

## Clay/Mud River Shore

Sparsely to densely vegetated plant communities on clay or silt substrates on river shorelines that flood in spring but are exposed as water levels recede over summer. RVx54 includes plant communities on slumping river embankments as well as river shorelines.

### Vegetation Structure & Composition

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

- **Vegetation** cover is ephemeral and zonal, with an upper zone present above normal water level and one or more lower zones that develop on exposed sediments as water levels recede during the growing season, during periods of drought, and in some instances following failure of beaver dams.

- **Upper zone** is inundated during high water levels following spring runoff or repeated heavy summer rains. It is characterized by annual herbaceous species and by perennial species tolerant of inundation and physical fragmentation. Woody plants, if present, are often contorted, with stems or trunks that run horizontally along the ground.

- **PPL & MIM**—Substrate is typically silt; habitat may be shaded or sunny. Shaded beaches are dominated by Emory's sedge (*Carex emoryi*), which forms dense patches that may extend into adjacent floodplain forest communities. Other species that may be present include woundwort (*Stachys palustris*), blue monkey flower (*Mimulus ringens*), stinging nettle (*Urtica dioica*), and seedlings of silver maple, willows (*Salix amygdaloides*, *S. nigra*, and *S. x rubens*), and green ash. Species typical of partially shaded or sunny beaches include false indigo (*Amorpha fruticosa*), water smartweed (*Polygonum amphibium* var. *emersum*), angelica (*Angelica atropurpurea*), cow parsnip (*Heracleum lanatum*), glade mallow (*Napaea dioica*), cup plant (*Silphium perfoliatum*), tall coneflower (*Rudbeckia laciniata*), tall meadow-rue (*Thalictrum dasycarpum*), giant goldenrod (*Solidago gigantea*), rough avens (*Geum laciniatum*), tall bellflower (*Campanula americana*), obedient plant (*Physostegia virginiana*), ground nut (*Apios americana*), and great Indian plantain (*Cacalia mühlenbergii*). The highly invasive species reed canary grass (*Phalaris arundinacea*) often dominates upper beach zones.

- **SSU, WSU & MDL**—Substrate is typically clay in the SSU and silt in the WSU and MDL. Most beaches are shaded and often have nearly continuous patches of Emory's sedge (*Carex emoryi*), ostrich fern (*Matteuccia struthiopteris*), or starry false Solomon's seal (*Smilacina stellata*). In the SSU, this zone is often present on short (6–10ft [2–3m]), steep clay slopes just above normal water levels.

- **Lower zones** are generally exposed during normal to low water levels, typically in midsummer to fall. Lower zones are sunny and characterized by annuals and terrestrial forms of perennial aquatic plants that can survive long periods of inundation.

- **PPL & MIM**—Creeping lovegrass (*Eragrostis hypnoides*) and awned umbrella sedge (*Cyperus squarrosus*) are often abundant. Other typical species include rice cut grass (*Leersia oryzoides*), catchfly grass (*Leersia lenticularis*), intermediate spikerush (*Eleocharis intermedia*), knotty rush (*Juncus nodosus*), path rush (*J. tenuis*), river bulrush (*Scirpus fluviatile*), giant bur reed (*Sparganium eurycarpum*), broad-leaved arrowhead (*Sagittaria latifolia*), ditch stonecrop (*Penthorum sedoides*), golden dock (*Rumex maritimus*), water smartweed, Icelandic yellow cress (*Rorippa palustris*), bristly buttercup (*Ranunculus pennsylvanicus*), nodding smartweed (*Polygonum lapathifolium*), Pennsylvania bitter cress (*Cardamine pennsylvanica*), goosefoots (*Chenopodium berlandieri*, *C. glaucum*, *C. simplex*, and *C. rubrum*), plantains (*Plantago major*, and *P. rugelii*), false pimpinell (*Lindernia dubia*), water speedwell (*Veronica catenata*), blue monkey flower, yellow monkey flower (*Mimulus glabratus*), and beggarticks (*Bidens cernua* and other *Bidens* spp.). Emergent aquatic plants and floating-leaved or submerged aquatic plants tolerant of stranding are sometimes present, especially during low water levels.

- **SSU (and possibly WSU & MDL)**—Vegetation cover ranges from 25–75%, with exposed soil, rocks, and debris common. The dominant vegetation varies between

shrubs and herbaceous plants. Some shoreline areas have shrub thickets with abundant willows, such as slender willow (*Salix petiolaris*) and Bebb's willow (*S. bebbiana*) and occasionally sandbar willow (*S. exigua*), as well as other woody species, including speckled alder (*Alnus incana*), black ash saplings, red-osier dogwood (*Cornus sericea*), and balsam poplar. Other areas are dominated by graminoids and forbs, with typical species including giant bur reed (*Sparganium eurycarpum*), wild rice (*Zizania palustris*), wild ryes (*Elymus* spp.), sweet grass (*Hierochloa odorata*), bluegrasses (*Poa* spp.), prairie cordgrass (*Spartina pectinata*), Emory's sedge (*Carex emoryi*), golden-fruited sedge (*C. aurea*), awl-fruited sedge (*C. stipata*), lake sedge (*C. lacustris*), bluejoint (*Calamagrostis canadensis*), horsetails (*Equisetum* spp.), tall meadow-rue, common milkweed (*Asclepias syriaca*), common strawberry (*Fragaria virginiana*), buttercups or crowfoots (*Ranunculus* spp.), spotted Joe pye weed (*Eupatorium maculatum*), spotted water hemlock (*Cicuta maculata*), yellow rocket (*Barbarea vulgaris*), black bindweed (*Polygonum convolvulus*), and the highly invasive species reed canary grass (*Phalaris arundinacea*).

- **Slumping embankments** have sparse to patchy vegetation cover (25–50%) of herbaceous and woody plants. The dominant plants are early-successional species such as willows, paper birch, and aspen (see **RVx54a** below).

### **Landscape Setting & Soils**

RVx54 occurs along sluggish, meandering streams and rivers across Minnesota but is probably most common in level landscapes and on landforms with fine-textured parent material, such as glacial lake plains and till plains. It is especially prominent in the clayey, stream-dissected topography of the Glacial Lake Superior plain in the SSU. RVx54 develops in the shoreline zone between seasonal low-water and high-water levels. Substrates consist of silt and clay that have been deposited by river currents and receding floodwaters. Soils have little horizon development because of frequent erosion and deposition.

### **Natural History**

The zonation of vegetation in RVx54 is caused by alternating episodes of deposition, erosion, and exposure of sediments as river levels rise and fall during the growing season. The upper beach zone is often severely eroded by currents, wave action, and ice flows during periods of high water in the spring, and less frequently following heavy summer thunderstorms. 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, thereby delineating the upper edge of the river shore community. Lower beach zones are typically exposed as water levels recede from midsummer through fall. Pools often persist on exposed substrates long after recession of water levels. The presence of predominantly perennial species (as well as some species characteristic of dry habitats) in lower beach zones along some streams such as the Nemadji River in the SSU suggests that at least along some rivers the lower zones are not inundated for long periods. Length of inundation varies greatly with stream gradient, channel shape, and features of the surrounding watershed such as watershed size, topography, and parent material. Inundation cycles have been affected along many streams by increases in impermeable surfaces in watersheds from residential or industrial development, by wetland draining, by stream channelization, by dam construction, and by deforestation.

### **Similar Native Plant Community Classes**

#### • **RVx32 Sand/Gravel/Cobble River Shore**

RVx32 occurs in similar settings and along most of the same streams as RVx54 and shares many species, especially where the substrate is sand (RVx32b). Difficulty in differentiating the two classes may arise in areas where silt is deposited over sand, especially on the upstream and downstream margins of RVx54, where the two

communities often intergrade. As a general rule, when silt is greater than 1in (3cm) thick over sand, the community is classified as RVx54.

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

LKi54 shares a number of species with RVx54; distinguishing the two is most difficult along riverine lakes where shorelines are influenced both by seasonal flooding and by wave action.

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### **Native Plant Community Types in Class**

Plant species composition has not been systematically sampled across the range of RVx54 in Minnesota; delineation of the class into types is based primarily on characteristics of the physical environment.

- **RVx54a Slumping Clay/Mud Slope (River)**

Plant communities on clay soils on upper parts of steep riverbanks that become unstable and collapse following undercutting by river currents or because of other cumulative events such as frost heave or saturation from groundwater seepage. Vegetation is composed of plants, ranging from herbs to large trees, that become established on stable banks and are then toppled and partially buried on the collapsed slope. Plant communities on recently collapsed slopes are sparsely vegetated, with less than 25% cover. The dominant plants are often early-successional woody species such as willows, paper birch, and aspen. Bebb's willow and red raspberry (*Rubus idaeus*) are common shrubs, while speckled alder, green alder (*Alnus viridis*), beaked hazelnut (*Corylus cornuta*), and red-osier dogwood are often present. Among herbaceous species, field horsetail (*Equisetum arvense*) is often abundant, and golden-fruited sedge (*Carex aurea*) is frequent on areas of bare, moist clay. Other characteristic species include large-leaved aster (*Aster macrophyllus*), common strawberry, tall meadow-rue, bluegrasses, and Pennsylvania sedge (*Carex pennsylvanica*). Slopes that have recovered for several years from the last disturbance usually have more continuous vegetation (25–50% cover), often including tree and plant species from adjacent uplands. RVx54a occurs primarily in the red clay region of the Nemadji River basin and lower St. Louis River in the SSU but also occurs along lower portions of streams flowing through lake clay sediments in the North Shore Highlands Subsection in the NSU.

- **RVx54b Clay/Mud Shore (River)**

Sparsely to densely vegetated communities along streams or rivers on exposed clay or silt sediments or beaches. Vegetation is often zonal and is variable in cover (See **Vegetation Structure & Composition** above for description). RVx54b is divided into two subtypes based on stream permanence.

- *RVx54b1 Intermittent Streambed Subtype*

Present on exposed clay or silt sediments in streams and small rivers that become almost completely dry during normal low-water periods. RVx54b1 occurs across much of Minnesota.

- *RVx54b2 Permanent Stream Subtype*

Present on clay or silt sediments along streams and rivers that flow throughout the year, including normal low-water periods. RVx54b2 occurs along shores and islands in permanent streams and rivers across most of Minnesota.



photo by D.S. Wovcha MN DNR

Todd County, MN