

Soil Testing and Restoration

This is a guest blog written by Beau Larkin and Ylva Lekberg. Jim and I were excited they chose our property as one of their research sites.

Often prairie restoration is to change agricultural fields into native prairie habitat. We can evaluate progress by comparing the restored plant community to a remnant prairie. It is relatively easy to measure this with plant communities, but this does not reveal what has happened belowground. We want to know if soil microbes become more similar to remnant prairie after restoration. We collected soil from cornfields and remnant prairie to characterize the microbial communities in these habitats. These represent endpoints along a gradient from degraded to desirable habitat. Then we sampled soil from restored prairies that differ in the amount of time since restoration began. If soil microbes in restored prairies become more similar to those in remnant prairie over time, then older restoration sites should be more like remnant prairies. On the other hand, if soil microbes remain similar to those in cornfields regardless of time since restoration, then restoration is only partly successful and the stability and function of these communities may be compromised.



Ylva pulling a soil core from Sunset Prairie.



The soil core being transferred to a paper envelope.

If soil microbial communities do not shift to become more like

those in remnant prairie, what are the consequences for restoration? Many restoration managers have noticed that grasses increase after treatment at the expense of forbs. Many variables could cause this to happen. Seed mixes that favor grasses, and frequent burning since restoration could cause this phenomenon. Some grass species are more competitive than others, and post-restoration overseeding also affects the resultant plant community. Amid the "noise" restoration and management history, there may be another explanation for the enhanced competitive nature of grasses in restored prairie. Because corn is more closely related to common prairie grasses than it is to forbs, is it possible that the soil community will favor these grasses. Working with Mike Healy from Adaptive Restoration, we collected plant cover data along with our soil samples to investigate how changes in plant communities correlate with soil microbial communities. In older restored fields that contain many forbs, we should find that the soil communities resemble those in remnant prairies. In restored prairies that reverted to high grass cover, we may find that the soil communities remained "stuck" in a condition similar to a cornfield. This situation might suggest that restoration projects should contain some mechanism to inoculate soil with microbes found in remnant prairie. We will attempt to disentangle the management histories and discover whether such a microbial signal exists. As results from this project come in, we will share what we learn with you.



Plant surveying of the Deer Camp Prairie, a 2-year-old planting.

Beau Larkin and Ylva Lekberg are both staff at MPG Ranch, which promotes conservation through restoration, research, education and information sharing. Beau is also an adjunct professor at University of Montana in the Department of Ecosystem and Conservation Sciences (DECS).