Simple Ideas for Greener Facility Management

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Auburn University and ACES
STMA Conference, January 18, 2013

Our decisions as turfgrass and landscape managers directly affect the health and quality of the environment!

Today's Environmental Buzz Words

- Global Warming
- Environmental Sustainability
- Xeriscape
- Going Green
- Environmental Stewardship
- Water Conservation
- LEED Certified Construction
- Carbon Credits

How to Have a Safe and Green Field?

EYEON

Football

What will it take for Redskins to fix FedEx Field's turf problem?

By Ryan **Wilson** | Blogger

January 10, 2013 9:31 pm ET

Tweet 11 0

RG3 and Chris Clemons suffered serious injuries in Sunday's game. (US Presswire)

The shoddy conditions at FedEx Field during Sunday's wild-card game between the

Components of Best Management Practices

- Right plant, right place
- Fertility
- Irrigation practices
- Mowing practices
- Pesticide spraying
- Sustainable!

What are BMPs?

- A best practice is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered. Best practice is considered by some as a business buzzzword, used to describe the process of developing and following a standard way of doing things that multiple organizations can use.

- Best practices are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking

Superior how?

- More sustainable
- Cheaper
- Less input
- Healthier
- Less liability risk
- Less work
- Better PR

Fertilization

Fertilization Schedule

- **Highly Variable**
  - **Weather**
  - **Play schedule**
  - **Wear**
  - **Mowing requirement**
  - **Labor and equipment available**
- **Generic recommendation: ½ - 1 lb N / 1000 sq. ft / Month in growing season for bermudagrass, ½ lb N for ryegrass when growing**

For High-Traffic Sports Fields

- **You want growth!**
- **Nitrogen in soluble form, applied often is best**
- **Not too much at any one time**
- **½ lb N / 1000 ft^2 every week is ideal if you can do it!**
- **This is also the recommendation for a grow-in from sprigs**

Timing N Fertilization

Warm-season Grasses

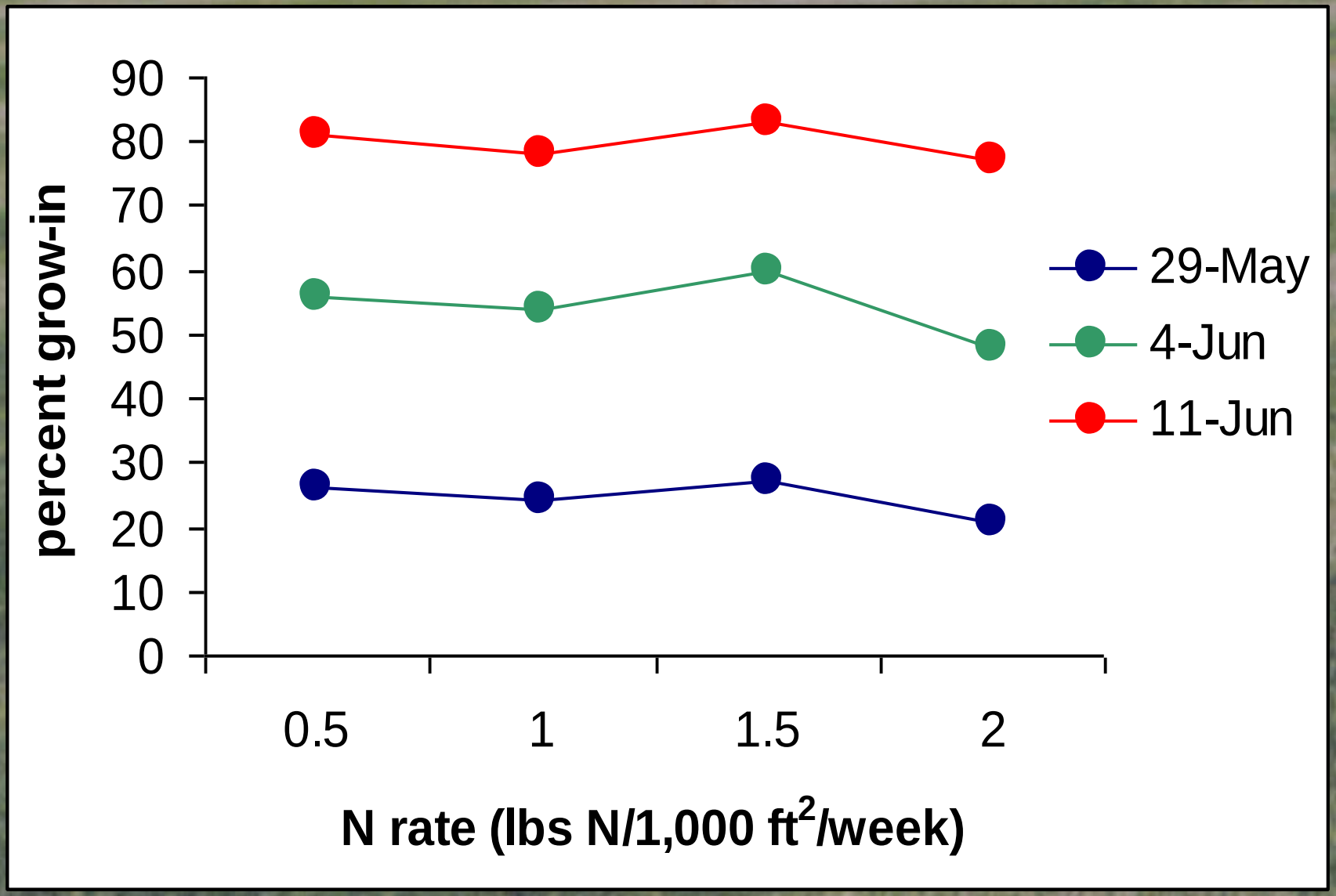
- Soil Temperatures
  - ✓ Active root growth & activity
  - ✓ 65° - 70° F is the magic number
  - ✓ Consistently – multiple days
  - ✓ 4-inch depth

Timing N Fertilization

Cool Season Grasses

- Soil Temperatures
  - ✓ Active root growth & activity
  - ✓ 55 - 65 F is the magic number
  - ✓ Consistently – multiple days
  - ✓ 4-inch depth

Grow-in of Tifway and TifSport bermudagrass as affected by N rate, 2002



Adverse Affects

High N Fertilization

- Susceptibility to pests
  - diseases
- Susceptibility to environmental stresses
  - drought

Common Sense

Remove clippings from hard surfaces so they do not wash into a water source and contribute to water pollution.

This is like throwing fertilizer into the water and should be avoided.

Phosphorus (P)

Role in the plant

- Nucleic acids & nuclei of plant cells
  - ✓ DNA reproduction
  - ✓ Especially important for new shoot and root growth and flower & fruit production
- Energy
  - ✓ ATP – adenosine triphosphate
  - ✓ Other P containing components

Phosphorus (P)

Forms & Sources

- **Absorbed by plants**
  - ✓ **Phosphate -** $H_2PO_4^-$ & HPO_4^{-2}
- **Sources**
  - ✓ Natural - superphosphate
  - ✓ Organic – e.g. bone meal
  - ✓ Chemical – ammoniated phosphate

Phosphorus (P)

Considerations

- Relatively immobile in soils
- Effect on soil pH
  - Ammoniated phosphates lower soil pH
  - Superphosphate (SP) & triple SP increase soil pH
- Environmental hazards
  - Water quality – algal bloom
  - ✓ Soil test for need

What happens with too much P?

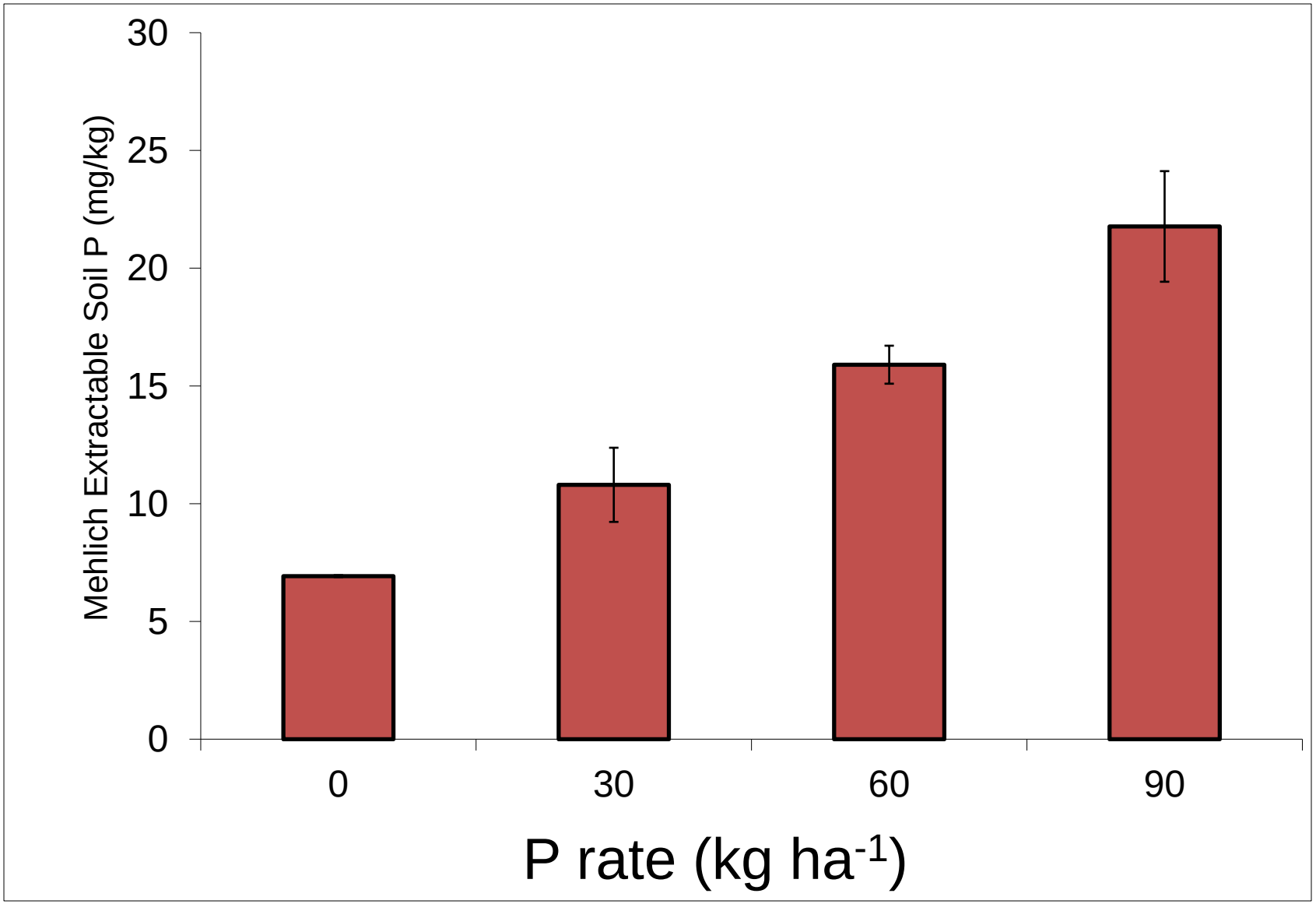
Algae growing in surface water

Numbers for when things get bad…

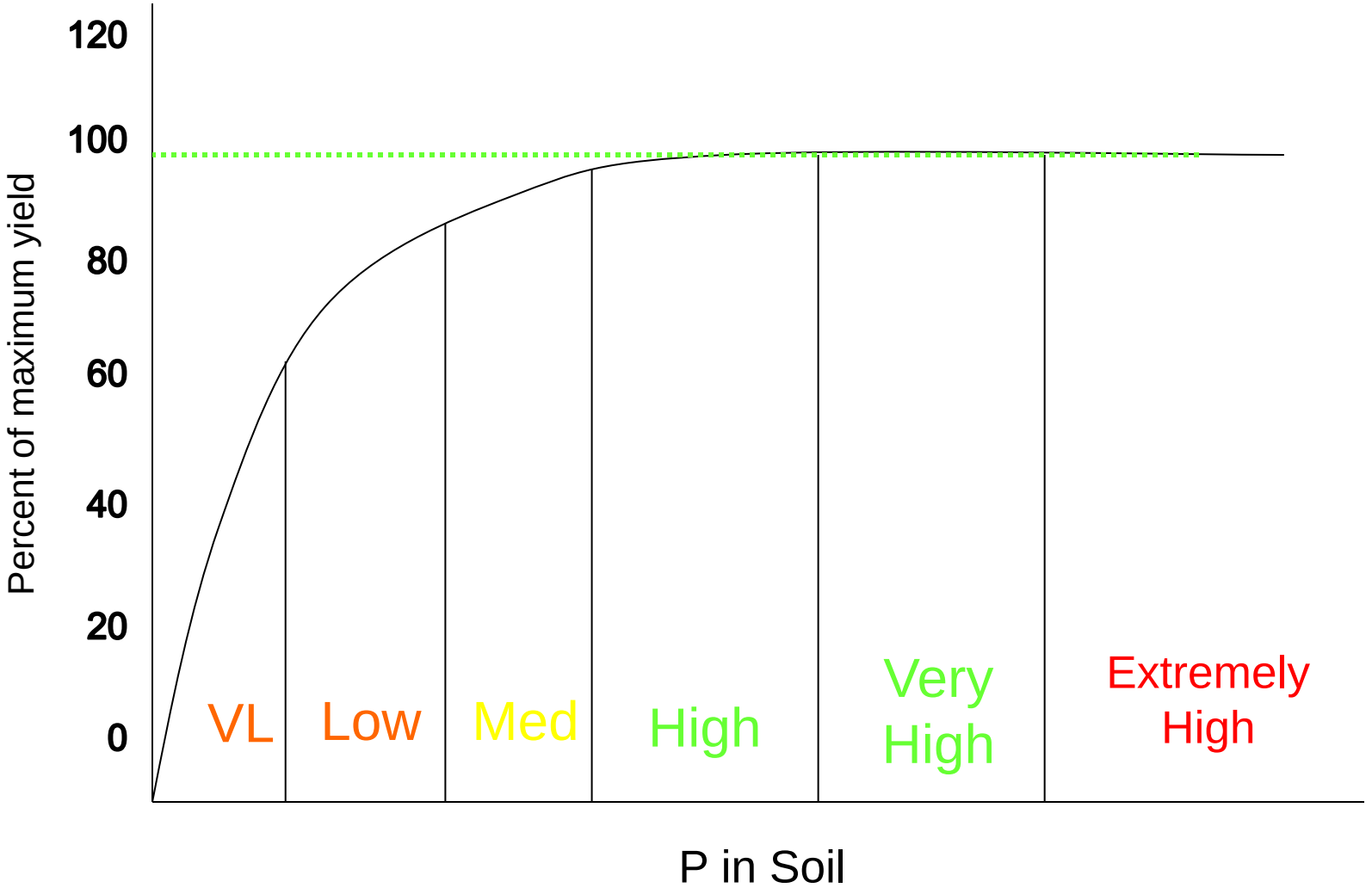
- Water: One water-quality threshold level set by the USEPA is 0.3 mg L^{-1} of PO_4^{-3}.
- Soil: For Mehlich 3: very low (VL): 0 to 12 lb A^{-1}; low (L): 13 to 25 lb A^{-1}; medium (M): 26 to 50 lb A^{-1}, high (H): 51 to 100 lb A^{-1}; very high (VH): 101 to 200 lb A^{-1}, and, extremely high (EH): > 200 lb A^{-1}.

(Soils with a CEC of 0 to 9)

The effect of increasing rates of P fertilizer on extractable soil P



How that Affects P Fertilizer Recommendations…..



Example P Soil-Test Recommendations…..

LAB No.	SENDER'S SAMPLE DESIGNATION	CROP TO BE GROWN	SOIL* GROUP	SOIL TEST RESULTS					RECOMMENDATIONS			
				pH**	Phosphorus P***	Potassium K***	Magnesium Mg***	Calcium Ca***	LIME-STONE	N	P_2O_5	K_2O
					Pounds per acre				Tons/acre	Pounds per acre		
14208	NEW S 201 SEE COMMENT 59	GOLF GREEN	1	7.0	H 100	M 62	H 61	1010	0.0	400	0	130
14209	NEW S 202 SEE COMMENT 55	GOLF GREEN	1	6.9	VH 141	M 94	H 84	440	0.0	400	0	80
14210	NEW S 203 SEE COMMENT 62	GOLF GREEN	1	6.1	M 27	M 70	H 59	580	0.0	400	130	110
14211	NEW S 301 SEE COMMENT 62	GOLF GREEN	1	6.2	M 32	M 97	H 56	620	0.0	400	120	80
14212	NEW S 302 SEE COMMENT 55	GOLF GREEN	1	6.7	VH 157	M 116	H 123	480	0.0	400	0	50
14213	NEW S 303 SEE COMMENT 55	GOLF GREEN	1	6.7	VH 115	M 81	H 83	640	0.0	400	0	100
14214	NEW S 401 SEE COMMENT 56	GOLF GREEN	1	6.9	VH 105	L 57	H 87	740	0.0	400	0	130
14215	NEW S 402	GOLF GREEN	1	6.4	L 19	M 71	H 57	560	0.0	400	150	110

1. Sandy soils (CEC < 4.6 $cmol_c kg^{-1}$)
2. Loams & Light clays (CEC = 4.6-9.0 $cmol_c kg^{-1}$)
3. Clays and soils high in organic matter(CEC > 9.0 $cmol_c kg^{-1}$)
4. Clays of the Blackbelt(CEC > 9.0 $cmol_c kg^{-1}$)

* 7.4 or higher - Alkaline 6.6-7.3 - Neutral 6.5 or lower - Acid 5.5 or lower - Strongly Acid

** Extractable nutrients in pounds per acre

Where are rules about P fertilization being enacted?

	IL	ME	MD	MI	MN	NJ	NY	VT	VA	WA	WI
Effective dates:	2010	2008	2011-2013	2012	2004	2011, 2013	2012	2012	2013	2013	2010
Applicators affected:	"Applicator for hire" (licensed commercial, certified applicators, and others)	All persons	Everyone	All persons	All persons	All persons	All persons	All persons	All persons	All persons	All persons
Exempt applicators and allowed Phosphorus fertilizer use:	Golf courses; Commercial and Sod farms; Agricultural lands and production; Right-of-ways; P deficiency; Establish new turf; Lawn repair	Agriculture; P deficiency; Establish new turf; Sod farms; Turf repair; Gardening	Agricultural purposes; Commercial and Sod farms; P deficiency; Establish new turf; Turf repair	Golf courses; Commercial farm land; P deficiency; Establish new turf	Golf courses; Sod farms; Agricultural lands and production; P deficiency; Establish new turf	Golf courses; Commercial Farms; Phosphorus deficiency; Establish new turf; Turf repair	Gardens; Agricultural lands and production; Sod farms; Phosphorus deficiency; Establish new turf	Golf courses; Sod farms; Agricultural lands and production; Phosphorus deficiency; Establish new turf	Phosphorus deficiency; Establish new turf; Turf repair; Agricultural use; Gardening; Golf courses management plan	Establish new turf; Turf repair; Phosphorus deficiency; Gardens; Sod farms; Agricultural land or production	Sod farms; Agricultural land and production; Phosphorus deficiency; Establish new turf

	IL	ME	MD	MI	MN	NJ	NY	VT	VA	WA	WI
Setbacks from water (buffer):	3 ft to 15 ft setback	None	10 ft to 15 ft setback	3 ft to 15 ft setback	None	10 ft to 15ft setback	3 ft to 20 ft setback	25 ft setback	None	None	None
Application on frozen and saturated soils:	Prohibited	No restrictions	Prohibited from Nov. 16 to Feb. 29 or on frozen ground	Prohibited	No restrictions	Prohibited during heavy rain or when predicted, on saturated or frozen ground, or from Nov. 16 - Feb. 29 (Dec. 2 - Feb. 29 for professionals)	Prohibited between Dec. 1 and Apr. 1	Prohibited from Oct. 16 to Mar. 31 or on frozen ground	Package label prohibits certain uses	Prohibited on frozen ground	Prohibited on frozen ground
Restrictions on Phosphorus lawn fertilizer sales:	No restrictions	Post signs about fertilizer use at point of sale	Must sell low Phosphorus fertilizer for lawns unless organic and sold to professional	No restrictions	No restrictions	Sale prohibited to consumers unless for deficiency, new turf, or turf repair	Display Phosphorus fertilizer separately; Post educational signs	Display Phosphorus fertilizer separately; Post educational signs	Sale of lawn maintenance fertilizer prohibited; Can sell existing stock	Sale prohibited unless for an allowed use and properly labeled; Can sell existing stock	No display but may post sign; Must sell only for specific purposes

How to Handle a Site with High Soil Test P

- Don’t fertilizer with P.
- Remove clippings to ‘mine’ P from the site.
- Don’t let the site get bare – P in runoff is our biggest environmental issue.

Being Smart with Fertilizer Input

- Let soil tests guide you on P & K needs
- P is often not needed on mature turf
  - P being removed from homeowner products
- K is often overapplied relative to need
  - Yes, a K deficiency contributes to winter damage, but that does not mean potash needs to be applied every year!
- Soil Testing needs to be the foundation of fertility programs!

Greener Pesticide Use

Know Your Pests!!!

Apply pesticides and select a treatment method only after you have correctly identified the problem.

Follow label directions!

Integrated Pest Management

"Integrated Pest Management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. The IPM approach uses knowledge of pest, crop, and environmental conditions to select the best combination of management strategies."

- 1999 IPM in the Southern Region

Control methods used in IPM

- Chemical – traditional pesticides
- Biological – pests of pests
- Cultural – Resistant varieties, also management practices – mowing, irrigation, etc.
- Physical – altering the environment – changing rootzone, slopes, drainage,etc.

Steps in IPM

- First: Information gathering - Critical to good pest management!
- Pest ID and life cycle
  - Target weak points in life cycle
- Need to know about the cultural, biological or chemical control methods you are using
- Need to know how some indicator pests can point you to underlying problems that need to be fixed

Japanese Beetle Life Cycle

Soap Flushing

Steps in IPM

- Second: Decision making – choosing the right combination of tools given the information you have
  - Use right chemical at the right time, in combination with the right cultural and biological methods
- Third: Record keeping
  - Records are information to help you in future years
  - What works, what doesn't, when and where pests appear, etc

Conflicting Messages!

Greener Pesticide Use

Measure your turf area properly before any application. Know the size of area to be treated.

Use the correct rates for fertilizers and pesticides. Don’t exceed the per 1000 square feet recommendations for each product.

Greener Pesticide Use

Consider spot treatments instead of total field / site applications whenever possible.

Don’t apply fertilizers and pesticides within 5 -10 feet of lakes and streams.

Do not apply pesticides and fertilizers during inclement weather conditions.

Greener Pesticide Use

Calibrate your spreader and spray equipment often.

Use recommended spray volume

Apply recommended amounts of water to treated areas after application, if necessary.

Pesticide Storage and Mixing Areas

Detached structure

Nonflammable materials

Select a site with minimal runoff

At least 100’ down slope from surface water and wells

Pesticide Storage and Mixing Areas

Use sealed floors

Equip floor with a continuous curb to contain spills

Pesticide Storage and Mixing Areas

Best shelving – metal with a lip

Keep shelving painted to avoid corrosion

Pesticide Storage and Mixing Areas

Bottom shelf on floor – unable to clean

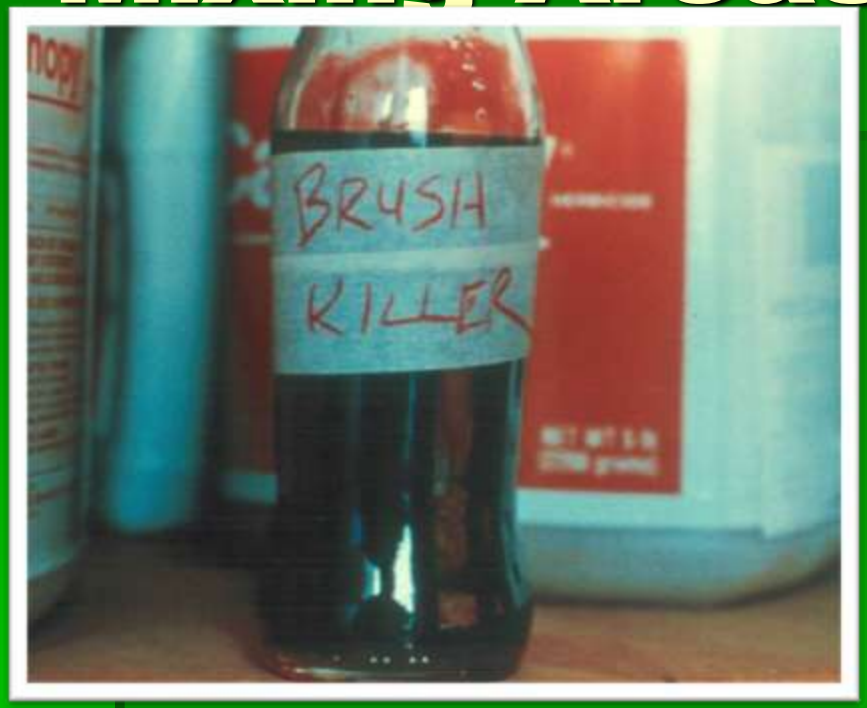
Wooden shelves – may absorb spilled pesticide

Pesticide Storage and Mixing Areas

Have a built-in drain to a sump for storage and mixing

Locate sump beside, not under, building for easy access

Pesticide Storage and Mixing Areas



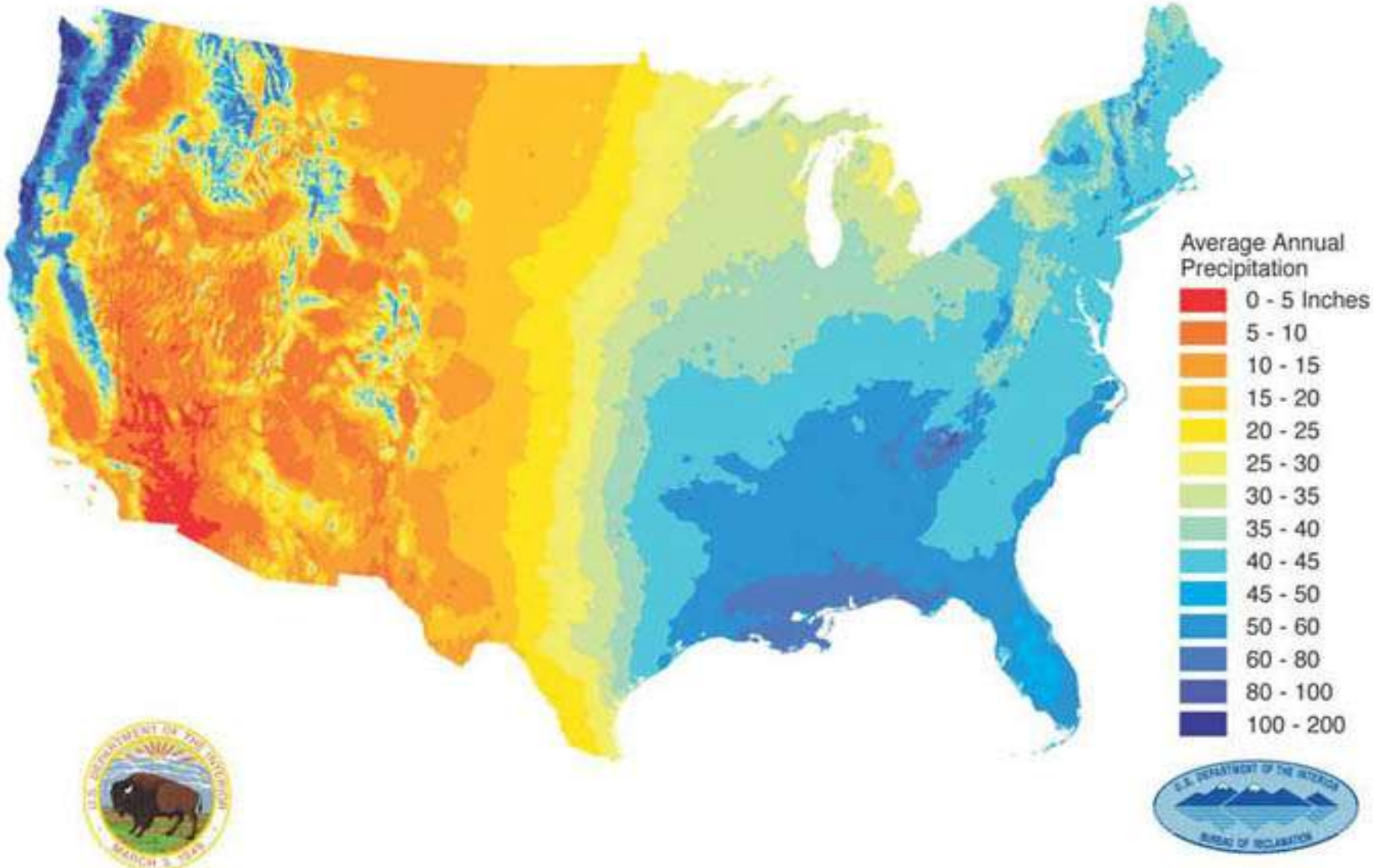
Store pesticides in their original container

Don’t place them in containers that children or others may mistake for food or drink

Make sure labels are visible and legible, refasten all loose labels

IRRIGATION

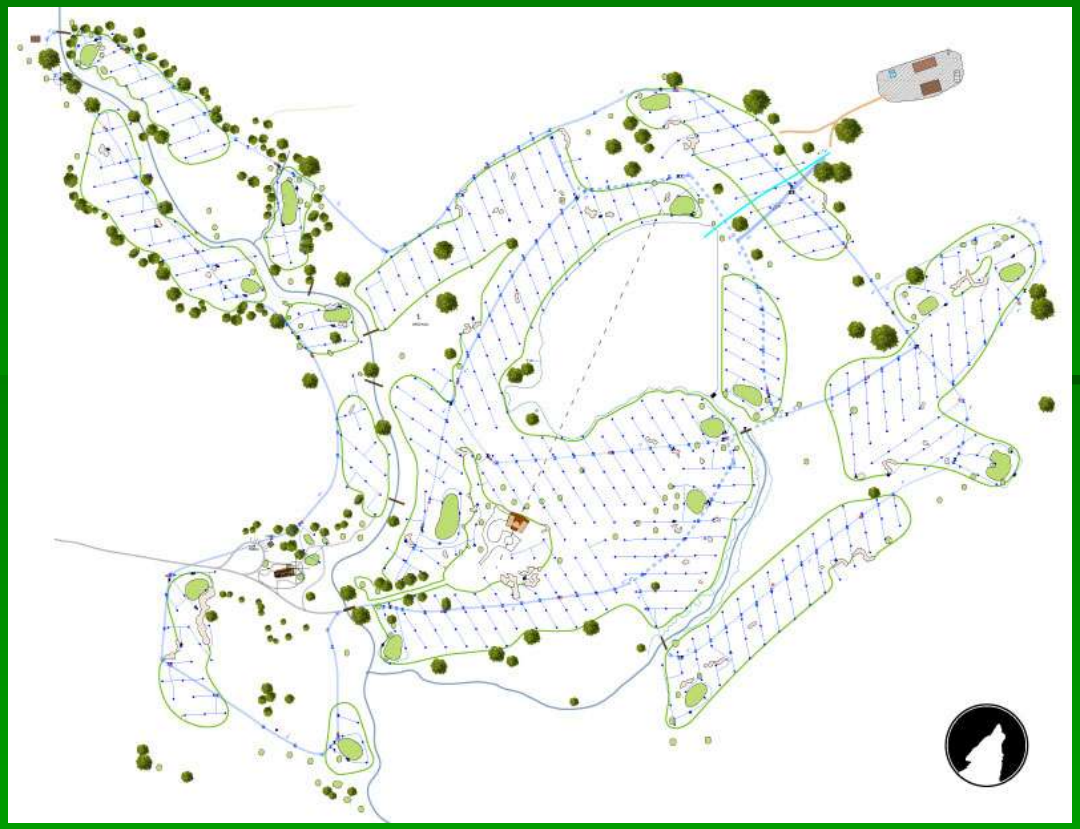
Average Inches of Annual Precipitation in the United States 1961-1990



Source: USDA-NRCS: http://www.ftw.nrcs.usda.gov/prism.html

Rule of thumb – water deeply but not too often. In general, watering should moisten the soil to a depth of 4 – 6 inches. This requires applying a half inch of water on course, sandy soil and 1 inch on heavy or fine – textured soil.

- Upgrade irrigation systems by adding rain sensors (save 30-35%), moisture sensors (save 76%), and pressure regulators to all irrigation systems.
- Install evapotranspiration (ET) based controllers
- Install drip systems where possible and save 50%
- Install sub-meters to reduce sewer charges.



- Perform regular irrigation system maintenance.
- Maintain as-built maps of all systems as repairs are made.

- Use the correct irrigation head for the intended application.
- Keep up with new equipment designs, i.e. Matched Precipitation (MP) rotary heads save up to 30%.
- Install check valves on traditional or drip systems and eliminate systems draining.
- Maximize output rates at .4”/hr and virtually eliminate runoff.

- Irrigate in early morning hours when wind and heat are lowest.
- Irrigate until 10:00 a.m. if necessary, but avoid mid-day water cycles.
- Adjust automatic controllers to seasonal changes.
- Cycle irrigation applications (on-off-on-off) to allow penetration and avoid runoff.

Photo Courtesy of Hunter Industries

Photo Courtesy Toro

Photo Courtesy of Weathermatic

Photo Courtesy of Rain Bird

Smart Controllers

- Weather-based irrigation controllers (Smart Controllers) allow for more accurate, customized irrigation by automatically adjusting the schedule and amount of water in response to changing weather conditions.

- Not only does this save water by reducing unnecessary watering, it allows you to tailor irrigation to meet your landscape's specific plant and climate needs.

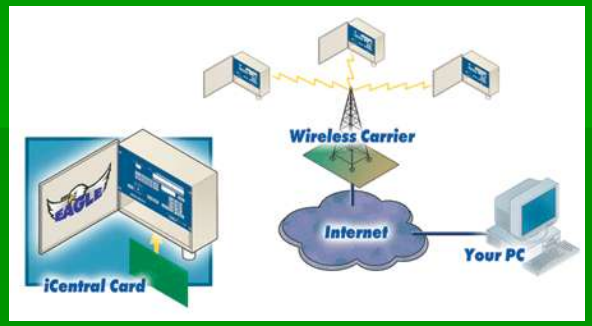
Rain Sensors

Photo Courtesy of Weathermatic

Photo Courtesy of Hunter Industries

Soil Moisture Sensors

On and Off Site Management of the Irrigation System



Look for ways to capture rain water from rooftops and other hard surfaces using holding ponds and rain barrels.

Most importantly remember that besides being expensive, over watering is a waste of this precious resource.

LANDSCAPE DESIGN

Choose the correct turfgrass, shrubs, and trees for the location. (keep in mind soil conditions, moisture levels, light levels, maintenance requirements, and plant zones).

When dealing with turfgrasses, choose improved varieties, mixtures, or blends, based on your climate, typical activities on your turfgrass, and quality expectations.

- Minimize site and soil disruptions.
- If soil disruptions occur, cover them as quickly as possible.
- Reuse soils within the work site.
- Reduce soil compaction – aerate.

Create bioswales and water retention areas to slow the runoff of storm water from reaching streams and creeks during critical rainfall periods allowing for infiltration of water back to ground deposits.

Why it helps …

- Retaining stormwater before it reaches streams decreases peak flows and transport of pollutants
- Encouraging infiltration into soil increases ‘natural’ treatment of pollutants in stormwater

RECYCLING

Recycle

- Triple rinse and recycle plastic containers
- Recycle used oil and tires
- Provide recycling receptacles next to trash receptacles
- Recycle paper and cardboard
- Recycle metal and old parts
- Recycle / return wood pallets to vendors
- Chip branches into mulch for onsite use

Recycle (con't)

- Start a compost site for green waste
- Recycle bedding trays and plastic pots
- Properly dispose of or recycle chemicals and their containers

OTHER THOUGHTS

- Buy electric carts
- Keep equipment engines tuned
- Use more 4-cycle equipment
- Build using Leadership in Energy and Environmental Design (LEED) ideas
- Consider “green roofs”

Thank You!

- handavi@auburn.edu
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- Alabama Turfgrass Association Seminars
  - Dothan, Jan. 23
  - Huntsville, Jan. 30
  - Montgomery, Feb. 6

- AU Turfgrass Research Field Day, Apr. 2