



Vegetation and Soils Monitoring Brief

2015

Importance

Meadows, shrublands and forests are integral components of the natural and cultural landscapes of parks within the Rocky Mountain Inventory and Monitoring Network. Because they may be impacted by a range of disturbances like invasion by exotic weeds, wildfire, accelerated erosion and climate change, we monitor vegetation and soils closely. Results from our monitoring program help park managers, scientists and visitors understand the ecological integrity or health of these ecosystems and how they may be changing over time.

Study Area

Grant-Kohrs Ranch National Historic Site is a 655 hectare (1,618 acre) park with 90 structures located in western Montana. Established in 1972, the park commemorates the western cattle industry from its 1850s inception and evolution to the 20th century. It is maintained as an operating ranch, maintaining roughly 100 livestock animal units. The Clark Fork River runs through the park. The landscape is typical of a mixed-grass prairie grassland with riparian plants along the floodplains and both tall and short grasses in the uplands.



A transect runs through site 20. Both upland (foreground) and irrigated pasture (background) areas of the park are visible.

Grant-Kohrs Ranch National Historic Site

Most abundant species at each site, 2015

National Park Service
U.S. Department of the Interior

Legend

- smooth brome
- cheatgrass
- thickspike wheatgrass
- quackgrass
- Kentucky bluegrass
- bluebunch wheatgrass
- GRKO Boundary

Map created March 2016
Background imagery from
USDA National Agriculture
Imagery Program, 2013

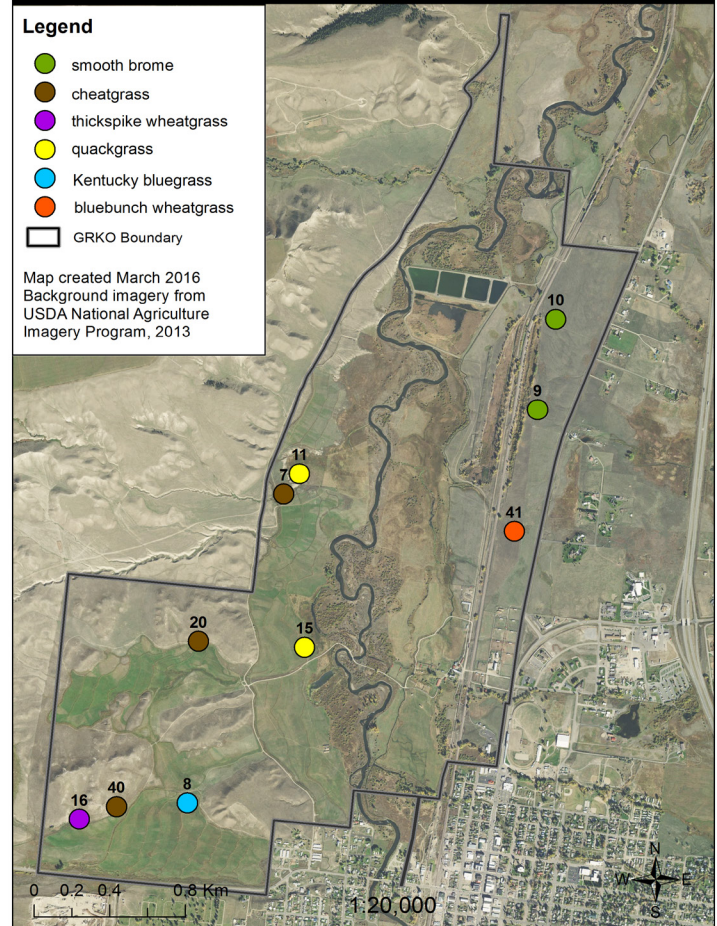


Figure 1. Sites visited in 2015 with the color of each circle representing the most abundant species at that site: smooth brome (green), cheatgrass (brown), thickspike wheatgrass (purple), quackgrass (yellow), Kentucky bluegrass (blue), and bluebunch wheatgrass (orange). Numbers above each circle are site names.

Sampling Methods

Our protocol (<https://irma.nps.gov/DataStore/Reference/Profile/2170699>) provides detailed descriptions of the techniques used for monitoring. We use a random sampling design with sites selected within five ecological site and soil types to allow us to understand conditions across the park. Sites are visited following a paneled structure over four years, with a smaller subset visited every year to understand year-to-year variability.

Objectives

The objectives of vegetation and soils monitoring are to quantify status and trend in:

- Vegetation structure, species composition and biodiversity
- Abundance of invasive/exotic plants
- Soil condition

2015 Monitoring Effort

At Grant-Kohrs Ranch National Historic Site, we visited 10 sites in mid June 2015 (Figure 1). We identified 88 plant species, 33 of which were non-native and 4 that were exotic invasives found on the Montana noxious weed list (Figure 2). Of these species, 91.9% of the total foliar cover was from graminoids, 6.5% forbs, and 2.7% shrubs.

The most abundant species (based on average cover) were:

- quackgrass (*Elymus repens*)
- smooth brome (*Bromus inermis*)
- cheatgrass (*Bromus tectorum*)
- needle and thread (*Hesperostipa comata*)
- thickspike wheatgrass (*Elymus lanceolatus*)

Exotic invasive species included spotted knapweed and field bindweed with covers under 2%, Canada thistle at 13.5% cover and cheatgrass at 19.9% cover.

We measured soil aggregate stability (the ability of soil particles to adhere to each other) and the percent cover of litter and bare ground to help determine the erosion potential at sites. Our measure of soil stability ranges from 1 to 6, with lower values indicating lower stability (see protocol for full description). Mean surface soil stability was 5.4 (0.4 standard deviation) and mean subsurface soil stability was 4.3 (1.4) across all sites.

The mean cover of litter was 75.3% (15.3% standard deviation) while the cover of bare soil averaged 13.9% (9.6%).

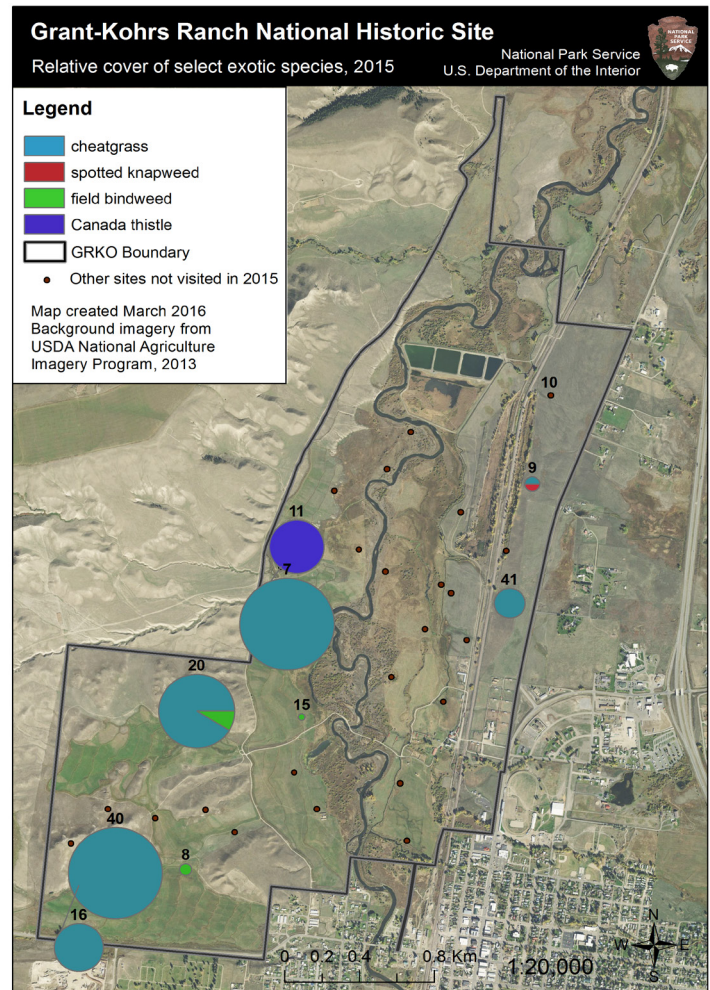


Figure 2. Relative cover of invasive exotic species at sites visited in 2015. The size of each circle represents the relative abundance of those species compared to other sites. Numbers above each circle are site names. No invasive species were found at site 10.

About the ROMN

The Rocky Mountain Network is one of 32 vital signs monitoring networks across the National Park Service. We have been monitoring status and trends in upland vegetation structure, species composition, and soil condition in Grant-Kohrs Ranch National Historic Site since 2006. We also monitor the Clark Fork River in the park.

For More Information

ROMN homepage:

<http://science.nature.nps.gov/im/units/romn/>

Data downloads via the Natural Resource Information Portal: <https://irma.nps.gov/DataStore/Reference/Profile/2229262>

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