Soil Health, Watersheds & Low-Impact Development

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Conservation... Our Purpose. Our Passion.
A New Look at an Old Practice

• Thomas Jefferson used turnips, buckwheat and vetch for cover crops at Monticello in 1794.

• “…indeed I think it important to separate my exhausting crops by alternations of amelioraters (sic).”
  • Letter to John Taylor, December 29, 1794

• Ameliorate – Amend; make better; improve

• Alternative name for Land Improvement.

Coast Redwood (*Sequoia sempervirens*) and Giant Sequoia (*Sequoiadendron giganteum*) trees often produce more biomass on average than any other tree.

- Fairly shallow-rooted trees.
- Moderately deep, sandy, granitic Soils.
- Who is fertilizing these trees?

Soil Health is the continued capacity of the soil to function as a vital living system that sustains plant and animal health.

Soil Health Five Principles:

1. Cover the Soil (Armor)
2. Minimize Disturbance
3. Plant Diversity (4 Species Types/Functional Groups)
4. Keep a Living Root Year Round
5. Livestock Integration
Net Change in Land Cover/Use Between 1982 and 2015
Thousands of Acres

- Cropland: -53,728.2
- CRP Land: 17,914.4
- Pastureland: -9,394.2
- Rangeland: -14,192.6
- Forest Land: 4,987.5
- Other Rural Land: 3,441.1
- Developed Land: 42,982.9
- Water Areas & Federal Land: 7,989.1

USDA-Natural Resources Conservation Service, National Resources Inventory Data
Hindrances to Soil Health in Urban Environments

- **Cover the Soil?**
  - Concrete, Asphalt & Roofs (these cover the soil, but no Infiltration)

- **Minimize Disturbance?**
  - Construction
  - Compaction

- **Plant Diversity?**
  - Nature Loves Diversity
  - Most Home-Owners Association Rules specify a monoculture for lawns

- **Integrate Livestock?**
  - Zoning Laws & HOA Rules

- **Paradigm Shifts**
  - Educating public of what you are trying to accomplish
  - Social dynamic is often the most difficult item to get past
Soil Health, Watersheds & Low-Impact Development

• Catching the water
• Storing the water in the land

• Trees catch more RF
• Cut 1/2-inch taller (Catch more RF)
• Mulching Lawn Mower (Don’t Bag It)
• Mulch & Compost
• Alternatives to Concrete
• Crushed Granite, Gravel, Pavers
VOID FILL
ASTM D448-#8

1/4" JOINTS

2" BEDDING
ASTM D448-#8

4" BASE
ASTM D448-#57

12" SUB-BASE MIN
ASTM D448-#2

CONCRETE CURB

STORMWATER RUN OFF

SUB-GRADE

PERMEABLE PAVEMENT CROSS SECTION

Image courtesy of Pine Hall Brick Company, Inc
Raindrop Splash - Where Erosion Starts

http://www.public.asu.edu/~mschmeec/rainsplash.html
Hydrology 101 - What happens to rainfall when it hits the ground?
The clear water from the No-Till side of the field is transporting less topsoil, nutrients and pesticides.

Milan Experiment Station-Milan, Tennessee
Plant Vigor-Leaves and Roots

Caring for the Green Zone, Riparian Areas and Grazing Management
Alberta Riparian Habitat Management Project, “Cows and Fish Project”

Alberta Riparian Habitat Management: [http://cowsandfish.org/riparian/riparian.html](http://cowsandfish.org/riparian/riparian.html)
Increase in Impervious Surface

Increases Runoff
Reduces Infiltration

What Happens to a 3-inch Rain?

Texas A&M Forest Service
Removal of vegetation along creeks can cause:

- Increased runoff
- Increase Streambank erosion
- Increase floodwater energy (trees and other vegetation help dissipate floodwater energy)

• http://images.search.yahoo.com/
How many of you know the Square Footage of your Yard?

- Lot Size minus House/Driveway/Deck/Patio/Sidewalks
Three Main Plant Nutrients, N-P-K
How much do you use?

- N-P-K is expressed as a percentage of Nitrogen, Phosphorous and Potassium
- Nitrogen (N)
  - Most commonly deficient nutrient
  - Above ground vegetative growth
- Phosphorous (P)
  - Seed germination
  - Disease resistance
  - Root development
  - Plant maturation (flowering, fruiting, seed formation)
- Potassium (K)
  - Root development
  - Photosynthesis (especially root crops and for starch formation)

On lawns, if you do not Soil Test, the general Rule of Thumb is 1 pound of Nitrogen per 1000 square feet. More is NOT always better.

So...How many pounds of this fertilizer (25-10-5) should you use on a 6000 square foot yard?
How much Fertilizer for 6000 square feet?

- **25-10-5** → 25% N → 0.25 lb N per lb Fertilizer
  - Rule of Thumb

- 0.25 lbs N × ? lbs Fert = 1 lb N per 1000 sq ft

- 0.25 lbs N × ? lbs Fert = 1 lb N per 1000 sq ft =
  - 0.25 lbs N

- = 4 lbs Fert per 1000 sq ft

- 4 lbs Fert × 6000 sq ft = 24 lbs Fertilizer

- 1000 sq ft
References

• [http://www.public.asu.edu/~mschmeec/rainsplash.html](http://www.public.asu.edu/~mschmeec/rainsplash.html)
• Milan Experiment Station-Milan, Tennessee
• Texas A&M Forest Service
• Alberta Riparian Habitat Management: [http://cowsandfish.org/riparian/riparian.html](http://cowsandfish.org/riparian/riparian.html)
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