



MN DNR

Washington County, MN

General Description

River Shore (RV) communities occur along the shorelines of rivers and streams throughout Minnesota in the zone between the annual low-water level and the upper limit of impacts from currents and ice scouring. RV communities are inundated during annual spring flooding and sporadically following heavy rains at other times during the year. Most RV communities are sparsely vegetated, at least seasonally, because of absence of well-developed soils and frequent disturbance from flooding, ice scouring, and strong currents. River shores are often narrow, not more than a few yards wide, but can be wider along large rivers with distinct floodplains. Substrates range from silt to loose sand, gravel, cobbles, and bedrock. In addition to plant communities on river shorelines, the RV System includes communities on slumping river embankments well above high-water levels and on dry streambeds of intermittent streams. RV communities are common throughout the Eastern Broadleaf Forest Province.

Structure and Disturbance Regime

The vegetation of RV communities is zonal, usually with distinct upper and lower zones. These zones are produced by differences in severity of erosion and by differences in timing of exposure of sediments as river levels drop during the growing season. The upper zone is often severely eroded by ice scouring and strong currents during spring breakup and flooding. As a result, perennial plant species cover is typically sparse in upper zones, consisting of only a few species tolerant of inundation and physical fragmentation. Annual species, however, can become common on exposed sediments in upper zones after floodwaters recede. The lower beach zone, which is exposed later in the growing season, supports terrestrial forms of perennial aquatic species and other species, especially annuals, that can survive long periods of inundation or have seeds that remain viable buried in river sediments.

The most common pattern of natural disturbance in RV communities is repeated erosion and deposition of materials by currents. This process generally results in removal of organic matter and nutrients from substrates along river shores, or burial of organic matter by new deposits of silt or sand. Normal erosion also commonly removes existing shoreline vegetation, leaving bare sediments for recolonization by plants. Clearing or replacement of native vegetation on uplands adjacent to river shore communities

can lead to greatly increased erosion of riverbanks. The roots of perennial species, especially trees and shrubs, stabilize and protect substrates along rivers much more effectively than annual species such as those commonly planted as crops.

Natural disturbance regimes are often altered significantly along rivers that have been dammed. Downstream from dams, flooding can be markedly reduced, especially the flooding that typically follows heavy summer rains. Upstream from dams, shoreline communities often have disturbance regimes more similar in many respects to communities of the Lakeshore (LK) System, with less fluctuation in water level and increased wave action. Dammed rivers can be managed to restore some of the natural flooding regime through timed releases of water that mimic normal flood cycles downstream. RV communities along major rivers have been increasingly exposed to wave action over the past few decades, a new phenomenon that has come with the onset of major recreational and commercial boat traffic. Boat waves, especially from large and fast boats, have caused rapidly accelerating erosion of many riverbanks. This is especially evident along the largest and busiest rivers, such as the Mississippi and St. Croix, where entire islands have been eroded away by boat waves.

Plant Adaptations

Plant species in RV communities are adapted to annual cycles of major natural disturbance. Characteristic species include 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. Perennial plants are generally limited to a few species extremely tolerant of inundation and physical fragmentation. These species tend to have well-developed root systems that help to anchor plants during physical stress from strong currents or erosion. They also may have adaptations that allow them to survive long periods of low oxygen during inundation. A number of perennial species are capable of generating roots from fragments of vegetative tissue that break off from the plant and are dispersed to new habitats by floodwater. Vegetative reproduction through adaptations like adventitious rooting is exemplified by species such as glade mallow (*Napaea dioica*), sandbar willow (*Salix exigua*), and other willow species, which seem especially well adapted to river-shore settings. Annual plant species such as creeping lovegrass (*Eragrostis hypnoides*) and awned umbrella sedge (*Cyperus squarrosus*) are common and often abundant in river shore habitats. These species tend to be good at colonizing newly exposed sediments along river shorelines. Many produce seeds that can remain viable buried in sediments for long periods until conditions are suitable for germination and growth. These include species such as beggarticks (*Bidens* spp.) and smartweeds (*Polygonum* spp.) that germinate rapidly and profusely on recently exposed substrates. Others produce floating seeds that are transported by floodwater to other sites favorable for growth of the plant. In addition to various adaptations for surviving inundation, many plants in RV communities must withstand the droughty conditions common on coarse sandy or gravelly substrates after water levels drop over the course of the growing season. As in LK communities, the repeated cycles of natural disturbance in RV communities allow establishment of many invasive plants, and aggressive invaders such as reed canary grass (*Phalaris arundinacea*) are now abundant along shorelines of many rivers.

Floristic Regions

The floristic composition of RV communities has not been systematically surveyed in Minnesota, and there are no recognized floristic regions within the RV System. Additional surveys will likely result in changes in classification within the RV System.