

Lake Superior Rocky Shore

Open, lichen-dominated plant communities on bedrock, boulder, or wet cobble shores along Lake Superior. Best expressed on the tips of points or peninsulas but also present on long, relatively straight sections of shoreline.

Vegetation Structure & Composition

Description is based on summary of vegetation data from 21 plots (relevés).

- **Lichen** cover is interrupted to nearly continuous (50-100%), with crustose lichens especially abundant. Areas exposed to frequent washing by waves or groundwater seepage flow typically have sparser lichen cover. Characteristic lichens include crustose and tightly attached foliose species such as *Xanthoria elegans*, *Rhizocarpon disporum*, *Rhizoplaca chrysoleuca*, *Acarospora americana*, *Aspicilia cinerea*, *Phaeophyscia sciastra*, *Lecidea tessellata*, *Lecanora muralis*, *Candelariella vitellina*, and *Lecidella effugiens*.
- **Vascular plant** cover is sparse. Forbs, grasses, low shrubs, and stunted trees are usually confined to rock crevices or edges of bedrock pools. Shores with substrates of large cobbles and boulders in moist sand or gravel can have dense cover of sedges, grasses, herbs, and shrubs.
- **Characteristic graminoids** include tufted hair grass (*Deschampsia cespitosa*) and tufted bulrush (*Scirpus cespitosus*).
- **Characteristic forbs** include yarrow (*Achillea millefolium*) and harebell (*Campanula rotundifolia*).
- **Characteristic shrubs** include shrubby cinquefoil (*Potentilla fruticosa*), ninebark (*Physocarpus opulifolius*), and green alder (*Alnus viridis*).

Landscape Setting & Soils

LKU43 is best developed on sloping bedrock outcrops, especially at the tips of narrow to rounded points and on large cobble shores in gently curving bays adjacent to these points. Substrates consist of bedrock, boulders, or cobbles. Moist or wet sand or gravel is present between cobbles on wet cobble shores. Soil development is minimal and is confined to rock crevices and edges of permanent pools in the rock. Soils in rock crevices are mainly composed of organic matter. At edges of bedrock pools, "perched" soils up to 15-18in (38-46cm) deep sometimes develop under a sod of sedges, grasses, and bryophytes; these areas of soil are small and patchy.

Natural History

Open, lichen-dominated communities on rocky shores along Lake Superior are maintained by irregular disturbance from storm waves, which can be up to 15-20ft (5-6m) high and wash inland up to 100-130ft (30-40m), depending on the slope of the shore. In winter, rocky shores are also sometimes scoured by large pieces of floating ice pushed onto the shore by storm waves. The rocks and vegetation are often coated with fog or spray, which in winter can turn to ice, making woody twigs and branches brittle and readily broken by strong winds. The stunted "krummholz" trees and shrubs typical along Lake Superior are indicative of the harshness of the shore environment for vascular plants. Rocky shores along Lake Superior provide habitat for several disjunct plant species that usually grow much farther north or at high elevations on mountains. These species are concentrated in areas cooled by the adjacent lake. Some of the lichens present in LKU43 have nitrogen-fixing algae, and lichen cover may be an important source of nitrogen for plants rooted in very shallow soils in rock crevices. Dry rock substrates in rocky shore communities are subject to extreme fluctuations in temperature, both cooled by the lake, which is often well below ambient temperature in summer, and baked by sunlight. Rocky shores have a distinct, narrow, lower zone of bare rocks washed regularly by waves or submerged during high water levels.

Similar Native Plant Community Classes

● ROn23 Northern Bedrock Shrubland

ROn23, when present along Lake Superior, can be similar to LKU43 but occurs on sites less susceptible to wave wash, either slightly inland from the shore or on exposed rocky headlands above the shore.

► **ROn23**—Has patchy to interrupted cover (25-75%) of shrubs and trees. More likely to have shade-tolerant woodland species such as large-leaved aster (*Aster macrophyllus*) and Canada mayflower (*Maianthemum canadense*).

► **LKu43**—Tree and shrub cover is sparse (<25%). More likely to have shrubby cinquefoil, harebell, tufted hair grass, and tufted bulrush.

● **LKi43 Inland Lake Rocky Shore**

LKi43 occurs in settings similar to those of LKu43 but on inland lakes rather than along Lake Superior. The rocky shores along these smaller lakes are less influenced by wave and ice action than those along Lake Superior.

► **LKi43**—Present along shore of inland lake.

► **LKu43**—Present along shore of Lake Superior. More likely to have shrubby cinquefoil, Hudson Bay eyebright (*Euphrasia hudsoniana*), birds-eye primrose (*Primula mistassinica*), butterwort (*Pinguicula vulgaris*), tufted hair grass, and spike trisetum grass (*Trisetum spicatum*).

● **LKu32 Lake Superior Sand/Gravel/Cobble Shore**

LKu32, when present on cobble substrates, can appear similar to LKu43. LKu32 differs by having dry voids, or dry sand or gravel between cobbles (rather than wet sand or gravel) and has very low diversity of plants and little or no lichen cover on dry cobble surfaces.

Native Plant Community Types in Class

● **LKu43a Dry Bedrock Shore (Lake Superior)**

Open plant communities on dry, well-drained bedrock shores with interrupted to continuous cover (50-100%) of lichens and bryophytes, and sparse cover (<25%) of grasses, forbs, shrubs, and stunted trees. Bedrock types include basalt, diabase, and rhyolite. Characteristic lichens include crustose and tightly attached foliose species such as *Rhizocarpon disporum*, *Rhizoplaca chrysoleuca*, *Xanthoria elegans*, *Lecanora argopholis*, *Caloplaca arenaria*, *Acarospora americana*, and *Lecidea tessellata*. Characteristic herbs and low shrubs are harebell, three-toothed cinquefoil (*Potentilla tridentata*), tufted hair grass, yarrow, shrubby cinquefoil, hairy goldenrod (*Solidago hispida*), rough bentgrass (*Agrostis scabra*), ninebark, and upland white aster (*Solidago ptarmicoides*). There are usually small patches of moss on rock surfaces; characteristic species include *Grimmia unicolor* and *Hedwigia ciliata*.

● **LKu43b Wet Rocky Shore (Lake Superior)**

Open plant communities on a mosaic of wet and dry substrates on cobble, boulder, or bedrock shores. Low, wet areas in rock depressions, seepage zones, or at lake level support a diverse flora of sedges, shrubs, forbs, and bryophytes. Dry rock surfaces are covered by lichens and mosses. Characteristic vascular plant species include tufted bulrush, green alder, birds-eye primrose, flat-topped aster (*Aster umbellatus*), shrubby cinquefoil, sweet gale (*Myrica gale*), ninebark, Kalm's lobelia (*Lobelia kalmii*), lenticular sedge (*Carex lenticularis*), and alpine rush (*Juncus alpinoarticulatus*). Common mosses on moist substrates below herbs and shrubs include *Hypnum lindbergii*, *Campyllum chrysophyllum*, *Campyllum stellatum*, and *Climacium dendroides*. LKu43b is divided into two subtypes that, although similar in flora, are distinct in rock substrate and in position relative to the lake.

○ **LKu43b1 Cobble Subtype**

Cobble and boulder shores at lake level. Cobbles and boulders are kept moist by wave-wash. Vegetation consists of patchy to interrupted cover of shrubs, sedges, grasses, and forbs rooted in wet gravel or sand between large cobbles. Individual cobbles are >12in (30cm) long.

○ **LKu43b2 Bedrock Subtype**

Sloping, solid bedrock surfaces above lake level. Characterized by scattered permanent rock pools filled by rainwater and seepage from adjacent uplands. Vegetation consists of small patches of wet meadow plants perched on bedrock at edges of the pools.



photo by K. Wendt, MN DNR

Temperance River State Park, Cook County, MN