

*Harford County Department of Parks & Recreation*

# Turf Management Program

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PALS - Partnership for Action Learning in Sustainability  
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## Introduction

The purpose of this document is to provide an agronomic plan for the Harford County Department of Parks & Recreation that establishes a minimum/recreational level turf grass standard for a variety of activities and that uses the most cost-effective treatment options available.

The department maintains 91 multi-purpose fields and 58 baseball and softball diamonds. All of these sites consist of native soil and standard grass (mostly fescue and some bluegrass) playing surfaces. Fields are generally used from 5pm to dark on weekdays and games are played on weekends typically from sun-up to sun-down. Prior data collection indicates fields are used approximately 20-30 hours a week. There are instances where fields are used up to 35 hours a week.

The current mowing schedule is a seven-day mowing cycle. Current mowing heights are between 2.5" - 3" (which can be adjusted) with a rotating cross-cut direction each week. Mowing occurs from early April until early November. Based on the current budget, we recommend maintaining the mowing schedule at once per week and rotating the direction of cut. Currently, the recreation councils are treating their fields with fertilizer treatment, weed inhibitor, seeding and sodding when needed. The goal is to determine the most cost-effective treatment option for these playing surfaces. Equally important is to create a uniform maintenance regime among all fields.

This proposal includes:

- types of applications to be provided, their purpose and schedule
- materials that will be used
- mixtures of seeding/over-seeding and fertilizer applications
- a field aeration plan
- proper water management
- insect control (no fungus control)
- soil testing and analysis recommendations
- crabgrass and broadleaf control
- field repair, filling low areas
- sodding
- miscellaneous issues

## Cultural Practices

Based on the budget three different types of seed blends with different prices and the benefits of each are compared.

### Seed Mix 1:

Newsom Trio Mix (80% Tall Fescue, 10% Perennial Ryegrass, 10% Kentucky Bluegrass)  
\$75.00 per 50 lb. bag



This blend is what we recommend. Three different types of grasses provide the best qualities of each. Tall fescue is known for its heat, drought, and traffic tolerance, making it desirable; it is often the choice for roughs at Mid-Atlantic golf courses because it can thrive with minimum inputs. Currently, the fields are predominantly Tall Fescue and that shouldn't change because it's a terrific grass for a recreation facility. Perennial ryegrass offers quick germinating capabilities. In a pinch, it will sprout in just a few days providing quick cover. Its high lignin content makes it a great sports field grass but, due to its poor drought and heat tolerance, it will not survive without proper management. The reason to choose a blend with perennial ryegrass is to provide quick cover when seeding. The third grass, Kentucky bluegrass, is a great addition to any seed blend because it helps provide strength to the field. It is a rhizomatous grass, meaning its shoots growing lateral underground stems that help stabilize it in the soil. It is different than tall fescue and perennial ryegrass, which are both bunch-type growth grasses that grow tillers from the mother plant. Kentucky bluegrass will provide structure and maximize the torque needed to "break" the playing surface; think of a cleat twisting on the turf and pulling up grass.

### **Seed Mix 2:**

Newsom Tall Fescue Blend (100% Tall Fescue) \$69.00 per 50 lb. bag

The strength in this seed mix is that it is blended with three cultivars of tall fescue seed—all chosen from the National Turfgrass Evaluation Program (NTEP), which runs trials in the Mid-Atlantic. All three of these cultivars have proven data showing it is well suited to grow in this environment.

### **Seed Mix 3:**

Newsom Premium Mix (90% Tall Fescue, 10% Perennial Ryegrass) \$68.00 per 50 lb. bag

This is a second favorite blend to use on the fields because it provides two of the three grasses that the Trio Mix provides. Even Kentucky bluegrass, tall fescue and perennial ryegrass offer stability, just not as much as Kentucky bluegrass.

Fields should be inspected to determine for the need of a full field over-seeding or spot seeding. In both situations, a rotary spreader can ensure uniform coverage. For full field over-seeding seeding in the late summer-early fall is recommended, when the soil temperatures offer the best environment for seed germination. Seed should be kept moist after being applied to ensure proper seed germination rates. This can be done by hand watering or by coinciding seeding with rain.

One issue with most recreation fields is soil compaction. A deep-tine aeration program (usually using a Verti-Drain or Weidenmann) relieves soil compaction by fracturing the soil profile, allowing more oxygen to reach the roots as well as creating drainage channels. Deep-tining should be done in the early spring prior to the start of regular activities. On sports fields certain high traffic areas are prone to compaction. These areas include in front of goals, middle of fields and sidelines where spectators gather. We also recommend deep-tining these areas on an as-needed basis. For instance, before a rainstorm would create drainage channels that a compacted area would not otherwise have. Another option is to outsource the use of a Verti-Quake. A Verti-Quake is the same idea as deep-tining but instead of tines, it uses fins that slowly roll into the soil



to a depth of 7-10 inches while it moves slightly side-to-side. This machine also creates drainage channels, but ones that remain open for a longer period of time. Deep-tining attachments can be rented for tractors with PTO capability. Aeration will allow significant air/gas exchange making the soil more conducive to healthy turfgrass growth and longevity.

## **Integrated Pest Management Program**

In our evaluation of Harford County's recreational centers, we determined that fields are a composite mix of primarily tall fescue and Kentucky bluegrass. For the overall field quality, we recommend not one particular grass, but a generally healthy turf stand in the integrated pest management program.

This program accounts for the three pests that impact turfgrass health: weeds, disease, and insect pressure. Control initiatives consider budget limitations, time and labor costs, and the plans conceived by colleagues. This report details the strongest concepts for an effective strategy.

First, weed pressure competes with otherwise desired turf. None of these fields were subject to pesticide applications, so that must be considered. If the budget allows, we recommend a single application of a pre-emergent herbicide, preferably in mid-March to late April. The pre-emergent will restrict the growth of plant roots as they germinate by forming a barrier between the seed and soil. Once it is applied, weeds won't be able to grow to any significant size, and the barrier can last a whole season.

A suggested herbicide is Dimension (dithiopyr), a relatively inexpensive option for controlling both smooth crabgrass and goosegrass, which is the primary competition turfgrass faces in this area. This product's active ingredient is effective in preventing these weeds as well as dandelion and white clover from germinating.

The best pre-emergent is a strong, dense, healthy stand of turfgrass that can out-compete weed germination and growth. This plan's overall goal is to create a strong turfgrass stand. Due to pricing and lack of the desired formulation, we don't recommend any post-emergent treatment. The goal is not to eradicate a Bermudagrass invasion, which offers a terrific playing surface and can flourish in a minimal-input situation.

We also don't recommend any fungicide programs for the fields for one main reason—once a fungicide program begins, a turfgrass stand will rely on the fungicide whenever it's stressed by environmental factors or disease, rather than developing its own natural defenses. A fungicide program will eventually develop a dependency on chemical applications.

However, there are several common diseases in the Mid-Atlantic. Tall fescue can suffer from dollar spot and brown patch. Dollar spot is the more common and can easily kill an entire stand of turf. Dollar spot is categorized as a low nitrogen disease, so it will be managed through the fertility program. Brown patch is categorized as a high nitrogen disease, which can also be managed through the fertility program. Kentucky bluegrass is also susceptible to dollar spot as well as summer patch. Dollar spot can be managed, but summer patch is difficult to control even



with a fungicide program. Any damage can be mitigated through a seeding program. Perennial ryegrass is susceptible to pythium diseases caused by wet conditions and high nitrogen levels; this can also will be managed with the fertility program.

No heavy treatment programs are recommended for insect control. Insecticides are expensive and can be environmentally harmful. One benefit of a mostly tall fescue stand is that it uses a fungal endophyte. There is relationship between this fungal endophyte and the plant that combats surface-feeding insects. Even with this fungal endophyte, tall fescue and the other grasses are susceptible to damage by white grubs. White grubs are the larval stages of many insects, most notably Japanese beetles, and are root feeding pests that “scalp” the turf so it can be pulled up by its sheared roots. The easiest way to identify white grub damage is to look for areas where foxes and skunks have torn up the ground to get at the grubs. Another, way is to a “soap wash,” by mixing water and a lemon soap (preferably Dawn), pouring the mixture over an area of grass, and wait to see what emerges. The solution irritates the insects and they move up looking for air.

An insecticide can be applied prior to the onset of white grub damage. The insecticide we recommend is Acelepryn, which is extremely safe for applicators and allows activities to resume right away. It isn’t harmful to humans or any mammals and there is no signal word (Caution, Danger, etc.) on the label. This product will be used with Dimension in the fertility program.

## **Fertility Program**

Given budget limitations, fertility is the most important part of the agronomic plan. Without an updated soil test it is hard to suggest a perfect fertility program but the recommendations that follow are a sound plan for any sports field. A fertility plan must consider the three plant major nutrients: nitrogen, phosphorus, and potassium.

Nitrogen is a growth nutrient promoting leaf growth and often (after application) gives a plant its green color. Managing this nutrient is important, too little and the plant will look chlorotic with a loss of aesthetic appeal, too much and the plant will appear succulent but lose roots as carbohydrate production goes toward leaf rather than root growth. Some turfgrass diseases are influenced by plant fertility levels. Dollar spot is most prevalent in turfgrass stands with low nitrogen levels; brown patch is more likely to be destructive in an area with excessive nitrogen. Pythium will also become more of a nuisance with high fertility. Therefore, nitrogen should be closely managed using products such as slow release fertilizers that provide the plant nitrogen over the course of a season rather than a quick release that would encourage a growth surge that isn’t beneficial for the plant.

Phosphorus is an important root nutrient. And promotes plant stress tolerance. Unfortunately, in Maryland, the 2011 Maryland Fertilizer Use Act prohibits the application of phosphorus unless a soil test indicates a deficiency. Fortunately, Maryland native soils are not known to be deficient of phosphorus so fields are not like to need a phosphorus fertilizer unless a soil test finds low levels.



Potassium is a plant hardiness nutrient and provides excellent stress tolerance. A fertilizer that provides an adequate amount of potassium will ensure the plant can overcome environmental stressors such as heat, drought, and extreme cold.

In a perfect fertility situation, two-thirds of the nitrogen will be provided in the fall while the rest will be provided in the spring. This schedule helps plants store carbohydrates that can be used for overall plant health and to force root shooting from those stored carbohydrates. This will give the turfgrass stand a competitive advantage while remaining healthy year-round.

The fertility program will provide two different products used at two different times of year. The first product has three benefits: a pre-emergent herbicide, an insecticide, and fertility. Many fertilizer companies are selling products that have nitrogen and potassium along Dimension and Acelepryn mixed into a granular formulation. Having all three in one package minimizes the labor spent managing the fields. This product will be applied between mid-March and late April depending on environmental cues such as growing degree days or environmental clues such as the blooming stage of a forsythia bush. The nitrogen source in this fertilizer will should either be a slow-release fertilizer such as a Polymer Coated Urea (PCU) or a MESA source. PCU will take an extended period of time to break down, preventing a growth surge. The MESA product is broken down by soil microbials, which happen when the weather is warm enough to promote more microbial activity.

Pre-emergent herbicide products are typically applied between late March and early April, then again in eight to ten weeks. Given budget limitations, a fertilizer plus Dimension (which has early post-emergent activity) combination product can be applied in late April/early May to control summer annual grasses in an early post-emergent fashion.

If the budget allows, another option would be to apply a fertilizer plus Dimension product once in late March/early April, then again in eight to ten weeks for season-long crabgrass and goosegrass control. A second application in the fall would use a primarily PCU nitrogen source with some quick release nitrogen as well.

The cost analysis spreadsheet gives several options for fall and spring.

## Conclusion

Without actual budget information, it is difficult to meet to the needs of a given field. Nevertheless, this study's goal was to provide a plan to provide the best playing conditions for all users.

A fertilizer that controls both weeds and root-feeding insects will ensure best conditions throughout the season. Using deep-tine aeration or a Verti-quake will allow for quick playability even after rainstorms. Seeding fields that are thin or bare will support player safety because most injuries will occur on bare ground. All in all, this agronomic plan can help create fields that everyone can enjoy.