

Converting Kentucky Bluegrass to Native Grass in City Parks

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ABSTRACT. *As a result of the severe budget constraints that have impacted the health of the City's parks, Colorado Springs Parks Department developed a strategy for reducing the amount of irrigated Kentucky bluegrass in order to help maintain a healthier and more sustainable parks system. The strategy includes converting low-use, high-maintenance Kentucky bluegrass to native grass to achieve significant water savings and reduce the overall water footprint of city parks and greenways. The results of converting of nearly 60 acres have been dramatic, proving very cost effective while providing more attractive landscapes. Learn which areas to convert, how much water you can save, and step-by-step details of how to make the conversion a success!*

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Sustainable landscape designs have greatly improved over the last two decades. This trend towards alternative landscape creation is driven in part by interest and need for resource conservation. More sustainable landscape designs can be seen in new construction along the Front Range corridor of Colorado and help address the dual needs to reduce water consumption and maintenance. The next challenge is to expand these benefits by exploring the potential for conversion of existing, conventional landscape treatments into more sustainable landscapes. Conversion of high water usage turfgrass areas to less water consumptive and lower maintenance areas is possible and can provide significant resource savings. While there are many viable alternatives for creating sustainable landscapes, the focus of this paper is to broaden the understanding and use of native grasses as a landscape option and a viable water and landscape management conservation strategy.

Situation

Colorado Springs is a growing city at the confluence of the Great Plains and Rocky Mountains. The city is almost completely dependent upon surface water resulting from snow melt for its water supply. It is the only large city in Colorado not built around a major river and for that reason the majority of its drinking water comes from approximately 200 miles away through a series of pipes, tunnels, reservoirs, and pumping stations (Colorado Springs Utilities, 2012). The city's unique geography and highly variable semi-arid climate combined with the complexity and scale of its water system means that the cost of water is high relative to other large providers on the Front Range of Colorado

As a result of the severe budget constraints that impacted the health of the City's parks, Colorado Springs Parks and Recreation Department (CSPRD) developed a comprehensive water management strategy to help maintain a healthier and more sustainable parks system, short and long term.

One significant part of the strategy consists in converting areas of low-use and/or poor performing Kentucky bluegrass to native grasses. By doing so we expected to reduce irrigation water usage and maintenance costs, and in many cases improve the overall health and appearance of the landscape area. We also anticipated that such conversions would provide a more sustainable parks system.

Identifying Areas for Conversion

From 1970-2000, Kentucky bluegrass was widely used as the landscape grass of choice in Colorado Springs parks and medians. Kentucky bluegrass has long been used as a durable turfgrass. It is still a good option for heavily used, active play areas and sports fields. However, many conventional bluegrass installations are low-use or not intended for active play. In

CSPRD’s landscape conversions, we identified three major areas for conversions as follows: low-use conventional turf, restricted access turf, and problem maintenance areas.

Low-Use Conventional Turf

City parks have multiple functions for community citizens. Neighborhood parks provide relief from the built environment surrounding residents. They provide greenscape, recreation centers, sports fields and playgrounds. A greenscape is a landscaped park, often with large un-programmed turf areas, primarily for passive recreation. These large, low-use turf areas have little aesthetic diversity and offer an excellent opportunity for conversion. These areas also offer the greatest opportunity for water and maintenance savings.



Two, 7.5 acre low-use conventional turf sites converted in 2013.

Restricted Access Turf

Throughout Colorado Springs, we maintain a wide range of Kentucky bluegrass areas situated along roads and next to parking lots. These areas are not suitable for active play and mostly offer an aesthetic appeal to ongoing motorists. Many of these areas are a challenge to maintain and have received important consideration for conversion.



Two, restricted access turf sites converted from Kentucky bluegrass to native grasses.

Problem Maintenance Areas

Given our location on edge of the Great Plains, native grasses can offer a great alternative to difficult-to-maintain turfgrass and problem maintenance areas. Steep slopes, south-facing exposures, wet drainages and areas with heavy shade are some example problem maintenance areas that could be converted to achieve water and maintenance savings.



This heavily shaded area in front of the main Park & Rec office was converted to a shade-tolerant fine fescue blend in 2014.

Existing Site Condition Evaluation

Before selecting a conversion area, evaluate the physical characteristics and desired use. This site specific information will determine the design and native grass species. This section is intended to assist with identification of key considerations for a successful conversion.

- **Irrigation** – Renovation of an existing irrigation system will need to occur to support changes in landscape design. Conversion area installations generally require separate irrigation zones from non-converted areas. If only part of an irrigation turf area is to be converted, a dedicated zone could be an essential requirement. Other equipment changes could include retrofitting 4” pop-up heads to 6” pop-ups.
- **Soil**- When converting a landscape, the existing soil characteristics should be considered to assure a good match to the requirement of the native grass species. For example, buffalograss is not well adapted to sandy soils.



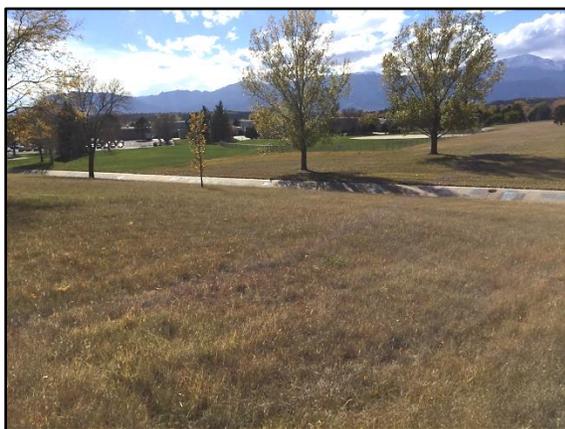
Irrigation modifications at Ford Frick Park

- **Topography and exposure** – Slopes tend to shed water quickly and thus tend to be drier. South and west facing slopes can become very dry, particularly during the winter when the sun angle is low. Grass selection is very important for these dry, exposed sites.
- **Existing vegetation** – When converting high water using turfgrass that contains established existing landscape vegetation (especially trees), special care should be given along with the use of a dedicated irrigation zone.

Grass Selection – Seed Mixes

The intended use and expectations should influence the selection of the grass species and desired mix. In order to select the best mix, potential uses should be identified and the previously mentioned site conditions evaluated. Once these have been identified, it will be possible to select an appropriate seed mix. The following two seed mixes are two of the primary conversion mixes we have used:

Midgrass Prairie Seed Mixture			
Common Name	Grass Season	Improved Variety	PLS #/Acre
Buffalograss	warm season	Texoka	4
Blue Grama	warm season	Hachita	4
Sand Dropseed	warm season	Native	2
Western Wheatgrass	cool season	Arriba	7
Sideoats Grama	warm season	Butte	6
Green Needlegrass	cool season	Lodorm	7
Seeding Rate: Total 30 PLS #/acre - Drill seeded at half rate; two different directions, perpendicular to one another.			



A seeded, native midgrass prairie at Keller and Wildflower Parks.

Wheatgrass Blend			
Common Name	Grass Season	Improved Variety	% of mix by weight
Pubescent wheatgrass	cool season	Luna	40
Western wheatgrass	cool season	Arriba	23
Streambank wheatgrass	cool season	Sodar	18
Slender wheatgrass	cool season	Pryor	19
Seeding Rate: Total 300 PLS # acre - Drill seeded at half rate; two different directions, perpendicular to one another.			



9.35 acres converted to wheatgrass at Memorial Park.



Wheatgrass area 8 weeks after seeding.

Conversion Method

We have experimented with a variety of conversion methods throughout the last four growing seasons. Below is the method we've found to be most effective and desirable. This method is more suitable for larger sites, but has been effective on smaller sites where equipment can be used. Conversion in areas with irrigation:

1. Initiate conversion when vegetation is actively growing. Generally speaking, May 1 – August 31st. To assure adequate time for establishment prior to the first hard frost, irrigated conversion areas should be seeded on or before August 31st. The majority of our projects were seeded in late July and August with great success. This period of time offers warm soil temperatures for quick and reliable germination, our most predictable moisture (monsoon) of the summer, with weed pressure tapering off in late August.
2. Irrigate conversion area well. If needed, allow more time and irrigation cycles to ensure conversion area is not drought stressed. You want vegetation that is in good growing condition at the time of herbicide treatment.
3. Thoroughly treat the conversion area with a glyphosate product at a 2-3 oz./1000 sq. ft. rate. Repeat with second application in 10-14 days to provide a complete kill. Any areas

that were missed or any remaining weeds should be treated with an additional application. This process takes about 4 to 5 weeks for a complete kill.

4. Mow conversion area at 2 to 3 inches or as short as possible.
5. Flag all irrigation heads, valve boxes, etc. to avoid damage.
6. Aerate using a hollow, tine core aerator that pulls a 2 to 3 inch plug. Make a minimum of three passes at different angles.
7. Broadcast seed using whatever means possible to assure seed is broadcasted over the conversion area. Native grass seed is quite large and can be difficult to apply using traditional rotary spreaders. Hand broadcasting seed can be an effective means.
8. Drill or slit seed conversion area with appropriate grassland drill or slit seeder. Seed the area twice in perpendicular directions using half the seed in each direction. The depth of the seed should be set at 0.25 to 0.5 inch depth.
9. Drag entire area thoroughly with drag mat.
10. Fertilize using a low fertility (8-2-0) slow release granular organic fertilizer at a rate of 0.5 to .75 #N/1000.
11. (Optional) The application of hydromulch may be necessary in some locations to prevent wind and water erosion. Straw netting has been effective on steep slopes for securing seed.
12. Fertilize using a low fertility slow release granular organic fertilizer at a rate of 0.5 to .75 #N/1000.
13. Irrigation programs for establishment should be carefully managed. It is critical to schedule irrigation based on the actual requirements of the seedbed soils. Irrigation should deliver consistent moisture to improve establishment results.

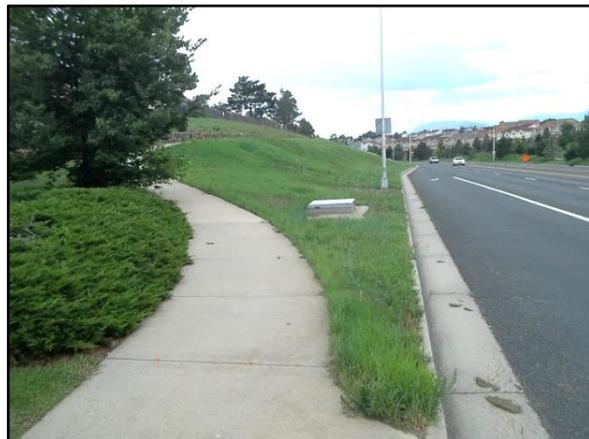


Water and Maintenance Savings – Midgrass Prairie

Annual maintenance activities for midgrass prairie conversion areas differ greatly from those required for conventional turf. Maintenance is adapted to the local, annual precipitation, requiring far less moisture than conventional turf. For highly visible locations, access to long-term consistent irrigation will ensure a healthy dense native stand. Expected water savings in comparison to maintaining conventional Kentucky bluegrass will range from 65% to 75%. Once established, no additional fertilizer, core aerating or overseeding is required. Mowing can be done a couple times during the growing season if desired. Unmowed midgrass prairie is visually attractive and will offer the greatest savings. Regular control of weeds is an essential annual activity. The following tables provide actual maintenance costs and savings numbers for the first couple of seasons, as well as anticipated savings for the next 10 years.

Briargate Roadway Maintenance Costs (.41 acres)			
2013-2016 Midgrass Prairie Annual Maintenance Costs	Cost	2013-2016 Kentucky Bluegrass Annual Maintenance Costs	Cost
Mowed once a season	\$100	32 mowings (May – October)	\$640
Herbicide (2 applications)	\$300	Herbicide (2 applications)	\$300
Fertilizer (not needed)	-	Fertilizer (3x/yr)	\$90
Overseeding (not needed)	-	Overseeding (1x/yr)	\$200
Aeration (not needed)	-	Aeration (2x/yr)	\$100
10 Inches (anticipated usage)	\$938	22 Inches of irrigation applied annually (historical avg. usage)	\$2,064
Total	\$1,338	Total	\$3,394

Briargate Roadway 10-Yr Cost Benefit Analysis (.41 acres)	
10-Year Water Savings (CF):	179,903
10-Year Water Savings (GAL):	1,345,673
10-Year Annual Savings Average:	\$2,295
Renovation Cost:	\$11,490
Project Payback (Years):	5.01
Yearly Savings Per Acre	\$306.02
Acre feet saved per year	0.41
Cost per acre foot saved	\$2,782



Briargate Roadway Conversion Site

Keller Park Maintenance Costs (7.5 acres)					
2013-2016 Midgrass Prairie Annual Maintenance Costs	Cost per acre	Overall cost	2013-2016 Kentucky Bluegrass Annual Maintenance Costs	Cost per acre	Overall cost
Mowed 3x season	\$100	\$2,250	32 mowings (May – October)	\$54	\$12,960
Herbicide (2 applications)	\$190	\$2,850	Herbicide (2 applications)	\$100	\$1,500
Fertilizer (not needed)	-	-	Fertilizer (3x/yr)	\$90	\$2,025
Overseeding (not needed)	-	-	Overseeding (1x/yr)	\$500	\$3,750
Aeration (not needed)	-	-	Aeration (2x/yr)	\$30	\$225
10 Inches (anticipated usage)		\$16,363	19 Inches of irrigation applied annually (historical avg. usage)		\$31,090
	Total	\$21,463		Total	\$51,550

Keller Park 10-Yr Cost Benefit Analysis (7.5 acres)	
10-Year Water Savings (CF):	2,885,850
10-Year Water Savings (GAL):	21,586,158
10-Year Annual Savings Average:	\$33,820
Renovation Cost:	\$16,052
Project Payback (Years):	0.47
Yearly Savings Per Acre	\$4,509
Acre feet saved per year	6.63
Cost per acre foot saved	\$173



Keller Park Conversion Site

Water and Maintenance Savings – Wheatgrass

This cool season grass blend can be used to provide a range of cover from dense turfgrass to unmowed, naturalized grassland. After establishment, this blend of wheatgrasses will look strikingly similar to Kentucky bluegrass and will provide a very durable drought-tolerant turf

which requires less maintenance. In comparison to maintaining conventional Kentucky bluegrass, expected water savings will range from 40 - 45%. These grasses germinate and establish very quickly. For wheatgrass conversion areas, annual maintenance activities differ from those required for conventional turf. Irrigated turf wheatgrass should be fertilized once a season using 1.0# N/1000 of a slow release nitrogen fertilizer, and core aerated once a year. These grasses tolerate frequent mowing, or they can be left unmowed, and generally perform better if not mowed shorter than 4 inches. The following tables provide actual maintenance costs and savings numbers for the first couple of seasons, as well as anticipated savings for the next 10 years.

Memorial Park Maintenance Costs (9.35 acres)					
2015-2016 Wheatgrass Annual Maintenance Costs	Cost Per Acre	Overall Cost	2015-2016 Kentucky Bluegrass Annual Maintenance Costs	Cost Per Acre	Overall Cost
Mowed bimonthly 16x season (May – October)	\$54	\$8,078	32 mowings (May – October)	\$54	\$16,156
Herbicide (2 applications)	\$100	\$1,500	Herbicide (2 applications)	\$100	\$1,500
Fertilizer (1x/yr)	\$90	\$842	Fertilizer (3x/yr)	\$90	\$2,525
Overseeding (not needed)	-	-	Overseeding (1x/yr)	\$100	\$935
Aeration (1x/yr)	\$30	\$281	Aeration (2x/yr)	\$30	\$562
14 Inches (anticipated usage)		\$28,559	24 Inches of irrigation applied annually (historical avg. usage)		\$48,595
	Total	\$39,260		Total	\$70,273

Memorial Park 10-Yr Cost Benefit Analysis (9.35 acres)	
10-Year Water Savings (CF):	3,394,050
10-Year Water Savings (GAL):	25,387,494
10-Year Annual Savings Average:	\$37,923
Renovation Cost:	\$22,833
Project Payback (Years):	0.60
Yearly Savings Per Acre:	\$5,056
Acre Feet Saved Per Year:	7.79
Cost Per Acre Foot Saved:	\$147

Summary

The City of Colorado Springs Parks Department developed a strategy for reducing the amount of irrigated Kentucky bluegrass to help maintain a healthier and more sustainable parks system. The successful strategy includes converting low-use, high-maintenance Kentucky bluegrass to native grass to achieve significant water savings and reduce the overall water footprint of city parks and greenways. The results of converting of nearly 60 acres have been dramatic, proving very cost effective while providing a more sustainable attractive landscape. This effort will continue as we look for additional opportunities for conversions and demonstrate thoughtful stewardship of our resources.

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REFERENCES

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