles and repair anything needing fixed

3. Cycle and Soak, and water less frequently to encourage deep root growth

Break up total watering time into two or three cycles, allowing the lawn to rest in between cycles. This allows water to move **deeper into the soil profile, driving the roots deeper into the soil, making the lawn more drought tolerant and resistant to disease**



4. Water between 4 am and 8 am

Self-timing systems are relatively inexpensive, easy to install, and allows you to set the exact time your sprinklers turn on. Water evaporates during the middle of the day when it's hotter, so it's best to water in the middle of the night or early morning.

5. Try taking two minutes off the water times for each zone.

If that works and your lawn stays green, take off another two minutes. Water only when your lawn needs it.

6. Turn off your sprinkler system when it rains, or install a 'rain sensor'

7. Raise your mower blade

Keep your grass at least 3 inches long to keep the soil cool. This also helps the soil retain moisture.



Do it Yourself:

Collect Rain Water for Summer Use

Calculating Potential:

Before building any collection system, it's important to think about how much water we have the potential to harvest in any given year. While we live in a dry climate, receiving only 13 inches of rain annually, on average, you may be surprised just how much water you can collect off of the roof of your home, garage, or sheds

First, we will divide 13 by 12 to get the annual average rainfall in feet, which equals 1.08 feet. Then, we multiply that by the total square footage of the catchment area (the size of the roof, for example), as well as the number of gallons in a cubic foot (7.48 gallons in one cubic foot). The equation looks like this:

$$\begin{array}{l} \text{catchment area (square feet) } \times \text{ average rainfall (ft)} \\ \times 7.48 \text{ gallons/cubic foot} \\ = \\ \text{total amount of annual collection potential} \end{array}$$

For example, if you have a roof that is 30 feet by 50 feet (1,500 square feet), we would expect to be able to collect, on average, each year:

$$\begin{array}{l} 1,500 \text{ (square feet)} \times 1.08 \text{ (ft)} \times 7.48 \text{ gallons/cubic} \\ \text{foot} \\ = \\ \mathbf{12,118 \text{ gallons of rain water}} \end{array}$$

Building the System:

1. Select Location

This seems like an obvious first step, but it is important to stop and think about where the best location for your collection barrels will be. Are there existing gutters on the roof, if so, which way do they drain? Is there a particular side of the structure that will make it easier for watering? Is there a potential to connect the rain barrel system to existing trees, shrubs, or garden areas?

2. Choose design and materials

There are a variety of ways to construct a rain barrel collection system, ranging in cost, quality, and appearance. Any option will suffice, it comes down to how you would like it to look, the time you have to dedicate to the project, and how much money you would like to spend.

3. Build and Install

Example materials that can generally be sourced for free or at low cost



Food-grade barrels



Cinder blocks



Used pallets

Understanding SOIL

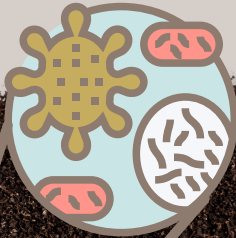
Healthy Soil, Healthy Plants, Less Water

Caring for the dirt below your lawn or planting beds is the first step to both a healthier yard and water savings. So take stock of your soil, show it some love with amendments like compost, and mulch your way to a happy, water-friendly landscape.

Did you know...

that in just one thimble of soil, there can be

MILLIONS of living organisms,
THOUSANDS of species,
a **KILOMETER** of mycelium



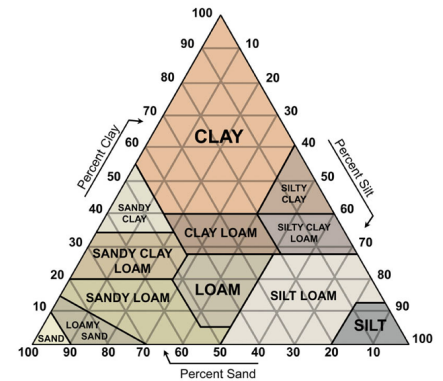
Soil Types

There are three main components of soil texture: sand, clay, and silt. The proportion of each determine your soil type. Knowing your soil type is critical to a healthy landscape and efficient water use. There are specific amendments for each soil type to make improvements. One of the most important characteristics of each soil type is its ability to drain and retain water. For example, soil rich in sand will shed water very quickly, and may require more frequent watering. In the Helena Valley, we have soil predominately rich in sand and gravels. Amending this soil type with compost and incorporating mulch can help improve the soil's ability to retain moisture. We do see areas with soils rich in clay, too, so it's important to determine your soil type to know for certain!



Determine your soil type with the mason jar test

Top layer will be clay
The next layer will be the silt particles
The bottom layer will be the heavier particles, sand, and rocks.



1. Use an empty jar with a tight lid. A pint or quart Mason jar works well.
2. Fill the jar about half full of soil.
3. Fill the jar nearly to the top with water. Leave room for shaking.
4. Tighten the lid and shake the jar for several minutes so that all the particles are in suspension.
5. Set your mason jar soil test aside for several hours, so the particles have a chance to settle. They will separate into clay, silt, and sand layers.



Mulch

The term 'mulch' is used to describe any organic material that is applied on the surface of the soil around the base of plants. Examples of 'mulch' include bark, leaves, and straw.

Benefits of Mulch

- Mulch helps hold in soil moisture
- It helps protect soil from erosion on steep slopes
- A well-mulched bed keeps weeds at bay
- Organic mulch (wood chips, straw, etc.) provides the soil with free nutrients
- Mulch insulates and regulates soils temperature. Hot summer days won't scorch your plants, and those trees, shrubs and perennials will stay cozy during cold, fall evenings.
- Adding mulch can help create a finished appearance to your landscaping beds.



Make the most of Mulch

1. Before adding mulch to bare soil – especially for newly planted shrubs and perennials – **make sure the soil surrounding the plant's roots is moist.** This hydration kick-start will ensure roots do not dry out between rains.
2. **Mix all of your preferred mulch components together before spreading it onto the soil.** This ensures a balanced interaction with air, moisture, light, and nutrients.
3. **Rake the full depth of a mulch layer at least once per season.** Some mulch, when regularly wet and exposed to extreme temperature changes, can grow mold if left unturned.
4. **Keep the depth of your mulch between 2-3 inches deep.** Adding too much mulch could risk the development of crown disease from excess heat and moisture, so only add mulch to a planting bed if there is less than three inches in depth (after applying water). On the other hand, having too little mulch won't properly regulate temperature or control plant water stress, or inhibit weed growth.

Adding Compost

Compost is decomposed organic material, and plants love it. You can purchase it or make it yourself from leaves, lawn clippings, vegetable waste, and coffee grounds. Compost improves air circulation in clay soils and nutrient retention in sandy soils. Plus, healthy plants in a well-composted landscape bed don't need to be watered as frequently. Most soils can be improved by adding compost, which helps retain water in the soil and at plant roots. Compost can be added to flower beds and gardens and before installing sod or planting trees and shrubs. Compost can also be used as a top dressing on existing lawns.

DIY Home Composting

Creating your own composting bins can be completely free. All it requires is some old scrap wood or pallets to create the structure (mostly to keep it contained and out of site). Typically, a 2 or 3 bin set up is preferable because it allows you to continue to add more materials as the older piles finish decomposing. All fruit and vegetable scraps can be composted, reducing the waste you send to the landfill. Stay away from adding any dairy and meat products. Your compost will not be hot enough to eliminate the harmful bacteria and it will smell rich and earthy!

Ingredient list - Think lasagna!

Materials: be sure to add 'brown' and 'green!' The 'brown' materials are sources of carbon in the compost – dead leaves, wood chips, cardboard. The 'green' materials are sources of nitrogen – lawn clippings, vegetable waste, coffee grounds.

Microorganisms: these are key to transforming materials into rich, compost. You can also add worms, manure, or compost starters.

Oxygen: needed for the microorganisms and speeds up the decomposition process. The compost pile must be turned regularly to ensure there is enough oxygen for the microorganisms.

Water: the compost pile should be watered regularly so the pile is damp, like a wrung-out sponge.



All of these ingredients work together to heat things up and create compost!



Sheet Mulching 101

What is it?

Sheet mulching is a technique used to convert sod, lawn, or compacted / poor soils to a different, often healthier, landscape. It requires no digging, no tilling, reduces or eliminates weed growth from below, and helps build up healthy soil rich in microorganisms and organic matter.

How it works:

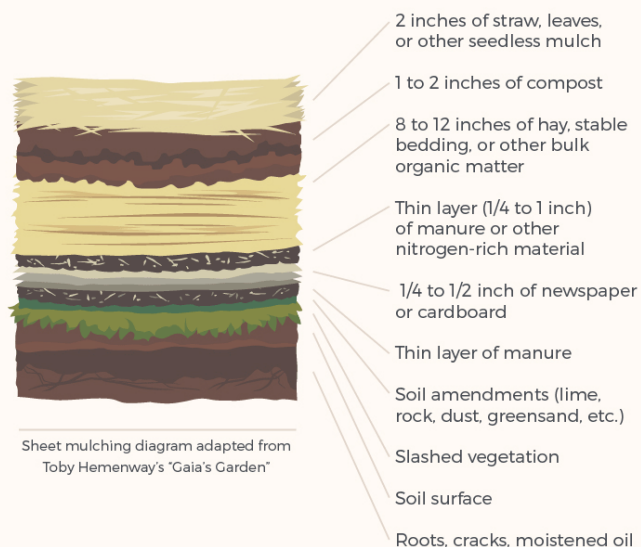
A weed barrier, followed by layers of organic and nutrient-rich material, is all you need to start building healthy soil and a new landscape. Often, these materials can be sourced from local farmers or other businesses at a low cost.

INSTALLATION:

1. Add a thin layer of manure or compost (~1")
2. Spread the cardboard/newspapers – this is the “sheet” or barrier. It's best to overlap and be sure to cover the cardboard seams with newspaper. If only using newspaper, ensure that the layers are up 1/8"-1/2" thick.
3. Water the sheets thoroughly as you go. This feeds the microorganisms and helps jump-start the decomposition process.
4. Add another 1-2" of manure or compost (food for the decomposers).
5. Add 8-12" of bulk material, watering every few inches to keep it damp (not wet).
6. Add 1-2" inches of compost
7. Final layer of mulch (1-3" wood chips, shavings, or straw).

Above: Montana Conservation Corps volunteers sheet mulch to help build what is now the 6th Ward garden park and food forest.

WHAT IS SHEET MULCHING



For more information, check out: 6thwardgardenpark.com/sheetmulching



WaterWise Helena Planting Guide

Creating Native, Drought-Tolerant Landscapes in Helena

A typical lawn requires a lot of water to keep green. Landscaping with drought-tolerant plants can help you water less--whether you replace a few high-maintenance flowers, a section of lawn, or redo your entire landscape. Choosing to landscape with native, and/or drought-tolerant plants has many benefits:

Environmental

- Improved Water and Soil Conservation
- Reduced Use of Petroleum Products
- Improved Air Quality/Carbon Sequestration
- Enhanced Wildlife Habitat for Pollinators
- Reduced Water Contamination

Economic

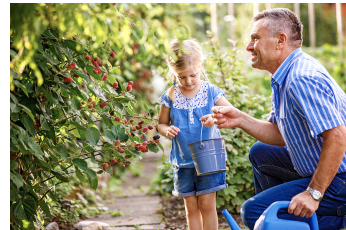
- Lower Water and Maintenance Costs
- Enhanced Real Estate Values
- Increased Survivability of Plantings
- Edible and/or Decorative Products

Aesthetic

- Increased Year-Round Visual Interest
- Increased Urban Wildlife Viewing
- Encouraged Link with Nature
- Enhanced Quality of Life

Tips for best survival

- Group plants according to their preferred soil, sun, and water conditions
- Keep weeds to a minimum while your new plants are getting established (1-3 years)
- Use mulch and/or compost around new plants to help retain moisture and block out weeds



The following plant lists are meant to be a starting point for your new water-wise landscape, but there are many more! Visit these sites for more species and ideas:

Native Plant Landscaping Resources for the Helena Area:

mtnativeplants.org

Montana State University Extension, Yard & Garden Resources:

store.msuextension.org

Creating Native Landscapes in the Northern Great Plains and Rocky Mountains:

nrcs.usda.gov

Pollinator-Friendly Plantings:

nrcs.usda.gov/

6th Ward Garden Park:

6thwardgardenpark.com

Plant Lists Key



Prefers Full sun



Will tolerate partial shade



Pollinator-friendly



Medicinal Uses



Edible

DT = Drought Tolerant

DROUGHT TOLERANT PLANTS

These plants generally don't need extra watering after the plant is established, unless there is a long dry spell. Plants are considered "established" usually two to three seasons after planting.

WaterWise Plant Lists for Your Landscape

Source: www.mtnativeplants.org

Wildflowers:

"Bee" a friend to the bees (and many others)! Many of these flowers are excellent for pollinators of all sorts: birds, bees, butterflies, and more. Many are drought-tolerant once established, which means little watering for you. Incorporate these native wildflowers for a beautiful, low-maintenance flower bed or pollinator garden.



	Common Name	Latin Name	Soil Type	Notes/Benefits
1	Beebalm, wild	<i>Monarda fistulosa</i>	sand	
2	Blanketflower	<i>Gaillardia aristata</i>	sand to loam	DT
3	Coneflower, purple	<i>Echinacea augustifolia</i>	sand to loam	DT
4	Dotted gayfeather	<i>Liatris punctata</i>	sand to loam	DT
5	Hairy golden-aster	<i>Chrysopsis villosa</i>	light to medium texture	
6	Larkspur, little	<i>Delphinium bicolor</i>	loam	
7	Penstemon, fuzzy-tongue	<i>Penstemon eriantherus</i>	sandy, gravelly	DT
8	Sunflower, prairie	<i>Helianthus maximiliani</i>	sand	DT
9	Bitterroot	<i>Lewisia rediviva</i>	sand to gravelly	
10	Coneflower, prairie	<i>Ratibida columnifera</i>	sand to loam	DT
11	Crazyweed, rabbit-foot	<i>Oxytropis lagopus</i>	sand to loam	
12	Cut-leafed Daisy	<i>Erigeron compositus</i>	sand; rocky	
13	Forget-me-not	<i>Eritrichium howardii</i>	limestone	
14	Hoary chaenactis	<i>Chaenactis douglasii</i>	sand to loam	

Wildflowers (continued):



	Common Name	Latin Name	Soil Type	Notes/Benefits
15	Lupine, silvery	<i>Lupinus argenteus</i>	sand to loam	☀️
16	Phacelia, silverleaf	<i>Phacelia hastata</i>	sand	☀️
17	Jacob's ladder	<i>Polemonium pulcherrimum</i>	sand	☀️ ❤️
18	Prairie Smoke	<i>Geum triflorum</i>	loam	☀️
19	Rocky Mountain douglasia	<i>Douglasia montana</i>	sand	☀️
20	Scarlet Gilia	<i>Ipomopsis (Gilia) aggregata</i>	sand to loam	☀️ DT
21	Stemless Hymenoxys	<i>Hymenoxys acaulis</i>	calcareous rocky	☀️
22	Stonecrop, lance-leaved	<i>Sedum lanceolatum</i>	rocky; thin soil	☀️
23	Townsendia, Hooker's	<i>Townsendia hookeri</i>	sand to loam	☀️
24	Townsendia, Parry's	<i>Townsendia parryi</i>	sand to loam	☀️
25	Twinpod, common	<i>Physaria didymocarpa</i>	sand	☀️
26	Vaseflower; sugar bowl	<i>Clematis hirsutissima</i>	loam	☀️
27	Violet, yellow prairie	<i>Viola nuttallii</i>	loam	☀️
28	Wyoming kittentails	<i>Besseyia wyomingensis</i>	loam	☀️

WaterWise Plant Lists for Your Landscape

Source: www.mtnativeplants.org

Ground Covers

Typically, 'ground covers' refer to low-lying, spreading plants that are often used to cover bare ground and to stop weeds from growing. An added bonus to these perennial, Montana-native ground covers is that a number of them are edible and can be used medicinally. As with many native Montana plants, all of these ground covers prefer drier conditions, and require little to no supplemental watering once established, except for during extended drought periods.


















	Common Name	Latin Name	Soil Type	Notes/Benefits
1	Buckwheat, sulfur	<i>Eriogonum umbellatum</i>	medium to coarse	☀️ 🦋
2	Juniper, Creeping	<i>Juniperus horizontalis</i>	sandy, rocky	☀️ 🐦 🍏
3	Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	medium to coarse	☀️ 🐦 ❤️
4	Oregon Grape	<i>Berberis repens</i>	medium to coarse	☀️ ❤️ 🍏
5	Phlox species	<i>Phlox spp.</i>	fine to coarse	☀️ 🐝
6	Pussy-toes species	<i>Antennaria spp.</i>	fine to coarse	☀️
7	Wild Strawberry	<i>Fragaria virginiana</i>	tolerant of poor soil	☀️ 🐦 🍏

WaterWise Plant Lists for Your Landscape

Source: www.mtnativeplants.org

Shrubs

These perennial shrubs require minimal supplemental water once established, attract many native birds and pollinators, and some produce delicious berries for you and your friends and family to enjoy! Use these shrubs as the 'skeleton' of your landscape, or incorporate one or two as statement pieces.

	Common Name	Latin Name	Soil Type	Notes/Benefits
1	Buffaloberry	<i>Shepherdia spp.</i>	Sand to loam	
2	Chokecherry	<i>Prunus virginiana</i>	Sand to loam	 DT
3	Cinquefoil	<i>Potentilla fruticosa</i>	Sand to loam	
4	Currant, Golden	<i>Ribes aureum</i>	Sand to clay	 DT
5	Elderberry	<i>Sambucus canadense</i>	Rich, rocky	
6	Lilacs	<i>Syringa vulgaris</i>	Well-drained	 DT
7	Mountain-Mahogany	<i>Cercocarpus ledifolius</i>	Sand to loam	
8	Nanking Cherry	<i>Prunus tomentosa</i>	Well-drained	 DT
9	Rabbitbrush	<i>Chrysothamnus spp.</i>	Sand to clay	
10	Rose, Wood's	<i>Rosa woodsii</i>	Sand to loam	
11	Sagebrush species	<i>Artemisia spp.</i>	well-drained	 DT
12	Siberian Pea Shrub	<i>Caragana arborescens</i>	Gravelly; sand to loam	 DT
13	Snowberry	<i>Symphoricarpos albus</i>	Gravelly; sand to loam	 DT
14	Sumac, Skunk-Bush	<i>Rhus trilobata</i>	Sand to clay	 DT
15	Yucca	<i>Yucca glauca</i>	Sand to loam	 DT



WaterWise Plant Lists for Your Landscape

Source: www.mtnativeplants.org

Grasses

Bunchgrasses are a beautiful, drought-tolerant addition to any landscape. Other lawn alternatives such as Blue Grama, Buffalo Grass, or even Yarrow, can keep your lawn green and lush with much less water required to keep it healthy and looking nice. Fescue sod blends are typically more drought-tolerant than kentucky bluegrass.

	Common Name	Latin Name	Notes/Benefits
1	Blue Grama	<i>Bouteloua gracilis</i>	lawns; sod former
2	Buffalo Grass	<i>Buchloe dactyloides</i>	lawns; sod former
3	Fescue, Idaho	<i>Festuca idahoensis</i>	bunchgrass
4	Fescue, Sheep	<i>Festuca ovina</i>	good lawn alternative; sod-former
5	Indian Ricegrass	<i>Achnatherum hymenoides</i>	bunchgrass
6	Junegrass, prairie	<i>Koeleria macrantha</i>	bunchgrass
7	Little Bluestem	<i>Schizachyrium scoparium</i>	
8	Pinegrass	<i>Calamagrostis rubescens</i>	Sod former; good under conifer trees
9	Purple Threeawn	<i>Aristida pupurea</i>	bunchgrass
10	Wheatgrass, bluebunch	<i>Agropyron spicatum</i>	Montana State grass; bunchgrass
11	Yarrow	<i>Achillea millefolium</i>	Not a grass, but a good lawn alternative



WATERWISE HELENA



**City of
Helena**



Lewis & Clark County
Water Quality Protection District

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