

NARA

Sustainability: Soil Carbon

Name

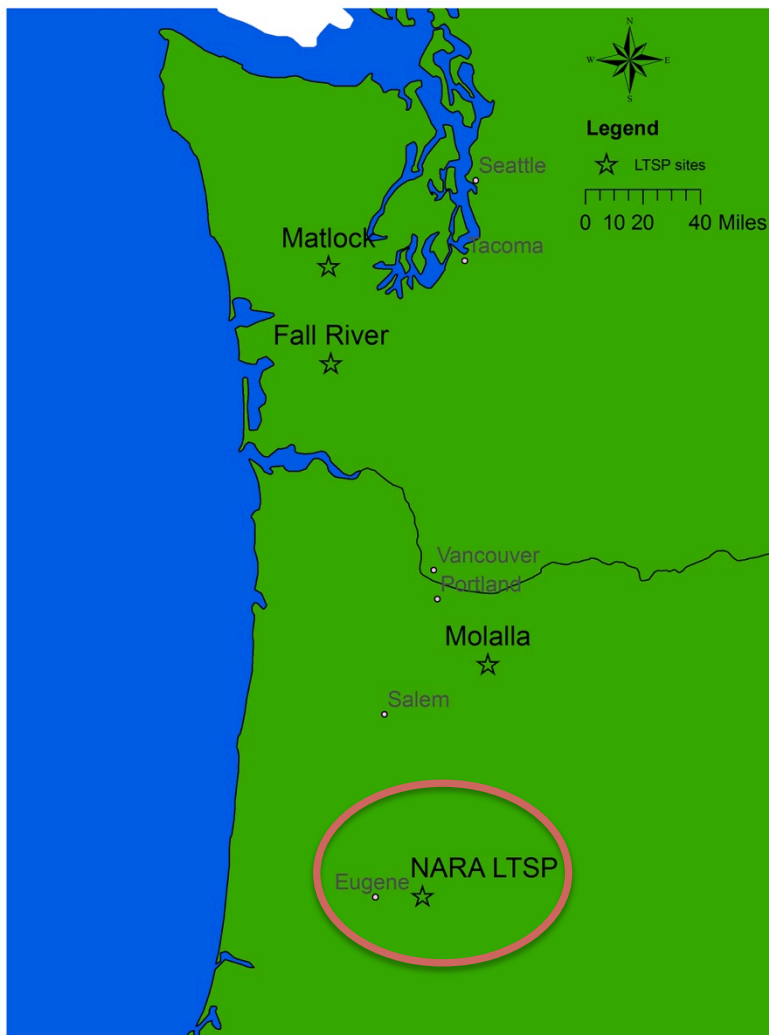
Institution

Northwest Advanced Renewables Alliance





- Soil carbon is the largest global terrestrial carbon pool (about 3-5 times biomass)
- Small changes to soil carbon pool could mean large changes to atmospheric carbon (e.g. CO₂)
- Harvesting inherently removes inputs to soil carbon pool





-Levels of Residual Removal-

<i>Compaction OM Removal</i>	C0 – No compaction	C1 - Moderate compaction
OM0 – Bole only	OM0 C0 Boles removed / No compaction	OM0 C1 Boles removed / Moderate compaction
OM1 - Boles and crowns removed	OM1 C0 Boles & crowns removed / No compaction	OM1 C1 Boles & crowns removed / Moderate compaction
OM2 - Boles, crowns, forest floor removed		OM2 C1 Boles, crowns & forest floor removed / Moderate compaction

* F&G = + mid-rotation fertilization



NARA Post-Treatment Aerial Photo

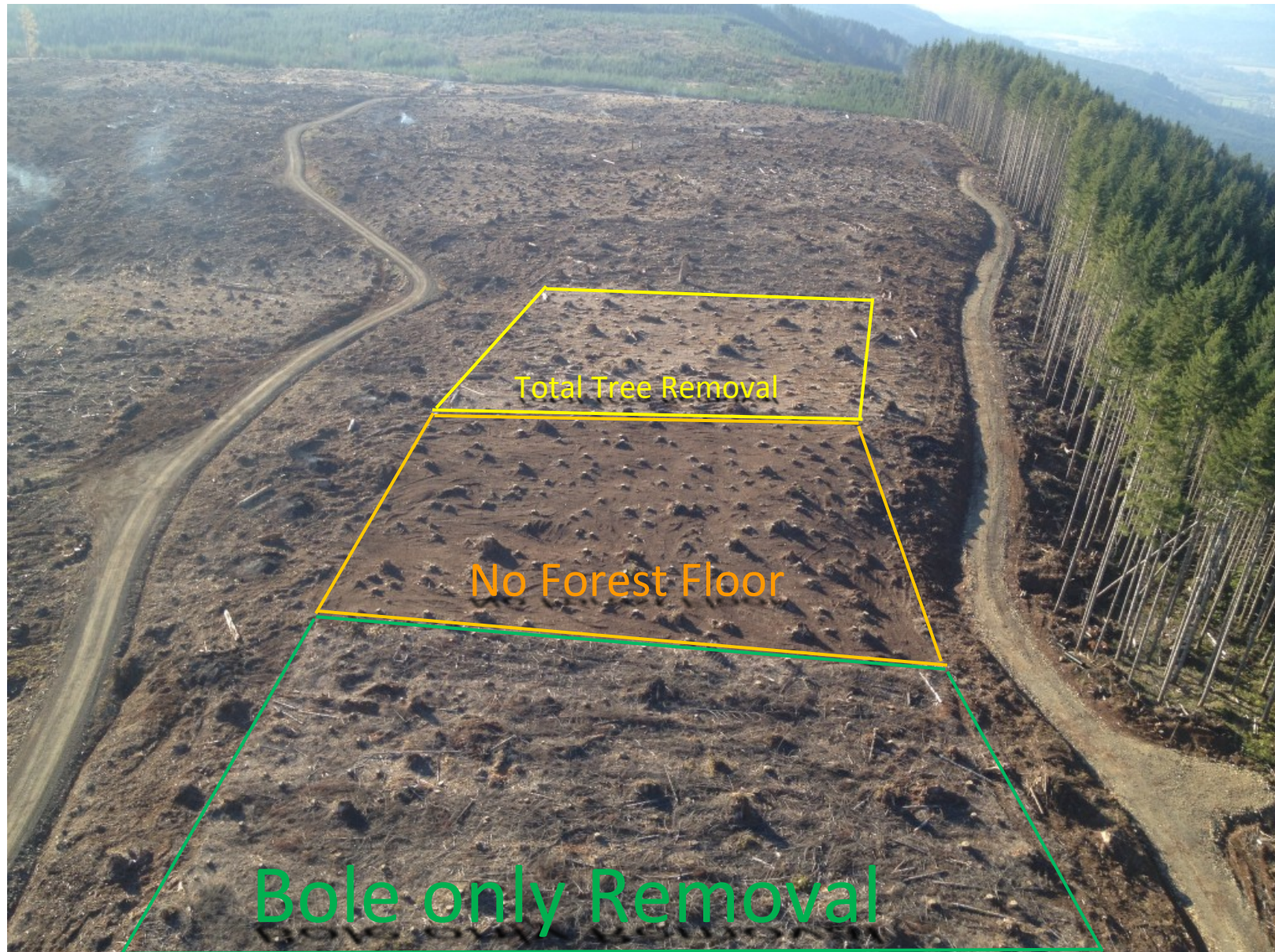
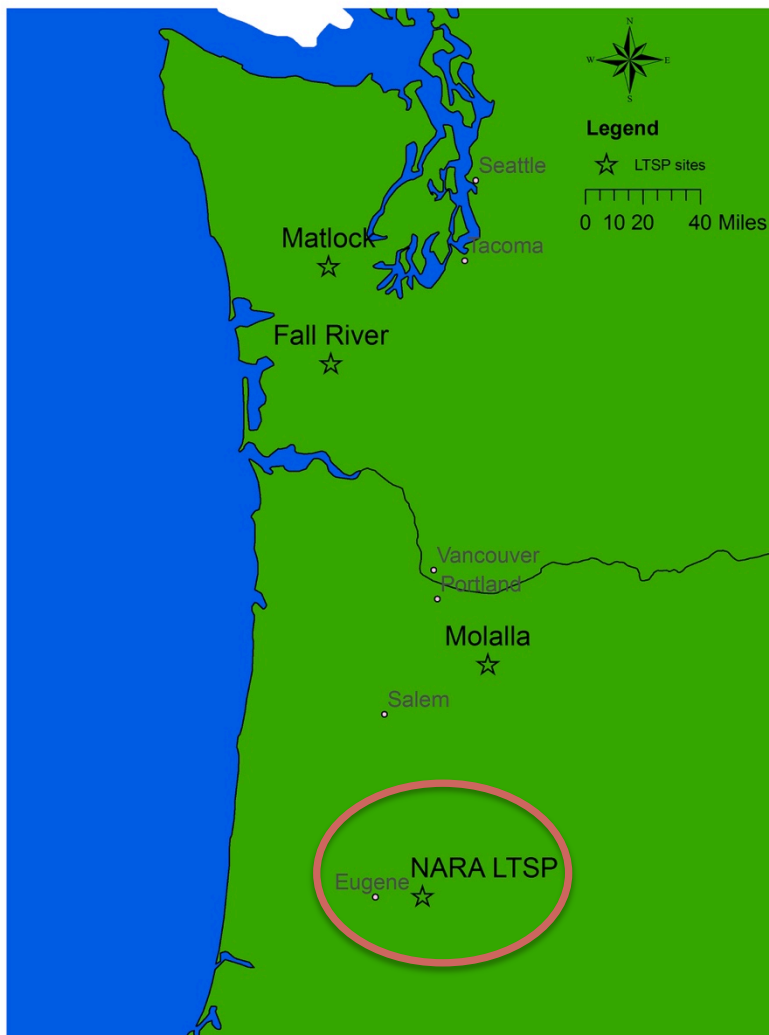


Photo taken October 2013 – Post treatment – looking west across the north part of the study

NARA



2012 – Sites identified and pre-harvest measurements taken

2013 – **Treatments applied**, post-harvest measurements, instrumented for weather data, soil water collections, gas analysis, and fenced for deer

2014 – **Seedlings planted** with initial tree measurements

2015 – Second year tree measurements, continuing soil observations



Direct solar radiation and direct rain on the soil surface will increase soil temperature and moisture throughout the profile.

This may promote a favorable environment for microbial activity leading to increased heterotrophic respiration.

Higher heterotrophic respiration will lead to lower soil carbon.



- Standard Weather Stations (2)
 - Harvested area
 - Forest

Every plot (28) + 4 in Forest:

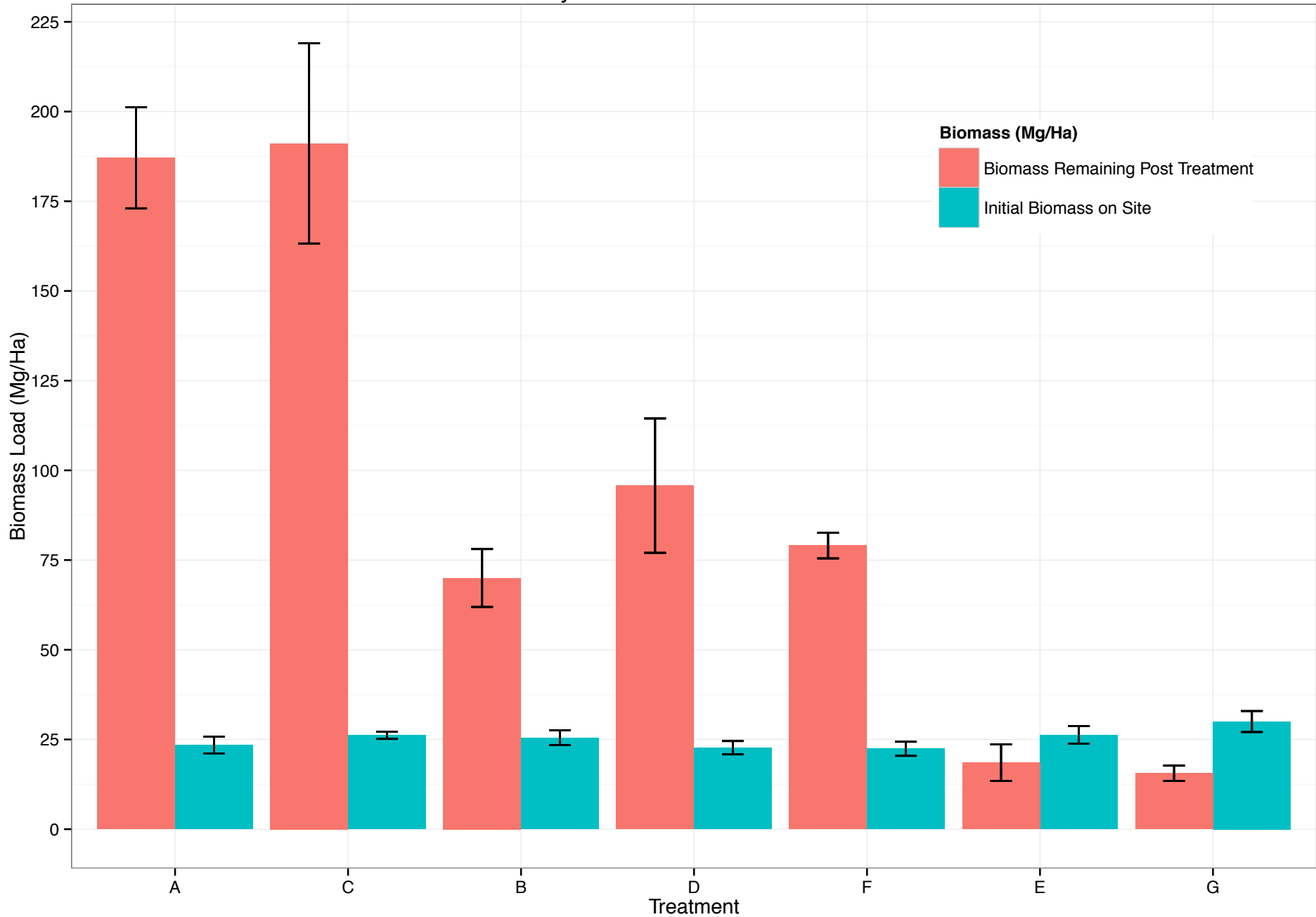
- Soil moisture and temperature
 - 10, 20, 30, 100 cm

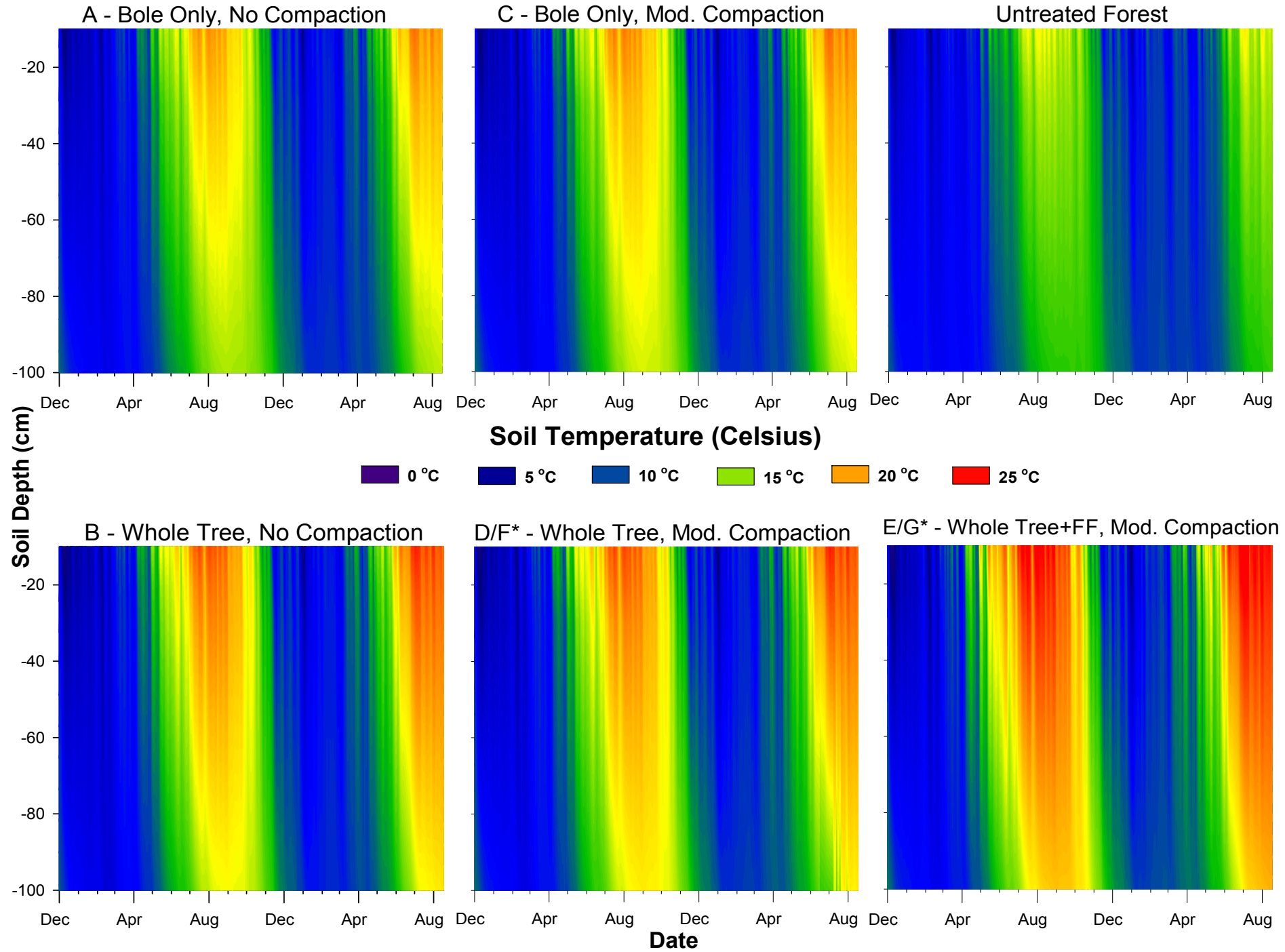


- 15 cm Air temperature and Relative Humidity
- Soil respiration

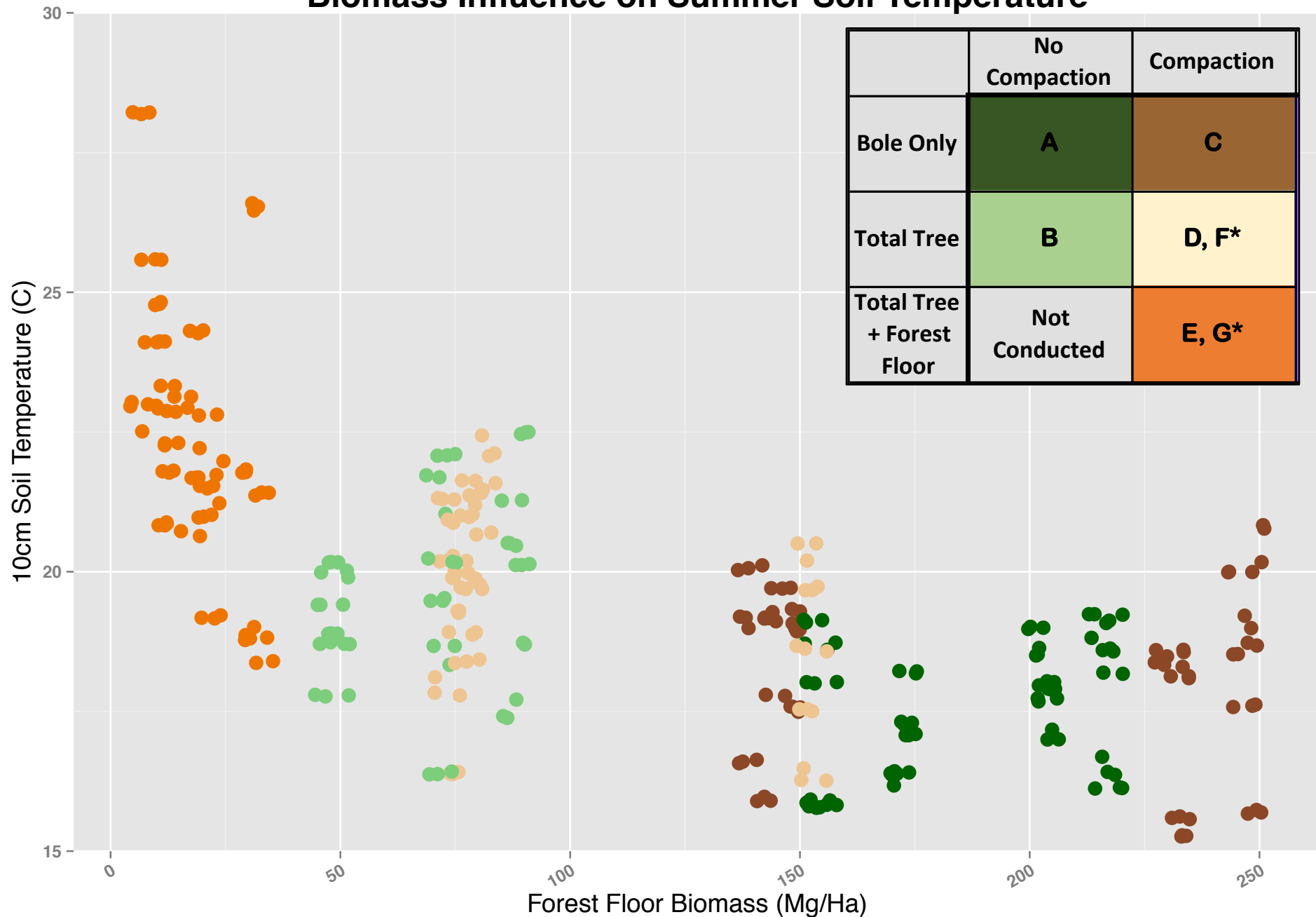


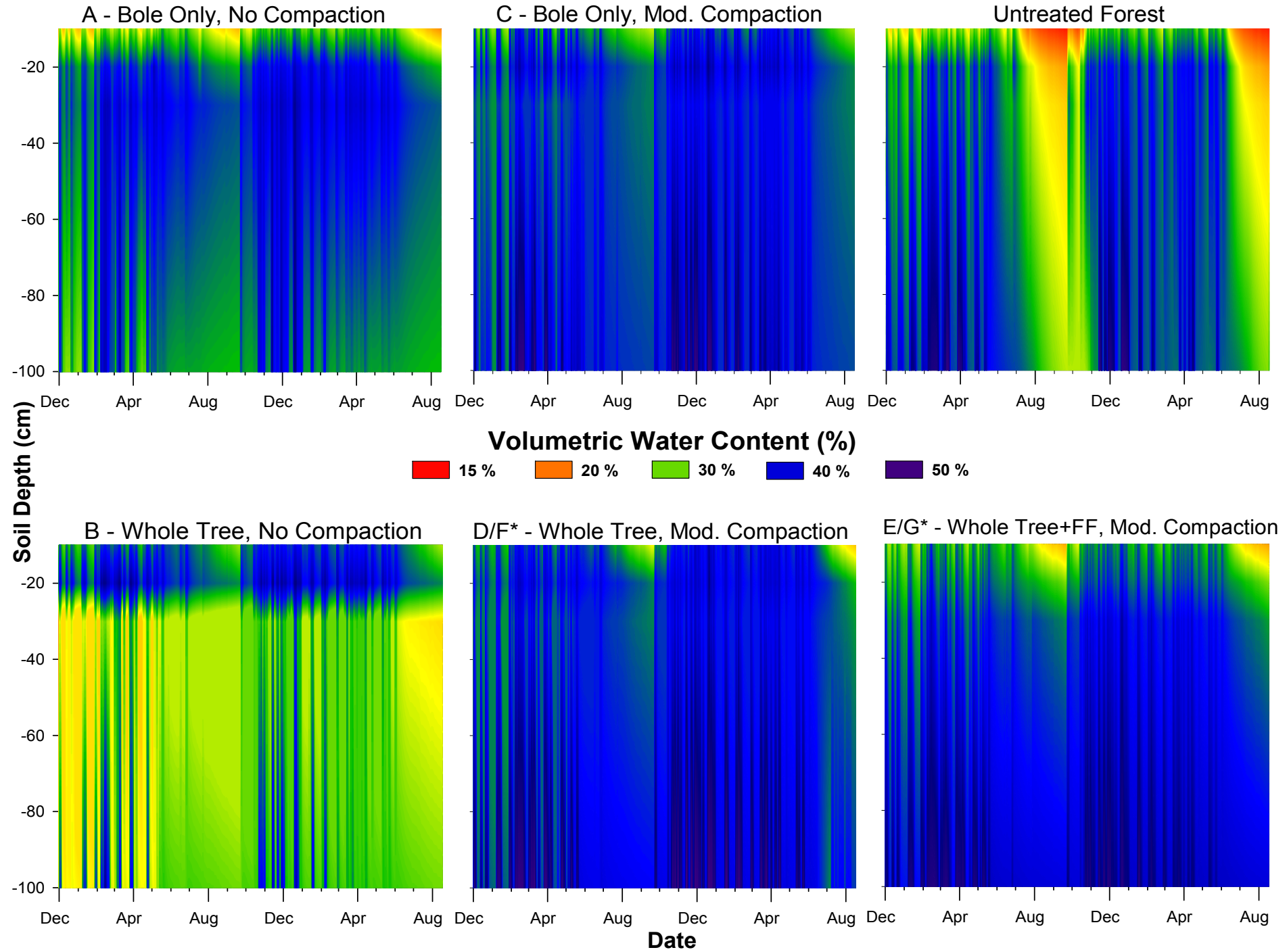
Quantity of Biomass on the Forest Floor





Biomass Influence on Summer Soil Temperature

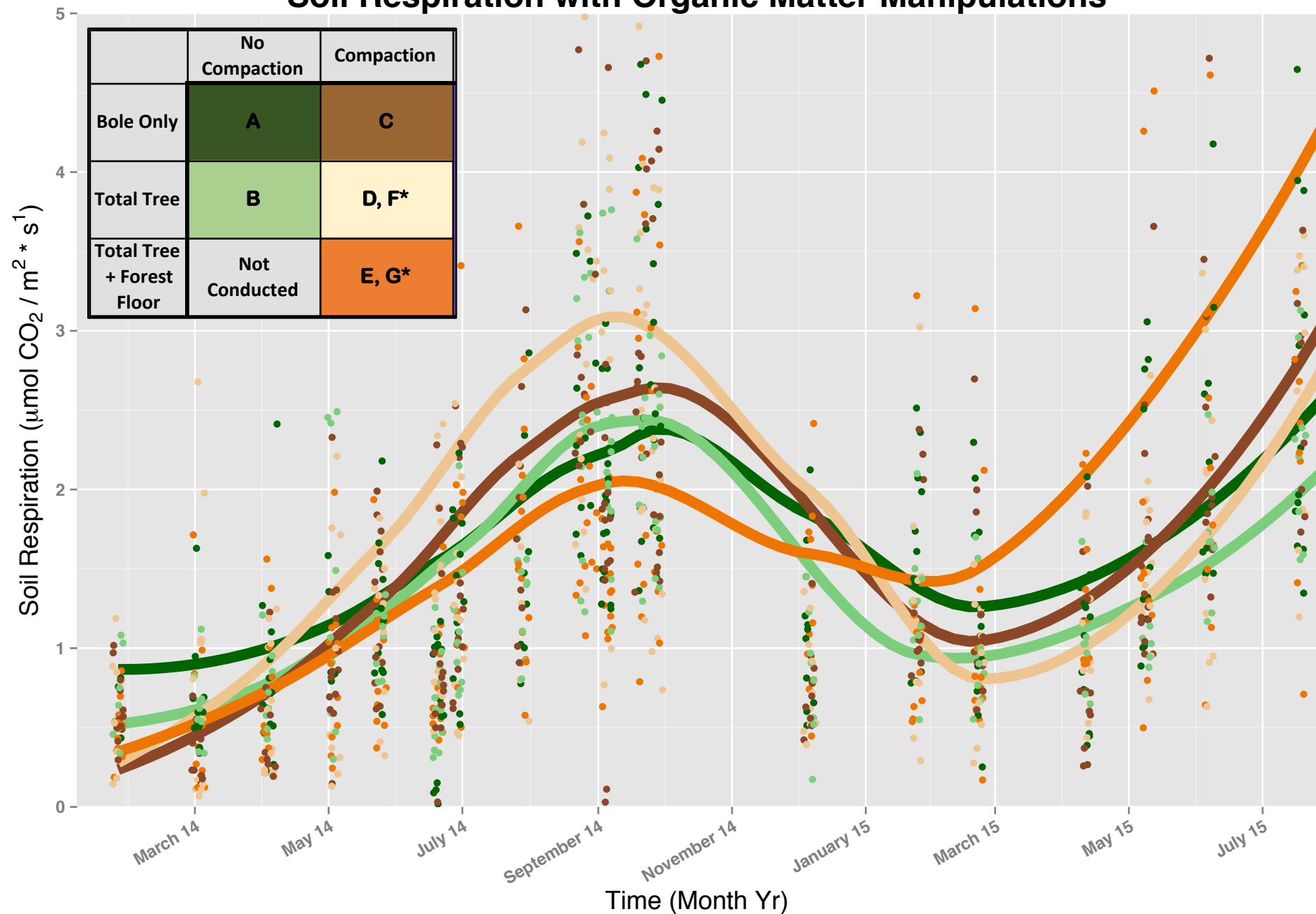




Biomass Influence on Summer Soil Moisture



Soil Respiration with Organic Matter Manipulations





- Soil temperature appears to be negatively related to biomass remaining on site
 - Less biomass = warmer soil
- Soil moisture does not appear to be different between treatments
- Higher soil temps appear to be causing higher soil respiration (i.e. higher heterotrophic activity)