

Rocky River Shore

Sparingly vegetated plant communities on bedrock or boulder substrates along river shores. Scoured annually during spring breakup by ice and strong currents and during other periods of flooding.

Vegetation Structure & Composition

Description is based on field observations and review of field notes for river shore communities.

• **Vegetation** cover ranges from nearly absent to dense and may be zonal with distinct upper and lower zones related to seasonal fluctuations in water level, degree of exposure to ice scouring, and deposition of fine materials among boulders.

• **Upper zone** is present on the portion of the shore above normal water levels, where erosion occurs primarily during spring breakup and flooding or following heavy rains. These erosion events are less frequent and shorter than those in lower beach zones.

○ **NSU**—Species composition has not been well documented, but on bedrock vascular plants are mostly restricted to cracks or crevices with lichens and mosses on rock surfaces. Typical species include speckled alder (*Alnus incana*), swamp ragwort (*Senecio congestus*), harebell (*Campanula rotundifolia*), hairy goldenrod (*Solidago hispida*), oak fern (*Gymnocarpium dryopteris*), and wild sarsaparilla (*Aralia nudicaulis*). On boulder substrates, vascular plants are restricted to interstitial spaces between boulders or large cobbles where finer material collects. Species that may be present include hawthorns (*Crataegus* spp.), high-bush cranberry (*Viburnum trilobum*), Bebb's willow (*Salix bebbiana*), speckled alder, giant goldenrod (*Solidago gigantea*), sweet Joe pye weed (*Eupatorium purpureum*), spotted Joe pye weed (*Eupatorium maculatum*), monkey flower (*Mimulus ringens*), purple fringed orchid (*Platanthera psycodes*), grass-leaved goldenrod (*Euthamia graminifolia*), marsh bellflower (*Campanula aparinoides*), common mint (*Mentha arvensis*), common marsh marigold (*Caltha palustris*), lady fern (*Athyrium filix-femina*), nodding sedge (*Carex gynandra*), aquatic sedge (*C. aquatilis*), beaked sedge (*C. utriculata*), manna grasses (*Glyceria* spp.), bladder sedge (*C. intumescens*), and yellow loosestrife (*Lysimachia terrestris*).

○ **PPL & MIM**—RVx43 is uncommon in the PPL and rare in the MIM, and its composition is poorly documented. Mosses and lichens are dominant on rock surfaces.

• **Lower zone** is located in the area along the shoreline within the range of fluctuation of normal water levels, where frequency, energy level, and length of exposure to river currents is high. On bedrock substrates, vascular plant cover is often absent in this zone, but lichens and mosses may be present on areas of bedrock that are not frequently or intensely scoured by currents and ice. On boulder substrates, vascular plant cover in the lower zone varies from sparse to dense patches, depending on the gradient of the stream and other local conditions that influence erosion and deposition. In intermittent streams, there is often dense cover of mosses such as *Fontinalis hypnoides* on boulders in this zone. Liverworts and algae are also common on rock surfaces; lichens are rare.

Landscape Setting & Soils

RVx43 occurs on exposed level or sloping bedrock or boulder substrates along rivers in the zone between normal low- and high-water levels. Sites are typically inundated during spring flooding. The community is most common in bedrock-dominated landscapes, such as the Border Lakes and North Shore Subsections in the NSU but also occurs along rivers and streams in other landscapes such as the PPL and locally in the MIM. Substrates consist of eroded bedrock or of boulders > 12in (30cm) in diameter. Soils are thin or absent because of frequent erosion and are often limited to cracks or crevices in bedrock or interstices between boulders.

Natural History

The open and often sparse structure of vegetation in the community is maintained by frequent erosion of rock and boulder substrates by flooding following snowmelt

and heavy rains and by ice scouring during spring breakup, which typically remove vegetation, plant litter, and soil (although on boulder substrates, floodwaters may also deposit finer material between boulders that provides suitable rooting habitat for vascular plants). In addition to moving large quantities of sediment, floodwaters typically transport logs and other large debris that scour the shoreline and can form jams that impede stream flow and cause flooding of the upper beach zone. Scouring during high water removes upland or forest vegetation along the shoreline and delineates the upper edge of the river shore community. Typical vascular plant species in the community include shrubs and perennial forbs and graminoids tolerant of erosion and inundation, annual herbaceous species that germinate on exposed sediments, emergent aquatic plants, and floating-leaved or submerged aquatic plants tolerant of stranding.

Similar Native Plant Community Classes

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

When present on cobble substrates, RVx32 can be similar to RVx43, although RVx43 generally occurs on boulders > 12in (30cm) in diameter, while RVx32 occurs on cobbles < 12in (30cm) in diameter.

- **LKi43 Inland Lake Rocky Shore**

LKi43 may share a number of species with RVx43, and distinguishing the two may be difficult along riverine lakes where shorelines are influenced both by seasonal flooding and by wave action.

- **ROs12 Southern Bedrock Outcrop**

RVx43 can grade into ROs12 in areas above flooding zones along streams or rivers bordered by level or sloping bedrock exposures.

- **CTs Southern Cliffs**

RVx43 can grade into Southern Cliff (CTs) communities on tall vertical bedrock faces that rise above the reach of floodwaters along streams or rivers in bedrock-dominated terrain.

Native Plant Community Types in Class

Plant species composition has not been systematically sampled across the range of RVx43 in Minnesota. Its delineation is based primarily on characteristics of the physical environment. Only one community type is recognized at present.

- **RVx43a Bedrock/Boulder Shore (River)**

Sparingly vegetated communities on exposed bedrock and boulder streambeds and shores. RVx43a is divided into two subtypes based on stream permanence.

- **RVx43a1 Intermittent Streambed Subtype**

Present on exposed bedrock or boulders in streams and small rivers that become almost completely dry during normal low-water periods. RVx43a1 occurs most commonly in bedrock-dominated terrain in the NSU, occasionally in the PPL, and locally in the MIM but may also occur in other parts of Minnesota.

- **RVx43a2 Permanent Stream Subtype**

Present on bedrock and boulder shores along permanent rivers and streams. RVx43a2 occurs most commonly in bedrock-dominated terrain in the NSU, occasionally in the PPL, and locally in the MIM but may also occur in other parts of Minnesota.



Carlton County, MN

photo by B.C. Delaney, MN DNR