



United States Department of Agriculture



**Soil Science Division**  
Natural  
Resources  
Conservation  
Service



# Wetlands in a Watershed at the Landscape Scale

August 15, 2018/Kendra Moseley,  
Regional ESS, Soil Science Division

Natural  
Resources  
Conservation  
Service

[nrcs.usda.gov/](https://nrcs.usda.gov/)



United States Department of Agriculture

# Wetlands in a Watershed at the Landscape Scale



What is a wetland  
Factors defining a wetland  
What is a watershed  
Landscape setting  
considerations  
Soils/Vegetation  
Land Use by Humans



Natural  
Resources  
Conservation  
Service

[nrcs.usda.gov/](https://nrcs.usda.gov/)



# What is a Wetland

Many types, many synonym: Bog, Fen, River, Marsh, Slough, Swamp, Mire...

1. Distinguished by the presence of water, either at the surface of the soil or within the root zone of the plants
2. Often have unique soil types and conditions that differ from adjacent uplands and aquatic systems (water bodies)
3. Support vegetation and animals that are specially adapted to wet conditions (hydrophytes), or conversely, are characterized by an absence of flooding-intolerant biota.



Natural  
Resources  
Conservation  
Service

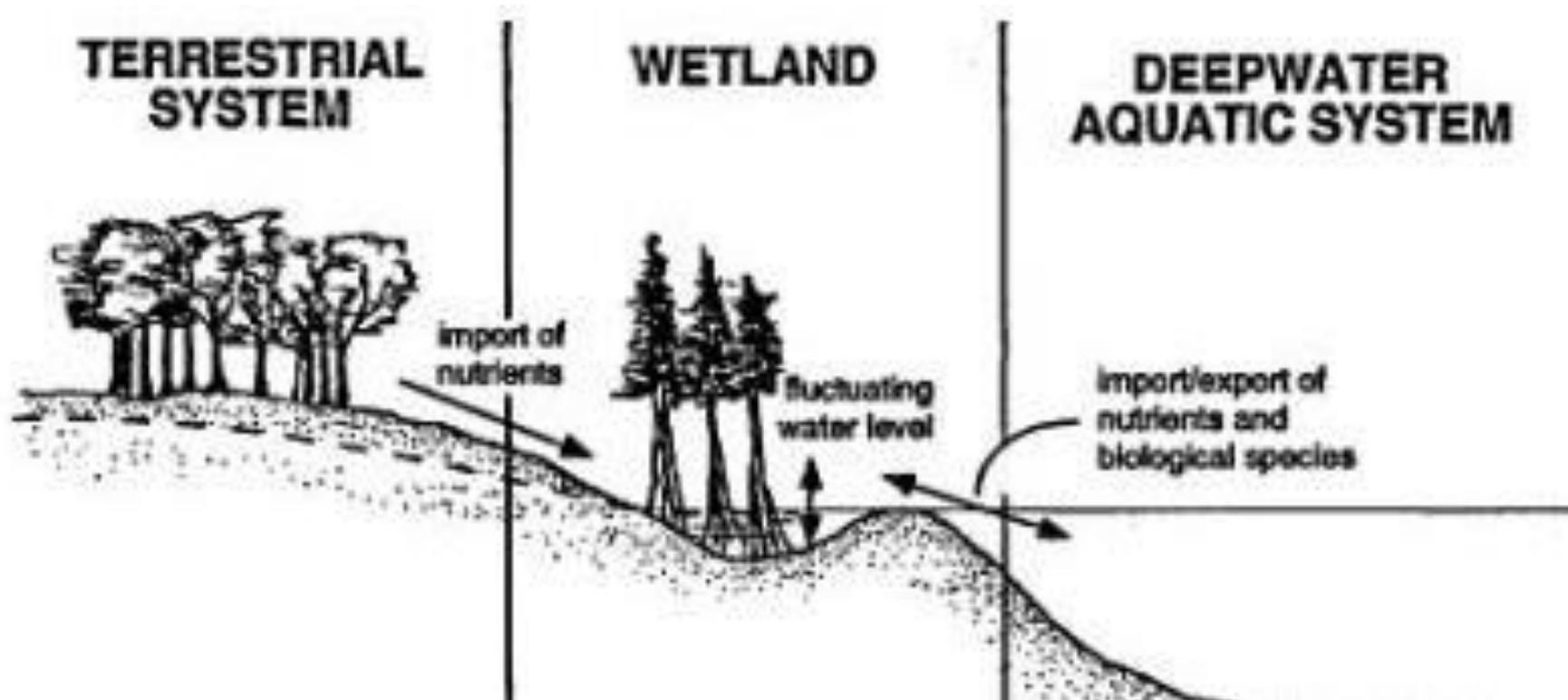
[nrcs.usda.gov/](https://nrcs.usda.gov/)



# What is a Wetland

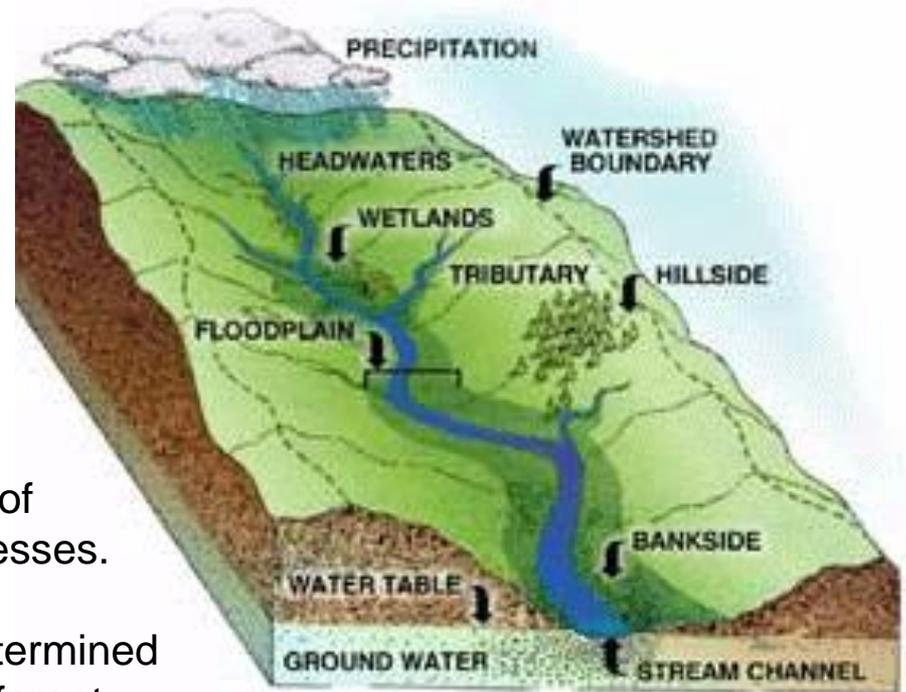
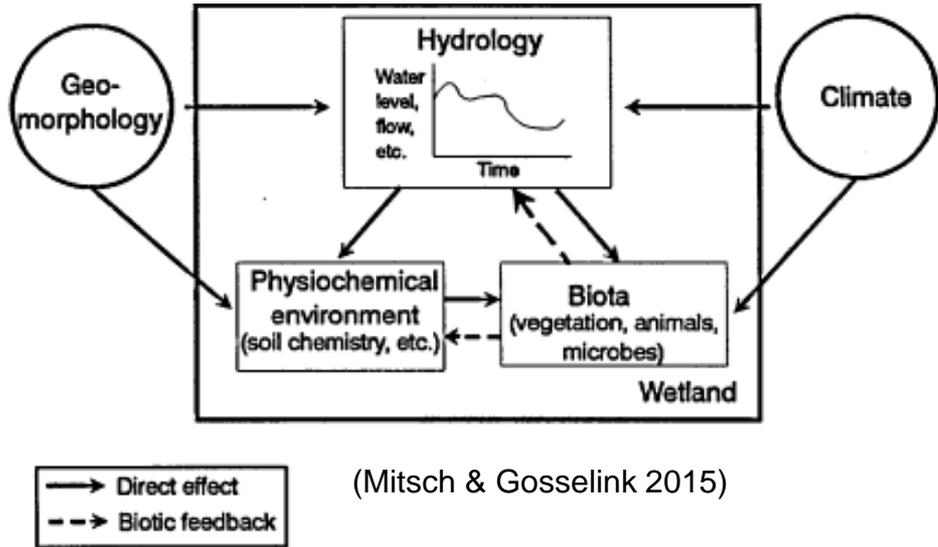


- Transitional between terrestrial systems (i.e. upland forests and grasslands) and aquatic systems (water bodies)
- Different from each yet uniquely connected to both



\*\*Adapted from Mitsch & Gosslink 2007

# Factors that Define a Wetland



The formation, persistence, size and function of wetlands are determined by **hydrologic** processes.

These hydrologic processes are ultimately determined by the geology, climate, and topography at different scales from the large watersheds down to the individual wetlands.



# Factors that Define a Wetland



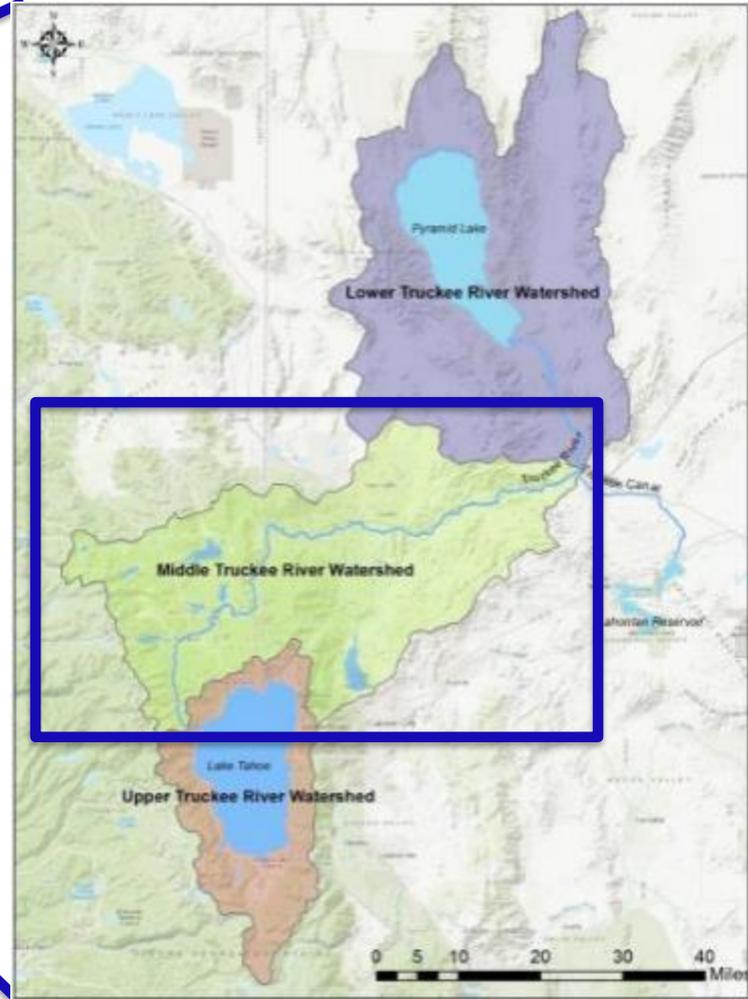
Natural  
Resources  
Conservation  
Service

[nrcs.usda.gov/](https://nrcs.usda.gov/)

# Landscape to Watershed



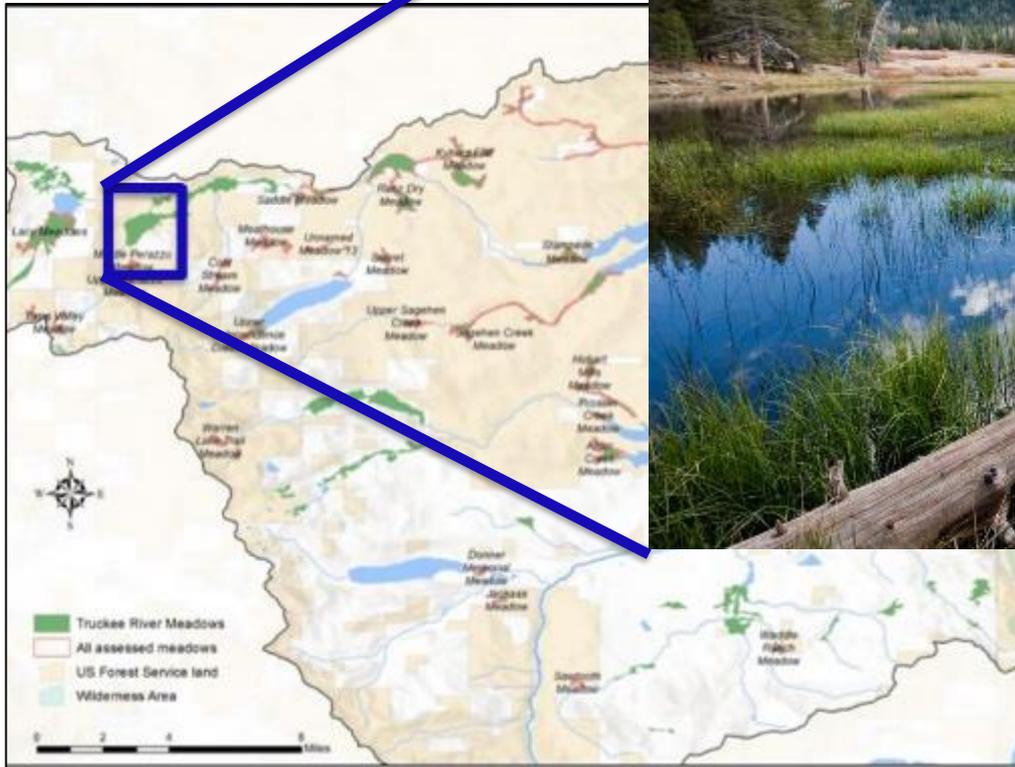
California Sierra Nevada Mountains



Middle Truckee River Watershed



# Watershed to Wetland



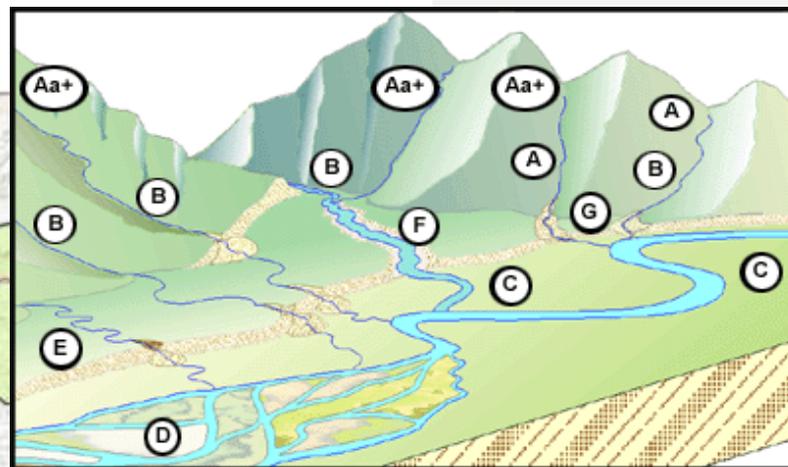
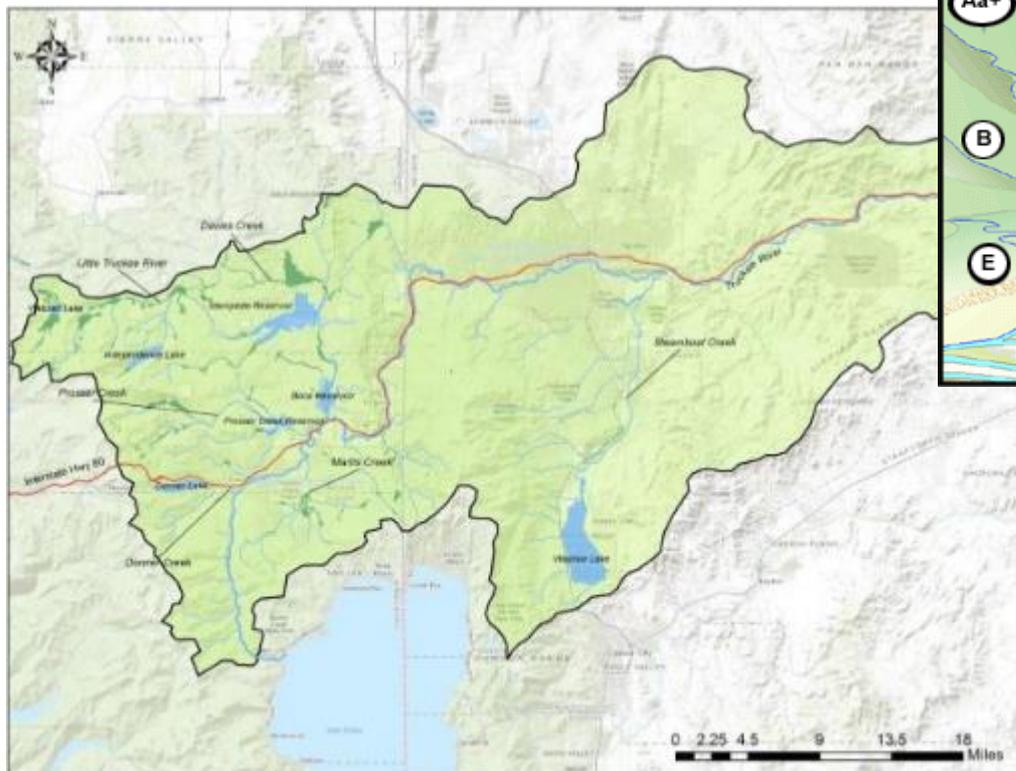
**Middle Perazzo Meadows  
Wetland**

**Middle Perazzo Meadows**



# Watershed

**What is a watershed?** A watershed (also called a drainage basin or catchment) is the area of land where all of the water that falls in it and drains off of it goes to a common outlet. Watersheds can be as small as a footprint or large enough to encompass all the land that drains water into rivers that drain into the San Francisco Bay, where it enters the Pacific Ocean (USGS).



[https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent\\_object\\_id=1202](https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=1202)



# Watershed

Precipitation (how much water stays or goes depends on):

- Climate
- Evaporation
- Transpiration
- Formation of the land
- Shape of the land
- Slope of the land
- Water flow
- Soil/Vegetation
- Land use by humans

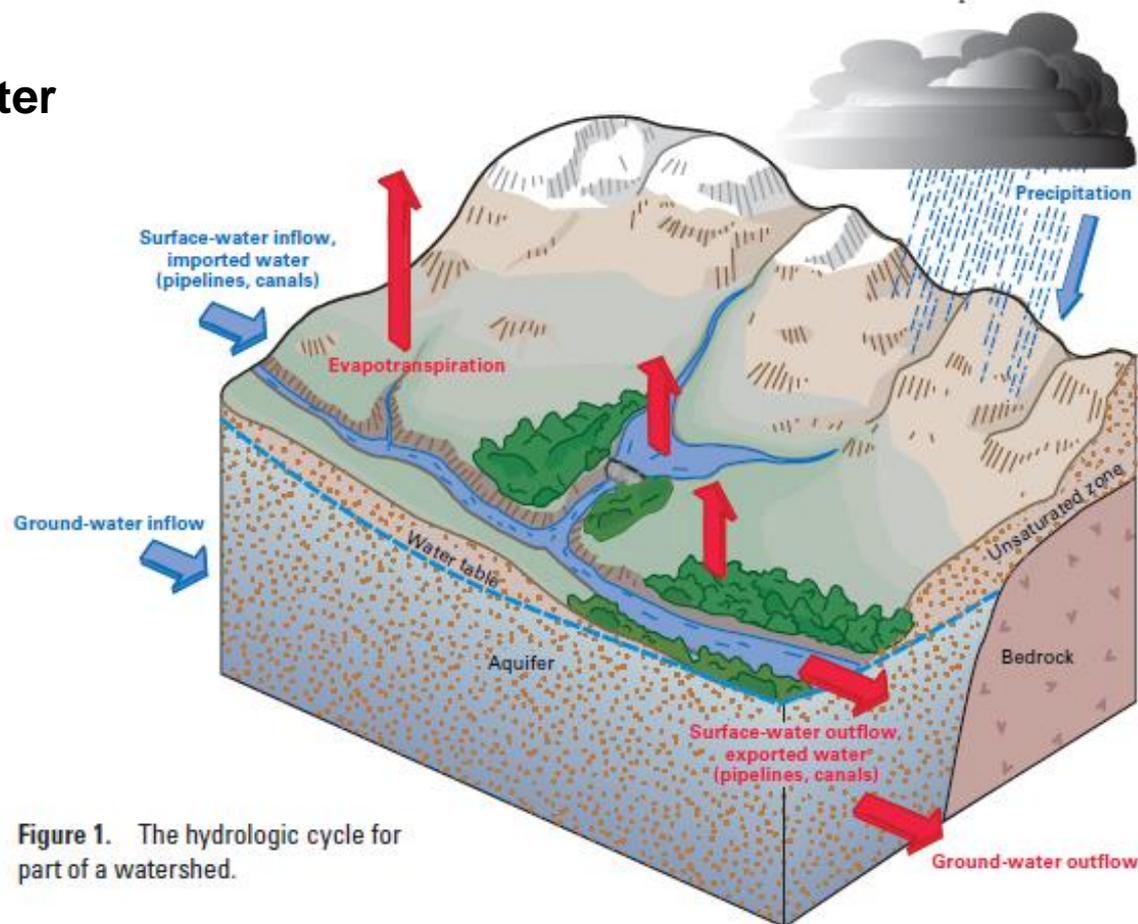
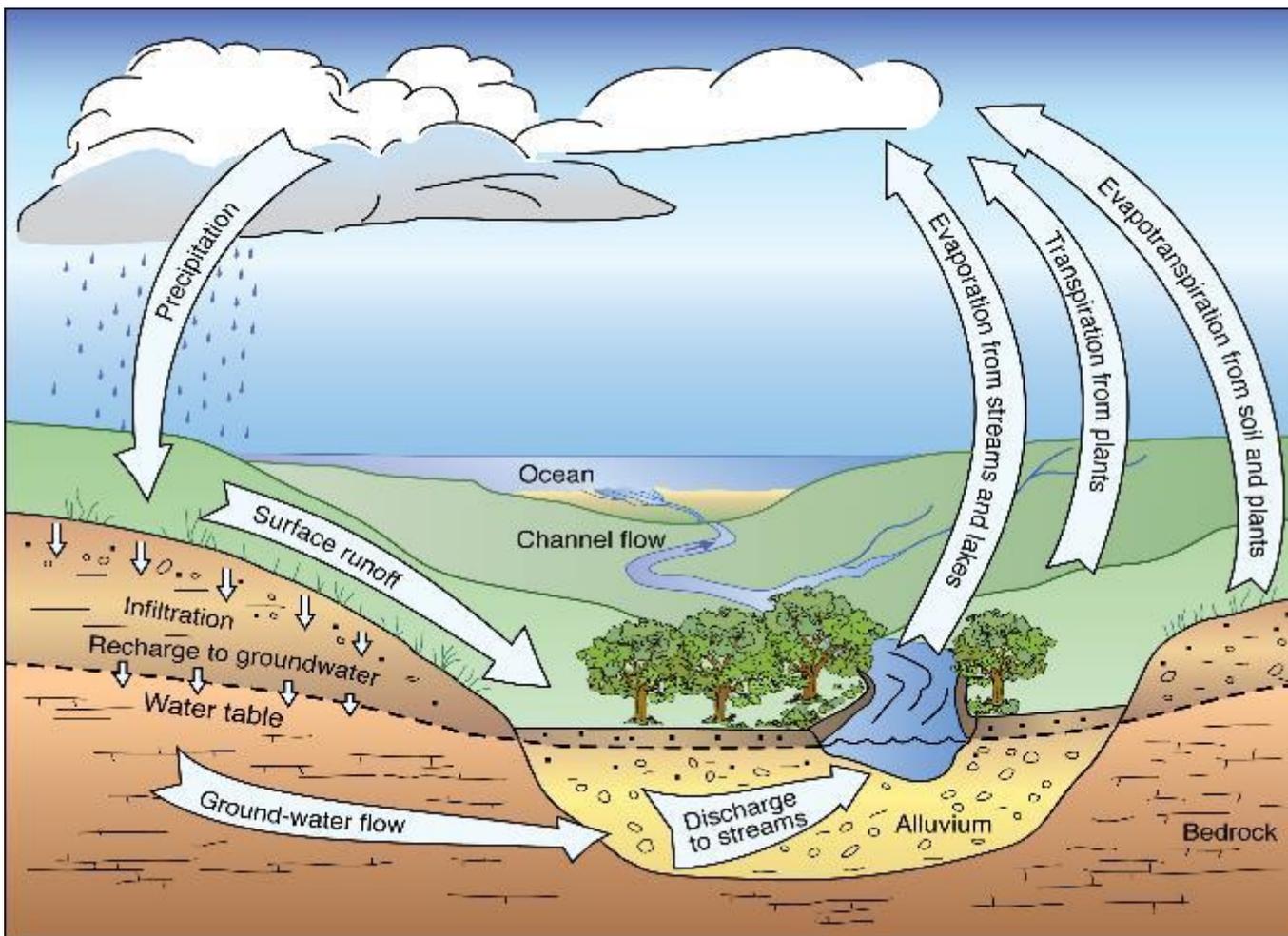


Figure 1. The hydrologic cycle for part of a watershed.



# Hydrologic Cycle



Natural Resources Conservation Service

[nrcs.usda.gov/](https://nrcs.usda.gov/)



# Landscape Setting

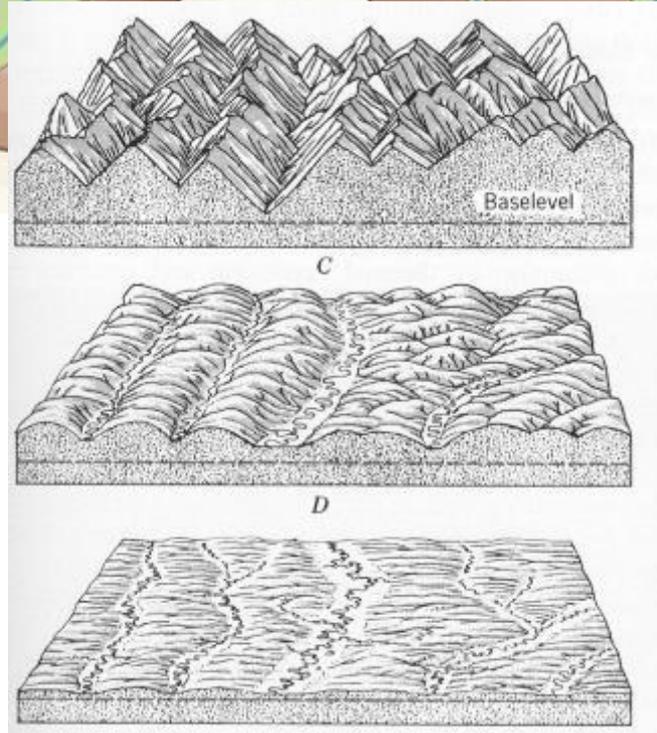
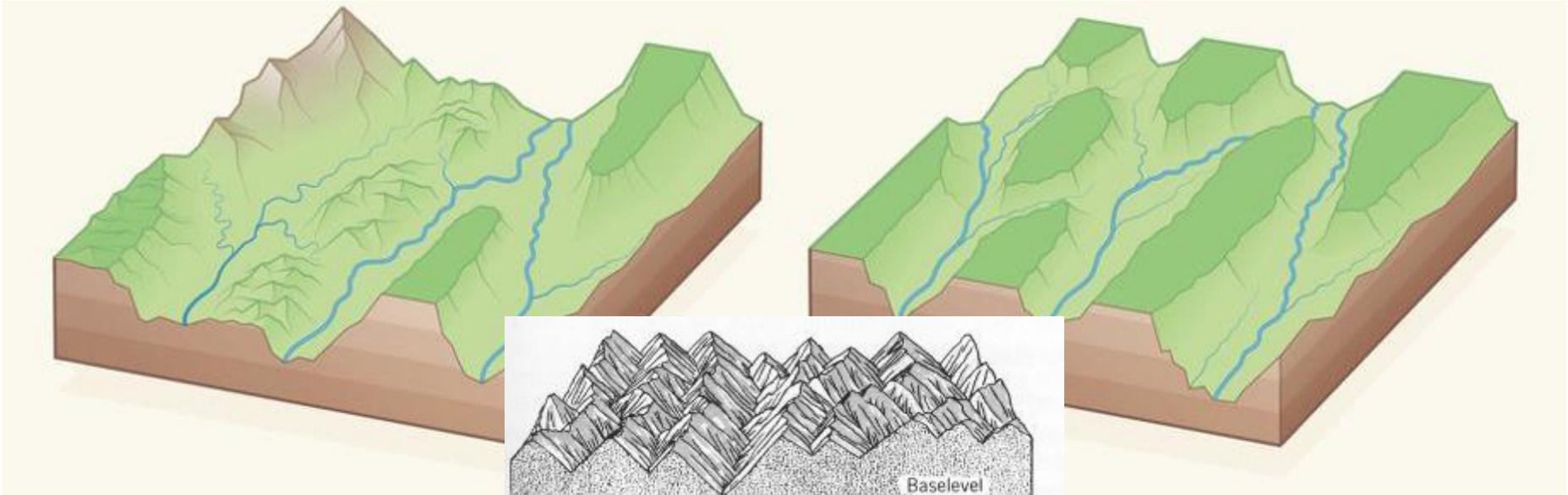


# Landscape Setting

Evaporation and transpiration rates will be different depending on where you are

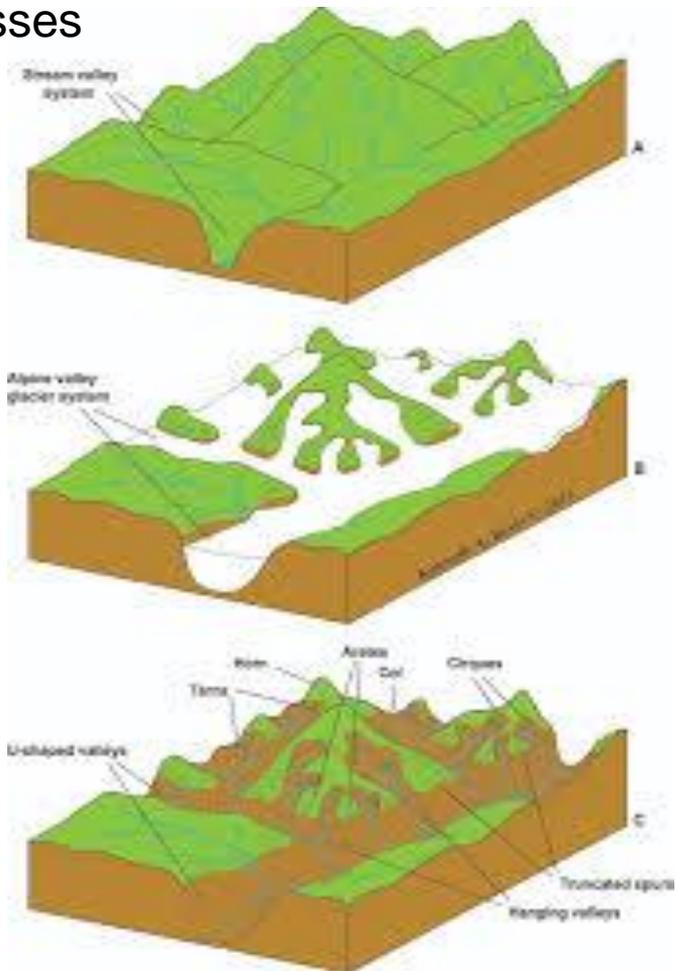


# Landscape Setting

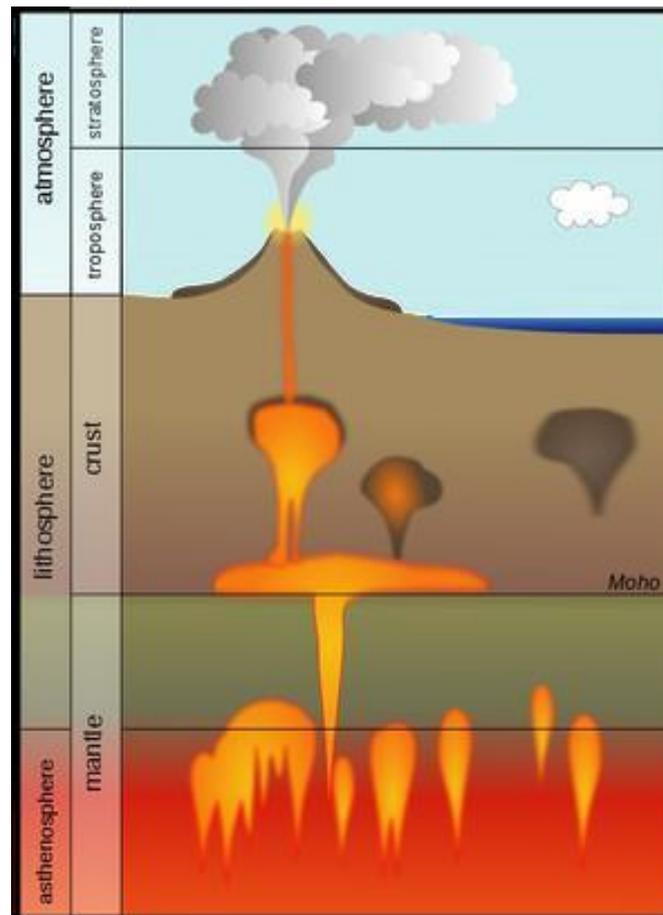


# Landscape Setting

Glacial processes



Volcanic processes

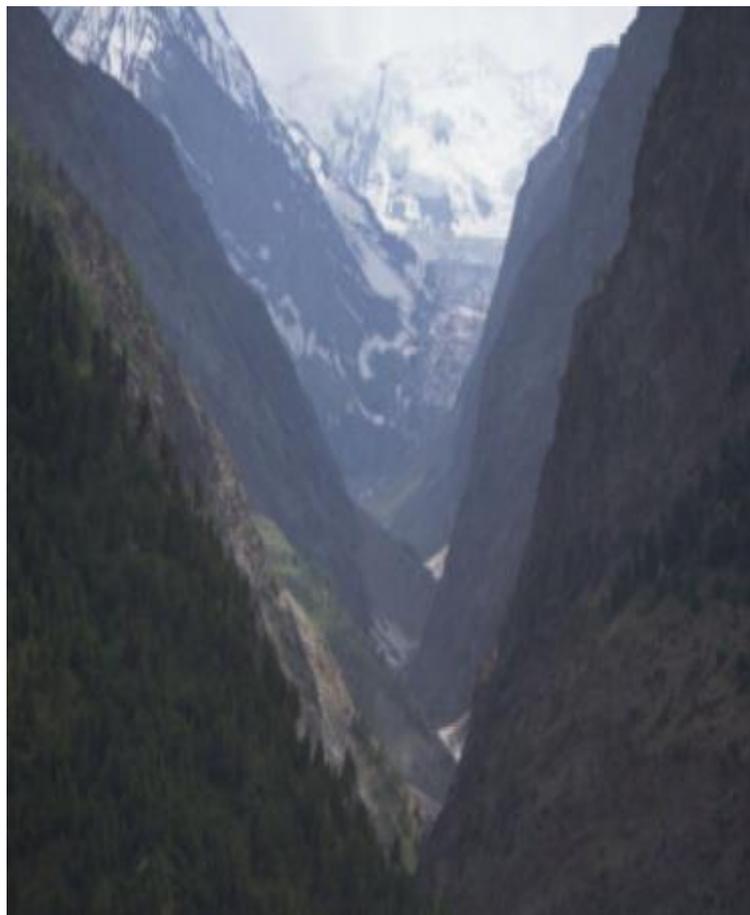


Natural Resources Conservation Service

[nrcs.usda.gov/](http://nrcs.usda.gov/)



# Landscape Setting



Natural  
Resources  
Conservation  
Service

[nrcs.usda.gov/](https://nrcs.usda.gov/)

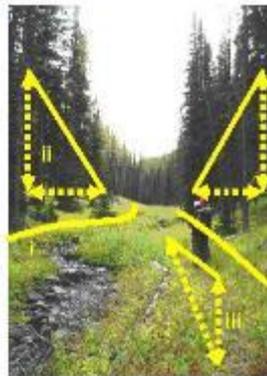
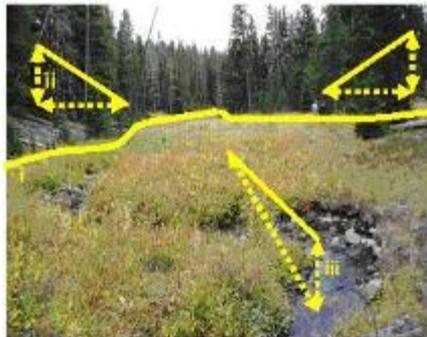


# Landscape Setting

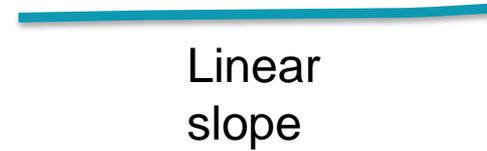


A

B



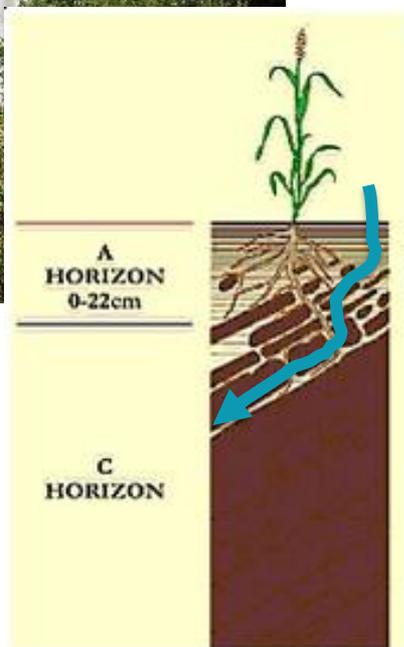
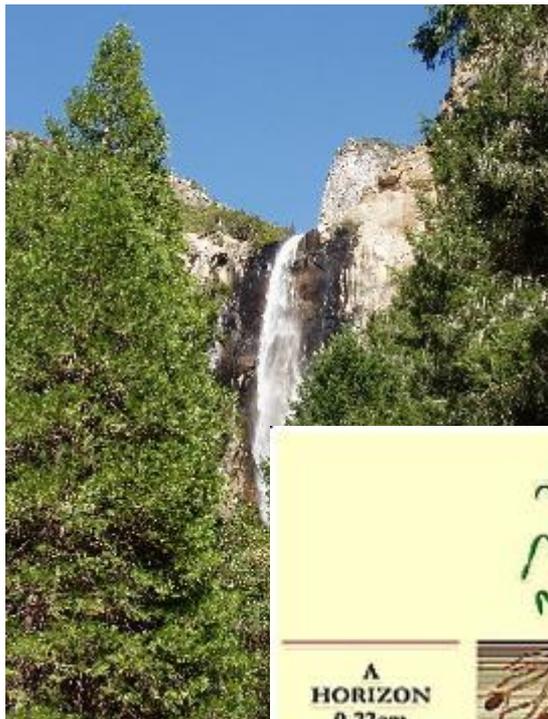
# Slope Shapes & Water Flow



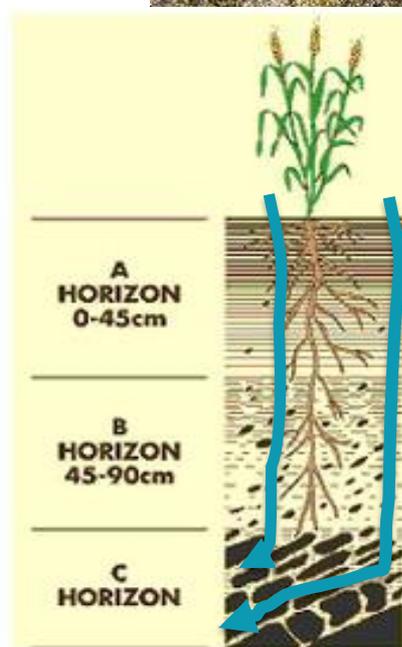
Water  
Flow  
Paths



# Soils/ Vegetation



**Shallow topsoil**  
Root growth restricted.  
Poor water holding capacity



**Upper Topsoil Layer**  
Darker colour due to organic carbon

**Lower Topsoil Layer**  
Lighter colour due to leaching & less organic matter

**Lower Subsoil Layer**  
Materials leached from above layer held

Lighter colour - less accumulation of leached material

**Parent Material**

Water hits impervious surfaces and runs downhill

Water sinks deep into the soil profile, slowing down the velocity and allowing much more water to stay onsite



# Land Use by Humans

