

Effects of Prescribed Fires on Soil Fungal Communities in Upland Prairies of the Pacific Northwest

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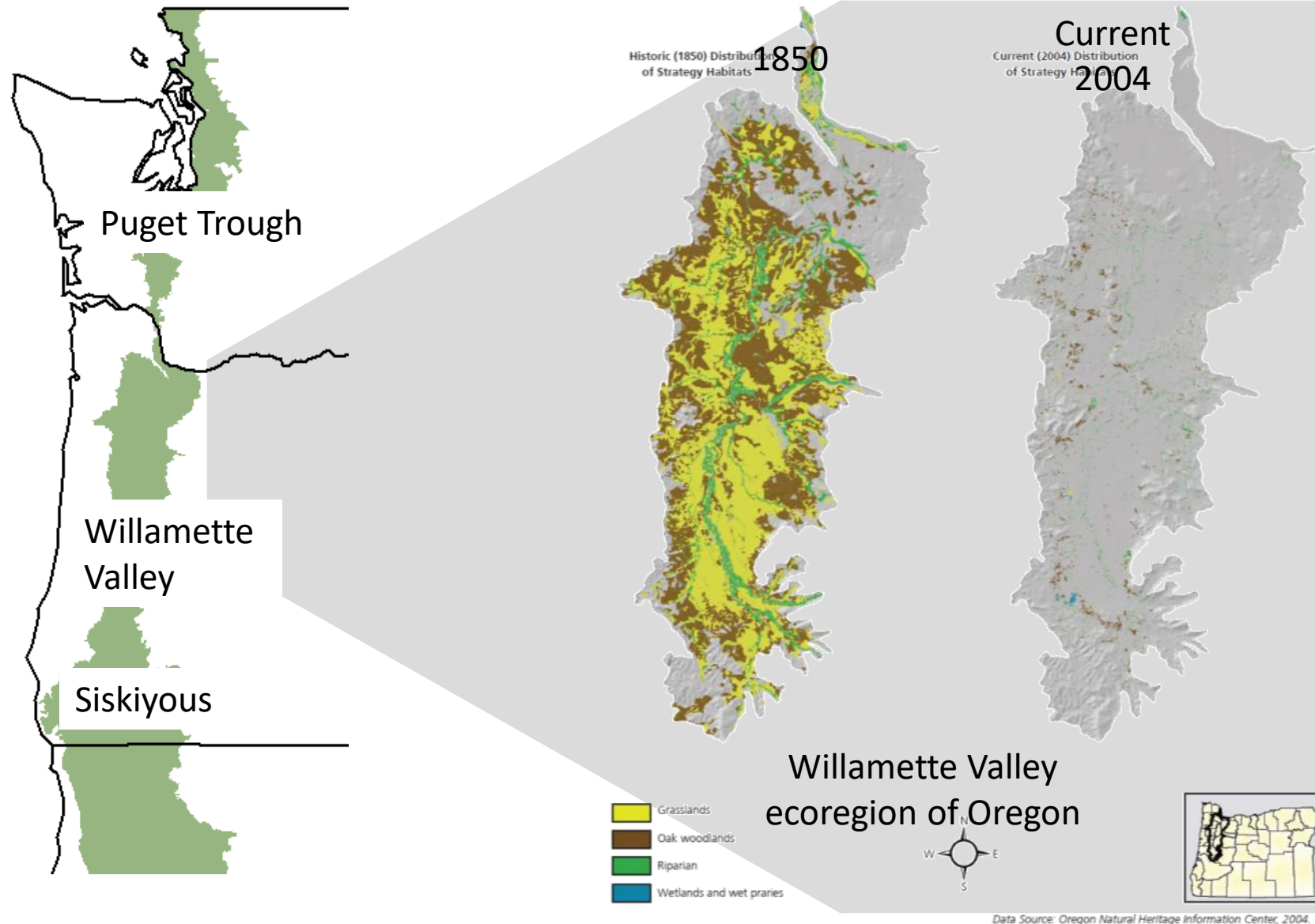
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Willamette Valley

Estimates range from 90-99.9% loss of grasslands in the Pacific Northwest



Importance of Soil Fungal Communities

- Regulate rates of ecosystem processes.
- Affect plant community structure.
- Contribute to overall soil structure.



Fire and Soil Fungal Communities

- Grassland fires tend to be low severity.
- Fire alters soil chemical and physical properties.
- May remove surface litter and competitive species.
- Decreased organic matter decomposition rates following fire.



Photo by Bitty Roy

Study Questions

- Do soil fungal communities differ significantly with time since burning?
- Do soil fungal communities differ significantly between sites and between regions?

Locations of Prairies



Pacific Northwest

South of Olympia, Washington

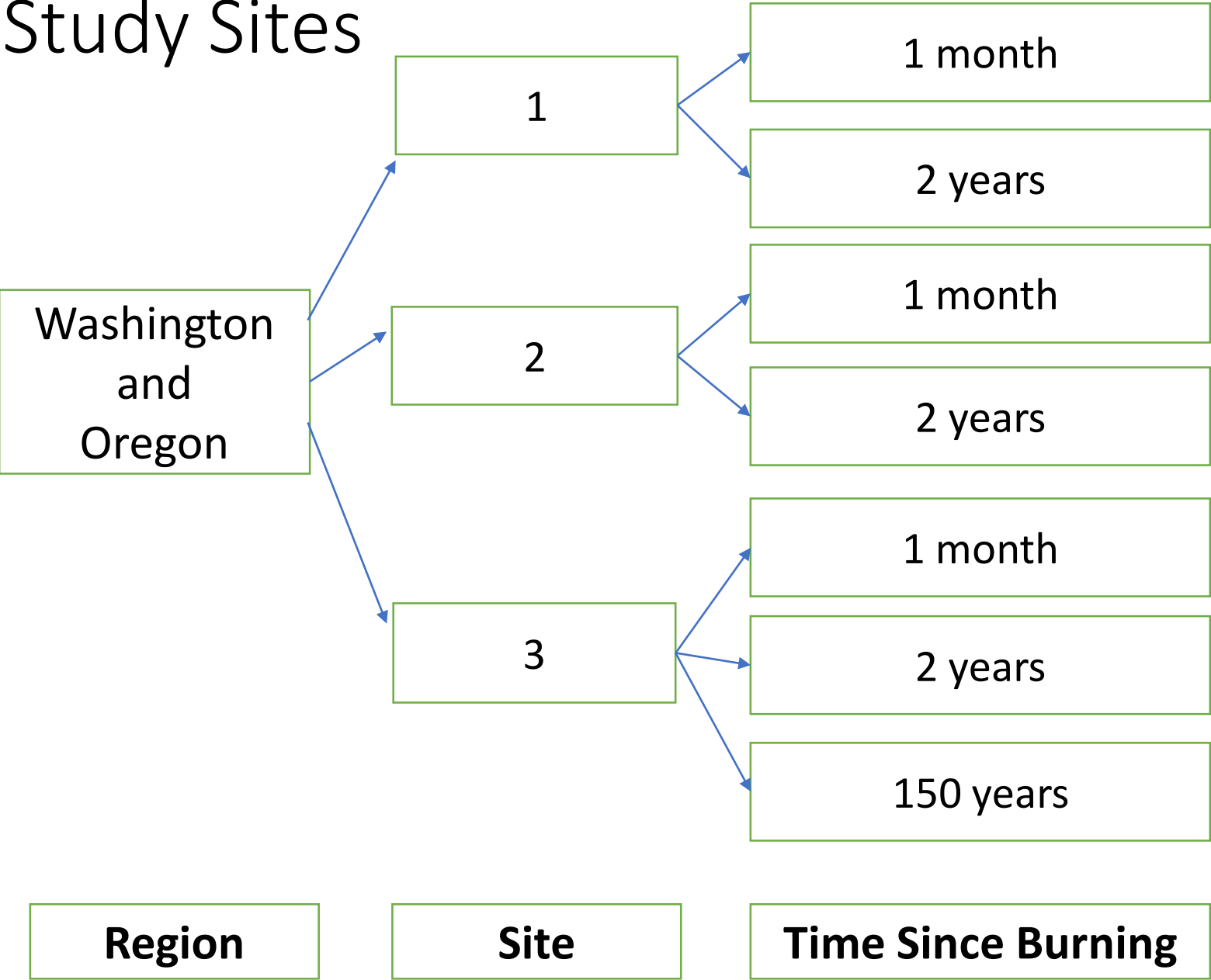


West of Eugene, Oregon



Photo: Wes Messinger

Study Sites



- Three upland prairies in Washington and Oregon
- *Festuca roemerii* dominated.
- Similar climates
- Soil types differed between regions.
- Land-use prior to restoration differed between regions.

Methods

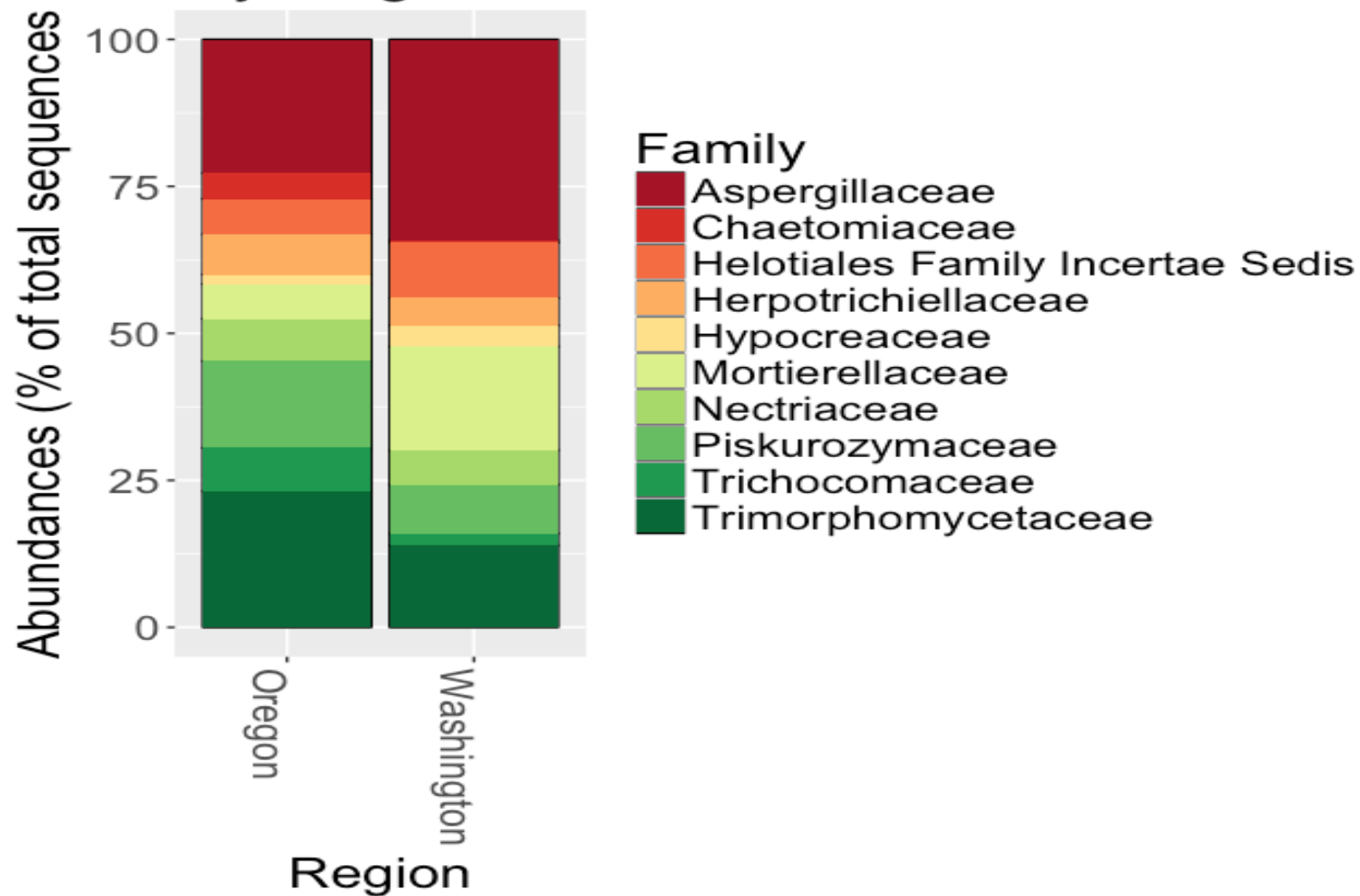


Washington - West Rocky Burned within 1 month

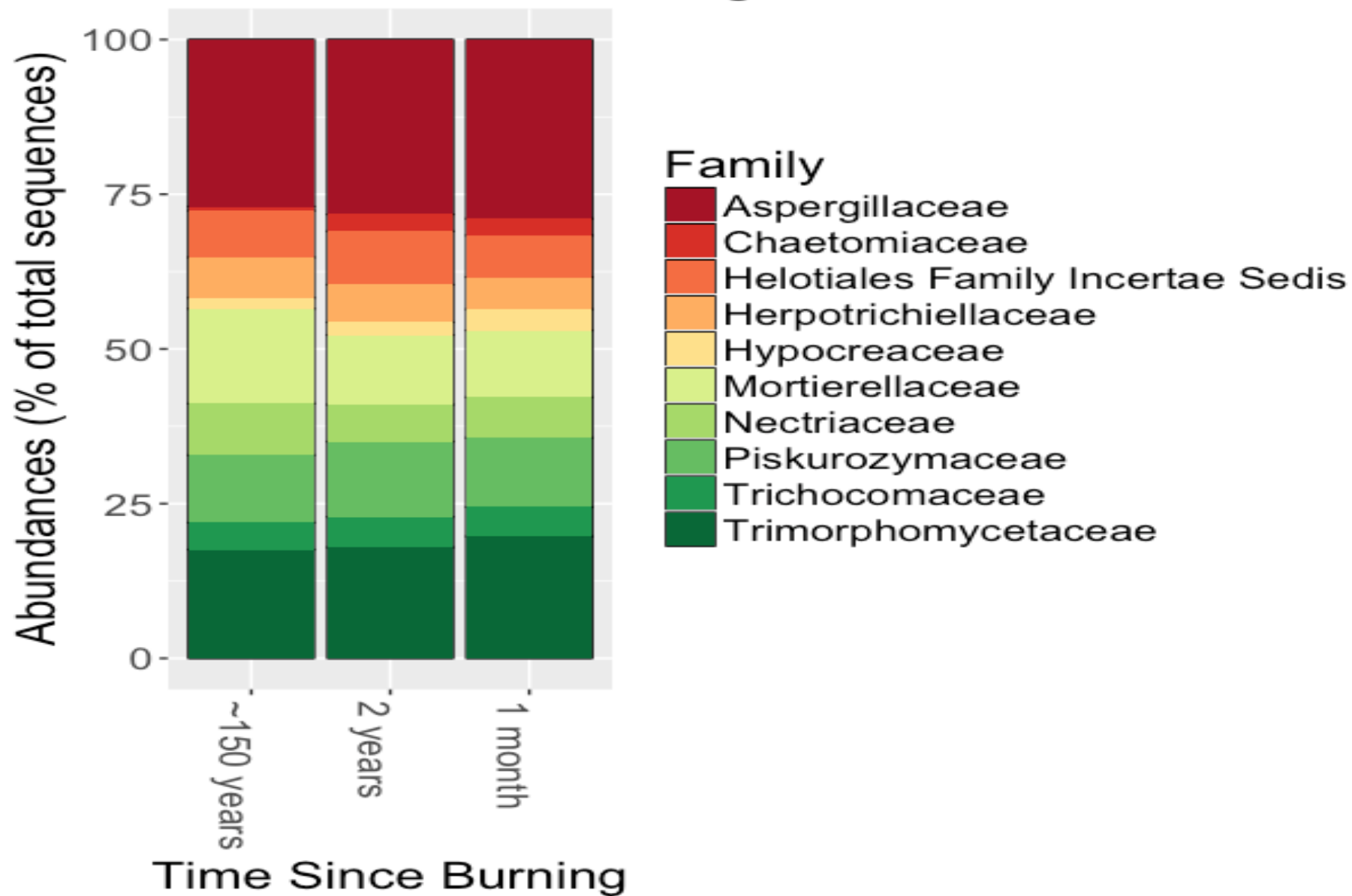


Washington Glacial Heritage ~150 years Plot

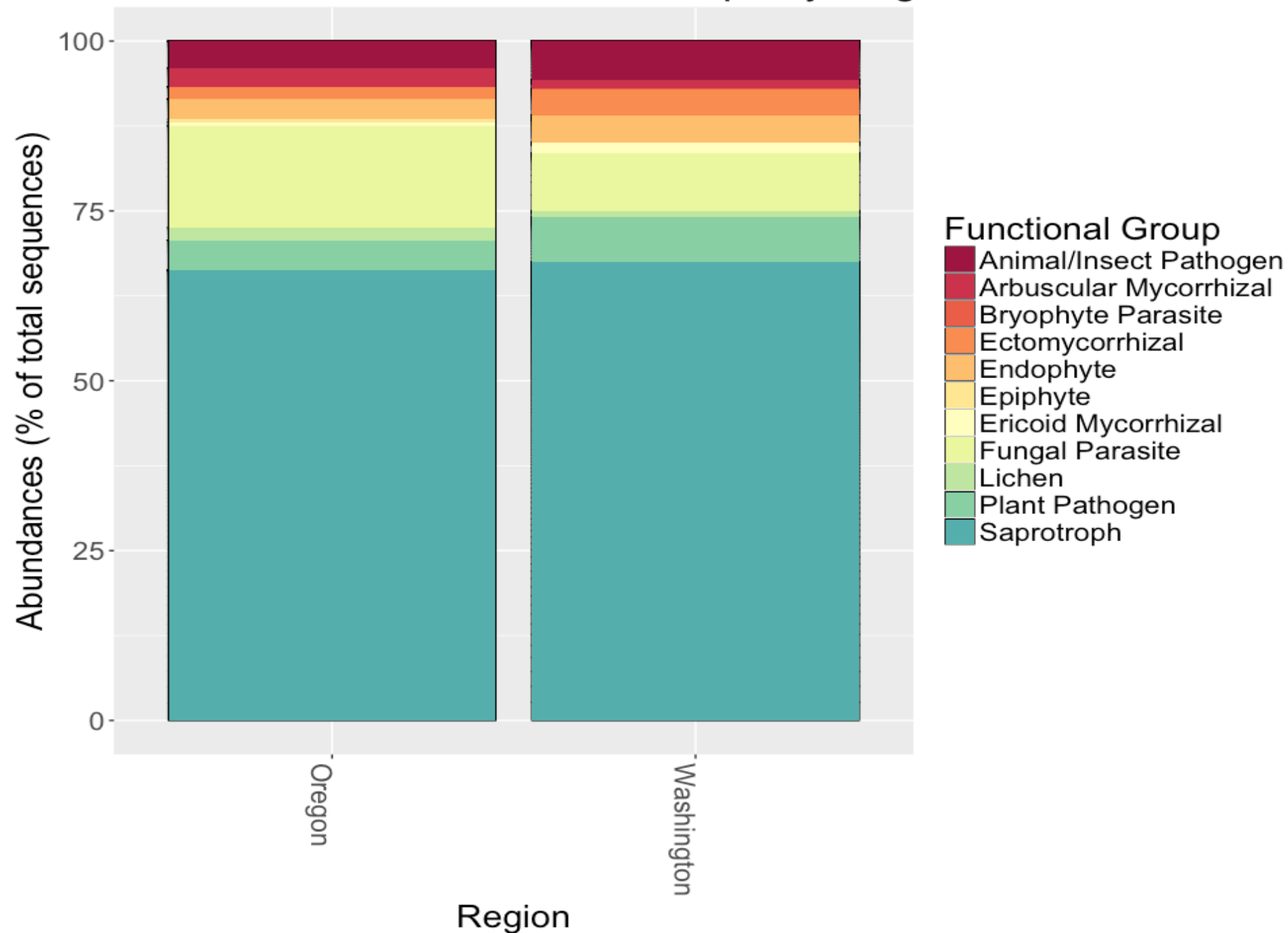
Abundances of Top Ten Families by Region



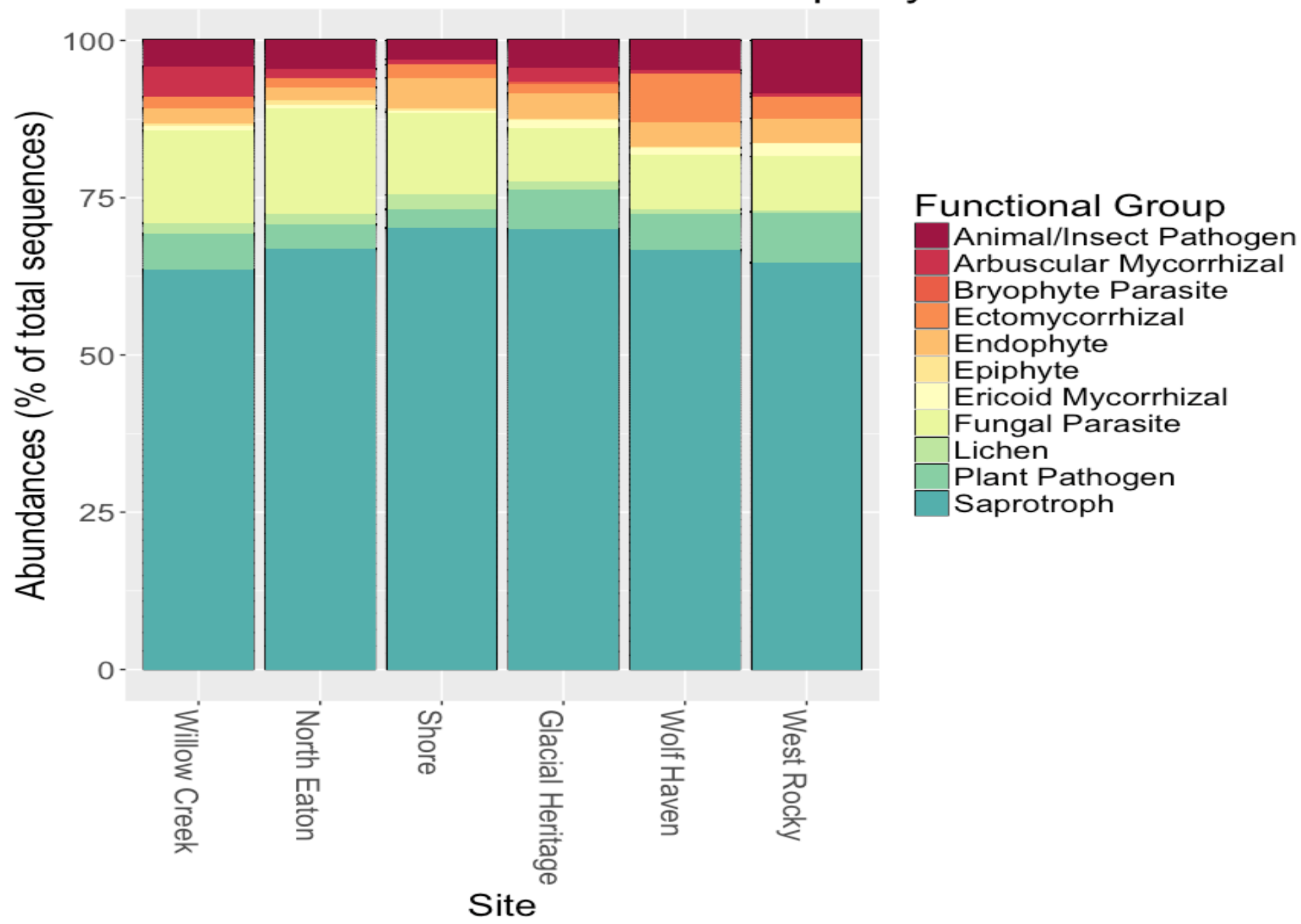
Abundances of Top Ten Families by Time Since Burning



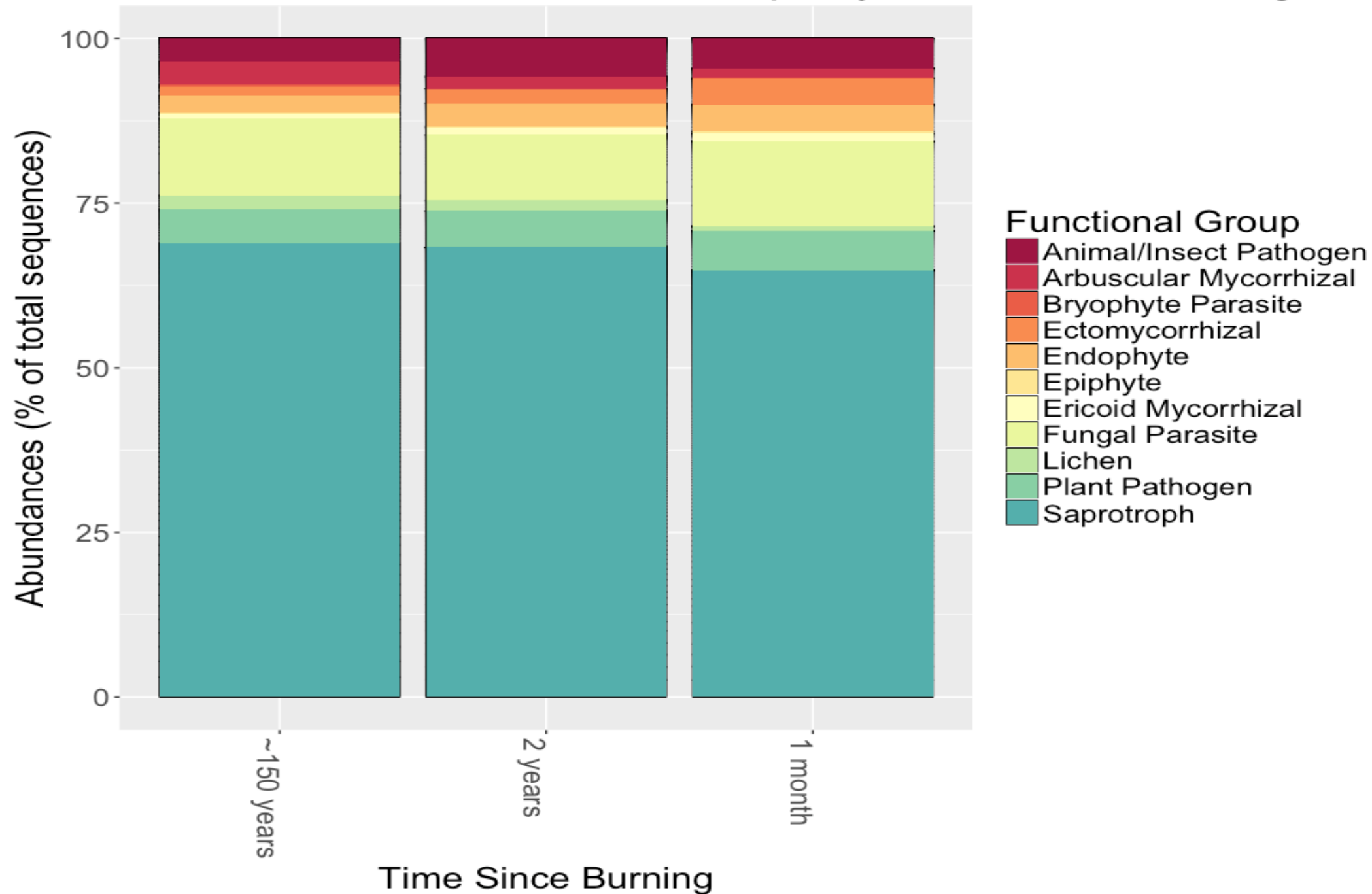
Abundances of Functional Groups by Region



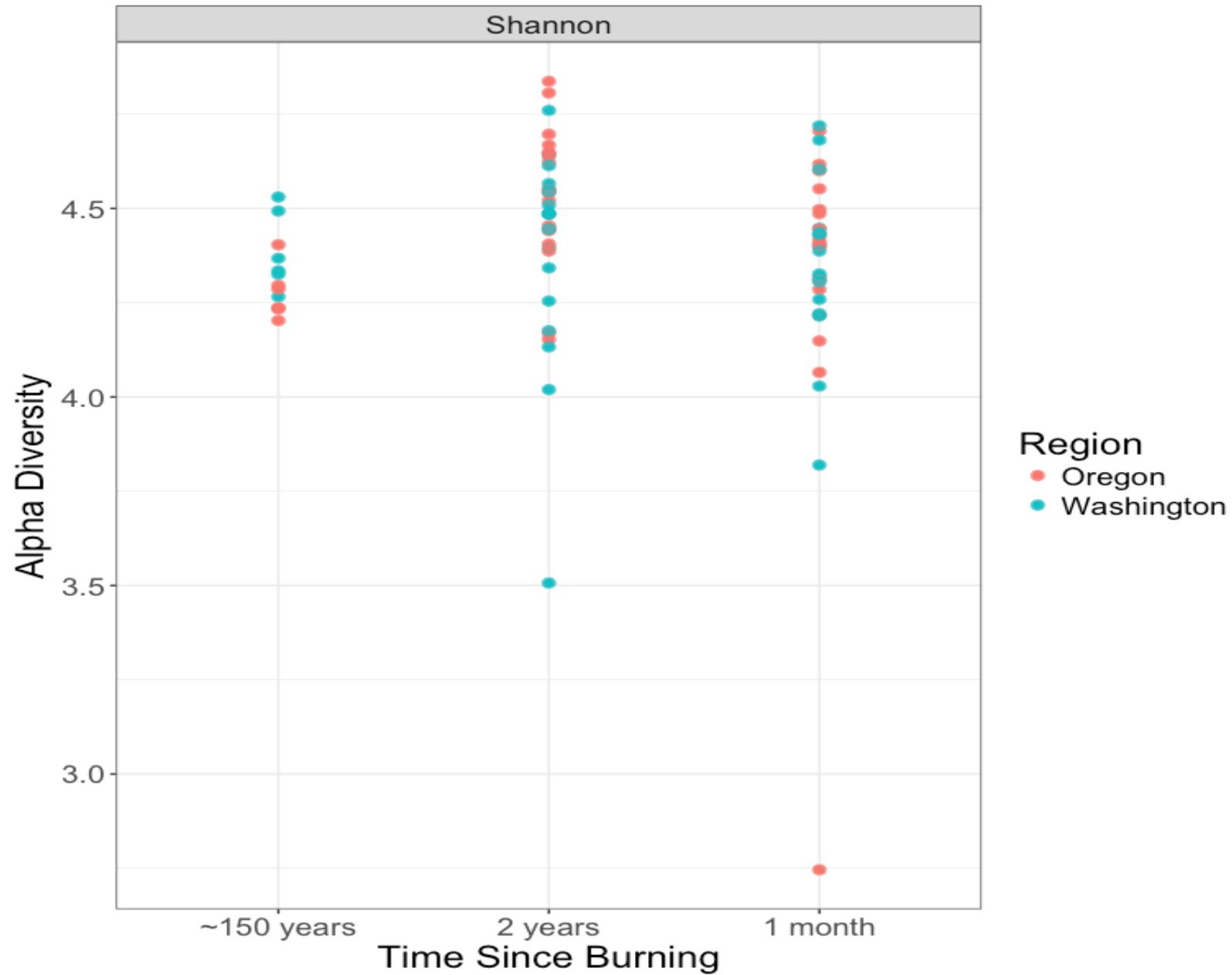
Abundances of Functional Groups by Site



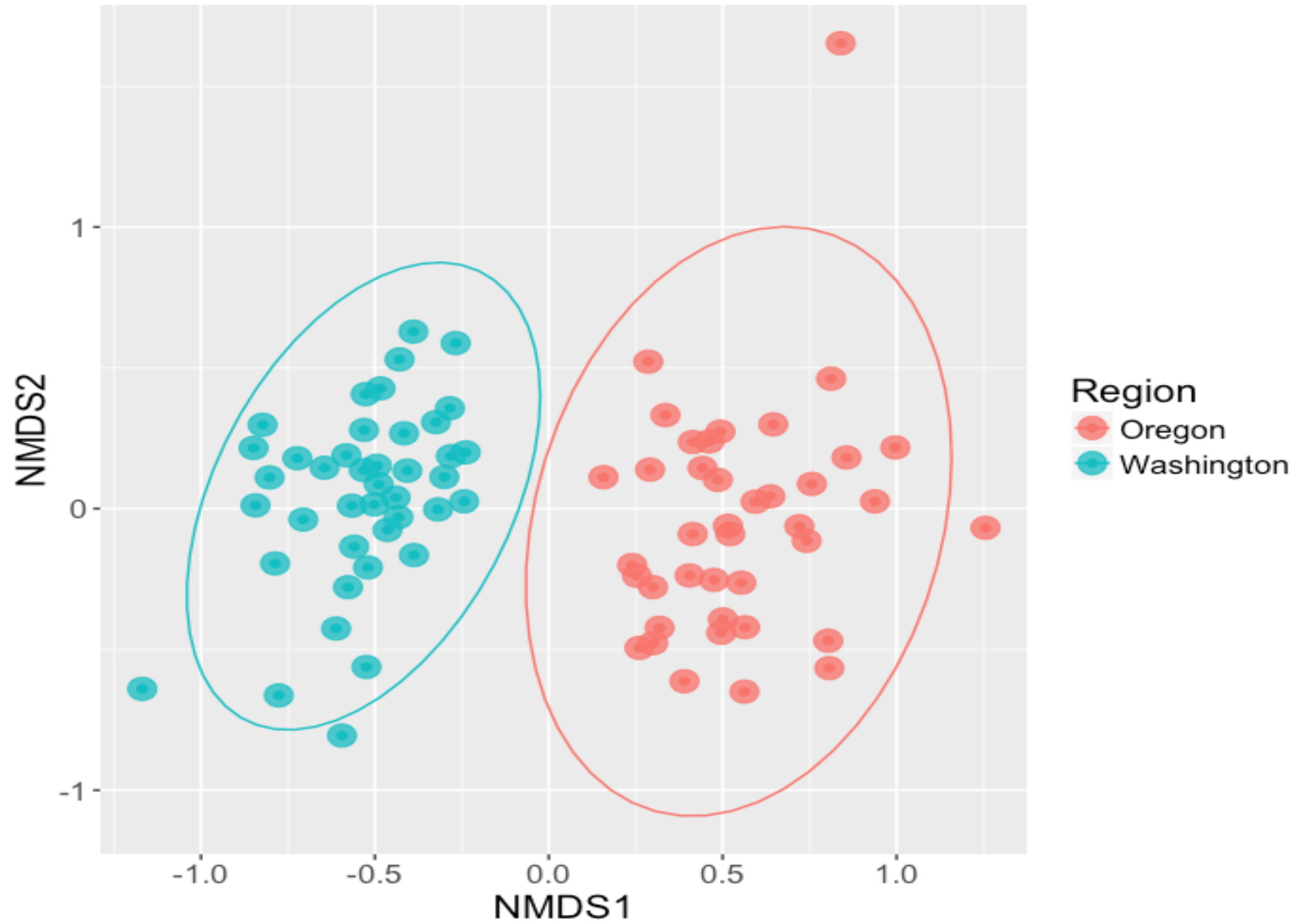
Abundances of Functional Groups by Time Since Burning



Alpha Diversity by Region and Time Since Burning

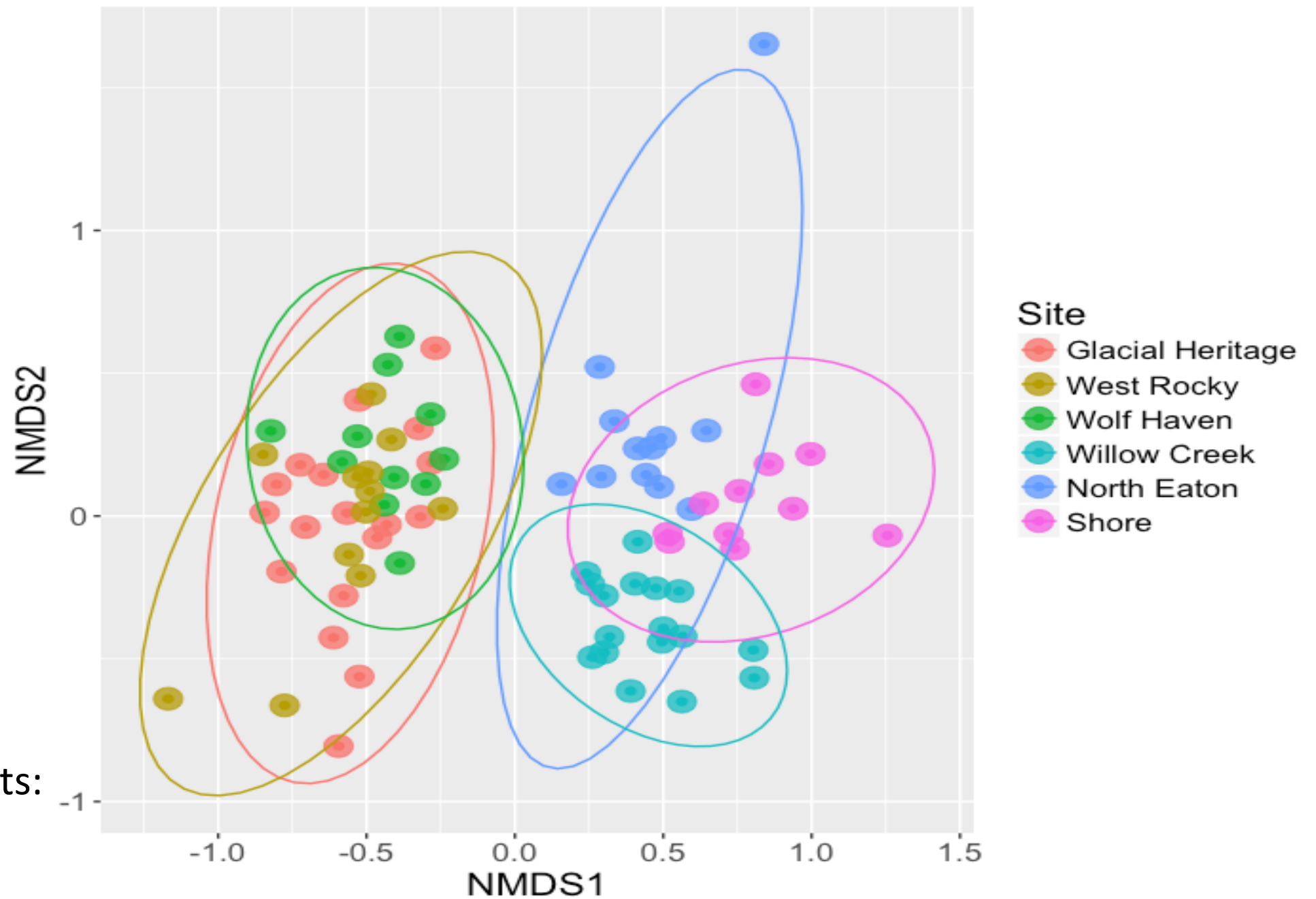


NMDS by Region



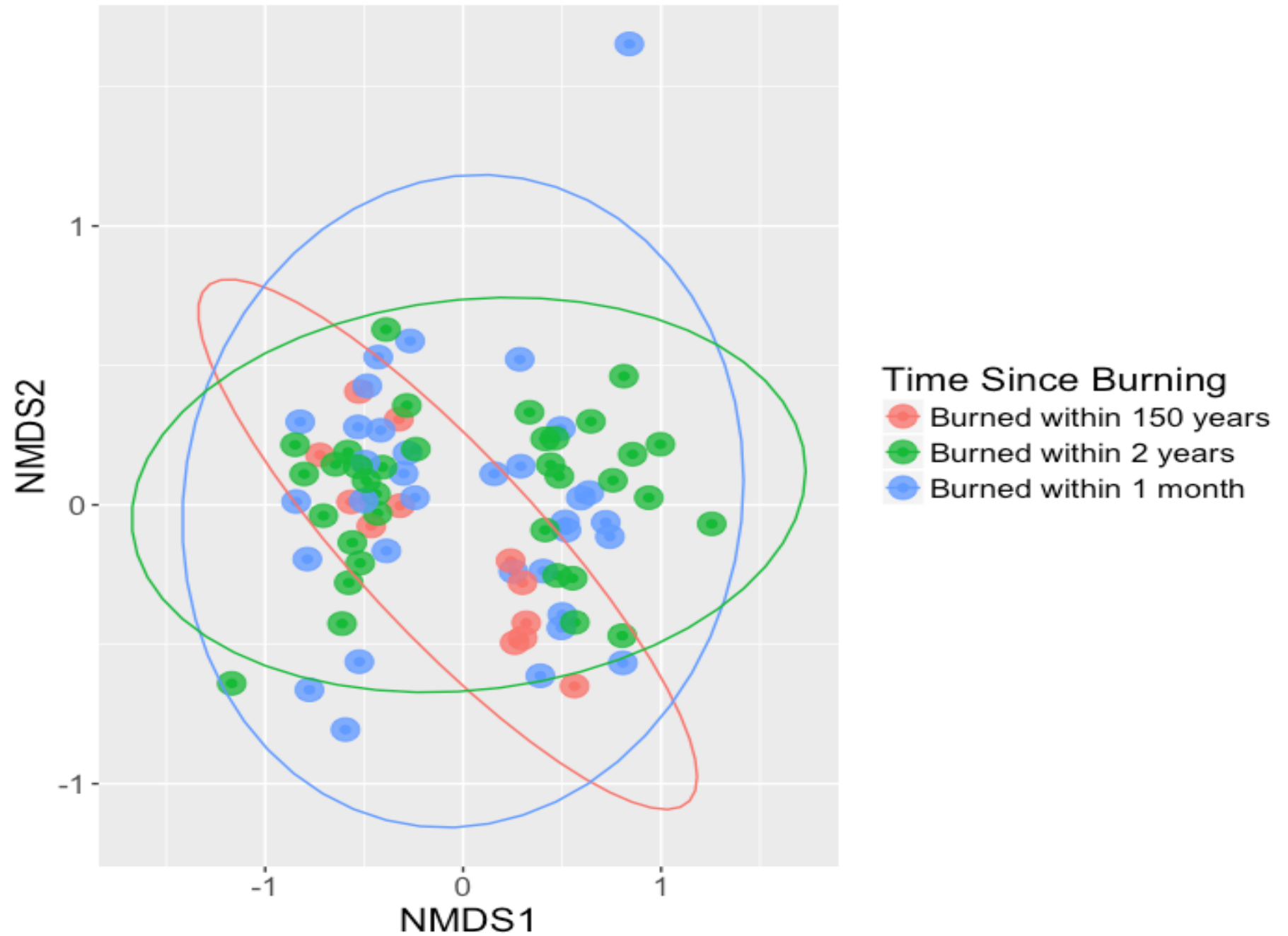
PERMANOVA
Results:
P-value < 0.001

NMDS by Sampling Site



PERMANOVA Results:
P-value < 0.001

NMDS by Time Since Burning



PERMANOVA
Results:
P-value < 0.001

Implications



- Burning affects soil fungal community structure.
- Regional differences drive soil fungal community differences.
- Burning alters the abundances of soil fungal functional groups.

Next Steps

- Explore differences in functional group abundances and within sites.
- Compare aboveground and belowground fungal communities.
- Investigate shared and unshared members of communities between regions, sites, and burning times.
- Variation partitioning of environmental factors.

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