

GREATER YELLOWSTONE AREA **XERISCAPING**

A Guide for Landscaping *with Less Water*

THE GREATER YELLOWSTONE COORDINATING COMMITTEE

SUSTAINABLE OPERATIONS SUBCOMMITTEE REPRESENTATIVES:

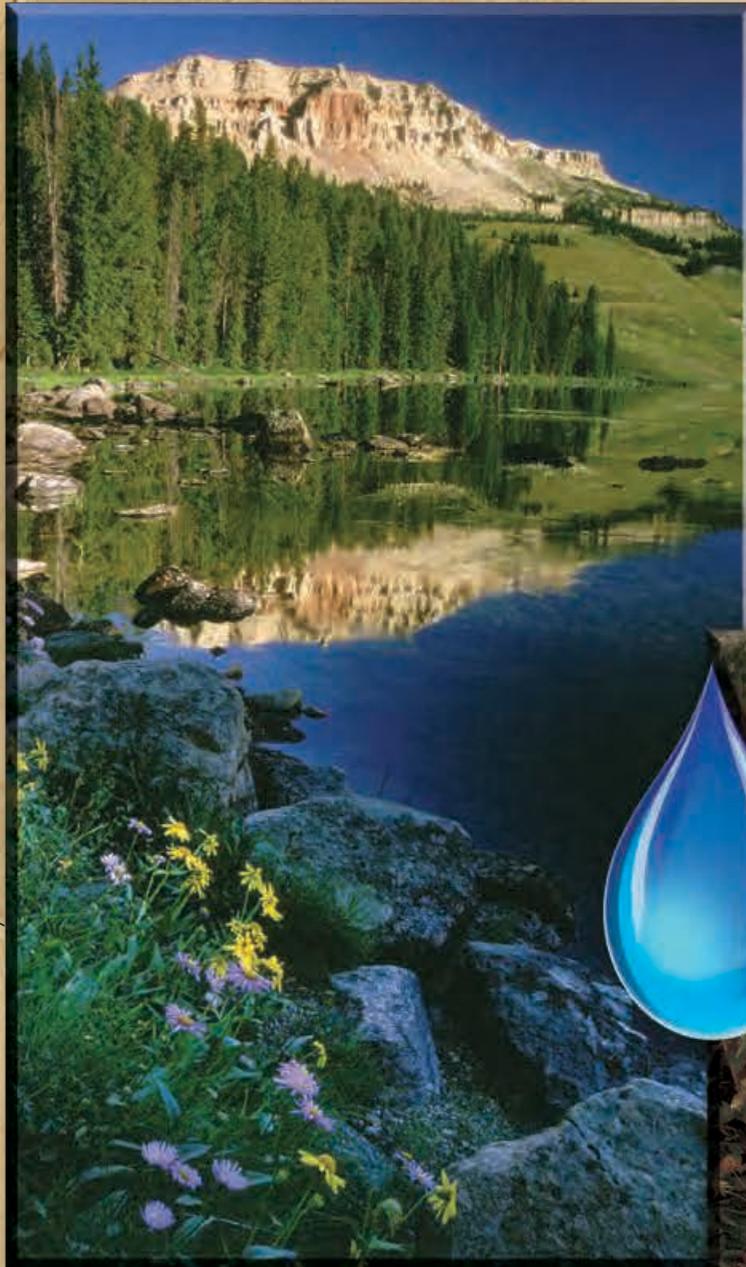
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Beartooth Mountains Photo courtesy of Bob Kurzenhauser

Bozeman, MT Photo courtesy of Blanchford Landscaping



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WATER: Our Most Valuable Resource



THE GREATER YELLOWSTONE AREA (GYA)

is the headwaters of the Missouri, Snake, and Green rivers. These rivers feed the mighty Columbia, Mississippi, and Colorado rivers. Our lush mountain meadows, forests, arid sagebrush prairies, smallest towns to ever-growing urban areas, and farmlands depend on water for life. Water is perhaps our most valuable natural resource, integral to the health of our spectacular landscape.

Water resources in the GYA, with some of the faster-growing counties of the United States, will realize unprecedented pressure to satisfy human needs. The Federal lands that form the core of the GYA provide water for agriculture, tourism, recreation, household, business, and landscape use.

Water conservation has been identified as a priority by the Greater Yellowstone Coordinating Committee (GYCC), the GYA Federal land managers collaborative of the U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, and Bureau of Land Management. In addition to water conservation, the GYCC has identified actions to reduce greenhouse gas production. Water conservation helps achieve this goal, since less water used for landscaping means less energy required for pumping.



Water is a resource we all share—along with the responsibility to use it wisely.

XERISCAPING

A Practical Alternative to Traditional High Water Use Lawns and Landscaping

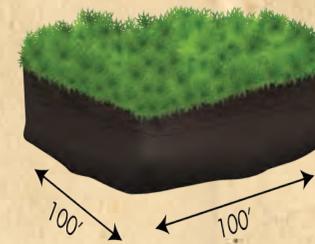
The term “xeriscape,”[©] originally used by the Denver Water Department, combines the words “xeric,” which means dry or arid, and “landscape.” The goal of xeriscaping is to develop functional and beautiful landscaped areas that require less water. Xeriscape does not mean *zeroscape*, which may conjure images of large expanses of concrete, asphalt, or rocks surrounding a lone cactus or juniper.

Often in landscaping, the overwhelmingly dominant element is traditional lawn grass like Kentucky bluegrass which is popular around homes and commercial areas. However, to maintain a lush green Kentucky bluegrass lawn throughout the summer requires an enormous amount of water. About half of the water used in urban areas during the summer months is for maintaining landscaping, particularly traditional Kentucky bluegrass lawns.

TRADITIONAL LAWN

An average traditional 10,000 square-foot Kentucky bluegrass lawn:

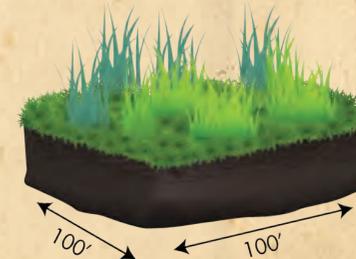
- requires 3,800 gallons of water per week
- requires 54,340 gallons of water per growing season
- costs on average \$353.50 per growing season for electricity for pumping



XERISCAPE LAWN

A typical 10,000 square-foot xeriscaped area:

- requires 2,318 gallons of water per week
- requires 33,142 gallons of water per growing season
- costs on average \$202.50 per growing season for electricity for pumping



Figures based upon these assumptions:

- the average length of the growing season in the GYA is 100 days (14.3 weeks)
- the average natural precipitation in the GYA is 0.38" per week, 19.75" per year
- xeriscaping provides on average about a 39% reduction in water usage over traditional landscaping
- traditional lawns require, on average, 1" of water per week, and xeriscape landscaping requires on average about 0.6" of water per week
- costs based on average local utility rates

References: Sovocool and Rosales, 2001, a 5-year investigation into the potential water and monetary savings of residential xeriscape in the Mojave desert AWWA Annual Conference Proceedings, June. Washington D.C. Southern Nevada Water Authority, NV.

Sovocool, 2005, Xeriscape Conversion Study, Southern Nevada Water Authority Final Report.

PLANNING AND DESIGN

Zoning for Site Uses, Conditions, and Plant Needs

INVENTORY YOUR SITE. Determine all the challenges and opportunities on your site including:

- uses (existing and desired)
- desirable or undesirable views
- sunny or shady areas
- wet or dry areas
- wind direction
- slope
- existing plants, landscaping or natural features to retain
- existing utilities and underground structures



Bozeman, MT. Photo courtesy of Blanchford Landscaping

BUILDINGS

HIGH WATER USE AREA: Sometimes referred to as the “oasis” zone, this area is often located close to buildings for maximum enjoyment, play areas for children and pets, or to create “curb appeal.”

Traditional lawn grass may be used sparingly to create a dramatic contrast with xeriscaped areas.

MODERATE WATER USE AREA: This is often the “transition zone” between high and low water use areas and is designed to require less frequent watering and less human activity.

LOW OR NO SUPPLEMENTAL WATER AREA: Often located farthest away from buildings, it is designed to need infrequent or no supplemental watering, except during prolonged dry periods, after plants are established. This area often receives little or no human activity and may serve as a visual backdrop to the foreground “oasis” and “transition” zones.

As you develop your plan, create zones or areas based upon:

- amount of water or sun the plants need
- aesthetic goals for landscaping
- planned uses for your site

PLAN AND DESIGN TO REDUCE WATER NEEDS

- Limit the use of traditional Kentucky bluegrass lawn or other high water use plants to only where you want a small “oasis” for activities such as entertaining, children or pets playing, or simply for the “look” of a traditional lawn and lush vegetation.
- Replace some lawn with hardscape materials such as flagstones or concrete pavers, or with mulched beds of showy perennials to create dramatic variety.
- Use water efficient grasses in moderate or low water use areas or low activity areas. Consider leaving those areas unmowed to enjoy visual contrast and variety.
- Solve challenging steep or hot and dry areas with a combination of hardscape materials, plants, or mulch.

Save some water by xeriscaping portions of your landscape. Save more water by xeriscaping your entire landscape.



Cody, WY Photo courtesy of K3 Ranch



Bozeman, MT Photo courtesy of Jennifer Weiss



Bozeman, MT Photo courtesy of Jennifer Weiss



Ruby Valley, MT Photo courtesy of Greenspace Landscaping

SOIL SECRETS FOR SUCCESS

Good Soil Supports Healthy Plants With More Efficient Use of Water.

GOOD SOIL HAS:

- water holding capacity
- adequate amount of organic material
- readily available nutrients
- good drainage

UNDERSTANDING & IMPROVING YOUR SOIL

In the GYA, our soils are highly variable and largely a function of the geologic parent resulting from various forces and factors like volcanism, glaciers, hydrothermal, topography, and elevation. Because of this variability across the GYA it is important to consider your site's specific soil. Knowing your soil's properties will help you determine if it needs to be improved.



SAND is grainy, rough and coarse. It drains well, warms up quickly, and when compressed, does not hold its shape. Sand is an excellent addition to other soils that lack drainage.



LOAM generally contains equal parts of silt and sand, with a bit less clay. It is the ideal soil for most plants. However, some plants have a preference for sandy soil, and others prefer clay soil. Loam works best for xeriscape landscaping since it holds plenty of moisture while draining well, allowing sufficient air to reach the roots, and roots can penetrate the soil easily.



SILT is a powdery combination of smooth and gritty particles that are smaller than sand. When wet and formed into a ball, silt is malleable. Silt can be very slippery when wet and has a tendency to erode, but provides good nutrient retention and can be broken to allow plant roots to penetrate.



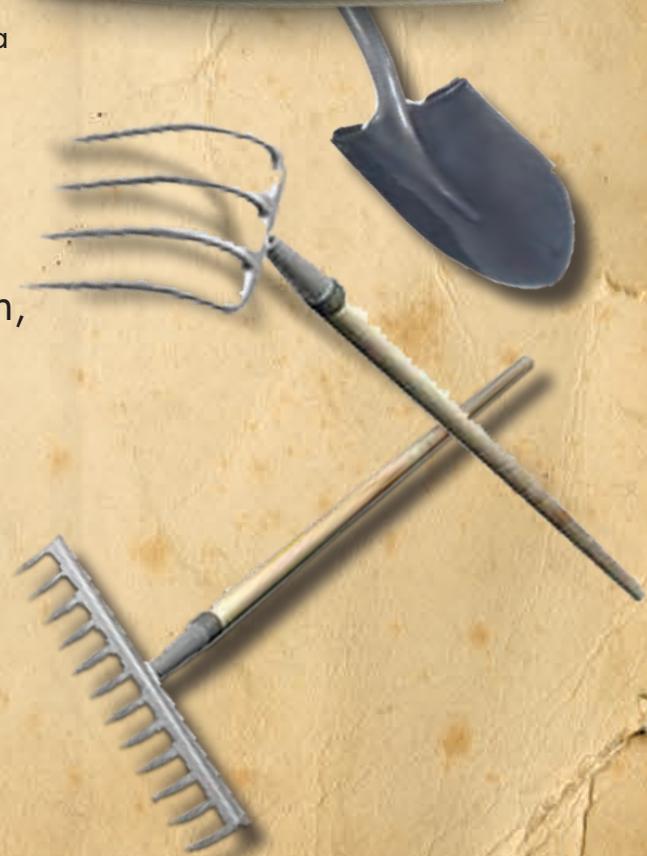
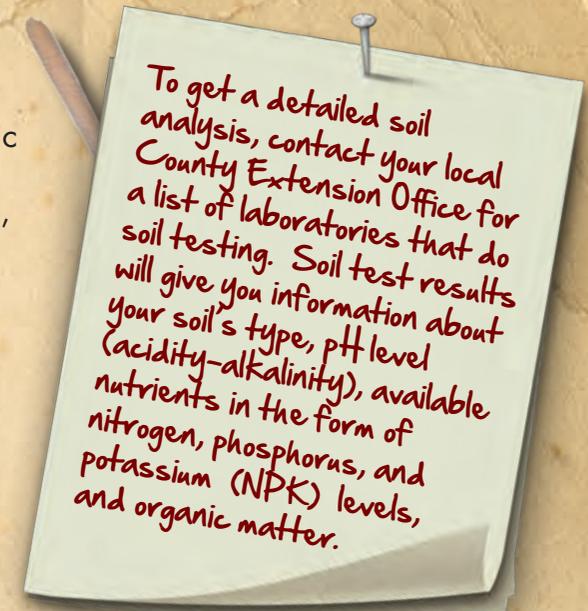
CLAY is finely textured, feels sticky when wet and has the smallest particles. It forms a strong ball that holds its shape when compressed. Clay has good water holding capability and nutrient retention, but has poor drainage and is slow to warm up. It is difficult to plant into clay soil as it tends to dry into hard clumps and forms a concrete-like hardness that is almost impossible for plant roots to penetrate or thrive in.

STRUCTURE YOUR SOIL FOR SUCCESS...*BEFORE* YOU PLANT

If your soil has:

- **poor water holding capacity**, such as silty or sandy soils, then work in about 3" of organic matter such as decomposed manure, compost, or decomposed wood chips into the top 6" to 12" of your planting area. Example: for a 20' x 20' planting area with very silty or sandy soil, mix in about 4 cubic yards of organic materials.
- **poor drainage**, such as very clayey soils, first till and break up the compacted soil layers to a depth of at least 12" or more. Add not more than 20% coarse materials such as sand or fine gravel. Equally, or even more important, add and mix in organic matter like decomposed manure to aerate the soil.
- **low nutrient levels**, add organic matter such as decomposed manure, compost, or organic fertilizer. As the organic materials break down they provide nutrients that are more readily available to the plants: nitrogen (N) for healthy foliage, phosphorus (P) for strong stems and good root development, and potassium (K) for flower, fruit, and seed development. After decomposition, the organic materials leave humus which aids in binding the soil particles into a stable medium which helps plants thrive.

After you have amended your soil so it holds water but still drains adequately and contains some organic material for nutrients and aeration, your plants can become successfully established for the long term and be able to withstand longer time periods with less water.



PLANT SELECTION

Function and Aesthetics

SELECT AND LOCATE PLANTS TO ACHIEVE YOUR FUNCTIONAL AND AESTHETIC GOALS WHILE MAXIMIZING WATER EFFICIENCY:

- control erosion
- frame and enhance views or block views for privacy
- provide shade
- create outdoor “rooms”
- buffer wind
- provide dramatic color and contrasts in line, form, color, and texture
- create year-round interest
- form a higher visual backdrop for lower growing showy plants
- link to the natural surroundings to enhance the “sense of place”



Bozeman, MT Photo courtesy of Jennifer Weiss



Paradise Valley, MT
Photo courtesy of Linda Iverson Landscape Design



Bozeman, MT Photo courtesy
of Cashman Nursery



Big Timber, MT Photo courtesy of
Blake Nursery and Landscaping

PLANT SELECTION: RIGHT PLANT IN THE RIGHT PLACE

Look at a plant's tag to determine if it will help you achieve your goal of reducing your use of water and be suitable for the location you have chosen.

PLANT CHARACTERISTICS

ZONE WHERE PLANT WILL THRIVE

DROUGHT TOLERANCE AND WATER NEEDS

Water Requirements based upon the needs of fully established plants (at least 1-3 years old)	Drought Tolerance	Water Needs (in addition to natural precipitation)	Soil Moisture Levels (somewhat dependent upon soil type)
Very low	High to very high	No additional water is required once plant is established	Constantly dry
Low	Moderate to high	1/2"- 3/4" every other week during extended dry periods	Soil will be dry in the top 2"- 6" moist below 6"
Moderate to high	Moderate to low	3/4"-1" once a week during extended dry periods	Soil will be moist most of the time below 2"

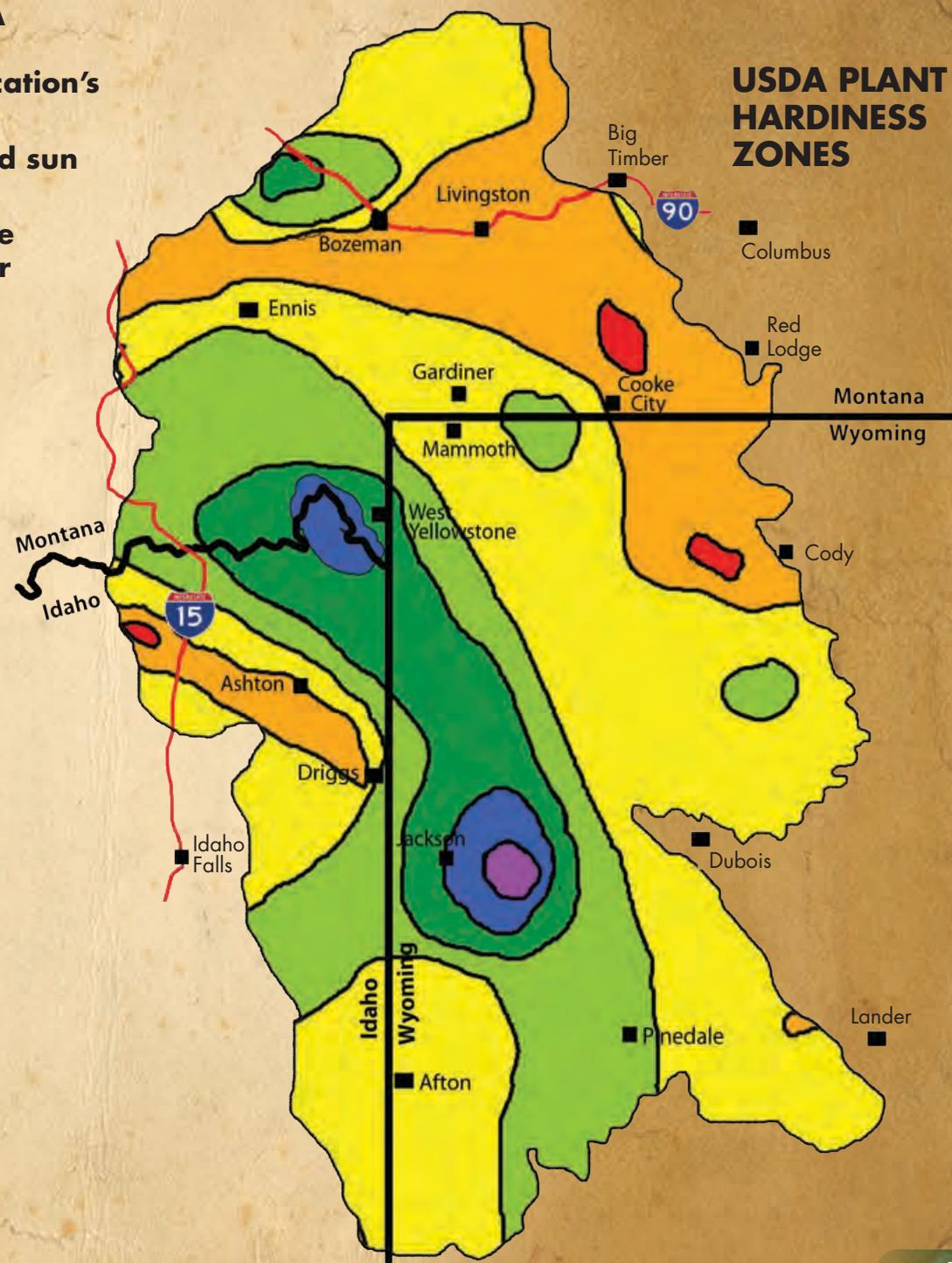


SUN REQUIREMENTS

PLANT SELECTION: GREATER YELLOWSTONE AREA

- Select plants that are appropriate for your location's temperature range or hardiness zones.
- Locate plants where the shade, wind, soil, and sun are compatible with the plants needs.
- Group plants with similar water and exposure needs together so that no plants are under- or over-watered.

Plant Hardiness Zone	Average Annual Minimum Temperature (F)
2a	-45 to -50
2b	-40 to -45
3a	-35 to -40
3b	-30 to -35
4a	-25 to -30
4b	-20 to -25
5a	-15 to -20



USDA PLANT HARDINESS ZONES

PLANT SELECTION: ADAPTATIONS FOR WATER EFFICIENCY

Look at the plant's physical traits. Plants that need less water or that are tolerant of drought, sun, or wind often display certain characteristics.

Photo courtesy of Blake Nursery and Landscaping



Deep roots take advantage of deeper soil moisture especially when the surface is dry. The tap root of a lupine can be up to 12" long.

Photo courtesy of Jane Ruchman



White or silver-colored leaves reflect sunlight, reduce leaf temperature, and use water efficiently, like this silver mound sage (rear), and pussy-toes (front).

Photo courtesy of Jane Ruchman



Short, tough, or small leaves lose less water to evaporation, like these hen and chicks (rear) and creeping thyme (front).

Photo courtesy of Blake Nursery and Landscaping



Wavy, hairy, and sticky leaves protect the plant tissues from the wind and indicate water-efficiency, like this sticky geranium.

NATIVE PLANTS or cultivars of native plants do very well in a xeriscaped landscape because they:

- are often very drought-tolerant once they get established.
- are well-suited to the GYA, subject to each site's individual constraints.
- help prevent non-native plants from spreading and invading into places where they are not wanted. Once non-natives start invading they can sometimes out-compete the native plants.
- bring a bit of the natural, wild environment into the garden, reinforcing a sense of the region.

LAWN AND TURF GRASSES: Here are some water efficient grasses that may be used across the GYA (zones 3-5, and zone 2 in some locations) to replace water-loving Kentucky bluegrass lawns where a carpet-like appearance is not mandatory. These grasses can withstand planting at high density and will have a texture more varied than Kentucky bluegrass. Kentucky bluegrass is **not** water efficient since it needs a lot of water to maintain its usual lush green carpet-like appearance. It is, however, very drought-tolerant since it does not die when left unwatered, though it will appear to die and be brownish-yellow. After receiving plenty of water it will come back.

- Warm season grasses start growing later in the season and thrive during the heat of summer.
- Cool season grasses start growing in early spring and may go semi-dormant in high summer.

Common Name	Botanical Name	Native	Season & Form	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High	Notes
Blue Grama	<i>Bouteloua gracilis</i>	Yes	Warm season Small bunch-type grass	FS	VL	H	Blue green foliage, comb shaped seed heads, mat forming. Height 8-12 inches. Suitable for short grass no-mow lawn.
Buffalograss	<i>Buchloe dactyloides</i>	Yes	Warm season, spreading form stolons	FS	VL	H	Green only during high temperatures (80-95° F)
Fine and Tall Fescues: (Sheep, Hard, Red, Idaho)	<i>Festuca... (ovina, trachyphylla, rubra, idahoensis)</i>	Mostly no	All are cool season, bunch-type grasses	FS - PSh	L - M	M - H	4 -12 inches tall, fine bladed. A mix of these is recommended. For a mow or no-mow lawn.
Thickspike Wheatgrass	<i>Elymus lanceolatus</i>	Yes	Cool season. Sod-forming Rhizomatous	FS	M	M	Grass blades are 2 -10 inches tall, seed heads are taller. May out-compete some weeds due to very fibrous roots.
Western Wheatgrass	<i>Agropyron smithii</i>	Yes	Cool season, spreads and forms open sod Ground Cover	FS	L	M	Somewhat coarse texture, bluish-green, strongly rhizomatous grass once established, provides good ground cover. Blades 1 -1 ½ ft tall. Wyoming state grass.



A blend of these and other turf grasses is often the most successful since different grass attributes can complement each other and the blend can be tailored for you depending on:

- whether you plan to water
- elevation and soil type
- intended uses
- whether you plan to mow
- exposure to sun and wind

Talk with your local nursery to find out what blend will work best for your site and needs.

ORNAMENTAL OR ACCENT GRASSES: These water efficient grasses can be used across the GYA (zones 3-5 and zone 2 in some locations) where their upright shape, attractive seed heads, and fall colors can provide visual interest, contrast to mowed lawns, and complement adjacent flowering perennials, mulch, or hardscape.



Common Name	Botanical Name	Native	GYA Zone	Season & Form	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High	Notes
Basin Wild Rye	<i>Leymus cinereus</i>	Yes	3-5	Cool season, Tall bunch-type grass	FS	L	M - H	Adapted to wide range of soils. Height 3-5 ft and 1-3 ft wide.
Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i>	Yes	3-5	Cool season, Bunch-type grass	FS	L	H	Blue green foliage in summer, tawny winter color. Height 3 ft and 1 ft wide. State grass of Montana.
Blue Oat Grass	<i>Helictotrichon sempervirens</i>	No	3-5	Cool season, Bunch-type Grass	FS - PSh	L - M	M	Beautiful blue green foliage with a tawny seed head. Provides year round visual interest. Height 2-3 ft and 3 ft wide
Feather Reed Grass	<i>Calamagrostis x acutiflora 'Karl Foerster'</i>	No	4-5	Cool season, Clump-forming	FS	M	M - H	Vertical wide-bladed grass, feathery seed heads. Height to 4 ft and up to 2 ½ ft wide.
Idaho Fescue	<i>Festuca idahoensis</i>	Yes	3-5	Cool season, Low bunch-type grass	FS - PSh	M	M - H	Fine bladed, short, mounding bluish-green grass. Height 4-6 inches.
Indian Ricegrass	<i>Achnatherum hymenoides</i>	Yes	3-5	Warm Season, Bunch-type grass	FS	L	M - H	Fine leafed with delicate seed heads. Provides winter texture. Height 1-2 ft and 2-3 ft wide.

Basin Wild Rye



Photos on this page courtesy of Blake Nursery and Landscaping

Blue Oat Grass



Feather Reed Grass



ORNAMENTAL OR ACCENT GRASSES, CONTINUED

Common Name	Botanical Name	Native	GYA Zone	Season & Form	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High	Notes
Little Bluestem	<i>Schizachyrium scoparium</i>	Yes	3-5	Warm season Bunch-type grass	FS	L	H	Wide-bladed grass grows to 3 ft. tall, red autumn color, produces an airy seed head.
Prairie Dropseed	<i>Sporobolus heterolepis</i>	Yes	4-5	Warm season Bunch-type grass	FS	L	H	Deep green with free flowing arching stems and delicate airy seed heads provide winter interest. Height 2 ft and 2 ft wide
Prairie Junegrass	<i>Koeleria macrantha</i>	Yes	3-5	Cool season Bunch-type grass	FS - PSh	L	M	Delicate seed head with blue green foliage. Pale yellow fall color. Height 8-20 inches.
Switch Grass	<i>Panicum virgatum</i>	Yes	3-5	Warm season Bunch-type grass	FS - PSh	L - M	M - H	Can grow to 6 ft. high with a 4 ft width. Provides autumn interest turning from green to orange red. Seed heads provide winter interest.
Tufted Hair Grass	<i>Deschampsia caespitosa</i>	No	3-5	Cool season Tufted bunch-type grass	PS - PSh	M	M - H	Tall grass with unique feathered appearance. Many cultivars for leaf variety. Height to 3 ft and up to 2 ft wide.
Western Wheatgrass	<i>Agropyron smithii</i>	Yes	3-5	Cool season Rhizomatous	FS	L	M	Spreads and forms open sod providing good ground cover. See also turf grasses.



Little Bluestem



Photos on this page courtesy of Blake Nursery and Landscaping

Tufted Hair Grass



Prairie Dropseed



HERBACEOUS FLOWERING PLANTS: Here are some water efficient perennials that will provide beauty and interest, year after year, planted as individuals, in masses for drama, as borders, and some can serve as ground covers.

Common Name	Botanical Name	Native	GYA Zone	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M=Moderate L=Low VL=Very Low	Drought Tolerance M=Moderate H=High
Autumn Joy Sedum (1)	<i>Sedum spectabile</i>	No	3-5	FS-PS	L	M
Blanketflower (2)	<i>Gaillardia aristata</i>	Yes	3-5	FS	M-L	M
Blue Flax (9)	<i>Linum perenne L. lewisii</i>	Yes	3-5	FS	M-L	M-H
Bitterroot (4)	<i>Lewisia rediviva</i>	Yes	3	FS	VL-L	H
Curly Cup Gumweed	<i>Grindelia squarrosa</i>	Yes	3-5	FS-PS	L	H
Daylily (3)	<i>Heemerocallis spp.</i>	No	3-5	FS-PSh	M	M
Dotted Gayfeather (6)	<i>Liatrix punctata</i>	Yes	4-5	FS	M-L	H
Fireweed	<i>Epilobium angustifolium</i>	Yes	3-5	FS-PSh	L-M	H
Fringed Sage	<i>Artemesia frigida</i>	Yes	3-5	FS	VL-L	H
Fuzzy Tongued Penstemon (5)	<i>Penstemon eriantherus</i>	Yes	3-5	FS	VL-L	H
Giant Hyssop	<i>Agastache urticifolia</i>	Yes	3-5	FS	M	M
Hyssop (Hummingbird Mint) (7)	<i>Agastache spp.</i>	No	4-5	FS	M	M-H
Hairy Golden Aster	<i>Heterotheca villosa</i>	Yes	3-5	FS	L	H
Harebell (8)	<i>Campanula rotundifolia</i>	Yes	3-5	FS	L-M	H



Photo courtesy of Jane Ruchman



Photo courtesy of Kaye Suzuki



Photos on this page courtesy of Blake Nursery and Landscaping unless otherwise noted

HERBACEOUS FLOWERING PLANTS, CONTINUED:

Common Name	Botanical Name	Native	GYA Zone	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High
Hens 'N' Chicks (1)	<i>Sempervivum tectorum</i>	No	4-5	FS	L	M-H
Husker Red Penstemon	<i>Penstemon digitalis</i>	No	3-5	FS	L-M	H
Lavender (2)	<i>Lavandula angustifolia</i>	No	5	FS	L-M	M
Lupine (3)	<i>Lupinus sericeus</i> , <i>L. argenteus</i>	Yes	3b-5	FS	L	H
Mountain Little Sunflower	<i>Helianthella uniflora</i>	Yes	3-4	FS-PS	L	H
Nodding Onion	<i>Allium cernuum</i>	Yes	1-5	FS-PSh	M	M
Pale Evening Primrose (9)	<i>Oenothera caespitosa</i> (<i>O. pallida</i> , <i>O. elata</i>)	Yes	3-5	FS	L	H
Penstemon (Palmer's and others) (8)	<i>Penstemon spp.</i>	Yes	3-5	FS	L	H
Pasque Flower (4)	<i>Pulsatilla vulgaris</i>	Yes	3-	FS	L	H
Plains Coreopsis	<i>Coreopsis tinctoria</i>	Yes	3-5	FS-PSh	M	M
Prairie Coneflower (5)	<i>Ratibida columnifera</i>	Yes	3a-4b	FS	L-M	H
Prairie Smoke (6)	<i>Geum triflorum</i>	Yes	3a-5a	FS-PSh	L-M	M
Prickly Pear Cactus (7)	<i>Opuntia polyacantha</i>	Yes	4	FS	VL	H



Photos 1, 2, courtesy of Jane Ruchman



Photos on this page courtesy of Blake Nursery and Landscaping unless otherwise noted

Photo courtesy of Kaye Suzuki

HERBACEOUS FLOWERING PLANTS CONTINUED:

Common Name	Botanical Name	Native	GYA Zone	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High
Purple Coneflower	<i>Echinacea angustifolia</i>	Yes	3a-4a	FS - PSh	M	M
Purple Prairie Clover (1)	<i>Dalea purpurea</i>	Yes	3-5	FS	L	H
Pussytoes (2)	<i>Antennaria spp.</i>	Yes	3-5	FS	L	H
Rocky Mountain Beeplant (4)	<i>Cleome serrulata</i>	Yes	Annual	FS	L - M	H
Russian Sage (3)	<i>Perovskia atriplicifolia</i>	No	3-5	FS	VL - L	H
Scarlet Globemallow	<i>Sphaeralcea coccinea</i>	Yes	3-5a	FS	Low	H
Showy Fleabane	<i>Erigeron speciosus</i>	Yes	3-4	FS	L - M	H
Silver-leaved Phacelia	<i>Phacelia hastata</i>	Yes	3-4	FS - PSh	L	H
Silver Mound Sage	<i>Artemisia Schmidiana "Silver"</i>	No	2-5	FS - PSh	L	H
Small-flowered Penstemon	<i>Penstemon procerus</i>	Yes	3a-5a	FS	VL - L	H
Sticky Geranium	<i>Geranium viscosissimum</i>	Yes	4	FS - PSh	L	H
Stonecrop (7)	<i>Sedum lanceolatum</i>	Yes	3-5	FS	VL	H
Thyme (6)	<i>Thymus spp.</i>	No	3-5	FS - PSh	L	H
Wild Bergamot	<i>Monarda fistulosa</i>	Yes	3a-4b	FS	L	M
Yarrow (5)	<i>Achillea spp.</i>	Yes/No	3-5	FS	M - L	M - H
Yucca (8)	<i>Yucca glauca</i>	Yes	3-5	FS	L	H



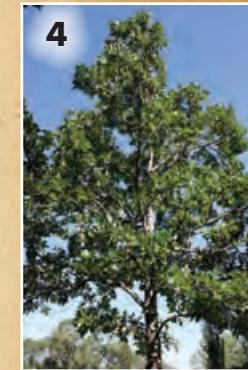
Photos courtesy of USDA Forest Service

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Photos 6,7 courtesy of Jane Ruchman

SHRUBS AND TREES: Here are some water efficient shrubs and trees that will add structure and interest to your landscape year-round. Some grow large enough to provide shade and shelter from the sun and wind and others, like the creeping junipers, are low-growing ground covers.

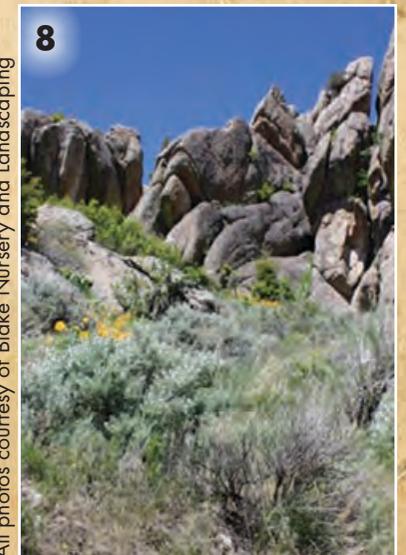
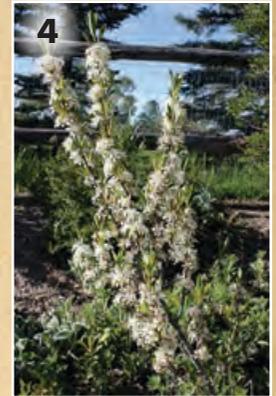
Common Name	Botanical Name	Native	GYA Zone	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High
Big Sagebrush (8)	<i>Artemisia tridentata</i>	Yes	4	FS	L	H
Bristlecone Pine (1)	<i>Pinus aristata</i>	No	4-5	FS	L	H
Bush Cinquefolia (Potentilla) (2)	<i>Dasiphora fruticosa</i>	Yes	2-3	FS - PSh	L - M	H
Bur Oak (4)	<i>Quercus macrocarpa</i>	Yes	3	FS - PSh	M	H
Creeping Junipers (3)	<i>Juniperus spp.</i>	Some	3-5	FS	L once established	M-H once established
Curl Leaf Mountain Mahogany	<i>Cercocarpus ledifolius</i>	Yes	3-5	FS – PS	L	H
Lilac (Common) (5)	<i>Syringa vulgaris</i>	No	3-5	FS	L once established	H once established
Rabbitbrush (7)	<i>Chrysothamnus nauseosus</i>	Yes	3-4	FS	M	H
Red Twig Dogwood (6)	<i>Cornus sericea</i>	Yes	2-5	FS	M	M - H once established



All photos courtesy of Blake Nursery and Landscaping

SHRUBS AND TREES, CONTINUED:

Common Name	Botanical Name	Native	GYA Zone	Light Requirement FS = Full Sun PS = Part Sun PSh = Part Shade	Water Needs M = Moderate L = Low VL = Very Low	Drought Tolerance M = Moderate H = High
Rocky Mountain Juniper (1)	<i>Juniperus scopulorum</i>	Yes	3-4	FS	L	H
Rocky Mountain Maple (2)	<i>Acer glabrum</i>	Yes	3	PS - PSh	L - M	M
Rugosa Rose	<i>Rosa rugosa</i>	Yes / No	4	FS – PSh	M	H
Sandcherry (4)	<i>Prunus pumila</i>	Yes	2-5	FS – PSh	L - M	M
Siberian Crabapple	<i>Malus baccata</i>	No	2	FS	M	H
Skunkbrush (Three Leaf) Sumac (3)	<i>Rhus trilobata</i>	Yes	3-5	FS	L	H
Silver Sage (8)	<i>Artemesia cana</i>	Yes	3-5	FS	M	M
Toba Hawthorn (5)	<i>Crataegus x mordenensis 'Toba'</i>	No	3-4	F	M	H
Woods Rose (6, 7)	<i>Rosa woodsii</i>	Yes	4	FS – PSh	M	M



All photos courtesy of Blake Nursery and Landscaping



MULCHING

Maximizing Water Conservation

USE MULCHES TO:

- reduce water evaporation from the soil to keep the soil temperature cooler.
- help control weeds that compete for water and nutrients.
- control erosion, run-off, rain-drop action, and splashing.
- dissipate surface heat, shade the soil, and reduce the amount of heat that reflects up to the plants.
- help protect plant roots by insulating the soil and keeping it less susceptible to temperature fluctuations.

ORGANIC MULCHES	ADVANTAGES	DISADVANTAGES
Wood and Bark Chips 	+ several colors and sizes + attractive + wide price range + if applied deeply enough (at least 3" deep or more) will keep soil moister and cooler + decomposes to provide a rich humus	– must be reapplied after it decomposes – can become full of weeds if not applied thickly enough, or if not installed on top of landscape fabric – can blow away
Shredded Bark 	+ can tend to interlock, forming a more cohesive mat + more resistant to blowing away than chips + decomposes to provide a rich humus	– can still blow away in high wind areas
Conifer Needles 	+ inexpensive + attractive, natural, woody look + conifer needles can be a product from your own yard	– conifer needles take a long time to decompose – can still blow away – needles do not withstand traffic well – may be difficult to find at garden centers
Straw 	+ easy to find + good insulation + effectively keeps down weeds + forms a mat as it breaks down so it can serve as a weed barrier + decomposes to provide a rich humus	– can blow away – forms a mat as it breaks down which may inhibit desirable plants from growing through it – herbicide residues can persist and affect mulched plants – can contain some seeds and can introduce weeds
Yard Waste Such as Grass Clippings or Leaves 	+ readily available + decomposes to provide a rich humus + effectively blocks weeds	– can harbor diseases and fungal pathogens – herbicide residues can persist and affect mulched plants – forms a dense mat that can block air or water

INORGANIC MULCHES	ADVANTAGES	DISADVANTAGES
<p>Decorative Rock Mulch</p> 	<ul style="list-style-type: none"> + comes in a variety of shapes, colors, and sizes + ranges in price + does not blow away + can be installed over permeable geotextile cloth to help control weeds and reduce maintenance needed over time + does not decompose and lasts a long time + good for high traffic areas + can heat the soil in summer 	<ul style="list-style-type: none"> - may tend to slide downhill if installed on a slope - may be difficult for some people or pets to walk on - doesn't insulate the soil - can compact soil beneath it - can heat the surface of the soil somewhat in summer in some exposures
<p>Recycled Shredded Tire Rubber</p> 	<ul style="list-style-type: none"> + helps repurpose and divert material from the landfill 	<ul style="list-style-type: none"> - cannot decompose to form humus
<p>Recycled Glass</p> 	<ul style="list-style-type: none"> + helps repurpose and divert material from the landfill + adds a bright, somewhat colorful element to the landscaping + available in some GYA communities 	<ul style="list-style-type: none"> - moves around when walked on
<p>Plastic Sheeting</p> 	<ul style="list-style-type: none"> + prevents weeds + inexpensive + can slow down or deflect invasive plants 	<ul style="list-style-type: none"> - blocks water and air penetrating to soil and roots - not long-lasting, rips easily - not aesthetic unless covered by other mulch, such as rocks or bark - other mulches tend to slide or move around somewhat
<p>Woven Fabric, Also Called Geotextile or Landscape Fabric</p> <p><i>This is a permeable material that is often used underneath other mulches, such as gravel or bark chips.</i></p> 	<ul style="list-style-type: none"> + excludes weeds while allowing water and air exchange + reduces weed growth and time spent weeding the landscape + preserves the organic mulch by reducing decomposition + can deter pets from digging 	<ul style="list-style-type: none"> - increases compaction and reduces aeration of soil - hinders decomposition of top organic mulch and nutrient cycling into the soil - reduces natural re-seeding of desirable plants - complicates removal of existing plants, or the addition of new plants

EFFICIENT IRRIGATION

Correct Amount, Timing, and Delivery of Water

- **Provide water in the appropriate amounts**, tailored to each water use area...not too much, not too little.
- **Provide water at the right time of day**, not during the hottest part of the day when water is wasted to evaporation or during rainy weather, when unnecessary supplemental water is wasted.
- **Provide water in the most efficient and least wasteful manner**, directly to the roots of the plants.

- Before your plants become drought tolerant, they need regular deep watering for at least the first season.
- Once your xeriscape plants become established, water infrequently and deeply (about 0.6" of water or less each week).



AVOID WATERING

the road,
the sidewalk,
buildings,
fences, or
anything
other than
your plants



To avoid wasting water by overspraying onto the asphalt or concrete, place plants with the lowest water needs next to those edges.

TO ENSURE THAT YOUR IRRIGATION SYSTEM WILL REDUCE YOUR WATER USE:

Design and install your irrigation system so that it is tailored to your site, the zones and water use areas you have established and the plants in those zones. Incorporate an irrigation controller device to ensure that the timing is coordinated with the proper amount of water needed at the best time of day, and can be turned off during periods of rain.

TIP: To determine how much water is being applied by overhead sprinklers, place tuna cans on the ground while watering. Measure the total amount in inches.



Photo and sketch courtesy of JD Sprinklers, Bozeman, MT

Provide the proper amount of water by watering deeply and infrequently!



WHAT IS THE PROPER AMOUNT OF WATER?

Traditional Kentucky bluegrass lawn should be watered only about 1 inch per week. However, during extended drought, a bit more water may be necessary to keep it green. Much more water than that will be wasteful.

Xeriscape grasses and planting areas should be watered on average, about 0.6 inches per week, or less.



Frequent and shallow watering prevents grasses and other plants from developing deep roots, causing shallow roots and weaker plants.



Deep but infrequent watering encourages grasses and plants to develop deeper roots that are less subject to heat or drought stress because they can take advantage of moisture deeper in the soil, especially when the surface dries out.

3. Water at the proper time of day!

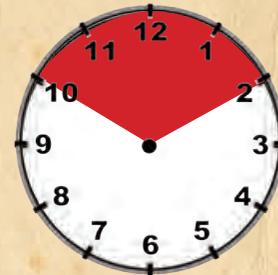
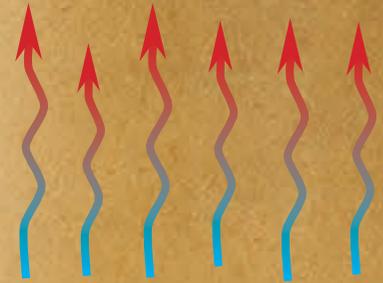
WHEN IS THE PROPER TIME OF DAY TO WATER?

BEST
5-9 am



Plants maximize their utilization of water most in the early morning when the temperature is still cool but rising. At that time of day less water is wasted through evaporation. In addition, early watering allows the plants to maximize their growing processes as the day warms up and the sun rises. Watering early in the day also helps to eliminate the possibility of fungal or mold growth from excess water sitting on plant and grass leaves.

WORST
10 am-2 pm



Mid-day watering, when the sun is at its hottest, is the very worst time to water.

Much of the water is lost and wasted through evaporation, increasing your power and water bills.



OK
7-10 pm



Even though watering late in the day does not waste water to evaporation, it is best to avoid if possible. As the temperature is cooling down, any water left on the leaves may remain longer and may cause fungus or other diseases to form. In addition, the early evening hours are often when energy demand peaks with competing demands since more people are home using electricity.

SELECT THE MOST APPROPRIATE TYPE OF IRRIGATION SYSTEM

IRRIGATION SYSTEM TYPE	MOST APPROPRIATE USE	ADVANTAGES	DISADVANTAGES
<p>Overhead Sprinklers</p>	<p>Watering traditional lawn areas</p> 	<ul style="list-style-type: none"> + may deliver water over a large area that can include mowed grass as well as some higher unmowed grass and mid-height shrubs + can be tailored for different spray types or angles + if installed properly and regularly maintained, underground systems are usually problem-free 	<ul style="list-style-type: none"> - subject to evaporation since water is shot into the air, with up to a 50-60% water loss - cannot deliver water to only specific plants - can be blown off target by the wind - sprinkler heads that are not properly installed or not functioning properly can be damaged by lawn mowers - may be hard to adjust to avoid sprinkling adjacent fences, walls, and sidewalks
<p>Drip Irrigation (surface or subsurface tube)</p> <p>Drip tape can be used to water row plants</p>	<p>Watering beds with flowers, vegetables, berries, shrubs or ground covers</p>  <p style="font-size: small; text-align: right;">Photos courtesy of Jane Ruchman</p>	<ul style="list-style-type: none"> + very efficient, with only about a 10% water loss + delivers water directly at the soil line or to the roots or very close to the plant + can be designed to run with very low water pressure + can be tailored to specific water quantity or delivery needs of different plants in the same system with the use of a variety of emitter types that drip or spray + emitters can be installed that deliver water very slowly (in drips) to allow deep percolation into the soil + can help eliminate many diseases that are spread by water remaining on leaves + fertilizer can be incorporated into a drip system attached to a tank + avoids watering areas where plants are not desired, reducing weed growth and leaving areas between plants dry, allowing easier walking 	<ul style="list-style-type: none"> - for aesthetic purposes, surface piping and hoses need to be covered with mulch - emitters and pipes are small and may get clogged - can be somewhat complex to calculate quantity and pressure of water, design, install, and maintain - emitters may get chewed by rodents or other animals, such as family pets

MAINTAINING YOUR XERISCAPE LANDSCAPE

Time Well Spent

Early in the season:

- **check sprinkler and drip irrigation systems** to ensure they are functioning and did not burst over the winter.
- **replace organic mulch** if it has blown away or decomposed.
- **prune** out dead parts of woody or semi-woody shrubs or vines.
- **apply fertilizer**, but keep in mind that too much fertilizer will produce excessive foliage, which increases the amount of water the plants need. Native plants, trees, and shrubs need little to no fertilizer. If you want to fertilize, use slow-release fertilizer or top dress the soil with organic materials, such as compost, that will make the nutrients available to the plants as it decomposes.

During the season:

- **weed out plants that are not wanted.** The more regular you are with weed removal work, the easier it is to maintain your landscape.
- **control insect pests.** Your local County Extension Office can help you determine if your plants have pests and how to deal with them. Maintain your landscaping to include a variety of types of plants so that one pest will not decimate it all.
- **mow or not mow?** You can save water, time, and money by choosing to not mow parts of your xeriscape lawn. Water efficient grasses can be left unmowed so the beauty of the mature grass and seed heads add texture and interest to your landscape. When you mow traditional or xeriscape grasses, only mow off about the top third. Grass that is mowed too low will not develop deep roots. Leave the clippings on the lawn to provide some mulch and nutrients as they decompose. De-thatch or aerate your lawn periodically, especially the fine fescues.
- **continue to water efficiently**, appropriately and only when and where needed.



Bozeman, MT Photo courtesy of Jennifer Weiss



Paradise Valley, MT Photo courtesy of Linda Iverson Landscape Design

Towards the end of the season:

- **control seeds from spreading where you don't want them.** In the parts of your landscape where you do not want plants to spread their seeds and self-sow, deadhead flowering plants by removing the wilted blossoms that are starting to produce seeds. Deadheading also will encourage a second round of new blooms, increasing the length of time the blooms can be enjoyed.
- **allow natural seeding to occur where desired.** In a planting bed where your goal is to allow the plants to spread naturally, do not deadhead.
- **avoid too much end of season fertilizer for most plants.** It is usually recommended that the amount of fertilizer applied to plants is reduced and eventually stopped to allow the plants to prepare for dormancy and to avoid encouraging new growth that could be damaged by cold autumn temperatures. Native turf grasses usually need no fall fertilizing.
- **decrease watering towards autumn.** Except for recently planted plants, gradually decrease the amount of water to your established trees and shrubs to let them slow their growth, harden off, and be ready for the first hard freeze of winter. Don't forget that during very dry, warm, and snow-free winters, even drought-resistant trees can benefit from an occasional deep watering.
- **prepare your irrigation and sprinkler systems and hoses for winter.** Shut down, blow out, and drain sprinkler and drip irrigation systems and hoses to prevent winter freeze-thaw damage.

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Resources Conservation Service, Bismarck, ND

*Watershed Management in the Greater Yellowstone Area: An Interagency Strategy
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Paradise Valley, MT
Photo courtesy of Linda Iverson Landscape Design



As drought conditions are becoming more common across our region, there are increased pressures on available water, heightened scrutiny of water use, and battles over water rights.

Now is the perfect time to transition to a xeriscaped landscape...

Dry winter foretells dangerous fire season

BOISE, Idaho (AP) — Two small but unseasonably early fires burning in northern California's wine country and another wind-whipped blaze farther south likely are a harbinger of a nasty summer fire season across the West. Officials with the National Interagency Fire Center in Boise said

Scientists expect nation's drought to persist

By ERIKA BOLSTAD
McClatchy Newspapers

WASHINGTON — More than half of the United States remains in drought, although things have improved from the record-breaking conditions last year that killed 123 a

At one point in September 2012, two-thirds of the United States was suffering from record-breaking drought conditions so

said Mike Strobel of the USDA's Natural Resources Conservation Service. Reservoirs in Colorado already are low because of last year's drought.



Drought worsens to extreme in some counties

Associated Press

BILLINGS - Drought conditions in southeastern Montana have worsened due to an unusually dry March, with extreme conditions reported for most of Yellowstone and Treasure

Gazette reported Tuesday. "Once we get into March, we should start to see trends changing to get moisture in the ground for spring," said Tom Frieders, warning coordination meteorologist that National Weather Service Office in Billings

Agriculture and the National Oceanic and Atmospheric Administration. The map labels conditions in much of southwestern and central Montana as abnormally dry. The weak moisture patterns are not unusual for the Yellowstone

below-normal snowpack at about 85 percent of average for the mountains that feed the upper and lower stretches of the Yellowstone. But most of that snowpack hasn't started melting much, said Brian Domonkos, water supply

BOZEMAN DAILY CHRONICLE

BIG SKY

CITY DESK: 587-4491 | CITYDESK@DAILYCHRONICLE.COM

Low snowpack, dry March signal below-average streamflows

By LAURA LUNDQUIST
Chronicle Staff Writer

Streams could run low and warm this summer because snow amounts continue to dwindle in southern Montana compared to normal for April 1.

Extended periods of high pressure over the central and southern parts of the state brought above average temperatures and significantly below average precipitation during March, according to a recent Department of Natural Resources and Conservation report. As a result, the snow-

A storm system moves over

pack in the central and southern mountains ended the month between 3 percent and 9 percent below average. That means less

Last month, the Gallatin River basin had an average amount of snow, but now the snowpack is 94 percent of average. The Jefferson and M... son River...

again as much snow as normal, an increase of almost 25 percent since last month. The Mill... basin...

than 90 percent of average. Only the Flathead...

DANGEROUSLY DRY

Hot weather, record-low soil moisture prompts wildfire concern

By LAURA LUNDQUIST
Chronicle Staff Writer

With the official start of summer, Memorial Day, still two weeks away, the August-like heat of this past weekend doesn't bode well for the 2013 fire season. Temperatures vaulted into the upper 80s on Sun...



...for the health of our incredible watershed—the Greater Yellowstone Area—as well as for our downstream neighbors.