





Sedimentation



Lesson five:
Reducing Sedimentation



Based on your experiment and the previous lessons, what can you say about soil and water?



- Soil and rock can both hold water
- Porous rocks, like limestone, can hold large amounts of water
- Large underground areas of water-bearing rocks are called **aquifers**



Aquifers

- 50% of the water people use in the United States comes from the ground (aquifers).
- When you use a well for water, that water comes from an aquifer.



Water types

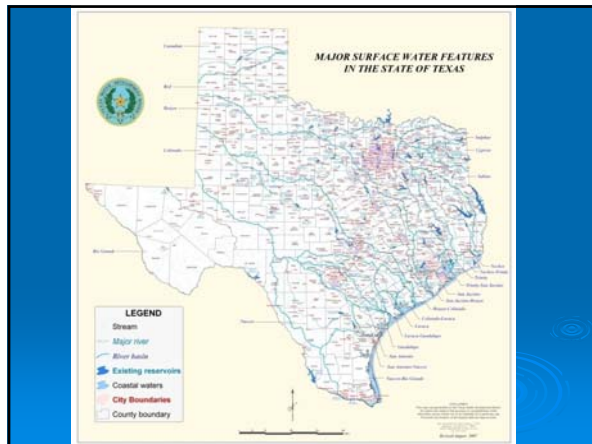
- Water on the surface of the earth is called *surface water*.
- Water under the surface of the earth is called *groundwater*.
- What are some examples of surface water?



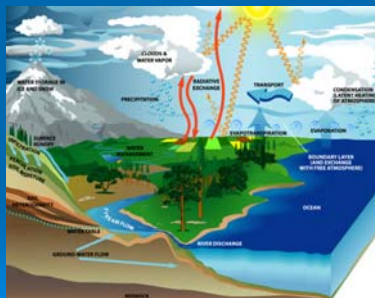
Surface water examples

- Streams
- Ponds
- Lakes
- Rivers
- Wetlands
- Oceans
- Bays



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The Water Cycle



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Sediment

- Suspended sediment in surface water harms life, so therefore sediment is a pollutant.
- Review: Where does sediment come from?

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Sediment comes from the soil

- When wind or water carry soil particles, we call it *erosion*.
- Soil particles are most easily moved when the soil is BARE, not covered with vegetation.

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Bare soil causing erosion

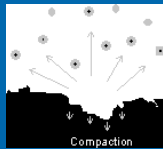


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Runoff



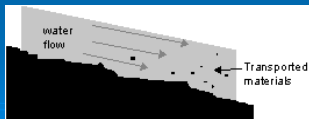
Falling raindrop



Compaction

Raindrop hitting bare soil

Where the rain falls faster than the ability of the soil to absorb it, water builds up at the surface and runoff starts. If the land slopes, gravity causes runoff to move rapidly down hill, which increases its ability to erode and move more soil in the watershed.



Water transporting soil particles

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Actual photograph of a drop of water as it lands



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Runoff



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Common sources of suspended solids



Construction activities



Erosion of agricultural lands



Surface mined land (strip mining)

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Poor logging practices can also lead to soil erosion and sedimentation



Note the exposed bare soil



Hamilton Pool has silt (sediment) in it because of nearby housing construction. In the fall of 2007, Travis County sued the construction company to make them control the sediment runoff.



In order to reduce erosion, which results in suspended solids in the water, we must first **COVER the bare soil!**

Can you come up with some ways to cover bare soil?





Ways to cover bare soil

- Plants- the very best permanent means of covering bare soil. The roots hold the soil in place, plus roots add to the organic matter in the soil
- Mulches- hay, chopped wood, leaves, gravel, tarps help control erosion
- Cover crops- alfalfa, clover fields hold the soil in place in the winter and add organic matter and nitrogen to the soil

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Notice the plants growing along the banks of the waterway




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UT Pan Am "Teaching Environmental Science," Edinburg
Main Canal, Edinburg, TX, 7/20/07. Photo by J. Tuason

Roots of plants hold the soil in place and do not allow raindrops to land directly on bare soil.



Note the length of the roots of the plant on the far left-grass/sod. Now note the lengths of the roots of the rest of the plants. The *roots of the native plants are much longer* the grass/sod are only 2 inches long, the with some extending as long as 15 FEET underground!

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Mulches

There are many different materials that can be used for mulch



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Reclamation of land from surface mining takes a lot of money and effort

Open pit strip mining Reclaimed land project



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Contour farming on a hillside keeps the soil in the ridges

Erosion from farmland Contour farming



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Farmers can also plant cover crops to enrich and hold the soil

Dense cover crop



➤ Cover crops are useful any place where there is bare soil.



Retention ponds



Typically, retention ponds are found in housing and commercial developments. They are dug to slow down the water and allow the sediment to settle out thus preventing the deterioration of "downstream" surface waters such as streams and lakes.



Selective logging reduces soil erosion

Selective logging



Clear cut logging



Silt fences help control sediment runoff during construction



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Important terms and concepts

- Surface water
- Ground water
- Erosion
- Erosion increases sedimentation
- Ways to decrease erosion
