Efficient Irrigation Practices

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Considerations

• Turn it off; use it as a tool, not a thermostat
• When? Symptoms/signs of need; time of day
• How Much? Depth of roots; infiltration rate:
  – Compaction and aeration
  – Texture
  – Slope and thatch and runoff potential
• Soil texture and compaction influences on:
  – Irrigation practices
  – Root system health
• Watch it run...frequently...look for flaws

Turn it Off

When? Symptoms/Signs of Need

Signs of Need - Like the 3 Bears....

When You Dig...
When? Timing – 5-10 am

How Much? How Long? It Depends...

Two Bottom Lines: Water to the bottom of the roots and keep it moist, not soggy or dry

How Much, How Long?
Soils have different capacity to absorb irrigation water

Images courtesy Brad Jakubowski

Soil Compaction

Junk, Compaction Affect All LS Soils

Leads to Soil Drainage Problems
Fixing Problematic Soils

Concept: Physical disruption/loosening, then addition of organic matter

Techniques:
- “Scoop and Dump” Nina Bassuk,
- Raised Beds, Small Areas
- “The Recipe” Alan Stewart

Renovating soils in existing landscapes
- S&D not done under existing trees/PRZ
- Radial Trenching as per Nina Bassuk, John Ball
- Don’t add soil over top of existing roots/Planter Boxes
- Air Spading/Air Knife

Scoop & Dump

Scoop & Dump Soil quality after construction

- Poor soil structure
- Low oxygen, air penetration & organic matter content

- Apply ≅ 6-8” compost on top of compacted soil
- Use backhoe bucket to dig down ≅ 18”

The Recipe

- For new, non-vegetated areas:
  1. Rip the soil to a depth of 24 inches; reintroduces air into the soil
  2. Incorporate 1-2 inches of finished compost into the upper 10 inches of subsoil to recreate the A layer
  3. Topdress the soil with 1 inch of compost
  4. Wood chips over top, let sit for 6 months
  5. Use a rip and a rake
- New roots develop in year one in modified area and horizontally outside the modified area over time

Methods

Renovating landscape beds and turf areas entirely
- Don’t pulverize by discing/roto-tilling
- Instead, rip out plants,
- Add lots of compost
- Recreate soil aggregates
- Small areas can be loosened with a pitchfork and pickaxe

Ripped Site

The Recipe

- Protect root zone of existing trees as previously described
- Apply ≅ 6-8” compost on top of compacted soil
- Use backhoe bucket to dig down ≅ 18”
- Lift and drop soil/compost combination
- Breaks up compacted soil and creates veins of compost running through it

Image by Nina Bassuk

Scoop & Dump

Images by Nina Bassuk
Fixing Soils – OM, Compaction

Techniques for Small Areas

Techniques for Small Areas

Slow, Steady Approach

Sand, Silt, Clay

Comparative size of sand, silt and clay. Image from Colorado State University Extension.

- **Sand**
  - Very large particles which resist compaction.
  - Large pore spaces don’t hold water or nutrients easily.
  - Facilitates drainage when it’s the dominant component (more than 75%).

- **Silt**
  - Rock and mineral particles, too small to see with naked eye.
  - Slippery when wet, not rocky or grainy.
  - Medium pore spaces.

- **Clay**
  - Very small size and negative ion charge makes them good holders of some soil nutrients.
  - Small pore spaces retain water well.
  - Slower water percolation and drainage capacity.
  - Easily compacted.
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### Soil Particles & Particle Arrangement

![Image from Soil Science Society of America.](image)

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### Soil Structure

- Impact on water infiltration
- Impact on root development and plant health
- Impact on macro and microbial populations

![Image by John Fech](image)

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### Soil Layers – C Remains

![Image](image)

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### Compaction Effects on Soil Water Movement

- “Crushed” pore spaces
- Reduced water percolation
- Water runoff
- Soil erosion
- Perched water table

![Image](image)

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### Thatch Impedes Irrigation Infiltration

- Increased run off potential

![Image](image)
Slope impedes irrigation infiltration

Increased run off potential

Soil Texture and Compaction Influences on Infiltration and Root Health

Photo courtesy R. Smiley, OSU

Watch It Run...Frequently...Look For Flaws

Watch It Run...Frequently...Look For Flaws

Photo courtesy Roch Guassoin, UNL

Ever See This?

What’s Going On Here?
Audits

1. Turn it on and watch it run
2. Fix obvious flaws; fix the biggest flaw first
3. Measure output with cans/ruler
4. Replace parts/make adjustments
5. Re-measure output with cans/ruler
6. Trim – reduce runtime a little
7. Review an expanded version on water.unl.edu

Trim 10%

- Scale back the runtime
- I.e. from 30 minutes per zone to 27 minutes
- Not likely to notice the difference in turf quality, but it’s an easy 10% savings