

# **“Helping People Understand Soils”**

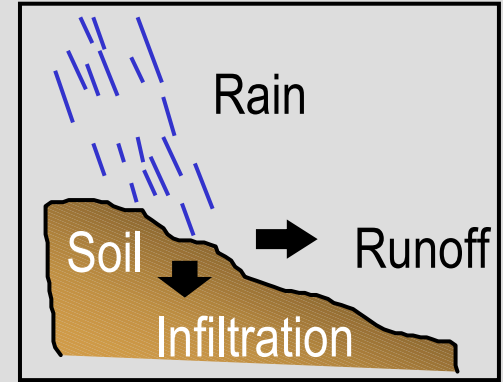
## **Ten Key Messages**

# Soils Perform Vital Functions



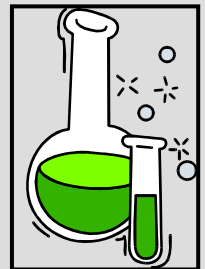
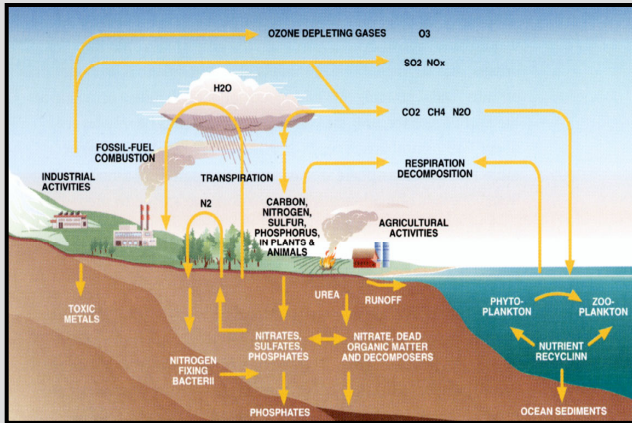
**Sustaining plant and animal life below and above the surface**

**Regulating and partitioning water and solute flow**



**Filtering, buffering, degrading, immobilizing, and detoxifying**

**Storing and cycling nutrients**

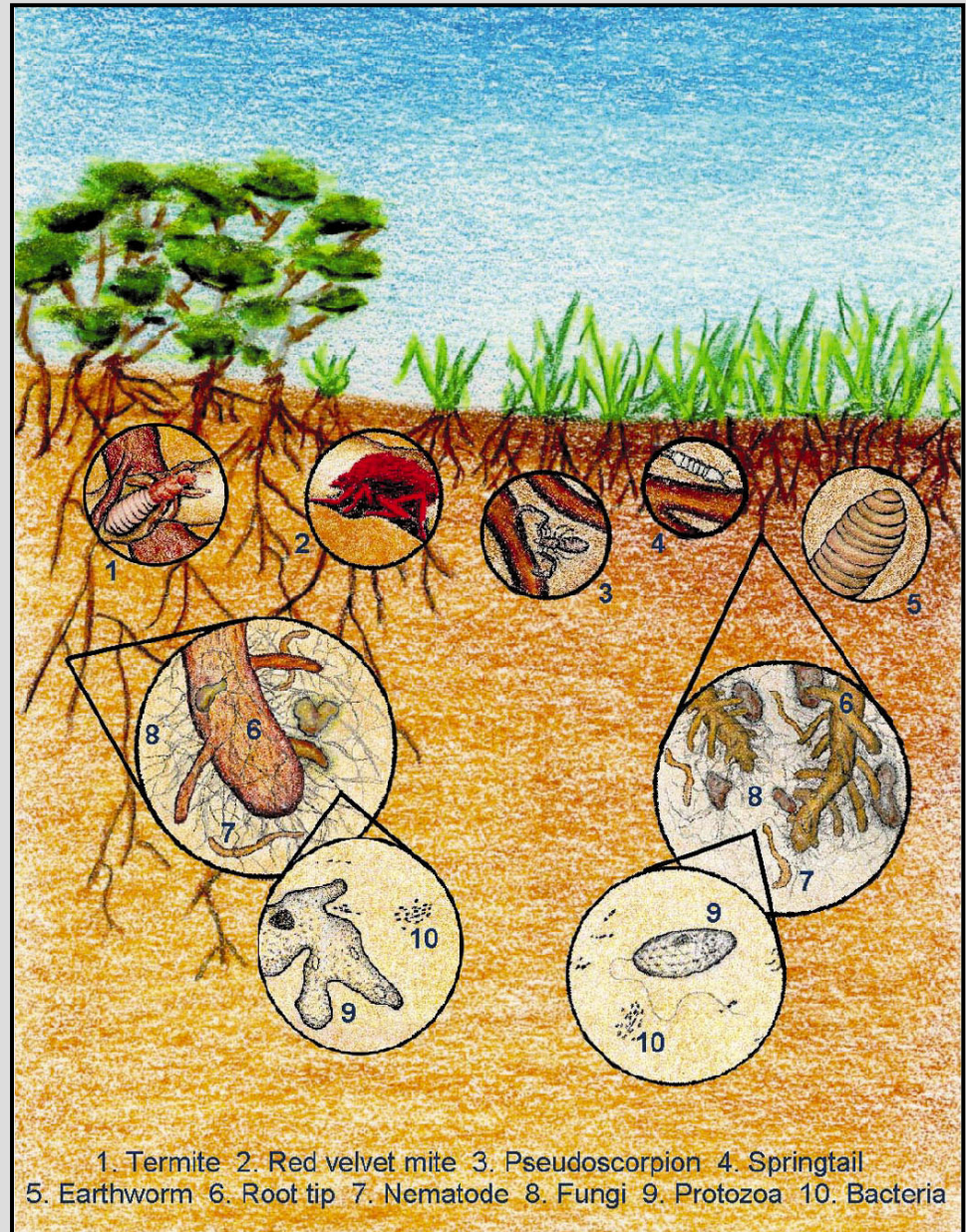


**Providing support to structures**



# 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

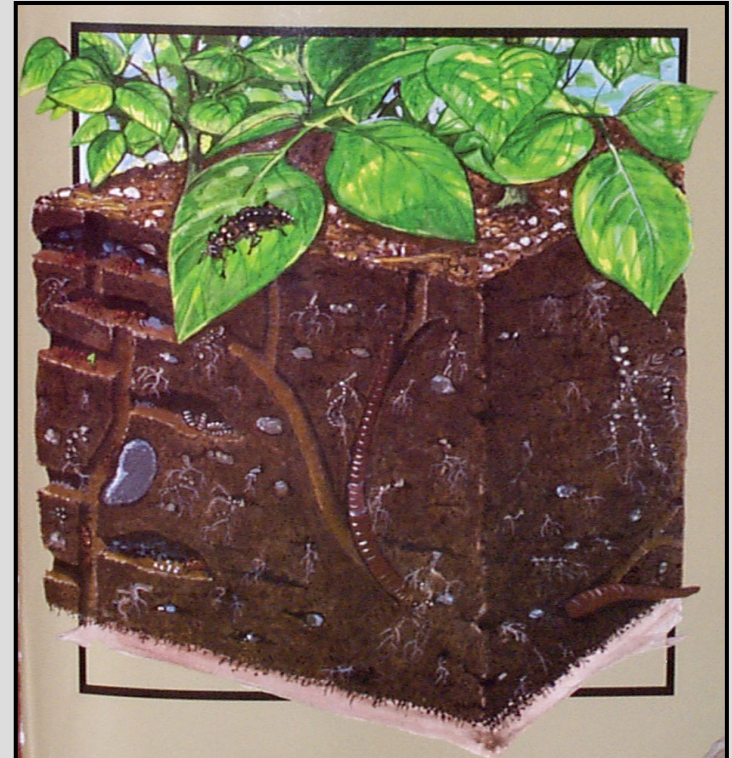


## Organism Types

bacteria  
fungi  
protozoa  
nematodes  
arthropods  
earthworms

## Roles & Benefits

decomposition  
release nutrients  
create pores  
stabilize soils



# Soil Management Affects Soil Quality

## Soil Quality



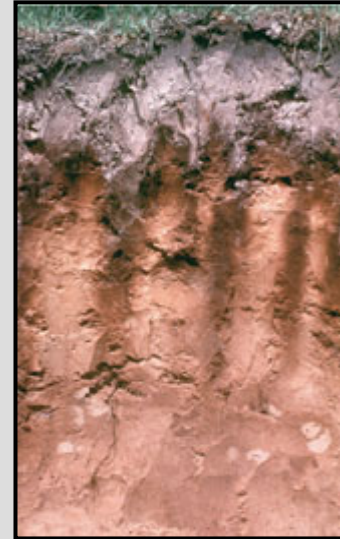
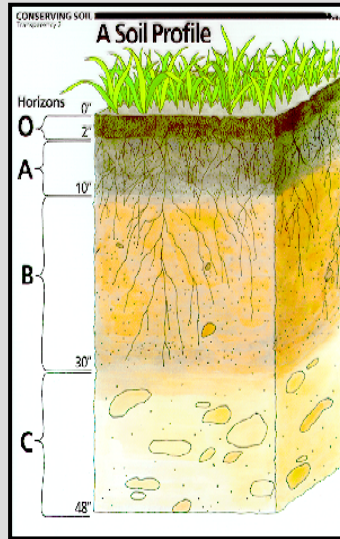
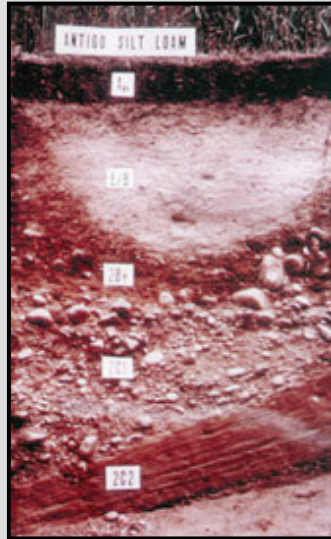
The screenshot shows a Netscape browser window with the following content:

- Browser title: **Soil Quality - Introduction**
- Page header: **USDA Natural Resources Conservation Service** (left) and **Revised June 2001** (right)
- Section: **What is soil?**
- Text: "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."
- Image: A photograph of a person's hands holding a handful of dark soil.
- Text: "Soil acts as a filter to protect the quality of water, air, and other resources."
- Text: "Soil supports structures and protects archeological treasures."
- Section: **What is soil quality?**
- Text: "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."
- Section: **Why is soil quality important?**
- Text: "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 Survey is a Scientifically-Based Inventory

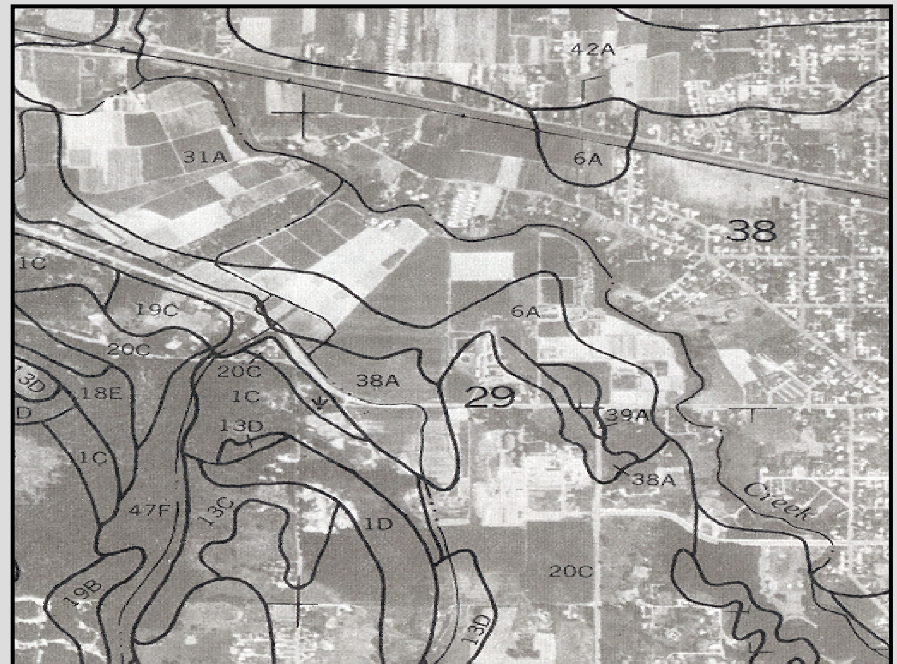
## SOIL SURVEY OF Pierce County Area, Washington



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

Histoisols

Inceptisols

Molliisols

Oxiisols

Spodoisols

Ultiisols

Vertiisols

## 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

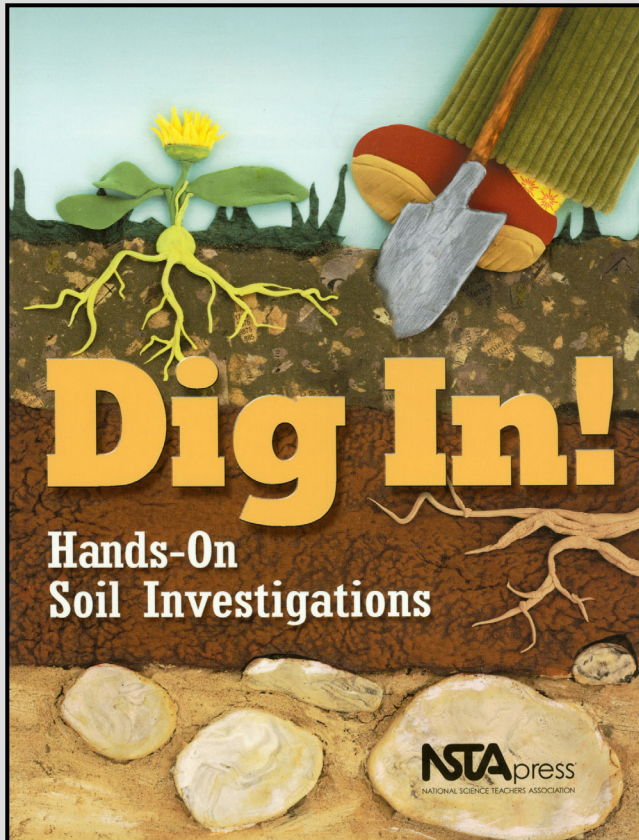
French oxide

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