

Natural Newaygo

*...an identification guide to
the natural features of the
Newaygo area*



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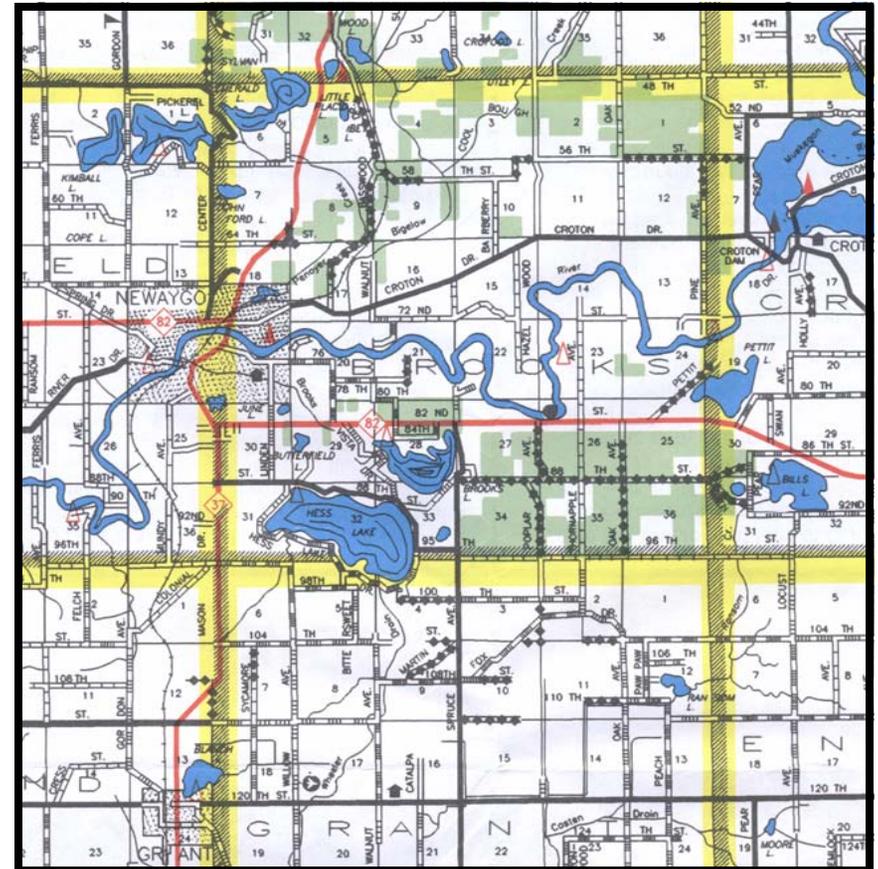
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Map of the Newaygo Area



Hiking Trails

North Country National Scenic Trail

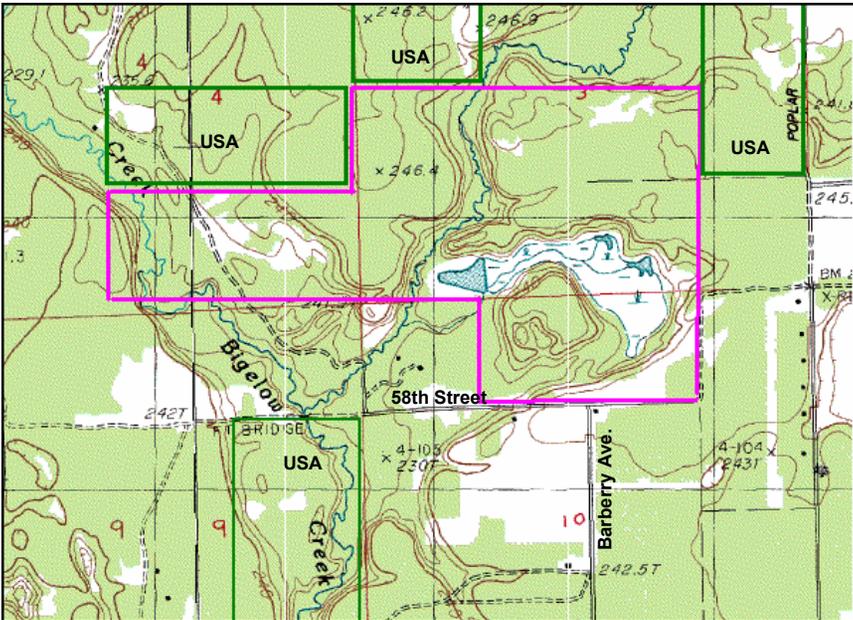
When completed, the North Country Trail will span 4,600 miles from New York to North Dakota. Over 1,700 miles of trail have been completed nationwide, including excellent segments through Newaygo County and the Manistee National Forest. Enthusiasts looking for an afternoon or weekend hike will find many accessible trailheads near Newaygo. A trail segment is planned for the Coolbough Natural Area. Another nearby trailhead is located on 40th Street, 0.5 mile west of M-37 and 3.5 miles north of Newaygo.

Regular hikes are sponsored by the West Michigan Chapter of the North Country Trail Association (NCTA). For trail maps or general inquiries, contact the NCTA at their Grand Rapids office at 616-454-5506 or visit their website at www.northcountrytrail.org.

Directions to the Coolbough Natural Areas

The Coolbough Natural Area is a 400-acre preserve owned by Brooks Township and jointly managed by the township and The Nature Conservancy. A volunteer group, the Coolbough Natural Areas Stewardship Team, assists in the management activities at the CNA. Contact Brooks Township for volunteer opportunities.

To get to the CNA, take Croton Drive 3.7 miles east of Newaygo to Barberrly Ave. Turn north on Barberrly; it will end after one mile at 58th Street along the southern boundary of the CNA. Turn right on 58th, which curves north at Hazelwood. The entrance to the CNA is on Hazelwood—look for the sign. The CNA is free and open to the public.



The following activities are allowed on the Coolbough Natural Areas:

- Hunting and fishing (in compliance with all applicable state regulations)
- Hiking, wildlife watching, cross-country skiing, and snow-shoeing
- Horseback riding (on the designated horse trail east of Coolbough Creek)
- Educational activities

These activities are not allowed on the Coolbough Natural Areas:

- No motor vehicles of any kind
- Camping
- Littering
- Permanent blinds or tree stands, or baiting or any kind
- Collection of plant or animal species

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Where is “Natural Newaygo”?

Natural Newaygo is intended to showcase the natural features of the Newaygo area. In this guide the term “Newaygo area” refers to the area within a six mile radius of the city of Newaygo. However, much of the information in *Natural Newaygo* applies to natural areas throughout Newaygo County. Directions to natural sites in the Newaygo area are on pages 28—31 of this guide. Contact the Newaygo County Tourist Council at 231-924-3501 or the Manistee National Forest ranger station in Baldwin at 231-745-4631 for more information about natural areas outside the Newaygo area.

Etiquette for Visiting Natural Areas

"Leave only footprints. Take only memories. Kill only time."

Caring for natural areas is the responsibility of all who visit them. Please observe the following guidelines when visiting *Natural Newaygo*.

General tips...

1. Please read all posted signs and regulations. They are intended to keep visitors safe and protect natural features.
2. Take out everything you bring in. Trash is unsightly and a danger to wildlife.
3. Leave the trail cleaner than you found it.
4. Keep the noise level down to a minimum. Your chances for seeing wildlife will increase and you'll avoid disturbing other visitors.
5. Stay on the trail. Trails are constructed to keep visitors off fragile vegetation and away from safety hazards.
6. Be aware that many privately owned parcels are scattered throughout publicly owned lands. Respect the rights of private property owners. Avoid trespassing, and always get permission before entering private property.

If you're backcountry camping...

1. Only build a fire when necessary. If you build a fire, conceal all traces of it before you leave - and make sure it's out!
2. Keep campsites at least 200 feet away from streams and rivers to avoid contamination of water resources, and at least 150 feet away from the nearest trail or road.
3. Camping is restricted within certain natural areas. Please check with the appropriate land managers for camping regulations. Contact the Baldwin ranger station at 231-745-4631 for camping information in the Manistee National Forest.

Viewing wildlife...

1. Do not feed, handle or remove wildlife. Their survival is threatened by improper exposure to human activity.
2. Avoid handling young wildlife, even if they appear injured or abandoned. It's probable that a parent is watching and waiting for you to leave.
3. Stay at a safe viewing distance. Use binoculars or blinds for a closer look.
4. Do not disturb dens or nests.
5. Move slowly and quietly.
6. Pets are best left at home when watching wildlife.

Plants and other natural features...

1. Do not remove plants or pick flowers. Many plants are endangered or threatened and it is unlawful to remove them. Even if a particular plant is not endangered, picking it means that the next visitor won't have the opportunity to enjoy its beauty.
2. Similarly, leave other natural items like feathers, egg shells and other natural elements where you find them. Allow others the excitement of discovering these natural treasures.

See pages 28—31 for directions to Newaygo's Natural Areas.

Brooks Lake Public Access

This DNR access is located on the northeast bay of Brooks Lake. Take M-82 east of Newaygo two miles. The public access is on the south side of the road.

Bills Lake Public Access

Bills Lake is located seven miles east of Newaygo on the south side of M-82. The access is on the northwest shore of the lake.

Pickerel Lake Public Access

Take M-37 north of Newaygo two miles to 56th Street. Turn west on 56th, go one mile to Centerline and turn south. Turn west on Pickerel Lake Dr. and follow the signs.

Wetlands

Camp Newaygo Wetland Trail

Take M-37 two miles north of Newaygo and turn west on 56th Street. Go one mile to Centerline and turn north. The road to the trailhead is less than one mile north of 56th on the west side of the road. Look for the Camp Newaygo Wetland Trail sign to direct you.

Coolbough Natural Areas Wetland System

This ten acre pond/wetland system is one of the focal points of the Coolbough Natural Areas. Visitors can easily walk around the perimeter of the wetland while traversing portions of a white pine - white oak forest system. See next page for directions.

Coastal Plain Marsh—88th Street Wetland Restoration Area

Take M-82 east of Newaygo three miles to Spruce Avenue. Go south on Spruce 0.75 mile to 88th Street. Go one mile east on 88th Street. The wetland is on the north side of the road. Please keep in mind that motor vehicles are not permitted in the wetland area.

Forests

Coolbough Natural Areas - White Pine/White Oak Forest System

This is the forest type that dominated large portions of the area prior to European settlement and is considered globally significant. See next page for directions.

Manistee National Forest

The area shaded light green on the map (next page) is managed by the US Forest Service and is open to the public. Visitors should recognize that not all property is accessible for all activities. For example, the operation of off-road vehicles is only permitted on roads specifically marked "OPEN" for ORV or ATV use. For trail maps or more information on specific activities permitted in the Manistee National Forest, contact the Baldwin ranger station at 231-745-4631.

DNR Forest Area along the Muskegon River

The Michigan Department of Natural Resources also manages land near Newaygo. A beautiful section of riparian forest is located northeast of the High Rollway public access on the Muskegon River. Over 125 acres and nearly one mile of Muskegon River shoreline are available for the angler, hiker, birder or outdoor enthusiast to enjoy. Take M-82 east of Newaygo 4.5 miles to Thornapple. Turn north on Thornapple and go 1.25 miles to 72nd Street. Turn east on 72nd. It will dead end after a half mile at the DNR property.

Sailors Virgin Pine Forest

This is one of few remaining virgin pine stands left in Michigan. Dedicated for permanent preservation and owned by James Sailors, these pines are reminiscent of what would have been seen in the 1800s. Some are over two feet in diameter and over 100 feet tall. Sailors' Pines is located on 52nd Street, 0.25 mile east of Locust.

Nature is abundant in Newaygo! The following sites are open to the public.

Prairies

Ronald O. Kapp Memorial Prairie, located on the Coolbough Natural Area

Visitors can enjoy many of the unique natural features of the Newaygo area at the Coolbough Natural Area, including dry sand prairies and barrens. The prairie is located on the western end of the property. See page 30 for directions to the CNA.

Michigan Nature Association Preserve

The Michigan Nature Association owns a 110-acre prairie remnant on Poplar Ave. north of Croton Drive. The property is open to the public, and visitors should observe the rules posted at various locations on the property. Direct inquiries about the preserve to:

Michigan Nature Association; P.O. Box 102; Avoca, Michigan 48006
Phone: 810-387-3771 Toll free: 1-866-223-2231 Email: mna@greatlakes.net

Prairie restoration in the Manistee National Forest

The US Forest Service has removed select red pine plantations to restore the land back to a prairie and barrens ecosystem. An example is visible along 48th Street in the north-east part of Brooks Township. Take Croton Drive east of Newaygo four miles to Poplar. Turn north on Poplar two miles until you reach 48th Street.

Prairie in the Manistee National Forest

Remnant prairie can also be explored southeast of Newaygo. Although not as biologically diverse as other remnant prairie locations in the area, this location is nonetheless an accessible example of prairie remnants. To visit this site, take M-82 east of Newaygo five miles to Oak Ave. Go south on Oak one mile until you reach the prairie area. Motor vehicles are not allowed on the prairie. Park along the road and enjoy the prairie on foot.

Muskegon River and Lakes

Henning Park

Henning Park is part of the Newaygo County Parks system. A motor vehicle pass is required, and camping and other facilities are available in addition to river access. Henning Park is located on Croton Drive in Newaygo.

High Rollway Public Access

A boat launch, outhouses and a natural area are available at this DNR site. Take M-82 east of Newaygo 4.5 miles and turn north on Thornapple Avenue. The road to the access is one mile north on the left.

Pine Street Public Access

Less than one mile downstream from the Croton Dam, this DNR site provides a boat launch and outhouses. Take Croton Drive six miles east of Newaygo to Pine Avenue. Turn south on Pine, and follow the signs to the public access.

Hess Lake Public Access

This DNR site is situated on the northwest shore of the Newaygo area's largest lake. To reach the access, take M-37 south of Newaygo one mile to 88th Street. Turn east on 88th Street. The access is on the corner of 88th and Redwood Drive.

Blanch Lake Park

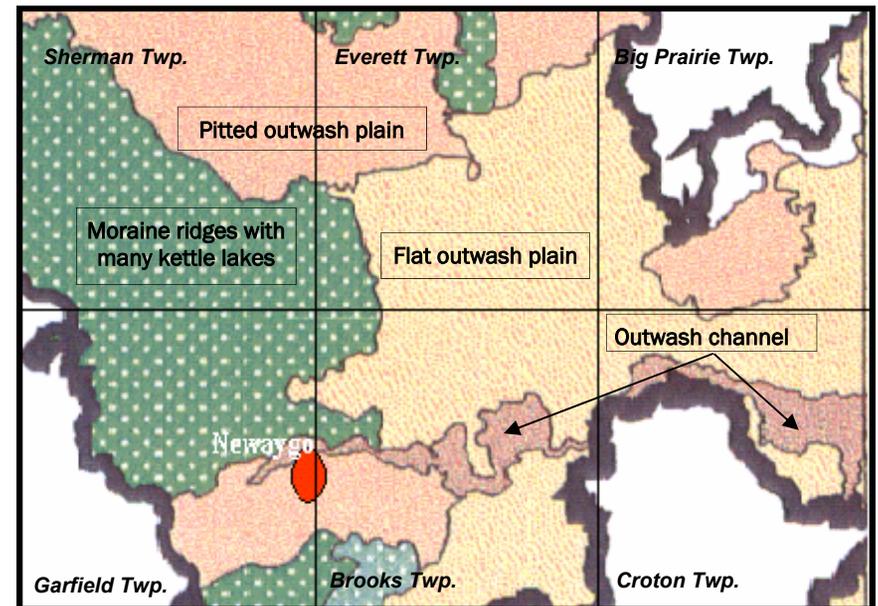
Take M-37 south of Newaygo five miles to State Street in Grant (at the stop light) and turn east. Go to Park Drive and turn north. The park is on the south side of Blanch Lake.

Twinwood Lake

Go north of Newaygo four miles to 40th Street and turn east. Turn immediately south on Basswood. Twinwood Lake is located in the Manistee National Forest.

The location and composition of Newaygo's natural features—lakes, streams, forests and prairies—are closely linked to the area's glacial past. The last major glacial advance and retreat, known as the Wisconsin Glaciation, ended approximately 10,000 years ago. During that time huge sheets of ice carved the land, bulldozing materials like sand and boulders from one location to another.

In some areas, glaciers deposited their load of unsorted debris in hills known as *moraines*. In other areas, melt water carried materials away from the glacier. The heaviest sediments remained close to the glacial front. Lighter materials like clay and silt were carried the farthest by the melt water. These expanses of sorted glacial materials are known as *outwash plains*.



Graphic modified with permission from "Landtype Association of The Newaygo Outwash Plain: Sub-section VII.3"; Corner, R.A. et. al.; Michigan Natural Features Inventory Report Number 1999-04; May 1999.

Newaygo's outwash plains are primarily composed of sand, which does not hold water or nutrients very well. Widespread wildfires were relatively common on the flattest expanses of outwash plain, and the plant communities that developed were a result of these environmental conditions.

The moraine ridges are composed of a mixture of unsorted material. Their irregular topography and greater moisture-holding capability did not favor widespread wildfires. Because of this, different plant communities developed on the moraines.

Muskegon River Watershed



The glacial processes that shaped Newaygo's landscape also created the Muskegon River Watershed. A watershed is more than just a river or a stream. It is an entire geographical area where all the water drains to a common point. The Muskegon is Michigan's second largest watershed, larger than the state of Delaware. The city of Newaygo and the adjoining townships are almost entirely within this 2,634 square mile system.

History of the Muskegon River Watershed

From the time it was formed until European settlers immigrated to the area in the early 1800s, the Muskegon River experienced little alteration from human activity. The big change came in 1837 when the first sawmill opened on the Muskegon River. For the next 70 years logging swept through Michigan. The forests were cut clear, and rivers served to transport the hewn logs to the mills.



Log jam on the Muskegon River in the 1800s.



Evidence of log rolling on the river banks.

The annual rush of wood down the Muskegon River was sufficient to scar the riverbed and bulldoze its banks. Vegetation was stripped from the shore as newly-cut logs were rolled down the slopes. The sandy banks along the Muskegon slid into the river along with the timber, resulting in excessive erosion and sedimentation. Scars from this period of the river's history are still visible today.

Eurasian Water Milfoil

Native to Europe and Asia, this plant was discovered in the United States in the 1940s and has since spread to 40 states. It grows rapidly, even from small plant fragments, and is easily transported by watercraft. It forms dense mats that interfere with boating and recreation. Plus, it competes with native plant species, displacing wildlife that rely on native plants. Eurasian water milfoil can be easily confused with native milfoil. Eurasian milfoil usually has 12–21 leaflet pairs as opposed to 5–10 leaflet pairs generally found on native milfoil.



USDA, NRCS, 1997
Northeastern Wetlands Flora

Purple Loosestrife

A showy plant, purple loosestrife was introduced in the early 1800s for ornamental reasons. It has since spread throughout wetlands and shorelines areas, displacing native species and disrupting the food chain. Purple loosestrife can produce up to 2.5 million seeds per year, and can also reproduce by root fragments, each of which can grow into a new colony. Because of its aggressive reproduction habits, eradication of established colonies is difficult. Currently under study, biological control measures may prove effective in managing this exotic species.



John M. Schoenecker
Wisconsin State Herbarium

Spotted Knapweed

A Eurasian native, this plant was probably introduced in the 1890s mixed with imported alfalfa or hay seed. It has spread throughout the United States, and poses a serious threat to prairie habitat. An individual plant can produce as many as 1,000 seeds a year, and the seeds can remain viable in the soil for up to seven years. Spotted knapweed has the advantage of being allelopathic, meaning that it releases a substance into the soil that inhibits the germination of other plants.



Kenneth J. Syltsma
Wisconsin State Herbarium

Common St. Johnswort

Native to Europe, this perennial was problematic for pasturelands in the west until an Australian beetle was introduced to control it. Many states still list St. Johnswort as a noxious weed. It contains a toxic substance which can cause second degree burns in some individuals, and may cause some animals to develop a sensitivity to sunlight when ingested. If enough is eaten, death may result. Interestingly, St. Johnswort is being studied as a possible treatment for AIDS. A chemical compound in the leaves and flowers called hypericin may be effective against viruses such as Equine Infectious Anemia Virus (EIAV) and Human Immunodeficiency Virus (HIV).



Michael Clayton
Wisconsin State Herbarium

Exotic Invaders—Threats to Native Ecosystems

Exotic species are plants and animals that do not originate from a given location, but were imported accidentally or purposely, usually from other continents. Many exotic species encounter limited or no competition in their new environment and aggressively compete with native species. Since many native species have not developed adaptations to compete with invaders, exotic species often become a form of biological pollution in the environment. The following are some problematic exotic species in the Newaygo area.



Left—female; right—male

Gypsy Moth

The gypsy moth, a native to Europe and Asia, was introduced in the United States in 1869. This pest has few natural predators, and its taste for over 600 species of trees and shrubs, especially oak, has cost federal, state and local governments millions of dollars in tree damage and control measures. Since eradication is nearly impossible, control efforts will continue indefinitely.



Zebra Mussel

Native to the Ukraine and Russia, zebra mussels were introduced in the 1980s from a transatlantic freighter that dumped its ballast water in the Great Lakes. Since then, they have spread throughout the Midwest and eastern United States. Zebra mussels filter microscopic algae from the water, which leads to increased water clarity. This allows more sunlight to penetrate the water column and spurs on additional aquatic plant growth. Zebra mussels also attach to a variety of surfaces, including hard shelled organisms, water intake pipes, boats and docks. At this time there is no effective control measure against zebra mussels.



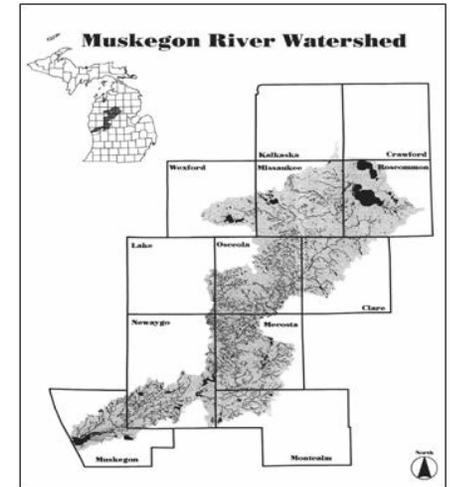
New York State Department of Environmental Conservation

Sea Lamprey

Although the Great Lakes host many native lamprey species, the sea lamprey is indigenous to the Atlantic Ocean. A primitive, jawless fish, it made its way to the Great Lakes in the early 1800s through locks and shipping canals. Sea lamprey have suction cup-like mouths and feed on the blood of other fish. By the 1940s they had caused extensive damage to many fish species, especially lake trout. Sea lamprey spawn in streams and rivers, including the Muskegon. Control measures have reduced the impact of this non-native species.

Tributaries of the Muskegon River

Watersheds can be divided into smaller units called subwatersheds. For example, the Muskegon River watershed is a part of the larger Lake Michigan watershed. The Muskegon River is made up of many smaller subwatersheds, three of which cover the Newaygo area. The biggest is the Bigelow Creek subwatershed, which includes Coolbough Creek (on some maps labeled Cold Creek) and reaches as far north as White Cloud.



GVSU—Annis Water Resources Institute

Bigelow Creek



Bigelow Creek is a high-quality cold water tributary of the Muskegon River, and is particularly noted for its trout fishing. This stream primarily flows through steeply forested lands on its journey to the Muskegon River. Bigelow Creek is accessible on various public lands throughout the Newaygo area, including a stretch through the Manistee National Forest on 58th Street one mile west of Barbary Avenue, and along the west side of the Coolbough Natural Area. Coolbough Creek, a major tributary to Bigelow Creek, is also accessible at the Coolbough Natural Area.

Penoyer Creek



Penoyer Creek is formed where the outlets of Emerald and Pickerel Lakes converge. Sylvan, Kimball and Long Lakes, as well as a number of other small lakes, are connected to the Penoyer Creek subwatershed through a series of small streams. Penoyer Creek flows through heavily wooded, steep-banked terrain before discharging into the Muskegon River. Although it has a warm water source, Penoyer Creek is considered a cold water tributary due to its relatively short course, its steep sandy banks and a large influx of cold groundwater. At the mouth of Penoyer Creek are two dams, one of which dates from 1915 and served as a small hydroelectric facility.

The Muskegon River Today

Brooks Creek



The third subwatershed in the Newaygo area is the Hess Lake watershed. This is the most heavily developed watershed in the Newaygo area, and extends south of Newaygo to include Blanch Lake, Wheeler Drain and Alger Creek. This water flows north into Hess Lake, which empties into Brooks Lake. Brooks Lake discharges into Brooks Creek, which flows northwest through Brooks Township and the City of Newaygo. Along the first mile of its two-mile journey, this warm-water stream flows primarily through wetlands. Once into the City of Newaygo, Brooks Creek flows through residential and commercial areas before discharging into the Muskegon River.

The Muskegon River Today

According to scientists and conservationists, the Muskegon River is at a crossroads. As a cool water stream, it is noted for its biological diversity and is capable of supporting species found in both warm water and cold water river systems. However, increased development, runoff, erosion and pollution, along with the continued effects of the many dams throughout the watershed, threaten to shift the balance. If nothing is done the Muskegon River could become a shallow, murky, warm water system, a nearly irreversible transformation.

Currently, one of the biggest debates regarding the health of the river centers on the many dams found throughout the system. Of the 95 dams in the Muskegon River watershed, 15 are in Newaygo County. This includes Croton and Hardy Dams, two of the three hydroelectric dams along the river. The reservoirs behind these dams provide many recreational opportunities for residents and visitors alike. Boating, fishing, wildlife watching, camping, and hiking can all be enjoyed behind the dams. Despite the recreational opportunities, the debate continues over the costs and benefits of the dams.

Muskegon River Stats

Size — 2,634 square miles
Length — 219 miles

Historical native fish species—97
Present native fish species—77
Exotic fish species—12

Significant natural features in the Muskegon River watershed:

- 207 species of breeding birds
- Great blue heron rookery
- Bald eagle nesting area
- Blue ribbon trout streams
- Special plant communities—dry sand prairie, coastal plain marsh

Ottoe Skipper—*Hesperia ottoe*

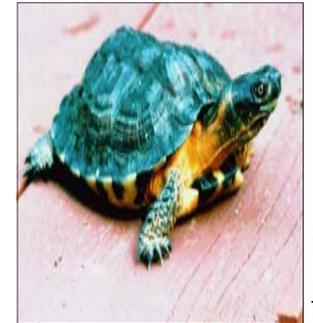
Like the Karner blue, this threatened butterfly makes its home on prairies and barrens. With a 1"-1.5" wingspan, the Ottoe skipper isn't much larger than the Karner. However, its mostly orangish coloring makes it more difficult to spot. Females can be distinguished from males by the yellowish spots that occur on the upper side of the female. Black patches occur on the forewing of the male. The caterpillar is greenish brown with a dark brown head and eats grasses like little bluestem. The best time to see adults is between mid-June to mid-August, feeding on the nectar of flowers like prickly pear cactus.



Robert Dana

Wood Turtle—*Clemmys insculpta*

Sandy banks along the Muskegon River surrounded by forested land make prime habitat for the wood turtle. Listed as a special concern species in Michigan, the wood turtle is especially threatened by illegal collection. This long-tailed turtle has a rough upper shell, which is 6"-8" long and bears concentrically grooved pyramids on each of the large plates. The upper shell is brown, and the neck and forelegs are reddish. The wood turtle can live to be 60 years old and eats a variety of material including algae, leaves and berries, insects, mollusks, crayfish and tadpoles. Be aware that turtles cannot be collected in Michigan without a permit.



Jeff Phillips

Blanding's Turtle—*Emydoidea blandingii*

Ranging from 6"-11" long, the Blanding's turtle has a yellow chin and throat and a black upper shell with yellow specks and streaks. Its dark brown head is also covered with yellow spots. They are best seen between April and October and are most active in the mornings. Blanding's turtles are omnivorous and prefer clean, shallow water habitats filled with plentiful vegetation. This species is listed as special concern due to increasing threats from habitat loss and water pollution.



Photo by J. H. Harding

James Harding

Many other wildlife species make their home in the Newaygo area.

Mammals: Bats, cottontail rabbit, snowshoe hare, squirrels, white-tailed deer, black bear, raccoon, fox, coyote, beaver, mink, muskrat, and otter.

Reptiles and Amphibians: various frog, toad, salamander, snake, and turtle species.

Birds: songbirds; eagle, hawk and other raptor species; upland game species like turkey, pheasant, ruffed grouse, quail, and woodcock; water species like Great blue heron, kingfisher, black crowned night heron, loon, Canada goose, swan and other waterfowl.

Fishes: See page 11 for selected fish species of the Newaygo area.

US Fish and Wildlife Service



Bald Eagle—*Haliaeetus leucocephalus*
 Bald eagles have regularly nested along the Muskegon River and in other places in Newaygo County. However, they are still classified as threatened at both the state and federal authorities. Although these are large and powerful birds, they are very sensitive to the environment around them, including human disturbances—so keep your distance. With their white heads and large bodies, bald eagles are easy to identify.

George Raichte



Red-shouldered Hawk—*Buteo lineatus*
 This hawk is distinguished from other hawks by its reddish underside; five to six narrow, white tail bands; wider, more rounded tail; and broader, longer wings. The best time to see one is in late February to early March when mating pairs return to their breeding grounds. Red-shouldered hawks inhabit mature forested floodplains and mature deciduous or mixed forests near wetlands. Nests are typically 35-40 feet above the ground in a crotch 1/2 to 2/3 of the way up the tree. Red-shouldered hawks are threatened in Michigan.

C. S. Robbins
 US Geological Survey

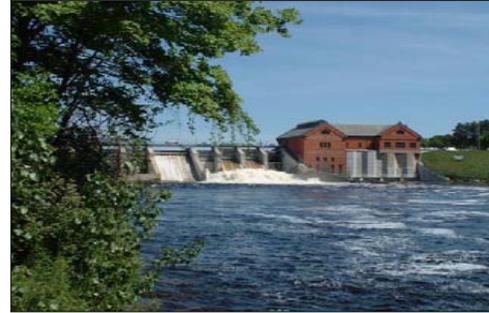


Golden-winged Warbler—*Vermivora chryoptera*
 This active, insect-eating bird has a thin, very pointed bill; a yellow forehead; a yellow patch on the wing; and a black mask and throat. Approximately 4.25 inches long, this is one of the smaller birds you may see around Newaygo. Though not listed as threatened, the continued loss of habitat may place this bird on the list soon. Look for this warbler in shrubby fields and wetlands.

US Fish and Wildlife Service



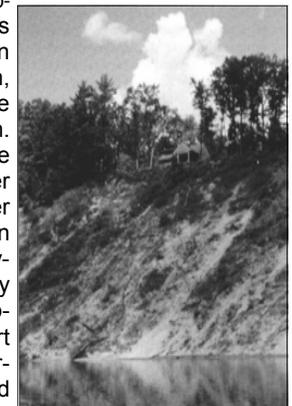
Karner Blue Butterfly—*Lycaeides melissa samuelis*
 This small butterfly has been the focus of much attention. Since the 1980s its population has decreased by nearly 99 percent. In 1992 it was listed as endangered, and much effort has gone into protecting both the butterfly and the prairies and barrens it calls home. With a one-inch wingspan, the Karner is small but strikingly blue (although the female is more grayish-brown). Eggs hatch two times a year, usually in April and again in June. The light green caterpillars are difficult to see. They blend well with the wild lupine, which is the caterpillar's sole food. The best time to see adult butterflies is late May to early June and again in July.



Since the Muskegon River's first hydroelectric dam - the Newaygo Dam - was completed in 1900, users have enjoyed the benefits and dealt with the consequences of dams. Opponents of the dams continue to question whether the benefits outweigh the costs. Below are some of the pros and cons associated with hydroelectric dams along the Muskegon River.

Pros	Cons
Electricity generated without air pollution or nuclear waste.	Thousands of fish are killed each year in the turbines.
Reservoirs trap sediment and potentially harmful nutrients like phosphorus and nitrates.	Reservoirs submerge sections of the river with the steepest slope, which scientists contend would provide the best aquatic habitat.
Dams provide some flood control.	Naturally-fluctuating water levels are disrupted.
Dams lock upstream passage of exotic species and fish contaminated with PCB's, mercury and other toxics.	Dams block one river segment from the next, preventing fish and other aquatic species from moving past these imposing barriers.
Reservoirs provide suitable waterfowl habitat, and are available for boating, fishing and other recreational activities.	Water is warmed in reservoirs, increasing downstream water temperatures and lowering dissolved oxygen available to aquatic life.

The Croton Dam is a well known landmark in the Newaygo area. Many people enjoy the activities afforded by the dam, including camping, picnicking, hiking, swimming, boating and fishing. On the other hand, others argue that the same activities can be enjoyed without the dam and without the ongoing ecological problems associated with the dam. One of these problems is stream bank erosion. Although recent modifications in operations at Croton Dam will alleviate the problem, damage has already been done. Estimates to correct the largest eroding bank in Brooks Township top \$1 million. To add to the debate, the Muskegon produces more salmon smolts, about 1.5 million annually, than any other Michigan river. Some DNR fish biologists claim the river could produce enough salmon to supply Lake Michigan and Lake Huron—eliminating the need for hatchery-produced fish—if salmon could bypass the Croton, Hardy and Rogers hydroelectric dams and spawn in areas upstream. With conservation groups focusing more effort on protecting and improving the Muskegon River watershed, the debate over dams isn't likely to be resolved soon.



Newaygo Conservation District

Lakes



Brooks Lake public access

Lakes are scattered across the Newaygo landscape, and are integral components of the Muskegon River watershed. Ranging in size from a few acres to hundreds of acres, these lakes date back to the most recent glacial times. As the glaciers receded, they deposited material like boulders, sand, gravel, and clay. Mixed in with this glacial debris were chunks of ice—much like raisins in a cookie. In time the ice blocks melted, leaving water-filled pits called *kettles*. Most of the lakes throughout the Newaygo area are kettle lakes.

Over time, sediment from the surrounding watershed washes into lakes. Many lakes will eventually fill with sediment, becoming wetlands and in time dry land. This natural aging process is called *eutrophication*, and can take hundreds to thousands of years to occur. Depending on where a lake is in its aging process it is classified as *oligotrophic*, *mesotrophic* or *eutrophic*. Unfortunately, many human activities can speed up the eutrophication process and lead to unnatural conditions. Fertilizers, septic systems, road runoff, animal wastes, and contaminated stormwater runoff all lead to increased eutrophication.

Oligotrophic	Mesotrophic	Eutrophic
Very little aging of the lake has occurred. There is very little nutrient buildup and little plant and algae growth. Typically the water looks very clear. These types of lakes are usually deep, and the bottom is most likely sand or marl. Oligotrophic lakes generally support cold water fish like trout.	Mesotrophic lakes show some signs of aging. Some buildup of nutrients has occurred, and plant and algae growth is greater than in oligotrophic lakes. Water clarity is generally lower due to more plant growth. However, recreational activities like swimming and boating can usually be enjoyed without interference from excessive plant growth.	Eutrophic lakes are farther along in the aging process. They have higher levels of nutrients like phosphorus and nitrates, and are able to support greater amounts of aquatic plant growth. Clarity can be lower due to algae cells in the water. Eutrophic lakes are generally shallow with mucky bottoms. They support warm water fish like bass and bluegill.
Lake Michigan is an example of an oligotrophic lake.	Emerald and Sylvan Lakes are examples of mesotrophic lakes.	Hess and Brooks Lakes are examples of eutrophic lakes.

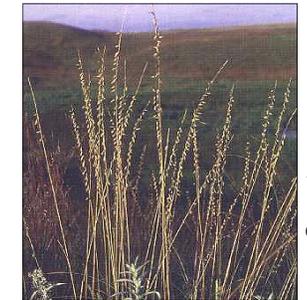
Hoary Puccoon—*Lithospermum canescens*

Hoary puccoon is a perennial that blooms mid-May to early June. In addition to dry sand prairie remnants, it is found throughout Lake Michigan sand dunes. Hoary puccoon grows between 8"-12" tall and is covered with a dense, white down. Its bright golden yellow flowers are distinctly tube-shaped.



Side-oats Grama—*Bouteloua curtipendula*

This perennial, warm season grass grows between 1 to 3 feet tall. It is classified as a warm season grass because it grows best during the hot summer months. Side-oats grama has small seeds that are evenly lined up on one side of the stem. Additionally, the leaf blade has hairs and bumps along its edges. Side-oats grama is classified as threatened in Michigan.



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Big Bluestem—*Andropogon gerardii*

Big bluestem is a perennial, warm season grass that, on average, grows 3 to 8 feet tall. Big bluestem is also known as turkey track grass because the seed head resembles a turkey's foot. Mature plants have a reddish appearance in the fall, when the normally blue-green stem changes color. Like other warm season grasses, big bluestem is valued for the wildlife habitat it provides.



Little Bluestem—*Schizachyrium scoparium*

Little bluestem is the dominant native grass on Newaygo's dry sand prairies. It is a perennial, warm season grass that grows 2 to 4 feet tall. The bottom shoots are bluish in color, and mature plants turn a golden brown color in the fall. Like other warm season grasses, little bluestem is a bunch grass, meaning that it grows in clumps. Little bluestem is also similar to other warm season grasses in that it develops a deep root system, an important adaptation on the prairie.





Wild Lupine—*Lupinus perennis*
A perennial that flowers in the early spring, wild lupine is the sole source of food for the larvae of the federally endangered Karner blue butterfly. Its flowers are generally a lavender-bluish color, although they can also be pink or white. Interestingly, lupine is in the same family as peas (legume). Legumes have the ability to fix nitrogen in the soil, an important adaptation on the nutrient-poor prairie.



Prairie Smoke—*Geum triflorum*
Prairie smoke is a perennial that flowers in mid-May. It has clusters of pale pink hair-like structures (which are actually fruit) that look like smoke from a distance. Prairie smoke grows about one foot tall from a thick root. Its leaves are about six inches long. Also known as prairie avens or purple avens, this unique plant is classified as threatened in Michigan.



Prickly Pear Cactus—*Opuntia humifusa*
This native Michigan cactus is a perennial that flowers in late June or early July. Usually 3"-4" in height, prickly pear is a low growing cactus that grows in clumps. Its bright yellow flowers and distinctive cactus appearance makes it easy to identify throughout Newaygo's prairies.



Western Silvery Aster—*Aster sericus*
Western silvery aster is a perennial that flowers in late September and October. Its small leaves are covered with small silvery hairs, and its flowers are purple with yellow centers. Western silvery aster is listed as threatened in the state of Michigan. Once abundant, it was recently found in only five areas in Newaygo County.

Kenneth J. Sysma
Wisconsin State Herbarium

William Tans
Wisconsin State Herbarium

Visiting Newaygo Lakes

Lakes offer many recreational opportunities, including fishing, swimming, canoeing or kayaking. However, lake users should keep in mind that most Newaygo lakes are populated by year-round residents and certain guidelines should be followed.

Many of the public access sites have rules posted for safe and enjoyable lake use. Be sure to read and follow all of these guidelines. If you are operating a personal watercraft, it is your responsibility to know all applicable rules and regulations, both state and local. Always operate in a responsible manner and respect other lake users and ecologically sensitive areas.



Hess Lake Association

Hess Lake public access

Lakes with public access	Facilities (Directions to these lakes are found on pages 28-29 of this guide.)
Bills	DNR— boat ramp and outhouse
Blanch	Grant Twp. Park—boat ramp, outhouses, picnic area and playground
Brooks	DNR— boat ramp, outhouse, and nearly 15 acres of wooded area
Hess	DNR— boat ramp and outhouse. Largest lake in the Newaygo area.
Pickerel	DNR— boat ramp and beach. Kimball, Emerald and Sylvan Lakes are accessible via Pickerel Lake if using a small boat.
Twinwood	USFS—boat ramp, outhouses, and campground

Selected fish species in the Muskegon River Watershed:

The Newaygo area is a fisherman's paradise. These are just some of the fish species to look for in Natural Newaygo.



Sylvan Lake

Muskegon River:

- Brown trout
- Chinook salmon
- Rainbow trout
- Steelhead

Newaygo Lakes:

- Bluegill
- Largemouth bass
- Northern pike
- Speckled bass
- Walleye
- Yellow perch

Threatened Fish Species:

- Lake sturgeon
- River herring

Wetlands



From clean water to wildlife habitat, wetlands provide many crucial ecological functions. Wetlands are also incredibly biologically diverse ecosystems, which makes for an exciting visit. Newaygo is fortunate to have a variety of wetlands, including two unusual wetland types: bogs and coastal plain marshes.

Wetland Indicators

Some wetlands are very noticeable, with standing water and obvious wetland vegetation like cattail and water lily. However, some wetlands aren't so apparent. Seasonal wetlands only have standing water for part of the year and may dry out at times. Nevertheless, all wetlands have three basic characteristics: 1) hydric soils, which only develop under saturated conditions (check the Newaygo Conservation District or the Newaygo County Soil Survey for a map of hydric soils); 2) evidence of standing water during some part of the growing season (like water marks on surrounding vegetation); and 3) wetland vegetation.

Value of Wetlands

Wetlands play a crucial role in the maintenance of our water and wildlife resources. In addition to their aesthetic value, wetlands provide the following measurable ecological functions.

- Provide wildlife habitat—permanent homes for some wildlife, nesting sites for others, and resting and feeding spots for migratory waterfowl.
- Reduce risk of devastating floods.
- Filter sediments, nutrients and other contaminants from water.
- Recharge groundwater.
- Provide recreational opportunities like wildlife watching.



Jeff Phillips

Changing Times—Changing Landscapes

Before immigrants settled the Newaygo area in the early 1800s, prairie openings of 600 to 1,500 acres were common. The Marengo Prairie was one of these openings, and covered parts of Brooks, Croton and Everett Townships. Little Scherrar Prairie was another prairie opening, and remnants of this prairie remain southeast of Newaygo.

The lack of trees made prairies attractive places for early settlers to farm. However, since prairie soils are mostly sand, farmers had little success. Many sites were abandoned, leaving the disturbed prairies open to soil erosion. During the dust-bowl era of the 1930s, many prairie sites were planted with red pine seedlings, resulting in many of the red pine plantations we see today.



Newaygo County Historical Museum

Tourists on the Big Prairie Desert, Newaygo.



Settlers brought many other changes to the prairie. Plants from their homelands in Europe and Asia found their way into the prairie landscape, where they had no natural competitors to keep them in check. Today, natural resource managers are struggling to keep plants like spotted knapweed and common St. Johnswort from taking over remaining prairie areas.

Wildfire suppression has also affected the prairies. Fire is the prairie's defense against forest succession, and without it the prairies lose out to forests. Furthermore, residential and commercial development have taken over many historic prairie sites. As a result, only a small amount of the original prairie remains today.

Newaygo Prairies Today

In total, less than 1% of the prairie acreage of the 1830s remain. Dry sand prairies are now considered globally rare, and the plant and animal species that exist solely on prairies are threatened as well. Because of their ecological importance and because they are examples of Newaygo's natural heritage, efforts are being made to protect and restore this uncommon ecosystem. Volunteer workdays are organized to remove invasive species from the Newaygo prairies. Additionally, land managers periodically burn prairies and barrens to enhance and restore them. During a burn, managers follow specific burn plans to alleviate smoke problems, maintain control lines, meet ecological objectives and protect public safety. Prescribed fire and hand removal are two of the tools used to restore this significant and beautiful part of natural Newaygo.



Prairies are diverse and unique ecosystems, dominated by grasses and wildflowers rather than trees or shrubs. Like prairies, barrens (or savannas) are grass dominated landscapes. However, trees like white oak and white pine are commonly scattered throughout barrens, much like a park setting. Barrens serve as an important transition zone between prairies and forests. Together, prairies and barrens form an interconnected ecosystem that provide habitat for a diversity of plant and animal species.

Origin of Newaygo's Prairies

The formation of Newaygo's prairies was set in motion 10,000 to 15,000 years ago when glaciers dominated the landscape. Those areas where glaciers deposited flat, sandy outwash plains are where we find dry sand prairies today.



Prescribed burn on the Ronald O. Kapp Memorial Prairie helps restore this rare ecosystem.

Since sand doesn't hold water or nutrients very well, plants developed characteristics to withstand the harsh conditions of the dry sand prairie. These plants also developed adaptations to fire, a necessary component of the prairie ecosystem. Without the periodic fires sparked by lightning or Native Americans, surrounding forests would have overtaken Newaygo's dry sand prairies. Because of the specific adaptations plants developed to withstand the conditions of the prairie, many species of the dry sand prairie are found only in these special areas.

The Nature Conservancy

Bog



Bogs usually form in poorly drained lakes or ponds when vegetation spreads over the water to form a floating mat. Often dominated by sphagnum moss, this mat thickens over time to the point where it can support trees, shrubs and other vegetation.

Sphagnum moss significantly influences bog conditions. Not only can it hold 10-20 times its weight in water, but it absorbs minerals from the water and releases hydrogen ions in return. This process results in water so



acidic that many plants have developed special adaptations to survive.

Visiting Bogs in the Newaygo area

The most prominent example of a bog is Camp Newaygo's Wetland Trail. The 1.25 mile boardwalk is the only one in Michigan to cross a sphagnum bog.

Because a bog is literally a floating mat of sphagnum moss, it is possible to fall through the moss mat and become trapped. Stay on the boardwalk at all times when visiting this bog.

Coastal Plain Marsh



Coastal plain marshes are found only in the Great Lakes region. They are home to more than 40 rare plant species, including species typically associated with Atlantic coastal wetlands. They generally occur in small, isolated depressions on sandy, glacial outwash plains and are very sensitive to disturbances.

A grass and rush dominated community, coastal plain marshes may look different year to year and season to season due to fluctuations in groundwater levels. Some plants only emerge in low-water times as seeds in the soil are exposed. Coastal plain marshes may also exhibit a bulls-eye pattern in vegetation growth. The center of the marsh may be open water, surrounded in a circular pattern by different types of wetland vegetation.

Visiting Coastal Plain Marshes in the Newaygo area

The Manistee National Forest is home to several coastal plain marshes. Unfortunately, many have been damaged by off-road vehicle use. Visitors should note that it is illegal to operate any motor vehicle in any type of wetland. The best way to enjoy these fragile ecosystems is on foot.

Select Wetland and Riparian Plants

William S. Justice
USDA, NRCS @ PLANTS



Jewelweed is a common sight in local wetlands. It has small, bright orange flowers that bloom late summer through early fall. Jewelweed is also known by a second name, spotted touch-me-not, because when the seed pods are ripe they will “explode” with the slightest touch.

Joe-pye weed and **boneset** are closely related. In the same genus, they prefer damp soils and typically grow 6’ or taller. Both have downy-looking flowers which bloom late summer through early fall. Joe-pye weed (shown above) is pinkish-purple. Boneset looks very similar, but its flowers are white.



Robert R. Kowal
Wisconsin State Herbarium



Jack-in-the-pulpit is a spring wildflower which is identified by a hood that arches over the rest of the plant. The upper part is often striped, either green or purplish-brown. Also known as Indian turnip, Jack-in-the-pulpit produces red berries in the fall. Jack-in-the-pulpit is found in bogs as well as upland forest systems.

Arrowhead, also called duck potato because of its edible root, is identified by its arrow-shaped leaves. The leaves grow anywhere from 2” - 16” long, and can be either broad or narrow. Arrowhead’s white flowers bloom from an upward growing stem in late summer and early fall.



USDA, NRCS @ PLANTS

William S. Justice
USDA, NRCS @ PLANTS



Cinnamon fern is one of many ferns found in wetland areas. It gets its name from the cinnamon colored tuft that tops the plant in the spring. In the autumn the leaves turn a cinnamon brown color. Other common ferns found in Newaygo wetlands include sensitive fern, royal fern, and ostrich fern.

Skunk cabbage is another wetland plant named for its most prominent characteristic. With large, broad leaves, skunk cabbage literally smells like the animal for which it is named. This special adaptation attracts insects, which in turn pollinate the plant.



USDA, NRCS @ PLANTS

Newaygo’s Forests Today

Today’s forests differ from the original pre-settlement forests. Where white pine and white oak once flourished, black oak, red pine plantations and Christmas tree farms now dominate. Still, Newaygo is fortunate to have remnants of the original forest communities scattered throughout the area.

Dry-Mesic Northern Forest

This forest community is found primarily on sandy, glacial outwash plains. White pine and white oak dominate this original forest type of the Newaygo area, although other species such as sugar maple, red maple, red oak, and yellow birch are also part of this community. Of course, because white pine was the species most favored by loggers, it is uncommon to find mature stands of white pine today.



Tamarack
Robert R. Kowal
Wisconsin State Herbarium

Rich Conifer Swamp

Usually found along streams, lakes, or low spots in the topography, rich conifer swamps serve as important wetland buffers. This forest community is dominated by northern white cedar. Balsam fir, white pine, tamarack, hemlock, white spruce, black spruce, red maple, paper birch, and dogwoods are also species that inhabit this forest type.



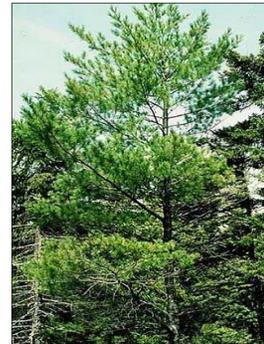
Black spruce
Kenneth J. Sytsma
Wisconsin State Herbarium



White oak leaves
Michael Clayton
Wisconsin State Herbarium



Northern white cedar branch
Hugh H. Iltis
Wisconsin State Herbarium



Eastern white pine
Kenneth J. Sytsma
Wisconsin State Herbarium



Eastern white pine needles
Michael Clayton
Wisconsin State Herbarium



Eastern hemlock branch
R.A. Seelig
USDA, NRCS @ PLANTS

The Rush is On

Following the opening of the first lumber mill on the Muskegon River in 1837, the lumber industry swept through Michigan's forests for nearly 70 years. During that time, approximately 30 million board feet of timber was sent down the Muskegon.

The valuable white pine and hardwoods were cut and, if not milled here, were sent down the river to the mills in the bustling town of Muskegon. Once cleared, settlers attempted to use the land for agriculture. However, not all were successful. In the Newaygo area in particular, the sandy soil was not suitable for crop production.

Much of the land that was not fit for agriculture was planted with red pine seedlings by the Civilian Conservation Corps in the 1930s to stabilize the sandy soils. A good portion of this land reverted back to the ownership of the federal government, and in 1938 the US Forest Service created the Manistee National Forest to manage this unwanted land.

Today nearly 20% of Newaygo County is part of the Manistee National Forest. Although most of the original forest is gone, second or third growth forests cover a good portion of the county. Red pine plantations continue to dominate sections of the national forest. However, forest managers are slowly working to restore these lands back to healthy and diverse forest ecosystems.



Late 1800's lumber operation in the Newaygo area.

Newaygo County Historical Museum



Millions of board feet of lumber were sent

Newaygo County Historical Museum



The common red pine plantations seen today were established to control erosion.

Robert W. Freckmann
Wisconsin State Herbarium



Cottongrass is a type of sedge that is topped by white, bristly tufts in mid to late summer. The stems are round and can grow over two feet tall. Cottongrass is more commonly found in bogs, but many other sedge varieties can be found throughout Newaygo's wetlands.

USDA, NRCS @PLANTS



The leaves of the carnivorous **pitcher plant** look and function like little pitchers. This plant gets needed nutrients from insects which become trapped in the plant. Stiff, downward pointing hairs keep an insect from escaping, and it ultimately drowns in water that collects at the bottom of the pitcher. Pitcher plant produces a dark red flower on top of a leafless stalk between June and July.

William S. Justice
USDA, NRCS @ PLANTS



Look for **Virginia meadow-beauty** in Newaygo's coastal plain marshes. Also found in Atlantic coastal marshes, like many coastal plain marsh species it is believed to have been brought here as seed on the wings of migrating waterfowl. This perennial has a four-sided stem, and its white, pink or lavender flowers bloom May through October.

James Reveall
USDA, NRCS @ PLANTS



Cattail is found in many different wetland communities. They are easily recognizable by their cylindrical brown flowers that form at the end of tall stems. Cattails are aggressive colonizers and can become dominant in wetland environments. They provide good habitat for many bird species, including red-winged blackbirds.

USDA, NRCS @PLANTS



Pink lady slipper, or moccasin flower, is named for the distinctive shape of its flower. Like many orchids, pink lady slipper prefers acidic conditions. It can be found in bog environments, as well as dry pine forests. A good place to view lady slipper is along the Camp Newaygo Wetland Trail. Look for it in bloom between May and June.

Other Common Wetland Plants

Wildflowers

blue flag iris, cardinal flower, water lily, great blue lobelia, marsh marigold, milkweed varieties, goldenrod varieties

Trees and Shrubs

red-osier dogwood, silky dogwood, high bush cranberry, willow, birch, black spruce, tamarack, eastern white cedar



Michigan forests fall within a transition zone between the evergreen forests to the north and the deciduous forests more common in the south. An imaginary line drawn between Muskegon and Saginaw Bay called the *tension zone* represents this transitional area. Newaygo is located within this zone. South of this line the pre-European settlement forests were primarily deciduous; north of this line mixed pine and hardwood communities were dominant. Because this zone has characteristics of both northern and southern forest communities, it is a unique and diverse place. Newaygo's forests encompass the southern range of species more common in the north (like jack pine and white spruce), as well as the northern range for species more common in the south (like shagbark hickory and tulip tree).

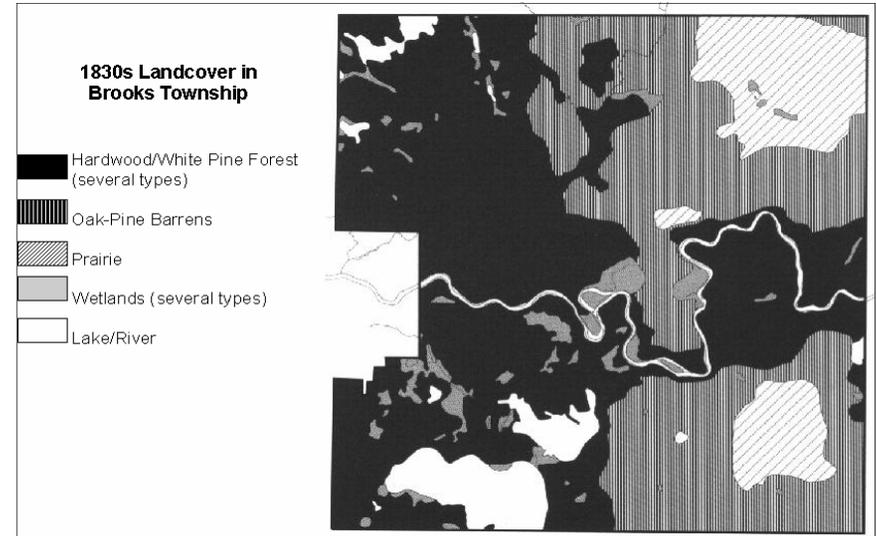
Forests also distinguish Newaygo and the townships to the north and east from the nearby agricultural lands to the west and south. In addition to the economic and recreational value of forests, they provide a number of beneficial ecological functions. Forests hold soil in place and prevent erosion. They absorb carbon dioxide and replenish the atmosphere with oxygen. They also provide shade which cools rivers and streams. Plus, forests provide key habitat for wildlife, including threatened and special concern species like the bald eagle, red-shouldered hawk and wood turtle.

Most of the public forest land in the Newaygo area is part of the Manistee National Forest. Contact the Manistee National Forest ranger station in Baldwin at 231-745-4631 for additional information.



Newaygo's Forests 200 Years Ago

While prairies dominated the sandiest, flattest stretches of outwash plains, forests dominated the remaining areas of the outwash plain and the moraines. The map below depicts the pre-European vegetation of Brooks Township. At that time, forests were mostly comprised of white pine and white oak, although it would not have been uncommon to find beech and red maple thrown into the mix. This all changed, however, with the coming of settlers in the early 1800s.



Source: Corner et al. 1995. Michigan's Pre-settlement Vegetation, as interpreted from the General Land Office Surveys 1816—1856. Michigan Natural Features Inventory. Lansing, MI.

The combination of dense white pine forests, a dependable mode of transportation like the Muskegon River and the entrepreneurial spirit of settlers led to the lumber rush. The white pine forests of northern Michigan proved to be a gold mine for many early entrepreneurs. Although the early lumber industry provided jobs, produced lumber for growing cities and cleared land for agriculture, it is also credited with clear cutting Michigan's forests in less than a century.



Newaygo County Historical Museum

This site near Newaygo, like many others, was logged in the late 1800s.