

MA FERTILIZER REGULATIONS & SOILS-BASED TURF MANAGEMENT



PREPARED FOR:

**WILMINGTON
STORMWATER
MANAGEMENT**

**PUBLIC EDUCATION
PROGRAM**

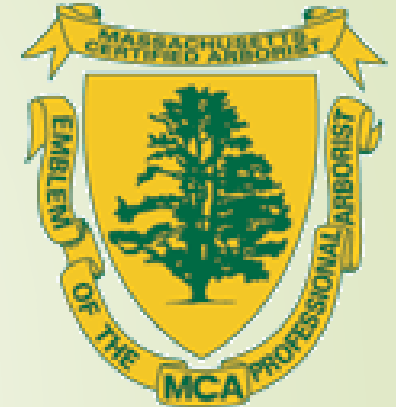




Jamie Magaldi, PE, MCA

*Operations Manager / Tree Warden
Town of Wilmington DPW*

- Massachusetts Licensed Professional Engineer #47070
- Massachusetts Certified Arborist #2489
- Executive Board of the Mass Tree Wardens' and Foresters' Association
- Certified Pesticide Applicator, Category 40 and 36
 - *Rights of Way and Shade Tree endorsements*



Member of:

Mass Tree Wardens' and Foresters' Association (MTWFA)

Massachusetts Arborist Association (MAA)

Society of Municipal Arborists (SMA)

American Public Works Association (APWA)

Sports Turf Managers Association (STMA)



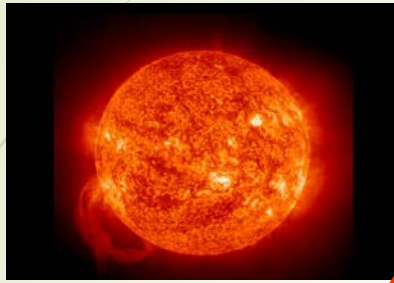
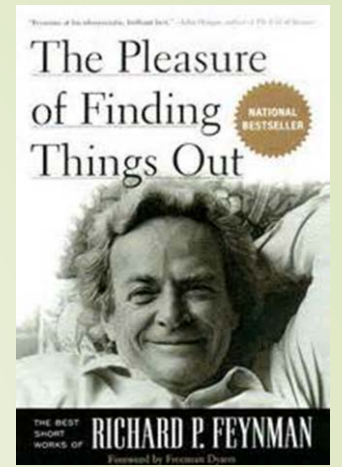
Massachusetts Arborists Association

PURPOSE OF TODAY'S TALK

- ▶ Help educate the public on fertilizer regulations which affect Wilmington's Turf Management Plan, residents, and developers
- ▶ Promote awareness of stormwater sensitivities and phosphorus concerns
- ▶ Encourage thinking "outside the box" and break "1-Size Fits All" turf generalizations

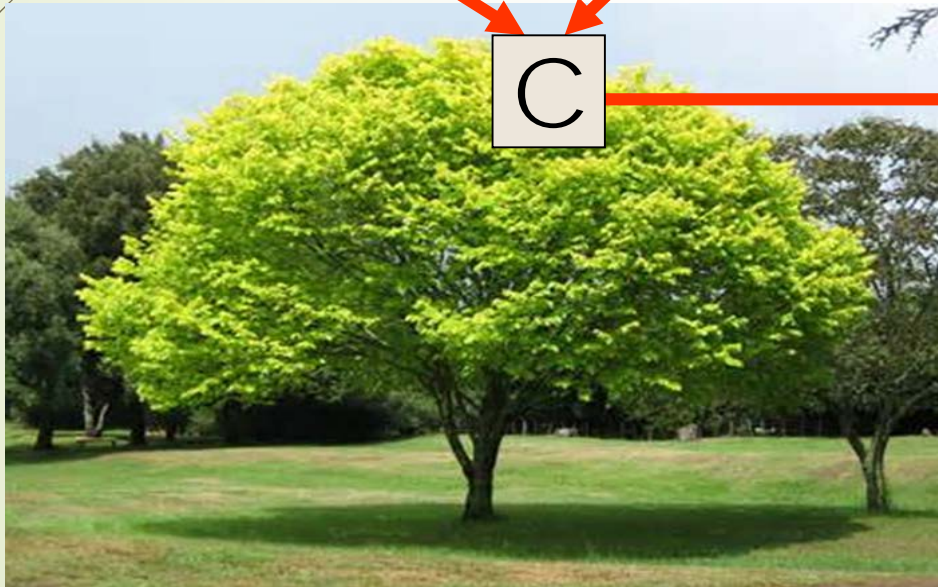


...Speaking of Thinking Outside the Box
Feynman's Perspective on "Fire"



CO_2

C

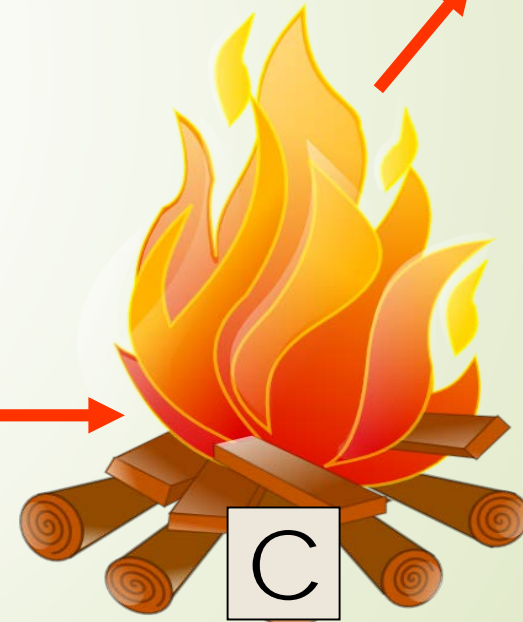


O_2

"Trees grow out of the air"

CO_2

O_2



C

"Logs store sunlight"

BASIS OF THE REGULATIONS

- 2012 Mass Legislature passed "An Act Relative to the Regulations of Plant Nutrients"
- The Act directed MDAR to develop regulations to ensure effective and efficient use of nutrients

330 CMR 31.00

- Helps get the most out of nutrients while protecting public health and the environment

WHEN YOU'RE FERTILIZING THE LAWN,
REMEMBER, YOU'RE NOT JUST
FERTILIZING THE LAWN.



WHAT DO THE REGULATIONS INVOLVE?

- The regs establish standards for the application of plant nutrients, including limitations on phosphorus to turf and lawns
- Regs became effective on June 5, 2015



WHO DO THE REGULATIONS APPLY TO?

➤ IN GENERAL:

Regs apply to ANYONE who applies plant nutrients to Agricultural and non-Ag land (turf and lawns).

➤ Record Keeping requirements only apply to professional applicators

➤ No licensing is required (Yet) \$\$\$



REMEMBER THIS IS NOT ABOUT PESTICIDES!!

- These regulations are about fertilizers, not pesticides.
- MDAR is the enforcement agent, in both cases
- No license is currently required to apply fertilizers
- Record keeping requirements are similar to commercial pesticide applicators



THE REQUIREMENTS OF THE REGS:

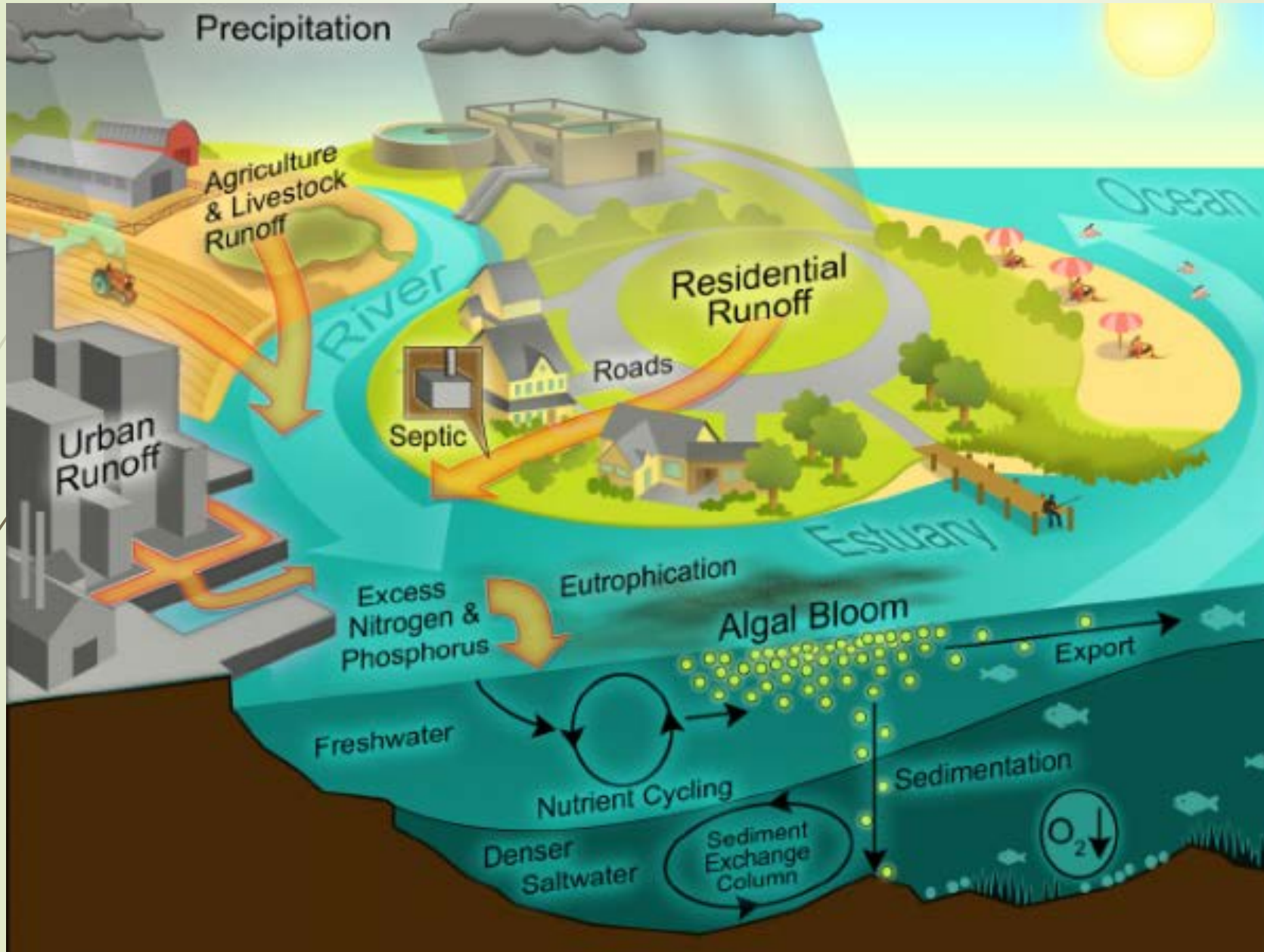
(APPLY TO HOMEOWNERS AND PROFESSIONALS)

GENERAL RULE #1

- Phosphorus containing fertilizers may ONLY be applied when a soil test indicates it is needed or when a lawn is being established, patched, or renovated
 - Will Revisit Soil Testing Later
- Leads to "eutrophication"

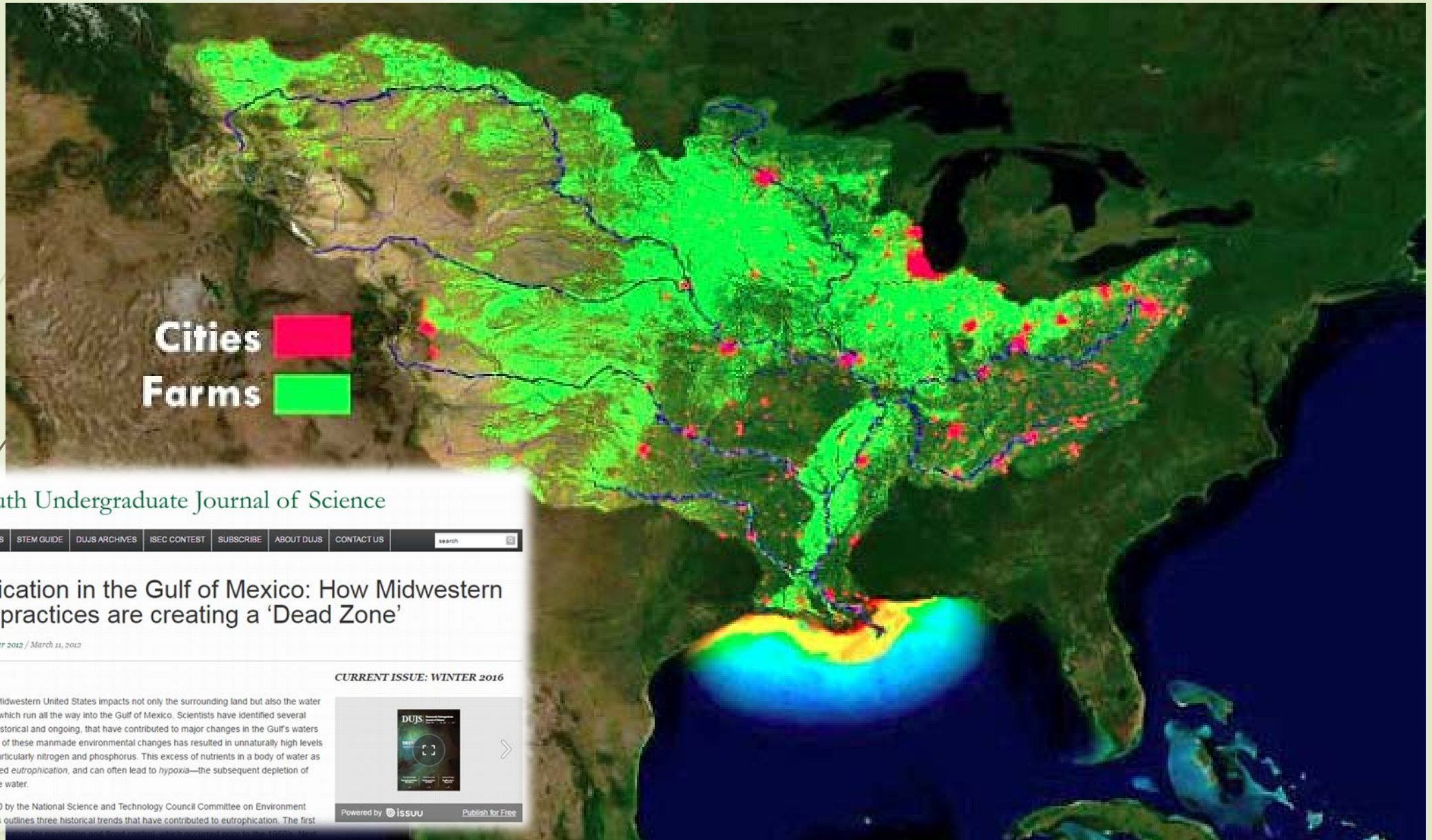


THE EUTROPHICATION PROCESS



Source:
<http://www.everythingconnects.org/water-pollution.html>

TOO MANY NUTRIENTS CAN CREATE “DEAD ZONES”



Cities
Farms

Dartmouth Undergraduate Journal of Science

HOME SUBMISSIONS STEM GUIDE DUJS ARCHIVES ISEC CONTEST SUBSCRIBE ABOUT DUJS CONTACT US

Eutrophication in the Gulf of Mexico: How Midwestern farming practices are creating a 'Dead Zone'

Posted by DUJS / In Winter 2012 / March 11, 2012

[f](#) [t](#) [g+](#) [p](#) [243](#)

Human activity in the Midwestern United States impacts not only the surrounding land but also the water in rivers and streams, which run all the way into the Gulf of Mexico. Scientists have identified several human actions, both historical and ongoing, that have contributed to major changes in the Gulf's waters and ecosystems. Each of these manmade environmental changes has resulted in unnaturally high levels of specific nutrients, particularly nitrogen and phosphorus. This excess of nutrients in a body of water as a result of runoff is called *eutrophication*, and can often lead to *hypoxia*—the subsequent depletion of dissolved oxygen in the water.

A report written in 2000 by the National Science and Technology Council Committee on Environment and Natural Resources outlines three historical trends that have contributed to eutrophication. The first

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THE REQUIREMENTS OF THE REGS: (APPLY TO HOMEOWNERS AND PROFESSIONALS)

GENERAL RULE #2

- Do not apply nutrients to sidewalks or other impervious surfaces.
- Materials that land on these surfaces need to be removed, swept, or blown back onto the grass.



THE REQUIREMENTS OF THE REGS:

(APPLY TO HOMEOWNERS AND PROFESSIONALS)

GENERAL RULE #3

- ▶ No applications of plant nutrients shall be made:
 - ▶ Between 12/1 and 3/1
 - ▶ To frozen or snow covered ground
 - ▶ To saturated soils
 - ▶ Within 20 feet of waterways if using broadcast spreader
 - ▶ Within a Zone 1 of public water supply
 - ▶ Within 100 feet of waters used for public water supply



GRASSHOPPER



Water Soluble Fertilizer

19-19-19 w/ MICRO NUTRIENTS

THE ULTIMATE PROFIT HOPPER

THE REQUIREMENTS OF THE REGS:

(APPLY TO HOMEOWNERS AND PROFESSIONALS)

GENERAL RULE #4

- ▶ Applied plant nutrients shall not exceed Umass Guidelines for plant nutrient application rates to turf
 - ▶ When determining the amount of phosphorus and nitrogen to apply, the amounts known to have been applied by organic sources shall be accounted for (compost, biosolids, etc)



THE REQUIREMENTS OF THE REGS:

(APPLY TO PROFESSIONALS ONLY – NOT HOMEOWNERS)

GENERAL RULE #6

- Record keeping for nutrient applications to lawn and turf is required for PROFESSIONAL applicators

Jamie Magaldi

Town of Wilmington D.P.W

Print Date: 10/25/16

2017 Agronomic Planner

2017 Middle School

3.12 Acres

136,000.00 sq.ft.

Spray Tank Capacity: 0 gal

Spray Coverage: 0.00 sq.ft.

Dilution Rate: 0.00 Gal/M

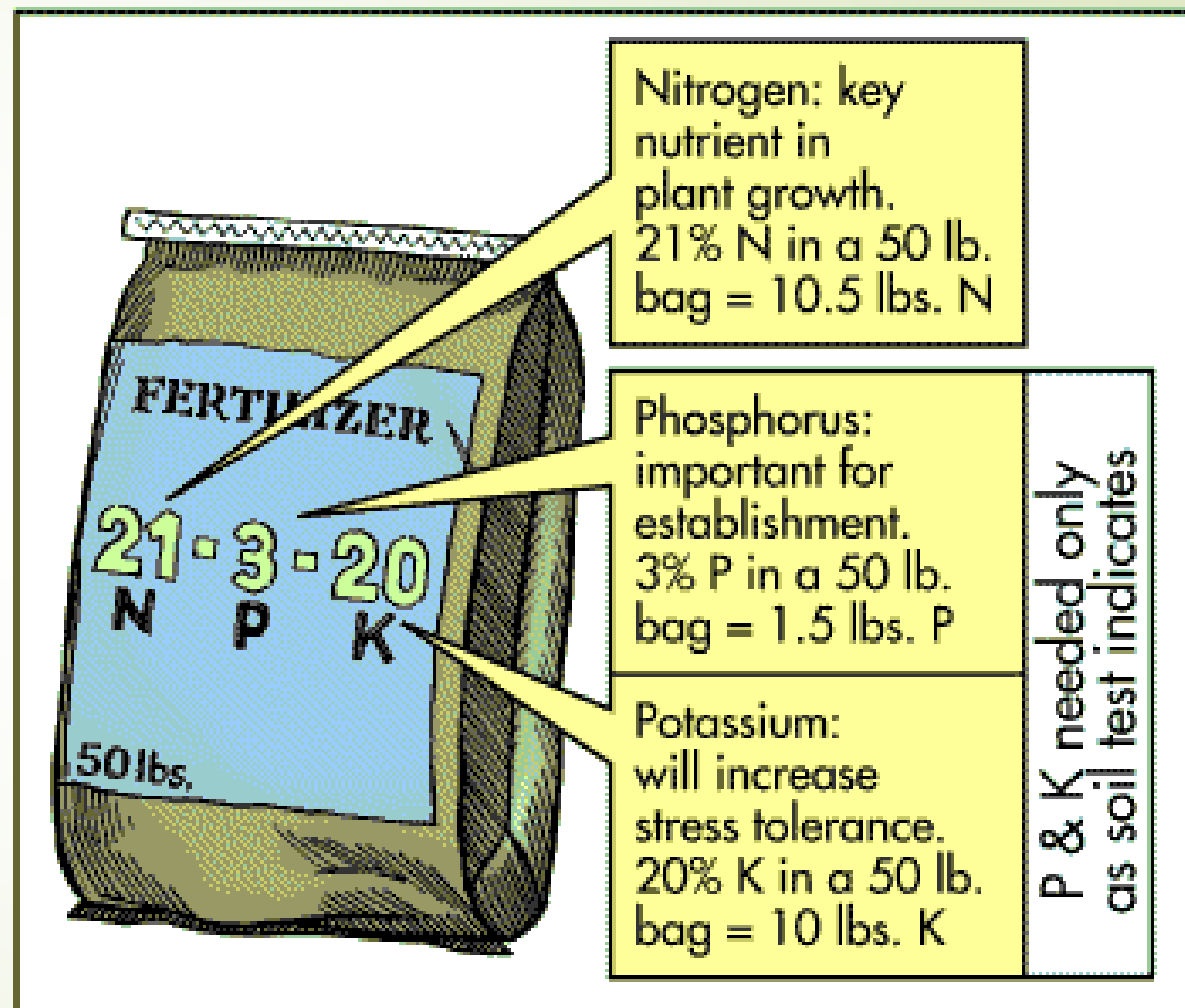
Number of Sprays: 0.00

4/11/17		Cultural Practice Aerification		Core aerate, overseed bare areas with 50-50					
Product	Package	lb/M	Total Case/Bag	Per Load	n/M	p/M	k/M	Purpose	
Touchdown 50/50 Mix	1 Lb	1.10	150.00	Lb				Aggressive, Wear Tolerant, and Fast Germinating Bluegrasses combined with Fast Germinating, disease resistant, dark colored ryegrass	
4/18/17		Granular Application		Apply to dry mown turf and water in or apply before moderate rainfall					
Product	Package	lb/M	Total Case/Bag	Per Load	n/M	p/M	k/M	Purpose	
Country Club 29-0-10 SGN 195	50 Lb	3.68	10.00	Bag	1.07	0.00	0.37	Slow release Nitrogen and Potassium Fertility	
6/6/17		Granular Application		Apply Sili Cal before 16-1-5 and water in 1/2" or apply before moderate rainfall					
Product	Package	lb/M	Total Case/Bag	Per Load	n/M	p/M	k/M	Purpose	
Sili-Cal SS SG	50 Lb	20.22	55.00	Bag				Calcium Silicate Buffers sodium, increases wear tolerance, ball roll, playability	
Replenish 16-0-5 SG	50 Lb	6.25	17.00	Bag	1.00	0.00	0.31	Carbon based bridge product for soil biology building with Ammonium Sulfate and Methlyn Urea.	

THE REQUIREMENTS OF THE REGS:

GENERAL RULE #7

- ▶ Retailers who sell phosphorus containing fertilizers are required to:
 - ▶ Display phosphorus containing fertilizer products SEPARATE from phosphorus containing fertilizers
 - ▶ Post a sign displaying language informing the consumer about phosphorus restrictions



Healthy Lawns – Healthy Water

Use Zero-Phosphorus Lawn Fertilizer! It's the Law!

Phosphorus runoff poses a threat to water quality. Therefore, under Massachusetts Law, phosphorus-containing fertilizer may only be applied to lawn or non-agricultural turf when:

- a soil test indicates that additional phosphorus is needed for the growth of that lawn or non-agricultural turf; or
- is used for newly established lawn or non-agricultural turf during the first growing season.

Most lawns in Massachusetts do not need additional phosphorus for healthy growth.

Look for the “Zero” to Protect Our Waters



Check the fertilizer bag for a set of three numbers representing the percentage of nitrogen (N), phosphorus (P) and potassium (K).

Buy the bag with a “0” in the middle: Zero Phosphorus!

Visit www.mass.gov/agr for more information and resources on plant nutrient management.

MDAR Recommended Sign For Retailers



So...How Do You Know How Much To Apply?

INVESTIGATE YOUR SOILS !!

...But NOT this way



How Do You Know How Much To Apply?

- ▶ A nutrient analysis should be performed (Soil Test)
 - ▶ UMASS Amherst Extension Office offers this service for \$15
 - ▶ Tests are good for 3 years
- ▶ Soil Tests will give you recommendations for Phosphorus and Potassium
- ▶ Nitrogen requirements cannot be determined by soil test, but rather recommended by turf type.
- ▶ This is how you would justify the use of phosphorus for maintenance purposes



Nutrients: Nitrogen, NO₃-N (Up)

- Essential to every aspect of plant growth
- Levels vary due to changing weather and humidity conditions in New England, so soil tests are not useful in determining N levels.
- N recommendations are made based on type of turf, grass, or plant being fed (UMASS Recommendations)
- Provides quick energy, most noticeable nutrient.



Nutrients: Nitrogen, $\text{NO}_3\text{-N}$ (Up)

- ▶ New England soils typically have a naturally occurring nitrogen deficiency.
- ▶ Plants have evolved to use as much nitrogen as possible, sometimes at the expense of other nutrients.
- ▶ So then...how does it get to water ways?
 - ▶ Leaching through sandy soils
 - ▶ Runoff from steep yard slopes
 - ▶ Over use, improper spreading, bad timing



UMASS Guidelines for Nitrogen on Turf *Based on Grass Type*

Table 6. Typical nitrogen fertilizer rate ranges for common cool-season lawn grasses.

	Kentucky bluegrass	Perennial ryegrass	Tall fescue	Fine fescues
Fertility level	med - high	med - high	med - high	low - med
Lbs. N per 1000 sq ft per season	2 - 4	2 - 4	2 - 4	0 - 2

** Note that in this case "Per Season" refers to "Per Year" or Full Growing Season

Source:

UMASS Extension BEST MANAGEMENT PRACTICES FOR SOIL & NUTRIENT MANAGEMENT IN TURF SYSTEMS

Table 7. Suggested options for timing, rate, and % SRN^a for N applications^b based on number of applications per year (lbs N/M = lbs of nitrogen per 1000 square feet).

Time of year	Number of N applications				
	1x/yr	2x/yr	3x/yr	4x/yr ^c	4x/yr ^c
Spring (after ~50% green-up)		50-100% SRN 1.0 - 1.5 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M	
Late spring/ early summer			50-75% SRN 0.75 - 1.0 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M
Summer (irrigated turf only)				50-75% SRN 0.75 - 1.0 lbs N/M	50-75% SRN 0.75 - 1.0 lbs N/M
Late summer/ early fall (~Labor Day)	75-100% SRN 1.0-2.0 lbs N/M	50-100% SRN 1.0 - 1.5 lbs N/M	25-50% SRN 1.0 - 1.5 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M	25-50% SRN 0.75 - 1.0 lbs N/M
Late fall (late season) ^d					25-50% SRN 0.75 - 1.0 lbs N/M
TOTAL ANNUAL N	1.0 - 2.0 lbs N/M	2.0 - 3.0 lbs N/M	2.5 - 3.5 lbs N/M	3.0 - 4.0 lbs N/M	3.0 - 4.0 lbs N/M

- Ranges for slow-release nitrogen (% SRN) content are approximate guidelines. Specific SRN percentages may vary from commercially available products by as much as 5% (plus or minus). Use higher SRN content when available, and especially on sandy root zones or during stress and pre-stress periods.
- Specific N rates may vary based on several factors including turfgrasses present, management, and turf use. For predominately fine fescue turf or shaded sites use lower listed N rates.
- Programs utilizing 4 or more N applications per year are best suited for intensively used, high-value turf.
- Final application made after last mowing while grass is still green. *As noted in the text, not necessary for most lawns and not appropriate for environmentally sensitive sites.*

UMASS Guidelines for Nitrogen on Turf *(Recommended rates by frequency)*

Source:
*UMASS Extension BEST
MANAGEMENT PRACTICES FOR
SOIL & NUTRIENT
MANAGEMENT IN TURF SYSTEMS*

Jamie Magaldi

Town of Wilmington D.P.W

Print Date: 10/25/16

2017 Agronomic Planner

2017 Middle School

3.12 Acres	136,000.00 sq.ft.	Spray Tank Capacity: 0 gal	Spray Coverage: 0.00 sq.ft.	Dilution Rate: 0.00 Gal/M	Number of Sprays: 0.00
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4/11/17	Cultural Practice Aerification	Core aerate, overseed bare areas with 50-50				
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Product	Package	lb/M	Total Case/Bag	Per Load	n/M	p/M	k/M	Purpose
Touchdown 50/50 Mix	1 Lb	1.10	150.00	Lb				Aggressive, Wear Tolerant, and Fast Germinating Bluegrasses combined with Fast Germinating, disease resistant, dark colored ryegrass

4/18/17	Granular Application	Apply to dry mown turf and water in or apply before moderate rainfall						
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Product	Package	lb/M	Total Case/Bag	Per Load	n/M	p/M	k/M	Purpose
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Replenish 16-0-5 SG	50 Lb	6.25	17.00	Bag	1.00	0.00	0.31	Carbon based bridge product for soil biology building with Ammonium Sulfate and Methlyn Urea.

Nutrients: Phosphorus, P_2O_5 (Down)

- Phosphorus helps plants use the energy created by photosynthesis to drive its metabolism
- Deficiencies can lead to weak roots (down)
- Phosphorus can occur naturally in a maintained turf soil, from natural breakdown of matter, which is why it's easy to overload phosphorus and create leaching
- Once soil tests reveal Phosphorus in optimum range, only a small amount is needed to maintain level



Nutrients: Potassium, K – K₂O (All Around)

- Rivals Nitrogen as the nutrient plants absorb in greatest amounts
- Plants deficient in K are unable to utilize nitrogen and water efficiently and are more susceptible to disease.
- Sandy soils tend to lose K quickly from leaching
- Provides overall health and disease tolerance
- Too much Potassium is not typically detrimental



Symptoms of typical P and K deficiencies

Other Information from Soil Testing

➤ Calcium and Magnesium Readings

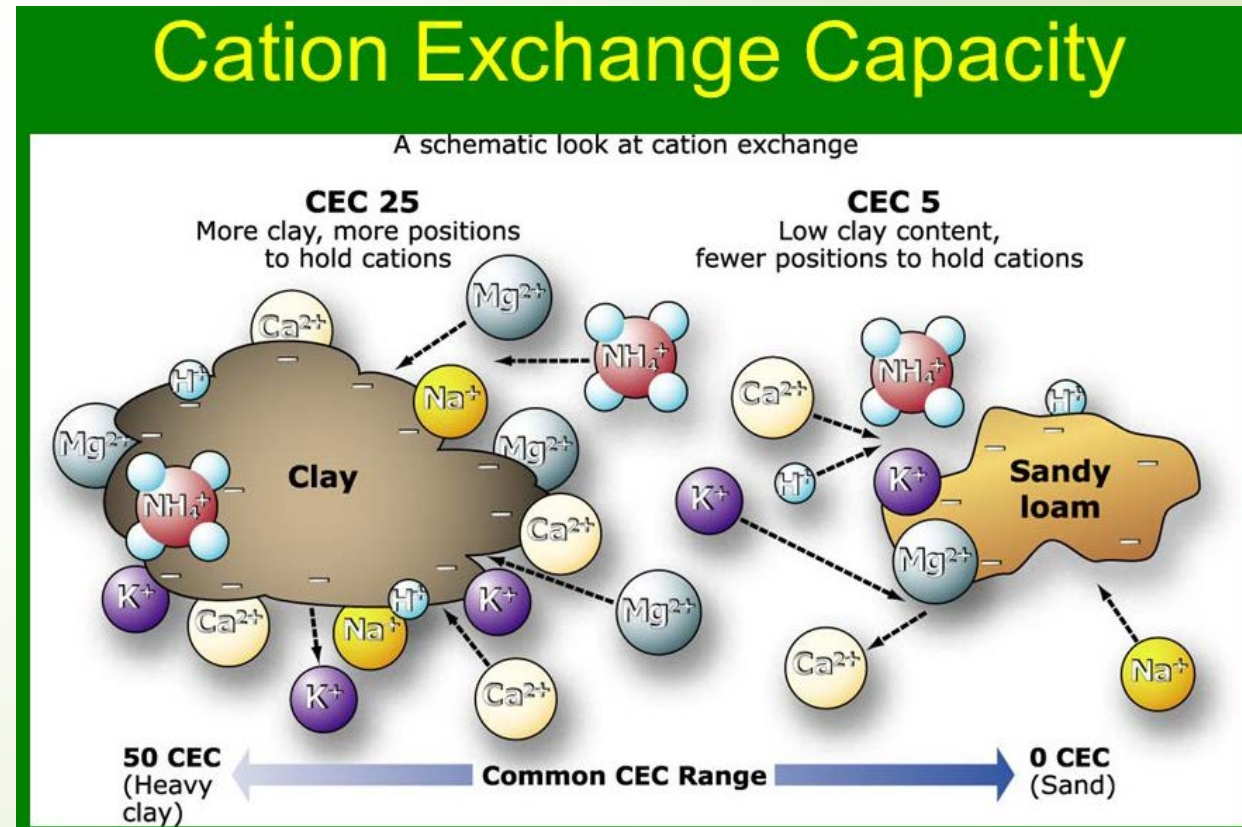
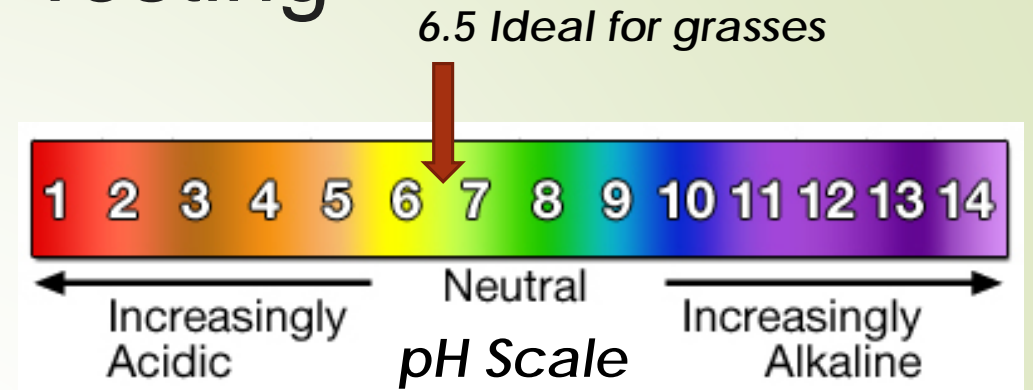
- Liming Recommendations

➤ pH Levels

- New England has acidic soils

➤ CEC (Cation Exchange Capacity)

- Ability to retain & supply nutrients
- Sandy soils have low CECs



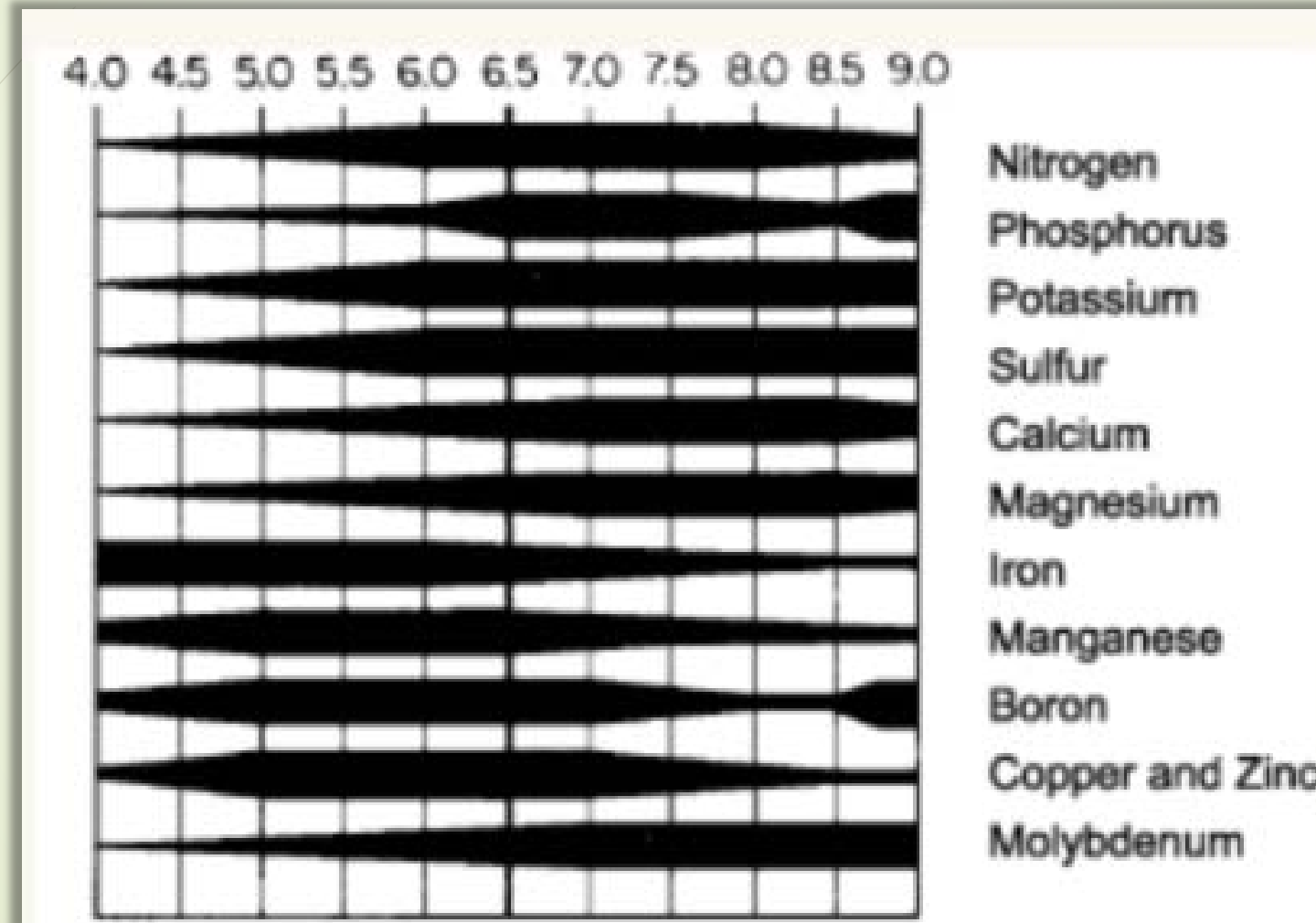
Achieving Maximum Nutrient Potential

pH Scale

Acidic side

Neutral Zone

Basic side



Source: Colorado State University Co-Op Extension



Soil and Plant Nutrient Testing Laboratory
 203 Paige Laboratory
 161 Holdsworth Way
 University of Massachusetts
 Amherst, MA 01003
 Phone: (413) 545-2311
 e-mail: soiltest@umass.edu
 website: soiltest.umass.edu

Soil Test Report

Prepared For:
 Jamie Magaldi

Sample Information:
 Sample ID: MAG 1

Order Number: 27231
 Lab Number: S170126-115
 Area Sampled: 10000 sq ft
 Received: 1/26/2017
 Reported: 1/30/2017

Results

Analysis	Value Found	Optimum Range	Analysis	Value Found	Optimum Range
Soil pH (1:1, H ₂ O)	6.1		Cation Exch. Capacity, meq/100g	11.2	
Modified Morgan extractable, ppm			Exch. Acidity, meq/100g	5.1	
<i>Macronutrients</i>			Base Saturation, %		
Phosphorus (P)	2.3	4-14	Calcium Base Saturation	39	50-80
Potassium (K)	61	100-160	Magnesium Base Saturation	14	10-30
Calcium (Ca)	867	1000-1500	Potassium Base Saturation	1	2.0-7.0
Magnesium (Mg)	197	50-120	Scoop Density, g/cc	1.18	
Sulfur (S)	9.6	>10			
<i>Micronutrients *</i>					
Boron (B)	0.0	0.1-0.5			
Manganese (Mn)	1.7	1.1-6.3			
Zinc (Zn)	2.6	1.0-7.6			
Copper (Cu)	0.3	0.3-0.6			
Iron (Fe)	8.5	2.7-9.4			
Aluminum (Al)	87	<75			
Lead (Pb)	4.6	<22			

* Micronutrient deficiencies rarely occur in New England soils; therefore, an Optimum Range has never been defined. Values provided represent the normal range found in soils and are for reference only.

Soil Test Interpretation

Nutrient	Very Low	Low	Optimum	Above Optimum
Phosphorus (P):	██████████	██████████		
Potassium (K):	██████████	██████████		
Calcium (Ca):	██████████	██████████		
Magnesium (Mg):	██████████	██████████		

SINGLE FAMILY HOUSE CASE STUDY

Sometimes...it's not what you think

- High Magnesium can be an indicator of tight soils
- May warrant Gypsum (calcium sulfate) to help loosen soils



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 e-mail: soiltest@umass.edu
 website: soiltest.umass.edu

Recommendations for Established Lawn

Limestone (Target pH of 6.5)	Nitrogen, N	Phosphorus, P ₂ O ₅	Potassium, K ₂ O
75	2 - 4	1.5	3

lbs / 1000 sq ft

Questions?



Thank You !