

# Athletic Field Maintenance

Michael Krupke  
Certified Turf Specialist  
Insight FS



Turf programs all have basics that should be adhered to, but most programs are as different as the athletes that use the fields.

- Budget Constraints
- Labor Constraints
- Traffic areas
- Poor facility construction
- Communication
- Public Pressure



# 7 Basics of Turf Management

- ✓ Mowing
- ✓ Watering
- ✓ Fertilizing
- ✓ Aeration
- ✓ Overseeding
- ✓ Topdressing
- ✓ Weed & Pest Control = IPM

# Mowing

- Never remove more than  $\frac{1}{3}$  of the plant in a single cutting.
- Vary directions
- Raise height of cut in the offseason.
- In season =  $2 \frac{1}{4}$ " -  $2 \frac{3}{4}$ "
- Off Season =  $2 \frac{3}{4}$ " - 3"
  
- Make sure blades are **SHARP!!**



# Watering

- Athletic fields should receive 1” of water per week
- Water late evening early morning
- Avoid watering in windy conditions
- Avoid watering the night before early morning games
- Seasonal adjustment = more in summer, less in spring and fall
- Irrigation systems should be checked twice a month

**\*Water less often for longer periods as this promotes root growth!**








# Irrigation scouting is crucial !!



# Soil Testing to Determine Fertilizer Program

## Aerial Map





**Professional Turf Analysis**  
**LAF SOC**

Account: Insight FS #181  
222 East Puermer  
Jefferson, WI 53549

Report For:  
Madison Schools

---

Lab #: 199530  
County: JEFFERSON  
Received: 4/21/2017  
Acres: 0

**RECOMMENDATIONS**

Turf Type	P205		K20	
	lb/1000 sq. ft.	lb/acre	lb/1000 sq. ft.	lb/acre
Established Turf, High Traffic Areas	2	---	0	---
Established Turf, Low Traffic Areas	0	0	0	0

Potassium plays an important role in the plant's ability to manage stress but is not a known environmental contaminant. The K values presented are recommendations to help maintain turf density.

Phosphorus recommendations provide the maximum amount of fertilizer that can be applied between soil tests. When soils require phosphorus, one of two approaches may be taken. Option one is to make what is known as a corrective application. This is a one-time application of the amount of phosphorus recommended. The second option is that of gradual buildup, and then re-testing of the soil to check if the desired level of phosphorus was achieved. Gradual buildup of phosphorus is accomplished by selecting the proper type or grade of fertilizer to apply at different times during the year. Use either the lb/1000 sq ft or lb/acre column for the recommendation.

Low maintenance turf and roughs shall follow recommendations for established turf, low traffic areas.

Established turf, high traffic areas include but are not limited to athletic fields, intensively used paths in low traffic areas, and high use park areas.

Sample Num	Soil pH*	Om %	P ppm	K ppm	Mg ppm	Est. CEC	B ppm	Mn ppm	Zn ppm	S ppm	Sol. Sph. mmbars /cm	NO3 ppm	Fe ppm	Cu ppm	Na ppm
1	7.2	4.5	28	128	4163	588	28.0								
2	7.0	5.1	30	178	2309	625	19.2								
Adj. Avg	7.1	4.8	29	153	3236	607									

\*pH Interpretations <5.0 Very Low 5.0-5.5 Low 5.5-6.0 Medium 6.0-7.0 Sufficient 7.0-7.5 High >7.5 Excessive


Very Low	Low	Medium	Optimal	Very High
P				K
P				K

Table 2. Bray P1 Potassium Soil Test Interpretations and Recommendations for Golf Turf

Soil Test Interpretation	Established Turf	Fairway
0-30	4.0	3.0
31-45	3.0	2.0
46-60	2.0	1.0
61-75	1.0	0
>75	0	0

Table 1. Phosphorus Soil Test Interpretations and Recommendations

ppm	lb/acre	lb P205/1000 R sq	lb P205/acre
0-15	0-30	Very Low	3
16-30	31-60	Low	2
31-45	61-90	Medium	1
46-60	91-100	Optimal	0
61-75	101-150	Very High	0



**Professional Turf Analysis**  
**LAF BB**

Account: Insight FS #181  
222 East Puermer  
Jefferson, WI 53549

Report For:  
Madison Schools

---

Lab #: 199530  
County: JEFFERSON  
Received: 4/21/2017  
Acres: 0

**RECOMMENDATIONS**

Turf Type	P205		K20	
	lb/1000 sq. ft.	lb/acre	lb/1000 sq. ft.	lb/acre
Established Turf, High Traffic Areas	1	---	0	---
Established Turf, Low Traffic Areas	0	0	0	0

Potassium plays an important role in the plant's ability to manage stress but is not a known environmental contaminant. The K values presented are recommendations to help maintain turf density.

Phosphorus recommendations provide the maximum amount of fertilizer that can be applied between soil tests. When soils require phosphorus, one of two approaches may be taken. Option one is to make what is known as a corrective application. This is a one-time application of the amount of phosphorus recommended. The second option is that of gradual buildup, and then re-testing of the soil to check if the desired level of phosphorus was achieved. Gradual buildup of phosphorus is accomplished by selecting the proper type or grade of fertilizer to apply at different times during the year. Use either the lb/1000 sq ft or lb/acre column for the recommendation.

Low maintenance turf and roughs shall follow recommendations for established turf, low traffic areas.

Established turf, high traffic areas include but are not limited to athletic fields, intensively used paths in low traffic areas, and high use park areas.

Sample Num	Soil pH*	Om %	P ppm	K ppm	Ca ppm	Mg ppm	Est. CEC	B ppm	Mn ppm	Zn ppm	S ppm	Sol. Sph. mmbars /cm	NO3 ppm	Fe ppm	Cu ppm	Na ppm
1	7.2	4.9	47	177	3979	510	30.1									

\*pH Interpretations <5.0 Very Low 5.0-5.5 Low 5.5-6.0 Medium 6.0-7.0 Sufficient 7.0-7.5 High >7.5 Excessive

Very Low	Low	Medium	Optimal	Very High
P				K
P				K

Table 2. Bray P1 Potassium Soil Test Interpretations and Recommendations for General Turf Areas

Soil Test Interpretation	Established Turf	Fairway
0-30	4.0	3.0
31-45	3.0	2.0
46-60	2.0	1.0
61-75	1.0	0
>75	0	0

Table 1. Phosphorus Soil Test Interpretations and Recommendations

ppm	lb/acre	lb P205/1000 R sq	lb P205/acre
0-15	0-30	Very Low	3
16-30	31-60	Low	2
31-45	61-90	Medium	1
46-60	91-100	Optimal	0
61-75	101-150	Very High	0

map center: 43° 3' 53.67, -89° 16' 9.85

**16-7N-10E**  
**Dane County**  
**Wisconsin**

For detailed information on Turf Management, see [http://dnr.wi.gov/topic/stormwater/standards/turf\\_nutrient.html](http://dnr.wi.gov/topic/stormwater/standards/turf_nutrient.html)

These recommendations are based on Wis. Dept. of Natural Resources Technical Standard. Data represents the soil samples, not necessarily the entire property.

4/20/2017 1:25:37 PM Page 8 of 11

1/23/2017

Field borders provided by Farm Service Agency as of 5/21/2008.



# Corrections/Recommendations

## Madison Metropolitan School District Soil Test Recommendations

### LaFollette High School – Lussier Stadium

Soil tests were performed in April, 2017. The samples were tested by Rock River Laboratories in Watertown. Results and recommendations are as follows.

Phosphorous level results of the samples of the Football Field were an average of 36 parts per million (ppm). This field is considered a high traffic field which puts these levels in the “medium” category. It is recommended that corrective Phosphorous applications of 2 lbs. P be applied.

I recommend applications of 1 lb. P/1000 sq. ft., 2 times per season (Early Spring and Late Fall), using a 14-24-9 fertilizer analysis. A single application of 2 lbs. is acceptable, but two applications allows for less chance of nutrient loss due to runoff, etc..

In regards to Potassium, the levels showed an average 218 ppm, which is in the “very high” category. Additional K is not recommended.

The average pH test result of 7.1 is in the high range. Please refer to my comments concerning the pH of the East Football field.

### Practice Football

Phosphorous level results were 27 parts per million (ppm). This field is considered a high traffic field which puts these levels in the “medium” category. It is recommended that corrective Phosphorous applications of 2 lbs. P be applied.

I recommend applications of 1 lb. P/1000 sq. ft., 2 times per season (Early Spring and Late Fall), using a 14-24-9 fertilizer analysis.

In regards to Potassium, the levels showed 184 ppm, which is in the “very high” category. Additional K is not recommended.

The pH test result of 6.7 puts this area in the sufficient range.

### LaFollette High School Soccer

Phosphorous level results of the samples of the Football Field were an average of 29 parts per million (ppm). This field is considered a high traffic field which puts these levels in the “medium” category. It is recommended that corrective Phosphorous applications of 2 lbs. P be applied.

I recommend applications of 1 lb. P/1000 sq. ft., 2 times per season (Early Spring and Late Fall), using a 14-24-9 fertilizer analysis. A single application of 2 lbs. is acceptable, but two applications allows for less chance of nutrient loss due to runoff, etc..

In regards to Potassium, the levels showed an average 153 ppm, which is in the “optimal” category. Additional K is not recommended.

The average pH test result of 7.1 is in the high range. Please refer to my comments concerning the pH of the East Football field.

### LaFollette High School Baseball -

Phosphorous level results of the sample of the Baseball Field was 47 parts per million (ppm). This field is considered a high traffic field which puts these levels in the “optimal” category. It is recommended that corrective Phosphorous applications of 1 lbs. P be applied.

I recommend an application of 1 lb. P/1000 sq. ft., (Late Fall), using a 14-24-9 fertilizer analysis.

In regards to Potassium, the levels showed 177 ppm, which is in the “very high” category. Additional K is not recommended.

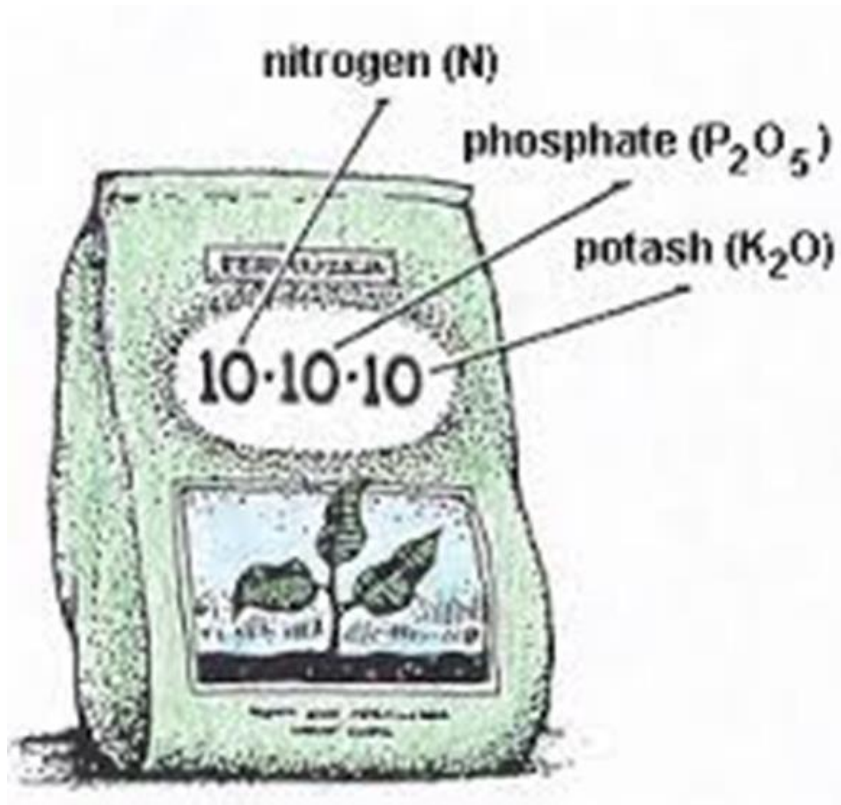
The average pH test result of 7.2 is in the high range. Please refer to my comments concerning the pH of the East Football field. The pH test result of 6.8 puts this area in the sufficient range.

In summary, if you refer to my turf program, I included an option for these corrections pending the soil test results. We can certainly start this process (should you choose to make the corrections) this Spring or wait until Fall. An application this Spring would certainly help with the Seeding program, as we are essentially using a starter fertilizer.

If you have any questions, please do not hesitate to contact me at your convenience.



# Fertilizer



- N-P-K
- **Nitrogen**-promotes growth and color
- **Phosphorous** = Root development
- **Potassium** = Water relation and health

# When to Fertilize

- Spring = Early May
- Crabgrass Control?
- June = Slow release/High Nitrogen
- Grub Control?
- August = Slow release
- October 1<sup>st</sup> = No slow release
- SCOUT and be Proactive!



# Fertilizer Types

## Slow Release Nitrogen

- Sulfur Coated Urea
- Polymer Coated Urea
- Nitrogen Inhibitors

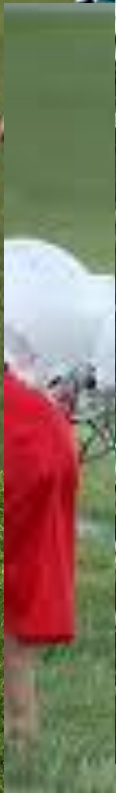
## “Straight Analysis”

- Starter Fertilizer for Seeding or Soil Corrections ....11-23-10
- Dormant/Late Season so Nutrients go quickly into plant....28-0-6
- Urea = Nooooooooo!!!!!!





IRIE  
BLACK

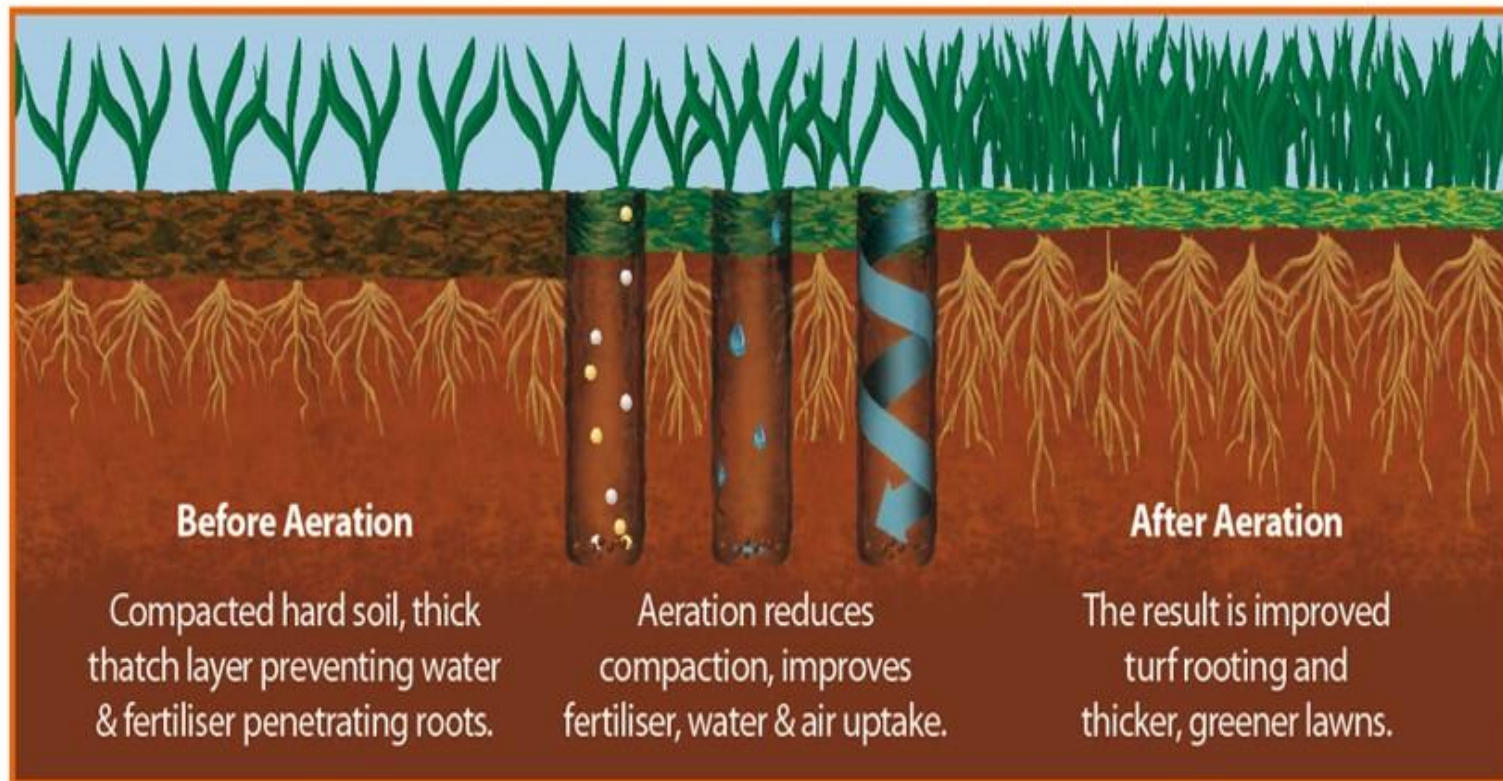




# Aerification

- How often?
- What machine?
- What times?
- How do I know my trouble spots?





# How often?

- As often as possible!
- Minimum 2-3 times per year  
2-3 Directions
- Spring
- Late Spring/Early Summer
- Fall

# Types of Aeration/Tines



Solid Tine



Hollow Tine



# Core Aeration





# Advantages of Coring

- Pulls soil out creating increased macroporosity
- Breaking up cores provides topdressing
- Decreases Thatch

# Advantages of Solid Tines

- Shatters soil profile
- No core cleanup – less labor

## Disadvantages

- Decreases Macroprosimy
- May cause cultivation pan

# Other Aeration forms

Deep Tine



Slicing



# Compaction Testing



# Other Compaction Remedies

- Rotate Fields when possible.
- Move practice areas.
- Move practice patterns.



# Topdressing

- Spreading a thin later of material to modify the surface or to fill holes and inconsistencies
- Can be used to cover seed, add field amendments, rebuild a crown to a field or fill in low spots
- Sand
- Soil or Sand/Sand Blend
- Turface



# Overseeding

- Overseed in conjunction with aeration.
- Full overseed after each Athletic season
- Fall Dormant Seeding...50% germination
- Timing considerations...
  - Traffic and usage
  - Weed Control



T  
Y  
P  
E  
S  
  
o  
f  
  
S  
E  
E  
D  
E  
R  
S



# Seeding during the season

50 lbs. seed/10 bags Turface Field  
and Fairway or MVP

Football.....Between hash marks

Soccer.....In Goal mouths



# Use Wear Tolerant Turfgrass

- **Kentucky Bluegrass**
- Has a moderate wear tolerance and recovers well from traffic
- Germination = 14-21 days
  
- **Perennial Ryegrass**
- Perennial Ryegrass has the highest wear tolerance of high traffic.
- Quick Germination = 7-14 days

\* Turf Type Tall Fescue







# Different weeds require different attack!

## Grassy weeds = Pre-emergent

- Need to consider seeding timing/intervals
- Sports Turf may need to consider Tenacity (mesotrione) which can be seeded into. Or use a Post-emergent (quinclac)

- **Quackgrass = Roundup**  
(Know the Difference)





# Broadleaf Weed Control Timing

- Spring/Early Summer once weeds have emerged.
- Fall when weeds are taking nutrients into the roots.
- Knotweed...Pre-emergent in the late Fall



# Write the Program

Baseball Field Maintenance Program

	Application	Notes	
	<b>LaFollette Baseball</b>	<b>1 acre</b>	
April	Fertilize 25-0-5 33% PCSCU 2% Fe Aerate to relieve compaction	3.5 bags/acre 1 lb Nitrogen/1000 ft sq)	
May/June	Fertilize 30-0-5 50% XRT 2% Fe Aerate to relieve Compaction Over seed Premium Athletic Gold Seed	3 bags/acre (1 lb Nitrogen/1000 ft sq)  2 directions 2 - 3 lbs/acre  20% Everest KBG 20% 4 Seasons KBG 20% Rugby II KBG 10%Grand Slam PRG 10% Home Rum PRG	
		<b>TOTAL</b>	
August	Fertilize 25-0-5 33% Slow Release Nitrogen	3.5 bags/acre 1 lb Nitrogen/1000 ft sq)	
		<b>TOTAL</b>	
Oct.	Fertilize 14-24-9 25%SCU	3.5 bags/acre (1 lb Phosphorus/1000 sq ft.)	
		<b>TOTAL</b>	
Nov.	Aerate to relieve compaction	2-3 directions	
		<b>SEASON TOTAL</b>	

Soccer Field Maintenance Program

	Application	Notes	
	<b>LaFollette Soccer</b>	<b>4 acres</b>	
April	Fertilize 14-24-9 25%SCU Aerate to relieve compaction	3.5 bags/acre (1 lb Phosphorus/1000 ft sq)  2 directions	
		<b>TOTAL</b>	
May/June	Fertilize 30-0-5 50% XRT 2% Fe	3 bags/acre (1 lb Nitrogen/1000 ft sq)	
		<b>TOTAL</b>	
August	Fertilize 25-0-5 33% Slow Release Nitrogen	3.5 bags/acre 1 lb Nitrogen/1000 ft sq)	
		<b>TOTAL</b>	
Oct.	Fertilize 14-24-9 25%SCU	3.5 bags/acre (1 lb Phosphorus/1000 sq ft.)	
		<b>TOTAL</b>	
Nov.	Aerate to relieve compaction Over seed Premium Athletic Gold Seed	2-3 directions 2 - 3 lbs/acre  20% Everest KBG 20% 4 Seasons KBG 20% Rugby II KBG 10%Grand Slam PRG 10% Home Rum PRG	





# Start This Fall

- Set yourself up for success by prepping ball fields in fall
- Less mowing needed
- Firm soil conditions compared to spring
- Easier to grade infields/shape mounds/aerify turf while soils are dry



# Fall care for ball fields:

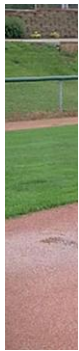
1. Treat turf-aerify,  
fertilize, and water





# Ball fields

Infield moisture management



- Differences of conditioners and top dress materials
- Conditioners - manage moisture with your existing infield mix - are **mixed in**
- Top dress - left on top to color and act as dust mulch
- When to use field dry and what to use
- Can a wetting agent help?
  - 50 lbs per month - \$75/app



# Synthetic Turf

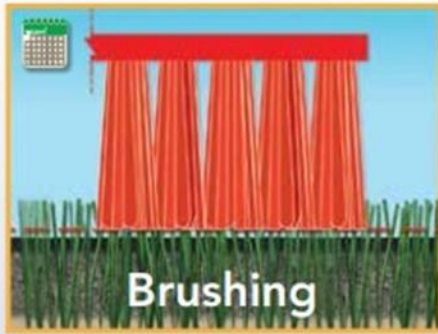
- Follow Manufactures/Installers directions for care!
- Document, document, document!
- It still takes a lot of work!





# Synthetic Surface Basics

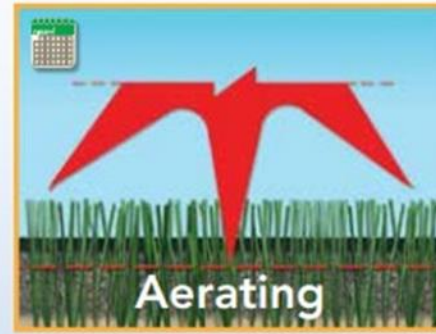
## A SUMMARY OF THE STEPS TO FOLLOW FOR LONG-LASTING PERFORMANCE



### **BRUSHING**

Rejuvenates the matted fibers and levels the top portion of the infill.

**EVERY 4-6 WEEKS**



### **AERATING**

Rotating tines are designed to penetrate and loosen the infill to avoid minor compaction.

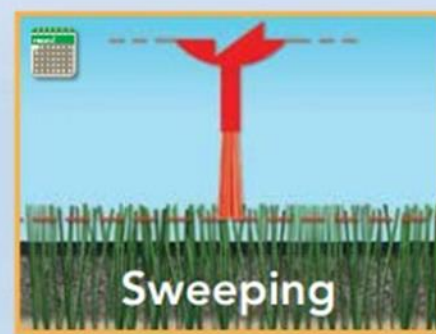
**MAXIMUM 3 TIMES/ YEAR (BEGINNING 2ND YEAR)**



### **RAKING**

Prevents fibers from matting down and ensures that the infill is loosened.

**EVERY 4-6 WEEKS**



### **SWEEPING**

A clean field ensures that foreign material or debris does not get into the infill.

**AS NEEDED**



# Synthetic Surface Maintenance Log

Date Form Submitted (M/D/Y): \_\_\_\_\_ Organization: \_\_\_\_\_  
 Name of Field: \_\_\_\_\_ Name of Maintainer: \_\_\_\_\_

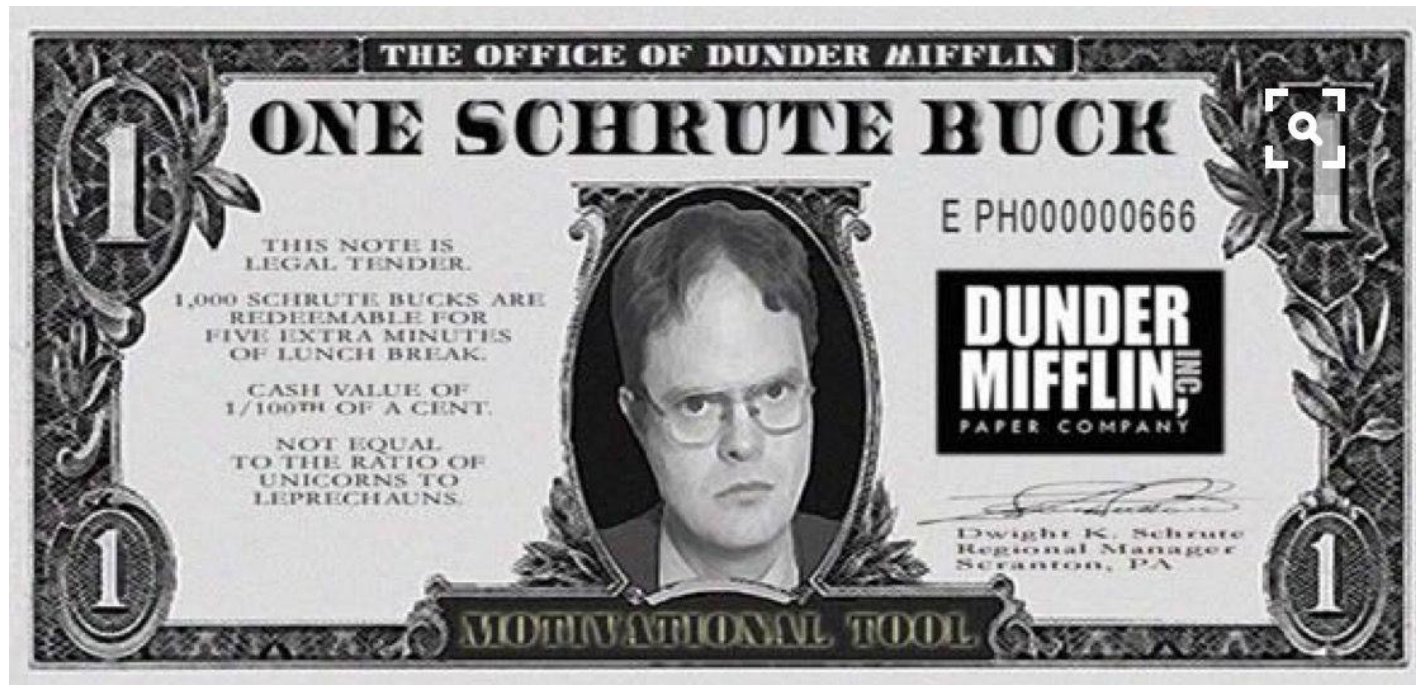
STAGES	DATE	NAME	SIGNATURE
<b>Surface Brushing</b> Recommended Frequency: Every 4-6 weeks	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Surface Aerating</b> Recommended Frequency: Maximum 2-3 times/year (beginning in 2nd year)	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Surface Raking</b> Recommended Frequency: Every 4-6 weeks	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Surface Sweeping</b> Recommended Frequency: As needed	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Additional Maintenance Activities</b> (specify) Recommended Frequency: As needed	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Complete Inspection of Line Markings, Seams and High Traffic Areas</b> Recommended Frequency: As needed	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Infill Top Dressing</b> (high-traffic areas) Recommended Frequency: As needed	WSPV		
	WSPV		
	WSPV		
	WSPV		
<b>Snow Removal</b> (if applicable) Recommended Frequency: As needed	WSPV		
	WSPV		
	WSPV		
	WSPV		



Get Athletes, Coaches,  
Athletic Directors,  
Administrators,  
Youth Sports  
Organizations,  
Parks Departments  
**INVOLVED !!!!!**



# Figure out priorities!!



# FIELD SAFETY BEGINS AT THE GRASS-ROOTS LEVEL



Player safety, at any level, doesn't stop with the coaching staff and the players. The field conditions play a big role, right down to the soil. Insight FS offers a service to help sports field managers take a comprehensive approach to managing athletic field conditions. This program addresses the concerns for player safety at both the administrative and field maintenance level.

## FIELD MANAGEMENT ASSESSMENT ELEMENTS

- **Plant Health** – Turf quality and density on defined high-traffic areas
- **Soil Compaction (Hardness)** – Measured with penetrometer multiple times each year with relative soil moisture readings
- **Soil Sampling** – Pulled on regular intervals and monitored
- **Weed and Insect Control** – Surveying done with each visit to determine acceptable levels and expectations
- **Reporting** – Results compiled in a report and updated after each assessment



This tool is designed to give field managers some hard data on issues that directly affect player safety, in a form that can be quantified and compared year over year. Relaying and sharing this information with decision-makers is sometimes difficult. Our goal is to have field managers use this plan to monitor field conditions through various times of the year, and for administrators to be aware of how cultural practices can affect long-term turf quality and player safety.



Wisconsin  
**SportsTurf**  
MANAGERS ASSOCIATION

[wstma.org](http://wstma.org)





# BMP's

- Introduced in 2021, outlines a comprehensive plan from building to maintenance specifically geared to athletic field managers
  - 100+ pages
  - Customizable to your facility or school
  - Includes synthetic field care, chemical storage, and emergency info
- [www.wstma.org](http://www.wstma.org)



# Thank you!!

## Questions?

Michael Krupke  
[mkrupke@insightfs.com](mailto:mkrupke@insightfs.com)  
(920)723-0936

