



Knife River Indian Villages National Historic Site

Plant Community Resource Brief



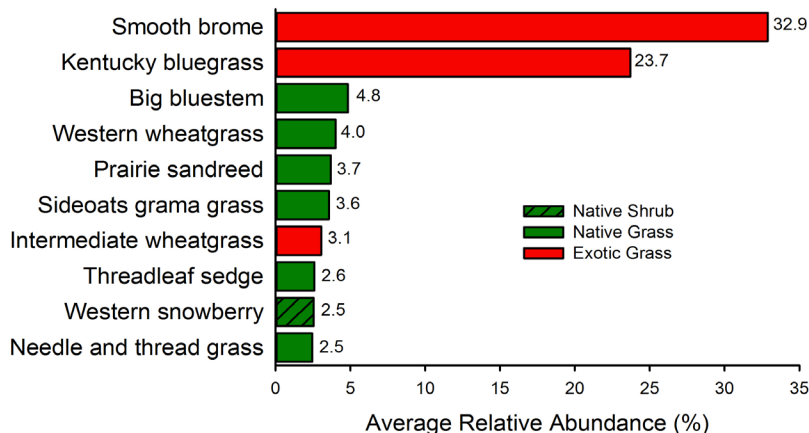
2011 Monitoring Status

Overview: In 2011, the first year of vegetation monitoring by the Northern Great Plains Network Inventory and Monitoring staff at Knife River Indian Villages National Historic Site, efforts resulted in the documentation of 117 plant species. Graminoid (grass and grass-like plant) species accounted for only 29 (25%) of the total species, but graminoid cover was much higher than that of any other plant type. Forbs were much more diverse, but did not provide as much foliar cover.

In the 8 plots which were sampled in 2011, the 5 most abundant native graminoid species by relative cover were big bluestem (*Andropogon gerardii*), 5%;

ciana ssp. *ludoviciana*), 2%; white heath aster (*Symphotrichum ericoides* var. *ericoides*), 1%; and blue lettuce (*Mulgedium oblongifolium*), <1%.

Exotic species: Relative cover of exotic species averaged 62%, though this value was quite variable, ranging from 20% to 100%. In the 8 plots which were sampled in 2011, the 5 most abundant exotic species by relative cover were smooth brome (*Bromus inermis*), 33%; Kentucky bluegrass (*Poa pratensis*), 24%; intermediate wheatgrass (*Thinopyrum intermedium*), 3%; yellow sweet-clover (*Melilotus officinalis*), 2%; and dame's rocket (*Hesperis matronalis*), <½%. Four additional species



western wheatgrass (*Pascopyrum smithii*), 4%; prairie sandreed (*Calamovilfa longifolia*), 4%; sideoats grama (*Bouteloua curtipendula*), 4%; and threadleaf sedge (*Carex filifolia*), 3%.

The 5 most abundant native non-graminoids were western snowberry (*Symphoricarpos occidentalis*), 3%; silverleaf scurfpea (*Pedimelum argophyllum*), 2%; white sagebrush (*Artemisia ludovi-*

targeted by the park for early detection (absinth wormwood [*Artemisia absinthium*], Canada thistle [*Cirsium arvense*], houndstongue [*Cynoglossum officinale*], and leafy spurge [*Euphorbia esula*]) were also observed in the surveys.

Warm season grasses: Warm-season grasses are grasses which grow primarily in the summer months and tend to be

Objectives

1. Capture baseline data on the status of park vegetation.
2. Document long-term trends in plant communities within the park.
3. Explore the relationship between changes in plant communities and climate change, grazing, fire, and other disturbances.
4. Provide information to assist park managers in decision-making.

Importance

Generating more than 99.9% of Earth's biomass, plants are the primary producers of the biomass that supports life on our planet. Vegetation provides food and shelter to many species and it is a large part of the scenery that visitors to NPS units come to enjoy. Plant diversity and composition is sensitive to stressors including invasive species, habitat fragmentation, river flow management, climate change, atmospheric nutrient deposition, pollution, and altered fire and grazing regimes, and can show effects of management activities including prescribed fire programs, exotic species control, and wildlife management. Vegetation monitoring can provide feedback on management activities, is critical for understanding the current health of ecosystems, and can alert us to degradation of an ecosystem.

Management Applications

- Provide a baseline for further comparisons
- Provide early warning of undesirable change
- Measure digression from or progress towards a desired state
- Document species of management concern (rare or invasive plants)
- Link dynamics of disturbance to changes in vegetation

Long-term Monitoring

Vegetation monitoring aims to document status and trends in foliar cover and species composition. The program balances the immediate needs of managers for current information and the need for insight into the changes occurring in plant communities over time. The Northern Great Plains Network has established 18 of its eventual 20 plots in Knife River Indian Villages National Historic Site, and 8 of them were sampled in 2011. In future years, a rotating selection of 8 plots is expected to be surveyed each year. Annual reports will document current status, helping managers to formulate questions that need further research, and 5-year reports will document any trends that become apparent. These reports should help inform and guide management decisions based on sound scientific information.



Identifying plants at Knife River Indian Villages

drought resistant. Examining the trend over time in warm-season graminoids and climate variations may reveal whether warm-season grasses are increasing due to warmer and drier conditions. Warm season graminoids composed 23% of the relative cover in plots at Knife River Indian Villages National Historic Site. While it is not possible to infer a trend from only one year of data, this value provides baseline data, and will be

useful in future studies, particularly if climate data are cross-referenced.

Disturbance: Moderate disturbance can contribute to diversity in grasslands, but high levels of disturbance, especially disturbances caused by humans, often promote invasive or weedy species. All 8 of the plots visited showed signs of disturbance; however, these are almost all signs of management activities aimed at controlling invasive weeds. Three plots (38%) showed evidence of prescribed fires. Three plots (38%) showed signs of ATV tracks and herbicide application, and one (13%) showed signs of recent grass seeding and establishment. Two of the plots (25%) had pocket gopher burrows. Two plots (25%) showed evidence of anthropogenic disturbance via former land use, namely an old farm road and a planted patch of asparagus, likely indicating an old homestead.

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Photos by Northern Great Plains Inventory & Monitoring Network. Resource brief based on a design by Mid-Atlantic Inventory & Monitoring Network



White heath aster, one of the most abundant non-graminoids at Knife River Indian Villages

For Further Information

The annual report on which the resource brief is based, as well as the detailed protocol and procedures and other products of the Northern Great Plains Network may be found at the plant community link on our website <http://science.nature.nps.gov/im/units/ngpn/>



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Parks monitored: Agate Fossil Beds NM • Badlands NP • Devils Tower NM • Fort Laramie NHS • Fort Union Trading Post NHS • Jewel Cave NM • Knife River Indian Villages NHS • Mount Rushmore NM • Scotts Bluff NM • Theodore Roosevelt NP • Wind Cave NP

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