

## Introduction

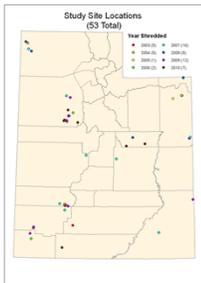
To stem catastrophic wildfires and create firebreaks, whole *Pinus edulis* and *Juniperus osteosperma* trees are being mechanically shredded into coarse woody debris (CWD) and deposited on soils previously exposed to decades of tree-induced changes creating “tree-islands of fertility.” To investigate the unknown consequences of CWD on the availability of essential nutrients for establishing grass species, we evaluated the N mineralization rates and P availability in interspace and *Pinus* and *Juniperus* tree-island (i.e., soils beneath the canopy and at the edge of the canopy) surface soils exposed to field CWD manipulation in over forty cold deserts. We also evaluated the frequency of three exotic grasses and thirty-five native grasses to identify links between N and P dynamics.

**Objective:** We investigated how the introduction of coarse woody debris to desert soils influenced N mineralization rates, P availability, and the frequency of native and invasive grasses.

## Methods

### Study Site and Shred Treatments

Our study sites consist of 53 piñon and juniper sites located in the Great Basin and Colorado Plateau. Shredding has taken place since 2003 with the most recent shredding accomplished in 2010.



### Soil Sampling

Soil samples were collected at three microsites: interspace, canopy edge, and canopy. Each sample represents a composite sample consisting of three subsamples bulked together.



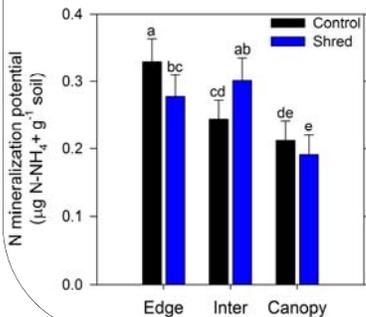
### Nutrient Cycling

We measured N mineralization and P availability to identify links between N and P dynamics.

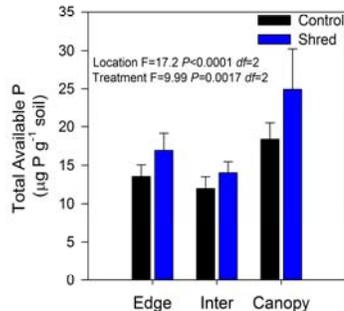


## Results

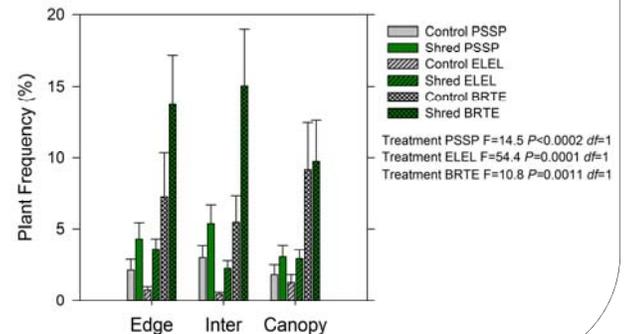
The addition of CWD decreased N mineralization in tree-island edge soils but increased N mineralization in interspace soils.



CWD enhanced the availability of P in all soils with the greatest percent increase occurring in canopy (36%), followed by canopy edge (26%), and finally interspace (17%) soils.



The frequency of perennial native grasses, especially *Elymus elymoides* and *Psuedoroegneria spicata*, was at least 70% higher under CWD additions in all soils. Also, the frequency of perennial exotic grasses and *Bromus tectorum* was higher under CWD additions in interspace and tree-island edge soils.



## Conclusions and Acknowledgements

- Our results suggest that inorganic N availability was directly depressed by CWD as microbes potentially coped with the addition of more woody recalcitrant C sources by scouring soils for N.
- Inorganic N availability was indirectly enhanced as the higher grass frequencies in interspace soils supplied microbes with more labile C substrates stimulating N to mineralize
- Ultimately, CWD additions increased the availability of N and P and native and exotic grasses indiscriminately used these nutrients alike.