

Unmapped forested wetlands contain vast stores of soil carbon

Stewart, Anthony J., et al., "Revealing the Hidden Carbon in Forested Wetland Soils." *Nature Communications* (January 25, 2024) <https://doi.org/10.1038/s41467-024-44888-x>.



Science Question

- How much soil carbon is stored in unmapped forested wetlands?
- Are unmapped wetlands a significant store of soil soil carbon compared to currently mapped wetlands?
- Wetlands represent a vulnerable pool of carbon due to disturbance from land use conversion exemplified by the ruling by the U.S. Supreme Court in *Sackett et ux. v. Environmental Protection Agency*

Analysis

- Aerial Lidar, satellite imagery, geospatial analysis, and soil sampling field work

Results

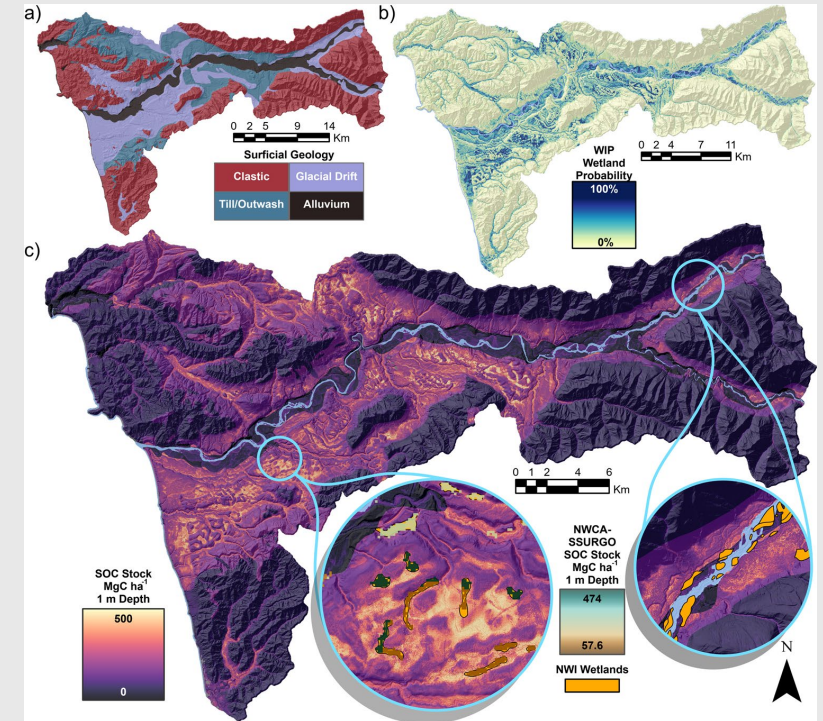
- We show that total unmapped or "cryptic carbon" is 1.5 TgC and when added to current estimates, increases the estimated wetland soil carbon stock to 1.8 TgC or by 482%
- Mean soil carbon stock in unmapped wetlands was much higher than currently mapped wetland soil carbon (259 vs. 184 MgC/ha)

Significance

- The potential magnitude of cryptic carbon supports the need for more wetland identification in forested regions. Land and natural resource managers will be able to use this framework to improve protection of potentially vulnerable wetland soil carbon.

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a Shows the surficial geology categories of the HRW by color classes in surficial geology legend, b shows the WIP probability gradient shown by yellow-blue shading indicated in WIP legend, c shows the predicted 1 m SOC stock across the HRW with purple-to-yellow shading that continues in inset maps showing fine scale SOC patterns overlain by estimated SOC shown by brown-teal shading from the harmonized National Wetland Condition Assessment and Soil Survey Geographic Database (NWCA-SSURGO) dataset and additional current wetland extent from the National Wetland Inventory (NWI).