Progress Report

Resilience of soil organic matter to harvesting: A global study of long-term soil productivity experiments

CAFS 20.81

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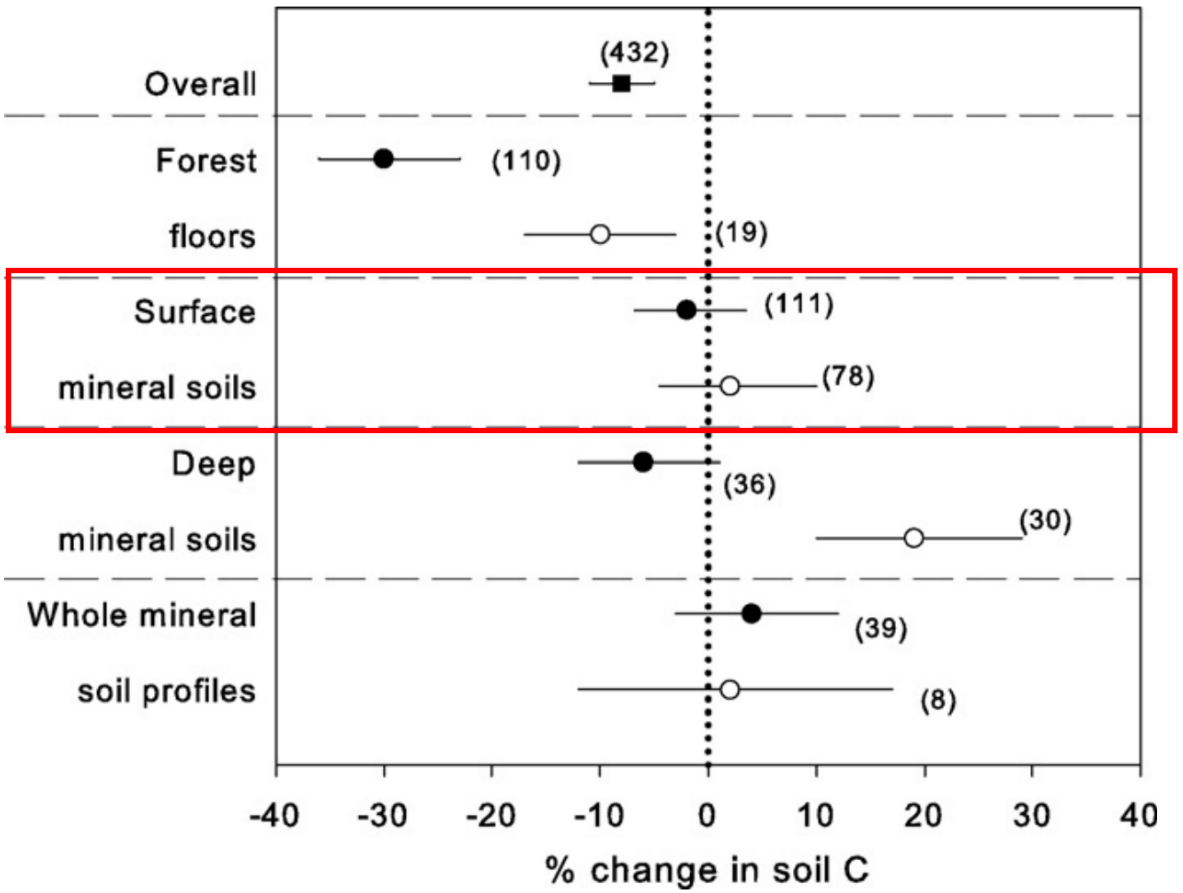
SOM and Site Productivity

Soil Organic Matter (SOM) is positively related to site productivity
- >99% soil N is organic in form
- Large portion of soil P is in organic forms
- Cation exchange capacity
- Water holding capacity
- Structure and root penetrability

SOM is central to many other Ecosystem Services
- Soil carbon is the largest actively cycled terrestrial pool of carbon on the earth
- Water purification

SOM may also be affected by harvesting

Harvesting Effects on SOM



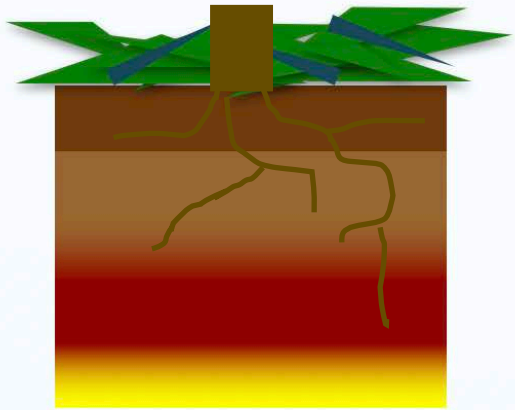
Nave et al. 2012

Why doesn’t soil carbon change after harvesting?

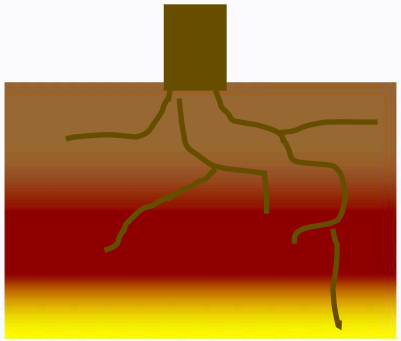
Objectives

Determine the mechanisms of resilience, resistance, or vulnerability of soil carbon to forest harvesting on LTSP studies

Methods: LTSP



Bole-only



Whole-tree + Forest Floor

Methods

Sample Archives: Soils

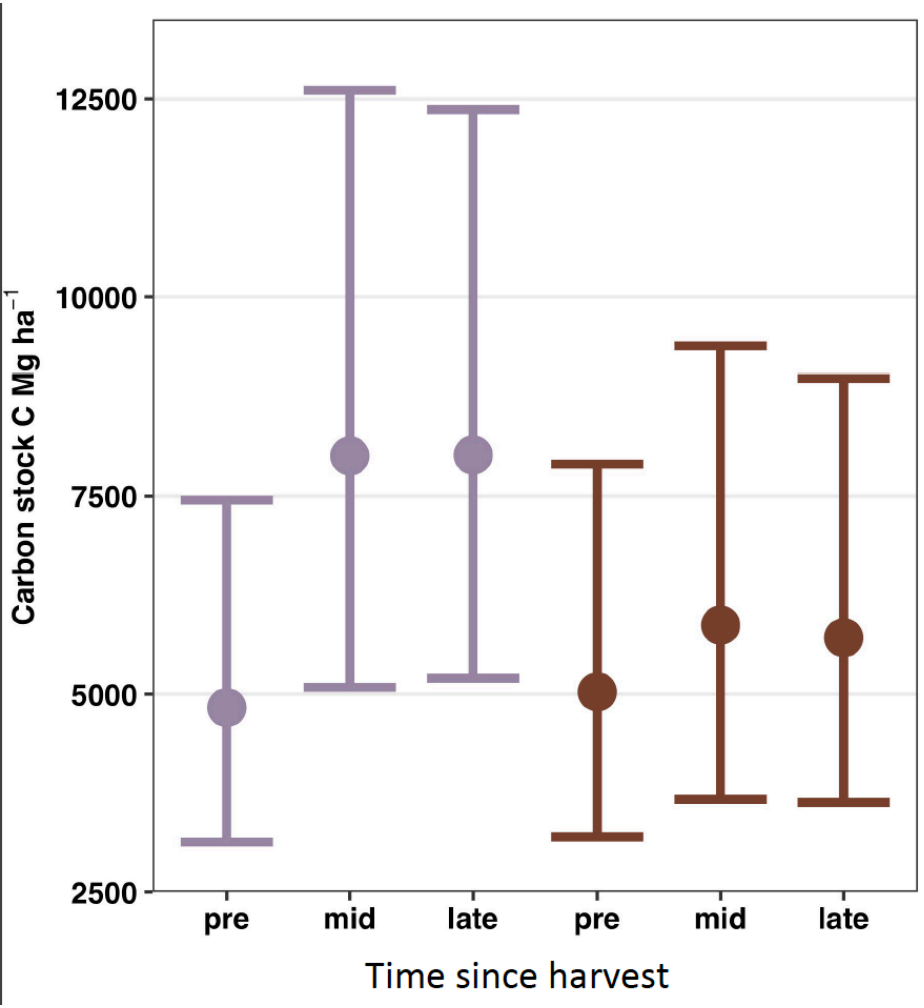
Pre-treatment
Immediate post-treatment
Years post-treatment

Methods: Sites

Since these figures:
6 Sites in California
1 Site in North Carolina

Preliminary Results

Current Progress

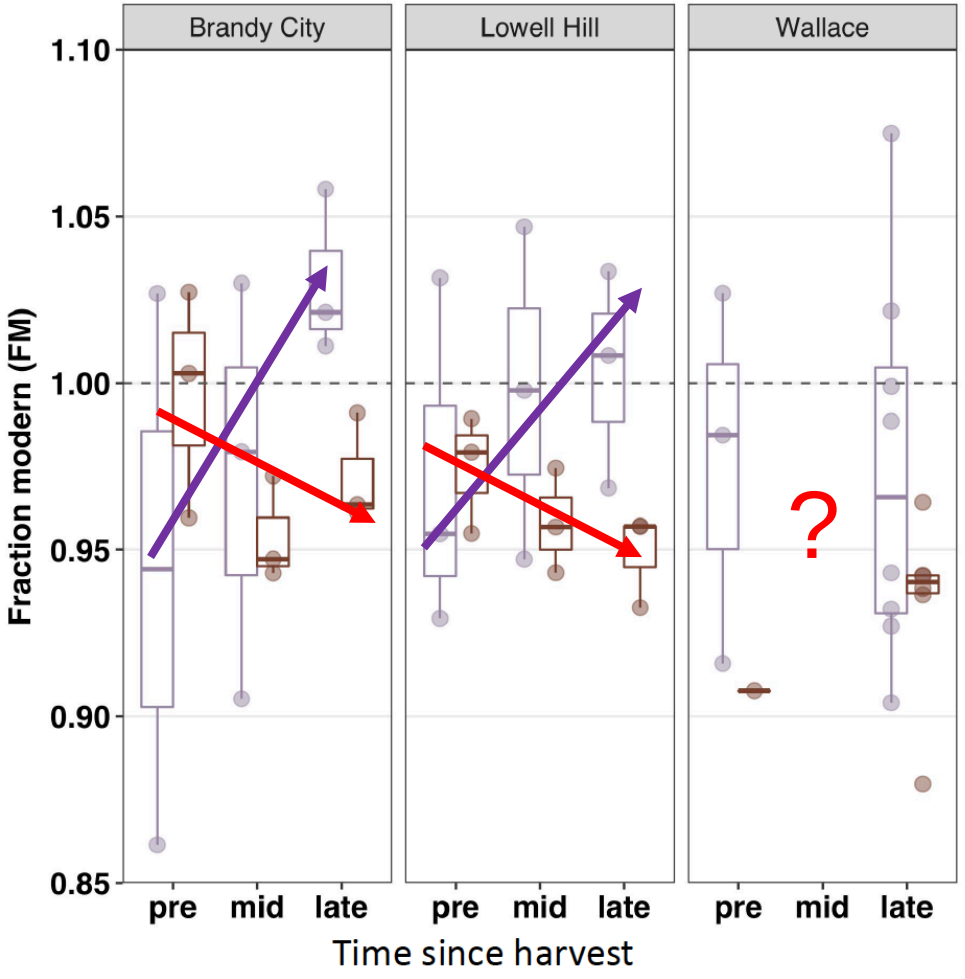


- Stem only removal (SO)
- Whole tree + forest floor removal (WT + FF)

- Pre = 0
- Mid = 5-11 years
- Late = >15 years

Preliminary Results

Current Progress



Younger carbon

Older carbon

- Stem only removal
- Whole tree + forest floor removal

Future Work

- Continue measure radiocarbon on other sites and soils
- Density fractionation to determine which portion of the soil (particulate or mineral associated) carbon pool is being affected
- XRD and selective dissolution to determine the role of mineralogy in setting up a soil's resilience
- Biomarkers to determine sources (roots, shoots, microbial, etc.)