

Land Resource Regions and
Major Land Resource Areas
in New York State

Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

MLRA Explorer Custom Report

L - Lake State Fruit, Truck Crop, and Dairy Region
101 - Ontario-Erie Plain and Finger Lakes Region

M - Central Feed Grains and Livestock Region
111E - Indiana and Ohio Till Plain, Eastern Part
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140 - Glaciated Allegheny Plateau and Catskill Mountains
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L - Lake State Fruit, Truck Crop, and Dairy Region

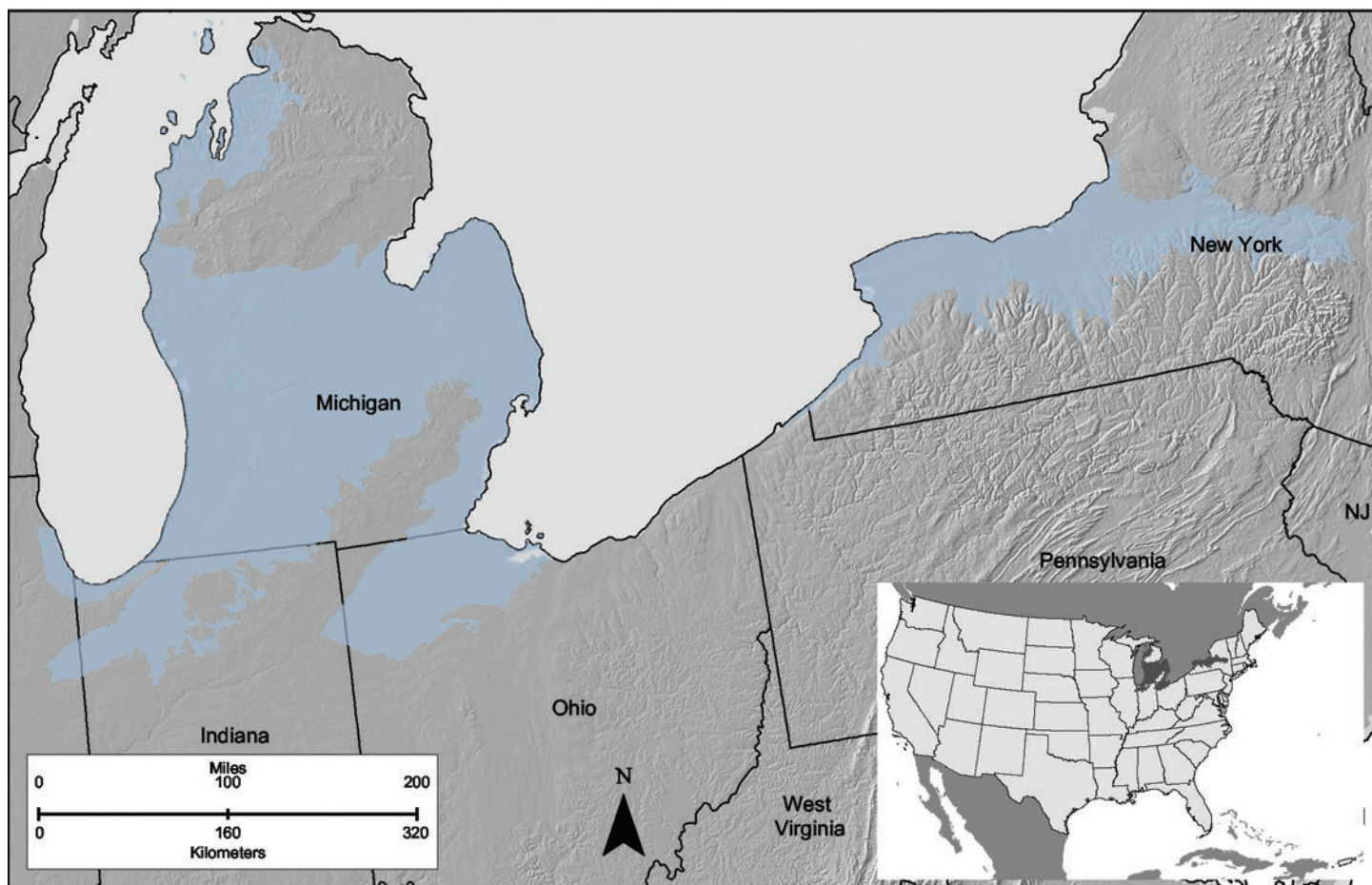


Figure L-1: Location of Land Resource Region L

LRR Overview

This region (shown in fig. L-1) is in Michigan (59 percent), New York (22 percent), Ohio (10 percent), Indiana (8 percent), and Illinois (1 percent). A very small part is in Pennsylvania. The region makes up 45,715 square miles (118,460 square kilometers).

Typically, the land surface is a nearly level to gently sloping glaciated plain (fig. L-2). The average annual precipitation is typically 30 to 41 inches (760 to 1,040 millimeters), but it is 61 inches (1,550 millimeters) in the part of the region east of Lake Erie. The precipitation is fairly evenly distributed throughout the year. In most of the region, the average annual temperature is 43 to 49 degrees F (6 to 10 degrees C). The freeze-free period generally is 145 to 205 days. It is longest in narrow belts adjacent to the Great Lakes.

The total withdrawals of freshwater in this region average about 25,540 million gallons per day (96,670 million liters per day). About 96 percent is from surface water sources, and 4 percent is from ground water sources. The abundant precipitation and numerous perennial streams provide ample supplies of good-quality surface water for all uses in the region. Almost all of the water used in the region is for municipal supply and industrial purposes.

The soils in this region are dominantly Alfisols, Entisols, or Spodosols. The dominant suborders are well drained Udalfs, which are in the southern part of the region, and Boralfs, which are in the

northern part. Aqualfs and Aquepts are the dominant wet soils throughout the region. The sandy soils are Psamments or Orthods. Histosols are in bogs and in other low, wet areas. The soils in the region dominantly have a mesic or frigid soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy.

About 99 percent of the region is privately owned. The soils and climate favor agriculture, and the region has a wide variety of agricultural enterprises. Dairy farming is important, but some beef cattle also are produced. Canning crops, corn, soft winter wheat, beans, and sugar beets are among the leading crops. Fruits, especially sour cherries, are important in a narrow belt adjacent to the Great Lakes, and wine grapes are grown in the Finger Lakes area. Much of the cropland near the larger cities is being subdivided and developed for urban uses.

The major soil resource concerns are controlling the pollution resulting from the movement of sediment and pesticides by water and wind, reducing excess wetness on cropland, conserving soil moisture in droughty soils, improving fertility and tilth, and preserving water quality, wetlands, habitat for fish and wildlife, and prime farmland.



L-2: Farmland in an area of Land Resource Region L

MLRA 101 - Ontario-Erie Plain and Finger Lakes Region



Figure 101-1: Location of MLRA 101 in Land Resource Region L

Introduction

This area (shown in fig. 101-1) is in New York (99 percent) and Pennsylvania (1 percent). It makes up about 9,960 square miles (25,815 square kilometers). The cities of Buffalo, Rochester, Syracuse, and Utica, New York, are connected by Interstate 90, which crosses the entire area. The town of Gloversville, New York, is in the eastern end of the area, and Watertown, New York, is in the northern part. Interstate 81 connects Syracuse and Watertown. This MLRA extends as far south as Ithaca, New York, and includes the Finger Lakes Region. Numerous State parks occur in the Finger Lakes Region and along the shores of Lake Erie and Lake Ontario. The western part of the Fort Drum Military Reservation is in the far northeast corner of this MLRA. The Tuscarora and Cattaraugus Indian Reservations also are in this MLRA. The New York State (Erie) Canal crosses the northwestern part of the area.

Physiography

Most of this area is in the Eastern Lake Section of the Central Lowland Province of the Interior Plains. The southeast quarter of the area is in the Southern New York Section of the Appalachian Plateaus Province of the Appalachian Highlands, and the northeast corner is in the Mohawk Section of the same province and division. Most of the MLRA is a nearly level to rolling plain. Low remnant beach ridges are commonly interspersed with a relatively level lake plain in the northern part of the area. Drumlins (long, narrow, steep-sided, cigar-shaped hills) are prominent in an east-west belt in the center of the area. The Finger Lakes Region consists of a gently sloping to rolling till plain. Elevation is 330 to 1,310 feet (100 to 400 meters), increasing gradually from the shores of Lake Ontario and Lake Oneida to the Allegheny Plateau, the southern border of the area. Local relief is mostly 10 feet (3 meters), but the larger drumlins and many valley sides rise 80 to 330 feet (25 to 100 meters) above the adjacent lowlands or valley floors.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Southeastern Lake Ontario (0414), 45 percent; Upper Hudson (0202), 20 percent; Southwestern Lake Ontario (0413), 18 percent; Eastern Lake Erie-Lake Erie (0412), 12 percent; and Susquehanna (0205), 5 percent. Many rivers cross this area and discharge into Lake Erie and Lake Ontario, which border the area on the north. Most of the streams in this area flow north, but the Mohawk River flows east.

Geology

The bedrock underlying this area consists of alternating beds of limestone, dolomite, sandstone, and shale of Ordovician to Devonian age. Most of the surface of the area is covered with glacial till or lake sediments. The texture of the lake sediments is silt, loam, or sand. Ancient beaches, formed at different lake levels, form ridges along the shoreline of Lake Erie and Lake Ontario. Stratified drift (eskers and kames) and glacial outwash deposits are in many of the valleys. A large drumlin field occurs in the Finger Lakes Region.

Climate

The average annual precipitation in most of this area is 29 to 45 inches (735 to 1,145 millimeters). It is as high as 61 inches (1,550 millimeters) in the extreme eastern end of the area, near the Adirondack Mountains, and in the extreme western end, along the shore of Lake Erie, and is less than 30 inches (760 millimeters) in a few areas near the center of the MLRA. The precipitation is evenly distributed throughout the year. Most of the rainfall occurs as high-intensity, convective thunderstorms in summer. Heavy snowfall is common in winter. The average annual temperature is 42 to 50 degrees F (5 to 10 degrees C). The freeze-free period averages 175 days and ranges from 145 to 205 days.

Water

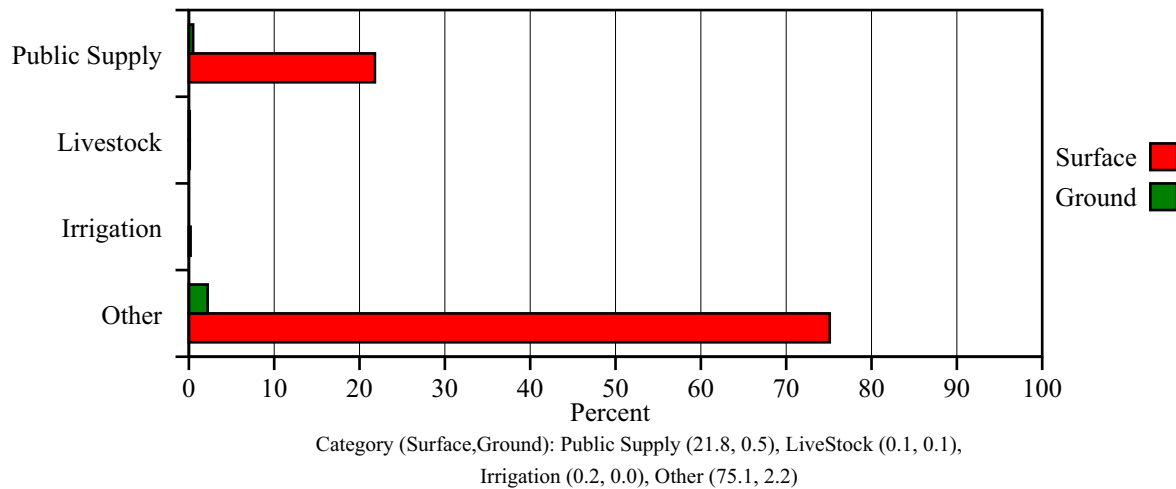
The total withdrawals average 4,155 million gallons per day (15,725 million liters per day). About 3 percent is from ground water sources, and 97 percent is from surface water sources. In most years the precipitation is adequate for crops, except for those on the coarse textured soils. Irrigation water for high-value fruit and vegetable crops is obtained from wells or from the Great Lakes. The wetter soils must be drained before they can be used for crops, and even the better drained soils benefit from drainage. Many of the larger cities in the area obtain water from the Great Lakes. The Great Lakes also provide transportation and are used extensively for recreation. The Finger Lakes also are used for recreation. The surface water in the area is suitable for almost all uses with little to no treatment.

Ground water is not used to any extent in this area because of the abundance of surface water. The ground water also is abundant and meets domestic, industrial, and municipal needs in parts of the area. All of the aquifers are fairly shallow and are subject to contamination from agriculture and urban and industrial wastes. A sandstone aquifer is used in the northeastern part of the area. The sandstone has very hard water, but the median value of total dissolved solids is only about 300 parts per million (milligrams per liter). The sandstone also has the highest levels of chloride of all the aquifers in this area. The median value of 100 parts per million (milligrams per liter), however, is well below the drinking water standard of 250 parts per million (milligrams per liter) for chloride.

A carbonate aquifer occurs all along the southern half of this area. It has naturally occurring saline zones in which evaporate deposits occur and the level of total dissolved solids exceeds 1,000 parts per million (milligrams per liter). Typically, water from this aquifer contains 500 parts per million (milligrams per liter) total dissolved solids, which is well below the national standard for drinking water. This aquifer produces the hardest water in New York and requires treatment prior to use.

Lake sediments and valley fill deposits of glacial outwash and stratified drift in this area have good-quality ground water. This water has low levels of total dissolved solids, 200 parts per million (milligrams per liter), but is very hard and requires softening prior to use. These shallow aquifers are very susceptible to contamination from surface activities.

MLRA 101 Water Use by Category



Soils

The dominant soils in this MLRA are Alfisols and Inceptisols. The dominant suborders are Udalfs and Udepts. The soils in the area have a mesic soil temperature regime, a udic soil moisture regime, and mixed mineralogy. They are deep and are medium textured or moderately fine textured. Well drained and moderately well drained, undulating to moderately sloping Hapludalfs formed in glacial till high in content of lime (Honeoye, Cazenovia, and Hilton series). They also formed in lacustrine sediments (Schoharie and Galen series). Nearly level to gently sloping, somewhat poorly drained Endoaqualfs (Appleton and Niagara series) are extensive in low areas. Poorly drained and very poorly drained Endoaquepts (Canandaigua and Lamson series) formed in lacustrine sediments and are common at the lowest elevations in the northern part of the area. Hapludalfs that formed in calcareous outwash deposits (Palmyra and Wampsville series) and in moderately deep till (Aurora and Lairdsville series) are prominent locally but are of small extent. Well drained and moderately well drained Eutrudepts (Hamlin and Teel series) formed in alluvial deposits along streams.

Biology

This area supports forest vegetation, particularly hardwoods. The potential forest types are elm-ash-red maple or beech-birch-sugar maple in varying proportions. Other species associated with these types include basswood, hemlock, white pine, black cherry, and some species of upland oak. Northern white-cedar, red maple, black ash, and aspen grow on the wet soils. Cattails and mosses grow on the organic soils and on other extremely wet sites.

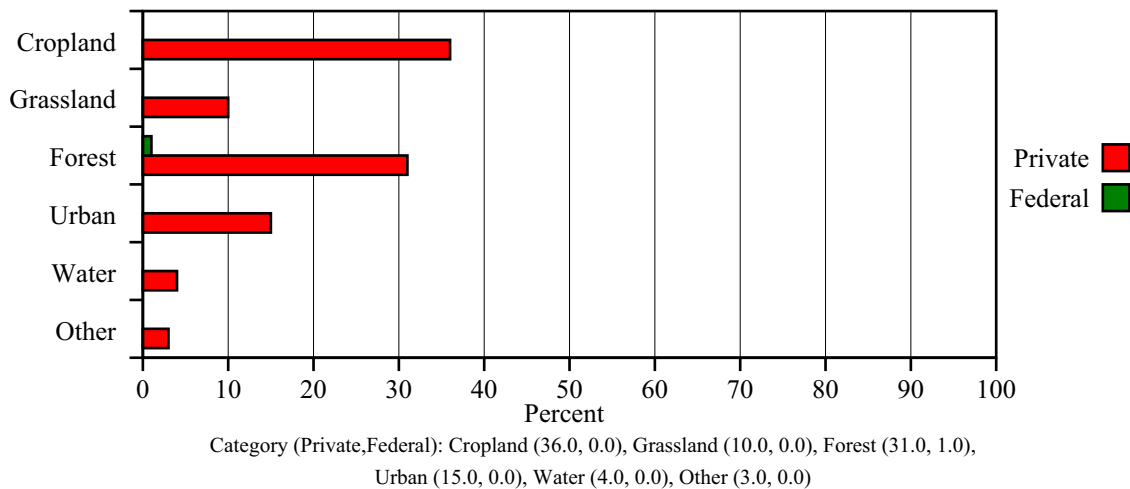
Some of the major wildlife species in this area are white-tailed deer, cottontail, gray squirrel, pheasant, woodcock, and ruffed grouse.

Land Use

Most of this area is in farms. About one-third of the acreage is cropland, which is used mainly for hay, corn, and small grains associated with dairy operations. Cash crops, including canning and truck crops, wheat, and dry beans, also are grown. Orchard crops are important locally, particularly near Lake Ontario. Vineyards are common near some of the Finger Lakes. About one-third of the area is forestland, mostly in farm woodlots. About 15 percent of the area is used for urban development, which is expanding around the larger cities, such as Buffalo, Rochester, and Syracuse.

The major soil resource concerns are sheet and rill erosion, the sedimentation caused by storm-water runoff, maintenance of the content of organic matter and productivity of the soils, and management of soil moisture. Conservation practices on cropland generally include crop residue management; conservation tillage; winter cover crops; nutrient management, including manure management; and pesticide management. Excluding livestock from wetlands and watercourses and developing rotational grazing systems help to control erosion and protect water quality. Conservation practices that are important to community development include critical area treatment and urban storm-water management.

MLRA 101 Land Use by Category



R - Northeastern Forage and Forest Region

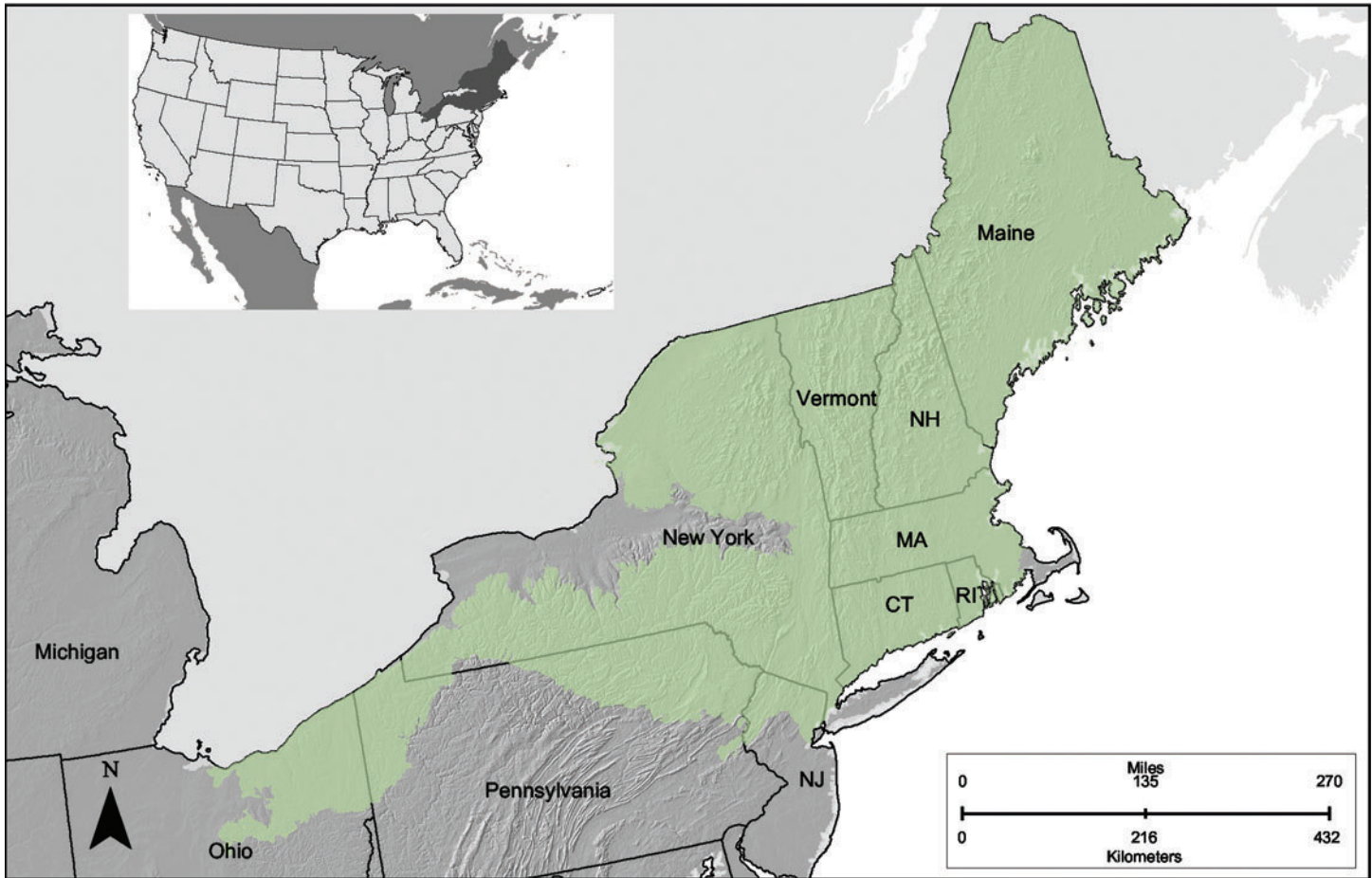


Figure R-1: Location of Land Resource Region R

LRR Overview

This region (shown in fig. R-1) is in New York (31 percent), Maine (27 percent), Pennsylvania (9 percent), Vermont (8 percent), New Hampshire (8 percent), Massachusetts (6 percent), Ohio (5 percent), Connecticut (4 percent), New Jersey (1 percent), and Rhode Island (1 percent). It makes up 120,635 square miles (312,625 square kilometers).

Plateaus, plains, and mountains characterize this region. The climate is generally cool and humid. The average annual precipitation is generally 34 to 62 inches (865 to 1,575 millimeters). In most of the region, more than one-half of the precipitation falls during the freeze-free period. The average annual temperature is typically 40 to 48 degrees F (4 to 9 degrees C). The freeze-free period generally is 130 to 200 days, but it ranges from 110 days in the higher mountains to 240 days in some areas along the Atlantic coast.

The total withdrawals of freshwater in this region average about 19,100 million gallons per day (72,295 million liters per day). About 93 percent is from surface water sources, and 7 percent is from ground water sources. About 78 percent of the water is used for the timber industry and manufacturing and 21 percent for public supply.

The soils in this region are dominantly Entisols or Spodosols. They commonly have a fragipan. Alfisols are less extensive. They formed in limy parent material and have a fragipan. The dominant

suborders are Ochrepts and Orthods at the higher elevations and Aqualfs, Aquepts, and Histosols on lowlands and in depressions. The soils on flood plains (Fluvents) are of small extent but are important for many uses. The soils in the region dominantly have a frigid or mesic soil temperature regime, a udic soil moisture regime, and mixed mineralogy.

Most of the land in this region, especially the land in the steeper areas, is forested, and 98 percent is privately owned. Significant amounts of lumber and pulpwood are produced. Locally, Christmas trees and maple syrup are important forest products. Forage and grains for dairy cattle are the principal crops. In areas where markets, climate, and soils are favorable, fruits, tobacco, potatoes (fig. R-2), and vegetables are important crops. Wildlife habitat and recreation are important land uses. Stoniness and steep slopes limit the use of many of the soils.



R-2: Potato fields in an area of Land Resource Region R

MLRA 144B - New England and Eastern New York Upland, Northern Part

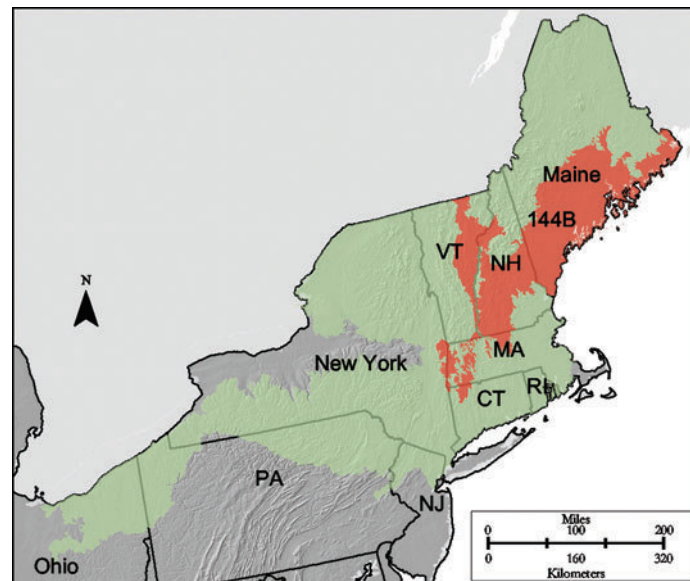


Figure 144B-1: Location of MLRA 144B in Land Resource Region R

Introduction

This area (shown in fig. 144B-1) is in Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (5 percent), New York (2 percent), and Connecticut (1 percent). It makes up about 20,500 square miles (53,125 square kilometers). Most of this area is in Maine and New Hampshire, but a small, separate part is on the Vermont-Massachusetts border with New York. The majority of Maine's population is in this MLRA. This is the easternmost MLRA in the country. It includes the cities of Bangor, Augusta, and Portland, Maine; the towns of Littleton, Plymouth, and Laconia, New Hampshire; and the towns of Montpelier, Barre, and St. Johnsbury, Vermont. The separate part of the MLRA on the eastern border of New York has no cities. Interstates 89, 90, 91, 93, and 95 cross different parts of this MLRA. Some of the White Mountain National Forest is in the part of the MLRA in New Hampshire, and the Acadia National Park is in the part in Maine. The Rachel Carson National Wildlife Refuge is in the part in southeast Maine. A large number of State forests and State parks are throughout this MLRA.

Physiography

This area is the New England Province of the Appalachian Highlands. The separate western part of the area is in the Taconic Section of the province. The rest of the area is mostly in the New England Upland Section. The part in southeastern Maine is in the Seaboard Lowland Section. This MLRA includes the entire coastal zone of Maine and extends inland along the major river valleys. Most of the area is characterized by rolling to hilly uplands. The area has some isolated mountain peaks. In the part of the area in southeastern Maine, gently sloping to level valleys terminate in coastal lowlands. Elevation ranges from sea level to 1,000 feet (0 to 305 meters) in much of the area. It is 2,000 feet (610 meters) on some hills and 2,950 feet (900 meters) on a few isolated peaks. Local relief is mostly low or moderate. It generally is highest in the northern part of the area and decreases as sea level is approached. An exception is the Taconic Mountains along the New York-Massachusetts border, where relief is substantial. Relief is mostly about 5 to 65 feet (2 to 20

meters) in the valleys and about 80 to 330 feet (25 to 100 meters) in the uplands.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Connecticut (0108), 20 percent; Maine Coastal (0105), 15 percent; Saco (0106), 15 percent; Kennebec (0103), 13 percent; Merrimack (0107), 11 percent; Penobscot (0102), 9 percent; Androscoggin (0104), 6 percent; Richelieu (0201), 4 percent; Upper Hudson (0202), 3 percent; St. Francois (0111), 2 percent; and Connecticut Coastal (0110), 2 percent. In this area, the Piscataqua and Saco Rivers begin in New Hampshire and flow into Maine. The Penobscot and Saco Rivers are in the part of this area in Maine. Another major river in the area is the Merrimack River in New Hampshire. The part of the area in Vermont encompasses the upper end of the Connecticut River drainage and the headwaters of the Lamoille and Winooski Rivers. The small, separate part of the MLRA on the eastern border of New York has short reaches of the Batten Kill River in Vermont, the Kinderhook River in New York, and the headwaters of the Housatonic River in Massachusetts.

Geology

Most of this MLRA is characterized by till-mantled, rolling to hilly uplands. The northern and eastern parts of the area are underlain mostly by granite, gneiss, and schist bedrock. Limestone, dolomite, and marble beds interspersed with basalt flows occur in the southern and western parts. Stratified drift deposits of unconsolidated sand and gravel, primarily glacial outwash, fill most of the narrow river valleys. Some marine sediments occur at the lower end of the valleys that terminate in the coastal lowlands in southeastern Maine. Some glacial lake sediments occur on valley floors behind glacial moraines. The areas of marine and glacial lake sediments are not extensive but are important agricultural areas.

Climate

The average annual precipitation in most of this area is 33 to 45 inches (840 to 1,145 millimeters). It is 45 to 69 inches (1,145 to 1,755 millimeters) in a few scattered, higher elevation areas and along the coast. The precipitation generally is evenly distributed throughout the year. Near the coast, however, it is slightly lower in summer. In inland areas, it is slightly higher in spring and fall. Rainfall occurs as high-intensity, convective thunderstorms during the summer. During the winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. Heavy snowfalls commonly occur late in winter. The average annual temperature is 39 to 48 degrees F (4 to 9 degrees C). The freeze-free period averages 160 days and ranges from 120 to 195 days. Temperatures and the length of the freeze-free period increase from north to south and closer to the coast.

Water

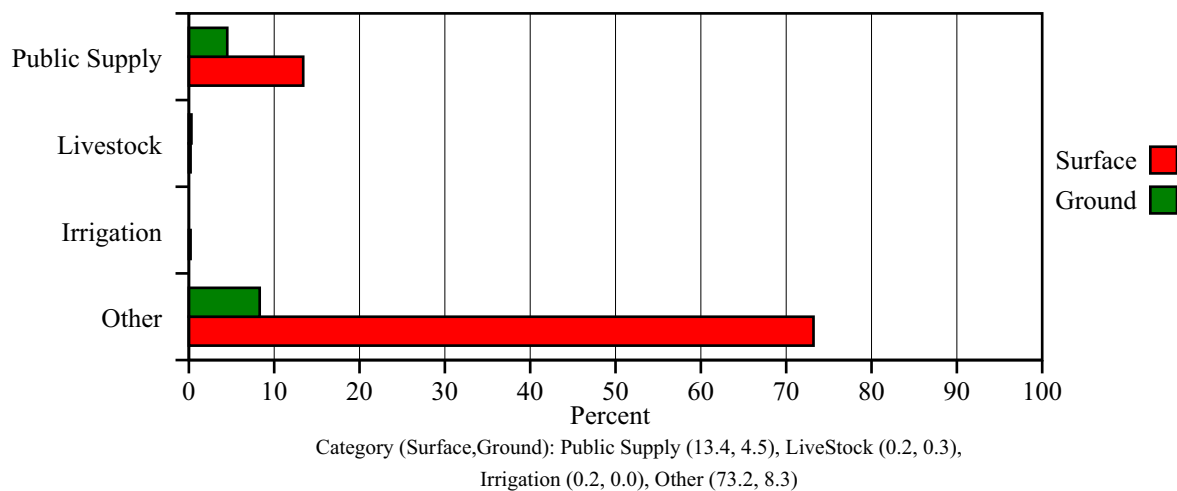
The total withdrawals average 885 million gallons per day (3,350 million liters per day). About 13 percent is from ground water sources, and 87 percent is from surface water sources. Abundant precipitation, many perennial streams, and many natural lakes and ponds are important sources of surface water. Many large and small reservoirs provide municipal and industrial water. The surface water in the area is of good quality and is suitable for almost all uses with no or minimal treatment. Acid rain and municipal and industrial waste discharges are the primary sources of contamination of the surface water.

Ground water is scarce on the till-mantled uplands but is abundant in the deep outwash deposits in the valleys. Most public supplies and industries that use ground water obtain the water from the stratified drift aquifer in the river valleys. The water from this aquifer is soft to very hard, is acidic, and has very low levels of total dissolved solids, 75 to 125 parts per million (milligrams per liter). The aquifer is only about 100 feet (30 meters) thick, and the water table is typically at a depth of 30 feet (10 meters). As a result, water in the aquifer is very susceptible to contamination from surface activities.

Domestic and some public supply and light industry water is obtained from wells drilled in the granite, gneiss, and schist bedrock under the uplands in Vermont, New Hampshire, and Maine. This water has slightly more total dissolved solids and generally is harder than the water in the valley fill aquifers. Also, there are more instances of iron concentrations exceeding 300 parts per billion (micrograms per liter) in water from the crystalline bedrock aquifer. This is the national and State secondary standard for iron in drinking water. High levels of radon-222 occur in wells drilled into granite that has high amounts of muscovite and biotite.

Industrial and domestic wells pump water from a carbonate aquifer on the western edge of Massachusetts, in the northeast corner of Connecticut, and along the eastern border of New York. This aquifer consists of beds of limestone, dolomite, and marble interspersed with beds of schist and quartzite. The water from this aquifer is very hard and has more than 500 parts per million (milligrams per liter) total dissolved solids. This level exceeds the national secondary drinking water standard.

MLRA 144B Water Use by Category



Soils

The dominant soil orders in this MLRA are Inceptisols and Spodosols. The soils in the area dominantly have a frigid soil temperature regime, an aquic or udic soil moisture regime, and isotic, illitic, or mixed mineralogy. They are shallow to very deep, generally excessively drained to poorly drained, and loamy or sandy. Eutrudepts (Buxton series) and Epiaquepts (Scantic series) formed in glaciomarine or glaciolacustrine deposits on coastal lowlands and in valleys. Dystrudepts formed in till on till plains and moraines (Lanesboro, Shelburne, and Colrain series) and on hills and ridges (Taconic series). Haplorthods formed in glaciofluvial deposits on outwash plains and eskers (Adams and Colton series); in till on till plains, ridges, and moraines (Bangor, Berkshire, Dixmont, Hermon, Lyman, Monadnock, and Tunbridge series); and in dense till on drumlins and uplands (Marlow and Peru series).

Biology

This area supports northern hardwoods. Beech, white birch, yellow birch, sugar maple, and hemlock are dominant on the better drained soils. Spruce and balsam fir are dominant on the wetter soils and on mountaintops. The northern aspects of mountain slopes favor spruce and fir, and the southern aspects support northern hardwoods. White pine is common on abandoned farmland, in river valleys, and on outwash plains. Spruce fir, mountain cranberry, and similar acid-tolerant plants grow on alpine or subalpine mountaintops.

Some of the major wildlife species in this area are white-tailed deer, beaver, snowshoe hare, muskrat, mink, and ruffed grouse. The species of fish in the area include trout, salmon, alewife, striped bass, smelt, and eel.

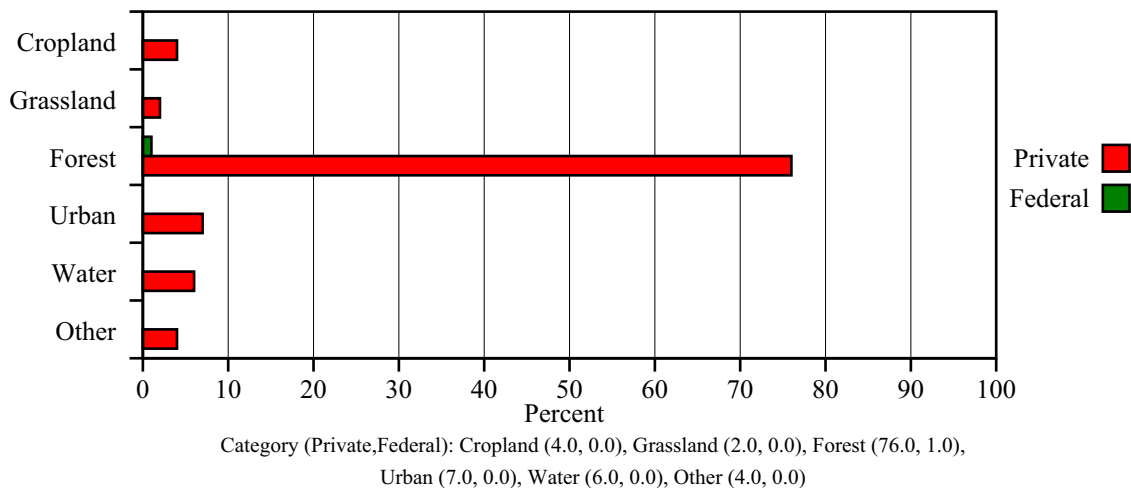
Land Use

Almost four-fifths of this area is in hardwood and conifer forests, most of which are in small holdings. Some areas are in State forests or in other large holdings. Sawlogs and pulp for paper mills are the principal products, but maple syrup and Christmas trees are produced on some sites. The forests are widely used for hunting and other kinds of recreation. A significant acreage of the forestland is used for residential and leisure home developments. Forage crops for dairy cattle are grown on most of the cropland in the area. Truck crops, small fruits, and apples are grown on some farms, mainly near the larger towns and cities. Native lowbush blueberries are produced in an area in the extreme eastern part of this MLRA. This is the largest blueberry production area in the world. Many farmsteads are used as rural residences, and the residents earn their living from nonfarm occupations. Urban development is increasing in this populous MLRA.

The major soil resource concerns are sheet, rill, and gully erosion on cropland and on logging roads and forest landings and sedimentation in urban areas during periods of construction. Other resource concerns on cropland include nutrient management, maintenance of the content of organic matter in the soils, maintenance of soil quality, and the loss of important farmland to development.

Conservation practices on cropland generally include crop residue management (no-till), diversions, grassed waterways, cover crops, and filter strips. They also include management of the storage and utilization of all sources of nutrients on farms. Conservation practices on forestland generally include riparian buffer zones, sediment control on roads and in ditches, and proper stream crossings, which prevent sedimentation and help to maintain water quality.

MLRA 144B Land Use by Category



MLRA 144A - New England and Eastern New York Upland, Southern Part

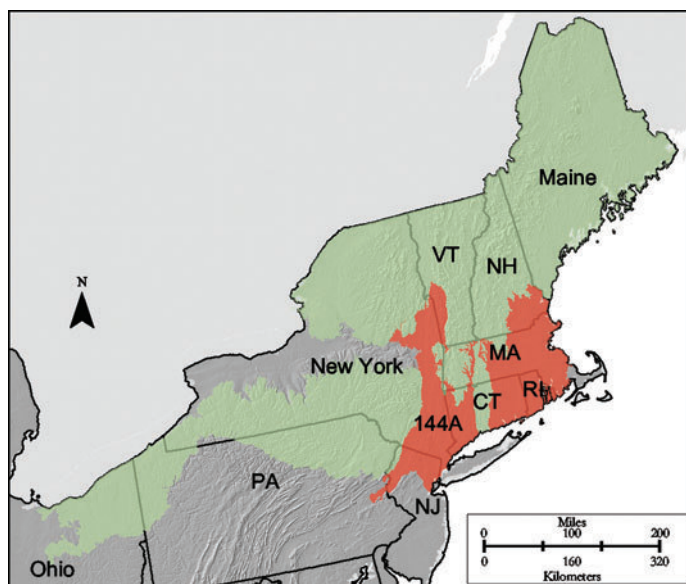


Figure 144A-1: Location of MLRA 144A in Land Resource Region R

Introduction

This area (shown in fig. 144A-1) is in New York (29 percent), Massachusetts (26 percent), Connecticut (20 percent), New Hampshire (10 percent), New Jersey (8 percent), Rhode Island (6 percent), and Vermont (1 percent). Also, Pennsylvania and Maine have a few square miles of this area. The MLRA makes up about 18,590 square miles (48,180 square kilometers). It consists of two separate parts, one east of MLRA 145 and one west of MLRA 145. The eastern part of MLRA 144A is primarily in Connecticut, Rhode Island, and Massachusetts, and the western part is primarily in southeastern New York. The western part includes the cities of Troy, Albany, and Poughkeepsie, New York, and the northern boroughs of New York City, in the Hudson River Valley. It also includes numerous cities on the New Jersey side of the Hudson River, across from New York City. The eastern part of the MLRA includes Storrs, Norwich, and New London, Connecticut; Providence, Rhode Island; Worcester, Boston, and New Bedford, Massachusetts; and Portsmouth, Concord, and Manchester, New Hampshire. The highways in the MLRA include Interstates 80, 84, 87, 89, 90, 93, and 95 and numerous extensions of Interstate 95.

This MLRA includes the West Point Military Academy in New York, the New London Naval Submarine Base and the United States Coast Guard Academy in Connecticut, and the South Weymouth Naval Air Station and Fort Devens Military Reservation in Massachusetts. It also includes the Saratoga National Historic Park in New York; the Cape Cod National Seashore, Minuteman National Historic Park, Wood's Hole Oceanographic Institution, and Martha's Vineyard State Forest in Massachusetts; and the first State forest in New England, the Meshomasic State Forest in Connecticut. A large number of State forests and State parks are throughout this MLRA.

Physiography

The eastern half of the eastern part of this MLRA is in the Seaboard Lowland Section of the New England Province of the Appalachian Highlands. The western half of the eastern part and the southeastern half of the western part are in the New England Upland Section of the same province and division. The northwestern half of the western part is in the Hudson Valley Section of the Valley and Ridge Province of the Appalachian Highlands. This MLRA is a very scenic area of rolling to hilly uplands that are broken by many gently sloping to level valleys that terminate in coastal lowlands. Elevation ranges from sea level to 1,000 feet (0 to 305 meters) in much of the area, but it is 2,000 feet (610 meters) on some hills. Relief is mostly about 6 to 65 feet (2 to 20 meters) in the valleys and about 80 to 330 feet (25 to 100 meters) in the uplands.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Upper Hudson (0202), 22 percent; Connecticut Coastal (0110), 20 percent; Massachusetts-Rhode Island Coastal (0109), 19 percent; Merrimack (0107), 12 percent; Lower Hudson-Long Island (0203), 11 percent; Connecticut (0108), 9 percent; Saco (0106), 3 percent; Delaware (0204), 2 percent; and Richelieu (0201), 2 percent. The Hudson River flows south down the center of the long, narrow western part of this MLRA. The Housatonic and Connecticut Rivers are in the part of the MLRA in Connecticut. The Pawtuxet, Pawcatuck, Blackstone, and Wood Rivers are in the part in Rhode Island, and the Blackstone, Merrimack, Nashua, Mystic, and Charles Rivers are in the part in Massachusetts.

Geology

This area has been glaciated and consists almost entirely of till plains and drumlins dissected by narrow valleys with a thin mantle of till. The southernmost boundary of the area marks the farthest southward extent of glaciation on the eastern seaboard. The river valleys and coastal plains are filled with glacial lake sediments, marine sediments, and glacial outwash. The bedrock in the eastern half of the area consists primarily of igneous and metamorphic rocks of early Paleozoic age. Granite is the most common igneous rock, and gneiss, schist, and slate are the most common metamorphic rocks. In the parts of the MLRA in northeastern Pennsylvania and in eastern and southeastern New York, Devonian- to Pennsylvanian-age sandstone, shale, and limestone bedrock is dominant. Carbonate rocks, primarily dolomite and limestone, are the dominant kinds of bedrock in the part of this MLRA in northwestern Connecticut.

Climate

The average annual precipitation is 35 to 45 inches (890 to 1,145 millimeters) in the Hudson Valley, which is in the northern half of the western part of this area. It is 45 to 54 inches (1,145 to 1,370 millimeters) in the south end of the western part of the area and in most of the eastern part of the area. The precipitation generally is evenly distributed throughout the year. Near the coast, however, it is slightly lower in summer. It is slightly higher in spring and fall in inland areas. Rainfall occurs as high-intensity, convective thunderstorms during the summer. During the winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. The average annual temperature is 44 to 54 degrees F (6 to 12 degrees C), increasing from north to south. The freeze-free period averages 190 days and ranges from 145 to 240 days, increasing in length to the south.

Water

The total withdrawals average 6,950 million gallons per day (26,305 million liters per day). This MLRA ranks eighth among all of the MLRAs in total amount of water used. About 9 percent is from ground water sources, and 91 percent is from surface water sources. Abundant precipitation, many perennial streams, and many natural lakes and ponds are important sources of surface water in this area. Many large and small reservoirs provide municipal and industrial water to urban areas that may lack sufficient water. For example, aqueducts that divert water from reservoirs in the basin of the Merrimack River provide half of the public water for Boston and many of its suburbs in eastern Massachusetts. The surface water in the area is suitable for almost all uses.

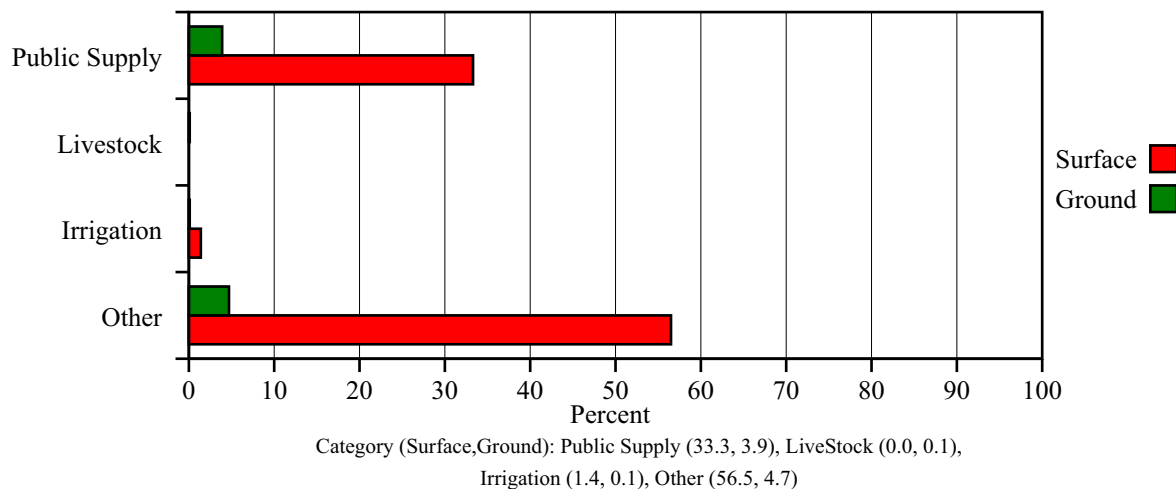
Some ground water is pumped for domestic use from the glacial till that covers most of this area. The quality of the ground water in the till is the same as that of the water in the stratified drift and valley fill aquifer. The stratified drift and glacial outwash deposits that fill the river valleys throughout this MLRA are the primary sources of most of the public water supply. Water from these units is very fresh. The water has not remained in this shallow aquifer for a very long period, and almost all of the unconsolidated sediments consist of quartz and feldspars, which offer few minerals for dissolution in water. The level of total dissolved solids typically ranges from 50 to 150 parts per million (milligrams per liter). The water is typically soft, but it can be hard in local areas where the more soluble minerals occur in the drift, for example in western Connecticut, where glaciers eroded the carbonate bedrock. High, naturally occurring levels of iron and manganese can occur, but the median levels of these metals generally are below the national and State primary standards for drinking water. Ground water in the valley fill generally is acidic. Corrosion of iron, lead, and concrete water lines is common in this area.

Many wells provide good-quality ground water from fractures, bedding planes, and joints in the crystalline igneous and metamorphic bedrock underlying almost all of this area. This aquifer provides water mainly for domestic use but also for public supply and industrial uses. This ground water is slightly alkaline. It has a low level of total dissolved solids, about 120 parts per million (milligrams per liter). In some areas the water has high levels of naturally occurring iron and manganese that exceed the national and State secondary standards for drinking water of 300 and 50 parts per billion (micrograms per liter), respectively. Water from wells that penetrate granite with high amounts of muscovite and biotite can contain high levels of a naturally occurring radionuclide, radon-222. This radionuclide can produce an odorless and inert gas that can cause health problems for humans when it collects in showers, bathrooms, and basements of residences.

Some younger carbonate and sandstone bedrock units are aquifers in the parts of this area in eastern New York, northwestern Connecticut, and northwestern Pennsylvania. Water from the sandstone units typically has 200 or less parts per million (milligrams per liter) total dissolved solids and commonly is soft. Water from the carbonate units typically has 250 or more parts per million (milligrams per liter) total dissolved solids and typically is very hard. Water from carbonate units in eastern New York is the only water from aquifers in the area that exceeds the national secondary drinking water standard for total dissolved solids of 500 parts per million (milligrams per liter). The water from both types of bedrock is slightly alkaline.

Because of a shallow depth to water and the openings in the rocks, all of the aquifers in this MLRA are susceptible to contamination from surface activities.

MLRA 144A Water Use by Category



Soils

The dominant soil orders in this MLRA are Entisols, Histosols, and Inceptisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They generally are very deep, somewhat excessively drained to poorly drained, and loamy or sandy. Udorthents (Hinckley series) and Udipsamments (Windsor series) formed in outwash deposits on outwash plains, terraces, kames, and eskers. Haplosaprists (Freetown series) formed in organic material in depressions on uplands and outwash plains. Dystrudepts formed in till, loamy sediments over till, and dense till on till plains, hills, and ridges (Canton, Charlton, Chatfield, Gloucester, Hollis, Montauk, Paxton, Scituate, Sutton, and Woodbridge series) and in outwash deposits on outwash plains and terraces (Merrimac series). Endoaquepts (Leicester and Ridgebury series) and Epiaquepts (Ridgebury series) formed in till in depressions on hills and in drainageways. Fragiudults (Rockaway series) formed in till on hills.

Biology

This area was cleared for agriculture in colonial times. The agricultural land was abandoned at the turn of the last century and then was reforested. The area is currently undergoing suburban and rural development. Historic and modern types of vegetation are similar. The area supports a mixture of northern and central hardwoods. Sugar maple, birch, and beech, as well as oaks and hickories, are the major species. White pine and hemlock are the dominant conifers. Pitch pine and red pine grow on sandy soils that formed in outwash. Red maple grows on the wetter sites. Northern white-cedar reaches its northern limit in bogs in this area. The nonnative, invasive plants include Japanese barberry, Asiatic bittersweet, and Norway maple. The most common understory plants are moosewood and hobblebush in the northern part of the MLRA and dogwood in the southern part. Abandoned agricultural land is dominated by white pine and paper birch in the northern part of the area and red cedar and gray birch in the southern part.

Numerous unique habitats are in scattered areas throughout this MLRA. Some of the maritime habitats include coastal grasslands, heaths, and dunes; tidal wetlands of estuaries; and freshwater tidal reaches of the major rivers. Away from the coast, freshwater marshes, swamps, flood plains, lowlands, areas of peat, sand barrens, rocky summits, limestone fens, and glades occur.

Black bear, beaver, fisher, wild turkey, vultures, and forest songbirds are woodland species that are increasing in population in this area. Animals that are tolerant of human settlement also are increasing in population. Examples are white-tailed deer, opossum, skunk, raccoon, and coyote.

The species that are decreasing in population are animals that inhabit more open areas, such as woodchuck, vole, and red fox, and such birds as bobolinks, meadowlarks, whippoorwills, and nighthawks. The species of fish in the area include brook trout, brown trout, rainbow trout, largemouth bass, chain pickerel, flounder, bluefish, and striped bass.

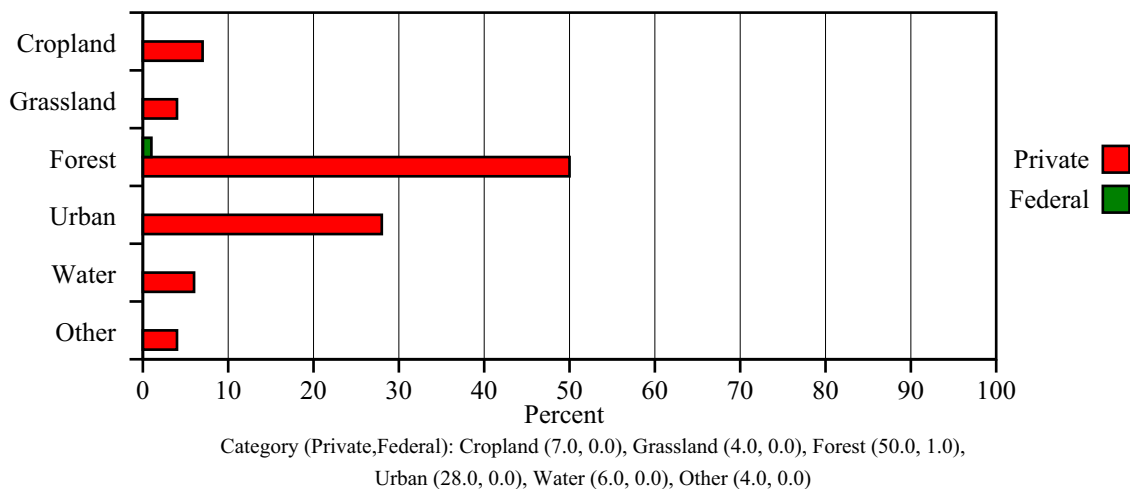
Land Use

About one-half of this area is in hardwood and pine forests. Most of the forests are in small holdings. Some are State forests or other large holdings. The forests in the MLRA are used for wood products and for hunting and other kinds of recreation. The acreage used for urban development is increasing rapidly in this area. Agriculture in the area is dominated by dairy, nursery, and greenhouse stock, much of which is driven by the increase in residential development and the demand for landscaping materials. Some forage crops for dairy cattle are still grown, and truck crops, small fruits, and apples are grown on some farms, mainly near the larger towns and cities. Many farmsteads are used as rural residences, and the residents earn their living from nonfarm occupations.

The major soil resource concerns on cropland and forestland are sheet and rill erosion, maintenance of the content of organic matter and productivity of the soils, and management of soil moisture. Storm-water runoff and subsequent erosion and sedimentation are the primary concerns in managing areas of urban expansion.

Conservation practices on cropland generally include systems of crop residue management, especially conservation tillage; winter cover crops; rotations of annual crops and grasses and legumes; contour farming; irrigation water management; compost facilities; and nutrient, manure, and pesticide management. Excluding dairy cattle from wetlands and watercourses and developing rotational grazing systems help to control erosion and protect water quality. Storm-water management and erosion- and sediment-control practices are needed in the rapidly expanding urban areas.

MLRA 144A Land Use by Category



MLRA 143 - Northeastern Mountains

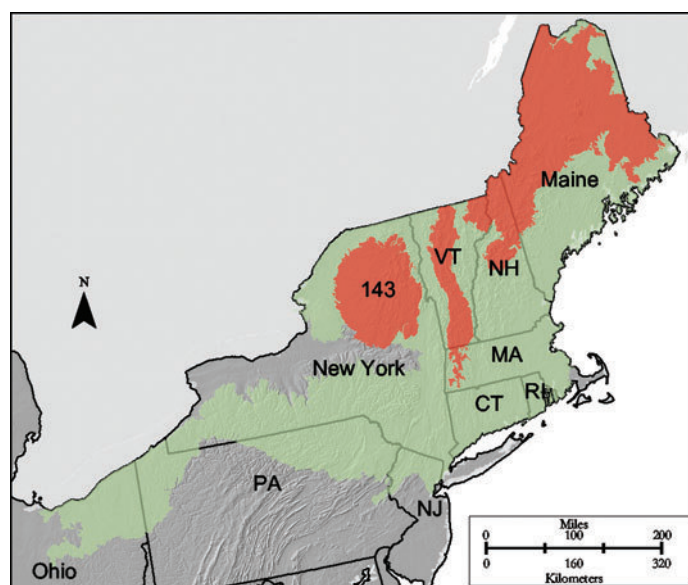


Figure 143-1: Location of MLRA 143 in Land Resource Region R

Introduction

This area (shown in fig. 143-1) is in Maine (54 percent), New York (25 percent), Vermont (12 percent), New Hampshire (7 percent), and Massachusetts (2 percent). It makes up about 36,840 square miles (95,465 square kilometers). This area is in three parts, separated by other MLRAs. The western part is in New York (primarily the Adirondack Mountains). The central part is mainly in the Green Mountains in Vermont and the Berkshires in Massachusetts. The eastern part is in the White Mountains in New Hampshire and most of northern Maine. There are no major cities in this mountainous MLRA. Interstate 95 cuts across the eastern part of the area, in Maine, and Interstate 89 cuts across the middle part, in Vermont. The westernmost part of the area is almost entirely in Adirondack State Park. The middle part of the area, in Vermont and Massachusetts, has more than 25 State forests. The Baxter, Connecticut Lakes, and Coleman State Parks and the Allagash Wilderness Waterway are in the eastern part of the area, in northern Maine. The Green Mountain and White Mountain National Forests are in the central and eastern parts of the MLRA, respectively.

Physiography

The westernmost part of this area is primarily in the Adirondack Province of the Appalachian Highlands. A small area in the southern end of the western part is in the Mohawk Section of the Appalachian Plateaus Province of the same division. The easternmost part, primarily in northern Maine, is in the New England Upland Section of the New England Province of the Appalachian Highlands. The southwestern half of this part is in the White Mountain Section of the New England Province of the Appalachian Highlands, and the middle part of the MLRA is in the Green Mountain Section of the same province and division. The mountains and foothills in this MLRA are commonly rounded. They are underlain by bedrock and are typically covered with thin deposits of glacial till. The more rugged mountain areas are separated by high-gradient streams coursing through steep areas of colluvium or talus-laden valleys. Many glacially broadened valleys are filled with glacial outwash and have numerous swamps and lakes. The mountains and foothills are moderately steep to very steep, and the valleys are nearly level to sloping. Elevation generally

ranges from 1,000 to 4,000 feet (305 to 1,220 meters), but it is more than 5,000 feet (1,525 meters) on a few isolated peaks and is less than 1,000 feet (305 meters) in some of the valleys, especially in northeastern Maine. Local relief ranges from moderate in some areas to high in ruggedly mountainous areas.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Penobscot (0102), 18 percent; St. John (0101), 16 percent; Northeastern Lake Ontario-Lake Ontario-St. Lawrence (0415), 11 percent; Upper Hudson (0202), 11 percent; Connecticut (0108), 10 percent; Richelieu (0201), 9 percent; Kennebec (0103), 9 percent; Androscoggin (0104), 6 percent; Maine Coastal (0105), 6 percent; Merrimack (0107), 1 percent; Saco (0106), 1 percent; Connecticut Coastal (0110), 1 percent; and St. Francois (0111), 1 percent. Almost all of the rivers draining the Adirondack Mountains have been designated as National Wild and Scenic Rivers. These include the Moose, Black, Canada Creek, Independence, Beaver, Oswegatchie, Grass, Raquette, St. Regis, Saranac, Ausable, Bouquet, Salmon, Hudson, and Sacandaga Rivers. In the central part of the MLRA, the Green Mountains are drained by numerous rivers that empty into the Hudson River or Lake Champlain to the west or the Connecticut River to the east. These include the Missisquoi, Lamoille, Winooski, and White Rivers, Otter Creek, and the Batten Kill and West Rivers. The major rivers in the part of this area in Maine include the Allagash and Aroostook Rivers, the East and West Branches of the Penobscot River, and the Androscoggin River.

Geology

The entire area was glaciated by the last continental ice sheet. In addition, evidence on the more rugged mountain peaks indicates that alpine glaciation may have lingered after the retreat of Wisconsin ice. A thin mantle of till covers most of the bedrock. Sandy glacial outwash has been deposited in many stream valleys, and ice-contact, stratified drift (on kames and eskers) has been deposited on the walls of the valleys. When the European and African Continents were squeezed up against the North American Continent by plate tectonic activity, the mountains in this MLRA must have appeared to be similar to the present Himalaya Mountains. For the past 500 million years, as the Atlantic Ocean opened up and the European and African continental plates were pushed east, erosion has been the dominant process. Only the roots of those ancient mountains remain in the area today. The bedrock consists primarily of igneous and metamorphic rocks. The metamorphic rocks (gneiss, schist, slate, metanorthosite, marble, and quartzite) are the oldest rocks. The igneous rocks, primarily granite and granodiorite, were intruded into the metamorphic rocks during the Triassic and Cretaceous periods. The deformation history and the weathering of these rocks have left numerous fractures, joints, bedding plane partings, and cleavage partings that now contain freshwater.

Climate

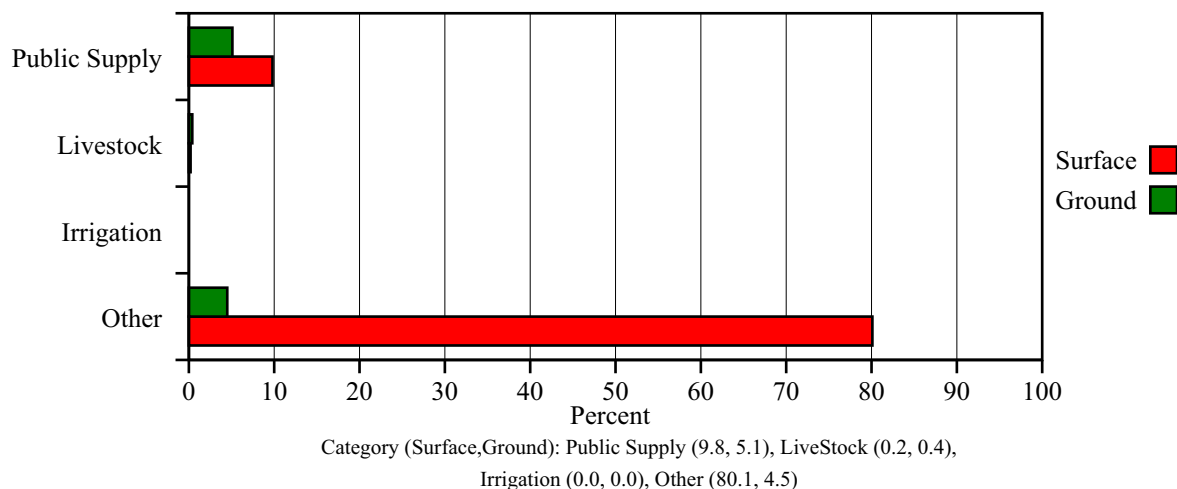
The average annual precipitation in most of this area is 32 to 45 inches (815 to 1,145 millimeters). It is typically 45 to 60 inches (1,145 to 1,525 millimeters) at the higher elevations in the mountains and is 60 to 105 inches (1,525 to 2,665 millimeters) on the highest peaks in the Green and White Mountains. More precipitation generally falls in summer than in winter. Most of the rainfall occurs as high-intensity, convective thunderstorms during the summer. Heavy snowfalls are common in winter. The average annual temperature is 35 to 46 degrees F (1 to 8 degrees C). The freeze-free period averages 145 days and ranges from 110 to 185 days, decreasing in length with elevation.

Water

The total withdrawals average 410 million gallons per day (1,550 million liters per day). About 10 percent is from ground water sources, and 90 percent is from surface water sources. Precipitation, perennial streams, and lakes provide an abundance of water. In the parts of the MLRA in New York and Vermont, the surface water is used primarily for recreation and the steep terrain provides numerous opportunities for hydropower facilities. The surface water in the part of the MLRA in New Hampshire, Maine, and Massachusetts is used for light industry (textile and paper mills) and public supply. The surface water throughout the MLRA generally is of excellent quality. Acid rain is a problem. The acidity removes metals, such as aluminum, iron, and mercury, from soils, and these contaminants enter the streams, lakes, and reservoirs and eventually enter the food chain.

Ground water is abundant in deep glacial outwash in valleys but is scarce in the till and bedrock on uplands. Wells in the glacial till yield moderate quantities of water for domestic use. The water from the glacial aquifers can be soft to very hard, but it typically has less than 150 parts per million (milligrams per liter) total dissolved solids. The crystalline bedrock throughout this area yields moderately hard ground water of generally excellent quality. The level of total dissolved solids is very low; the median value is less than 150 parts per million (milligrams per liter). In the water from some wells, high, naturally occurring levels of iron and manganese can exceed the secondary standards for drinking water of 300 and 50 parts per billion (micrograms per liter), respectively. In Maine and New Hampshire, high, naturally occurring levels of radon cause problems in about 5 percent of the wells tested in this aquifer. Wells in granite with high amounts of muscovite and biotite appear to be the source of the radon-222.

MLRA 143 Water Use by Category



Soils

The dominant soil orders in this MLRA are Inceptisols and Spodosols. The soils in the area dominantly have a frigid soil temperature regime, an aquic or udic soil moisture regime, and isotic or mixed mineralogy. At high elevations (above 3,000 feet, or 915 meters, in the Adirondack Mountains), the soil temperature regime is cryic. The soils are shallow to very deep, generally somewhat excessively drained to poorly drained, and loamy. Humaquepts (Burnham series) and Epiaquepts (Monarda series) formed in dense till in depressions on till plains. Haplorthods formed in loamy till on hills, mountains, and plateaus (Berkshire, Lyman, Thorndike, and Tunbridge series) and in dense till on drumlins, hills, and ridges (Becket, Colonel, Dixfield, Howland, Marlow, Peru, and Plaisted series).

Biology

This area supports northern hardwoods, spruce, and fir. The most common trees are sugar maple, American beech, yellow birch, black cherry, white pine, balsam fir, red spruce, eastern hemlock, black spruce, and trembling aspen. Sugar maple, yellow birch, American beech, red spruce, and eastern hemlock are dominant on the better drained soils on hills and ridges. Red spruce and balsam fir are dominant on the wetter soils on long, gentle slopes and in depressions. Stunted balsam fir and red spruce are common on many of the high mountaintops.

Some of the major wildlife species in this area are white-tailed deer, snowshoe hare, and ruffed grouse.

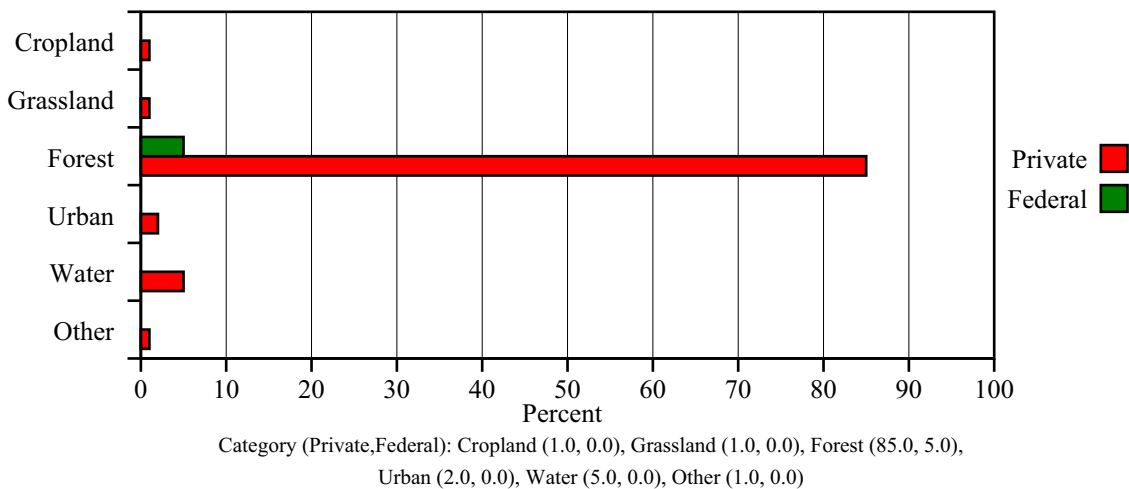
Land Use

The forested areas support northern hardwoods, spruce, and fir. Wood for lumber and pulp for the paper industry are the principal forest products. Maple sugar is an important product in many areas. Most farming is a part-time enterprise occurring on isolated farms. Much of the area in the Adirondacks in New York is in a State park. Although most of the area in New England is privately owned, a large part is in national forests, State forests, or State parks. This MLRA is widely used for year-round recreation. A small acreage is used for residential development.

The major soil resource concerns in this area are related to forestry and recreational development. They include sheet, rill, and gully erosion. Forest management concerns include erosion in scarified areas used as log decks and in areas along logging roads and skidder ruts that focus runoff up and down the slope. Construction sites for cottage and housing developments expose soil to the elements. The hazard of erosion becomes severe as the extent of disturbed areas and the slope increase. Erosion also is a severe hazard on ski slopes and in snowboarding areas because of the steepness and length of slopes and the difficulty in establishing stabilizing vegetation. Erosion on logging roads and skid trails is a potentially serious land use problem. Rill and gully erosion can occur in crop fields.

Conservation practices on forestland generally include forest stand improvement and proper construction, use, and maintenance of skid trails, water bars, access roads, and log landings. Critical area planting and sediment-control measures are needed on construction sites, ski slopes, and recreation trails. Conservation practices on cropland generally include conservation tillage, contour stripcropping, crop rotations, crop residue management (primarily mulch-till), cover crops, diversions, and grassed waterways.

MLRA 143 Land Use by Category



MLRA 142 - St. Lawrence-Champlain Plain

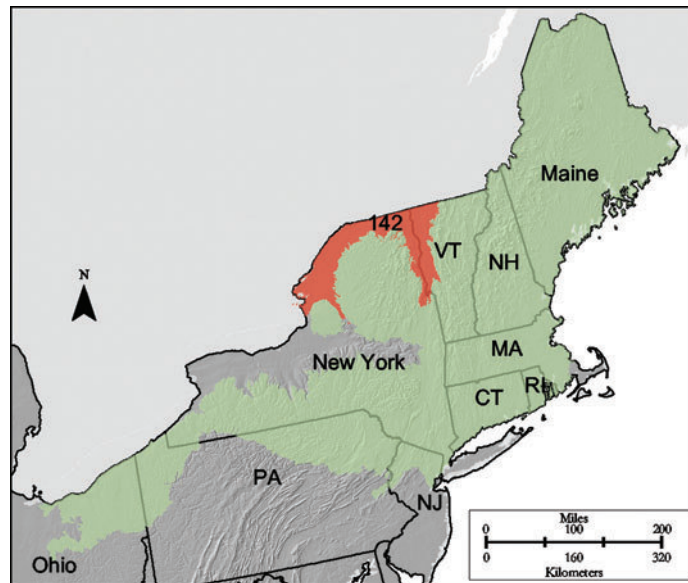


Figure 142-1: Location of MLRA 142 in Land Resource Region R

Introduction

This area (shown in fig. 142-1) is in New York (73 percent) and Vermont (27 percent). It makes up about 7,040 square miles (18,240 square kilometers). Burlington, Vermont, and Ogdensburg, Plattsburgh, and Watertown, New York, are important cities in this area. The area is served by Interstates 81, 87, and 89, which run north and south. Fort Drum Military Reservation is in the southwestern part of the area. Parts of the MLRA are in Adirondack State Park. The St. Lawrence River and the Canadian border form the north end of this area. The area is bounded on the west by Lake Ontario, on the south by the Adirondack Mountains, and on the east by the Green Mountains. It surrounds Lake Champlain at the New York-Vermont border.

Physiography

The northern half of this area is in the Champlain Section of the St. Lawrence Valley Province of the Appalachian Highlands. Small areas in the northern part of the MLRA are in the Adirondack Province of the same division. Most of the southwest corner of the area is in the Eastern Lake Section of the Central Lowland Province of the Interior Plains. A small area in the southwest corner is in the Mohawk Section of the Appalachian Plateaus Province of the Appalachian Highlands. The southeastern extremities of the MLRA are in the Hudson Valley Section of the Valley and Ridge Province and the Taconic Section of the New England Province of the Appalachian Highlands. This MLRA is a glaciated area of low relief dominated by broad expanses of nearly level, sandy deltas and shallow lacustrine basins or plains punctuated by low hills of glacial till. Rivers and streams have cut relatively deep but narrow valleys across the plain. Elevation ranges from 80 to 1,000 feet (25 to 305 meters), increasing gradually from the St. Lawrence River southward and from Lake Champlain to the east and west. Local relief generally is less than 30 feet (10 meters), but glacial till ridges, till plains, and some outwash terraces rise 15 to 80 feet (5 to 25 meters) above the adjacent plains.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Northeastern Lake Ontario-Lake Ontario-St. Lawrence (0415), 50

percent; Richelieu (0201), 47 percent; and Southeastern Lake Ontario (0414), 3 percent. The St. Lawrence River and Lake Champlain are important waterways in this area. Many rivers drain across the area from the Adirondack Mountains to the St. Lawrence River in the west and north and to Lake Champlain in the east. These rivers include the Moose, Black, Beaver, Oswegatchie, Grass, Raquette, St. Regis, Saranac, Ausable, and Bouquet Rivers.

Geology

This area has been glaciated, and a thin mantle of till covers most of the bedrock. Extensive areas of sandy glacial outwash and eolian deposits also occur. Some glacial lake sediments have been deposited above glacial moraines. These deposits are thickest in the valleys and thinnest on the ridges and highlands. During the later stages of the Wisconsin glacial period, seawater entered the Champlain Valley and deposited marine sediments that were later covered by freshwater sediments. The marine deposits are unique to the area. Numerous bedrock outcrops occur in the western half of the area. The bedrock is primarily the Stony Point shale on top of a series of beds of limestone and dolomite of Ordovician age. Below these rocks are the Cambrian Potsdam sandstone and conglomerate. The limestone units and the Potsdam Sandstone are major aquifers. Some quartzite layers are in the carbonate rocks in the part of this area in northwestern Vermont.

Climate

The average annual precipitation in most of this area is 30 to 45 inches (760 to 1,145 millimeters). It is 45 to 60 inches (1,145 to 1,525 millimeters) in the high-elevation areas in the southern part of the area. The precipitation is evenly distributed throughout the year. Most of the rainfall occurs as high-intensity, convective thunderstorms during the summer. Snowfall is heavy from late in autumn to early in spring. The average annual temperature is 41 to 47 degrees F (5 to 9 degrees C). The freeze-free period averages 165 days and ranges from 140 to 190 days. It is longest in a narrow belt around Lake Champlain.

Water

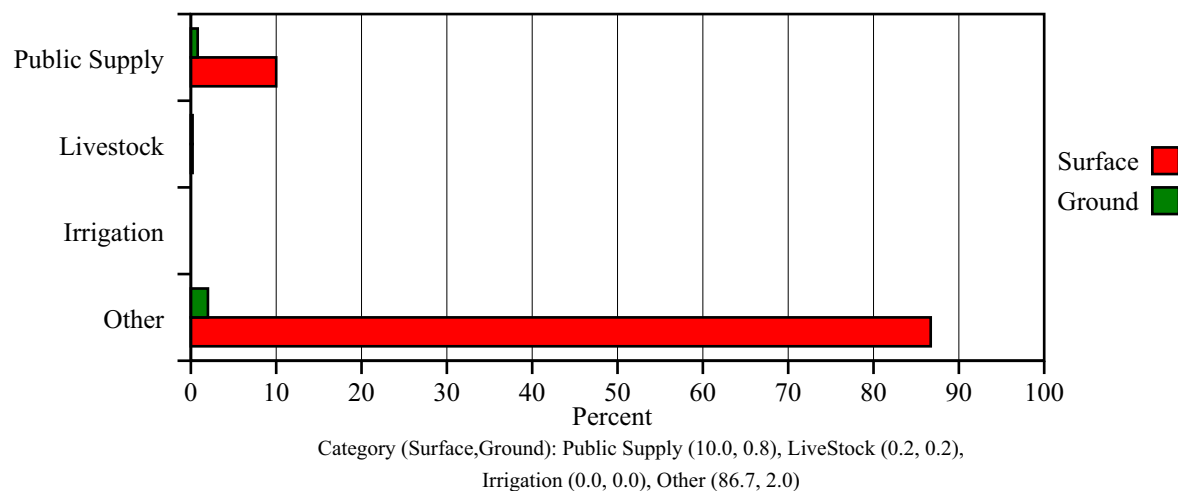
The total withdrawals average 1,020 million gallons per day (3,860 million liters per day). About 3 percent is from ground water sources, and 97 percent is from surface water sources. Precipitation and numerous perennial streams provide an abundance of surface water. The St. Lawrence Seaway, which forms the northern border of the area, and Lake Champlain, on the eastern border, are important transportation arteries and are used extensively for recreation. Industry is generally the largest user of both surface and ground water in this area. The steep terrain provides numerous opportunities for hydropower facilities on rivers. Even though New York ranks third among the States in the production of electricity from hydropower, only 3 percent of the State's needs are met by this power source. The surface water in the area generally is of excellent quality. Acid rain is a problem. The acidity removes metals, such as aluminum, iron, and mercury, from soils, and these contaminants enter the streams, lakes, and reservoirs and eventually enter the food chain. Algae growth in Lake Champlain is a local concern.

Ground water is abundant in this MLRA. Deep wells in the stratified glacial drift yield moderate quantities of water for domestic use. In nearly level areas consisting mainly of heavy textured marine and lake sediments, ground water is close to the surface during part of the year. The unconsolidated sand and gravel in alluvial and glacial outwash deposits filling valley floors is a significant aquifer in the part of this area in Vermont. The water from this aquifer is hard or very hard, but it typically has less than 150 parts per million (milligrams per liter) total dissolved solids.

Two bedrock aquifers, a carbonate system and the Potsdam sandstone, occur in the northwestern, north-central, and northeastern parts of this MLRA. The water in the carbonate aquifer is the hardest encountered in New York and Vermont. It is the only water in the area that exceeds the national secondary drinking water standard for total dissolved solids, 500 parts per million (milligrams per liter). The Potsdam sandstone typically lies beneath the carbonate aquifer,

but both aquifers do not always occur in a given area. The sandstone has very hard water, but the median value of total dissolved solids is only about 300 parts per million (milligrams per liter). The water in the sandstone has the highest levels of chloride of all the aquifers in this area. The median value of 100 parts per million (milligrams per liter), however, is well below the drinking water standard of 250 parts per million (milligrams per liter).

MLRA 142 Water Use by Category



Soils

The dominant soil orders in this area are Alfisols, Inceptisols, Spodosols, and Entisols. The soils in the area have a frigid or mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or isotic mineralogy. They are shallow to very deep, excessively drained to very poorly drained, and sandy to clayey. Hapludalfs (Hudson and Vergennes series), Endoaqualfs (Niagara and Rhinebeck series), and Epiaqualfs (Muskellunge series) formed in lacustrine sediments on lake plains. Dystrudepts formed in till on uplands (Charlton series) or on flood plains (Lovewell series). Epiaquepts (Malone series) formed in till on uplands. Eutrudepts (Amenia series) formed in dense till on uplands. Haplorthods and Udipsamments formed in sandy glaciofluvial or lacustrine deposits on outwash plains, lake plains, eskers, and terraces (Adams and Colton series, examples of Haplorthods, and Plainfield series, an example of Udipsamments); in till on hills, mountains, and plateaus (Berkshire, Lyman, and Tunbridge series); and in loamy sediments over dense till (Becket and Potsdam series). Haplohumods (Rawsonville series) formed in till on hills, mountains, and plateaus. Fragiorthods (Worth series) formed in dense till on till plains. Cryofolists (Ricker series) formed in organic material on mountains and hills.

Biology

This area supports hardwoods. The beech-birch-sugar maple forest type is the dominant climax forest type on uplands. Associated with this type are basswood, American elm, maple species, white ash, black cherry, and white pine. The aspen-birch type, earlier in succession, is economically important. Such species as eastern hemlock, red maple, American elm, and spruce are on wet soils.

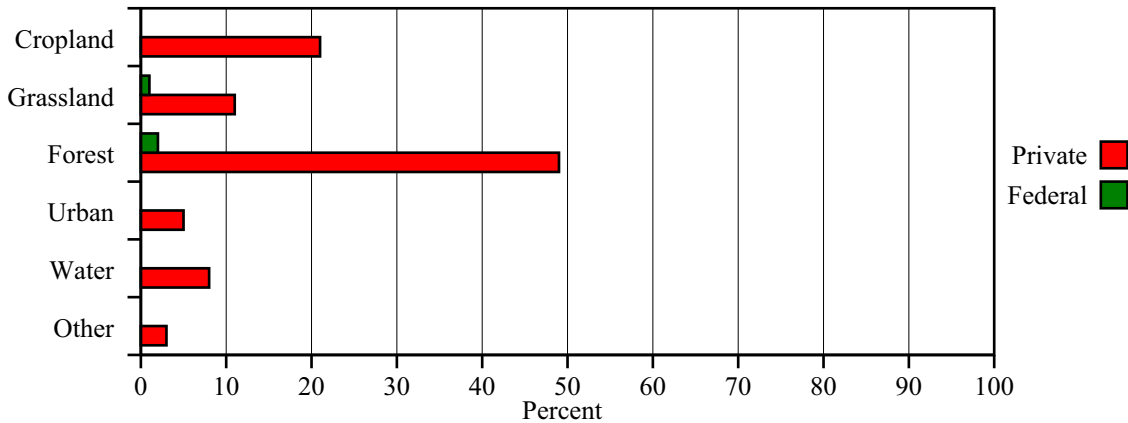
Some of the major wildlife species in this area are white-tailed deer, red fox, raccoon, beaver, woodchuck, muskrat, cottontail, ruffed grouse, and woodcock.

Land Use

Most of this area is in forests or farms. The forests consist of northern hardwoods and conifers. Sawlogs and pulpwood are the main forest products. Christmas trees and maple syrup also are produced throughout the area. Dairy operations and some beef operations are common. Hay for dairy cattle is the principal crop, but small grain and corn are grown for silage in some areas. Potatoes are an important cash crop in some areas, and a few apple orchards are on the slopes along Lake Champlain, but the total acreage of these crops is small. Some areas are used for urban development.

The major soil resource concerns on cropland are sheet, rill, and gully erosion; the content of organic matter and productivity of the soils; and surface compaction (resulting primarily from harvesting crops under wet conditions). Some erosion results from logging practices. Conservation practices on cropland generally include conservation tillage, contour stripcropping, crop rotations, crop residue management (primarily mulch-till), cover crops, diversions, and grassed waterways. Conservation practices on forestland generally include forest stand improvement and proper construction, use, and maintenance of skid trails, water bars, access roads, and log landings.

MLRA 142 Land Use by Category



Category (Private,Federal): Cropland (21.0, 0.0), Grassland (11.0, 1.0), Forest (49.0, 2.0), Urban (5.0, 0.0), Water (8.0, 0.0), Other (3.0, 0.0)

MLRA 141 - Tughill Plateau

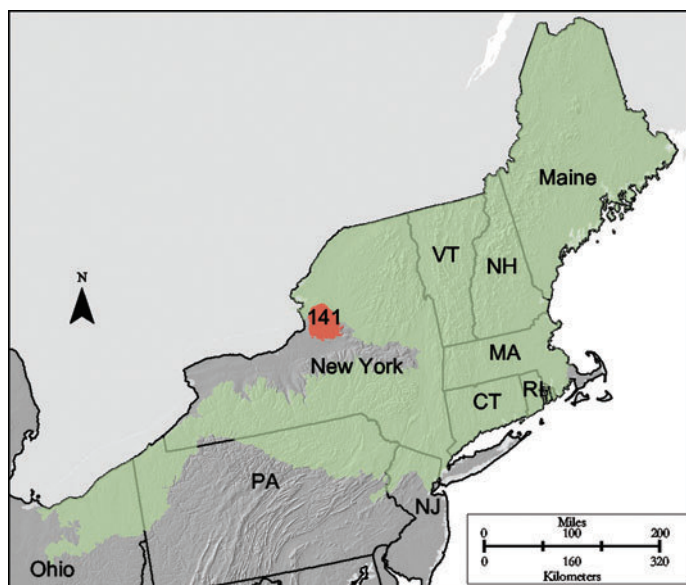


Figure 141-1: Location of MLRA 141 in Land Resource Region R

Introduction

This area is entirely in New York (fig. 141-1). It makes up about 1,175 square miles (3,045 square kilometers). It has no major towns or roads. This plateau lies between Lake Ontario and the Adirondack Mountains. State highways and secondary roads skirt the lowlands around the base of the plateau. The area has numerous State forests, and the public trail system in the area is used heavily by drivers of all-terrain vehicles and snowmobiles.

Physiography

Most of this area is in the Mohawk Section of the Appalachian Plateaus Province of the Appalachian Highlands. The west and southwest third of the area is in the Eastern Lake Section of the Central Lowland Province of the Interior Plains. This MLRA is nearly level to gently sloping across the top of the plateau and hilly to steep around the margins. Elevation ranges from 980 feet (300 meters) along the lower margins to 1,970 feet (600 meters) at the top of the plateau. Local relief generally is 15 to 80 feet (5 to 25 meters), but the bordering lowlands are typically about 330 feet (100 meters) below the top of the plateau.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Southeastern Lake Ontario (0414), 80 percent; Northeastern Lake Ontario-Lake Ontario-St. Lawrence (0415), 15 percent; and Upper Hudson (0202), 5 percent. Streams flow off the plateau in several directions. The principal rivers in the area are the Salmon and Mad Rivers and the East and West Branches of the Fish River.

Geology

This plateau is underlain mostly by Ordovician-age sandstones. The Queenston shale occurs in the southwest part of the area, and the Oswego and Pulaski sandstone, siltstone, and shale beds occur in the rest of the area. All of the area has a thin mantle of glacial till. Some glacial lake sediments and moraines occur in the southwest part of the area.

Climate

The average annual precipitation in most of this area is 45 to 63 inches (1,145 to 1,600 millimeters). It is 41 to 45 inches (1,040 to 1,145 millimeters) around the lower margins of the plateau. The precipitation is evenly distributed throughout the year. Rainfall occurs as high-intensity, convective thunderstorms during the summer. Lake-effect snowfall is heavy from late in autumn to early in spring. In some areas the seasonal snowfall is as much as 140 inches (355 centimeters). The average annual temperature is 40 to 46 degrees F (4 to 8 degrees C). The freeze-free period averages 160 days and ranges from 135 to 180 days. The lowest temperatures and the shortest freeze-free periods are on the summit of the plateau.

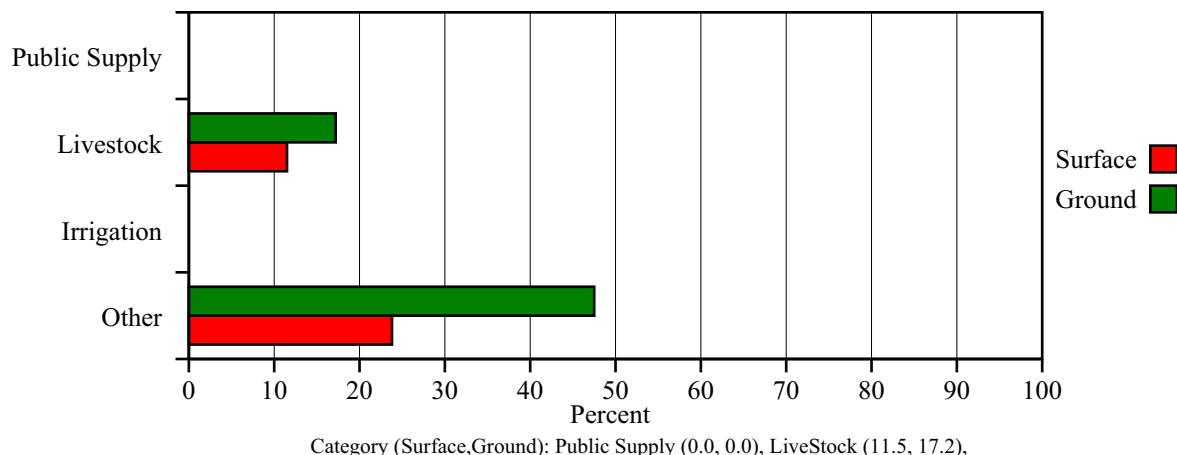
Water

The total withdrawals are about 0.4 million gallons per day (1.5 million liters per day). About 65 percent is from ground water sources, and 35 percent is from surface water sources. Precipitation and perennial streams provide an abundance of good-quality surface water. The area has few natural ponds or lakes, and the water resources available in the area are little used because of the lack of urban centers, mining, industry, or suitable agricultural land. Dense fragipans in most of the soils perch ground water for extended periods in winter and spring.

Shallow and deep wells supply water for domestic use and for livestock, the two main uses of water in this area. Stratified glacial drift is a source of ground water in the central and southeastern parts of this MLRA. In nearly level areas consisting mainly of glacial lake sediments, ground water is close to the surface during part of the year. The water from this aquifer is hard or very hard, but it typically has less than 150 parts per million (milligrams per liter) total dissolved solids.

A sandstone bedrock aquifer occurs under almost all of this area. It has very hard water, but the median value of total dissolved solids is only about 300 parts per million (milligrams per liter). The water in this aquifer has the highest levels of chloride of all the aquifers in this area. The median value of 100 parts per million (milligrams per liter), however, is well below the drinking water standard of 250 parts per million (milligrams per liter).

MLRA 141 Water Use by Category



Soils

Most of the soils in this MLRA are Orthods or Aquods. They have a frigid soil temperature regime, a udic or aquic soil moisture regime, and mixed or isotic mineralogy. Many have a fragipan. Most are very deep to bedrock. The soils are loamy or sandy and have varying amounts of gravel. Surface stones and boulders are common. The soils formed mostly in glacial till derived primarily from acid sandstone. The till is compact and dense in many places. Well drained and moderately well drained Fragiorthods (Worth and Empeyville series) are in undulating to sloping areas. Nearly level to gently sloping, somewhat poorly drained Fragiaquods (Westbury series) are in the lower areas. Very poorly drained Endoaquepts (Tughill series) are extensive on flats and in depressions. Very poorly drained Haplohemists (Rifle series) are in bogs in a few of the large, deeper and wetter depressions. Somewhat excessively drained and excessively drained Haplorthods (Colosse and Adams series) that formed in sandy or gravelly outwash are prominent locally but are of small extent in the MLRA.

Biology

This area supports northern hardwoods. The beech-birch-sugar maple forest type is of primary importance. Sugar maple is of particular economic significance. The elm-ash-red maple type also has potential in some parts of the area. Red spruce, balsam fir, and white pine can be expected to occur in mixed stands. Early succession vegetation includes highbush blueberry, lowbush blueberry, and aspen-birch forest types. As succession approaches climax, sugar maple, beech, and hemlock increase in importance. Eastern hemlock, white spruce, American elm, black ash, and red maple grow on the wetter soils. A mixture of moss, Labrador tea, and fern occurs on extremely wet, organic soils.

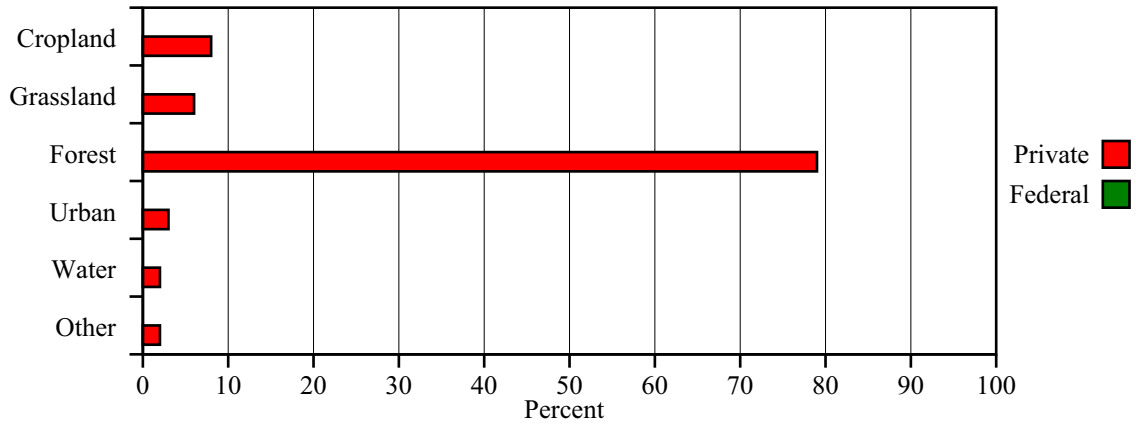
Some of the major wildlife species in this area are white-tailed deer, snowshoe hare, cottontail, and ruffed grouse.

Land Use

Most of this area is forested with mixed hardwoods and conifers. Part of the forestland is abandoned cropland that has reverted to forest vegetation. Pulpwood, sawlogs, Christmas trees, and maple syrup are the principal forest products. The cropland in the area is used mainly for forage and some feed grains grown for dairy cattle. A sizable acreage has reverted to unproductive brush and weeds. A small acreage is used for urban development.

The major soil resource concerns in this area are water erosion, soil wetness, and maintenance of the content of organic matter and productivity of the soils. Sedimentation from nonpoint sources, such as agricultural and urban runoff, also is a concern. Conservation practices on cropland generally include conservation tillage, contour stripcropping, crop rotations, crop residue management (mulch-till), cover crops, diversions, and grassed waterways. Conservation practices on forestland generally include forest stand improvement and proper construction, use, and maintenance of skid trails, water bars, access roads, and log landings.

MLRA 141 Land Use by Category



Category (Private,Federal): Cropland (8.0, 0.0), Grassland (6.0, 0.0), Forest (79.0, 0.0), Urban (3.0, 0.0), Water (2.0, 0.0), Other (2.0, 0.0)

MLRA 140 - Glaciated Allegheny Plateau and Catskill Mountains

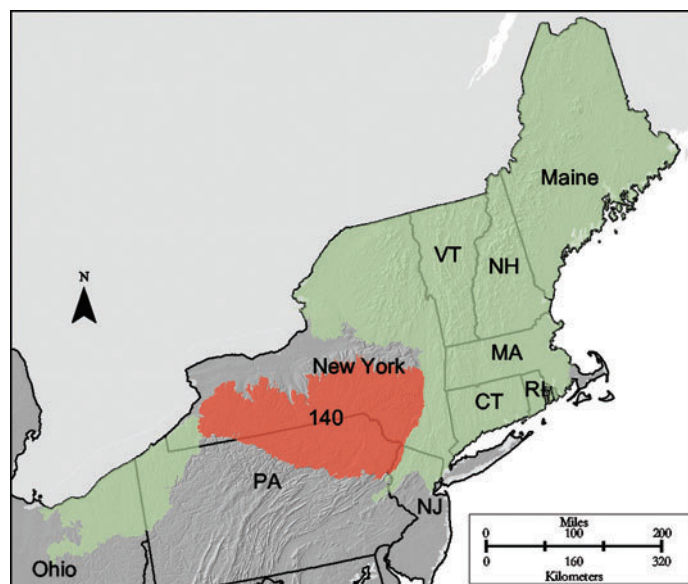


Figure 140-1: Location of MLRA 140 in Land Resource Region R

Introduction

This area (shown in fig. 140-1) is in New York (65 percent), Pennsylvania (34 percent), and New Jersey (1 percent). It makes up about 22,370 square miles (57,975 square kilometers). It includes the cities of Binghamton, Johnson City, Endicott, Elmira, and Corning, New York, and Carbondale, Scranton, and Wilkes-Barre, Pennsylvania. Interstate 81 connects the cities of Binghamton and Scranton, Interstate 84 crosses the southeast corner of the area, Interstate 90 (the New York Thruway) crosses the northern part, and Interstate 87 parallels the eastern border. Numerous State forests and State parks are throughout this MLRA. The Catskill Mountains are in the eastern part of this area, in New York.

Physiography

This area is primarily in the Southern New York Section of the Appalachian Plateaus Province of the Appalachian Highlands. The east-central part is in the Catskill Section of the same province and division. A small portion of the Allegheny Mountain Section is in the south-central part of this MLRA, and the southwest corner of the MLRA is in the Kanawha Section. These two sections are in the Appalachian Plateaus Province of the Appalachian Highlands. The southeast edge and a fingerlike area protruding into the southeast corner of the MLRA are in the Middle Section of the Valley and Ridge Province of the Appalachian Highlands. The top of the dissected plateau in this MLRA is broad and is nearly level to moderately sloping. The narrow valleys have steep walls and smooth floors. The Catskills in the east have steep slopes. Elevation is typically 650 to 1,000 feet (200 to 305 meters) on valley floors; 1,650 to 2,000 feet (505 to 610 meters) on the plateau surface; and 3,600 feet (1,100 meters) or more in parts of the Catskills.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Susquehanna (0205), 50 percent; Delaware (0204), 20 percent; Upper Hudson (0202), 9 percent; Southwestern Lake Ontario (0413), 8 percent; Southeastern Lake

Ontario (0414), 5 percent; Eastern Lake Erie-Lake Erie (0412), 4 percent; and Allegheny (0501), 4 percent. This MLRA includes the headwaters of the Susquehanna, Delaware, and Allegheny Rivers. The Genesee River, in the southwestern part of this area, is one of the few rivers in the area that flow north.

Geology

The bedrock in this area includes alternating shale and sandstone beds of Devonian age. Some of the upper Devonian layers have been eroded away in the part of the area in New York. Glacial drift mantles the area. Significant deposits of glacial outwash, consisting of unconsolidated sand and gravel, fill most of the valley floors. Some glacial lake sediments and ice-contact and stratified drift deposits occur in most of the valleys. These deposits are the primary aquifers in this area. Younger stream deposits cover some of the glacial deposits on the valley floors.

Climate

The average annual precipitation in most of this area is 30 to 45 inches (760 to 1,145 millimeters). It is 45 to 64 inches (1,145 to 1,625 millimeters) in small areas at the higher elevations in the eastern part of the MLRA. Rainfall occurs as high-intensity, convective thunderstorms during the summer, but most of the precipitation in this area occurs as snow. The average annual temperature is 40 to 50 degrees F (4 to 10 degrees C). The freeze-free period averages 165 days and ranges from 130 to 200 days. The coldest temperatures and the shortest freeze-free periods are in the high-elevation areas in the eastern part of the MLRA.

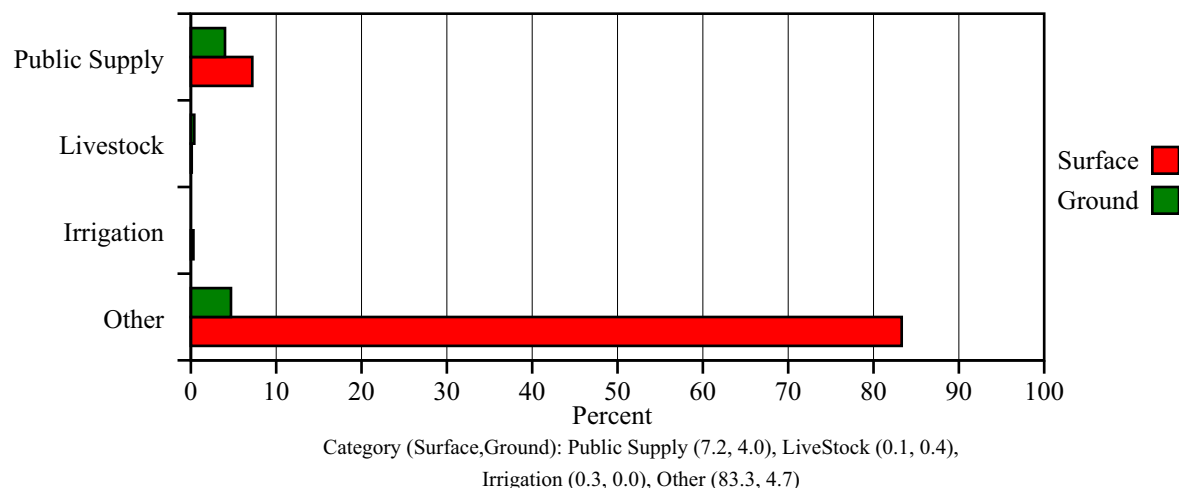
Water

The total withdrawals average 3,100 million gallons per day (11,735 million liters per day). About 9 percent is from ground water sources, and 91 percent is from surface water sources. Precipitation and perennial streams and lakes provide an abundance of good-quality surface water in this area. Soils that have a fragipan are too wet in winter and spring for cultivation and are deficient in moisture during much of the growing season.

The primary source of ground water in this area is the glacial outwash deposits in the valleys. The water in these deposits is hard or very hard and may require softening. The average level of total dissolved solids is about 200 parts per million (milligrams per liter). This good-quality water is susceptible to contamination from surface activities because the aquifer is often directly recharged from precipitation and runoff on the valley floors. The valleys are the sites of the most intensive land use activities in this hilly area.

A secondary source of ground water, primarily in the southern half of the area, in Pennsylvania, is the sandstone and shale aquifer. Water from this aquifer varies in quality, depending on the source rocks. The water from dominantly sandstone units is soft, and the water from the shale units generally is hard and requires treatment prior to use. The water from this aquifer is a calcium bicarbonate type that has about 300 parts per million (milligrams per liter) total dissolved solids. Contamination from surface activities is rare.

MLRA 140 Water Use by Category



Soils

The dominant soil order in this MLRA is Inceptisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They are shallow to very deep, well drained to very poorly drained, and loamy or loamy-skeletal. Dystrudepts (Arnot, Lordstown, and Oquaga series) formed in till on hills and dissected plateaus. Fragiudepts (Bath, Lackawanna, Mardin, Swartswood, Wellsboro, and Wurtsboro series) and Fragiaquepts (Chippewa, Morris, Norwich, and Volusia series) formed in till (dense till in some areas) on hills and till plains.

Biology

This area supports forest vegetation, particularly hardwood species. Beech-birch-maple and elm-ash-red maple are the potential forest types. The extent of oak species increases from east to west, particularly in areas of shallow and dry soils. In some areas conifers, such as white pine, are important. Aspen, hemlock, northern white-cedar, and black ash grow on the wetter soils. In some parts of the area, sugar maple has potential economic significance.

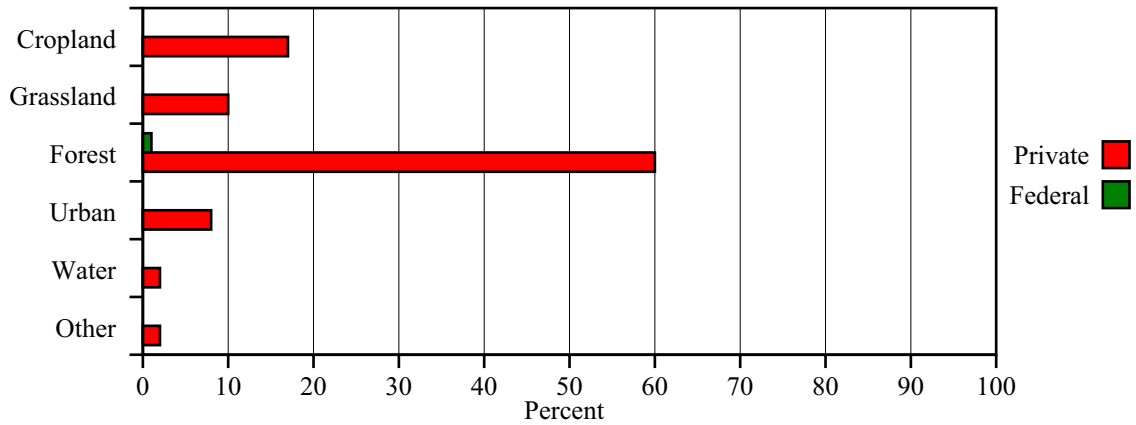
Some of the major wildlife species in this area are white-tailed deer, cottontail, turkey, pheasant, and grouse.

Land Use

A large acreage in this area is in second- and third-growth forests of oak and northern hardwoods. Much of the area is in farms. Hay, pasture, and some grain for dairy cattle are the principal crops. Potatoes are an important crop on the top of the plateau, and poultry, fruits, and truck crops are produced in many of the narrow valleys. Abandoned or idle land, which is common in the steeper areas, is reverting to grasses, weeds, shrubs, and trees. Urban development is expanding in some areas. The Catskills are used mainly for recreation.

The major soil resource concerns in this area are water erosion, soil wetness, and maintenance of the content of organic matter and productivity of the soils. Sedimentation from nonpoint sources, such as agricultural and urban runoff, also is a concern. Conservation practices on cropland generally include conservation tillage, contour stripcropping, crop rotations, crop residue management (mulch-till), cover crops, diversions, and grassed waterways. Conservation practices on forestland generally include forest stand improvement and proper construction, use, and maintenance of skid trails, water bars, access roads, and log landings.

MLRA 140 Land Use by Category



Category (Private,Federal): Cropland (17.0, 0.0), Grassland (10.0, 0.0), Forest (60.0, 1.0), Urban (8.0, 0.0), Water (2.0, 0.0), Other (2.0, 0.0)

MLRA 139 - Lake Erie Glaciated Plateau

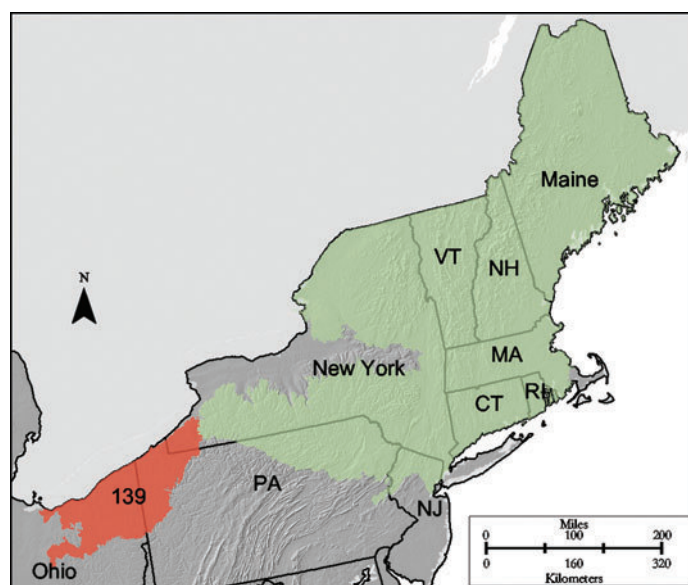


Figure 139-1: Location of MLRA 139 in Land Resource Region R

Introduction

This area (shown in fig. 139-1) is in Ohio (62 percent), Pennsylvania (29 percent), and New York (9 percent). It makes up about 10,715 square miles (27,770 square kilometers). It includes the cities of Cleveland, Akron, Kent, Warren, Youngstown, Massillon, Wooster, and Mansfield, Ohio; Dunkirk, Fredonia, and Jamestown, New York; and Erie, Sharon, and Newcastle, Pennsylvania. Interstates 76, 80, and 90 cross this area from east to west, and Interstates 71 and 77 cross it from north to south. Interstate 79 crosses the northeastern and eastern parts of the area. The Erie National Wildlife Refuge is in the part of the area in Pennsylvania. Numerous State forests are in the northeast corner of the area, in New York, and a number of State parks are throughout the area. The Cuyahoga Valley National Recreational Area is between Cleveland and Akron.

Physiography

Almost all of this area is in the Southern New York Section of the Appalachian Plateaus Province of the Appalachian Highlands. The southern edge of the area is in the Kanawha Section of the same province and division. The western suburbs of Cleveland, in the western tip of the area, are in the Till Plains Section of the Central Lowland Province of the Interior Plains. A narrow band along the shore of Lake Erie is in the Eastern Lake Section of the same province and division. Most of this MLRA is a gently rolling to strongly rolling, dissected glaciated plateau. The narrow band along Lake Erie is fairly flat. Stream valleys are narrow and are not deeply incised, but the valley walls are typically steep. In some areas the interfluves are broad and nearly level. Elevation ranges from 660 to 1,000 feet (200 to 305 meters), increasing gradually from north to south. Local relief is about 7 to 50 feet (2 to 15 meters).

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Southern Lake Erie (0411), 28 percent; Upper Ohio (0503), 25 percent; Allegheny (0501), 23 percent; Muskingum (0504), 16 percent; Eastern Lake Erie-Lake Erie (0412), 6 percent; and Western Lake Erie (0410), 2 percent. The Cuyahoga and Grand Rivers are designated as National Wild and Scenic Rivers in northeastern Ohio. Most of the rivers in this

MLRA flow north to Lake Erie. The headwaters of the Ohio River are in the northeast corner of this area, in Pennsylvania, and some of the headwaters of the Muskingum River are in the central part of the area, in Ohio.

Geology

The bedrock in this area consists mostly of alternating beds of sandstone, siltstone, and shale of upper Devonian, Mississippian, and Pennsylvanian age. Shale units are dominant closer to the surface along Lake Erie and the western edge of the area. The surface is mantled with glacial till, outwash of unconsolidated sand and gravel, glacial lake sediments, and stratified drift deposits (kames and eskers). The outwash, lake sediments, and stratified drift deposits that fill valleys are important sources of ground water. Younger stream deposits cover the glacial deposits in some of the river valleys.

Climate

The average annual precipitation in this area is 34 to 50 inches (865 to 1,270 millimeters). Rainfall occurs as high-intensity, convective thunderstorms during the summer. The seasonal snowfall averages 40 inches (100 centimeters). The average annual temperature is 44 to 51 degrees F (7 to 10 degrees C). The freeze-free period averages 180 days and ranges from 145 to 215 days.

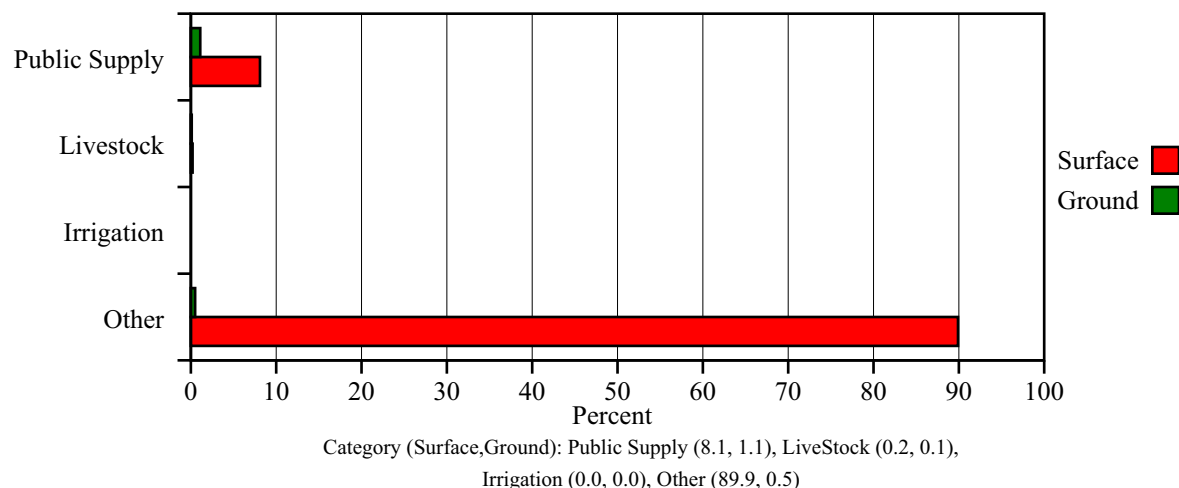
Water

The total withdrawals average 6,190 million gallons per day (23,430 million liters per day). This MLRA ranks tenth among all of the MLRAs in total amount of water used. About 2 percent is from ground water sources, and 98 percent is from surface water sources. Precipitation and perennial streams provide an abundance of good-quality surface water. Lake Erie and large reservoirs on perennial streams provide water for public supply and industrial use in several of the large cities in the area. On many farms, small constructed ponds provide water for livestock and irrigation and are used for recreation.

Shallow and deep wells are the main sources of water for domestic use and municipal supplies in this area. One source of ground water is the glacial deposits in the valleys. The water from these aquifers is hard or very hard and generally requires softening. The level of total dissolved solids typically ranges from 200 to 400 parts per million (milligrams per liter). This good-quality water is susceptible to contamination from surface activities because the aquifer is often directly recharged from precipitation and runoff on the valley floors.

A second source of ground water in this area is the sandstone bedrock. The water from this aquifer is generally very hard and requires treatment prior to use. It is a calcium bicarbonate type of water that has a median value of 322 parts per million (milligrams per liter) total dissolved solids. At a depth of more than 300 feet, this water is saline. Contamination of the water in this bedrock aquifer is rare.

MLRA 139 Water Use by Category



Soils

The dominant soil order in this MLRA is Alfisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or illitic mineralogy. They are very deep, well drained to poorly drained, and loamy or clayey. Epiaqualfs (Mahoning series) formed in till on till plains. Hapludalfs formed in outwash deposits on outwash plains, terraces, kames, and beach ridges (Chili series) and in till on till plains (Ellsworth series). Fragiudalfs formed in till (Canfield and Rittman series) and loess over till (Wooster series) on till plains and moraines. Fragiaqualfs (Frenchtown, Platea, Ravenna, Sheffield, Venango, and Wadsworth series) formed in till on till plains and moraines.

Biology

This area supports mostly beech forest vegetation. American beech, sugar maple, red oak, white ash, and white oak are the dominant species. Other species include American basswood, shagbark hickory, black cherry, and cucumbertree. American beech and sugar maple are dominant on some poorly drained flatlands. Mixed, mesophytic oak-sugar maple and oak forest types occur in some areas.

Some of the major wildlife species in this area are white-tailed deer, cottontail, squirrel, pheasant, and quail.

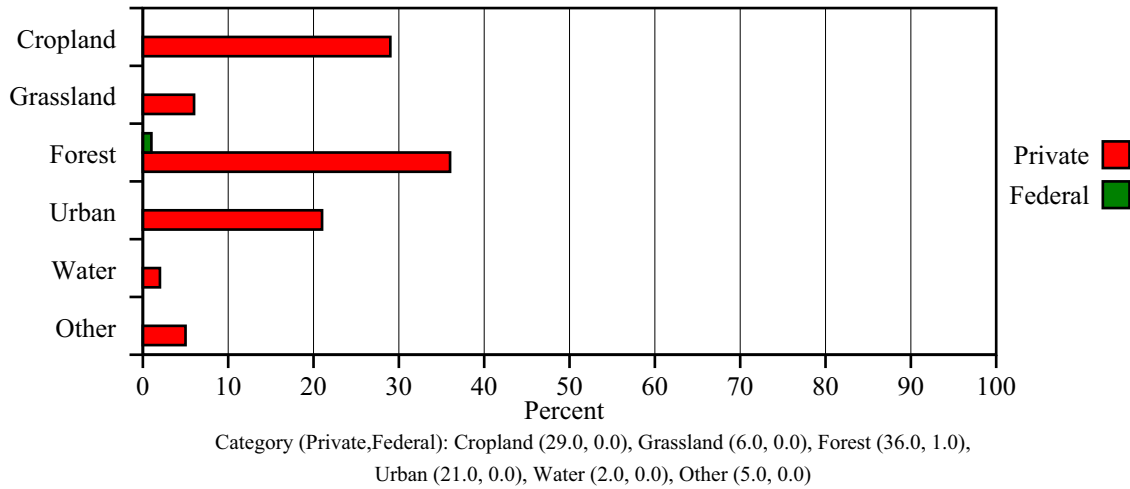
Land Use

About three-fourths of this area is in farms. Feed grains (corn, soybeans, winter wheat, and oats) and forage (grass-legume hay, tall fescue pasture, and alfalfa hay) for dairy cattle are the main crops in the western part of the area. Similar crops are grown in the eastern part, where there are many part-time farms and many rural residences. The area has some cow-calf operations. Some areas are used for potatoes or small fruit crops. A large amount of the milk produced in the area is converted to cheese. The areas of hardwood forest in the MLRA are mainly in farm woodlots. Sawlogs for rough construction, firewood, and some high-quality sawlogs for specialty uses are harvested from the numerous farm woodlots. Some large holdings are used for watershed protection.

The major soil resource concerns are sheet and rill erosion, sedimentation by storm-water runoff, maintenance of the content of organic matter and productivity of the soils, and management of soil moisture. Conservation practices on cropland generally include systems of crop residue management (such as conservation tillage), winter cover crops, grass-legume plantings, contour

farming, irrigation water management, compost facilities, nutrient management, manure management, and pesticide management. Excluding livestock from wetlands and watercourses and developing rotational grazing systems help to control erosion and protect water quality. Conservation practices that are important to community development include critical site planting and urban storm-water management.

MLRA 139 Land Use by Category



Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

MLRA Explorer Custom Report

N - East and Central Farming and Forest Region
127 - Eastern Allegheny Plateau and Mountains

N - East and Central Farming and Forest Region

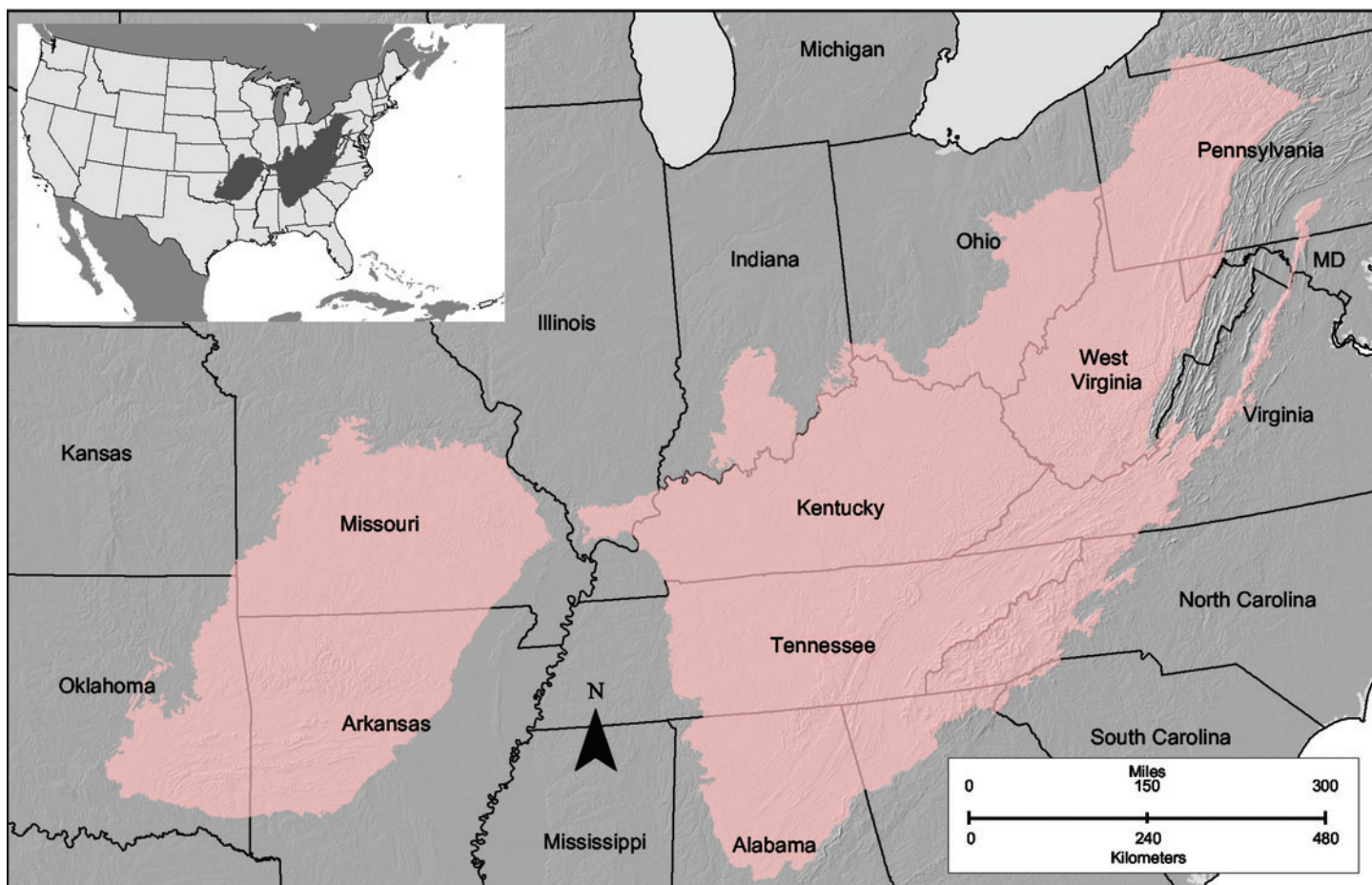


Figure N-1: Location of Land Resource Region N

LRR Overview

This region (shown in fig. N-1) is in Kentucky (16 percent), Missouri (13 percent), Tennessee (13 percent), Arkansas (11 percent), West Virginia (9 percent), Pennsylvania (8 percent), Alabama (6 percent), Ohio (6 percent), Oklahoma (5 percent), Virginia (4 percent), North Carolina (3 percent), Indiana (3 percent), Georgia (2 percent), and Illinois (1 percent) and in very small areas in Kansas, Maryland, New York, and South Carolina. It makes up 236,415 square miles (612,645 square kilometers).

Diversity of topography and climate gives rise to a wide range of natural ecosystems and limits the amount of land available for production agriculture. The topography ranges from undulating hills in the Kentucky Bluegrass region to steep, mountainous terrain in the Appalachians (fig. N-2). The climate ranges from hot and humid with modest snowfall in the western part of the region to more than 100 inches (2,540 millimeters) of annual snowfall in spruce forests in the eastern part. The mean annual precipitation in most of the region is 40 to 59 inches (1,015 to 1,500 millimeters), but the southern, high-elevation parts of the Blue Ridge may receive as much as 119 inches (3,025 millimeters). The mean annual air temperature in most of the region is 52 to 59 degrees F (11 to 15 degrees C). The freeze-free period generally ranges from 180 to 235 days, but it is considerably shorter in the high-elevation areas in North Carolina, Virginia, and West Virginia. The mean annual air temperature and the length of the freeze-free period increase from north to south and

with decreasing elevation.

The physiography in the part of this region east of the Mississippi River is varied and consists of gently rolling terrain on level-bedded limestone in the Kentucky Bluegrass and Highland Rim areas. Moving eastward, the topography becomes progressively more dissected and hilly. The Appalachian Plateau, stretching from central Pennsylvania to northern Georgia, grades from a dissected plateau to a rugged band of mainly forested mountains and high hills underlain by shale, sandstone, coal, and some limestone. The Valley and Ridge features long, linear forested ridges and cropland in the valleys. The bedrock geology is faulted and folded shale, sandstone, and limestone. The Blue Ridge makes up the eastern edge of the region. It consists mainly of rugged mountains formed from igneous and metamorphic rocks. West of the Mississippi River, the Ozarks are a slightly dissected to deeply dissected plateau typically underlain by limestone, sandstone, and shale bedrock. Igneous rocks are exposed in a small area in southeast Missouri. Elevation ranges from 300 to 6,600 feet (90 to 2,010 meters) overall. West of the Mississippi River, elevation ranges from 300 to 2,750 feet (90 to 840 meters) and local relief ranges from 100 feet (30 meters) in the St. Francois Knobs and Basins to 800 feet (245 meters) in the Ozark Highland. East of the Mississippi River, elevation ranges from 330 to 6,600 feet (100 to 2,010 meters) and is highest in the Southern Blue Ridge. Local relief ranges from 10 to 50 feet (3 to 15 meters) in southern Indiana to 1,000 to 3,000 feet (305 to 915 meters) in western North Carolina.

The total withdrawals of freshwater in this region average about 30,935 million gallons per day (119,720 million liters per day). About 93 percent is from surface water sources, and 7 percent is from ground water sources. This region is one of six land resource regions that use more than 30,000 million gallons (113,550 million liters) of water daily. About 89 percent of the total water used is for cooling thermoelectric power plants or for mining or industry.

The soils in this region are dominantly Alfisols, Entisols, Inceptisols, or Ultisols. In the Ozarks, Hapludalfs and Paleudults formed in material weathered dominantly from limestone and cherty limestone. Hapludults and Dystrudepts formed in shale and sandstone residuum. Paleudults and Hapludults typically formed in colluvium. Most of the soils in the middle third of the region are Hapludalfs that formed in limestone residuum or loess. The soils in the eastern third of the region are dominantly Hapludults and Dystrudepts that formed in shale and sandstone residuum. Some Hapludalfs formed in calcareous material. In the high mountains, the soils are dominantly Dystrudepts and Hapludults that formed in material weathered from igneous and metamorphic rocks. The soils in the region have a thermic, mesic, or frigid soil temperature regime, depending on latitude and elevation, and have a udic soil moisture regime.

About 93 percent of the land in this region is privately owned. The native vegetation generally consists of deciduous forests. At the highest elevations, however, coniferous forests and glades are evident. Forestry is an important industry. Oak, yellow-poplar, and pine are the dominant trees harvested. The array of crops grown is diverse and includes cotton, soybeans, corn, and wheat. The major management concerns in areas of forestland are the erosion resulting from harvest practices and maintenance of forest productivity. The concerns on cropland include maintenance of the productivity of the soils, erosion control, and prevention of ground-water contamination.



N-2: An area of Land Resource Region N

MLRA 127 - Eastern Allegheny Plateau and Mountains



Figure 127-1: Location of MLRA 127 in Land Resource Region N

Introduction

This area (shown in fig. 127-1) is in Pennsylvania (57 percent), West Virginia (37 percent), Maryland (4 percent), and New York (2 percent). It makes up about 19,440 square miles (50,370 square kilometers). The towns of Warren, Oil City, and Johnstown, Pennsylvania, and Beckley, West Virginia, are in this area. Titusville, Pennsylvania, is in the northwest corner of the area. It was the site of the first well drilled specifically for oil in the United States in 1859. Cumberland, Maryland, is on the eastern border of this area. From north to south, Interstates 80, 70/76, 68, and 64 cross the area. The Allegheny National Forest covers the northern tip of the area, and the Monongahela National Forest is in the southeast corner. Many State forests and parks are throughout the area, and half of the Allegheny Indian Reservation is at the northern end of the area.

Physiography

The southern third and northwest corner of this area are in the Kanawha Section of the Appalachian Plateaus Province of the Appalachian Highlands. The rest of the area is in the Allegheny Mountain Section of the same province and division. The deeply dissected plateau in this area terminates in a high escarpment, the Allegheny Front, in the eastern part of the area. Steep slopes are dominant, but level to gently rolling plateau remnants are conspicuous in the northern part of the area. Elevation ranges from 980 feet (300 meters) in the lowest valleys to 1,970 to 2,620 feet (600 to 800 meters) throughout much of the top of the plateau. It is 3,600 to 4,600 feet (1,100 to 1,400 meters) on the mountains in the southeastern part of the area. Local relief is mainly about 330 feet (100 meters), but some mountain peaks in the southern part of the area rise 980 feet (300 meters) or more above the plateau or adjacent valleys.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Allegheny (0501), 28 percent; Susquehanna (0205), 25 percent; Kanawha (0505), 22 percent; Monongahela (0502), 20 percent; and Potomac (0207), 5 percent. The New, Cranberry, and Greenbrier Rivers in West Virginia have been designated National Wild and Scenic Rivers. The reach of the New River in the New River Gorge has been designated a National River. The Youghiogheny National Wild and Scenic River is in Maryland and continues in Pennsylvania. The Cheat River and the North Branch of the Potomac River are in West Virginia and Maryland. The headwaters of many tributaries to the Allegheny River to the west and the

Susquehanna River to the east are in the part of this area in Pennsylvania. Some tributaries of the Kanawha River occur in this MLRA.

Geology

This area consists of alternating beds of sandstone, limestone, coal, and shale in the uplands. These units are mostly flat-lying. A few distinct folds and faults are along the southeastern edge of the part of this area in West Virginia. These bedrock units are Permian to Mississippian in Pennsylvania and Pennsylvanian to Cambrian in West Virginia. Coal is mined throughout most of this area, and oil and gas wells have been developed. There are no coal mines in the older rocks along the southeastern edge of this area, in West Virginia. The major river valleys are filled with unconsolidated deposits of clay, silt, sand, and gravel, and some outwash and glaciofluvial deposits are in the river valleys in the northwest corner of this area, in Pennsylvania. The lower portions of most hills are mantled with a layer of colluvium.

Climate

The average annual precipitation in this area is 33 to 68 inches (840 to 1,725 millimeters), increasing to the south and with elevation. The maximum precipitation occurs in spring and summer, and the minimum occurs in fall. Most of the rainfall occurs as high-intensity, convective thunderstorms. The average annual snowfall ranges from 35 inches (890 millimeters) in the southern part of the area to more than 90 inches (2,285 millimeters) in the northern part. The average annual temperature is 43 to 54 degrees F (6 to 12 degrees C). The freeze-free period averages 160 days and ranges from 115 to 205 days, decreasing in length to the north and with elevation.

Water

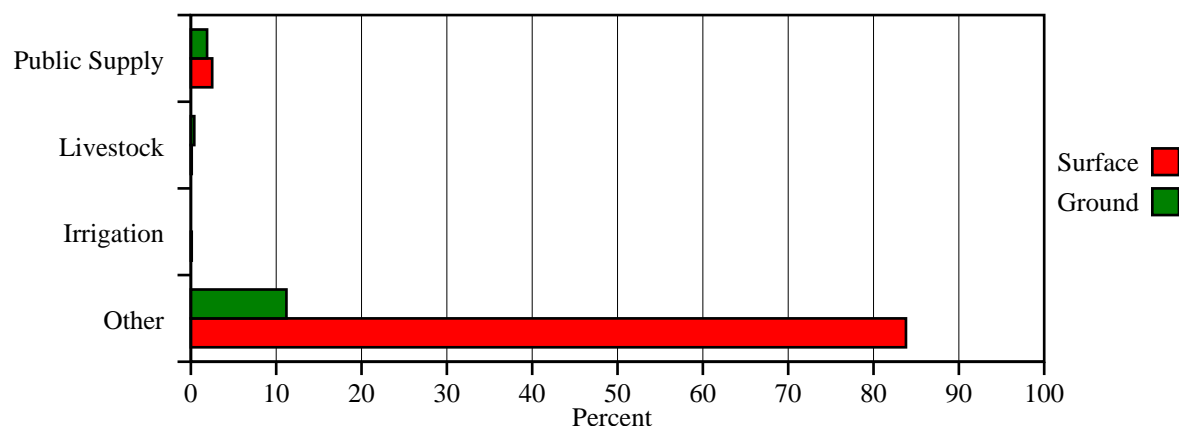
The total withdrawals average 2,465 million gallons per day (9,330 million liters per day). About 14 percent is from ground water sources, and 86 percent is from surface water sources. Water from farm ponds, reservoirs, and streams is plentiful. The several large reservoirs in the area include Deep Creek Lake, the Youghiogheny River Reservoir, and the Allegheny Reservoir. Deep Creek Lake, the largest reservoir in Maryland, is a popular summer recreation area. The quality of the surface water is impaired in a few streams because of acid mine drainage or municipal and industrial waste discharges.

Ground water is plentiful, although well yields and water quality are highly variable. Water from alluvium in the major river valleys in West Virginia commonly is used as drinking water. It is of good quality and requires little treatment.

In the rest of the area, alternating beds of sandstone, siltstone, shale, and limestone on uplands of the Appalachian Plateau are the primary sources of ground water. Coalbeds in the Pennsylvanian-age rocks also are considered aquifers. Ground water collected in coal mines commonly is used for industrial supplies. The water in these bedrock units is in fractures, in partings along bedding planes, and in solution openings in limestone. The different rock types and their elevation impact water quality. Hard water occurs in limestone- and shale-dominated layers, and soft water occurs in sandstone-dominated units. The water is freshest on ridgetops where active recharge occurs. Hardness and levels of iron, manganese, and total dissolved solids commonly increase from ridgetops to valley floors. The freshwater in the bedrock is on top of a layer of brine water, which is typically about 300 feet (90 meters) below the valley floors.

Manganese concentrations in the bedrock aquifers exceed the national drinking water standard of 50 parts per billion (micrograms per liter). The ground water is a calcium bicarbonate type where the level of total dissolved solids is less than 300 parts per million (milligrams per liter) and typically is a calcium sulfate type where the level exceeds 300 parts per million (milligrams per liter).

MLRA 127 Water Use by Category



Category (Surface,Ground): Public Supply (2.5, 1.9), LiveStock (0.1, 0.4), Irrigation (0.1, 0.0), Other (83.8, 11.2)

Soils

The dominant soil orders in this area are Ultisols and Inceptisols. The soils dominantly have a mesic or frigid soil temperature regime, a udic soil moisture regime, and mixed or siliceous mineralogy. They generally are moderately deep to very deep, excessively drained to somewhat poorly drained, and loamy. Fragiudults formed in colluvium on footslopes and alluvial fans (Buchanan and Ernest series) and in residuum on ridges (Cookport series). Endoaquults (Cavode series) and Dystrudepts (Dekalb and Hazleton series) formed in residuum on hills and ridges. Hapludults (Gilpin, Hartleton, Leck Kill, Rayne, and Wharton series) formed in residuum and/or till on hills and ridges. Frigid Dystrudepts (Leatherbark and Mandy series) and Fragiudepts (Simoda and Snowdog series) are at high elevations. Udorthents formed in material derived from the surface mining of coal in mesic areas (Cedarcreek and Kaymine series) and frigid areas (Briery series).

Biology

This area supports high-quality hardwoods. Oak, black cherry, yellow-poplar, maple, and other associated hardwoods are the principal species at the lower elevations. White pine, Virginia pine, and black walnut also occur but are of lesser extent. Red spruce, hemlock, birch, and maple species grow on the high mountains. Sugar maple, black cherry, and red oak commonly grow at intermediate elevations.

Some of the major wildlife species in this area are black bear, white-tailed deer, fox, beaver, raccoon, muskrat, mink, cottontail, gray squirrel, pheasant, ruffed grouse, woodcock, and mourning dove.

Land Use

Most of this area consists of farms. Corn, small grains, and forage for dairy and beef cattle are the principal crops grown in the area. Other important crops are potatoes and soybeans. Dairy, beef, and poultry farms are important enterprises. About three-fourths of the area is in hardwood forests. Most of the forestland is privately owned, although the area has large blocks of State forest and game lands and national forests. Less than one-tenth of the MLRA consists of urban areas and disturbed land, including surface-mined areas. Stabilizing and revegetating surface-mined areas and controlling acid drainage water from deep mines are major management concerns.

The major soil resource concerns are sheet and rill erosion on pasture, land slippage, subsidence caused by mining, streambank erosion, gully, surface compaction caused by livestock trampling, and a reduced content of organic matter on cropland. Conservation practices on cropland generally include crop rotations, contour farming, nutrient management, grassed and forested riparian buffers, cover crops, hayland planting, diversions, and grassed waterways. Pasture management includes rotational grazing, watering systems, fencing, managed livestock access to streams, pasture planting, and nutrient management. Forest management includes properly constructed forest harvest trails, critical area planting, and water bars on trails.

MLRA 127 Land Use by Category

