



Vegetation Composition, Structure, and Soils Monitoring

Grasslands, shrublands, and forests are integral components of the natural and cultural landscapes of parks within the Rocky Mountain Network (ROMN). Because they can be impacted by rapid climate change, human land use, and impacts from exotic species, we monitor them closely to detect change. We communicate what we learn to inform management decisions. For example, the encroachment of annual invasive species into an intact perennial grassland can alter historic fire regimes, increase erosion potential, and affect wildlife habitat. If detected in time, park management can reduce or eliminate threats by treating the invasive plants and avoid the costly consequences of their impacts.

Scientifically credible information on the current status and long-term trends of the composition, structure, and function of the forests and grasslands in Little Bighorn Battlefield National Monument (NM) is a key component for sound management. In 2006, the Rocky Mountain I&M Network (ROMN) began an effort to determine status and trends in upland vegetation structure, species composition, and soil condition at Little Bighorn Battlefield NM. A set of 32 long-term plots were established in the park using a spatially balanced probability survey design. We visited a subset of these plots each year to understand the condition of upland vegetation and soils. This brief presents a basic summary of the ROMN sampling effort from 2010-2014. A complete report of findings will be available later this year.



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Select Results

Select results include the following:

- Erosion potential was generally low because of high soil stability and a low proportion of bare ground (Figure 1).
- Native species richness and cover was greater than that of exotic species. Common exotic species included cheatgrass (*Bromus tectorum*), Japanese/field brome (*Bromus japonicus*, *B. arvensis*), and Kentucky bluegrass (*Poa pratensis*). Continued management of exotics is a key component to preventing further spread of exotics (Figure 2).
- The percent cover of grasses, forbs, and shrubs was generally at or above expected values compared to ecological site descriptions. High plant cover helps minimize runoff and erosion (Figure 3).
- Soil quality was consistent with findings from the Natural Resources Conservation Service (Soil Survey Staff) and lower than found in a U.S. Forest Service study (Amacher et al. 2007). We will continue to monitor soil quality to better understand the ecological condition of LIBI soils.

Monitoring at Little Bighorn Battlefield NM.

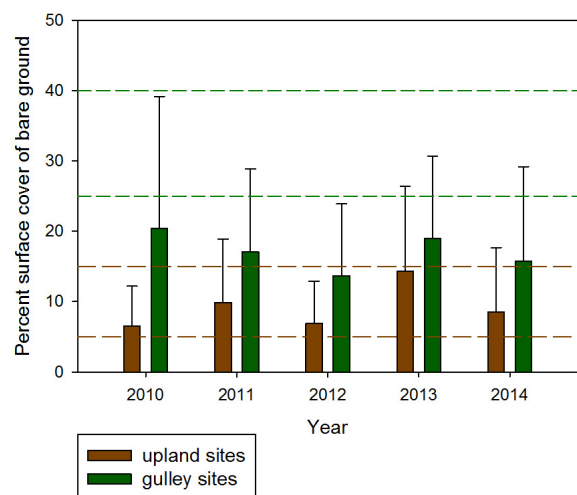


Figure 1. Relative cover of bare ground at upland (brown) and gulley (green) sampled sites 2010-2014 compared to the expected range of bare ground cover at each ecological site type. The low cover of bare ground contributed to low erosion potential at sites.

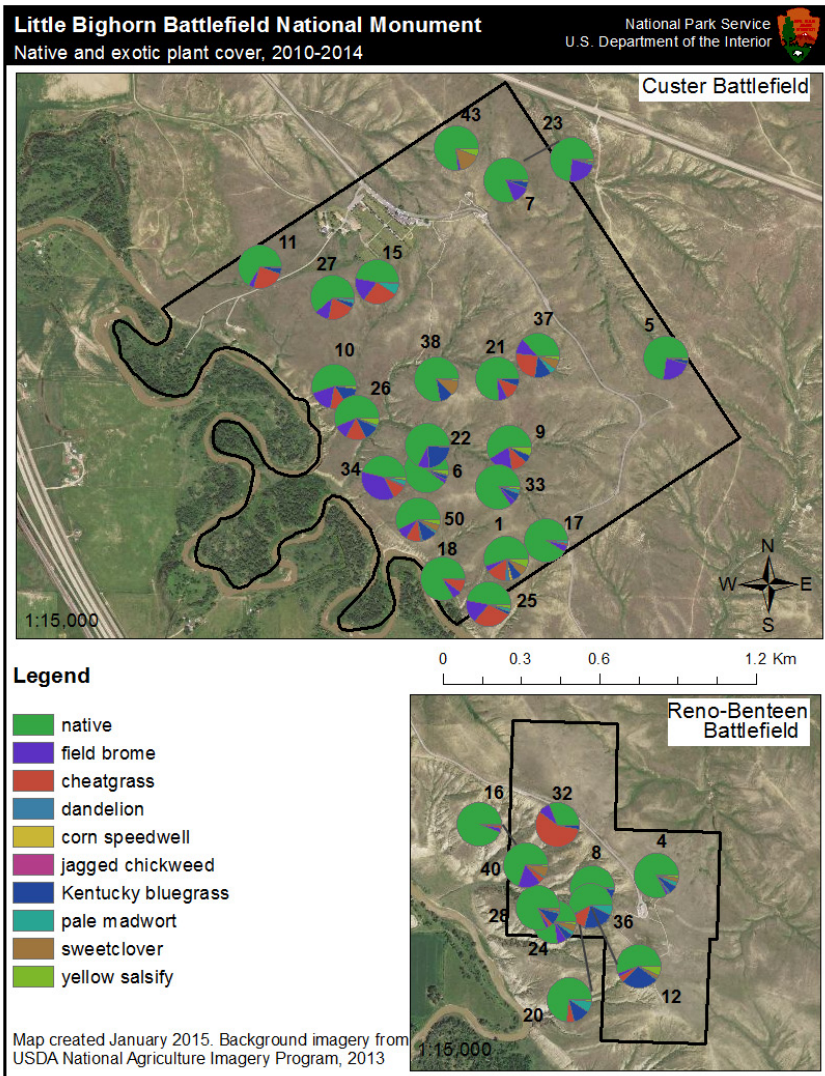


Figure 2. Percent relative cover of native species (green) and exotic species with relative covers over 1% (all other colors) at sampled sites 2010-2014. Site names are in black text.

ROMN upland vegetation and soils monitoring will help park staff understand issues such as the impact of a changing climate on the park ecosystems, the response of soils to disturbance, and changes in native and non-native species. As we collect more data and conduct a thorough analysis, we will look for patterns and trends that might indicate a change in the ecological integrity of the vegetation and soils at Little Bighorn Battlefield NM.

References

Amacher, M. C., K. P. O'Neill, and C. H. Perry. 2007. Soil vital signs: a new soil quality index (SQI) for assessing forest soil health. Res. Pap. RMRS-RP-65WWW. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 12p

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/> (accessed 22 April 2015)

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Find the published protocol and other reports on our website <http://science.nature.nps.gov/IM/units/romn/index.cfm>

Figure 3. Average relative cover of graminoids (green), forbs (orange), and shrubs (blue) compared to the expected range at each ecological site type. At upland sites there were less graminoids and more forbs than expected and at gulley sites there were more graminoids and forbs, but less shrubs than expected.

