Conneaut Creek Wild and Scenic River Designation Study

A study of the Conneaut Creek for inclusion into Ohio's Scenic Rivers System

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Ohio Department of Natural Resources
Division of Natural Areas and Preserves

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Introduction

Ohio pioneered the river preservation movement with the enactment of Senate Bill 345 by the 107th General Assembly on February 28, 1968. The Ohio Wild, Scenic and Recreational Rivers Law was the first of its kind and predated the National Wild and Scenic River Act. The purpose of establishing scenic rivers is to help protect and preserve the few remaining natural rivers in the state.

The focus of Ohio's Scenic Rivers Program is the maintenance of streamside forested corridors wide enough to protect the aquatic resources and suitable for the terrestrial communities dependent on forested riparian habitats. The program is administered by the Division of Natural Areas and Preserves, within the Ohio Department of Natural Resources (ODNR). Ohio's Scenic Rivers Law provides for three categories of designation.

Wild rivers are those rivers which are generally inaccessible, the flood plain is undeveloped, the river is free flowing and 75 percent of the adjacent corridor is forested to a depth of at least 300 feet.

Scenic river designation is representative of a waterway which still retains much of its natural character for the majority of its length. Shorelines are for the most part undeveloped, but the river may exhibit signs of disturbances by human activities. The adjacent corridor must be forested to a minium depth of 300 feet for 25 percent of the stream's length.

Recreational rivers are those rivers which do not possess the same degree of natural quality found in Wild or Scenic rivers, yet warrant protection due to unique cultural and/or important historical attributes. The influence of human activities is much more apparent on rivers with this classification.

Ohio currently has 11 designated Wild, Scenic and/or Recreational rivers comprising 20 stream segments. More than 701 river miles are protected in Ohio's Scenic Rivers Program. Three state designated streams, the Little Miami, Big and Little Darby Creek and Little Beaver Creek, are also designated as National Wild and Scenic rivers.

ODNR recognizes partnerships and local cooperation as the most effective method for river preservation efforts. Rivers are studied for possible designation only after receiving resolutions of support from a majority of local governments adjacent to the river. Designation studies incorporate extensive field investigations and the assistance and input of numerous local organizations and individuals.

Upon designation of a river as Wild, Scenic or Recreational, the director of ODNR appoints a 10-member Scenic River Advisory Council comprised of a broad representation of local interests within the river watershed. Members often include private citizens, local government officials, conservation organizations and many others. Local advisory

councils provide the crucial service of advising ODNR on local attitudes, interests and areas of concern related to preservation of a designated river.

Designation as a Wild, Scenic or Recreational river is not a river restoration tool designed to successfully restore a degraded stream to an improved natural condition. It is much more effective as a means for recognizing the unique characteristics of a stream and coordinating river preservation activities among diverse state and local governments, organizations and individuals. When combined with statutory authority to review and approve or disapprove publicly funded projects on scenic rivers, designation helps ensure that decisions and activities affecting a scenic river are conducted in an environmentally sensitive and responsible manner.

To best understand the context of the information provided in this report, it is important to recognize that the role of Ohio's Wild, Scenic and Recreational Act is to identify and protect those rivers and streams possessing important natural or historical characteristics of state signicance. The Division of Natural Areas and Preserves' Scenic Rivers Program is attempting to identify and designate the few remaining river systems which have retained their most natural characteristics and those that, due to their intact natural characteristics, possess uniquely state important historical values.

The purpose of this examination of the Conneaut Creek watershed is to determine whether the Conneaut Creek meets state Wild, Scenic or Recreational river designation criteria. Additionally, this report represents a recommendation related to whether any portions(s) of the watershed should be recognized as a component of Ohio's Scenic Rivers system.

Executive Summary

The Conneaut Creek corridor possesses outstanding water quality; diverse aquatic and terrestrial habitats supporting exceptional wildlife populations; and intact riparian forest buffers with minimal evidence of human impacts. Conneaut Creek is one of the finest remaining examples of a natural stream in Ohio and is most worthy of inclusion into the Ohio Scenic Rivers Program. The following segments of Conneaut Creek meet or exceed the qualifying criteria and are therefore recommended for designation as an Ohio Wild and Scenic River:

- From the Ohio-Pennsylvania state line at river mile 23.83 downstream to the Creek Road bridge crossing at river mile 7.39 qualifies as a "wild river area." The total distance recommended for Wild River designation on Conneaut Creek is 16.44 miles.
- From the Creek Road bridge crossing at river mile 7.39 downstream to the Penn Central railroad bridge crossing (known locally as "The Arches") at river mile 2.0 qualifies as a "scenic river area." The total distance recommended for Scenic River designation on Conneaut Creek is 5.39 miles.

A total of 21.83 (16.44 wild and 5.39 scenic) miles of Conneaut Creek qualifies for and is recommended for designation as an Ohio Wild and Scenic River.

According to the Ohio Environmental Protection Agency (Ohio EPA), 99 percent of the Ohio portion of Conneaut Creek is in full attainment of water quality standards for exceptional warm water habitat. The remaining 1 percent is listed as being in partial attainment. This area is located near the mouth of the river where the channel has been modified to accommodate shipping traffic. The causes of impairment in this area are priority organics, metal and other habitat alterations. The sources of impairment are primarily stream bank modification (dredging), stream bank destabilization (development) and landfills. This area is also downstream of the area recommended for designation. There are no areas along Conneaut Creek listed as being in non-attainment.

Although Conneaut Creek is presently in excellent condition, the potential for future adverse impacts to the watershed still exist from nonpoint source pollution, timbering, filling of wetlands and floodplains, and the development of residential areas and oil and gas wells. Cooperative efforts between state and local entities are needed to plan for the future protection of the watershed.

The exceptional biological communities found in Conneaut Creek, including populations of several species with declining ranges in Ohio, in conjunction with the unique recreational opportunities afforded by the creek and the highly aesthetic pristine natural qualities of its surroundings, warrants its protection as an Ohio Wild and Scenic River.

Criteria for Wild and Scenic River Designation

To obtain **Wild River Designation**, the following criteria must be met:

- 100 percent free flowing in natural condition
- Accessible by canoe or trail
- No more than two bridges per 5 river miles
- The designated section of river must be more than 10 miles
- At least 75 percent of the river's shoreline must be in natural condition representing vestiges of primitive Ohio
- No industry may be located within 300 feet of the river or within the visual corridor
- Water quality must exceed aquatic life-warm water fisheries criteria
- Pan fish or game fish must be present in at least 75 percent of the designated section

To obtain **Scenic River Designation**, the following criteria must be met:

- At least 75 percent of the river is free flowing in natural condition
- Accessible by canoe or trail during normal recreational season
- No more than 50 percent of the adjacent roadways may be closer than 300 feet from the river's banks
- The designated section of river must be more than 10 miles, which may be in conjunction with other designations
- At least 25 percent of the shoreline of designated section should be in 300 feet of forest cover
- No more than one industry for each 5 miles within 300 feet of the river or within the visual corridor
- Water quality must exceed aquatic life-warm water fisheries criteria
- Pan fish or game fish must be present in 50 percent or more of the designated section

To obtain **Recreational River Designation**, the following criteria must be met:

- At least 25 percent of the river must be deep enough for small boating and for pan or game fishing
- The river must be readily accessible by road or railroad
- The river may flow through urban areas, but 50 percent of the river must be in natural vegetation or cultivation
- The designated section of river may not be less than 10 miles, and may be in conjunction with other designations
- Water quality must exceed designated recreational use water qualities or standards for public water supply

Wild and Scenic River Designation Process

Step 1: Determine if the river proposed for designation meets minimum length and width requirements.
The Ohio portion of Conneaut Creek proposed for study exceeds the minimum length of 5 miles and also has a mean surface width of greater than 10 feet.

Step 2: Obtain resolutions of support for the designation study from at least 50 percent of the local political subdivisions that are located within 1,000 feet of the area proposed for designation.
In 1999, Robert Marcy of Conneaut began spearheading efforts to designate Conneaut Creek as an Ohio Wild and Scenic River. supporting the effort was Phil Hillman from ODNR's Division of Wildlife, Fish Management Program and Steve Roloson from the Ohio Scenic Rivers Program. After a series of meetings about the idea, resolutions requesting ODNR to conduct a study of Conneaut Creek in Ashtabula County for potential Wild, Scenic or Recreational river designation were received from Kingsville Township on December 12, 1999 and the City of Conneaut on April 24, 2000. Munroe Township was the only township which elected not to sign a resolution at the time the designation study was initiated.

Step 3: Collect background and resource information on the natural and cultural history of the watershed.
Division staff collected information about Conneaut Creek from a variety of sources. Topographic maps were obtained from ODNR's Division of Geological Survey.

Ohio EPA mileage maps were used to create Conneaut Creek designation study maps. Aerial photographs and property plat maps were obtained from the Ashtabula County Engineer's office. National Wetland Inventory maps and an Ashtabula County Soil Survey map were also used. Biological studies were provided by the Ohio EPA, Cleveland Museum of Natural History, ODNR's Division of Wildlife, and the Ohio Natural Heritage Program, which is administered by the Division of Natural Areas and Preserves.

Information searches using the internet, the Conneaut Public Library and the Conneaut Historical Society resulted in useful information. Several public meetings and private interviews were also held to discuss the Ohio's Scenic Rivers Program, scenic rier designation process, as well as to provide additional information.

Step 4: Conduct a river inventory to document the existing condition of the river's corridor within 300 feet of the river.

Field work for the Conneaut Creek designation study included four canoe trips along the 23.83-mile-long Ohio segment of Conneaut Creek. Both digital and film photography and GPS coordinates were used to document any problem areas which were observed. When landowner permission was available, division staff hiked the adjacent floodplains to observe areas that were not visible from the river. More than 20 miles of riparian area were hiked as part of this study.

Step 5: Complete the designation study report and submit recommendation to the director of ODNR.

Pertinent information from the research and field work phases was compiled into this designation study. Based on field surveys and the supporting background information, it is recommended that the following portions of Conneaut Creek be designated:

- From the Ohio-Pennsylvania state line at river mile 23.83 downstream to the Creek Road bridge crossing at river mile 7.39 qualifies as a "wild river area." The total distance of Wild River designation on Conneaut Creek is 16.44 miles.
- From the Creek Road bridge crossing at river mile 7.39 downstream to the Penn Central Railroad bridge crossing (known locally as "The Arches") at river mile 2.0 qualifies as a "scenic river area." The total distance of Scenic River designation on Conneaut Creek is 5.39 miles.
- A total 21.83 miles of Conneaut Creek is proposed for designation as an Ohio Wild and Scenic River.

Step 6: The director of ODNR may then declare his intent to designate a river as wild, scenic or recreational by placing a legal notice in the principal county newspaper and by informing applicable public officials in writing.

Step 7: After 30 days have elapsed, the director shall make the designation official by making an entry into his journal.

General Description of Conneaut Creek

The Conneaut Creek watershed is nestled in the extreme northeastern corner of Ashtabula County, Ohio (see Figure 1) and northwestern Pennsylvania. Of the 191.2-square-mile watershed, 153.5 square miles, including most of the headwater streams, are located in Pennsylvania. The Conneaut Creek main stem originates south of Conneautville in Crawford County, Pennsylvania. The balance of the watershed in Ohio totals 37.7 square miles or 24,128 acres. In general, Conneaut Creek flows in a northwesterly direction towards Kingsville, Ohio. The river then turns and flows northeast to the city of Conneaut, where it enters Lake Erie. The main stem of the river is 56.8 miles in length with 23.8 of those miles in Ohio.

The Conneaut Creek main stem has an average gradient or fall of 11.3 feet per mile. The river drops from 1,215 feet above sea level at its source to 573 feet by the time it reaches the backwater area of Conneaut Harbor. All principal tributaries to Conneaut Creek are located in Pennsylvania. Major Pennsylvania tributaries include Temple Creek, Marsh Run, West Branch, Stone Run and Fish Creek. Although a series of low head dams were constructed on Conneaut Creek in the 1920s and '30s, over the years high flow conditions have collapsed all of these structures and none of them currently impound water. Because of those non-functioning dams, the Ohio portion of Conneaut Creek is 100 percent free flowing.

Conneaut Creek enters Ohio from Pennsylvania at river mile 23.83, which is the recommended starting point for the Ohio Wild River designation. Figure 2 illustrates a typical Wild River stream segment. The two-lane Furnace Run bridge crosses the Conneaut Creek at river mile 23.24.

The area at river mile 23.3 consists of a nice cobble substrate with a riffle/pool sequence and extensively forested riparian buffers consisting primarily of black walnut, willow, sycamore, silver maple and red oak. A Qualitative Habitat Evaluation Index (QHEI) taken at this location in 1995 resulted in an excellent score of 88.

At river mile 22.6 there is an area with a narrow buffer of about 50 feet wide on both river right and river left. Pastures are located beyond the buffers. This area has some undercut banks with leaning trees. Just downstream of this area a central bar has formed, most likely due to erosion and the inability of the stream to transport sediment downstream because of the excessive channel width at this location.

The Middle Road covered bridge at river mile 22.23 is the first covered bridge a canoeist will encounter when canoeing down Conneaut

Creek. The 136-foot-long Middle Road covered bridge spanning Conneaut Creek was built in 1868. The bridge is a fine example of Howe truss construction and was renovated in 1984. The Middle Road bridge was rededicated at the first Covered Bridge Festival in 1984.

The State Route 7 bridge, which was replaced in 2004-2005, crosses the valley at river mile 20.67. The river channel widens in this area, with a flat bedrock bottom from this point to river mile 20.42 where the old State Route 7 concrete arch bridge crosses the river. During low water conditions it is often necessary to walk canoes or portage through this area of the river. Several houses can be observed on river right.

The remnants of an old low head dam can be found at river mile 20.4 On river left is the former Farnham Park, which has been closed for more than 20 years. This area is still controlled by the Conneaut Township Park Board. There are excellent shrub and riparian buffers beyond this area where the river channel narrows and is bordered on the north, or river right, by high shale bluffs.

From river mile 19.0 to 18.3 on river right there is evidence of prior logging at the top of the bank, which extends into the floodplain at several locations. Undercut river banks have collapsed into the river at several locations. Some concrete debris was observed in the river at mile 18.3 near the old iron truss bridge that carries Horton Road across the river. Downstream from Horton Road there is a well-wooded floodplain on river left and a nearly vertical shale bluff that borders the right edge of the river. At river mile 17.8 on river left an agricultural field lies within 50 feet of the creek.

The State Road covered bridge spans Conneaut Creek at river mile 17.2. It was built in 1983 under the direction of retired Ashtabula County Engineer John Smolen, Jr. The bridge is 152 feet long and uses the Town lattice truss construction method. Located in Munroe Township, this site offers an excellent location for canoe access.

A power line crosses Conneaut Creek at river mile 16.8 with a cleared right-of-way of approximately 150 feet. The river bed in this area is fractured bedrock. Large numbers of darters and minnows were observed in the clear water of the deeper pools. Steep shale bluffs border river right until mile 16.1. The floodplain area between that point and the I-90 bridge crossing at river mile 15.6 has been impacted by recent logging activity. Indications of an all-terrain vehicle (ATV) trail, which crossed the creek, was observed near river mile 16.1. Through this area, the bank along river left features an alternating sequence of high bluffs and forested floodplains.

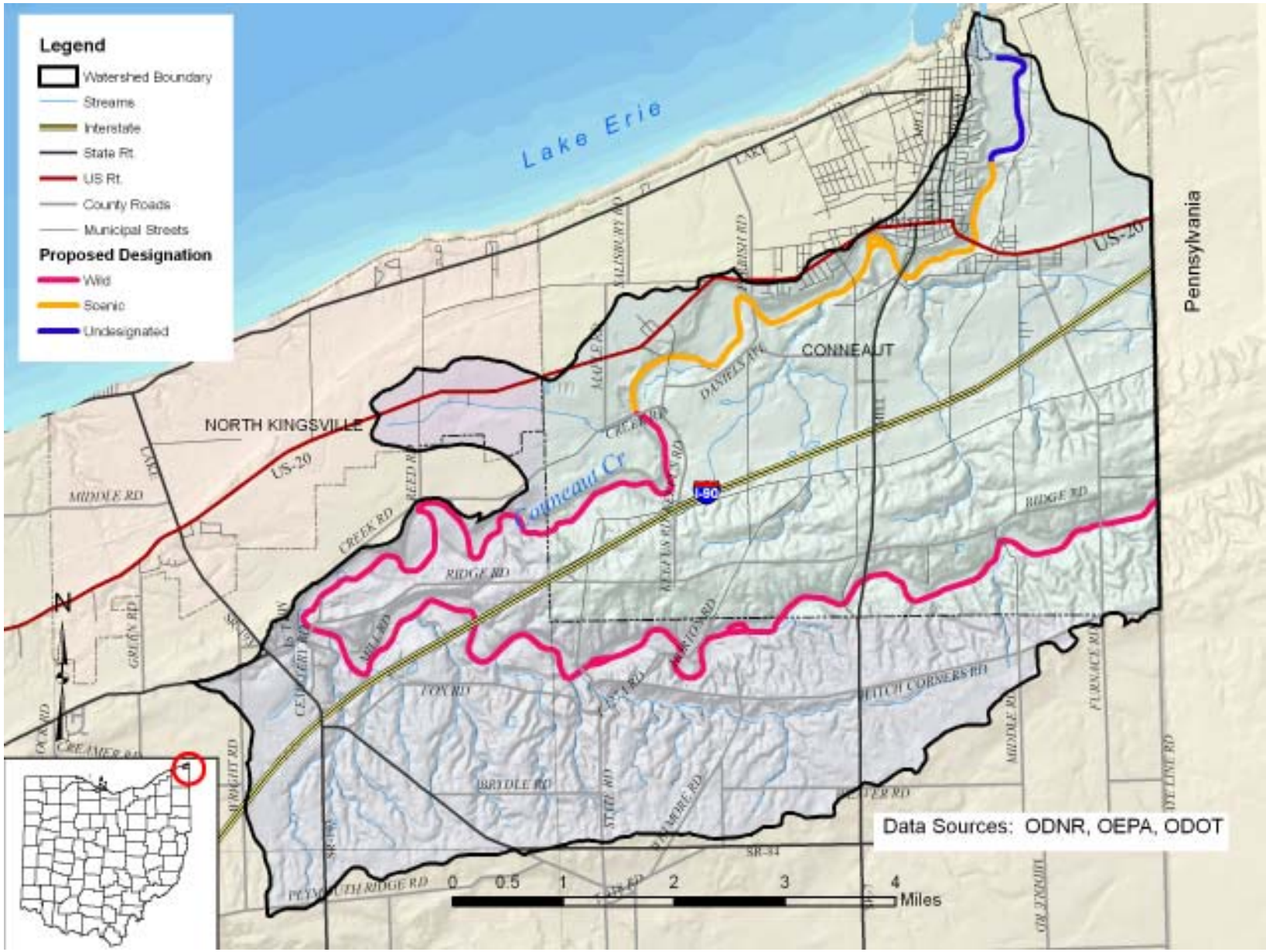


Figure 1 - Conneaut Creek Watershed

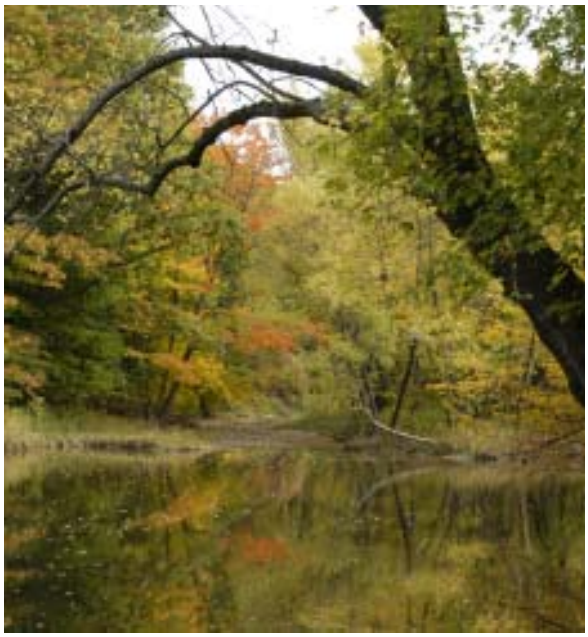
The area downstream of the I-90 bridge crossing has an intact riparian forest buffer on both sides of the creek. A conservation easement held on a portion of this area by the Cleveland Museum of Natural History provides long-term protection.

Between river miles 14.2 and 13.8 several active ATV crossings were noted. There is also evidence of past logging in this area. Old concrete bridge abutments were still visible in the river. An active sand and gravel operation is screened from view from the river as it operates behind a narrow, but high buffer along river left. A significant natural area on river right, Blakeslee-Barrows Preserve, is owned by the Cleveland Museum of Natural History.

In the vicinity of South Ridge Road at river mile 13.5 near Kingsville, there is evidence of timbering and agricultural activity. Several homes and structures are visible from the river. The floodplain in this area is primarily vegetated with grasses and shrub species. At river mile 13.4 the stream substrate is solid bedrock. There is a shrub buffer on river right with several areas of eroding banks reaching heights of 8 feet. An exceptional riparian buffer exists on both banks by river mile 13.1.

At river mile 12.6 a sequence of riffles and pools with high quality riparian buffers creates excellent aquatic habitat. Studies completed at this location by the Ohio EPA in 1995 resulted in an exceptional QHEI score of 86.

Just downstream is a property owned by Olin Corporation, known as the Big D Campground site. It is located on river left at mile 12.4 and was identified and investigated by the U.S. EPA from 1982 until 1989. The area was declared a superfund site after



approximately 93,000 cubic yards of hazardous materials were found. The site's groundwater was contaminated with volatile organic compounds and heavy metals including barium, chromium and lead. The site was remediated from 1992 to 1994. Groundwater treatments continued through 2000, which reduced the concentration of heavy metals. Studies were begun in 2000 to determine if natural attenuation will preclude the need for additional treatment at this site, which has been graded and planted in grass. The presence of several perimeter monitoring wells gives little indication of the past problems that existed at this location. The opposite river bank is heavily forested, as is the land immediately downstream.

From river mile 11.8 to 11.4 on river left is a campground with camping trailers parked in the floodplain. There are remnants of an old concrete dam at river mile 11.6. A high shale bluff is located on river right in this area before fading into a broad floodplain area, which has been heavily timbered within the last several years, from river mile 11.5 to 10.8.

The high shale bluffs along river right from river mile 10.8 to 9.8 support impressive populations of hemlocks, red oaks and tulip poplars. River left is also well wooded in this area.

The Conneaut Creek flows through a beautiful area known as Camp Pete from river mile 7.9 to 7.4. This property features an impressive riparian forest buffer and floodplains supporting abundant wildflowers. The Creek Road covered bridge at mile 7.4 defines the end of the proposed Wild River designation on Conneaut Creek and the beginning of the proposed Scenic River segment. Figure 2 is representative of a Scenic River stream segment. The Creek Road covered bridge spans the river using a 125-foot-long example of Town lattice truss construction. The original construction date is unknown, but the bridge was restored in 1983 and further updated in 1994.

From river mile 7.3 to 6.4 on river left there is a shale bluff topped with various hardwood species. A 25-foot-wide forest buffer is present on river right, but it is not wide enough to effectively protect the river from cultivation, which is taking place in the adjacent floodplain. This field follows the river's course for nearly .5 mile before ending at the Keefus Road bridge at river mile 6.7. The remnants of a U.S. Geological Survey gauging station can be found at the Keefus Road bridge.

Immediately downstream from the Keefus Road bridge on river left is another agricultural field with little buffer remaining. Erosion has resulted in undercutting and slumping of most of the trees into this area of the creek. Just downstream a series of sand and gravel bars have formed, which indicates excessive siltation is taking place. Further

downstream, the river channel begins to recover and exhibits stable banks and intact forest buffers.

There is evidence of past timbering along river left from river mile 5.7 to 5.5. A private camp located on river right from mile 5.8 to 5.4 has occasional trees and mowed areas, but there is only minimal riparian buffer in this area.

The metal frame work is all that remains of the old Parrish Road bridge that spans the river at river mile 5.4. From this point downstream to the Center Road bridge at river mile 4.3 Conneaut Creek has been fairly well protected by landowners. There are unimproved foot trails in this area that appear to be used primarily for river bank fishing. An exposed shale bluff forms the southern edge of the river through this area. The steep topography on the north side of the river has effectively protected much of the floodplain by preventing easy access. There are concrete remnants of an old low head dam and an abandoned wastewater treatment plant near river mile 4.5. Some filling of a small floodplain wetland has occurred along the Center Road bridge. Restoring this site will help restore the function of this wetland.

Only a narrow band of trees remain along the Conneaut-Lakeville Youth Organization's (CLYO) ball fields on river left from mile 4.3 to 4.0. This complex is located in the floodplain; fill has been placed along the river in a futile attempt to protect the facilities from flooding and ice damage. This site would be another excellent candidate for restoration if a better location could be found for the CLYO. Downstream from the CLYO is a fairly intact forest buffer worthy of future protection.

The last 3.6 miles of Conneaut Creek flows through the most intensely developed area of the city of Conneaut. Even though there are four road crossings and three railroad bridge crossings within the next 1.5 miles, the river channel retains a surprisingly high quality condition. Other than these crossings and the adjacent railroad, the lack of development along the river can be attributed to ownership by the railroad and the area's topographic and floodplain limitations. The Mill Road bridge crosses Conneaut Creek at river mile 3.6. The State Route 7 bridge crosses at river mile 3.55. The new U.S. Route 20 bridge, which opened in 2004, crosses at river mile 2.7. The Old Main Street bridge crosses the river at river mile 2.6. Railroad bridges cross Conneaut Creek at river miles 3.4, 2.3 and 2.0. It is this railroad bridge at river mile 2.0, locally known as "The Arches," which is recommended as the end of the Scenic River designation.

The last 2 miles of Conneaut Creek have been extensively modified in the past in order to accommodate Great Lakes shipping. Two additional railroad bridges cross the river in this area at mile 1.7 and 0.6. These last 2 miles lack most of the natural attributes found upstream; therefore the area is not recommended for Scenic River designation.

Figure 2 - Conneaut Creek: river mile 22.0 to 20.6

This segment is typical of a Wild River stream segment.

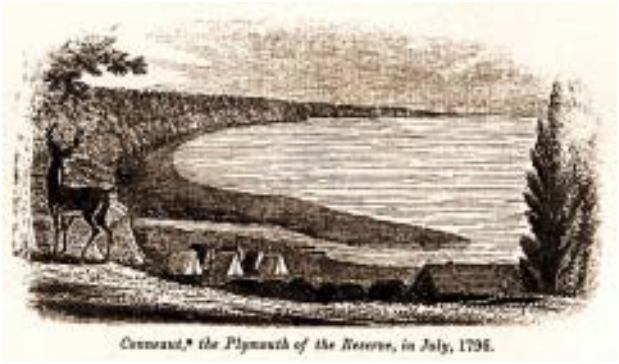
Figure 3 - Conneaut Creek: river mile 5.0 - 4.3

This segment is typical of a Scenic River stream segment.

Natural and Cultural History

Geology

The Conneaut Creek Watershed is situated within the gently rolling, dissected glacial plateau of the Erie-Ontario Lake Plain ecoregion. During the Pleistocene era varying thicknesses of glacial drift were deposited over Devonian shale. The majority of this watershed consists of ground moraines and end moraines. Sediments deposited by former beach ridges, arranged parallel to the existing Lake Erie shoreline, are composed of sand, gravel and cobble. Figure 4 illustrates the geologic features of the Conneaut Creek Watershed. The preglacial valleys within the underlying bedrock shale were buried by glacial clays, sands and gravels down to depths of 200 feet from the ground surface.



Conneaut, the Plymouth of the Reserve, in July, 1796.

Forest Community

The Conneaut Creek Watershed is home to the rare hemlock-white pine-hardwood forest, which is only found in the northeastern corner of the state. Dominant species within this woodland include white pine, hemlock, yellow and sweet birch, beech, white and red oak, tulip tree, red and sugar maple. Other notable species found in the area include striped maple and hobblebush. This forest community generally occurs on either valley slopes and bottoms, or as in the Conneaut Creek watershed, on flat till or lacustrine deposits. Sometimes called swamp forests, this type of community generally occurs in tight mosaics with ponded areas, but the trees themselves occur on rises which are never flooded.

Cultural History

In early Native American history, Conneaut was home to the Eriez nation, who occuppied the region from about 900 until the 1650s. The Eriez were fierce fighters and often battled with the neighboring Iroquois nation. About 1653, the Iroquois attacked and the surviving Eriez retreated and later surrendered the area. They left behind a large group of Indian mounds, often referred to as the Conneaut Earthworks.

Other tribes known to inhabit the area later included the Seneca and the Massassauga. The name Conneaut is believe to have been derived from the Seneca Indians who called the river, Konyiat, which may have meant either "place of many fish" or "where snow lays in spring."

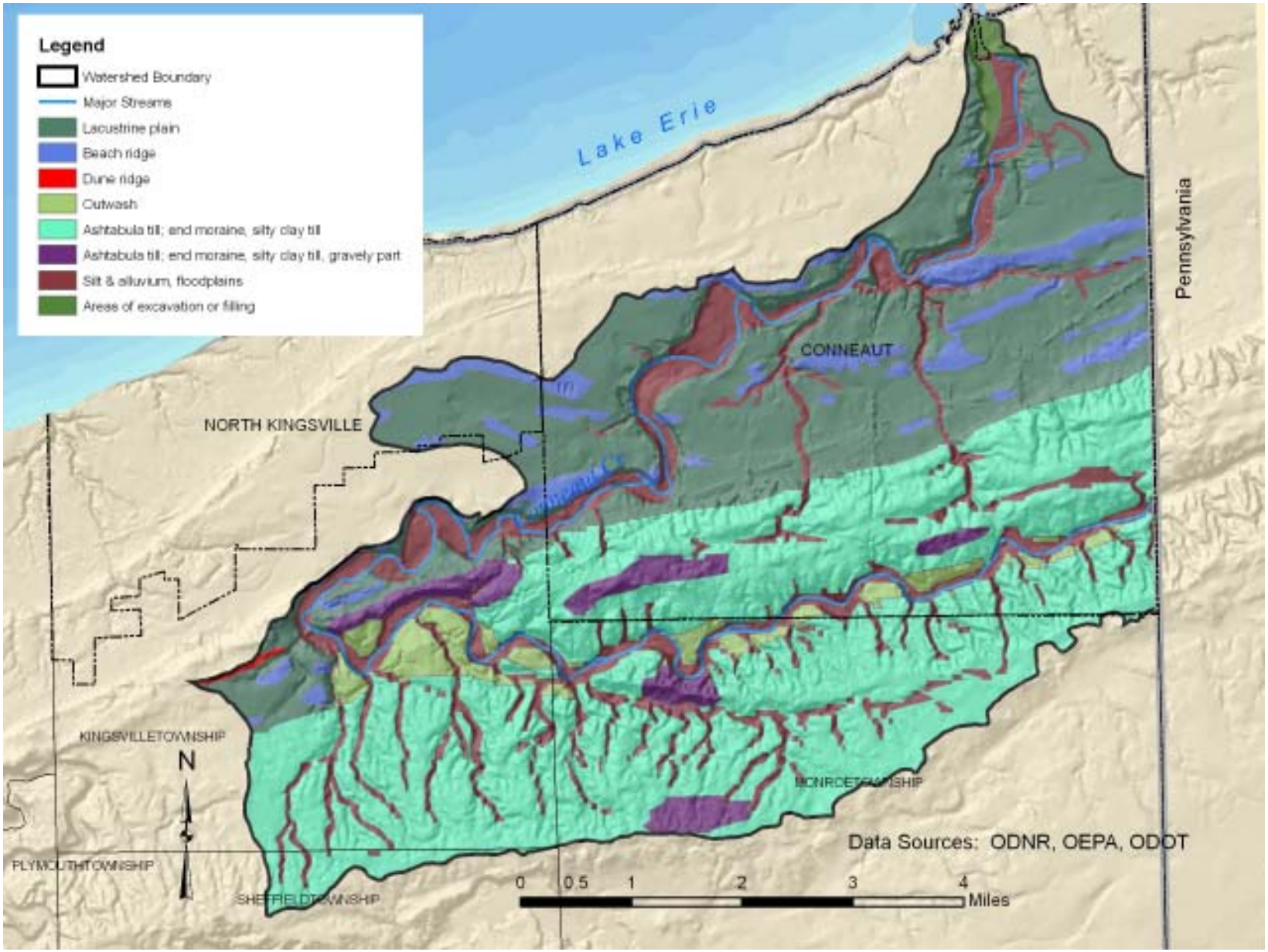


Figure 4 - Glacial Geology

In 1800, Aaron Wright, a Conneaut pioneer, conducted the first study of the Conneaut Earthworks. Between two to three thousand graves placed in rows were identified by slight depressions in the earth. The graves were reported to contain human remains, including a number of bones which were unusually large compared to average humans. During the 1970s, regular archeaology digs were conducted by the Conneaut Archeaology Society at Case Western Reserve University.

Conneaut Creek was first identified on July 4, 1796 when a surveying party of 52, headed by Moses Cleaveland of the Connecticut Land

Company, landed at the mouth of the river. The area was described as follows:
"It was then a mere sand beach overgrown with timber, some of it of considerable size, which we cut to build the house and for other purposes. The mouth of the creek, like so many others of the lake streams in these days, was frequently choked up with a sandbar, so that no visible harbor appeared for several days..."

After a few failed attempts, the first permanent settlement in the Conneaut area occurred in 1798. When the earliest settlers arrived, roads were nonexistent and the only transportation routes were old Indian paths and along the beach of Lake Erie. In 1802, a stage route was laid out through Conneaut, which linked Erie, PA with Cleveland. Today this is U.S. Route 20. Built in 1804, Old Salt Road was the first road built to head south. In 1835, a plank toll road was laid to connect the waterfront piers with the business section of town. The first stagecoach service was established in 1815, but it wasn't until 1902 that trolley serviced arrived in the area.

Early businesses included an 1806 grist mill, an 1812 drug store and a saw mill built in 1817. In 1829, the Conneaut harbor began being used for shipping and was later expanded in 1880 and 1892-96. During the last expansion, the mouth of the creek was significantly altered for large freighters transporting coal and iron ore. The first light stations on the piers were constructed in 1835, followed by light houses in 1885, 1897, 1917 and 1936. There were several foundries producing cast iron in Conneaut, with the first opening in 1830.

The shipping industry was an important part of Conneaut's economy for many years. The Pittsburgh and Conneaut Dock Company, in association with Bessemer Railroad, rebuilt the docks in 1892 which allowed for a significant increase in business. One of the greatest advances in shipping occurred at Conneaut Harbor in 1898 when George Huelett

introduced his ore unloaders to steel tycoon Andrew Carenegie. The ore loaders were so efficient they revolutionized shipping by cutting shipping time in half. Today, the Conneaut Port Authority manages the harbor which continues to be an active location for shipping and recreational boaters.

Ship building was a significant industry beginning in 1830 and peaking in the late 1840s as railroads began impacting shipping. The first railroad was established in 1852 by the Cleveland-Painesville & Ashtabula Railroad, which later was known as the New York Central Pacific Railroad. In 1882 it became the Nickel Plate Railroad until it ceased operation in 1957. The stone arch railroad bridge crossing, known as the Arches, is the ending point for the scenic river designation.

Several attempts were made in the 1870s to open cheese factories, but most only operated for a few years before closing. The formation of canning factories was more successful; the Cummins Canning Factory operated from 1875 to 1960 and the Conneaut Can Company opened in 1902.

In 1832, the town of Conneaut, Conneaut Township and South Ridge, also known as Farnham, formed the borough of Conneaut. In 1902, Conneaut became an official Ohio city. As the Conneaut area grew through the 1800s and into the 1900s, schools, churches and a hospital were built, along with a supporting infrastructure of utilities, roads, fire department and govnerment offices.

The idea of recognizing the Conneaut Creek as an Ohio State Scenic River was first proposed by Jeffrey Cheney. A talented young artist, Cheney painted scenes of the Conneaut Creek, many of which can be found today in local buildings. In 1974 his proposal was supported by the local paper, but Cheney passed away. His plan to designate Conneaut Creek was revived by local businessman, Robert Marcy.

Stream Biological Diversity and Water Quality

Overview

Some of the most important factors influencing the Scenic River designation determination include the biological diversity, stream habitat and water quality of the candidate stream. These parameters are reflected in the Scenic River designation criteria, which states that the stream must exceed the Warm Water Habitat Use Designation as established by the Ohio EPA. The Ohio EPA utilizes several indices to evaluate stream habitat, aquatic macroinvertebrate communities and fish communities in rivers and streams throughout the state of Ohio. These indices are as follows:

- **Qualitative Habitat Evaluation Index (QHEI):** an objective method of measuring physical habitat conditions by examining and assigning numeric values to various attributes of the physical habitat including riparian corridor, substrate types, instream cover, geomorphology, pool and riffle development and others.

- **Index of Biological Integrity (IBI):** a means of objectively measuring and evaluating biological community performance based on the number of fish species found, the presence of certain indicator species, the numbers of individuals found and other characteristics of the fish community.

- **Modified Index of well being (MIwb):** an objective method of measuring and evaluating fish community performance. This methodology is a measure of fish community abundance and diversity using numbers and weight information.

- **Invertebrate Community Index (ICI):** the ICI is a method of evaluation applied to macroinvertebrate community performance and characteristics using parameters similar to the IBI.

Once evaluations of stream habitat, water quality, macroinvertebrate and fish communities have been completed, the above indices are used to evaluate the overall condition of a stream and apply the appropriate aquatic life use designation. For purposes of stream evaluation to determine inclusion within the Scenic Rivers Program, several of the following aquatic life use designations are relevant.

- **Exceptional Warmwater Habitat (EWH):** this designation is for waters that can support and maintain an exceptional or unusual community of warmwater aquatic organisms having a species composition, diversity and functional organization comparable to the seventy-fifth percentile of the identified reference sites statewide. These are some of most diverse and highest quality biological communities found in Ohio's rivers and streams.

- **Warmwater Habitat (WWH):** this designation is for waters that can support and maintain a balanced, integrated and adaptive community of warmwater aquatic organisms having a species composition, diversity and functional organization comparable to the twenty-fifth percentile of the identified reference sites within each of the following ecoregions: Erie-Ontario Lake Plain, Western Allegheny Plateau, Eastern Corn Belt.

- **Seasonal Salmonid Habitat (SSH):** indicates that a stream and its tributaries are capable of supporting the passage of salmonids from October to May and that the stream is large enough to support recreational fishing for these species.

Current Conditions

The Ohio EPA's Division of Surface Water, Ecological Assessment Unit conducted an in-depth survey of the Conneaut Creek Watershed from June 15, 1995 through October 10, 1995. The results of this survey were published on January 7, 1997 in a document entitled *Biological and Water Quality Study of the Grand and Ashtabula River Basins including Arcola Creek, Cowles Creek, and Conneaut Creek* . This document is available as OEPA Technical Report Number MAS/1996-11-5. Additional intensive sampling was conducted during 2000.

Macroinvertebrate communities were consistently in the exceptional range at three sampling locations located between the state line and river mile 5.4 near the City of Conneaut for the 1995 sampling year. ICI scores, total Ephemeroptera (mayflies), Plecoptera (stoneflies) and Tricoptera (caddisflies) (EPT) and Qualitative Community Tolerance Values (QCTV) scores were consistently among the highest in the survey. In 1995 a total of 149 taxa were collected from these three sites with an average of 99 total taxa and 23 qualitative EPT taxa per site. The sampling site at river mile 23.3 yielded 110 total taxa which is the highest number recorded to date from any station out of 4,610 samples in the Ohio EPA database. Results from the Ohio EPA's 1995 study as well as previous studies conducted in 1989 and 1979 (see Table 1 on the following page) all indicate that Conneaut Creek met or exceeded the biocriteria for Exceptional Warmwater Habitat within the Erie-Ontario Lake Plains ecoregion, showing outstanding aquatic diversity.

According to fish community studies conducted by the Ohio EPA on Conneaut Creek during 1995 and 1989 (see Table 2), an exceptional diversity of fish species was found at each sampling location. In addition to the exceptional species diversity, several fish species, which have declining populations and shrinking distributions throughout Ohio, were also taken. Most notable of these species is the bigeye chub which comprised nearly 10 percent of the fish caught at each sampling location. High numbers of river chub, mimic shiner, rosyface shiner and black redhorse were also taken. All of these species are sensitive to changes in water quality and habitat disturbances. Their presence confirms that good water quality and instream habitat exists within the Conneaut Creek. MIwb scores for the study locations also indicated existence of very good/exceptional fish communities.

Detailed biological surveys of Conneaut Creek were also conducted by Dr. Tim Mattson and Dr. Jim Bissell of the Cleveland Museum of Natural History. Data collection started in 1996, but most of the results are from fieldwork conducted in 1999-2002. A total of 83 sites along Conneaut Creek were surveyed. These surveys resulted in documentation of species including spotted turtles, leopard frogs, southern red bellied dace, erithristic phase red backed salamanders, silvery salamander, Jefferson salamander and native fathead minnows.

Table 1: Conneaut Creek Macroinvertebrate Sampling Results by Ohio EPA

River mile	Sample Year	Density (no. per square)	Quantitative Taxa	Qualitative Taxa	Total Taxa	Qualitative EPT*	Qualitative Community Tolerance Values	ICI-**	Narrative Evaluation
6.7	1979	No data	36	32	55	16	41.3	48	Exceptional
6.7	1989	No data	43	65	84	26	39.9	52	Exceptional
23.3	1995	819	68	80	*** 110	23	39.1	46	Exceptional
12.6	1995	1,151	60	66	95	21	39.9	46	Exceptional
5.4	1995	470	57	60	92	26	40.9	50	Exceptional

* EPT = total Ephemeroptera (mayflies), Plectoptera (stoneflies) and Tricoptera (caddisflies)
** ICI = Invertebrate Community Index. This is the biocriteria figure used to classify rivers.

For the Erie-Ontario Lake Plains Eco-region where Conneaut Creek is located:
- a score of at least **22** qualifies a river for Modified Warmwater Habitat
- a score of at least **34** qualifies a river for Warmwater Habitat
- a score of at least **46** qualifies a river for Exceptional Warmwater Habitat

*** Highest diversity record in Ohio as sampled by Ohio EPA out of 4,610 samples

Table 2: Conneaut Creek Fish and Aquatic Habitat Sampling Results by Ohio EPA

River mile	Sample Year	Mean No. of Fish Species	Cumulative No. of Fish Species	Mean Relative No. of Fish/0.3 km	Mean Relative Weight of Fish/0.3 km	QHEI	Mean MIwb	Mean IBI	Narrative Evaluation
6.7	1989	19	No data	525.0	No data	56	8.5	47	Good/Very good
23.1	1995	24	26	1,004.3	14.0	88	9.3	55	Very good/ Exceptional
12.1	1995	24.5	27	1,805.3	14.4	86	9.5	48	Exceptional/ Very good

Surface Water and Sediment Quality

Five water and sediment samples were taken by the Ohio EPA at Furnace Road during the 1995 survey and analyzed to determine pollutant concentrations. The results of these tests were very favorable. Nearly all of the survey data indicated good water quality that either met or exceeded Ohio's Water Quality Criteria for Exceptional Warmwater Habitat. The one exception was a dissolved oxygen value that was 5.0 mg/l compared to the standard of 6.0 mg/l. This was attributed to low flow conditions during the sampling rather than any impact originating from nonpoint pollution sources. All other dissolved oxygen samples met the standards with results as high as 8.8 mg/l.

Nutrient Concentrations

Chemical samples taken by the Ohio EPA during their 1995 monitoring found that the concentrations of nutrients in the water of Conneaut Creek were very low. Findings included concentrations of Nitrate-nitrite nitrogen at levels that were generally less than 0.50 mg/l. Concentrations of ammonia-nitrogen were so low they were either not detected or barely detectable. Phosphorus concentrations were not detected in any of the water samples. The survey sites were found to be in full attainment and exceeded Ohio Water Quality Criteria for chemical parameters.

The presence of these exceptional macroinvertebrate and fish communities in addition to the high water quality of the Conneaut Creek have resulted in the stream being classified as an Exceptional Warmwater Habitat effective on July 21, 2002. This

The presence of good numbers of steelhead in the Conneaut Creek have led to the stream being classified as Seasonal Salmonid Habitat by the Ohio EPA. ODNR's Division of Wildlife has developed a successful stocking program with up to 75,000 yearling steelhead stocked annually in the Conneaut Creek.

designation truly reflects the high biological diversity and water quality present within the system.

Subsequent to the EWH use designation, the Conneaut was also placed within the Outstanding State Water based on Exceptional Ecological Value (OSW-E) antidegradation tier from the state line, river mile 23.83 to the mouth, river mile 0.0.

This designation was effective on July 1, 2003 as specified in Table 5-5 of rule 3745-1-05 of the Administrative Code. The *OSW-E* designation of Conneaut Creek indicates the waters have special significance for the state because of their exceptional ecological values. The antidegradation tier will offer the Conneaut Creek enhanced protection with regard to pollutant discharges and total pollutant loads permitted by the Ohio EPA. To qualify on the basis of exceptional ecological values, Conneaut Creek had to meet the qualifications for superior high quality waters and be further distinguished as being demonstratively among the best waters of the state from an ecological perspective.

Breeding bird habitat

With the loss of many wetlands in Ohio, the Conneaut Harbor has long been recognized by birders as one of the best places in northeast Ohio to observe shorebirds as they migrate through the area. The best observation site is the sandy marsh area located just west of the marina. During migration season, nearly all of the migratory species that occur in Ohio can be seen here.

In December 2004, the National Audubon Society, Ohio Chapter named the Conneaut Harbor as one of Ohio's Important Birding Areas (IBAs). Ohio has more than 80 designated IBAs. These areas are selected based on established criteria for habitat, species diversity and importance as a bird study area. A partial list of Conneaut Creek watershed sightings include: long-billed dowitcher, stilt sandpiper, sanderling, Baird's sandpiper, Amercian avocet, willet, American golden plover, marbled godwit, red knot, Lapland longspor, Hudsonian godwit,
buff-breasted sandpiper and great black-breasted gull.

Bird surveys along the upper watershed of Conneaut Creek in Pennsylvania resulted in the identification of 90 different species. Recent work by the Cleveland Museum of Natural History has documented similar bird communities to those found along the Grand State Wild and Scenic River. Cerulean warbler, Northern waterthrush and winter wrens are some of the more unusual species using the valley.

Riverine Wildlife

The following pages list the fish species, reptiles and amphibians that can be found in Conneaut Creek, as well as a comprehensive listing of the watershed's endangered plant and animal species and rare plant communities.

Fish Species of Conneaut Creek

Scientific Name (Common Name)

Petromyzontidae (lamprey)
- *Ichthyomyzon fossor* (northern brook lamprey-E)
- *Ichthyomyzon unicuspis* (silver lamprey)
- *Lampetra appendix* (American brook lamprey)
- *Petromyzon marinus* (sea lamprey)

Lepisosteidae
- *Lepisosteus osseus* (longnose gar)

Amiidae
- *Amia calva* (bowfin)

Clupeidae
- *Alosa pseudoharengus* (alewife)
- *Dorosoma cepedianum* (gizzard shad)

Cyprinidae (minnows, etc.)
- *Campostoma anomalum* (central stoneroller)
- *Carassius auratus* (goldfish)
- *Clinostomus elongates* (redside dace)
- *Cyprinella spiloptera* (spotfin shiner)
- *Cyprinus carpio* (common carp)
- *Cyprinus carpio x Carassius auratus* (common carp x goldfish hybrid)
- *Luxilus chrysocephalus* (striped shiner)
- *Luxilus chrysocephalus x Notropis rubellus* (striped shiner x rosyface shiner hybrid)
- *Luxilus cornutus* (common shiner)
- *Lythrurus umbratilis* (redfin shiner)
- *Nocomis micropogon* (river chub)
- *Notemigonus crysoleucas* (golden shiner)
- *Notropis boops* (bigeye shiner)
- *Notropis atherinoides* (emerald shiner)
- *Notropis buccatus* (silverjaw minnow)
- *Notropis hudsonius* (spottail shiner)
- *Notropis photogenis* (silver shiner)
- *Notropis rubellus* (rosyface shiner)
- *Notropis stramineus* (sand shiner)
- *Notropis volucellus* (mimic shiner)
- *Phoxinus erythrogaster* (southern redbelly dace)
- *Pimephales notatus* (bluntnose minnow)
- *Pimephales promelas* (fathead minnow)
- *Rhinichthys atratulus* (blacknose dace)
- *Rhinichthys cataractae* (longnose dace)
- *Semotilus atromaculatus* (creek chub)

Catostomidae (suckers)
- *Carpiodes cyprinus* (quillback)
- *Catostomus commersoni* (white sucker)
- *Hypentelium nigricans* (northern hogsucker)
- *Ictiobus bubalus* (smallmouth buffalo)
- *Moxostoma anisurum* (silver redhorse)
- *Moxostoma duquesnei* (black redhorse)
- *Moxostoma erythrurum* (golden redhorse)
- *Moxostroma macrolepidotum* (shorthead redhorse)

Ictaluridae (bullhead, catfishes, madtoms)
- *Ameriurus melas* (black bullhead)
- *Ameriurus natalis* (yellow bullhead)
- *Ameiurus nebulosus* (brown bullhead)
- *Ictalurus punctatus* (channel catfish)
- *Noturus flavus* (stonecat)
- *Noturus miurus* (northern madtom)

Esocidae
- *Esox americanus* (grass pickerel)
- *Esox lucius* (northern pike)

Umbridae
- *Umbra limi* (central mudminnow)

Osmeridae
- *Osmerus mordax* (smelt)

Salmonidae (trout)
- *Oncorhynchus mykiss* (rainbow trout)

Percopsidae
- *Percopsis omiscomaycus* (trout-perch)

Cyprinodontidae
- *Fundulus diaphanous* (banded killifish)

Atherinidae
- *Labidesthes sicculus* (brook silverside)

Gasterosteidae (sticklebacks)
- *Culaea inconstans* (brook stickelback)

Cottidae (sculpins)
- *Cottus bairdi* (mottled sculpin)

Percichthyidae
- *Morone americana* (white perch)
- *Morone chrysops* (white bass)

Centrarchidae (sunfish, bass)
- *Ambloplites rupestris* (rock bass)
- *Lepomis cyanellus* (green sunfish)
- *Lepomis gibbosus* (pumpkinfish)
- *Lepomis macrochirus* (bluegill)
- *Micropterus dolomieu* (smallmouth bass)
- *Micropterus salmoides* (largemouth bass)
- *Pomoxis annularis* (white crappie)
- *Pomoxis nigromaculatus* (black crappie)

Percidae (darters, walleye, logperch)
- *Etheostoma blennioides* (greenside darter)
- *Etheostoma caeruleum* (rainbow darter)
- *Etheostoma flabellare* (fantail darter)
- *Etheostoma nigrum* (Johnny darter)
- *Perca flavescens* (yellow perch)
- *Percina caprodes* (log perch)
- *Percina maculata maculata* (blackside darter)
- *Stizostedion vitreum* (walleye)

Sciaenidae
- *Aplodinotus grunniens* (freshwater drum)

Gobiidae
- *Neogobius macrostomus* (round goby)

Amphibians and Reptiles of Conneaut Creek

Scientific Name (Common Name)

Ambystomatidae
- *Ambystoma jeffersonianum* (Jefferson salamander)
- *Ambystoma maculatum* (spotted salamander)
- *Ambystoma platineum* (silvery salamander)

Plethodontidae
- *Desmognathus fuscus* (northern dusky salamander)
- *Desmognathus ochrophaeus (*Allegheny mountain dusky)
- *Eurycea bislineata* (northern two-lined salamander)
- *Plethodon cinereus* (red-backed salamander)
- *Plethodon glutinosus* (northern slimy salamander)

Proteidae
- *Necturus maculosus* (mudpuppy)

Salamandridae
- *Notophthalmus viridescens*(Eastern newt)

Bufonidae
- *Bufo americanus* (American toad)
- *Bufo fowleri* (Fowler's toad)

Hylidae
- *Hyla versicolor* (grey treefrog)
- *Pseudacris crucifer* (spring peeper)

Ranidae
- *Rana catesbeiana* (North American bullfrog)
- *Rana clamitans* (green frog)
- *Rana palustris* (pickerel frog)
- *Rana pipiens* (northern leopard frog)
- *Rana sylvatica* (wood frog)

Chelydridae
- *Chelydra serpentine* (common snapping turtle)

Emydidae
- *Chysemys picta* (painted turtle)
- *Clemmys guttata* (spotted turtle- T)

Trionychidae
- *Apalone spinifera* (spiny soft-shell turtle)

Colubridae
- *Diadophis punctatus* (ring-necked snake)
- *Elaphe obsolete* (yellow rat snake)
- *Lampropeltis triangulum* (milk snake)
- *Nerodia sipedon* (northern water snake)
- *Regina septemvittata* (queen snake)
- *Storeria dekayi* (brown snake)
- *Storeria occipitomaculata* (red-bellied snake)
- *Thamnophis sauritus* (eastern ribbon snake)
- *Thamnophis sirtalis* (eastern garter snake)

Sources:
- Ohio EPA, Division of Surface Water
- ODNR, Division of Natural Areas & Preserves, Heritage Database
- ODNR, Division of Wildlife
- Cleveland Museum of Natural History

Listing of Threatened and Endangered Plant and Animal Species of the Conneaut Creek Watershed

Status as of 2004

Endangered

Acer pensylvanicum - striped maple
Potentilla paradoxa - bushy cinquefoil

Threatened

Ammophila breviligulata - American beach grass
Apocynum sibiricum - clasping-leaved dogbane
Botrychium multifidum - leathery grape fern
Carex albolutescens - pale straw sedge
Carex appalachica - Appalachian sedge
Carex pallescens - pale sedge
Carex projecta - necklace sedge
Lathyrus japonicus - inland beach pea
Oenothera parviflora - small-flowered evening-primrose
Panicum meridionale - southern hairy panic grass
Polygala polygama - racemed milkwort
Sagittaria rigida - deer's-tongue arrowhead

Potentially threatened

Betula populifolia - gray birch
Cakile edentula - inland sea rocket
Carex brevior - tufted fescue sedge
Castanea dentata - American chestnut
Cornus rugosa - round-leaved dogwood
Cyperus diandrus - low umbrella-sedge
Equisetum sylvaticum - woodland horsetail
Euphorbia polygonifolia - seaside spurge
Gentianopsis procera - small fringed gentian
Juglans cinerea - butternut
Juncus alpinus - alpine rush
Lilium superbum - turk's-cap lily
Lupinus perennis - wild lupine
Panicum laxiflorum - pale green panic grass
Triplasis purpurea - purple sand grass

Species of concern

Orconectes propinquus - Great Lakes crayfish

Rare habitat

Hemlock-hardwood forest plant community
Hemlock-hardwood swamp plant community
Mixed mesophytic forest plant community

Current Land and Water Resources

Current Land Use

A stream's water quality and biological diversity are largely dependent upon the land uses within its watershed. Analyzing land use patterns has shown that a relatively low amount of urban land use and associated impervious cover can begin to degrade a stream's water quality and lead to a decline in species diversity (Schuler T.R., 1994), (Miltner, White and Yoder, 2002) and (Yoder, Miltner and White, 1999). These studies suggest that as low as 8-10 percent impervious cover in a stream's watershed may result in a loss of sensitive species and biodiversity.

Land use in the Conneaut Creek Watershed is still predominantly agricultural and woodland. (See Figure 5.) Approximate percentages of major land use categories within the Conneaut Watershed are as follows:

- 42 percent - agriculture
- 39 percent - woodland
- 11 percent - urban
- 8 percent - water and wetlands

Approximate percentages of major land use categories within 300 feet of the Conneaut Creek are as follows:

- 8 percent - agriculture
- 68 percent - woodland
- 4 percent - urban
- 20 percent - water and wetlands

While 11 percent urban land use within the watershed would seem to indicate that the Conneaut Creek's biodiversity is threatened and may already be declining, this is not the case because most of this urbanization occurs in the city of Conneaut, which is located on Lake Erie at the mouth of the Conneaut Creek.

The city of Conneaut has experienced a loss in population over the last two decades, but has made a slight rebound during the last few years. Projections indicate that growth will gradually rise providing the economy begins to recover. There is a gradual loss of farmland, primarily due to residential development. Logging and oil and gas exploration has impacted some of the woodlots in the watershed. Similar changes are occurring within the adjoining townships of Kingsville and Munroe.

Above the city of Conneaut there is very little development within the watershed; the predominant land uses are agriculture and woodland. These land use patterns are ultimately responsible for the high quality of the Conneaut Creek ecosystem today.

The lower 2 miles of Conneaut Creek has been impacted by industrial activities. A major coal handling operation has resulted in extensive layers of coal dust in the substrates. The lowest half-mile of Conneaut Creek has been channelized for freighter traffic. The waterway has been dredged to an approximate depth of 25 feet and the river bank reinforced with a combination of vertical steel and concrete bulkheads.

Groundwater Resources

Land use is also dependent upon and may negatively impact groundwater resources. Groundwater yields for water wells within the Conneaut Creek watershed are generally very low. The yields can range from less than 3 gallons per minute to 10 gallons per minute (see Figure 6). Drinking water for the city of Conneaut is withdrawn from Lake Erie which provides a virtually unlimited supply of water for this small city. The water intake for the

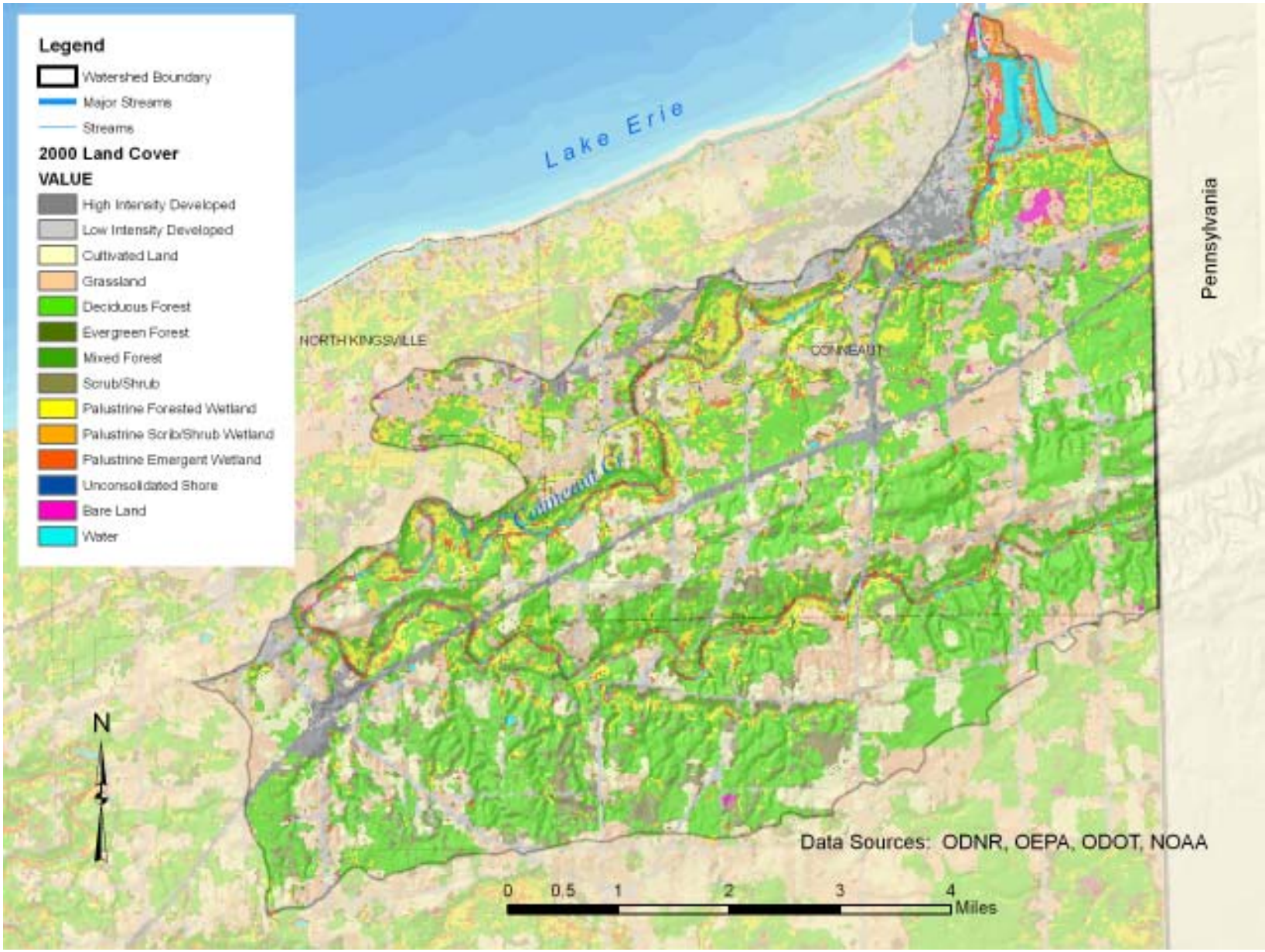


Figure 5 - Land Use

city of Conneaut is located approximately 1,900 feet from the north shore and 1.5 miles west of the mouth of Conneaut Creek (see Figure 6).

This close proximity of the intake to the mouth of Conneaut Creek means that the creek's water quality is important to the maintenance of a healthy water supply for the city of Conneaut. For this reason the Drinking Water Source Assessment for the Conneaut Public Water System has identified Conneaut Creek, its tributaries and adjacent riparian corridors as part of a 1,000 foot wide Potential Influence Zone (PIZ). Within the PIZ there is a potential for pollution events to negatively impact the Critical Assessment Zone (CAZ) around the city of Conneaut's water intake in Lake Erie. Some existing potential sources of contamination are oil and gas wells located within the PIZ. The Conneaut water treatment plant constructed in 1933 averages 1.68 million gallons per day of production or about 56 percent of its 3 million gallons per day capacity. Approximately 13,500 people are served through 5,000 metered service connections.

The Drinking Water Source Assessment for the Conneaut Public Water System, released in June of 2003 by the Ohio EPA's divisions of Surface Water and Drinking and Ground Water also included the rest of the Conneaut Creek Watershed as a Source Water Protection Area. The efforts of the Scenic Rivers Program to protect water quality, biological diversity as well as riparian forests adjacent to the Conneaut Creek will be beneficial to protecting this resource's important influence on local drinking water supplies.

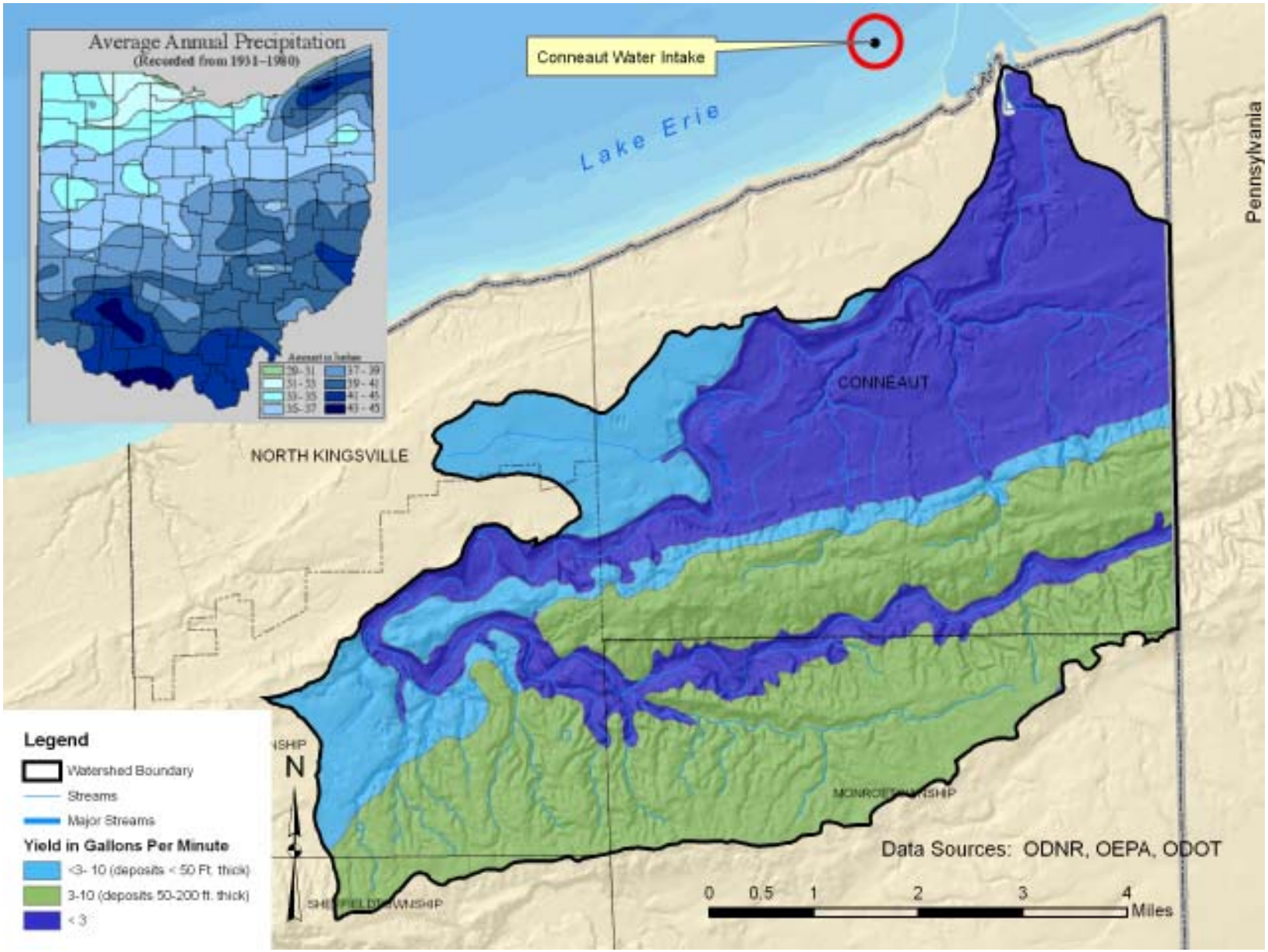


Figure 6 - Groundwater Resources

Present and Potential Threats

The major threats to Conneaut Creek include a coal handling facility and modification of the river by channelization and steel bulkheading of the riverbanks near the mouth of the creek. The lower 2 miles of Conneaut Creek have been impacted from industrial activities. A railroad parallels the river along its western bank. Over the last mile, a major coal handling operation has resulted in extensive layers of coal dust in the substrates.

Near Lake Erie, the lowest half-mile of Conneaut Creek has been channelized in order to accommodate shipping traffic by freighters for transportation of coal and other resources. In 2002, approximately 5.7 million tons of coals were shipped from the Conneaut Port. If a spill were to occur, there could be impacts to the immediate area. In this area, the river has been dredged to an approximate depth of 25 feet and in some areas the river bank has been reinforced in the past with a combination of vertical steel and concrete bulkheads. Even though this area of the creek has undergone substantial alterations over the years, the creek in this area has been determined by the Ohio EPA to be in partial attainment of water quality standards.
A proposed coal-fired electric generating plant in the City of Conneaut near the mouth of the creek could have substantial adverse direct and indirect impacts depending on the plant design, construction methods and operational emissions. All potential impacts to Conneaut Creek and the surrounding areas should be carefully evaluated.

On January 9, 2004, the Ohio EPA, Division of Surface Water released Appendix A to the *Ohio 2004 Integrated Water Quality Monitoring and Assessment Report*. In order to determine areas where fish consumption advisories may be needed, fish tissue samples were tested for mercury concentrations from 20 different lakes or rivers in the Lake Erie Basin. In Conneaut Creek, smallmouth bass was the only species found with notable levels of mercury. The average mercury concentration of 310 ug/kg was less than the threshold level of 430 ug/kg that would have triggered a fish consumption advisory.

The Conneaut Creek fared well in this study, even when compared to the Grand River, another high quality water resource. The report identified six fish species in the Grand State Wild and Scenic River with notable mercury levels compared to only one species in the Conneaut. The primary source of these mercury levels is reportedly from acid rain

resulting from the burning of coal to fuel electric generating plants and certain industrial plants. This should be kept in mind when evaluating the potential impacts of placing a new coal burning power plant in the city of Conneaut.

Localized impacts, primarily from erosion and subsequent siltation, have occurred in a few areas. Most often these sites are immediately downstream from where cultivation of row crops, construction and logging activities are under way. Recent road construction, including replacement of both the I-90 bridges and S.R. 20 bridge, have resulted in localized impacts in the vicinity of these river crossings. To minimize similar impacts from future projects, additional effort needs to be made to ensure that best management practices are being fully implemented.

As of 2002, at least 24 oil and gas wells were known to exist within 500 feet of the Ohio portion of Conneaut Creek and its tributary streams. Although oil and gas production has not been identified as a source of significant pollution, the potential is present for accidental spills during the installation and operation of the wells. Although the exact number of new wells was not determined as part of this study, the rise in prices of natural gas and crude oil has spurred the most significant increase in drilling activity since the 1970s.

Sand and gravel mining operations are not common near the banks of Conneaut Creek, but there is one mining operation southeast of Kingsville, located just north of I-90. There are additional areas in the northwestern third of the watershed where significant watershed features are being threatened by proposed mining. These include significant wetlands and springs that are important contributors to maintaining the base flow of Conneaut Creek during periods of drought.

In recent years, the rural character of Conneaut Creek has started to change as large tracts of land are split into smaller suburban lots and urban developments. This development may result in adverse impacts to water quality and quantity due to increased runoff from impervious surfaces and the pollutants that are typically found in stormwater. Permanently protecting riparian forest buffers and maintaining functional vegetated floodplains and adjacent wetlands is vital to preserve the exceptional water quality and aquatic habitat of Conneaut Creek.

Other potential sources of contamination include urban, suburban and rural storm water runoff, new construction site activities, and river bank erosion. As development pressures increase, more land will be converted to impervious surfaces. An increase in both volume and velocity of runoff increases the potential for adverse impacts resulting from changes in land use.

Of all of these threats, the major existing impacts to Conneaut Creek result from the coal handling facility and the habitat impacts that have occurred as a result of channelization and bulkheading near the mouth of the river.

Land Conservation and Corridor Protection

Protection Efforts

Several organizations have a history of being active in protection efforts in the Conneaut Creek Watershed.

The proposed designation of Conneaut Creek as Ohio's next Wild and Scenic River will bring greater recognition to the high quality of Conneaut Creek which has long been enjoyed by local residents. The designation will enable the Ohio Scenic Rivers Program to cooperate with local officials to ensure that future improvements to local infrastructure will have minimal impacts to the Conneaut Creek watershed. Efforts will be made to address the few areas that are in need of restoration. Landowners along Conneaut Creek will have the option to request technical advice from the Ohio Scenic Rivers Program so they may make informed decisions regarding the management of their properties.

In 2003, during the designation study process, a potential funding source through the Ohio EPA, Division of Environmental and Financial Assistance became available in the form of the Water Resource Restoration Sponsorship Program (WRRSP). With cooperation from local organizations and the city of Conneaut, a $1 million grant was received by ODNR for the purchase of riparian buffers, floodplains and wetlands.

As of June 2005, 28 different landowners, representing more than 600 acres of qualifying area, have expressed an interest in permanently protecting their properties. Some of these landowners are considering a sale of their property to ODNR while others wish to protect their properties with conservation easements. Following designation, ODNR will continue to work with partners to develop additional funding sources for the preservation of high-quality

areas along Conneaut Creek, including rare and endangered species communities (see Figure 7). Identified properties include a variety of high-quality riparian habitats including floodplains, vernal pools, channel ponds, abandoned oxbow wetlands, mature hardwood forest buffers, cold water tributaries, steep shale slopes and spring-fed seeps.

Formed in 2003, the Friends of Conneaut Creek is a private non-profit land trust, which has become very active in organizing local river education, restoration and preservation efforts. In 2004, the Friends of Conneaut Creek Board of Trustees was instrumental in developing the necessary political support that enabled the Conneaut WRRSP project to become a reality. After the Conneaut Creek WRRSP grant was obtained, the Friends of Conneaut Creek also assisted with identifying potential parcels for protection and contacted landowners to encourage their voluntary participation.

Creek Keepers is an organization founded by Howard Bernini, who has also been active with the Friends of Conneaut Creek. For more than 15 years Bernini has served as the "River Keeper," organizing volunteer river cleanups and leading educational trips for school children. He has also developed and maintained a website devoted to the protection of Conneaut Creek.

The Cleveland Museum of Natural History, led by efforts of Dr. Bissell, has purchased land and successfully protected many areas along the Conneaut Creek. Several of these properties, such as the Blakeslee-Barrows Preserve in Kingsville Township (see Figure 7), are significant natural areas which preserve sensitive habitats as well as plant and animal diversity. The museum has also been successful in placing permanent conservation easements on additional high-quality areas to ensure their future preservation (see Figure 7). During the development of the preservation and management plan for the Conneaut Creek WRRSP project, both Dr. Bissell, curator of botany, and Dr. Tim Mattson, curator of vertebrate zoology for the museum, have generously contributed their knowledge about the sensitive habitats, and local flora and fauna.

A long-established organization, the Sam Wharram Nature Club owns and manages the Wharram Nature Preserve (see Figure 7) along the river. Its membership is active in organizing and participating in educational field trips and seminars, as well as special events including the Ashtabula County Covered Bridge Festival. At the time of this study, Marc Hanneman served as club president.

The city of Conneaut developed a new comprehensive plan in 2003 which provides a blueprint for guiding future decisions and addressing potential problems, such as urban runoff.

The Ashtabula Soil and Water Conservation District (SWCD) is working with farmers in the watershed to reduce the potential for occurrences of nonpoint pollution. The Ashtabula SWCD has also been active in working with staff from Natural Resource Conservation Service's Orwell office on the Wetland Reserve Program (WRP). In 2004, two landowners agreed to protect portions of their property with WRP conservation easements.

Ashtabula County is in the process of drafting a green space plan which should be beneficial in helping to protect rural areas, typical of much of the Conneaut Creek watershed.

Corridor Protection

Riparian Forest Buffers

The high water quality and diverse wildlife habitats present on Conneaut Creek are due to a complex interaction of a number of contributing factors. The most important of these factors is the presence of an intact system of deciduous riparian forest buffers along the river. Therefore, protecting the maximum amount of riparian forest buffers along Conneaut Creek should be one of the highest priorities.

Preserving riparian forest buffers results in a number of benefits to water quality. These buffers help protect Conneaut Creek from the effects of nonpoint source pollution. The trees and understory shrubs absorb nonpoint pollutants from overland runoff and from the near surface groundwater zone.

Two of the major nonpoint pollutants which are removed by forest buffers are nitrogen and phosphorus. If too much of these nutrients are allowed to enter the river, they will cause excessive algae growth. It is important to avoid an over abundance of algae because it reduces light penetration which causes submerged aquatic vegetation to die. These plants are essential to the survival of fish and other aquatic organisms. The problem is compounded by the use of nearly all of the available oxygen during the subsequent decomposition process of the algae. Fish kills usually result in these situations.

Extensive studies have determined that in relatively flat areas with slopes of 4 percent or less, a buffer strip as narrow as 50 feet can remove the majority of nitrogen and phosphorous from surface and subsurface runoff. This should be considered the minimum width needed for small tributary streams. Forest buffers with a minimum width of 120 feet are needed on steeper slopes and for rivers, like Conneaut Creek, which have a drainage area of more than 20 square miles. This 120-foot distance - measured on each river bank in a horizontal plane outward from the ordinary high water mark (also known as bank full) - has been determined to be the minimum width buffer that is necessary for trees to be wind firm and create a forest-like habitat. A riparian forest buffer width of 300 feet or more is preferable where maximum water quality protection benefits are desired. This width is needed in areas where steep slopes, or highly erodable soils are present. The exceptional water quality of Conneaut Creek and its pending status as an Ohio Wild and Scenic River warrants protection of the riparian forest buffer to widths of at least 300 feet (see Figure 7).

Riparian forest buffers of 120 feet or more generally support a greater variety of wildlife than upland forests. This is due to many habitat conditions that exist at the edge and interior of the riparian buffer. The variety of plants and trees in these areas offer diverse habitats providing wildlife with needed food and shelter. The linear nature of riparian forest buffers is preferred by wildlife over fragmented woodlots because of the safety it provides as they move from area to area. Where conditions are suitable in riparian forest buffers, vernal pools form, which are important breeding sites for frogs, toads and salamanders.

Protecting the riparian forest buffers along Conneaut Creek will provide many additional functions and benefits related to maintaining healthy and diverse aquatic populations. The tree roots help to stabilize the stream banks

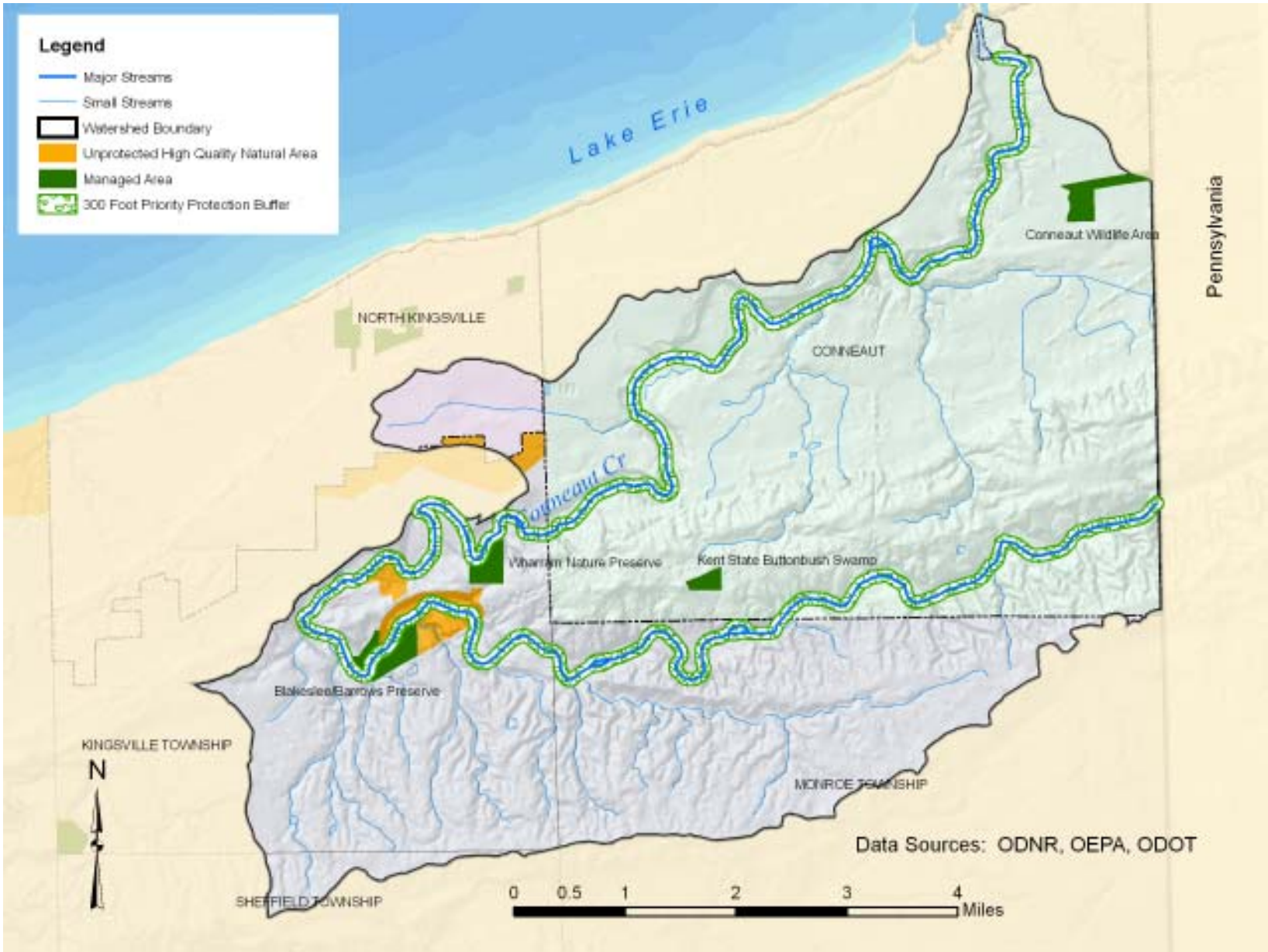


Figure 7 - Protected and Unprotected High Quality Areas

and uncut roots provide shelter for fish and macroinvertebrates. The leaves that fall into the stream are the primary food source for the macroinvertebrates which feed on the leaves and shred them into smaller pieces. This is the foundation for the aquatic food chain, which is vital in supporting a healthy population of minnows, darters and larger game fish like smallmouth bass.

Forested buffer zones also help to moderate water temperatures in the summer. Shade reduces water temperature fluctuation, which decreases the stress on aquatic organisms. Reducing exposure to direct sunlight reduces the demand by aquatic organisms for dissolved oxygen.

The riparian forest buffers along Conneaut Creek also perform the vital function of filtering out siltation which originates from cropland and construction site erosion. This silt is considered a nonpoint pollutant, which if allowed to occur will degrade the aquatic environment. Silt will settle out and fill in the critical spaces within the stream substrates smothering macroinvertebrates and reducing the ability of fish to successfully spawn.

Preventing embedded substrates by protecting riparian forest buffers is vital to the continued aquatic diversity of Conneaut Creek.

Floodplains

It is important to protect the floodplains along Conneaut Creek in order to maintain the functions they provide (see Figure 8). The floodplains are vital to maintaining a stable river channel. Loss of access to the floodplains on Conneaut Creek through either entrenchment, filling or building of dikes would result in drastic changes to the stream morphology.

Floodplains provide storage capacity during periods of high water, thereby moderating flood levels and current velocities. A reduction in floodplains will begin to adversely impact the river through increased erosion and turbidity, destabilized river banks, substrate scour and down cutting of the stream bed. All of which have an obvious negative impact on water quality and adversely impact the aquatic diversity. Therefore, protecting floodplains should be an important goal for the future preservation of the river.

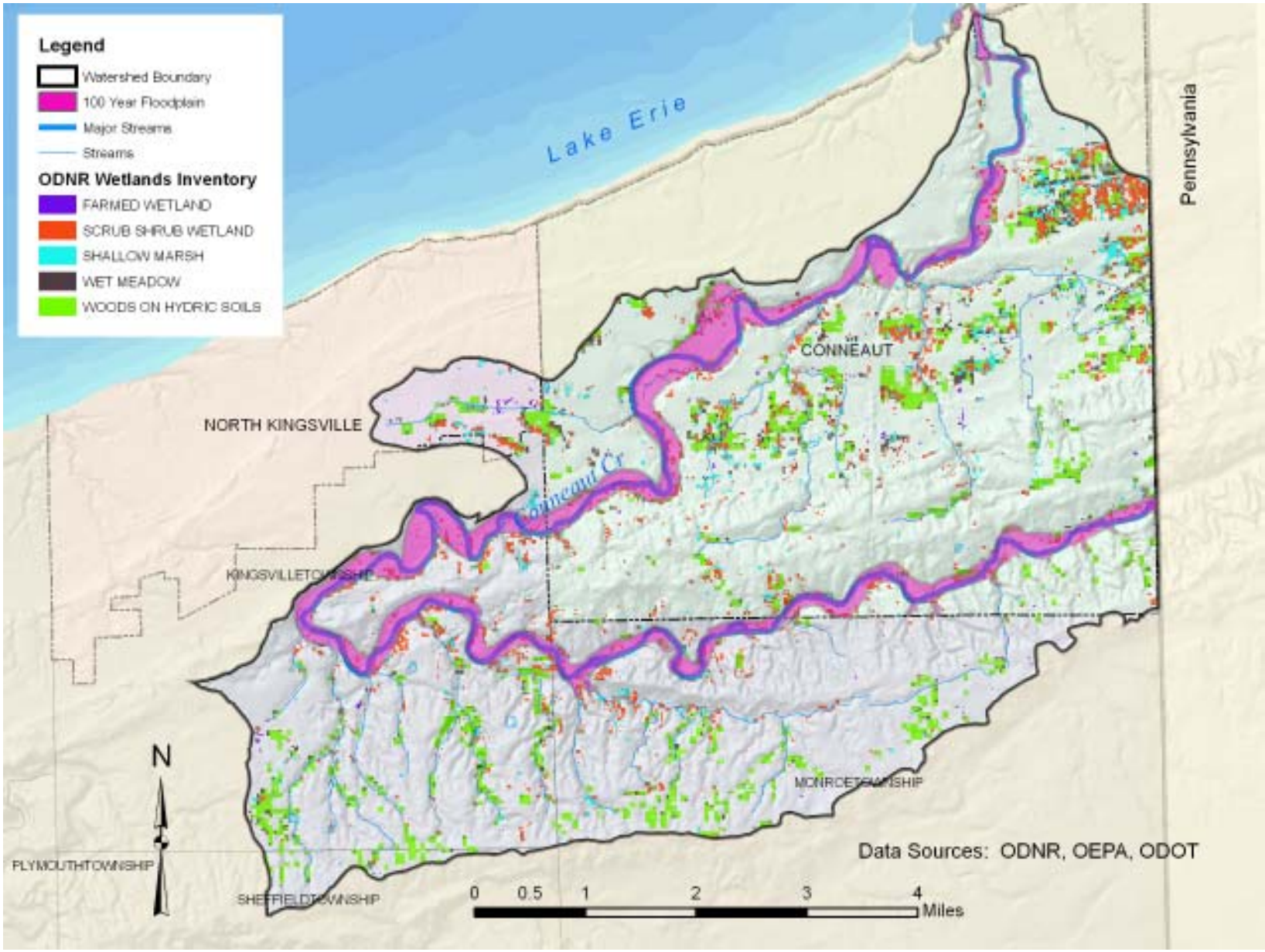


Figure 8 - Floodplains and Wetlands

Wetlands

The benefits of protecting wetlands have been well documented. They serve as important areas for filtering excess nutrients from surface runoff. Wetlands contribute to groundwater recharge and gradually release water, resulting in springs that supply the critical base flow level to Conneaut Creek.

Wetland areas also serve as storage areas and help to moderate the impacts of flooding. They produce some of the most diverse habitat for both plants and animals. The initial identification of wetlands along Conneaut Creek for possible future protection can be accomplished through either observation, referral or from national wetland inventory maps (see Figure 8).

Steep Slopes

There are steep slopes along many areas of the Conneaut Creek corridor. If left in their natural condition, they are usually quite stable. It is in areas where they are cleared of trees that problems occur. When the stability provided from the tree roots are lost due to clearing, the steep slopes in the Conneaut Creek Watershed are susceptible to surface erosion and bank slumping. In severe cases, rotational slides occur, creating major problems for landowners. Protecting steep slope areas along Conneaut Creek will help to reduce impacts to water quality and aquatic diversity resulting from erosion and subsequent siltation.

Tributary Streams

The role of tributary streams in protecting the water quality of Conneaut Creek cannot be overlooked. Land use activities on the tributaries will either contribute or detract from the overall quality of Conneaut Creek. Due to their relatively small size, streams are more easily impacted than larger rivers. Protecting riparian forest buffers, floodplains, wetlands and steep slopes along the tributary streams is also important in order to maintain a healthy stable condition that is necessary to provide good water quality and aquatic habitat.

Conneaut Creek
Criteria for Designation as a Wild River

Criteria 1: For maximum benefit, the total length of the designated section of stream may be no less than 10 miles; however, sections of the river may be so divided that other river designations are possible. No section may be less than 5 miles.

Finding: The total length of the Conneaut Creek to be considered for Wild River designation is 16.44 river miles.

Criteria 2: At least 75 percent of the shoreline must be in natural condition representing vestiges of primitive Ohio.

Finding: Approximately 77 percent of the shoreline is in a natural condition within 300 feet of Conneaut Creek.

Criteria 3: The designated section should be accesible by canoe or trail.

Finding: Conneaut Creek is accessible by canoe except during periods of low rainfall.

Criteria 4: No more than two bridges per 5 river miles.

Finding: There is an average of 1.9 bridge crossings in use per 5 miles for the area proposed for Wild River designation.

Criteria 5: Industries may not be located closer than 300 feet to the river and must be adequately screened to be out of sight and hearing from the river and associated use areas.

Finding: There is no industry within 300 feet of the segment proposed for Wild River designation.

Criteria 6: Existing water quality must exceed the water quality criteria for Aquatic Life-Warm Water Fisheries.

Finding: The entire segment of Conneaut Creek proposed for Wild River designation has received the use designation of exceptional warmwater habitat.

Criteria 7: Pan or game fish species should be present in 75 percent or more of the designation section.

Finding: Both pan and game fish are present on 100 percent of the proposed Conneaut Creek section.

Recommendation
From the Ohio-Pennsylvania state line at river mile 23.83 downstream to the Creek Road bridge crossing at river mile 7.39 qualifies as a "wild river area." The total distance of Wild River designation recommended for Conneaut Creek is 16.44 miles.

Conneaut Creek
Criteria for Designation as a Scenic River

Criteria 1: For maximum benefit, the total length of the designated section of stream may be no less than 10 miles; however, sections of the river may be so divided that other river designations are possible. No section may be less than 5 miles.

Finding: The total length of the Conneaut Creek to be considered as a Scenic River is 5.39 river miles, which when combined with the 16.44-mile-long portion proposed as aWild River, is 21.83 miles.

Criteria 2: At least 75 percent of the shoreline must be free flowing in natural condition.

Finding: Conneaut Creek is 100 percent free flowing.

Criteria 3: At least 25 percent of the shoreline of the designated section should be in 300 feet of forest cover.

Finding: Forty percent of the area proposed for Scenic River designation has riparian forest buffer of at least 300 feet.

Criteria 4: The designated section should be accessible by canoe or trail during the normal recreation season.

Finding: Conneaut Creek is accessible by canoe except during periods of low rainfall.

Criteria 5: No more than 50 percent of the adjacent roadways may be closer than 300 feet from the river's banks.

Finding: Approximately 35 percent of the area proposed for Scenic River designation has road located within 300 feet of the edge of the river.

Criteria 6: Industries may not be located within 300 feet of the river and must be adequately screened to be out of sight and hearing from the river and associated use areas.

Finding: There is only one industry located within 300 feet of the proposed Scenic River portion of the Conneaut Creek. A coal handling facility at river mile 2.0 is at the end of the proposed designation.

Criteria 7: Existing water quality must exceed the water quality criteria for Aquatic Life-Warm Water Fisheries.

Finding: The entire segment of Conneaut Creek proposed for Scenic River designation has received the use designation of exceptional warmwater habitat.

Criteria 8: Pan or game fish species should be present in 75 percent or more of the designation section.

Finding: Both pan and game fish are present on 100 percent of the proposed Conneaut Creek section.

Recommendation
From the Creek Road Bridge crossing at river mile 7.39 downstream to the Penn Central Railroad Bridge crossing (known locally as "The Arches") at river mile 2.0 qualifies as a "scenic river area." The total distance recommended for Scenic River designation on Conneaut Creek is 5.39 miles.

Appendix

Appendix A: The Ohio Wild, Scenic and Recreational River Act

Section 1517.14

As used in sections 1517.14 to 1517.18 of the Revised Code, "watercourse" means a substantially natural channel with recognized banks and bottom, in which a flow of water occurs, with an average of at least 10 feet mean surface water width and at least 5 miles of length. The director of natural resources or his representative may create, supervise, operate, protect and maintain wild, scenic and recreational river areas under the classifications established in section 1517.15 of the Revised Code. The director or his representative may prepare and maintain a plan for the establishment, development, use and administration of those areas as a part of the comprehensive state plans for water management and outdoor recreation. The director or his representative may cooperate with federal agencies administering any federal program concerning wild, scenic or recreational river areas.

The director may propose for establishment as a wild, scenic or recreational river area a part or parts of any watercourse in this state, with adjacent lands, which in his judgment possesses water conservation, scenic, fish, wildlife, historic or outdoor recreation values which should be preserved, using the classifications established in section 1517.15 of the Revised Code. The area shall include lands adjacent to the watercourse in sufficient width to preserve, protect and develop the natural character of the watercourse, but shall not include any lands more than 1,000 feet from the normal waterlines of the watercourse unless an additional width is necessary to preserve water conservation, scenic, wildlife, historic or outdoor recreation values.

The director shall publish his intention to declare an area a wild, scenic or recreational river area at least once in a newspaper of general circulation in each county, any part of which is within the area, and shall send written notice of his intention to the legislative authority of each county, township and municipal corporation and to each conservancy district established under Chapter 6101. of the Revised Code, any part of which is within the area, and to the director of transportation, the director of development, the director of administrative services, and the director of environmental protection. The notices shall include a copy of a map and description of the area.

After 30 days from the last date of publication or dispatch of written notice as required in this section, the director shall enter a declaration in his journal that the area is a wild, scenic or recreational river area. When so entered, the area is a wild, scenic or recreational area. The director, after 30 days' notice as prescribed in this section and upon the approval of the recreational and resources commission, may terminate the status of an area as a wild, scenic, or recreational river area by an entry in his journal.

Declaration by the director that an area is a wild, scenic or recreational river area does not authorize the director or any government agency or political subdivision to restrict the use of land by the owner thereof or any person acting under his authority or to enter upon the land.

The chief of the division of natural areas and preserves or his representative may participate in watershed-wide planning with federal, state

and local agencies in order to protect the values of wild, scenic and recreational river areas.

Section 1517.15

As used in this section, "impoundment" means the reservoir created by a dam or other artificial barrier across a watercourse that causes water to be stored deeper than and generally beyond the banks of the natural channel of the watercourse during periods of normal flow, but does not include water stored behind rock piles, rock riffle dams and low channel dams where the depth of water is less than 10 feet above the channel bottom and is essentially confined within the banks of the natural channel during periods of normal stream flow. In creating wild, scenic or recreational river areas, the director of natural resources shall use the following classifications:

(A) "Wild river areas" to include those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted, representing vestiges of primitive America;

(B) "Scenic river areas" to include those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads;

(C) "Recreational river areas" to include those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Section 1517.16

No state department, state agency or political subdivision shall build or enlarge any highway, road, or structure or modify or cause the modification of the channel of any watercourse within a wild, scenic or recreational river area outside the limits of a municipal corporation without first having obtained approval of the plans for the highway, road, or structure or channel modification from the director of natural resources or his representative. The court of common pleas having jurisdiction, upon petition by the director, shall enjoin work on any highway, road, or structure or channel modification for which such approval has not been obtained.

Section 1517.17

The chief of the division of natural areas and preserves may administer federal financial assistance programs for wild, scenic and recreational river areas. The director of natural resources may make a lease or agreement with a political subdivision to administer all or part of a wild, scenic or recreational river area. The director may acquire real property or any estate, right or interest therein for protection and public recreational use as a wild, scenic or recreational river area.

The chief may expend funds for the acquisition, protection, construction, maintenance, and administration of real property and public use facilities in wild, scenic or recreational river areas when the funds are so appropriated by the general assembly. The chief may condition such expenditures, acquisition of land or easements, or construction of facilities within a wild, scenic, or recreational river area upon adoption and enforcement of adequate floodplain zoning rules.

Section 1517.18

The director of natural resources shall appoint an advisory council for each wild, scenic or recreational river area, composed of not more than 10 persons who are representative of local government and local

organizations and interests in the vicinity of the wild, scenic or recreational river area, who shall serve without compensation. The chief of the division of natural areas and preserves or his representative shall serve as an ex officio member of each council.

The terms of all members serving on any advisory council under this section on the effective date of this amendment 20, 1994, shall end on January 31, 1995. The director shall appoint new members to serve on each council for terms beginning on February 1, 1995, provided that a member serving on a council on the effective date of this amendment 20, 1994 may be appointed to such a new term. The initial member appointed to each council shall serve for terms of not more than three years, with the terms of not more than four members of any council ending in the same year. Therefore, terms of office shall be for three years commencing on the first day of February and ending on the last day of January.

Each council shall advise the chief on the acquisition of land and easements and on the lands and waters that should be included in a wild, scenic or recreational river area or a proposed wild, scenic or recreational river area, facilities therein, and other aspects of establishment and administration of the area that nay affect the local interest.

Section 1513.02

(B) The chief, by rule, may designate as unsuitable for coal mining natural areas maintained on the registry of natural areas of the department of natural resources pursuant to Chapter 1517 of the Revised Code, wild, scenic or recreational river areas designated pursuant to that chapter, publicly owned or dedicated parks, and other areas of unique and irreplaceable natural beauty or condition, or areas within specified distances of a public road, occupied dwelling, public building, school, church, community or institutional building, public park, or cemetery. Such a designation may include land adjacent to the perimeters of those areas that may be necessary to protect their integrity.

Appendix B: Letters of Support