

# Building Soil at Clifford Park

Building the Soil Carbon Sponge at Clifford Park to support a Food Forest,  
and to Manage Flooding, Erosion, and Drought !



*Connecting communities to affect positive food system change from the ground up.*



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A close-up photograph of a person's hand, palm up, holding a large, dark brown mound of rich topsoil. The soil is moist and clumpy, with some small roots visible. The background is a plain, light-colored surface.

**DESPITE ALL OF  
OUR ACCOMPLISHMENTS  
WE OWE OUR EXISTENCE TO  
A SIX-INCH LAYER OF TOPSOIL  
AND THE FACT THAT  
IT RAINS.**





# Soil Health Principles

1. Context matters
2. Living roots In the ground
3. Maximized diversity
4. Minimized disturbance
5. Minimized bare soil
6. Animals in contact with soil

# Current Condition



## Town Maintenance:

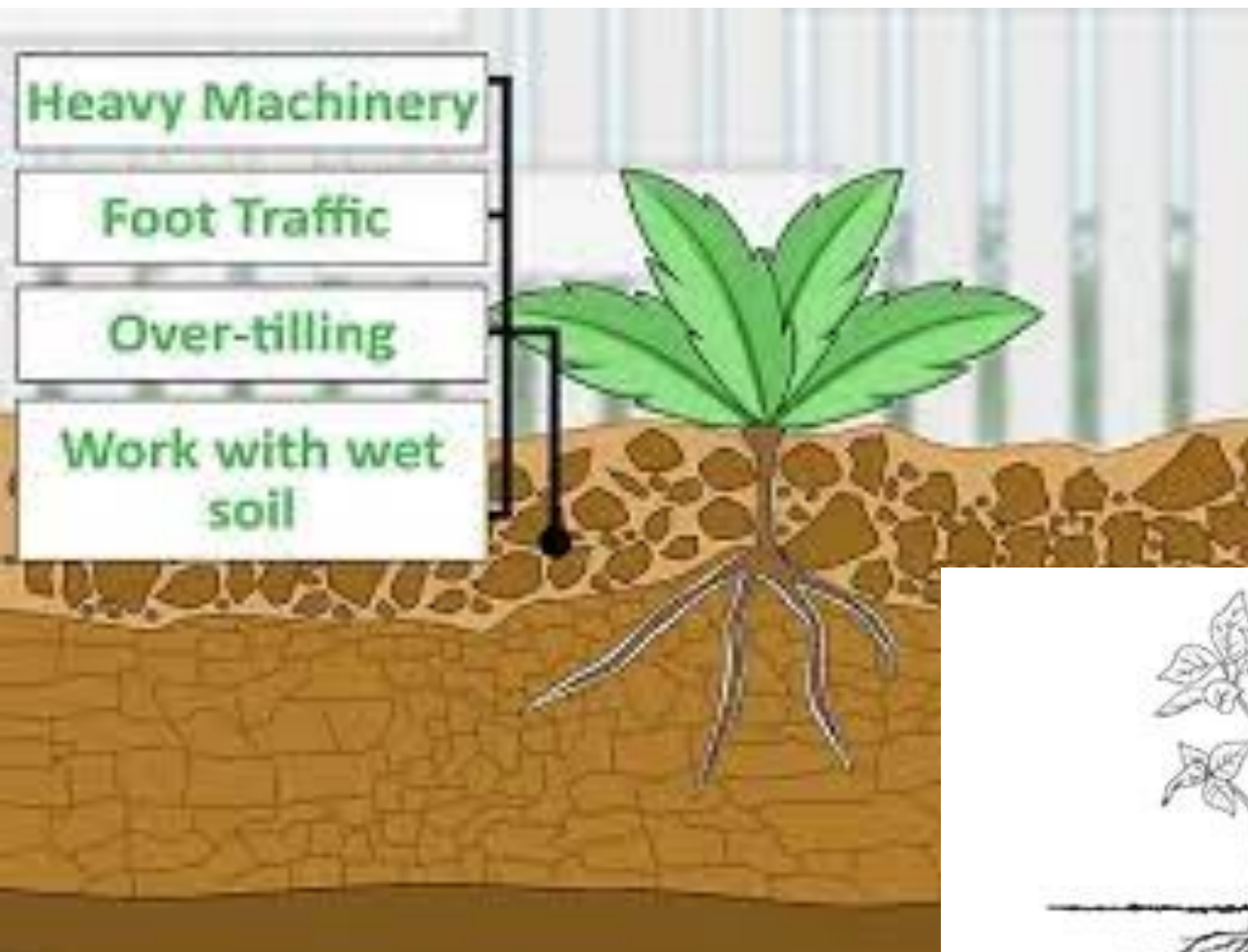
- The park is mowed once or twice a week during the spring, summer and fall months depending on grass growth and programmed activities.
- Clifford is not a park of our Turf Management Plan, i.e. no fertilizers or pesticides have been used on this site for the past three seasons.
- The soil is quite compacted due to management, use and flooding from the river.



# Current Condition

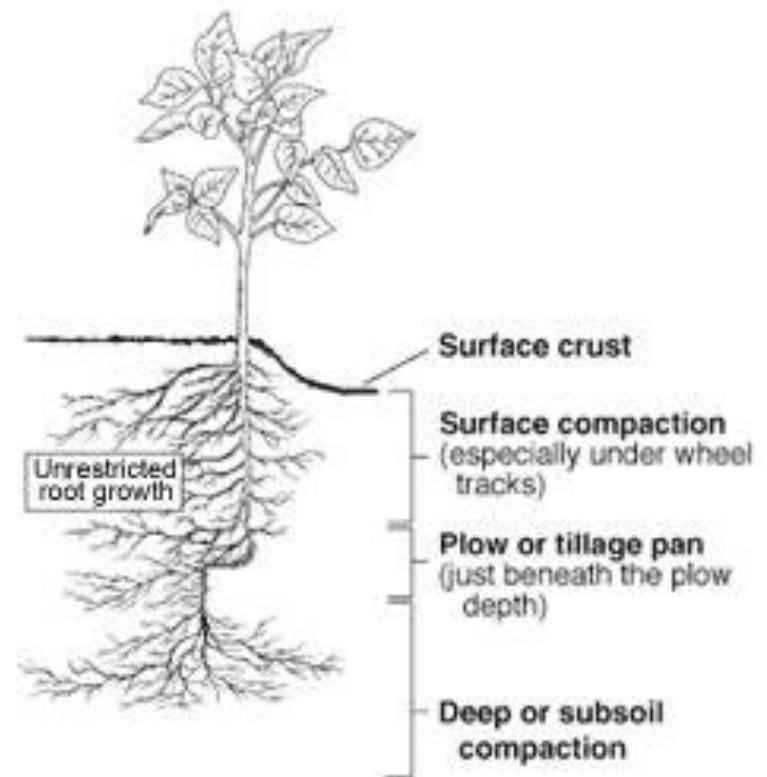
early spring 2021





Compacted soil has minimal air and pore spaces, depleting soil life of oxygen and water and making it difficult for plant roots to navigate.

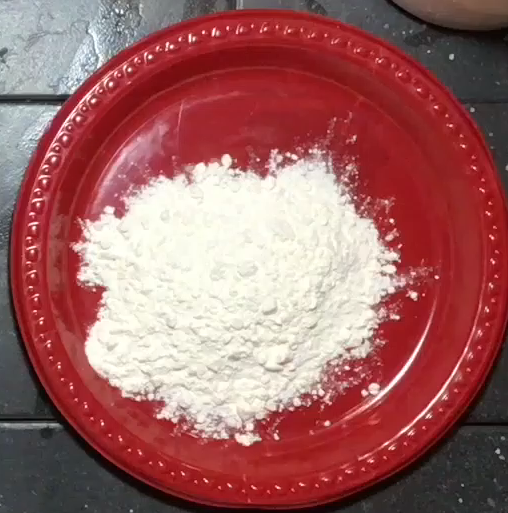
**Context: Riparian buffer**  
Compacted, minimal life,  
sandy, high use area







BREAD  
SOIL  
SAND. SILT. CLAY.  
+ BIOLOGY



FLOUR  
DIRT  
SAND. SILT. CLAY





# Infiltration and runoff

## by type of management on agricultural land



Which jars indicate that the soil health principles are in place?

INFILTRATION - back row of jars

RUNOFF - front row of jars



# Holding Landscapes in Place

Creating conditions for healthy soil will decrease flooding and drought and increase transpiration and global cooling.

Soil carbon is the living (soil organic matter [SOM] including plants & animals), the dead (decaying SOM) and the very dead (stable humus, glomalin, fossil fuels, coal).

SOM holds 18-20 times its weight in water and recycles nutrients for plants to use.

The first meter of soil contains three times as much carbon (in SOM) as is found in either the atmosphere or in living plants.

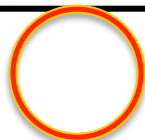
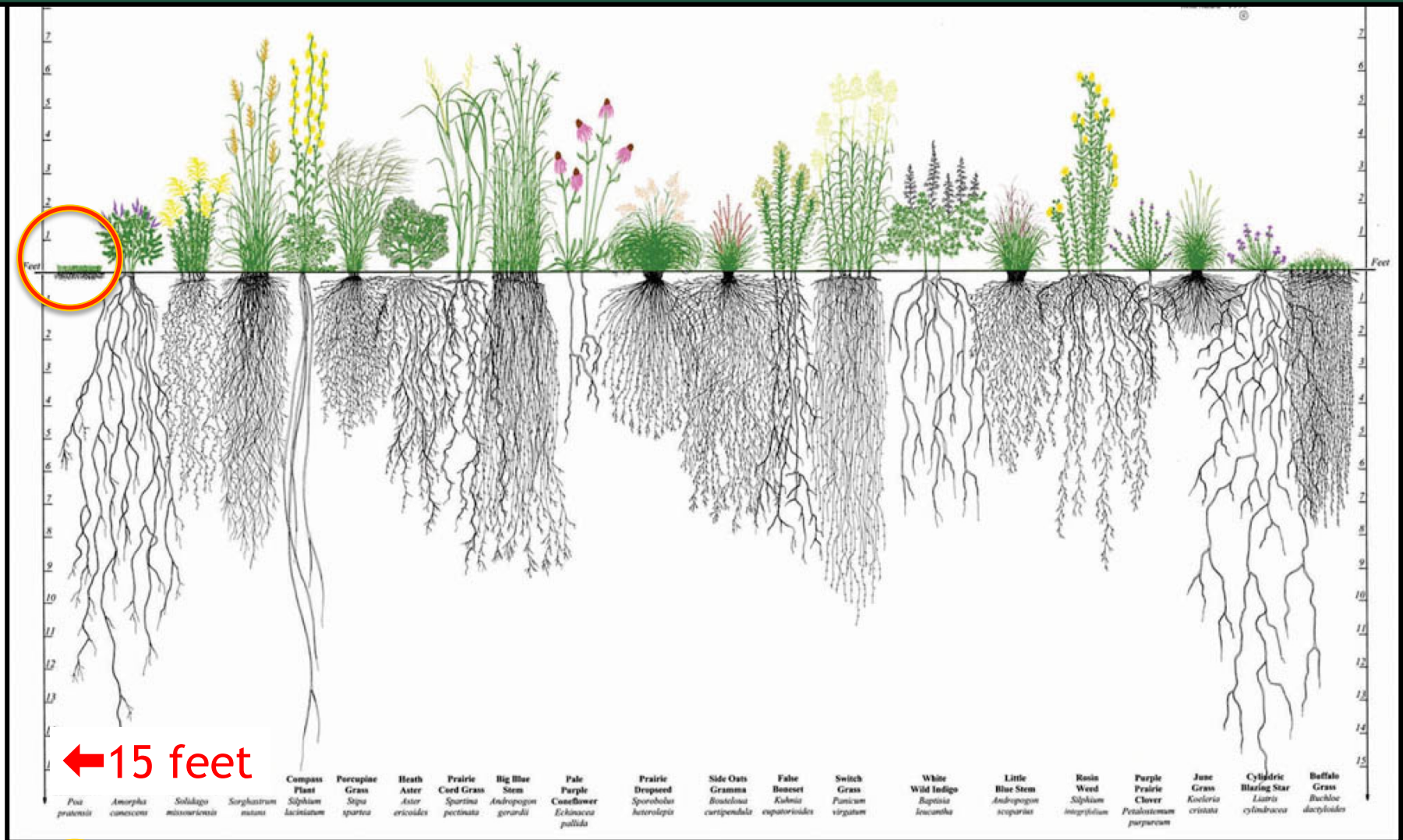
Living soil can absorb and store greenhouse gases AND retain and cycle water.

A 1% increase of organic matter in the top 6 inches of soil per acre can hold over 20,000 gallons of water.



# Principle 1: Living Roots In the Ground

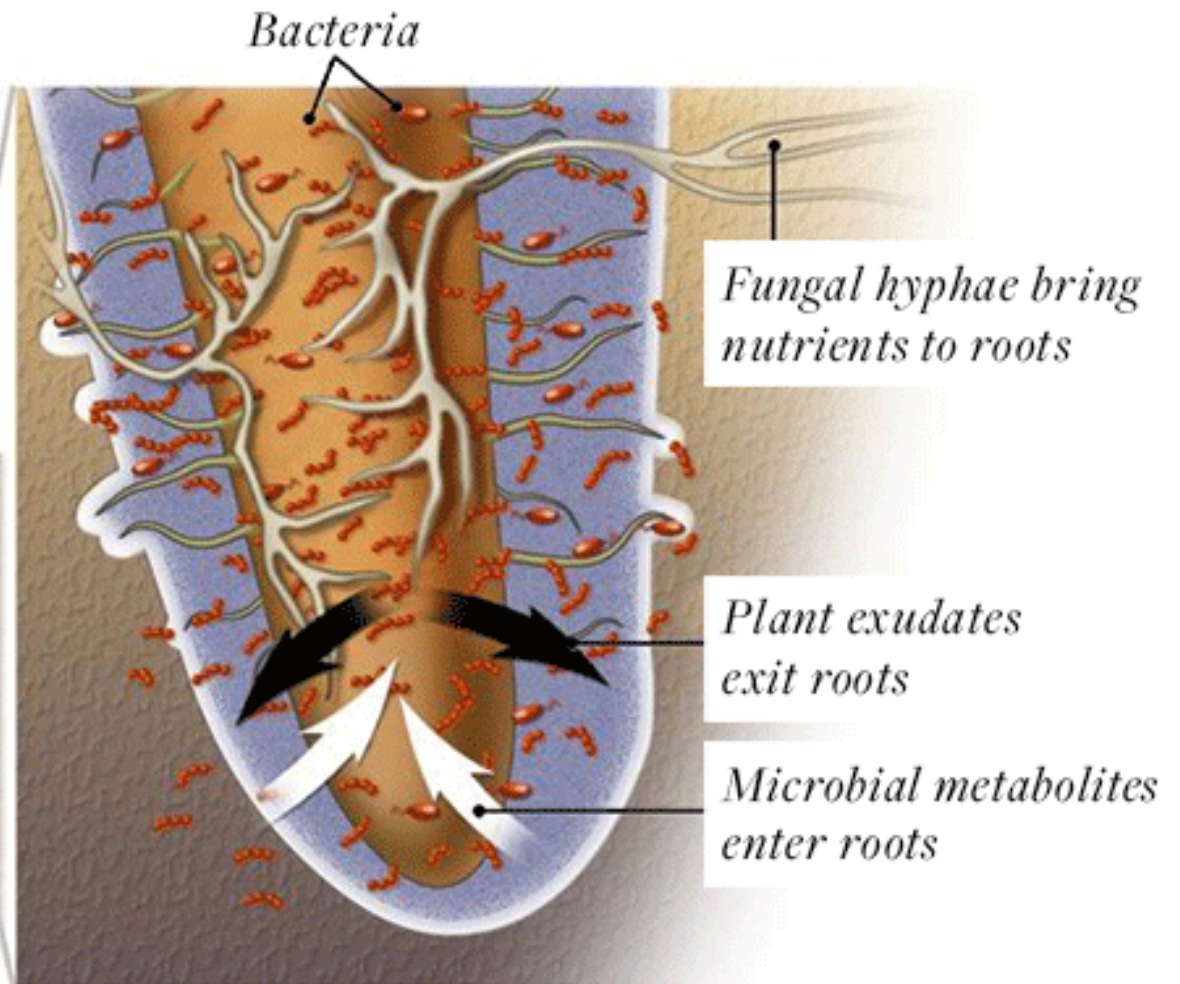
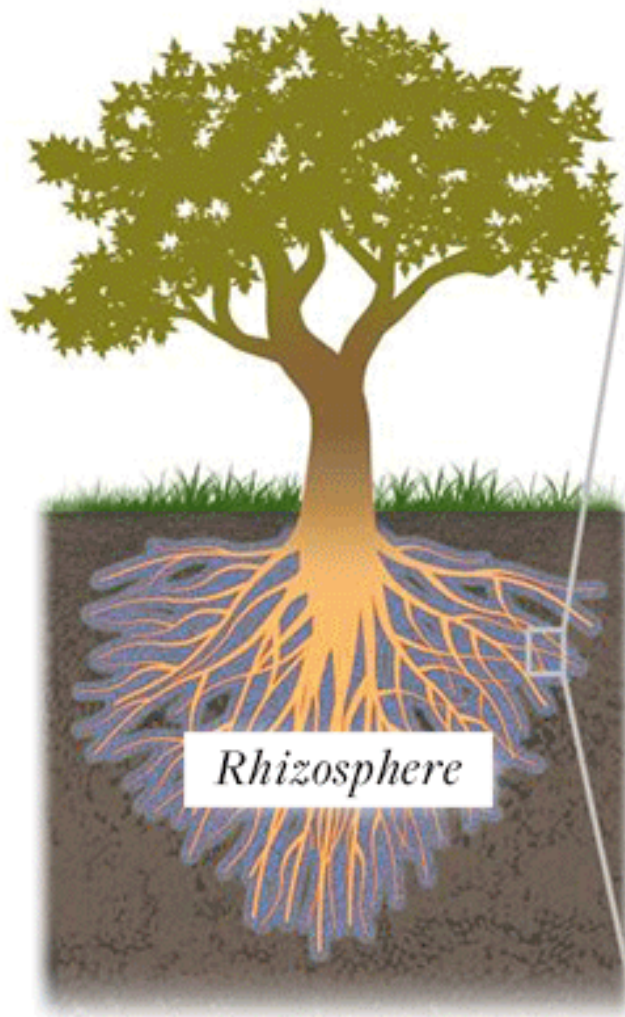
Grow More Deep-Rooted Perennials. Nurture photosynthesis.



Standard lawn

USA: 32 million acres of lawns (residential, commercial, and institutional lawns, parks, golf courses and athletic fields)

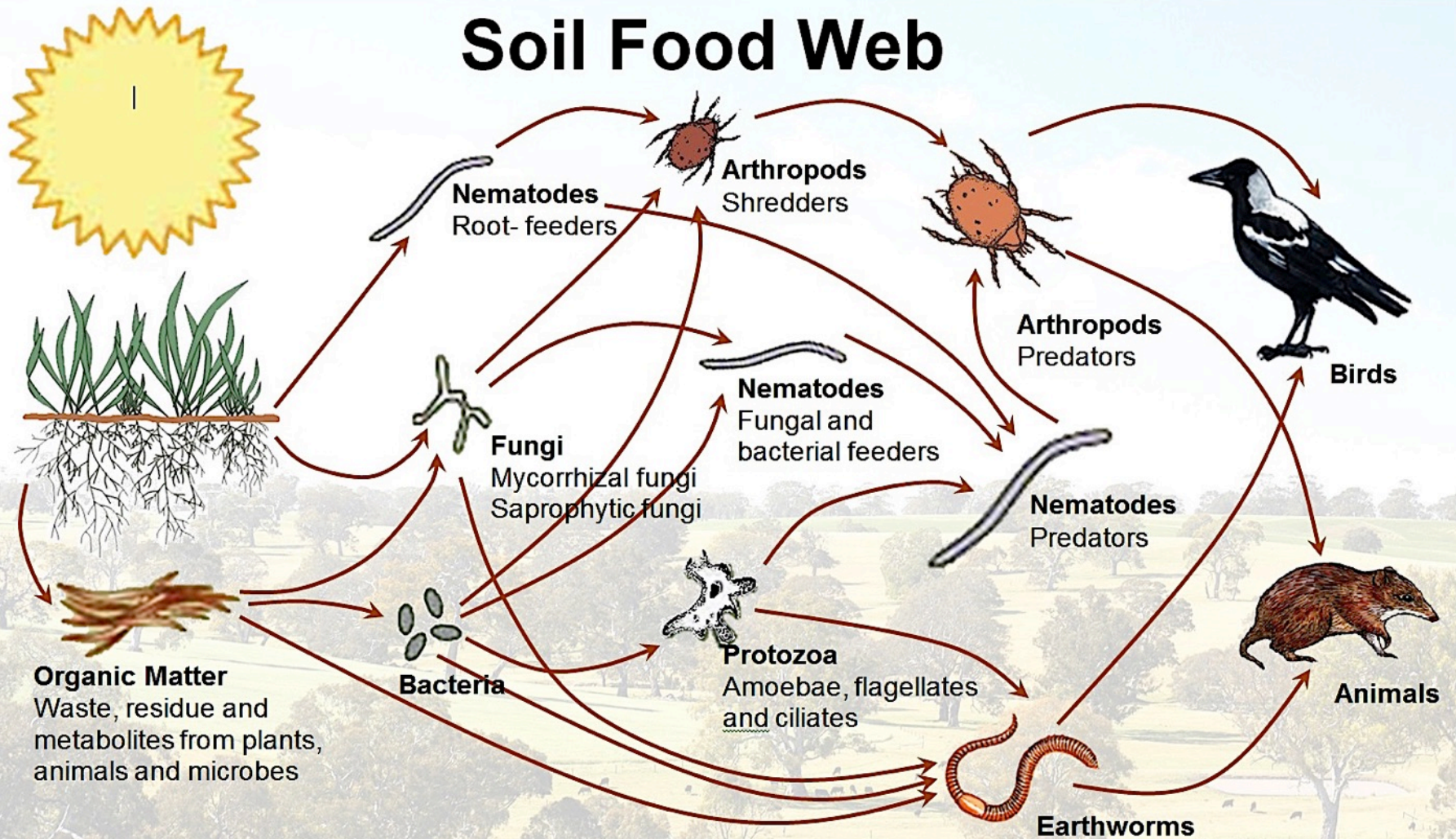




The rhizosphere can be vast!



# Soil Food Web

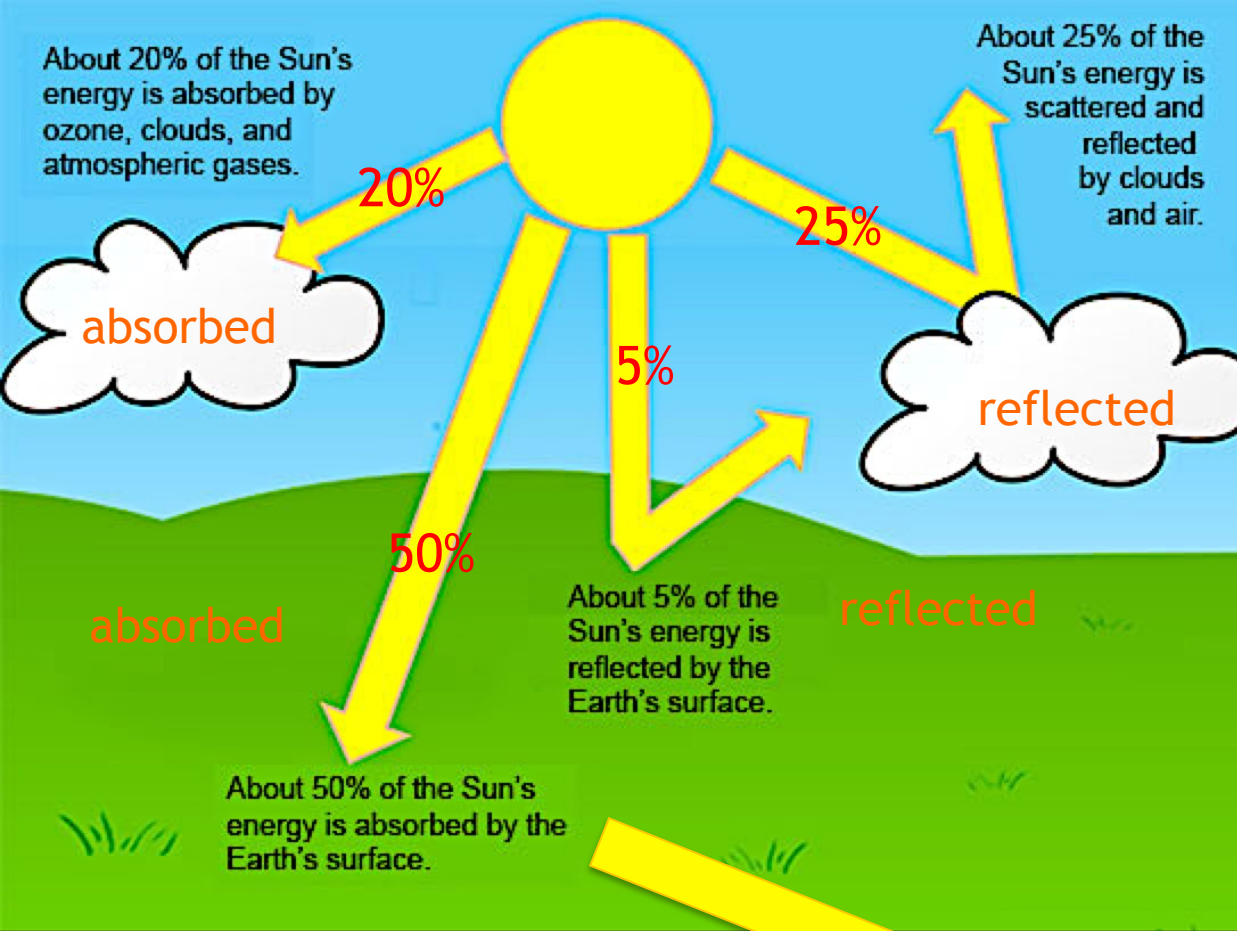


First trophic level	Second trophic level	Third trophic level	Fourth trophic level	Fifth trophic level
Photo synthesisers	Decomposing Mutualists, Pathogens, Parasites, Root-feeders	Shredders Predators Grazers	High level predators	Higher level predators

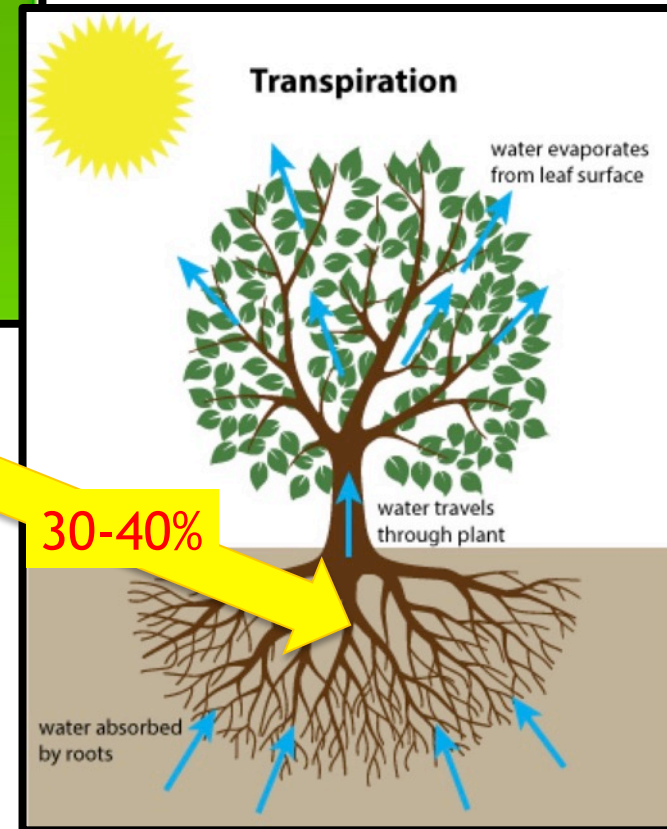


# SUNLIGHT ENERGY

- 25% reflected back to space
- 50% absorbed by earth as carbon to feed the underground zoo: biomass, plants, microbes
- 20% absorbed by atmosphere
  - Need clouds
- 5% reflected by earth surface
  - Radiative cooling

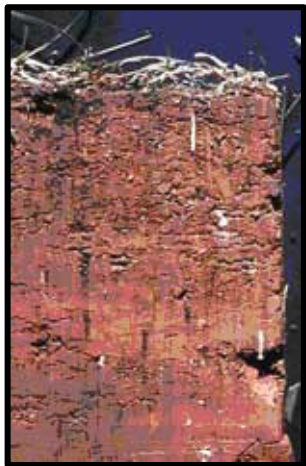


## INCREASED BIOMASS



# Build the Soil Carbon Sponge with Plants!

Turn this



and this!

and this!



Jack and Anne Lazor's perennial pasture Butterworks Farm, Westfield VT

To this!



Nicole Masters photo: New Zealand



# Breaking compaction and building soil aggregation with living plants



American Society for Microbiology

# HOW WILL WE IMPROVE SOIL AT CLIFFORD PARK?

By Following the Soil Health Principles!

1. Context matters
2. Living roots In the ground
3. Maximized diversity
4. Minimized disturbance
5. Minimized bare soil
6. Animals in contact with soil

1. Manage compaction. Add organic matter. Secure water.
2. Path/bed design. Plant cover crops.
3. Design for maximum diversity, above and below.
4. Management plan
5. Mulch and built up soil beds for planting
6. Compost (chickens... goats...)



# Area of Focus



# PROCESS



Design Paths and bed shapes

Gather sheet mulching materials for paths: cardboard, newspapers, wood chips, leaves

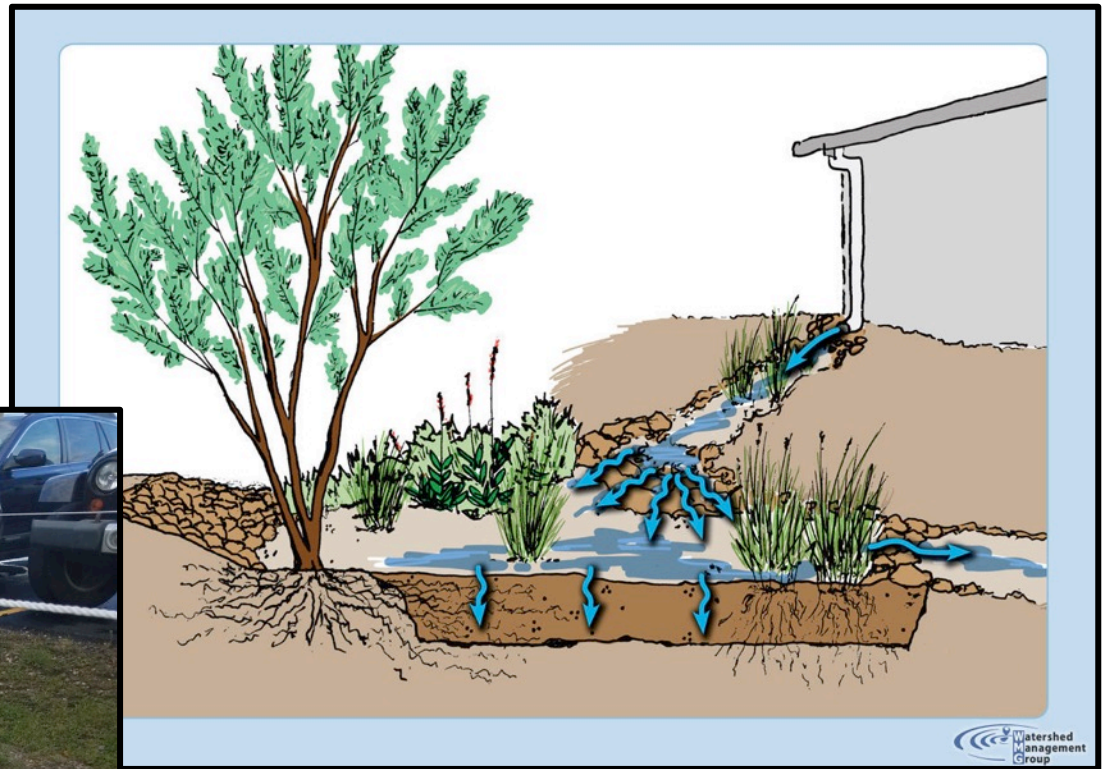
Loosen compaction in bed areas with broad forks or tillage

Build soil in beds with leaves, straw, compost, manures...

Begin planting soil building cover crops in beds.

Plant keystone bed species.





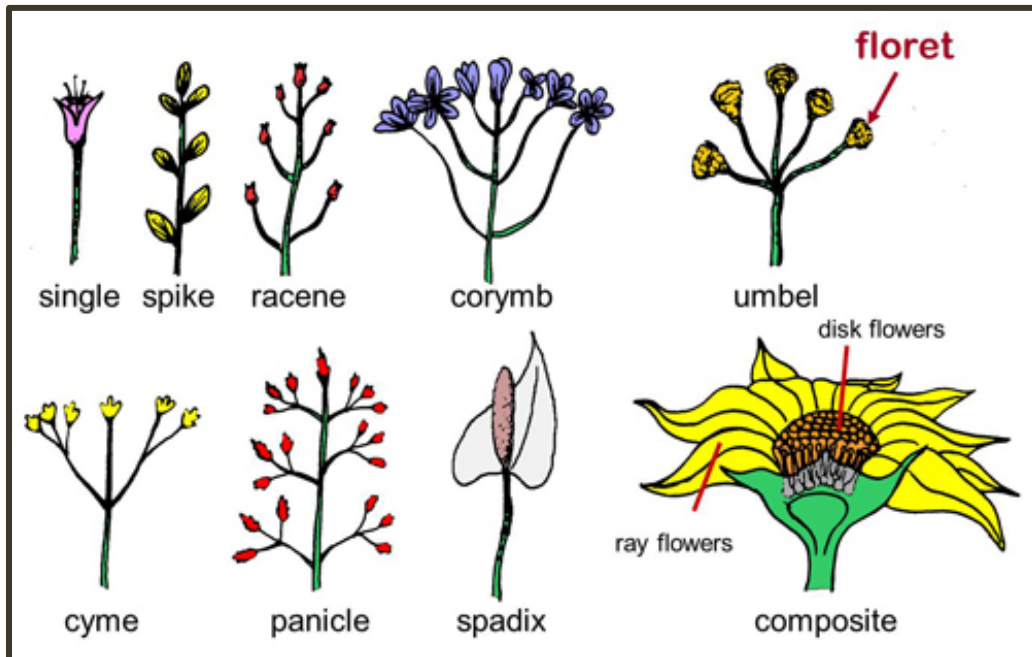
Slow and sink the water into the soil sponge





# Diversity attracts diversity, promoting balance.

Species, heights, textures, structure, color, timing, food  
for all, micro climates, biomass, crops, livestock ...



Some insects  
are specialist feeders



Some insects require  
plenty of good places  
to rest, or to hunt  
from.

# Community Process

**1 Build a Clifford Park Team! - Join us!**

**2 Build Skills: Community Education**

Wednesdays 6:30 PM - 8:00 PM

May 26: Building Soil with Cat Buxton

June 9: Species & Design with Karen Ganey

Community Design Process - Charette - Date TBD

**3 Build soil**

**4 Grow a food forest!**



# PHYSICAL PROCESS TIMELINE

## MAY

Mark the spot 125' X 182' ( 21,950 square feet)

## JUNE

### Design space layout

Design and Mark Paths and bed shapes

Gather sheet mulching materials for paths: card board, newspapers, wood chips, leaves

Loosen compaction in bed areas with broad forks

Build soil in beds with leaves, straw, compost, manures...

## MID JUNE

Species design

## LATE JUNE

Begin planting soil building cover crops in beds.

Plant keystone bed species.

## JULY

Design approval

## AUGUST/SEPTEMBER

Plant trees and tree guilds

# Join the Clifford Park Food Forest team!

## There are lots of ways to get involved

### Ground Team

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Do you have connections to resources like leaves, wood chips, compost, plants, or other organic matter?

Do you have an interest in building soil?

### Creation Team

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Do you like physical work? In the short term we have soil to build, holes to dig, and seeds to plant! In the long term, we need a team of committed caretakers.

### Fundraising

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Are you a writer? Comfortable writing grants? Do you like fundraising for community projects?

### Design

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Do you have ideas for species and design and want to be involved in that process?





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