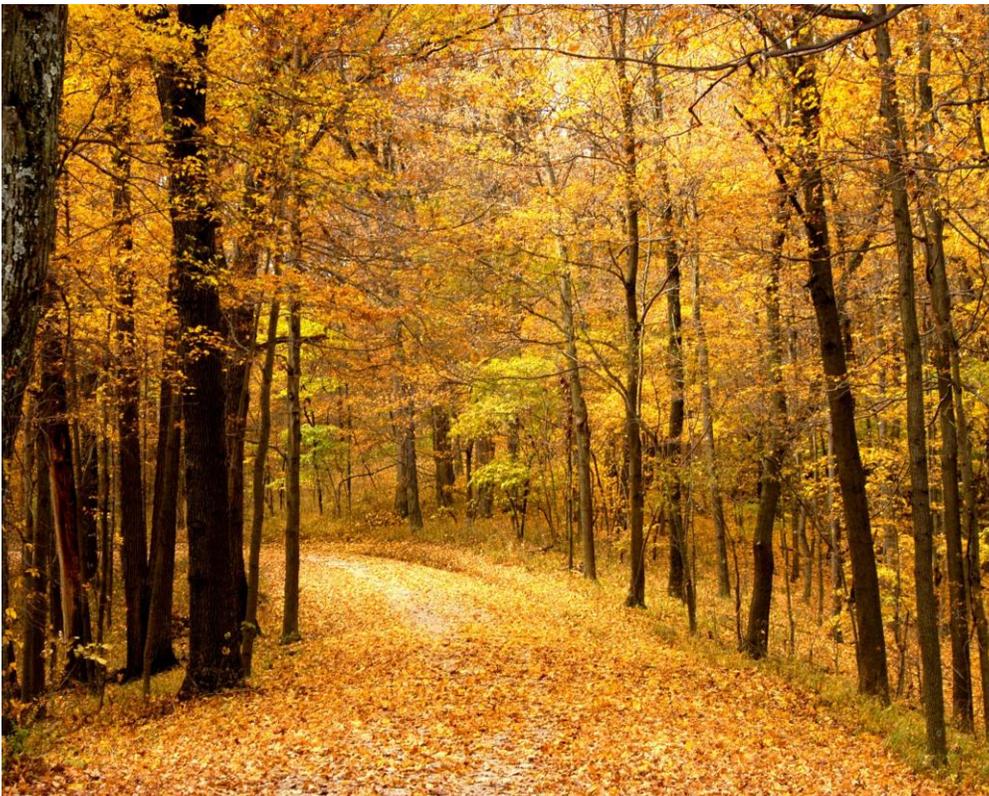


# WOODLANDS FOR WATER, WILDLIFE, & PEOPLE



*A Plan for the Woodlands  
of NW Portage County*



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## INTRODUCTION

This plan is designed to be a broad-scale woodland management plan to benefit the landowners in northwest Portage County, with a focus on small parcel woodland owners. This plan has been developed with the help of local woodland owners, local partners, and natural resource professionals. It is a collaborative effort to maintain functioning woodlands and to positively address issues and concerns stemming from the loss of woodlands in the area and the fragmentation of the area's forest. The first sections of the plan set the stage with a general overview of the benefits and services provided by trees, woodlands, and the greater forest followed by a basic description of forest fragmentation. Next are several sections that describe the plan area ending with a description of the area's top woodland issues and concerns. Finally, the plan's goals and objectives are laid out followed by an outline for implementation. Additional supporting information is found in the appendices.

### Woodland Benefits & Services

Trees are vital for much of life on earth. Trees purify the air by removing carbon dioxide and releasing oxygen, protect freshwater supplies by stabilizing the soil and preventing erosion, and moderate the earth's climate by blocking winds, providing shade, and by reducing floods through intercepting rainfall and absorbing water. Many wildlife species depend upon trees and woodlands to provide food and habitat. Trees produce nuts, berries, and leafy herbaceous materials that are consumed by a variety of omnivores and herbivores. Woodlands also provide wildlife with shelter and cover from natural predators, which is critical for successfully breeding. For example, bats, birds, squirrels, and other small mammals often nest in tree branches and tree cavities, while other birds like ruffed grouse depend upon thick stands of young woodland regrowth for nesting habitat and protection from predators.

Trees and woodlands have a positive effect on the human psyche. These benefits are hard to measure but there are several studies that show this relationship. One study showed that simply having a window view of trees will help shorten a hospital patient's recovery time (Ulrich 1984). Another study showed that trees may mitigate psychological precursors to crime, such as irritability, inattentiveness, and impulsive behavior (Kuo & Sullivan 2001). Trees can even positively affect our driving according to Cackowsky & Nasar (2003); tree lined streets have a calming effect on drivers, and this is known to slow down traffic (Wolf 2005). In addition, we know that forests provide opportunities for a variety of recreational pastimes such as hiking, bird watching, camping, fishing, and hunting. These activities have indirect effects that raise our quality of life, like keeping us active and reducing stress. Finally, woodlands are aesthetically pleasing and this improves everyone's quality of life. A world without trees is hard to imagine.

There are numerous economic benefits gained from trees. Trees reduce home energy costs by providing shade in the summer and breaking the wind in the winter. According to the National

Arbor Day Foundation, “the net cooling effect of a young, healthy tree is equivalent to ten room size air conditioners operating 20 hours a day”. Trees also increase the value of a home or property. “Healthy, mature trees add an average of 10 percent to a property’s value” ([www.arborday.org/trees/benefits.cfm](http://www.arborday.org/trees/benefits.cfm)). At the community level, woodlands provide economic benefits by cumulatively reducing energy demands and thus reducing the amount of power plants and power infrastructure needed. They also prolong the life of the paved surfaces. McPherson and Simpson (1999) reported that pavement under full sun needed to be restored every 7 to 10 years, but restoration of pavement under dense shade may be deferred to every 20 to 25 years. Trees reduce the amount of stormwater that a community has to contain or treat and reduce the frequency of flooding by intercepting rainfall, taking up water, and slowing water movement.

Finally, woodlands that are managed wisely and sustainably can provide people with renewable materials. Woodlands provide us with wood for a variety of products such as lumber for homes, furniture, picture frames, handles, musical instruments, paper, and fuel for electricity. Woodlands also provide us with maple syrup, fruits, nuts, mushrooms, and a variety of herbs. We can ensure these materials do not run out by being good stewards of our woodlands.

## **Urban Development & Forest Fragmentation**

Urban areas across the United States have been expanding into the surrounding rural areas at a high rate for several decades. This growth has generally been low density development that occupies large amounts of what once was rural land. This pattern of growth alters large amounts of land including woodlands and leaves the remaining forests fragmented and degraded. The result is what many refer to as urban sprawl. One factor influencing this growth pattern is people’s desire to enjoy the amenities of urban life yet be close to nature. This transition zone between urban and rural areas is called the rural-urban interface.

In Ohio, from 1990—2000, the area classified as rural-urban interface increased by 15.3%. In the year 2000, an estimated 16.1% of Ohio’s land area was classified as rural-urban interface (Figure 10, Appendix I). In the rural urban interface, forests become fragmented in terms of ownership and geographic location. Forest fragmentation leads to decreases in forest benefits and services such as water quality, wildlife habitat, woodland products, and biodiversity, while leading to increases in woodland threats, like invasive plants and pests. Also increased parcelization, or fragmented ownership of the land, has resulted in a mixture of land uses with a variety of management goals. The goal of this plan is to maintain functioning forests and the benefits they provide by supporting coordinated management of woodlands in the rural-urban interface.

## PLAN AREA

### Area Description

This plan was developed for a broad area of woodlands located in northwest Portage County, in northeastern Ohio. This area is known for its scenic rivers and for its bogs and fens that support unique vegetation communities and harbor unusual assemblages of plants and animals. The plan covers approximately 97,714 acres of land. The urban areas, townships, watersheds, and scenic rivers included in the plan area are listed in Table 1.

Table 1. Features Within The Plan Area			
Urban Areas	Townships	Watersheds	Scenic Rivers
Aurora	Freedom	Aurora Branch, Chagrin River	Aurora Branch, Chagrin River
Garrettsville	Hiram	Breakneck Creek, Cuyahoga River	Upper Cuyahoga River
Hiram	Mantua	Eagle Creek, Mahoning River	
Mantua	Shalersville	Headwater, Cuyahoga River	
Streetsboro		Tinkers Creek, Cuyahoga River	
Sugar Bush Knolls		West Branch, Mahoning River	

### Area Selection

This area was chosen for several reasons. Portage County is part of a 17 county focus area identified in Ohio for having significant areas of state designated priority forests and significant amounts of rural-urban interface. Northwest Portage County has many valuable woodlands and unique wildlife communities that are under pressure from land use conversion and further fragmentation. There are protected woodlands in the area that could serve as an anchor for an area-wide woodland plan. And because Northwest Portage County was identified for plan development by natural resource professionals and partners in northeast Ohio at a meeting to identify local sites and steer development of a broad-area woodland management plan.

## Area Map

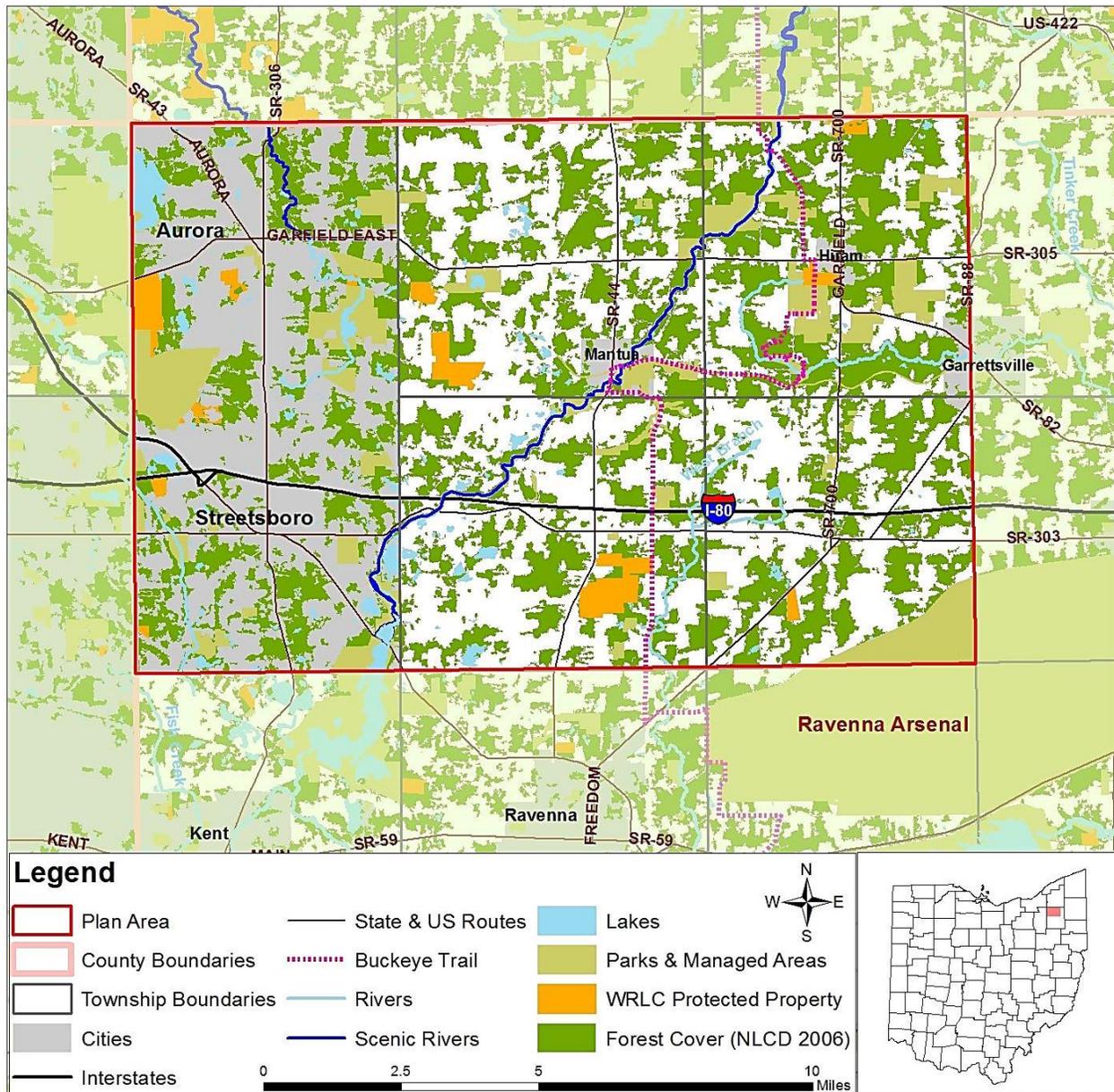


Figure 1. NW Portage County Plan Area (ODNR-Forestry)

## Features & Facts

The plan area includes several notable features. There are portions of two state designated scenic rivers within the plan area: the Aurora Branch of the Chagrin River in north Aurora and the Upper Cuyahoga River which flows through much of the plan area. The Buckeye Trail passes through the middle of the plan area (Figure 1). And there also is an impressive collection of parks and nature preserves found within the plan area (Table 2). Many of these parks and preserves are accessible to the public but some of them have restricted entry.

<b>Table 2. Northwest Portage County Parks and Preserves</b>	
<b>Owner</b>	<b>Parks and Preserves</b>
<b>City of Akron</b>	<ul style="list-style-type: none"> <li>• Arthur Youngblood Property</li> <li>• Lake Rockwell</li> </ul>
<b>City of Aurora</b>	<ul style="list-style-type: none"> <li>• Aurora Park</li> <li>• Harmon Farm</li> <li>• Hartman Farm</li> <li>• Moebius Nature Center</li> <li>• Sunny Lake Park</li> </ul>
<b>City of Streetsboro</b>	<ul style="list-style-type: none"> <li>• Gott Fen Expansion</li> <li>• Municipal Park</li> <li>• Wilcox Park</li> </ul>
<b>Cleveland Audubon Society</b>	<ul style="list-style-type: none"> <li>• Aurora Sanctuary</li> <li>• Molnar Sanctuary</li> <li>• Novak Sanctuary</li> </ul>
<b>Portage Parks District</b>	<ul style="list-style-type: none"> <li>• Chagrin Headwaters Preserve</li> <li>• Morgan Preserve</li> <li>• Seneca Ponds Park</li> <li>• Headwaters Trail</li> </ul>
<b>Ohio Department of Natural Resources</b>	<ul style="list-style-type: none"> <li>• Gott State Nature Preserve</li> <li>• Mantua Bog Nature Preserve*</li> <li>• Marsh Wetlands Nature Preserve*</li> <li>• Tinkers Creek State Nature Preserve</li> <li>• Tummonds Nature Preserve</li> </ul>
<b>The Nature Conservancy</b>	<ul style="list-style-type: none"> <li>• Herrick Fen Nature Preserve</li> </ul>
<b>Silver Creek Conservancy</b>	<ul style="list-style-type: none"> <li>• Headwaters Trust</li> </ul>
<b>Township Parks</b>	<ul style="list-style-type: none"> <li>• Freedom Township Park</li> <li>• Shalersville Community Park</li> </ul>

\* Mantua Bog & Marsh Wetlands are part of the Mantua Swamp Region which was designated as a National Natural Landmark in 1976.

## History & Heritage

Before the European immigrants settled this area, NW Portage County was nearly 100 percent forested, as was the rest of Ohio. It is estimated that 95% of Ohio was forested before it was settled ([forestry.ohiodnr.gov/history](http://forestry.ohiodnr.gov/history)). After the American Revolutionary War ended, the land that makes up present day Ohio was claimed by several colony states, including Connecticut. Eventually Connecticut and other states gave up most of their Ohio land claims to the US government so that the Northwest Territory could be formed. However, Connecticut managed to “reserve” the northeast corner of Ohio for itself. Connecticut was successful in holding this claim based on a legal issue that predated the revolution where Connecticut had lost some of its land to New York & Pennsylvania. This area became known as the Connecticut Western Reserve.

The western portion of the Connecticut Western Reserve was given to Connecticut residents who had lost their homes in fires set by British forces during the American Revolutionary War. These lands became known as the Fire Lands. The eastern portion of the Reserve, which included NW Portage County, was sold to Connecticut Land Company in 1795 for \$1.2 million. Almost immediately after purchasing the land, the Connecticut Land Company began selling it,



and the first Europeans came to settle this area in 1798 and 1799. Eventually, many New England residents moved to the area because of its easy access to Lake Erie. However, settlers faced struggles with Native Americans over ownership of the land, especially in the Fire Lands region which had also been granted to Native Americans as part of the Treaty of Greeneville of 1795. As the new settlements increased in population, Ohio Native Americans were forced from the region (US Department of the Interior-National Park Service 2011).

From 1820-1860, many Europeans immigrated to the region, including many of German and Irish decent. As more and more settlers arrived, woodlands were cleared for settlements, agriculture, timber, paper, and energy. By the early 1900's, only 10 percent of Ohio's land remained forested; however since then, Ohio's forests have increased to about 33 percent of land in the state. The regrowth of forests in Ohio was fueled by several actions and started in 1916 when the Ohio Division of Forestry began purchasing and reforesting land, reforestation work continued during the Great Depression when the Civilian Conservation Corps planted millions of trees, and was also aided by the abandonment of many acres of unproductive agricultural lands that have naturally reverted back to woodlands ([forestry.ohiodnr.gov/history](http://forestry.ohiodnr.gov/history)). This general trend also occurred in NW Portage County. Presently, forests cover approximately 40 percent of the land within the plan area (using National Land Cover Database (NLCD), Fry et al. 2011).

Another bit of history unique to this area is Camp Ravenna, or Ravenna Arsenal, which is found in the southeast corner of the plan area. This historic camp served the U.S. as an arsenal and manufacturer of shells and bombs during World War II, the Korean War, and the Vietnam War. The U.S. Army initially set aside over 21,000 acres in 1940 for the creation of 2 military ammunition production facilities. They were officially opened in March of 1942. The facilities were combined during World War II to form Ravenna Arsenal. During World War II, Ravenna Arsenal produced more weapons for the war effort than any other plant in the United States. More than 14,000 Ohioans found employment here during World War II.

The complex ceased arms production at World War II's conclusion, although it continued to store ammunition. The plant produced arms again during the Korean War and Vietnam War, but in 1971, the facility was placed on stand-by and has never served the same purpose again. After years of inactivity, the facility was transferred to the Ohio National Guard as a training facility in 1992 ([www.ohiohistorycentral.org/entry.php?rec=1707](http://www.ohiohistorycentral.org/entry.php?rec=1707)). Today, Camp Ravenna is heavily forested with approximately 84 percent of the land in woods and employs several natural resource staff who actively manage their woodlands. A section of the Camp, called Wadsworth Glen, has been so lightly touched by humans that it is listed as an old growth forest in several documents (McCarthy 1995, Davis 2003)

## Social Conditions

- I. Demographics – Within the plan area, there are approximately 50,799 residents and 20,878 housing units. This information is based on 2010 Census Data for blocks within the plan area; the Census Block boundaries fall along township & county lines with only slight deviations. Figure 2 shows housing densities within individual 2010 Census blocks. More detailed information on the area’s demographics can be found in Appendix III.

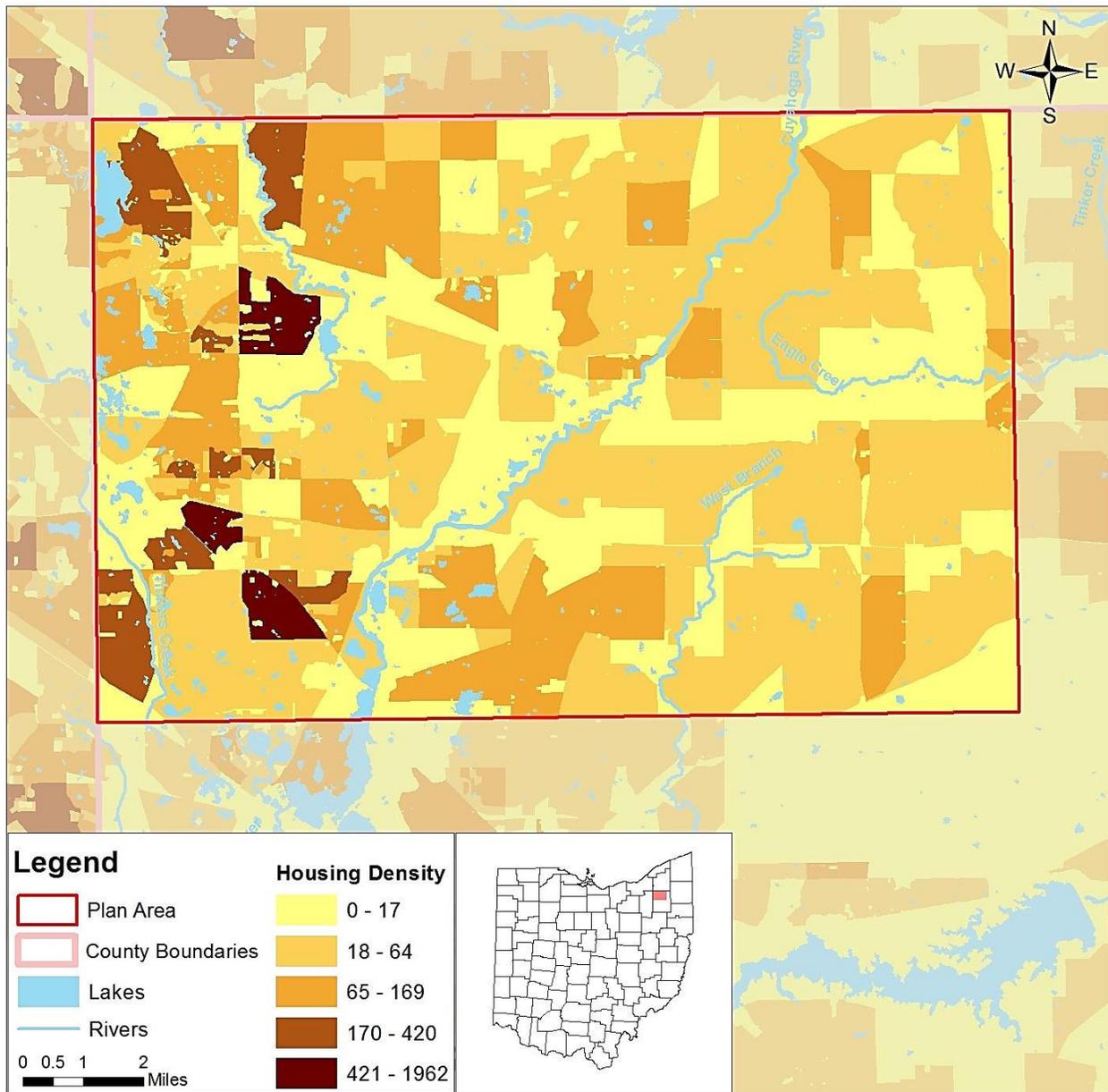
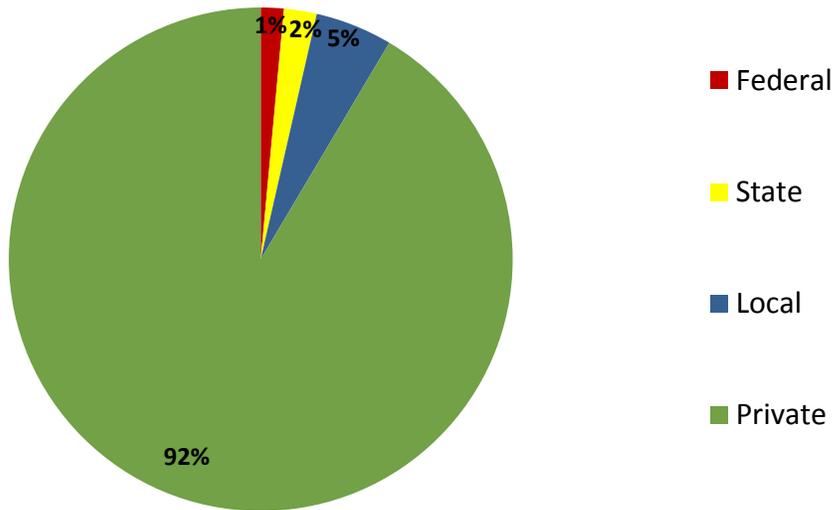


Figure 2. Housing Density Per Census Block (2010 U.S. Census Data)

- II. Land Ownership Characteristics – The vast majority of land within the plan area is privately owned. Only about 8,330 acres of land (or 8.5%) is publically owned. Figure 3 shows the percentage breakdown of ownership types (Portage County GIS Department). See Appendix III

for a breakdown of the area’s protected lands by ownership/type (Figure 14) and a breakdown of the area’s parcels by size category (Figure 15).



**Figure 3. Land Ownership**

- III. Landowner Interests & Objectives – No previous information was found on landowner interests and objectives for the plan area in NW Portage County but that information is available on regional and statewide scale from the U.S. Forest Service’s National Woodland Owner Survey (NWOS). In northeastern Ohio (17 Counties) the NWOS found that woodland owners with 10 acres or more of land listed beauty, biodiversity, hunting, privacy, recreation, timber, and keeping the land intact for heirs as the top reasons for owning woodlands. The NWOS also indicated that the top 3 concerns in the state are: (1) insect and plant disease, (2) property taxes, and (3) trespassing. More information from the NWOS on statewide landowner attitudes and objectives can be found in Figures 29 and 30 in Appendix III ([www.engaginglandowners.org/new-landowner-research/sffi-landowner-types](http://www.engaginglandowners.org/new-landowner-research/sffi-landowner-types)).

In order to better understand the interests and objectives of small parcel landowners (2-10 acres) in northern Portage County we invited them to take part in a woodland owner survey during the month of October, 2012. The survey was advertised on our website, on many of our partner’s websites, through a news release, and a radio interview. Responses from the survey indicate that local landowners have similar reasons for owning their woodlands as indicated in the NWOS. However, we did not receive enough responses to be statistically confident in the survey results. More detailed results from our survey can be found in Appendix III and Figures 16-28.

### **Economic Conditions**

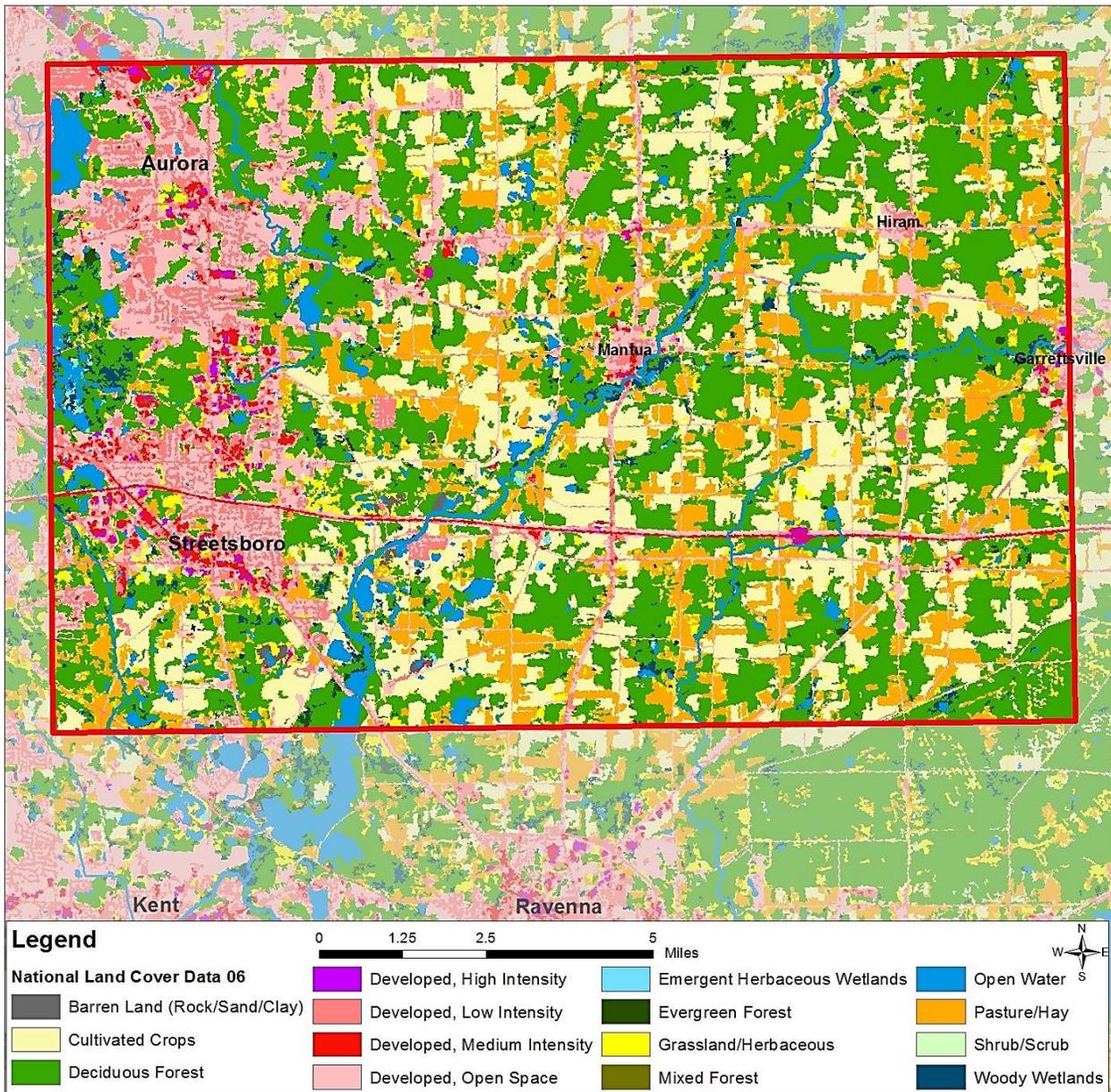
In general, all across northeast Ohio, the economy has been slowly shifting from a manufacturing-based to a service-based economy. The old manufacturing jobs have been disappearing, but a few smaller manufacturing operations have opened, mainly in suburban areas. This, along with the evolution of the service economy, has encouraged job migration to

suburban industrial parks and edge cities, including Aurora and Streetsboro in northwest Portage County. Also the recent economic recession (2007 – 2009) has intensified the loss of manufacturing jobs resulting in historic unemployment rates. Presently the area’s economic conditions seem to be slowly improving but are still unstable. More detailed information on the region’s economic conditions can be found in Appendix IV.

## Biophysical Conditions

- I. Land Cover -- As a whole, Portage County is still fairly rural but land cover continues to change, especially in the NW corner of the county. Based on 2006 National Land Cover Data (Fry et al. 2011), approximately 20.6% of the land in the plan area is developed, 37.8% is forested, 18.8% is in crops, 13.3% in pasture/hay, 4.7% in grasslands/herbaceous cover, 2.6% in open water, 1.7% in wetlands, 0.4% in shrub cover, and 0.2% in barren lands (Figure 4). The area is known to have multiple fens and bogs, which are unique vegetation communities that harbor unusual assemblages of plants and animals. Many of these biological communities are protected within the nature preserves in the area.
  
- II. Forest Cover – In the plan area 54.3% of the forests are classified as Beech-Maple-Basswood Forest, 26.5% as Mixed Evergreen-Hardwood Forest, 5.3% as Mixed Urban Forest (Developed), 4.5% as Atlantic Swamp Forest, 4.3% as Eastern Floodplain Forest, 3.1% as Northeastern Interior Dry-Mesic Oak Forest, and the remaining 2% in a mix of other forest classifications (LANDFIRE 2008). Portage County’s Watershed Plan (2006) indicates the most common tree species found in the uplands are sugar maple (*Acer saccharum*), northern red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), black cherry (*Prunus serotina*), and white oak (*Quercus alba*). Common species found in wetland and riparian forests include silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), pin oak (*Quercus palustris*), and swamp white oak (*Quercus bicolor*).  
[www.co.portage.oh.us/watershedmaps102006/Appendix%2010%20Inventory%20Metadata.pdf](http://www.co.portage.oh.us/watershedmaps102006/Appendix%2010%20Inventory%20Metadata.pdf)

More information on the area’s forest cover can be found in Appendix I where Figure 11 shows a LIDAR generated map that portrays the plan area’s forest cover and tree canopy heights from the surface of the earth.



**Figure 4. Land Use Map--Plan Area (NLCD 2006 data)**

III. Wildlife – There are a wide variety of wildlife species found in the plan area. White-tailed deer, wild turkey, raccoon, opossum, squirrel, weasel, and coyote can be found in woodland habitat or along the edges of woodlands. Also a variety of birds are found in the woodlands including warblers, woodpeckers, thrushes, woodcock, great horned owl, and barred owl. In the more open areas and along the woodland edges, cottontail rabbit, woodchuck, and fox make their home. Birds found on the edges and open spaces include red-tailed hawk, red-shouldered hawk, Cooper's hawk, sharp-shinned hawk, swallows, flycatchers and bluebird. Mink, beaver, muskrat, and four-toed salamander prefer habitat in and along the wetlands, ponds and lakes; also a variety of waterfowl spend their summers in the area including mallards, wood duck, and Canada geese. A greater diversity of waterfowl can be found in the area during the spring and fall migrations including a numbers of diving duck species like scaup, ring-necked, bufflehead, and canvasback. Rail, gallinule, snipe, heron, bittern are also found along the shorelines. In the

lakes and ponds there are walleye, largemouth bass, bluegill, yellow perch, white and black crappie, channel catfish, snapping turtle, water snake, and a variety of frogs (ODNR DNAP, ODNR DOW).

- IV. High Priority Bird Species – The plan area provides valuable woodland habitat for a variety of bird species, including a number of priority species for conservation. The Ohio All-Bird Conservation Plan (Ohio Bird Conservation Initiative 2010; [www.obcinet.org](http://www.obcinet.org)) designates high priority species for conservation based on population trends at regional and continental scales. Data from the Ohio Breeding Bird Atlas II (2006-2011) indicates that the plan area contains two highest priority species and four high priority species that depend upon woodland habitat. The highest priority species, or those requiring immediate conservation action and having high conservation threats and concern across their range, include cerulean warbler (*Setophaga cerulea*) and wood thrush (*Hylocichla mustelina*). The cerulean warbler, also an Ohio Species of Conservation Concern, prefers a landscape of predominately (>60%) mature forest cover for breeding, preferentially nesting in white oak (*Quercus alba*) (Rodewald 2012). Wood thrush breed in mature deciduous and mixed forests containing American beech (*Fagus grandifolia*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), oaks (*Quercus spp.*), and pines (*Pinus*) (Roth 1996).

The plan area also supports individuals of four species ranked as high priority species for Ohio, meaning that they have widely decreasing populations at regional and continental scales, but the current threat is not as strong as for highest priority species. These species include the prothonotary warbler (*Protonotaria citrea*), hooded warbler (*Wilsonia citrine*), black-billed cuckoo (*Coccyzus erythrophthalmus*) and the Acadian flycatcher (*Empidonax virescens*). The Prothonotary warbler, also an Ohio Species of Conservation Concern, relies on wooded wetlands containing willows (*Salix spp.*), sweet gum, tupelo (*Nyssa sylvatica*), and willow oak (*Quercus phellos*) for breeding habitat (Petit 1999). Like the Prothonotary warbler, the Acadian flycatcher frequently nests in riparian forests (Whitehead and Taylor 2002).

One other bird species of note is the yellow-bellied sapsucker, which is a state listed species of concern and has been observed within in the plan area in Morgan Preserve (Portage Parks District).

- V. Rare Species -- The U.S. Fish & Wildlife Service (2012) lists the Indiana Bat (*Myotis sodalist*) and Mitchell's Satyr Butterfly (*Neonympha mitchellii mitchellii*) as the only Federally Endangered species found in Portage County. Northern Monkshood (*Aconitum noveboracense*) is listed as a Federally Threatened plant species, and the Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) is a Federal Candidate for the endangered list. The American Bald Eagle (*Haliaeetus leucocephalus*) is also listed as a Federal Species of Concern in the county.

Yearly records indicate that Portage County has a high number of state listed rare species. It is ranked 4<sup>th</sup> out of 88 counties in Ohio for number of state listed rare plants and animals. Table 4

(Appendix II) shows the number of state listed species recorded in Portage County by category and by state status. (Ohio Natural Heritage Database & Ohio Wildlife Diversity Database; ODNR Division of Wildlife)

There are a total of 26 state listed rare species that have been recorded in the plan area or near the plan area boundary (within 5 km). A list of these state listed rare species is found in Table 5 (Appendix II). Also Figure 14 (Appendix I) shows sections of the plan area that have been designated as High Quality Environmental Communities by the Ohio Natural Heritage Database and approximate locations where rare plant or animal species have been recorded.

- VI. Water Resources – The plan area has an abundance of water resources. The region is dotted with glacial lakes, bogs, fens, ponds, and wetlands. Major lakes within or partially within the plan area include Aurora Pond, Geauga Lake, Hallow Lakes, Lake Rockwell, Melco Lake, Round-up Lake, Sunny Lake, and West Twin Lake. There are 3 major rivers that traverse the area: the Chagrin, Cuyahoga, and Mahoning. Portions of the Chagrin and Upper Cuyahoga Rivers are designated as State Scenic Rivers. There are 6 sub-watersheds; Aurora Branch of the Chagrin River, Breakneck Creek of the Cuyahoga, Eagle Creek of the Mahoning, Headwaters of the Cuyahoga, Tinkers Creek of the Cuyahoga and the West Branch of the Mahoning (Figures 1 & 5).

According to Ohio State University Extension fact sheet on Portage County's Water Resources ([ohioline.osu.edu/aex-fact/0480\\_67.html](http://ohioline.osu.edu/aex-fact/0480_67.html)), about 90 percent of the households rely on ground water for their water supply. The other 10 percent in the county rely on surface water, namely Lake Hodgson, which is Ravenna's water source. However, it should be noted that the city of Akron, in Summit County, draws water from Lake Rockwell, which is partially within the plan area. Out of the 90 percent that rely on ground water, approximately 51 percent obtain their water from private wells with the remaining 49 percent using public groundwater wells for their water supply. More information on groundwater is found in Appendix V.

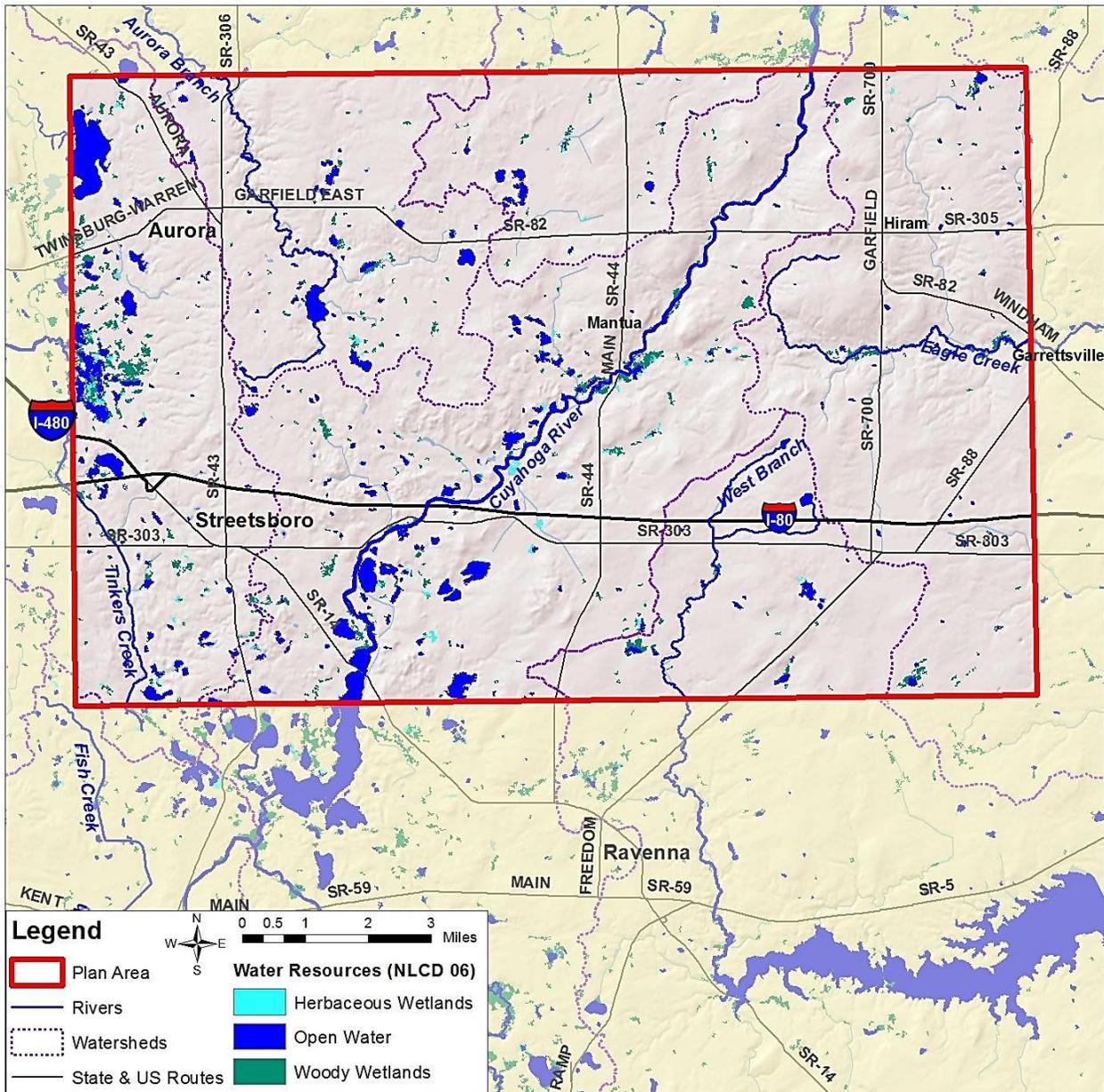


Figure 5. Water Resources—Plan Area (NLCD 2006 data)

VII. Soils & Geology – The plan area is part of the Lake Erie Glaciated Plateau (Major Land Resource Area), which is found in a band adjacent to Lake Erie. Soils in this area generally consist of glacial outwash, glacial till, glacial lake sediments, and stratified drift deposits which are very deep, loamy to clayey, and range from well to poorly drained soils ([www.pennystone.com/ecoregions/USDA139.php](http://www.pennystone.com/ecoregions/USDA139.php)). More detailed soil information is found in Appendix VI. Information on the area’s geology is found in Appendix VII.

## Top Issues, Concerns, & Needs

- I. Forest Loss -- Since the early 1900's forest land in Ohio has increased from a low of 10% to about 33% today. Much of this increase is due to unproductive farm land being abandoned and then allowed to naturally revert to woodlands. This same general trend has occurred in Portage County. However, in recent decades the trend has been reversed, with woodlands shrinking due to land use change and development. As woodlands are lost, the benefits and services they provide also diminish. This is a concern across Ohio and is a real threat in the plan area, given its proximity to major urban areas.
  
- II. Forest Fragmentation – The permanent clearing of wooded areas leaves the remaining forests fragmented and this diminishes the benefits they provide, such as wildlife habitat, water quality, and stormwater protection. For example, several studies have shown that forest fragmentation is a major cause of population decline in many species of neotropical migrant birds in North America (Whitcomb et al. 1981; Lynch and Whigham 1984; Askins et al. 1990; Hagan et al. 1996; Bayne and Hobson 2001; Nol et al. 2005; Sauer et al. 2005; Zuckerberg and Porter 2010). When large parcels of land are divided and sold as many smaller parcels (called parcelization), benefits from forests can also diminish, even if trees are not cleared. For example, heavily parcelized forests may be more susceptible to forest health impacts, like invasive species or diseases, since there are more potential pathways for entry. In addition, once introduced, forest health issues are often more difficult to control in parcelized forests, as treatment of the problem is often spotty and inconsistent across ownership boundaries. Another issue is that parcelized and fragmented forests are still at risk from forest fires, which means a raised potential for loss of human life and homes. Human-wildlife conflicts are also likely to increase as a forest becomes more fragmented. For example, black bears wandering into backyards and deer-vehicle collisions appear to be on the rise in many areas.

One way you can get a feel for forest fragmentation is to look at forest patches. The area occupied by one continuous forest block is referred to as forest patch size. As the forest becomes more fragmented average forest patch size decreases. Simply put, if an area of forest is not fragmented it will be one patch, but if it is fragmented then it will be divided into many smaller patches. Figure 6 illustrates the arrangement and size of forest patches in the plan area.

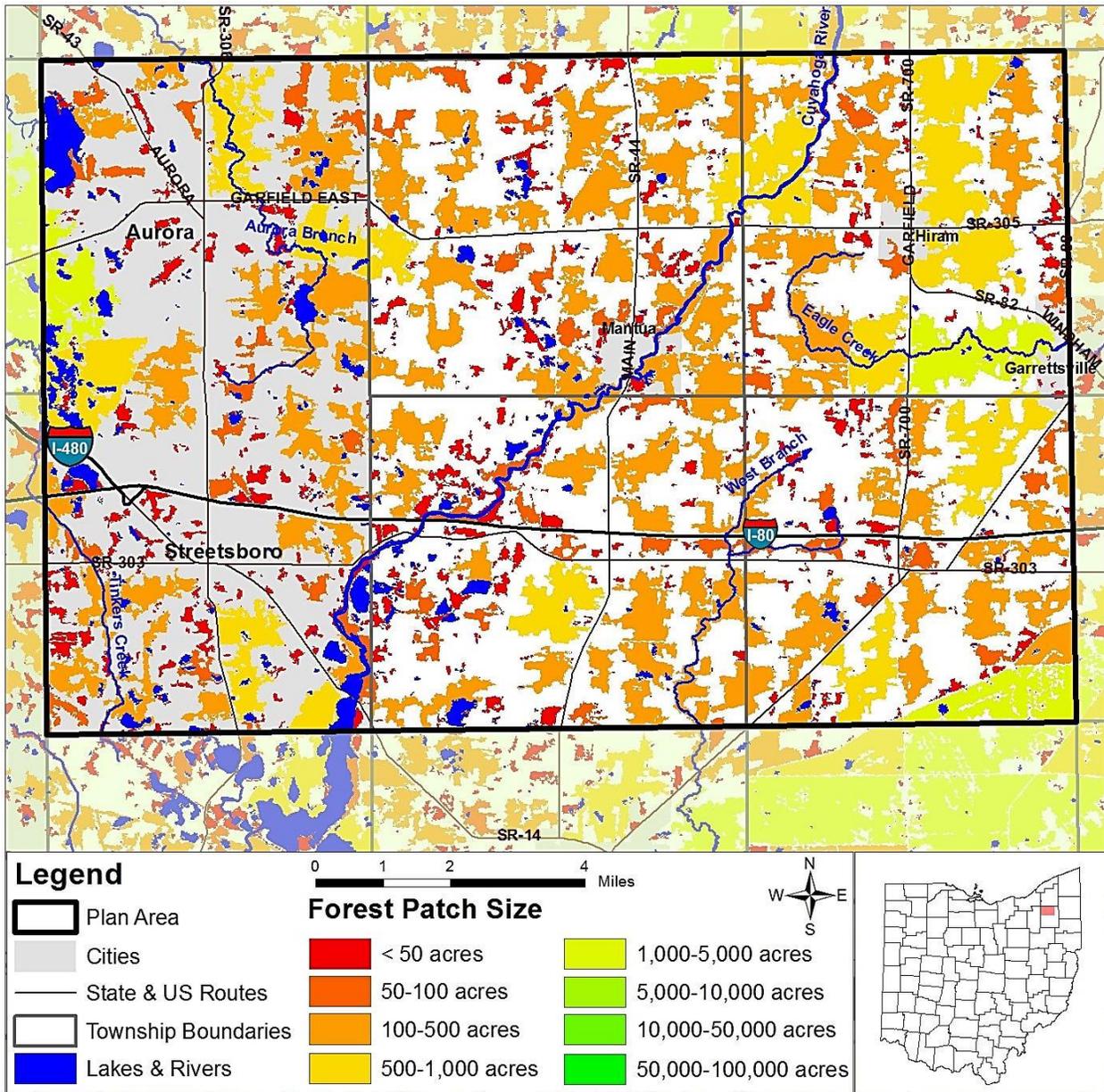


Figure 6. Forest Patch Size—Plan Area (NLCD 2006 data)

Another way you can measure forest fragmentation is by looking at forest edge. As forests become fragmented, not only do forest patch sizes decrease but the amount of forest edge increases. Forest edge is the area where the forest transitions into non-forest land. Most often a natural edge is a soft edge with a transition zone between non-forest land and forest land. In this transition zone you will often find sun loving pioneer species—a mixture of shrub and tree species that are the first to become established in an open field. This soft edge provides unique wildlife habitat, buffers the inner woods, and enables natural woodland expansion. However when woodlands are cleared for developing subdivisions, houses, businesses, or roads, hard edges are often created with no transition zone. Trees that were sheltered by other trees on all sides suddenly find themselves with no buffer and exposed to wind, sunlight, new diseases, different insects, invasive species, road salt, and automobile exhaust. These new pressures

often lead to some die-off and blow downs of previously interior trees and leads to a shift in the mix of plants and animals inhabiting the new edge area, with edge-loving species coming in. The result is a decrease in interior forest habitat. Therefore, the area covered by forest edge and transition zones is an important measure of how fragmented forests are. Figure 7 shows the arrangement of forest edge and forest interior areas within the plan area.

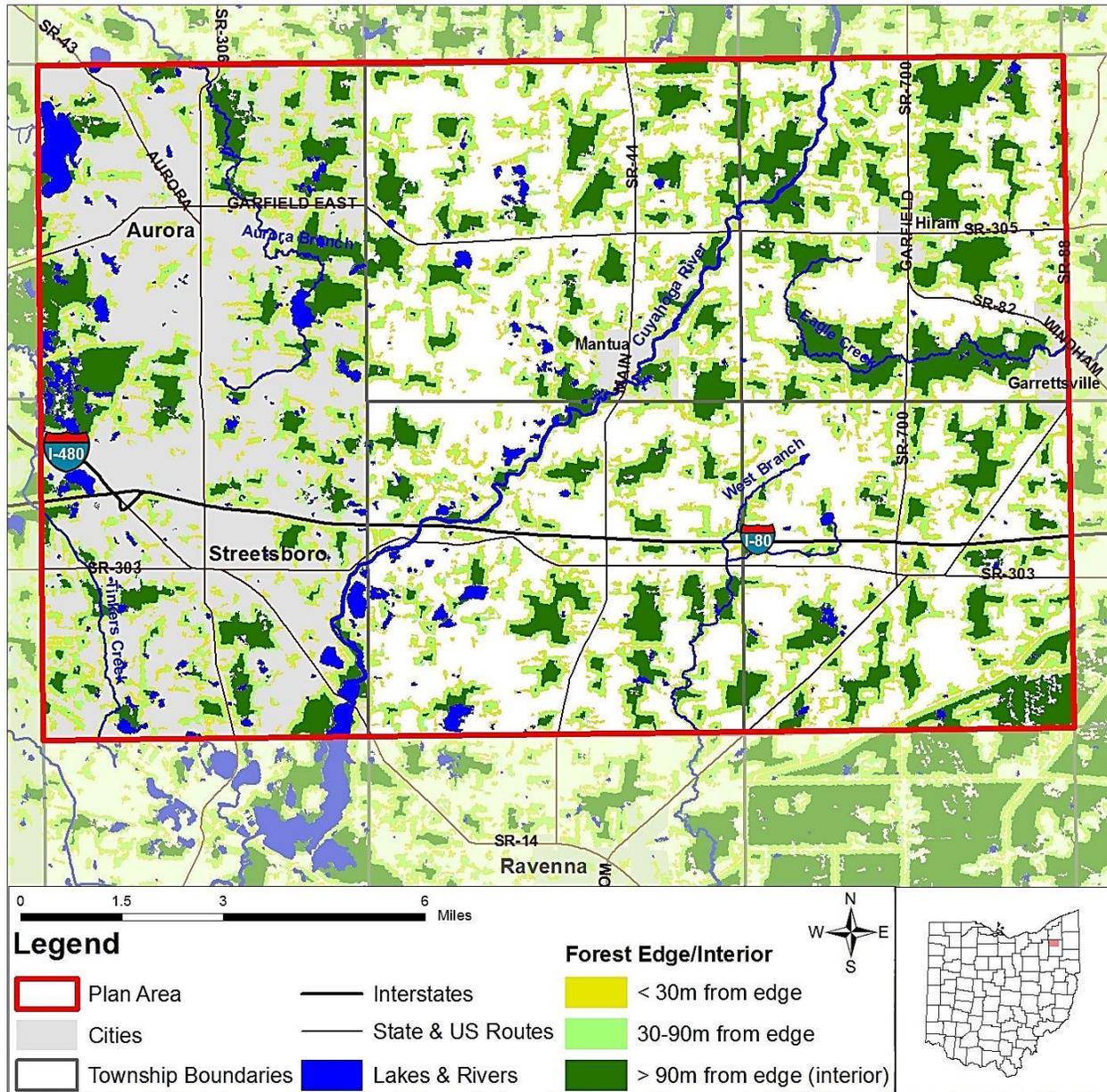


Figure 7. Forest Edge—Plan Area (NLCD 2006 data)

Figures 6 and 7 portray the issue of forest fragmentation in the plan area. The recent economic recession (2007-2009) seems to have slowed the trend, but as the economy improves, the threat of forest fragmentation will likely increase again.

- III. Forest Degradation & Invasive Species – Forest degradation can occur in many ways and by different means. One significant way that woodlands have become degraded is through the

introduction of non-native diseases and insect pests. Several major native tree species have declined in numbers from insects and diseases, some to the extent of being practically eliminated from our natural environment. Unfortunately, this has been occurring for over 100 years and new diseases and insect pests are discovered every few years. The following is a list of non-native insects and diseases that have, or potentially could have, substantial negative impacts to the woodlands in the plan area:

- American Chestnut Blight ([www.fs.fed.us/r8/chestnut/index.php](http://www.fs.fed.us/r8/chestnut/index.php)),
- Asian Longhorn Beetle ([www.agri.ohio.gov/topnews/asianbeetle](http://www.agri.ohio.gov/topnews/asianbeetle)),
- Beech Bark Disease ([na.fs.fed.us/fhp/bbd](http://na.fs.fed.us/fhp/bbd)),
- Butternut Canker Disease ([www.na.fs.fed.us/spfo/pubs/howtos/ht\\_but/ht\\_but.htm](http://www.na.fs.fed.us/spfo/pubs/howtos/ht_but/ht_but.htm)),
- Dutch Elm's Disease ([ohioline.osu.edu/hyg-fact/3000/pdf/3308.pdf](http://ohioline.osu.edu/hyg-fact/3000/pdf/3308.pdf)),
- Emerald Ash Borer ([emeraldashborer.info](http://emeraldashborer.info)),
- Hemlock Woolly Adelgid ([na.fs.fed.us/spfo/pubs/pest\\_al/hemlock/hwa05.htm](http://na.fs.fed.us/spfo/pubs/pest_al/hemlock/hwa05.htm)),
- Sudden Oak Death ([ohioline.osu.edu/hyg-fact/3000/pdf/HYG\\_3309\\_08.pdf](http://ohioline.osu.edu/hyg-fact/3000/pdf/HYG_3309_08.pdf)),
- Thousand Cankers Disease ([www.thousandcankers.com](http://www.thousandcankers.com))

The introduction of invasive plant species can also degrade a woodland over time. Invasive plant species are non-native species that have been documented to outcompete native plant species on many sites to the point of harming ecosystems. Invasive species often grow very quickly, spread quickly, and have few or no natural enemies. If left alone, invasive plant species can eventually form a monoculture, which provides minimal benefits compared to diverse native ecosystems. For example, the invasive tree species called tree-of-heaven (or ailanthus) will outcompete most native trees in woodland openings or edges. If left alone, tree-of-heaven can often become the dominate tree species in a woodland stand. Tree-of-heaven produces a chemical that suppresses the growth of many native plants (a biological phenomenon called allelopathy). Without management a monoculture of tree-of-heaven can form which has very low wildlife value and very little timber value since tree-of-heaven is not a sought after wood. The following is a list of non-native plant species that are degrading or could degrade woodlands in the plan area:

- Buckthorn (*Rhamnus frangula*, & *Rhamnus cathartica*)  
([na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/common-and-glossy-buckthorn.pdf](http://na.fs.fed.us/spfo/invasiveplants/factsheets/pdf/common-and-glossy-buckthorn.pdf)),
- Bush Honeysuckle (*Lonicera spp.*)  
([forestry.ohiodnr.gov/Portals/forestry/pdfs/invasives/F-68Honeysuckle.pdf](http://forestry.ohiodnr.gov/Portals/forestry/pdfs/invasives/F-68Honeysuckle.pdf)),
- Japanese Honeysuckle Vine & Asian Bittersweet (*Lonicera japonica* & *Celastrus orbiculatus*)  
([www.oipc.info/FactSheets/9Fact\\_sheetJaphoneysuckleAsianbittersweet2.pdf](http://www.oipc.info/FactSheets/9Fact_sheetJaphoneysuckleAsianbittersweet2.pdf)),
- Japanese Knotweed (*Fallopia japonica*) ([www.in.gov/dnr/files/Japanese\\_Knotweed.pdf](http://www.in.gov/dnr/files/Japanese_Knotweed.pdf)),
- Kudzu (*Pueraria Montana*) ([www.na.fs.fed.us/fhp/invasive\\_plants/weeds/kudzu.pdf](http://www.na.fs.fed.us/fhp/invasive_plants/weeds/kudzu.pdf)),
- Mile-A Minute Weed (*Polygonum perfoliatum*)  
([na.fs.fed.us/fhp/invasive\\_plants/weeds/mile-a-minute\\_weed.pdf](http://na.fs.fed.us/fhp/invasive_plants/weeds/mile-a-minute_weed.pdf)),
- Privet, Border & European (*Ligustrum obtusifolium Sieb./Zucc.* & *Ligustrum vulgare L.*)  
([www.invasive.org/browse/subinfo.cfm?sub=10087](http://www.invasive.org/browse/subinfo.cfm?sub=10087)) ([www.invasive.org/browse/subinfo.cfm?sub=3036](http://www.invasive.org/browse/subinfo.cfm?sub=3036)),

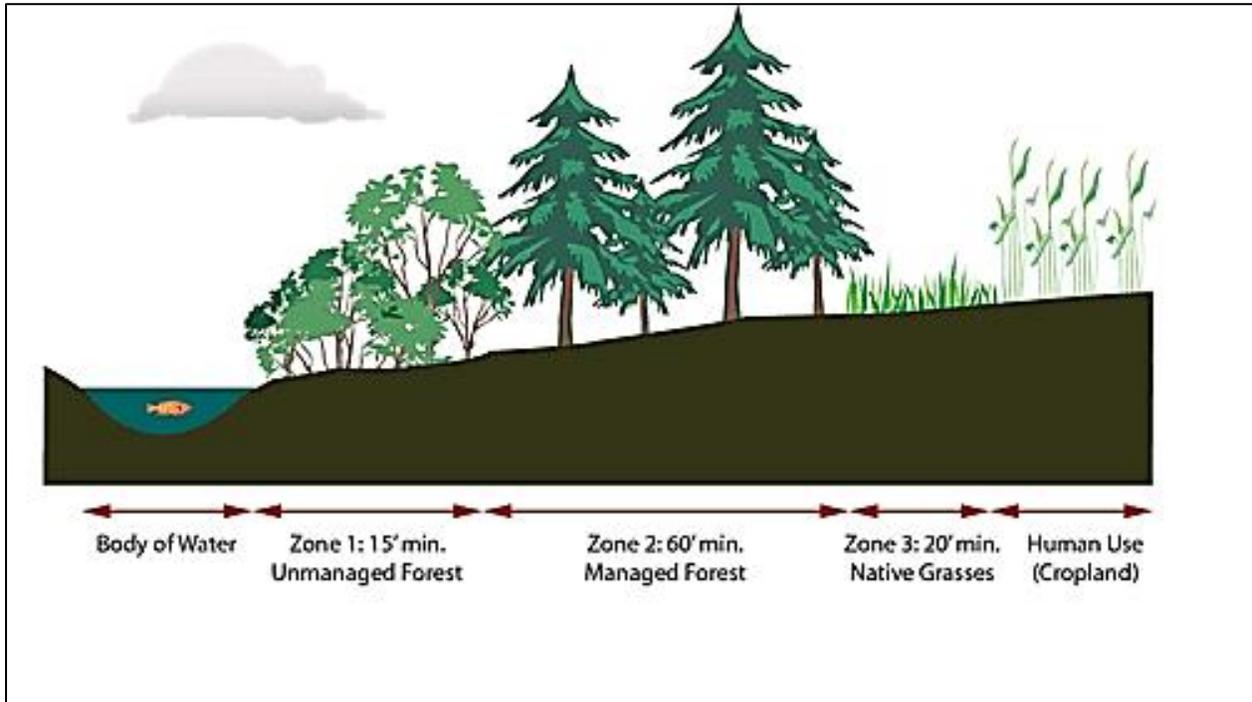
- Russian & Autumn Olive (*Eleagnus umbellata* and *Eleagnus angustifolia*) ([forestry.ohiodnr.gov/portals/forestry/pdfs/invasives/F-69Olive.pdf](http://forestry.ohiodnr.gov/portals/forestry/pdfs/invasives/F-69Olive.pdf)),
- Tree-of-Heaven (*Ailanthus altissima*) ([forestry.ohiodnr.gov/portals/forestry/pdfs/invasives/F-65Ailanthus.pdf](http://forestry.ohiodnr.gov/portals/forestry/pdfs/invasives/F-65Ailanthus.pdf)).

Another way woodlands are often degraded is from over-abundant deer populations. Deer will consume many beneficial plants in a woodland, including tree seedlings. High deer populations can prevent natural reforestation or significantly change the mixture of tree species that develop since they prefer to browse on some tree species over others. They can also make it very difficult to plant or establish new trees. Likewise a woodland can be degraded by consistently allowing livestock to graze in it. Livestock compact the soil, damage roots, destroy woodland understory plants, reduce wildlife habitat, increase erosion, and reduce the overall health of a woodland.

Finally, the mismanagement of woodlands can be a source of degradation. One common mistake is allowing your woods to be 'high graded', which occurs when the largest and most valuable tree species are cut during a timber harvest, and the low value and/or undesirable trees are left. The result is a woodland that has only low quality poorly formed trees (which is often linked to poor genetics), and species with no timber value. Ironically, one of the biggest losses from high grading is potential for future timber harvests. Sustainably and properly managed woodlands provide better quality timber products and more volume of wood over-time than a one-time high grade harvest. Other harvesting activities such as improperly placed skid trails, woodland roads, stream crossings, and log loading sites can also degrade a woodland by causing erosion and compacting high quality soils. Given that it takes considerable time and additional management to correct poor harvesting practices, it is important to work with a professional forester before a harvest to minimize potential mistakes and ensure that woodland benefits are protected. A harvest done the right way can improve wildlife habitat and woodland health while providing renewable resources. In fact some woodlands become over-crowded and stressed without a proper woodland thinning or harvest and thus more vulnerable to insect pests, diseases, and wildfire. Wise management of our woodlands is needed maintain healthy forests and the benefits and services they provide especially in our fragmented environments where our forests are faced with so many threats like invasive plants, exotic insects, and diseases which can significantly alter the mixture of tree species and natural reforestation processes.

- IV. Water Quality & Flood Frequency – Great strides have been made in water quality since the Clean Water Act of 1972; however, there is still concern over present day water quality and increases in the magnitude and frequency of flood events. Forest loss and fragmentation, especially along rivers, streams, lakes, and wetlands, has contributed to lower water quality and increased flooding. Forests that immediately border rivers and streams are called riparian forests. Riparian forests provide multiple benefits to surface water resources. They are good buffers between surface waters and open land uses such as crops, pastures, and parking lots.

Forests are effective in removing excess nutrients, pollutants, and sediment from surface water runoff during heavy rain events or from snow melt. Forests also mitigate flooding by absorbing water through their roots; by increasing the structure of soils—through root development and by supporting healthy biotic communities—which translates into a greater ability to soak up rainwater and floodwaters; and by simply slowing the movement of flood waters. Furthermore, riparian forests shade rivers and streams, which keep water temperatures cool for aquatic plants and animals. Thus forest loss and fragmentation adjacent to surface water resources is an important concern. ([na.fs.fed.us/spfo/pubs/n\\_resource/buffer/cover.htm](http://na.fs.fed.us/spfo/pubs/n_resource/buffer/cover.htm))



**Figure 8. USDA 3-Zone Riparian Buffer Planning Model.** For more information on riparian forest buffers see Figure 13 in Appendix I. ([www4.ncsu.edu/~acpierc3/world\\_forestry](http://www4.ncsu.edu/~acpierc3/world_forestry))

During the initial steering meeting for the development of this plan, local natural resource partners ranked water protection as one of the biggest concerns within the plan area. Continued forest loss and fragmentation threatens the area’s water quality and could increase the frequency and intensity of flood events. Figure 8 portrays a well-designed riparian buffer left along a body of water. This figure shows a 95 ft. wide buffer, but it should be noted that the recommended width of a riparian buffer differs based on soil types, slope, and other values (e.g., scenic or ecological) and can be anywhere from 75 ft. to over 300 ft. wide on each side of the river. In riparian areas, woodlands play a critical role in maintaining proper hydrologic function. Addressing the issues of forest loss and fragmentation within the area by working to maintain current forest cover and planting new woodlands is critical to addressing multiple issues including water quality protection and stormwater management.

Within the plan area there is a total of 18,954 acres of land found within 300 ft of a lake, pond, river or stream with 54 percent (10,322 acres) of this riparian land being forested (based on

2006 National Land Cover Data). While having forest cover on 54 percent of riparian lands is good relative to only 38 percent forest cover across the total plan area, it is important to maintain these forests in riparian areas and try to expand them when possible to maintain water quality and stormwater protection.

An example of this issue is the Chagrin River watershed which is at a critical level of development, with approximately 9% of the watershed covered with impervious cover. As the watershed continues to develop, the impervious cover is estimated to increase to approximately 17%. Today, most of the streams within the Chagrin River watershed are high quality and continue to attain their aquatic life use designations. However, there are areas within communities where residents experience erosion, flooding, and water quality problems. Sediment inputs created by stream bank erosion, increases in flooding and impacts to water quality can all be linked to loss of forest cover in the watershed and in particular loss of forest cover in riparian corridors. In order to ensure the watershed continues in balanced growth and development with natural resource management, stream quality and integrity must be protected to maintain the natural hydrologic functions they provide to the watershed. Forests play a critical part in maintaining hydrologic function in the Chagrin River watershed. To accomplish this goal, a wide variety of tools from land acquisition, planning, stormwater management, riparian setback regulations, restoration, and retrofits to existing development sites are all needed and woodland management, tree planting and riparian corridor enhancement will play an important role in achieving a proficient level of resource protection.

Outside of the Chagrin River watershed, development and land use change is also occurring to varying degrees. Promoting forests and the wise management of woodlands at the rural-urban interface helps to diminish the effects of development and land use change. Managing woodland resources at the rural-urban interface employs similar tactics as managing stormwater within a watershed. Often management and deployment of best management practices is prescribed on a parcel by parcel basis with overarching objectives for enhancement of natural resources. Due to severe fragmentation within the rural-urban interface, re-connecting woodland resources is a significant goal. Utilizing stormwater management techniques that focus on opportunities to incorporate trees into the landscape can dovetail with woodland management strategies focused on the small parcel owners owning 2-10 acres of land.

So addressing the issues of forest loss and fragmentation within the area by working to maintain current forest cover and planting new woodlands is critical to addressing multiple issues including water quality protection and stormwater management. There are a variety of different methods and tools that can be used by communities and individuals to adequately protect water resources, and many of them integrate trees. For example, communities can increase green infrastructure, follow low impact development (LID) principles, and support stormwater best management practices. Also communities and individuals can utilize rain

gardens, bioretention cells, and tree filter boxes to reduce stormwater. See appendix II for more detailed information on these practices.

- IV. Wildlife Diversity -- There are several rare and high priority wildlife species found in the plan area that are at risk, primarily due to loss of habitat. While not all of these species require extensive forest habitat, most of them use woods or benefit from them indirectly. For example, the rare fish and invertebrates found in the area require high water quality and woodland habitat along rivers and streams supports this. Also black bears and bobcats (endangered & threatened) are rare species that have been seen in the area and both require woodland habitat. Woodland habitats are also needed by all of the high priority bird species found within the plan area.

Given the habitat requirements of these rare and high priority species, we can see that forest loss and fragmentation is a contributing factor to declines in wildlife diversity. Studies of breeding habitat preferences and nest success in priority bird species support planting a diversity of trees to connect woodland patches and increase forest cover in riparian areas to benefit populations of priority bird species. As cerulean warblers prefer larger patches of forest for breeding habitat (Parker et al. 2005), and wood thrush nest success is higher in larger forest patches (Hoover et al. 1995), populations of both species could benefit from increased connectivity between existing woodland areas to increase forest patch size. Prothonotary warbler and Acadian flycatcher make extensive use of riparian forests (Whitehead and Taylor 2002), suggesting populations of both species may benefit from increased forest cover within riparian corridors.

## **WOODLAND ACTION PLAN**

Woodland Action Plan Purpose – A collaborative plan of action to maintain functioning woodlands in the rural-urban interface and a plan to positively address issues and concerns stemming from forest fragmentation and parcelization. The Woodland Plan will provide information and natural resource professional assistance to woodland owners in these environments and also be a framework for coordinated woodland management across property boundaries. The plan focus is on assisting small parcel woodland owners (2-10 acres) but large parcel landowners can also play an important role in achieving area-wide results. Our goals and objectives center on how we can help small parcel landowners maximize their woodland benefits in three areas: **water protection, wildlife habitat, and forest health**. We believe that there are many small parcel landowners who are concerned about these issues and would be willing to work together to positively address them when provided assistance and framework.

### **Short Term Goals & Objectives**

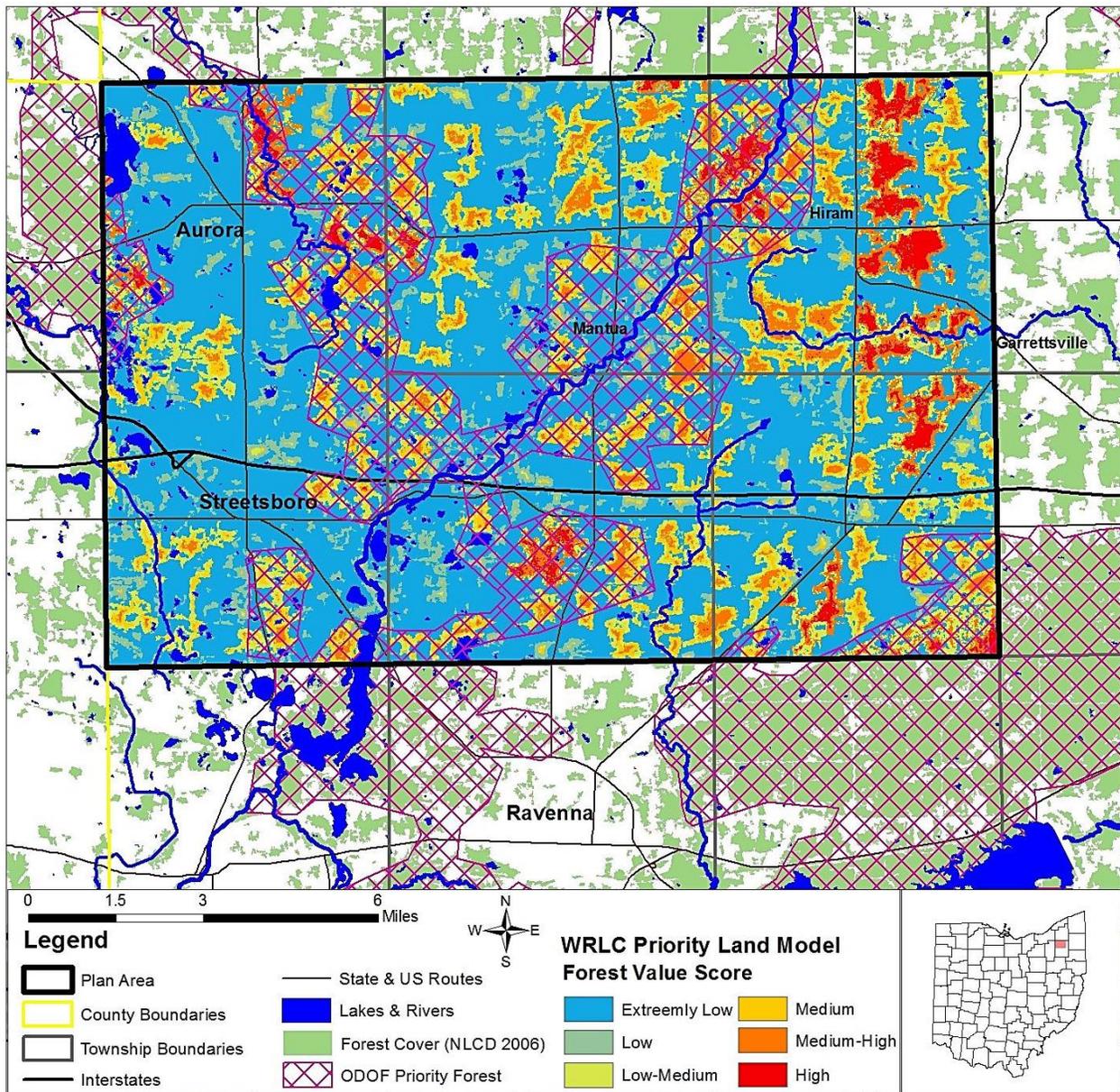
(Target completion date—April, 2014)

#### Goal #1, Expand Woodlands

- **Objective #1a** – Identify and assist 10 private landowners with small parcel properties located in priority areas or potential corridor areas who are interested in expanding woodlands through planting a diversity of native tree species. Priority areas are defined as open or semi-open areas that lie in areas designated as Priority Forest Lands\* by the Ohio Division of Forestry. Potential corridor areas are defined as open or semi-open areas that lie between two forested areas designated by Western Reserve Land Conservancy as high to medium-high value forests.\*\* (Figure 9)

\* Priority forest as defined by the ODNR Division of Forestry 2010 Forest Action Plan.

\*\* Priority lands as defined by Western Reserve Land Conservancy’s Land Prioritization Model (Figure 9)



**Figure 9. Ohio Division of Forestry (ODOF) Priority Lands & Western Reserve Land Conservancy (WRLC) Land Prioritization Model (Higher # = Higher Priority Lands).**

- **Objective # 1b** – Identify and assist 10 private landowners with small parcel properties located in riparian areas\* who are interested in expanding riparian woodlands through

planting a diversity of native tree species. Riparian areas we plan to target include scenic river sections, high quality primary headwater streams, and connectivity of riparian corridors to larger rivers such as the Aurora Branch of the Chagrin, and headwaters/major tributaries to the Cuyahoga River and West Branch of the Mahoning. Expanding woodlands along primary headwater streams will provide critical resources needed for groundwater recharge and stormwater management.

\* Recommended widths for riparian zones differ based on soil types, slope, and other values (e.g., scenic or ecological) and can be anywhere from 75 ft. to over 300 ft. wide, each side of the river.  
([na.fs.fed.us/spfo/pubs/n\\_resource/buffer/otherinfo.htm](http://na.fs.fed.us/spfo/pubs/n_resource/buffer/otherinfo.htm))

### Goal #2, Maintain Healthy and Diverse Woodlands

- Objective #2a – Identify and assist 20 private woodland owners with small parcel properties who are interested in implementing invasive plant control projects or woodland improvement projects on their property.
- Objective #2b – Identify and assist 10 private woodland owners with small parcel properties who are interested in implementing wildlife habitat improvement projects on their property (e.g., backyard habitat).

### Goal # 3, Promote Coordinated Woodland Management

- Objective #3a – Coordinate woodland management across public and private property boundaries in at least one location within the plan area where woodland management activities are completed on both sides of a public/private boundary and support the goals and objectives of this plan.

### Goal #4, Increase Awareness of Woodland Benefits and Woodland Threats

- Objective #4a – Provide educational assistance to 200 small parcel landowners through field events, educational events, and with 1 on 1 assistance.
- Objective #4b – Identify and assist 30 private woodland owners with small parcel properties who would like specialized woodland management plans that address issues such as riparian management, wildlife habitat improvement, specialty forest product development (e.g. maple syrup, mushrooms, ginseng, native herbs), and establishment of native plants.
- Objective #4c – Publish one article aimed at increasing awareness of the plan and recommended practices in a local magazine or newsletter (Ohio Woodland Journal, Portage SWCD Newsletter, etc.).

## **Long Term Goals**

Long Term Vision – Our long term vision is to bring together woodland landowners, organizations, and professionals that are interested in working together to raise awareness about the benefits and services of the forests in northwest Portage County and interested in addressing issues that threaten the woodlands in the rural-urban interface.

Long term goal #1 – Connect interested landowners, organizations, and natural resource partners in the plan area and develop a committee for the continued implementation and future direction of this Woodland Action Plan.

Long term goal # 2 – Seek and obtain additional funding for continued future implementation of this plan and to address future threats to the area’s forest.

Long term goal #3 – Identify lands released from sand and gravel mining activities and work to reforest these damaged lands.

## **Implementation**

### I. Marketing – The plan will be marketed to the area through a variety of means including:

- Targeted press releases
- Direct mailings
- A Rural-Urban Interface website
- Short Videos
- Factsheets on recommended practices
- Through field days & educational workshops

### II. Provide Landowner Education & Assistance Opportunities

- With the assistance of our partners, we will hold a variety of field days and educational workshops designed to increase landowner awareness of woodland benefits and services and to demonstrate how to best maximize those benefits and services on a property.
- Identify and provide assistance to landowner groups and home owner associations where coordinated woodland management is a possibility.
- Make on-site visits to assist interested landowners in planning and implementing recommended plan practices.
- Prepare management plans and paperwork for landowners interested in EQIP funds.
- Prepare specialized woodland management plans for landowners interested in topics such as riparian forest management, native plant establishment, wildlife habitat improvement, and non-timber woodland product development.

### III. Demonstration Sites

- Provide grant funding for the development of at least one demonstration site within the plan area on local protected woodlands, such as local parks or non-governmental organization lands (grant funds must be matched 1:1, state & federal Lands are not eligible)

- The purpose of a site will be to demonstrate how local concerns identified in the plan can be addressed through recommended woodland management activities and to encourage coordinated woodland management across public and private property boundaries.
- A site will be publicly accessible and provide private landowners with a visual and narrative demonstration of recommended woodland management activities. Activities will be explained through signs, brochures, and/or website information.

IV. Action Steps

<b>Table 3. Action Steps, Timeline, Responsibilities</b>		
<b>Action Step</b>	<b>Completion Date</b>	<b>Responsibility</b>
Draft Plan	08/30/12	Ohio Division of Forestry & Partners
Draft Plan Public Comment	10/31/12	Ohio Division of Forestry
Demonstration Site Application Due	11/20/12	Interested Applicants with help of Ohio Division of Forestry
Final Plan	11/30/12	Ohio Division of Forestry & Partners
1 on 1, EQIP sign-up	Fall 2012 – Fall 2013	Ohio Division of Forestry & Partners
Develop Social Marketing Tools and Launch Campaign	April 2013	Ohio Division of Forestry, & NNFP
Identify potential funds to continue future Plan implementation	Continuous	Ohio Division of Forestry & Partners
Target funds for future Plan implementation	Continuous	Ohio Division of Forestry & Partners
Field Days & Educational Events	Spring 2013 – Spring 2014	Ohio Division of Forestry & Partners
Demonstration Site Completion	December 31, 2013	Locally Protected Lands Partner & Ohio Division of Forestry
Short Term Goals & Objectives	April 2014	Ohio Division of Forestry & Partners
Project Evaluation	April 2014	Ohio Division of Forestry & Partners
Form a group of landowners & partners to continue Plan implementation	April 2014	Partners & Ohio Division of Forestry
Long Term Goals	Continuous	Partners & Ohio Division of Forestry
Plan Reassessment	2018	Plan Partners



## Plan Partners

Many groups and organizations have helped with the planning and development of this plan. The following groups and agencies have been involved in this process:

- American Tree Farm System
- Camp Ravenna
- City of Akron
- City of Aurora
- City of Streetsboro
- Chagrin River Watershed Partners
- Cleveland Museum of Natural History
- Cuyahoga River Community Planning Organization
- Doll Lumber Company
- Hiram College
- Hiram Township
- Lake Metroparks
- National Network of Forest Practitioners
- Ohio Bird Conservation Initiative
- ODNR Division of Forestry
- ODNR Division of Wildlife
- Ohio State University Extension
- Portage County Regional Planning Commission
- Portage Soil and Water Conservation District
- Portage Parks District
- Shalersville Township
- The Holden Arboretum
- The Nature Conservancy
- The Ohio Forestry Association
- Tinkers Creek Watershed Partners
- USDA Natural Resources Conservation Service
- US Fish and Wildlife Service
- Western Reserve Land Conservancy
- Wildlife Management Institute

## Steering Committee

The following partners are part of the steering committee for this plan:

- City of Akron
- City of Aurora
- City of Streetsboro
- Chagrin River Watershed Partners
- Cuyahoga River Community Planning Organization
- Doll Lumber Company
- USDA Natural Resources Conservation Service
- ODNR Division of Forestry
- ODNR Division of Wildlife
- Portage County Regional Planning Commission
- Portage County Soil and Water Conservation District
- Portage Parks District
- Western Reserve Land Conservancy

## Acknowledgments

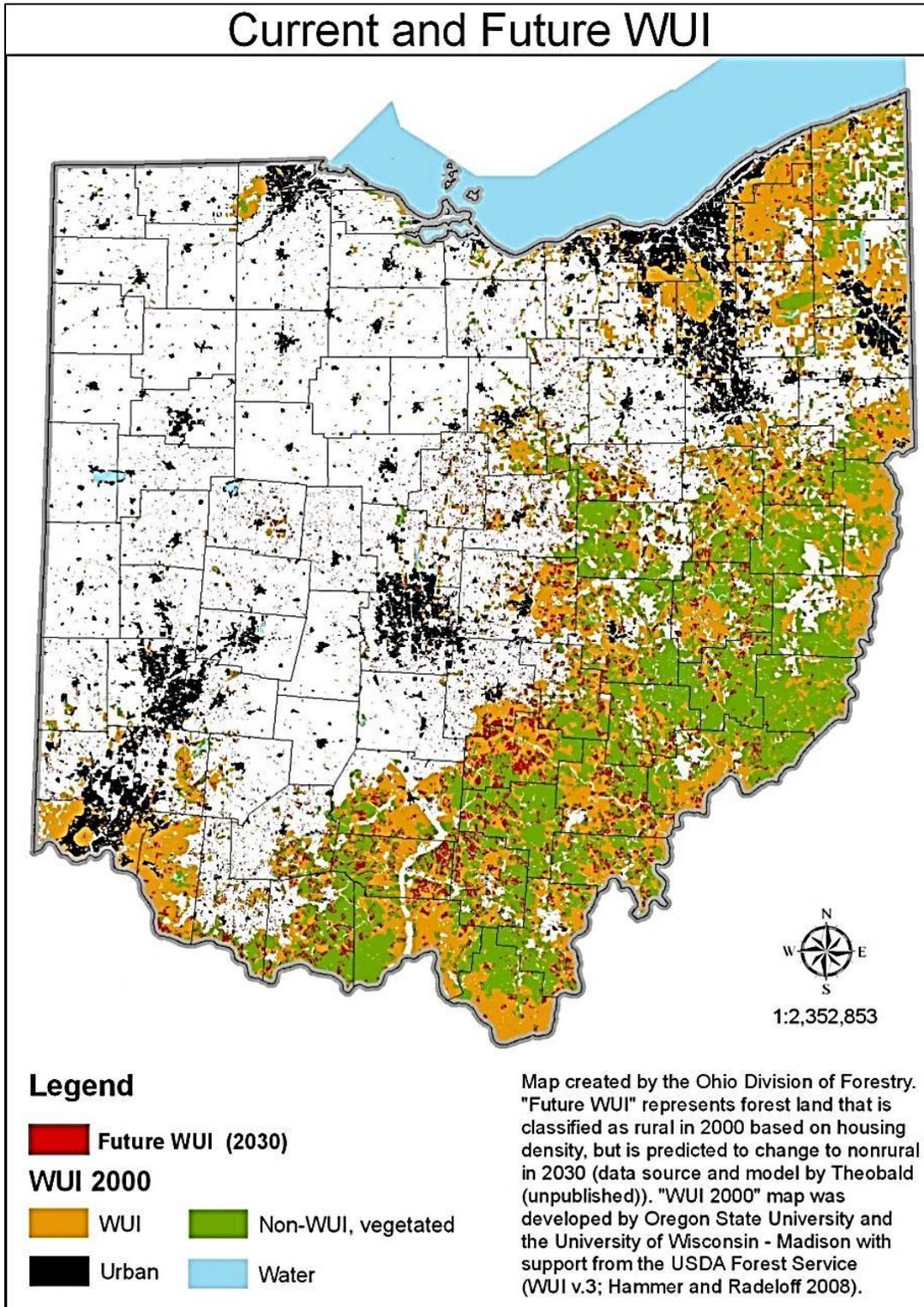
The following individuals contributed time to compile data, or author sections of the plan:

- Brian Armitage, ODNR Division of Wildlife
- Amanda Conover, Ohio Bird Conservation Initiative
- Elizabeth Mather, Western Reserve Land Conservancy
- Cotton Randall, ODNR Division of Forestry
- Matt Scharver, Chagrin River Watershed Partners
- Greg Schneider, ODNR Division of Wildlife
- Jason Van Houten, ODNR Division of Forestry

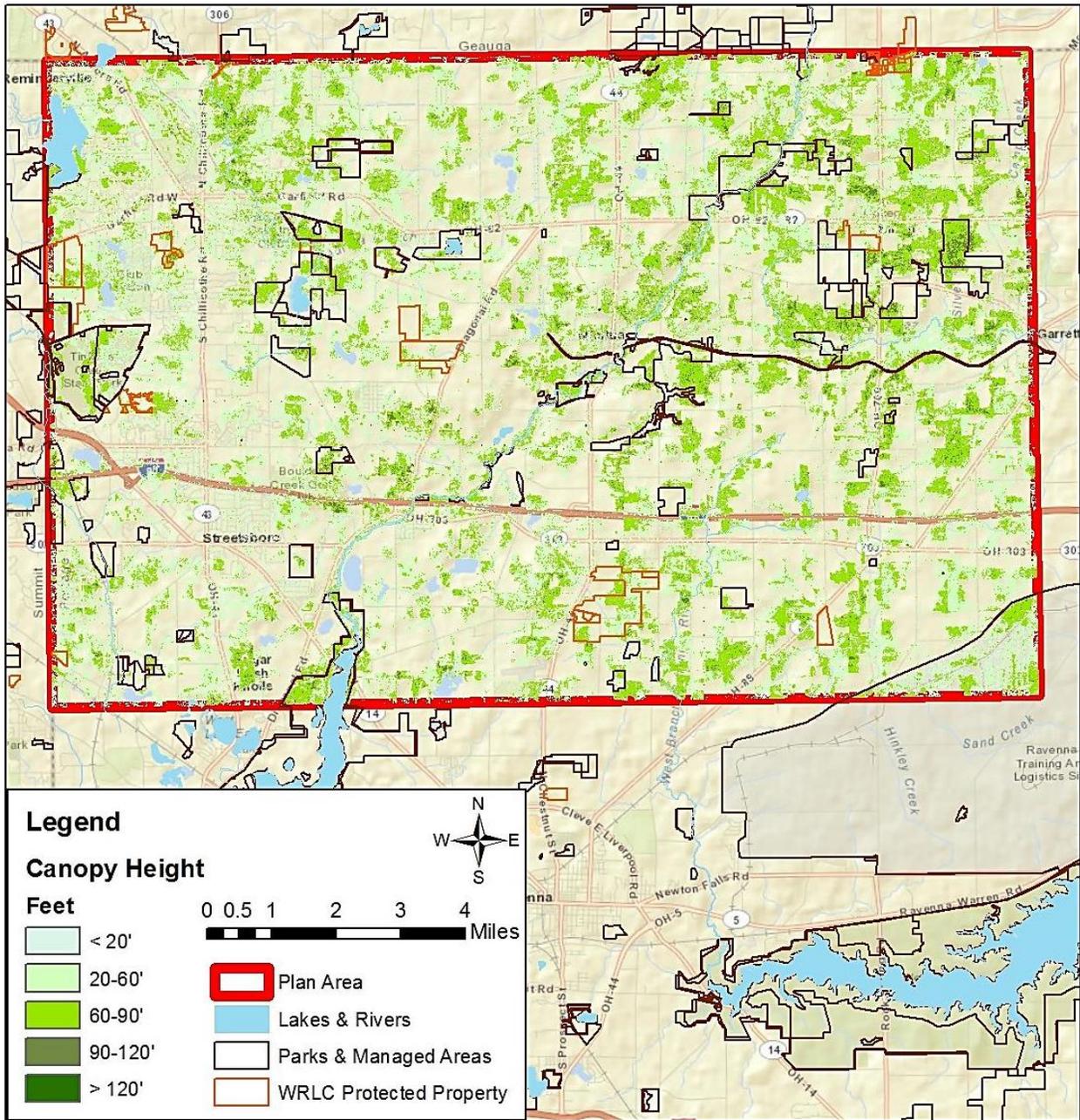
\* \*And thanks to all the landowners who fill out the Northeast Ohio Woodland Survey.

# APPENDICES

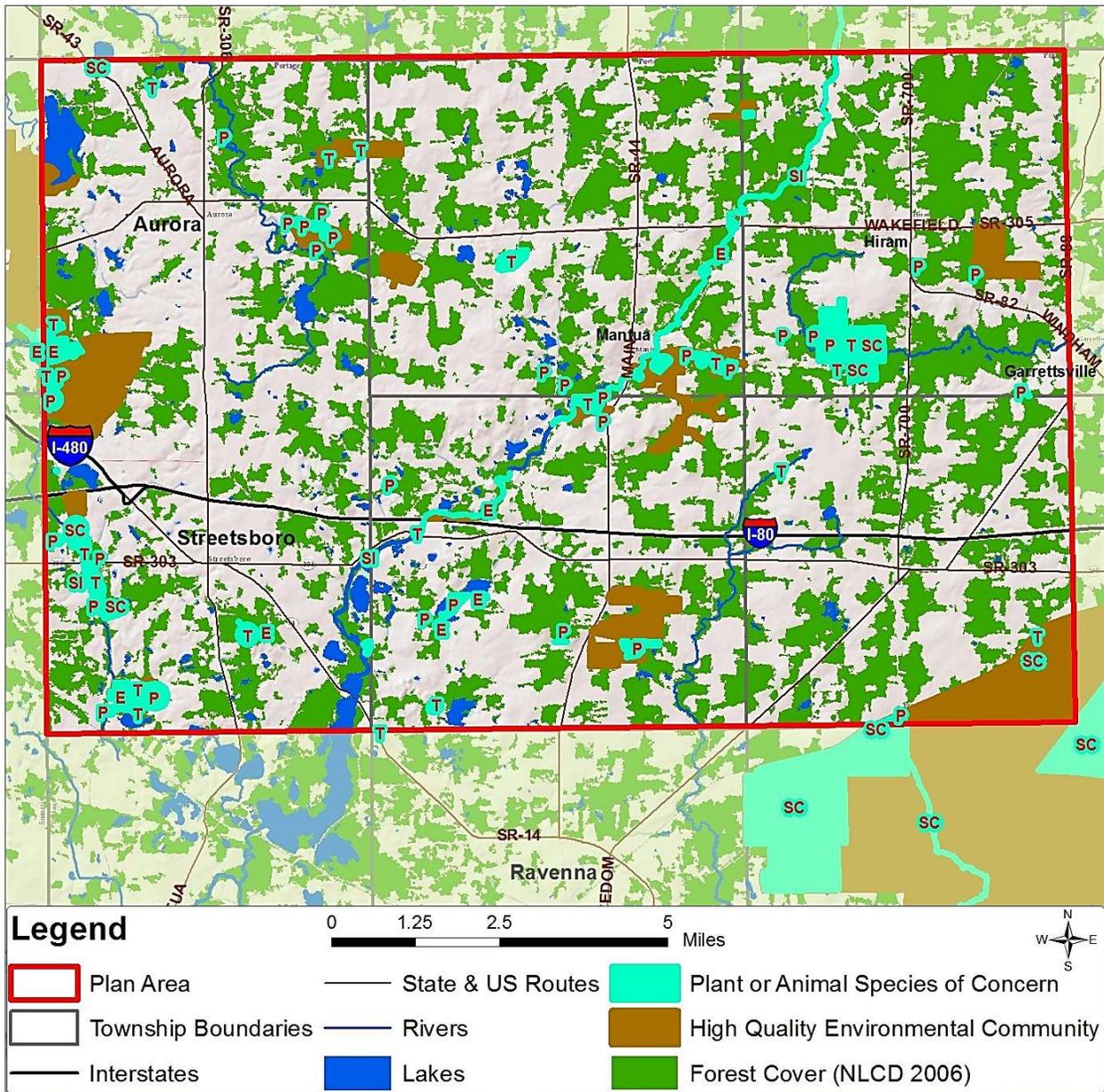
## I. Additional Figures



**Figure 10.** Ohio's Rural-Urban Interface (also known as Wildland-Urban Interface--WUI) (ODNR-Forestry 2010)



**Figure 11.** Tree Canopy Height (Western Reserve Land Conservancy, 2012)



**Figure 12. High Quality Environmental Communities.**

[Capital red letters represent the State Status of the recorded species (E = Endangered, T = Threatened, P = Potentially Threatened, SI = Special Interest, & SC = Species of Concern). (Ohio Natural Heritage Database, 2012)]

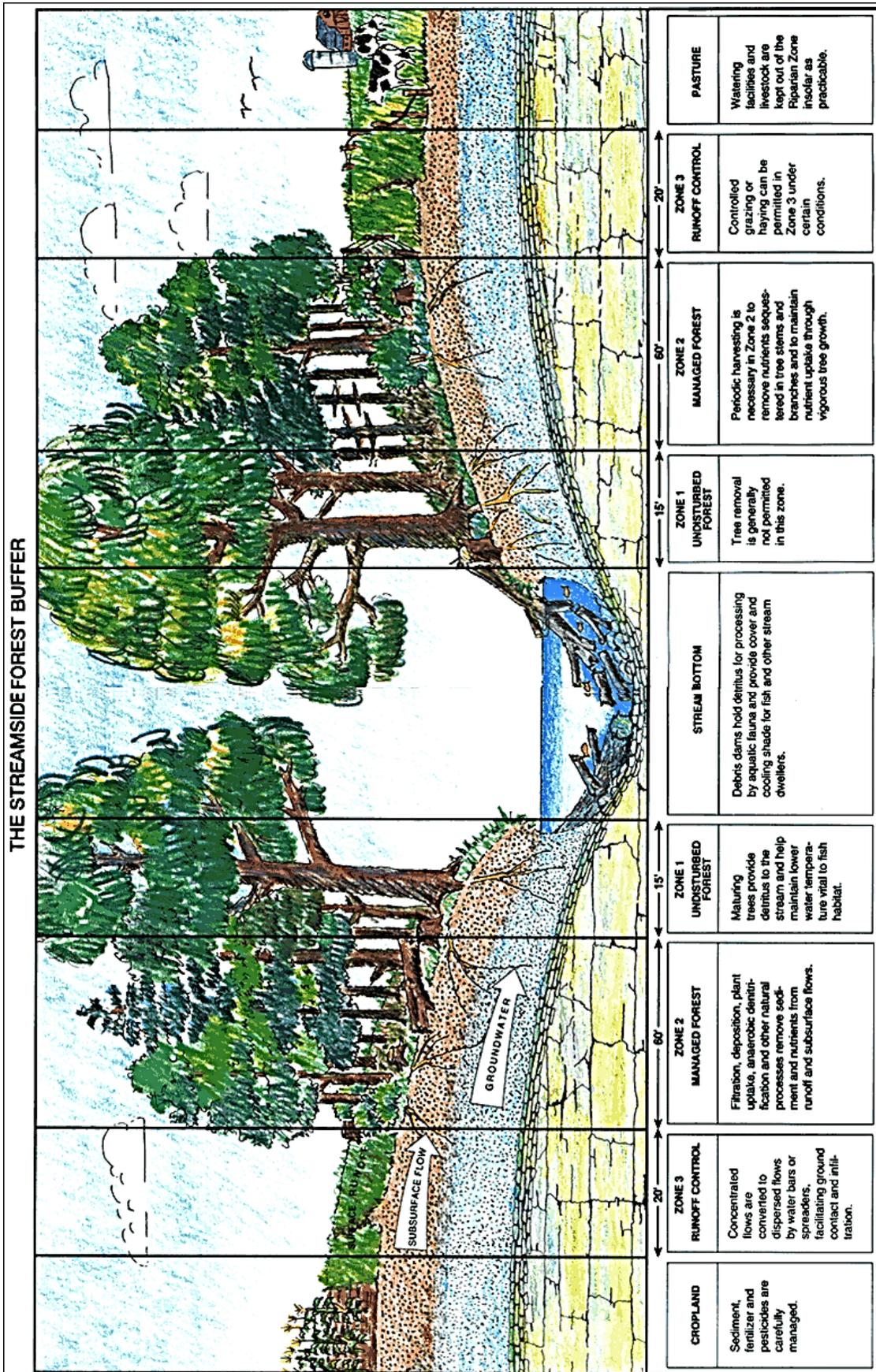


Figure 13. USDA Forest Service Streamside Forest Buffer Diagram (1991)  
[na.fs.fed.us/spfo/pubs/n\\_resource/buffer/part7.htm](http://na.fs.fed.us/spfo/pubs/n_resource/buffer/part7.htm)

## II. Additional Tables

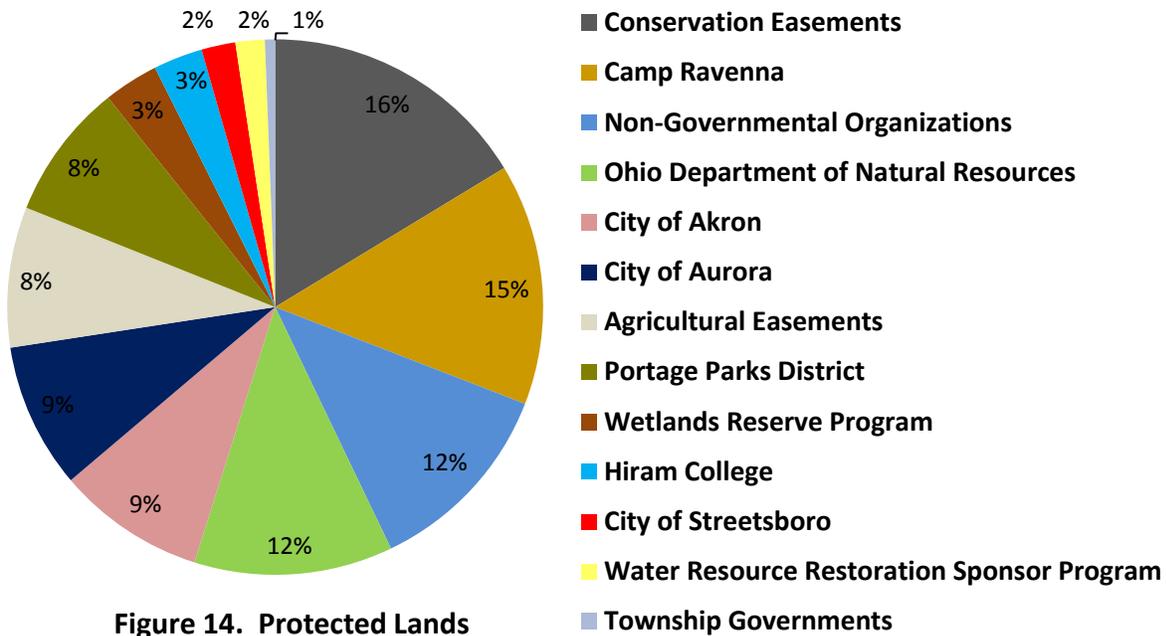
Table 4. Portage County State Listed Rare Species (Ohio Natural Heritage & Wildlife Diversity Databases, Ohio Bird Conservation Initiative)						
Category	Endangered Species	Extirpated	Potentially Threatened	Special Interest	Species of Concern	Threatened
Amphibians					1	
Birds	5			5	7	4
Fish	1				4	1
Insects	8				5	4
Invertebrates	3	1			3	1
Mammals	2	3			3	
Plants	42	3	49			30
Reptiles					3	1
<b>Totals</b>	<b>61</b>	<b>7</b>	<b>49</b>	<b>5</b>	<b>26</b>	<b>41</b>

Table 5. State Listed Rare Species—Plan Area. (Ohio Natural Heritage Database, Wildlife Diversity Database, & Ohio Bird Conservation Initiative)						
Species Name	Common Name	Category	State Status	Inside Project Area	Within 1 km of boundary	Within 5 km of boundary
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Bird	Threatened	✓	✓	✓
<i>Setophaga cerulea</i>	Cerulean Warbler	Bird	Species of Concern	✓		
<i>Protonotaria citrea</i>	Prothonotary Warbler	Bird	Species of Concern	✓		
<i>Neonympha mitchellii</i>	Mitchell's Satyr	Insect - butterfly	Endangered			✓
<i>Speyeria idalia</i>	Regal Fritillary	Insect - butterfly	Endangered			✓
<i>Euphyes bimacula</i>	Two-spotted Skipper	Insect - butterfly	Species of Concern			✓
<i>Psilotreta indecisa</i>	no common name	Insect - caddisfly	Threatened		✓	✓
<i>Capis curvata</i>	Curved Halter Moth	Insect - moth	Species of Concern			✓
<i>Catocala gracilis</i>	Graceful Underwing	Insect - moth	Endangered			✓
<i>Phalaenostola hanhami</i>	Hanham's Snout Moth	Insect - moth	Species of Concern			✓
<i>Fagitana littera</i>	Marsh Fern Moth	Insect - moth	Threatened			✓
<i>Brachylomia algens</i>	no common name	Insect - moth	Species of Concern			✓
<i>Phalaenostola hanhami</i>	no common name	Insect - moth	Species of Concern			✓
<i>Epiglaea apiata</i>	Pointed Sallow	Insect - moth	Endangered			✓
<i>Orconectes (Crokerinus) obscurus</i>	Allegheny Crayfish	Invertebrate - decapod	Species of Concern	✓	✓	✓

<i>Lasmigona compressa</i>	Creek Heelsplitter	Invertebrate - fw bivalve	Species of Concern	✓	✓	✓
<i>Ligumia nasuta</i>	Eastern Pondmussel	Invertebrate - fw bivalve	Endangered	✓	✓	✓
<i>Etheostoma microperca</i>	Least Darter	Fish	Species of Concern			✓
<i>Rhinichthys cataractae</i>	Longnose Dace	Fish	Species of Concern			✓
<i>Eptesicus fuscus</i>	Big Brown Bat	Mammal	Species of Concern	✓	✓	✓
<i>Ursus americanus</i>	Black Bear	Mammal	Endangered			✓
<i>Felis rufus</i>	Bobcat	Mammal	Threatened			✓
<i>Myotis lucifugus</i>	Little Brown Bat	Mammal	Species of Concern			✓
<i>Microtus pinetorum</i>	Pine Vole	Mammal	Species of Concern			✓
<i>Condylura cristata</i>	Star-nosed Mole	Mammal	Species of Concern	✓	✓	✓
<i>Thamnophis sirtalis sirtalis</i>	Eastern Garter Snake	Reptile	Species of Concern			✓
<b>Totals</b>				<b>8</b>	<b>7</b>	<b>24</b>

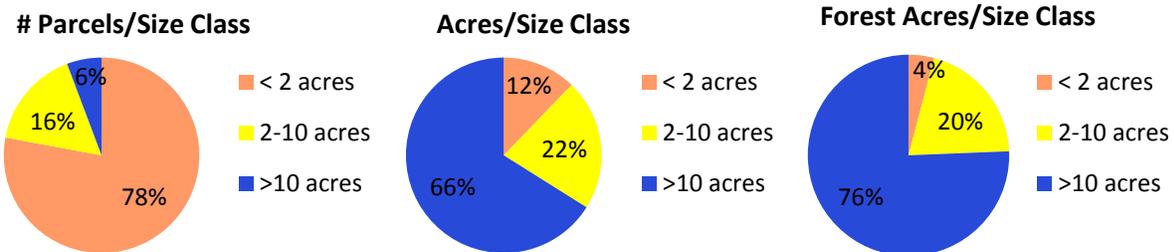
### III. Social Conditions

- a. Demographics – The 2010 U.S. Census shows that Portage County has a total population of 161,419 people, a 6.2% increase from 2000 Census data. On average, this equals 331.2 people per square mile. The county per capita income per year is \$25,097. There are 62,222 households in the county with an average of 2.46 people per household and a median yearly household income of \$50,447 in 2010 dollars (2006-2010). The average density of housing units is 139 per square mile. 2010 U.S. Census Data indicate that 91.1% of the county population is White, 4.4% African American, 1.5% Asian, 1.4% Hispanic or Latino, 0.2% Native American/Alaskan, and 1.6% mixed. Of those 25 years or older, 90.4% are high school graduates and 24.9% have graduated college with a Bachelor’s degree or higher. Based on 2006-2010 data, 13.5% of the population is living below poverty level.
- b. Land Ownership Characteristics – In the plan area more than 60% of the public land is in protected parks or managed areas, roughly 5,121 acres. In addition, there are approximately 4,162 acres of private lands that are either owned by conservation oriented non-governmental organizations, protected by conservation easements, or protected by environmental reserve programs for a total of 9,283 acres of protected lands. Figure 14 shows a breakdown of ownerships and/or types of protected lands (ODNR, WRLC).



**Figure 14. Protected Lands**

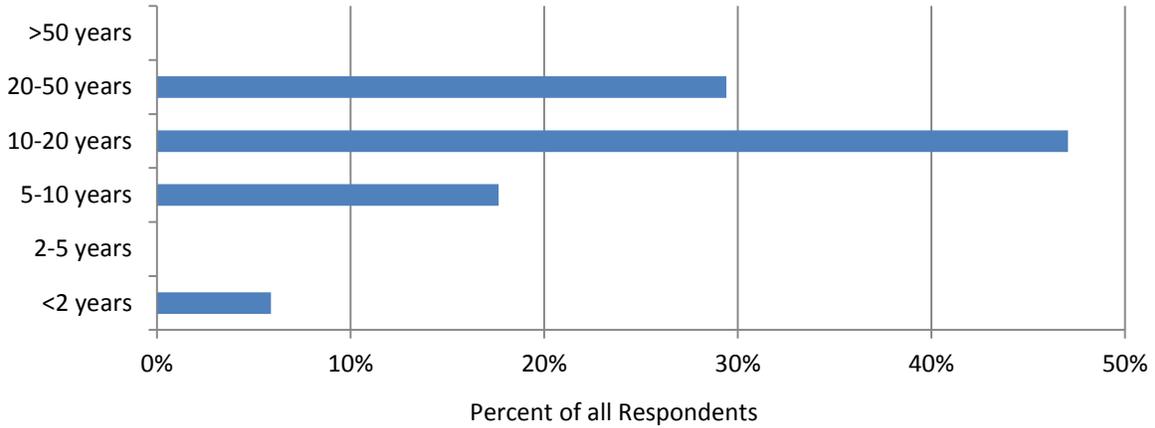
There are a total of 28,266 parcels in the plan area. Parcels were divided into 3 size classes: < 2 acres, 2-10 acres, and >10 acres. The following figures show the distribution of parcels, acres, and forested acres among size classes (Portage County GIS Department).



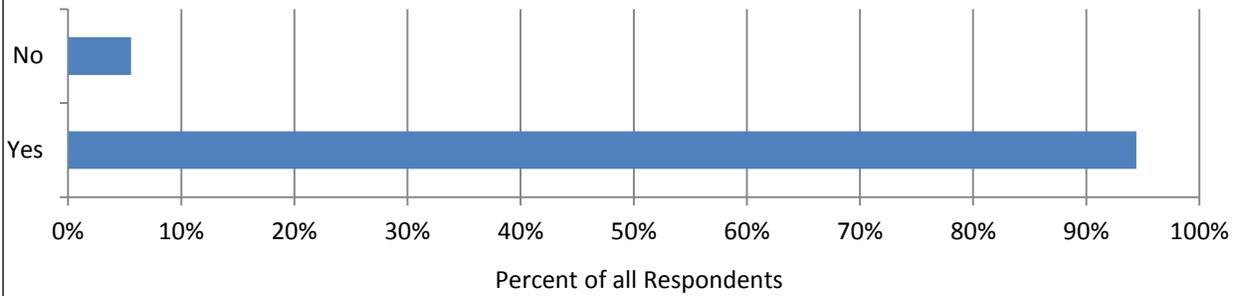
**Figure 15. Distribution of Parcels, Acres, & Forested Acres**

- c. Landowner Interests and Objectives – During the month of October 2012 we invited northern Portage County residents to give us feedback on a draft of this woodland plan and to take a short woodland owner survey. All feedback received was positive with the majority of the feedback coming from the online survey. A total of 26 people took part in the woodland survey. Out of the 26 respondents, 18 were landowners who owned woodlands on small parcel properties under 10 acres in size. The following figures show the responses of the 18 small parcel landowners that completed the survey.

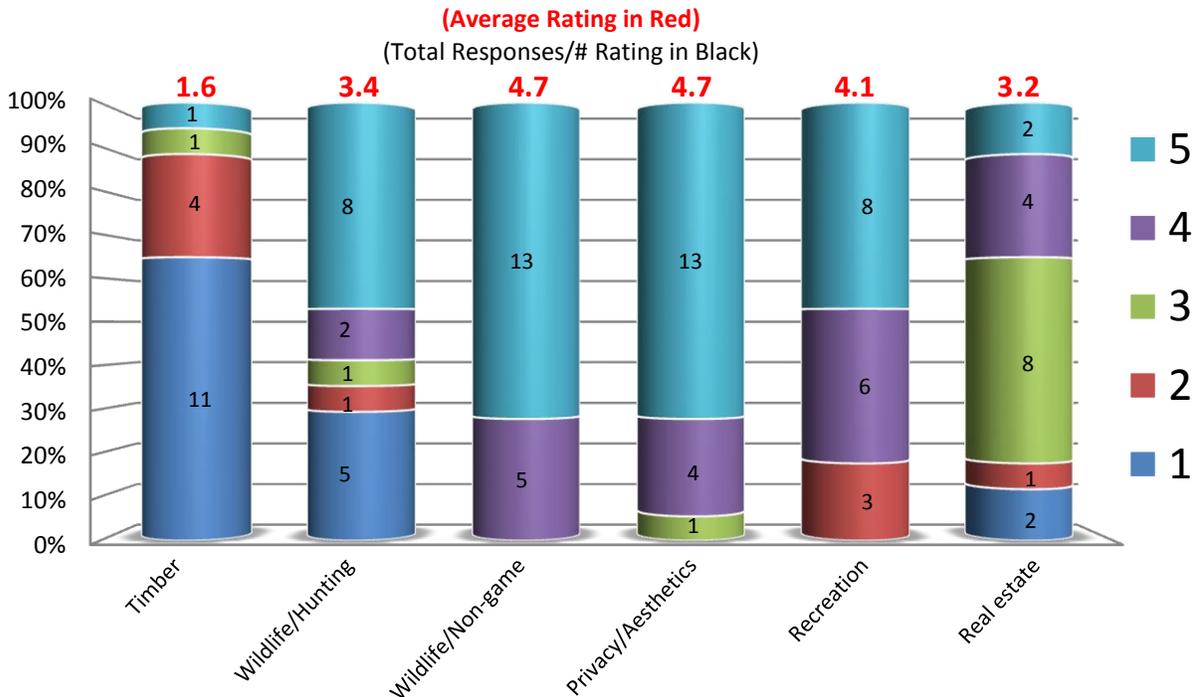
**Figure 16. Woodland Survey Question # 3: How long have you owned your woods?**



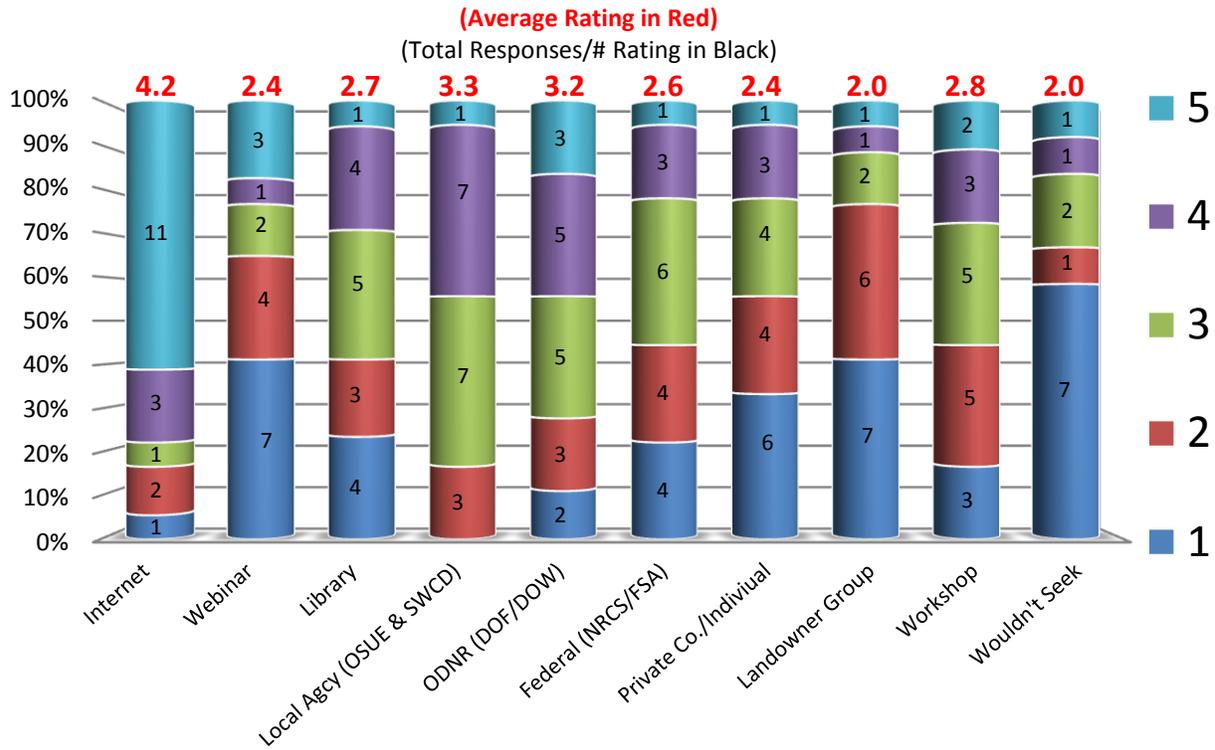
**Figure 17. Woodland Survey Question # 4: Do you live on your wooded property?**



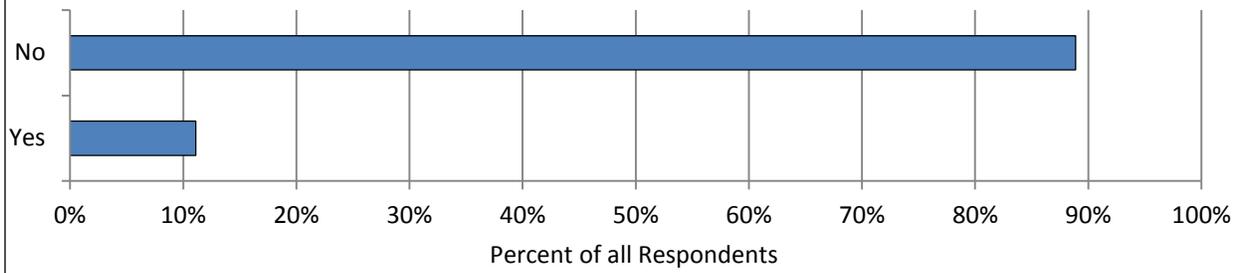
**Figure 18. Woodland Survey Question # 6: Please rate the following woodland benefits and services on a scale of 1 to 5, with 5 being the highest and 1, the lowest.**



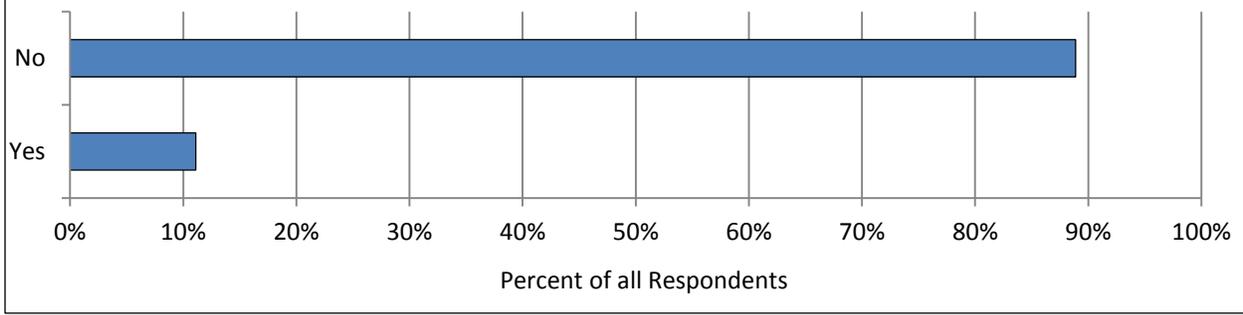
**Figure 19. Woodland Survey Question # 7: Where do (or would) you go to get information about trees, woods, woodland wildlife, or other related topics? Rate your preference for each on a scale of 1 to 5, with 5 being highest and 1, the lowest.**



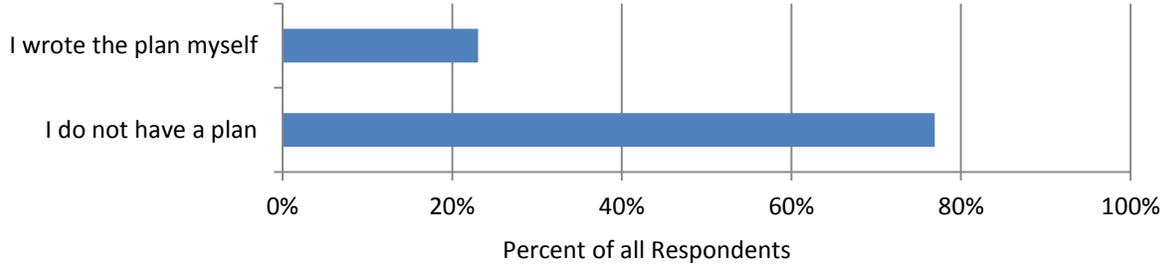
**Figure 20. Woodland Survey Question # 10: Have you ever received advice from a natural resource professional (forester, wildlife biologist, etc.) on managing your woods?**



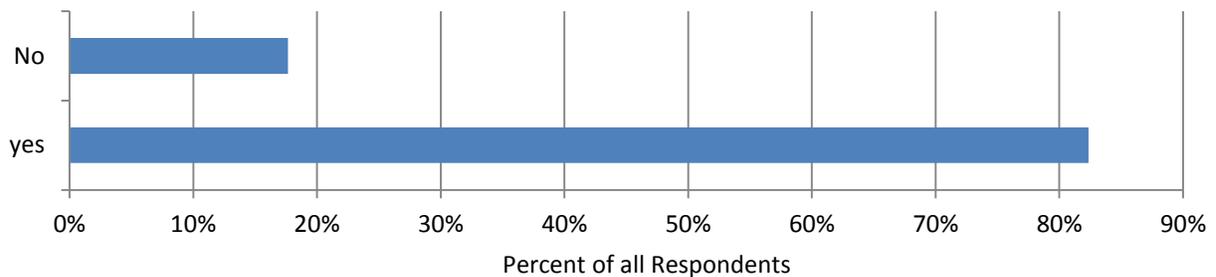
**Figure 21. Woodland Survey Question # 9: Do you have a woodland management plan?**



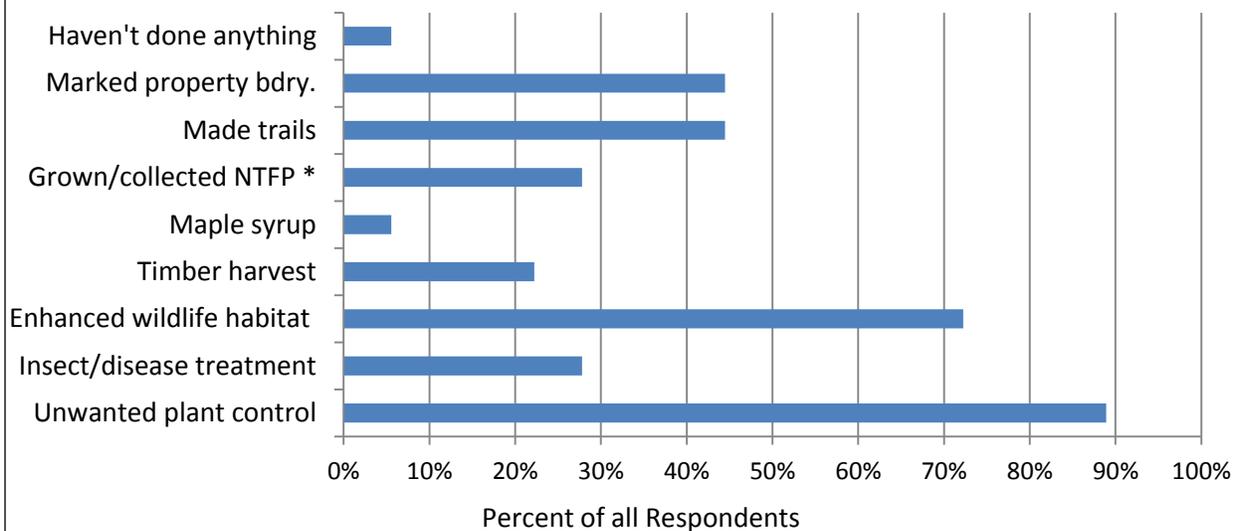
**Figure 22. Woodland Survey Question # 10: If you have a woodland management plan, who wrote it?**



**Figure 23. Woodland Survey Question # 11: Have you ever done work in your woods to try to improve it, make it healthier, or obtain forest products?**

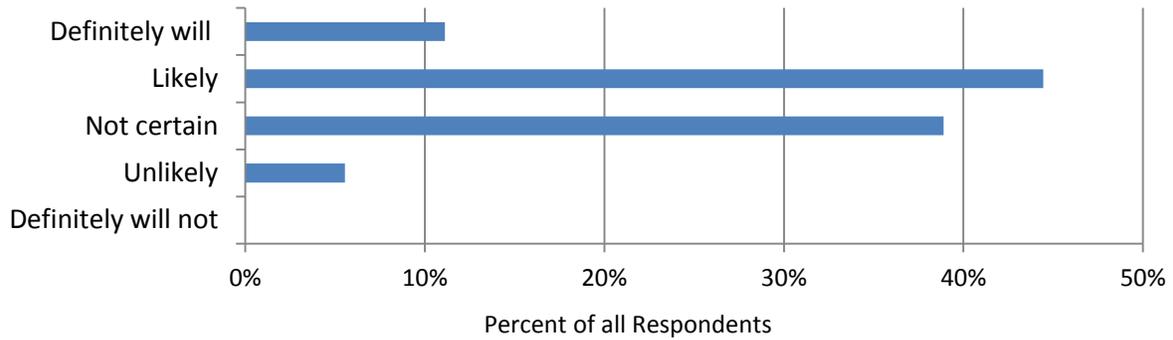


**Figure 24. Woodland Survey Question # 12: If you've worked in your woods, what did you do (select all that apply)?**

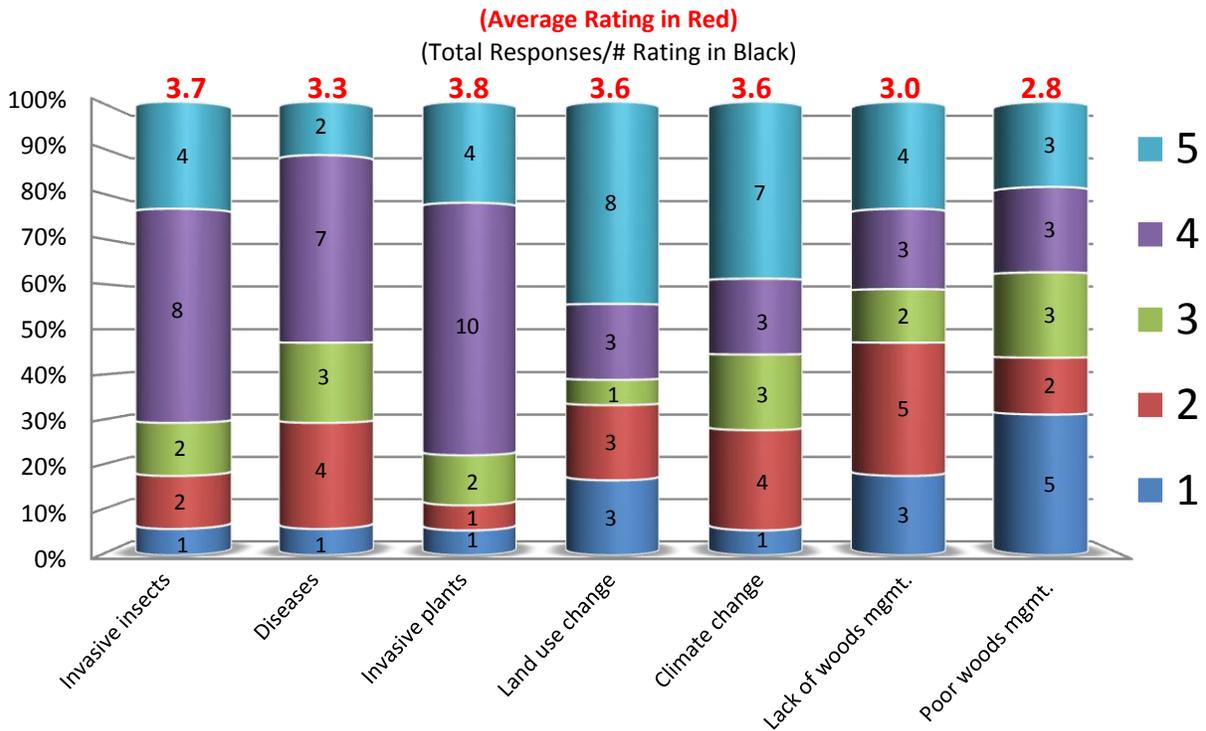


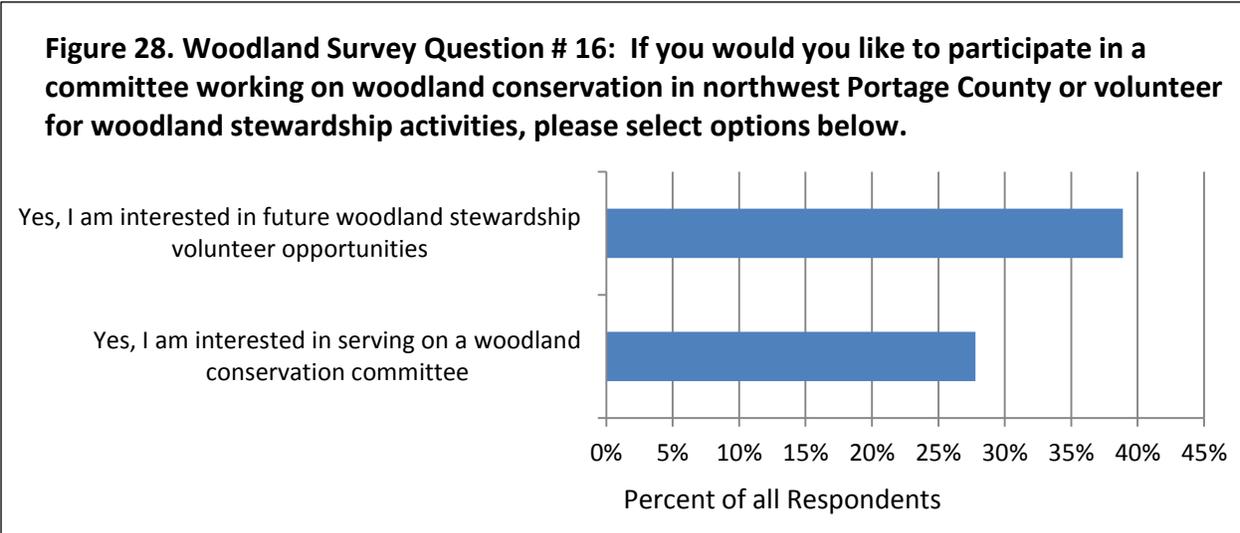
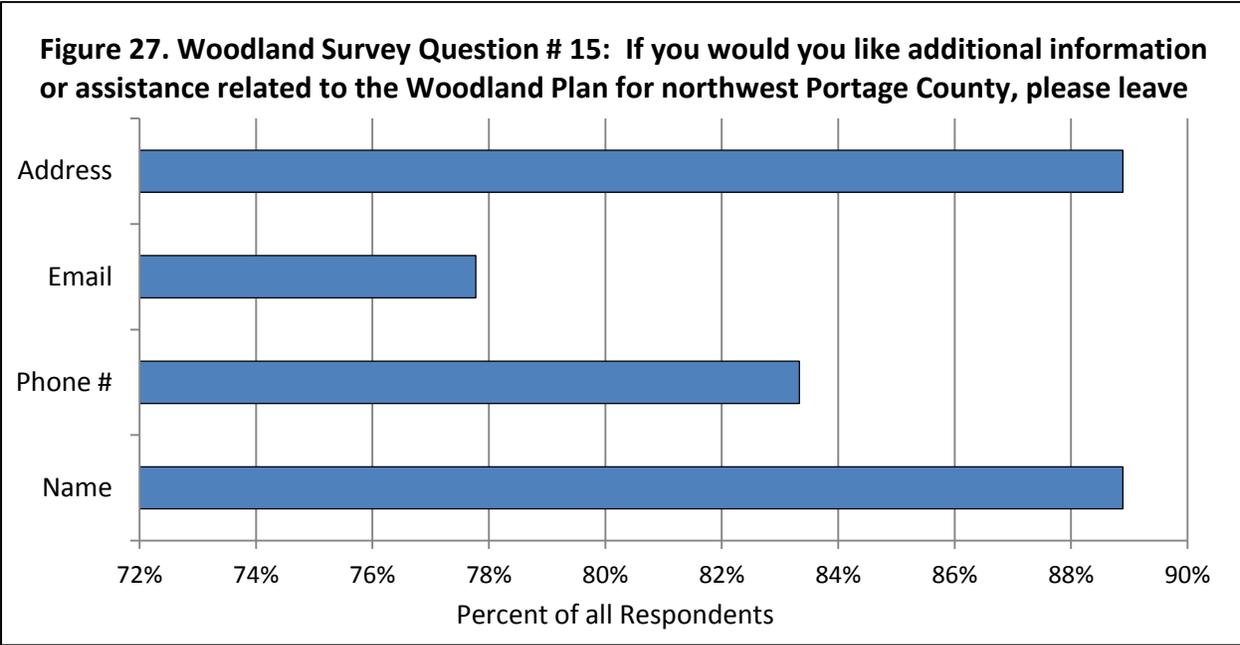
\* NTFP = Non-Timber Forest Products (mushrooms, nuts, herbs, etc.)

**Figure 25. Woodland Survey Question # 13: How likely are you to do woodland improvement work on your property in the next 6 months?**



**Figure 26. Woodland Survey Question # 14: Please rate the following woodland threats on a scale of 1 to 5, with 5 being the highest and 1, the lowest.**





The 8 landowners with properties larger than 10 acres generally responded similar to the 18 landowners who had properties smaller than 10 acres. However there were a few notable differences. Out of the 8 large parcel landowners 5 of them indicated they had received advice from a natural resource professional and also have a woodland management plan for their property. Out of the 5 management plans, 4 of them were written by a state forester and 1 by a consulting forester. In contrast only 2 out of the 18 small parcel landowners had ever received advice from a natural resource professional and also only 2 have a woodland management plan. The 2 small parcel landowners with a management plan indicated that they wrote their management plan themselves. Another notable difference among survey participants was that 7 out of the 8 large parcel landowners indicated that in the next 6 months they will definitely work on woodland improvement activities on their property, while only 2 out of the 18 small parcel landowners indicated that in the next 6 months they will definitely work on woodland improvement activities on their property.

The following figures (29 & 30) are state wide results from the National Woodland Owner Survey (NWOS). These results show that overall state landowners list scenery, privacy, hunting/recreation, and nature or biodiversity as the top reasons for owning woodlands. Also they show that many state landowners had either no plans or minimal plans for woodland activities on their property during the next 5 years.

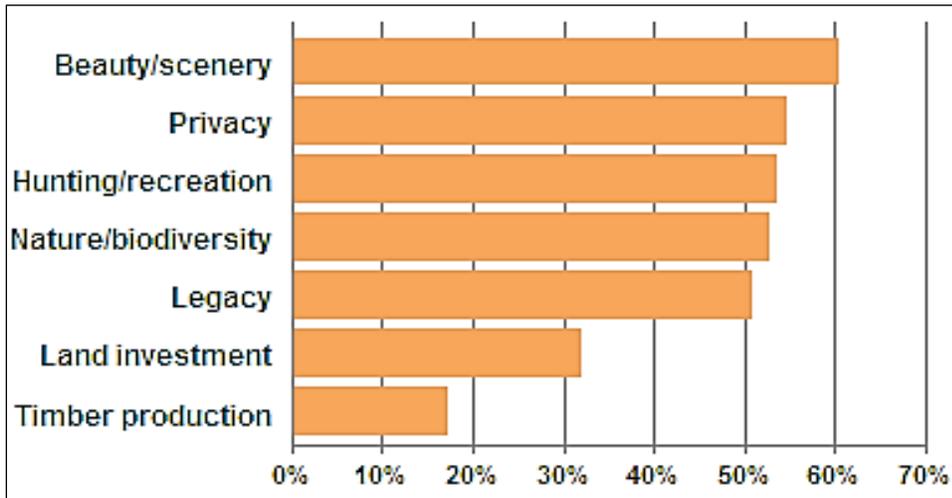


Figure 29. Reasons listed for owning woodlands (NWOS 2002-2006, statewide data)

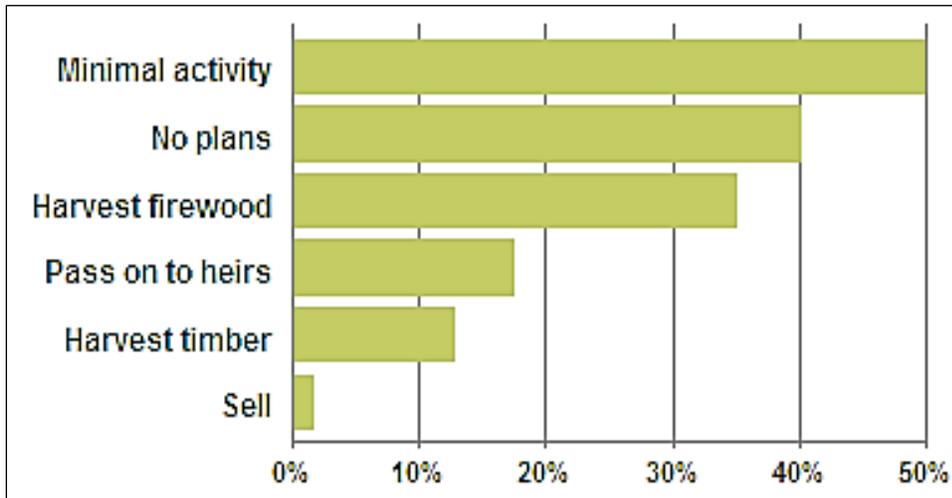
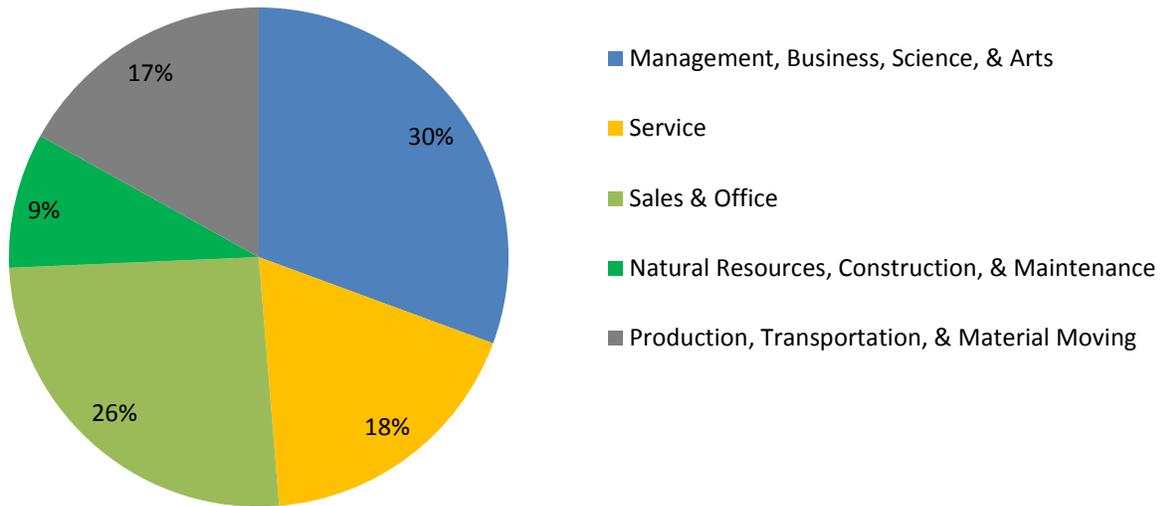


Figure 30. Planned activities in the next 5 years (NWOS 2002-2006, statewide data)

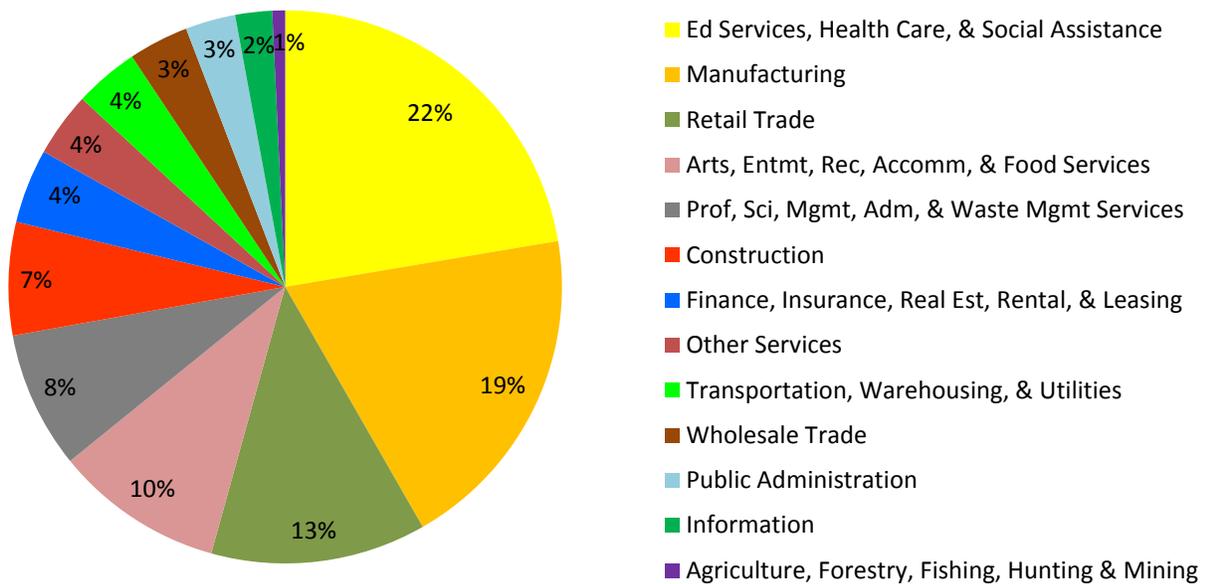
#### IV. Economic Conditions

- a. Employment -- Portage County was once noted for the high quality of its manufactured glass and for its cheese production from over 50 cheese plants. Now Portage County businesses produce an array of products, including butter, toys, lamp bulbs, personal care products, lawn care, and aircraft components. There are over 3500 businesses in Portage County, with nearly 400 involved in manufacturing or distribution. Metalworking, plastic and rubber products, and printing/publishing lead the county's manufacturing sector. In Agri-business, there are approximately 719 farms that average over \$33,000 each in annual sales

([www.portageworkforce.org/pcoed/wordfiles\\_profiles](http://www.portageworkforce.org/pcoed/wordfiles_profiles)). Figures 31 and 32 breakdown occupations and industries found within Portage County according to the 2010 US Census Data.



**Figure 31. Occupations**



**Figure 32. Industry**

Some of the major employers in Portage County include Ametek, Automated Packaging, Berry Plastics Corporation, Commercial Turf Products, Daimler-Chrysler Mopar Distribution Center, Davey Tree Expert Company, Delta Systems, Deluxe Business Systems, East Manufacturing Corporation, General Electric Company, Hattie Larlham Foundation, Hess Print Solutions, Hiram College, Kent State University, Kent City Board of Education, L’Oreal USA, McMaster-Carr Supply Company, Parker-Hannifin, Portage County Government, Ravenna City Board of Education, Robinson Memorial Hospital Health Care, St. Gobain Performance Plastics (Eaton



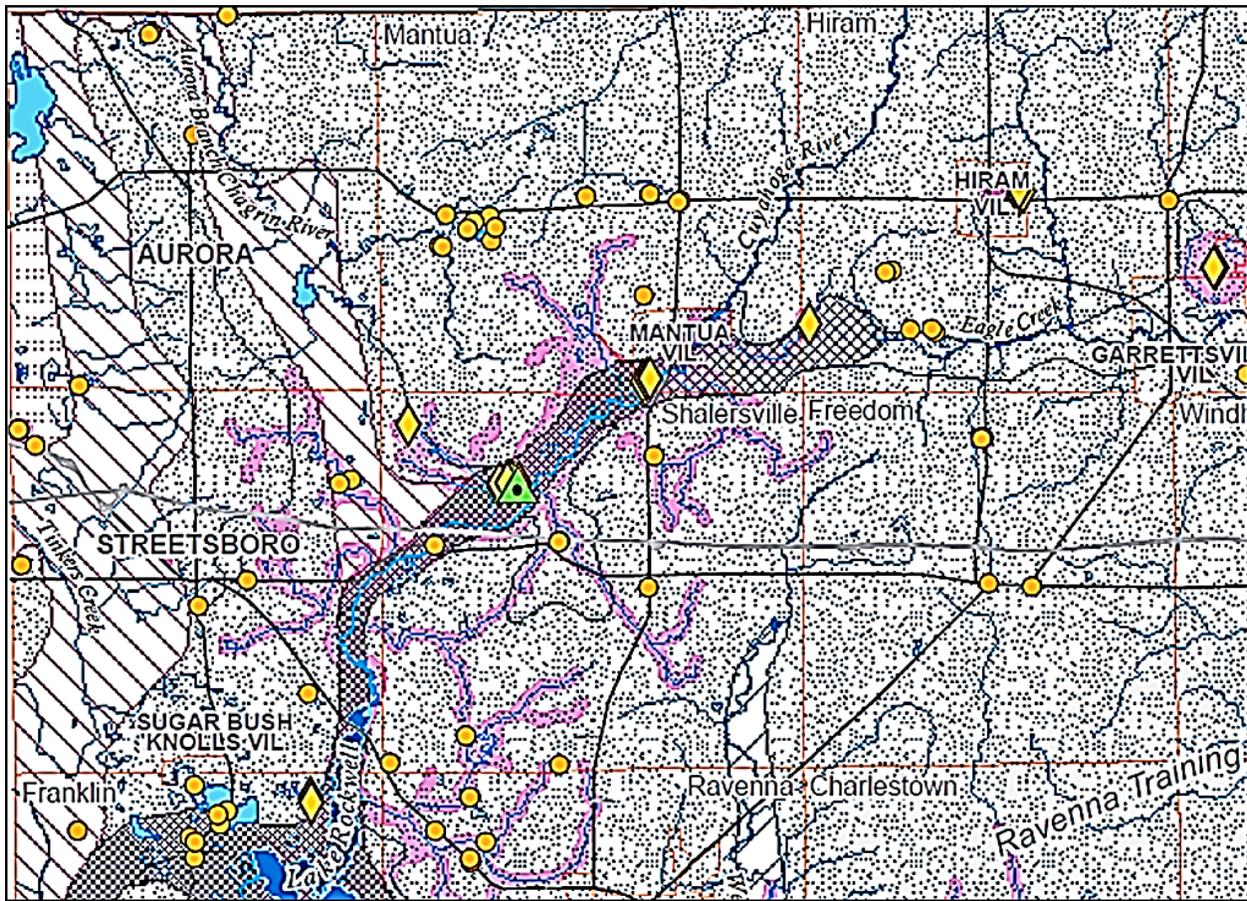
Corp.), State of Ohio, Technical Consumer Products (TCP) Inc., USA Instruments, and the US Government. ([development.ohio.gov/files/research/C1068.pdf](http://development.ohio.gov/files/research/C1068.pdf))

- b. Unemployment – Estimates made in September of 2012 put Portage County’s unemployment rate at 5.9 percent, which is dramatically down from the 11.5 percent estimated for January 2010. The lowest rate in the past 6 years was May of 2006 at 4.3 percent. (Ohio Department of Job and Family Services 2012) & (Economagic.com: Economic Time Series Page; [www.economagic.com/em-cgi/data.exe/blsla/laucn391330000000003](http://www.economagic.com/em-cgi/data.exe/blsla/laucn391330000000003))
- c. Employment in Local Timber Products – Data obtained from the 2010 US Census County Business Patterns Website was used to produce Table 6, which shows Portage County employers working with traditional timber products. In forestry, Portage County ranked 38<sup>th</sup> of Ohio Counties for total timber production. All of Portage County’s timber production was in hardwood saw logs (USDA Forest Service 2007).

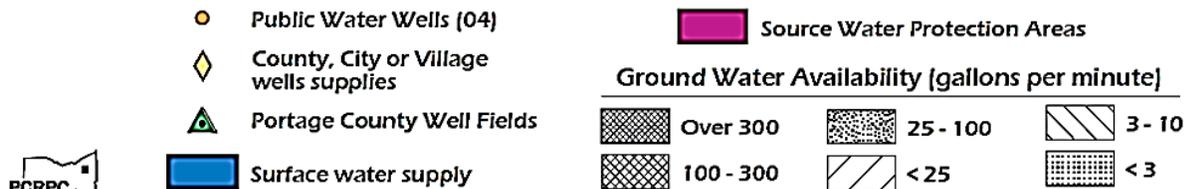
Industry Classification System Code	Reference Year	Number of establishments
Forestry and logging	2010	1
Wood product manufacturing (sawmills, millwork, wood container, pallet, & other wood products)	2010	6
Paper manufacturing from wood pulp	2010	0
Converted paper manufacturing	2010	3

## V. Groundwater Resources

The primary ground-water source in Portage County is consolidated sandstone. The most extensive sandstone formations are the Massillon and Sharon, both members of the larger Pottsville formation which consists of layers of sandstone and shale. This formation is most often found 10-80 feet deep, beneath a layer of glacial till. Wells drilled into the Pottsville formation have the potential to yield up to 100 gallons per minute (gpm) at depths of 50 to 150 feet. However, most wells will only produce 25 gpm reliably. Some areas of the county draw their ground water from buried valleys containing deep deposits of sand and gravel (glacial till). These valleys primarily mirror the above ground river valleys; primarily the Cuyahoga River valley and its tributaries within the plan area. Wells in these areas can sustain yields of up to 1,500 gpm. Most communities and industries draw their water from this abundant source of water (Figure 33). It is especially important to protect this water source since it supplies many communities with drinking water and because it is found above the bedrock and therefore has no rock buffer from rainwater recharge and any potential pollutants that could come with it.



### Water Supply



Source: Public Water Wells - OEPA, 2004; Well Fields - PC Water Resources, 2004; Ground Water Resources - ODNR, 1979; Source Water Protection documents - EPA 1996-2003.

**Figure 33. Ground Water Availability (gallons per minute), NW Portage County**

(Portage County Regional Planning Commission Watershed Plan, 2006)

## VI. Soils

There are 4 major Soil Associations found within the plan area (Figure 34):

- *Canfield-Ravenna-Wooster Association* – Nearly level to sloping, somewhat poorly drained to well drained soils with a fragipan, and slow to very slow permeability. The soils in this association have been formed from medium textured glacial till on upland sites. These soils are commonly farmed for crops such as corn, wheat, oats, grass-legume hay, and pasture.
- *Chili Association* – Nearly level to sloping, well drained soils, and very permeable. The soils in this association have been formed from loamy material overlying sand and gravel. These soils are mainly found in the valleys of the Cuyahoga and its tributaries. They are used for common field crops grown in the county and for some specialty crops.

- *Mahoning-Ellsworth Association* – Nearly level to sloping, somewhat poorly drained to moderately well drained soils, and with a slow to very slow permeability. The soils in this association have been formed from moderately fine textured glacial till. These soils are commonly farmed for crops such as corn, wheat, oats, grass-legume hay, and pasture.
- *Wadsworth-Rittman Association* – Nearly level to sloping, somewhat poorly drained to moderately well drained soils with a fragipan, and slow to very slow permeability. The soils in this association have been formed from moderately fine textured glacial till. These soils are commonly farmed for crops such as corn, wheat, oats, grass-legume hay, and pasture.

(United States Department of Agriculture Soil Conservation Service, 1972)

For more information on soils, contact the Portage Soil & Water Conservation District and/or view the Portage County soil survey online at:

[soilandwater.ohiodnr.gov/portals/soilwater/pdf/soil/surveys/portage.pdf](http://soilandwater.ohiodnr.gov/portals/soilwater/pdf/soil/surveys/portage.pdf)

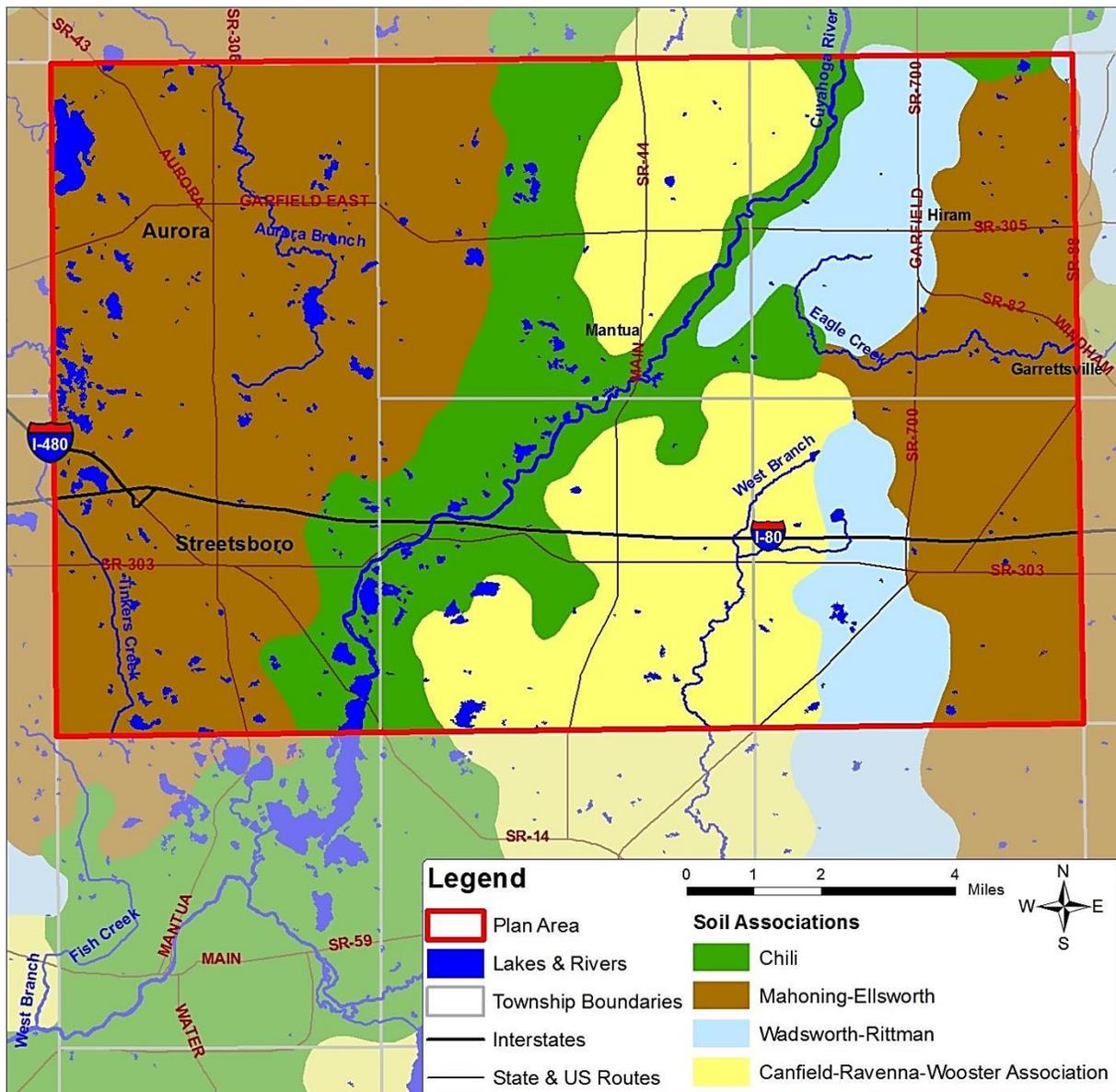


Figure 34. Soil Associations Map—Plan Area (NRCS 2006)

## VII. Geology

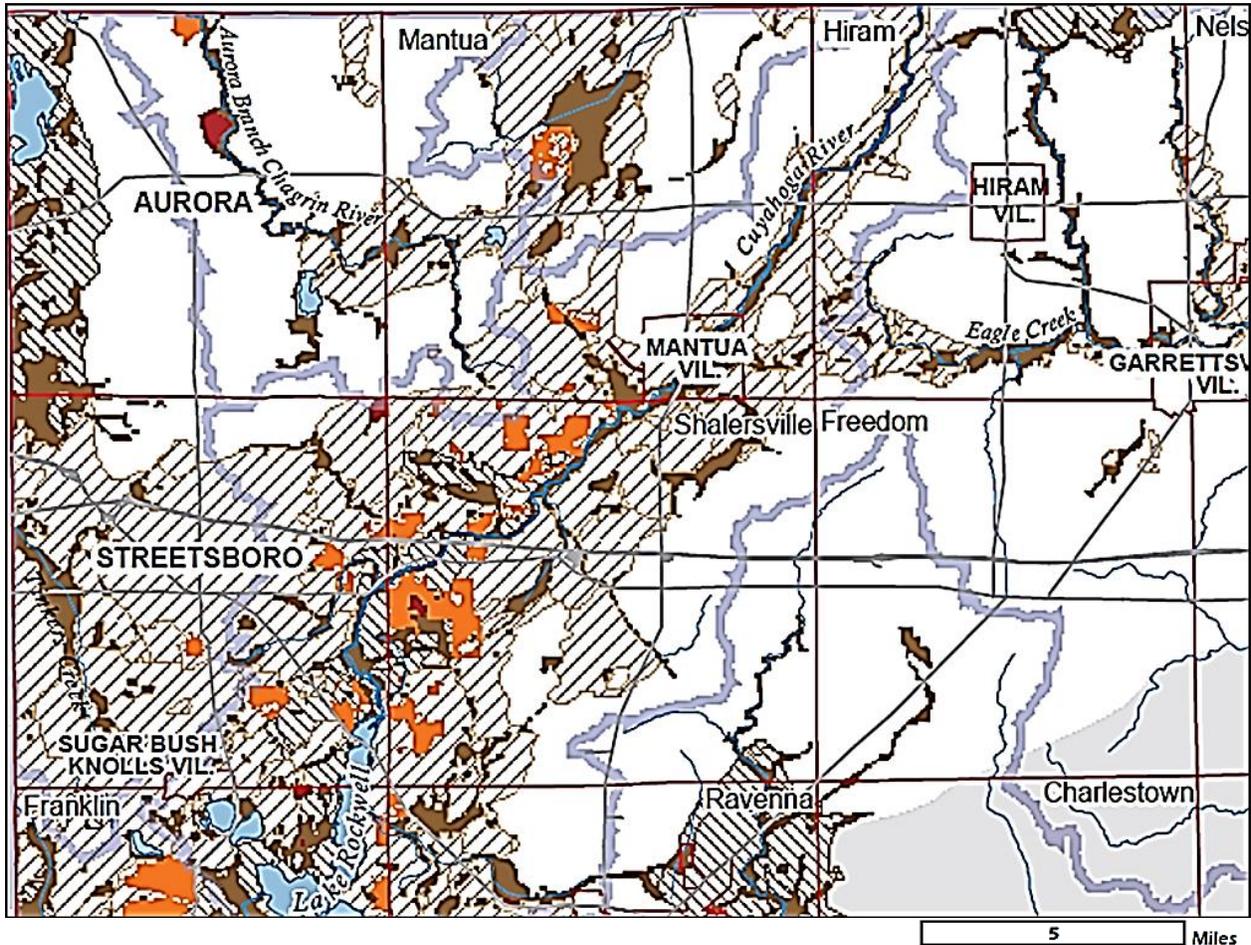
The landscape of Portage County has been shaped by at least 2 different glaciers in the past. This area was completely covered by continental glaciers during the Illinoian and Wisconsin glacial periods that ended about 10,000 years ago. The Wisconsin age glacial deposits of the Pleistocene Epoch are at the surface and consist of moraines, till plains, outwash plains, and lacustrine material. During the Wisconsin period there were two parallel glacier lobes. These lobes didn't meet but advanced and retreated repeatedly leaving lateral moraines in an interlobate zone that begins in central Geauga County, extends through the western third of Portage County, and continues through Summit County ending in Stark County. The past glacial activity has greatly influenced the soil and topography of the plan area. Evidence of the glaciers is found in the region's unique bogs, kettle lakes, and kames (sandy/gravelly hills).

([www.co.portage.oh.us/watershedmaps102006/2.2%20Existing\\_Physical.pdf](http://www.co.portage.oh.us/watershedmaps102006/2.2%20Existing_Physical.pdf) & [soilandwater.ohiodnr.gov/portals/soilwater/pdf/soil/surveys/portage.pdf](http://soilandwater.ohiodnr.gov/portals/soilwater/pdf/soil/surveys/portage.pdf))

Below the glacial deposits the upper layers of bedrock are mainly acid sandstone and shale with layers of conglomerate, siltstone, limestone, and coal. These layers are part of the Pottsville Formation of the Pennsylvanian System. Rock strata in the Pennsylvanian System formed over 300 million years ago in deltaic and marine environments. In the plan area the widely publicized Marcellus and Utica shale layers are found below the Pennsylvanian strata in the Devonian and Ordovician aged rock strata.

([geosurvey.ohiodnr.gov/portals/geosurvey/PDFs/BedrockGeology/BG-1\\_8.5x11.pdf](http://geosurvey.ohiodnr.gov/portals/geosurvey/PDFs/BedrockGeology/BG-1_8.5x11.pdf))

Presently there are widespread oil and gas wells found in Portage County and throughout the plan area with likely more to be drilled with new advances in technology. There are also significant sand and gravel resources in Western Portage County from the glacial deposits of unconsolidated materials. Many sand and gravel extraction operations are located along the Cuyahoga River between Lake Rockwell and Mantua Village. Figure 35 shows sand and gravel resources plus previously known extraction sites. (Portage County Regional Planning Commission's 2006 Watershed's Plan)



### Sand & Gravel Resources



April 2005

Source: Sand and gravel resources, ODNR 1980. No guarantee of accuracy of information.

**Figure 35. Sand/Gravel Resources & Extraction Sites, NW Portage County**

(Portage County Regional Planning Commission Watershed Plan, 2006)

## VIII. Landowner Resources

- American Tree Farm System – ATFS is a program of American Forest Foundation designed to enhance the quality of America’s woodlands by giving woodland owners the tools they need to keep their woodlands healthy and productive. Through this program properties of 10 acres or more can become certified Tree Farms if land owners demonstrate a commitment to sustainable management of their woodlands. ([www.treefarmssystem.org](http://www.treefarmssystem.org))
- Association of Consulting Foresters of America, Inc. – ACF is group of consulting foresters dedicated to advancing the professionalism, ethics, and interest of consulting foresters. Their goal is to set the standards for the consulting forestry profession, to educate and assist

landowners in good woodland stewardship, and to inform the public, legislators, and the media on issues sensitive to private landowners and their ability to practice good woodland management. ([www.acf-foresters.org](http://www.acf-foresters.org))

- **Backyard Conservation** – Is a Natural Resources Conservation Service program that provides information on how conservation practices that help conserve and improve natural resources in your backyard. These practices help the environment and can make your yard more attractive and enjoyable. Most backyard conservation practices are easy to use. ([www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?&cid=nrcs143\\_023574](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/?&cid=nrcs143_023574))
- **Backyard Wildlife** – A website by ODNR Division of Wildlife. Providing information on creating wildlife habitat in your backyard. “Your backyard can easily be converted into a mini-refuge for native wildlife. A number of wildlife species have adapted to backyard settings and can be drawn to them by the proper habitat elements. Anyone - even with the smallest parcel of land - can help wildlife by creating habitat areas around their backyard.” ([wildlife.ohiodnr.gov/wildlife-watching/attracting-wildlife](http://wildlife.ohiodnr.gov/wildlife-watching/attracting-wildlife))
- **Backyard Woods** – An Arbor Day Foundation program designed to assist landowners who want to enhance woodland scenery, provide superb habitat for wildlife, or even utilize backyard woodlands as an extra source of income. ([www.arborday.org/backyardwoods/tip-sheets.cfm](http://www.arborday.org/backyardwoods/tip-sheets.cfm))
- **Call Before You Cut Campaign** – an effort to provide in-depth woodland management information to Ohio’s 400,000 landowners. ([callb4ucut.com](http://callb4ucut.com))
- **Certified Wildlife Habitat** – The National Wildlife Federation has a certification program for backyard wildlife habitat. If you meet the requirements your backyard can become certified as wildlife habitat. ([www.nwf.org/certifiedwildlifehabitat](http://www.nwf.org/certifiedwildlifehabitat))
- **Conservation Easement** – CE is a voluntary but legal agreement between a landowner and a land trust or government agency. It is a way for a landowner to ensure permanent conservation of their property by limiting the type or amount of development on their property while retaining private ownership of the land. The landowner donates/sells the rights to develop or subdivide the land and then the land trust/agency agrees to enforce this agreement. The Landowner maintains the rights to sell their land or pass it on to their heirs but the future owner will be bound by the previous owner’s agreement. Each agreement is different and can be tailored to fit a landowner’s purposes. For example, a landowner can maintain the right to harvest trees, farm, and even the right to add agricultural structures if it is written into the agreement. Also an easement may apply to all or a portion of the property, and does not need to require public access. If donated, a conservation easement can qualify as a tax-deductible charitable gift and potentially reduce other future taxes. ([www.ohiolandtrusts.org](http://www.ohiolandtrusts.org)), ([www.wrlandconservancy.org](http://www.wrlandconservancy.org)), ([www.nature.org](http://www.nature.org))

- Conservation Reserve Program – CRP is a voluntary program administered by the USDA Farm Service Agency. The purpose of the program is to reduce soil erosion, increase wildlife habitat, improve water quality and increase woodlands. CRP provides land rental payments to farmers and landowners who are willing to sign long-term contracts (10-15 years) converting cropland into conservation practices. Practices include filter strips, riparian forest buffers, wetland restorations, and windbreaks. Eligibility varies by soil type and crop history (lands must have a crop history). ([www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp](http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp))
- Environmental Quality Incentives Program – EQIP is a voluntary program administered by the Natural Resource Conservation Service (NRCS). EQIP's Forestry Program is a cost share program that provides landowners with funds for woodland management practices such as tree planting, grapevine control, crop tree release, forest thinning, and control of woody invasive species. To be eligible a landowner must have a Forest Stewardship Plan, land that is capable of growing trees, and restrict livestock from the woodlands. There is no minimum acreage requirement. ([www.nrcs.usda.gov/wps/portal/nrcs/detail/oh/programs/?cid=nrcs144p2\\_029505](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/oh/programs/?cid=nrcs144p2_029505))
- Forest Legacy Program – FLP is a partnership between the state of Ohio and the USDA Forest Service to identify and help protect environmentally important forests from conversion to non-forest uses through conservation easements. Forest Legacy conservation easements are legal agreements made with property owners to forever restrict development on their land. Landowners who apply and are selected will be paid the market value of the easement based on an appraisal that is conducted of all Forest Legacy properties. Terms of the agreement are tailored to meet the objectives of the landowner, agency, and the characteristics of the land. The landowner retains ownership of the land and can continue past activities as long as they do not conflict with the terms of the easement. Landowners with land under a working forest agreement are not required to allow public access. However, the landowner will manage the land under a Forest Stewardship Plan and be encouraged to harvest timber and carryout other traditional forest uses. Activities that may disturb the land surface such as strip mining are prohibited, so the landowner must control certain mineral rights in order to participate in the Forest Legacy Program. Oil and gas drilling may be allowed depending on the situation. The conservation easement remains in place if the land is sold. The new owner is still bound by the terms of the easement and may not convert the land to non-forest uses. In addition to gains associated with the sale or donation of property rights, many landowners also benefit from reduced taxes associated with limits placed on land use. To be eligible you must be in a selected Forest Legacy Area. ([forestry.ohiodnr.gov/legacyprogram](http://forestry.ohiodnr.gov/legacyprogram))
- National Wildlife Federation's Backyard Habitat – A program that provides information on how to attract wildlife to your backyard. ([www.backyardhabitat.info](http://www.backyardhabitat.info))
- ODNR Service Foresters – The Ohio Division of Forestry employs 18 service foresters who are uniquely trained to assist private woodland owners who are interested in managing their woodlands. Service foresters can provide landowners with management plans, technical



assistance, and information on how to improve woodland health, wildlife habitat, timber production, hunting, or recreation. They also provide assistance on how to plant and establish trees and how to best market and sell woodland products. ([forestry.ohiodnr.gov/serviceforesters](http://forestry.ohiodnr.gov/serviceforesters))

- ODNR Wildlife Private Lands Program – Provides information on managing your land for wildlife; from stream corridors to pastures, prairies, woodlands, and urban landscapes. Also provides sources for planting stock and information on how to build nest boxes. Six private land biologists are employed to assist private landowners. ([wildlife.ohiodnr.gov/species-and-habitats/private-lands-management](http://wildlife.ohiodnr.gov/species-and-habitats/private-lands-management))
- Ohio Forest Tax Law -- OFTL is a voluntary program administered by the Ohio Department of Natural Resources, Division of Forestry, according to the Ohio Revised Code and the Ohio Administrative Code. A landowner must have at least 10 acres of woodlands in order to take advantage of this program. In exchange for the tax reduction conferred by Ohio's forest property tax laws, landowners agree to manage their woodlands for the commercial production of timber and other woodland products and to abide by pertinent rules and regulations. ([forestry.ohiodnr.gov/oftl](http://forestry.ohiodnr.gov/oftl))
- Ohio Forestry Association – OFA supports the management of Ohio's forest resources and improvement of business conditions for the benefits of its members in their endeavors to engage in forestry-related industries and enterprises. OFA maintains a Safety Training and Voluntary Certification Program for logging contractors and their employees. The following requirements are necessary for the Ohio Voluntary Master Logging Companies:
  - i. Each trained logger is trained to use Best Management Practices (BMPs) to reduce soil erosion and improve the appearance of timber harvesting activities.
  - ii. Each trained logger is trained to employ safe and efficient timber cutting and logging safety practices.
  - iii. Each trained logger has current certification in First Aid and CPR.
  - iv. The company maintains Workers' Compensation coverage on employees.
  - v. The company provides liability coverage on request.
  - vi. Each trained logger must participate in advanced training and periodic recertification training.
  - vii. Each trained logger must be member of local logger's chapter and the company must be a member of the Ohio Forestry Association, Inc.

The nearest Master Logger to you can be located at: ([www.ohioforest.org/](http://www.ohioforest.org/))

- Ohio Society of American Foresters – OSAF's mission is to advance the science, education, technology, and practice of forestry; to enhance the competency of its members; to establish professional excellence; and to use the knowledge, skills, and conservation ethic of the profession to ensure the continued health and use of forest ecosystems and the present and future availability of forest resources to benefit society. OSAF has an online directory of members that provide forestry services to landowners. ([ohiosaf.org/findforester](http://ohiosaf.org/findforester))

- Ohio Wood Products – A website where land owners can go to find information on Ohio’s timber prices, sawmills, loggers, and firewood dealers. ([ohiowood.osu.edu](http://ohiowood.osu.edu))
- Ohio Woodland Stewards Program – a program promoting stewardship across the woodlands of Ohio through classes, professional workshops and publications. ([woodlandstewards.osu.edu](http://woodlandstewards.osu.edu))
- Rural Action Forest Botanicals Program – Provides woodland owners with resources for alternative income opportunities, like forest farming of ginseng, goldenseal, and other forest botanicals. ([ruralaction.org/programs/forestry/forest-botanicals](http://ruralaction.org/programs/forestry/forest-botanicals))
- The Woods in Your Backyard – This is a Ohio Woodland Stewards Program workshop for landowners who have a small section of woods out back that they want to learn more about. Learn about which trees and shrubs are 'good' and what they are good for!? Learn how to attract wildlife, improve the health of the trees, and deal with invasive species. ([woodlandstewards.osu.edu/classes/woods-your-backyard](http://woodlandstewards.osu.edu/classes/woods-your-backyard))
- Trees are good – A website by the International Society of Arboriculture where landowners can go to find information on how to best care for their yard trees and/or how to find a professional tree care service and Certified Arborist. ([treesaregood.com](http://treesaregood.com))
- Woods in Your Backyard – This is a University of Maryland Extension Program that provides a broad amount of information on small woodlot management. ([extension.umd.edu/woodland/woods-your-backyard](http://extension.umd.edu/woodland/woods-your-backyard))

## IX. Support of other Nature Resource Plans & Initiatives

- Chagrin River Watershed Partners – a non-profit organization that strives to preserve and enhance the scenic and environmental quality of the ecosystem of the Chagrin River and its watershed in a manner that assures a sustainable future for people, plants, and animals.
  - i. The Chagrin River Watershed Balanced Growth Plan ([www.crowp.org/index.php/projects/watershed-plans#growthplan](http://www.crowp.org/index.php/projects/watershed-plans#growthplan))
  - ii. The Chagrin River Watershed Action Plan ([www.crowp.org/index.php/projects/watershed-plans#actionplan](http://www.crowp.org/index.php/projects/watershed-plans#actionplan))
  - iii. Description of Storm Water Management Best Management Practices (BMPs)-- Recommended For Plan Area:

Low impact development (LID) is the practice of decentralized stormwater management that often includes strategically maintaining and establishing trees and other types of vegetation (Green Infrastructure) to increase infiltration and evapotranspiration which reduces the volume of stormwater runoff in a watershed. Green infrastructure is a network of strategically planned and managed natural lands, landscapes, and open spaces, including trees, that conserves natural ecological value and hydrologic functions, while providing associated benefits to human communities. Implementing these

practices in developing or urbanizing environments can reduce the costs of containing and treating stormwater while maintaining/restoring the natural functions of the landscape and contributing to the overall health of natural ecosystems.

One model stormwater management tool that appears to be generating positive changes in several watersheds throughout the United States is the use of a stormwater site review to evaluate opportunities for improved stormwater runoff management on individual properties, particularly on individual parcels of less than 2 acres.

As part of a woodland-stormwater site review, experienced professionals can offer recommendations for stormwater BMPs highlighting the use of trees tailored to each resident's property. Homeowners who receive site review assistance will have the opportunity to receive professional recommendations for stormwater management practices such as rain gardens, bioretention cells, and filter boxes that include trees to reduce, filter, and manage stormwater as well as increase the urban forest canopy and enhance riparian corridors among other services.

For example, residents who choose to participate in a woodland-stormwater site review could receive recommendations to plant a rain garden as a stormwater management practice, receive a copy of the Rain Garden Manual for Homeowners, and a rain garden plant materials kit which could enable them to plant a 100 square foot rain garden on their property that contains tree species most appropriate for the location evaluated through an urban tree site index assessment. Homeowners choosing shade trees might choose from species such as red oak (*Quercus rubra*), pin oak (*Quercus palustris*), honey locust (*Gleditsia triacanthos*), Kentucky coffee tree (*Gymnocladus dioicus*) and red maple (*Acer rubrum*). Additional programs could be developed to include more innovative practices that encourage property owners to establish mature trees in appropriate locations for multiple benefits. ([www.crowp.org/index.php/member-services/storm-water-npdes-phase-ii/mcm-1-2-public-education-and-involvement](http://www.crowp.org/index.php/member-services/storm-water-npdes-phase-ii/mcm-1-2-public-education-and-involvement))

- Cuyahoga River Restoration – A group working to restore and protect the environmental quality of the Cuyahoga River and selected watersheds that affect the aquatic ecosystems of the immediate Lake Erie shoreline. ([www.cuyahogariver.org](http://www.cuyahogariver.org))
- Portage County Regional Planning Commission - Watersheds Plan – A plan or framework to manage growth, encourage sustainable growth, and protect the natural resources and highly-valued rural character of Portage County. ([www.co.portage.oh.us/watershedmaps.htm](http://www.co.portage.oh.us/watershedmaps.htm))
- Tinker's Creek Watershed Partners – A group working to protect and restore water quality and habitats of the Tinker's Creek Watershed through community partnership.
  - i. Tinkers Creek Conservation Plan  
([www.tinkerscreekwatershed.org/TCLC\\_final\\_report.pdf](http://www.tinkerscreekwatershed.org/TCLC_final_report.pdf))
  - ii. Tinkers Creek Watershed Action Plan  
([www.tinkerscreekwatershed.org/documents/Tinkers%20Creek%20WAP%20Final.pdf](http://www.tinkerscreekwatershed.org/documents/Tinkers%20Creek%20WAP%20Final.pdf))

## X. Literature Cited

- Askins, R., J. Lynch, & R. Greenberg. 1990. *Population declines in migratory birds in eastern North America*. *Current Ornithology* 7: 1–57.
- Bayne, E.M., and K.A. Hobson. 2001. *Effects of habitat fragmentation on pairing success of ovenbirds: importance of male age and floater behavior*. *The Auk* 118: 380–388.
- Butler, Brett J., Miles, Patrick D., & M. H. Hansen. Tue Jul 17 13:09:52 CDT 2012. National Woodland Owner Survey Tabler web-application version 1.0. Amherst, MA: U.S. Department of Agriculture, Forest Service, Northern Research Station. Found online at: <http://fiatools.fs.fed.us/NWOS/tablemaker.jsp>
- Cackowsky, J.-M. & J.L., Nasar., 2003. *Restorative effects of roadside vegetation: implications for automobile driver anger and frustration*. *Environment and Behavior*, 35(6): 736-751.
- Chagrin River Watershed Partners, Inc., 2008. *Targeting Best Management Practices and Monitoring Stream Hydrology in the Chagrin Watershed: Analysis of Riparian Corridor Connectivity and Urban Stormwater Infrastructure*. Found online at: [http://www.crowp.org/pdf\\_files/analysis\\_of\\_riparian\\_corridors\\_and\\_urban\\_sewersheds\\_2008.pdf](http://www.crowp.org/pdf_files/analysis_of_riparian_corridors_and_urban_sewersheds_2008.pdf)
- Davis, M.B., 2003. *Old Growth in the East: A Survey*. Online Ed.
- Economagic.com: Economic Time Series Page. Series Title: Unemployment Rate: Portage County, OH, Ohio; Percent; NSA. Found online at: <http://www.economagic.com/em-cgi/data.exe/blsla/LAUPS39067003> [accessed 2012, November]
- Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PE&RS, Vol. 77(9):858-864.
- Hagan, J.M., W.M.Vander Haegen, & P.S. McKinley. 1996. *The early development of forest fragmentation effects on birds*. *Conservation Biology* 10: 188–202.
- Hoover, J.P., Brittingham, M.C., & L.J. Goodrich. 1995. *Effects of forest patch size on nesting success of wood thrushes*. *The Auk* 112(1): 146–155.
- Kuo, F., & W. Sullivan. 2001. *Environment and crime in the inner city: does vegetation reduce crime?* *Environment and Behavior*, 33 (3).
- LANDFIRE: 2008, LANDFIRE 1.1.0. Existing Vegetation Type layer. U.S. Department of the Interior, Geological Survey. [Online]. Available: <http://landfire.cr.usgs.gov/viewer/> [accessed 2012, July].
- Lynch, J.F., and D.F. Whigham. 1984. *Effects of forest fragmentation on breeding bird communities in Maryland, USA*. *Biological Conservation* 28: 287–324.
- McCarthy, B.C., 1995. *Eastern Old Growth Forests*. *Ohio Woodland Journal* 2:8-10.
- McPherson, E.G., Simpson, J.R., Peper, P. & Q. Xiao. 1999. *Tree Guidelines for San Joaquin Valley Communities*. Published by the USDA Forest Service's Western Center for Urban Forest Research and Education.
- National Arbor Day Foundation. Benefits of Trees. Found online at: <http://www.arborday.org/trees/benefits.cfm>
- Nol, E., C.M. Francis, and D.M. Burke. 2005. *Using distance from putative source woodlots to predict occurrence of forest birds in putative sinks*. *Conservation Biology* 19: 836–844.
- Ohio Bird Conservation Initiative. 2010. *Ohio All-bird Conservation Plan*. Unpublished report to the Ohio Department of Natural Resources-Division of Wildlife. 106 pp.



Ohio Department of Development, Office of Policy, Research, and Strategic Planning. Ohio County Profiles, Portage County. Found online at: <http://development.ohio.gov/research/files/s0/Portage.pdf>

Ohio Department of Job and Family Services, Office of Workforce Development, Bureau of Labor Market Information. 2012. May 2012 Ranking of Ohio County Unemployment Rates.

Ohio Department of Natural Resources Division of Forestry. 2010. Ohio's Forest Action Plan: Statewide Forest Resource Assessment & Strategy. Found online at: <http://www.ohiodnr.com/default/tabid/22674/Default.aspx>

Ohio Department of Natural Resources Division of Forestry. Protected Lands GIS Layer.

Ohio Department of Natural Resources Division of Forestry. The History of Ohio's Forests. Found online at: <http://ohiodnr.com/Home/history/HistoryofOhioStateForests/tabid/5226/Default.aspx>

Ohio Department of Natural Resources Division of Natural Areas & Preserves. Wildlife. In: Aurora Sanctuary, Herrick Fen, Novak Sanctuary, Marsh Wetlands, & Tinkers Creek Nature Preserve. Found online at: <http://ohiodnr.com/tabid/860/Default.aspx>

Ohio Department of Natural Resources Division of Wildlife, A-Z Species Guide & LaDue Public Hunting Area. Found online at: <http://ohiodnr.com/Home/ExperienceWildlifeSubHomePage/tabid/5658/Default.aspx>

Ohio Department of Natural Resources Division of Wildlife. 2012. Ohio Natural Heritage Database & Wildlife Diversity Database Programs. Found online at: [http://www.dnr.state.oh.us/Home/wild\\_resourcessubhomepage/ResearchandSurveys/OhioBiodiversityDatabase/tabid/23652/Default.aspx](http://www.dnr.state.oh.us/Home/wild_resourcessubhomepage/ResearchandSurveys/OhioBiodiversityDatabase/tabid/23652/Default.aspx)

Ohio History Central: An Online Encyclopedia of Ohio History. Ravenna Arsenal. Found online at: <http://www.ohiohistorycentral.org/entry.php?rec=1707>

O'Reilly, K., Marie N'Jie, N., & L.C. Brown. *Water Resources of Portage County*. Ohio State University Extension, Fact Sheet AEX-480.67-98. Found online at: [http://ohioline.osu.edu/aex-fact/0480\\_67.html](http://ohioline.osu.edu/aex-fact/0480_67.html)

Parker, T.H., Stansberry, B.M., Becker, C.D., & P.S. Gipson. 2005. *Edge and Area Effects on the Occurrence of Migrant Forest Songbirds*. *Conservation Biology* 19(4): 1157–1167.

Petit, L.J. 1999. Prothonotary Warbler (*Protonotaria citrea*). In *The Birds of North America*, No. 408 (A. Poole and F. Gill, eds.) The Birds of North America, Inc., Philadelphia, PA.

Portage County Department of Economic Development. 2009. Portage County Profile May 2009. Found online at: [http://www.portageworkforce.org/pcoed/wordfiles\\_profiles/](http://www.portageworkforce.org/pcoed/wordfiles_profiles/)

Portage County Geographic Information Systems Department. County Parcels Layer. Found online at: [http://www.co.portage.oh.us/GIS/Parcel\\_PDFs/Misc/](http://www.co.portage.oh.us/GIS/Parcel_PDFs/Misc/)

Portage County Regional Planning Commission. 2006. Watersheds Plan. Found online at: <http://www.co.portage.oh.us/watershedmaps.htm>

Portage Parks District. Morgan Preserve. Found online at: <http://www.portageparkdistrict.org/shalersville.html>

Rodewald, Amanda. 2012. *Managing for forest birds: a guide for land managers and private landowners*. Unpublished report to the Ohio Department of Natural Resources-Division of Wildlife. 59 pp.

Roth, R.R., M.S. Johnson, & T.J. Underwood. 1996. Wood Thrush (*Hylocichla mustelina*). In *The Birds of North America*, No. 246 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union, Washington, D.C.

Sauer, J.R., J.E. Hines, & J. Fallon. 2005. *The North American breeding bird survey, results and analysis 1966–2004 (Version 2005.2)*. Laurel, MD: USGS Patuxent Wildlife Research Center.



The Pennystone Project. 2004-2012. Lake Erie Glaciated Plateau. Found online at: <http://www.pennystone.com/ecoregions/USDA139.php>

Theobald, D.M. *SERGoM v3 forecasts of housing density classes from 1970 to 2030 for the coterminous US for the Forests on the Edge project*. Unpublished ArcGIS raster dataset. Natural Resource Ecology Lab, Colorado State University. 27 March 2008.

Tools for Engaging Landowners Effectively. Overview of Woodland Owners in Ohio. Found online at: <http://www.engaginglandowners.org/profile/state/ohio/overview/39?selection=Ohio>

Ulrich, R.S. 1984. *View through a window may influence recovery from surgery*. *Science*, 224(4647), 420-421.

United States Department of Agriculture, Forest Service. 2007. Timber Product Output (TPO) Reports. Knoxville, TN: U.S. Department of Agriculture Forest Service, Southern Research Station. [http://srsfia2.fs.fed.us/php/tpo\\_2009/tpo\\_rpa\\_int1.php](http://srsfia2.fs.fed.us/php/tpo_2009/tpo_rpa_int1.php) [accessed: July 2012].

United States Department of Agriculture, Natural Resource Conservation Service. 2006. Digital General Soil Map of United States. Found online at: <http://soildatamart.nrcs.usda.gov/>

United States Department of Agriculture, Soil Conservation Service. 1972. Soil Survey of Portage County, Ohio. Published by National Cooperative Soil Survey. Found online at: [http://soils.usda.gov/survey/online\\_surveys/ohio/OH133/portage.pdf](http://soils.usda.gov/survey/online_surveys/ohio/OH133/portage.pdf)

United States Department of Commerce, Bureau of Census, Geography Division. 2010. Found online at: <http://2010.census.gov/2010census/>

United States Department of the Interior, Fish & Wildlife Service. 2012. Federally Listed Species by Ohio Counties. Found online at: <http://www.fws.gov/midwest/Ohio/>

United States Department of the Interior, National Park Service. 2011. Western Reserve Heritage Feasibility Study Draft. Found online at: <http://parkplanning.nps.gov/document.cfm?parkID=155&projectID=27752&documentID=39766>

Virginia Outdoors Foundation. USDA 3-Zone Riparian Buffer Planning Model. In: *Riparian Buffers: An Introduction*. Found online at: [http://www.virginiaoutdoorsfoundation.org/VOF\\_resource-ripbuffer.php#plan](http://www.virginiaoutdoorsfoundation.org/VOF_resource-ripbuffer.php#plan)

Welsch, D.J. 1991. *Riparian Forest Buffers: Function and Design for Protection and Enhancement of Water Resources*. USDA Forest Service NA S&PF. Radnor, PA. Found online at: [http://na.fs.fed.us/spfo/pubs/n\\_resource/buffer/cover.htm](http://na.fs.fed.us/spfo/pubs/n_resource/buffer/cover.htm)

Western Reserve Land Conservancy. Canopy Height-GIS Layer, Land Prioritization Model-GIS Layer, & Protected Properties-GIS Layer.

Whitcomb, R.F., C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Klimkiewicz, & D. Bystrak. 1981. *Effects of forest fragmentation on avifauna of the eastern deciduous forest*. Pp. 125–205 in *Forest island dynamics in man-dominated landscapes*, ed. R.L. Burgess and D.M. Sharpe. New York: Springer-Verlag.

Whitehead, D. R., & T. Taylor. 2002. Acadian Flycatcher (*Empidonax virescens*). In *The Birds of North America*, No. 614 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Wolf, K.L., (2005). *The urban forest in the roadside: public values and transportation design*. Proceedings of the 9th National Conference of the International Society of Arboriculture, Launceton, Tasmania.

Zuckerberg, B., & W.F. Porter. 2010. *Thresholds in the long-term responses of breeding birds to forest cover and fragmentation*. *Biological Conservation* 143: 952–962.