Drought 101

Jordan Telford

Horizon

The Edge You Need

Irrigation • Specialty • Landscape • Equipment

Primary Objective

Provide you with a basic understanding of best irrigation/Landscape practices.

Today's Agenda

- Foundational Science of Irrigation
- Measurements - Water & Money
- Products that will accomplish goals
- Healthy Soil = Healthy Plants = Drink Less

Healthy Landscapes – Save Water

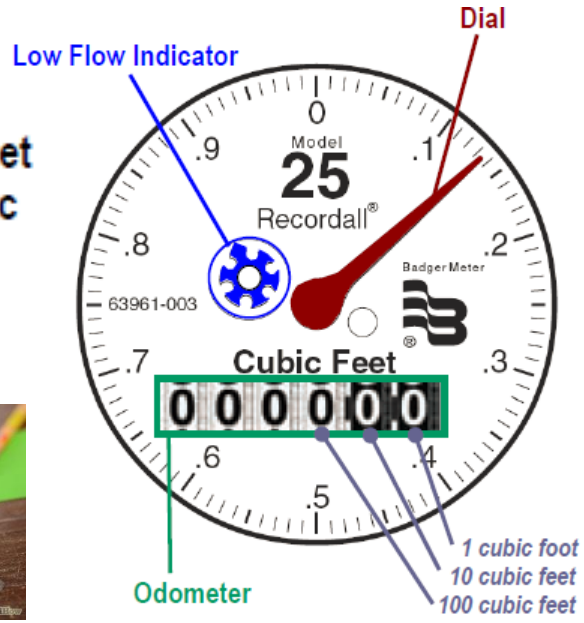
Low hanging fruit

- Check for leaks/repairs
- How to read water meters
- Stop sprinkler runoff
- Hydrozoning

FIX IT FIRST !!!

How to read water meters

- Water meters measure cubic feet of water used. To convert cubic feet to gallons, multiply the number of cubic feet by 7.48.



HOW TO CHECK FOR LEAKS

- Water Meter Running?
  - With irrigation system turned off.
    - Leak between meter and valves.
  - With the Backflow turned off.
    - Leak between meter and backflow.
  - Running out the heads on flat surface.
    - Irrigation Valve leaking.
  - Running out the heads on down slope surface.
    - Low head drainage, residual water in pipe after valve has closed.

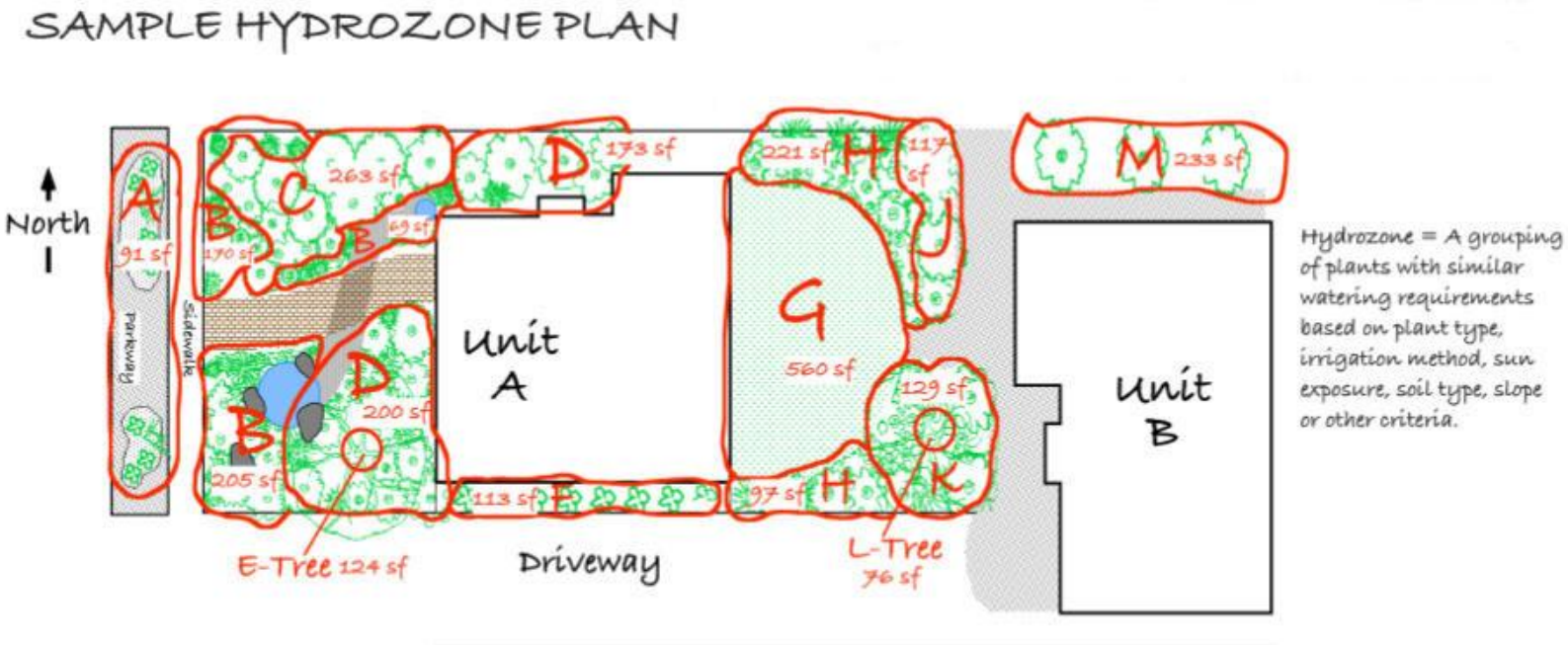
Check for leaks/Repairs

- Site audit

Stop runoff

- Cycle and soak
- Water efficient sprays

Hydrozoning



Minimize evaporation

- Mulch, mulch, mulch

❖Resource Conservation

Healthier, More Affordable Landscapes

Smart Irrigation Control

Evapotranspiration-Coefficient of Uniformity

Spray Nozzle Retrofits

Pressure Regulation

Horizon

The Edge You Need

Irrigation • Specialty • Landscape • Equipment

- **Think about this…**

  It is easy to know
  when we're under
  watering a landscape
  but…
  How do we know
  if we're over watering?

- We Need a Starting Point…

Evapotranspiration (ET) Rate Provides that Starting Point

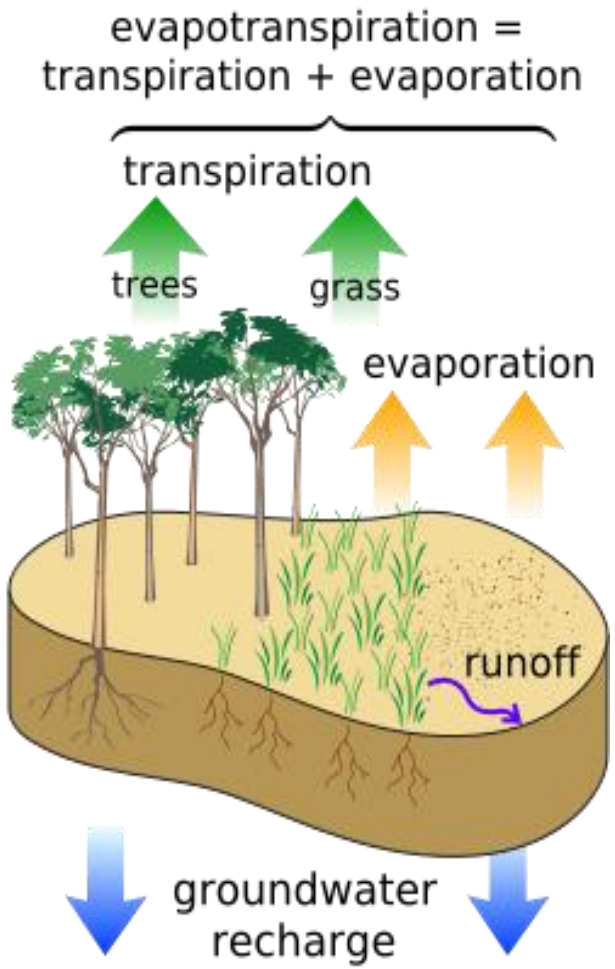
What is ET?

ET = Evapotranspiration

A measurement of water loss from the soil (evaporation) and use by plants (transpiration)

Measured in Inches Per Day (in/day)

This Measurement is Known as The ET Reference Rate (ET_o)



Evapotranspiration (ET) Example

- ET Based Scheduling Adjusts Daily the Valve Runtime and Application Interval by Calculating Local Weather Conditions and Plant Requirements

Example: For the Past 24 hours the amount of water used by plants and loss to evaporation = .3”. The sprinkler heads of a particular zone have a precipitation rate of 1.8” per hour.

What is the ET adjusted run time?

1.8”/ .3”= 6

… divide 6 into 60 (min/hr) = 10 mins run time

And at 15 gpm we have used 150 gallons

Evapotranspiration (ET) Example Continued

- Same zone next day…its cloudy and calm

  For the Past 24 hours the amount of water used by plants and loss to evaporation = .18”. Again, the sprinkler heads of this particular zone have a precipitation rate of 1.8” per hour.

  What is the ET adjusted run time?

  1.8”/ .18”= 10

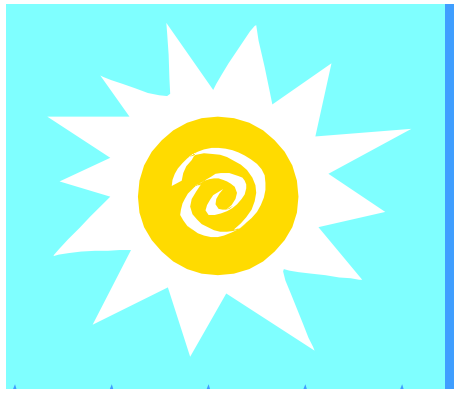
  … divide 10 into 60 (min/hr) = 6 mins run time

  And at 15 gpm we have used 90 gallons

  These **Daily** Adjustments are What Save Water and Maintain a Healthier Landscape

Smart Controllers

Irrigation Controllers that use ET Rate Inputs to Adjust Programs for Weather & Landscape Conditions



(And take out the guess work)

- **ET Based Controllers (smart controls)**
  - **Satalite based controllers**
  - **Onsite weather stations**
    - **Many can be retofitted**

Sensors to save water

- MINI CLICK

- WIND CLICK

- SOLAR SYNC

- FLOW SENSOR
  - A leak on a 1” pipe can waste 16GPM so 16GPM X 10 stations X 10 Minutes = 1600 gallons of water

Benefits to ET and proper Scheduling

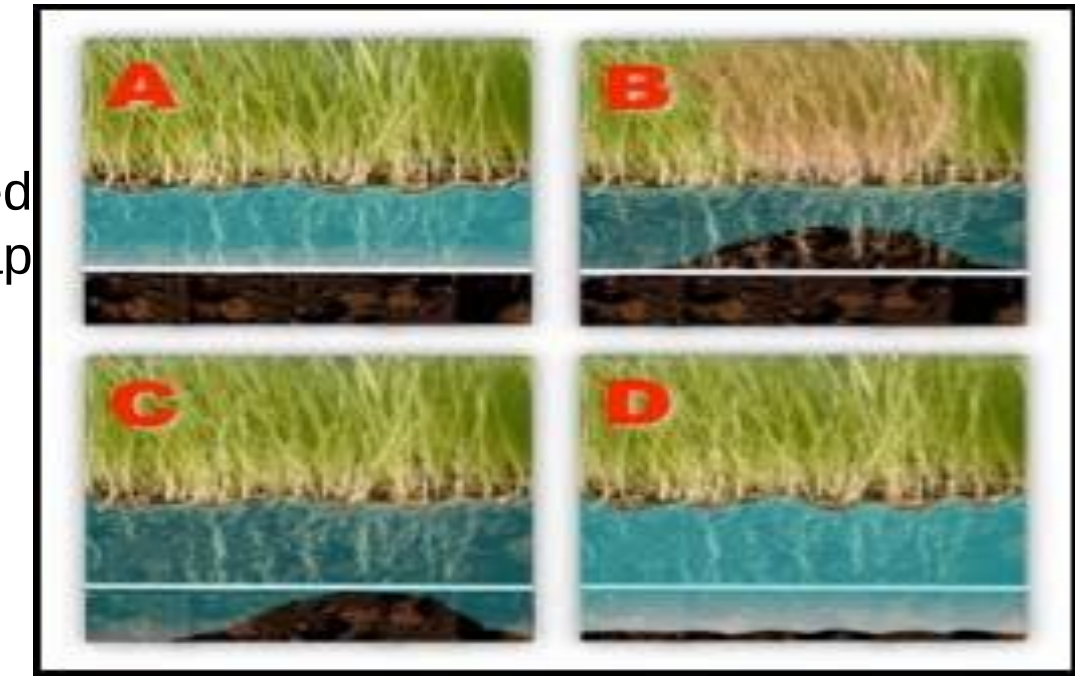
Benefit Summary

- Reduced Water Cost (at least 20%)
- Healthier Landscape / Greater Root Structure
- Reduced Fertilizer Wash Through
- Reduced Storm and Hardscape Damage

Healthy Landscapes – Save Water

Distribution Uniformity or DU

- Measure of how evenly water is applied across a field during irrigation
- DUs of less than 70% are considered poor
- DUs of 70 - 90% are good
- DUs greater than 90% are excellent
- Impossible to obtain 100%
- Poor DU means that either too much water is applied costing unnecessary expense, or too little water is ap causing stress to crops
- Can be influenced by outside factors



Precipitation Rates

- The speed at which an individual irrigation nozzle or irrigation system applies water.
- Measured in inches per hour (in/hr) in the United States.
- Considering precipitation rates in an irrigation system helps
  - Eliminate run off
  - Apply the only the needed amount of water
  - Maximize plant health
  - Avoid wet and dry spots
  - Minimize water waste
  - Reduce system cost
- Use this measurement to determine how long to run your irrigation system.

Pressure

- Pounds per square inch that water is moving through a designated space.
- Different nozzles call for different pressures.
- Single largest contributing factor to water usage efficiency.

High Pressure

Low Pressure

Gallons Per Minute

- The available amount of water coming through your irrigation system.
- Make sure you have enough water to provide for all heads on a zone.
  - Example if you have 10 heads with a precipitation rate of 1.7 gallons per minute you need at least 17 GPM flowing through your system
- Just as important as pressure when diagnosing problems in the field
- You Can measure a couple different ways
  - A gauge that measure GPM
  - The bucket test

Standard Nozzles

- Calls for 30PSI
- 15H – 1.8 in/hr
  - High output
- Not good for hard soils
- Average DU 40%

Smarter Spray Head Nozzles

- Greater DU Efficiency (Up to 75%)
- Lower Flow Rates (GPM)
- More Evenly Matched Precipitation Rates
- Radius' from 5' to 27' with fixed & adjustable arcs from 45^ to 360^
- Use less water to maintain landscape health
- Can solve zone pressure and flow problems
- Perform Best with Pressure Regulation


Precision™ Series Spray Nozzles

High Pressure

Every 5 psi over recommended operating pressure is a 10% efficiency loss

Pressure Regulated Stem

- Maintains constant outlet pressure at 30psi (2.1 bar). Spray nozzles perform best at 30psi.
- Restricts water loss by up to 70% if nozzle is removed or damaged. Saves water and money
- Ensures consistent performance throughout zone if nozzle is removed or damaged.

1800 Spray with PRS at 79 psi inlet pressure.
PRS regulates flow to 0.86 gallons per minute.

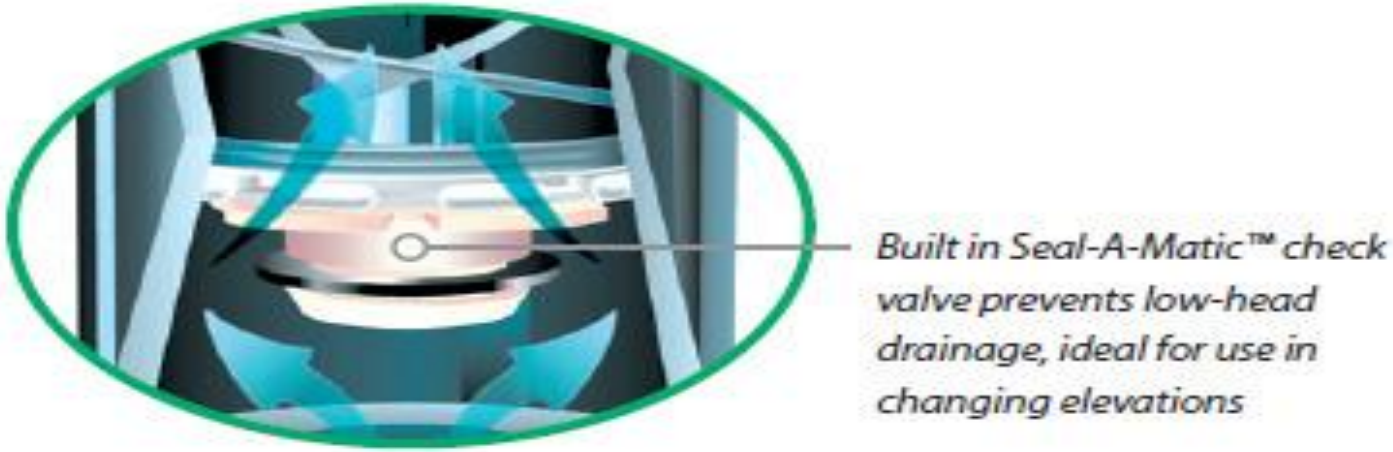
Non-PRS competitive spray at 79 psi inlet pressure.
Without PRS, flow rises to 1.64 gallons per minute.

Run Out

Water runs out of the lowest sprinkler head in the system once valve has turned off

SAM

- Traps water in pipes in elevation changes of up to 14 feet.
- Reduces wear on system components by minimizing water hammer during start-up.
- Prevents drainage from spray heads at lower elevations
- Stops water waste. Ends landscape damage due to flooding and/or erosion.



Geyser

Standard irrigation system can flow 14gpm through a sprinkler head …

So if you system runs for 15 mins with a broken head you could be loosing 210 gallons of water each day.

RD1800

- Flow Shield – Uses same amount of water as a 15H nozzle

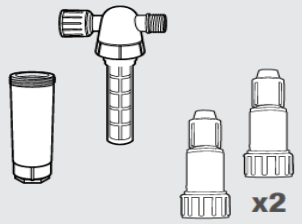
Convert Sprays to Drip Irrigation

AGRIFIM™ Professional Drip Watering Products by NDS

Convert Spray Head To Drip Irrigation!
Universal Conversion Kit Installation Guide

Doc# AF_Univ_Conv_Guide_Aug_2012

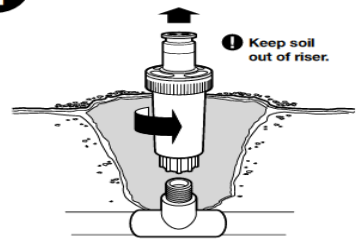
Conversion Kit Installation



Part # FR2 17-710

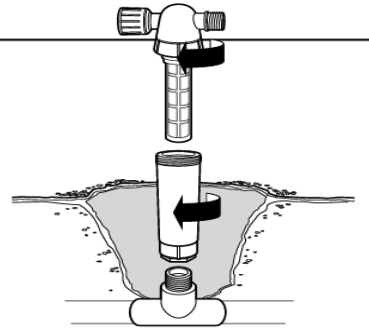
1 Install Conversion Kit

Keep soil out of riser.



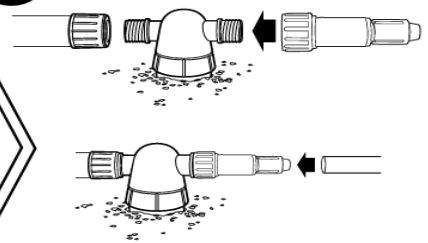
1.) Identify sprayhead to use as water supply
2.) Remove pop-up sprayhead

2



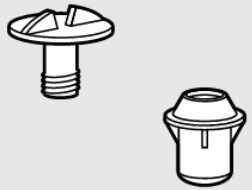
3.) Remove filter and adaptor top from canister.
4.) Screw canister onto riser pipe.
5.) Flush system before adding filter and adaptor top.
6.) Reassemble filter and adaptor assembly.
7.) Replace soil.

3



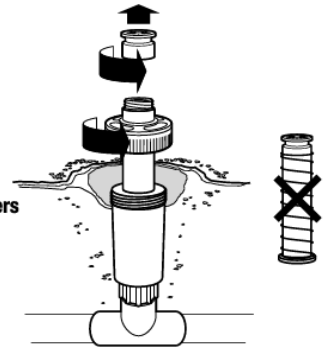
8.) Connect 16, 17 or 18mm tubing.
9.) Cap-off any unused adapter outlet

Cap-off Installation



Part # CAP POP/25

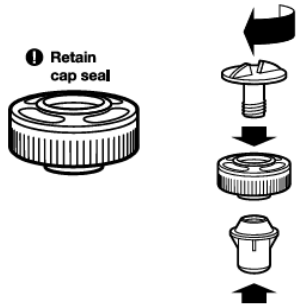
1



1.) Remove internal sprinkler components (the stem nozzle and spring).

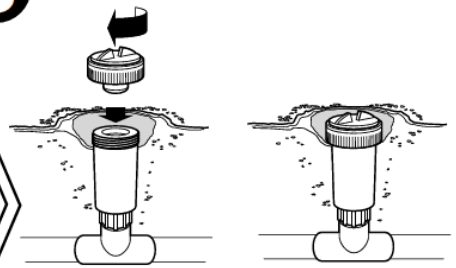
2

Retain cap seal



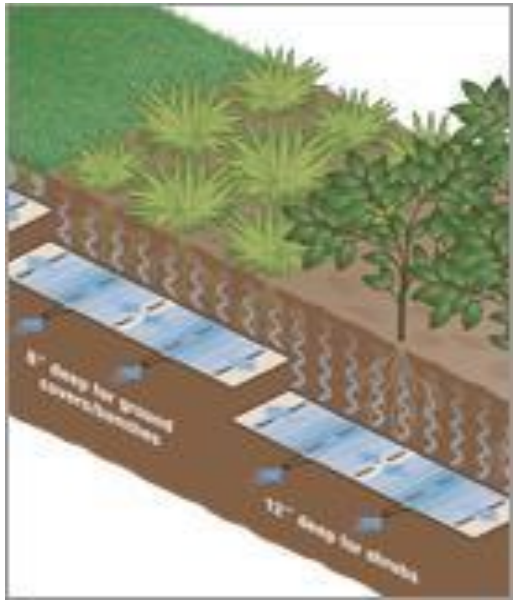
2.) Retain cap and seal from spray head.
3.) Disassemble cap-off device.
4.) Place tab portion through top of spray head cap.
5.) Thread on lower portion of cap-off device.
6.) Tighten lower portion to seal.

3



7.) Thread completed assembly onto spray head.

Low Volume and Subsurface Irrigation



- Point source
- Subsurface
- Eco-mat

ROI Calculator

http://www.hunterindustries.com/

http://rainbird.com/

Healthy Landscapes
Begin in the Soil

Horizon

Basic Fertilizer Turf Claims

- Color
- Stress
- Rooting
- Density
- Quality

Traditional Synthetic Fertilizers

- Nutrient Mgmt
- Reduce Microbial Diversity
- Reduce Carbon Levels
- Collapse Soil Structure

Horizon

Understanding the Basics
Organic Fertilizers

"Organic Energy Concept"

Horizon

Healthy Landscapes Begin in the Soil

Program Aspects

- Nutrient Mgmt
- Microbial Life
- Bio Reserves

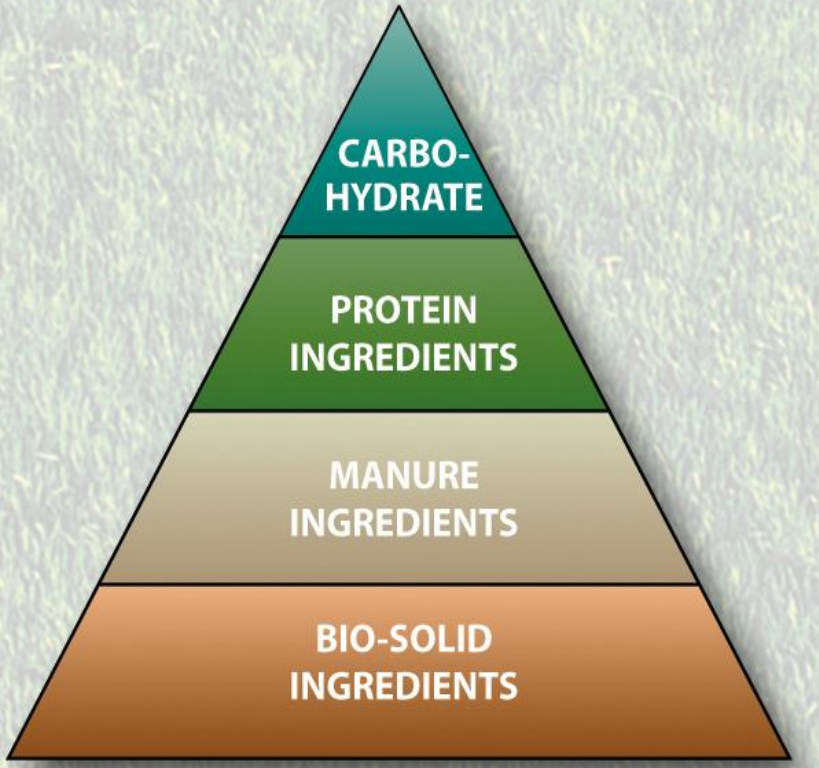
Horizon

Organic Nutritional Values

Key Organic Benefits

1. Provides Energy for Microbial Build-up

2. Increases Organic Content to Enhance Soil Structure, Water & Nutrient Retention



Natural Products

Carbon Based Products:

- *Provides Non-Leaching Nutrient Base*
- *Adds Energy Rich Diet to Tired Soils*
- *Build Microbes and Stabilizes Root Zone*
- *Improves Nutrient & Water Retention*
- *Promotes Rooting and Lateral Growth*

Horizon

The Role of Soil Microbes

Organic Product Impact

"Soil Life Opportunity"

Horizon

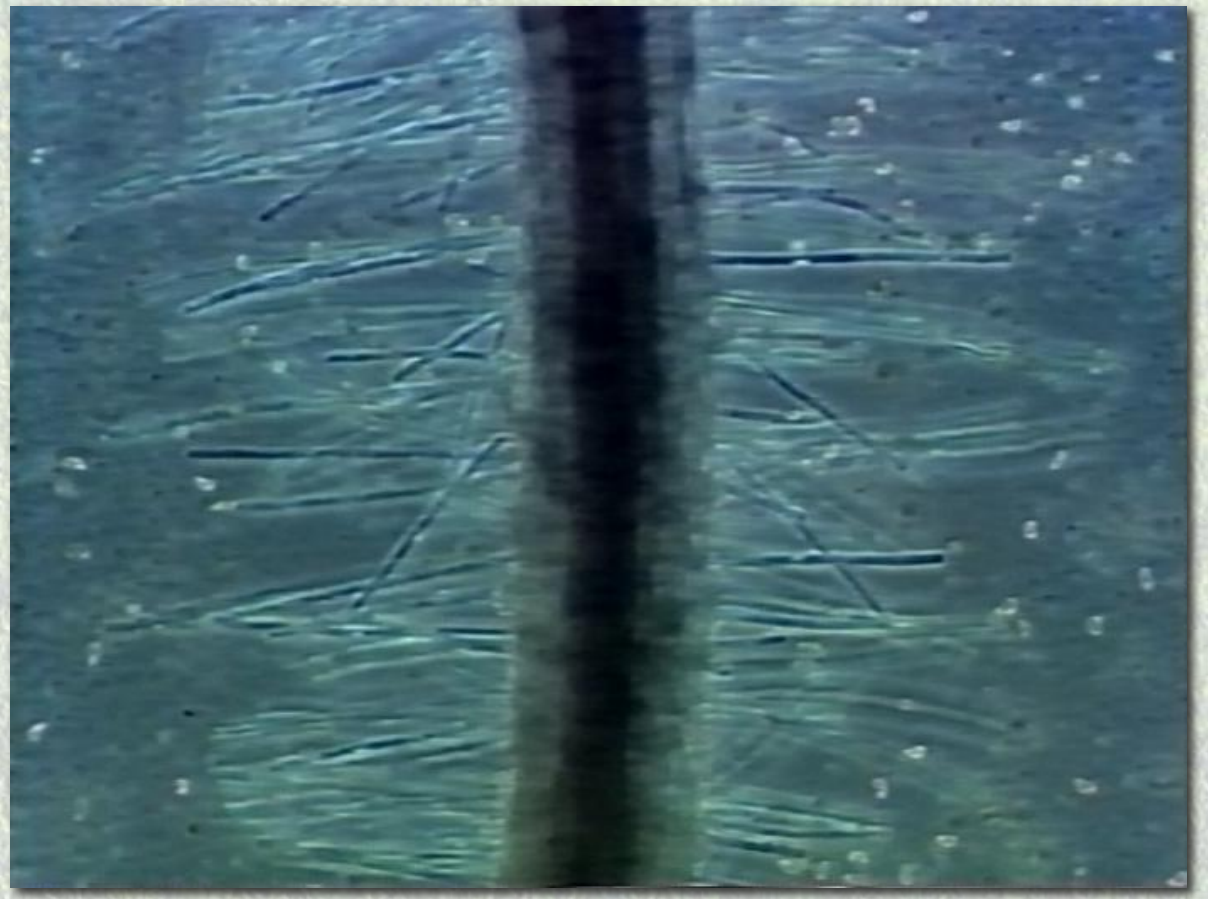
Microbial Benefits

- Stimulate Existing Soil Microbes
- Establish Improved Bio Energy Foundation
- Improve Nutrient & Water Efficiencies
- Reduce Disease and Stress Problems
- Improve Soil Aggregation & Bio Diversity
- Enhance Rooting and Soil Aeration

Organic Products Builds Overall Turf Quality

"Application After Application"

Horizon

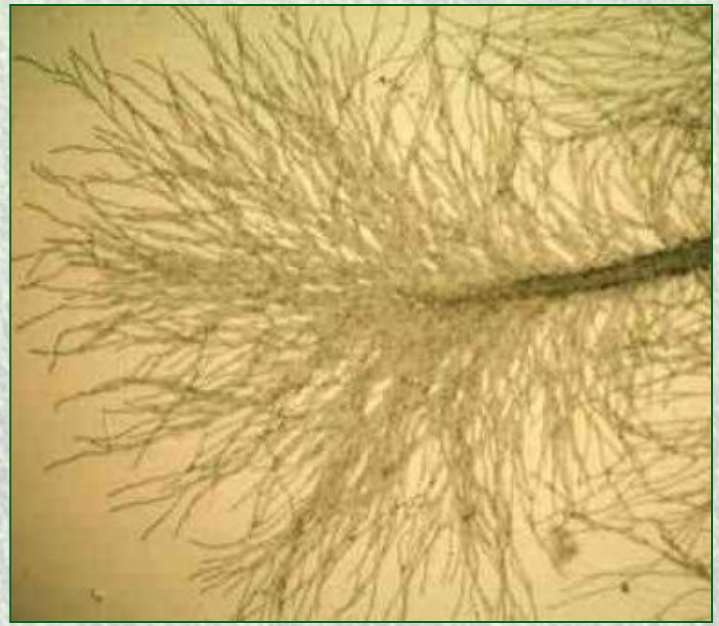


Root with Microbes . . .

. . . Nutrient Absorption!

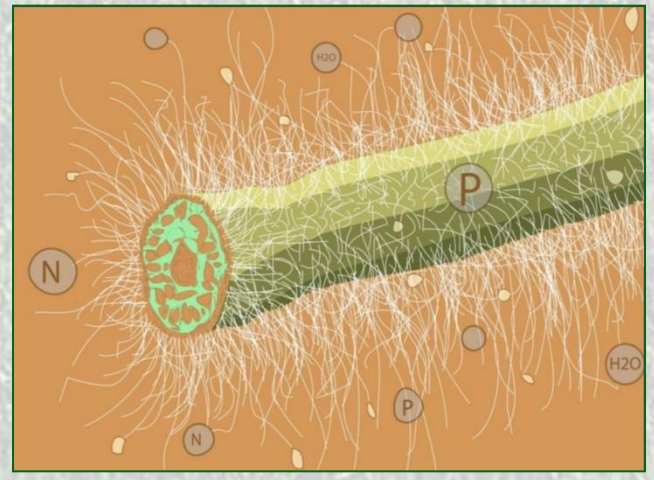
Horizon

What are Mycorrhizal Fungi?



- NATURALLY OCCURING Beneficial Fungi
- Form SYMBIOTIC relationships with plants
- Attach to roots and become EXTENSIONS of the root system

- They dramatically EXPAND ACCESS to moisture & nutrients from the soil
- In return, the host plant feeds the fungi with sugars and organic substances



Horizon

Mycorrhizae Benefits

- Improved Plant Establishment & Growth
- Increased Nutrient & water Uptake
- Drought Tolerance
- Improved Disease Resistance
- Assists in Weed Suppression
- Improved Soil Structure
- More Blossoms, Fruit & Top Growth

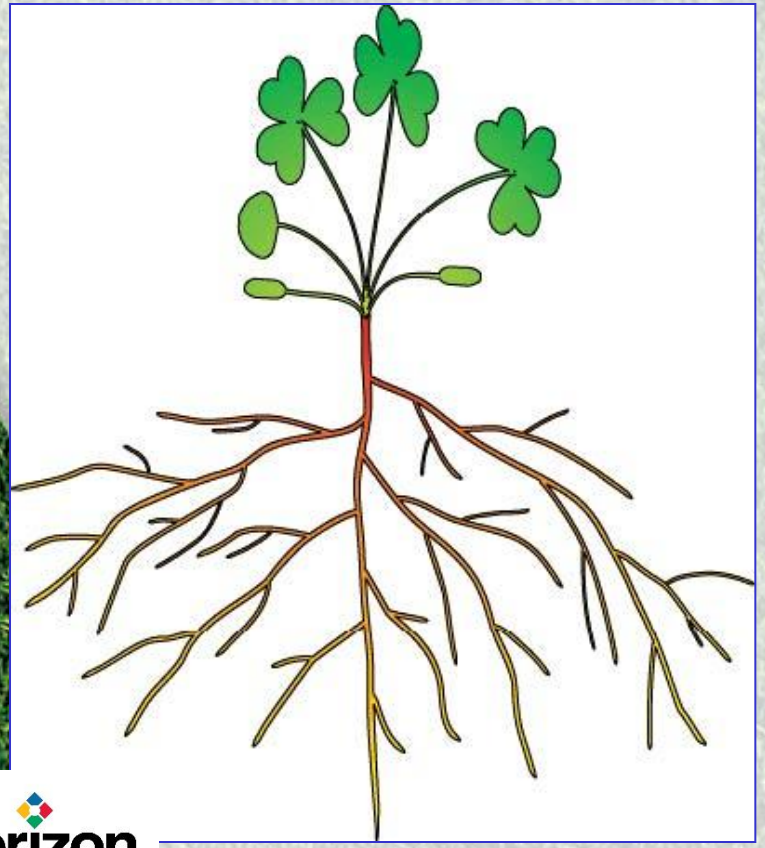
Horizon

Mycorrhizal Hyphae

Mycorrhizal Hyphae form a cotton ball like mass, significantly increasing the plant's reach for nutrients & water.

Imagine a Plant

Your Plant



Your Plant
With Mycorrhizae

Agronomic Benefits of Microbes

Organic Product Impact

"Soil Life Opportunity"

Horizon

Building Soil Structure

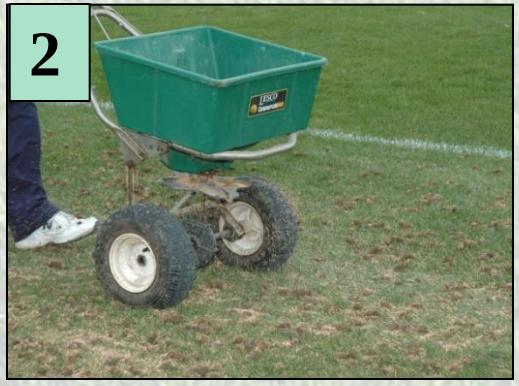
– Question: How do we get the organics and other beneficial soil additives into the soil profile?

Horizon

Amending Lawns with Turface after Core Aeration

1.

2



AERIFY: 2 Passes at 45˚ ; Collect Cores

Broadcast Amendment: 250 lbs per 1,000 sq ft

Plus any Seed & Fertilizer

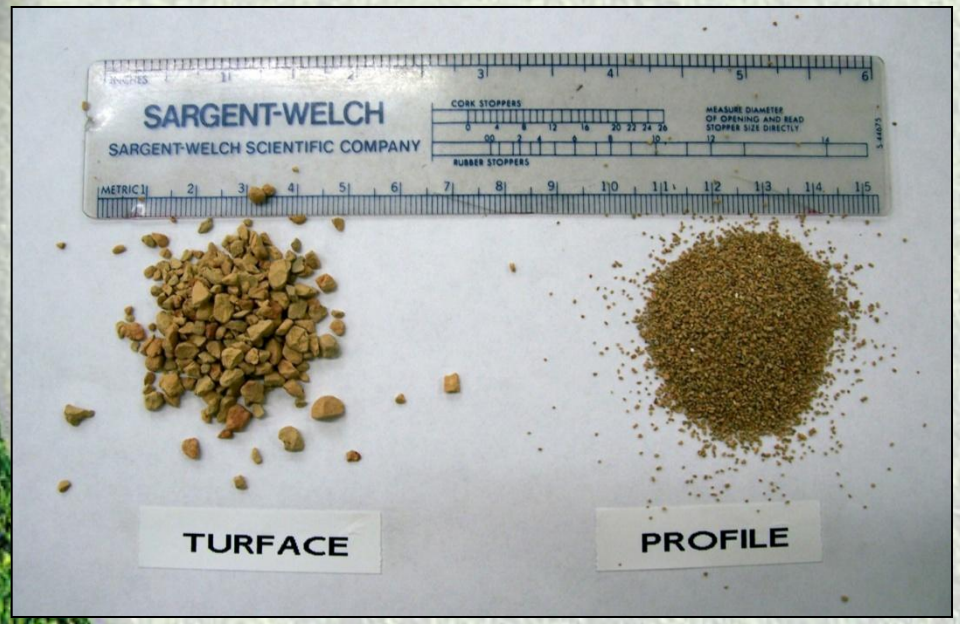
3.

4.

Rake or Drag Everything into holes

WATER Thoroughly

Particle Sizing & Best Uses

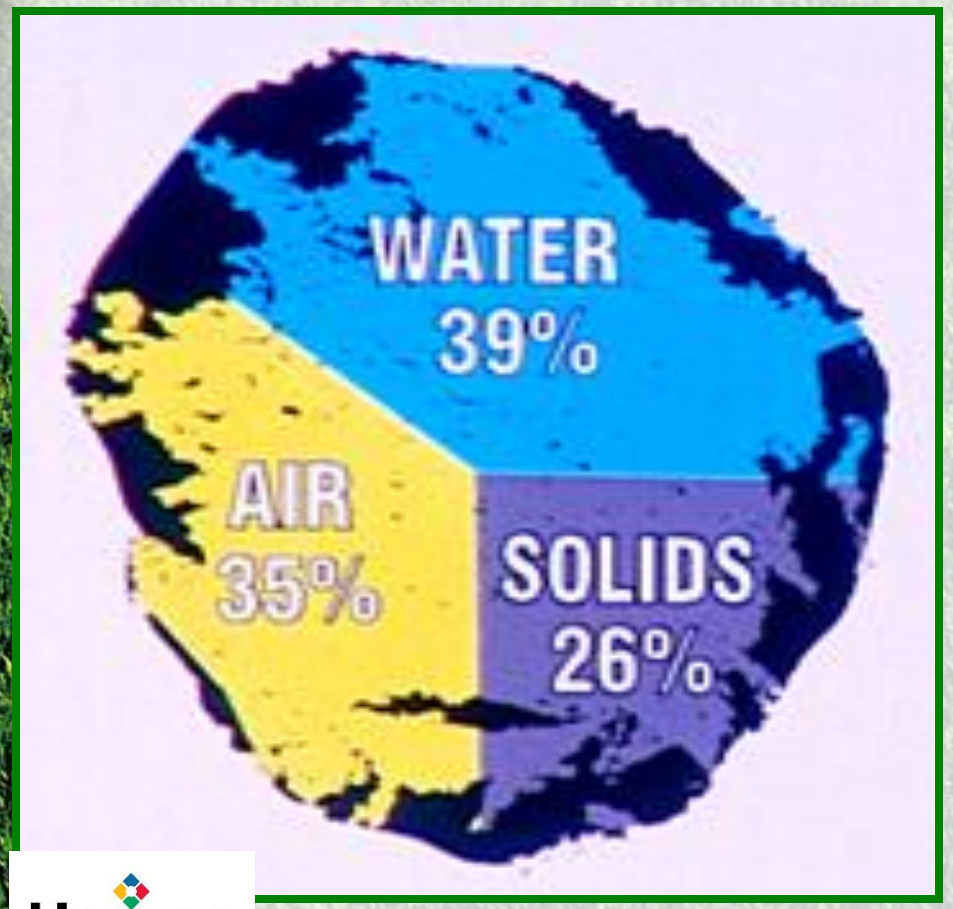


MVP
• Amending
New Beds & Lawns
• Backfilling around
Individual Plantings

Profile
• Golf Greens

Field & Fairway
• Backfilling
Aeration Holes
• Athletic Turf

Turface Particles

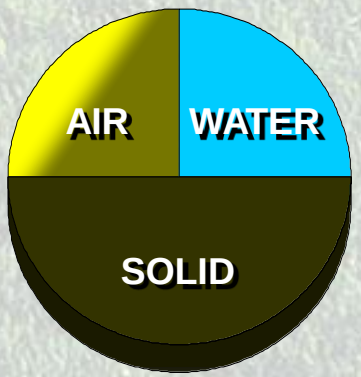


- Hard, Durable Ceramic Granules
- 74% Total Porosity
- Absorbs 90% of its weight in water and releases it slowly
- Increases Water Infiltration
- Improves Moisture Distribution
- Improves Drainage

Horizon

Amending Soil with Turface

By adding Turface to native soil, we are able to produce close to the "ideal soil."



Horizon

Bermuda grass Lawn Amended with Turface

Bermuda grass on Native Soil; No Soil Amendment

50% SAND Added to Native Soil

20% TURFACE Added to Native Soil

Reduced Water Need = Fewer Irrigation Cycles

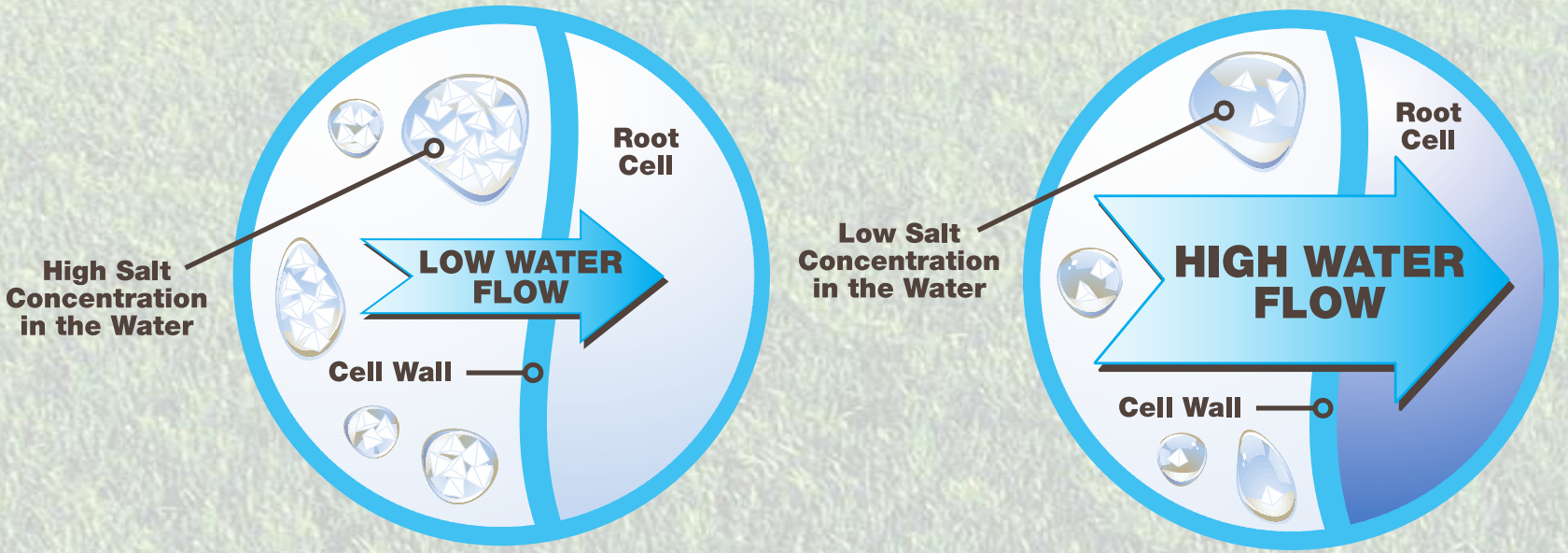
Deep & Less Frequent Watering

Length Between Cycles allows more time for natural rainfall to occur

Benefits to Organic Products

- Completely Organic or Bridged Organic Blend
- Eliminates or Reduces Applications of Salt
- Lack of Salt Increases Soil Available Water to Plants
- Safe for Children and Pets
- Longer Release Means Fewer Applications
- Eliminates the growth spikes in plant material with outstanding color
- Over Time Builds Soil and Beneficial Micro Organisms
- Water Conservation

Water ET Management



Horizon

The Solution to Soil Health

Begins in the Root Zone

Horizon

Colorado Water Management Case Study

"Water Savings Pays for Fertilizer"

Horizon

Annual Irrigation Usage

16 Year Average Water Usage Data

- 1996 to 2004
  - Used Traditional Synthetic Fertilizer
  - Average Annual Water Usage
    - 90.2 Million Gallons of Water
- 2005 to 2012
  - Used Natural Protein Based Fertilizer
  - Average Annual Water Usage
    - 81.9 Million Gallons of Water

Organic Products Reduce Water Usage

"Application After Application"

Horizon

Water & Cost Savings

16 Year Average Water Usage Data

- 1996 to 2004
  - 90.2 Million Gallons of Water
- 2004 to 2012
  - 81.9 Million Gallons of Water

- Savings
  - 8.3 Million Gallons of Water
  - Water Cost = $2.77 per 1000 gallons
  - 8300 x $2.77 = $22,991 SAVINGS

Organic Products Reduce Water Usage

"Application After Application"

Horizon

Natural Fertilizer Cost Savings

Tangible Savings

- 8.3 Millions Gallons of Water
- $22,991 Expense Savings
- Electrical Cost Savings
- Reduced Annual N Rate from 3 lbs to 1.75 lbs

Intangible Savings

- Reduced Peak Surcharge Electrical Costs
- Improve Irrigation System Efficiency
- Reduce Watering Window

Organic Products Reduce Water Usage

"Application After Application"

Horizon

Selecting a Natural Fertilizer Product

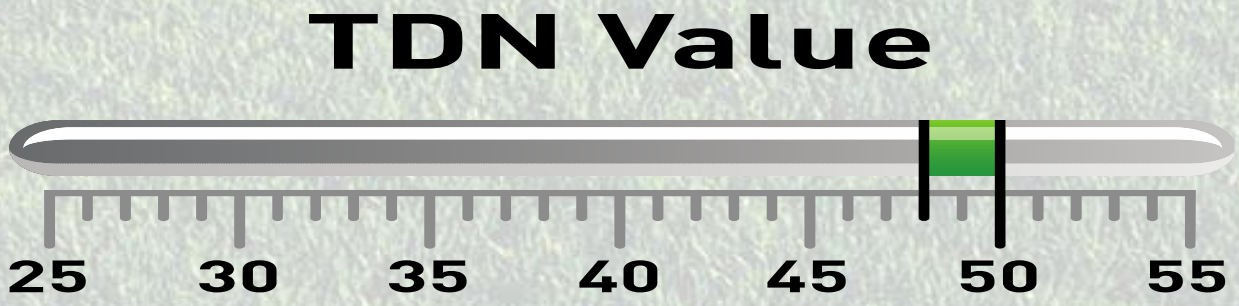
Biological Fertilizer Considerations

"Total Digestible Nutrient Value"

Horizon

Total Digestible Nutrient Value

- Traditional Synthetic Fertilizer = 0 TDN Value
  - Nutrient Value to Manage Cost
- Bio Solids = No TDN Value Available
  - Empty Energy Tank – Organic Filler
- All Manure Products = 20 TDN Value
  - Low Energy Product
- All Protein Products = 80 TDN Value
  - High Energy Product



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Summary

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- Measurements - Water & Money
- Products that will accomplish goals
- Healthy Soil = Healthy Plants = Drink Less

Healthy Landscapes – Save Water

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The Edge You Need

Irrigation • Specialty • Landscape • Equipment

Thank you

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