

Watershed Stewards soil overview

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6 May 2012

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Watershed Stewards soil overview

What is soil? What's not soil?

Varieties of soil

What makes a soil, a soil?

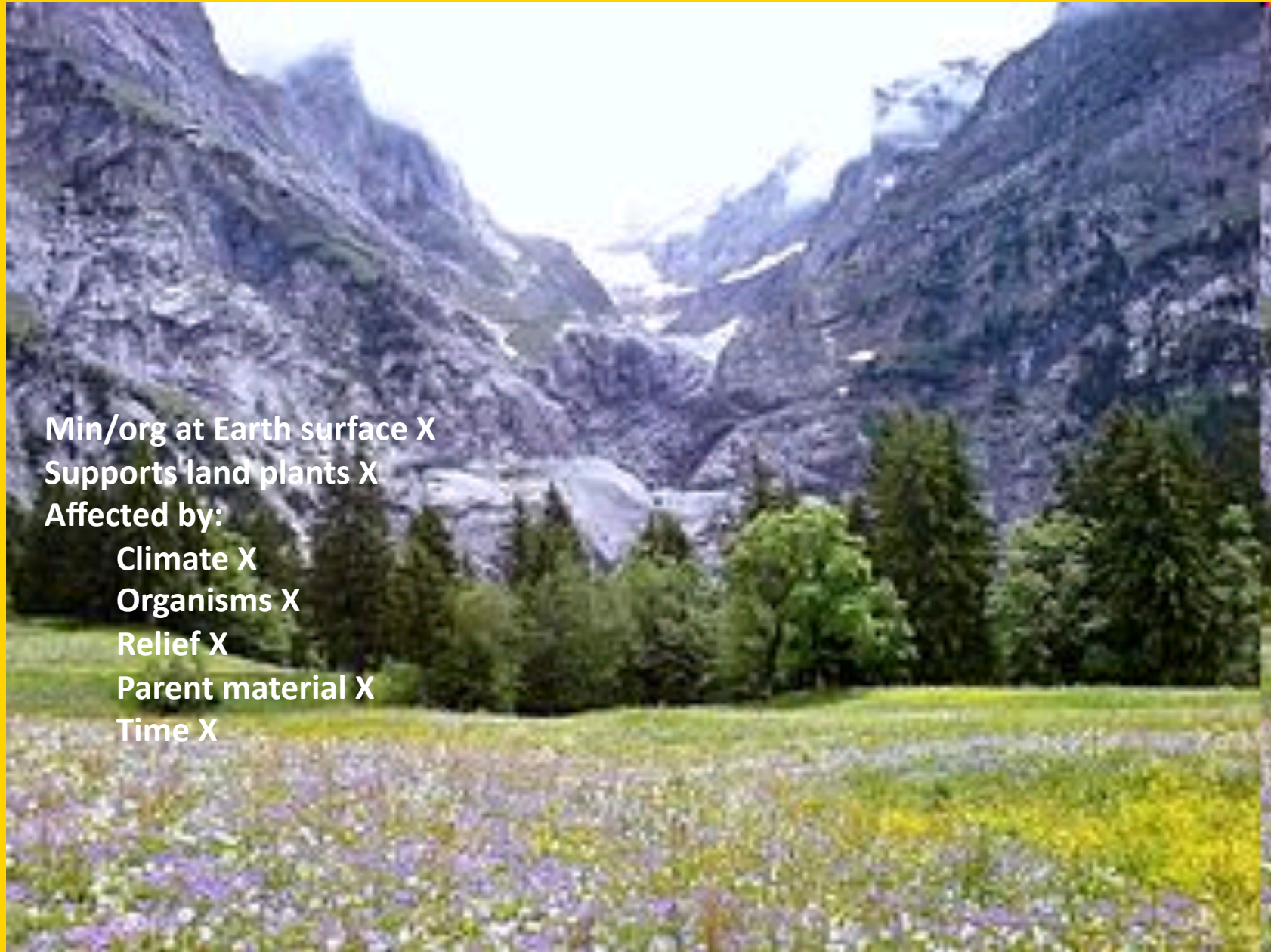
What makes Maryland soils, soils?

What is Soil?

From the Soil Science Glossary (Soil Science Society of America).

soil - (i) The unconsolidated **mineral or organic material** on the immediate surface of the Earth that serves as a natural medium for the **growth of land plants**. (ii) The unconsolidated mineral or organic matter on the surface of the Earth that has been subjected to and shows effects of genetic and environmental factors of: **climate** (including water and temperature effects), and **macro- and microorganisms**, conditioned by **relief**, acting on **parent material** over a period of **time**. A product-soil differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics.

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Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time X

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Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time ?

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Min/org at Earth surface X

Supports land plants ?

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time X

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Min/org at Earth surface X
Supports land plants X
Affected by:
 Climate ?
 Organisms ?
 Relief ?
 Parent material ?
 Time NO

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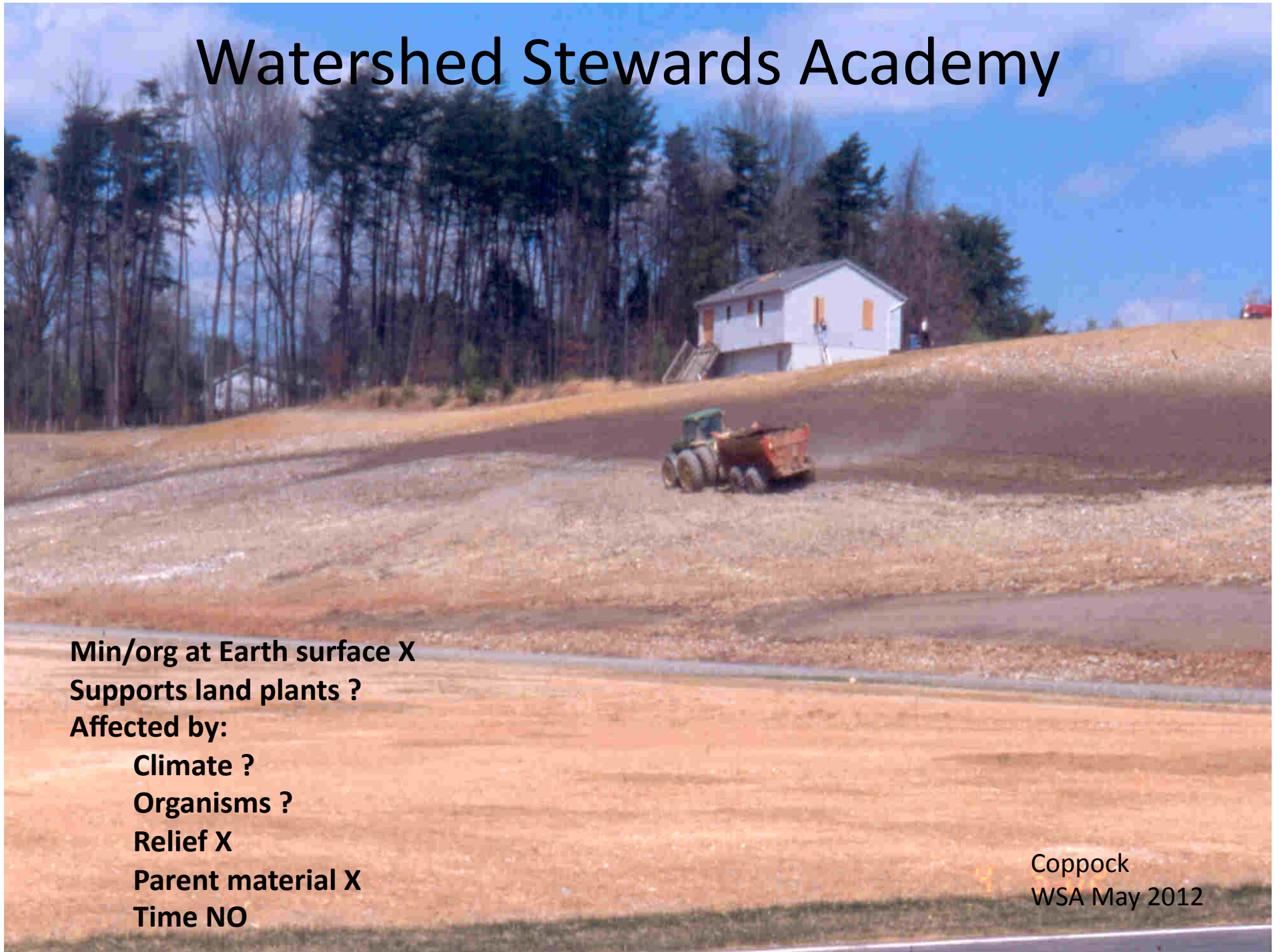
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Soil?

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Min/org at Earth surface X

Supports land plants ?

Affected by:

Climate ?

Organisms ?

Relief X

Parent material X

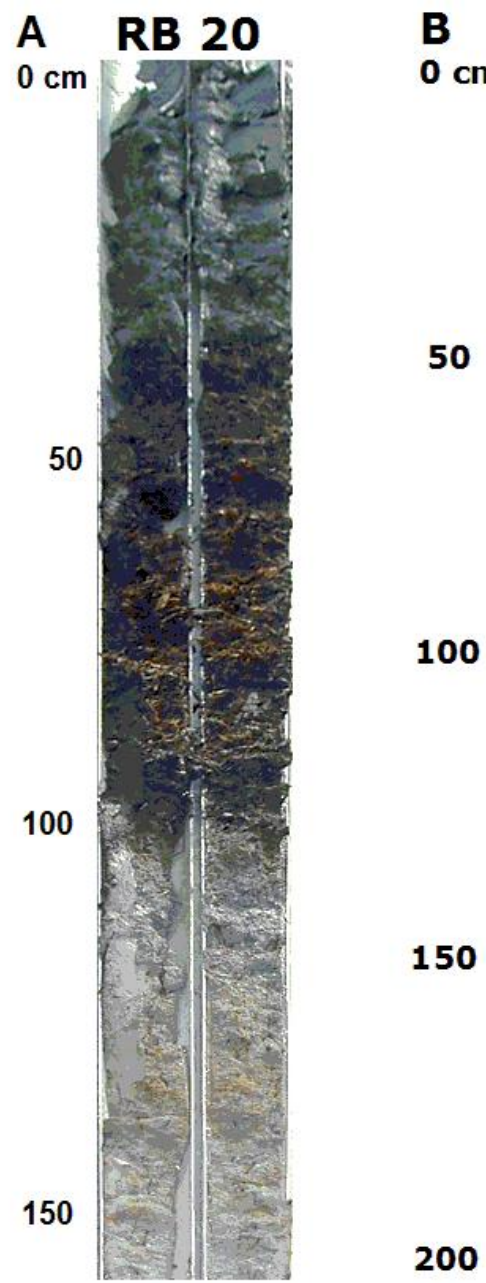
Time NO

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Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time X

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A photograph of a stream flowing through a forested area. The water is murky and turbulent, with several large logs and branches partially submerged. The surrounding forest consists of tall, thin trees, some with bare branches and others with green foliage. The ground is covered in dry grass and fallen leaves. The overall scene suggests a natural, somewhat untamed environment.

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A photograph of a forest landscape. In the foreground, there is a cleared area with brown, dry grass and scattered logs. A green measuring tape is stretched across the ground. In the background, there is a dense forest of tall, thin trees, some with green leaves and some without. The sky is overcast.

Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time X

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Min/org at Earth surface X

Supports land plants ?

Affected by:

Climate ?


Organisms X

Relief ?

Parent material NO

Time NO

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A photograph of a baby walking on a snowy surface. The baby is wearing a red, textured knit hat with a small red bow on top, a blue and white snow suit with a red logo on the chest, black gloves, and yellow boots. The baby has a pacifier in their mouth. In the background, the lower legs and skis of an adult are visible, suggesting a ski lift or a snowy slope. The overall scene is brightly lit, likely by sunlight reflecting off the snow.

Min/org at Earth surface NO
Supports land plants NO
Affected by:
Climate X
Organisms X
Relief X
Parent material NO
Time NO



Soil?

Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time ?

anacostiaws.org

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So what if we can take an erosion feature like this

Loss of soil (erosion)

Continued sediment to creek

Changed hydrology surrounds

Lowered water table

Greater drought threat

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WATERBURY FOREST



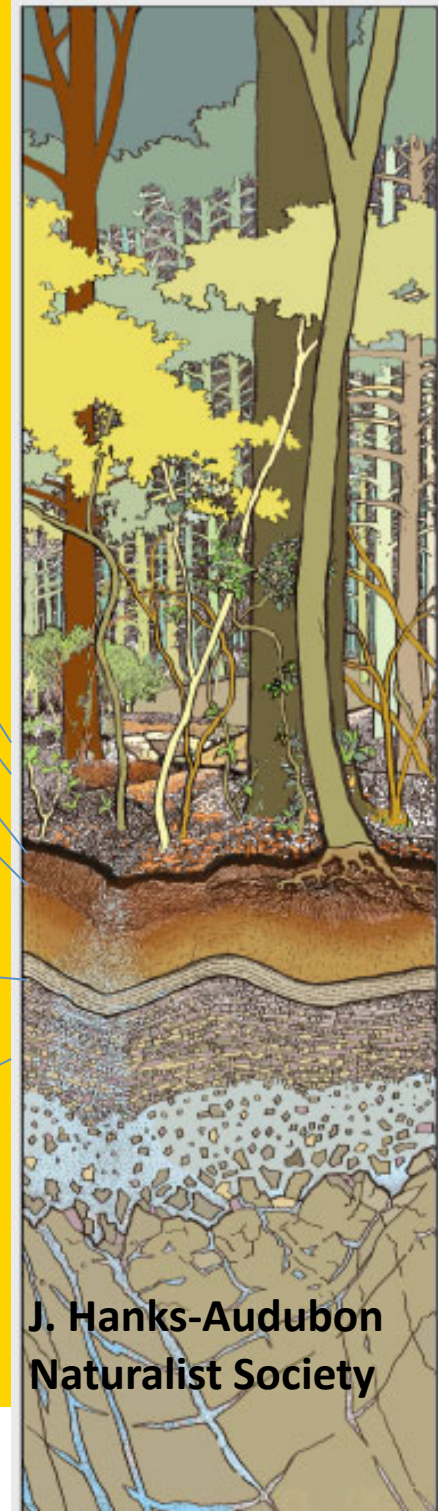
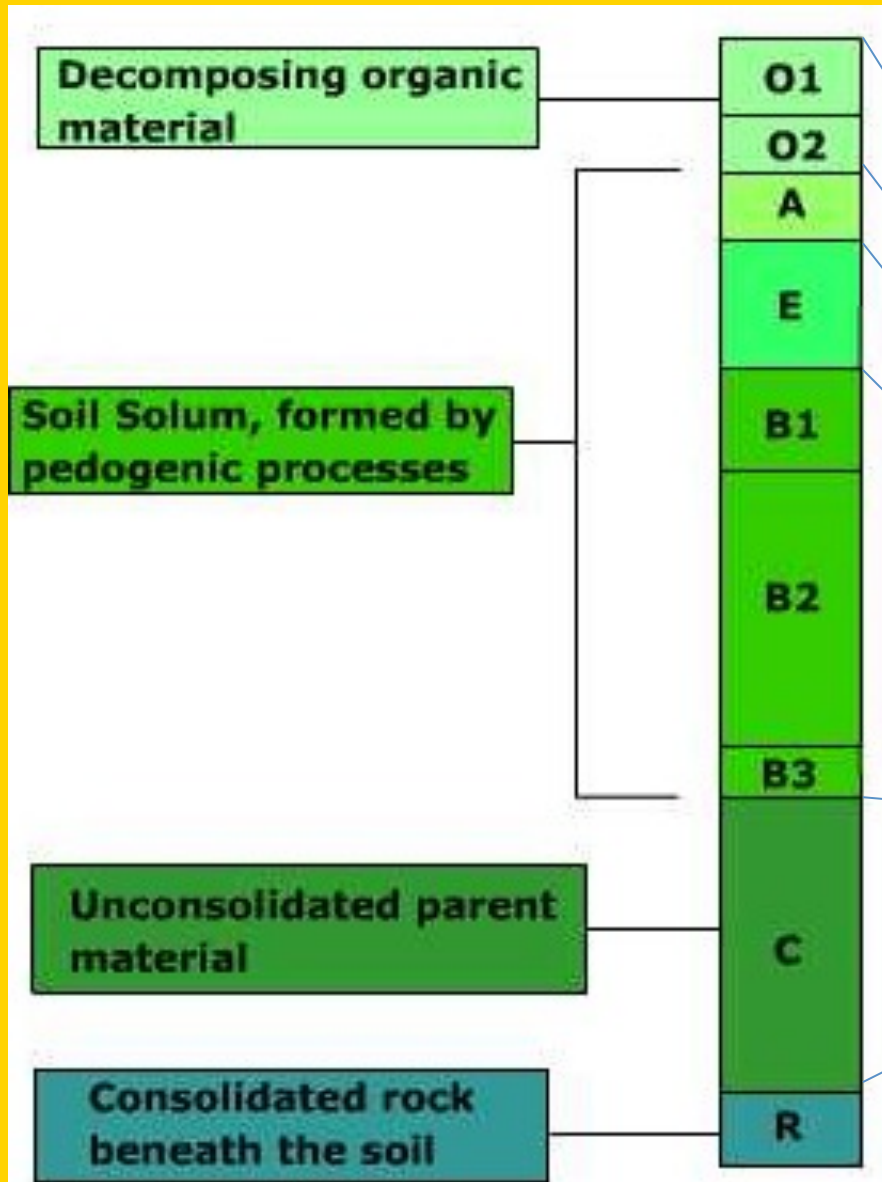
Mit
Sup
Aff

**J. Hanks-Audubon
Naturalist Society**



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Old growth forest soils... rare in our region



J. Hanks-Audubon
Naturalist Society

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Min/org at Earth surface X

Supports land plants X

Affected by:

Climate X

Organisms X

Relief X

Parent material X

Time ?

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Less affected

More affected



Soil Survey Staff

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A close-up photograph of a cedar branch. The branch is covered in small, green, scale-like leaves. Numerous small, brown, cone-like structures (strobili) are visible, clustered along the branch. The background is a blurred green, suggesting a dense forest.

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What is Soil?

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So what's going on here?

What happens when mineral and organic, Parent Material are affected by:

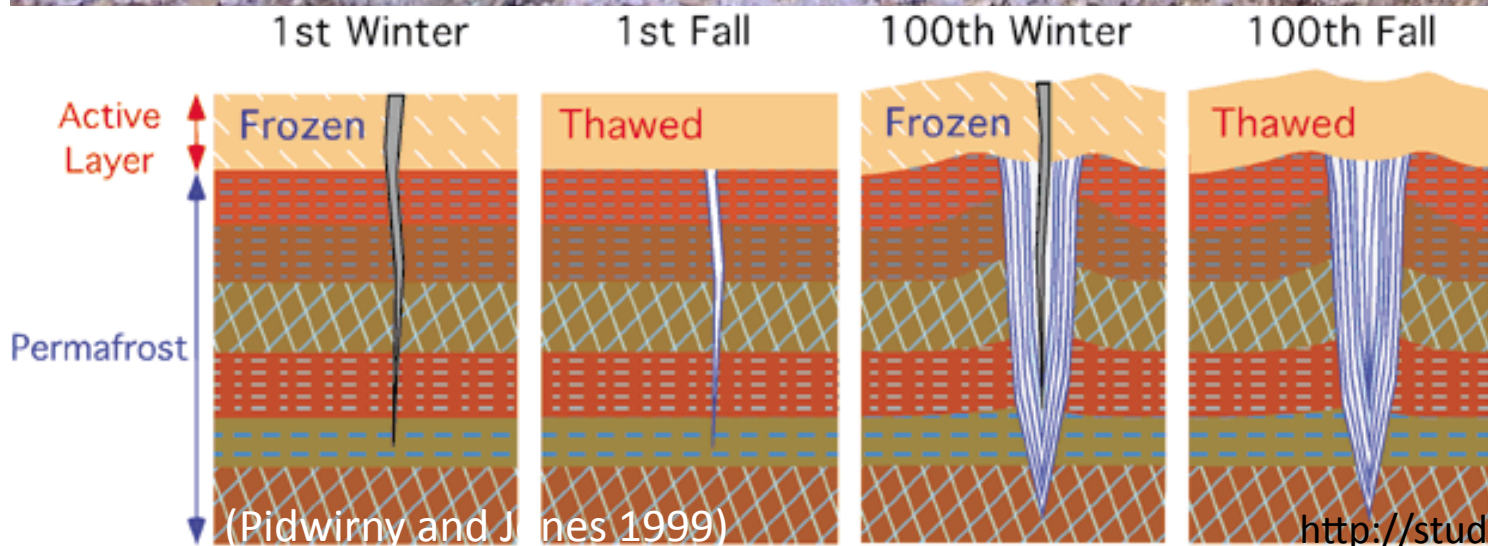
Climate?

Organisms?

Relief/Topography?

over Time?

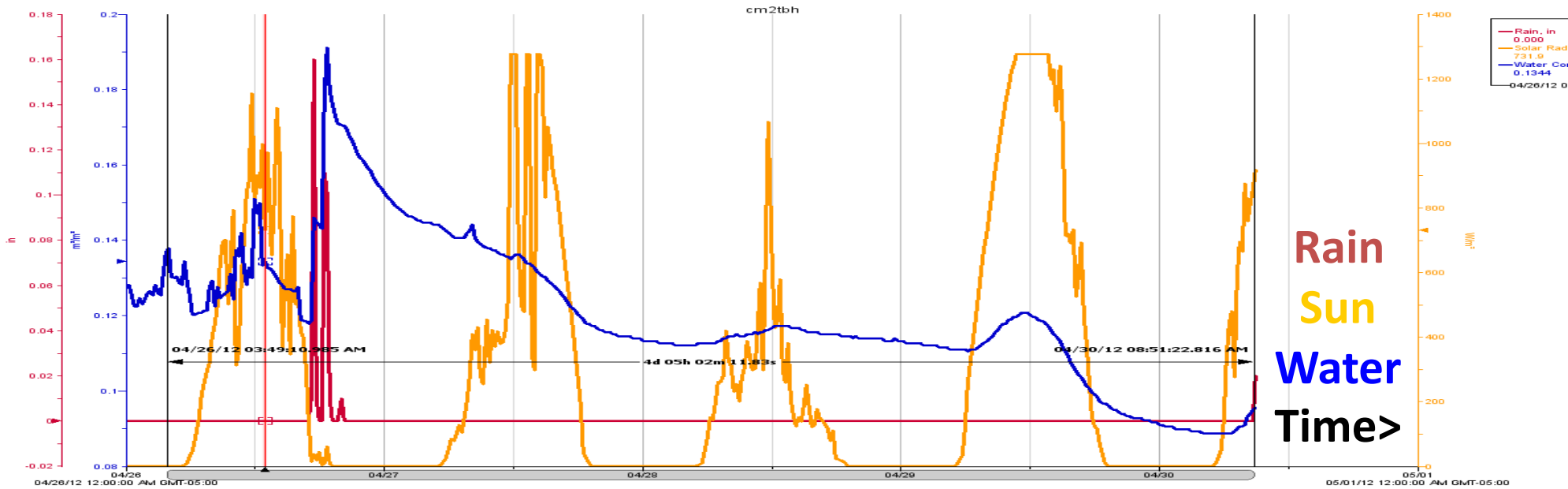
What's happening? Climate...




J. Brew, of the
National Snow and Ice Data
Center
University of
Colorado,
Boulder.

What's happening? Climate...

½ inch of rain evaporated in 3 days





What's happening: Organisms...

Back to the wetland, OR wet rain garden

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What's happening: Organisms...



Microorganisms are munching away at whatever they like in the flooded soil

Eventually they run out of free O_2 (DO)

Some can adjust others start to pull O molecules from Nitrogen

There is a progression O,N,Mn,Fe,S,C

When the Iron (Fe) loving bacteria take over, the soil turns gray

If oxygen returns you get brown soil again

If not Fe washes out and soil is gleyed.

What's happening? Organisms



Up to seven million grass-cutting ants can live and farm fungus in one giant nest
<http://www.bbc.co.uk/nature/14993585>

What's happening: Organisms...



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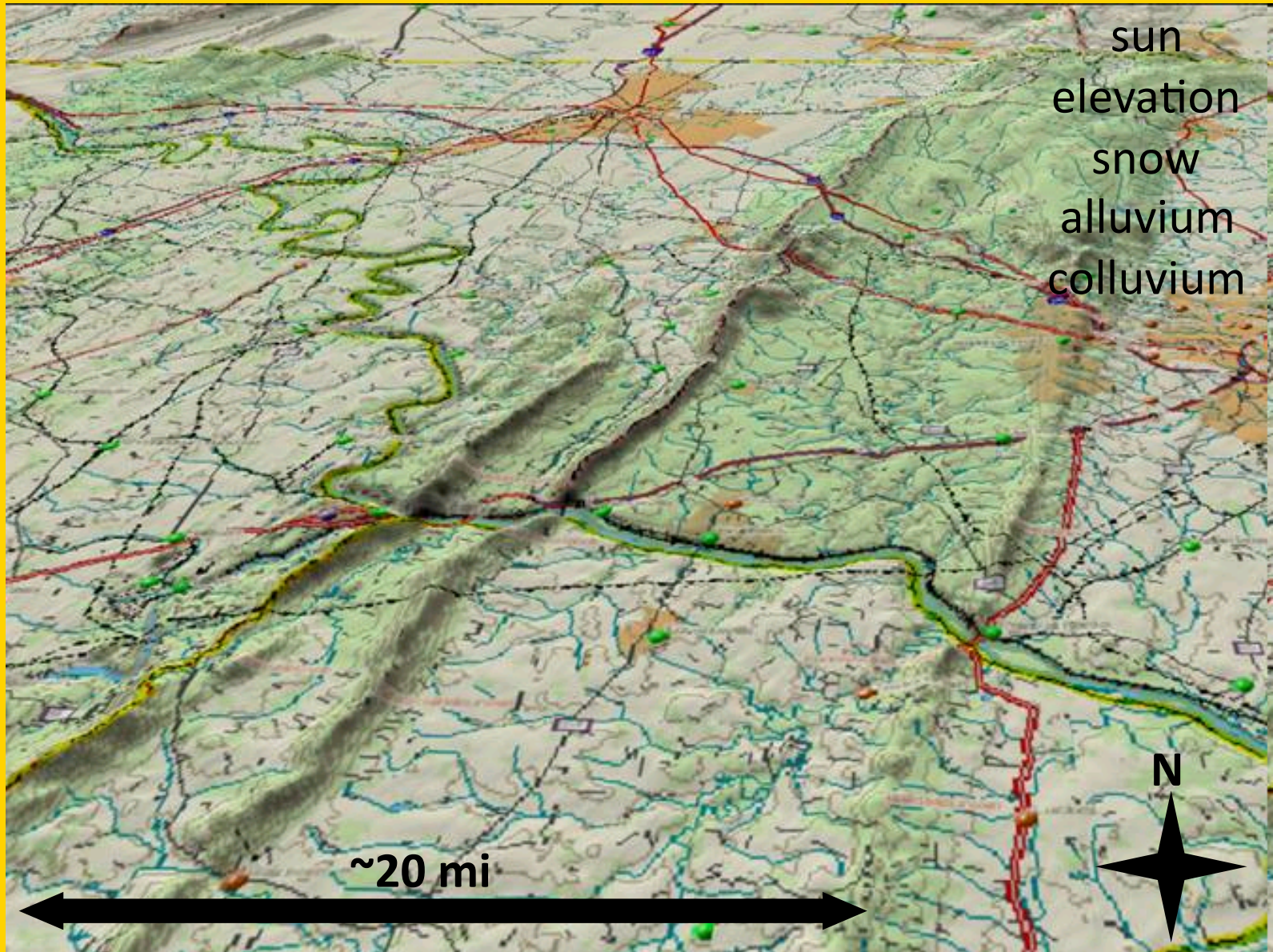
http://soils.usda.gov/SQI/concepts/soil_biology

What's happening? Organisms??



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What's happening? Relief...



durangobill.com/AncestralRivers/AncestralRiversUSEast.html

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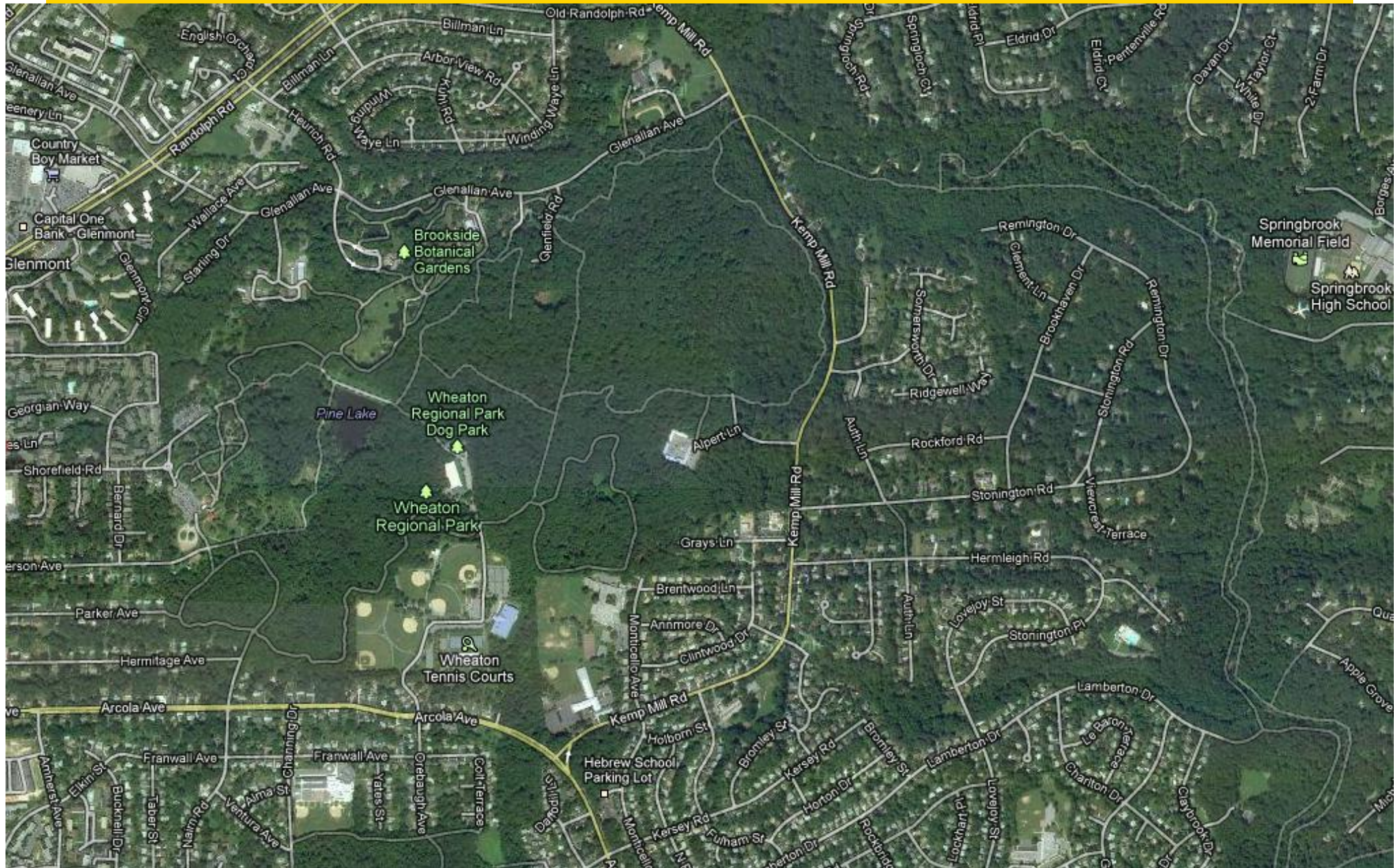
An aerial photograph showing a watershed area. A river flows from the top left towards the bottom right, eventually emptying into a large body of water on the right side. The land is covered in green vegetation, with some brownish patches indicating different types of terrain or land use. The river has several tributaries and a meandering path.

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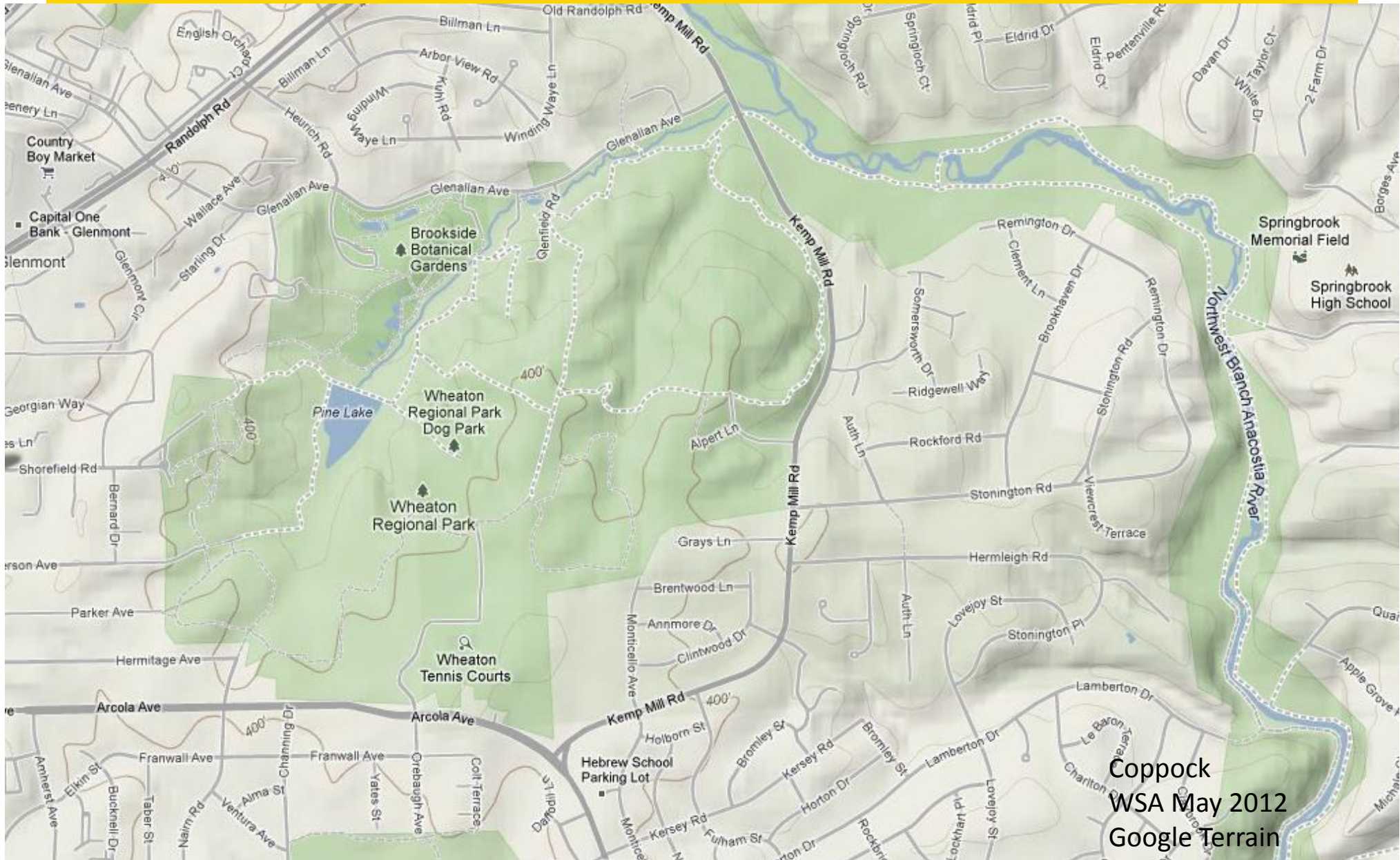
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Google WSA
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What's happening? Relief (topo)...



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Google Terrain