

Turf Grass Alternatives



Do you know...



Where we get our water?

Where we store our water?

How much water our city uses per year?

What programs we offer?

How much water we have saved over the years?

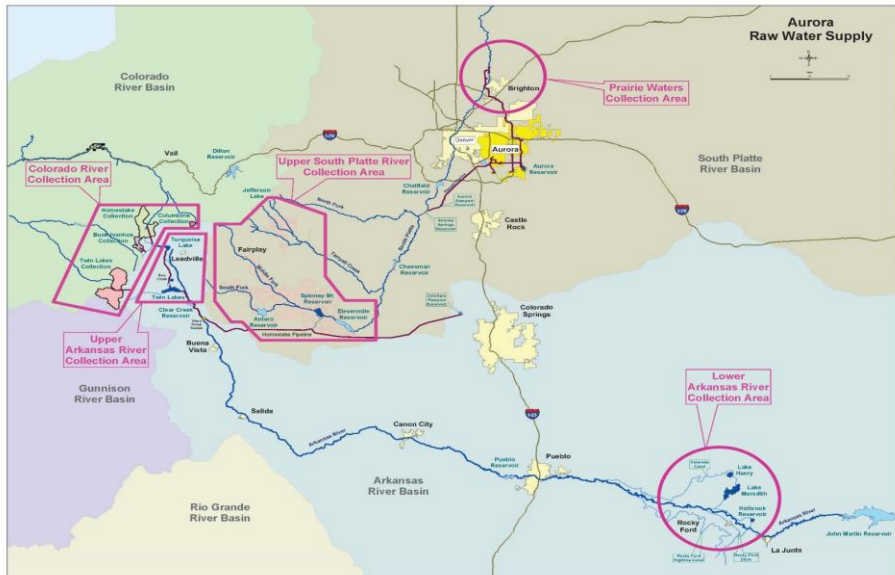
...where we get our water?



Colorado is a headwaters state, with the majority of the state's rivers beginning high in the Rocky Mountains as snowmelt. One of the benefits of living in a state that relies primarily on surface water is that unlike groundwater, surface water is a renewable water source.

One of the drawbacks is that precipitation levels vary greatly from year-to-year making the majority of the state's water supply relatively unpredictable – and highly prone to drought.

... where we store our water?



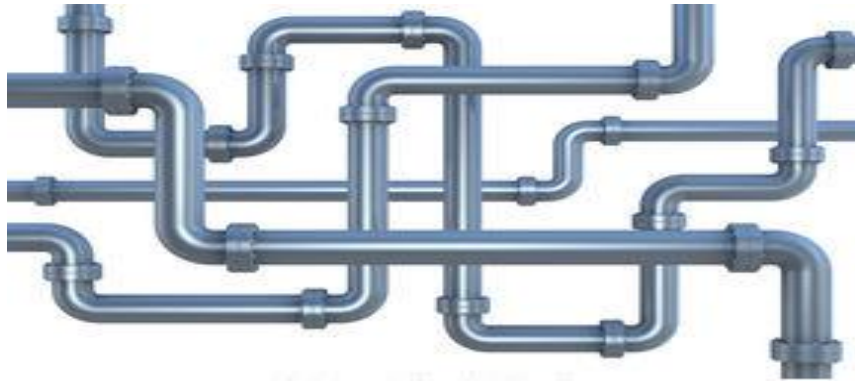
Aurora's water system starts nearly 180 miles away and includes the use of reservoirs, the natural river system, pipes, tunnels and pumps, all of which help us pull the water we own from our three river basins and deliver it to Aurora.

Aurora receives 25% of its water supply from the Colorado, 25% from the Arkansas and 50% from the South Platte river basins.

Homestake
Turquoise
Twin
Spinney Mountain
Jefferson
Strontia Springs

Rampart
Quincy
Pueblo
Aurora
Meredith
Henry

...how much water we use as a city?



16.6 billion gallons



The average annual distribution for the past three years is 16.6 billion gallons annually. About half of that water is used outdoors. Aurora has a semi-arid climate, and our snow and rain levels are about half of the average annual precipitation for the United States, so it's important that we all do our part to help conserve water.

...we offer programs to help you save water and money?

INDOOR PROGRAMS

- Free indoor water assessment
- Ultra-high-efficiency toilet rebate
- Low-income water efficiency program

OUTDOOR PROGRAMS

- Free landscape designs and rebates
- Free automatic sprinkler system assessments and rebates
- Customize your watering schedule
- Water conservation classes
- Gardening and volunteering



...how much water the conservation division has saved?



**448 million
gallons or 7.2
billion cups
of water**



Combined water savings for 2016, 2017, 2018

Class Objectives



This class will teach you how to save water and money by removing Kentucky bluegrass and installing an alternative turf-like grass or groundcover.

Alternatives will provide yard solutions that offer similar functionality but save water. All recommended alternatives still provide:

A walkable surface (can tolerate some foot traffic)

Defined open space in the yard

Green at least part of the year

Aesthetically pleasing

Our agenda:

- The traditional Kentucky bluegrass lawn

- Dormancy

- Considering an alternative lawn

- Your alternatives

 - Groundcovers

 - Native grasses

- City code requirements

Kentucky Bluegrass, a living carpet



Kentucky bluegrass varieties are the most common type of turf used for lawns in Colorado. They provide a living green carpet throughout the year.

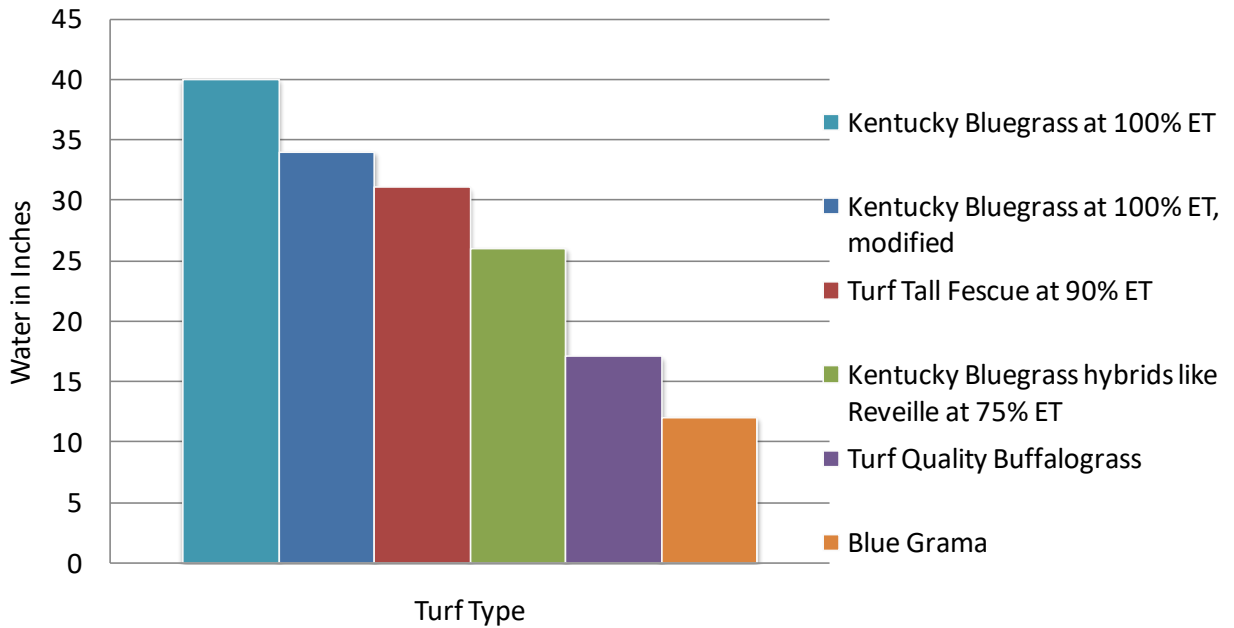
Pros:

They are useful for children, pets and for play. The turf is comfortable to walk on and is sturdy and resilient with regard to foot traffic. Kentucky bluegrass is readily available in sod or seed form. It has great heat and cold tolerance.

Cons:

In order to maintain the lush green look, Kentucky bluegrass must be watered well, mowed often, fertilized and weeded, often treated with chemicals. It has poor shade tolerance. It is more susceptible to diseases like leaf rot, necrotic ring spot, and ascochyta leaf blight. Like most turf-forming grass, it requires aeration periodically in order to avoid thatch

Water Requirements for Turf



In Colorado, bluegrass must receive about 40" of water a year to maintain a lush look. However, proper watering practices reduce this amount to 34", as shown in this graph (figures from Colorado State University). In Aurora, on average, we receive only 15" of precipitation a year in the form of rain and snow. This means we must irrigate with a supplemental 19-28" or more.

Utilizing plant material that thrives on the amount of water we receive naturally would conserve our water supply and save you money.

In the table above, notice that of all turf varieties normally used in Colorado, Kentucky Bluegrass needs the most amount of water. We'll touch on the benefits and drawbacks of other types of grasses in the following slides.

Dormancy



Is this grass dying or going dormant?



Bluegrass is a cool season grass, meaning it thrives in spring and fall and wants to stop growing in summer heat when water is less prevalent. We encourage growth in summer with regular watering. Actively growing Kentucky Bluegrass lawns require up to 1.5 inches of water per week, while a dormant bluegrass lawn requires only 0.5 inches of water every two weeks. A light watering or rainfall of 0.5 inch every two weeks supplies enough moisture to keep crowns, rhizomes and roots hydrated and alive. While this low volume of water will not re-green a dormant lawn, it will help to insure good recovery once rainfall occurs in fall.

Dormancy ... continued



Is this grass dying or going dormant?



Allowing bluegrass lawns to fully enter dormancy is an alternative to continued watering during hot, dry conditions and can result in a significant water savings. There will be some loss of root mass when a lawn goes into dormancy, but the 0.5 inches of water every other week will help it recover.

The above photo shows grass going dormant. Ensure that it enters dormancy without dying by gradually decreasing watering over the course of a few weeks until you are supplying only .5 inches every two weeks. How do you know it's not dead? As temperatures start to cool, check for green shoots in the brown patches. If you see green, the grass is breaking its dormancy and should start to repair itself as the root structures begin to grow again.

Why Choose Alternatives?



Reasons to replace Bluegrass and other high-water turf:

Desire for savings on your water bill

Difficulty maintaining current grass; obvious over or under watering

Turf grass area size and location may be impractical. For example, mowing and watering a steep slope can be challenging. Or, due to the layout of your beds, they're difficult to mow, maintain, and water.

Current grassy area isn't being fully utilized because of lack of demand; no children, pets or games.

Desire for low-maintenance landscape; no mowing, aerating, fertilizer or herbicide to worry about.

Belief in the importance of water conservation for environmental sustainability.

Desire to change look of the lawn.

Alternative #1: Groundcover



Creeping Thyme (*Thymus serpyllum*)



Perennial groundcovers are a great alternative to traditional turf. Be aware that they do not act the same as turf grass but, many groundcovers have other benefits.

There are so many good things to say about groundcovers!
Groundcovers enhance the attractiveness and interest of your yard by providing seasonal color from blooms and foliage.
They act as living mulch, inhibiting weed growth and providing erosion control.
They save time and money with regard to labor and materials.

Only one con:
Does not tolerate foot traffic well, more appropriate in between stepping stones or in areas that won't receive much traffic.

Creeping thyme (*Thymus serpyllum*) (pictured)
Dark green and narrow, oval foliage
Foliage persists through winter
Tiny pink flowers bloom for a short period of time, about 2-3 weeks in early summer



Sunny-Side Up Fleabane
(*Erigeron scopulinus*)



Wooly Thyme
(*Thymus pseudolanuginosus*)



Turkish Speedwell
(*Veronica liwanensis*)



Petite Dianthus
(*Dianthus gratianopolitanus*
'Petite')



Groundcovers we recommend as turf alternatives that provide similar functionality:

Sunny-Side Up Fleabane (*Erigeron scopulinus*)

Deep green foliage

Tiny white daisy-looking flowers bloom late spring to early summer

Wooly Thyme (*Thymus pseudolanuginosus*)

Has tight, woolly, gray-green foliage that persists through winter
(winter watering necessary when dry)

Will occasionally have tiny pink flowers bloom for a short period of
time, about 2-3 weeks, in spring

Turkish Speedwell (*Veronica liwanensis*)

Small, glossy green foliage

Blue flowers, late spring to early summer

Petite Dianthus *Dianthus gratianopolitanus* 'Petite'

Gray-green foliage

Small pink flowers on short spikes cover plant in early summer



Elfin Thyme
(*Thymus serpyllum* 'Elfin')



Periwinkle
(*Vinca minor*)



Dragon's Blood Sedum
(*Sedum spruium* 'Dragon's Blood')



Angelina sedum
(*Sedum rupestre* 'Angelina')



Groundcovers we recommend that can replace turf and provide similar functionality are:

Elfin Thyme (*Thymus serpyllum* 'Elfin' or *Thymus praecox arcticus* 'Elfin')

Reaches 1-3" high

Has small, green-gray oval-shaped foliage that persists through winter
Tiny pink flowers bloom for a short period of time, about 2-3 weeks, in early summer

Periwinkle (*Vinca minor*)

Reaches 6" high

A small-leaved vining groundcover that performs well under a variety of conditions

Small purple flowers will bloom in spring and in fall

Dragon's Blood Sedum (*Sedum spruium* 'Dragon's Blood')

Reaches 4-6" high

Gorgeous red-purple-green foliage

Vibrant pink flowers in summer

Angelina sedum (*Sedum rupestre* 'Angelina')

Reaches 4-6" high

Gorgeous yellow-green foliage

Yellow flowers in summer

Alternative #2: Grasses



Buffalograss (*Bouteloua dactyloides*)



Native and/or xeric grasses are a great alternative to traditional bluegrass, plus they look and act more like bluegrass. Most can stand at least some foot traffic. Some are not green all year round. Carefully research grass species to help you decide on the right variety for you, their availability and whether they come as seeds or plugs. Plugs are small clumps of sod (some have attached soil).

Aurora city code states that front yard lawn height cannot exceed 6" unless the grass is a turf alternative. These turf-type grasses may be grown to their natural height.

Turf-like grasses are either warm-season or cool-season grasses. These will be explained in the next slides.

Alternative #2: Grasses ... continued



Buffalograss (*Bouteloua dactyloides*)



Another distinction amongst grasses is whether they are bunchgrasses or sod grasses. Bunchgrasses grow in single clumps. Most ornamental grasses, like feather reed grass and little bluestem, are bunchgrasses. Sod grasses form a thick mat and spread in all directions, like Kentucky bluegrass.

If you're interested in native grasses, many are listed on this CSU fact sheet: <https://extension.colostate.edu/docs/pubs/garden/07232.pdf>

Warm Season Grasses



Buffalograss
(*Bouteloua dactyloides*)



Blue Grama
(*Bouteloua gracilis*)



Warm season grasses

Are green and growing during the warm (not hot!) temperatures of spring and early summer

Enter dormancy slowly and don't reach maximum growth rate until midsummer

Root mass can reach 3 feet below ground

Buffalograss is a sod-forming grass, a native to much of the Great Plains. Cultivars like '609' and 'Legacy' have been popular for many years. New cultivars, 'Roadcrest' and 'Cody' were created to form thicker turf and increase the duration of the growing season (stay green longer). It can be left unmowed and will reach 6-8", or if a mown look is preferred, we recommend 3-5".

Blue Grama is native to Colorado. While it is a bunchgrass, it is often used as a sod. It can be left unmowed to form its curving eyelash-like seedheads at 12-18". Several cultivars exist, 'Bad River' and 'Hachita' are a couple of the preferred. It's best to mow not more than a few times each season and probably not less than 4".

Cool Season Grasses



Reveille bluegrass
(*Poa pratensis* 'Reveille')



Wheatgrass
(*Agropyron cristatum* spp)



Cool Season Grasses

Are green and growing during the cooler temperatures of spring and fall, when sufficient water is present.

Emerge from dormancy and grow rapidly in the spring

Root mass is in the upper 12-18" of soil

Hybrid Kentucky Bluegrass is a sod-forming grass just like the original Kentucky Blue. This group is made up of cultivars such as 'America', 'Compact', 'Livingston', and 'Reveille', to name a few. Though this species is not considered low-water, it has a reduced water

Wheatgrass cultivars are bunch or sod-forming grasses.

The 'Fairway' cultivar is a bunch grass and is very drought-tolerant. It has a dense root system near the surface but also has roots that will grow as deep as 3'. It thins out if watered too much.

The 'Ephraim' cultivar is a non-native, sod-forming grass. It has a more wiry texture if left unmowed. Note that some *Agropyron* species are not recommended due to their aggressive habit.

Smooth brome grass is no longer recommended, as it is highly invasive.



Turf-type Tall Fescue
(*Festuca arundinacea*)



Fine Fescue
(*Festuca* spp.)



Turf-type Tall Fescue is a bunch grass that seems to perform best in the predominant clay soils in Aurora. Although not very tolerant of high foot traffic, it is more tolerant of shade than Kentucky Bluegrass and buffalograss.

Fine Fescue species are bunch or sod-forming grasses. They are well adapted to shade, poor soils and dry soils. Mowing should be done with care, preferably with a rotary mower, and avoided as much as possible in the hottest days of summer. Thatch is a problem and fine fescue lawns should be aerated every couple years.

Chewings Fescue, a bunchgrass, is the best looking for a lawn
Red Fescue, a sod-former, is highly shade tolerant and should not be overwatered.

Sheep Fescue, a bunchgrass
Hard Fescue, a bunchgrass

Turfgrass Persistence Under Low Maintenance

(1=best persistence, 10=worst persistence)

Common Name	Scientific Name	Persistence
Buffalograss	<i>Bouteloua dactyloides</i>	1
Blue grama	<i>Bouteloua gracilis</i>	1
Wheatgrass	<i>Agropyron</i> sp.	1-2
Hard fescue (Fine fescue)	<i>Festuca longifolia</i>	2-3
Sheep fescue (fine fescue)	<i>Festuca ovina</i>	3-5
Creeping fescue (fine fescue)	<i>Festuca rubra rubra / trichophylla</i>	3-5
Chewings fescue (fine fescue)	<i>Festuca rubra commutata</i>	5-6
Tall fescue	<i>Festuca arundinacea</i>	6
Kentucky bluegrass	<i>Poa pratensis</i>	8
Hybrid Kentucky bluegrass	<i>Poa pratensis</i> sp.	9-10
Perennial ryegrass	<i>Lolium perenne</i>	10



Grass Seeding



To install a native grass lawn, you must apply for a new lawn permit from Aurora Water so that you can water daily over a 30-day establishment period. A soil inspection is included in the cost of the permit to ensure soil was properly prepared. For information and the application, visit https://www.auroragov.org/business_services/development_center/inspections_certificate_of_occupancy/lawn_and_irrigation

Soil Preparation: Till in 0.75" of compost (2 cubic yards per 1000 sq. ft.). When seeding during warm weather, mulch with straw or other coarse material. A fertilizer is helpful at this initial point. If seeding in a small area, rake the bare soil. Avoid tilling under the canopy of trees tiller will damage roots.

Apply seed with broadcast spreader. Make sure seed is making good contact with the soil. You can lightly rake it in or roll with an empty "drum" roller. For small sites, seed may be broadcast by hand.

Grass Seeding



If seeding into existing vegetation, use herbicide and follow directions to eliminate any grass or weed cover which may compete with germination and establishment. Once dead, mow the lawn very short. Wait appropriate time before seeding. When?: It is recommended to seed late May and early July as soil temperatures warm.

Watering: Keep the newly seeded area evenly moist during and after germination for up to 30 days. This is the only time this lawn will require such extensive watering.

Purchasing Seed



Purchase seed from reputable companies and pay attention to the percent of pure live seed (PLS). If PLS is low, you'll need to purchase more, potentially increasing your cost. Also pay attention to the source of the seed, a weed free source is desirable. If 4 pounds per 1,000 square feet are required and the PLS is 70% you'll need to purchase almost 6 pounds of seed. (Pounds of seed per 1,000 sf / Percent PLS = Quantity to purchase per 1,000 sf)

The following links are for local companies that specialize in selling native grass seed. They list single species and mixes for lawns, pastures, foothills, plains and prairie. Most of these are available as seed, with a few exceptions sold as small plants called plugs. Buffalograss can also be purchased as sod.

Western Native Seed www.westernnativeseed.com

Arkansas Valley Seed www.avseeds.com

Southwest Seed www.southwestseed.com

Pawnee Buttes Seed www.pawneebutteseed.com

Granite Seed www.graniteseed.com

Watering



Soil must remain moist to ensure germination. Reduce watering frequency to once a day for a couple of weeks and then once every other day for a month. Finally, twice a week for the rest of the growing season.

Once the lawn is established (year 2), water only as needed. Research the water needs of your species. Do NOT use a watering schedule based on Kentucky bluegrass.

Maintenance



Mowing; leave grass clippings

Aerating; leave plugs



Expect to see most native grasses germinating in two to three weeks. Be diligent with weeds during this time, understanding that herbicides may not be used during seed germination and establishment.

Maintenance ... continued



Mowing; leave grass clippings

Aerating; leave plugs



How much maintenance your new lawn needs depends on what kind of grass it is.

Cut regularly, before grasses form seed heads. Cutting before it goes to seed encourages more foliage. This could be as little as once per month, depending on the species. Choose low-growing species, and take off no more than 1/3 of the grass length with each cutting. Keep mower blade sharp.

Leave your clippings on the ground, the extra nitrogen keeps your lawn healthy.

Keep your lawn within bounds. Grasses will keep expanding their reach across soil and mulch, into nearby beds, etc. At borders, clip grasses and dig up escapees.

Let them grow a bit higher, up to 6". Grasses that are left taller develop larger root masses which buffer them against more extreme climate conditions.

Aerate any kind of sod-forming grass. Aeration helps prevent soil compaction and breaks up thatch. Aeration removes plugs of thatch and soil two to three inches long (the longer, the better) and deposits them on the lawn. Enough passes should be made to achieve two-inch spacing between holes. It is a good practice to aerate in the spring and fall and apply fertilizer after aeration.

Fertilizing

Fertilizer Application Schedule for Established Colorado Lawns * **						
Turf Species		Mid-Mar. to Apr. ***	May to mid-Jun.	Jul. to early Aug.	Mid-Aug. to mid-Sept.	Early Oct. to early Nov. ****
(Nitrogen application rates are in pounds of nitrogen per 1,000 square feet of lawn area.)						
Cool Season Species	High maint. Bluegrass and Ryegrass	½ to 1	1	Not required	1	1-(2)
	Low maint. Bluegrass	½	½ to 1	Not required	1	(1)
	Turf-Type Tall Fescue	½	½ to 1	Not required	1	(1)
	Turf-Type Fine Fescue	½	½ to 1	Not required	½ to 1	Not required
Warm Season Species	Buffalograss, Blue Grama, and Bermudagrass	Apply no N	½ to 1	½ to 1	Apply no N	Apply no N



* Nitrogen applications can often be reduced by 1/4/ to 1/3 when grass clipping are returned to the lawn during mowing. Nitrogen and other nutrients contained in the clippings are recycled to the lawn as they decompose. Grass clippings do not contribute to thatch accumulations in lawns.

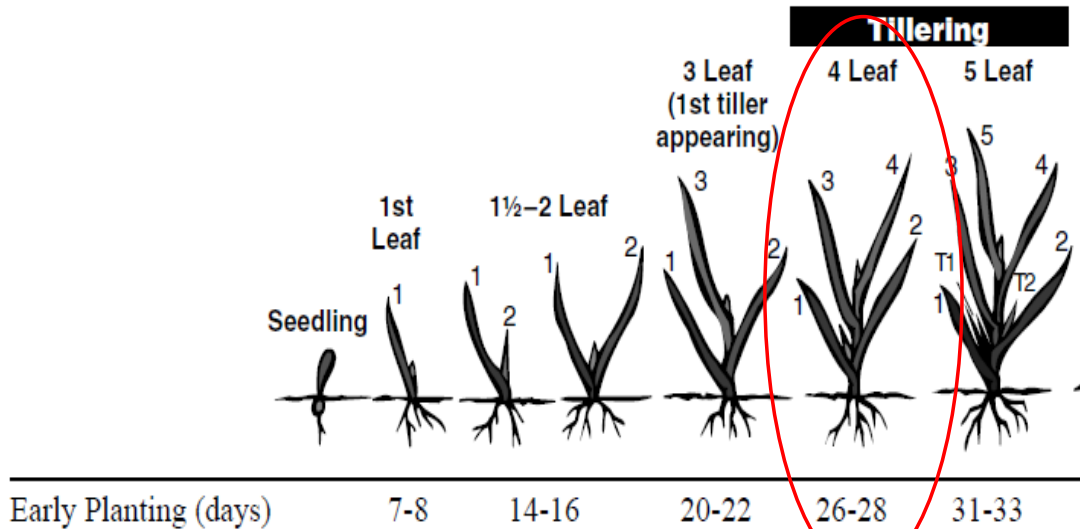
** On sandy soils, use slow-release nitrogen fertilizers (sulfur-coated ureas, IBDU, and natural organic-based fertilizers) throughout the year to reduce the potential for leaching loss. On very sandy soils, do not fertilizer turf after late September. Nitrogen can leach into ground water during the winter months.

*** The March-April nitrogen application may not be needed if fertilized late fall (September to November) the previous years. If spring green-up and growth is satisfactory, delay fertilizing until May or June.

**** Make the final fall nitrogen application (October-November) while the grass is still green and at least two to three weeks before the ground begins to freeze. Optional N applications shown in (). Use extra nitrogen applications where a higher quality turf is desired or on a heavily used turf.

For the full fact sheet, visit CSU Extension at <https://extension.colostate.edu/docs/pubs/garden/07202.pdf>

Weeds



Once grasses have been seeded, weeds can be controlled through the establishment period (first year and a half) by selective mowing at a height above the native grass seedlings.

Initial mowing for weed control will be most effective during spring or early summer during the second growing season. Selective herbicides that target broadleaf weeds can be used when native grass plants have reached the four-leaf stage and the air temperature does not exceed 75 degrees. See the illustration above for grass leaf stages.

Promote diversity. Consider letting other plants (like clover) into your lawn. Left to nature's devices, a lawn would become more diverse, allowing broad-leaved plants to mingle with the grass.

City of Aurora Code



As we live in a semi-arid state, restrictions have been set on the amount and location of Kentucky bluegrass in a landscape. While there are less restrictions with turfgrass alternatives / water-wise landscaping it's best to check with the Planning Department for guidelines specific to your property.

Let us know how we're doing

Please take just a few minutes to evaluate this class. We hope you enjoyed it.

<https://www.surveymonkey.com/r/AuroraWater>



Thank You

Water Conservation Office
Hotline 303.739.7195
conservation@auroragov.org



Please visit our website for additional information at www.auroragov.org