

Mercury in Adirondack Soils

Doug Burns

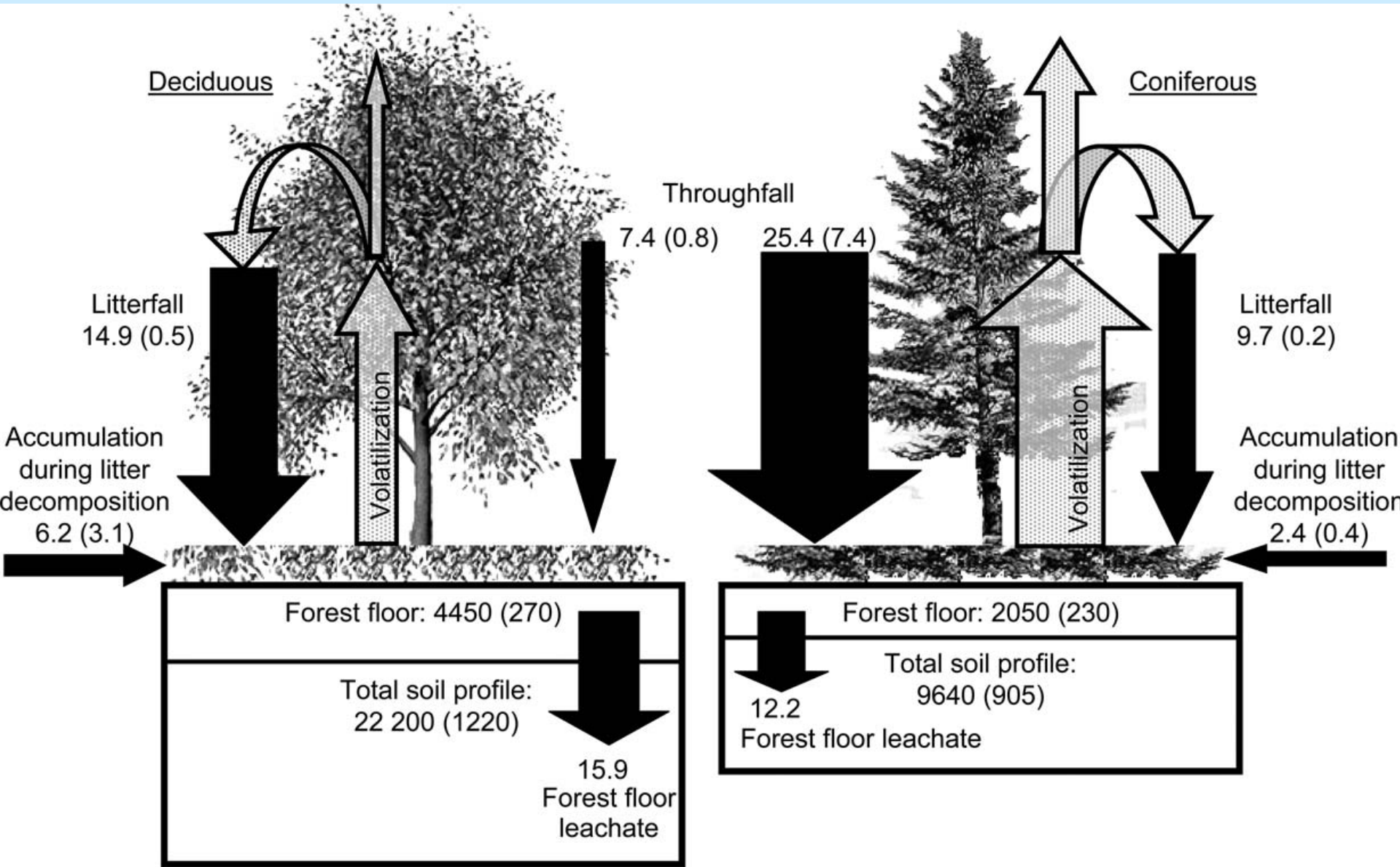
U.S. Geological Survey

Troy, NY

Mercury in Soils

- Largest pool of Hg in forested ecosystems
- Most studies show that inputs of Hg from atmospheric deposition exceed outputs in surface waters plus net emissions
- Hg strongly associated with soil organic matter
 - binds to thiol groups
- Hg in soils is new, old, and recycled

Hg Cycle in ADKs from Demers et al., 2007



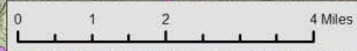
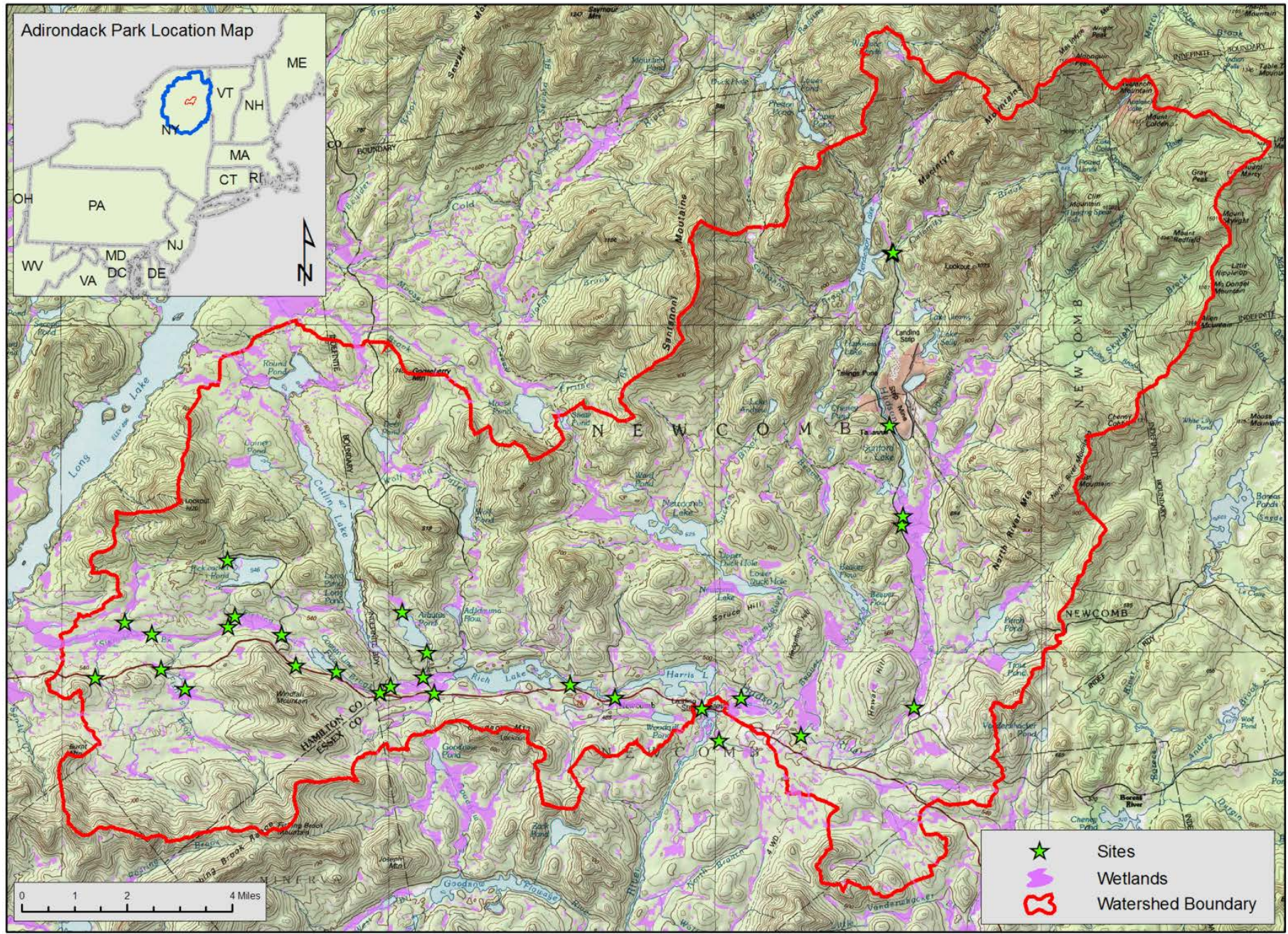
Soil Sampling in ADKs

- Collected samples in different land cover, multiple depths
- Analyzed for total Hg and methyl Hg
- Part of effort to model Hg cycle in two watersheds: (1) Fishing Bk, NY, (2) McTier Ck, SC

Where we are Going

- Compare THg and MeHg in Adirondacks to Coastal Plain, SC
- Soils concentrations and pools in ADKs much larger, but water and aquatic biota are similar
- Warmer temps, less storage of SOM in SC results in faster Hg cycle, but little storage

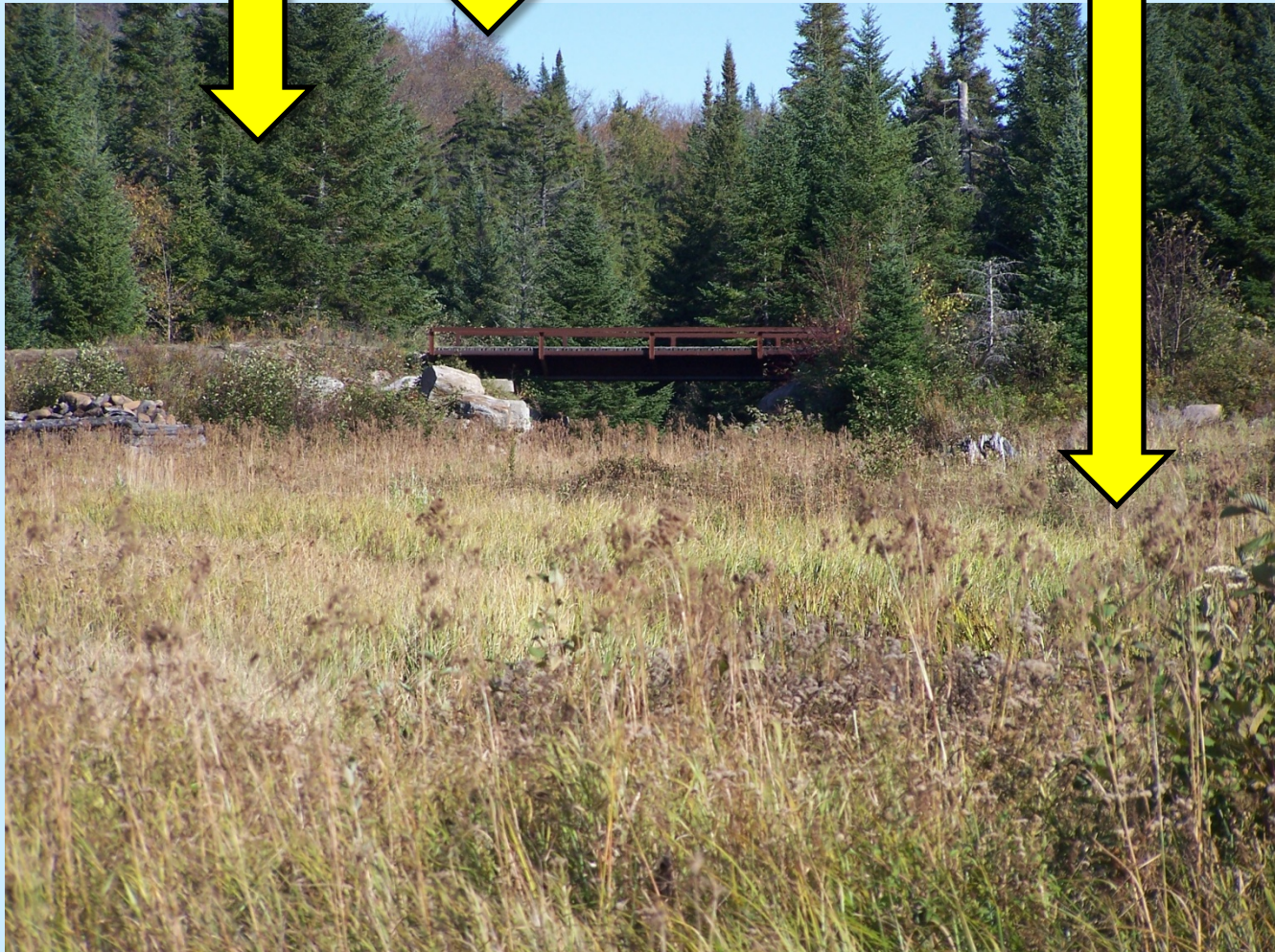
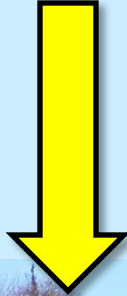
Upper Hudson Basin Upstream of Newcomb, NY



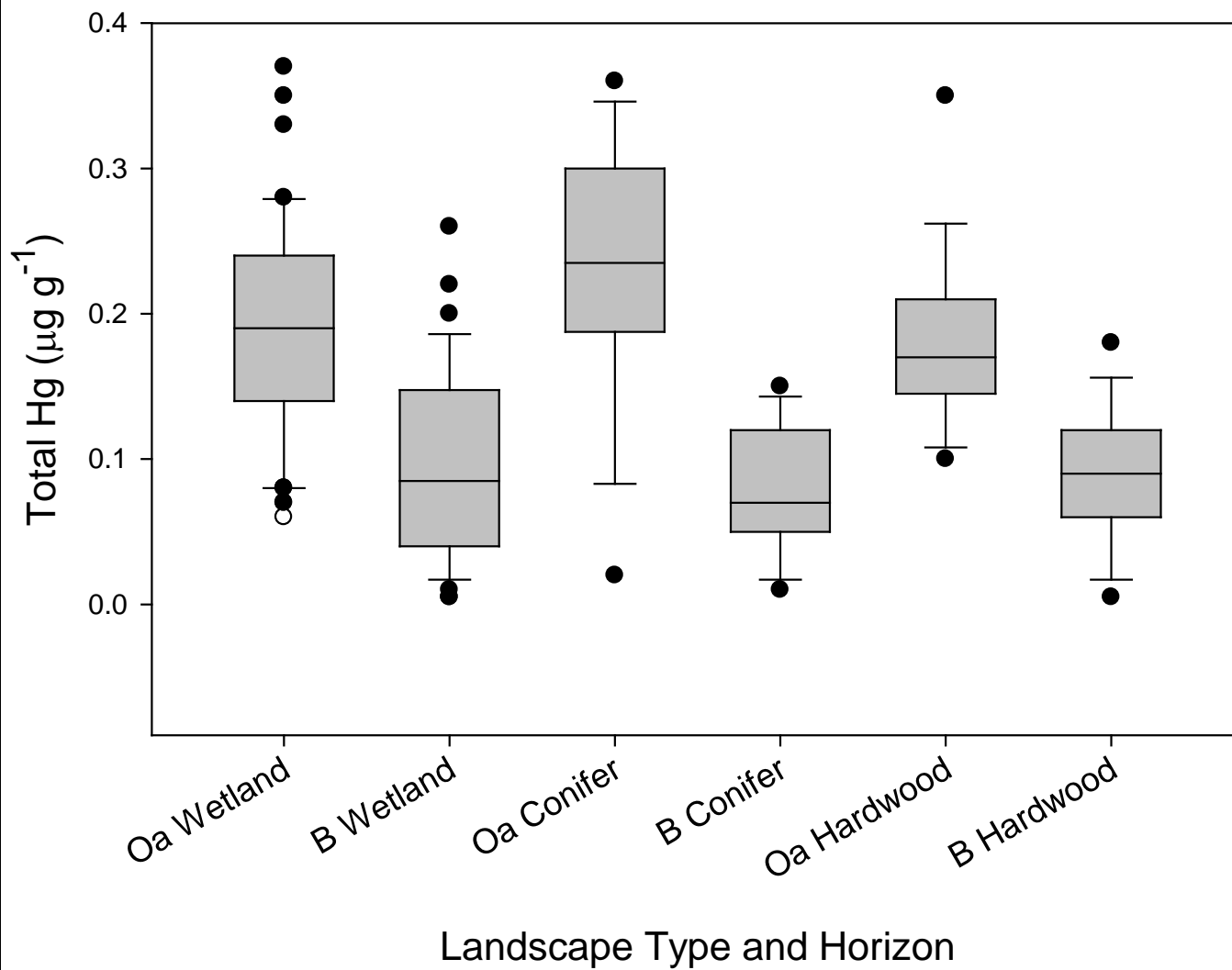
Riparian Conifers

Hardwood Hillslopes

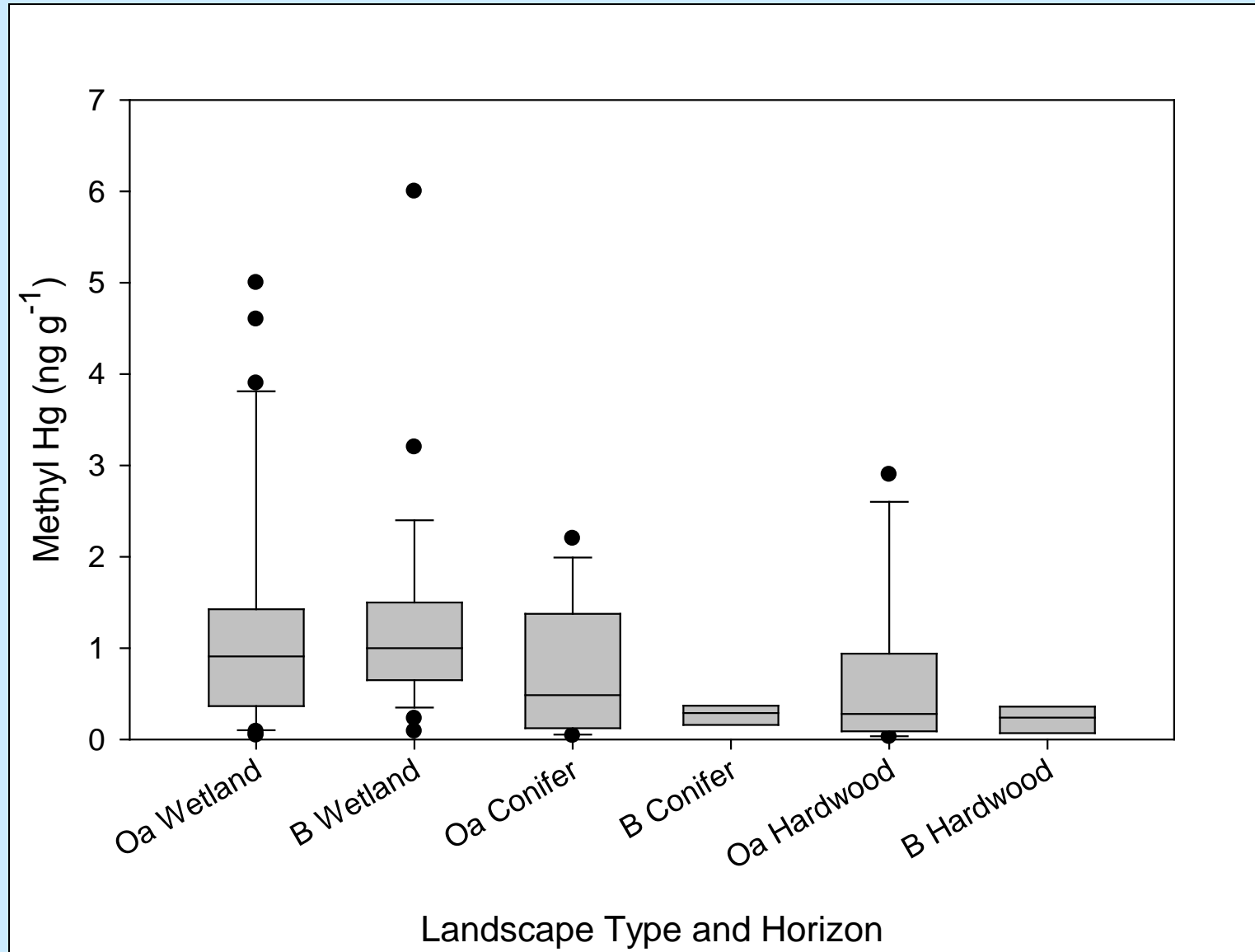
Riparian Wetlands



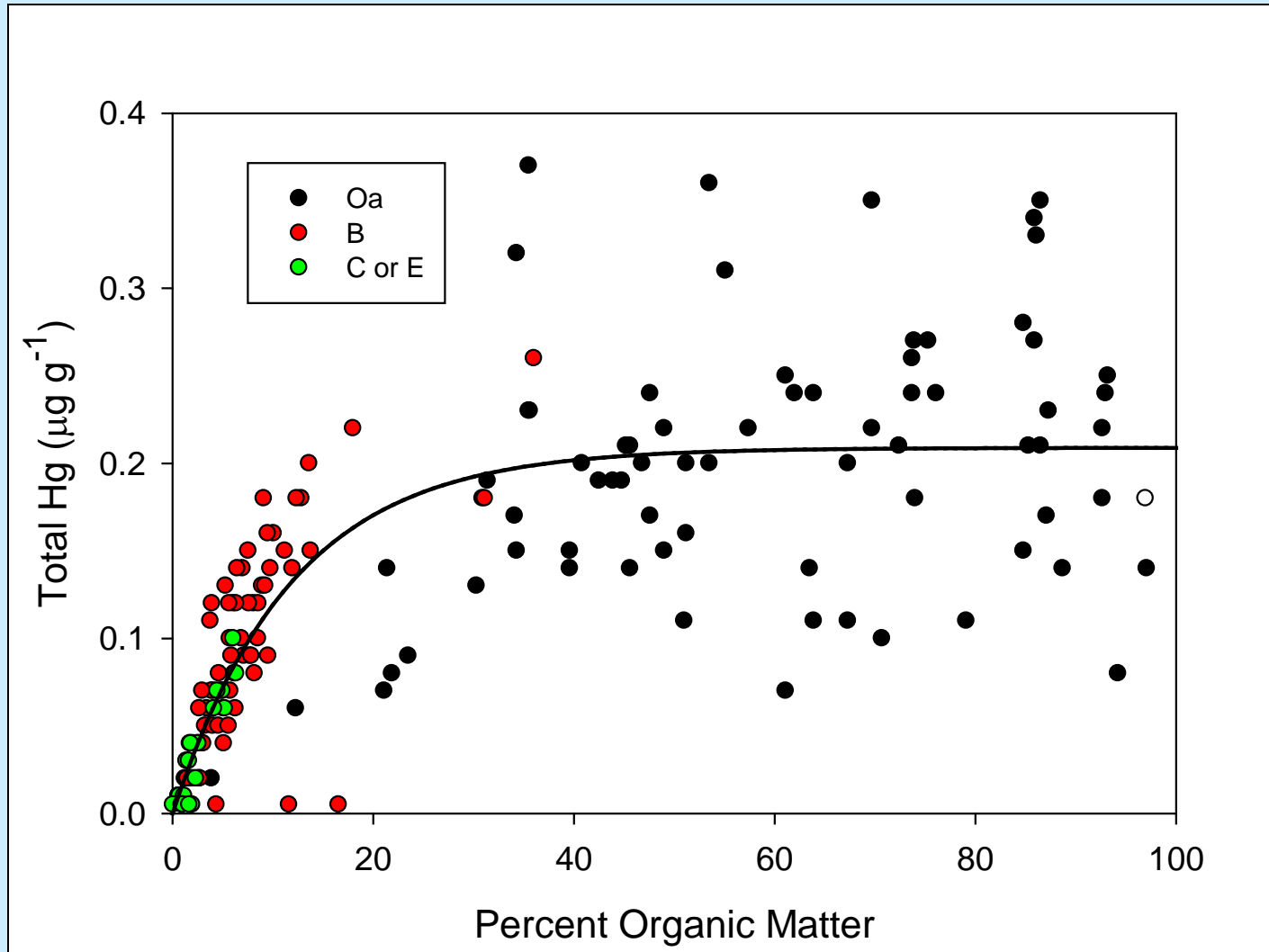
Total Hg



Methyl Hg



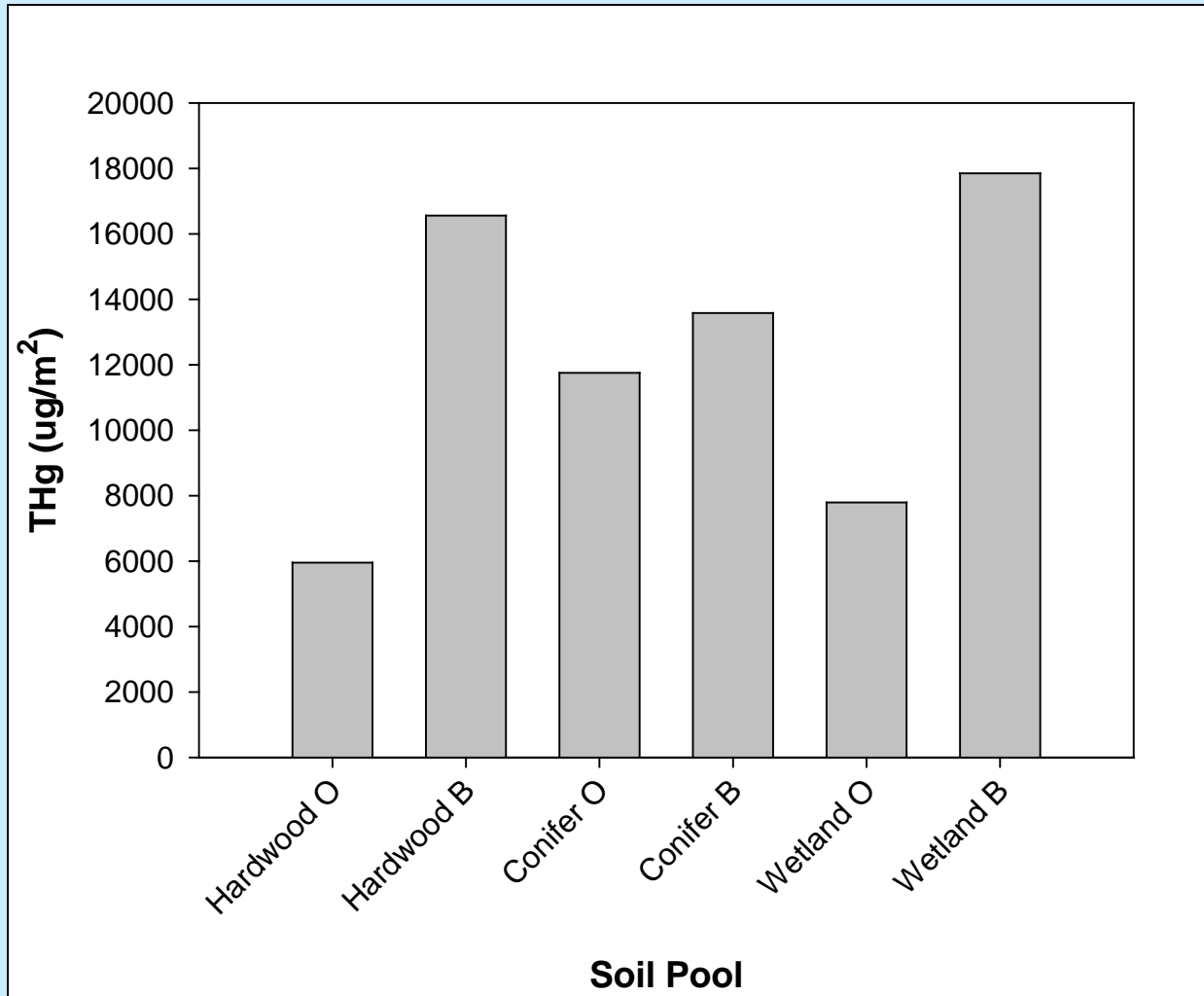
Organic Matter vs. Total Hg



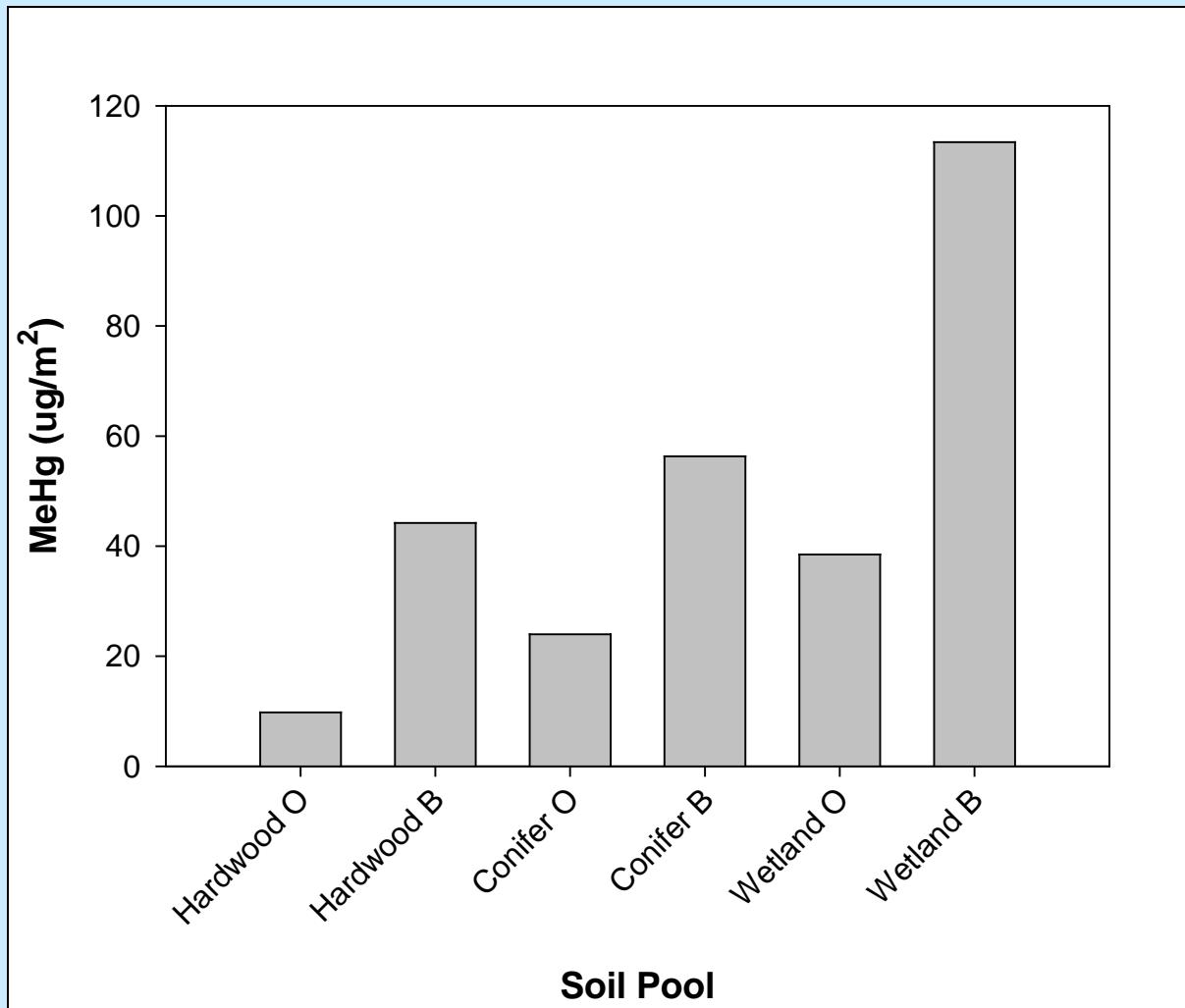
Estimating Hg Soil Pools

- Some bulk density measurements – use Federer eqn. for O horizon soils
- Did not estimate rock fragments – no quantitative pits
- High uncertainty – Monte Carlo analysis?

Total Hg

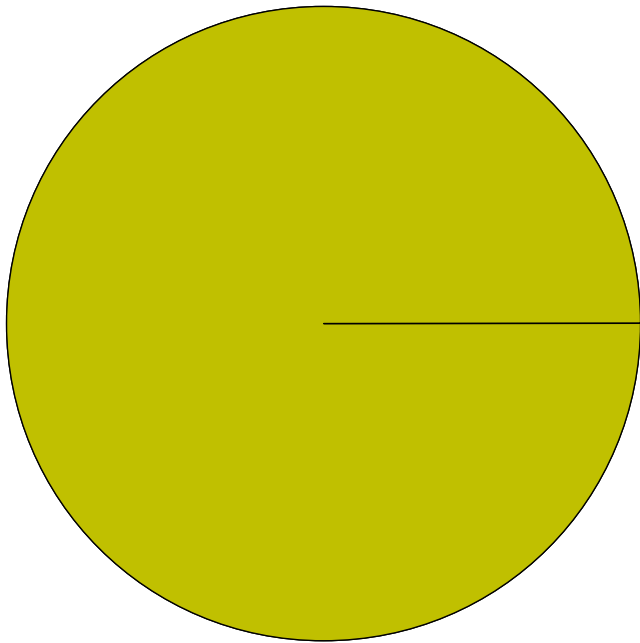


MeHg



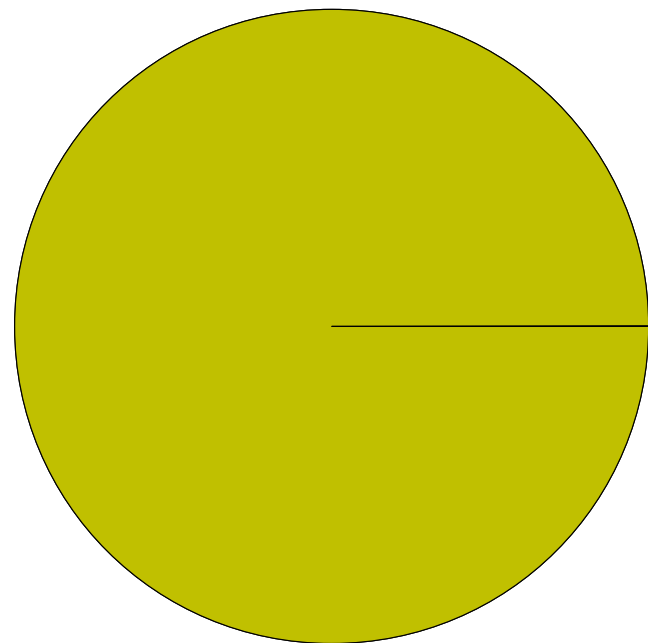
THg - Pools Contribute Equally

Proportion of Watershed Area



■ Hardwood
■ Conifer
■ Wetland

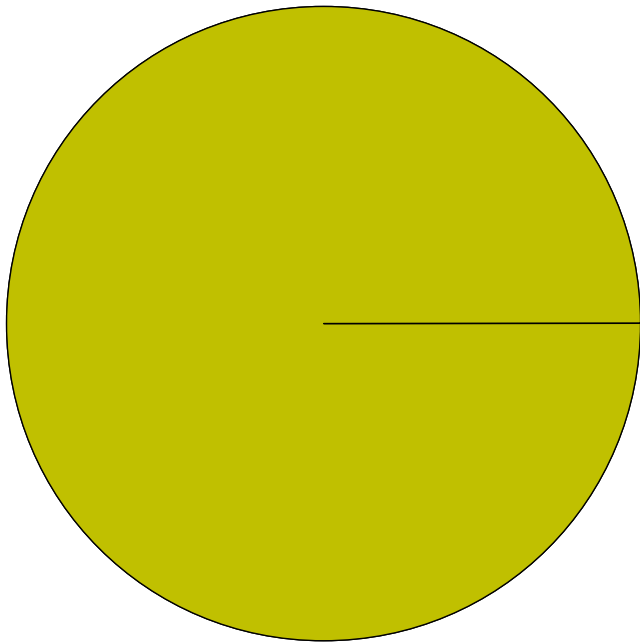
Proportion of THg Pool



■ Hardwood
■ Conifer
■ Wetland

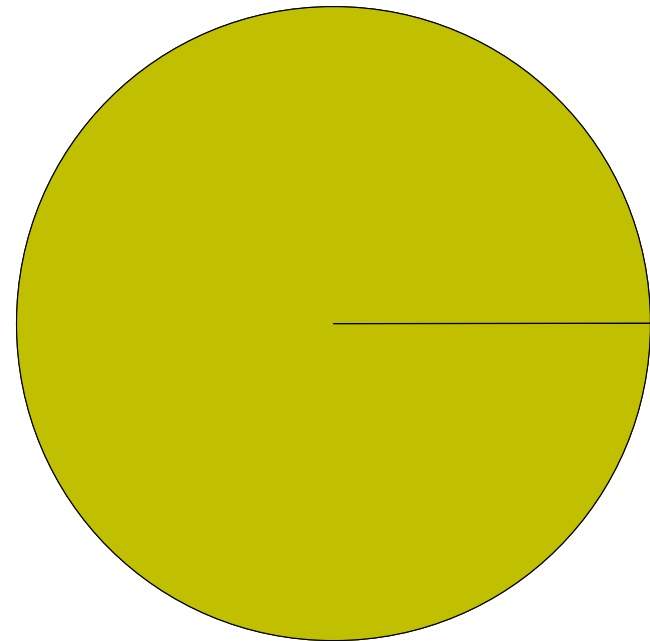
MeHg – Wetlands Contribute More

Proportion of Watershed Area



■ Hardwood
■ Conifer
■ Wetland

Proportion of MeHg Pool



■ Hardwood
■ Conifer
■ Wetland