

Methods for Measuring Plant Composition

To assess how disturbance and restoration treatments have affected plant community composition, three descriptors of the plant community have been periodically measured.

- The cover of each species in the plot was estimated with a point quadrat method.
- The density of perennial species was estimated with belt transects.
- Species richness was determined by listing all species in a defined area.



Figure 1. Undisturbed vegetation (foreground) and vegetation developing on disturbed site adjacent to it (middle-ground).

Cover

Cover of each species was estimated by dropping a long pin (Figure 2) into the vegetation at numerous points and recording every plant species that the pin hit. For each species, percent cover was estimated as the number of points where the pin hit that species divided by the total number of points (pin drops) measured. Example: if a person dropped a pin at 50 different points in an area and hit *Lotus scoparius* every single time, one would estimate that *Lotus scoparius* covered the entire area (100% cover).

For this study, the “pin” was a long fiberglass rod, approximately 8 mm in diameter. It was dropped at 40-cm intervals along transects in the undisturbed vegetation and in plots in the disturbed area. Operators dropped the pin through a tube attached to a leveling device to achieve a vertical drop. In the 6 x 6-m plots in the disturbed area, 5 parallel transects were run at 1-m intervals, and 12 points were measured at 40-cm intervals along each transect, yielding 60 points per plot. In the undisturbed vegetation that surrounded the disturbed area, transects 25-m long were placed in a stratified random manner, and 60 points were measured at 40-cm intervals along each transect. If the transect crossed a path or other obvious anthropogenic disturbance, that section of transect was skipped and the transect lengthened accordingly to achieve 25 meters of measurable transect.



Figure 2. Point quadrat measurements in plot in disturbed area.

Density of perennial species

Individuals of perennial species were counted in belt transects 1-m wide (Figure 3). In plots in the disturbed area, 3 to 5 transects, each 5-m long, were measured in each plot. The outer half meter in each plot was not included in the transects to avoid effects of excessive trampling along the edge and effects of treatments in adjacent plots (edge effects). In the undisturbed vegetation, an equal length of transect was measured. Density of each species was calculated as the number of individuals of that species counted divided by the area censused.



Figure 3. Density measurements along belt transects in disturbed area, 2009 (left) and 2010 (right).

Species richness and composition

All species in each plot were listed, including those not encountered in the cover measurements and the density measurements. Species were identified in each entire 6 x 6 m plot in the disturbed area, and in an equivalent area along the 25-m long transects established for the point-quadrat measurements in the undisturbed vegetation (generally a 36 m² area that was 25 m long and 1.44 m wide).