IPM in Turf
"The Real Story"

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Non Crop Vegetation Management
Pesticide Recertification Course
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IPM vs. Sustainability

- Goals are basically the same.
- IPM is more detailed as to the approach.
- "Sustainability" has more of a long term focus.

IPM

- Focuses on maintaining plant health and using cultural practices to minimize pest pressure.

- Encourages using pest resistant varieties.

- Uses thresholds and monitoring to make pesticide application decisions.

IPM Overview

- 9 Common Lawn Myths
- Making common sense choices.
- 3 Keys to IPM

9 Common Lawn Myths

Myth # 1

Lawns REQUIRE a lot of fertilizer.

Why Apply Fertilizer?

Improves the vigor of the lawn

A healthy lawn will:

- Resist weed encroachment.
- Reduces disease pressure.
- Resist insect pests.
- Be more drought resistant.

Overall, intelligent fertilizer applications will reduce the need for herbicides, insecticides, and water.

Fertilization

"The goal is to use the least amount of fertilizer nitrogen needed to achieve your goals"

Prioritize your lawn areas

The lawn behind the warehouse doesn't need to be as well maintained as the entrance to the Corporate Head Quarters.


Not fertilized
Climax bentgrass

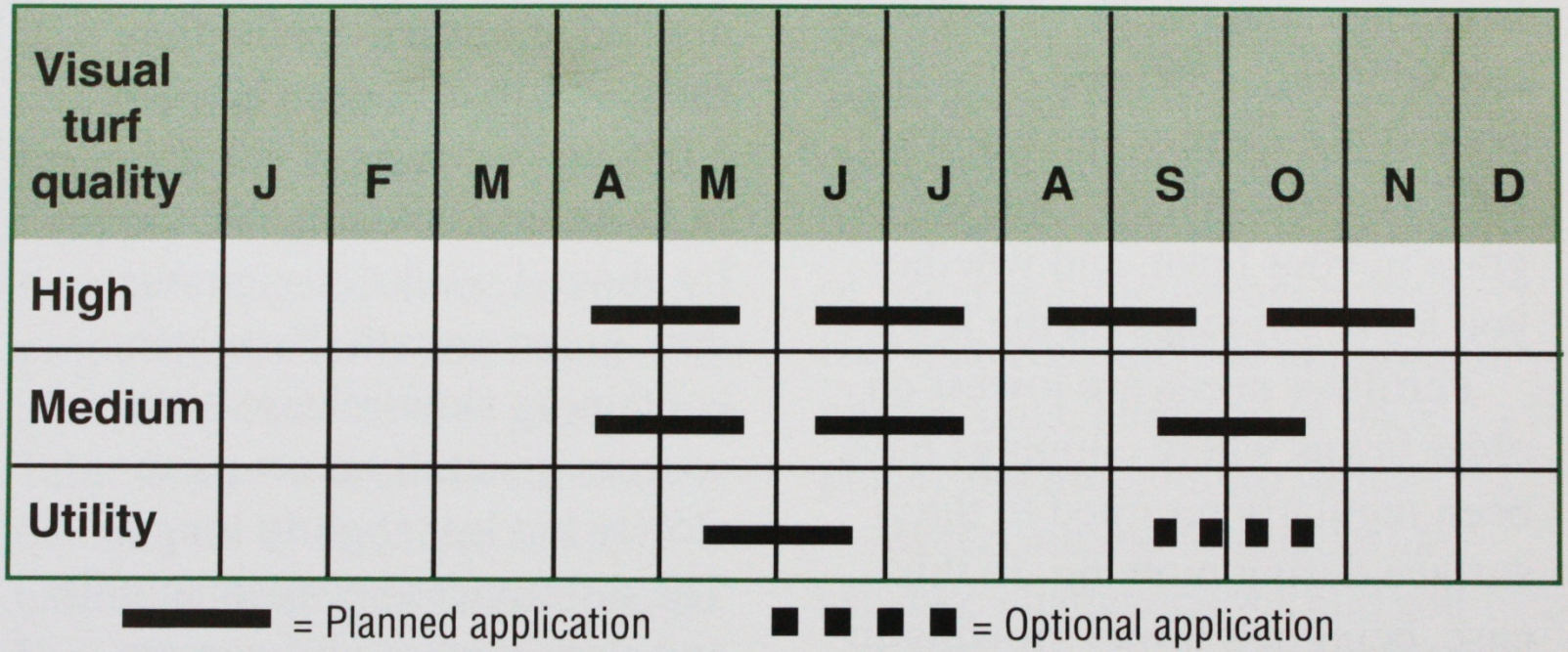

Fertilized occasionally
Climax annual bluegrass


Fertilized 3-4 times per year
Perennial ryegrass
P rye


Fertilized 4 - 6 times per year
Perennial ryegrass show lawn

When to Fertilize? (1 lb. N/1,000 ft^2)

Figure 1. Fertilizer calendar for irrigated lawns in western Oregon.



Horizontal bars indicate time for each application. Adjust timing based on your goals and personal experience with your lawn. Each application is assumed to be at 1 lb N per 1,000 sq ft. On hungry lawns, 1.5 to 2 lb N per 1,000 sq ft can be used to stimulate density and color. Unless lawns are very weak, avoid early-spring applications since grass normally grows vigorously by itself at that time.

What to consider:

- Type of grass
- Age of lawn
- Clipping removal
- Soil type/ fertility
- Expectations

Perennial ryegrass:

- Mowed weekly
- Clippings removed
- Irrigated
- 4+ fertilizer apps/ year

Mature perennial ryegrass lawn, clippings removed, fertilized regularly.

Young perennial ryegrass lawn, imported soil, clippings removed, not fertilized regularly.

Bentgrass climax:

- Mowed weekly
- Clippings returned
- Irrigated
- 0 -1 fertilizer application

Climax lawn fertilized once in past 24 yrs.
Mowed weekly, clippings returned, clay soil.

What to apply:

- Nitrogen is the key
- Phosphorus only if deficient
- Potassium is rarely needed

- Synthetic fertilizers work fine
- Organic fertilizers work fine

Myth # 2

Lawns REQUIRE a lot of pesticides.

Possibilities?

- Insect problems?
- Disease problems?
- Weed problems?

Insects: European crane fly

A few crane fly larvae in an otherwise healthy lawn do not require treatment

High larval populations (50+/sq. ft.) results in turf thinning. Do not spray after April 1st as they are done feeding and the damage is done.

Curative control in mature lawns

Treatment threshold for 3rd instar larvae:

25-50 larvae/sq ft

plus

visible turf thinning

Monitoring Schedule

No History: Start in January

Prior History: Start in December

SAMPLE EVERY TWO WEEKS

Practical monitoring for 3rd instar larvae

T Cook photo

Count the larvae and multiply by 4

Crane fly thoughts:

1. Crane fly damage is worse when they first invade a new area.

2. Damage is usually sporadic in a given area.

3. Monitoring can reduce insecticide use up to 80% (vs. Preventative sprays)

Fall plantings can have bad crane fly infestations

Cultural Crane Fly Control

- Keep your lawn healthy.
- Stop watering on Labor Day.

What about diseases?

- Most are foliar and cause little damage.
- Will recover in spring.
- Fall applications of fertilizer will go a long way in reducing severity of fall and winter diseases.
- Mulch or remove leaves promptly from turf.

Low N Diseases to Ryegrass in Winter

Low N diseases cause turf thinning.

Also, Microdochium patch – especially under leaves.

What about weeds?

- First, ask yourself whether the “weeds” are a problem.
- If they are, make 2 spray applications (ideally in the fall) and kill ALL your weeds.
- Do not use weed and feed products – they are only about 50% effective.

Broadleaf weed control options

Two Scenarios

Heavy infestation: use herbicides

Two apps about three weeks apart in spring or fall

Follow up with spot treatments or hand weeding

Continue to hand weed regularly

Light infestation: hand weed (spot spray) or ignore

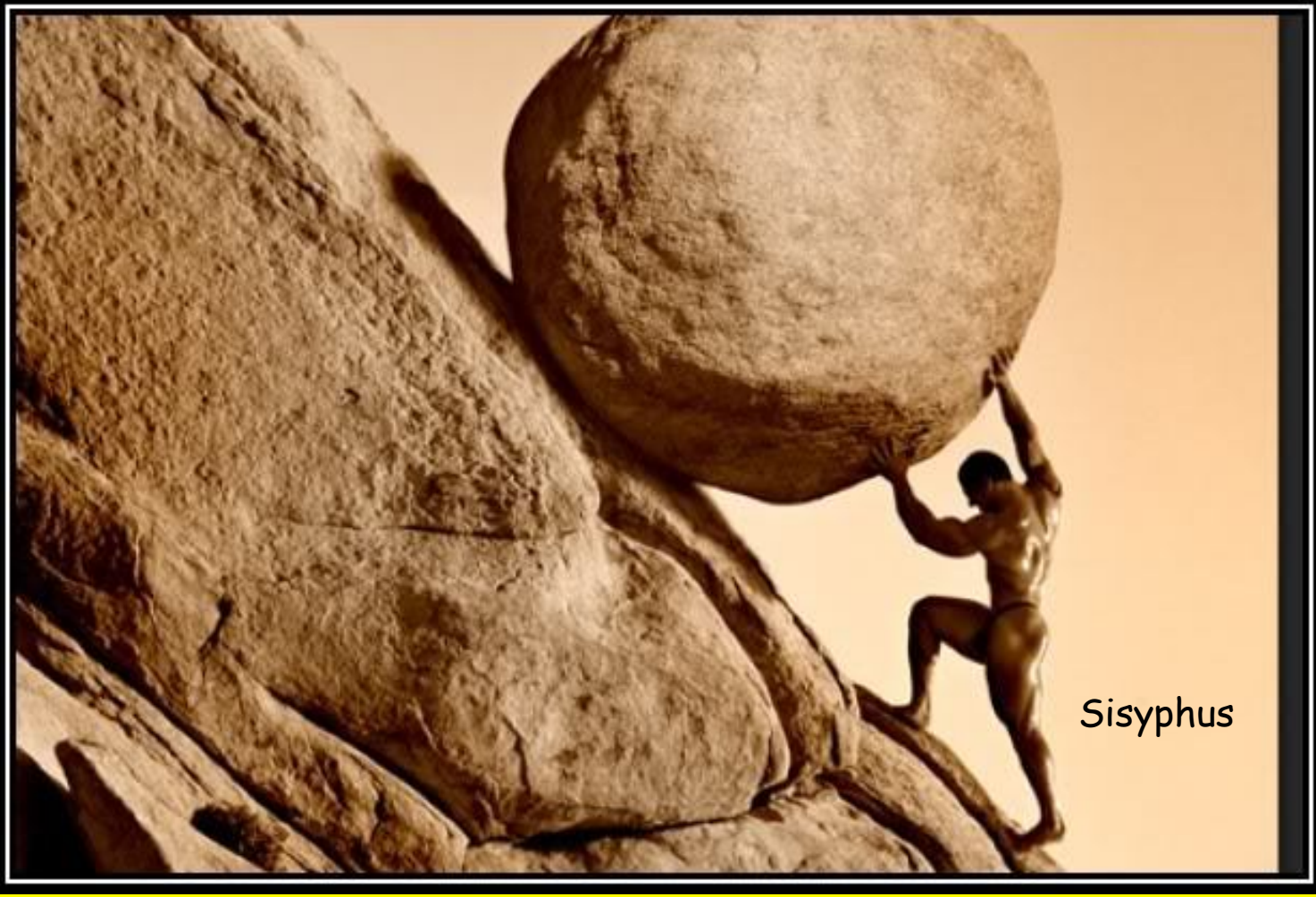
Mow frequently during flowering period

Continue to hand weed regularly

Can hand weeding work after herbicide treatments?

1984:
Before herbicide treatments

2013:
Thirty years of hand weeding after initial herbicide treatments



Myth # 3 – Lawns REQUIRE a lot of maintenance.

FALSE!

20 hours per week total
Lawns – 1 hour per week
Other landscape - 19 hours/week

Lawns are the lowest maintenance areas of a yard!

Myth # 4

Lawns are bad for the environment so you should remove them.

FALSE!

- Prevents nutrient runoff.
- Lawns filter nutrients from storm water.
- Improve air quality.
- Prevent soil erosion.
- Cool the area around your house.
- Store carbon.
- Greatly reduce dust.

But, if you want to remove your lawn and grow food or plant perennials, GREAT!

What about environmental impact of lawn and garden fertilizers?

Possible problems:

1. N & P runoff into storm sewers
2. N leaching into groundwater
3. Direct application into streets

Nitrogen Pollution Sources

- Atmospheric Deposition 48.7%
- Agriculture 39.2%
- Urban Storm Water Runoff 8.4%
- Septic Systems 3.4%
- Golf Courses and Lawns 0.3%

From: Penn State Agriculture, summer 1999

www.aginfo.psu.edu/PSA/s99/contents.html

Nutrients in Atmosphere: Nitrogen 78%, Oxygen 21%, Argon 1%, CO^2 0.0039%

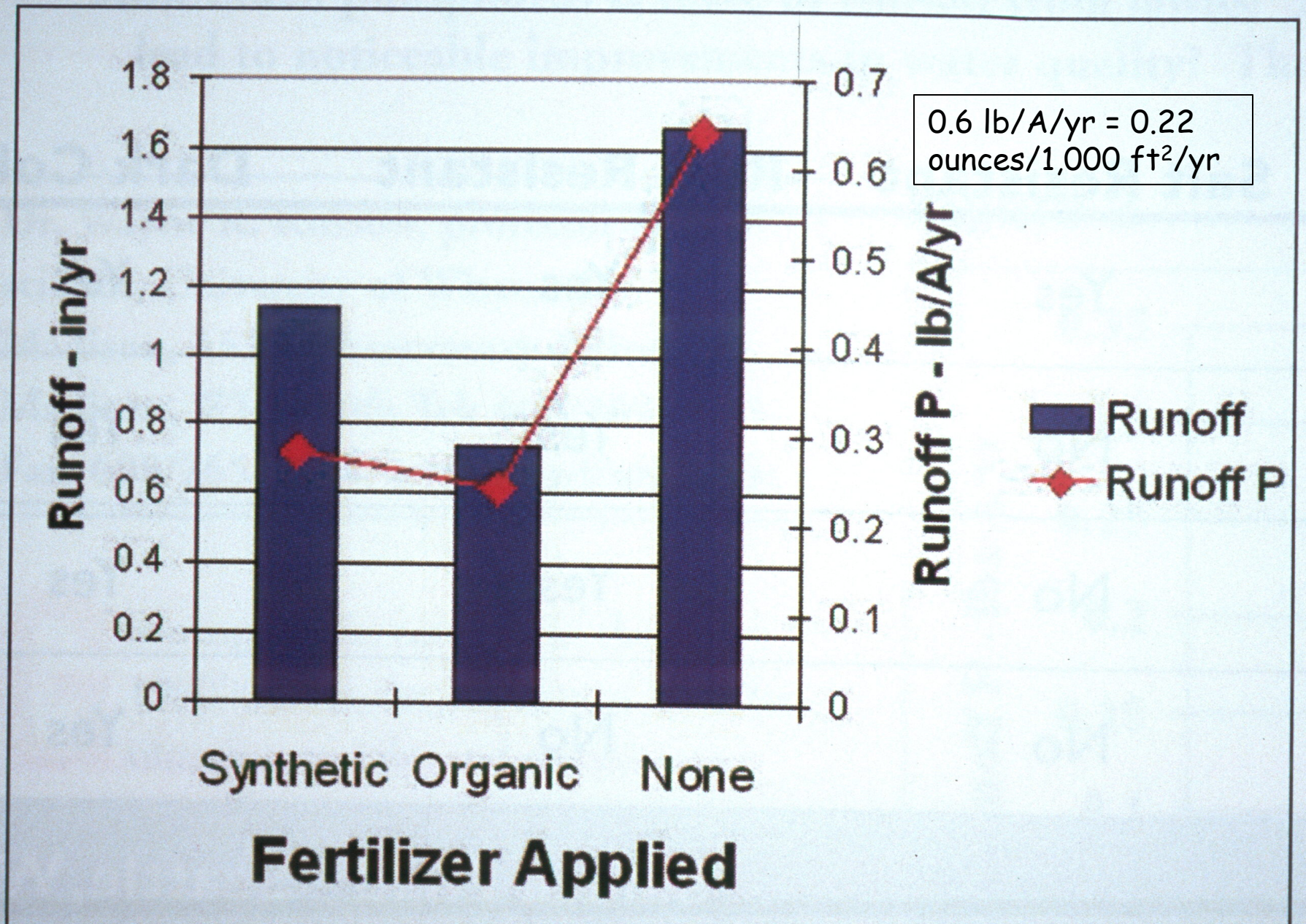
Phosphorus Pollution Sources

• Agriculture	68.8%
• Septic Systems	13.1%
• Urban Storm Water Runoff	10.8%
• Atmospheric Deposition	7.1%
• Golf Courses and Lawns	0.2%

From: Penn State Agriculture, summer 1999

www.aginfo.psu.edu/PSA/s99/contents.html

Figure 3


1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Runoff - in/yr
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Runoff P - lb/A/yr
0.6 lb/A/yr = 0.22 ounces/1,000 ft²/yr
Runoff
Runoff P
Synthetic
Organic
None
Fertilizer Applied

Where is Phosphorus Runoff coming from?

Dr. Wayne Kusow
University of Wisconsin-Madison
In: Turfgrass Producers Int'l "Turf News", March-April 2003 pg. 48-56

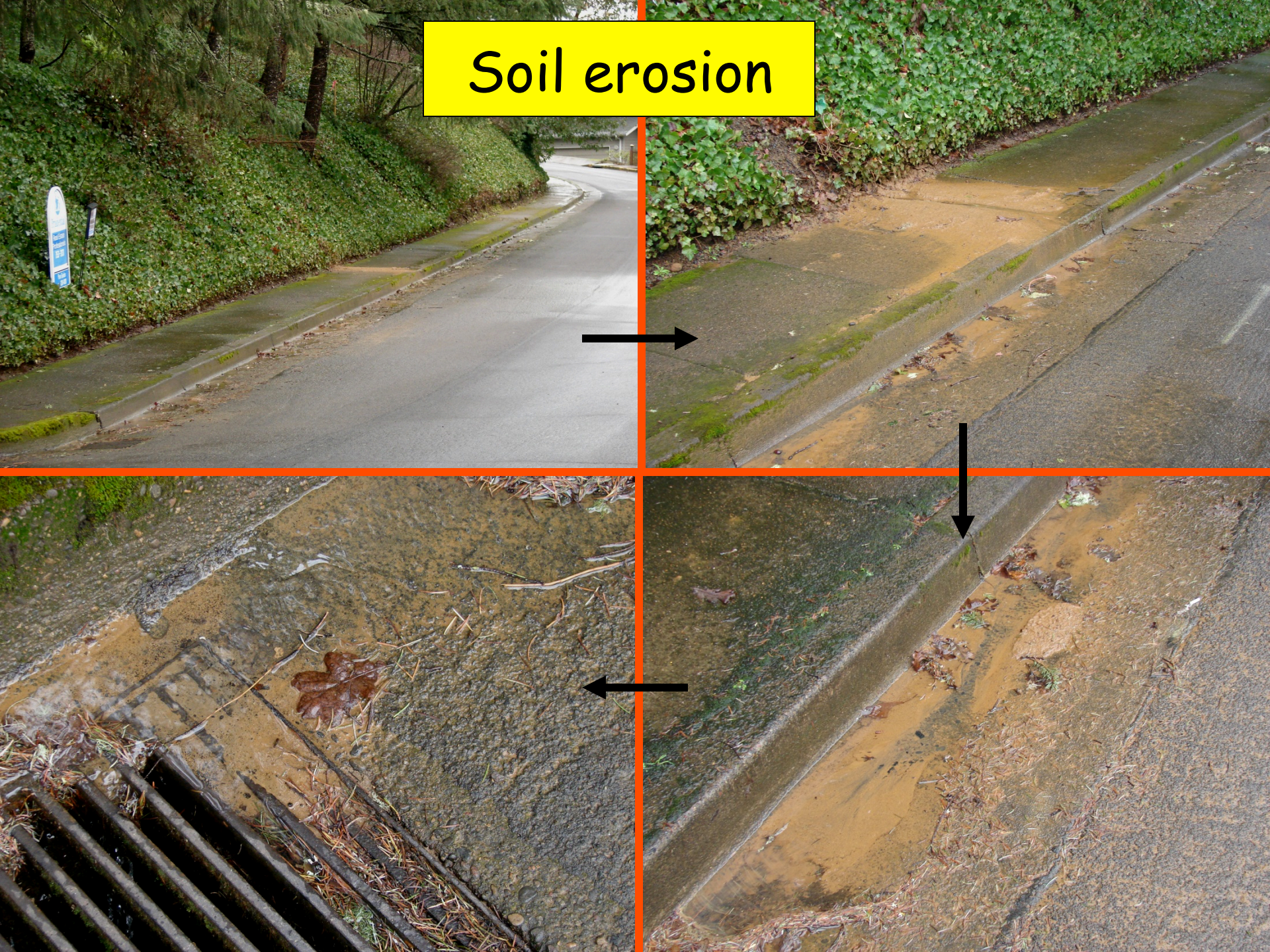
Quote:

"Phosphorus coming from vegetation in the landscape represents a level below which further reductions are not practical"


Other pollution sources
Garden debris


Fruit tree debris

Soil erosion




OM % P4 K Mg Ca pH CEC
1.6 12 99 570 1788 5.9 17.2
Corvallis, OR
Climax Lawn Bentgrass
Gray Clay

Comparing un-amended lawn soil vs. imported amended shrub bed soil in Corvallis, OR

Corvallis	OM %	P_1	K	Mg	Ca	pH	CEC
Lawn	1.6	12	99	570	1788	5.9	17.2
Shrub Bed	20.0	102	802	430	2392	6.5	19.1

Are nutrients leaching from this vegetation and soil?

What is more likely to leach nutrients - bare landscape soil amended with mulch every spring or a lawn?

To Minimize Pollution from Landscapes:

1. Keep fertilizer out of the street
2. Keep clippings out of the street
3. Keep mulch out of the street
4. Keep soil out of the street
5. Keep tree leaves out of the street

Myth # 5

- If I can’t find a plant that works in that spot, plant a lawn.

Why were lawns planted here?

Why were lawns planted here?

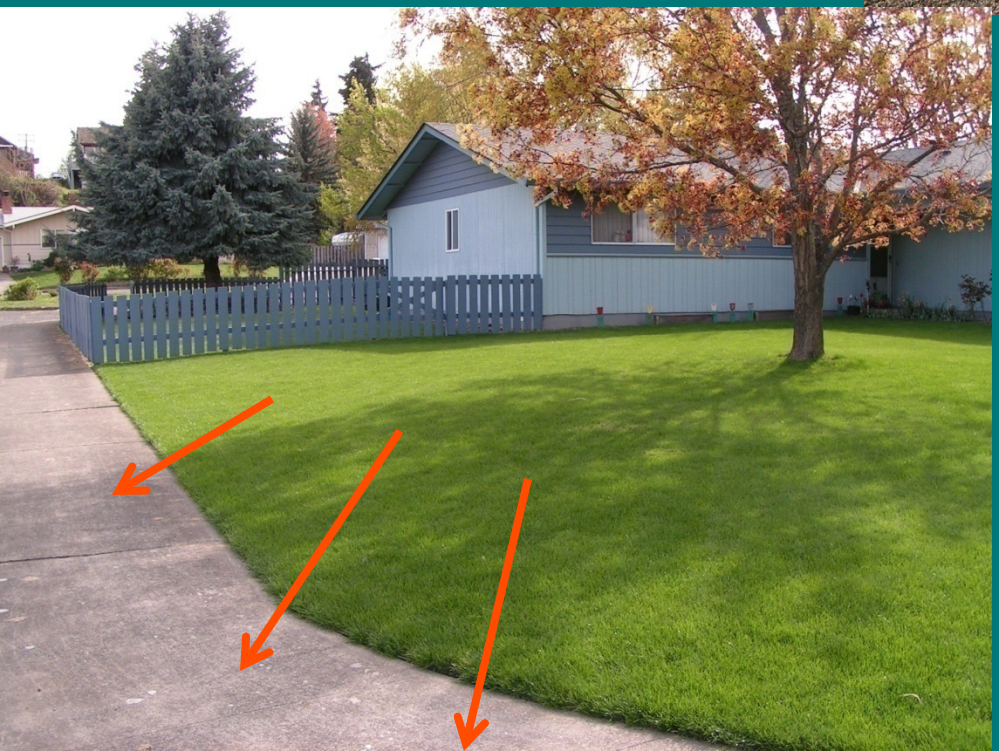
Why were lawns planted here?

Lawn design principle # 1:

"Lawns should be part of the overall design"

Design principle # 2

"Place lawns inside bed areas when feasible"



Lawns bordering sidewalks lead to maximum runoff and overthrow into streets

Intelligent design avoids non-target fertilizer pollution


This lawn makes sense

"Don't use lawns
as space fillers"

Parking strips don't have to be grass

Mowable Groundcovers

- *Cotoneaster dammeri*
- *Euonymous fortunei*
- *Juniperus conferta*
- *Juniperus horizontalis*
- *Vinca minor*

Worst use of grass?

How do you maintain it?

Myth # 6

Lawns use a lot of water

Recent irrigation research

Sydney, Australia: May 2006
Case studies of 50 landscapes
Lawn & garden areas

Two thirds of irrigation water was applied to gardens, one third to lawns

Corvallis irrigation habits

Unirrigated Lawns – Loss of Benefits?

- Prevents nutrient runoff
- Lawns filter nutrients from storm water
- Improves air quality
- Cool the area around your house
- Prevents soil erosion
- Stores carbon
- Greatly reduces dust

Recent irrigation research

North Carolina:

In ground systems used twice as much water as hose and sprinkler irrigation.

Irrigating lawns

" Automated in ground systems may be the worst thing that ever happened to lawn irrigation"

Tom Cook, Professor Emeritus
OSU Horticulture

Basic Irrigation Questions

1. How much water is needed?

2. How often should it be applied?
   > Daily or weekly?

Water required for turf *
Corvallis, OR

	ET/mo.	ET/ wk.	Ave Rainfall
May	3.04”	0.76”	2.0”
June	3.91”	0.98”	1.3”
July	5.46”	1.37”	0.4”
Totals	20.49”	1.03”	
Aug	4.77”	1.19”	0.5”

*Based on evaporation correlations

How often?

- Hose and sprinkler:
  - Once or twice per week
- In ground system:
  - More than once per week
  - Less than seven times per week

2 Basic Concepts

- Turf will take as much water as you give it.

- Declining soil moisture levels will progressively lower the water use rate by up to 80% *(Beard 2004)*

Practical Ideas to Reduce Water Use

- Increase the number of days between watering
- Wait as long as you can before turning on the system in the spring
- Quit irrigating on Labor Day

Practical Ideas to Reduce Water Use

- Core in April to increase rooting.
- Manage organic layer by dethatching.
- Adequate Nitrogen – healthy turf is more drought resistant.

Myth # 7

Planting Tall Fescue (or fine fescue) will save water


FALSE!
People turn the water on!

Tall Fescue - 1 year after planting

Myth # 8

“Mow your lawn at 3 – 4”.

FALSE – not in the PNW!

Bentgrass appearance mowed at 2.5”

Bentgrass mowed vs. unmowed

False Crowns

Note stem elongation

Functional mowing heights

Prostrate growing grasses

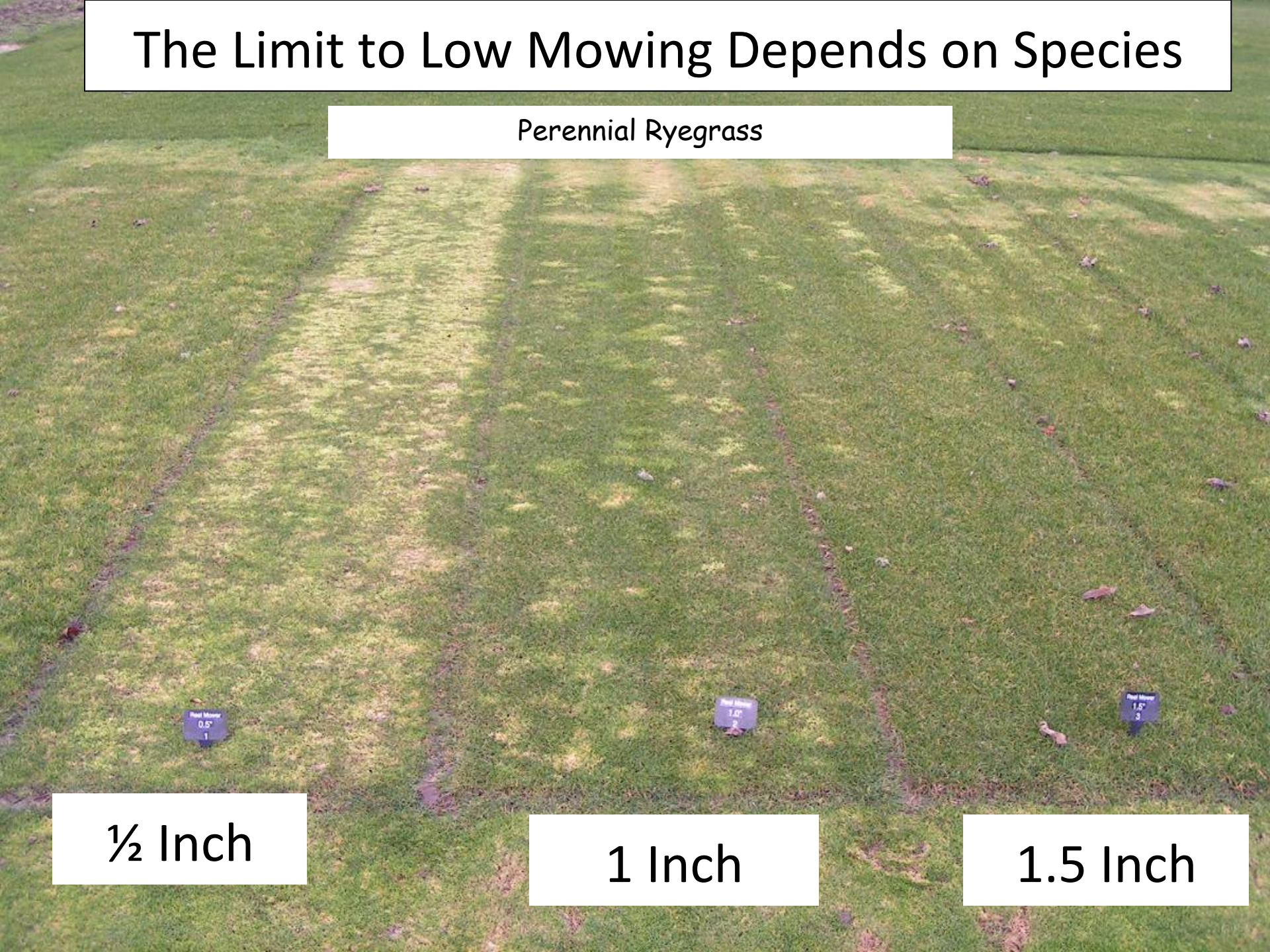
Dryland bentgrass	.75" – 1.5"
Colonial bentgrass	1.0" – 1.5"
Rough bluegrass	1.0" – 2.0"
Annual bluegrass	1.0" – 2.0"
Climax lawns	.75" – 1.5"

Functional mowing heights

Erect growing grasses

Fine fescues	1.5" – 2.5"
Per. ryegrass	1.5" – 2.5"
Ky. bluegrass	1.5" – 2.5"
Tall fescue	2.0" – 3.0"

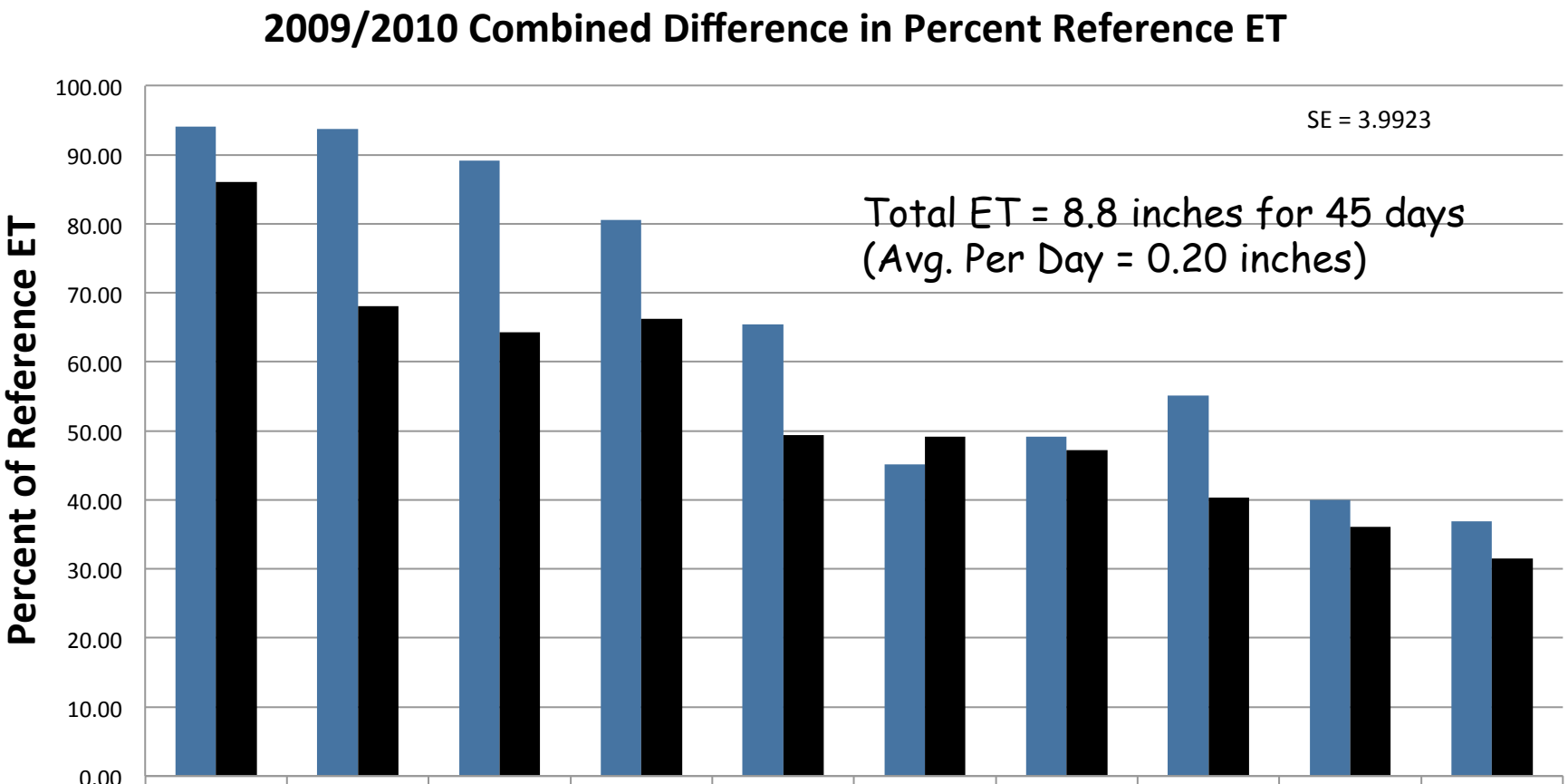
The Limit to Low Mowing Depends on Species



The Big Contradiction – Mow High or Low?

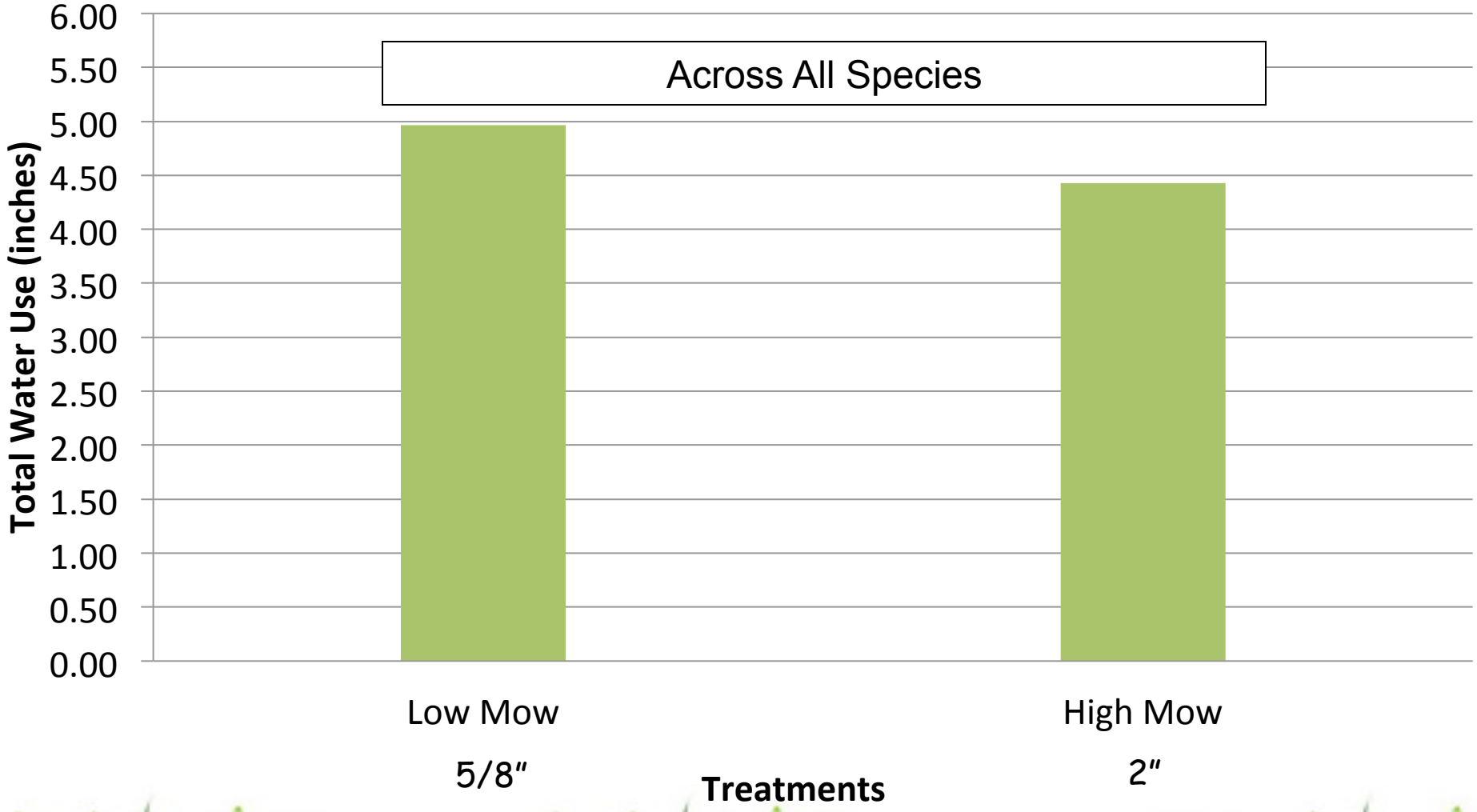
Longer roots give you a bigger gas tank – go more days between waterings

SUMMARY



	Annual Bluegrass	Strong CRF	Slender CRF	Chewings Fescue	Colonial Bentgrass	Velvet Bentgrass	Kentucky Bluegrass	Creeping Bentgrass	Perennial Ryegrass	Tall Fescue
Low Mow	94.04	93.74	89.16	80.52	65.45	45.19	49.17	55.13	40.05	36.91
High Mow	86.05	68.02	64.29	66.27	49.45	49.21	47.24	40.32	36.04	31.48

Total Water Use – 45 Days 2009 & 2010



Water Use – % ET (2009 & 2010)

	2.0” Height	5/8” Height
• Tall Fescue	32 %	37 %
• Perennial Ryegrass	36	40
• Creeping Bentgrass	40	55
• Kentucky Bluegrass	47	49
• Velvet Bentgrass	49	45
• Colonial Bentgrass	49	65
• Fine Fescues	64 – 68	81-93
• Annual Bluegrass	86	94

Trial Considerations

- Newly seeded in spring may have given species which establish quicker an edge (i.e. larger root system)?

- Choosing 0.3 inches per irrigation may have over estimated annual bluegrass water use.

- Does not address stand changes over time (e.g. climax lawns & fine fescues)

Myth # 9

All lawns have to be weed free show lawns.

FALSE! – Choose the lawn you want.

Alternative lawns:

aren't always green
aren't always pure
aren't always grass
are site appropriate

Ecolawns


Conventional grass lawn
Ecolawn
Three weeks without irrigation

3 Keys to IPM

- Mow consistently
- A little fertilizer can do wonders
- Irrigate based on your goals

- But keep in mind -

  "No water in the summer will result in weeds"

Myth # 10

The most important thing is to plant the correct grass.

Pacific Coastal Region Lawn Ecology

" All lawns transition from planted grasses to situation specific climax vegetation"

Tom Cook, Professor Emeritus, Oregon State University

The Pacific Coastal Region:

Hot dry summers/Mild wet winters/Moderate-low humidity
Lawns are brown in summer without irrigation and have a long growing season with irrigation.

Planted grasses: Perennial ryegrass (bunch grass)
Fine fescues (rhizomatous)
Tall fescue (bunch grass)

Insects: Crane fly, Billbugs, Cutworms

Lawn Diseases: Red thread, Net blotch
Microdochium patch
Rust & leaf spot

Weeds: False dandelion, Common dandelion, Clovers, Mousear chickweed, Blackmedic, moss, others.

Pacific Coastal Region Climax Species

- *Agrostis* sp. (Bentgrasses)
- *Poa trivialis* (Rough Bluegrass)
- *Poa annua* (Annual Bluegrass)
- *Holcus lanatus* (Velvetgrass)
- Vulpia myuros (Rat's-tail Fescue)
- Planted grasses
- Various moss species
- Numerous dicot species (i.e. weeds)

Pacific Coastal Lawn Ecology Rule # 1

- Plants that grow well fall through spring (or at least maintain density) will eventually dominate the stand.

"Competition occurs in the 9 cool months"

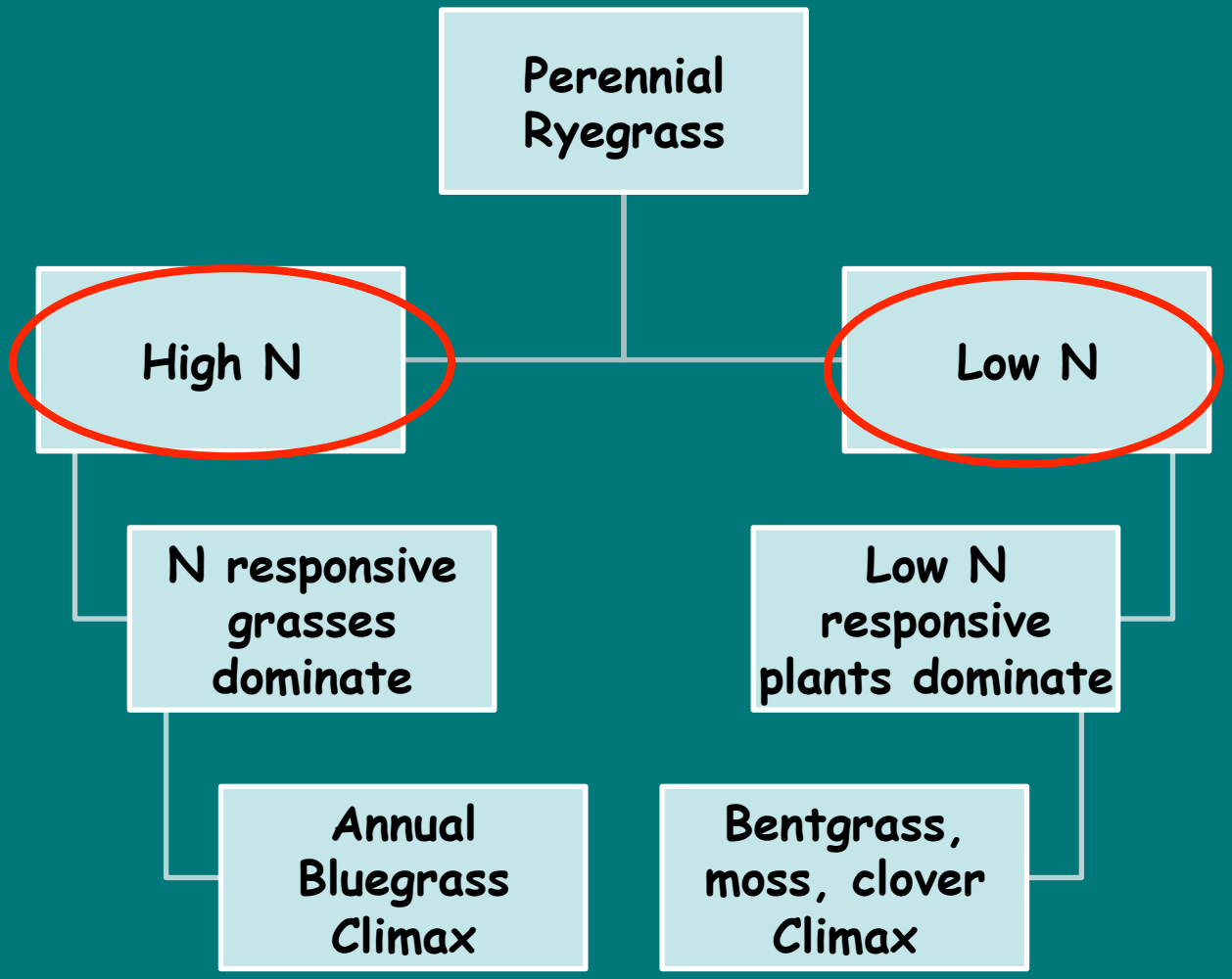
Pacific Coastal Region Succession Rule # 2

"Maintenance intensity determines the succession endpoint"

Primary factors include:

1. Nitrogen fertility,
2. Irrigation intensity, and
3. Herbicides.

Effects of Nitrogen on Grass Species



Effects of Drought on Grass Species

Perennial Ryegrass

Stand thins as ryegrass goes dormant. Some plants die.

Ryegrass stand thins to clumps.

Invading grasses:
Dryland bent
Velvetgrass
Rat's Tail fescue

Drought tolerant dicots invade.

Weeds germinate in fall.

Invading dicots:
Clover
False dandelion
Common yarrow
Mousear chickweed

Qualities of Climax Lawns in the Pacific Coastal Region

- Looks better at lower mowing heights
- Color is generally lighter green
- Generally require less fertilizer
- Most have limited drought resistance
- All form long lived soil seed bank
- Generally strong winter competitors


Climax lawn in Portland, OR
Bentgrass/*Poa* annua/Poa trivialis/ *Veronica* climax
T Cook photo


Typical Poa annua golf course in Portland, OR Seattle, WA
Long term consistent care will inevitably result in golf courses dominated by annual bluegrass.
T Cook photo

IPM in Turf – The Real Story

A lawn provides many benefits, but the key is how <u>you</u> maintain it.

Final Thoughts

Thanks to Tom Cook for providing slides.