



FORS 4160: Soil Science
Dr. Michael Remke

About me:

PhD: Forest Science
Northern Arizona University
Bowker Forest and Rangeland Soils Lab

B.S: Environmental Biology
Fort Lewis College

Collaborative Forest Mangement:
Mountain Studies Institute



Hobbies:

Travel (especially with my partner, Lauren)

Photography

Backpacking

Hiking

Birding....



Michael Rando Photography

Current Research:

Fire moss x mycorrhizae x
drought stress interactions



Classifying mixed conifer forests
for improved mangement
guidelines



Collaborative
Forest
Management



Post fire fungi succession
and mycorrhizae in
reforestation



What are some ways soil has impacted your life?

→ Labs

→ Microbiology

→ Food

→ Forests / outdoors

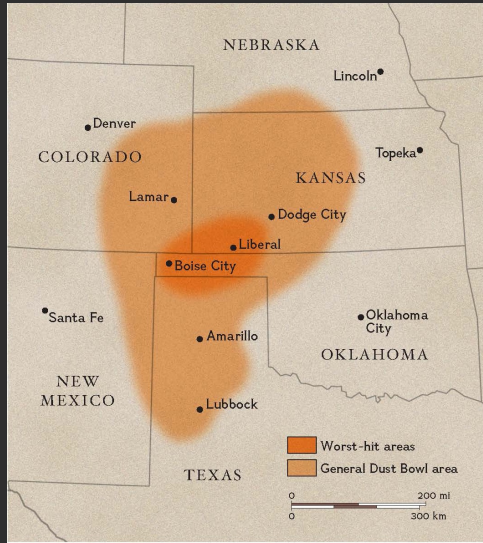
→ Live on soil

For in the end we will conserve only what we love.

We will love only what we understand.

And we will understand only what we are taught.

—Baba Dioum, African Conservationist



Dust Bowl







Varves



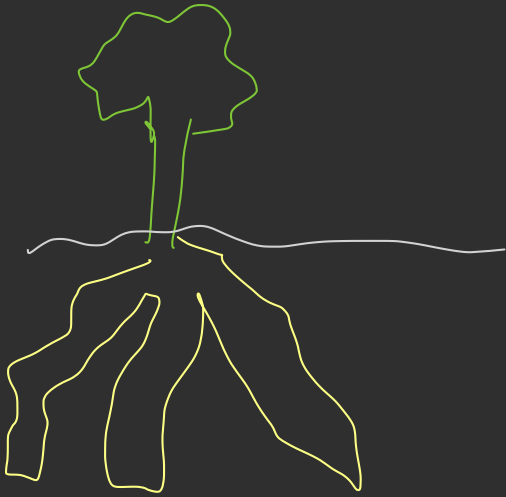
Clay Licks







1. Soil as a medium for plant growth.



Soil Provides plants.

Water (H_2O)

Nutrients N P K

Support



Table 1.1

ELEMENTS NEEDED FOR PLANT GROWTH AND THEIR SOURCES^a

The chemical forms most commonly taken in by plants are shown in parentheses, with the chemical symbol for the element in bold type.

Macronutrients: Used in relatively large amounts (>0.1% of dry plant tissue)		Micronutrients: Used in relatively small amounts (<0.1% of dry plant tissue)
Mostly from air and water	Mostly from soil solids	From soil solids
Carbon (CO₂)	<i>Cations:</i>	<i>Cations:</i>
Hydrogen (H₂O)	Calcium (Ca²⁺)	Copper (Cu²⁺)
Oxygen (O₂ , H₂O)	Magnesium (Mg²⁺)	*Cobalt (Co²⁺) ^b
	Nitrogen (NH₄⁺)	Iron (Fe²⁺)
	Potassium (K⁺)	Manganese (Mn²⁺)
	<i>Anions:</i>	Nickel (Ni²⁺)
	Nitrogen (NO₃⁻)	*Sodium (Na⁺) ^b
	Phosphorus (H₂PO₄⁻ , HPO₄²⁻)	Zinc (Zn²⁺)
	Sulfur (SO₄²⁻)	<i>Anions:</i>
	*Silicon (H₄SiO₄ , H₃SiO₄⁻) ^b	Boron (H₃BO₃ , H₄BO₄⁻)
		Chlorine (Cl⁻)
		Molybdenum (MoO₄²⁻)

Nice Plants Prefer Clean Moist Soil
 Fe N Mg P B K Calcium Mg S
 Iron Makes Beautiful Zinnias Copper Makes Color Nice
 Zn

2.
Soils

Regulate
Water



W.
Soils
recycle
raw
materials

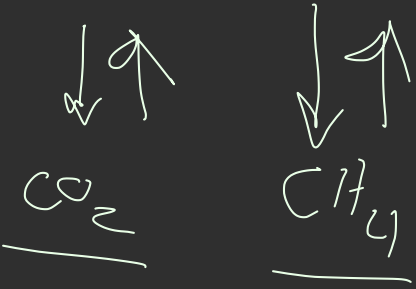


Decomposition!

4. Soils

Mod:fy

the atmosphere



↑
Haboob

S. Soils
as habitat

Microscopic
and

Macroscopic



Symphyla

6. Soils as
an engineering
medium



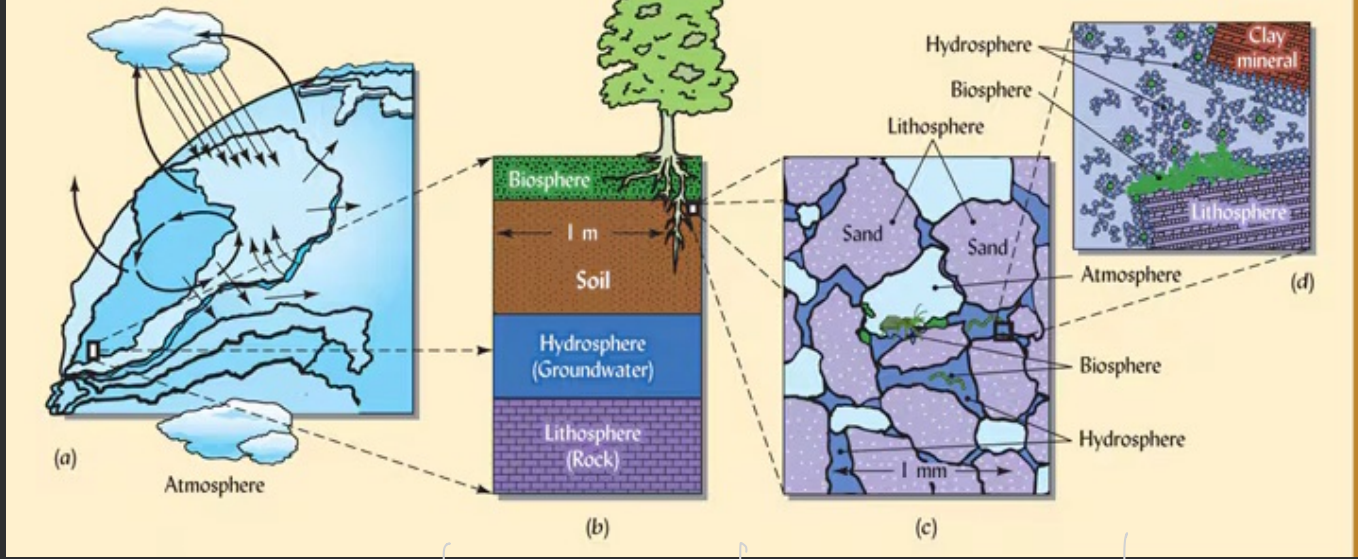


→ Sci.)
Pedosphere as an Environmental Interface

Regolith

Unconsolidated
loose rock
on top of
bed rock





km

m

mm

Soil Formation

Pedogenesis

A soil is a 3-D body made up of air, water, rock and life.

A soil = A tree

The Soil(s) the collection of soil on the planet.

The soils = Plants

