

Teri C. Balser, Ryosuke Fujinuma, Erica A.H. Smithwick, Kris Metzger, Jun Zhu
and Monica G. Turner
University of Wisconsin, Madison WI

Overcoming methodological challenges in ecosystem-scale research: a
landscape-scale assessment of microbial community composition following forest
fire

There is growing interest in linking soil microbial community composition and activity with large-scale field studies of nutrient cycling or plant community response to disturbances. However, several challenges exist in making this linkage. Foremost is the question of methodological feasibility. Past microbiological methodologies have not been readily adaptable to the large sample sizes necessary for ecosystem-scale research. As a result, it has been difficult to generate compatible microbial and ecosystem data sets. In this study, we used a modified lipid extraction method to generate a microbial community data set that matches a landscape ecological study of plant community response to forest fire sample for sample. We use geostatistics to assess spatial patterns of microbial community characters (biomass, lipid diversity, gross ammonium mineralization, and fungal, gram+ and gram- bacterial, and mycorrhizal abundance) in soils following fire in forests of Teton and Yellowstone National Parks. Semivariograms of mineralization and microbial community characteristics were compared to semivariograms of vegetative cover, soil water content, pH, and carbon and nitrogen concentrations. To our knowledge this is the first microbiological data set of its kind.

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