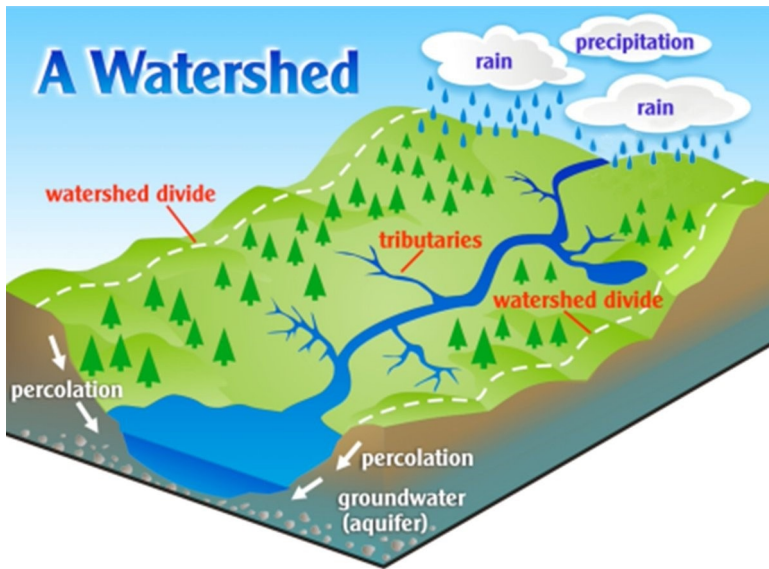


A6. Introduction to Ecosystems

Introduction to Ecosystems



Watersheds

A watershed is an essential concept in understanding the flow of water across the Earth's surface. It is the land area that drains into a particular body of water, such as a river, lake, or ocean. Watersheds are composed of both living organisms, known as biotic factors, and non-living elements, known as abiotic factors.

Abiotic Factors

Abiotic factors are the non-living components of a watershed system that significantly influence its health and function. These factors include water

supply, topography (the shape of the land's surface), landforms, geology, soils, sunlight, and air quality, including oxygen availability. Water supply, for instance, dictates the volume and flow of water in the watershed, while topography and landforms affect the direction and speed of water movement.

Virginia's Watersheds

The state of Virginia is characterized by a diverse range of watershed systems, each with its unique features. These systems include streams, lakes, and wetlands, each contributing to the overall health of the state's environment.



1. Streams

Virginia's streams are essential components of its watershed systems. They serve as conduits for the flow of water, transporting it from higher elevations to lower areas, eventually leading to larger bodies of water, such as rivers and the Chesapeake Bay.

Streams provide vital habitats for various aquatic species and play a significant role in regulating the flow of water and nutrients.

2. Lakes

Lakes are significant features within Virginia's watershed systems. They store water, offer recreational opportunities, and provide critical habitats for aquatic life. Lakes can vary in size and depth, and their health is influenced by factors such as water quality, sedimentation, and human activities.

3. Wetlands

Wetlands are unique ecosystems found in Virginia's watersheds. They act as natural filters, improving water quality by trapping pollutants and excess nutrients. Wetlands also serve as essential breeding grounds for various species of birds, amphibians, and aquatic plants. Protecting wetlands is crucial for maintaining the health of watershed systems.

4. The Chesapeake Bay

The Chesapeake Bay is a remarkable estuary located along the East Coast of the United States, known for its ecological significance. It serves multiple important functions and faces unique challenges.

Water Quality Monitoring

The health of the Chesapeake Bay is closely monitored through various parameters, including pH, temperature, salinity, oxygen levels, turbidity (clarity of the water), and the presence of organisms. Monitoring these factors helps assess the overall condition of the bay and the impact of human activities.

Higher Elevations and Watersheds

Higher elevations in the region act as natural dividers, separating watersheds that drain into the Chesapeake Bay. This division affects the types and amounts of pollutants and sediments that flow into the bay, making it a critical consideration in managing the bay's health.



Influences on Watershed Health

The health of a watershed system is influenced by a complex interplay of natural processes, human activities, and various biotic and abiotic factors. Several key factors contribute to the overall health of a watershed:

Dry and Wet Lands

The balance between dry lands (uplands) and wetlands in a watershed plays a crucial role in regulating water flow and filtering pollutants. Alterations to these landscapes can disrupt the natural functioning of the watershed.

Runoff and Pollutants

Runoff from urban areas, agriculture, and construction sites can carry pollutants such as fertilizers, pesticides, and sediment into water bodies, degrading water quality and harming aquatic life.

Freshwater and Saltwater - Chesapeake Bay

The mixing of freshwater and saltwater in the Chesapeake Bay creates a unique environment with its own set of challenges. Increased salinity levels can impact the bay's ecosystems, and changes in sea level due to climate change can affect its shoreline.

Human Activities and Decline

Human activities, such as urbanization, deforestation, industrial pollution, and agriculture, have contributed to the decline of many watershed systems. Pollution, habitat destruction, and altered water flow patterns have disrupted the natural balance of these systems. Conservation efforts and sustainable land use practices are essential for restoring and preserving the health of our watersheds.

1. What is a watershed primarily composed of?
 - a) Biotic factors only
 - b) Abiotic factors only
 - c) Both biotic and abiotic factors
 - d) Inorganic matter only

2. Which of the following is an abiotic factor in a watershed?
 - a) Fish
 - b) Soil
 - c) Trees
 - d) Algae

3. What is the primary role of streams in a watershed system?
 - a) Providing habitats for terrestrial animals
 - b) Transporting water from higher elevations
 - c) Storing excess water during heavy rains
 - d) Filtering pollutants from the water
4. Which of the following is NOT a feature of Virginia's watershed systems?
 - a) Streams
 - b) Lakes
 - c) Mountains
 - d) Wetlands
5. What is the Chesapeake Bay primarily known for?
 - a) Serving as a transportation route
 - b) Being a source of drinking water for nearby cities
 - c) Its ecological significance as an estuary
 - d) Hosting large industrial ports
6. Which of the following is NOT a parameter monitored for the Chesapeake Bay's water quality?
 - a) pH
 - b) Oxygen levels
 - c) Elevation
 - d) Turbidity
7. What separates different watersheds that drain into the Chesapeake Bay?
 - a) Geographical location
 - b) Underground tunnels
 - c) Higher elevations
 - d) Man-made barriers
8. What is the primary function of wetlands within watershed systems?
 - a) Filtering pollutants
 - b) Transporting water
 - c) Generating electricity
 - d) Storing excess nutrients

9. What type of human activity can contribute to water pollution in watersheds?
- a) Planting trees
 - b) Constructing wetlands
 - c) Implementing sustainable agriculture practices
 - d) Runoff from urban areas
10. Why is it crucial to protect and preserve watersheds?
- a) To increase urbanization
 - b) To maintain water scarcity
 - c) To safeguard ecosystems and water quality
 - d) To promote industrial pollution

ANSWERS & EXPLANATIONS

1. c) Both biotic and abiotic factors
 - A watershed is primarily composed of both living (biotic) and non-living (abiotic) factors.
2. b) Soil
 - Soil is an example of an abiotic factor in a watershed.
3. b) Transporting water from higher elevations
 - Streams primarily transport water from higher elevations to lower areas in a watershed.
4. c) Mountains
 - Mountains are not listed as features of Virginia's watershed systems.
5. c) Its ecological significance as an estuary
 - The Chesapeake Bay is primarily known for its ecological significance as an estuary.
6. c) Elevation
 - Elevation is not a parameter monitored for the Chesapeake Bay's water quality.
7. c) Higher elevations
 - Higher elevations naturally separate different watersheds that drain into the Chesapeake Bay.
8. a) Filtering pollutants
 - Wetlands act as natural filters, improving water quality by trapping pollutants.
9. d) Runoff from urban areas
 - Runoff from urban areas can contribute to water pollution in watersheds.
- 10.c) To safeguard ecosystems and water quality
 - Protecting and preserving watersheds is crucial to safeguard ecosystems and maintain water quality.