

“Helping People Understand Soils”

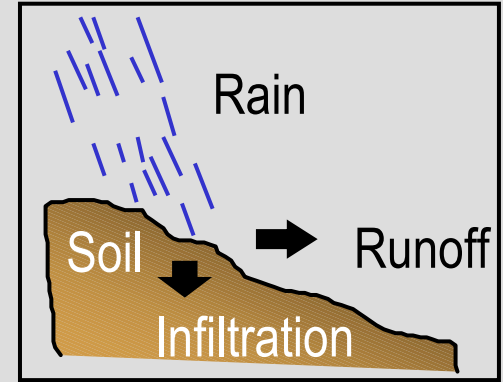
Ten Key Messages

Soils Perform Vital Functions



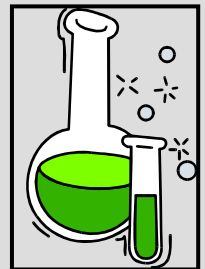
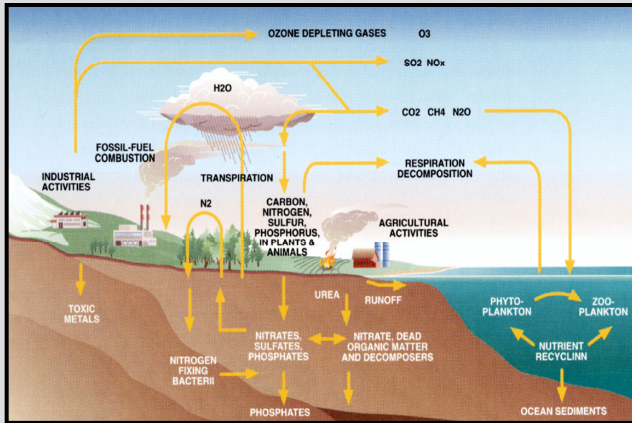
Sustaining plant and animal life below and above the surface

Regulating and partitioning water and solute flow



Filtering, buffering, degrading, immobilizing, and detoxifying

Storing and cycling nutrients

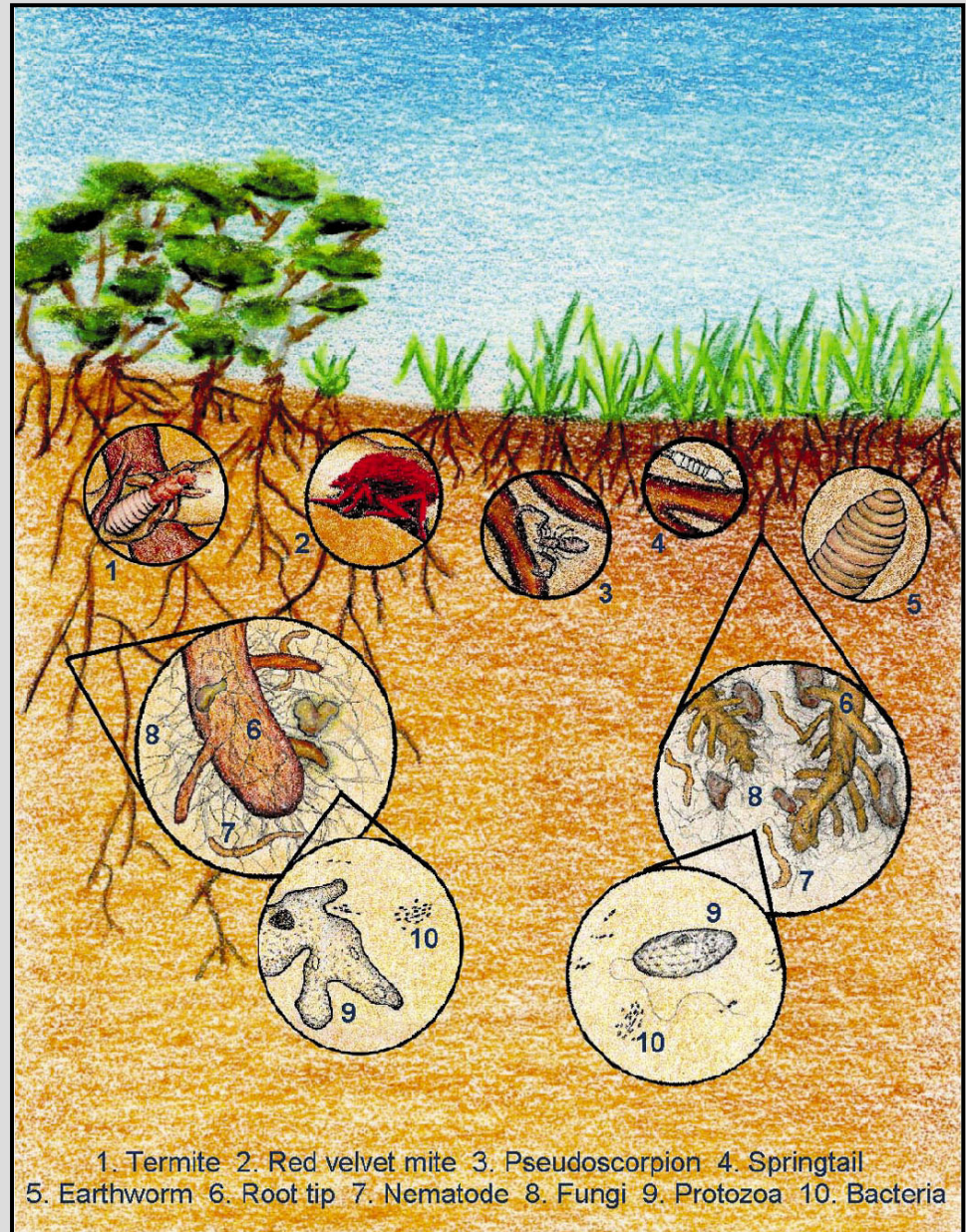


Providing support to structures



Soil is the Basis of the Ecosystem

The living systems occurring above and below the ground surface are determined by the properties of the soil. We often ignore the soil because it is hard to observe.



Soils Support Life

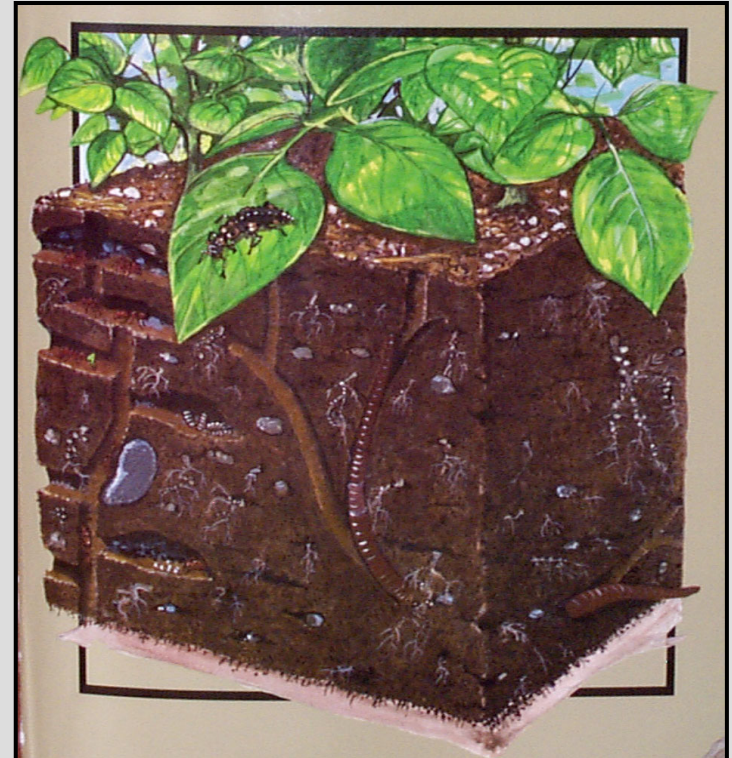


Organism Types

bacteria
fungi
protozoa
nematodes
arthropods
earthworms

Roles & Benefits

decomposition
release nutrients
create pores
stabilize soils



Soil Management Affects Soil Quality

Soil Quality




Soil Quality - Introduction

USDA Natural Resources Conservation Service Revised June 2001

What is soil?

Soil is a dynamic resource that supports plant life. It is made up of different sized mineral particles (sand, silt, and clay), organic matter, and numerous species of living organisms. Thus, soil has biological, chemical, and physical properties, some of which are dynamic and can change in response to how the soil is managed.



Soil acts as a filter to protect the quality of water, air, and other resources.

Soil supports structures and protects archeological treasures.

What is soil quality?

Soil quality is the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation. Changes in the capacity of soil to function are reflected in soil properties that change in response to management or climate.

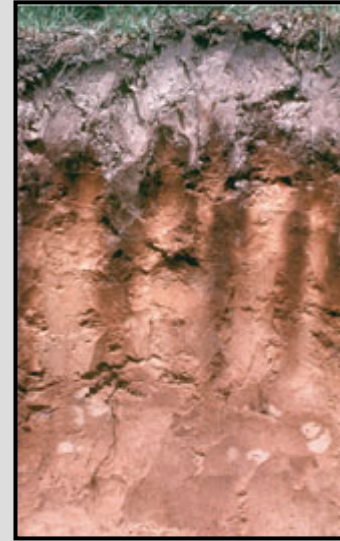
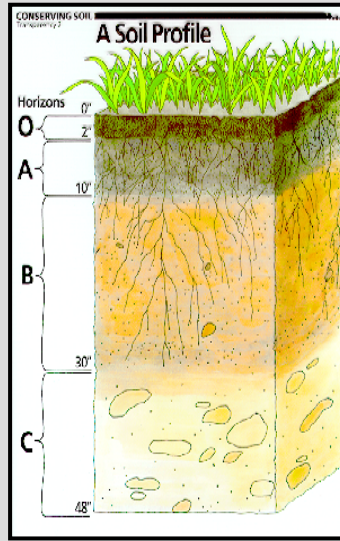
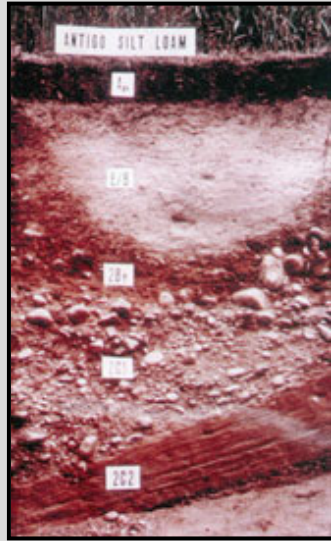
Why is soil quality important?

Management that enhances soil quality will benefit



Soils Have Unique Physical, Chemical, and Biological Properties Important to Their Use

color
texture
structure
consistence
roots
pores
other features



Soil is a natural body of solids, liquid, and gases, with either horizons, or layers or the ability to support rooted plants.

Pedology, the study of soil, is a unique discipline.

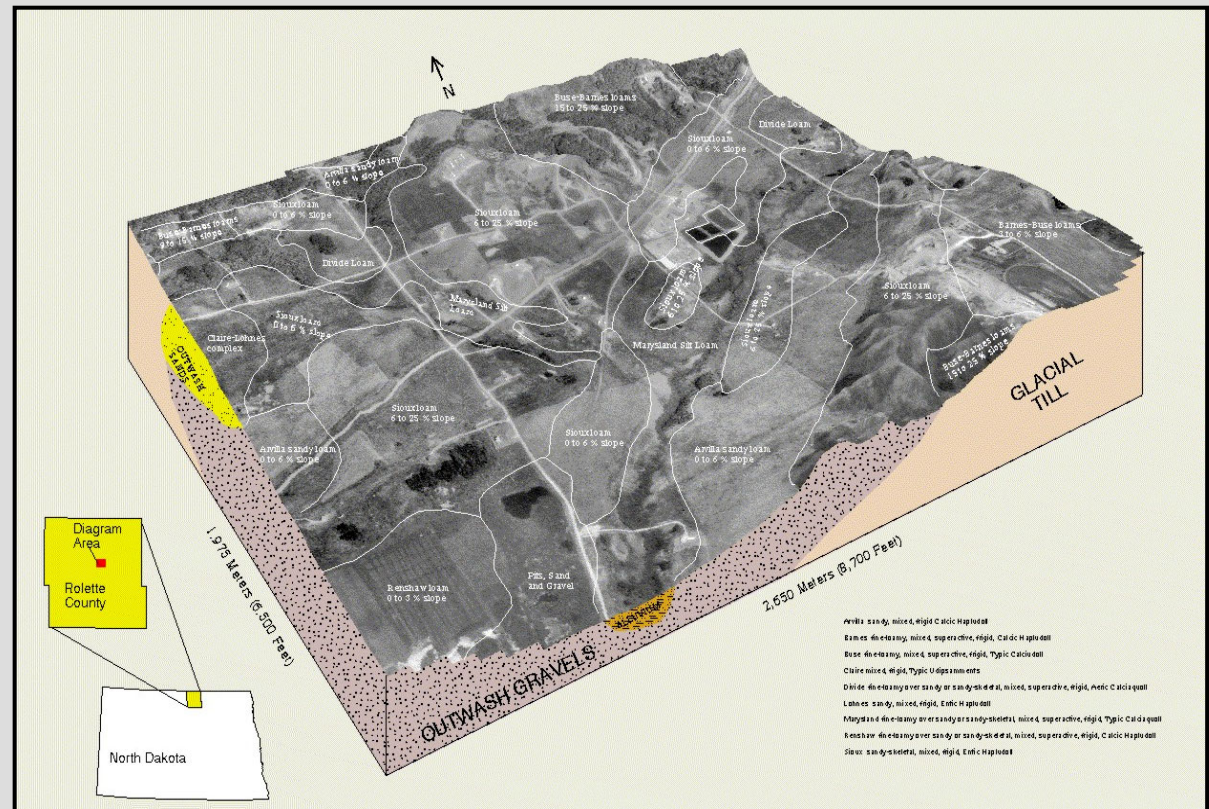
Soil-Forming Factors Determine the Location and Kind of Soil

There are 23,000 soil series in various combinations with different slopes and surface textures in the U.S.

Soil Forming Factors:

Parent Material
Climate

Living Organisms
Topography
Time



Soil Survey is a Scientifically-Based Inventory

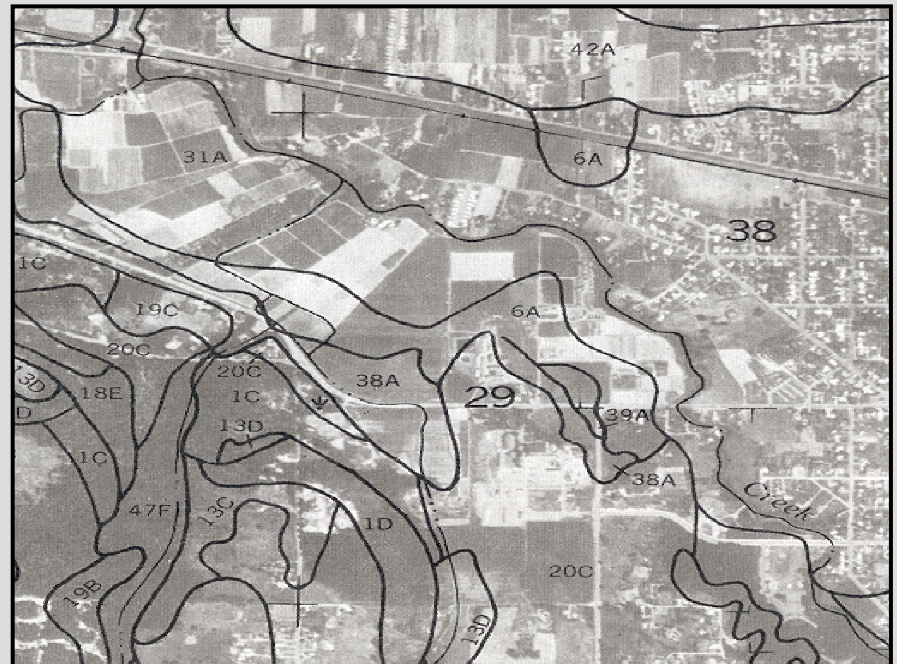
SOIL SURVEY OF
Pierce County Area, Washington



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Washington Agricultural Experiment Station

A soil survey includes maps, descriptions, properties, climate, and interpretations. These are excellent sources of information.

About 3000 counties in the United States have a soil survey.



Soils Have Limitations Which Must Be Understood

Concerns for life and properties

allergies

corrosivity

dust

flooding

gypsum dissolution

piping

rapid runoff

sand blowing

septic failure

sinkholes

soil borne disease

sulfidic materials

water tables

contaminants

crop loss

erosion

frost action

liquefaction

radon

salt build up

sedimentation

shrink-swell

slope failures

subsidence

urban hydrology



Scientific Names for Soils Reduce Ambiguity

- Like plants and animals, **soils are classified**
- The **system** is called **Soil Taxonomy**
- The **highest level** is the **soil order** (12)
- The **lowest level** is the **soil series**, often a place name



Soil Order

Alfisols

Andisols

Aridisols

Entisols

Gelisols

Histosols

Inceptisols

Mollisols

Oxisols

Spodosols

Ultisols

Vertisols

Formative terms

Alf from combination of al (aluminum) and f (ferrous) iron

Ando from Japanese term dark referring to dark volcanic ash

Latin, aridies, dry arid

Ent meaningless, root recent

Latin gelare, to freeze

Greek, histos, tissue

Latin, incepum, beginning, inception

Latin, mollis, soft, mollify

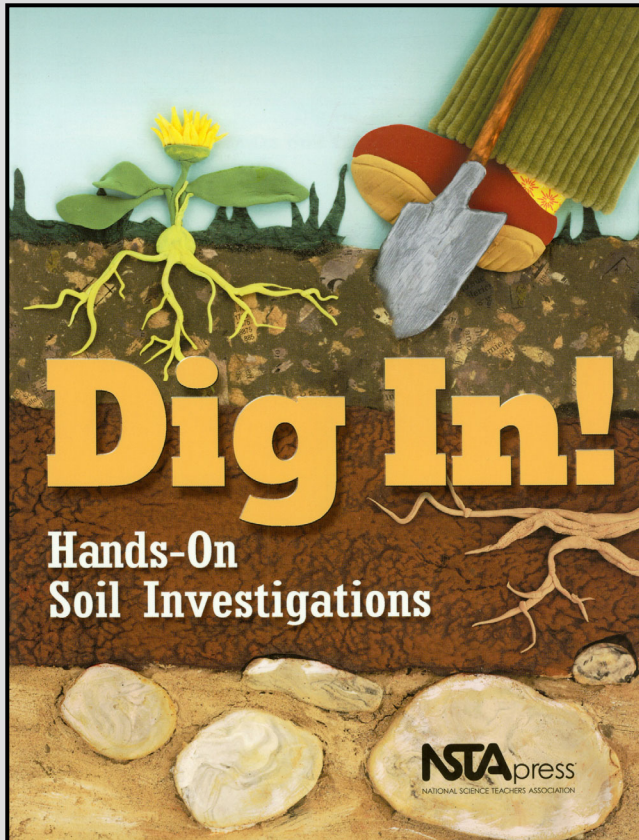
French oxide

Greek spodos, wood ash

Latin ultimus, last, ultimate

Latin verito, vertical cracking

Soil Science Can Be Usefully Incorporated Into Other Studies



Science

ecology, biology, chemistry

Social Studies

world trade, land use

Mathematics

soil loss over one hectare

History

settlement of the U.S., dust bowl

Art

soil crayons, acrylic paints