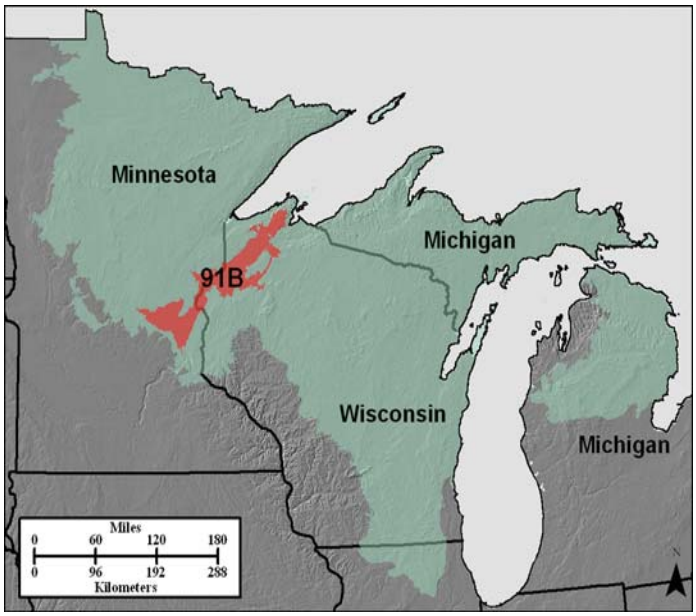

Location of MLRA 91B in Land Resource Region K.

91B—Wisconsin and Minnesota Sandy Outwash

This area is in Wisconsin (60 percent) and Minnesota (40 percent). It makes up about 4,110 square miles (10,650 square kilometers). The cities and towns of Spooner, Grantsburg, Solon Springs, and Siren, Wisconsin, and North Branch, Princeton, and Zimmerman, Minnesota, are in this MLRA. Interstates 35 and 94 cross the area. Some of the Chequamegon National Forest is in the far northern part of the area. All of the Crex Meadows Wildlife Area is in this MLRA.

Physiography

The eastern half of this area is in the Superior Upland Province of the Laurentian Upland, and the western half is in the Western Lake Section of the Central Lowland Province of the Interior Plains. Much of the area is nearly level to gently sloping, but some steeper escarpments occur along streams, rivers, and lake borders. The area is characterized by outwash plains, some of which are pitted or collapsed, and by small moraines, dunes, lake plains, swamps, bogs, and marshes. Lakes are common, and streams generally form a dendritic pattern. Elevation ranges from about 800 feet (245 meters) to 1,500 feet (455 meters). Local relief typically is only a few meters.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: St. Croix (0703), 69 percent; Mississippi Headwaters (0701), 20 percent; and Western Lake Superior (0401), 11 percent. The St. Croix, Namekagon, Rum, and Yellow Rivers are major rivers that drain this MLRA. The St. Croix River is a National Scenic River, and the Rum River is a National Wild and Scenic River.

Geology

Precambrian and Cambrian sandstone bedrock underlies most of the glacial deposits in this MLRA. The bedrock consists of Keweenawan sandstone in the northern part of the area and Cambrian sandstone with dolomite and shale in the southern part. In most areas the bedrock is covered by Pleistocene deposits as much as 330 feet (100 meters) thick. Bedrock exposures occur in some areas along the St. Croix River. Most of the Pleistocene deposits are late Wisconsin in age.

Climate

The average annual precipitation in this area is 25 to 34 inches (635 to 865 millimeters). About two-thirds of the rainfall occurs as convective thunderstorms during the growing season (May through September). Snowfall generally occurs from October through April. The average annual temperature is 38 to 46 degrees F (3 to 8 degrees C). The freeze-free period averages about 150 days and generally ranges from 120 to 180 days. It can be as short as 90 days in the northern part of the area.

Water

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

Public supply—surface water, 6.3%; ground water, 6.4%
Livestock—surface water, 0.3%; ground water, 0.2%
Irrigation—surface water, 1.2%; ground water, 5.5%
Other—surface water, 74.8%; ground water, 5.3%

The total withdrawals average 570 million gallons per day (2,155 million liters per day). About 17 percent is from ground water sources, and 83 percent is from surface water sources. Surface water and ground water are very abundant and readily available. 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. Drainage of the wet soils on lowlands is needed for the field crops and tame pasture plants commonly grown in the area.

Irrigation is widely used for high-value crops. The sources of surface water are the many lakes and streams. The surface water is used mostly for recreational activities in the part of this area in Wisconsin, but it is used for public supply and municipal and industrial purposes in the part in Minnesota. Water quality is generally good. Most of the lakes and streams are clear, but those that receive deposits of organic material from wetland vegetation are tinted brown.

This MLRA has three types of lakes—spring lakes, seepage lakes, and drainage lakes. Spring lakes seldom have an inlet, but they have an outlet with substantial flow. They are fed by ground water. Seepage lakes generally do not have an inlet or an outlet but may have an intermittent outlet. The water level is maintained by the water table or a well sealed bottom. Drainage lakes have an outlet and at least one inlet. Their main water source is runoff from streams. Spring lakes have a high mineral content because they receive the greatest amount of ground water. Drainage lakes have a lower mineral content than the spring lakes, and seepage lakes have a very low mineral content. Drainage lakes have the greatest range in reaction. Water in the spring lakes has reaction similar to that of the ground water. Seepage lakes commonly are acid, and some of the drainage lakes are alkaline. About 80 percent of the lakes are acid, having a pH of less than 7.0. The rest are neutral or alkaline, having a pH of 7.0 or higher.

Glacial deposits are the primary sources of ground water. Ground water supplies meet domestic, agricultural, municipal, and industrial needs. The quality of the water is good. The level of total dissolved solids is less than 150 parts per million (milligrams per liter). The main components in the water are calcium, magnesium, and bicarbonate ions. Locally, the dissolved mineral content may be relatively high because of a high content of limestone in the glacial deposits. Minor problems may be caused by hardness and in some areas by high concentrations of iron. Pollution of surface water is minimal because the area is relatively undeveloped and there is little municipal or industrial waste. Extensive building of cottages and houses along the lakes and streams is a potential problem. Effluent from sewage disposal facilities can pollute the water and result in the growth of weeds and algae. The problem is especially severe in seepage lakes, where there is little water exchange. Ground water yields from all the aquifers range from 100 to more than 1,000 gallons per minute (380 to more than 3,785 liters per minute).

Good-quality ground water is available from a number of sedimentary rocks in the part of this MLRA in Minnesota. These aquifers include the St. Peter and Prairie du Chien sandstone and dolomite, the Ironton-Galesville sandstone, and the Mount Simon-Hinckley sandstone. The level of total dissolved solids averages about 250 to 350 parts per million (milligrams per liter). All of these aquifers have a 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 Alfisols, Entisols, Histosols, and Spodosols. The soils have a frigid soil temperature regime, a udic or aquic soil moisture regime, and mixed or isotic mineralogy. The soils on uplands are very deep, excessively drained to somewhat poorly drained, and sandy. The soils on lowlands are very deep, poorly drained or very poorly drained, and sandy or mucky. Udipsamments (Cantlin, Graycalm, Grayling, Menahga, Mahtomedi, Grettum, Friendship, Wurtsmith, Zimmerman, Shawano, Crex, and Lino series) and Haplorthods (Croswell, Rubicon, Vilas, and Sayner series) formed in sandy outwash or windblown sediments. Hapludalfs formed in sandy outwash or windblown sediments over lacustrine clay on old glacial lake plains (Karlsborg, Meenon, and Perida series) or in sandy-skeletal alluvium along the major rivers (Dairyland and Bigisland series). Psammaquents (Newson series) and Endoaquods (Kinross and Au Gres series) formed in sandy outwash in depressions on outwash plains. Haplosaprists formed in sapric material in marshes (Markey and Seelyeville series) and in bogs (Dawson and Loxley series). The soils on flood plains include Udipsamments (Winterfield series) and Fluvaquents (Totagatic series), which formed in sandy alluvium, and Haplosaprists (Bowstring series), which formed in sapric material.

Biological Resources

This area is in a mixed coniferous-deciduous forest. Jack pine and scrub (Hill's) oak are the dominant trees. Barrens are common. Poorly drained soils support black spruce, tamarack, speckled alder,

willow, and sedges.
Some of the major wildlife species in this area are white-tailed deer, black bear, eastern gray wolf, ruffed grouse, sharp-tailed grouse, woodcock, gray squirrel, red squirrel, snowshoe hare, porcupine, ducks, and geese. Red fox, bobcat, coyote, muskrat, fisher, mink, otter, raccoon, and beaver are the main furbearers. Private and public forestland mixed with scattered cropland provides substantial wildlife habitat. Fishing occurs in the many lakes and rivers. Local species include rainbow trout, brook trout, walleye pike, largemouth bass, smallmouth bass, bluegill, black crappie, yellow perch, musky, and northern pike.

Land Use
Following are the various kinds of land use in this MLRA:
Cropland—private, 20%
Grassland—private, 7%; Federal, 1%
Forest—private, 43%; Federal, 3%
Urban development—private, 11%
Water—private, 6%; Federal, 1%
Other—private, 8%
Nearly 50 percent of this MLRA is forested. Two-thirds of the forestland consists of national and State forests and large, privately owned holdings, and one-third consists of small, privately owned holdings. The forestland is primarily in the eastern part of the MLRA, and it supports a pulp and timber industry and is used for recreational activities. About 28 percent of the MLRA, mostly in the western part, is used for agriculture. Irrigated corn, soybeans, and vegetable crops (such as potatoes, snap beans, and peas) and forage and feed grains for dairy cattle and other livestock are the principal crops. Other vegetable and fruit crops also are grown. Cranberries are grown on some wet soils. A substantial acreage in the MLRA, mainly in the southern part, is urban land. The urban areas are expanding rapidly.

The major resource management concerns in this area are water erosion, wind erosion, wetness, soil fertility, soil tilth, and water quality. Conservation practices on cropland generally include conservation crop rotations and crop residue management, which help to control water erosion and wind erosion. Cover crops are sometimes planted with low-residue canning crops. Nutrient management and pest management are important because of water-quality concerns, especially on irrigated cropland. Prescribed grazing and pasture and hayland planting improve pastures and grazing management. Forest stand improvement and forest trails and landings reduce the impacts of timber management activities on the quality of surface water and ground water.