



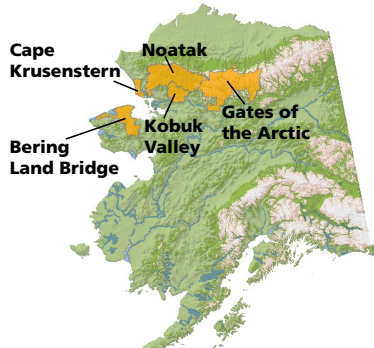
Bering Land Bridge N Pres. • Cape Krusenstern NM
Gates of the Arctic NP & Pres. • Kobuk Valley NP • Noatak N Pres.

February 2022

Terrestrial Vegetation Resource Brief

Monitoring plots in poplar forests near the northern limit of trees in the Noatak Valley provide an opportunity to study the effect of climate change on trees.
NPS photo Dave Swanson

Terrestrial Vegetation in the Arctic Network



Map: Terrestrial vegetation is being monitored in all 5 Arctic Network parks: Gates of the Arctic National Park and Preserve, Noatak National Preserve, Kobuk Valley National Monument, Cape Krusenstern National Preserve, and Bering Land Bridge National Preserve.



Image (top far left): Tussock and low shrub tundra on the slopes of Devil Mountain in Bering Land Bridge National Preserve (BELA). NPS photo Dave Swanson



Image (top near left): Monitoring plot in the sparse forest of white spruce near the northern limit of trees in the Noatak Valley provide an opportunity to study the effect of climate change on trees. NPS photo Sarah Schuette

Image (middle): ARCNet scientists measure the cover of plants on the tundra in BELA using a laser pointer set at regular intervals along a tape measure. Buried magnets allow them to precisely re-locate the position of the plot for future measurements. NPS photo Dave Swanson



Image (bottom far left): These portable chain-link fences keep caribou and reindeer from grazing lichens in a small area so that scientists can judge their impact on the surrounding areas. NPS photo Peter Neitlich

Image (bottom near left): Arctic tundra vegetation of herbs and low shrubs in fall color. NPS photo Dave Swanson

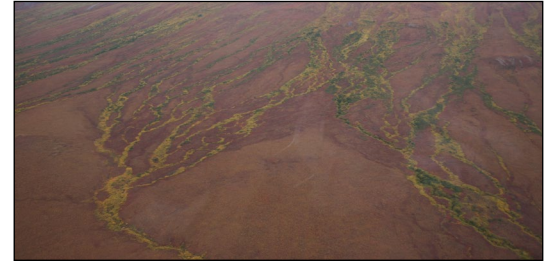
Why Terrestrial Vegetation Is Important

Vegetation is the basis for ecosystem productivity and wildlife habitat. Arctic vegetation is very sensitive to climate change and disturbance such as fire, herbivory, and traffic. Research has documented an increase in shrubs and, to a lesser extent, trees in the arctic over recent decades, probably related to climate change. Major changes in vegetation structure such as these have a cascading effect on other ecosystem attributes, such

as herbivore use patterns, fire regime, and the chemistry of water bodies. In addition to vascular plants such as shrubs and herbs, the arctic has abundant lichens that provide biodiversity and wildlife forage. Lichens are sensitive to caribou and reindeer grazing, competition from other plants, fires, and contaminants. All these factors could lead to decreased lichen diversity and biomass in the future.

What We Want To Know About Terrestrial Vegetation

- Long-term changes in plant structure: the height and density of plants by species.
- Long-term changes in lichen abundance and diversity, and their relation to grazing by caribou or reindeer.
- The local history of weather and climate effects on tree growth at the northern limit of trees.

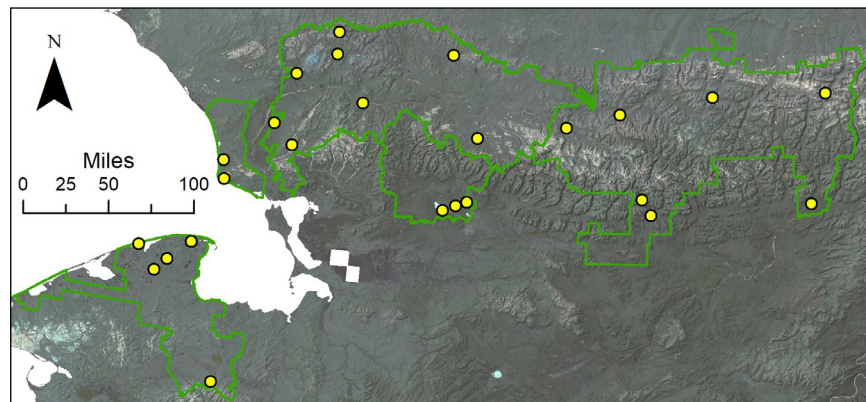


Different fall colors on slopes in the Noatak Valley in late summer show reveal different shrub species. NPS photo Dave Swanson

How We Monitor Terrestrial Vegetation

Vegetation is monitored using plots that can be relocated exactly and re-measured. These plots are all in remote areas requiring access by airplane or helicopter. We have nearly 500 comprehensive vegetation monitoring plots distributed across ARCN, where we measure a variety of vegetation properties: the cover and height by species of plants (sedges, grasses, forbs, shrubs, and trees); the cover of selected mosses and lichens; and tree diameters and growth rates from cores. We also have

described the soil and site characteristics of the plots. We have started re-measuring these plots and expect to visit them all every 10 to 15 years. In addition, in BELA we have 16 fenced grazing exclosures with permanent monitoring plots inside and outside, where we measure lichen cover and height. We also have hundreds of lichen species inventory plots around ARCN that could be re-visited to detect major changes.



Locations of ARCN permanent vegetation monitoring. Each location has a lake or flat open area to land an airplane on, a good campsite, and between 10 and 30 plots accessible on foot.

How Monitoring Terrestrial Vegetation Can Help Park Managers

Vegetation monitoring will help us understand changes in habitats that will affect decisions about management of wildlife and fire.

Interpretive products will be used to educate the public about how climate change is affecting arctic ecosystems.

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<https://www.nps.gov/im/arcn/index.htm>