

Inland Lake Sand/Gravel/Cobble Shore

Plant communities characterized by variable cover of shrubs, forbs, graminoids, and aquatic plants on well-drained, wave-washed sand, gravel, or small cobbles on shores along inland lakes. Present in the zone between low-water level and the upper reach of storm waves or ice scouring.

Vegetation Structure & Composition

Description is based on field observations, supplemented by species lists from aquatic plant surveys of 877 lakes, mostly in central and northern Minnesota.

- **Vegetation** cover ranges from sparse to dense but varies seasonally. Distinct upper and lower zones are almost always present, with lower zones often expanding as water levels fall over the summer.
- **Upper zone** lies above normal water levels, where seasonal flooding, erosion by large waves, and ice scouring have strong influence on the composition of plant communities. Ice-thrust ridges occur at or just above the upper extent of this zone and commonly support trees and other upland forest species.

Characteristic Upper Zone Species

MDL,WSU, MIM

NSU

Characteristic Upper Zone Species	MDL,WSU, MIM	NSU
Forbs		
Swamp milkweed (<i>Asclepias incarnata</i>)	•	
Bulb-bearing water hemlock (<i>Cicuta bulbifera</i>)	•	
American willow-herb (<i>Epilobium ciliatum</i>)	•	
Touch-me-not (<i>Impatiens capensis</i>)	•	
Golden dock (<i>Rumex maritimus</i>)	•	
Spotted Joe pye weed (<i>Eupatorium maculatum</i>)	•	•
Common boneset (<i>Eupatorium perfoliatum</i>)	•	•
Northern bugleweed (<i>Lycopus uniflorus</i>)	•	•
Blue monkey flower (<i>Mimulus ringens</i>)	•	•
Nodding smartweed (<i>Polygonum lapathifolium</i>)	•	•
Arrow-leaved tearthumb (<i>Polygonum sagittatum</i>)	•	•
Marsh skullcap (<i>Scutellaria galericulata</i>)	•	•
Mad dog skullcap (<i>Scutellaria lateriflora</i>)	•	•
Yellow loosestrife (<i>Lysimachia terrestris</i>)		•
Grasses & Sedges		
Rough barnyard grass (<i>Echinochloa muricata</i>)	•	
Tall manna grass (<i>Glyceria grandis</i>)	•	
Path rush (<i>Juncus tenuis</i>)	•	
Rice cut grass (<i>Leersia oryzoides</i>)	•	
Woolgrass (<i>Scirpus cyperinus</i>)	•	
Brown-fruited rush (<i>Juncus pelocarpus</i>)	•	•
Bluejoint (<i>Calamagrostis canadensis</i>)		•
Narrow reedgrass (<i>Calamagrostis stricta</i>)		•
Stalked woolgrass (<i>Scirpus cyperinus</i> var. <i>pedicellatus</i>)		•
Low Shrubs		
False indigo (<i>Amorpha fruticosa</i>)	•	
Leatherleaf (<i>Chamaedaphne calyculata</i>)		•
Sweet gale (<i>Myrica gale</i>)		•
Shrubs		
Sandbar willow (<i>Salix exigua</i>)	•	
Alder (<i>Alnus</i> spp.)		•
Meadowsweet (<i>Spiraea alba</i>)		•
Trees		
Jack pine (<i>Pinus banksiana</i>)		•
White cedar (<i>Thuja occidentalis</i>)		•

- **Lower zones** lie at or just above normal water levels and extend below normal water level. Lower zones are exposed during periods of low water but are washed by waves almost daily. Characteristic plants include annual herbaceous plants, emergent aquatic species, and submergent and floating-leaved aquatic species that become stranded as water levels fall during the summer.

Characteristic Lower Zone Species	MDL,WSU,MIM	NSU
Floating-Leaved & Submergent Forbs		
Watershield (<i>Brasenia schreberi</i>)		•
Pipewort (<i>Eriocaulon aquaticum</i>)		•
Braun's quillwort (<i>Isoetes echinospora</i>)		•
Lake quillwort (<i>Isoetes lacustris</i>)		•
American shore plantain (<i>Littorella uniflora</i>)		•
Slender water milfoil (<i>Myriophyllum tenellum</i>)		•
Coiled pondweed (<i>Potamogeton spirillus</i>)		•
Awlwort (<i>Subularia aquatica</i>)		•
Humped bladderwort (<i>Utricularia gibba</i>)		•
Emergent Forbs		
Swamp milkweed (<i>Asclepias incarnata</i>)	•	
Bulb-bearing water hemlock (<i>Cicuta bulbifera</i>)	•	
Touch-me-not (<i>Impatiens</i> spp.)	•	
Northern bugleweed (<i>Lycopus uniflorus</i>)	•	
Sessile-fruited arrowhead (<i>Sagittaria rigida</i>)	•	
Narrow-leaved cattail (<i>Typha angustifolia</i>)	•	
Water horsetail (<i>Equisetum fluviatile</i>)	•	•
Northern blue flag (<i>Iris versicolor</i>)	•	•
Broad-leaved cattail (<i>Typha latifolia</i>)	•	•
Wild calla (<i>Calla palustris</i>)		•
Water lobelia (<i>Lobelia dortmanna</i>)		•
Yellow loosestrife (<i>Lysimachia terrestris</i>)		•
Buckbean (<i>Menyanthes trifoliata</i>)		•
Broad-leaved arrowhead (<i>Sagittaria latifolia</i>)		•
Lavender bladderwort (<i>Utricularia resupinata</i>)		•
Grasses & Sedges		
Bristly sedge (<i>Carex comosa</i>)	•	
Red-stalked spikerush (<i>Eleocharis palustris</i>)	•	
Woolgrass (<i>Scirpus cyperinus</i>)	•	
Soft stem bulrush (<i>Scirpus validus</i>)	•	
Three-way sedge (<i>Dulichium arundinaceum</i>)	•	•
Katahdin sedge (<i>Carex katahdinensis</i>)		•
Beaked sedge (<i>Carex utricularata</i>)		•
Least spikerush (<i>Eleocharis acicularis</i>)		•
Small's spikerush (<i>Eleocharis smallii</i>)		•
Rattlesnake grass (<i>Glyceria canadensis</i>)		•
Soft rush (<i>Juncus effusus</i>)		•
Brown-fruited rush (<i>Juncus pelocarpus</i>)		•
Slender rush (<i>Juncus subtilis</i>)		•
Shrubs		
Willows (<i>Salix</i> spp.)	•	

Landscape Setting & Soils

LKi32 occurs on wave-washed shores on lakes across most of Minnesota in the zone between annual low-water levels and the upper reach of storm waves or ice scouring during spring breakup. Substrates consist of wave-washed sand, gravel, or cobbles less than 12in (30cm) in diameter. Soil development is minimal in upper zone and absent in lower zones.

Natural History

Wave action and ice scouring are important in maintaining the open structure of shoreline communities. Wave action is most important during periods of high winds, especially storms. Ice scouring occurs primarily during spring breakup, when winds may push large pieces of ice on shore, sometimes forming ice-thrust ridges. These ridges sometimes mark the upper extent of the community but more often are ecotonal between the beach and adjacent upland vegetation. Lakeshore communities typically vary in extent over the growing season and from year to year with fluctuation in water level. Characteristic plants include shrubs and perennial herbaceous species tolerant of inundation, erosion, and stranding. Many of the perennial herbaceous species are rhizomatous, and there may be a tendency for species to be dispersed by floating

propagules. Also present in shoreline communities are annual species whose seeds are dispersed readily by wind or water or can remain dormant for long periods buried in sediment and then germinate when conditions are suitable (often as water levels fall and expose sediments along the shore).

Similar Native Plant Community Classe

● **RVx32 Sand/Gravel/Cobble River Shore**

RVx32 shares a number of species with LKi32; distinguishing the two classes is most difficult along riverine lakes where shorelines are influenced both by seasonal flooding and by wave action.

● **LKi43 Inland Lake Rocky Shore**

When present on cobbles rather than bedrock or boulders, LKi43 can be similar to LKi32. By definition, however, LKi43 occurs on cobbles or rocks > 12in (30cm) in diameter, while LKi32 occurs on cobbles < 12in in diameter.

● **LKi54 Inland Lake Clay/Mud Shore**

LKi54 occurs in similar settings and along the shores of many of the same lakes as LKi32 and shares some species but is present on clay or silt substrates.

Native Plant Community Types in Class

Very little systematically collected vegetation data exist for LKi32 in Minnesota. Delineation of the community is based primarily on characteristics of the physical environment.

● **LKi32a Sand Beach (Inland Lake)**

LKi32a is common along wave-washed shores of lakes on sandy outwash plains, especially in the MIM, MDL, and WSU. In these settings, the upper beach zone is dominated by perennial graminoids tolerant of periodic inundation and erosion, with occasional annual herbaceous species. Lower beach zones support many submergent, emergent, and floating-leaved aquatic species tolerant of stranding. In the NSU, LKi32a is occasional on wave-swept sandy beaches on lakes in bedrock-dominated terrain. The upper beach zone in these settings is dominated by perennial herbs and shrubs tolerant of inundation and erosion and by annual herbaceous species. Lower beach zones often support submergent, emergent, and floating-leaved aquatic species tolerant of stranding. LKi32a has not been well surveyed in other parts of Minnesota but is common in regions with expansive lake-dotted outwash deposits.

● **LKi32b Gravel/Cobble Beach (Inland Lake)**

LKi32b is present on lakeshores with wave-washed gravel or small-cobble (< 12in [30cm] in diameter) substrates and is common in bedrock-dominated terrain in the NSU, especially in the Border Lakes Subsection. In the NSU, the upper beach zone is dominated by shrubs and perennials tolerant of inundation and erosion. Lower zones often support submergent, emergent, and floating-leaved aquatic species tolerant of stranding, and terrestrial annual species. LKi32b may also be present along larger lakes elsewhere in Minnesota.

photo by B.C. Delaney, MN DNR



Cedar Creek Natural History Area, Anoka County, MN