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## Abstract

Lawns in the United States are associated with problems related to water usage, chemical usage, and emissions from lawn equipment. For these reasons the average American lawn is unsustainable. I researched how current methods of lawn management could be improved to make lawns more sustainable and environmentally friendly, including wise water use, alternatives to chemicals, and alternatives to gasoline powered lawn mowers. I also looked at natural alternatives to replace the common turf grass lawn, including: xeriscaping, native species, and ground covers/moss. The region that I focused on was the Twin Cities area of Minnesota. I also looked at three common types of cool season turf grasses (Kentucky Bluegrass, Tall Fescue, and Perennial Ryegrass) and compared how each performed in the stresses associated with Minnesota weather. **I found that we can make improvements in lawn care management to make lawns more sustainable and environmentally friendly. Most importantly people need to be educated about the small behavioral changes they can make to use fewer resources and pollute less.**

## Methods

To solve the environmental problems associated with turf grass and lawn care I looked at which types of grass are the best to use in Minnesota and the best management practices to use to make our lawns the most efficient. I looked through different studies and papers that were written about lawns and turf grasses to find out which ones would be the best for the Minnesota climate. The three turf grasses that I looked at were: Kentucky Bluegrass, Tall Fescue, and Perennial Ryegrass. I made a chart that shows the positives and negatives of using each one of those turf grasses. In addition, I created a chart that shows the positives and negatives of choosing an alternative lawn that uses other things besides turf grass, which include: xeriscaping, native species, and ground covers/moss. Looking at all of these options and what would work best in Minnesota for both environmental impacts and economic costs I am able to show which type of lawn and management practices are best for Minnesotans.

**\*When thinking about how much you need to water and fertilize your lawn, make sure to do a soil test first. This lets you know what type of turf grass to put in and how much water and fertilizer your lawn needs, based on what type of soil you have.**

## Best Management Practices

**Water Use:** Water your lawn in the early morning or evening to prevent evaporation. When you water your lawn try to get as close to the ground and roots as you can. Let your lawn go dormant in July and August, and it will turn green again in September.\*

**Chemical Use:** Break your lawn of its chemical addiction. The first year will be tough on the lawn, but after that it will rebound back to being green again. If you feel the need to use chemicals, use natural or organic ones instead of the commercial ones.\*

**Mowing:** Let your turf grass grow higher. Mow more frequently using an electric lawn mower and cut less than an inch of grass. Always mulch and leave the grass clippings on your lawn so that no chemicals are wasted. Switch mowing directions every time to make sure you are not packing down the soil. The overall best option to use is the hand mower: no gas needed=no pollution.

**Using xeriscaping techniques, including using native plants and implanting landscapes that save water, will increase the performance of your lawn and the effectiveness of the best management practices listed above.**

Turf Grass Type	Kentucky Bluegrass	Tall Fescue	Perennial Ryegrass
Water Usage	2 inches per week	1 to 2 inch per week	1 to 2 inches per week
Chemical Usage	3 applications per year	Fall application	4 or more applications per year
Mowing Height	3 inches	4 inches	2 1/2 inches



Figure 1. Kentucky Bluegrass



Figure 2. Tall Fescue



Figure 2. Perennial Ryegrass

Alternative Type	Xeriscaping	Native species	Ground Covers/Moss
Water Usage	Save up to 70%	No Water	No Water
Chemical Usage	No Chemicals	No Chemicals	No Chemicals
Mowing Height	No Mowing	No Mowing	No Mowing



Figure 4. This is an image of what a lawn looks like when xeriscaping techniques are used. Xeriscaping uses native plants and landscaping techniques to help reduce the amount of water needed for a lawn.

## Conclusion

A combination of different types of turf grasses and alternative lawns is the best options for most Minnesotans. When a turf grass seed is created out of the three different types of turf grasses listed above, this new type of turf grass allows the lawn owner to have a lawn that can withstand stresses, such as drought. A mixture of other alternative lawn options like xeriscaping or using native plants can make lawns look aesthetically pleasing and also help save resources like water. Adding alternative lawn ideas with turf grass also allows a person to not use as much chemicals and limits the total amount of lawn that needs to be mowed. Along with incorporating these new types of lawn ideas, people need to start thinking about how their lawn functions and use better management practices when watering, spraying and mowing their lawns. There is a lot of information from the government that helps promote and educate people in participating in better management practices that will save them money and help promote environmentally friendly sustainable lawns.