

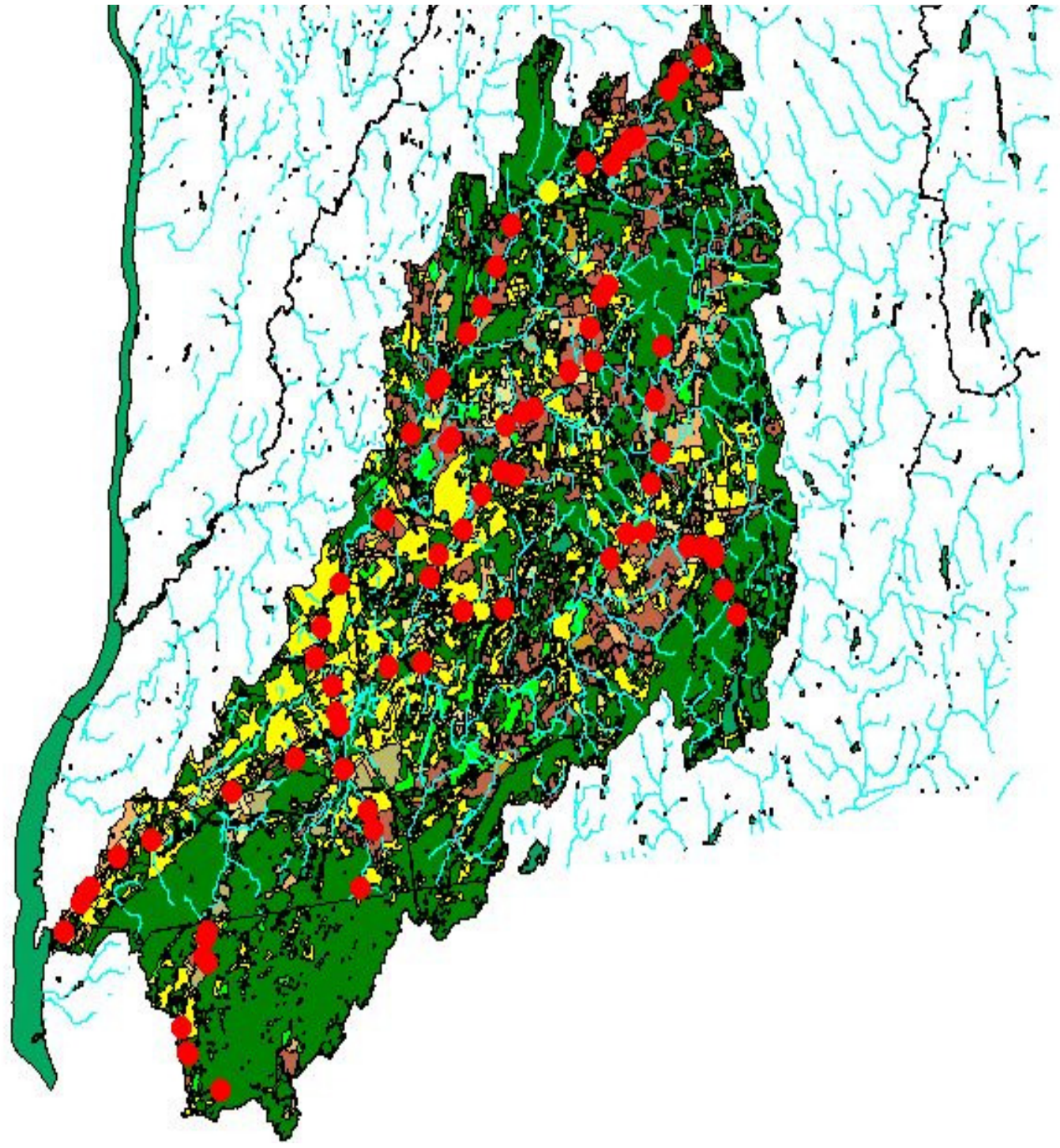
A dramatic, dark sky filled with heavy, grey clouds. A bright, jagged lightning bolt strikes down from the right side, illuminating the surrounding clouds and creating a strong contrast with the dark background. The overall mood is intense and powerful.

Storm Runoff and 4 Types of Land Cover

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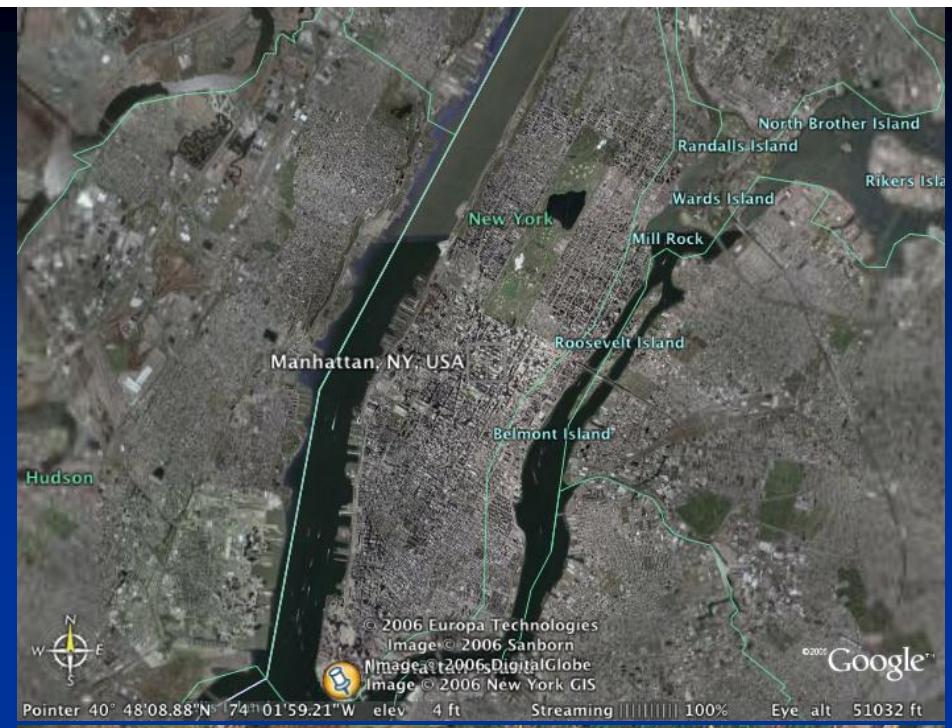
What is land cover?

- Land Cover: Description of the physical coverage of land: Often described by the type or lack of vegetation
- EX: Agricultural, oak forest, urban, light suburban, industrial, commercial, transportation . . .



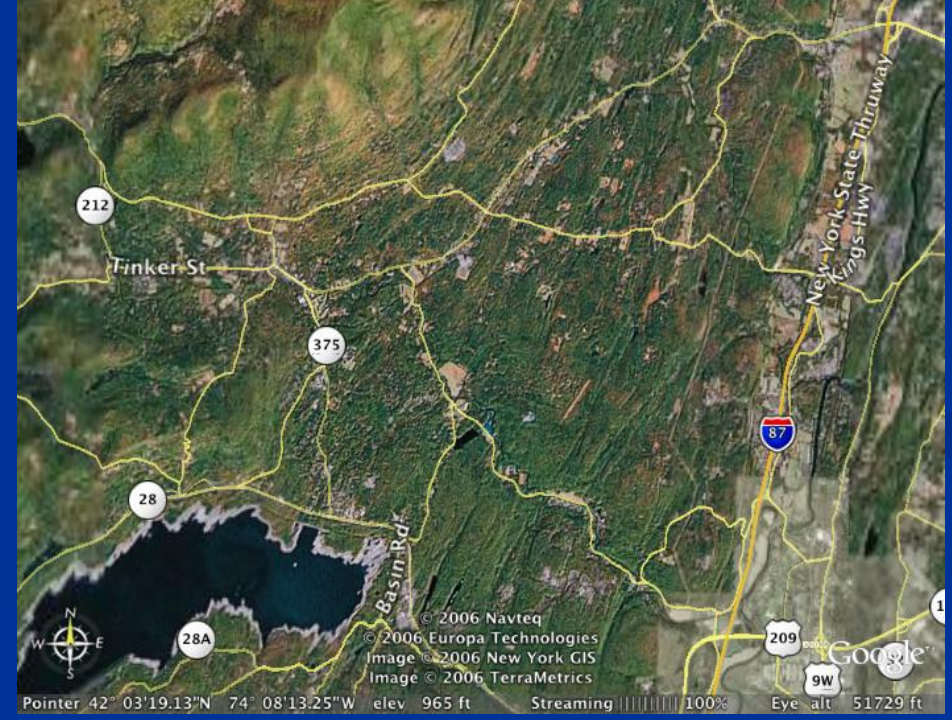
- Manhattan

- Lots of urban land cover

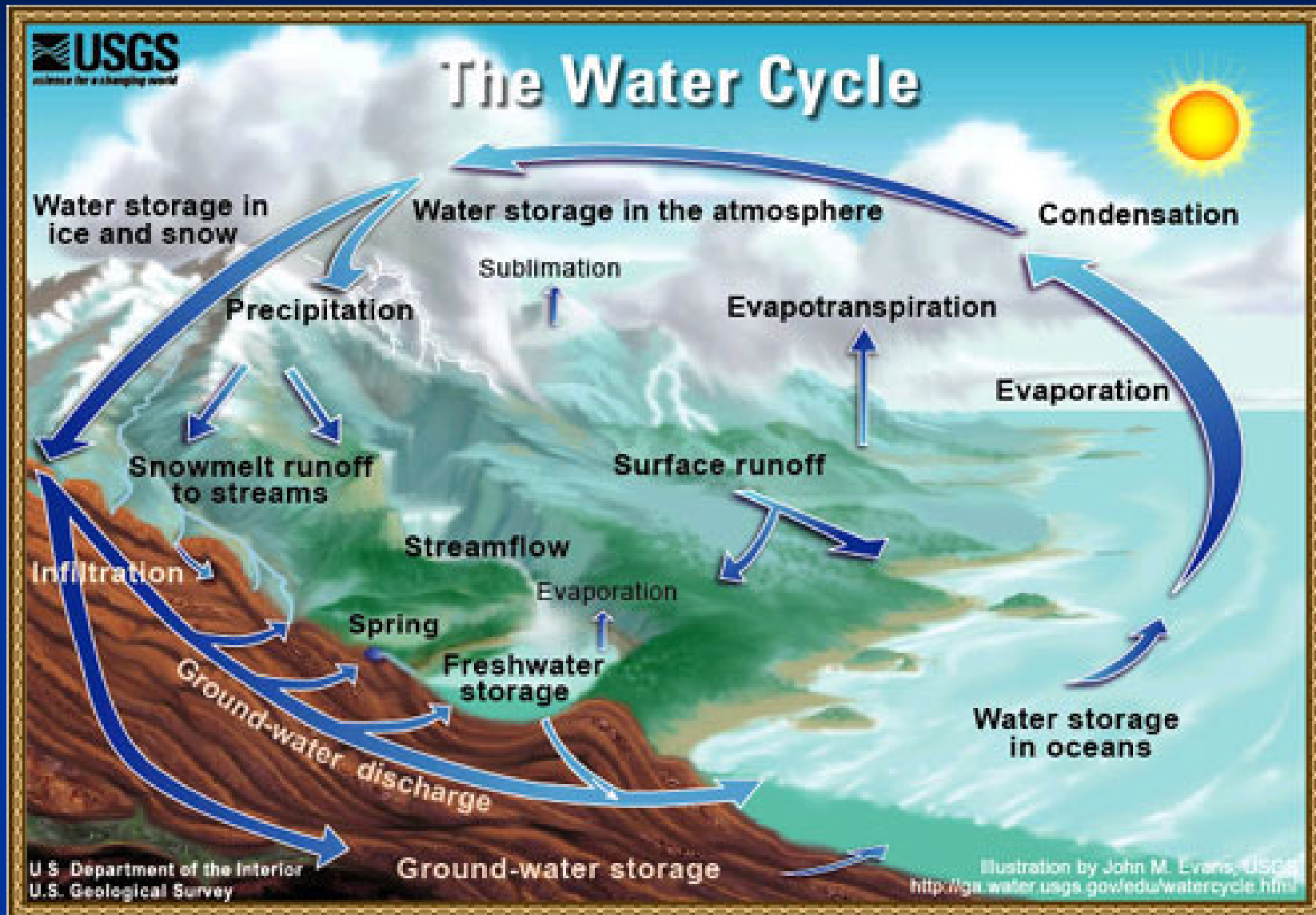


- Ulster County

- Lots of forested land cover



Water Cycle



What happens to water when it hits the ground?

- Runoff (into gutters, streams, rivers, lakes)
- Percolation into ground (only permeable surfaces)
- Evaporation
- Taken in by plants
- Land cover determines what water does once it hits the ground

Variables that affect water behavior

- Amount of precipitation/melt
- Permeability of land cover
 - Type of soil/stone
 - Saturation of soil
- Vegetation type
- Elevation grade

Permeability

- **Permeability**: How well water filters through a substance
 - Gravel: Very high permeability
 - Sands: High permeability
 - Silt: Low permeability
 - Clay: Very low to impermeable
 - Asphalt/cement: **Impermeable**

Vegetation

- Trees and vegetation reduce runoff
 - Absorb water
 - A 6 caliper inch tree takes in a minimum of 35 gallons of water each week.
 - 35% tree canopy cover reduces runoff by 12%
 - Leaves catch water and increase evaporation
 - Some water never hits the ground and evaporates off leaves

4 Major Land Cover Types



Urban Land Cover

- High amount of impervious surfaces
 - Cement
 - Buildings
 - Asphalt
- Low Occurrence of Vegetation



Urban Runoff

- Increased levels of hydrocarbon Pollutants
 - Oil, gasoline, etc.
- Increased levels of toxic metals
 - tires, cars, industry, etc.
- Increased salt concentrations (up to seawater levels!)
- Increased bacteria levels from overwhelmed treatment plants

Urban Runoff cont'd

- Impermeable surfaces lead to quickly moving water and flash flooding on roads etc.
- Increased erosion



Urban Runoff cont'd



- Urban stormwater pollution can destroy animal populations in streams and waterways.
- Reduction in biodiversity.
- Standing water breeds mosquitoes and smelly algae

Controlling Urban Runoff

- Storm Gutters
- Storm Drains
- Water Treatment Plants



Water Treatment Plants



Agriculture Land Cover

- Permeable Soils
- Fields for crops/grazing
- Lots of vegetation
- Often fewer trees



Agricultural Runoff

- Much water percolates through soils into groundwater
- May be high in fertilizers
 - Nitrates/nitrites
 - Phosphates
 - Leads to increased nutrients in streams
- May be high in pesticides
- Erosion may lead to increased turbidity

Suburban Land Cover

- Mix of permeable and impermeable surfaces
 - Lawns
 - Driveways
 - Roads
- May have many septic systems instead of sewer
- May have wells



Suburban Runoff

- Some soil percolation, some impermeable surface runoff
- Erosion on steeper driveways/plots
- Fertilizers, pesticides, oils from driveways
- Salt from roads, driveways, sidewalks
- Septic overflow/contamination of groundwater and wells

Forest Land Cover

- Defined by many trees and vegetation
- High biodiversity
 - Animals
 - Plants
- Permeable soils
- Few buildings/roads



Forest Runoff

- Trees absorb much water
- Soil allows percolation into groundwater
- Runoff into natural channels and streams
- Trees and vegetation filter out nutrients (nitrates/nitrites, phosphates)
- Trees and vegetation control erosion and stream turbidity

Conclusion

- Different land cover affects water runoff during/after storms in different ways
- Human habitation changes land cover
- Communities need to be careful about how land is used within the communities.