



CMG GardenNotes #412

Water Wise Landscape Design: Selecting Turf Options

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For additional information on turf selection, refer to Dr. Tony Koski's website at <http://csuturf.colostate.edu> and the following *CMG GardenNotes*:

- #561, Turfgrass Species Selection Guidelines
- #562, Best Turf Varieties: Variety Recommendations for Bluegrass, Ryegrass, Tall Fescue, Fine Fescue, Buffalograss and Bermudagrass
- #563 Hybrid (Kentucky X Texas) Bluegrass for Turf Use in Colorado
- #564, Fine Fescues for Lawns
- #565, Buffalograss Lawns
- #566, Sources of Grass Seed, Sod, and Plugs for Colorado Lawns

Water-wise landscaping is not anti-turf, but about matching turf selection to the design needs and use of the site.

With Colorado's continued population growth, water use becomes a critical issue. Water conservation helps 1) reduce total water demand, and 2) reduce the extensive cost of expanding a community's water infrastructure.

In a typical community, water use more than doubles during the summer irrigation season. On a statewide perspective, landscape irrigation accounts for 7 to 10% of Colorado's total water use.

Benefits of Grass

Healthy grass is an aesthetic asset and a factor in property value. It provides a backdrop for other landscape elements pulling the landscape design together.

The growing body of evidence points to the positive health and environmental contributions made by lawns and other grassy areas. A healthy, vigorous lawn with high plant density provides the following benefits:

- **Conversion of CO₂ to O₂** – Twenty-five square feet of actively growing grass produces enough oxygen for one person per day.

On a global basis, grasslands of the northern hemisphere are second to the tropical rain forests in the CO₂ to O₂ conversion.
- **Pollution breakdown** – Microorganisms found in the soil of actively growing turf, breakdown organic pollutants, including air contaminants, pollen, and pesticides.
- **Wind erosion** – Grass cover prevents wind erosion of soil, trapping dust and pollen.
- **Water quality** – Turfgrass areas play a significant role in reducing surface water runoff, a key factor in *non-point-source* pollution in the landscape setting.
 - An average golf course of 150 acres can absorb 12 million gallons of water during a 3-inch rainfall.
 - A thick turfgrass allows 15 times less runoff than does a lower quality lawn.
 - A healthy, dense stand of turfgrass can reduce runoff to almost zero.
 - Compared to a garden or field planted to row crops, grassy areas reduce soil erosion by 84 to 668 times.
 - To protect surface water quality, direct surface runoff onto grassy areas allowing for natural filtering in the biologically active turf soil.
- **Soil structure** – Actively growing grass supports soil organism activity that improves soil structure.
- **People space** – Turf is basic “people space” with a cool, dirt-free activity space for children and adults.
- **Element of landscape design** – Turf brings unity to a landscape design and provides a neutral background to set off flowers and shrubs.
- **Property values** – Turf quality influences property appeal and marketability.
- **Fire defense zone** – Irrigated mowed lawns is an important aspect of fire management in communities. Dry, unmowed grass/weeds become a major fire hazard.

Turf Selection: Creating Practical Turf Areas

High input lawns are a habit in American and European landscapes since the days of King Louis of France. However, does the property use require the perfect green lawn with high inputs or would a moderate quality lawn with reduced inputs or a low input lawn be acceptable for the site?

Many lawn care problems arise from management differences between high, moderate and low input lawns. For many gardeners, there is a conflict between expectations and inputs. Table 1 summarizes difference in high, moderate, and low input lawns.

Table 1. Comparison of High, Moderate, and Low Input Lawns			
	High Input	Moderate Input	Low Input
Wear tolerance	best	good	limited
Appearance	best	good	limited
Water	high	moderate	limited
Exposure	sun	sun to partial shade	sun
Fertilization	spring and fall	primarily fall	fall
Species	<ul style="list-style-type: none"> ○ Select KBG cultivars ○ Perennial rye ○ Turf-type tall fescue 	<ul style="list-style-type: none"> ○ Select KBG cultivars ○ Turf-type tall fescue ○ Buffalo grass 	<ul style="list-style-type: none"> ○ Select KBG cultivars ○ Blue grama ○ Buffalo grass

Grass and Water Use

Contrary to popular belief, there is no magic lawn type that delivers top quality with minimal inputs. The quality of any turf is directly dependent on the amount of summer rainfall and supplemental irrigation it receives.

A lawn's tolerance or resistance to drought is a complex situation. A "drought tolerant" specie may or may not use and/or require less water depending on many factors. Factors contributing to drought tolerance include:

- Species (including its actual water use, rooting depth, and ability to go dormant)
- Soil tilth and soil oxygen levels (rooting depth)
- Wind and sun exposure (actual water use)
- Mowing height (high mowing leads to deeper roots).
- Traffic, (any lawn is intolerant of traffic when dry).
- Salt levels in soil and irrigation water.
- Previous irrigation pattern (frequency and watering depth).

The bottom line is that species selection is secondary to irrigation management in water savings. A more drought tolerant lawn species will not use less water if managed like a high input lawn!

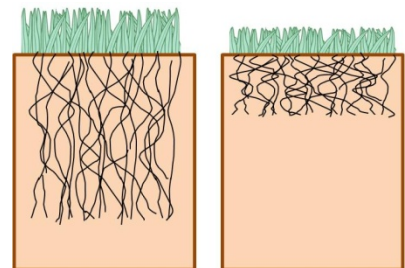
Since Kentucky bluegrass, turf-type tall fescue, and Buffalograss make up 99% of home lawns in Colorado, this *CMG GardenNotes* only looks at these options. For additional information on turf species, refer to *CMG GardenNotes #561, Turfgrass Species Selection Guide*.

If A Turf Is Deeper Rooting

If a turf is deeper rooting:

- It requires less frequent irrigation (i.e., stays greener longer between irrigations).
- However, it will also require a heavier/deeper irrigation to recharge the rooting zone, so actual water use is not necessarily reduced.
- Deeper rooting may or may not be an irrigation savings technique depending on the frequency of soaking summer rains and the irrigation pattern. If the area can depend on frequent soaking summer rains, the deeper rooting cultivars can be an advantage to keep the grass green between rain events. If the lawn is automatically watered two or three times a week, potential rooting depth is a moot point. [Figure 1]
- Many gardeners mistakenly assume that deep rooting is a water savings because irrigation is needed less often. However, the frequency of irrigation is not the primary factor to consider. The issue is total water consumption.

Figure 1. Deeper rooting means less frequent irrigation, but heavier irrigation to replenish the rooting zone. It should not be interpreted as a water savings.



Kentucky Bluegrass Makes a Great Lower-Input Turf Option.

- Kentucky bluegrass, KBG, is the standard for home lawns due to the rich blue-green color and its high tolerance for wear.
- Water use primarily depends on the gardener's irrigation management. On a community wide basis, we use twice the amount of water that the KGB lawns actually need. Research studies show that the most gardeners actually do a good job of irrigation management. However, in any neighbourhood, some gardeners apply four to ten times the amount of actually needed by the lawn.
- With KBG, water use and growth actually slows when the soil begins to dry down. However, to capitalize on this dry down requires careful irrigation management rather than automatic irrigation on fixed days of the week.
- Irrigation demand varies significantly between cultivars. Some deeper rooting cultivars require less frequent irrigations. Some cultivars demand 25% less total water.

- KBG goes dormant with water stress. Summer dormant KBG is a standard in many parts of the eastern United States. Just not in the arid west! Will summer dormant with green lawns in the spring and fall work for the site?
- Bottom line: It is not the KBG that demands the heavy irrigation but rather the gardener's management style.
 - High input KBG makes a great "people space" for high use areas like a ball field with lots wear and tear. Few home lawns have this high traffic situation demanding high inputs.
 - Moderate input KBG (irrigated at 80% ET) fits the need for most home lawns where a beautiful green lawn is desired.
 - When irrigated at 60% ET, KBG makes a thinner carpet. This may be well suited for lower use areas.
 - Where summer dormant is acceptable, KBG makes a great minimal input lawn. It needs to be greened up in the cooler weather of spring and fall with rainfall and supplemental irrigation. [Figure 2]
 - The public objection to summer dormant lawns is that so many are found in un-kept yards that become the neighborhood weed patch.

Note: the term "ET" stands for *evapotranspiration* which is an actual measurement of the water use of the lawn (or crop) based on crop growth, temperature, wind, humidity, and solar radiation.

Figure 2. A weed free, summer dormant KBG lawn. Public objection to summer dormant KBG is that so many are simply no maintenance yards becoming the neighborhood weed patch.



Turf-Type Tall Fescue Makes A Great Lower Input Turf Option.

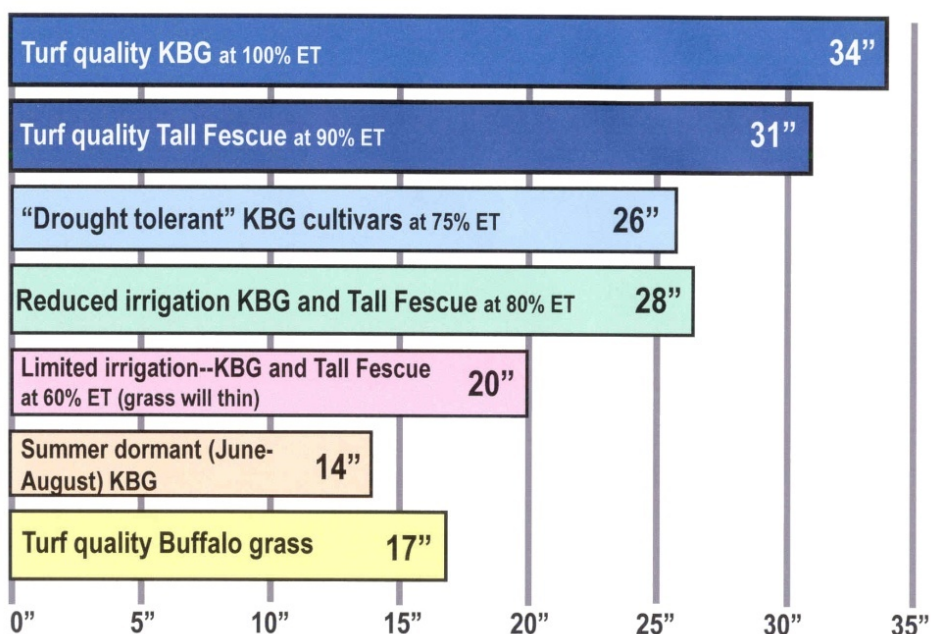
- Turf type tall fescue may be deeper rooted than KGB, depending on soil tilth (oxygen levels), cultivars, and irrigation pattern. This means it may go longer between irrigation, but should not be mistaken as water savings.
- Tall fescue cannot slow growth and water use as the soil dries down. Actual water use may be significantly higher than KBG.
- Tall fescue cannot go dormant. In summer dry spells, it requires irrigation.
- Based on ET, actual water use of turf-quality tall fescue is only 10% less than the ET for KBG. Irrigation management plays a larger role in water use than species selection. Switching from a KBG to a turf-type tall fescue lawn will not save water! Water savings comes in the management of the irrigation.
- Tall fescue makes a great reduced-input turfgrass for site where top quality turf is not essential for the landscape design.

Buffalograss Quality Is Dependent on the Amount of Summer Rain and Irrigation It Receives.

- Being a warm season grass, Buffalograss will be dormant brown from early fall (first frost) to late spring in Colorado.
- To be green in the summer, water use for Buffalograss is about 1 inch of rain and irrigation per week. To remain green in Colorado summers, Buffalograss generally requires irrigation to supplement natural rainfall.
- Turf-quality Buffalograss requires 50% less rain and irrigation per season than KBG. This reduction is due, in part, from being dormant in the spring and fall.

Comparative Seasonal Water Requirement

Figure 3 illustrates the comparative season water requirement (including summer rainfall and irrigation) of lawn options. The typical lawn receives twice the amount of irrigation required for high input KBG. [Figure 3]



Authors: **David Whiting**, Extension Consumer Horticulture Specialist (retired), Dept. of Horticulture and LA, Colorado State University; and **Jeffry de Jong**, Horticulturist, Victoria, BC, Canada. Artwork by David Whiting; used by permission.

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