

INDIANA SILVER JACKETS NORTH BRANCH ELKHART RIVER WEST LAKES TASK TEAM



CHAPTER 3 - NATURAL RESOURCES OF THE NORTH BRANCH, ELKHART RIVER

The watershed of the North Branch Elkhart River (NBR Elkhart River) lies entirely within the “Northern Lakes Natural Region” of Indiana. (Homoya et. al.). This natural region is a large section of landscape that shares a cohesive combination of natural features, including its physiography, soil types, vegetation, and flora and fauna.

Originally, prior to settlement, this large watershed was comprised of upland forests (oak-hickory on the gravelly kames and eskers, beech-maple on the more loamy soils), floodplain forests along the rivers, swamp forests on the mucky and peaty soils along the rivers and around lakes, prairies and savannas, and numerous types of wetlands, including bogs, fens, and marshes.

Numerous lakes, usually surrounded by large marshes and swamp forests, were common. The NBR Elkhart River and its tributaries were lined with margins of floodplain forests and marshes, and teemed with fish. In fact, the whole region teemed with wildlife. (An excellent description of this region, including what remains today, can be found in the Chapter “Half land-half water” in the book titled: The Natural Heritage of Indiana).

Settlement of this region, and the entire state, occurred rapidly. Forests were cleared, and today, no old growth forests remain, only scattered woodlots. The prairies and savannas were cleared and plowed, converted to agriculture. In addition, a large majority of the wetlands were drained and converted to agriculture. Many lakes are much smaller than their original size, and many of them are ringed with houses.

In contrast with much of the rest of Indiana, much of what makes this part of Indiana unique remains. The extensive muck soils and the glacially carved landscape have enabled the essence of this region to survive, especially its lakes, wetlands, and rivers.

Today, swamps, forested fens, and floodplain forests still border some of the lakes; fairly extensive marshes still occupy peat and muck soils in large swaths around some of the rivers and lakes; seeps still bloom in profusions of marsh marigolds and skunk cabbage; and several richly diverse bogs and fens remain intact. Some of Indiana’s rarest wildlife that are characteristic to this region remain, including the four-toed salamander, spotted turtle, Blanding’s turtle, Massasauga rattlesnake, star-nosed mole, and swamp sparrow. Numerous rare plants can still be found, tucked away in the most natural and least disturbed habitats. Some of these include red baneberry, slender cotton grass, wild calla, bog rosemary, spoon-leaved sundew, and shining ladies’ tresses.

Strengths and Challenges of the Natural System

Wetlands are an extremely important link in the hydrologic cycle. Wetlands and lakes abound, and many of the streams and rivers have forested corridors and grass buffers. They store vast amounts of water, filter water, acting like a large kidney, and can help minimize flooding.

Fully forested stream and river corridors provide stable river banks and habitat for wildlife. The stable root systems help hold the banks during flooding events. These natural systems also act as reservoirs of biological diversity, providing food, cover, and habitat for numerous species of wildlife.

Vegetated stream corridors and wetlands provide many benefits. Altering these natural features can adversely impact the system. For example, in the area described in Chapter 2 as the stream/lake transition area, it appears the lack of stream corridor vegetation to provide a filter and shade, may be contributing to adverse impacts to the water quality and providing an environment for excessive aquatic vegetation in the stream. This is likely due to excessive nutrients in the stream, along with an open canopy allowing light to reach the stream. This dense transition area vegetation may slow water flow, increase deposition of sediment, and alter channel characteristics.

While it may be tempting to only remove the vegetation in the transition area to resolve the issue of slowed stream flow, the excessive vegetative growth is actually, in part, a natural response to the ongoing excess nutrient load. The vegetation is actually improving the water quality.

In fact, natural aquatic vegetation provides excellent habitat for fish and other aquatic organisms and is important for stream ecology. Removal of the transition-area vegetation without first addressing the ongoing nutrient inputs could be damaging to downstream water quality, and would not be cost effective, because the vegetation will continue to return until the excess nutrient source is remedied. This area may be a location to consider water quality stream monitoring to help identify the source of the nutrients.

In addition, generally speaking, removing the forests and wetland vegetation has enabled much quicker runoff and has allowed large quantities of sediments to get into the rivers, lakes, and wetlands. Over the last 200 years, nationally, the majority of the forests have been removed from the landscape (see Figure 3-1, next page). The forests have been converted into crop and pasture lands. Many wetlands have been ditched, drained, or filled throughout the watershed. Streams have been straightened and channelized. The low-lying floodplain areas, which are natural flood storage, have been developed into residential areas with summer cottages and year-around homes.

The cottages along the lakes and area communities provide a considerable ongoing source of nutrients into the waterways. These nutrients feed the algal blooms and

excessive vegetative growth within the lakes and streams. In addition, the removal of the forested canopies along streams allows the vegetation in the streams to take advantage of the sunlight and explode into unnaturally dense mats of vegetation which can obstruct flow. Again, water quality stream monitoring can help identify the areas where nutrient loading is a problem.

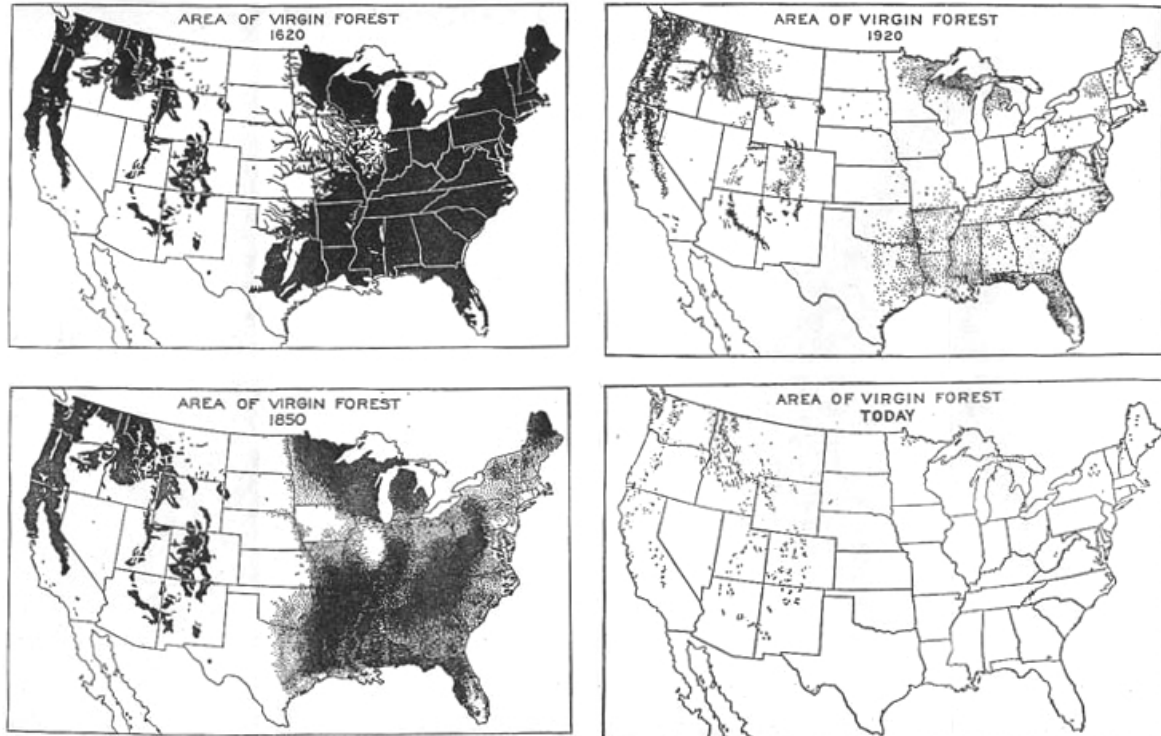


Figure 3-1, virgin forest areas of the United States over time.

When rain falls on a forested watershed or on a natural wetland, the moisture has a tendency to soak into the soil instead of run off the land. Removal of forested areas results in an increase in the amount of runoff seen after a rain event. Because the runoff is not soaking into the soil, it washes off the soil and takes with it sediment, nutrients, and pesticides. If this runoff drains into a wetland, the wetland can help slow the discharge of water, take up nutrients and pesticides, and filter sediment. The level of filtering effectiveness is dependant upon the size and the quality of the wetland. As stated earlier, many wetlands have been ditched and drained. A ditched and drained wetland cannot effectively provide flood storage and will not remove nutrients and pesticides, and will filter very little sediment from runoff.

For example, in this watershed, 200 years ago, when a large rain event occurred, the rain fell on forests, wetlands, and prairie. Due to the natural land cover, much of the water would soak into the ground or be absorbed by natural areas. What water was discharged into the streams was flowing slowly through wetlands and through small upper watershed streams into meandering streams with very low gradients. The water that did not infiltrate into the ground would be released slowly into the larger rivers over a relatively long period of time. The water quality of the stream would change very little, and there would be a minimal increase in the level of the river.

Under altered conditions, in many cases, rain falls on farmland, parking lots, rooftops or roadways that do not absorb rainfall as fast as natural areas. The water runs off, carrying sediment, nutrients, and pesticides. Water quality decreases rapidly, turbidity sharply increases due to sediment, and the river level may rise more quickly.

Each added acre of impermeable surface (parking lots, rooftops, roads) within the watershed increases the rate of water discharged into the stream or lake. Each field tile, drainage ditch, storm drain, or other artificial conveyance of water which bypasses the natural cycle, removes the natural filtering and buffering of the wetlands. This alteration results in dramatic increases of pollutants, an increase in the rate of discharge of water into the system, and an increase in the erosion that occurs.

In many cases in the watershed, water flows directly into a drain tile, which flows directly into a ditch in an area that used to be a wetland. That ditch then flows to a channelized stream which provides a direct route to the main river channel. Channelization of streams (removing the meanders) reduces stream length, causes higher water velocity, and increases the gradient of the stream. Channelization causes increased bank erosion within the system, because the new, shorter stream must handle the same amount of water within a shorter distance and at a steeper gradient. In this scenario, the rainfall picks up pollutants and flows directly into the river fairly quickly. Fish kills occasionally occur after rain events due to rapid increases of sediment, organic matter, and other pollutants into the stream, which can quickly reduce dissolved oxygen levels to lethal levels.

Current Conditions

Water Quality

The Indiana Department of Environmental Management (IDEM), Office of Water Quality, develops Indiana's 303(d) List of Impaired Waters every two years as part of the State's Integrated Water Monitoring and Assessment Report that is submitted to the U.S. EPA in accordance with the Clean Water Act. This list shows several water quality issues within this watershed. The NBR Elkhart River and its tributaries are listed as impaired due to E.Coli inputs. Adams Lake, Oliver Lake and Olin Lake are listed due to contaminants such as mercury and PCBs. Messic Lake, Hackenburg Lake, Dallas Lake, and Witmer Lake are all listed as impaired. Decreases in water quality will result in the loss of sensitive species first and result in a community comprised of tolerant species. One of the sensitive fish species in northern Indiana is the cisco (*Coregonus artedii*).

Cisco were once common in several lakes within the watershed. Since the early 1900s, cisco have been on the decline in Indiana. In 1955, cisco were found in Atwood, Hackenburg, Messic, Olin, Oliver and Witmer lakes. Cisco need clean, clear, cold, oxygen-rich water to survive. Ongoing development within the watershed, combined with urban and agricultural runoff, has reduced the water quality to the point where cisco can no longer survive. Cisco currently are considered extirpated (no longer present) from all of these lakes.

Fisheries

Fish community sampling data from IDEM's Surface Water Quality Assessment Program show there is still relatively high quality habitat remaining in the lower stretch of the NBR Elkhart River. No detailed fish community studies were available for the upper watershed. IDEM studied a site on the NBR Elkhart River at County Road 450 West in Noble County. This section yielded a Qualitative Habitat Evaluation Index (QHEI) score of 81 out of a maximum of 100. A QHEI score greater than 75 is considered excellent. The high score is indicative of the lack of channelization in this portion of the river and the relatively intact riparian forest at this location.

An IBI (Index of Biotic Integrity) was also calculated for the site based upon the fish species collected. The site scored an IBI of 46 out of 60, indicating a good/fair rating. Sampling resulted in 22 species of fish of which six species were classified as sensitive species. While many of the streams in the watershed have been severely impacted, there are still some very high quality areas left.

Wetlands

The watershed of the NBR Elkhart River still has some large areas of wetlands. These are but a small percentage of the original expanses of wetlands. As mentioned earlier, wetlands serve extremely important functions in filtering nutrients and other pollutants and provide storage for flood waters. Wetlands are also important areas of wildlife habitat and several area wetlands have received long-term protection from development. There also are large expanses of wetlands found within the lakes. Department of Natural Resources (DNR)

Fisheries staff has been mapping wetland areas in some area lakes. These wetlands provide fish habitat, along with spawning and foraging areas for reptiles and amphibians, as well as fish. In-lake wetlands also absorb wave energy and help reduce shoreline erosion. By 1980, Indiana had lost 85 percent of its wetlands.

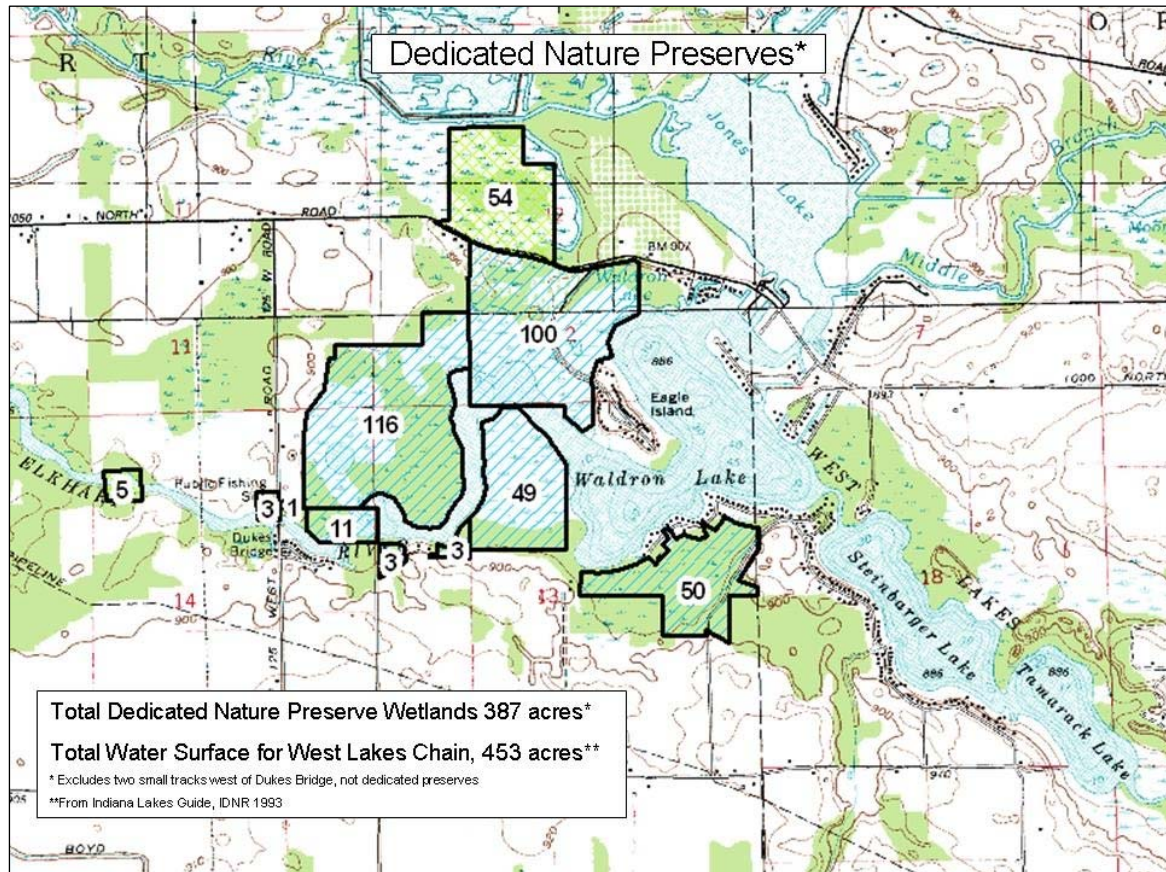


Figure 3-3

Public-private partnerships have been a big part of the success in protection of conservation lands to-date. The ACRES Land Trust and The Nature Conservancy have both been involved actively for more than 50 years. The Indiana Heritage Trust, which is funded by Indiana’s environmental license plate, encourages partnerships, and matches funds raised by local land trusts. Lands acquired under this program can be dedicated as state nature preserves, ensuring the lands will be protected for future generations.

Use of more conservation practices in the most critical areas, such as along ditches and streams, would further enhance these benefits. As noted in the 2008 updated Noble County Comprehensive Plan, for instance, riparian corridors (and water quality) can be protected by using Best Management Practices, and sensitivity to natural features during development can help the rarest species to continue to survive.

Conservation programs, many of which are funded in partnership with the U.S. Department of Agriculture’s Natural Resource Conservation Service, provide funds enabling landowners to install conservation practices, such as buffer strips that help minimize siltation and enhance flood storage.

The Lake and River Enhancement Program (LARE) administered by the DNR Division of Fish and Wildlife, provides technical assistance and financial assistance for projects that enhance aquatic habitat for fish and wildlife. Funding may be used for such things as

identifying problems affecting lakes or streams, evaluation of identified problems, developing management plans, feasibility studies, engineering designs, and construction and water quality monitoring.

Restoring forest through planting trees improves wildlife habitat and reduces runoff. Tree seedlings are also available through the state nursery program. More information on some of the available funding opportunities is detailed in Chapter 7.

By implementing the plans that are in place (Noble County Conservation Plan, Elkhart Watershed Plan), by utilizing information from DNR biologists and soil scientists, by partnering with Land Trusts, Heritage Trust, and DNR, and by targeting both development and protection, more of the significant features in the watershed will be available for the enjoyment of the citizens, and more of the damages caused by flooding and siltation can be minimized and avoided.

Traps to Avoid

“The problem of flood prevention is a part of a larger problem which we have considered either in a fragmentary way or not at all. This larger problem is the development of the waters of our state as a natural resource. To regard a river as a menace because its higher stages, under present conditions, are destructive; or to consider a lake to be a waste area because it can not be plowed, indicates a very limited insight or selfish motives.”

This quote is from a paper presented at the 1914 Indiana Academy of Science by Will Scott titled “The Relation of Lakes to Floods, with Special Reference to Certain Lakes and Streams of Indiana.”

One thing Scott’s quote tells us is that flooding is not a new or special event. The classic trap to avoid is being convinced to spend all your efforts and resources addressing the symptoms, which will reoccur, while ignoring the cause or actual problem. Repeatedly treating symptoms through actions such as dredging of rivers, straightening or widening rivers, removal of all woody debris, removal of forested riparian canopies, or altering lake levels will not permanently fix any problem. In addition, repeatedly treating symptoms may continue to degrade the remaining natural flood reduction systems, natural resources, degrade water quality, destroy habitat and damage fish communities without offering a real solution. Stream monitoring and comprehensive watershed planning can help identify areas of concern and help focus resources on the source(s) of problems, and help develop a plan for long-term success.