

CONSERVATION

This section will focus on planning for greenways as conservation corridors in Northwest Indiana. Conservation Corridors can be a critical part of the “Green Infrastructure” of an area. *Green Infrastructure* is jargon used in many aspects of environmental conservation these days, but what is it really?

Typically when people think of infrastructure, they most often think of the built environment. Places we live, work, shop and play are connected by a wide variety of infrastructure such as roads, cables, wires and pipes. This “gray” infrastructure help us connect the places that are important to us and transport people, goods, energy, resources and information between these places.

Green Infrastructure in the human landscape can include both natural areas and man-made areas designed to function through natural processes. This can include woodlots and wetlands. It can also include common amenities such as parks, detention ponds, street trees, and roadside swales. More recently it might include engineered bioswales, rain gardens, and green roofs.

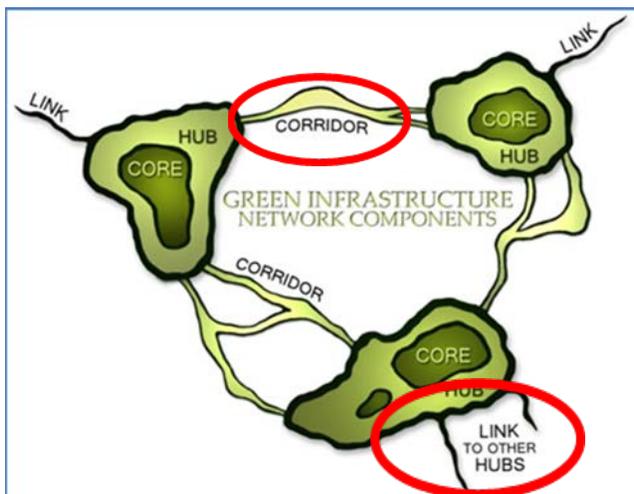


Figure C-1 Greenways can be the corridors and links between islands of nature.¹

The natural world also requires infrastructure. In our region, many of our most valuable natural places have become islands of nature surrounded by urban or agricultural development. Like neighborhoods, natural environments require connections to be healthy and resilient. Isolation leads to decay and stagnation. Conservation corridors are a great way to provide connections for movement of wildlife, seeds, water, genetic diversity, pollinators and even people between parks, preserves and water bodies. Planning and protecting greenway conservation corridors maximizes the natural treasures we already value and protect.

¹ Weber, Ted and Allen, Will. *Beyond on-site mitigation: An integrated, multi-scale approach to environmental mitigation and stewardship for transportation projects*. Landscape and Urban Planning 96(4):240. June 2010

Conservation Benefits of Greenways

Benefits to Nature

Northwest Indiana is fortunate to have rich natural resources, with an especially abundant and unique diversity of plant species. The varied topology of the active sand dunes at the Indiana Dunes led the region to becoming the birthplace of the study of ecology in the early 1900s. Similar to Indiana's place as the Crossroads of America, Northwest Indiana is at the crossroads of several major eco-regions such as central forest-grassland transition, tall grass prairie, and eastern temperate broadleaf and mixed forest. Within the region, there are over 315 areas containing over 36,000 acres of lands managed for some natural resource or recreational purpose. These managed lands encompass 3.7% of NIRPC's three county region. Except for the core expanse of the Indiana Dunes State Park and National Lakeshore, these managed lands are scattered across the region. Large tracts of valuable ecological habitat remain in private and often highly fragmented ownership.

In the *2040 Comprehensive Regional Plan*, NIRPC mapped a Green Infrastructure Network, a more refined subset of the *2007 Greenways and Blueways Plan*. In the *2040 CRP 2015 Update Companion*, NIRPC refined that map further with a Green Infrastructure Vision highlighting areas with potential to add functionality to our region's green infrastructure. These green infrastructure opportunities are determined by a variety of factors, including hydrology, soils, and floodplains.

The *Greenways +Blueways 2020 Plan* proposes to embrace conservation as an aspect of Greenway planning on par with transportation and recreation. The identification of important places for Living Corridors, which integrate all three purposes, is a practical first step toward implementing the Green Infrastructure Network envisioned in the 2020 CRP.

Key Features of Conservation Corridors

- Lakes, rivers and streams
- Undeveloped shore lands and floodplains
- Wetlands
- Woodlands
- Prairie remnants
- Wildlife habitat
- Rugged terrain and steep slopes
- Unique landforms or geological formations
- Unfarmed poorly drained and organic soils
- Existing outdoor recreation sites
- Potential outdoor recreation sites
- Significant open spaces
- Historical sites and structures
- Outstanding scenic areas and vistas

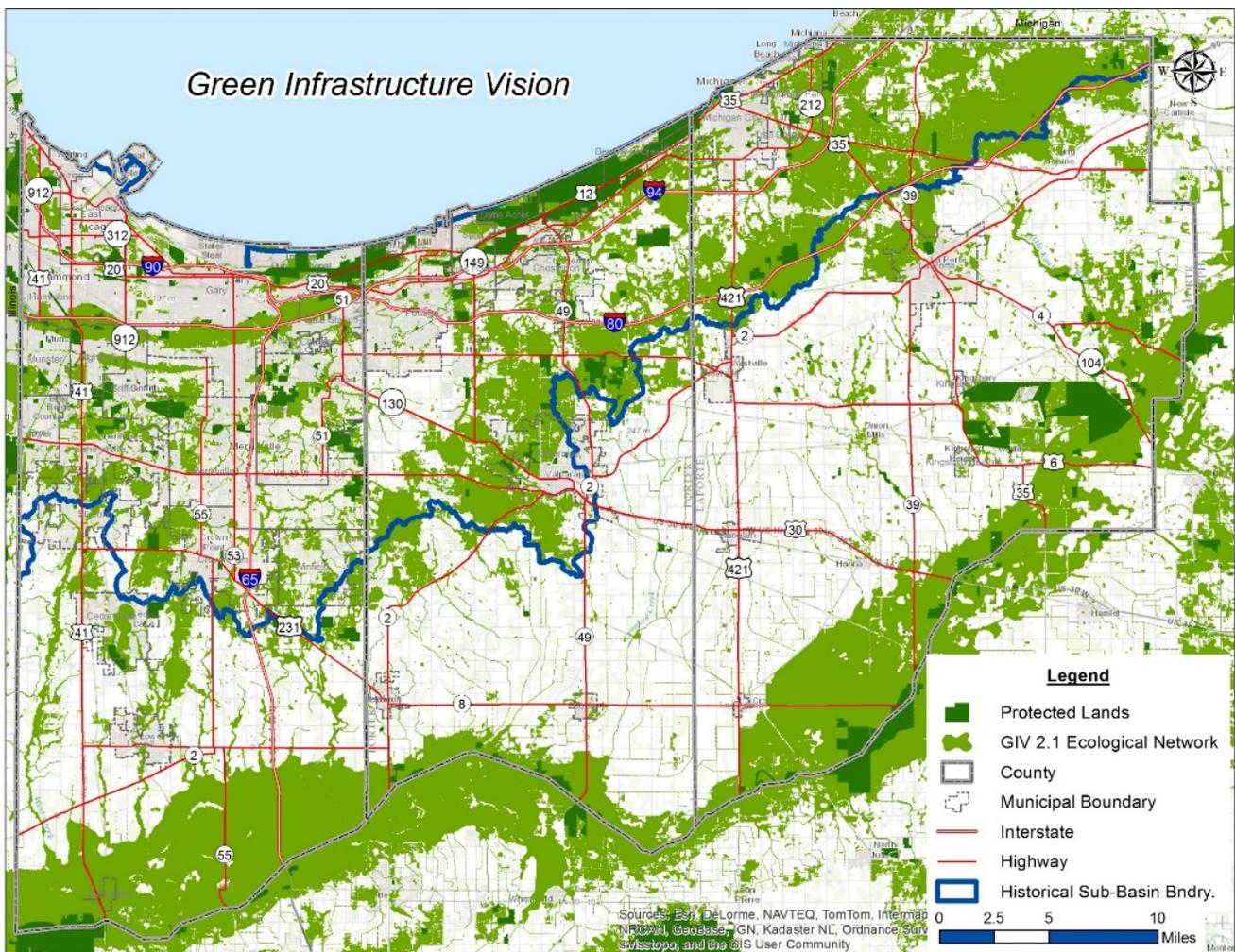


Figure C-1: NIRPC's Green Infrastructure Vision²

² Northwestern Indiana Regional Planning Commission-(NIRPC) 2040 CRP Update Companion. 2015

The *Greenways + Blueways 2020 Plan* identifies bands of existing habitat within the green infrastructure vision landscape that could connect the scattered and fragmented pockets of our preserved and managed ecological heritage. NIRPC's hope is to encourage communities, stakeholders and private landholders to preserve and manage Living Corridors for conservation within these bands.

These corridors would provide animals with safe routes to travel from one area to another to better their access to food, water, mates and nesting spaces. Many species require different habitats at different points in their lifecycle. For example, many amphibians and insects require wet areas for breeding, but move upland into dryer forests or grasslands as adults. Populations that share genetic material have increased resilience to disease and changing conditions in the environment. Because different species have different mobility, habitat and shelter needs, corridors need to be carefully planned to maximize their benefits and cross different habitat types.

For purposes of natural area planning at the regional scale, NIRPC has focused on several natural area types most of which can be mapped with available aerial and satellite imagery. Figure C-3 shows the location of existing habitats identified by natural community types across the region. These represent a smaller subset of the previously mapped Green Infrastructure Vision lands because they more accurately convey where possible habitat still exists, whereas the Green Infrastructure Vision includes areas such as Kankakee Floodplain which soils and terrain tell us were once wetlands, but are now productive farmland.

Natural Community Types

- *Forest*: Areas dominated by trees generally greater than sixteen feet tall and greater than 20% of total vegetation cover.
- *Shrub/Scrub*: Areas dominated woody shrubs less than sixteen feet tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- *Savannah*: Areas that are a complex of both trees and grasses or herbaceous plants, with tree canopy generally falling between 20% and 50%. Savannahs are dependent on fire management to maintain the open understory. ³ Its rareness makes Savannah a very high priority regionally for preservation and restoration.
- *Grasslands*: Areas dominated by grasses or herbaceous plants, generally greater than 80% of total vegetation.

³ This critical and rare habitat community types remains difficult to map due to its inherent patchiness and the pixel size used in currently available habitat mapping tools. As a result this habitat type is mapped in with forested, shrub, or grassland areas.

- *Wetlands:* Wetlands can occur with plant life similar to any of the types described above: forested, shrub/scrub, or emergent which can include wet prairies and grasslands as well as emergent marsh plants.

- *Lakes and Streams:* Areas of open or flowing water without significant emergent vegetation cover.

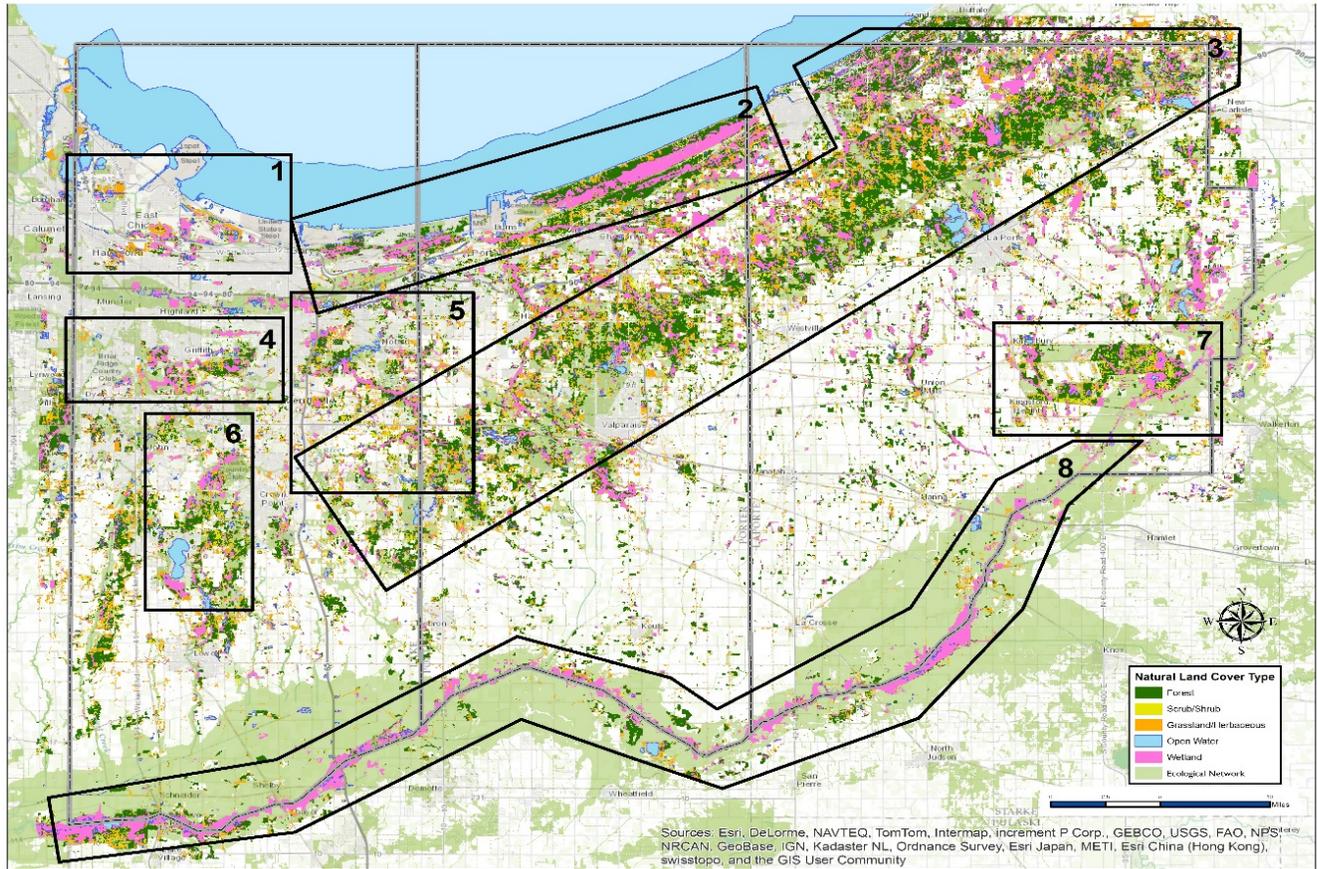


Figure C- 2: Significant Natural Community Types across Northwest Indiana

Benefits to People

NIRPC conducted an online survey of the region to determine what values the residents placed on conservation and natural areas. There were approximately 540 respondents to this survey between February and October of 2015. Figures C-4 and C-5 show 75% of respondents listed enjoying nature and the outdoors as a primary motivational factor for visiting parks, with 32% enjoying nature observation and photography, 20% reporting enjoying bird watching, 8% fishing, and 4% hunting.

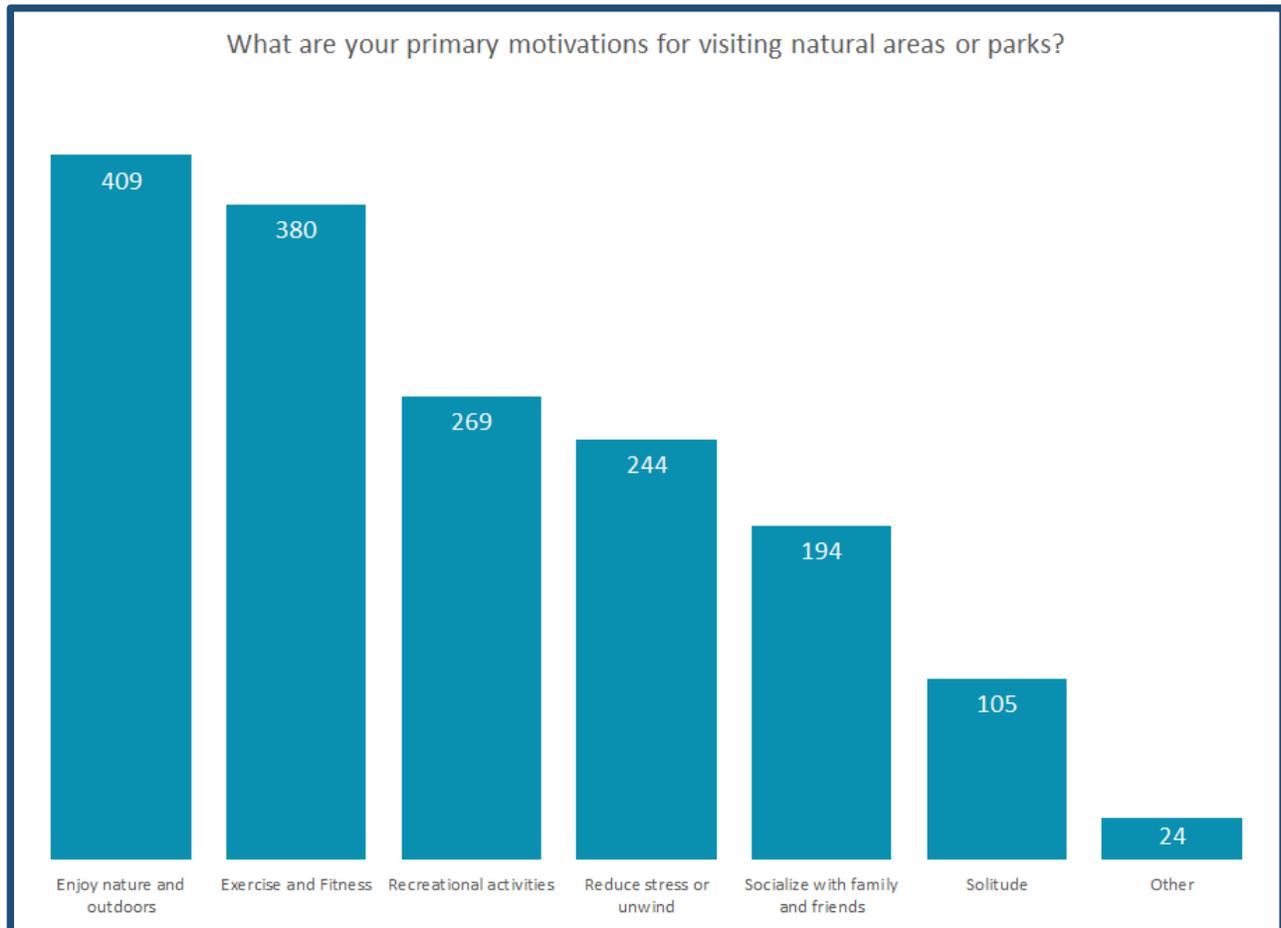


Figure C-4: Survey responses for visiting natural areas and parks

These activities in particular require that natural areas, parks and waterways be of sufficient quality and quantity of habitat to support populations of interesting birds, fish, animals, and plants. Greenways designed as conservation corridors can boost the ability of the existing protected natural areas to provide this habitat. When integrated with recreational corridors such as multi-use trails, water trails and parks, greenways can increase access to the types of activities people enjoy. Recreating in nature has been proven to contribute to human health, wellbeing and community quality of life.

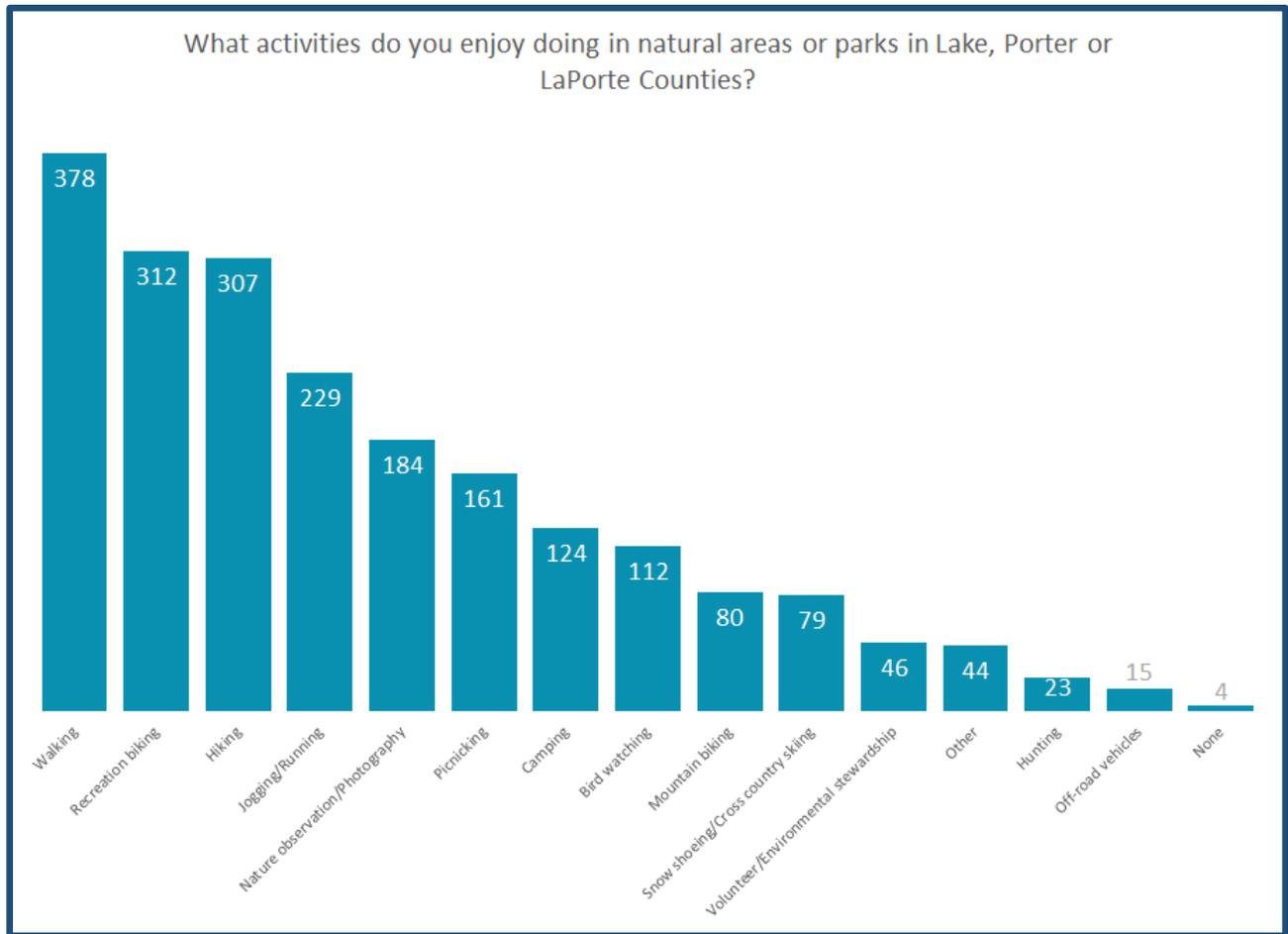


Figure C-5: Survey responses to activities enjoyed in natural areas

The top three factors influencing the decisions of where to recreate in nature were quality of scenery and views, ease of access, and water quality. All of these factors can be improved through greater access to natural or naturalized conservation corridors, particularly those located to improve water quality.

Opportunities to play and learn in nature have even been linked to higher educational outcomes in children. Many studies conducted over the past twenty years, including recent ones that factor out other variables, showed that schools that use outdoor classrooms and other forms of nature-based experiential education were associated with significant student gains in social studies, science, language arts, and math. One study found that students in outdoor science programs improved their science testing scores by 27 percent. Beyond test scores, other studies have shown that greener environments improve basic concentration skills and reduce overall stress levels in children.⁴

⁴ American Institute for Research, *Effects of Outdoor Education Programs for Children in California*. January 27, 2005. http://www.air.org/sites/default/files/downloads/report/Outdoorschoolreport_0.pdf

Conservation corridors located with access points to public parks, neighborhoods and schools maximize the opportunity of schools and families to take advantage of these benefits.

Benefits to Communities

The sustainable function of our natural places is important for many reasons. Natural places create and maintain resources we need for our economy and our quality of life such as clean air and water, open space, recreation, health, community resilience and wellbeing. These are often called Ecosystem Services. Ecosystem services are defined as services provided by the natural environment that benefit people, such as clean water. In many cases the actual value of these services can be measured in dollars and cents. The more we have disturbed and impaired the ability of the natural environment to function, the more we have had to intervene and provide expensive engineered alternatives to substitute for or maintain these services.

In school we all learned about the water cycle. Water moves from clouds to rain to river to sea, then evaporates to start all over again. That system works smoothly when the rain falls on forests and prairies which absorb and slow it down. However, extreme river channel erosion can occur from high velocity water flows resulting from an increase in impervious surfaces such as pavement and rooftops. The eroded stream banks may indicate that the nature provided ecosystem service of water regulation is not functioning properly. At times, the first inclination to respond to degradation of natural resources is to construct a man-made structure to fulfill the same purpose as the natural feature. For example, naturally vegetated riverbanks may be replaced with a concrete wall structure or large rocks to prevent soil erosion. However, man-made structures are costlier to produce and maintain than simply keeping the natural system intact. Conservation corridors placed along river and stream banks can be an excellent solution by maintaining a riverbank in natural vegetation, capturing pollutants in runoff and reducing the high velocity of stormwater running into the system.

NIRPC funded a study to better understand the economic value of the natural areas, floodplains and conservation lands identified in the Green Infrastructure Vision. This information is summarized provided below. The ability of lands to provide these services is heavily influenced by their location in the landscape. For example, native vegetation in floodplains along rivers and in upland catchments have the most opportunity to provide flood protection and water quality benefits.

Many of the local governments in our region are aware of the public's appreciation for recreation and the community benefits to saving natural areas. In a survey of municipalities, a dozen indicated that they currently purchase, or might like to purchase land for conservation, nature enjoyment, and wetland and water protection. Several indicated they would do more if appropriate land or if more funding were available.

Ecosystem Service	Benefit to NWI	Rationale	Estimated Economic Value Provided:
Flood Protection	Reduces: <ul style="list-style-type: none"> <input type="checkbox"/> flood damage <input type="checkbox"/> stream bank erosion <input type="checkbox"/> dredging costs 	Natural landscapes such as wetlands and forests, retain and mediate stormwater runoff	\$4,000,000,000
Clean Water	Enhances: <ul style="list-style-type: none"> <input type="checkbox"/> tourism <input type="checkbox"/> recreation opportunities <input type="checkbox"/> aesthetics Reduces: <ul style="list-style-type: none"> <input type="checkbox"/> water treatment costs <input type="checkbox"/> health care expenses <input type="checkbox"/> dredging costs 	<p>Clean water is attractive for many fun activities which also attracts tourists.</p> <p>Wetlands and other natural systems remove sediment, toxic substances, excess fertilizer and pathogens from entering our waterways and Lake Michigan. This reduces drinking water treatment costs, beach closures, siltation, algae blooms, and waterborne illnesses.</p>	\$393,000,000
Recreation and Ecotourism	Enhances <ul style="list-style-type: none"> <input type="checkbox"/> fishing & hunting <input type="checkbox"/> bird and wildlife watching <input type="checkbox"/> hiking <input type="checkbox"/> tourism 	Fish, animals, and birds all require healthy habitats provided by natural areas to thrive.	\$1,900,000,000 (Existing public land only)
Ground Water Supply	Reduces: <ul style="list-style-type: none"> <input type="checkbox"/> Cost of obtaining well water <input type="checkbox"/> Cost of crop insurance 	Groundwater is naturally replenished by soaking into green spaces. This supplies drinking water for rural residents and towns south of the Lake Michigan basin, and irrigates valuable crops.	\$1,400,000,000
Clean Air	Reduced health care expenses Enhances quality of life	Plants filter our air and sequester carbon. Breathing polluted air can spur or worsen medical conditions.	\$319,000,000

Table C- 1. Ecosystem Services Value of Green Infrastructure Vision Lands

Priority Conservation Areas for Other Plans and Partners

Northwest Indiana is very fortunate to have many dedicated organizations partnering in the region to preserve, restore, and manage high quality natural areas for our benefit and for future generations. Federal, state, and local agencies as well as non-profit organizations, land trusts, and foundations have invested many resources into identifying and planning for the long term viability of several priority conservation areas. These areas may have been protected due to their biodiversity and ecological significance, such as the globally rare and endangered dune and swale habitat complexes found near the Grand Calumet River. They may have been saved from development due to their high biodiversity and beauty, such as the Indiana Dunes State Park and National Lakeshore. They may be preserved remnants of much larger ecosystems such as the Grand Kankakee Marsh County Park. The purpose of this plan is not to select or prioritize core conservation areas. Rather it is to identify techniques, policies, and opportunities to provide connections and buffer areas, and to enhance access to these areas.

Grand Calumet Area of Concern

The Grand Calumet Area of Concern consists of portions of Gary, Hammond, East Chicago, and Whiting in Northern Lake County. It encompasses the Grand Calumet River, Marquette Lagoons, Indiana Harbor Ship Canal, Wolf Lake and George Lake and Nearshore Lake Michigan. While this highly industrialized area is the economic heart of Northwest Indiana, it also includes many acres of globally rare and critical species and endangered habitat types. This area has been the focus of national and international contaminated sediment clean-up efforts, river and habitat restoration. At least \$68.7 million has been invested through federal and state grants as well as settlements with local industries that contributed to the historic pollution of the area. Over 200 acres of habitat has been preserved and restored in several clustered areas throughout the Area of Concern. Connecting the fragmented natural habitat around Wolf and George Lake, the Gary Airport, and Marquette Park via the Grand Calumet River system is important to their long term resilience.

Indiana Dunes

The Indiana Dunes ecosystem stretches from Marquette Park in Gary through Michigan City to the Michigan state line. It includes the Indiana Dunes National Lakeshore, the Indiana Dunes State Park, and many additional segments of high quality natural habitat area in private and public ownership. IDNL is the seventh most biodiverse park in the National Park System and is home to a variety of habitats and rare, endangered, and threatened species. The Indiana dunes region is diverse at both a habitat and species level. A range of natural community types can be found within a singular site, and the variety of habitats provides a home to over 1,000 native species of plants.

Moraine Forest

The Moraine Region⁵ of LaPorte and Porter Counties is one of the more biologically diverse areas of the United States, including boreal flatwoods (northern forests), bogs, and fens. The Moraine Forest region extends from southwest of Valparaiso to the Michigan state line and contains some of the largest remaining tracts of forested habitat. Scattered parks and managed

⁵ <http://www.heinzetrust.org/conservation-planning-projects.html>

natural areas such as Sunset Hill County Park, Moraine Nature Preserve, and Moraine Wildlife Rehabilitation Center, Red Mill County Park, and Ambler Flatwood Nature Preserve have beautiful footholds within the Moraine Forest Region. Maintaining the scenic beauty and rare habitats throughout the majority of this privately owned area will require significant outreach and participation by landowners. Scenic recreational greenways such the proposed Moraine Forest Bike Path could provide one incentive to do so.⁶

Hoosier Prairie/Oak Ridge Prairie

Hoosier Prairie⁷ and Oak Ridge Prairie County Park⁸ together protect over 2,200 acres of rare prairie remnants, wetlands, and savannas. The diverse habitats are home to more than 350 species of native plants.

Hobart Marsh and Deep River

The Hobart Marsh and Prairie Grove Area encompasses nearly 750 acres of permanently protected but still fragmented land, which includes, wet forest, oak woodland, tall grass prairie, emergent marsh, savanna, and fens. The site provides critical habitat for nine state threatened or rare plant species, Blanding's turtle (state endangered), over 40 state endangered, threatened and rare insect species, four state endangered bird species, and five high quality natural communities. This area also includes Lake George in Hobart.

Founder and Cedar Creek Watersheds

The Founder and Cedar Creek Watersheds area includes significant tracks of contiguous woodlands, including publicly owned Lemon Lake County Park. It also includes Cedar Lake, Marsh south of the Lake, and Lake Dalecarlia, and Cedar Lake

Kingsbury

Kingsbury Fish and Wildlife Area in LaPorte County is 7,280 acres of grassland, marsh, shrub/scrub, and farm field. The property has been managed by the Department of Natural Resources for quality hunting and fishing.⁹

Kankakee Marsh

Grand Kankakee County Park and the Kankakee Fish and Wildlife Refuge are large protected habitat tracts within the once-vast Grand Kankakee Marsh system. These properties are managed for recreation and fish and wildlife habitat along the Kankakee River.¹⁰ The productive farmland surrounding the river now is very important to the regional economy and the small town culture in the southern stretches of Northwest Indiana. However, this valuable cropland can act as a barrier for many species of plants and animals that call these spaces

⁶<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/placesweprotect/moraine-nature-preserve.xml>

⁷<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/placesweprotect/hoosier-prairie.xml>

⁸ http://www.lakecountyparks.com/parks/oak_ridge_prairie_and_oak_savannah_trail.html

⁹ <http://www.in.gov/dnr/fishwild/3089.htm>

¹⁰ <http://www.in.gov/dnr/fishwild/3090.htm>

home. Connecting habitat corridors in the Kankakee River Floodplain could increase the resilience of the remaining protected places.

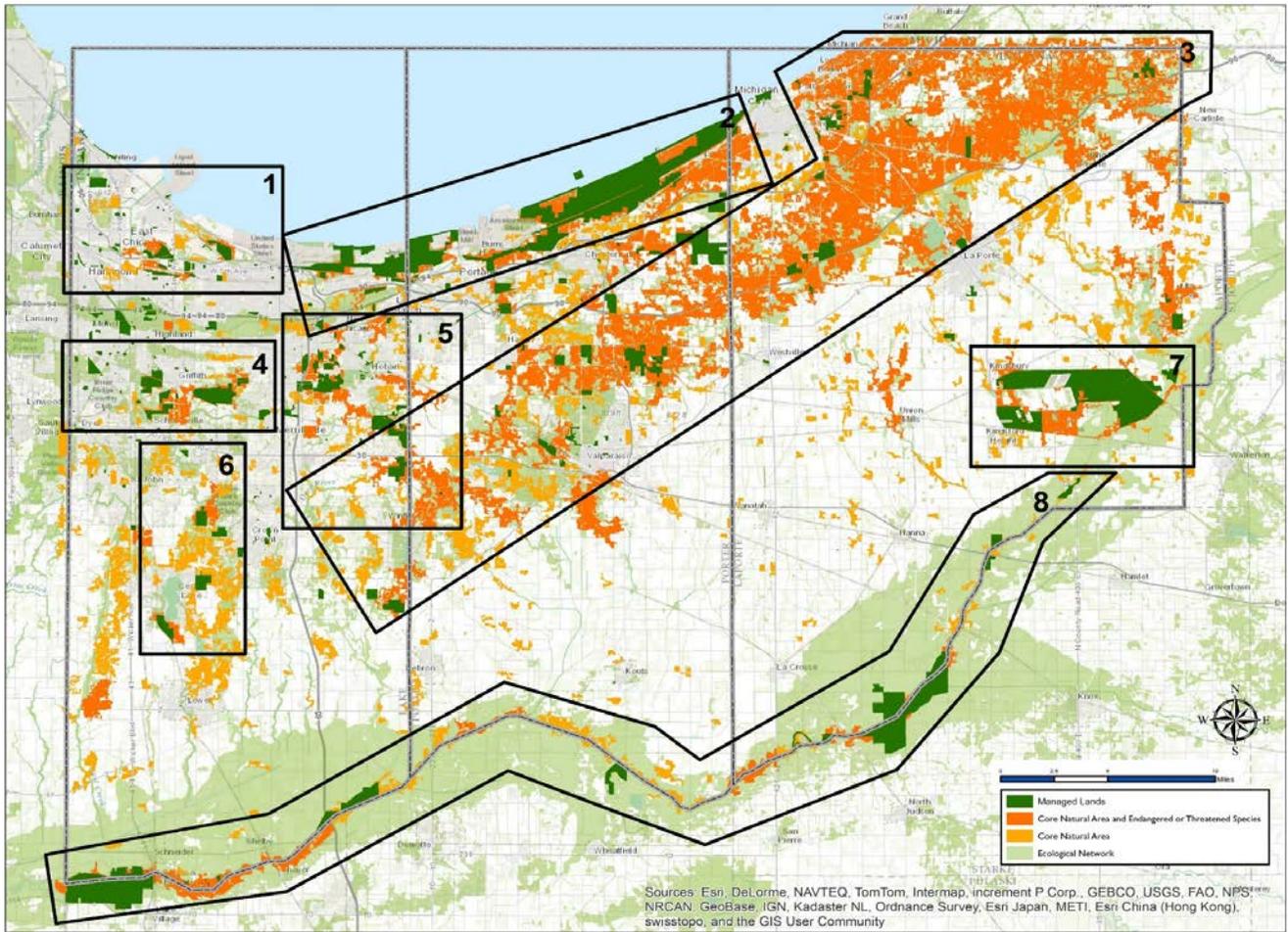


Figure C-6: Managed and unprotected natural habitat areas in Northwest Indiana

Riparian Conservation Corridors

Rivers and streams have several key attributes that are especially valuable for potential conservation corridors.

In many cases, land adjacent to waterways (riparian land) is regulated wetland, delineated floodplain, designated floodway, or steep erodible banks. Buildings and infrastructure in these lands are vulnerable to flooding or other damages. This land is often uneconomical to develop for uses beyond low-impact recreation or agricultural production, so it often remains in a somewhat natural condition much longer than upland areas even in built-up communities. They contain many of the ingredients needed for successful wildlife habitat, such as food, shelter, and access to water.

Creating conservation corridors in riparian buffer zones can have multiple benefits to the region. Riparian buffers are zones adjacent to waterbodies such as lakes, rivers, and wetlands, that simultaneously protect water quality and wildlife, including both aquatic and terrestrial habitat. These zones minimize the impacts of human activities on the landscape and contribute to recreation, aesthetics, and quality of life.

There are many other uses of the term “buffer” in other contexts. In the agricultural industry, a buffer is used more generally to describe filtering best management practices, most often at the water’s edge. Other practices which can be interrelated may also sometimes be called buffers. For example, a grassed waterway is designed to filter sediment and reduce erosion and may connect to a riparian buffer. These more limited-purpose practices may link to multipurpose buffers, but by themselves, they are not adequate to provide the multiple functions of a riparian conservation corridor as defined here. In the urban environment similar practices such as roadside bioswales may similarly be identified as green infrastructure or buffers without being riparian conservation corridors.¹¹

Planting these areas with the native plants needed for successful conservation corridors has significant water quality benefits. Typically, riparian buffers can provide varying degrees of benefits, depending on width, slope, and adjacent land uses. These are typically divided into three zones which we will call the Wet Zone, Habitat and Water Quality Zone, and Transition Zone.

and the [Milwaukee Metropolitan Sewerage District](#) (MMSD) launched a pioneering flood management program, GreenseamsSM. Greenseams purchases land and conservation easements from willing landowners in the Milwaukee, Menomonee, Oak Creek and Root River watersheds, where major suburban growth is expected to occur. Properties are chosen for their proximity to water, their water-absorbing soils, environmental corridor and natural area designations and their connection to public spaces.

Since the program’s inception, Greenseams has protected 100 properties preserving 3,142 acres of flood-prone land within greater Milwaukee. This area includes 28 communities and 1.1 million people.

Greenseams creek buffer photo by Ivan LaBianca.

¹¹ Southeastern Wisconsin Regional Planning Commission (SEWRPC) *Managing the Water’s Edge*. 2010

Wet Zone: The Wet Zone is typically from the water’s edge to the top of the bank or uplands. It provides critical connection between water, wetland, and upland habitats for wildlife, protects streams from bank erosion, and often provides shading that cools aquatic habitats. Typically, this may range between 10 feet to 150 feet in width, depending on terrain.

Habitat and Water Quality Zone: The Habitat and Water Quality Zone is from the top of the bank to the edge of wooded and native vegetation. This provides wildlife habitat, stormwater runoff infiltration, and pollutant removal. This zone typically ranges from 30 feet to 300 feet in width, depending on terrain, local conditions and need. Vegetated buffers 50 feet wide generally provides effective removal of nutrients pollutant nutrients such as nitrogen and phosphorus, as well as bacteria. Table C-4 summarizes the pollutant removal effectiveness of different types of plant communities used in riparian buffer strips.

Transition Zone: The Transition Zone is suitable for passive recreational uses such as parks, trails, and community open space. Certain types of agricultural uses may also be compatible with transition zone areas of conservation buffers.

Buffer Type	Nitrogen	Phosphorus	Sediment
Forested	48-74%	36-70%	70-90%
Vegetated Filter Strips	4-70%	24-85%	53-97%
Forested and Vegetated Filter Strips	75-95%	73-79%	92-96%

Source: Delaware Department of Natural Resources and Environmental Control ¹²

Table C-2. Riparian Buffer Strip Pollutant Removal Effectiveness

There are many riparian buffer functions, and the ability to effectively fulfill those functions is largely dependent on width. Figure C-7 shows the effectiveness of different widths of conservation corridors for performing different functions. Determining what buffer widths are needed should be based on what functions are desired, as well as site conditions. For example, in small headwater catchments, with limited fishery or recreational value, buffers to preserve stormwater flow regulation and water quality may be adequate for community benefits in most locations.

Based on the needs of wildlife species found in similar Great Lakes states, the minimum core habitat buffer width is about 400 feet and the optimal width for sustaining the majority of wildlife species is about 900 feet. Because not all riparian corridors are suitable or desirable for this wide of a conservation buffer, the value of greenway linkages to other large conservation areas described above is key. The minimum effective buffer width distances are based on data

¹² Hawes, Ellen and Markelle Smith. *Riparian Buffer Zones: Functions and Recommended Widths*. Yale School of Forestry and Environmental Studies. April 2005.

reported in the scientific literature and the quality of available habitats within the context of those studies.¹³

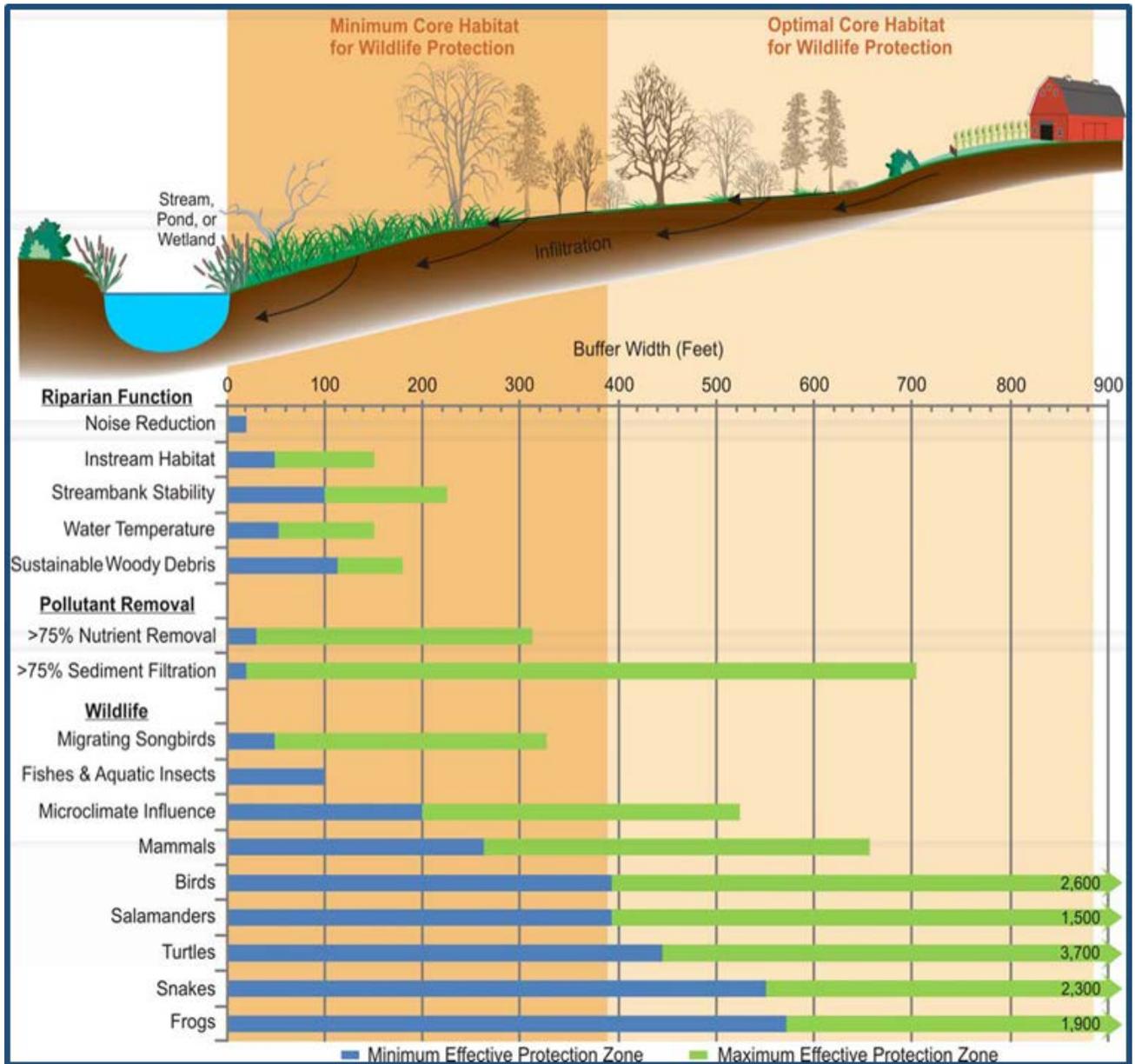


Figure C-7. Conservation Buffer Width Effectiveness¹⁴

¹³ Southeastern Wisconsin Regional Planning Commission (SEWRPC) *Managing the Water's Edge*. 2010

¹⁴ Southeastern Wisconsin Regional Planning Commission (SEWRPC) *Managing the Water's Edge*. 2010

Preserving the riparian land surrounding Northwest Indiana rivers and streams in public ownership has the added benefit of ensuring public access for highly valued blueway recreational activities such as paddling and fishing. Public Access law in relation to rivers, streams, and lakes in Indiana is complicated. The details of the legal framework are provided in the inset below.

Private Property Rights vs. Public Trust Water Access Rights in Indiana

Water rights laws in Indiana primarily descend from English Common Law principles, with centuries of modification through both the court system, legislative system, and regulatory system. It is useful to understand these legal frameworks when planning for public access, waterway buffers, and water trail development. Sometimes waterbodies and their banks are private property; sometimes they are public property; sometimes they are private with public right to navigate on the water; sometimes the water and the bed is held in public trust. The public right to access and use waterways in the U.S. and in Indiana are legally descended from ancient Roman and English common law. Public Trust doctrine was developed centuries ago when waterways were a major transportation mode for individuals, businesses, and governments. The public good of water use for these “navigation” related purposes was held to be so essential that from ancient times, common law has determined that governments hold these rights in “Public Trust” and must balance them with private property rights.

Navigability in Indiana:

Indiana is a riparian use water rights state, which means that certain rights to access and use surface water belong to property owners who own the adjacent land. The riparian owner’s private property rights relating to the stream differ depending on whether it is legally navigable or not. In Indiana, navigability has been largely determined on a case by case basis through the judicial system, unless declared navigable through legislation. In general, if a river or stream that a property touches was not capable of supporting river transportation in 1816 when Indiana became a state, then the waterway is not consider to be a legally navigable waterway and the bed is the private property of the adjacent land owner. Even if the waterbody itself might be physically navigable, touching the bottom or banks for recreation or other purposes would be trespassing without express permission of each property owner it flows past.

Public Access:

In our region, the waters listed above are legally navigable, although they might not physically so. The beds of these waters below the ordinary high water mark are properties of the state, and as such are held in public trust. Today, although we don’t often use our rivers and streams for daily commutes, the Public Trust Doctrine means that the public retains a right to use these waters for boating and paddling, provided they can be accessed without trespassing on the private property of riparian land owners. In some places, the individual’s safe access to navigable waters for recreation must be balanced with the

NWI NAVIGABLE WATERWAYS

- Lake Michigan: Navigable throughout the region.
- Kankakee River: Navigable throughout the region.
- Little Calumet River: Navigable throughout Lake and Porter counties.
- Grand Calumet River: Navigable from the Illinois State Line (near Hammond) to Marquette Park.
- Indiana Harbor and Ship Canal: Navigable throughout.
- Burns Ditch: See Portage Burns Waterway.
- Portage Burns Waterway: Navigable in its entirety (1.3 river miles) as a connection between the Little Calumet River and Lake Michigan.
- Trail Creek: Navigable 1.0 river miles from its junction with Lake Michigan.

NWI PUBLIC FRESHWATER LAKES

Lake County

- Cedar Lake
- Fancher Lake
- Golf Lake
- Lake George (Hobart)

LaPorte County

- Clear Lake (Mill Creek)
- Clear Lake(Westville)
- Crane Lake
- Fish Trap Lake
- Hog Lake
- Horseshoe Lake
- Hudson Lake
- Lily Lake
- Pine Lake
- Saugany Lake
- Silver Lake
- Stone Lake,
- Tamarack Lake
- Upper and Lower Fish Lake

Porter County

- Canada Lake
- Carlson Pond (Moraine Nature Preserve)
- Clear Lake(Westville)
- Flint Lake
- Lake Eliza
- Long Lake
- Loomis Lake
- Mink Lake
- Morgan Lake
- Moss Lake
- Wauhob Lake

economic benefit of commerce uses, which in our region are most significant on Lake Michigan and its industrial harbors and ports.

Public Freshwater Lakes:

In Indiana, any lake that has ever been used by the public with the permission of a riparian owner is considered a “public freshwater lake” regardless of the legal navigability. The 1947 Lakes Preservation Act gives the state “full power and control of all the public freshwater lakes” and holds and controls “all public freshwater lakes in trust for the use of all citizens of Indiana for recreational purposes”. As with rivers and streams, a lake may be “public” for recreational purposes; however, this right is balanced against the rights of riparian landowners (those whose land is adjacent to the water). Some “public freshwater lakes” may in fact have no direct public access to them without crossing private property. To preserve public access to these lakes for recreation, some portion of the shoreline must be owned by public entities.

Interestingly, in Northwest Indiana two very important recreational lakes — Lake Michigan and Wolf Lake — are not by state definition “public freshwater lakes”. Despite not being considered within this category, state law holds that the bed of Lake Michigan below the Ordinary High Watermark (defined in state law as 581.5 feet elevation) is held in trust by the state for the people of Indiana.

Wolf Lake by contrast is considered to be wholly owned by the City of Hammond. This has the advantage of offering local control but limited opportunity to access some state resources there.

Special Designations:

Several other state special designations apply to some region waterbodies. These special purpose designations typically receive extra regulatory attention.

Outstanding State Resource Waters includes Lake Michigan and waters within Indiana Dunes National Lakeshore.

Outstanding Rivers and Streams include Deep River, East Branch Little Calumet River, Kankakee River. **Salmonid Streams** include Trail Creek, East Branch of Little Calumet River, Burns Ditch, Salt Creek, Kintzele Ditch, Galena River, and Lake Michigan.

Northwest Indiana Significant Riparian Features for Living Corridors

Regionally Significant Riparian Conservation Corridors are identified here based on: the presence of significant naturalized floodplain; the presence of parks or natural areas already in public or conservation trust ownership; or the area identified in public plans or documents for future recreational or conservation projects.

Grand Calumet River

The Grand Calumet River is a thirteen (13) mile waterway at the center of the Grand Calumet River/Indiana Harbor Canal Area of Concern, traversing Gary, Hammond, and East Chicago. ¹⁵Thirty Years ago this river was considered a “dead” river. Toxic sediments had accumulated over half a century of unregulated municipal and industrial pollution. As a result of US Steel remedial dredging, \$288 million in Great Lakes Legacy Act funding, and U.S. Army Corps of Engineers dredging projects, hundreds of thousands of cubic yards of highly toxic sediments have been removed from the river or capped in place. ¹⁶ By 2020 much of the sediment cleanup work will be completed.

Today the water flows in this river are heavily dominated by non-contact cooling water from steel mills and treated effluent from industry and sewage treatment plants. During dry conditions, the river water typically meets or exceeds water quality standards, although during wet weather it can be contaminated with urban runoff and combined sewer overflows. Many of these problems will be further reduced as the cities of Gary and Hammond implement long term control plans that will minimize these problems.

The Grand Calumet River forms a potential conservation corridor connecting the valuable conservation lands preserved and restored from the Marquette Park in Gary through the many nature preserves within the Gary Airport Conservation Zone, through Roxanna Marsh, to the Gibson Woods Nature Preserve in Hammond.

Little Calumet River & Portage Burns Waterway

The Little Calumet River West Branch flows east from the Illinois State Line to its junction with the East Branch and Burns Waterway in Portage. This waterway forms the boundary between Hammond and Gary to the north and Munster, Highland, Griffith, to the South. A primary feature of the West Branch is the Little Calumet River, Indiana Flood Control and Recreation Project. The Project includes over 9.7 miles of set-back levees, 12.2 miles of levees and floodwalls, flow diversion structures, and over 16.8 miles of hiking and biking trails. Within the project boundaries over 2,000 acres of wetlands are restored and protected for habitat and recreation, forming an essentially in place conservation corridor.¹⁷ The West Branch further flows as a straightened canal through the City of Lake Station and Portage before the confluence with the East Branch. The primary tributary to this branch is the Hart Ditch/Plum Creek watershed.

¹⁵ <https://www.epa.gov/grand-calumet-river-aoc>

¹⁶ <https://www.epa.gov/grand-calumet-river-aoc/legacy-act-cleanup-grand-calumet-river>

¹⁷ <http://littlecalsriverbasin.org/about.html>

The Little Calumet River East Branch is 22 miles long. It rises from its headwater springs in Red Mill County Park and the National Lakeshore's Pinhook Bog Unit in LaPorte County to flow west through Porter County, the towns of Chesterton, Porter, Burns Harbor, and the City of Portage. Much of the river remains somewhat natural, and it traverses the high quality Moraine Forest conservation area. In the western reaches it meanders through the Indiana Dunes National Lakeshore, an existing conservation corridor. The waterway is a salmonid stream, stocked with steelhead trout, chinook salmon, and coho salmon.¹⁸ It is a recently cleared water trail with a high recreational potential identified as the next priority for Blueway development. Extending Riparian Conservation Buffers eastward to the headwaters is a vision for a Little Calumet East Branch Conservation Corridor embraced by the Shirley Heinze Land Trust in partnership with Save the Dunes Council, Indiana Dunes National Lakeshore, Indiana Department of Natural Resources Bicentennial Nature Trust, Northwest Indiana Paddling Association and many others.

Burns Waterway, as formed by the confluence of the East and West Branch of the Little Calumet, provides connectivity between this extensive inland greenway, Indiana Dunes National Lakeshore Portage Lakefront Park, and Lake Michigan. Although the eastern bank of this waterbody holds industrial steel mill, the west bank of the lower reach has been stabilized and planted with native vegetation, and has recreational trails and boardwalks managed by the City of Portage.

Deep River

The Outstanding State River designation applies to Deep River from its confluence with the Little Calumet West Branch north of I-94 through New Chicago, Lake Station, Hobart, Unincorporated Lake County, and Merrillville. Significant portions of the river's corridor are held by Lake County Parks including Deep River County Park, Big Maple Lake Park, and Three Rivers County Park. The City of Hobart also has parks and public access points on both the River and on Lake George. Finally, Deep River connects significant natural areas in Hobart Marsh, Deep River County Park, and The Little Calumet River, and Indiana Dunes. This corridor contains quantities of bottomland hardwood forested wetlands, which in addition to providing important habitat and flood protection in their own right, also protect the highest water quality and aquatic habitat reaches of the river.

Kankakee River

65 miles of the Kankakee River form the southern boundary of all three counties in our region. In addition to being a National Water Trail, thousands of acres of natural wetland habitat have been preserved or restored in its flood plain through county parks, DNR, or agricultural wetland and wildlife habitat reserve programs both within the levees, and in adjacent oxbows and floodways. The Kankakee is ideally located to provide connections between habitat rich parks and preserves such as the Grand Kankakee Marsh County Park, Kankakee Fish and Wildlife Refuge, Kingsbury Fish and Wildlife Area, and other county parks, as well as other downstream locations in Illinois.

¹⁸ <http://www.in.gov/idem/nps/3958.htm> http://www.in.gov/idem/nps/files/wmp_littlecalumet-east_sec_1-2.pdf

Locally Significant Riparian Corridors

Many other smaller streams and creeks in the region have been the beneficiaries of community efforts to preserve and protect conservation areas along their banks. While the Regionally Significant Riparian Corridors identified above form the trunklines of a Northwest Indiana's Green Infrastructure, the smaller corridors have the greatest potential to connect smaller isolated ecological hotspots with the larger system.

Coffee Creek

The Coffee Creek Watershed Conservancy already protects several miles of riparian conservation buffer along Coffee Creek with 157 acres of prairie, wetland, and forest. Extending the length of this buffered area could provide a protected corridor connecting other managed lands within the vulnerable Moraine Forest core habitat to the neighboring Little Calumet East Branch Corridor and the Indiana Dunes National Lakeshore.

Salt Creek

Salt Creek is a 24-mile tributary of the Little Calumet River that stretches from the moraine forest areas south west of Valparaiso and continues north mostly through unincorporated Porter County on its way to Portage. The Porter County Unified Development Ordinance calls out the Salt Creek corridor as a Priority One in the Blueway zoning overlay¹⁹. This protection could provide vital long term water quality protection for this salmonid stream and maintain regional connections for several rare plant and butterfly species found in its watershed. Figure C-6 map shows a narrow strip of core habitat following the creek. It could also provide public recreational access to the waterway through a segment of the county identified with gaps in the Indiana Lake Michigan Coastal Program Recreational Needs Assessment Study.

Trail Creek

Trail Creek in Michigan City and LaPorte County is a popular water trail and fishing destination. Its riparian forests and wetlands provide ecological connection opportunities between the Moraine Forest Core Habitat area and the Indiana Dunes Core Habitat area. The City of Michigan City and the Trail Creek Watershed Group have already laid the foundation for this conservation corridor in a variety of plans and projects along the Trail Creek

Cedar & Founders Creek

Cedar Creek and Founders Creek have their headwaters in Cedar Creek Golf Course and Lemon Lake County Park in remnant moraine forest surrounding Cedar Lake. Founders Creek merges with Cedar Creek to the east of the lake then flows south through Lake Dalecarlia and ultimately toward the Kankakee via Singleton Ditch. This watershed contains several managed lands and hotspots of biodiversity. In **2014** NIRPC drafted a plan for the Town of Cedar Lake highlighting a potential conservation and trail corridor that would protect and connect these natural areas through existing rights of way and forested floodplains.

¹⁹ Porter County Unified Development Ordinance Zoning Map- Overlay Blueways Plan.
<http://www.porterco.org/DocumentCenter/View/2306>

West Creek

West Creek is a tributary to the Kankakee River in the south western corner of Lake County. The Lake County 2014 Parks and Recreation Master Plan identifies five areas for future park development along the West Creek Corridor from the headwaters at Bull Run to the confluence with Singleton Ditch. The Figure C-6 habitat map shows that the corridor contains core habitat and rare species. In 2011, Indiana Department of Environmental Management found that water quality and the fish community in the creek had improved dramatically due to significant investment of the agricultural community and the town of St. John in urban best management practices and no-till farming methods. The Corridor also coincides with a regional priority trail route as well.

Upland and Urban Linear Features for Living Corridor Development

Other linear features cross the landscape of Northwest Indiana in locations that may provide excellent opportunities to provide Living Corridors. Utility easements for electricity and pipelines are often suitable for native habitat types that can survive periodic disturbances for maintenance. Railroad and roadway right of way may also be suitable with appropriate concessions to safety and provisions for wildlife crossings. Partnerships with the owners and operators of these rights of way can provide many benefits in major conservation areas.

In more heavily urbanized communities, the curbs and gutters in the street network form an important component of the stormwater system. In some areas around the country, the addition of requirements and design guidelines to incorporate Green Infrastructure and natural based stormwater management processes into roadway planning has also created urban habitat corridors within cities. Rain Gardens, bioswales, and properly planted street trees as well as other stormwater best management practices can provide important habitat for pollinators such as insects and butterflies, and food for songbirds. Great examples of these can be found in Grand Rapids, Michigan and Milwaukee, Wisconsin. These communities have expanded their definition of “Complete Streets” to include green stormwater management practices and native plantings.^{20, 21, 22}

²⁰ Grand Rapids Vital Streets Guide: <http://downtowndevelopment.com/pdf/vitalstreets.pdf>

²¹ https://www.werf.org/liveablecommunities/toolbox/gst_create.htm

²² http://city.milwaukee.gov/ImageLibrary/Groups/cityGreenTeam/documents/2013/Green_Streets_Stormwater_Manag.pdf

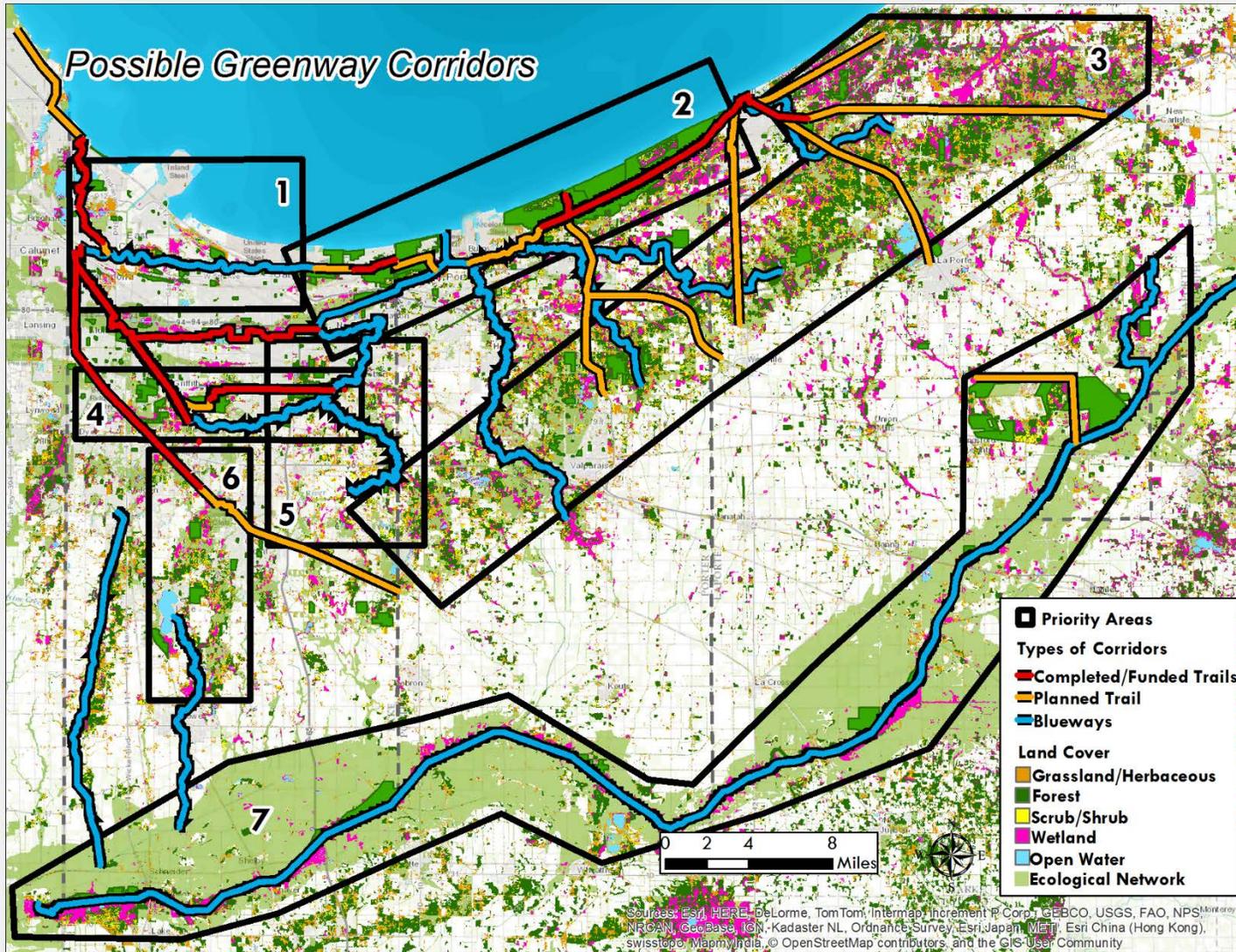


Figure C-1 Priority Zones for Living Corridors Development