NATURAL LAWN CARE: A BEST PRACTICE FOR WATERSHEDS

Presented by Steve Pincuspy

Illinois Lakes Management Association
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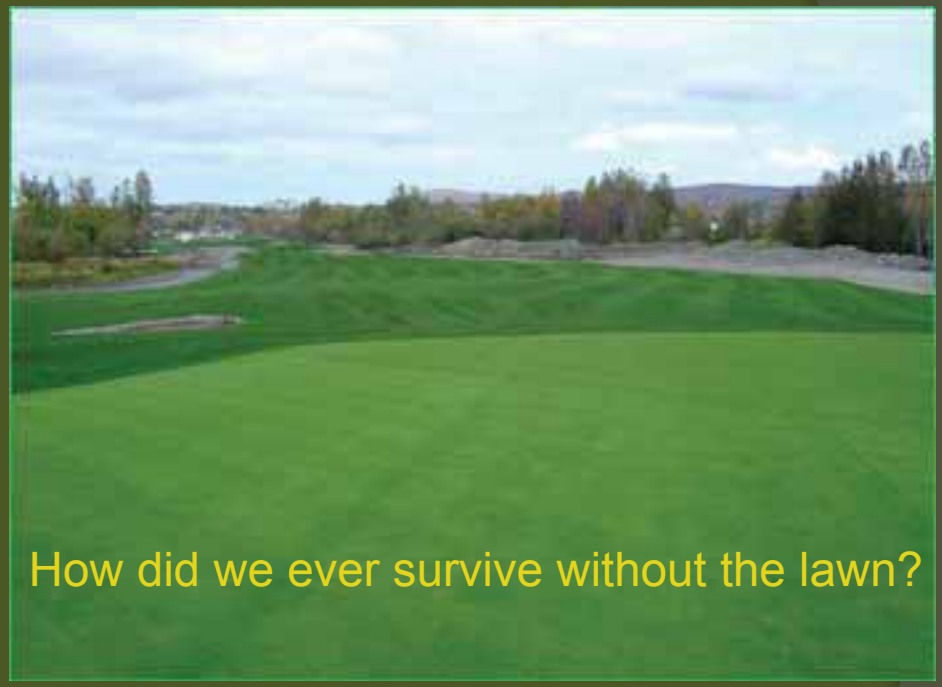
Lawns in Urban Landscapes

- Turf grass is everywhere
  - 63,000 square miles
  - ≈ 25% of land cover in urban areas
- Green Carpet Syndrome
  - Ubiquitous - lawn in untenable places
  - Uniform – maintain at all costs



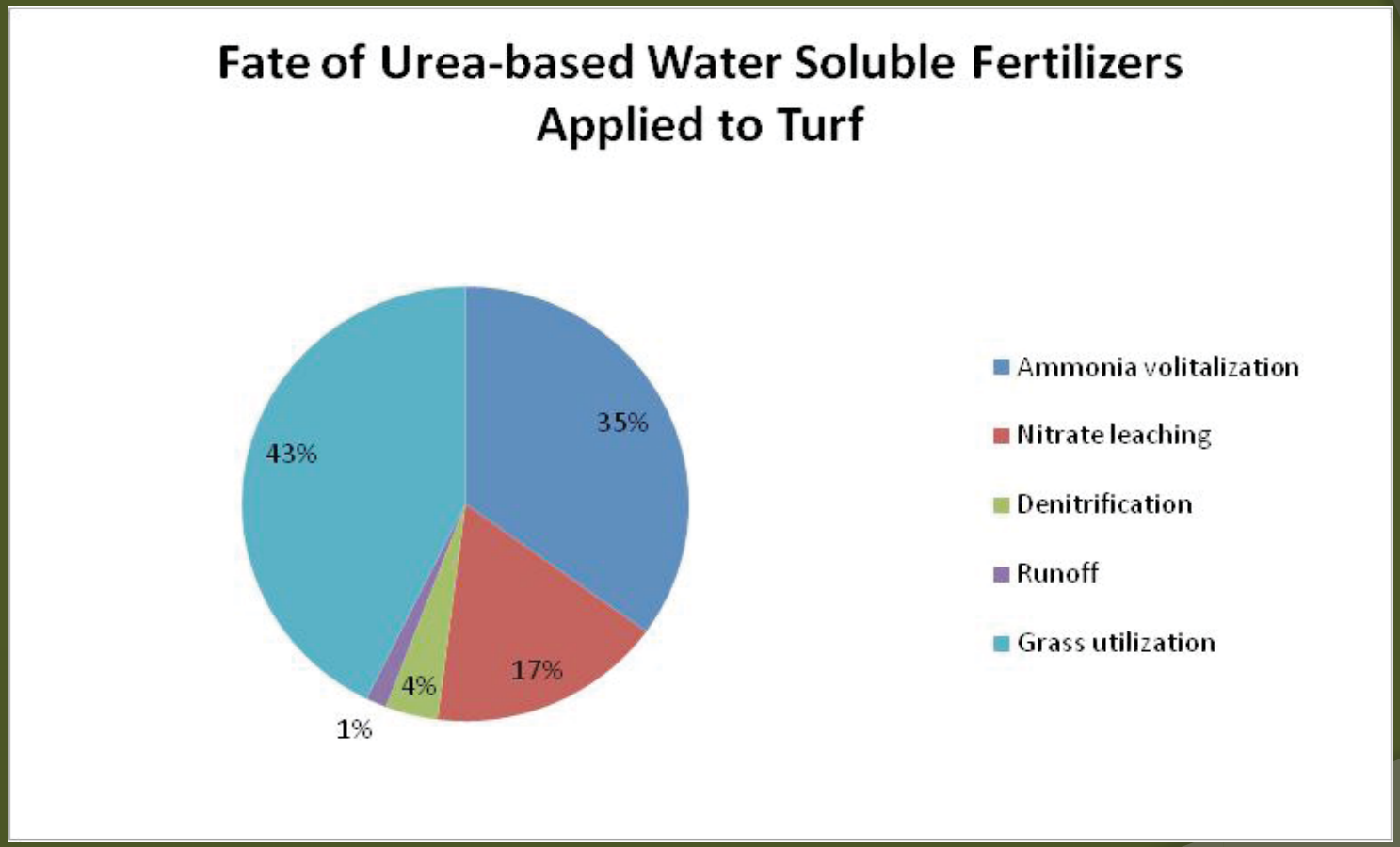
How did we ever survive without the lawn?

Lawns influence our lives in ways we don't consider

Conventional Lawns: Inputs

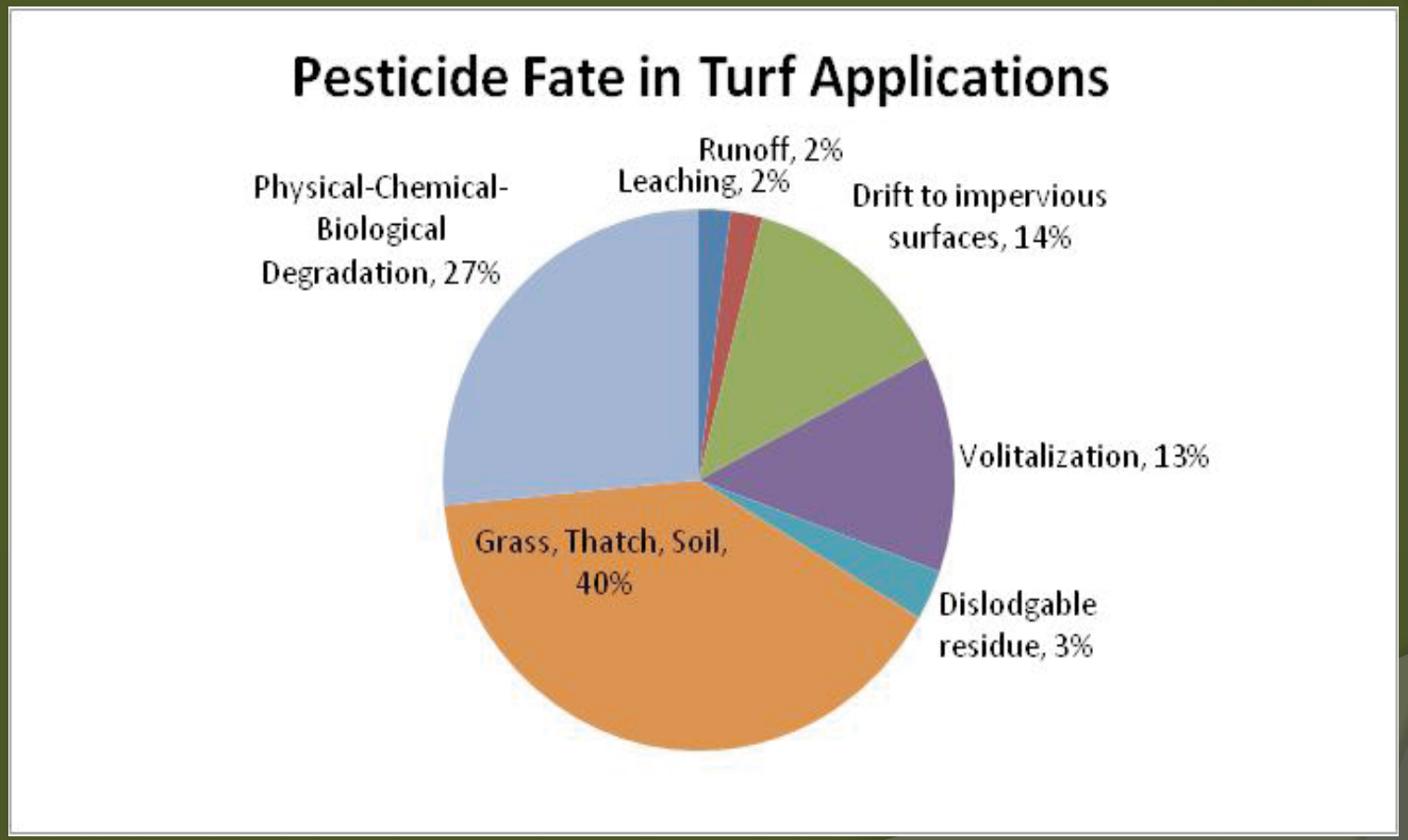
- **Water**
  - Typical suburban lawn uses10,000 gallons of irrigation water per year
  - Residential lawns consume 2.5 billion gallons per year
- **Fossil fuel**
  - A one-third acre lawn consumes 18 gallons of fossil fuel per year
- **Fertilizer**
  - 70 % of U.S. homeowners regularly fertilize their lawn
  - 3 million *tons* per year applied to residential lawns
- **Pesticides**
  - 67 million lbs of synthetic pesticides on residential lawns each year
  - Homeowners use 3 times more pesticide per acre than farmers

Less than 50% of soluble fertilizers make it to the grass.



Fertilization is inherently inefficient process

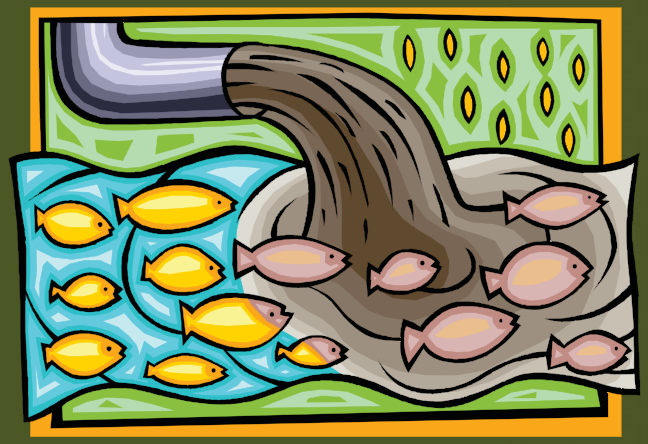
Only 40% of applied pesticides make it to the turf within 7 days of application



If conventional lawn care is inefficient, what happens to the inputs?

Water Impacts

- Quality
  - MN
    - 25% to 90% of storm water samples found four lawn pesticides
    - range 0.7 to 6.8 µg/l
  - Nationwide
    - 100% of surface waters, 33% GW have pesticides
    - Average nitrate in residential stormwater- 0.6 mg/l
    - Average TP in residential stormwater - 0.30 mg/l



- Ann Arbor Study
  - Ordinance restricting phosphorous on lawns
  - One year later
    - 28% reduction in TP
    - 13% reduction in DP
  - Results not universal

Air Impacts

Pollution

- Lawnmower emissions in 1 hour = car driven between 20 to 100 miles.
- VOC's - structural/landscape pesticides add 226 lbs/day
- Pesticides drift & evaporate
  - Increases inhalation, ingestion and tracking
  - Lawn /garden pesticide can persist indoors for up to one year post-application

Climate Change…

- 580 millions gallons of gasoline used in lawnmow
- Synthetic fertilizers and pesticides are manufactured using fossil fuels – additional environmental burden

Lawns: A Sea of ‘Not-So’ Green

UCI IRVINE TODAY

Urban 'green' spaces may contribute to global warming, UCI study finds

Turfgrass management creates more greenhouse gas than plants remove from atmosphere

— Irvine, Calif., January 19, 2010 —

Dispelling the notion that urban "green" spaces help counteract greenhouse gas emissions, new research has found – in Southern California at least – that total emissions would be lower if lawns did not exist.

Turfgrass lawns help remove carbon dioxide from the atmosphere through photosynthesis and store it as organic carbon in soil, making them important "carbon sinks." However, greenhouse gas emissions from fertilizer production, mowing, leaf blowing and other lawn management practices are four times greater than the amount of carbon stored by ornamental grass in parks, a UC Irvine study shows. These emissions include nitrous oxide released from soil after fertilization. Nitrous oxide is a greenhouse gas that's 300 times more powerful than carbon dioxide, the Earth's most problematic climate warmer.

"Lawns look great – they're nice and green and healthy, and they're photosynthesizing a lot of organic carbon. But the carbon-storing benefits of lawns are counteracted by fuel consumption," said Amy

Amy Townsend-Small, Earth system science postdoctoral researcher, found that management of urban "green"

The Gainesville Sun

Gainesville.com

Nutrient levels high in bodies of water at UF

By Thomas Stewart
Correspondent

Published Saturday, January 30, 2010 at 7:11 p.m.

For many, Lake Alice is one of the more scenic spots on the University of Florida campus, with students studying, picnicking and eyeing alligators in its waters or on its shores. Some people have even been known to sprinkle their loved ones' ashes in the lake.

But the lake is one of many water bodies on campus that would be considered impaired under new limits on nutrients proposed earlier this month by the U.S. Environmental Protection Agency. Nutrients such as nitrogen and phosphorous can cause algal blooms that can be deadly for fish and hazardous to humans.

In fact, not a single water body on campus that has been monitored regularly over the past few years would meet the proposed limits, according to a review of campus water quality records. Some nutrient levels are more than 20 times the proposed limits.

The most likely culprit, said Mark Clark, the UF professor in charge of monitoring, is fertilizer used by the University Athletic Association.

The UAA uses fertilizer on a number of fields on campus, including Florida Field, the football practice fields and the baseball diamond, to keep them green and safe for play.

The problem is that runoff from the fields is spreading the fertilizer across campus, causing conditions that are ripe for algal blooms. One such bloom began in Lake Alice b

Erica Brough/ The Gainesville Sun
Health Science major Brad Moore r
on the bank of Lake Alice at the Uni
of Florida, Friday, January 29, 201
Gainesville, Fla. "It's very peaceful
breezy here," Moore said.

Health Effects – Pesticides (acute)

- Accidental Poisoning
- Asthma
- Neurological Damage

- Cancer
- Immune System Damage

Health Effects – Pesticides (chronic)

30 Most Common Lawn Pesticides

Probable/Possible Carcinogens	13
Birth Defects	13
Reproductive effects	21
Neurotoxicity	15
Kidney/Liver damage	26
Sensitizer/irritants	27
Potential endocrine disruptors	11

Adapted from Beyond Pesticides' *Health Effects of 30 Commonly Used Lawn Pesticides*

Wildlife Toxicity

Wildlife toxicity of 30 common lawn pesticides	
Birds	16
Fish/Aquatic Organisms	24
Bees	11

The American Society for Prevention of Cruelty to Animals reported over 30,000 pesticide-poisoned pets in a single year. [1]

1. American Association for the Prevention of Cruelty to Animals. 2005. Exposure to human medications No. 1 reason for 95,000 calls to ASPCA Animal Poison Control Center. http://www.aspca.org/site/PageServer?pagename=media_pressreleases.

Chemical Paradox – lawn “care” not “healthy” lawns

- Stunt turf growth
- Inhibit beneficial microbes
  - Recycle nutrients
  - Suppress disease & pests
- Kill beneficial insects
- Harms earthworms- nature’s aerators and fertilizers
  - Increases compaction
  - Compacted lawns contribute up to 40% to runoff volume

3 Things to Consider

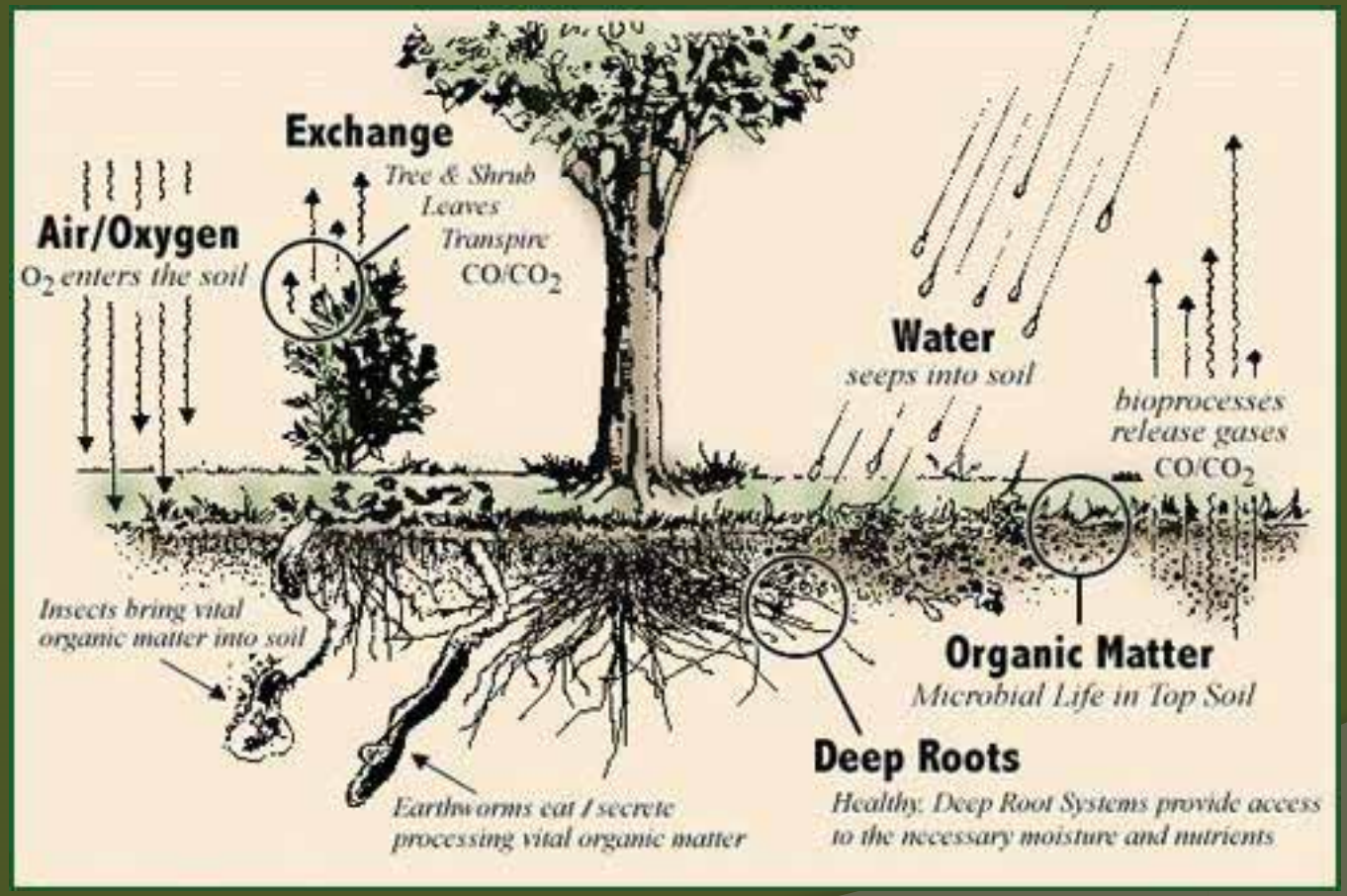
Conventional lawn care is…

1. Inefficient
2. Potentially harmful
3. Unnecessary

There has to be a better way to both have a lawn ***and*** reduce its impacts.

Natural Lawn Care 101

A Systems Approach



Does Natural Lawn Care work?

NLC: First the soil…

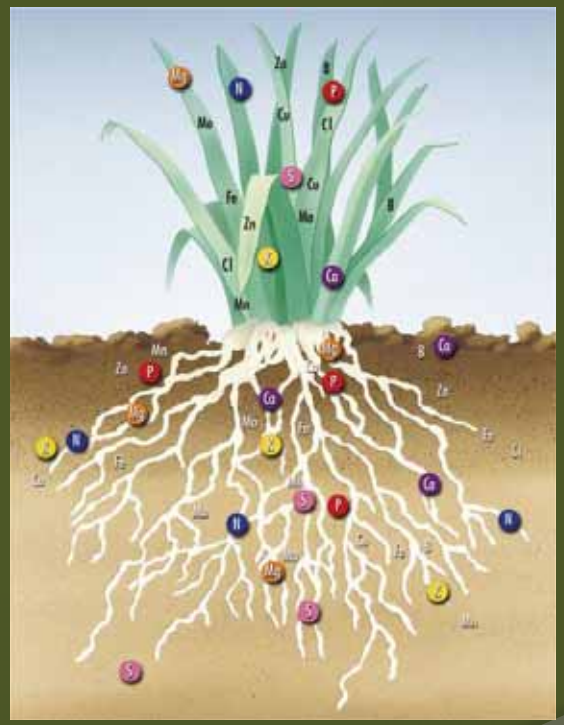
- Biggest component of system is soil
- *Healthy soil = healthy turf*
- Strive to restore soil integrity
  - Organic matter
  - Soil biology
  - Chemistry

...and then the grass.

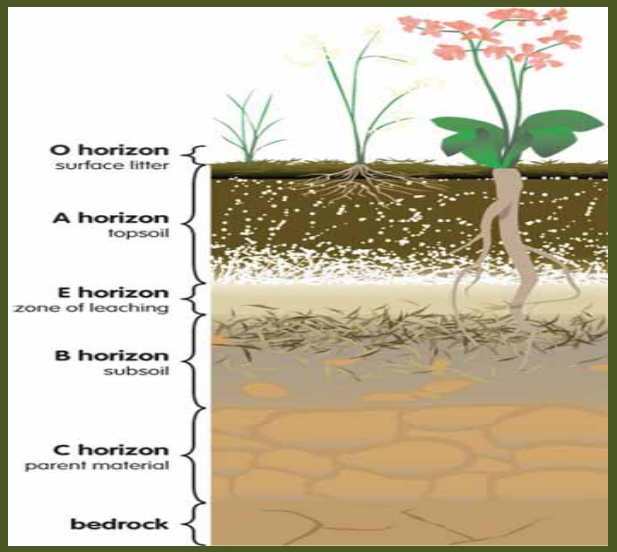
Soil Test First

Soil Chemistry

- pH: Lawns prefer close to neutral
  - 6.3 to 6.8 optimal
- Nutrients
  - Big Three (N-P-K)
  - Ca to Mg ratio (7:1)
  - Micronutrients
- Can effectively “halve” nutrient recommendations under a natural program - $$



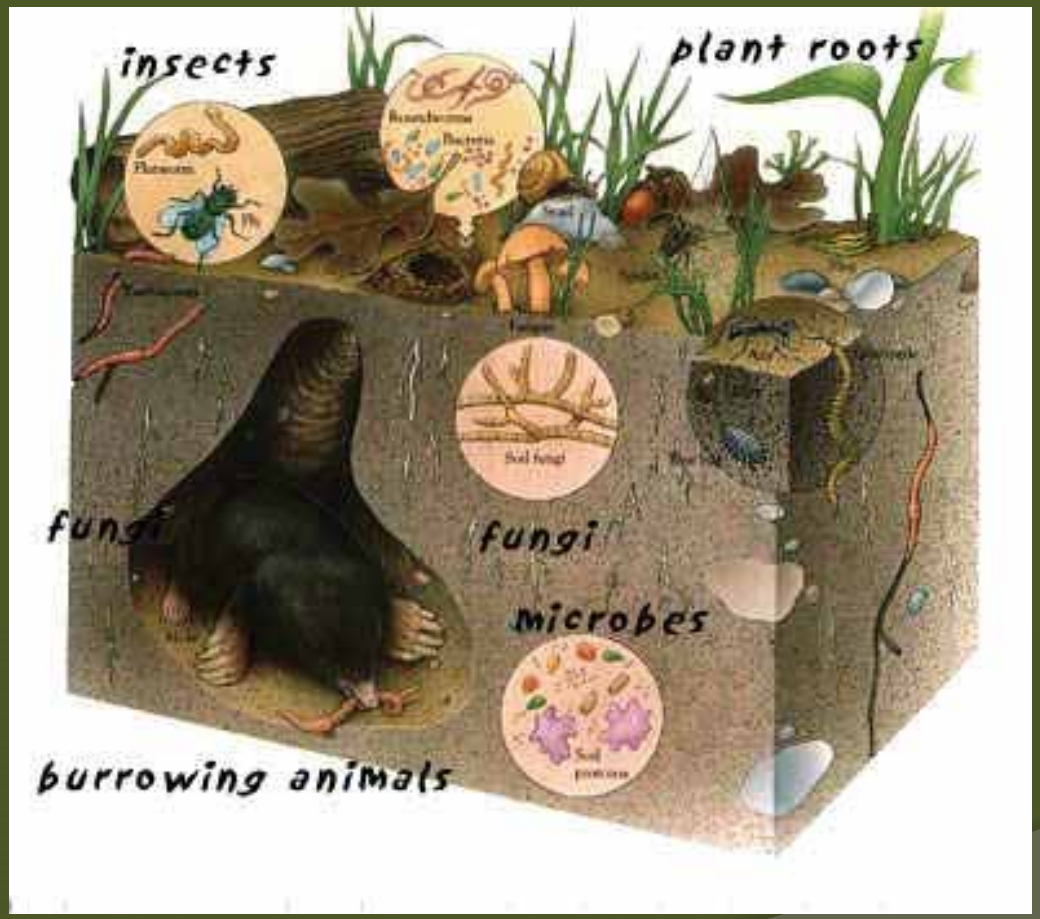
Soil Structure



- Clay – prone to compaction
- Sand – leaches easily

- Organic matter (OM)
  - Renewable resource
    - Plant/animals/insects add OM
    - Microbes recycle OM, feed plant
    - Healthy turf growth
  - Soil conditioner
    - Loosens clay - binds sand
  - Ideally 5% OM or more

Soil Biology



Starting from Scratch

New Lawns

- Good top soil
- Cool season grasses
  - Always match grass to site conditions
  - Fescues (tall and fine) great
  - Perennial ryes establish quickly
  - Kentucky bluegrass = high maintenance
- Sod versus seed
- Low/No Maintenance alternatives

Existing lawns can be renovated…

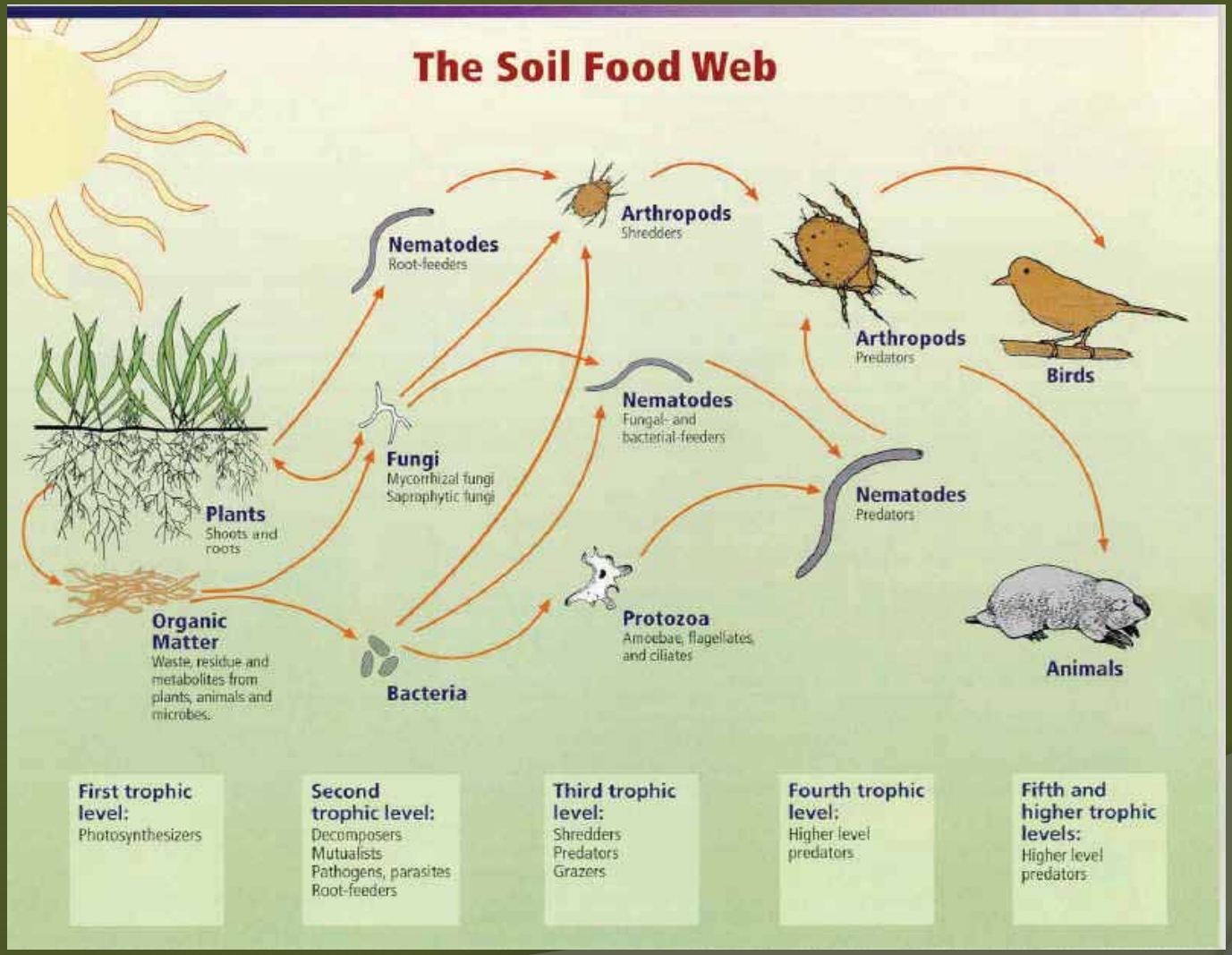
Maintenance

Cultural Practices

Deceptively simple, yet underappreciated:

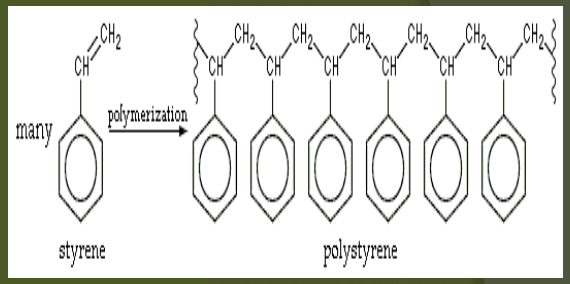
- Water Properly
- Mow Correctly
- Thatch, Aeration and Overseeding

Fertilizers - ‘Feed the Soil’



Confusion: Organic vs Natural

- Organic – anything that contains carbon
  - All plastics are organic
- Natural – plant or animal based organic matter
- Different levels of natural/organic
  - Full natural: no synthetics
  - Bridge products: some synthetic
  - Biosolids: sustainable?
- Application



Styrofoam formula

Wastewater treatment plant

Natural-Based Fertilizers

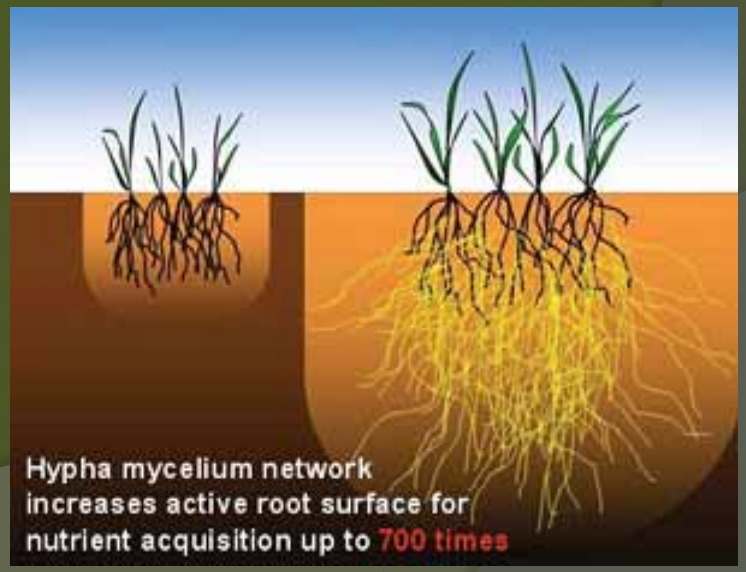
- Advantages
  - Organic N less water soluble – locked into soil profile
  - Restores soil OM – soil organisms convert as needed
  - More product gets to plant – less total N required ($)
  - Less salts – decreased salinization potential
  - Fewer disease outbreaks
  - Consistent feed overtime
  - Slower growing = less mowing ($)
- Drawbacks
  - Slower acting (yet longer lasting)
  - Microbial breakdown essential
  - Cost – appears more expensive upfront

Clippings: Waste or Resource?

- Can reduce total N requirement by 50% or more
  - Fertilizer recommendation: 87 to 174 lbs or N/acre/year
  - One acre clippings = 235 lbs of N/acre/year
  - Implication - mature turf can often go without fertilizer
- No increase in ammonia volatilization
- Less likely to leach/runoff
- Recycled matter/energy – only in presence of microbes

Getting Microbes Back into Soil

1. Compost
   - Nutrients, OM & microbes
   - Improves soils structure & water retention
   - Smooth lawn surface
2. Teas
   - Just the microorganisms
   - Mycorrhizae: the fungal wonder of the turf world



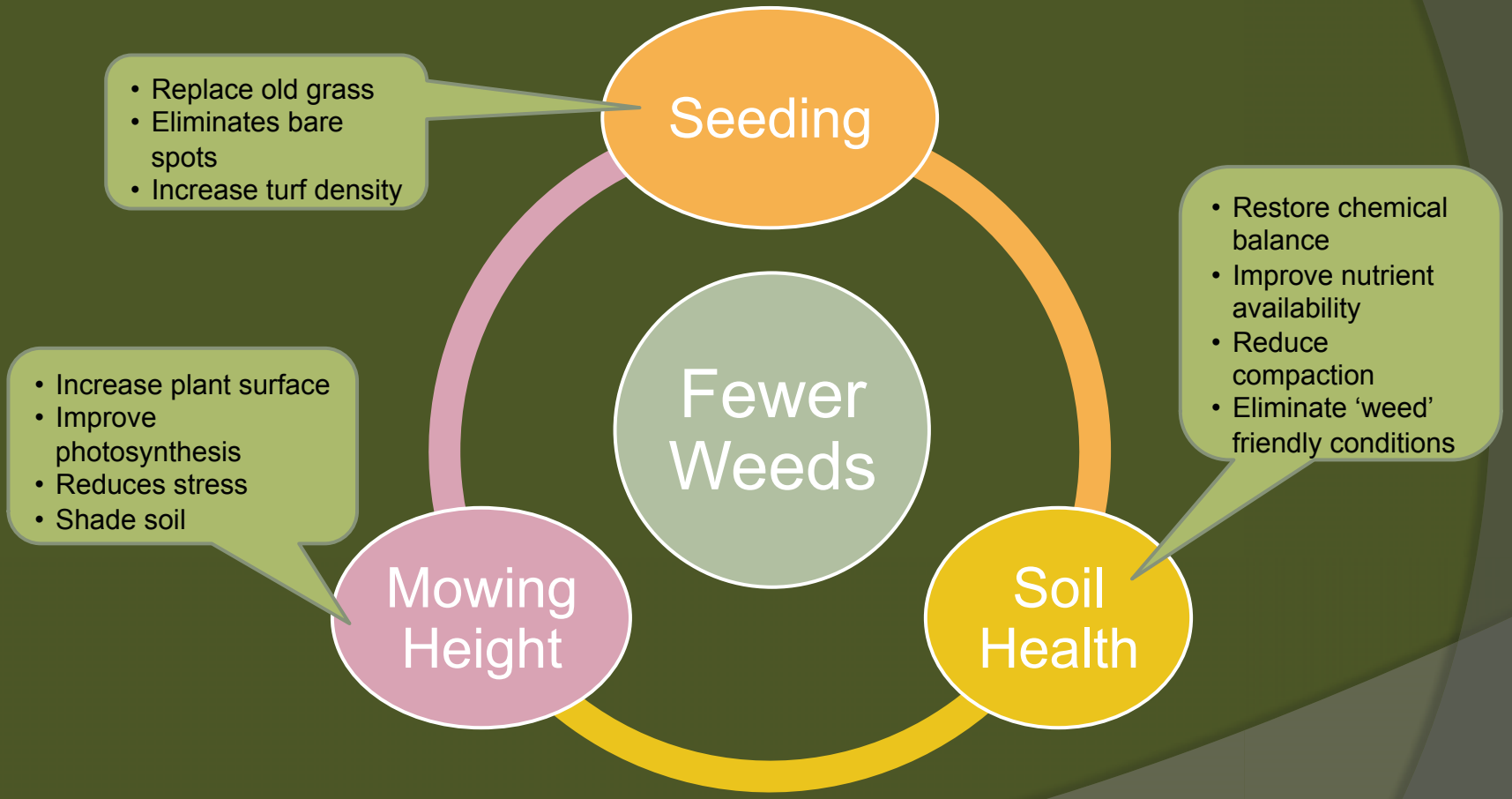
Disease, Pests & Weeds

Dealing with Pests & Disease

- Best offense is a good defense – healthy, dense turf
- Cultural practices limit weeds, pests & disease
- Microbes
  - Endophytes – insect control
  - Nematodes – grub control
- Least-toxic/botanicals
  - Still pesticides…potentially hazardous
  - Often indiscriminate

What is it?

Weed Control = Cultural Practices



What is a weed?

- Historical perspective
  - 60 years ago
  - Today
  - Dandelions

<u>Weeding the natural way</u>

1. Seed inhibitor: Corn Gluten
2. Spot treatment: vinegar sprays
3. Hand weeding (where feasible)

Benefits – Economic Savings

	Year 1	Year 2	Year 3	Year 4	Year 5
Synthetic	$7,745	$8,319	$8,946	$9,631	$10,381
Natural	$5,317	$5,789	$6,310	$6,377	$6,359

Five Year Savings with Natural Program = $14,870 per acre

Benefits – Environmental & Social

- Reduced synthetic fertilizer, pesticides, irrigation, fossil fuel use

Seattle Study – Environmental Value	Annual Benefit
Reduced soluble products	$16 - $21
Less fossil fuel for mowing	$8
Irrigation savings	$42
Lower hazardous waste disposal costs	$5 - $6
Decrease in storm water detention & diversion capacity (one time)	$31

- Growing public demand for sustainability

Your choice….

…natural or conventional?

More resources

- Safer Pest Control Project – fact sheets, articles, videos
  - www.spcpweb.org
- Grow Smart, Grow Healthy
  - Consumer guide to least hazardous pesticides and fertilizers, overview of NLC
  - http://bit.ly/dyqHp3
- Recommended reading

  The Organic Lawn Care Manual – by Paul Tukey

THANK YOU

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