



Checking Grant-Kohrs Ranch's Vital Signs

Rocky Mountain Network Science in the National Historic Site



National parks are the guardians of unique American natural and cultural history. But perhaps more than ever before, parks exist in a rapidly changing landscape. Development, replacement of native species by invasive exotics, air and water pollution, increasing visitor use, and climate change all impact the natural web of life. This leads park managers to ask:

How healthy are parks?

How are they changing?

In answer, the National Park Service clustered parks into 32 Inventory and Monitoring Networks. In 2007 at Grant-Kohrs Ranch and nearby parks, a small team of scientists with the [Rocky Mountain Network](#) began monitoring natural resources, called "vital signs," that can serve as red flags if conditions deteriorate. Our team supports park managers' efforts to make *science-based decisions*.



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What do we monitor at Grant-Kohrs Ranch National Historic Site?

Stream Ecological Integrity

The Clark Fork River winds through Grant-Kohrs Ranch National Historic Site carrying water vital to the ranching way of life commemorated here. It also nourishes streamside plants and tiny aquatic insects, like caddisflies and dragonflies. As larvae, these insects feed fish and other predators. As winged adults, they feed birds and bats. The river's prime fishing draws anglers and its waters offer many other recreational opportunities for the local community on a hot summer day.

Yet rivers are sensitive to many stressors. Climate change can warm rivers and shrink mountain snowpack, lowering streamflow. This affects fish and aquatic insects. The Clark Fork River and its banks experienced floods in the late 1800s and early 1900s that spread thick layers of toxic metals from the nearby Anaconda Smelter down the valley. In 2018, the Department of Environmental Quality began remediation through the ranch, removing contaminated sediment and reconstructing sections of the river riparian area designated as a Superfund cleanup site. To inform park managers, Rocky Mountain Network crews have been sampling the river each year, including toxic metal levels, to track river health and support the Superfund project.

Some resources we measure:

- Water and sediment chemistry, like copper and nitrogen levels
- Physical habitat, like woody debris and the size of sand and cobble along the streambed
- Algae and aquatic insects



Sampling aquatic insects in the Clark Fork River. The mix of stream bugs found reveals much about conditions in the river.

Learn more at our [website](#) (What We Monitor>Protocols>Stream Ecological Integrity)

Vegetation Composition and Soil

Grant-Kohrs Ranch is a working ranch that supports park-owned cattle and horses. It commemorates the frontier cattle industry and maintains diverse grasslands. The hills in the park's southwest corner support healthy native shortgrass prairie. Here you'll find the delicate, pink bitterroot flower. This prairie is vital for its role in feeding and sheltering wildlife, nourishing grazing cattle, stabilizing soil, and cycling water, carbon, and other nutrients through the ground for continual reuse. Lush irrigated pastures and hay fields support a mix of historically significant pasture vegetation, like timothy grass and red clover. Riparian zone plants along the Clark Fork River are yet another vegetation community, sustaining birds and wildlife and absorbing occasional floodwaters.

Threats to these plant communities vary, but maintaining soil stability and preventing the spread of noxious weeds are two key issues. Park managers aim for grazing levels that promote healthy soil and maintain a variety of plants that can outcompete noxious weeds and keep nutrients in the soil. To support this, Rocky Mountain Network crews track soil conditions and the mix of plants growing in each community. This provides early warning of threats like noxious weeds, upland soil health problems, and plant response to changing climate conditions. We also monitor changing soil health along the river in response to Superfund remediation.

Some characteristics we measure:

- Plant species occurrence and abundance (grasses, forbs, shrubs, trees)
- Presence/absence of noxious weeds
- Potential for soil erosion (soil texture, bare ground)
- Soil chemistry (pH, carbon, nitrogen, minerals, and the amount of organic matter)
- Disturbances (fire, rodent activity, roads/trails)



Bitterroot (*Lewisia rediviva*) is the Montana state flower.

Learn more at our [website](#) (What We Monitor>Protocols>Upland Vegetation and Soils)

Explore the [Rocky Mountain Network website](#)

Learn about inventory and monitoring at Grant-Kohrs Ranch and play with:

- [species lists](#) for the park (What We Inventory>Species Lists)
- [interactive visualization tools](#) for learning about climate, water quality, and landscape patterns (Reports & Publications>Data Visualization)

Contact us!

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