



Location of MLRA 91A in Land Resource Region K.

91A—Central Minnesota Sandy Outwash

This area is entirely in Minnesota. It makes up about 4,600 square miles (11,920 kilometers). The cities and towns in this MLRA include Park Rapids, Perham, Wadena, Brainerd, Little Falls, St. Cloud, Monticello, and Rosemount. Interstate 94 and U.S. Highway 10 cross parts of the MLRA. The Camp Riley Military Reservation is in the central part of the area. A small part of the White Earth Indian Reservation is in the northwest corner of the area. This MLRA has numerous State parks and State forests.

Physiography

This area is in the Western Lake Section of the Central Lowland Province of the Interior Plains. The area consists mostly of large outwash plains and stream terraces. The outwash was deposited by Wisconsin-age glaciers. Most of the area is gently undulating to rolling. Some steep areas are on valley sidewalls or on escarpments along lake margins. Elevation ranges from 820 to 1,470 feet (250 to 450 meters). Local relief is mostly 10 to 20 feet (3 to 6 meters), but it is as much as 80 feet (25 meters) in some areas.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Mississippi Headwaters (0701), 73 percent; Red (0902), 20 percent; Upper Mississippi-Black-Root (0704), 4 percent; and Minnesota (0702), 3 percent. The Mississippi River and its many tributaries drain much of this area. Lakes, ponds, and marshes are common throughout the area.

Geology

Most of this MLRA consists of coarse textured outwash with a thin, discontinuous mantle of loamy material. The thickness of the outwash ranges from 3 feet (1 meter) to more than 100 feet (30 meters). Loamy glacial till typically underlies the outwash. Organic material is in many of the larger basins and depressions. Recent loamy alluvium is on flood plains. In a few areas glacial till is along steep valley sidewalls. The western part of the area is underlain by undifferentiated Precambrian crystalline rocks, and the bedrock under the eastern part of the area consists of numerous Cambrian-age sandstone and shale sedimentary units.

Climate

The average annual precipitation in this area is 23 to 29 inches (585 to 735 millimeters). About 77 percent of the precipitation falls as rain during the growing season (May through September), and about 17 percent falls as snow. The average annual temperature is 39 to 44 degrees F (4 to 6 degrees C). The freeze-free period averages about 155 days and ranges from 135 to 175 days. It is longest in the southern part of the MLRA.

Water

Following are the estimated withdrawals of freshwater by use in this MLRA:

- Public supply—surface water, 5.7%; ground water, 3.6%
- Livestock—surface water, 0.3%; ground water, 0.9%
- Irrigation—surface water, 16.9%; ground water, 72.6%
- Other—surface water, 0.0%; ground water, 0.0%

The total withdrawals average 39 million gallons per day (150 million liters per day). About 77 percent is from ground water sources, and 23 percent is from surface water sources. Surface water occurs in all parts of the MLRA. It is most abundant in the western half. In years of normal precipitation, the moderate precipitation is inadequate for crops and pasture on sandy soils. In years of little or no precipitation, crop yields are seriously reduced. Irrigation is widely used for high-value crops. Drainage of the wet lowland soils is needed for good crop production. The surface water is generally of good quality and is suitable for almost all uses.

Ground water is abundant in unconsolidated sand

and gravel in the surficial drift and buried drift aquifers throughout this area. The deposits may be discontinuous in the buried drift, where lenses of sand and gravel are separated by lenses of till. The till helps to protect the buried drift aquifer from contamination from surface activities. The two aquifers have water with median levels of 350 and 450 parts per million (milligrams per liter) total dissolved solids, respectively. Both aquifers have calcium-magnesium-bicarbonate type water that is hard. The median level of iron in the buried drift aquifer exceeds 1,000 parts per billion (micrograms per liter), which is over three times the secondary standard for esthetics in drinking water. Except for these iron levels, the ground water is of good quality and is suitable for all uses with minimal treatment.

Good-quality ground water is available from a number of sedimentary rocks in the eastern half of this area. These aquifers include the St. Peter and Prairie du Chien sandstone and dolomite, the Ironton-Galesville sandstone, and the Mount Simon-Hinckley sandstone. The water from these aquifers averages about 250 to 350 parts per million (milligrams per liter) total dissolved solids. All of these aquifers have calcium-magnesium-bicarbonate type of water that is hard. They provide water primarily for municipal and industrial uses. The St. Peter aquifer is not utilized much in this area because good aquifers occur above it.

Soils

The dominant soil orders in this MLRA are Mollisols and Histosols. The soils have a frigid soil temperature regime in the northern part of the area and a mesic soil temperature regime in the extreme southern part. They have a udic or aquic soil moisture regime and mixed mineralogy. The soils on uplands generally are well drained to excessively drained. Very poorly drained Histosols are in basins and depressions. Hapludolls (Arvilla, Estherville, and Fairhaven series) and Argiudolls (Dorset, Malardi, and Verndale series) formed in outwash mantled with loamy material. They are on outwash plains and stream terraces. Hapludolls (Hawick, Hubbard, Sandberg, and Sparta series) formed in outwash on outwash plains and stream terraces. Haplosaprists (Houghton, Markey, and Seelyeville series) formed in organic material in basins and depressions.

Biological Resources

Historically, jack pine mixed with pin oak and bur oak grew on well drained soils on the outwash plains in this area. Oak savanna occurred in much of the area. Black spruce, tamarack, white cedar, and black ash were prominent on poorly drained and very poorly drained soils.

Some of the major wildlife species in this area are white-tailed deer, black bear, ruffed grouse, and sharp-tailed grouse. Because of its relatively unaltered landscape, this MLRA supports a high percentage of the rare plants and animals that occur in Minnesota.

Land Use

Following are the various kinds of land use in this MLRA:

- Cropland—private, 46%
- Grassland—private, 10%
- Forest—private, 15%; Federal, 1%
- Urban development—private, 5%
- Water—private, 13%
- Other—private, 10%

The cropland in this MLRA is used mainly for feed grains and forage for livestock. Irrigation is common in some areas where corn, soybeans, potatoes, and canning crops, such as snap beans, peas, and corn, are grown. Without irrigation, droughtiness limits crop selection and yields in many areas. Dairy and beef operations are common. The forestland in the area is used mainly for pulp and timber production. Recreational hunting and fishing are important activities in the MLRA, especially in the northern part, which is forested.

The major resource concerns are water quality, nutrient management, improperly managed grazing, and wind erosion. Conservation practices on cropland generally include conservation crop rotations, crop residue management, and field windbreaks, all of which help to control wind erosion. Nutrient management and pest management are important because of water-quality concerns, especially on sandy soils and in areas where irrigated vegetable crops are grown. Pasture and hayland planting and prescribed grazing improve pastures and grazing management. Forest stand improvement and forest trails and landings reduce the impact of timber management activities on water quality.