

## Lake Superior Sand/Gravel/Cobble Shore

Sparsely vegetated plant communities on dry, well-drained sand, gravel, or cobble shores along Lake Superior. Most common in coves, bays, or bay mouths but also present along gently curving or relatively straight sections of shore.

### Vegetation Structure & Composition

Description is based on field observations and summary of vegetation data from 9 plots (relevés).

- **Vegetation** cover is sparse or patchy, with sand, gravel, or cobbles exposed between plants.
- **Characteristic graminoids** include beachgrass (*Ammophila breviligulata*), nodding wild rye (*Elymus canadensis*), Schweinitz's nut sedge (*Cyperus schweinitzii*), and sand dropseed (*Sporobolus cryptandrus*).
- **Characteristic forbs** include beach pea (*Lathyrus maritimus*), starry false Solomon's seal (*Smilacina stellata*), and coast jointweed (*Polygonella articulata*).
- **Characteristic shrubs** include sand cherry (*Prunus pumila*), red raspberry (*Rubus idaeus*), northern gooseberry (*Ribes oxycanthoides*), speckled alder (*Alnus incana*), dogwoods (*Cornus* spp.), prickly rose (*Rosa acicularis*), and willows (*Salix* spp.).

### Landscape Setting & Soils

LKU32 occurs on dry, well-drained sand, gravel, or cobble shores along Lake Superior. The community is best expressed in coves, bays, or bay mouths but is also present along gently curving sections of shore. Sandy shores are very rare along Lake Superior in Minnesota, primarily confined to Minnesota Point, a sand spit forming part of the baymouth bar that encloses the St. Louis River estuary. Minnesota Point is formed and maintained by longshore currents that transport and deposit sand from shores to the east in Wisconsin. The beach sands are subsequently blown inland by onshore winds to form dunes, on which grassland and shrubland plant communities have developed. Soil is minimal or absent in the dune communities, with most plants rooted in sand. Gravel and cobble shores are more common along Lake Superior in Minnesota. Most are in coves and bays, although the most extensive gravel and cobble shores occur along gently curving or straight sections of shoreline exposed to storm waves. Soil development is minimal or absent in gravel and cobble shore communities.

### Natural History

The substrates of sand, gravel, and cobble shore communities are transported and deposited by longshore currents and wave action, with sand and small pebbles deposited in protected areas with slow currents, and larger pebbles and cobbles deposited in areas with stronger currents and wave action. Storm waves typically push these beach deposits into ridges, which are reconfigured intermittently by exceptionally large storm waves. Winter ice floes also move and rearrange finer-grained beach deposits such as sand and pebbles. Intermittent, short-term fluctuations in water level caused by seiches help to create wider zones of bare substrate along the shores of Lake Superior than are present along shores of smaller inland lakes. Long-term fluctuations in lake levels are important for dune formation in the Great Lakes. During episodes of high water, waves and storms erode greater amounts of sandy sediments than when water levels are low. Relatively high water levels for prolonged periods result in destabilization of the dunes, with increased sand movement and burial of adjacent forests. Fires from adjacent pine forests may occasionally spread into shrublands and grasslands present on dunes on Minnesota Point. Where protected from high-energy storm waves, ice-push, and scouring, gravel and cobble shores are typically very narrow (<10ft [3m]). Where regularly exposed to storm waves, gravel and cobble shores extend much farther inland, developing an upper zone that is impacted by only the largest waves, and a wave-washed lower zone. Wave-wash is frequent enough in the lower zone to prevent establishment of stable plant communities. Wave-wash and significant erosion and deposition of sediment in the upper zone typically occur only during infrequent high-energy storms, allowing plants to colonize beach substrates between storms.

## Similar Native Plant Community Classes

### ● LK132 Inland Lake Sand/Gravel/Cobble Shore

LK132 occurs in settings similar to those of LKu32 but on inland lakes rather than on Lake Superior. Shores along these smaller lakes are less influenced by longshore currents and wave action than those along Lake Superior, and inland lakes are generally too small to have seiches. Species that distinguish the two communities include beachgrass and beach pea, which are characteristic of LKu32 but uncommon in LK132.

### ● LKu43 Lake Superior Rocky Shore

When LKu43 is present on cobble substrates, it can appear similar to LKu32. LKu43 is distinguished, however, by having moist or wet sand or gravel between cobbles (rather than voids, or dry sand or gravel) and a high diversity of plants, typically including high cover of lichens on dry cobble surfaces.

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## Native Plant Community Types in Class

### ● LKu32a Beachgrass Dune (Lake Superior)

Open communities dominated by grasses on low dunes adjacent to sand beaches along the Lake Superior shore. The dominant grass is beachgrass, which stabilizes the dune sands. Other characteristic plant species are nodding wild rye, sand cherry, and sand dropseed. LKu32a occurs in Minnesota only on Minnesota Point in Duluth.

### ● LKu32b Juniper Dune Shrubland (Lake Superior)

Open communities on rolling, partly stabilized sand dunes inland from beachgrass-dominated dunes along the Lake Superior shore. Vegetation is a patchy cover of shrubs, forbs, graminoids, and fruticose lichens. Characteristic shrubs include common juniper (*Juniperus communis*), poison ivy (*Toxicodendron rhydbergii*), beach heather (*Hudsonia tomentosa*), sand cherry, and pin cherry (*Prunus pensylvanica*). Characteristic forbs and graminoids include Canada bluegrass (*Poa compressa*), starry false Solomon's seal, tall wormwood (*Artemisia campestris*), coast jointweed, umbel sedge (*Carex umbellata*), beachgrass, and Schweinitz's nut sedge (*Cyperus schweinitzii*). Common fruticose lichens are *Cladina mitis*, *C. rangiferina*, and *Cladonia cristatella*. LKu32b occurs in Minnesota only on Minnesota Point in Duluth.

### ● LKu32c Sand Beach (Lake Superior)

Barren or sparsely vegetated habitats on sand beaches exposed to regular wave-wash and ice-scouring. Continual erosion and deposition of sand prevents the development of stable plant communities. Occasionally, species associated with Beachgrass Dune (LKu32a) and Juniper Dune Shrubland (LKu32b) communities and opportunistic non-native species may become established temporarily on sand beaches. In Minnesota, this community is primarily confined to Minnesota Point in Duluth.

### ● LKu32d Beach Ridge Shrubland (Lake Superior)

Sparsely vegetated shrublands on the uppermost beach ridges of long curving beaches composed of gravel, pebbles, or small cobble-sized stones less than 12in (30cm) long. Beach ridges are formed and rearranged by storm waves and ice floes, so plant cover is variable, consisting of a few species able to grow in the dry and very well drained upper beach-ridge area. Characteristic species are beach pea, red raspberry, northern gooseberry, and bluejoint (*Calamagrostis canadensis*). LKu32d is present but rare along the Lake Superior shoreline in Lake and Cook Counties.

### ● LKu32e Gravel/Cobble Beach (Lake Superior)

Barren or sparsely vegetated habitats on gravel and cobble substrates, highly variable in both length and width. Plants are rarely present on beaches that extend <3ft (1m) from the water's edge. Where exposure to wave-wash extends gravel or cobble beaches farther inland, vegetation becomes established in the zone between the upper reach of regular wave-wash and the upper reach of larger, less frequent storm waves. Characteristic plants in these zones include beach pea, red raspberry, bluejoint, field horsetail (*Equisetum arvense*), yarrow (*Achillea millefolium*), common evening primrose (*Oenothera biennis*), common strawberry (*Fragaria virginiana*), and ninebark, (*Physocarpus opulifolius*). Balsam fir, white spruce, and balsam poplar may also be present on the largest, best-developed gravel beaches.



photo by W.R. Smith MN DNR

Minnesota Point, St. Louis County, MN