This presentation premiered at WaterSmart Innovations

watersmartinnovations.com

watersmart
INNOVATIONS

communication education design transformation

G3 green gardens group

www.greengardensgroup.com

October 7, 2014

WaterSmart Innovations 2014

SOIL SPONGE AS WATER CONSERVATION BMP

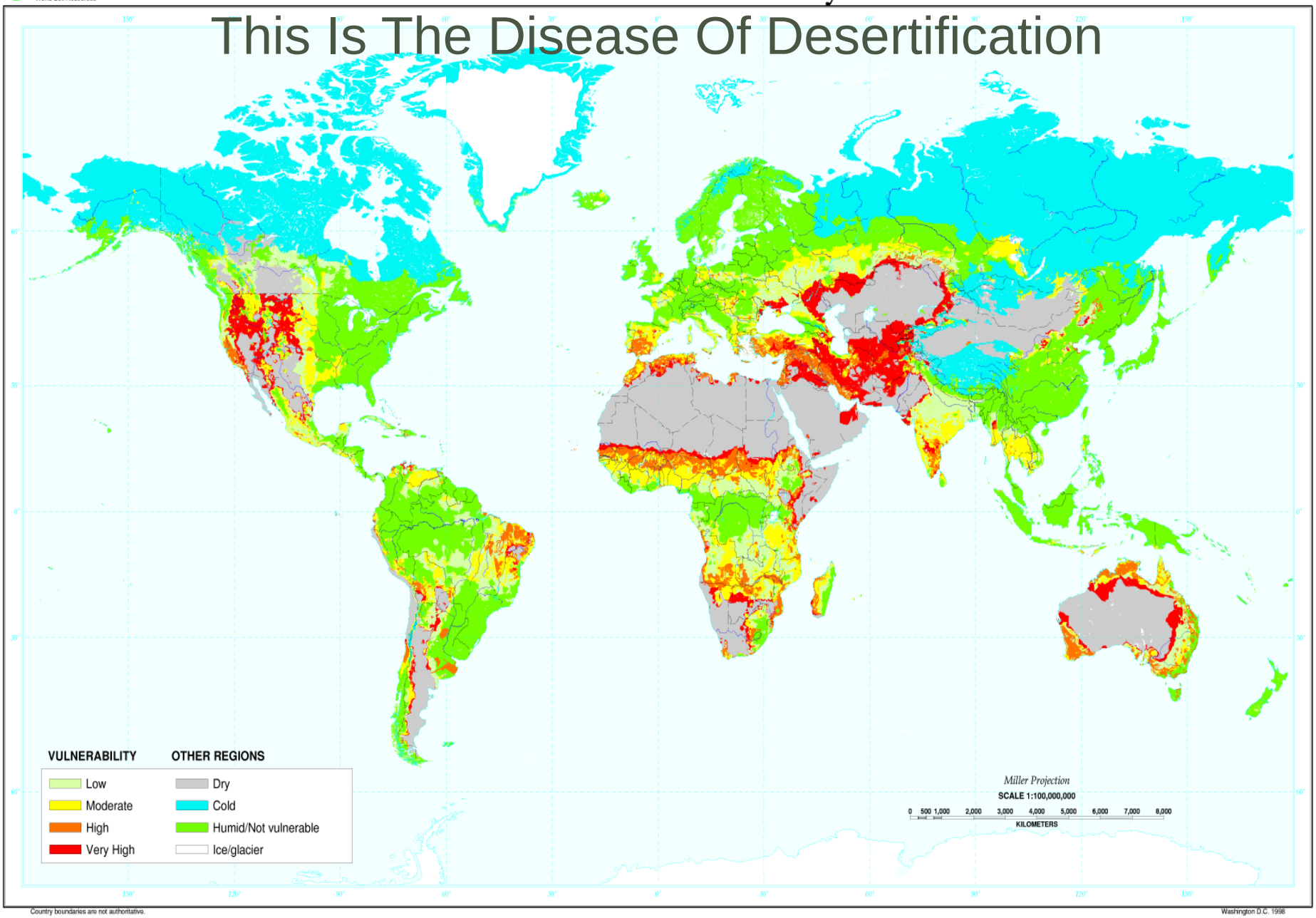

When one tugs on a thing in Nature, he finds it attached to the rest of the world. John Muir

Desertification?

U.S. Department of Agriculture
Natural Resources Conservation Service
Soil Survey Division
World Soil Resources

Desertification Vulnerability

This Is The Disease Of Desertification



Country boundaries are not authoritative.

Washington D.C. 1998

Cause: Destruction Of Soil Structure

Application Of Chemical Herbicides And Fertilizers

Compaction Affects Plant Root Growth

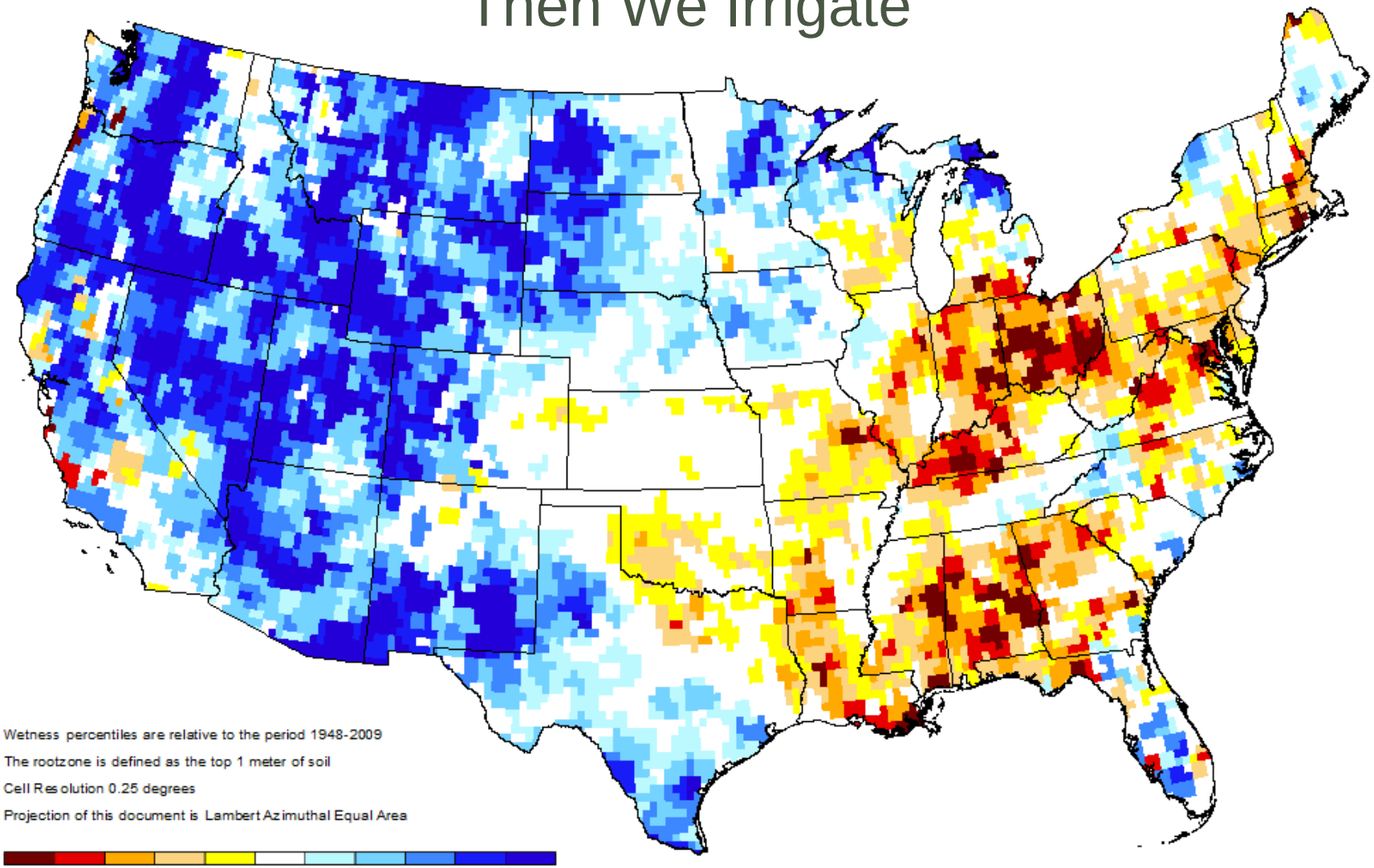
Compacted

Free-draining

GRACE-Based Root Zone Soil Moisture Drought Indicator

October 06, 2014

Then We Irrigate

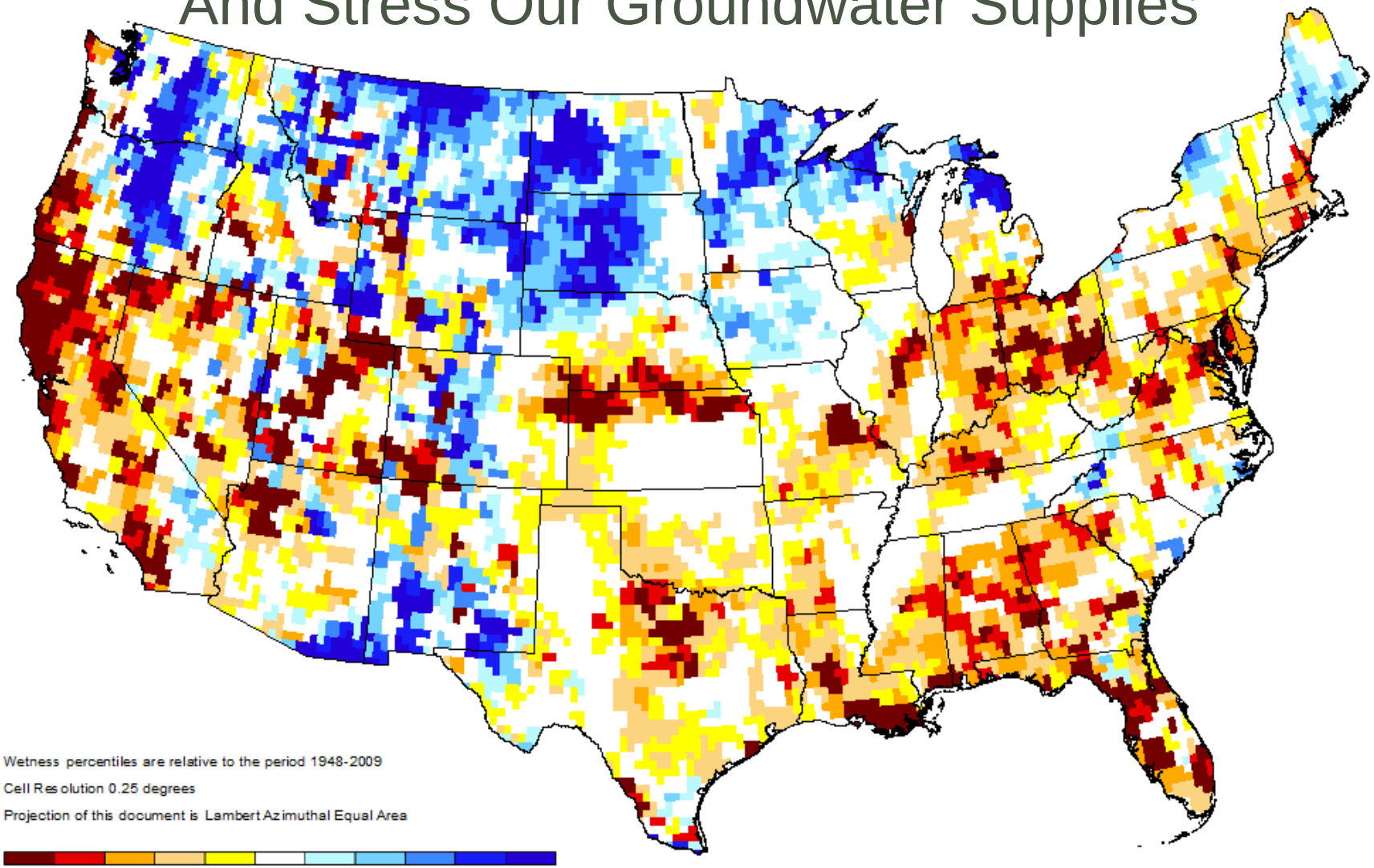


http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx

GRACE-Based Shallow Groundwater Drought Indicator

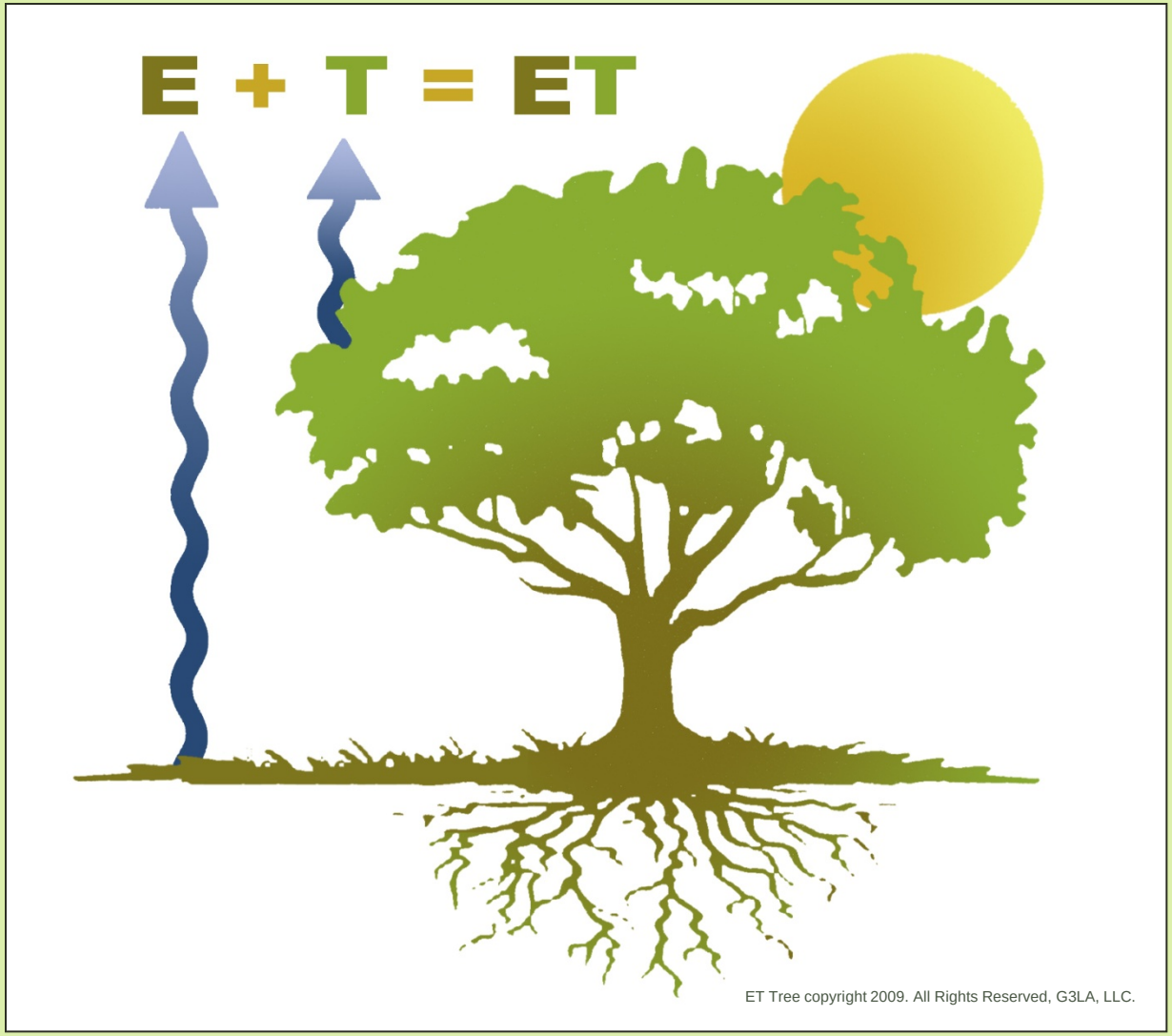
October 06, 2014

And Stress Our Groundwater Supplies



http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx

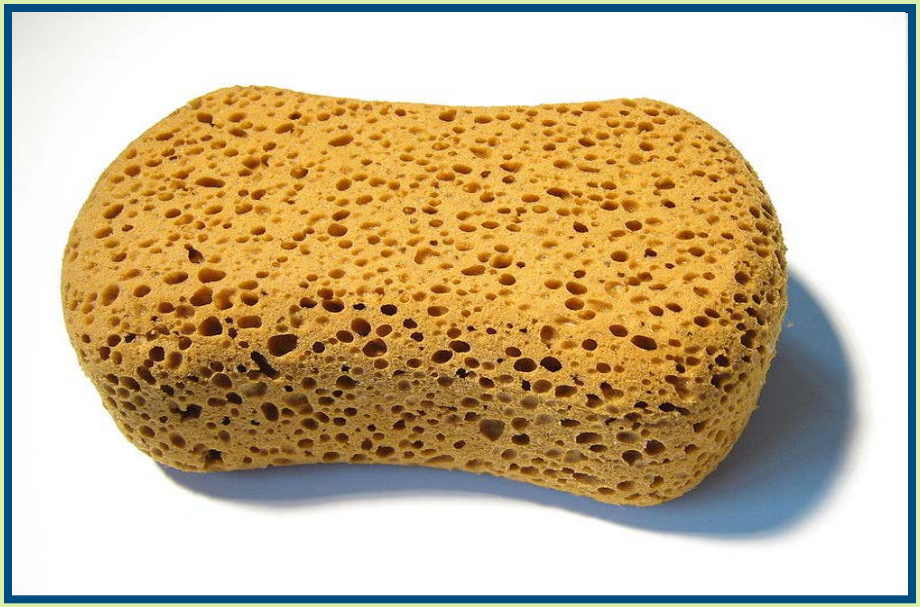
Evapotranspiration Drives The Water Cycle



Plants + Living Soil + Carbon = Water


Creating A Living Soil “Sponge”
Is Essential For Reversing Desertification

Living Soil Is NOT DIRT!



Living soil, the basis of all life, is filled with abundant, microbial, and fungal organisms that work together to feed the plants by gathering water and creating nutrients when the plants ask for them.

Compacted soil quickly becomes dirt, with no oxygen, water, or life to support plants.

Oxygen + Water + Life

Are The Essential Components of Living Soil

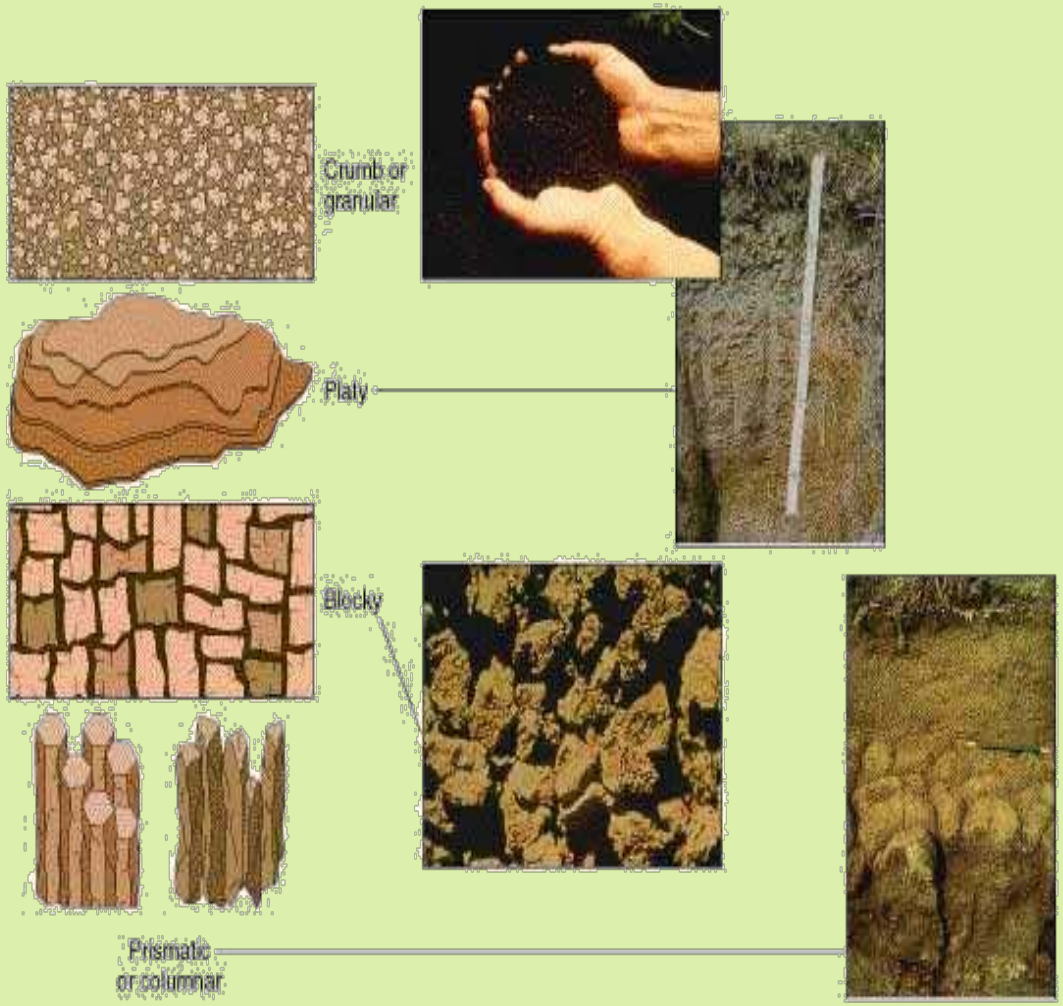
OWL Is The Most Effective Landscape Water Conservation BMP

We Can Change Soil From Brick To Sponge

Good **Soil Structure** is CREATED Through Biochemistry

Particles of soil are glued together (glomalin) in clumps to form Soil Structure, “the shape of aggregated soil particles.”

Oxygen+Water+Life



Thanks To The Soil Food Web

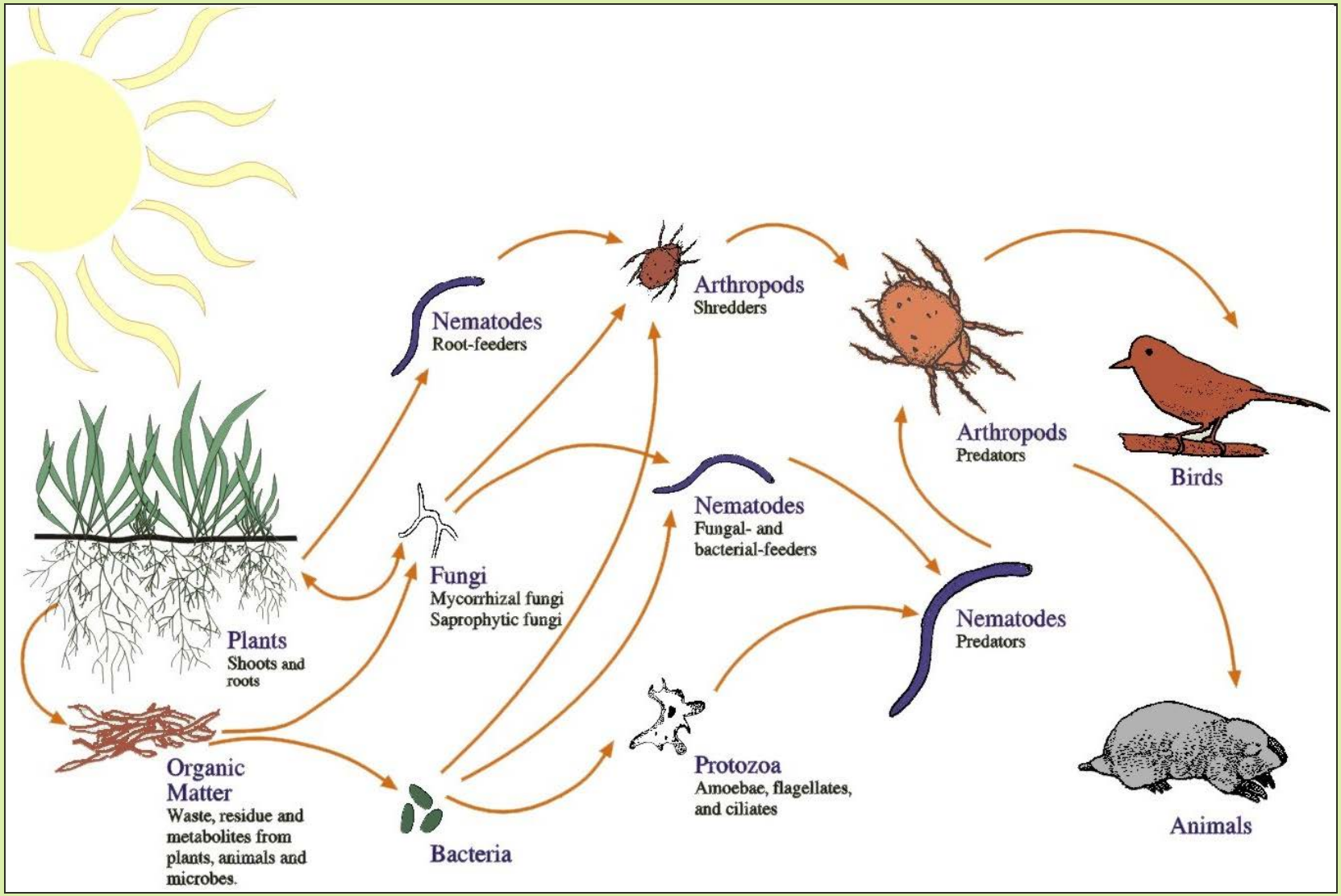


Image Courtesy of USDA NRCS

Take a Moment : Imagine Your Favorite Plant

80% Of What's Going On Is Below Ground In The Roots.

Not 80% of the root mass, but 80% of the plant's energy.

Photosynthesis and reproduction encompass only 20% of the plant's total energy.

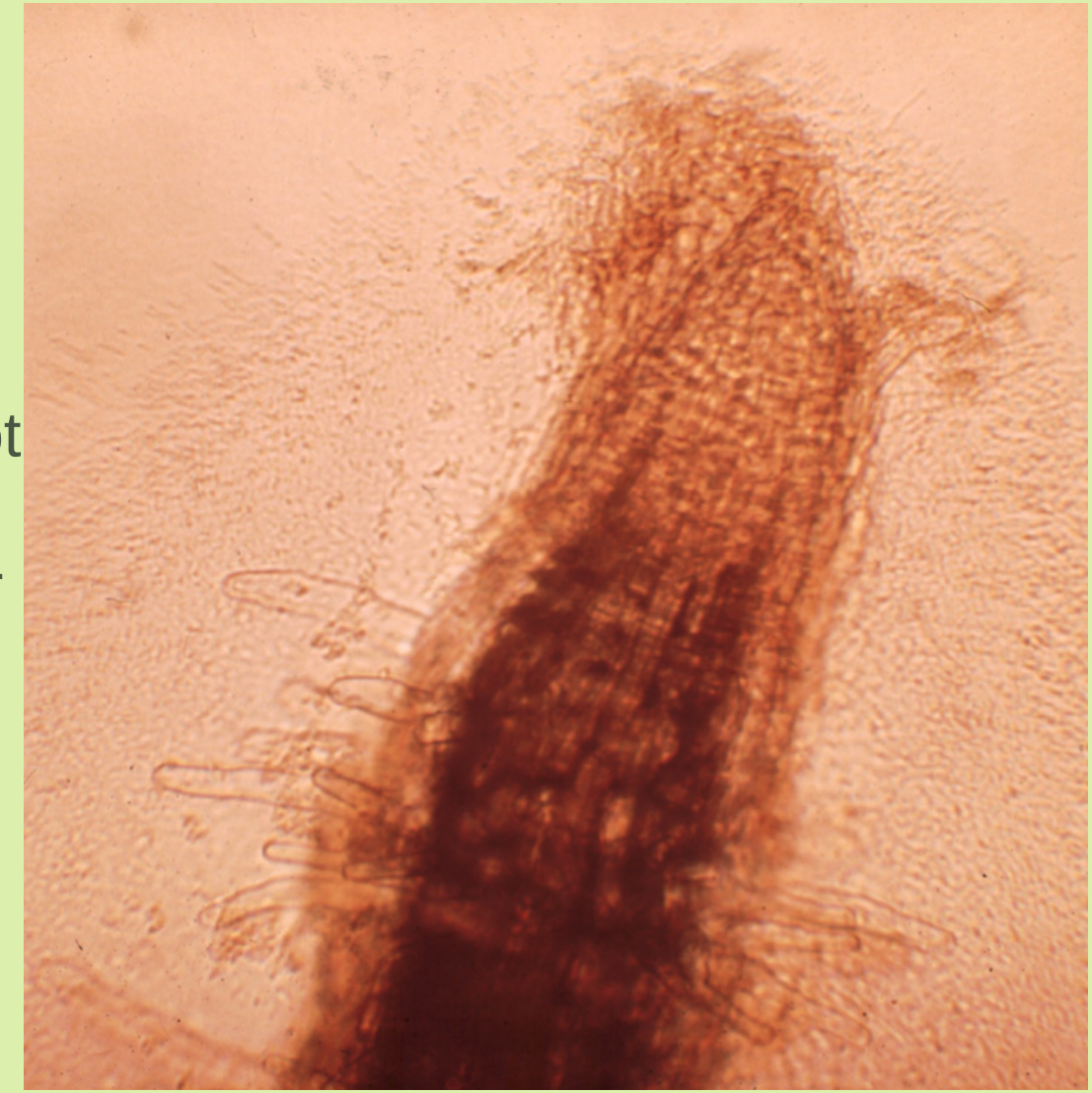
There's A Soil Party Going On!

A teaspoon of good garden soil contains billions of microbes that were only recently discovered. The microbes make the soil a sponge and also cycle nutrients so plants can thrive.

The Biology Lives In The Root Zone Of Plants

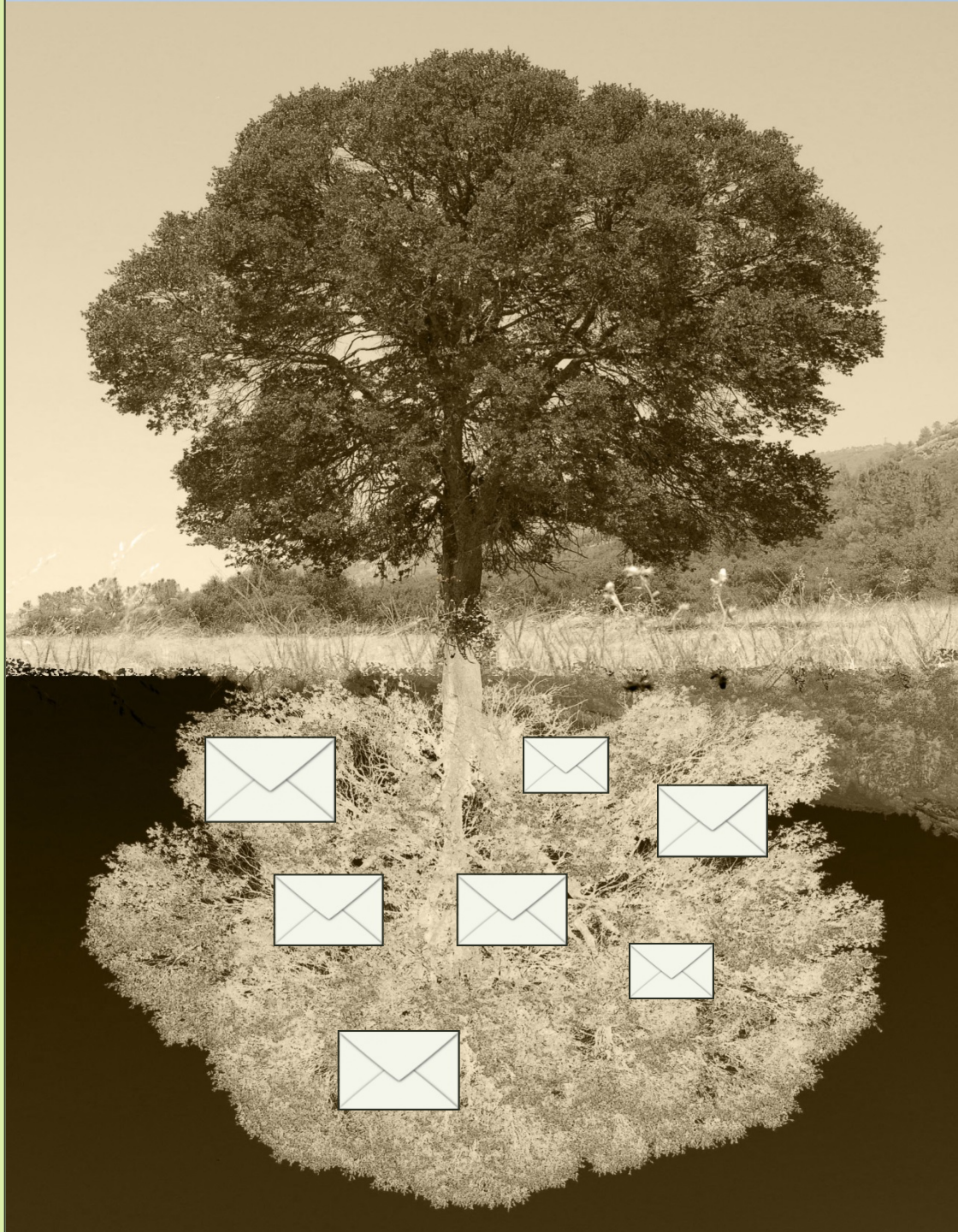
The RHIZOSPHERE area around the root of the plant is the most active area for biological activity.

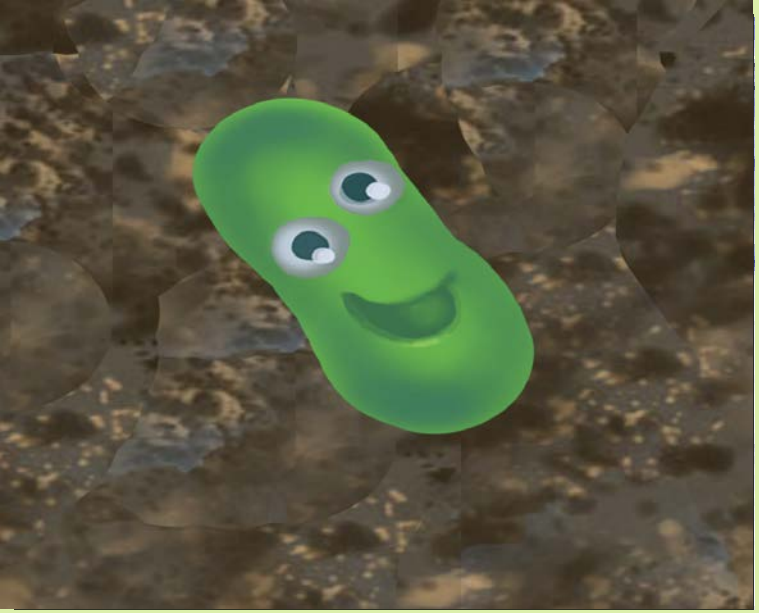
This is where the SOIL PARTY is taking place!



Plants Are In
Control
Of Who Attends
The Soil Party

Plants send out
“Invitations”



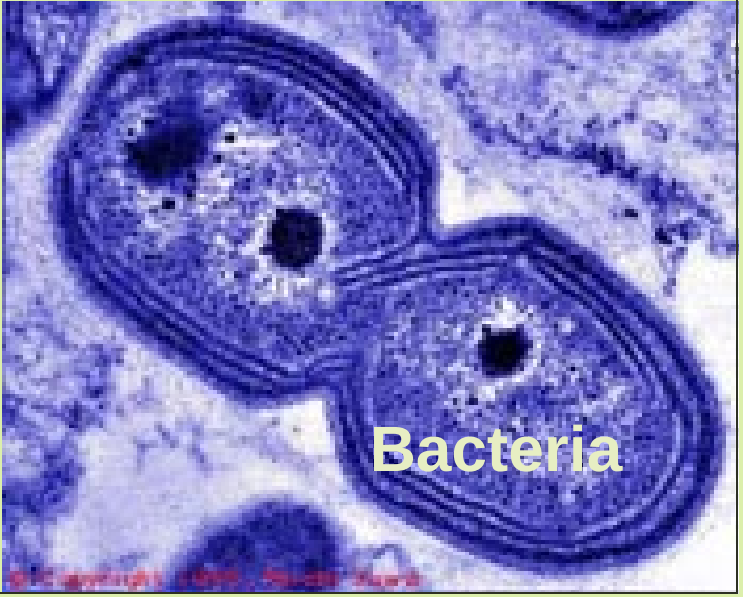


Party Guest #1 – Bacteria!

✓First to Arrive or Wake Up With Water

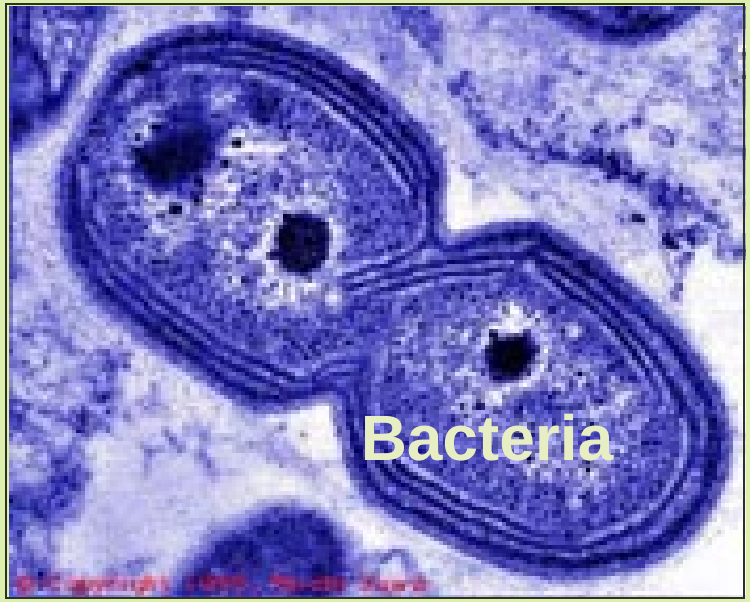
✓No Feet, so Needs A Taxi

✓Decomposers Eat and Cannot Release



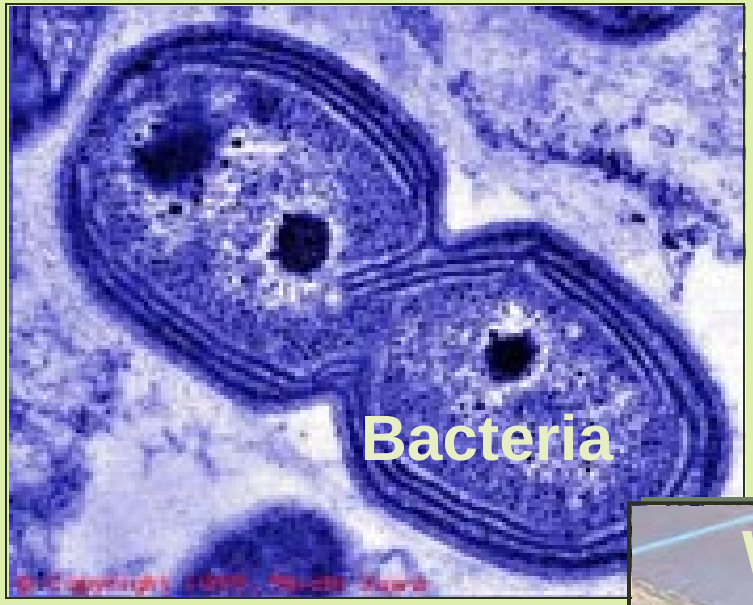
Party Guest #2 – Protozoa!

- ✓Love to Eat Bacteria
- ✓Have Flagella And Swim Around
- ✓Eating Bacteria Releases Nutrient Into Soil



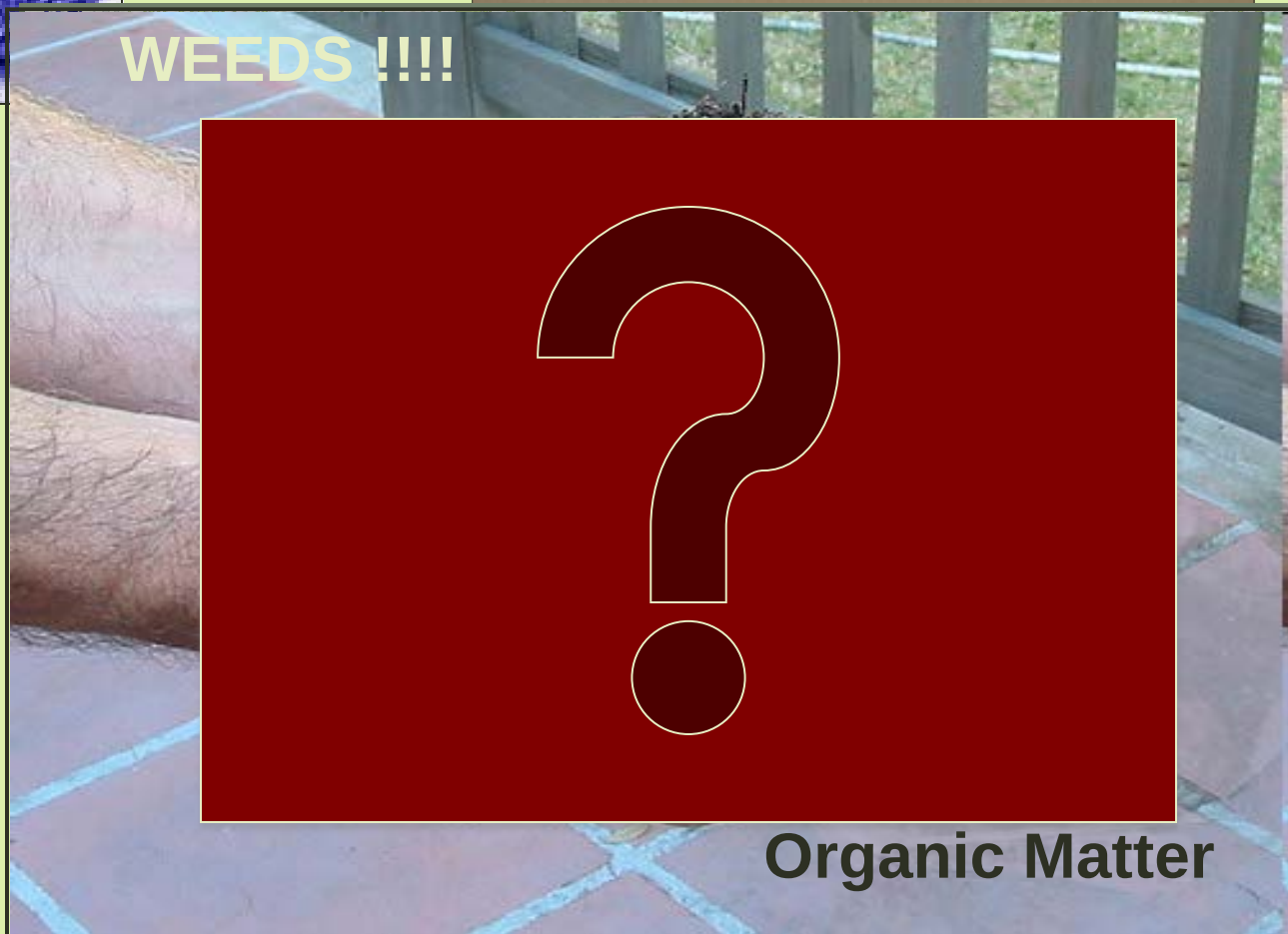
Party Guest #3 – Nematodes!

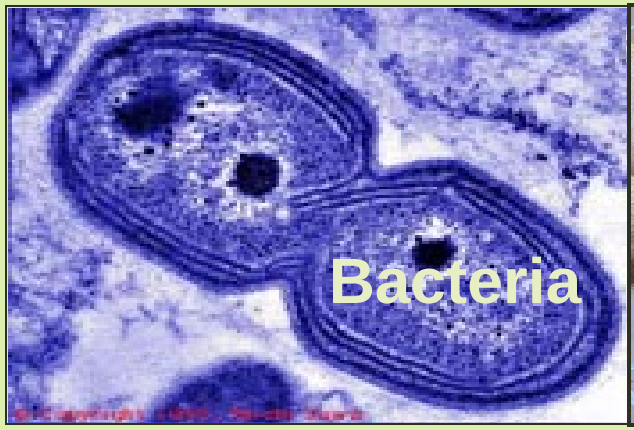
- ✓Love to Eat Bacteria & Protozoa
- ✓Swim Vigorously
- ✓Create Plant Available Nutrients

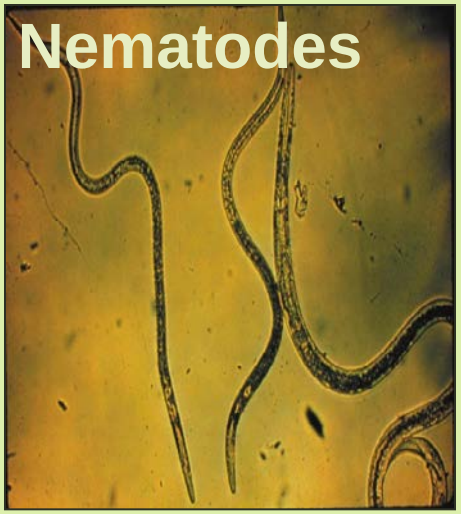

Bacteria


Protozoa


Nematodes


WEEDS !!!!
?
Organic Matter





FUN GUYS!

- ✓Create A Network
- ✓Awesome Decomposers Of Wood
- ✓Share Resources & Nurture Plants

Good Soil Biology Builds a Plant Defense Shield Sequesters Carbon, Holds Water In Root Zone

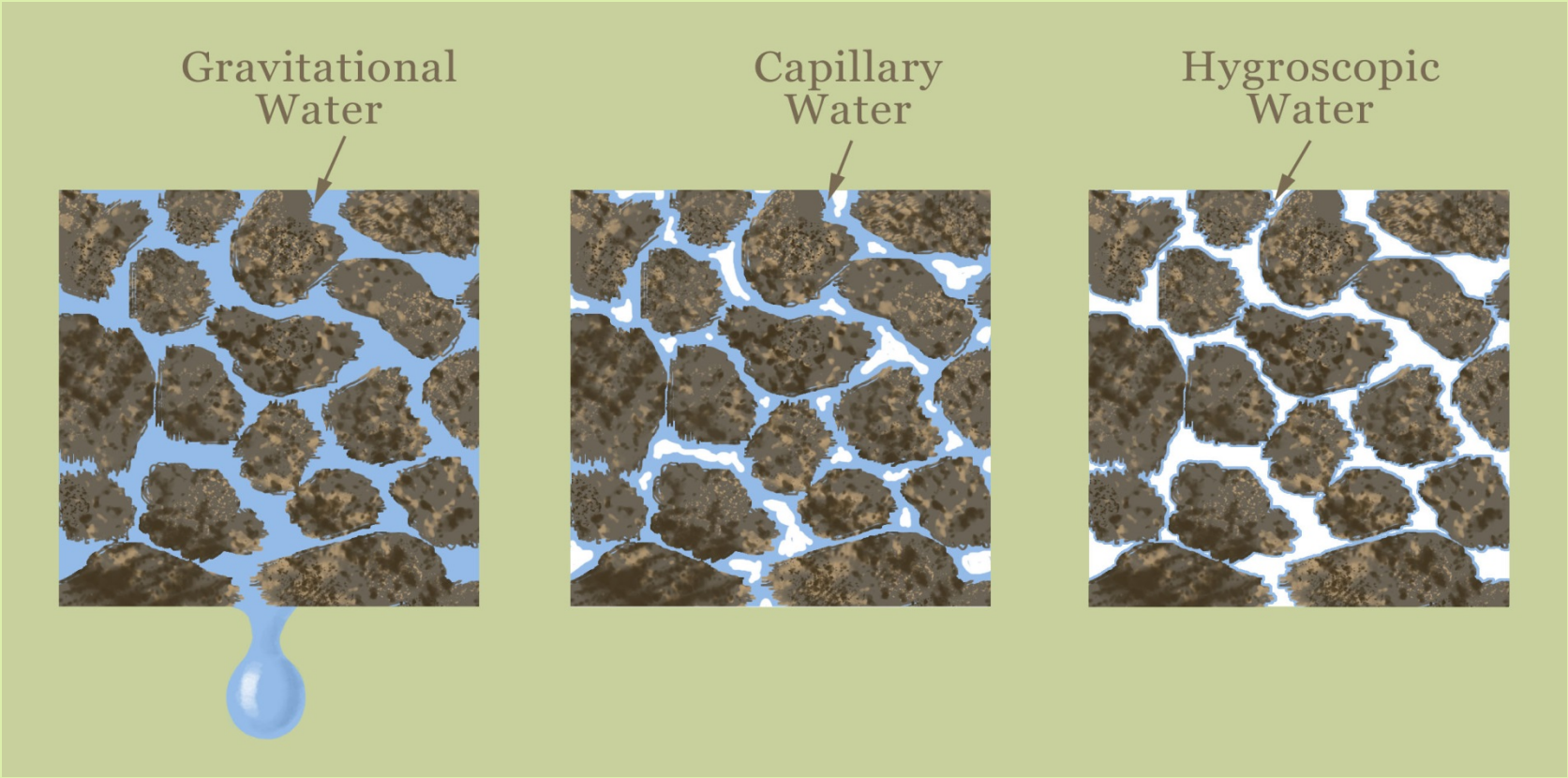
How Do We Encourage A Soil Party?

Create Opportunities For Oxygen

Add Organic Matter (Worm Castings) Down The Holes


Grab Rain When It Comes From The Sky
Grab All Of It!

Manage Irrigation To Maintain Healthy Soil



No Oxygen.
Too much Water.
Anaerobic Life.

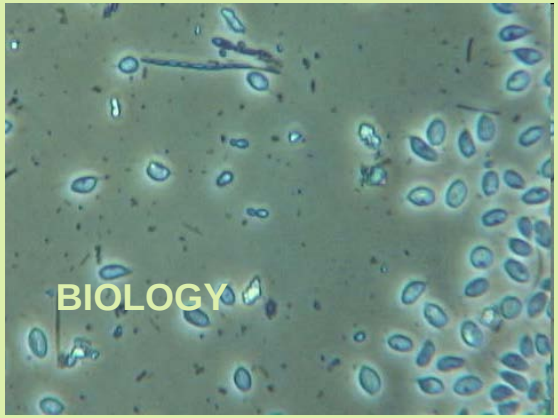
Balanced Oxygen.
Balanced Water.
Aerobic Life.

Plenty of Oxygen.
No Water.
No Life.

Feed Soil Microbes, Not Plants

+

+



Organic Matter should look and smell good enough to eat!

COMPOST

MULCH

Recycle Green Waste Back Into Landscapes

Mulch Every Open Space Today With Organic Material

Be Sure To Grasscycle

Remember Your Good Soil Structure (The Sponge)…

Living Soil structure both allows water to drain from too wet soil AND helps soil to hold water when it starts to dry out.

Creates Far More Storage Than Any Barrel Or Cistern

Grow Your OWL: A Case Study


A Sponge Garden Ready To Grow

This Is A Sponge Garden In Action


A Sponge Performs:
This One Reduces Irrigation By 90%
Definitely NOT A Desert

What's The Problem Here?

Same Turf Removal Incentive Program – Different Outcomes

Saves Water, Builds Soil, NOT A Desert

Why Settle For Climate Change….

Or More Steps Toward Desertification…

When We Could Build Sponge Gardens…

And Change Climate.

Learn More About The Soil Sponge As Water Conservation BMP

G3 green gardens group

Pamela Berstler
Managing Member
PamelaB@GreenGardensGroup.com
310.694.8351
www.GreenGardensGroup.com
www.WatershedWiseLandscape.com

communication education design transformation