



# Natural Connections

A vision for conserving the diversity of habitats and wildlife  
in the Lake Erie Allegheny region



By the Lake Erie Allegheny Partnership for Biodiversity  
2018



LEAP is dedicated  
to the identification,  
protection and restoration of  
biodiversity in our region  
and to the increased  
public awareness of  
biodiversity through  
the support of our  
member organizations.

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# The LEAP partnership and the need for a biodiversity vision

The [Lake Erie Allegheny Partnership for Biodiversity](#) (LEAP) is the consortium of conservation organizations for a 22,000-square-mile ecoregion encompassing the glaciated portion of the Allegheny Plateau and the Lake Plain from west of Cleveland almost to Buffalo.



The Lake Erie Allegheny ecoregion

[LEAP members](#) include park districts, nature centers, museums, nonprofit conservation organizations, watershed groups, and public natural resource agencies. Members' staff include the region's top wildlife and plant biologists, ecologists, naturalists, and park planners. These are people with scientific expertise and boots on the ground. They are witnesses to the changing conditions of nature.





## What is biodiversity?

Biological diversity — or biodiversity for short — is a broad concept that seeks to describe the variety and richness of life in a particular place. It spans various scales of life, from species and genetic diversity to the diversity of types of ecosystems. And it can span geographic scales, from the diversity in one's backyard to the biodiversity of nations or the whole Earth.

Here are typical definitions:

The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

— [Convention on Biological Diversity](#)

Biodiversity is the variability within and among all living organisms and the ecological complexes in which they occur. Biodiversity includes ecosystem or community diversity, species diversity, genetic diversity and the ecological and evolutionary processes that sustain it.

— [The Nature Conservancy's Conservation Gateway](#)

And they are concerned about the future of biodiversity — here in the LEAP region and around the world. Recently, the Earth has entered the [sixth mass extinction](#) event in its 4.5-billion-year history. The losses are being caused by the immense stresses imposed by the human economy on the natural world — including habitat loss, resource overexploitation, pollution, invasive species, and climate disruption. [More than 77 percent](#) of land on Earth now has been modified by human industry. Since 1970 alone, populations of many mammals, birds, fish and reptiles have [declined by 60 percent](#) on average.

Locally, habitats, species richness, and genetic diversity have also been lost. There are presently more than 20 plant communities and 20 to 50 species that are globally threatened priorities in the LEAP region. The quality and resiliency of natural areas have suffered. And the capacity of natural systems to provide vital ecosystem services (such as water purification, flood control, pollination, cooling, healthy soils, recreation, and aesthetic beauty) has been degraded.

Given the mounting threats to nature, LEAP members have come together to pool scientific expertise, discuss ways to preserve and restore the region's ecosystems, plants, and wildlife, and create a vision to inspire people of the region to do more to protect nature in the future. This document distills the group's thinking from the past several years. It is significant in a number of respects:

- As a statement of concern from the region's top conservation organizations.
- As a broad, landscape-scale analysis about what it will take to sustain biodiversity in the future.
- As the first, detailed analysis of climate change impacts on nature in the region.



LEAP members believe the region needs a bigger vision for nature. In a world of many stresses, nature needs more room to move and adapt to changing conditions. Doing this will not only help the region meet its responsibility to protect its share of global biodiversity but help assure a higher quality of life for communities in the region.

## Land use challenges in the LEAP region

When it comes to sustaining a rich diversity of native plants and wildlife, the LEAP region has significant assets, such as Lake Erie and an excellent system of parks and natural areas. But the region also has significant handicaps, such as a history of extensive land disturbance:

Historically, our inland terrestrial landscape was primarily deciduous and mixed forest, with the exception of some extensive wetland systems and small amounts of slumps, dunes and outcrops. However, a century ago nearly the entire area was cleared and drained for agriculture and industrialization, and larger wildlife species were eliminated. In the last fifty years, much of our farmland has been converted into sprawling urban complexes connected by an impressive transportation grid. A sparse matrix of leftover wetlands, forest fragments and various stages of fallow agriculture, partially connected by riparian corridors, are all that remains of our once unbroken natural expanses. Furthermore, these systems are very unlikely to regenerate back into what they once were, due to 1) the nature of past disturbance, 2) existing landscape conditions, 3) invasion of exotic species, 4) unbalanced native wildlife, and 5) climate change. Although we do have some relict historic habitats, novel systems often spearhead any natural recovery processes. (“Habitats of the LEAP region” by Dylan Stover and Robert Curtis, Summit Metro Parks, 2014)

Because so much of the region’s land has been disturbed, every remaining patch of undisturbed natural area is precious. Some of these places are protected in parks and nature preserves, but many are not. Less than 4 percent of the region’s land is protected. Thus, there are two challenges: the small amount of undisturbed land and the small amount of protected land. This situation is exacerbated by the fact that much of the rest of the region is highly fragmented by development, roads, and other infrastructure. Figure 1 provides a visual sense of the extent of fragmentation. It shows levels of imperviousness in the LEAP region — areas with a lot of hard surfaces. If you zoom in, you can see the dense network of these surfaces throughout the region. The fine scale of fragmentation means that there

## Key Messages

The LEAP biodiversity vision has the following key messages:

- We are all connected to and sustained by nature.
- Nature’s diversity of plants and wildlife is threatened by many stresses, with climate change quickly emerging as a top threat.
- Given the magnitude of current and future changes, we need large-scale conservation strategies to help nature become more resilient — and the best way to do this is to give nature more room to move and adapt.
- By protecting biodiversity, we also protect water quality and other vital ecological services, access to nature, scenic beauty, and community quality. It’s a great investment and a legacy for all.



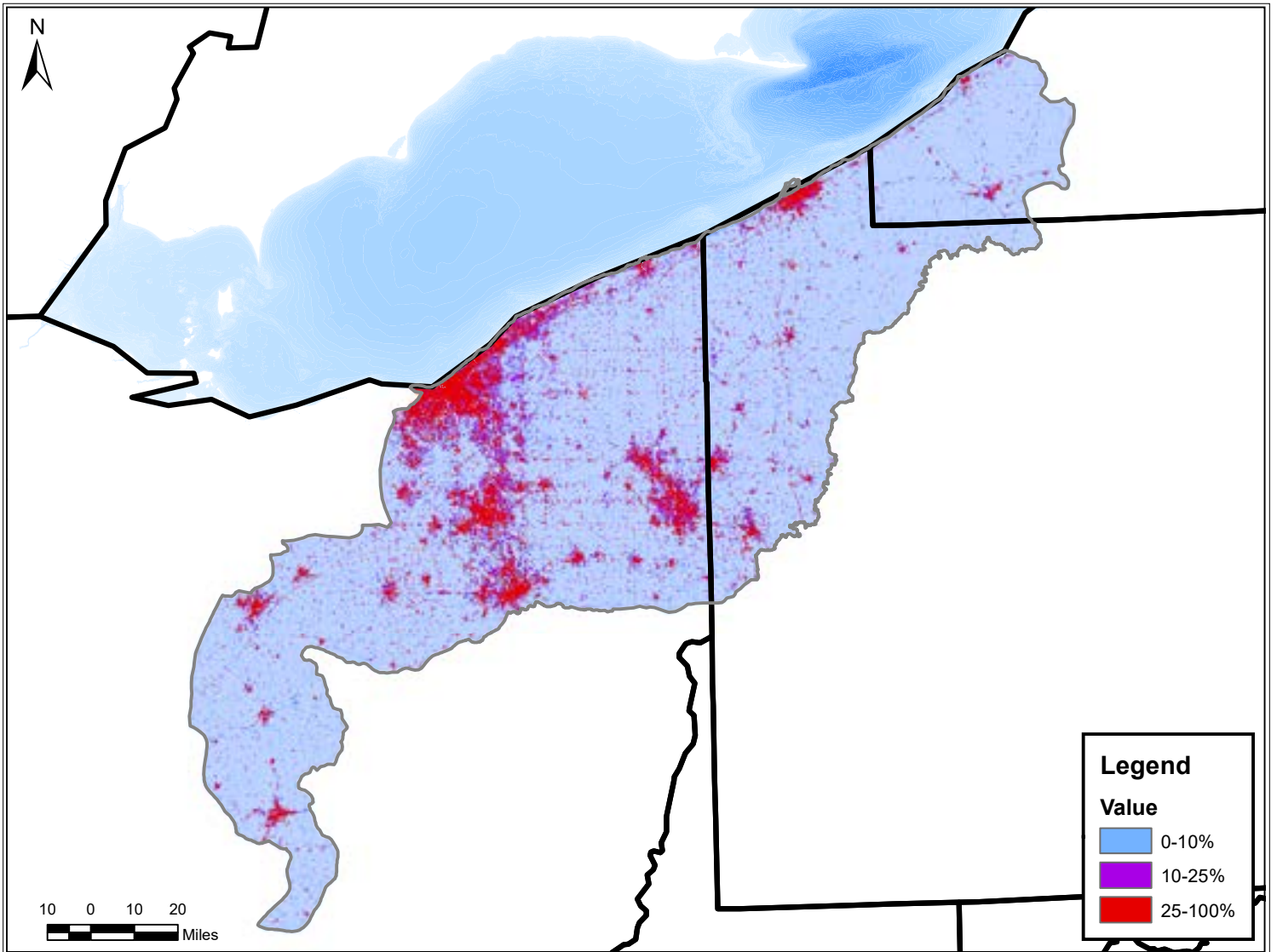


Figure 1: Levels of imperviousness in the LEAP region.



are few large areas where natural processes can occur free of disturbance. Many bird species, for instance, require large tracts of unbroken forest in order to breed and raise young successfully. (Imperviousness is also a critical factor affecting the [health of streams](#). In general, once a watershed reaches about 10 percent overall imperviousness, stream quality starts to be degraded by stormwater running off the impermeable surfaces. At 25 percent imperviousness, serious degradation often occurs.)

The fragmentation of the landscape is especially problematic at a time of rapid climate change. As habitats warm, many plant and animal species need to migrate northward or upslope to higher elevations. Such migrations are challenging in the LEAP region. There are no high mountains, so opportunities to move upslope are limited. Northward



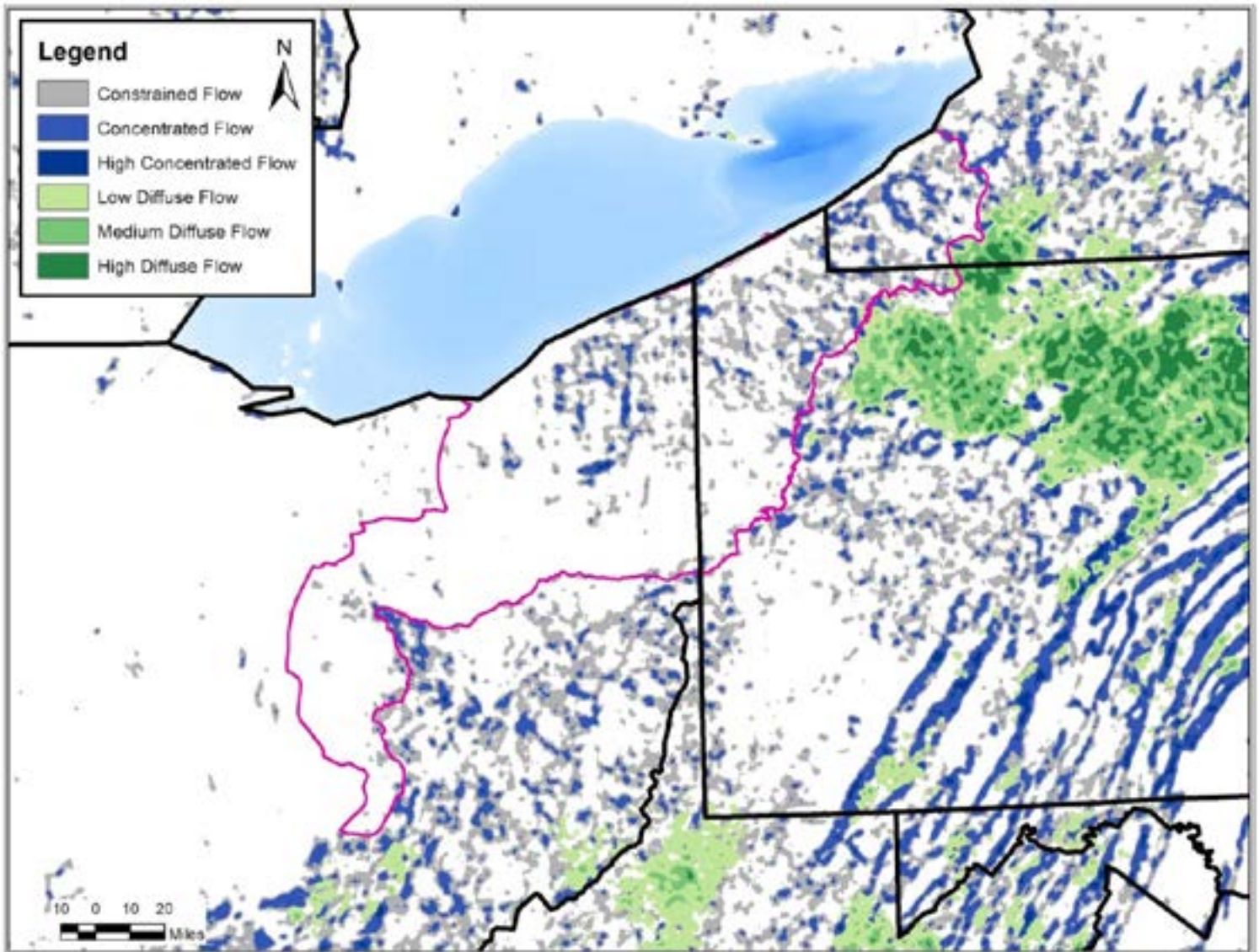


Figure 2: Climate flow patterns in the LEAP region (Source: The Nature Conservancy)

migrations are blocked by roads and other development. And Lake Erie is an enormous barrier for many species.

Scientists have begun to map the landscape conditions which enable or restrict the movement, or “flow,” of species in response to climate change. Figure 2 shows the paucity of [flow opportunities](#) in the LEAP region. There are some narrow corridors (mostly corresponding to river corridors), but no places where high amounts of flow can spread out and expand.

Other studies also have found that the LEAP region has little [landscape connectivity](#). All this means that nature in the region is extremely constricted. Biodiversity — including diverse species, ecosystems, and evolutionary processes — has a small and fragmented land base upon which to survive and adapt.







# Priorities for protecting nature

In response to the region's land use challenges, the members of LEAP propose the following five priorities to help nature adapt and thrive in the coming century:

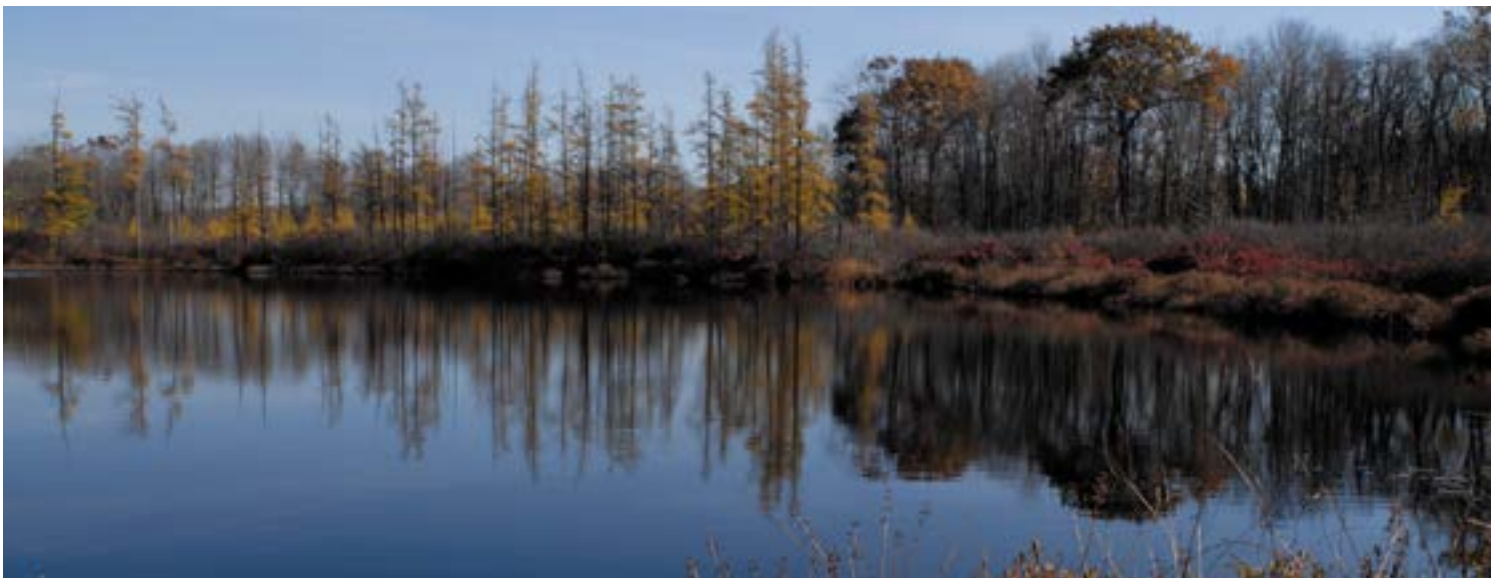
- Preserve large blocks of natural land
- Link natural areas
- Reduce habitat fragmentation
- Reduce other stresses on nature, such as air and water pollution, nonnative species, pesticides, and the overabundance of White-tailed deer
- Prepare for a changing climate

These priorities are discussed in more detail below.

## Preserve large blocks of natural land

Large blocks of undisturbed native habitat are critical for the continuation of high quality biodiversity, as well as the ecological services upon all life depends. The region should Increase efforts to protect large natural areas, with a special emphasis on native forests. Prior to European settlement nearly all of the region was forested, and it still “wants” to be a forest today (which is an unscientific way of saying that, if natural processes are allowed to occur over time, ecological succession will produce forests in most of the region).

Figure 3 shows where forested areas still exist in the region. It suggests where core forest preserves might be assembled and/or expanded.





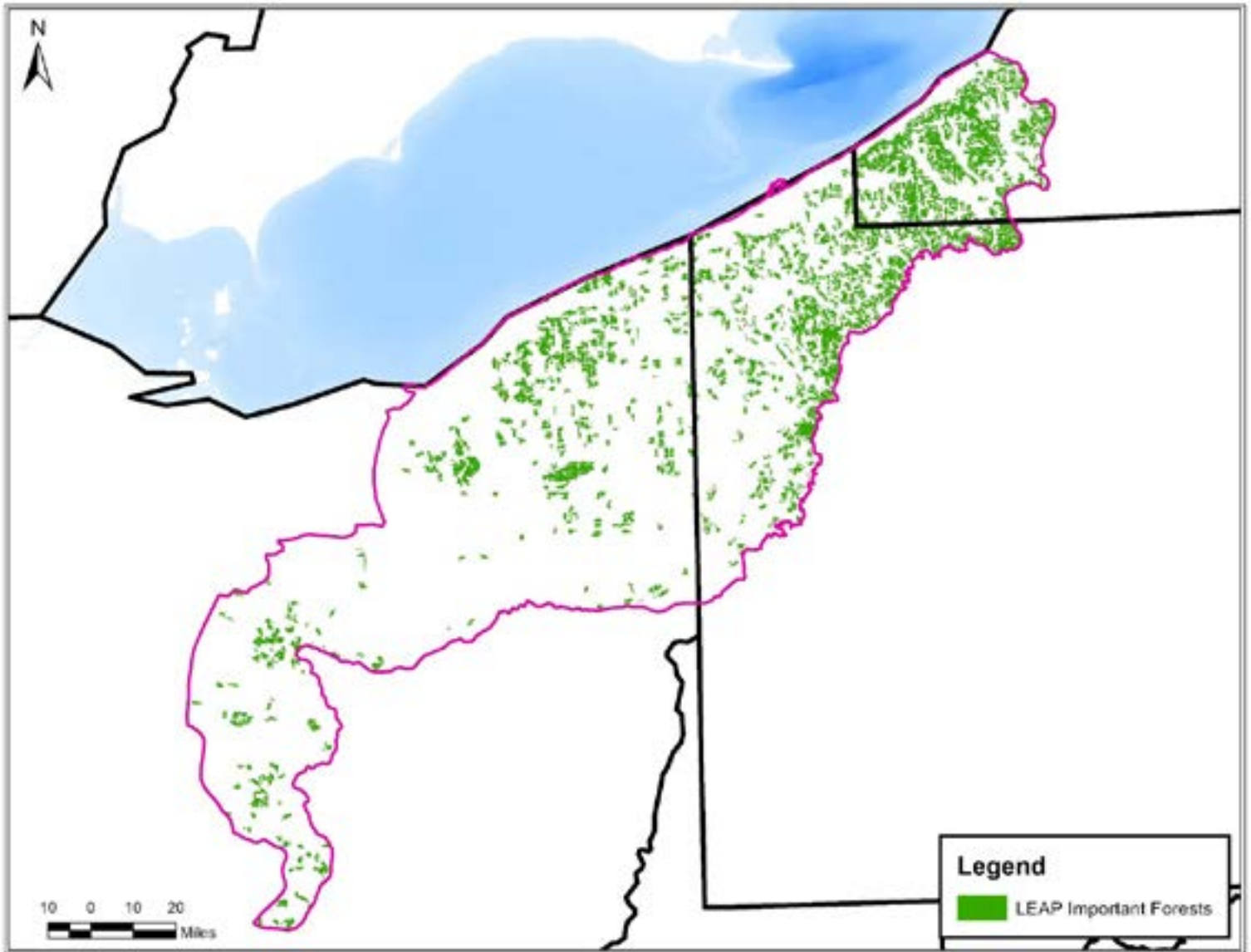


Figure 3: Forested areas in the LEAP region

## Link natural areas

The LEAP region lies within the North American continent on the south shore of a Great Lake and at the junction of three of the continent's major physiographic regions — Lake Plains, Allegheny Plateau, and Till Plains. In many ways, the region is at an ecological crossroads for species at the edge of their ranges. So it's important to think about how the region connects to surrounding areas and how plant and animal species move across the landscape. This will require bigger ideas about regional connections to mitigate habitat fragmentation.

For instance, based on major physical features, one can imagine a regional system of habitat corridors:





### Riparian corridors of major rivers

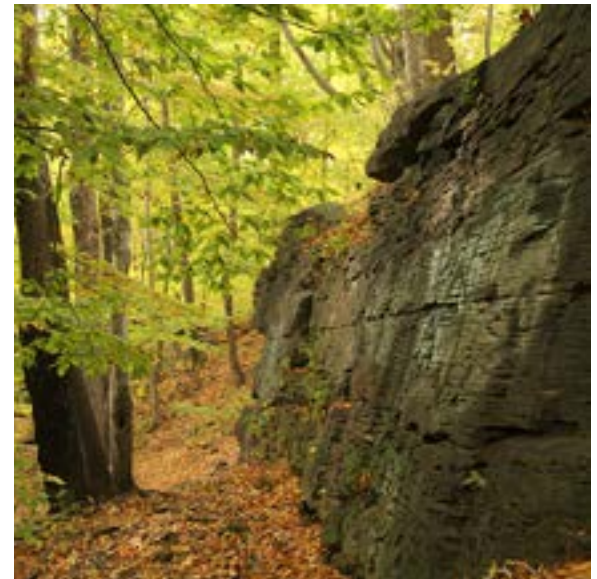
— These form the region’s major north/south corridors, which are critical for allowing species to move northward as the climate changes. The existing protected areas of park districts and other conservation organizations, which often lie along rivers, provide a good start.



**Lake Erie shoreline** — Lake Erie is the region’s large wilderness, so its edge is a critical habitat and migration corridor.







**Portage Escarpment**

The edge between the region's two major physiographic features, the Lake Plain and the glaciated Allegheny Plateau, has potential for becoming a green corridor across the region.



**Watershed divide between the Lake Erie and Ohio River drainages**

While there may be instances where one doesn't want certain species (such as Asian carp) to migrate across this divide, climate change will likely make it increasingly important to provide migration routes for many other species in the future.





## Reduce habitat fragmentation

Smart land-use planning can reduce habitat fragmentation from development and infrastructure (such as roads, power lines, and pipelines). Public planning processes should minimize the impacts of existing fragmentation, especially within significant habitat blocks and along the migration corridors mentioned above. In general, land use planning should take the cumulative impacts of habitat fragmentation into account.

A good approach is the [Ohio Balanced Growth Program](#), which helps state agencies, local governments, and landowners plan developments which avoid sensitive natural areas.

## Reduce other stresses on nature

In addition to conserving and connecting natural areas, it's vital to reduce the many other stresses on native plants and wildlife. Four of particular concern are:

### Air and water pollution

Clean air and water are essential for all life, so it's important to keep making progress on environmental protection. Today, the region's big air pollution problem is vehicle emissions, so biodiversity and human health depend on transitioning to cleaner vehicles and reducing the need to drive. The big water quality problem is stormwater runoff, which washes pollutants into lakes and streams, alters flow, and increases erosion. Stormwater solutions include programs to reduce impervious cover in watersheds, stream setbacks for development, and other floodplain protection measures. In addition, farming practices need to change to reduce the fertilizer runoff that causes harmful algal blooms in Lake Erie and other waterways.



### Pesticides

Pesticides have become ubiquitous in the modern environment and are causing many unintended consequences. Recent scientific studies, for example, have documented an alarming [decline of insect populations](#), including the insects that perform the essential service of pollination. Pesticides are one cause of this decline. Thus, it is important to reduce pesticide use and find safer alternatives.





## Nonnative species

Nonnative species — such as common reed grass (*Phragmites*) in marshes, zebra mussels in Lake Erie, and garlic mustard in forests — have degraded habitats throughout the region. For the most part, they can be controlled or managed only in a few, special locations where expensive effort is warranted. Therefore, the key is to work harder to prevent the introduction of nonnative species in the first place.

## White-tailed deer

White-tailed deer have multiplied beyond healthy carrying capacity in many parts of the region, devouring the understory of forests and causing widespread ecological damage (in addition to causing dangerous traffic accidents). Since top predators, such as wolves, have been extirpated from the region, it's up to humans to reduce the deer population to a sustainable level. Go [here](#) for more information about LEAP's position on deer management.

## Prepare for a changing climate

The [distribution of plants and wildlife](#) in our region will be greatly affected by a warmer climate. [A recent study](#) of the LEAP region by the U.S. Forest Service found that more than a third of the region's tree species will be less able to survive here by the end of the century. Such enormous changes will require new conservation approaches — perhaps less emphasis on preserving species that are no longer well adapted to local conditions and more emphasis on promoting a mix of species that will form healthy, resilient ecosystems in the future. This will raise complex questions about what species should be considered “native” to this place and when resources should be expended to protect certain habitats over others.

For more on how to think about climate change adaptation and resilience, see the resources at the [Climate Change Response Framework](#) and the interactive maps showing [climate change pressures in the 21st century](#).





## Everyone can help

LEAP members are committed to advancing the priorities listed above. As conservation organizations, they can do a lot with their own land protection programs. And they also can work hard to spread the word and build public awareness about the importance of biodiversity.

However, LEAP members can't preserve the region's biodiversity on their own. The vast majority of land in the region is privately owned, so long-term success require everyone's support.





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# Here are the top 5 ways to help:

## 1. Support the expansion of protected natural areas and corridors

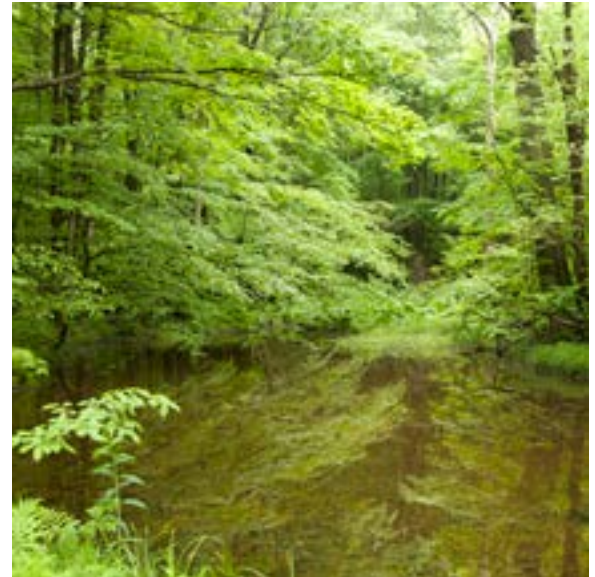
The region's conservation organizations are working collaboratively on strategies to protect natural areas, with an emphasis on assembling large blocks of high quality habitat and connecting those blocks with continuous corridors. But future progress depends on funding. So it's vital to support park levies, bond issues, and other funding sources for openspace acquisition, such as the [Clean Ohio Fund](#) and the federal [Land and Water Conservation Fund](#). Parks and greenspace are [great investments](#) — for nature, for public health, and for the prosperity of local communities.

## 2. Support the redevelopment of existing cities and towns

One of the best ways to conserve nature is to support redevelopment of existing communities. By avoiding the development of ecologically significant areas and promoting growth in areas that already have infrastructure, the region can reduce habitat fragmentation and the costs of haphazard growth. And by supporting policies and incentives — local, state, and federal — that help redevelop vibrant neighborhoods, more people will be able to choose walkable lifestyles that are easier on the planet.

## 3. Connect your land to the larger landscape

Most the region's land is privately owned, and everyone's backyard can be a valuable patch of habitat. So think of your land as part of a larger mosaic of nature. Can your yard be part of a green corridor that connects a natural area and a river? Can your urban yard be a resting point for birds and pollinators? Can the woodlots and hedgerows on your farm contribute to biodiversity across the countryside? The answers can be yes, if more private land is maintained in a natural state or restored with an abundance of native plants.





### Here are tips for turning your yard into a sustainable landscape:

- [Bringing Nature Home](#)
- [Garden for Wildlife](#)
- [Landscaping with native plants](#)
- [Native plant species guide](#)
- [Ohio Pollinator Habitat Initiative](#)
- [Pollinator planting guide](#)
- [Sustainable landscaping tips](#)
- [YardMap](#)

## 4. Protect water quality

Life depends on pure water, and water quality depends a lot on the quality of land. If the region protects more natural areas, it will protect forests, floodplains, wetlands, and other places that act like a sponge to retain and filter water. And if the region does a better job redeveloping existing cities and towns, it will reduce the spread of roads, rooftops, and other impervious surfaces that exacerbate damaging stormwater pollution. In addition, it's vital to support local stormwater management programs and sensible regulation at the state and federal levels to protect clean water.

LEAP members and many other organizations are working on these issues. Here are guides for how to help:

- [Guide to water issues and groups in Northeast Ohio](#)
- [Local government regulations for clean water](#)
- [Ohio Balanced Growth Program](#)
- [Natural stormwater solutions](#)
- [Rain garden manual](#)
- [Stormwater management benefits](#)
- [Stormwater management guide](#)
- [Stream and wetland protection guide](#)
- [Tips for clean streams](#)
- [Watershed Stewardship Center](#)
- [Western Pennsylvania Conservancy water program](#)



## 5. Reduce carbon emissions

Climate change is already stressing nature in our region and around the world, and the disruptive effects will grow much worse if carbon dioxide emissions from burning fossil fuels are not sharply reduced in the next decade. Everyone can help by reducing personal energy use, planting trees to sequester carbon, and supporting the climate action plans of local governments and organizations. Most importantly, everyone can support state and federal policies to accelerate the transition to clean energy sources — solar and wind — that generate power without pollution while creating good jobs for a healthy, sustainable economy. Visit the [U.S. Global Change Research Program](#) website for the most recent climate assessment.





# A bigger vision for nature

Many stresses — from habitat destruction to invasive species to climate change — are threatening the native diversity of plants and wildlife in the region. To give nature the best possible chance to adapt and thrive, it will be necessary to expand and connect natural areas across the landscape. LEAP member organizations are committed to working collaboratively to make this happen. And they invite everyone in the region to help in the coming years.

Making room for nature is the right thing to do. It's about:

- Clean air and water
- Abundant wildlife
- Vital ecological services such as pollination
- Support for our health and our way of life
- Awesome natural beauty

**It can be a legacy for everyone.**

*For more information about LEAP's biodiversity vision, [go here](#).*







[www.leapbio.org](http://www.leapbio.org)