



Northern Bedrock Outcrop

Dry, open, lichen-dominated plant communities on areas of exposed bedrock. Woody vegetation is sparse and vascular plants are restricted to crevices and shallow soil deposits.

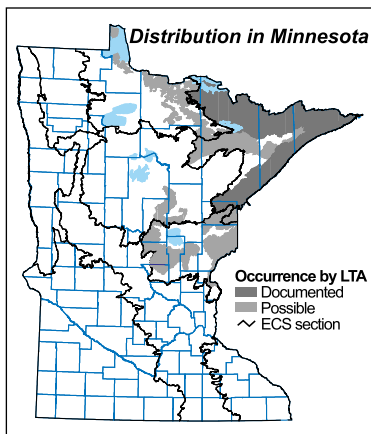
Vegetation Structure & Composition

Description is based on summary of plant species lists and field notes from ca.100 rock outcrops.

- **Lichen and bryophyte** cover is high. Crustose and foliose lichens are predominant on exposed bedrock, with fruticose species such as reindeer lichen (*Cladonia* spp.) common. Mosses often form carpets in rain-water-collecting bedrock hollows.

- **Herbaceous plant** cover is sparse to patchy (5-50%); characteristic species include pale corydalis (*Corydalis sempervirens*), rock spikemoss (*Selaginella rupestris*), poverty grass (*Danthonia spicata*), umbel sedge (*Carex umbellata*), fringed false buckwheat (*Polygonum cilinode*), Douglas' knotweed (*P. douglasii*), rusty woodsia (*Woodsia ilvensis*), and pussy toes (*Antennaria* spp.).

- **Tree and shrub** cover is absent to sparse (0-25%); characteristic shrub species include lowbush blueberry (*Vaccinium angustifolium*), bearberry (*Arctostaphylos uva-ursi*), and bristly sarsaparilla (*Aralia hispida*).



Landscape Setting and Soils

ROn12 occurs on a small, level to sloping exposures of Precambrian bedrock. It is occasional to common on summits, ridgetops, side-slopes, cliff tops, and along lake-shores and stream banks in rolling to rugged bedrock-controlled terrain, and may also occur on bedrock knolls in more level terrain such as the large peatland landscapes of northern Minnesota. Common rock types include diabase, basalt, gabbro, granite, and greenstone. Less common rock types include anorthosite, rhyolite, diorite, andesite, granophyre, gneiss, graywacke, tonalite, schist, and sandstone. Soil development is minimal, with soil mostly restricted to crevices or shallow bedrock depressions and largely consisting of decomposing plants and invertebrates. The amount of fracturing in the bedrock is varied, depending on the cleavage properties and resistance to weathering of the rock, and influences vascular plant cover. Exposures with few fractures, such as those composed of anorthosite, are often nearly devoid of vascular plants.

Natural History

Species in rock outcrop communities are subjected to greater environmental extremes than species in surrounding terrestrial communities, including more rapid fluctuations in substrate temperature, higher desiccation rates because of low substrate moisture-holding capacity and exposure to direct sunlight, and more limited nutrient availability. The absence of soil over most of the community limits opportunities for colonization by vascular plants, which are generally restricted to small patches of soil in crevices or shallow depressions. Many of the landscapes where rock outcrops occur are prone to periodic fires, and fire-scarred stumps are common on outcrops, indicating that fire is likely a factor in shaping outcrop communities. Fires may act to keep rock outcrops open by eliminating woody species and consuming shallow organic soils. Many typical rock outcrop plants are adapted to drought, and drought, like fire, may slow or prevent succession of open outcrop communities to shrub- or tree-dominated communities by periodically killing desiccation-intolerant trees and shrubs.



Similar Native Plant Community Classes

● ROn23 Northern Bedrock Shrubland

ROn23 is similar to ROn12 but has greater cover of woody plants. In general, occurrences of ROn23 are larger than those of ROn12 and are composed of a mix of large shrub-dominated areas and small, open exposures of bedrock dominated by lichens. Whether a site is classified as ROn23 or ROn12 can be at least in part a question of scale.

► **ROn23**—Tree and shrub cover is >25%. More likely to have small trees and tall shrubs such as showy mountain ash, white spruce, big-toothed aspen, northern red oak, northern pin oak, juneberries (*Amelanchier* spp.), and hawthorns (*Crataegus* spp.).

► **ROn12**—Tree and shrub cover is <25% and often <10%. Trees and tall shrubs are very sparse or absent.

● LKu43 Lake Superior Rocky Shore

LKu43, when present on dry sites (i.e., LKu43a, Dry Bedrock Shore [Lake Superior]) often shares many species with ROn12 but occurs only on the immediate shoreline of Lake Superior.

► **LKu43**—Present on shoreline of Lake Superior. More likely to have shrubby cinquefoil (*Potentilla fruticosa*), Hudson Bay eyebright (*Euphrasia hudsoniana*), ninebark (*Physocarpus opulifolius*), and upland white aster (*Solidago ptarmicoides*), which in northeastern Minnesota are largely restricted to the Lake Superior shore.

► **ROn12**—Present on inland site, away from immediate shoreline of Lake Superior.

● FDn22 Northern Dry-Bedrock Pine (Oak) Woodland

FDn22 often surrounds and grades into occurrences of ROn12.

► **FDn22**—Tree cover ranges from 25% to >50%. More likely to have moderately shade-tolerant species such as wild sarsaparilla (*Aralia nudicaulis*), large-leaved aster (*Aster macrophyllus*), wintergreen (*Gaultheria procumbens*), and bracken (*Pteridium aquilinum*). Mosses are more abundant in FDn22, especially on areas of exposed bedrock, which are more likely to be shaded.

► **ROn12**—Tree and shrub cover is <25%. Areas of exposed bedrock, which are more likely to receive direct sunlight, are covered mainly by lichens rather than mosses.

Native Plant Community Types in Class

● ROn12a Sandstone Outcrop (Northern)

Small (<2 acres), open communities with little or no (0-25%) shrub or tree cover, on dry exposures of quartz sandstone. Crustose lichens are the predominant cover, with foliose and fruticose species (including reindeer moss) common. Vascular plant cover is low, with plants restricted to crevices and shallow soil deposits. Characteristic species include lowbush blueberry, bristly sarsaparilla, pale corydalis, fringed false buckwheat, rock spikemoss, huckleberry (*Gaylussacia baccata*), and three-toothed cinquefoil (*Potentilla tridentata*). Sites with deeper soil surrounding the exposed bedrock typically support woodland or forest communities. ROn12a is uncommon, documented only on exposures of Hinckley Sandstone along the Kettle River near the town of Sandstone and on exposures of the Denhem Formation near the town of Sturgeon Lake. Exposures of Fond du Lac Sandstone along the lower St. Louis River might contain ROn12a.

● ROn12b Crystalline Bedrock Outcrop (Northern)

Small (<2 acres), open communities with little or no (0-25%) shrub or tree cover on dry exposures of crystalline bedrock. Common rock types include diabase, basalt, gabbro, granite, and greenstone. Less common rock types include anorthosite, rhyolite, diorite, andesite, granodiorite, granophyre, tonalite, and graywacke. Crustose lichens are the predominant cover, with foliose and fruticose species (including reindeer moss) common. Vascular plant cover is low, with plants restricted to crevices and shallow soil deposits. Characteristic species include lowbush blueberry, bristly sarsaparilla, pale corydalis, fringed false buckwheat, and rock spikemoss. Orchids including stemless lady's slipper (*Cypripedium acaule*), green adder's mouth (*Malaxis unifolia*), northern slender ladies' tresses (*Spiranthes lacera*), and hooded ladies' tresses (*S. romanzoffiana*) may occur in ROn12b. ROn12b occurs in small openings in woodlands or forests throughout much of northeastern Minnesota.



photo by N.E. Aaseng, MN DNR

Voyageurs National Park, St. Louis County, MN