Water-Efficient Lawn Care for Short-Season, High-Altitude Climates

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Inyo & Mono Master Gardener Program
Mission: Provide the public with research-based info about home horticulture, sustainable landscape and pest management

60 trained local volunteers offer: Classes, workshops, one-on-one consultations, Help Line, gardens
Outline

1. Recommended grasses for short-season, high-altitude areas

2. Lawn maintenance
   • Mowing
   • Irrigation
   • Fertilization
   • Thatch management
What species of lawn do you have?

1. Kentucky bluegrass
2. Fine fescue
3. A blend of bluegrass/ryegrass and fescue
4. A blend of weeds and grass
5. No clue
6. No lawn
Short-season, high-altitude zones

- Cool-season grass species grow best in cool weather (spring & fall), when soil temps are 55-65°F.
- Warm-season grasses not suitable over 7,000 ft elev.
- High-mountain climates need grass species that can also tolerate high snowfall and extended winters:
  - Kentucky Bluegrass
  - Fine fescues (creeping red; chewings; sheep; hard)
  - *Use as blend only*: Perennial ryegrass
  - *For soil erosion*: Wheatgrass, CA Native Bentgrass
## Comparative characteristics

<table>
<thead>
<tr>
<th>Species</th>
<th>Cold Tolerance</th>
<th>Drought Tolerance</th>
<th>Shade Tolerance</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky Bluegrass</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Tolerates wear. Susceptible to grubs at elevations &lt;5,000 ft.</td>
</tr>
<tr>
<td>Fine Fescues</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Tendency for leaves to lay over; not rec. for high-traffic areas</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Use only in seed mixes as a “nurse” grass</td>
</tr>
<tr>
<td>Wheat-grasses</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Good choice for meadow areas or erosion control. Not rec. for lawns</td>
</tr>
</tbody>
</table>

Kentucky Bluegrass

*Poa pratensis*

- Very cold-tolerant and well-suited to cold winters/snow
- Recovers quickly in the spring
- Tolerates wear, drought, and extreme temperatures
- Not shade-tolerant (powdery mildew)
- Hundreds of varieties available – different colors, quality. Seed usually available as a blend (w/ rye and red fescue)
Kentucky Bluegrass, ctd.

Poa pratensis

- Moderate to high maintenance
- Requires frequent irrigation (every 1-3 days)
- Despite reputation as a high water user, it can survive with little or no water by going dormant (brown)
- Can be susceptible to disease and weed invasion
Fine Fescues

*Festuca spp.* (i.e. creeping red, hard, sheep)

- Best-suited to high-altitude climates — the most shade-tolerant of the cool-grasses, can survive very cold temps, have low nitrogen requirement. Not heat-tolerant.
- Not recommended for high-traffic areas, as they are slow growing and take a while to recover from injury
- Often blended with other grasses (i.e. KBG)
- Can become thatchy and difficult to mow
Perennial ryegrass
*Lolium perenne*

- Bunch-type grass commonly used in mixtures with KBG and fine fescues (KBG will eventually crowd it out)
- Very rapid germination – it serves as a “nurse” grass for other species (i.e. bluegrass) that are much slower
- Shade-tolerant. **Not** cold-tolerant or disease-tolerant.
- **Not** recommended as stand-alone grass in short-season, high-altitude areas. Mix with others.
CA Native Bentgrass

*Agrostis pallens*

- Meadowy look – hard to mow
- Good ground cover & weed deterrent
- Does not need much water
- Uniform growing habit – self-repairing if patches die
- Tolerates high-altitude conditions but not too much heat
- Great soil stabilization and erosion control for hillsides
- Goes dormant (brown) in winter and where there’s snow
Wheatgrasses

*various species*

- Used at elevations up to 10,000 feet
- Germinate quickly
- Good to add to prairie or meadow areas - seedheads provide attractive texture
- **Not** recommended for lawns due to tall growth, summer dormancy, wide blades, tendency to not tolerate frequent mowing
- Good for soil stabilization and to control erosion
How to choose?

Key factors that impact species selection:
- Climate
- Intended use
- Desired level of maintenance

In terms of water savings, irrigation and other maintenance practices are more important than species selection.
Speaking of maintenance...

• Mowing
• Irrigation
• Fertilization
• Thatch management
How often do you mow your lawn in the summer?

1. Twice a week
2. Once a week
3. When I get around to it
4. When it is 1/3 higher than the desired mowing height
5. Not very often
The Golden Rule of Mowing

Mow when grass is $\frac{1}{3}$rd higher than desired height of cut.

*If grass is 3” tall, cut back to 2”*

Don’t mow off more than $\frac{1}{3}$rd of the grass at any one time.
Mowing recommendations for cool-season grasses

Proper mowing keeps lawns healthy and resistant to stress and weeds and disease.

<table>
<thead>
<tr>
<th>Turf Species</th>
<th>Set mower to:</th>
<th>Mow when grass reaches:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky Bluegrass</td>
<td>1 ½ -2 ½ inches</td>
<td>2 ¼- 3 ¾ inches</td>
</tr>
<tr>
<td>Red Fescue (Fine)</td>
<td>1 ½ -2 ½ inches</td>
<td>2 ¼- 3 ¾ inches</td>
</tr>
<tr>
<td>Perennial Ryegrass</td>
<td>1 ½ -2 ½ inches</td>
<td>2 ¼- 3 ¾ inches</td>
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</table>
Mowing frequency

- Depends on species, climate, inputs (irrigation, fertilization) and rate of growth
- May have to mow a bluegrass or fescue lawn every 3-4 days during the spring when actively growing but only once every 7-10 days when growth is slowed by heat, drought or cold.
# Mowing impacts

<table>
<thead>
<tr>
<th>PROBLEM: Grass cut...</th>
<th>IMPACT</th>
</tr>
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<tbody>
<tr>
<td>Too low (&lt;2”)</td>
<td>Exposes stems and soil and keeps canopy too open, allowing sun in and soil temps to rise. Decreases root growth. Doesn’t allow for proper carbohydrate reserves, which results in poor recuperative ability. Will turn yellow.</td>
</tr>
<tr>
<td>Too high</td>
<td>Tall canopy overshares blades closer to plant crown. Decreases air circulation &gt; more moisture retained. More contact between blades. Results in seed heads.</td>
</tr>
<tr>
<td>Too infrequently</td>
<td>Leaves canopy too open; loss of carbohydrate reserves; open to more weeds; reduced capacity to recover from stress.</td>
</tr>
<tr>
<td>Dull blade</td>
<td>Makes ragged cuts &gt; more freshly cut surface area to support fungal growth. Shred leaf blades &gt; brown lawn</td>
</tr>
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University of California
Agriculture and Natural Resources

Making a Difference for California
Mowing heights

• In high mountain zones, higher mowing heights = increased cold tolerance.

• Proper mowing height: 2.5-3” – leaves sufficient leaf area for grass to capture light and produce more energy reserves, resist stress. No less than 2”!

• If weather or another factor prevents mowing at the proper time, raise the height of the mower temporarily to avoid cutting too much at one time. Cut grass again a few days later at the normal mowing height.
Grass clippings

• Leave clippings on ground so that their nutrients are available for plant growth.
• Clippings decompose quickly and provide recycled nutrients and organic matter for the lawn.
• Grass clippings do not contribute to thatch accumulation.
• If herbicides applied to the lawn, do not use clippings in vegetable or flower gardens. Keep them on the lawn.
Mowing considerations for high-snow areas

• Keep mowing into late fall (late Nov) until grass has stopped growing.
  – Reduces excess debris and decreases chance of snow mold

• Encourage early and rapid spring growth by setting mowing height lower than normal (*1st mowing only* ) or by lightly raking matted areas to improve air circulation
  – Helps remove dead, overwintered leaves
  – Allows sunlight in, warms up the turf to get it started growing

• Use care – excessive cutting will expose soil and allow early-germinating annual grasses to grow as well
Irrigation at High-Altitude

• Healthy turf – i.e. that is mowed and fertilized properly – uses water more efficiently.
• Less irrigation needed at high-altitude than at lower elevations with higher temps (i.e. Owens Valley)
• Lawns with significant shade and wind protection do not need as much irrigation
• BUT unprotected lawns at high elevations can be thinned by winter dessication and low temp damage
  – Water as late into the fall or early winter as possible (as long as top 1-2 inches of soil are not frozen)
  – May need to re-seed in the spring if large areas die in winter
Other considerations

• In areas that experience consistent winter-kill, consider redesigning the landscape to provide some protection.

• Areas that are shady or where ice/snow accumulate (corners, low-lying areas) tend to have very thin grass stand due to compacted snow.
  – Consider alternatives: hardy shrubs or porous hardscape that allows for water drainage.
Irrigation – how much?

• Enough to moisten as much of the root zone as possible
  – Use soil probe or shovel to determine average rooting depth
  – Know how deep the roots grow as well as how deep your irrigation water penetrates

• Will vary depending on soil composition, drainage, moisture
  – Watering too deeply (esp. on sandy soils) wastes water by watering beyond the root zone

• Watering less often means more efficient water use because of less loss to evaporation.

• It can also reduce the number of weeds that appear.
Efficient Irrigation Practices

• Do not apply all water in a short period of time (leads to run-off)
  – Better to allow water to soak into the soil; move to another part of the lawn, and apply rest of water later.
  – Apply no faster than the soil absorption rate.

• Most efficient time of day to water:
  – late evening (10pm-midnight) or early morning (8-9 a.m.) when it is less windy, cooler, more humid (results in less evaporation)
  – Watering at night does not encourage disease development, contrary to popular belief...but don’t let sprinkler run all night!
  – Watering the sidewalk or driveway does not improve grass growth.
    • Inefficient; run-off (pesticides, fertilizer, pollutants) to water source
Water deeply & infrequently

• When possible, deep and infrequent watering is best for promoting deep and healthy root growth, high quality grass, and optimal wise water use
• Frequency is most associated with disease development (creates ideal environment for weeds)
• Light sprinkling is only beneficial for newly planted turf (when roots are in very top of soil). But as roots extend deeper, light sprinkling encourages root development only near soil surface.
  – Shallow root systems need frequent watering to keep surface wet; will result in moist environment and disease conditions
Determining your watering schedule

- Using reference evapotranspiration to determine how often and how long to water; also uniformity of irrigation in your yard
  - *Watering Home Lawns: How Much & How Often?* (CIS 1157) Univ. of Idaho
    [www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1157.pdf](http://www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1157.pdf)
  - Univ. of Nevada Coop Extension lawn care manual

How to get similar results using 20% less water
Consult irrigation schedule
UC Guide to Healthy Lawns

http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/irrsched.html
How to Irrigate Turfgrass – UC Davis irrigation guide
Irrigation system maintenance

Operating and Maintaining a Home Irrigation System
Colorado State University *Fact Sheet 7.239*

http://www.ext.colostate.edu/pubs/garden/07239.html
Fertilization

• Healthy, dense lawns are more resistant to diseases, insects and weeds; have better recuperative ability.

• All grasses require nitrogen on a regular basis. Lawns with adequate N have far fewer weeds.

• For most established lawns, N is the only nutrient that needs to be supplied on a regular basis. May be beneficial to apply a complete fertilizer with key nutrients (Nitrogen, Phosphorous, Potassium) at least once a year. Iron, sulfur.

• Nitrogen application increases growth to roots & shoots. If too much applied or too frequently, shoots grow while root growth slows. Leaves grass vulnerable.
Optimum fertilization

• Commercial (fast-release) vs. organic (slow, feeds soil as well as plant; need to apply more) N source
• Cool season grasses: 0.5-3 lbs of nitrogen per 1000 sq. ft. per season; no more than 1 lb. per application (grass burn)
• Apply fertilizers only during active growth periods:
  – Cool-season: spring (May-June) and fall (Aug-Sept; Oct/Nov).
  – Limit fertilization during the high temp summer months.
• For home lawns, dry fertilizers preferable (and cheaper) to liquid. Easier to apply evenly, less frequent application and less likely to burn grass
• Leaving grass clippings greatly increases N
Thatch

• Creates enviro for pests and diseases, unfavorable for root growth
• Tends to be a problem on Kentucky bluegrass, bentgrass, & fine fescue lawns.
• Not a problem with wheatgrass.
• Grass clippings do not contribute to thatch accumulation.
• Act early – when thatch exceeds over ½” thick. When too thick, exposes grass to drought stress, winter kill, disease.
• Fertilizers applied to thatchy lawn are less effective.
Methods of aeration

- **Core cultivation** – preferred for high-elevation areas
  - Remove plugs of thatch/soil to penetrate lawn
  - Relieve compaction and improve air flow, water infiltration, and root growth
  - Do yearly or in alternate years, fall is preferred time but can do spring too (as long as temps are warm enough for root growth)

- **Power raking** – less beneficial than core cultivation
  - While light raking in early spring can help with earlier green-up, deep raking can cause excessive damage to grass.
  - In short-season areas, grass may not have time to recover.
Sources

**University of Idaho** *Short-Season, High-Altitude Gardening Series*
http://www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0875.pdf

**Colorado State University**

- Fine Fescue for Lawns
  http://www.cmg.colostate.edu/gardennotes/564.html
- Lawn Care
  http://www.ext.colostate.edu/pubs/garden/07202.html

**University of Nevada, Reno Cooperative Extension**

The All-Seeing, All-Knowing Lawn Care Manual – SP93-02
www.unce.unr.edu/publications/files/ho/other/sp9302.pdf
Sources, ctd.

University of California

- Pam Geisel, Statewide Master Gardener Program Director
- UC Davis Integrated Pest Management (IPM) site: http://www.ipm.ucdavis.edu
Mountain and desert gardening

Mountain horticulture and high-altitude gardening

The High Sierra shares many characteristics with other high-altitude areas, and gardeners face many of the same challenges. As we continue to develop our own resources for Eastern Sierra gardeners, we look to resources from university extension departments in states with similar climates and ecosystems, such as: Colorado State University; University of Idaho; University of Nevada; New Mexico State; and the University of Arizona.

- Mountain gardening basics
- Mountain horticulture
- Garden strategies for short-season, high-altitude zones
- List of publications for short-season high-altitude gardening
- Frost protection and extending the growing season
- Vegetable planting guide from Colorado State
- High-elevation horticulture publications from Univ. of AZ - growing flowers, fruit trees, veggies, trees from 3,500 ft up. Lots of info on growing at 6,000 ft and up, also water-wise tips.

Great Basin gardening

- Grow Your Own: Weekly Steps to a Great Vegetable Garden. This 15-part series from the University of Nevada, Reno Cooperative Extension consists of 2-page info sheets on topics such as planting from seed, dealing with our challenging soils, composting, irrigation, and more. Each is found within this website and linked with more.
Inyo & Mono Master Gardener Program

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Thank you!