

## Chapter 10: Nature-based Solutions

**GOAL: Erie County will promote equitable nature-based solutions to protect intact landscapes, restore degraded ecosystems, and improve equitable access to green infrastructure, tree canopy, and open space for all residents. These efforts promote healthy natural resources, biodiversity, and resiliency by increasing the quality of life for humans and creating or protecting habitats for wildlife.**

Nature-based solutions to climate change are often cost effective and provide opportunities for communities and landowners to benefit from climate investments. Erie County is a region with diverse ecosystems and habitats that have been degraded due to loss of land from overdevelopment, climate change, and extreme weather events. This threat is borne disproportionately by low-income communities and communities of color. Loss of biodiversity impacts our health, food, air quality, water quality, soil, and culture. To overcome these impacts, Erie County must prioritize protecting habitats, upgrading infrastructure, and creating green space. This includes preserving tree canopies, protecting water quality, and combating invasive species. Careful planning is needed to ensure a balance between species diversity, climate resiliency, and native species.

There is tremendous opportunity within Erie County to use nature-based solutions to improve the County's natural environment. Erie County lies on the shores of Lake Erie, which provides drinking water for 12 million people and is one of the Great Lakes through which over 20% of the world's available freshwater flows. The Niagara River, which forms part of Erie County's western border, was officially designated as a Wetland of International Importance in 2019 under the Ramsar Convention, an international treaty that promotes the sustainable use of the world's wetlands. The Niagara River corridor has also been named a "globally significant" Important Bird Area. Erie County manages nearly 10,000 acres of traditional parks, natural habitat parks, and forestry lots. In addition, the County is responsible for over 1,000 miles of roadway and the adjacent rights-of-way.

In addition to providing habitats for flora and fauna, the diverse landscapes throughout Erie County offer residents and communities green spaces to be active and enjoy nature, which greatly improves health and emotional well-being. However, as a result of environmental racism, discriminatory land use practices, and unequal public investment, low-income communities and communities of color commonly reside in areas of Erie County that have fewer trees, as well as less access to parks and recreation. Erie County will work to ensure all residents have equitable access to green spaces and that new projects take into account and seek to remedy historic injustices.

### **Infographics/Call-Outs Boxes to Be Added Later:**

- What are Nature-Based Solutions?

- Why Nature-Based Solutions?

DEFINITIONS FOR ACTIONS SPECIFICATIONS
<b>Short-term:</b> By or before 2030
<b>Medium-term:</b> By 2040
<b>Long-term:</b> By 2050
<b>Direct:</b> County government can directly control the action - relating to County government operations and infrastructure
<b>Indirect:</b> Regional agencies and municipalities have control and/or County government can support/influence
<b>Support:</b> State or Federal policies and programs

### STRATEGY 1: Skilled Labor Jobs

As extreme weather events occur more often throughout our County due to the changing climate, a mix of labor-based approaches to adaptation will be necessary. Developing dedicated positions that focus on fortifying our landscape and restoring it from the effects of extreme weather events, as well as incorporating mitigation techniques and practices within the existing workforce, is and will be pivotal in Erie County. As described in the Erie County CVA, Erie County’s landscape, infrastructure, and communities, especially those that are disadvantaged, are impacted by increased heat, wind storms, ice storms, rain, and snowfall and greater, more frequent flooding/seiche events.

Professionals require specialized training to accomplish most nature-based solutions. Some training includes landscaping and groundskeeping, forestry, construction, equipment operation, soil and plant science, green infrastructure installation and maintenance, ecological monitoring, field testing, tree removal, trimming, and pruning, and invasive species control and management.

Erie County will prioritize working with partners to provide interested residents access to the essential training and skills required to work on nature-based projects. The County will work to ensure that these jobs have family-sustaining wages and are available to all residents that are interested, especially individuals living in communities that are disproportionately affected by the environmental degradation. Creating economic opportunities that benefit workers in Erie County and prioritizing communities that are more vulnerable to the harmful impacts of climate change is a primary goal.

To achieve this workforce-focused goal, working with interested parties like New York State, Climate Corps, and AmeriCorps will be a high priority. Investing in education and exposure to nature-based, skilled labor jobs at the high school and college levels is of utmost importance in providing opportunities to all. Erie County will work with training facilities to ensure adequate availability at affordable prices. This may include providing resources like grants and other funding opportunities to supplement training costs. Providing childcare, transportation, and a geographic spread of training sites in communities throughout Erie County will also help achieve this.

ACTION ITEM	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
1.1: Partner with interested parties to collaborate on training needs and opportunities.	Short-term	Indirect	DEP	High Schools and Colleges, Corps Groups, State and Federal Agencies, Non-profits, BOCES programs, Workforce Investment Board, Job training facilities, Municipalities, Businesses, Unions, Community-based organizations and block clubs, Live Well Erie
1.2: Provide training on skilled labor jobs surrounding nature-based projects.	Short-term	Indirect	DEP	High Schools and Colleges, Corps Groups, State and Federal Agencies, Non-profits, BOCES programs, Workforce Investment Board, Job training facilities, Municipalities, Businesses, Unions, Community-based organizations and block clubs, Live Well Erie
1.3: Hire workers from trainings.	Medium-term	Direct	Parks, DPW	DEP
1.4: Pursue preventive and maintenance efforts.	Medium-term	Direct	Parks, DPW	DEP

**Infographics/Call-Outs Boxes to Be Added Later:**

- None

**STRATEGY 2: Conserve Resilient Lands, Waterways, & Priority Habitat**

Land conservation protects valuable ecosystem services and is one tool that ensures resilient lands remain intact. Protected lands contribute to improved water and air quality, provide habitat for native plants and wildlife, and provide open space and recreational opportunities for the public.

Resilient lands are a critical focus for land conservation. The Nature Conservancy defines resilient land as “an area of land where high microclimatic diversity and low levels of human modification provide species with connected, diverse climatic conditions they will need to persist and adapt to changing regional climates.” Resilience is influenced by local connectedness, which is the ability for species to move across a landscape without barriers. Resilient lands promote biodiversity through connection and microclimatic diversity. By protecting resilient lands and areas of high biodiversity, and ensuring those lands are connected, species are better able to respond to changes in climatic conditions.<sup>27</sup>

Land conservation provides valuable ecosystem services and avoided costs for Erie County. Ecosystem services are ways that people benefit from their surrounding environment. Common ecosystem services include benefits that support daily life such as air filtration, carbon sequestration, water filtration, flood regulation, soil formation, and pollination. The most well-known example of avoided costs by investing in ecosystem services in the eastern United States is the protection of the Catskill and Delaware Watersheds instead of New York City spending \$8 to 10 billion to build a water filtration plant plus an annual cost of \$100 million to operate.<sup>28</sup> Avoided costs also include the potential future costs if intact natural systems are lost. An EPA paper on protecting healthy watersheds shows a correlation between percentage of forest cover and predicted water treatment costs.<sup>29</sup>

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<sup>27</sup> Terrestrial Resilience Core Concepts, <http://maps.tnc.org/resilientland/coreConcepts.html>

<sup>28</sup> How and why Farmers in the Catskills protect New York City’s Drinking Water, <http://blogs.edf.org/markets/2017/11/07/how-and-why-farmers-in-the-catskills-protect-new-york-citys-drinking-water/>

<sup>29</sup> The Economic Benefits of Protecting Healthy Watersheds, [https://www.epa.gov/sites/production/files/2015-10/documents/economic\\_benefits\\_factsheet3.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/economic_benefits_factsheet3.pdf)

Land conservation also provides the opportunity for outdoor recreation resulting in overall health benefits, a stronger relationship to nature, and better stewardship of natural spaces. Exposure to nature has many physiologic benefits including lowering cortisol levels and blood pressure, thus lowering stress and anxiety.<sup>30</sup> Living near green space reduces mortality even when adjusted for additional socio-demographic factors.<sup>31</sup> People having access to local green space can foster a sense of community, ownership, and thus stewardship, in addition to health benefits.

ACTION ITEM	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
2.1: Map the most climate resilient lands in Erie County and prioritize them for protection.	Short-term	Direct	DEP	NYS DEC, WNY Land Conservancy, Buffalo Niagara Waterkeeper
2.2: Create a Conservation Plan for Erie County that prioritizes areas for protection and ensures equitable access to open space and connectivity.	Short-term	Indirect	DEP	Local municipalities, NYSDEC, WNY Land Conservancy, Buffalo Niagara Waterkeeper
2.3: Work with partners and residents to protect priority lands through outreach and education.	Medium-term	Indirect	DEP	Local municipalities, NYSDEC, WNY Land Conservancy, Buffalo Niagara Waterkeeper

**Infographics/Call-Outs Boxes to Be Added Later:**

- Land Protection & Land Use Planning
- Headwaters

**STRATEGY 3: Restoration Strategies**

For portions of the County where lands have been degraded or contaminated, restoration techniques can be applied to re-establish ecosystem services associated with intact natural landscapes. Restoration techniques can improve carbon storage, increase biodiversity, add flood retention, and provide many other benefits that both mitigate and improve resilience to climate vulnerabilities identified within Erie County.

<sup>30</sup> <https://www.pnas.org/doi/10.1073/pnas.1510459112>

<sup>31</sup> <https://pubmed.ncbi.nlm.nih.gov/28863390/>

In addition to the ecosystem services described above, living shoreline restoration has proven to be successful in acting as the first line of defense in protecting communities from coastal erosion and extreme flooding. Living shorelines include native plant species that grow deep and complex root systems, which improve resilience to forces acting along shorelines, which is increasingly important as precipitation and wind patterns change and intensify. Natural materials like recycled logs and stone can also be incorporated to protect the shoreline while creating important habitats. Living shorelines also improve water quality by filtering out runoff and pollutants before they flow into local waterways while overhanging cover cools water temperatures, which improves water quality and reduces the occurrence of Harmful Algal Blooms. The dense native plant communities also prevent the occurrence of invasive species.

Beyond restoration of shoreline areas, restoring inland wetlands, natural corridors, open green spaces, urban forests, and grassland habitats are all nature-based solutions that contribute towards climate resilience. Additionally, focusing on transforming brownfields or contaminated properties into natural habitat is another effective nature-based solution that is of particular importance in addressing inequities in low-income communities and communities of color that have been historically dominated by industry with minimal green space.

An important component of all restoration efforts is the removal of invasive and non-native species while establishing beneficial native plants. This requires ongoing, long-term monitoring and adaptive management to ensure any recurrence of invasive species is controlled so that native species can thrive. Coordination with partners such as the Partnership for Regional Invasive Species Management (PRISM) and others doing this work locally to share best practices and knowledge will benefit these efforts in Erie County.

ACTION ITEM	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
3.1: With community and stakeholder input, identify and prioritize degraded lands, including shorelines, for implementation projects. The Erie County CVA and the NYS Disadvantaged Communities map should inform this prioritization.	Short-term	Direct	DEP	Lake Erie Watershed Protection Alliance, Erie County Soil and Water Conservation District, NYSDEC, PRISM WNY Land Conservancy, Buffalo Niagara Waterkeeper, Environmental Management Council, Local Municipalities, and Erie County Parks

<p>3.2: Identify lead organizations for implementation projects and funding sources.</p>	<p>Short-term</p>	<p>Direct</p>	<p>DEP</p>	<p>Lake Erie Watershed Protection Alliance, Erie County Soil and Water Conservation District, NYSDEC, PRISM WNY Land Conservancy, Buffalo Niagara Waterkeeper, Environmental Management Council, Municipalities, and Erie County Parks</p>
<p>3.3: Complete habitat and living shoreline restoration, including signage to educate the community, in priority areas that address climate vulnerabilities identified for Erie County.</p>	<p>Medium-term</p>	<p>Indirect</p>	<p>DEP</p>	<p>Lake Erie Watershed Protection Alliance, Erie County Soil and Water Conservation District, NYSDEC, PRISM WNY Land Conservancy, Buffalo Niagara Waterkeeper, Environmental Management Council, Local Municipalities, and Erie County Parks</p>
<p>3.4: Develop protocols and mechanisms for continued monitoring and adaptive management of work completed as part of this goal to ensure long-term success and successful establishment of restored habitats.</p>	<p>Medium-term</p>	<p>Indirect</p>	<p>DEP</p>	<p>Lake Erie Watershed Protection Alliance, Erie County Soil and Water Conservation District, NYSDEC, PRISM WNY Land Conservancy, Buffalo Niagara Waterkeeper, Environmental Management Council, Local Municipalities, and Erie County Parks</p>

**Infographics/Call-Outs Boxes to Be Added Later:**

- Ecosystem Services

**STRATEGY 4: Improve Connectivity for Pollinators & Wildlife**

Pollinators are integral to ensuring the longevity of the base of the natural food web, without which all other species, including humans, would struggle to survive. Bees are most commonly thought of when pollinators are discussed, however, over 100,000 invertebrates (including bees,

butterflies, beetles, moths, wasps, and flies) and more than a thousand mammals, birds, reptiles, and amphibians take on the job of pollinating plants as well.<sup>32</sup> Much of Erie County is located within the Eastern Wildway and the Western New York Wildway, making it all the more valuable to protect the pollinators within it. Pollination is a mutualistic relationship for the plant and animal, meaning both parties benefit. The pollinator consumes protein rich pollen and high energy nectar from the plant, while the plant's pollen is transported to other neighboring plants of the same species, allowing fertilization to occur. Pollinators are valuable in supplementing the fertilization of both wild plants and the agricultural crops we use for food.

Without pollinators, some plant species can resort to other modes of fertilization, such as pollen carried by the wind. Despite this, for some plants, wind pollination is inefficient and unsuccessful, making pollinators the ideal method of fertilization. We can attribute one-third of the food we eat to the successful fertilization that occurs through pollinators. As a result, their importance to both a balanced ecosystem and our own food production cannot be understated.

Yet, pollinator numbers are on the decline as they face serious threats. Habitat loss due to changing weather patterns and temperatures, and development practices are a huge threat to pollinators. Pesticide poisoning and diseases, typically of a non-native origin, are some of the other main causes of decline. The accumulation of all of these threats has resulted in reductions of insect populations across the board and has endangered wild bee species and monarch butterfly populations declining by 90% over the past 20 years.<sup>33</sup> Despite the trending decline, 2022 showed an increase in monarch butterfly populations over-wintering in Mexico, which may signify that conservation and protection actions do work.<sup>34</sup> In the midst of climate change, native perennial plants that provide shelter or food for wildlife are integral for promoting a healthy ecosystem and biodiversity.

Improving the connectivity for pollinators and wildlife can be done easily, inexpensively, and scaled from the park-sized level to the individual County resident's backyard. In fact, Black Rock Riverside Alliance has been working with residents to certify Erie County as a National Wildlife Federation Wildlife Habitat Community. This certification requires a certain amount of green spaces to be converted into pollinator and wildlife friendly habitats that encourage a symbiotic existence between humans and nature. It also requires education and outreach efforts that spread the understanding and knowledge of how to plant with nature in mind. The City of Buffalo became the 17th largest city in the country when it was certified as a Wildlife Habitat Community and Erie County is the 5th largest, proving that the work being conducted in Erie County has nationwide importance. Despite the great accomplishments that Erie County has achieved to receive the certification, there is still a lot of work to be done in the realm of improving habitat

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<sup>32</sup> <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Pollinators>

<sup>33</sup> <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Pollinators>

<sup>34</sup> <https://www.theyucatantimes.com/2022/06/data-on-monarch-butterflies-in-2022-show-a-sharp-increase-in-their-numbers>

and connectivity. We should not look at the certification as an excuse to not prioritize these efforts.

ACTION ITEM	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
4.1: Encourage pollinator-friendly habitat.	Short-term	Direct	DEP	Erie County Environmental Management Council Home for a Gnome, Citizen Coalition for Wildlife and Environment, Pollinator Conservation Association, Save the Bees WNY, Cornell Cooperative Extension Master Gardeners, Buffalo Niagara Waterkeeper, NYSDEC
4.2: Continue habitat certification efforts through outreach and education.	Short-term	Indirect	DEP	Black Rock Riverside Alliance, The Nature Conservancy
4.3: Support the planting of pollinator gardens in both urban and rural environments.	Short-term	Indirect	DEP	Community gardens, Master Gardeners, Grassroots Gardens WNY, Nurseries
4.4: Support the planting of native plants in both urban and rural environments.	Short-term	Indirect	DEP	Nurseries, Garden Stores, Grassroots Gardens, Massachusetts Avenue Project, other urban farms with Ag & Markets Greenhouse licenses, NYSDEC
4.5: Combat invasive species to promote biodiversity.	Short-term	Indirect	DEP	PRISM, Erie County Soil & Water Conservation District, Lake Erie Watershed Protection Alliance, WNY Land Conservancy, Lets Goat Buffalo
4.6: Educate on nature-based residential lawn care.	Short-term	Direct	DEP	Cornell Cooperative Extension Master Gardeners, Erie County Environmental Management Council Home for a Gnome

**Infographics/Call-Outs Boxes to Be Added Later:**

- Planting with Nature in Mind

- Eastern Wildway and the Western New York Wildway

### STRATEGY 5: Increase and Preserve Tree Canopy

Strategic tree canopy preservation and expansion are vital approaches for mitigating the harms of human-induced climate change. Trees and forest ecosystems are carbon sinks that can remove emitted carbon from the atmosphere through natural photosynthetic and respiration processes. Tree canopies therefore provide a natural method for removing carbon from the atmosphere without relying on expensive and technologically complex solutions such as carbon capture, carbon storage, and geoengineering.<sup>35</sup>

The presence of tree canopy provides weatherization benefits such as cooling and stormwater protection for nearby communities, thus reducing the reliance on energy intensive technologies such as air conditioning and stormwater pumps. Strategic tree planting could reduce building energy demand by up to 30%. Tree canopy can mitigate the effects of stormwater, flooding, and erosion from runoff by absorbing excess water and providing ground covering.<sup>36</sup> The polluting effects of high energy demand and extreme storms are also reduced by the presence of strategically situated tree canopies. Tree canopies also provide co-benefits related to local social and economic infrastructure by expanding outdoor recreation and environmental workforce development opportunities. Tree canopy also provides a myriad of physical and mental health benefits, especially with the climate crisis being the gravest global health threat of this century.<sup>37</sup> Importantly, tree canopy preservation and expansion can be highly cost effective as a climate strategy, with agencies such as NYSERDA investing in tree planting programs because of their relatively low costs and high job creating potential.<sup>38</sup>

ACTION ITEM	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
5.1: Establish a living list of native and climate resilient tree and shrub species of all sizes that can thrive in current and future climate	Short-term	Indirect	DEP	Cornell Cooperative Extension, Erie County Soil & Water

<sup>35</sup> <https://www.sipa.columbia.edu/academics/capstone-projects/energy-crisis-reducing-rising-energy-demands-through-tree-based>

<sup>36</sup> <https://www.epa.gov/soakuptherain/soak-rain-trees-help-reduce-runoff>

<sup>37</sup> <https://www.thelancet.com/countdown-health-climate>

<sup>38</sup> <https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00Pt0000005vuDZEAY>

conditions projected for the region, paired with a list of complementary best practices for planting and maintenance.				Conservation District, NYSDEC, Municipalities
5.2: Map and assess the demographic and geographic disparities in tree canopy, including a timeline with 2030 and 2050 goals, thereby establishing priority communities for tree canopy preservation and expansion.	Short-term	Indirect	DEP	Cornell Cooperative Extension, Erie County Soil & Water Conservation District, NYSDEC, Municipalities, University at Buffalo colleges and universities
5.3: Establish mechanisms for ongoing care and maintenance of canopy trees.	Short-term	Indirect	DEP	Cornell Cooperative Extension, Erie County Soil & Water Conservation District, NYSDEC, Municipalities, Block Clubs
5.4: Encourage developers, builders, and homeowners to plant and grow shade trees effectively.	Short-term	Indirect	DEP	Cornell Cooperative Extension, Erie County Soil & Water Conservation District, NYSDEC, Municipalities, Block Clubs, WNY Sustainable Business Roundtable

**Infographics/Call-Outs Boxes to Be Added Later:**

- Benefits of Planting Trees
- New Native Species