

Spatial Distribution of Mercury at the Catchment Scale

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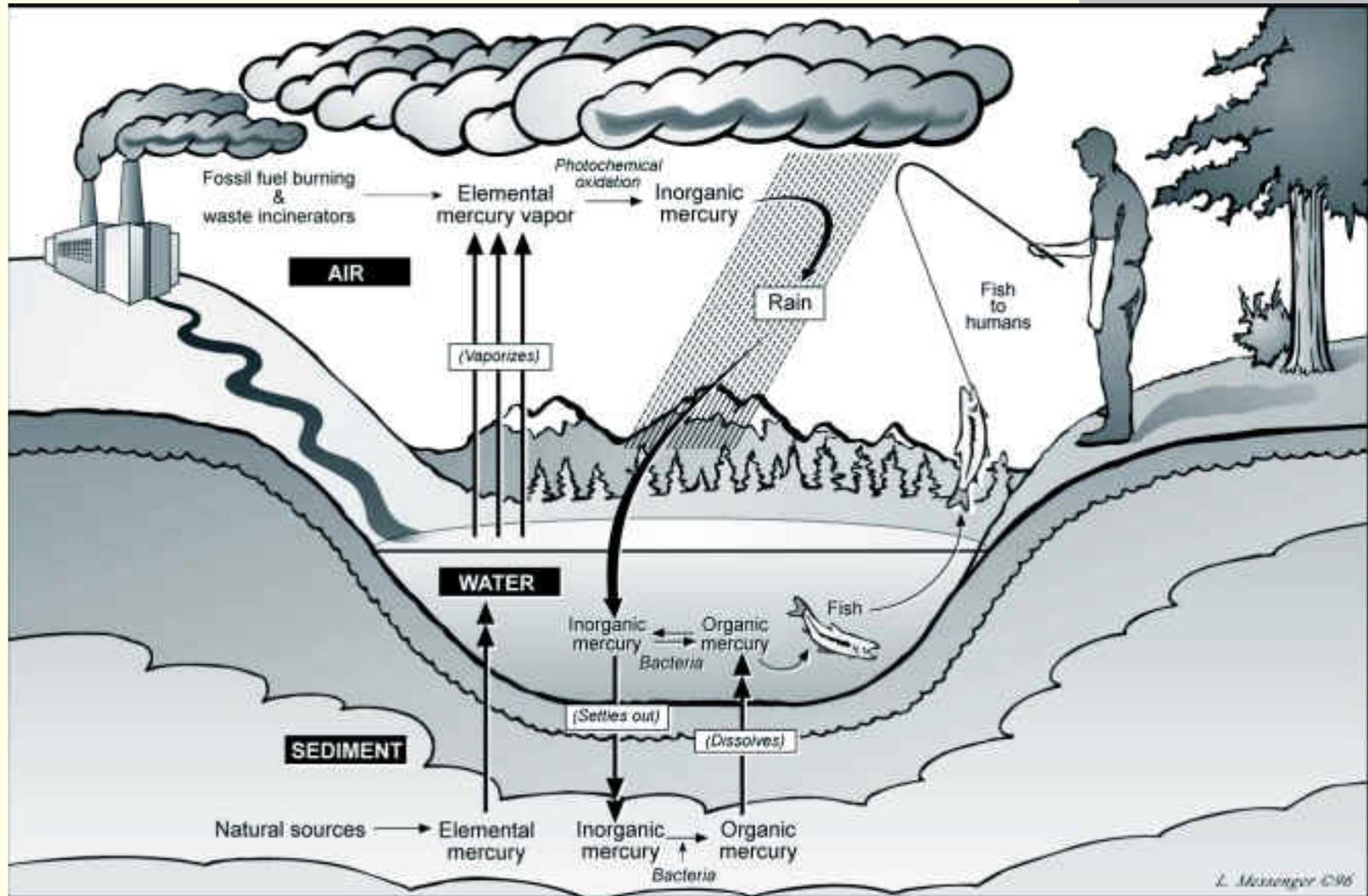
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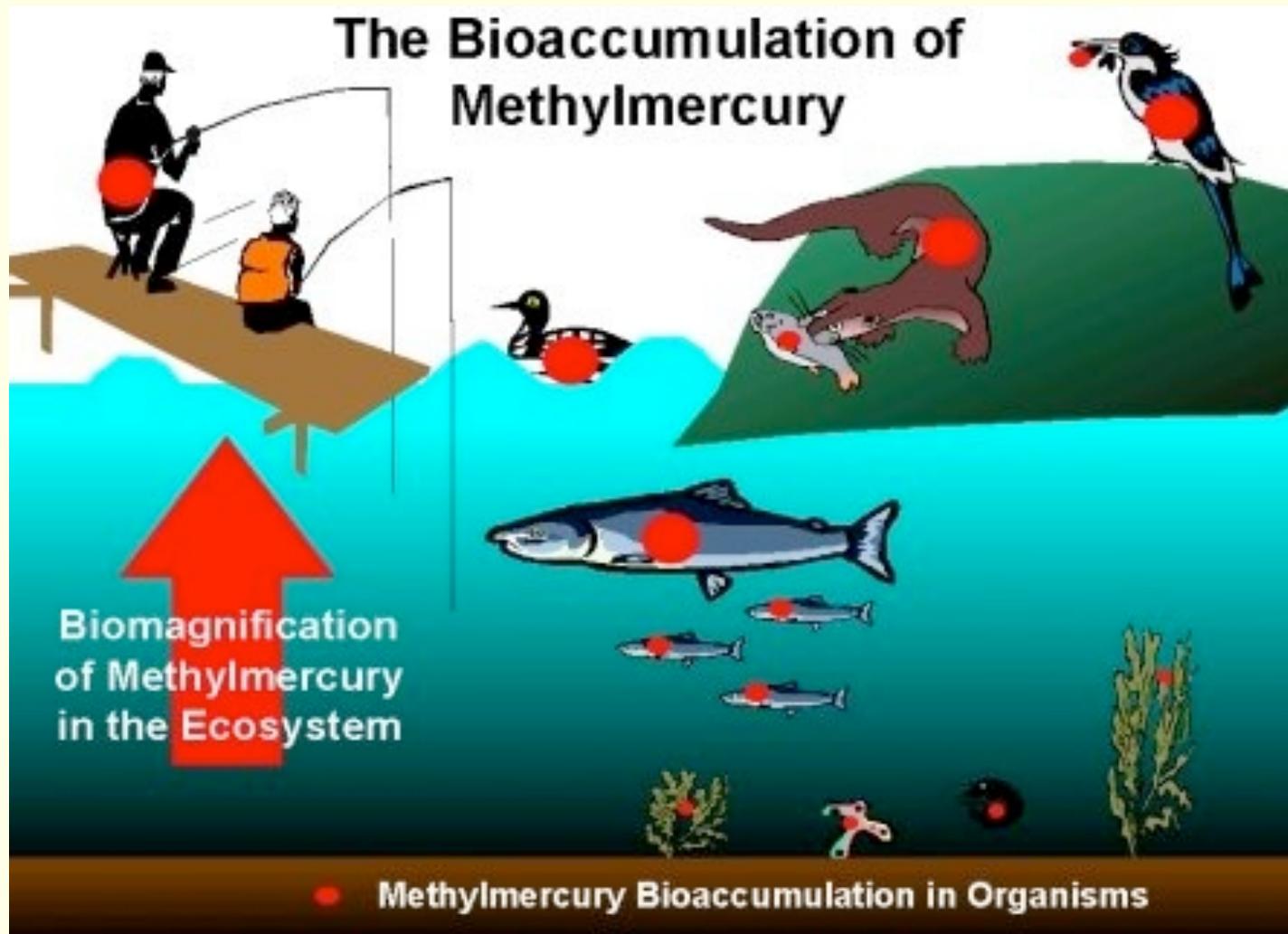
University of Virginia



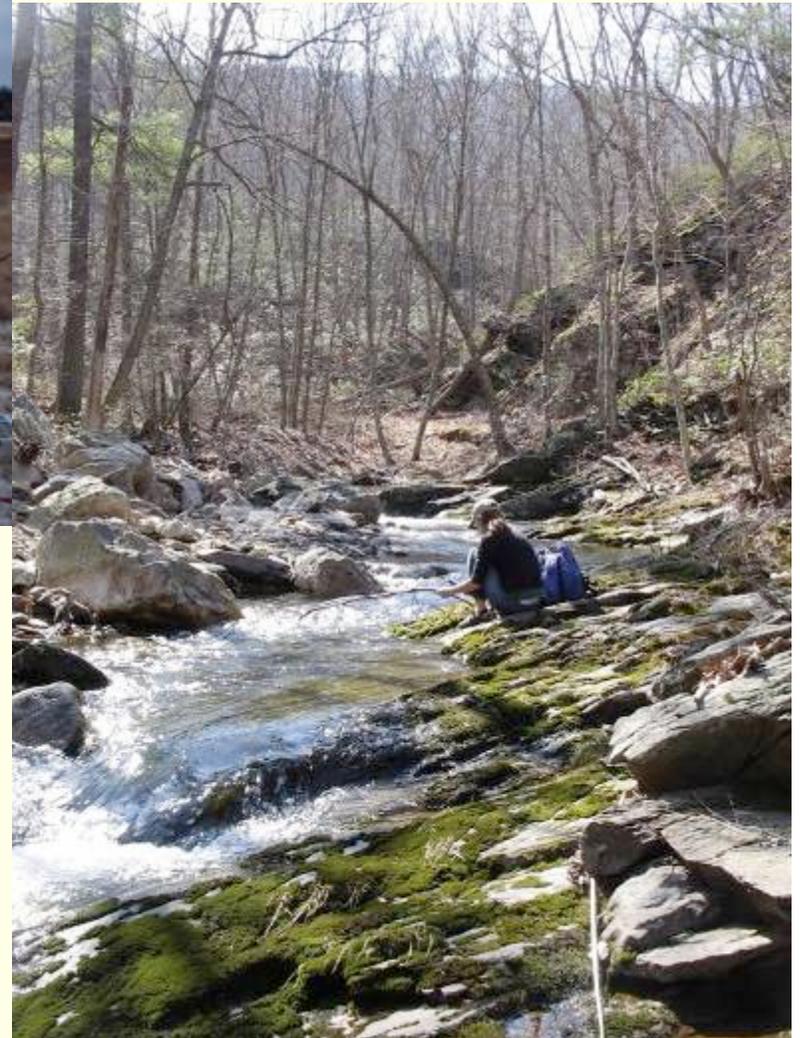
Hg Cycling



Methylmercury (MeHg)



- Higher levels of Hg deposited from atmosphere



- Lower levels of Hg in streams

What intermediate processes are
controlling the attenuation of Hg
on catchments?

Previous Studies...

- Intermediate cycling involving terrestrial vegetation and soils
- Foliage
 - Net sink
 - Originates from atmospheric deposition
 - Vary as a function of age and type
- Soils
 - Litterfall
 - Can store up to 90% of Hg in forests
 - Complexed with organic matter

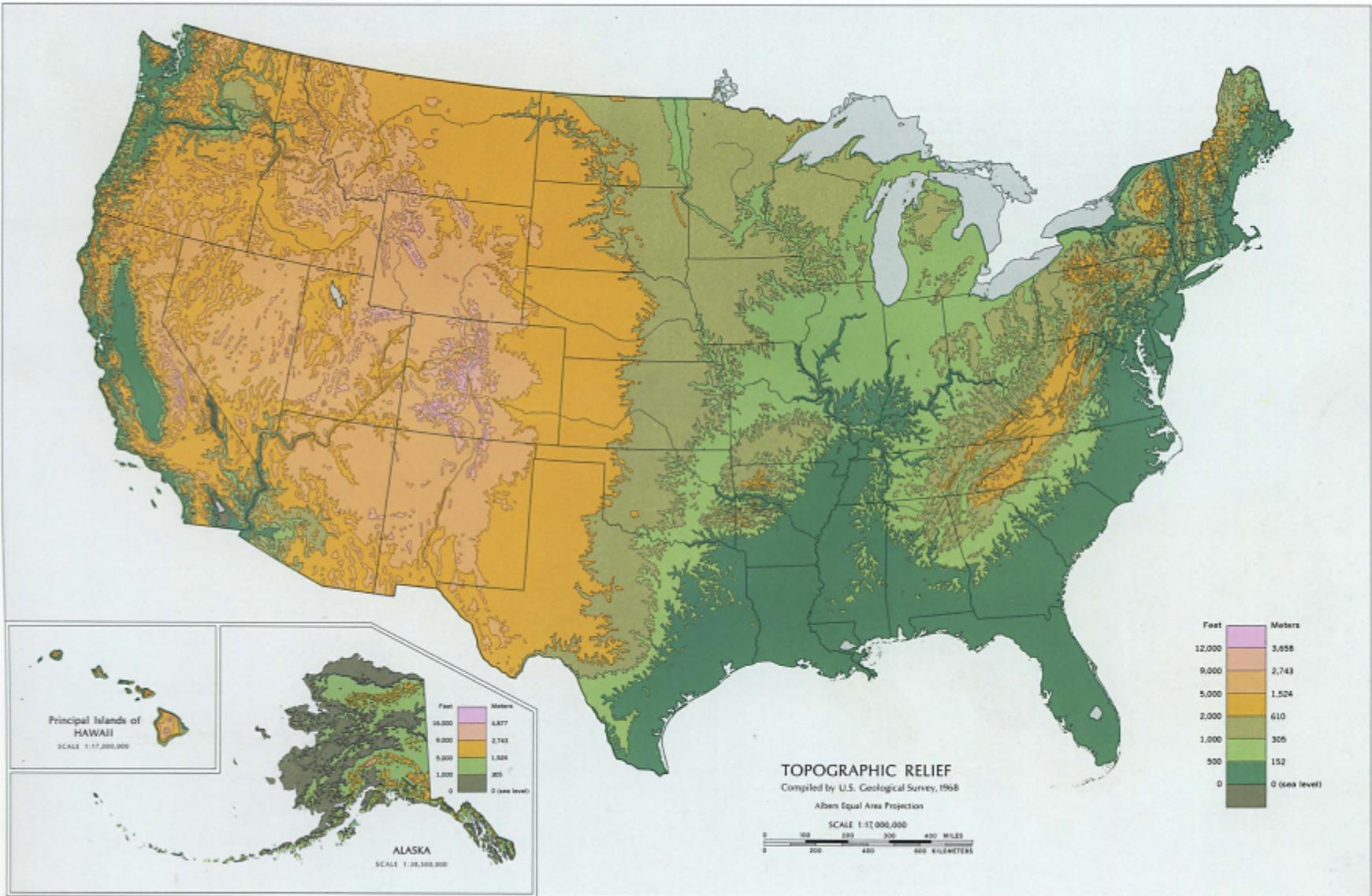
What (if any) role does aspect play in the distribution of Hg in leaves and soils?

Research Basis

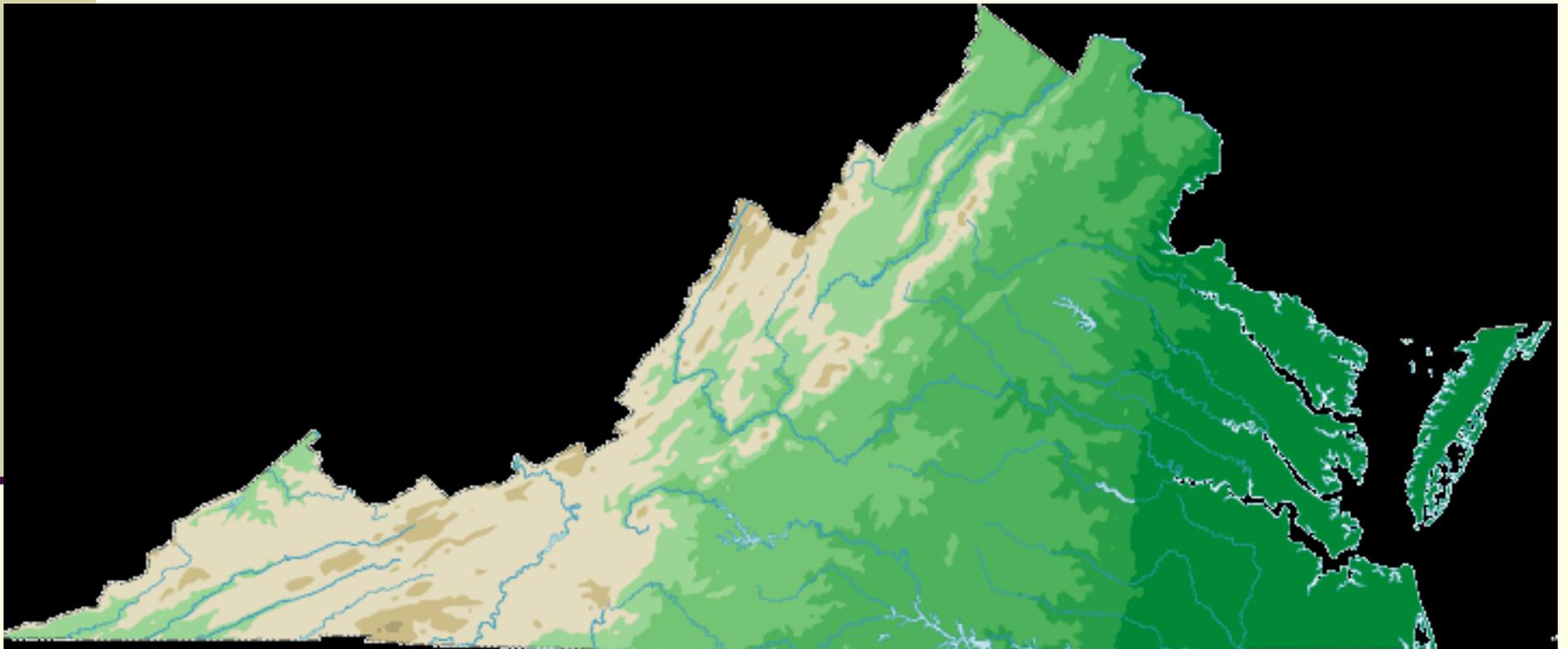
- Paired catchment study
- Varying aspects (NW vs. SE)
- Similar elevation, vegetation, size, geology, and latitude

	NFDR	Hannah Run
Area (km²)	2.32	1.72
Mean Elevation (m)	860	778
Mean slope (degrees)	23	23

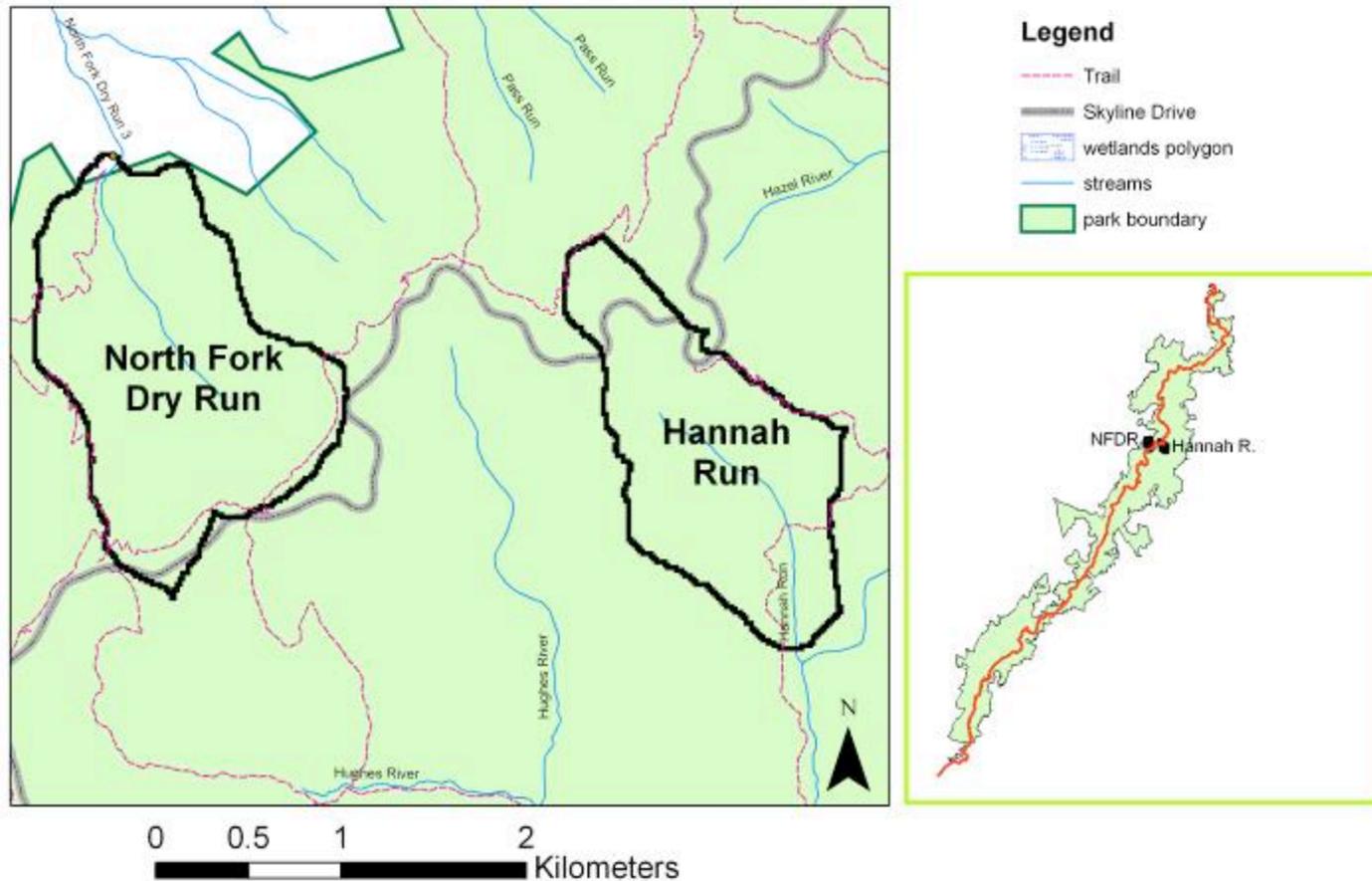
USA



Virginia



Study Site: Shenandoah National Park



Hypothesis: Role of Aspect

- West-facing catchment will have higher Hg deposition
- Coal-fired power plants



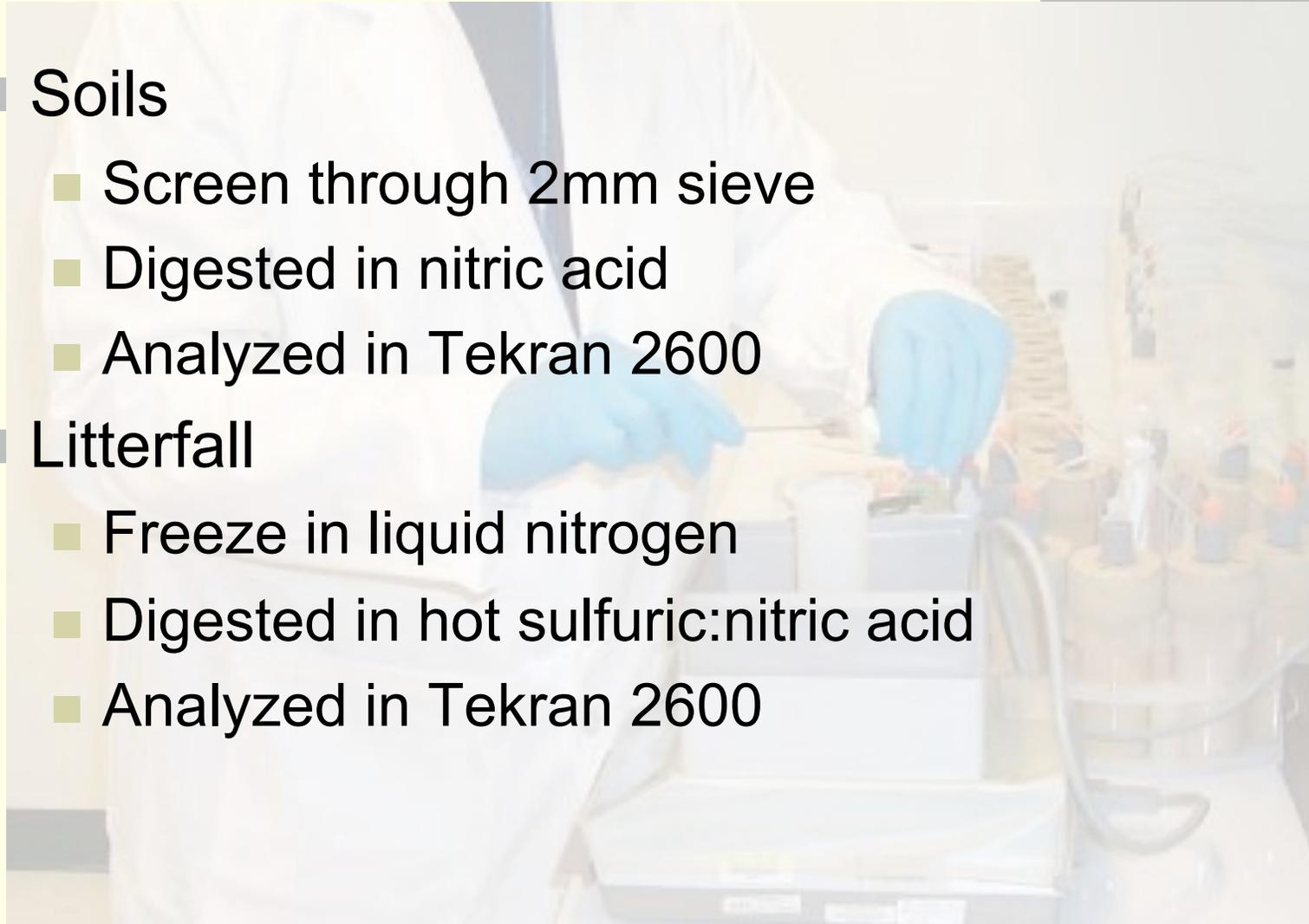
Methods

- Field collection
 - Litterfall basins deployed weeks prior
 - Triplicates of leaves & soils collected
 - Frozen until analysis

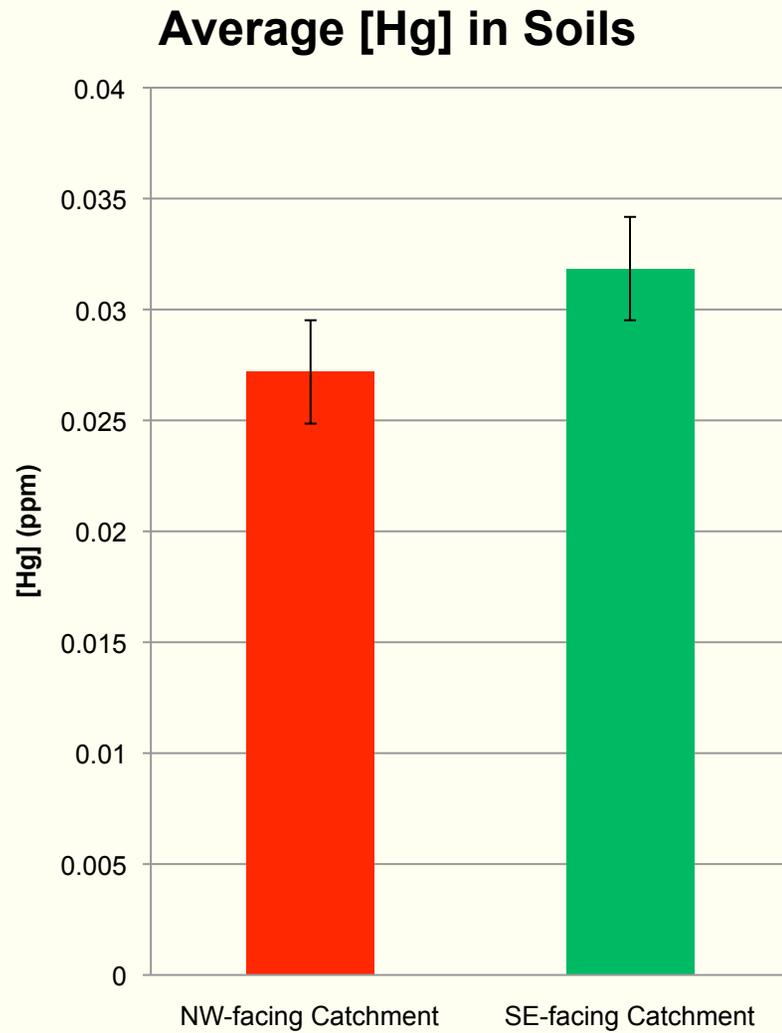


Lab Analysis

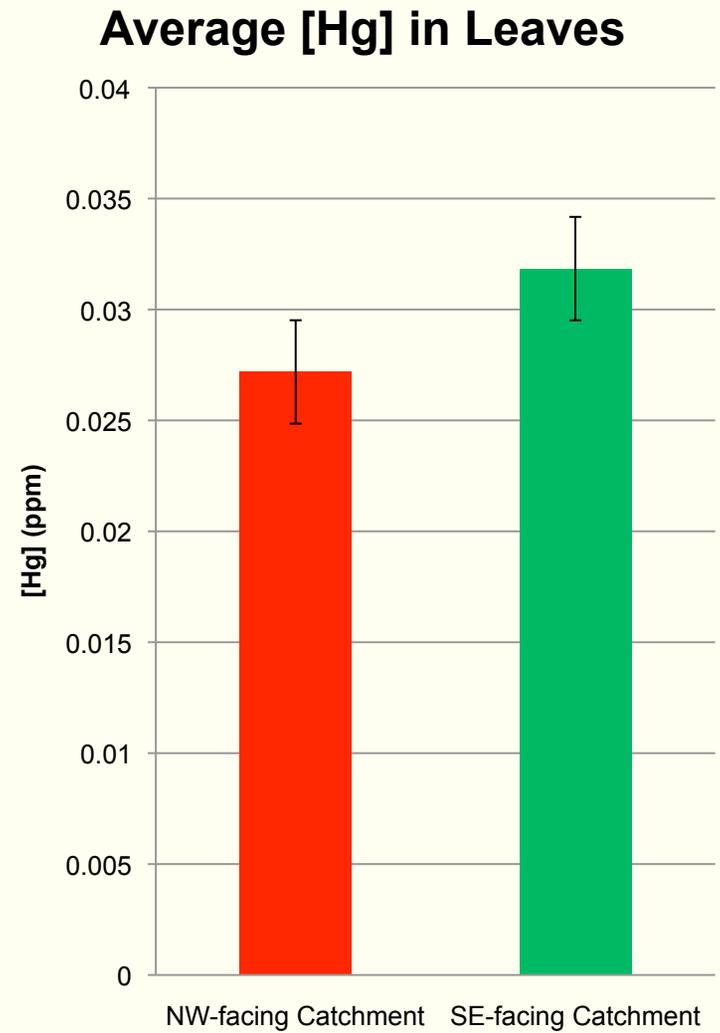
- Soils
 - Screen through 2mm sieve
 - Digested in nitric acid
 - Analyzed in Tekran 2600
- Litterfall
 - Freeze in liquid nitrogen
 - Digested in hot sulfuric:nitric acid
 - Analyzed in Tekran 2600



Results

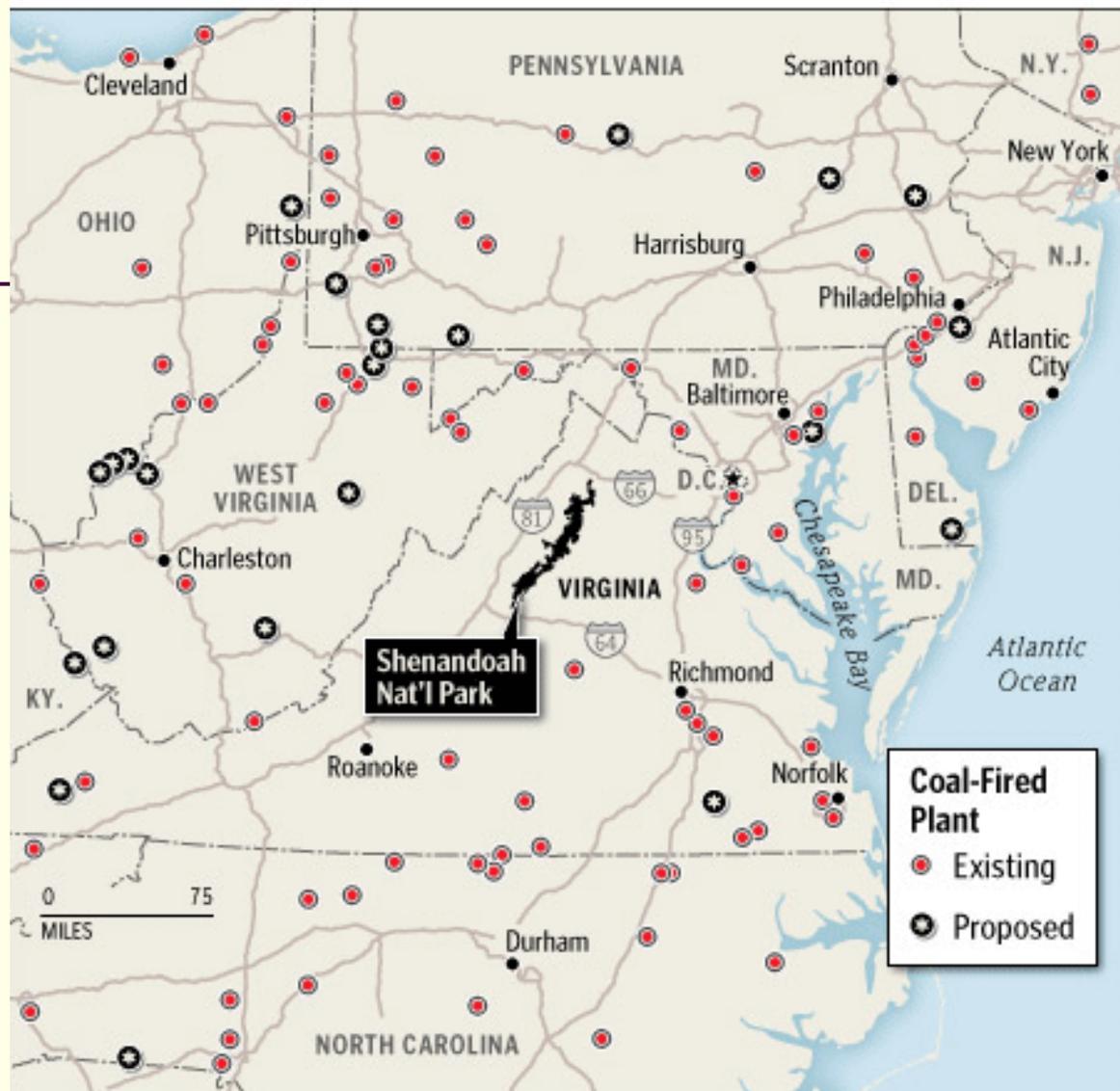


p-value = 0.007 (<0.05) = **Significant**



p-value = 0.543(>0.05) ≠ Significant

Implications



10 national parks most threatened by new coal-fired power plants:

- Badlands, *South Dakota*
- Capitol Reef, *Utah*
- Great Basin, *Nevada*
- Great Smoky Mountains, *Tennessee and North Carolina*
- Mammoth Cave, *Kentucky*
- Mesa Verde, *Colorado*
- **Shenandoah, *Virginia***
- Theodore Roosevelt, *North Dakota*
- Wind Cave, *South Dakota*
- Zion, *Utah*

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Thank you for your time!