NATURAL LAWN CARE: A BEST PRACTICE FOR WATERSHEDS

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Illinois Lakes Management Association Annual Conference
March 3, 2010

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

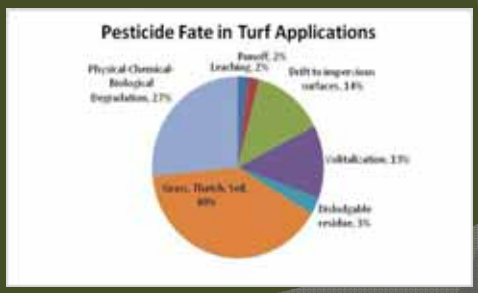
Conventional Lawns: Inputs

- **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 lawnmowers
- Synthetic fertilizers and pesticides are manufactured using fossil fuels – additional environmental burden

Lawns: A Sea of 'Not-So' Green

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?

What do you think?

NLC: First the soil…

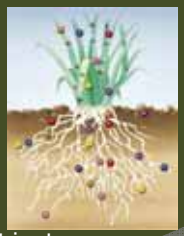
- Biggest component of system is soil
- *Healthy soil = healthy turf*
- Strive to restore soil integrity
  - Organic matter
  - Soil biology
  - Chemistry

...and then the grass.

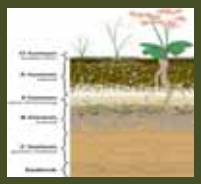
Soil Test First

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



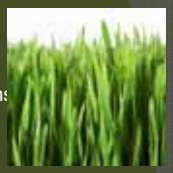
- Organic matter (OM)
  - Renewable resource
    - Plant/animals/insects add OM
    - Microbes recycle OM, feed plant
    - Healthy turf growth
  - Soil conditioner
    - Loosens clay - binds sand
  - Ideally 5% OM or more
- Clay – prone to compaction
- Sand – leaches easily

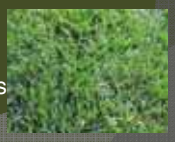
Soil Biology

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…

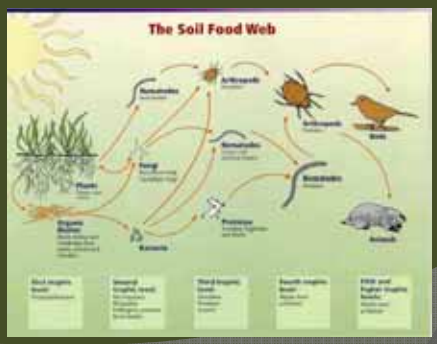
Maintenance

Cultural Practices

Deceptively simple, yet underappreciated:

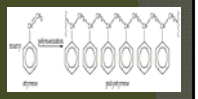
- Water Properly
- Mow Correctly
- Thatch, Aeration and Overseeding

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

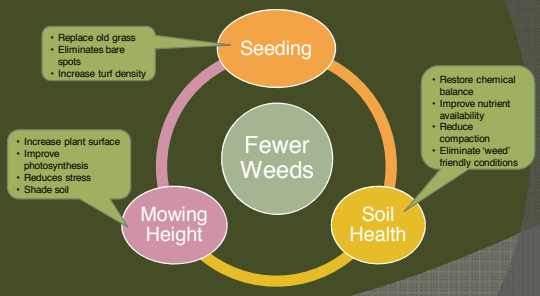
Disease, Pests & Weeds

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



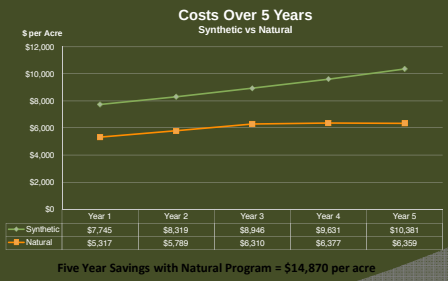
What is a weed?

- 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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