AUDUBON'S VISION

Restoring the Great Lakes for Birds and People

National Audubon Society

The National Audubon Society is one of the oldest, largest, and most influential conservation organizations in the United States. Since 1905, a passion for birds and nature has been the driving force behind Audubon's legacy. The organization has played a critical role in some of the most significant victories for birds and the environment, including the establishment of the first national wildlife refuges; the banning of pesticide DDT in 1972; landmark legislation like the Clean Water and Clean Air Acts; and the establishment of the U.S. Environmental Protection Agency. Audubon advocates broadly for conservation through science, policy, education, and on-the-ground conservation action.

Audubon is a nonprofit conservation organization. Learn more at audubon.org and follow us on Twitter and Instagram at **@AUDUBONSOCIETY**.

Audubon

AUDUBON.ORG/GREATLAKES

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The Great Lakes for Birds and People

Ecological Significance of the Great Lakes

The Great Lakes are the largest freshwater ecosystem on the planet, providing clean drinking water to 40 million people. They also serve as a global resource to millions of birds, providing critical habitat for breeding, for stopovers during migration across the Americas, and for wintering along the shorelines and on the lakes themselves. Globally significant populations of shorebirds, waterbirds, raptors, and migratory landbirds are all intricately connected to the sustainability of a healthy Great Lakes ecosystem.

GREAT LAKES BY THE NUMBERS

350 SPECIES OF BIRDS	40 MILLION PEOPLE IN WATERSHED	35,000 ISLANDS
10,500 MILES OF COASTLINE	12,000 YEARS OLD	1,333 FEET DEEP IN LAKE SUPERIOR
7% OF U.S. AGRICULTURE	84% OF NORTH AMERICA'S SURFACE FRESH WATER	

Formed 12,000 years ago, during the most recent ice age, the Great Lakes were carved by advancing and retreating glaciers. Native Americans began to settle in the region approximately 10,000 years ago. Much like the European settlers who followed them thousands of years later, they were attracted to the region's abundant fish and game, fertile soils, plentiful clean water, and accessible transportation routes along rivers and the lakes themselves.

Coastal areas where rivers empty into the Great Lakes naturally developed as hubs of human settlement and urban development. These early settlements grew to become today's population centers, located on the coasts near the mouths of both large and small rivers.

Today, more than 40 million people rely on the Great Lakes as a source of fresh water, as a place for recreation, as a hub of commerce and transportation, and as a vital community asset. Visitors from around the world are drawn to the region's majestic landscapes, like the Niagara River Gorge; its vibrant waterfronts, like those in Milwaukee, Chicago, and Cleveland; and the idyllic retreats found along miles of lakefront. After many decades of degradation and neglect that damaged coastal natural areas and polluted the lakes, the region's communities are increasingly turning back to their lakefronts, creating habitat, recreational space, and a more climate-resilient future. Federal funding through programs like the Great Lakes Restoration Initiative is restoring waterways, creating jobs, and jump-starting community engagement with these precious freshwater gems.

Stretching from western tallgrass prairies to northern hardwood and eastern deciduous forests, the Great Lakes region is home to approximately 350 species of birds. Nearly half of those species migrate across the lakes themselves—relying heavily on nearshore habitat to provide refuge along the way. The sheer size of the Great Lakes presents an initial hurdle in the fall and a final hurdle in the spring for many of these long-distance migrants. Many species utilize more stable air conditions to migrate directly over the lakes at night, funneling and concentrating large migratory populations along the lakeshore.

From the diminutive Piping Plover to the magnificent Bald Eagle, the lakes play a crucial role in birds' life cycles. Millions of raptors, waterfowl, and wetland birds rely on the Great Lakes for productive breeding grounds. The Great Lakes' coastal wetlands, which filter and store our water, also provide core nesting habitat for marsh birds such as the Common Gallinule, Least Bittern, and Pied-billed Grebe. However, the region also faces real challenges.

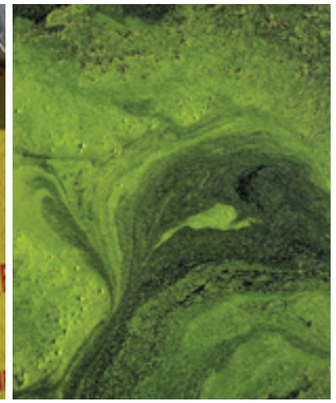
Active stewardship of these areas and advocacy for the policies and laws that protect them and the wildlife they support are core components of our strategy. A vibrant Audubon network of national and state offices, nature centers, chapters, and more than 350,000 members plays a key role in sustaining the health of this area. Our strategy empowers individuals and communities of the Great Lakes to help us reach our ambitious conservation goals.

THREATS TO GREAT LAKES BIRDS, WATER, AND WAY OF LIFE

At Audubon, we use birds as indicators of healthy, resilient environments. When ecosystems are dysfunctional and water and air quality worsen, birds disappear, resulting in fewer individuals and fewer species of birds.

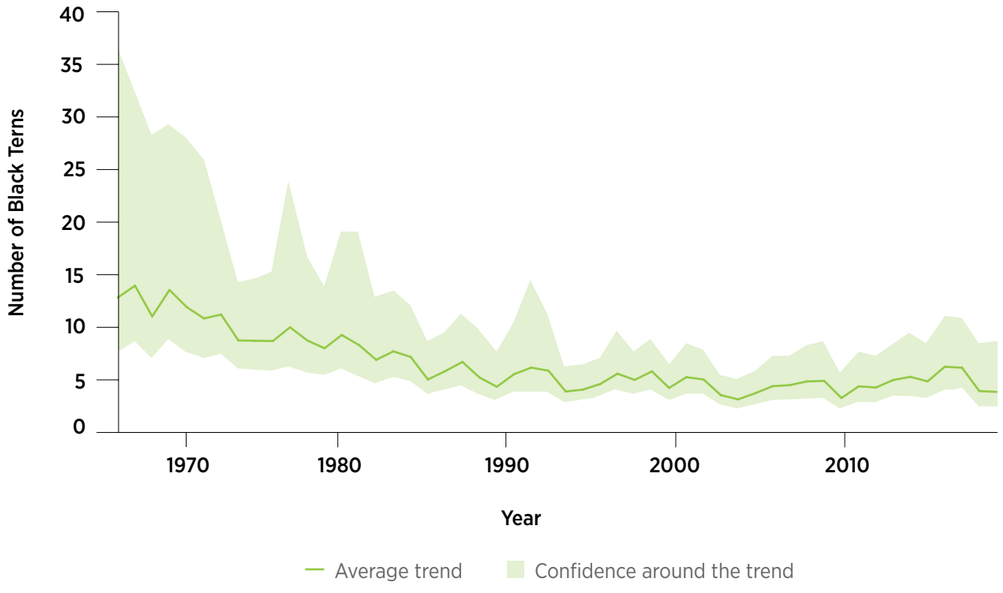
URBAN THREATS TO BIRDS

People and birds share their preference for Great Lakes coastal areas. By minimizing the potential for bird collisions with buildings, and by planting native vegetation in backyards and city parks, we can help make sure our urban areas provide refuge for birds and people.



Intensive agriculture, sewage overflows, and urban runoff all contribute to poor water quality in the lakes and their tributaries. Nutrient runoff has caused pervasive toxic algal blooms in the lakes, particularly in agriculturally dense regions like those around Saginaw Bay and western Lake Erie. In 2014, toxins created by an algal bloom forced the shutdown of the drinking water supply for a half-million people in the Toledo area for three days. Residents had to rely on bottled water, and the outbreak cost the area about $65 million, mostly in lost tax revenue and tourism.

DECLINE IN BLACK TERN POPULATION



Number of Black Terns is based on annual indices of Black Terns as estimated from the North American Breeding Bird Survey from 1966-2017. Trend line and 95 percent confidence interval around the trend shown.

Sewage and stormwater infrastructure built decades ago is now outdated and lacks adequate capacity to store water. During periods of heavy rain and rapid snowmelt, these underground channels overflow, diverting excess stormwater and raw sewage directly into coastal waterways and the lakes. More than 24 billion gallons of untreated sewage and stormwater are released into the Great Lakes each year during these combined sewer overflows (CSOs). Not only are these CSOs generally unpleasant, they frequently contain high levels of bacteria, parasites, viruses, and toxic metals, which pose a significant health risk to people and wildlife. They are also a major cause of beach closings and swimming advisories across the Great Lakes region.

As climate change continues, the region faces more frequent and more intense storms, longer periods of summer drought, and episodes of extreme spring heat. **The impacts of climate change are already compounding and worsening existing threats, further disrupting our cities, rural areas, and natural communities.** Great Lakes water levels have fluctuated dramatically in recent years, accelerating the spread of invasive species, flooding coastal communities, and disturbing the natural ebb and flow of wetland water levels. The changing climate is also causing North American birds to shift the timing of their migrations, and has altered their summer and winter geographic ranges. These shifts could be especially harmful to bird species that have evolved to depend on seasonal resources or that have narrowly defined habitat niches. What's more, climate change is also occurring too rapidly for many species to adapt.

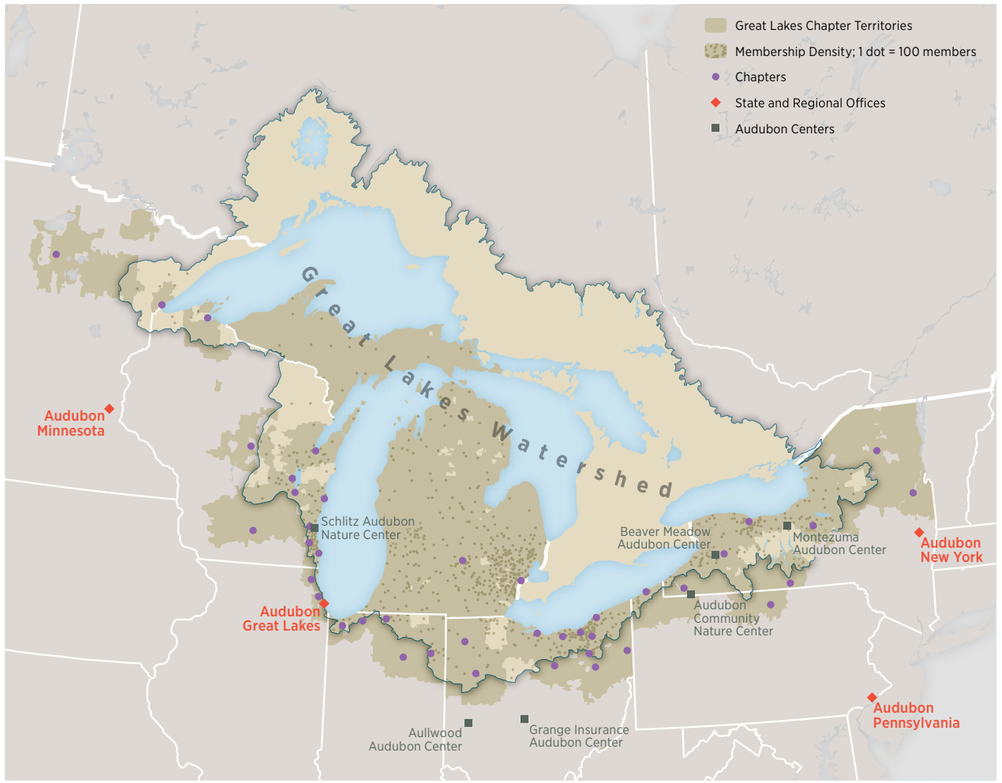
The loss and degradation of our region's coastal habitats from urban and agricultural development, invasive species, and a changing climate pose the greatest threats to Great Lakes birds. Investing in coastal watersheds now, especially wetlands, will create strongholds for bird populations in the future, mitigate water-quality impacts in both urban and rural areas, and make the region more resilient to climate change.

PROBLEM

Coastal development, climate change, and destructive invasive species threaten the watershed systems that support this great range of bird species.

SOLUTION

Audubon has created a cohesive strategy to engage communities across the region to address the threats to Great Lakes birds. With more than 10,000 miles of shoreline, we have focused our attention on the nearshore watersheds of the Great Lakes. These forested and wetland areas provide significant benefits to birds and people. By modeling and analyzing bird populations, water quality, and climate resiliency factors, we have a blueprint for how to best conserve indispensable coastal areas. Focused restoration and management of habitats are essential to revive and protect ecological systems that support bird species.



AUDUBON'S OFFICES, CENTERS, CHAPTERS, AND MEMBERS IN THE GREAT LAKES REGION

Audubon's Wingspan in the Great Lakes

The National Audubon Society has had a strong presence in the region for nearly a century. It currently has four state offices, 121 chapters, and extensive membership across the Great Lakes region.

Between 2014 and 2019, Audubon has built a Great Lakes strategy with strong ties to members and the culture of the Great Lakes region. Audubon Great Lakes, with headquarters in Chicago, serves as a state office for Illinois, Indiana, Michigan, Ohio, and Wisconsin. Audubon Minnesota, in the Twin Cities, Audubon Pennsylvania, outside of Philadelphia, and Audubon New York, in Ithaca, New York City, and Troy, round out Audubon's state offices in the region. National Audubon has employees in Cleveland, Detroit, Milwaukee, and Grand Rapids, Michigan. Three Audubon centers in the watershed provide educational and conservation programming in the region: the Montezuma Audubon Center and the Beaver Meadow Audubon Center, both in New York, and the Schlitz Audubon Nature Center in Wisconsin.

Osprey

Sandhill Crane

AUDUBON'S VISION FOR THE GREAT LAKES REGION

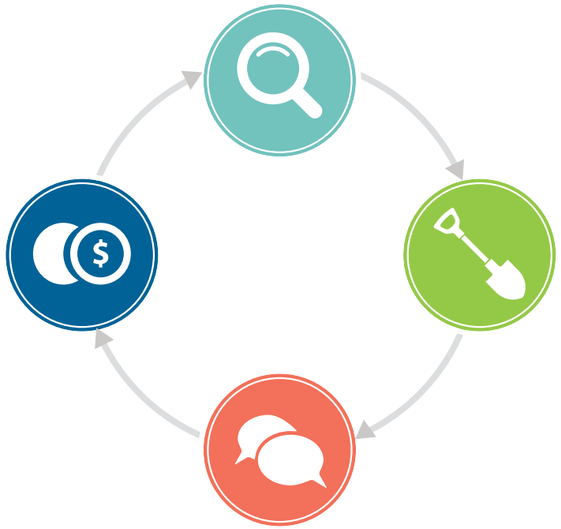
Audubon's Vision for the Great Lakes Region

Audubon's vision for the Great Lakes includes ensuring that the waters and lands of this iconic ecosystem remain healthy for the communities of birds and people that rely on them for survival. We are implementing a cohesive strategy to achieve this vision.

Our work to protect Great Lakes coastal ecosystems will help recover populations of threatened marsh birds, which have plummeted over the past four decades. Audubon's actions also mitigate threats faced by people throughout the Great Lakes Basin, including poor water quality, flooding, and disruption of local economies.

Our Cyclical Approach to Conservation

A complete approach to science and conservation is at the heart of our work:



TARGET SCIENCE-DRIVEN GOALS

Audubon guides conservation priorities with innovative science.

IMPLEMENT ON-THE-GROUND RESTORATION

Audubon delivers results for birds through projects that advance science.

SHARE RESULTS AND ENGAGE

Audubon engages our network to monitor, communicate, and influence policy and political will.

SECURE GOOD POLICIES AND FUNDING

Audubon secures favorable policies and conservation funding to scale up impact in line with Audubon science.

Strategies and Objectives

Our overall conservation goal is to improve Great Lakes water quality and stabilize declining bird populations. We use four strategies to do this: 1. Lead critical science; 2. Restore and manage habitat; 3. Engage local communities across the region; and 4. Drive public policy.

CONSERVATION GOAL
Improve Great Lakes water quality and stabilize declining bird populations by protecting and restoring the watershed's coastal wetlands and their associated riparian systems.

STRATEGY 1
Lead critical science: Audubon leads the applied science that engages communities, fills critical information gaps, and informs sustainable natural resource management.

Objective 1.1	Objective 1.2	Objective 1.3
Migratory and overwintering threats (environmental and/or anthropogenic) to Black Terns as well as optimal breeding habitat conditions in the Great Lakes region are identified by 2025.	Baseline marsh bird occupancy status and baseline habitat-quality metrics are determined within at least 8 of 12 priority regions by 2025.	Climate adaptation tools for Great Lakes coastal wetlands are identified and utilized by public natural area landowners across the basin by 2025. Tools are shared with at least 30 percent of lands managed by or in municipalities that are majority communities of color.

STRATEGY 2
Restore and manage: Audubon restores habitat and influences the restoration and management of priority regions to stabilize populations of focal species.

Objective 2.1	Objective 2.2	Objective 2.3
Ten focal marsh bird species have stable or positive 10-year population trends across the basin by 2025.	Audubon restores 37,400 acres of high-priority coastal wetlands and associated riparian watershed by 2030. At least 40 percent of restored acres impact or engage municipalities that are majority communities of color.	Habitat-quality metrics demonstrate improving trends at 8 or more of 12 priority regions by 2030.

STRATEGY 3

Engage communities: Audubon's network across the region is deeply engaged in science, policy, and conservation action.

Objective 3.1 Community scientists actively participate in bird and/or water monitoring within all 12 priority regions by 2025. Thirty-five percent of those engaged in community science efforts come from communities of color.	**Objective 3.2** Wild Indigo programming actively connects communities of color to important natural areas in 8 of 12 priority regions by 2025.	**Objective 3.3** At least 50 Audubon chapters and 100,000 members participate in targeted advocacy, monitoring, or stewardship by 2025. About 35,000 of those taking action are people of color.

STRATEGY 4

Drive public policy: Public policy supports adequate funding for Great Lakes conservation and robust water-quality standards.

Objective 4.1 Great Lakes Restoration Initiative funding increases to $475 million per year by 2025.	**Objective 4.2** Robust water-quality standards and wetland protections are maintained throughout the Great Lakes region.	**Objective 4.3** H2Ohio grants $900 million of funding to address water-quality issues and establish coastal habitat in Lake Erie by 2030.
Objective 4.4 The Knowles-Nelson Fund in Wisconsin—which preserves natural areas and wildlife habitat, protects water quality and fisheries, and expands opportunities for outdoor recreation—is reauthorized for 10 years at $32 million per year by 2022.	**Objective 4.5** Wetlands and natural infrastructure is incentivized in federal and state policies such as H2Ohio, the Farm Bill, and the Water Resources Development Act.	

Black-crowned Night-Heron

Juvenile Common Gallinule

GREAT LAKES PRIORITY SPECIES

Great Lakes Priority Species

Audubon's Great Lakes strategy prioritizes coastal wetland restoration and conservation actions that benefit marsh bird species. Regional populations of these species have been declining, and many are listed as endangered, threatened, or species of concern in at least one of the eight Great Lakes states. They serve as a barometer for coastal wetland health across the Great Lakes.

These species represent a variety of bird families and require different marsh habitat and conditions. Many of these species prefer to breed and forage in what is called hemi-marsh—a habitat type characterized by an even mix of vegetation and open water—while others prefer denser vegetation or more open marsh. Because marsh birds are sensitive to pollution, invasive species, and other water-related issues, Audubon and its partners can use them as a barometer for coastal wetland health across the Great Lakes.

Hemi-marsh creates ideal nesting cover for breeding marsh birds while also providing access to water for foraging. This habitat results from dynamic water levels that allow seeds to germinate during low water and fish, amphibians, and mammals to flourish during higher water. Beavers and muskrats, which also thrive in this system, help maintain it by building dams and chewing through vegetation.

Signs of Success: How to Bring Marsh Birds Back

Thanks to intensive restoration, marsh bird populations have rebounded at Calumet's Big Marsh Park. In 2015, Audubon documented only two focal species. Following invasive species control and water management, those numbers increased to 11 species in 2018. State endangered and threatened species, such as the Least Bittern and the Common Gallinule, which had not been active at the site in over a decade, now regularly breed at Big Marsh Park.

	 American Bittern	 American Coot	 Black-crowned Night-Heron	 Blue-winged Teal	 Common Gallinule	 Least Bittern	 Marsh Wren	 Pied-billed Grebe	 Sora	 Swamp Sparrow	 Virginia Rail	Total Marsh Bird Species
PRE-RESTORATION												
2015			●				●					2
2016							●					1
POST-RESTORATION												
2017		●		●	●	●	●		●	●	●	8
2018	●	●	●	●	●	●	●	●	●	●	●	11
2019	●		●	●	●	●	●		●	●	●	9

Hemi-marsh Diversity Depends on Water

Marshes in the Great Lakes region provide critical habitat for diverse wildlife that thrives in wet areas dominated by grasses, rushes, and sedges. The dynamic nature of water within marshes is an important driver of the whole system. As the water level changes over time and area, it affects the amount of vegetation that can grow, the type and pattern of growth, and how birds and other wildlife use the area.

SHALLOW, EMERGENT VEGETATION MARSH

Shallow areas of the marsh, which typically are found around the marsh's edge, often become densely vegetated. More sunlight can reach the soil, allowing for a broader range of plants to germinate. Sedges and grasses tend to dominate, acting as a transition zone between upland and wetland areas. King Rails, Sedge Wrens, and Swamp Sparrows all breed and nest in denser emergent marsh vegetation.

MIXED VEGETATION AND OPEN WATER

Hemi (or "half") marsh is an even mix of vegetation patches and open water. Taller plants that can withstand long periods of deep water, such as cattails and bulrushes, dominate the vegetation in hemi-marsh. American and Least Bitterns, Marsh Wrens, Soras, Blue-winged Teals, Virginia Rails, and Yellow-headed Blackbirds especially depend on this mix of open water and vegetation for both foraging and nesting.

DEEPER, MORE OPEN WATER

Deep water makes it virtually impossible for emergent vegetation to grow, while floating and submerged vegetation like pondweed and water lily persist. However, these open areas of the marsh are excellent places for marsh birds and waterfowl to swim, forage, and fish. Black Terns, Common Gallinules, and Pied-billed Grebes all utilize open water areas for foraging, but also depend on emergent or floating vegetation for nesting.

Common Loon

INVESTING IN CUTTING-EDGE SCIENCE

Investing in Cutting-Edge Science

Over the past half-century, human activity in the Great Lakes region has significantly degraded habitats and water quality. As a result, many marsh bird populations are in steep decline, dropping by as much as 60 percent. Given the urgent need to protect and restore remaining coastal wetlands, Audubon is investing in cutting-edge science to prioritize coastal wetlands for conservation action, studying the impact of climate change on birds, and developing a range of conservation management tools.

Black Tern Research

Black Terns are breeding marsh birds that are listed as either endangered, threatened, or a species of concern in all of the Great Lakes states and Ontario.

Since 2015, Audubon Great Lakes has been a leader in Black Tern research and conservation in the region. In 2019, Audubon embarked on a project to understand the fledging success rates of juvenile Black Terns at critical breeding sites in Michigan and Ontario. In partnership with the Audubon National Science team, the Detroit Audubon Society, the Canadian Wildlife Service, Indiana University, and others, our Black Tern research project uses innovative technology to track the movements of Black Terns, telling us if and when they depart the breeding grounds.

This project marks the first time this technology has been used to understand successful reproduction in Black Terns and will provide crucial information on factors affecting survival of the species. In the future, we will replicate this cutting-edge science to track the movements of other species.

Black Tern

BLACK TERNS IN THE SUMMER

St. Clair Flats has the largest concentration of breeding Black Terns in the Great Lakes region, numbering up to 200 pairs. Black Terns build their nests atop floating vegetation and feed their chicks insects and small fish.

BLACK TERNS IN THE SPRING AND FALL

Every spring and fall, Black Terns migrate across the Gulf of Mexico, foraging for small fish and invertebrates at the water's surface.

BLACK TERNS IN THE WINTER

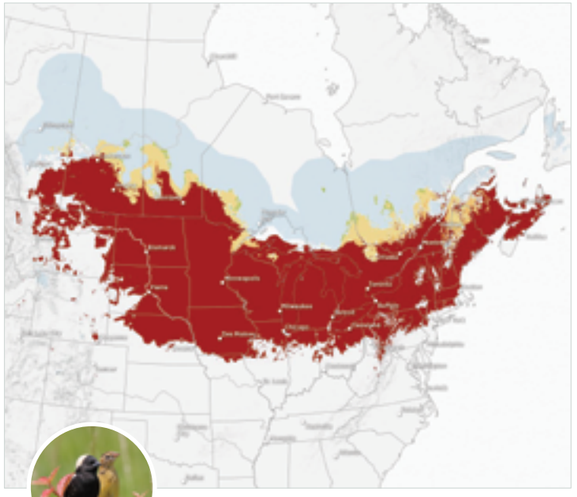
Great Lakes Black Terns overwinter as far south as Panama and Ecuador (including the Galápagos Islands), spending time in offshore and nearshore areas.

Climate Change Impacts on the Great Lakes Region

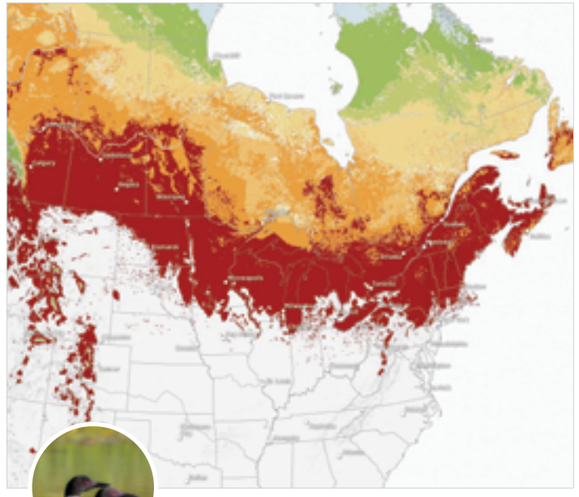
Audubon's 2019 climate report, "Survival," by Degrees: 389 Species on the Brink, reveals how vulnerable birds are to climate change across North America. The report is based on a new, updated scientific analysis that leverages big data and incorporates the unique biology of each bird to determine its vulnerability. In this research, Audubon cross-referenced bird observations for 604 species with climate and habitat conditions at the locations where the observations were made. It then used modeling algorithms to capture the unique composition of each species' suitable territorial range. The research team then mapped and compared the projected current and future ranges to predict range loss and gain under multiple future climate change scenarios. These projections were then used to assess how vulnerable each species is to climate change.

AUDUBON'S CLIMATE MODELING WORK REVEALS DRAMATIC SHIFTS IN BIRDS' RANGES (WITH 3 DEGREES CELSIUS OF WARMING)

Range Gained · Improving · Slightly Improving · Stable · Slightly Worsening · Worsening · Range Lost



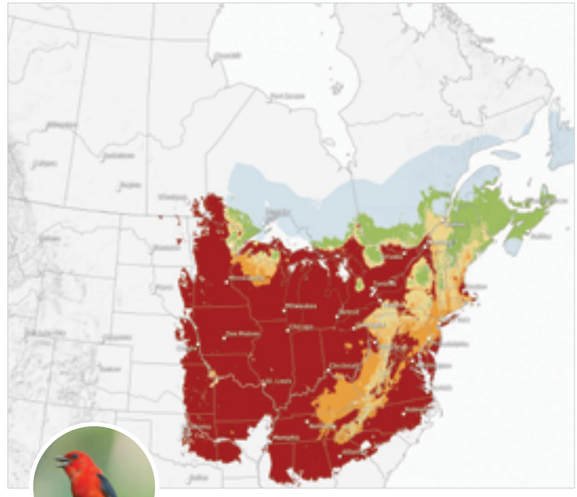
Bobolink

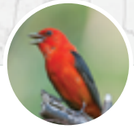


Common Loon

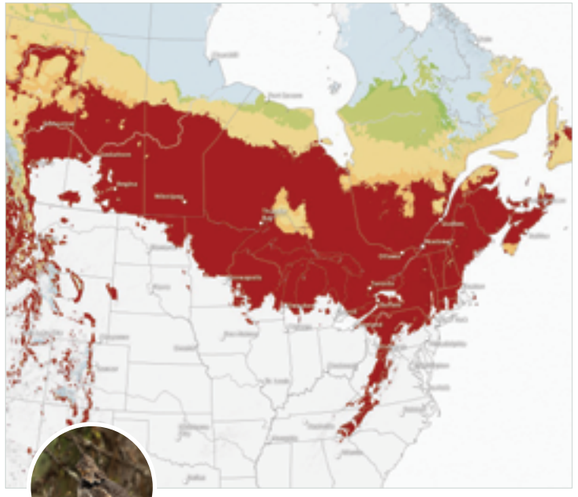
Overall, Audubon's science shows that stabilizing warming at a global average increase of 1.5 degrees Celsius, as recommended by the Intergovernmental Panel on Climate Change, would also reduce vulnerability and threats for many bird species. In the Great Lakes region, many species of interest are considered vulnerable to climate change under a scenario for a 3-degree Celsius average global temperature increase, including the Bobolink, Common Loon, Ruffed Grouse, and Scarlet Tanager. The percentage of vulnerable species per state varies, ranging from 27 percent (56 of 208 species) in Indiana to 55 percent (129 of 236) in Minnesota. **A rapidly changing climate could lead to population declines and local extinctions if species are not able to adapt.**

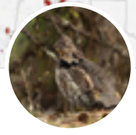
There will be substantial changes to the climate and habitat of the Great Lakes states if climate change mitigation does not occur. Between 2010 and the end of the century, across all eight states, average temperatures are expected to increase.





Scarlet Tanager





Ruffed Grouse

These increases range from 6 degrees Celsius (Pennsylvania) to 6.9 degrees Celsius (Minnesota) during the warmest month, and from 4.3 degrees Celsius (Indiana) to 6.4 degrees Celsius (Michigan) during the coldest month. While precipitation is generally expected to increase in every Great Lakes state, the available moisture is expected to decrease due to a rise in evapotranspiration. **All of these changes will alter plant and insect communities; influence the availability of food, water, and shelter for birds; and likely cause ecological disruption as species groups reshuffle.**

Audubon also assessed the potential impacts of other forecasted threats related to climate change, including sea level rise, land use change, and extreme weather events. Portions of all eight Great Lakes states are expected to experience increases in urbanization, extreme spring heat, and fire weather under climate change scenarios. The state with the greatest number of climate-related threats is New York (sea level rise, urbanization, extreme spring heat, fire weather, heavy rain), whereas Minnesota is expected to experience the fewest threats (urbanization, extreme spring heat, fire weather). These threats are all relevant to birds and the places they need.

By far, the threat affecting both the greatest area and greatest number of species across all Great Lakes states is extreme spring heat, which can be life-threatening for young birds in the nest. In addition, increasingly variable Great Lakes water levels and more frequent, intense storms pose significant threats to beach-nesting birds like Piping Plovers and wetlands-nesting birds like Black Terns. Heavy flooding from extreme weather and high water levels could flood low-lying nests, decreasing productivity during the breeding season for already vulnerable bird species.

To evaluate potential climate change impacts within the Great Lakes region more specifically, Audubon identified areas that could be affected by both drying (with low lake levels) and flooding (with high lake levels) in the future. We then overlaid this information with Audubon's predictions of future bird ranges. Taken together, these modeling results allow us to identify areas of high risk for lake level changes and the bird species that are most vulnerable to these alterations.

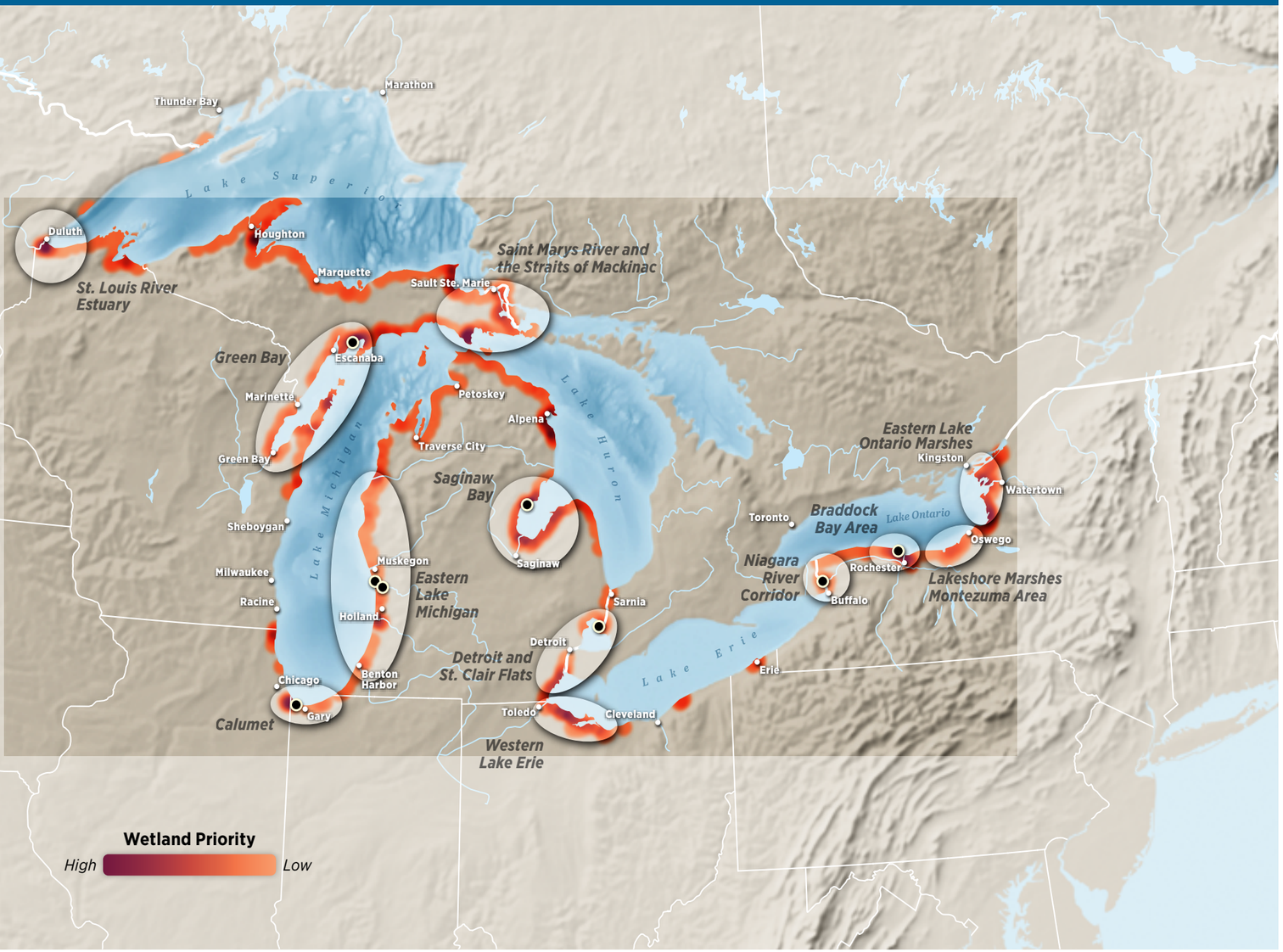
The clear scientific consensus is that we must reduce greenhouse gas emissions to achieve a more favorable future for birds and people. Audubon's report indicates that stabilizing warming at an increase of 1.5 degrees Celsius will reduce the vulnerability of the most threatened species. While there is no single solution to climate change, several actions can lead to desired reductions, including protecting the places birds need now and in the future, as well as promoting local actions that will support long-term conservation funding and programs that protect and restore Great Lakes coastal habitats.

STATE CLIMATE THREATS

STATE	REPRESENTATIVE THREATENED SPECIES	CLIMATE-RELATED THREATS					
		Fire	Spring Heat Waves	Urbanization	Heavy Rain	Cropland Expansion	Lake Level Rise
Illinois	Red-headed Woodpecker	•	•	•		•	
Indiana	Scarlet Tanager	•	•	•	•		
Michigan	Pine Warbler	•	•	•	•		
Minnesota	Sandhill Crane	•	•	•			
New York	Virginia Rail	•	•	•	•		•
Ohio	Wood Thrush	•	•	•	•		
Pennsylvania	Cerulean Warbler	•	•	•	•		
Wisconsin	Sedge Wren	•	•	•			•

All eight of the Great Lakes states will experience climate change-related threats, which will impact their native birds.

Our 12 Priority Regions



Spatial Prioritization of U.S. Great Lakes Coastal Wetlands

Audubon developed a spatial prioritization method to identify the most important U.S. Great Lakes coastal wetlands for birds and people. Spatial prioritization is the method used for determining geographic priority areas for conservation efforts. It includes modeling, data analysis, and interpretation of results to inform conservation action.

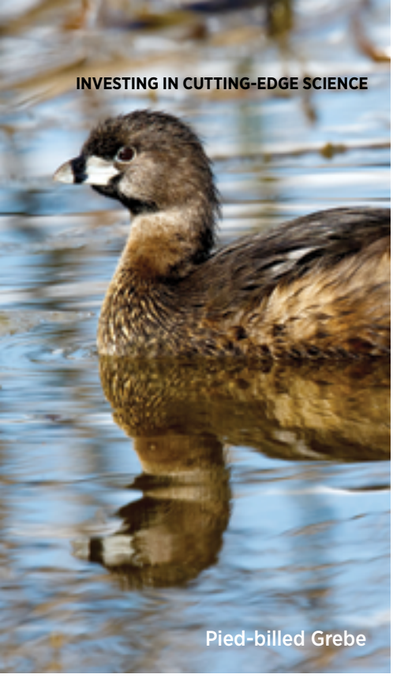
Audubon's first Great Lakes coastal wetland prioritization used bird data to identify coastal areas that are important for marsh birds. Birdwatchers, who provide critical data, are excellent volunteers and advocates for the birds in these coastal areas. The prioritization also incorporated data on nitrogen and phosphorus concentrations to help us target wetlands and watersheds that could provide the greatest water-quality benefits to the Great Lakes.

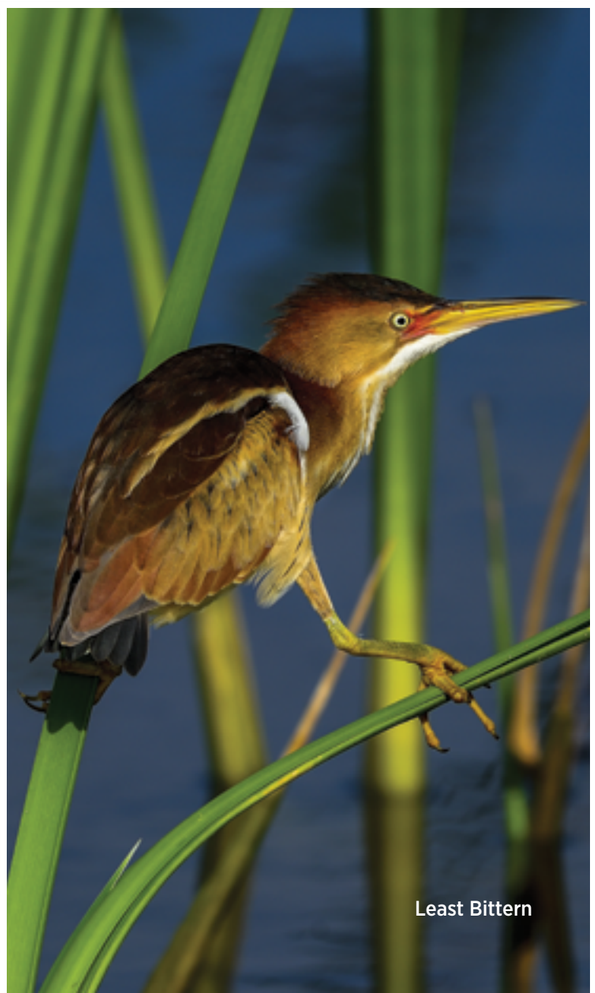
The model's results guided our selection of 12 coastal wetland regions across the Great Lakes where we now undertake conservation action. Within these regions, we have also identified key landowners and stakeholders with whom we are building strong relationships to facilitate restoration efforts.

After priority regions were identified in the first prioritization, Audubon took an additional step to identify wetland targets for restoration within each of the 12 priority regions. A second iteration of the Great Lakes coastal wetland prioritization identified 14 species of marsh birds dependent on high-quality wetland habitat: the American Bittern, Black-crowned Night-Heron, Black Tern, Blue-winged Teal, Common Gallinule, Least Bittern, Marsh Wren, Osprey, Pied-billed Grebe, Sandhill Crane, Sedge Wren, Sora, Swamp Sparrow, and Virginia Rail.

Utilizing bird data from the Coastal Wetland Monitoring Program and wetland habitat conditions that determine suitability for these birds—such as the amount of coastal vegetation—we ranked wetlands (at a 100-meter resolution) within 30 kilometers of the shoreline based on their importance to each of the 14 species. The fine-scale resolution of this modeling effort allowed us to be more effective in our project planning, outreach, and partnership development in high-priority regions.

In the eight states within the Great Lakes Basin, 25 percent of the population is people of color. In the areas surrounding our 12 priority regions, communities of color make up 30 percent of the population. That percentage increase is indicative of the region's demographic future. To foster long-term durable public will for conservation, it is critical to consider these demographics in our spatial prioritization.





Our science identifies the highest-priority coastal regions for marsh birds, water quality, and coastal resiliency. With the data and maps in hand, Audubon is now activating our membership, forming partnerships, and taking on-the-ground action to protect, restore, and steward the most critical habitat in 12 priority regions across the Great Lakes.

The maps in the following pages profile 550,000 acres of high-priority coastal wetlands and adjacent habitat. Audubon will restore 37,400 of those acres over the next 10 years through invasive species control, hydrological improvements, and native plant installation. Audubon will also directly impact approximately half of those wetlands (261,050 acres) through partnerships, management planning, volunteer stewardship, and marsh bird monitoring.

GOAL

Reverse the trend of marsh bird declines and build a sustainable and healthy water system for the wildlife and people of the Great Lakes region.

261,050
TOTAL ACRES IMPACTED OVER 10 YEARS

37,400
ACRES RESTORED DIRECTLY BY AUDUBON

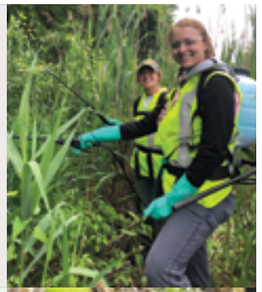
223,650
ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Audubon's Science-based Management Techniques Improve Wetland Health

Restoring highly altered and fragmented wetlands requires using techniques appropriate to local conditions, which can improve their health and structure.

Invasive Plant Control

Coastal wetlands are under threat by aggressive invasive species, such as the common reed, purple loosestrife, and narrowleaf cattail. These plants can overwhelm a wetland, creating dense stands of vegetation that reduce resources for foraging and nesting birds. Removing and controlling these invasives allows native species to compete.



Native Planting

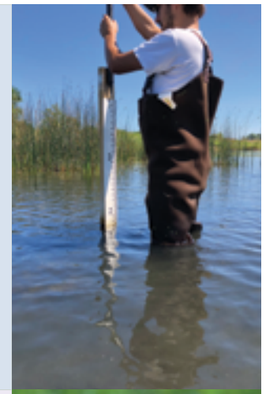
Reintroducing native plants is an important part of restoration. Native plants are often displaced by invasive species, erosion, or earth moving. Planting native seedlings gives the wetlands a head start in the restoration process.

Cutting, Clearing Vegetation

Dense vegetation limits marsh bird access to open water. Fire, a common "disturbance" in natural settings, can be used as a technique for reducing the density of vegetation, removing woody plants, and even invigorating new growth. Contained burns reduce the amount of vegetation in a wetland, creating a patchier, more diverse habitat. Clearing vegetation or using water-safe herbicides can create openings for marsh birds when burning isn't possible or practical.

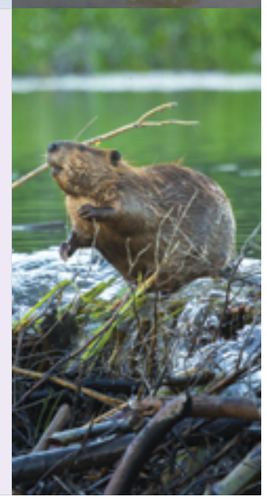
Water Level Management

Many wetland plants have evolved to respond to seasonal and annual changes in water levels, such as flooding in the spring and droughts in the summer. Periods of low water allow sediment to settle and sunlight to germinate seeds in the mud, improving water quality and habitat. Common infrastructure features, including pipes, drains, and culverts, negatively alter wetlands. Redesigning drainage systems to let land managers adjust wetland water levels allows them to recreate the natural fluctuation of these wetlands.



Natural Drivers

Where wetlands have natural features that drive diversity, it is best to embrace these features as management assets. For example, muskrats and beavers are often seen as pests and actively removed from wetlands, but they play very important roles in driving ecosystem diversity. Beavers build dams and muskrats eat emergent vegetation, helping to create the mix of open water and vegetation critical for nesting birds. Natural shorelines of coastal wetlands should be protected because the daily, seasonal, and annual water level fluctuations enhance wetland diversity. Developed, hardened shorelines should be removed or softened to reconnect the wetlands to these natural flow dynamics.



Least Bittern

PROTECTING AND RESTORING COASTAL WETLANDS

Protecting and Restoring Coastal Wetlands

12 Priority Regions

ST. LOUIS RIVER ESTUARY

GREEN BAY

CALUMET

EASTERN LAKE MICHIGAN

ST. MARYS RIVER AND THE STRAITS OF MACKINAC

SAGINAW BAY

DETROIT RIVER AND THE ST. CLAIR FLATS

WESTERN LAKE ERIE BASIN

NIAGARA RIVER CORRIDOR

BRADDOCK BAY AREA

LAKESHORE MARSHES MONTEZUMA AREA

EASTERN LAKE ONTARIO MARSHES

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #1:

St. Louis River Estuary

The St. Louis River is the largest tributary of Lake Superior. At the river's mouth, on the border of Wisconsin and Minnesota, is a massive complex of marshes that provides extensive habitat for waterfowl and marsh birds. These wetlands play a signifi cant role in protecting the water quality of Lake Superior and support a number of rare and declining species.

Bald Eagle

The St. Louis River Estuary, an Audubon Important Bird Area, supports exceptional bird diversity, particularly during the migratory stopover seasons. At least 240 bird species have been recorded within the estuary, and its numerous bays, islands, wetlands, barrier beaches, and forested areas provide significant breeding habitat.

Birds that depend on the estuary for breeding habitat include the Common Tern, the Bald Eagle, and marsh birds such as the Virginia Rail and the Sora. Black Terns have not been seen in the region since the 1990s and were last established at a breeding colony in Allouez Bay, just off Lake Superior.

While the St. Louis River itself has suffered from a legacy of industrial pollutants, much of the intact marshes remain in relatively high-quality condition. The rapid rise of lake levels has limited the amount of vegetation within coastal wetlands. Many of the highly disturbed areas are plagued by invasive vegetation and altered hydrology. The estuary's degraded wetlands offer abundant opportunities to improve habitat quality and revitalize breeding marsh bird populations.

St. Louis River Estuary

105,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

17,750

TOTAL ACRES IMPACTED OVER 10 YEARS

3,750

ACRES RESTORED DIRECTLY BY AUDUBON

14,000

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Audubon is working with the Minnesota Land Trust, THE Wisconsin Department of Natural Resources, the University of Minnesota-Duluth, and other partners to coordinate landscape-scale protection and restoration of high-priority coastal wetlands across the entire estuary. Audubon is focused on the highest-opportunity wetlands, such as Allouez Bay, Grassy Point, Hog Island, and Radio Tower Bay, where the growth of invasive cattails has led to reduced productivity for birds.

Mapping areas within the estuary that were once rich with vegetation and have converted to open water due to rising lake levels is important to determine where we could most easily reestablish rushes, grasses, sedges, and reeds. Over the next 10 years, we will identify priority marsh habitats and optimize them while working with partners to develop and implement restoration strategies. These strategies will be adaptive to the area's long-term land ownership and management objectives, climate change effects, and municipal and industrial development objectives.

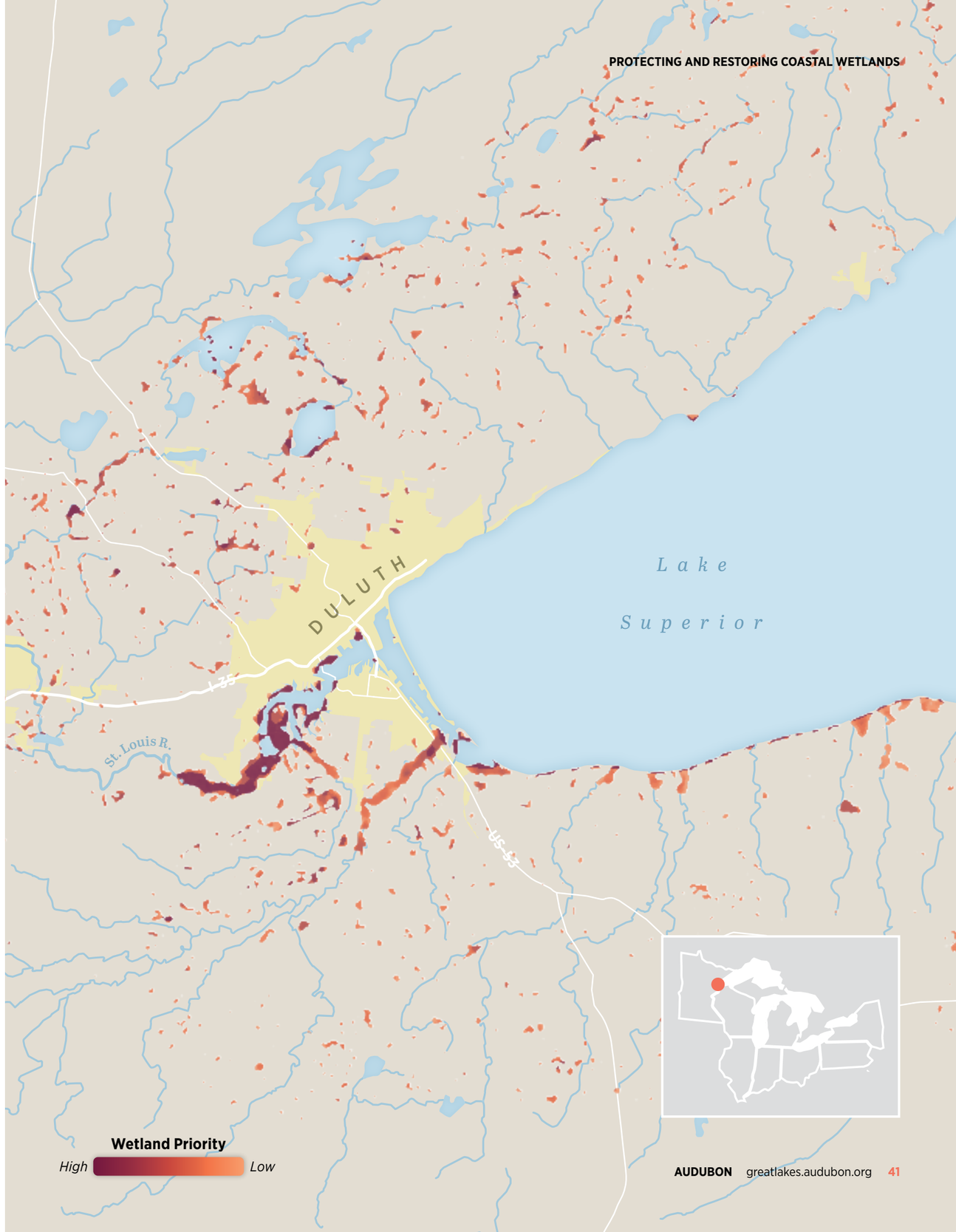
Audubon Chapters in the Region

For over 45 years the Duluth Audubon Society has protected habitat and educated the public about birds and bird conservation in the region. With over 770 members it harnesses the power of collaborative grassroots efforts to protect and restore the places birds need. Duluth Audubon is actively involved in restoration efforts in parks within the St. Marys watershed. Expanded wetland restoration work in the region will build on that energy.

Key Partners

City of Duluth, City of Superior, Fond du Lac Band of Lake Superior Chippewa, Lake Superior National Estuarine Research Reserve, Minnesota Land Trust, National Oceanic and Atmospheric Administration, Natural Resources Research Institute, University of Minnesota-Duluth, Minnesota Department of Natural Resources, U.S. Army Corps of Engineers, Wisconsin Department of Natural Resources

PROTECTING AND RESTORING COASTAL WETLANDS



PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #2:

Green Bay

The Green Bay region is home to nearly half of Lake Michigan's high-priority coastal wetlands. Habitat fragmentation, forest clearing, and wetland destruction in Wisconsin make these marshes critically important to the state's birds.

American White Pelican

Green Bay's coastal areas include expansive wetlands containing cattails, bur-reed, bulrushes, sedge meadow, shrub swamp of willow, dogwood, and alders, as well as some of the most extensive areas of lowland hardwood forest in Wisconsin. The bay's nearshore areas include four designated Audubon Important Bird Areas, which provide stopover habitat for high concentrations of migratory land birds, beaches for migrating shorebirds, and breeding areas for marsh birds, including the American Bittern and the Yellow-headed Blackbird.

The islands in the lower bay are home to hundreds of breeding American White Pelicans, as well as Great Egrets, Black-crowned Night-Herons, terns, gulls, and federally endangered Piping Plovers. Thousands of waterfowl also gather in the open bay during migration and over the winter. Currently, the Lower Green Bay region and its rivers, the Fox and East Rivers, are listed as an Environmental Protection Agency Area of Concern due to a history of pollution from local agriculture and the pulp and paper industry.

Green Bay

95,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

44,500

TOTAL ACRES IMPACTED OVER 10 YEARS

6,500

ACRES RESTORED DIRECTLY BY AUDUBON

38,000

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

There are multiple conservation strategies suitable across the extensive coastline of Green Bay. Barrier island recreation, hydrologic restoration, and wetland connectivity improvements are critical for maintaining and enhancing urbanized wetlands in Lower Green Bay. Larger, intact wetlands will also benefit from a focus on monitoring and management to improve habitat structure. Invasives like nonnative cattails are especially pervasive throughout the region and require dedicated, long-term focus.

Audubon has identified several potential high-opportunity wetland restoration projects along the coast and coastal rivers. Wetland restoration within the Fox River Area of Concern and the Cat Island reclamation project are major opportunities for Audubon engagement. Extensive monitoring and adaptive management are critical for sustained restoration success, and the Northeastern Wisconsin Audubon Society and its associated campus chapter are well suited to support this effort.

Audubon Chapters in the Region

Northeastern Wisconsin Audubon has nearly 1,000 members in seven counties and 55 communities throughout northeast Wisconsin. The chapter's leaders are involved in multiple independent bird monitoring and conservation projects as well as working with local university researchers supporting wetland restoration efforts in the Green Bay watershed.

Green Bay is also home to one of the first National Audubon campus chapters, at the University of Wisconsin-Green Bay—the Green Bay Audubon Student Conservation Chapter. The campus chapter is encouraging restoration and marsh bird monitoring with land managers and landowners, as well as advocating for Great Lakes conservation with regional lawmakers.

Key Partners

City of Green Bay, Ducks Unlimited, Oneida Nation of Wisconsin, Nature Conservancy, University of Wisconsin-Green Bay, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources

Piping Plover

PIPING PLOVER CONSERVATION SUCCESS

Historical Nesting Sites | Late-1980s Sites | 2019 Sites

Historically, Great Lakes beaches were home to nearly 800 breeding pairs of Piping Plovers. Today, about 75 pairs nest in the Great Lakes region. In 1986, that number had dropped to 17 pairs, and the Great Lakes population of Piping Plovers was officially listed as a federally endangered species.

Their rapid population decline was due, in part, to nest disruption and predation, as well as habitat loss and degradation. The Great Lakes Piping Plover Conservation Team—a partnership of federal and state agencies, Great Lakes tribes, non-government organizations, and interested private citizens—promotes the recovery of this unique shorebird through collaboration on intensive monitoring and predator abatement.

AUDUBON IN ACTION: ENGAGING CONGRESS

In 2019, Audubon Great Lakes organized a bird walk with the Northeastern Wisconsin Audubon Society and U.S. Representative Mike Gallagher (WI-8) to discuss the Great Lakes Restoration Initiative's importance for the Cat Island Restoration Project in Green Bay, a nesting site for the endangered Great Lakes Piping Plover. Audubon Great Lakes staff and chapter leaders also met with U.S. Senator Ron Johnson's (WI) district staff to advocate for sustainable fisheries. The chapter advanced local action around the Migratory Bird Treaty Act with a "Year of the Bird" proclamation for Green Bay and placed multiple letters to the editor.

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #3:

Calumet

The Calumet Region encompasses the southern shore of Lake Michigan, spanning Illinois, Indiana, and Michigan, and serves as a major stopover area for migratory birds.

Least Bittern

The shores and deep waters of Lake Michigan act as a funnel during spring and fall migration, generating intense concentrations of migrants in the small woodlots and other green spaces remaining in the highly urbanized and industrialized Calumet area.

This region is the most intensely developed and industrialized priority area within Audubon's focal regions. Substantial issues with water quality, legacy contaminants, disconnected and highly altered hydrology, and invasive species persist. Because the wetlands have been so highly altered, our conservation strategies prioritize the reconnection of wetlands, as well as hydrologic restoration via water control structures or shoreline improvements that aim to recreate historical water level fluctuations.

Calumet

15,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

8,000

TOTAL ACRES IMPACTED OVER 10 YEARS

3,500

ACRES RESTORED DIRECTLY BY AUDUBON

4,500

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Since 2015, Audubon Great Lakes has led Calumet marsh bird monitoring efforts that have informed habitat restoration and leveraged more of it. For over five years, the Calumet Marsh Bird Monitoring Project has engaged more than 30 community scientists and 15 landowner partners at 31 wetland sites across the Calumet region. Audubon has led several large restorations with field crews, contractors, and partners. This work includes the improvement and installation of water control structures that allow managers to simulate the natural ebb and flow of these fragmented wetlands while providing a climate adaptation tool to handle increased flooding, drought, and uncertain lake level change. Throughout the wetlands surrounding the Little Calumet River in Indiana, Audubon is facilitating design and planning for wetland restoration projects, including the reconnection of isolated wetlands and the re-meandering of the river itself. It is also leading efforts to remove invasive species.

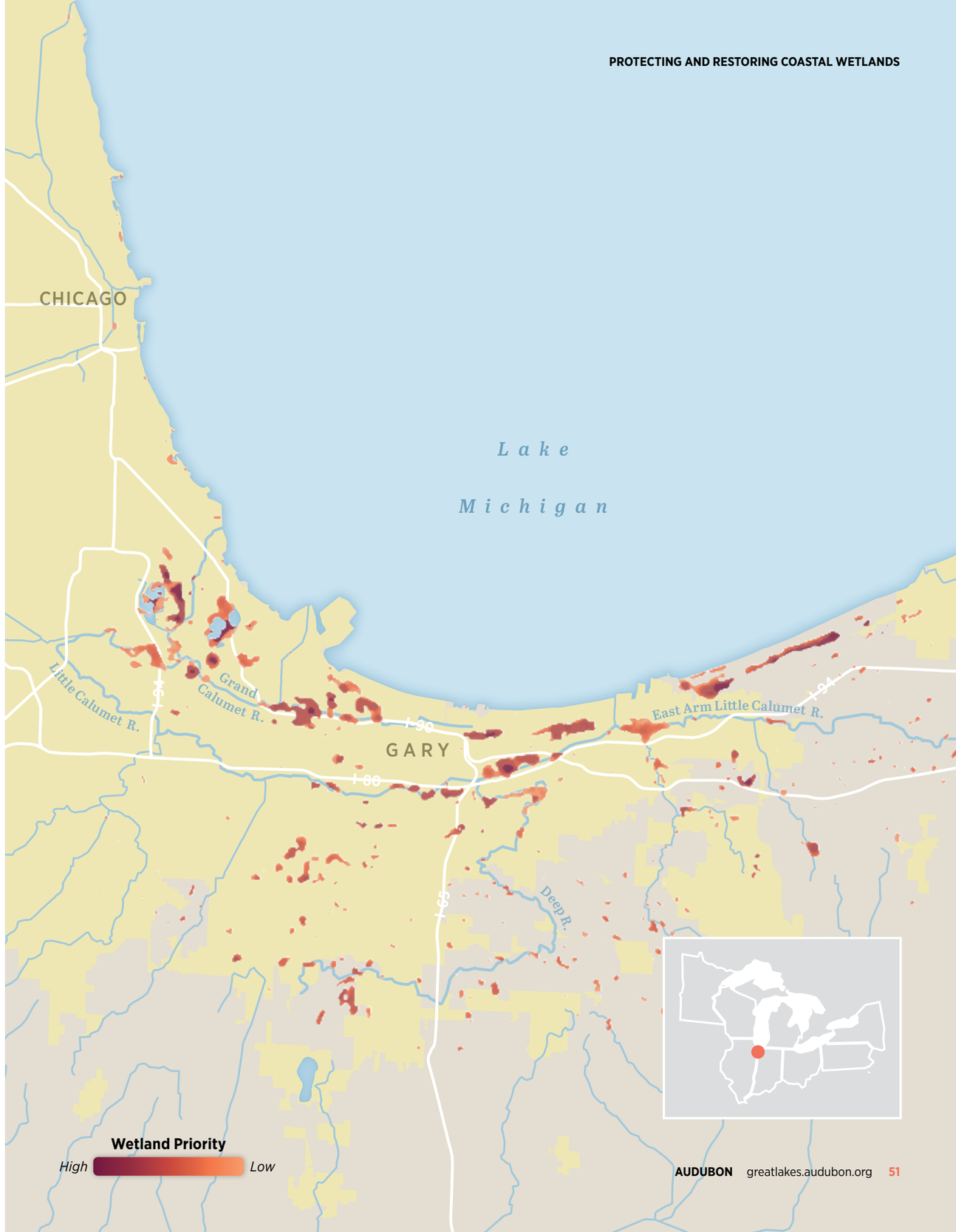
Audubon Chapters in the Region

At the southern edge of the Chicago metro region, the Calumet region is in the backyard of the Audubon Great Lakes office. Staff proximity and strong partner relationships make Audubon an important presence in the region. That presence is dramatically enhanced when the network is also factored in.

The Chicago Audubon Society covers Chicago and surrounding Cook County, where it connects more than 4,650 members with birds and nature through educational programming, field trips, advocacy, stewardship, and community science. Just southwest of Chicago, in Will County, the Thorn Creek Audubon Society works to preserve, protect, and restore wildlife habitat.

The Dunes-Calumet Audubon Society has more than 620 members in northwest Indiana's Lake and Porter Counties. It facilitates demonstrations of bird monitoring, conservation, and outdoor recreation, and is deeply engaged in regional marsh bird monitoring. On the eastern side of Calumet, the South Bend-Elkhart Audubon Society's 750 members promote stewardship through education, conservation, philanthropy, and fellowships.

PROTECTING AND RESTORING COASTAL WETLANDS



Calumet Marsh Bird Monitoring

Since 2015, Audubon Great Lakes has used marsh bird monitoring to inform restoration in the Calumet region, the geographic area drained by the Grand Calumet River and the Little Calumet River of northeastern Illinois and northwestern Indiana. Over five years, the Calumet Marsh Bird Monitoring program has engaged over 30 community scientists and 15 landowner partners at 31 wetland sites between Chicago and the Indiana Dunes.

Great Blue Heron

Across all these areas, chapter leaders are participating in marsh bird monitoring and other community science efforts, and advocating for the Great Lakes Restoration Initiative through letters to the editor and meetings with elected officials. Working with Audubon chapters in the Calumet region by building on these activities is essential to developing and sustaining volunteer leadership of wetland stewardship.

Key Partners

Alliance for the Great Lakes, Chicago Park District, El Valor, Field Museum, Forest Preserves of Cook County, Gary Department of Environmental Affairs, Friends of the Forest Preserves, Illinois Department of Natural Resources, Indiana Department of Natural Resources, Lake County Parks, Little Calumet River Basin Development Commission, National Park Service, Shirley Heinze Land Trust, Southeast Environmental Task Force, Nature Conservancy, U.S. Army Corps of Engineers, Wetlands Initiative.

AUDUBON WINGS

For over a decade, Audubon has trained young adults for careers in conservation through the Audubon Wings Internship program. The Wings Internship not only accomplishes critical restoration work at priority sites, it also provides professional development and project management for ecological restoration. Interns attend and participate in educational field seminars, professional conferences, and workdays with partner organizations. They collect and report field data and carry out administrative tasks required for the internship program.

The Audubon Wings Internship program has a strong network of alumni. Since 2014, nearly 70 percent of program graduates moved into jobs in conservation-related and other "green" professions immediately following their time at Audubon.

WILD INDIGO

Since 2013, the Wild Indigo Nature Explorations program has worked to build lasting connections between more than 6,000 South Side Chicagoans and the natural areas in the Calumet region. In 2019, the program expanded to the Gary, Indiana, area, and began building similar connections in northwestern Indiana.

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #4:

Eastern Lake Michigan

The region between the St. Joseph River and the outlet of Portage Lake, in the Eastern Lake Michigan area, has a unique composition of high-priority coastal wetlands.

Prothonotary Warbler

Many Eastern Lake Michigan wetlands are situated near the mouths of large rivers, where they form vast, meandering wetland complexes that are part of the coastline's interior sand dunes and beaches. These rivers, though impacted by agriculture, development, and historic deforestation, are generally less highly altered than other Great Lakes water bodies, and are frequently used as recreational corridors. They also drain much of the landscape of western Michigan and are therefore critical to water quality in Lake Michigan.

The coastal region of Eastern Lake Michigan hosts many bird species of high conservation concern, functioning as a regional source population for area-sensitive neotropical migrants, such as Cerulean and Prothonotary Warblers. The shorelines and riparian corridors attract diverse and abundant migratory shorebirds and waterfowl as well as breeding marsh birds. The nearshore waters of Lake Michigan host globally significant concentrations of Long-tailed Ducks and other migratory waterbirds during spring migration.

Eastern Lake Michigan

40,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

10,000

TOTAL ACRES IMPACTED OVER 10 YEARS

2,000

ACRES RESTORED DIRECTLY BY AUDUBON

8,000

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

The significant wetlands in this region are situated near river mouths, close to cities and other population centers. Successful conservation interventions at these rivers and wetlands include the structural restoration of riverbanks, water level and/or stormwater management, and marsh restoration. Audubon Great Lakes is working with Ottawa County Parks to assess the restoration potential of several riverbank properties the county has recently acquired around the Grand River, including Ottawa Sands, the Sag, and land around Stearns Bayou. In total, the county parks have acquired several hundred acres of high-priority sand dunes, a marshy inlet of the Grand River, and a large bog. These properties offer unique opportunities to enhance habitat connectivity and access for recreation. Throughout the county, local Audubon members conduct inventories and wild rice restoration along newly acquired coastal wetland properties in Grand Haven and along the Grand River.

Audubon Chapters in the Region

Lakeshore communities in western Michigan are home to 1,250 Audubon members who are actively involved in community science monitoring as well as stewardship of local nature preserves and county parks. Audubon Great Lakes has worked with and looks to explore new ways to connect to local Audubon organizations, such as the Owashtanong Islands Audubon Society, the Holland Audubon Club, the Grand Rapids Audubon Club, and the Muskegon County Nature Club. Members of these groups have expressed interest in marsh bird monitoring, stewardship, and policy advocacy.

Key Partners

Central Michigan University, Grand Valley State University, Gun Lake Tribe, Michigan Department of Natural Resources, Muskegon County Nature Club, Ottawa County Parks and Recreation, Pokagon Band

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #5:

St. Marys River and the Straits of Mackinac

Spanning the Upper and Lower Peninsulas of Michigan, this priority region includes the intersection of Lake Superior, the St. Marys River, and the Straits of Mackinac.

American Bittern

Historically vital for shipping, the area around the St. Marys River and the Straits of Mackinac has seen less coastal development than other parts of the Great Lakes. As a result, this priority region has large coastal wetlands with relatively high connectivity that serve as important breeding areas for marsh birds, including Black Terns, American Bitterns, and Pied-billed Grebes; waterfowl such as American Wigeons and Blue-winged Teal; and Common Loons. Coastal islands provide important nesting grounds for colonial waterbirds such as Common Terns and gulls.

The unique geography of the straits acts as a funnel for concentrating migrating raptors, which tend to avoid flying over large expanses of open water. Every spring, hundreds of Golden Eagles cross the Straits on their annual migration to their northern breeding grounds. In fall, the open water of the Straits attracts thousands of migrating diving ducks. Conservation strategies should focus on monitoring and adaptive management to improve wetland habitat structure, prioritizing control of aggressive and invasive plant species such as nonnative and hybrid cattail, common reed, and European frogbit.

St. Marys River and the Straits of Mackinac

150,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

45,000

TOTAL ACRES IMPACTED OVER 10 YEARS

4,000

ACRES RESTORED DIRECTLY BY AUDUBON

41,000

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

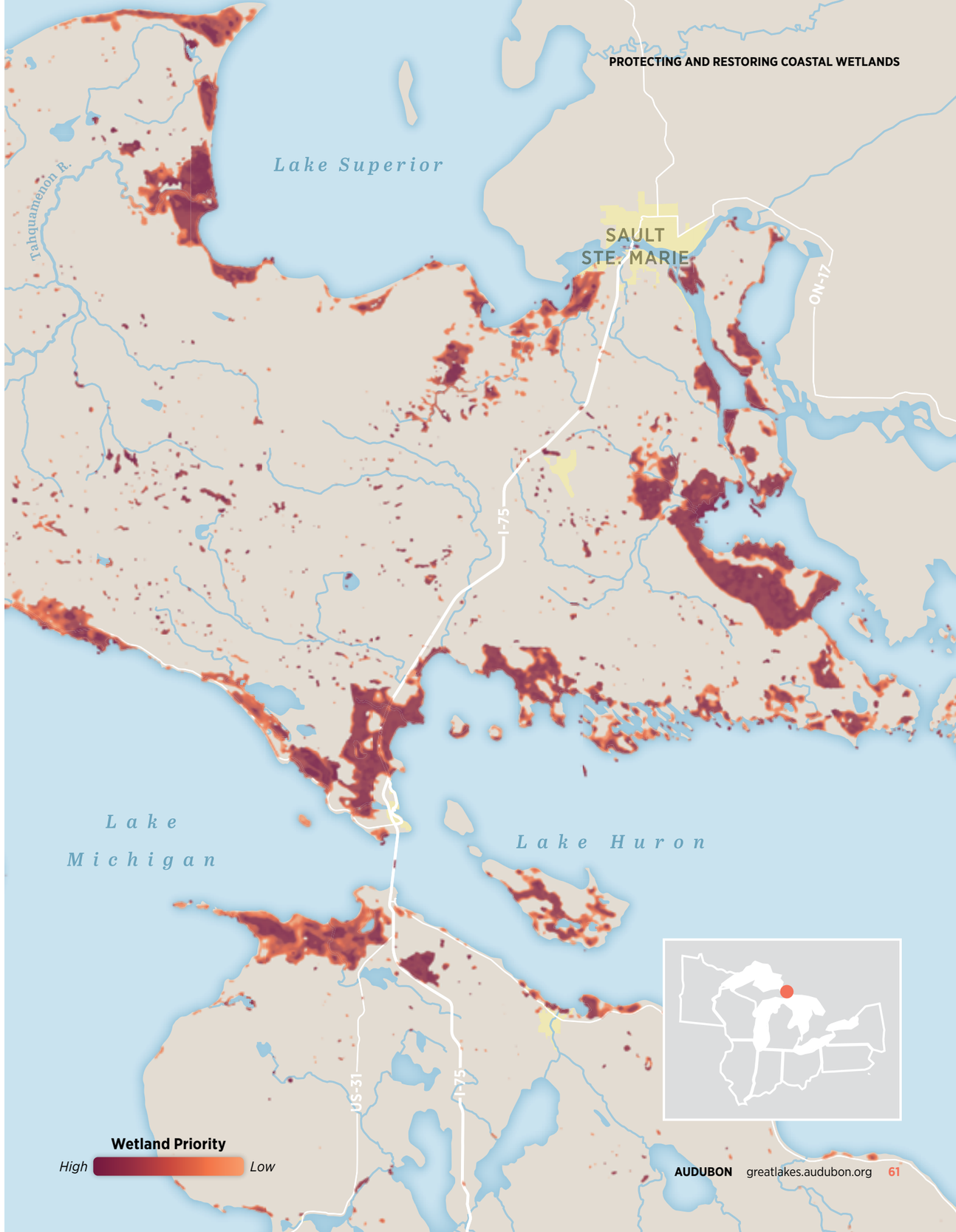
Audubon is working with the Sault Sainte Marie Band of Chippewa Indians, the U.S. Fish and Wildlife Service, and the Michigan Department of Natural Resources to develop management strategies that protect and enhance marsh bird nesting. Minimizing flooding and woody encroachment, planting native species, and controlling invasive plants are all emphasized in our conservation approach. Large water control structures have been unnecessary due to relatively fewer dikes, levees, and altered wetlands in the area. Robust monitoring that informs adaptive management is critical to sustaining bird populations and healthy ecosystems.

Audubon Chapters in the Region

There are 161 Audubon members in the Saint Marys River and Straits of Mackinac area, making up three Michigan Audubon chapters: the Straits Area Audubon Society, the Petoskey Regional Audubon Society, and the Sault Naturalists Club. These groups provide important bird observation data, with a focus on hawk, loon, and owl migration. The Sault Naturalists Club also collects a wide variety of environmental data and can be a valuable asset for wetland monitoring. There is a significant opportunity to engage these chapters in volunteer community science, including marsh bird monitoring and other Audubon research efforts.

Key Partners

Central Michigan University, Lake Superior State University, Loyola University, Michigan Department of Natural Resources, Petoskey Regional Audubon, Sault Sainte Marie Band of Chippewa Indians, Three Shores Cooperative Invasive Species Management Area, U.S. Fish and Wildlife Service



PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #6:

Saginaw Bay

Saginaw Bay's coastal wetlands serve as the critical connection between Michigan's largest watershed and Lake Huron, making up the vast majority of the bay's 100-mile shoreline.

Tundra Swan

Marsh vegetation is especially important along Saginaw Bay because it serves as the filter for the high amounts of nutrients and sediments coming from intensive agriculture within the watershed.

As an Important Bird Area, Saginaw Bay hosts an array of waterbird species that use the area as both a migratory stopover site and a wintering and breeding ground. Large congregations of waterfowl, including Tundra Swans, American Black Ducks, Mallards, Redheads, Common Goldeneyes, mergansers, and scaup species, flock to the marshes and open water of Saginaw Bay in spring and fall. Protected coastal wetlands along Saginaw Bay's coastline include Wigwam Bay State Wildlife Area, Nayanquing Point State Wildlife Area, Quanicassee Wildlife Area, and Wild Fowl Bay State Park. Some of these wildlife areas function as diked wetlands that are managed for waterfowl hunting. Threats to diked and undiked wetlands in the Saginaw Bay priority area include common reed and hybrid cattail invasions and water-quality issues related to legacy contaminants and agricultural runoff.

Saginaw Bay

68,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

28,000

TOTAL ACRES IMPACTED OVER 10 YEARS

2,500

ACRES RESTORED DIRECTLY BY AUDUBON

25,500

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

In partnership with the U.S. Fish and Wildlife Service Coastal Program and the Michigan Department of Natural Resources, Audubon is using an experimental design to treat invasive hybrid cattails within a diked wetland at Wigwam Bay State Wildlife Area and measuring the impact of management on breeding marsh birds. Detroit Audubon staff and volunteers help lead marsh bird surveys and Black Tern nest surveys to measure the impact of restoration on breeding birds. There is extensive state-owned land used for game and wildlife management across Saginaw Bay, providing many unique opportunities for restoration, enhancement, and community engagement that supports the region's threatened marsh birds while simultaneously improving foraging for gamebirds and waterbirds.

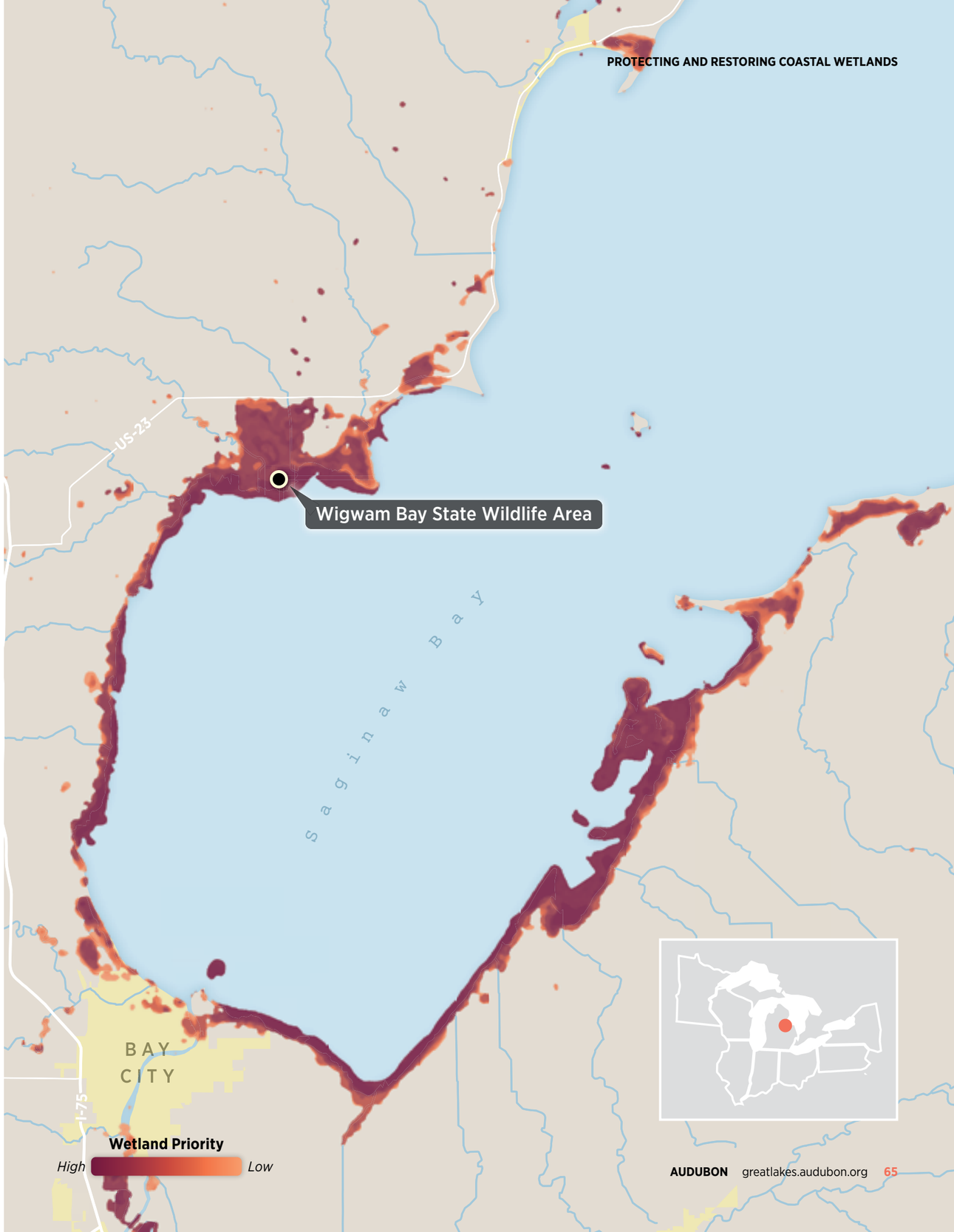
Audubon Chapters in the Region

There are 257 Audubon members in and around Saginaw Bay and the Saginaw River. There are two Michigan Audubon chapters in the region: the Saginaw Valley Audubon Society and the AuSable Valley Audubon, whose work includes Piping Plover monitoring. Marsh bird monitoring and Black Tern monitoring and research provide several opportunities for the network to engage in Great Lakes conservation.

Key Partners

Michigan Department of Natural Resources, Saginaw Bay Land Conservancy, U.S. Fish and Wildlife Service

PROTECTING AND RESTORING COASTAL WETLANDS



Priority Region #7:

Detroit River and the St. Clair Flats

Adjacent to the highly populated Detroit metropolitan area, the shallow waters of Lake St. Clair and the shores of the Detroit River contain highly valuable coastal wetlands for marsh birds, waterfowl, and migratory landbirds.

The Detroit River boasts high numbers of migratory raptors, especially in fall, as they round the west end of Lake Erie to avoid crossing the open water. This priority region includes several protected natural areas, including the St. Clair Flats, Point Mouillee State Game Area, Sterling State Park, and the Detroit River International Wildlife Refuge. This region's highly developed coastline is used frequently for a wide range of recreational activities, including sportfishing, waterfowl hunting, and boating.

Urbanization and industrialization in the area have led to persistent water-quality issues. Conservation strategies should focus on monitoring and managing coastal wetland complexes to improve habitat structure, and on structural restoration to soften urbanized coastlines.

PROTECTING AND RESTORING COASTAL WETLANDS

Black Tern

Detroit River and the St. Clair Flats

70,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

59,000

TOTAL ACRES IMPACTED OVER 10 YEARS

4,000

ACRES RESTORED DIRECTLY BY AUDUBON

55,000

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Audubon, in partnership with the Michigan Department of Natural Resources and Detroit Audubon, has spearheaded an effort to protect and enhance the St. Clair Flats, home to the largest colony of Black Terns in the Great Lakes region. The work at the St. Clair Flats focuses on managing conditions for marsh bird breeding success and studying the conservation needs of breeding Black Terns. Audubon projects also target the removal of invasive vegetation and the creation of patches of open water in dense stands of nonnative or hybrid cattails.

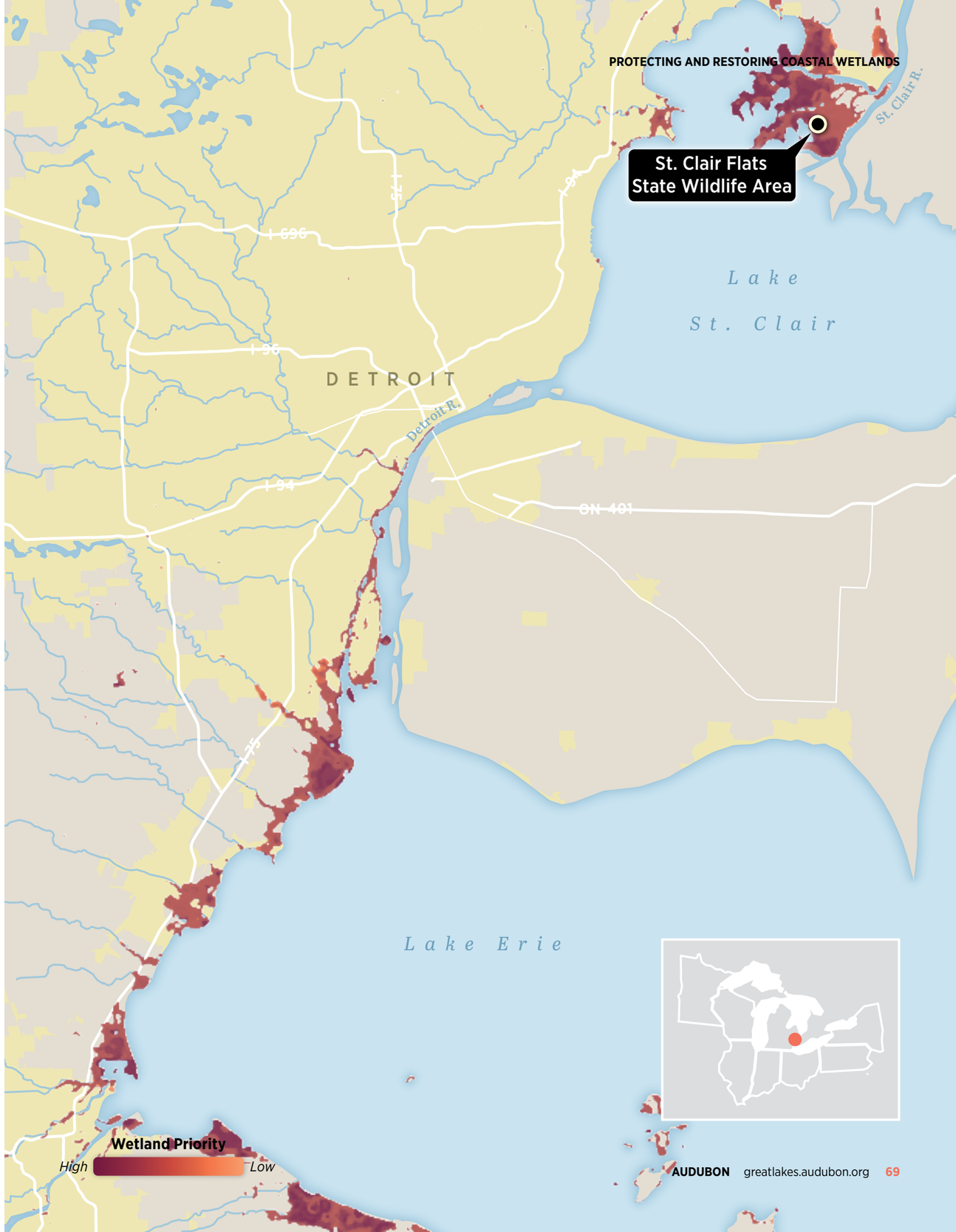
Audubon Chapters in the Region

Audubon has had a longstanding presence in the Detroit region. Founded in 1939, Detroit Audubon has more than 8,300 members and serves six counties in southeastern Michigan. Detroit Audubon has been a key partner in Black Tern conservation, enlisting volunteers as monitors. Chapter leaders are also engaged in restoring urban grassland habitat in Detroit, and actively support Great Lakes restoration policy in local papers and at the state capital. As Great Lakes restoration work expands in the region, Detroit Audubon will be a valuable partner in marsh bird monitoring efforts.

The Oakland Audubon Society has served Oakland County since 1958. Its more than 200 members are actively engaged in local stewardship in southeastern Michigan. Oakland Audubon has been a steadfast advocate for Great Lakes restoration policy.

Key Partners

Detroiters Working for Environmental Justice, Detroit Outdoors (Detroit Parks and Recreation, YMCA of Metropolitan Detroit, Sierra Club), Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, Upper Mississippi/Great Lakes Joint Venture



Broadening the Conservation Community in Michigan

MI Birds

MI Birds, created by Audubon and the Michigan Department of Natural Resources, brings together birders and hunters, who often share similar conservation values. MI Birds increases the number of Michiganders engaged in stewardship of public lands that are important for birds and communities. Across Michigan, it leads immersive public bird walks, gives public talks on bird conservation, engages Michiganders in stewardship activities and community science projects, and works with partner organizations to expand our reach and impact.

Wild Indigo in Detroit

Since 2018, Audubon's Wild Indigo Nature Explorations program has worked to build lasting connections between more than 1,220 Detroiters and natural areas around the metro region, focusing particularly on Rouge Park, Palmer Park, and the parks along the Upper Detroit River. With local partners and community members, the Wild Indigo program creates nature-based activities tailored to specific communities while addressing concerns related to excessive stormwater, community health and wellness, and access to recreation.

Audubon in Action: Engaging Congress

In 2019, Audubon visited with Michigan Sen. Gary Peters' staff to thank the senator for supporting the Great Lakes Restoration Initiative and to discuss the importance of sustainable fisheries for birds. The meeting included representatives from Detroit Audubon, the Oakland Audubon Society, and the Grosse Pointe Audubon Society.

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #8:

Western Lake Erie Basin

The coastal wetlands of the Western Lake Erie Basin, widely recognized as one of the most important migratory stopover locations in the Great Lakes, are also home to one of the region's most productive fisheries.

King Rail

The Western Lake Erie Basin is an important non-breeding site for waterfowl, with typical wintering flocks containing up to tens of thousands of diving ducks and Tundra Swans. Over 100 Bald Eagles have also been sighted using the shoreline of Sandusky Bay as a migratory stopover site. Western Lake Erie also serves as an important shorebird migratory route. Coastal marshes are hot spots for breeding and migrating rails and bitterns in the state, including what may be the only viable breeding population of King Rails in Ohio. From the mouth of the Maumee River and east to the shores of Sandusky Bay, the shallow western end of Lake Erie provides tremendous coastal wetland habitat. The intensive agriculture in the Maumee Bay watershed causes significant water-quality problems in the region, resulting in annual toxic algal blooms that have severely impaired local drinking water. Conservation strategies should focus on water-quality improvements and structural restoration to the developed coastline, to improve control of stormwater and agricultural runoff.

Western Lake Erie Basin

62,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

18,500

TOTAL ACRES IMPACTED OVER 10 YEARS

6,000

ACRES RESTORED DIRECTLY BY AUDUBON

12,500

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Audubon is working closely with Ohio's Coastal Management Program and other partners to plan and restore large wetland complexes in the region. The state government's 2019 commitment to improve water-quality entering Lake Erie has resulted in a program called H2Ohio, which will directly benefit wildlife and water quality through large-scale restoration of coastal wetlands. Audubon's efforts will focus on creating or improving the functionality of wetlands to deliver on those goals.

Audubon Chapters in the Region

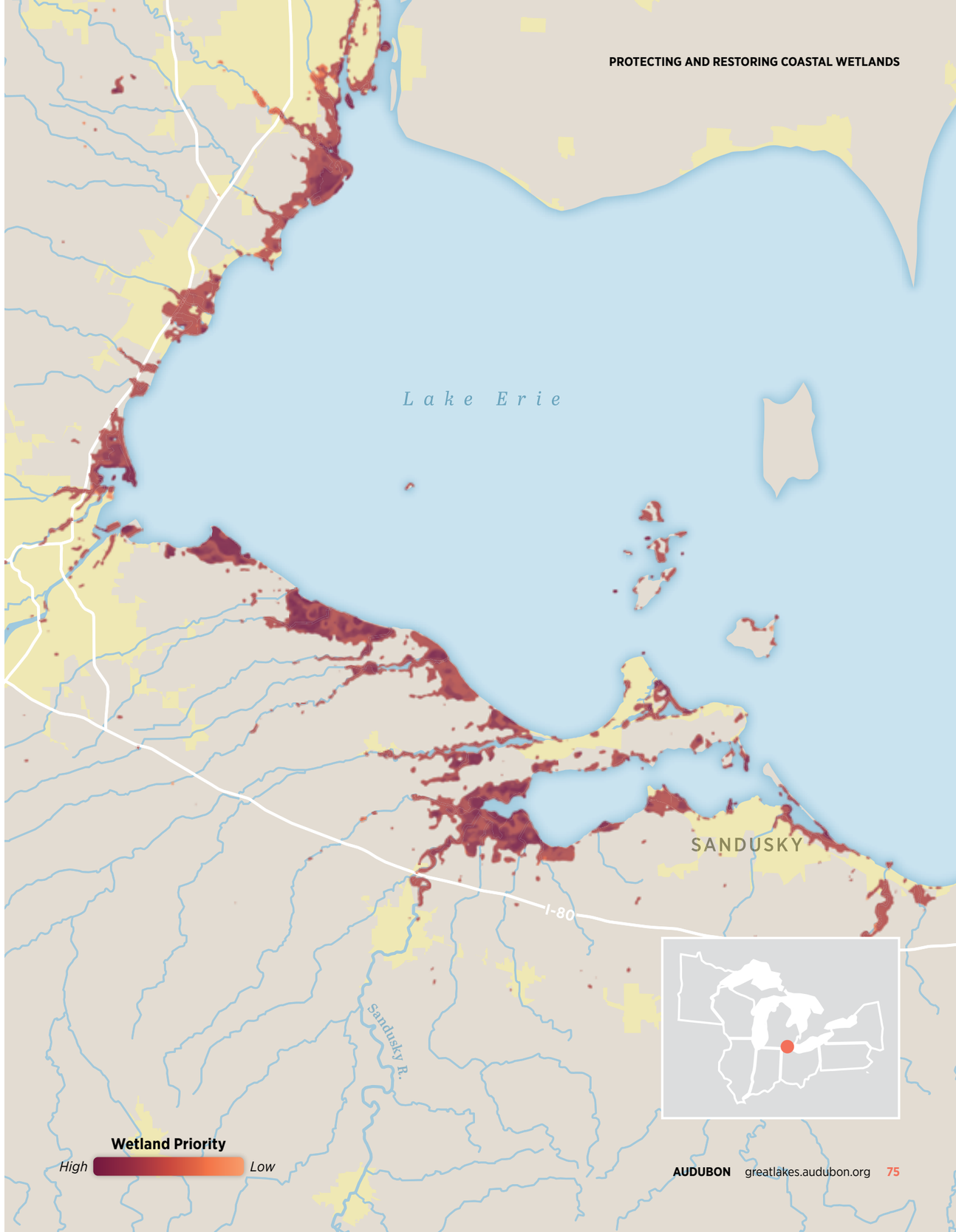
There are 1,180 Audubon members along the Ohio coast of Western Lake Erie. The closest chapters, the Firelands Audubon Society and the Black River Audubon Society, which serve the Sandusky and Elyria areas, respectively, support stewardship of local wetlands, native plant programs, and bird monitoring efforts. Building Audubon Great Lakes' restoration capacity in the area can provide opportunities for Audubon members to expand their impact.

Additionally, farther east along Lake Erie's shores more than 2,000 active members are organized into two chapters, the Western Cuyahoga Audubon Society and the Audubon Society of Greater Cleveland, which support conservation education and stewardship in the region.

Key Partners

Black Swamp Bird Observatory, Ducks Unlimited, Ohio Coastal Management Program, Ohio Department of Natural Resources, Nature Conservancy of Ohio, Toledo Metroparks, Toledo City Parks

PROTECTING AND RESTORING COASTAL WETLANDS



PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #9:

Niagara River Corridor

The portion of the Niagara River that flows north and northwest for some 30 miles from Lake Erie to Lake Ontario is crucial to gulls and waterfowl.

Common Tern

Some parts of the Upper Niagara River, on the U.S. side, are industrial, and very little natural shoreline remains. Along the lower river, the shoreline between Niagara Falls and Lewiston, New York, is made up of largely undeveloped shrublands and forests that are protected as state parks.

The Niagara River Corridor is a Global Important Bird Area that supports one of the world's most spectacular concentrations of gulls, with 19 species recorded and one-day counts of over 100,000 individuals. The river also hosts a remarkable diversity and abundance of waterfowl. The habitats along the river's edge support an exceptional diversity of migratory songbirds during spring and fall. The area's few remaining marshes, including one at Buckhorn Island State Park, support breeding Least Bitterns, Pied-billed Grebes, Northern Harriers, and Sedge Wrens.

Niagara River Corridor

5,300
ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

3,800
TOTAL ACRES IMPACTED OVER 10 YEARS

800
ACRES RESTORED DIRECTLY BY AUDUBON

3,000
ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Audubon Great Lakes, Audubon New York, the Buffalo Audubon Society, and other partners are engaged in large-scale conservation and habitat improvement projects in this priority area, including restoring hemi-marsh and floodplain forest habitat on Buckhorn Island, constructing a 14,000-square-foot island in the City of Buffalo's Niagara River Corridor for breeding Common Terns, and installing submerged aquatic and emergent marsh in areas around the tern island.

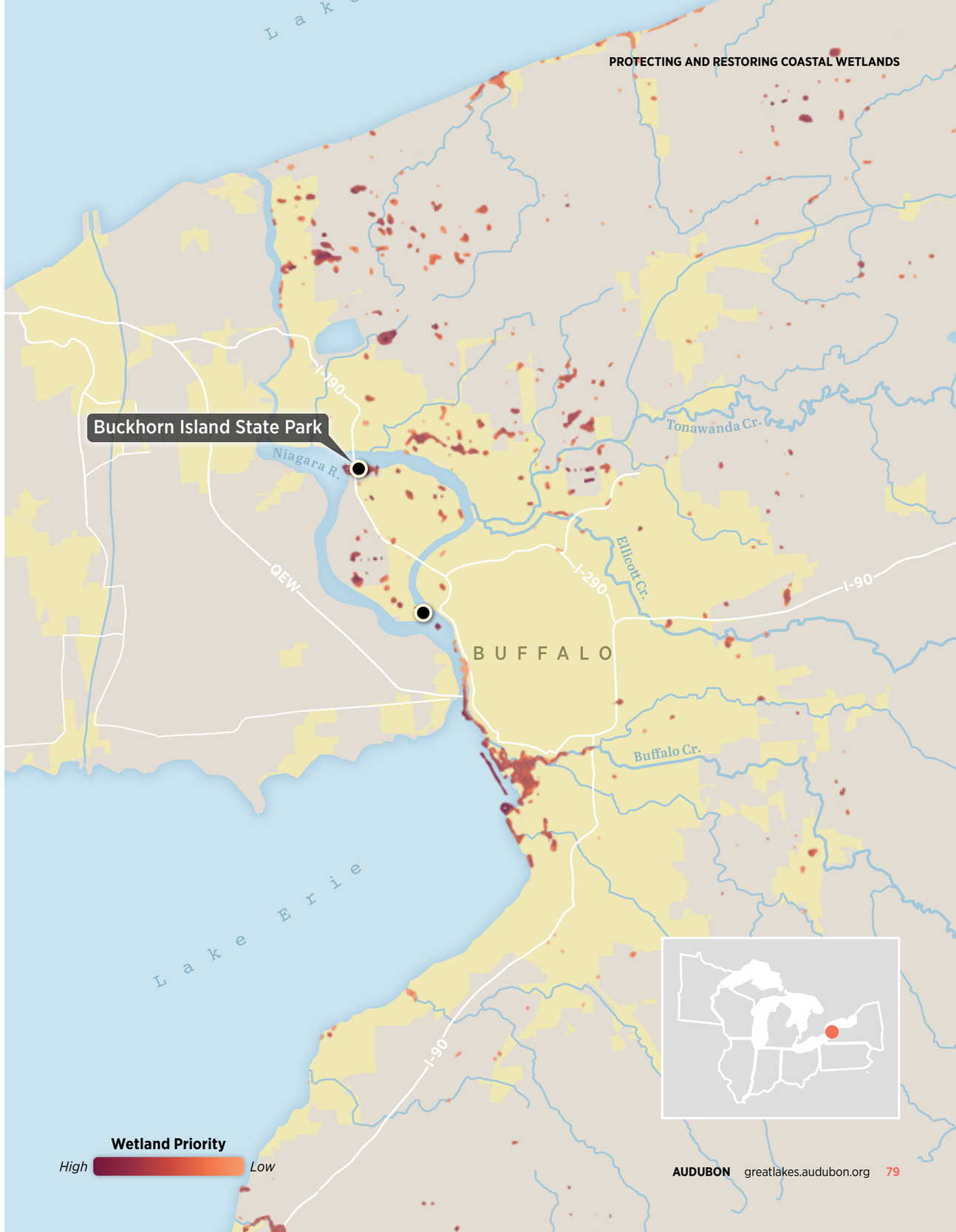
Audubon Chapters in the Region

The Buffalo Audubon Society currently stewards more than 1,000 acres throughout western New York from its headquarters at the Beaver Meadow Audubon Center in Wyoming County. The chapter, with more than 2,000 members, has been a critical partner in the development of Audubon's Great Lakes initiative, creating marsh bird habitat in the Niagara River corridor, enlisting and educating volunteers, and engaging policymakers on the value of Great Lakes restoration. As the project evolves, education and engagement efforts will expand to involve more residents from the City of Buffalo in the wetland restoration work.

Key Partners

Ducks Unlimited, New York State Department of Environmental Conservation, New York State Office of Parks, Recreation and Historic Preservation

PROTECTING AND RESTORING COASTAL WETLANDS



PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #10:

Braddock Bay Area

The Braddock Bay Area wetlands, located on the southern shore of Lake Ontario near Rochester, New York, is a mix of habitats including ponds, creeks, wetlands, woods, and fields.

Least Bittern

Braddock Bay is northwest of Rochester, on the south shore of Lake Ontario. The area's wetlands are dominated by cattail marshes, while its uplands are predominantly wet deciduous forests, abandoned farmlands, and private residences. The site includes the New York State Department of Environmental Conservation-administered Braddock Bay Wildlife Management Area—a globally significant Important Bird Area—as well as municipal and private land.

Besides being the site of one of the world's largest spring hawk flights, the area also supports breeding populations of at-risk marsh bird species, including the Pied-billed Grebe, American Bittern, Least Bittern, Northern Harrier, and Sedge Wren. The site has historically supported nesting Black Terns, and hosts thousands of waterfowl during migration.

Braddock Bay Area

7,000
ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

3,500
TOTAL ACRES IMPACTED OVER 10 YEARS

900
ACRES RESTORED DIRECTLY BY AUDUBON

2,600
ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

Audubon and its partners are actively restoring diverse habitat at Cranberry Pond, which is located within the Braddock Bay Wildlife Management Area. The project involves creating a series of potholes and channels within the existing vegetation to help establish hemi-marsh conditions across 260 acres of wetlands. The Genesee Valley Audubon Society (GVAS) has been active in this habitat enhancement project by coordinating volunteers to monitor bird response. In addition, GVAS and its volunteers have removed European water chestnuts, an invasive plant, from the wildlife management area and organized an annual beach cleanup for over a decade. GVAS also assists Audubon New York with the Healing Our Waters Coalition's lobbying efforts to ensure adequate federal funding and policies to protect the Great Lakes region

Audubon Chapters in the Region

Genesee Valley Audubon serves the communities of western New York in Monroe County and parts of Genesee, Livingston, and Ontario Counties. With over 1,600 members, it educates and advocates for the protection of birds, wildlife, and natural habitats. It has actively engaged with invasive vegetation removal in Braddock Bay, and is a central regional advocate for Great Lakes restoration policy in western New York. Audubon Great Lakes is eager to expand partnerships on Braddock Bay wetland restoration with Genesee Valley Audubon.

Key Partners

Ducks Unlimited, New York State Department of Environmental Conservation, State University of New York-Brockport, U.S. Fish and Wildlife Service

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #11:

Lakeshore Marshes Montezuma Area

This area in upstate New York includes several high-value wetland complexes. Greater Sodus Bay, on the south shore of Lake Ontario, is one of the lake's largest.

Pied-billed Grebe

Greater Sodus Bay, which covers 3,357 acres, is located along the south shore of Lake Ontario in Wayne County. Little Sodus Bay is a 750-acre water body off Lake Ontario that connects to Fair Haven Beach State Park. The coastal and riparian wetlands between Sodus Point and the City of Oswego make up an expansive network of habitat containing varied plant communities, including extensive cattail beds.

The Montezuma Wetlands Complex is a Global Important Bird Area that includes a 50,000-acre wetland complex on the New York Great Lakes plain.

The mix of extensive marshes, swamps, upland forests, productive agricultural land, and varied topography and hydrology create a patchwork of diverse habitats important to many migratory and resident wildlife species. The Montezuma Wetlands Complex supports an abundance and diversity of wetland-dependent species, including one of the largest migratory concentrations of waterfowl in the Northeast.

Lakeshore Marshes Montezuma Area

8,000

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

7,500

TOTAL ACRES IMPACTED OVER 10 YEARS

1,200

ACRES RESTORED DIRECTLY BY AUDUBON

6,300

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

The Montezuma Audubon Center serves as a gateway for adults and school-aged children to get involved in local conservation efforts and experience the wonder of the outdoors. Center staff and its Audubon conservation partners coordinate a robust army of volunteers through the Montezuma Alliance for Species and Habitats (MARSH!) program. MARSH! is part of a larger effort to restore, protect, and enhance wildlife habitat in the Montezuma Wetlands Complex. It focuses on the restoration of Montezuma's forests, where the Cerulean Warbler lives, and wetlands, where the American Black Duck lives. MARSH! helps reduce the main threat to these habitats so that priority birds can continue to breed and migrate through Montezuma.

Audubon Chapters in the Region

This priority region overlaps with two Audubon chapter territories: the eastern portion of the Genesee Valley Audubon Society's territory and the western part of the Onondaga Audubon Society's territory. Both chapters are active partners with the Montezuma Audubon Center. Montezuma has an active group of members and volunteers ready to expand their engagement in wetland restoration.

Key Partners

Ducks Unlimited, Finger Lakes Community College, Friends of the Montezuma Wetlands Complex, New York State Department of Environmental Conservation, State University of New York-College of Environmental Science and Forestry, Nature Conservancy, U.S. Fish and Wildlife Service

PROTECTING AND RESTORING COASTAL WETLANDS

PROTECTING AND RESTORING COASTAL WETLANDS

Priority Region #12:

Eastern Lake Ontario Marshes

The Eastern Lake Ontario area contains one of the largest inland dune systems in the eastern Great Lakes and some of the highest-quality freshwater marshes in New York.

Common Gallinule

The site includes a mix of private and public land with significant wetlands owned by the state of New York and The Nature Conservancy. These vitally important wetland complexes support many migrating and breeding birds, including at-risk species such as the American Bittern, American Black Duck, Black Tern, Common Loon, Common Tern, Least Bittern, Northern Harrier, Pied-billed Grebe, and Sedge Wren. Additional wetland-dependent species use the area as a migratory staging and feeding area, including the Caspian Tern, various shorebird species, and a diversity of waterfowl. Waterfowl numbers fluctuate widely, depending on winter ice conditions. In mild winters, the area hosts thousands of ducks, including the American Black Duck, Common Goldeneye, Common Merganser, Mallard, and Long-tailed Duck. Since 2015, the site has supported breeding Piping Plovers, a federally endangered species.

Eastern Lake Ontario Marshes

21,500

ACRES OF HIGH-PRIORITY COASTAL WETLANDS AND ADJACENT HABITAT

16,000

TOTAL ACRES IMPACTED OVER 10 YEARS

2,750

ACRES RESTORED DIRECTLY BY AUDUBON

13,250

ACRES IMPACTED THROUGH AUDUBON PARTNERSHIPS

Our Conservation Approach

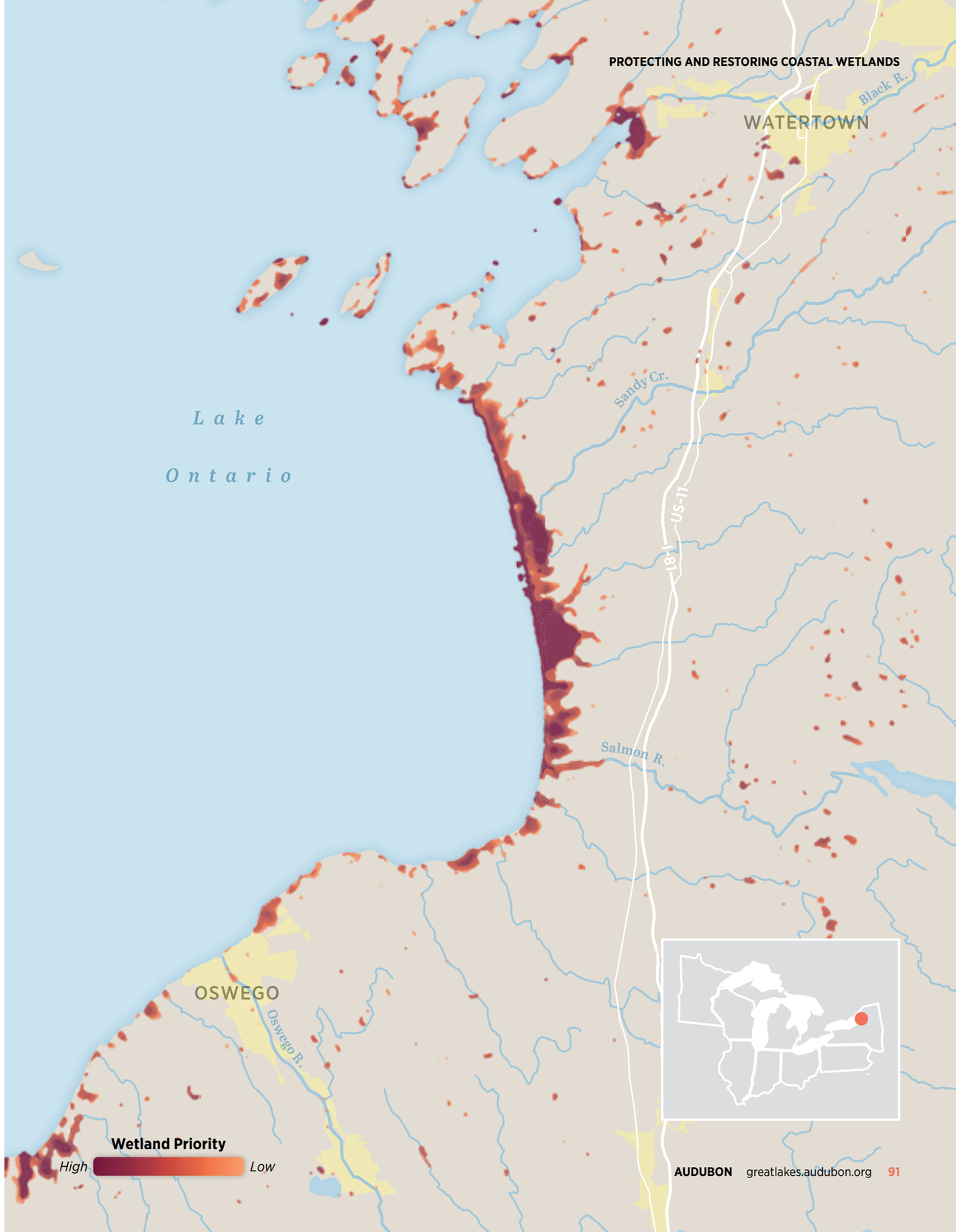
We are working with our partners to coordinate site management and outreach to minimize human impacts on sensitive habitats and nesting species like the Black Tern. This has included Great Lakes lobbying efforts to secure federal funding and advocate for water level management that supports healthy and resilient coastal habitats, as well as discussions with key players to identify new project sites, partnership opportunities, and restoration techniques.

Audubon Chapters in the Region

The Onondaga Audubon Society represents central New York and the Eastern Lake Ontario Basin, with over 2,200 members in Cayuga, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, and Oswego counties. It owns and operates two sanctuaries on the shore of Lake Ontario: the Derby Hill Bird Observatory and the Richard A. Noyes Sanctuary. Both provide critical habitat for migrating and breeding birds in areas prioritized for wetland restoration.

Key Partners

Ducks Unlimited, Nature Conservancy, New York State Department of Environmental Conservation, New York State Office of Parks, Recreation and Historic Preservation



Common Loon

DELIVERING ON OUR POLICY AGENDA

Delivering on Our Policy Agenda

Audubon works at the federal, state, and local levels to advance and protect policies that ensure clean water and healthy habitats for birds and people across the Great Lakes region.

Policy Priorities

Audubon's priorities include advocating for clean water protections, climate change solutions, bedrock environmental laws, and increased conservation funding in state and federal government budgets. We support our on-the-ground conservation work within our policy agenda to protect and restore the places that birds need. To advance our policy priorities, we engage our members in a variety of ways. Audubon has mobilized our network to participate in state and federal advocacy days, attend meetings with legislators in their districts, send action alerts to decision makers, publish letters to the editor and opinion pieces with local news outlets, and more.

Because science tells us that climate change is the greatest threat to birds in the region, we pursue durable policy solutions at the local, state, and federal levels that reduce carbon emissions. **We mobilize our bipartisan membership base of over 291,000 people in the region to take action on climate, based on their love of birds and the systems they depend on.** Alongside advocating for carbon reduction policies, we execute conservation and policy solutions that help maintain the resiliency of our ecosystems and mitigate the effects of climate change.

Pied-billed Grebe

Blue-winged Teal

DELIVERING ON OUR POLICY AGENDA

Sandhill Crane

State Policy

Our work at the state level is focused on advancing policies that protect waterways, reduce carbon pollution, and ensure robust funding for conservation initiatives.

State Policy Successes

In Wisconsin, Audubon mobilized our network to push for reauthorization of the Knowles-Nelson Stewardship Program, which was created by the Wisconsin legislature in 1989. For 30 years, this successful bipartisan program has protected Wisconsin's most treasured lands and waterways by providing millions of dollars in matching state funds for land conservation and maintenance and upkeep of waterways, parks, forests, and trails. The reauthorization of this important program ensures the preservation of valuable natural areas and wildlife habitat, the protection of water quality and fisheries, and the expansion of outdoor recreation opportunities. Audubon worked with its partners to ensure that this program will continue through 2021 at $33 million per year, and we will continue to advocate for a longer-term reauthorization. This funding source is essential to protecting vital bird habitat, such as forests, prairies, and wetlands, that hundreds of species of migratory birds rely on for stopover refuge as well as breeding sites.

In 1991, Goose Pond Sanctuary, just outside Madison, Wisconsin, received the first-ever nonprofit Knowles-Nelson Stewardship Grant to acquire and restore habitats to benefit birds, wildlife, and the public. More than 250 species of birds have been spotted at Goose Pond, which today includes almost 700 protected acres. Support from the Knowles-Nelson Stewardship Program has benefited every county in Wisconsin.

In Ohio, Audubon supported Governor Mike DeWine's effort to create the H2Ohio water-quality initiative. In July 2019, the Ohio General Assembly appropriated $172 million over the next two years for the plan. The funds will support the creation of wetlands, improvements to aging infrastructure, and programs to reduce nutrient runoff and ensure safe and clean water in Lake Erie and throughout Ohio. The Ohio Department of Natural Resources, the Ohio Department of Agriculture, and the Ohio Environmental Protection Agency will each have a significant role in implementing efforts that will address the biggest threats to Lake Erie and Ohio's waterways, including toxic algal blooms.

Audubon is coordinating with the Ohio Department of Natural Resources to prioritize wetland restoration projects that benefit our priority bird species and to help inform how the $46.2 million designated to fund natural restoration programs is spent. The H2Ohio initiative has broad bipartisan support, but it will be critical to secure a long-term funding commitment, beyond the initial two-year allocation, to address threats to Ohio's lakes and rivers. Audubon will advocate for a long-term commitment to this crucial water-quality plan.

State Policy Priorities

In Illinois, Audubon is working to pass the Clean Energy Jobs Act (CEJA)—comprehensive, statewide clean energy legislation that would place Illinois on the path to 100 percent renewable energy by 2050. This legislation would cut carbon out of the power sector by 2030, reduce the number of gas and diesel vehicles in the transportation sector, and create jobs and economic opportunity. **Because climate change is the greatest threat to birds, Audubon supports commonsense solutions that reduce carbon pollution at the speed and scale necessary to protect birds and the places they need**. We will continue to advocate for CEJA and other policies to ensure that Illinois commits to clean energy and clean air for birds and people.

In Ohio, Audubon sits on the state Energy Table steering committee, which is working to reduce carbon pollution by advocating for energy efficiency and clean energy solutions at the state and local levels. We are engaged in the Power a Clean Future Ohio campaign, which is focused on getting local governments to take action on climate change. The goal of this coordinated and collaborative effort is to secure local policies throughout Ohio communities that will reduce carbon emissions by 31 percent below 2005 levels by 2030.

Federal Policy

At the federal level, we advocate for policies that will have a positive impact on birds and their habitats for years to come.

A key part of Audubon's work with partners in the region is carried out through our membership and governance role in the Healing Our Waters (HOW) Coalition, which consists of more than 150 environmental, conservation, hunter and angler, community water advocacy, and outdoor recreation organizations. The HOW Coalition represents millions of people who share a common goal of restoring and protecting the Great Lakes. Through this coalition and beyond, Audubon is advocating to maintain and increase federal investments in Great Lakes restoration programs as well as federal water infrastructure initiatives. This will ensure that bird habitat in the Great Lakes Basin will be protected now and into the future.

Federal Policy Successes

The Great Lakes Restoration Initiative (GLRI) is the premier federal Great Lakes restoration program. Its goals include making fish safe to eat, making water safe to drink and safe for recreation, eliminating algal blooms, controlling invasive species, and protecting and restoring native habitat. Audubon mobilized our network and informed the science in the multiyear action plan that outlines priorities and goals for the GLRI through 2024. Our advocacy resulted in the prioritization of coastal wetland restoration that benefits marsh birds. We will monitor and track how those restoration dollars are spent and direct them toward our identified coastal wetland priority sites. In addition, our advocacy efforts helped to secure a $20 million increase in GLRI funding for fiscal year 2020. This is the first time the GLRI has seen an increase since 2011, and it represents significant progress toward restoring this one-of-a-kind ecosystem. We will continue to advocate for increased overall funding of the GLRI to its original allocation of $475 million over the next five years and support policies that protect bird habitat.

Every two years, Congress aims to renew the Water Resources Development Act (WRDA), which approves projects that steward and restore many

of our nation's waterways and wetlands, including the Great Lakes. Audubon advocated for the latest renewal of this important legislation, including testifying before Congress. The act advances natural infrastructure—an approach to addressing traditional water infrastructure needs in a way that mimics nature and is more resilient to the impacts of climate change. After the most recent renewal of the WRDA, Audubon submitted a list of potential projects for funding, with natural infrastructure as a central recommendation, including one for a project to prevent the invasion of exotic Asian carp—one of the greatest ecological threats to the health of the Great Lakes. Clean water and a healthy ecosystem are essential to protecting the 350 bird species found in the Great Lakes region. We will continue to advocate for natural infrastructure and Great Lakes priorities to be authorized in this biennial legislation.

Federal Policy Priorities

Audubon's science has shown us that climate change poses the greatest threat to North American birds, and we must act now to put solutions in place that limit global temperature increases. We support bipartisan efforts to address climate change, and we focus on advancing legislative solutions we have identified as 1) having a chance of passing through a divided Congress and 2) still meaningfully addressing the leading causes of climate change. Currently, we are working toward passing policies that promote innovation and strengthen the electric grid that will make renewable energy, like solar and wind power, available even when the sun isn't shining and the wind isn't blowing. We are also working to advance bipartisan policies that engage, empower, and incentivize the forest and agriculture industry to be a part of the solution to climate change.

Audubon works to ensure that our nation's bedrock environmental laws are protected in the long term. One of the oldest and most effective wildlife protection laws, the Migratory Bird Treaty Act, is under threat from a new interpretation of the law by the Trump administration that would no longer hold industry accountable for incidental bird deaths. We are opposed to this revision of the MBTA, and will continue to fight to ensure that migratory birds are protected and industry is held accountable for bird deaths. **Audubon supports efforts to maintain and increase investment in federal water infrastructure, which is a crucial component of keeping the Great Lakes clean and healthy for birds and people.** Two funds in particular that improve water infrastructure are the Drinking Water State Revolving Fund, which helps communities fix and upgrade drinking water infrastructure, and the Clean Water State Revolving Fund, which helps communities fix and upgrade wastewater infrastructure. We advocate for the adoption of green infrastructure investments and robust funding for these two funds.

Audubon works to promote investment in and effective implementation of conservation programs in the Farm Bill that enhance and restore the Great Lakes, like the Regional Conservation Partnership Program. This program incentivizes partnerships with the agricultural community that are crucial to addressing the threat of harmful algal blooms, which threaten the health of birds and their food sources. One of the critical policies passed by the U.S. House of Representatives in 2019 was the Coastal and Great Lakes Communities Enhancement Act, which would help states and communities reduce their vulnerability to costly and destructive acts of nature and preserve and protect important coastal ecosystems. It would also help communities and states plan for future risks and employ nature-based methods to reduce flood and storm damage. Audubon will work to prioritize policies at the state and federal levels to help protect and restore Great Lakes coastal habitats and the birds and wildlife that depend on them. We are also working toward passage of a variety of other legislation critical to bird conservation, including:

- The Recovering America's Wildlife Act, which would dedicate funding to state wildlife agencies for implementation of wildlife conservation plans, and ensure consistent, reliable funding to protect and restore the vital habitat that birds and other wildlife need. This would benefit many birds that depend on the Great Lakes region. In fall 2019, the Audubon Great Lakes policy director testified in front of the House Subcommittee on Waters, Oceans, and Wildlife in support of the act.
- The Forage Fish Conservation Act, introduced by Representative Debbie Dingell (MI-12), would establish a plan for managing forage fish in U.S. federal waters and would ensure that this important food source is protected for birds that migrate through the Great Lakes.
- The Bird-Safe Buildings Act, introduced by Representative Mike Quigley (IL-5), establishes guidelines for all future construction and alteration projects on federal buildings to reduce the amount of plain glass and limit light pollution to prevent bird collisions with buildings.

Sandhill Crane

MOBILIZING AUDUBON'S NETWORK

Mobilizing Audubon's Network

To achieve Audubon's goals in the Great Lakes, we rely on robust engagement from across our powerful network of chapters and members throughout the region. We also build connections with diverse communities typically underrepresented in the conservation movement.

AUDUBON IN ACTION

In August 2019, Audubon Great Lakes took U.S. Rep. David Joyce (R-OH) on his first bird walk. We were joined by members of the Blackbrook Audubon Society and the Greater Cleveland Audubon Society at Veterans Memorial Park in Mentor, Ohio. Audubon thanked the congressman for his leadership in protecting and restoring the Great Lakes for the birds and people that depend on them. The group also discussed climate change as well as the role federal funds have had in restoring Veterans Park, which is a remnant of original Ohio swamp forest and a birding hot spot near the Lake Erie shoreline.

Grassroots Mobilizing

Audubon mobilizes its powerful bipartisan network of chapters, nature centers, volunteer leaders, and partners to support birds at the local, state, and federal levels. We engage members in on-the-ground conservation and stewardship, and we provide opportunities for them to build relationships with decision makers and advocate for important conservation policies.

In the eight Great Lakes states, we have more than 291,000 Audubon members, who are organized into 121 chapters. Twenty-three of those chapters are in the actual Great Lakes Basin, and 14 are in or near our identified wetland priority regions. By mobilizing our network to act locally in communities across the region, Audubon is able to amplify our support of birds and the places they need.

New Audiences: Equity, Diversity, and Inclusion

The Great Lakes region's heavy industry, especially steel production, and the jobs it provided in the late 19th and 20th centuries attracted large, diverse populations to cities on the shores of the Great Lakes. Many of the wetlands we seek to protect were left undeveloped because of their proximity to industrial sites. This means that many of the communities closest to these sites are more diverse than Audubon's traditional membership base. To achieve success in the region, we bring together large, inclusive coalitions.

Beyond expanding our circle of engagement, this provides opportunities to impact habitats critical for birds while also meaningfully engaging communities that have experienced environmental injustices.

Areas of Focus

We engage members, chapters, and community partners through the following focal activities:

Bird Walks

Bird Walks provide valuable opportunities for Audubon member-advocates to build relationships with their elected officials in a relaxed environment. These walks showcase local conservation work and natural areas in the officials' districts while driving home the need for strong leadership to protect spaces that are important to birds and people.

Chapter Gatherings, State Council Meetings, and Chapter Calls

Chapter gatherings connect chapter members with Audubon staff members from across the country to discuss regional and national conservation, policy, and educational efforts. Meeting two or three times each year, chapter-organized state council meetings make it possible for members from across

AUDUBON IN ACTION

A chapter gathering in October 2018, in Grand Haven, Michigan, brought together 55 attendees representing 21 chapters from across the Great Lakes region. Chapter members learned about the successes and challenges of their peers in the Great Lakes region, and were paired with staff presenters to create peer-to-peer learning. In one session on writing letters to the editor, chapter leaders from Michigan and Illinois shared steps they had taken to get letters published in their local newspapers.

AUDUBON IN ACTION

The Dunes-Calumet Audubon Society contributes to local conservation efforts in northwestern Indiana through its involvement in bird monitoring and restoration initiatives. Members conduct annual marsh bird surveys at Calumet wetlands as part of Audubon efforts to inform marsh restoration. Members also participate in Eastern Whip-poor-will monitoring and Northern Saw-whet Owl banding. Through its monitoring and engagement work, Dunes-Calumet Audubon is quickly building its capacity as a conservation leader in the region.

their state to exchange information and identify ways to collaborate. Monthly calls, organized by the Audubon Great Lakes office, allow Audubon staff and chapter leaders to share information on a variety of topics and provide updates on chapter opportunities like Audubon grants, events, and workshops.

Community Science

Audubon volunteers have been on the forefront of informing the science of bird conservation since the first Audubon Christmas Bird Count over 100 years ago. Each year, tens of thousands of people from across the Americas participate in the count. Audubon and other organizations use the data collected in this long-running wildlife census to assess the health of bird populations and to help guide conservation action. Great Lakes community science efforts build on this tradition. For example, Audubon volunteers conduct marsh bird surveys using standard North American monitoring protocols. Data collected inform local land management decisions and contribute to the tracking of long-term bird population trends.

Congressional and State House Lobby Days

On advocacy days, Audubon members can meet with their elected officials in their state capital or the U.S. capital. This allows participants to build relationships with elected officials and their staff, as well as a chance to connect with and learn from other advocates from across their state or the nation.

In-District Meetings

In-district meetings provide opportunities for Audubon members to connect with elected officials and their staff members in their own communities. Highlighting the local connection to Audubon's policy and conservation priorities in a decision maker's own district is an effective way to build meaningful relationships.

Letters to the Editor

Letters to the editor are a valuable way to communicate concerns to decision makers and the community at large. Audubon provides members with messaging training and helps them place letters that support our priority policy campaigns. This critical tactic has proven to be a valuable way to advocate locally for important regional and national issues.

AUDUBON IN ACTION

In June 2019, members of U.S. Sen. Gary Peters' (D-MI) staff met to talk about Great Lakes restoration and other water policy issues with Audubon Great Lakes staff and representatives from Michigan Audubon chapters, including Detroit Audubon, Oakland Audubon, and Grosse Pointe Audubon. A member of Sen. Peters' staff who is a birder was eager to hear about the chapters' work and priorities on local projects like Black Tern research and Kirtland's Warbler protection. This meeting helped build a relationship and connect Sen. Peters with Audubon priorities. Peters became a lead Senate sponsor of the Great Lakes Restoration Initiative Act of 2019.

AUDUBON IN ACTION

In April 2019, the University of Wisconsin-Green Bay Audubon Student Conservation Chapter—the first Audubon college chapter in the nation—joined an Audubon advocacy day in Washington, D.C. The event put students who care about birds and conservation in front of lawmakers to advocate for solutions to the seabird and forage fish crisis.

AUDUBON IN ACTION

In 2018, The U.S. Environmental Protection Agency solicited public input for the Great Lakes Restoration Initiative Action Plan III. Audubon engaged its members to write informed comments and letters to the editor, which elevated Audubon's message and gave birds a bigger voice in the final plan.

Stewardship

Audubon's stewardship efforts in the Great Lakes region promote improved ecosystem health, responsible land use, and protection of local habitat through conservation, restoration, and sustainable practices. We offer a range of programs that engage members in on-the-ground efforts to protect and restore the places critical to birds in the region.

Wild Indigo Nature Explorations

Wild Indigo is an education and engagement program that works to build lasting connections between communities of color and local natural areas. The program is at the intersection of our conservation, advocacy, and engagement goals and is itself an important tool for building and sustaining durable public will for our wetland restoration efforts. With local partner organizations and community members, the Wild Indigo program creates nature-based activities tailored to specific communities that address concerns like excessive stormwater and community health and wellness, and that provide access to recreation.

Swamp Sparrow

AUDUBON IN ACTION

The Buffalo (New York) Audubon Society engages in stewardship through restoration projects, drawing new communities into conservation efforts. By improving critical habitat for birds and educating the public about how ecological restoration improves public access to green space, Buffalo Audubon is making a difference in the places we work and the places birds need.

Common Tern

Opportunities for Impact

After years of pollution, development, and environmental neglect, and with the growing threat of climate change, there is now an unprecedented opportunity to help the Great Lakes recover—and to protect them for generations to come. The next several years will prove critical to securing funding for habitat restoration projects, monitoring efforts, and stewardship programs that will strengthen populations of threatened bird species.

Making an Impact

Whether enhancing green infrastructure to better protect communities from storm surges or improving habitat that will in turn benefit ecotourism and recreational opportunities, these efforts will also positively affect the people who live in or visit the Great Lakes region.

As an employee of a state or federal agency, an elected official, a business, an NGO or community leader, a private landowner, a wildlife manager, a scientist, or an avid birder:

You have an opportunity to strengthen the Great Lakes for birds and people alike!

With Your Help We Will Achieve the Objectives Outlined in This Plan

- Restore extensive habitat in the most critical coastal areas to stabilize marsh bird populations.
- Provide leadership on applied science that engages our communities, fills critical information gaps, and informs sustainable natural resource management.
- Mobilize our network, across the region, in science, policy, and conservation action.
- Advocate for public policy that supports adequate funding for Great Lakes conservation and robust water-quality standards.

You Are What Hope Looks Like to a Bird. Here's What You Can Do:

Become a Member

Learn about the full range of benefits of being a member of Audubon and join at audubon.org.

Donate to Support the Work

Give online at audubon.org/greatlakes or contact us at 312-453-0230.

Volunteer and Join Us

Get involved with restoration, bird monitoring, helping kids learn about birds, or other community programs by contacting us at audubongreatlakes@audubon.org or at 312-453-0230.

Be a Voice for Birds and Audubon Great Lakes

Help us advance critical legislation that will protect birds and people by letting your representatives know your views and opinions. You can take action here: audubon.org/takeaction.

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Contact us for more information or to talk with our development team.

You can reach us at audubongreatlakes@audubon.org or at 312-453-0230.

Take Action in Your Community

Tell Your Story

One of the most important things you can do to protect birds and the places they need is also one of the simplest: talk about it. Research shows that discussing the plight of birds with family and friends reinforces that the crisis is real. Your story may involve changes in your backyard or a favorite place, or the news you've read. Consider your story and then start sharing it with those closest to you.

Advocate for Birds

Audubon Great Lakes organizes official lobby days in Washington, D.C., and in state capitals, which you can join. You can also write an effective letter to the editor of your local paper by keeping your message short (150-200 words) and sticking to one main point. We can help you draft and submit a letter. If you'd like to join us for a lobby day or would like us to help you with a letter to the editor, contact us by email or phone as listed on the previous page.

Support Local Natural Areas

When it comes to infrastructure, business as usual means concrete-dominated developments. You can get behind projects like parks along inland waterways, which can absorb flooding, or wetland and island restoration along coasts, which will buffer storm surges and stand the test of time.

Participate in Community Science

You can join our community science work in a number of ways. By participating in Audubon's national Christmas Bird Count, which takes place throughout the Great Lakes region, you'll help spot and count birds of different species in your area. You can also be a part of our marsh bird surveys, which take place in our coastal priority areas and offer insights into how management and habitat characteristics influence marsh bird species. You can join our Climate Watch, which focuses on species that, according to our climate models, are most threatened by climate change. Specifically in the Great Lakes region, Climate Watch participants are asked to look for two nuthatch species, the White-breasted Nuthatch and the Red-breasted Nuthatch, or the Eastern Bluebird. Contact is if you would like to be involved by email or phone as listed above.

OPPORTUNITIES FOR IMPACT

MOVING AHEAD

Sandhill Crane

Moving Ahead

The people and birds of the Great Lakes region share a common future. The region's legacy of heavy industry, rapid coastal development, and aging infrastructure present significant challenges to our ecosystems and communities alike. The emerging threats posed by climate change and invasive species multiply those challenges, and the decline of regional bird populations is telling us that now is the time to act.

Audubon and the people of this region have already proven that we are up to the challenge. When we invest in science and connect people to nature, we can reverse wildlife declines and create healthy natural areas that benefit people's mental and physical health. **Guided by science and with an extensive membership of bird and nature lovers, Audubon is uniquely positioned to play a major role in restoring the Great Lakes for birds and people.**

Audubon has committed over the next decade to stabilizing breeding populations of 10 focal marsh bird species by restoring thousands of acres of high-priority coastal wetlands. Our science has helped us create a blueprint that indicates where our investments will most effectively protect birds and water quality. We recognize the importance of saving these birds and that sustainable populations of Great Lakes marsh birds would indicate the healthy functioning of coastal wetlands and the services they provide to clean and store water.

We are committed to mobilizing and diversifying our membership across the region, which will help ensure equitable benefits of Great Lakes conservation and the impact of our investments. By 2025, over **100,000 Audubon members** will have participated in the science, restoration, and political action necessary to restore and protect our Great Lakes. By providing adequate habitat for the **350 species of resident and migratory birds** that depend on the largest freshwater system on the planet, we will ensure clean water for **40 million people** and resilient coastal communities for many years to come.

With a growing presence in the Great Lakes region, Audubon is committed to securing a brighter future a brighter future for the birds and people of this vital region. Please join us on the journey by supporting our efforts.

GREAT LAKES REGIONAL LEADERSHIP

Great Lakes Leadership

Julie Hill-Gabriel
National Audubon Society
Vice President,
Water Conservation

Karen Hyun, Ph.D.
National Audubon Society
Vice President, Coastal
Conservation

Nathaniel Miller
Audubon Great Lakes
Director of Conservation,
Great Lakes and Upper
Mississippi Flyway

Rob Schultz
Audubon Minnesota
Vice President and
Executive Director

Ana Paula Taveras
Audubon New York and
Audubon Connecticut
Executive Director

Marnie Urso
Audubon Great Lakes
Policy Director

Michelle Parker
Audubon Great Lakes
Vice President and
Executive Director

Troy Peters
Audubon Great Lakes
Engagement Manager

Rebeccah Sanders
National Audubon Society
Senior Vice President, States

Chad Wilsey
National Audubon Society
Vice President and
Chief Scientist

For inquires please contact:
Nicole Minadeo
Audubon Great Lakes,
Communications Director
AudubonGreatLakes@
Audubon.org

PRIORITY CONSERVATION PROJECTS

Osprey

Priority Conservation Projects

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
SLRE_1	Allouez Bay	St. Louis River Estuary	Conceptual design	Black Tern	5-10	850	City of Superior, Lake Superior State University, St. Croix Tribe, Wisconsin Department of Natural Resources
Summary of Project: Restore hemi-marsh conditions in cattail-dominated marsh and diversify marsh depths to create mixed habitat. Support the potential recolonization of Black Terns.							
SLRE_2	Grassy Point	St. Louis River Estuary	Initial funding secured	Marsh Wren	1-5	130	City of Duluth, Minnesota Land Trust, Minnesota Pollution Control Agency
Summary of Project: Remove legacy wood waste and establish sheltered bay and marsh habitat. Improve water quality and public access.							
SLRE_3	Perch Lake	St. Louis River Estuary	Initial funding secured	Common Gallinule	1-5	200	Minnesota Department of Natural Resources, Minnesota Land Trust
Summary of Project: Enhance hydrologic connectivity and create sheltered bay. Optimize water management capacity to establish hemi-marsh conditions.							
SLRE_4	Radio Tower Bay	St. Louis River Estuary	Seeking funding	Bald Eagle	5-10	115	Minnesota Department of Natural Resources, Minnesota Land Trust
Summary of Project: Remove lumber mill waste and restore native wetland community. Investigate feasibility of building resiliency to water level fluctuations.							
SLRE_5	Hog Island	St. Louis River Estuary	Seeking funding	American Bittern	5-10	85	Lake Superior State University, Minnesota Land Trust, Wisconsin Department of Natural Resources
Summary of Project: Reestablish native vegetation in backwater channels surrounding island. Buffer and grade shorelines to improve resiliency.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
GB_1	Pullman Tank Farm Marsh	Green Bay	Seeking funding	Common Tern	1-5	50	City of Green Bay, University of Wisconsin-Green Bay, Wisconsin Department of Natural Resources, NEW Water
Summary of Project: Reestablish marsh bird and colonial waterbird nesting habitat by managing water levels and controlling invasive plants. Increase neighborhood access to greenspace.							
GB_2	Bay Beach	Green Bay	Seeking funding	Piping Plover	5-10	170	City of Green Bay, University of Wisconsin-Green Bay, Wisconsin Department of Natural Resources
Summary of Project: Construct hydrologic systems to restore wetland function in near-coastal environment. Significant outreach opportunities as this is a highly visited wildlife sanctuary with a nature center. Potential reconnection to Green Bay.							
GB_3	Deer Creek	Green Bay	Seeking funding	Least Bittern	5-10	550	Ducks Unlimited, Wisconsin Department of Natural Resources, University of Wisconsin-Green Bay, U.S. Fish and Wildlife Service
Summary of Project: Restore significant coastal wetlands by controlling invasive plants. Expand coastal wetlands around Cat Island.							
GB_4	Point au Sable and Wequiock Creek	Green Bay	Seeking funding	American Bittern	1-5	325	University of Wisconsin-Green Bay, NEW Water
Summary of Project: Restore coastal wetlands by repairing or modifying existing water control structure and berms, facilitate marsh bird-focused land management planning, and restore upland riparian wetlands.							
GB_5	Oneida Wetland Complex	Green Bay	Seeking funding	Yellow-headed Blackbird	1-5	400	Oneida Tribe, NEW Water, Wisconsin Department of Natural Resources
Summary of Project: Reconvert cropland to wetlands and manage riparian wetlands to expand shallow marsh and mudflat habitat in the Upper Deer Creek watershed.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
MWC_1	Montezuma Wetlands Complex	Lakeshore Marshes Montezuma Area	Identifying partners	Pied-billed Grebe	1-5	TBD	U.S. Fish and Wildlife Service, Friends of the Montezuma Wetlands Complex
Summary of Project: Restore and manage marshes, swamps, and forests across 50,000-acre landscape-scale wetland complex.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
ELOM_1	Lakeview Wildlife Management Area	Eastern Lake Ontario Marshes	Seeking funding	Black Tern	1-5	180	Ducks Unlimited, New York State Department of Environmental Conservation
Summary of Project: Establish hemi-marsh by creating potholes and channels within cattail monoculture at Lakeview Wildlife Management Area.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
CAL_1	Big Marsh	Calumet	Project completed	Sora	1-5	100	Chicago Park District, Friends of Big Marsh
Summary of Project: Continue marsh bird monitoring, hydrologic restoration, and invasive plant control.							
CAL_2	Eggers Grove	Calumet	Project completed	American Coot	1	70	Forest Preserves of Cook County, Nature Conservancy
Summary of Project: Improve water level control of marsh by installing a three-tiered water control structure.							
CAL_3	Deadstick Pond	Calumet	Seeking funding	Marsh Wren	1-2	50	Chicago Park District, Metropolitan Water Reclamation District, Wetlands Initiative
Summary of Project: Repair existing drainage structures, control invasive vegetation, and facilitate regional bicycle accessibility to activate the riverfront park.							
CAL_4	Highland Heron Rookery	Calumet	Project underway	Great Blue Heron	1	110	Lake County Parks, Little Calumet River Basin Development Commission, Nature Conservancy, Wetlands Initiative
Summary of Project: Control invasive plants and modify existing water control structure to improve hydrologic manipulation.							
CAL_5	Indian Ridge Marsh	Calumet	Project completed	Black-crowned Night-Heron	1	100	Chicago Park District, Wetlands Initiative, Student Conservation Association
Summary of Project: Control invasive plants and modify existing drainage system to improve hydrologic manipulation.							
CAL_6	Marshalltown Marsh	Calumet	Project underway	Common Gallinule	1-5	300	Lake County Parks, Little Calumet River Basin Development Commission, Nature Conservancy, Wetlands Initiative, City of Gary
Summary of Project: Re-meander the highly channelized and straightened segment of the Little Calumet River to create backwater marshes.							
CAL_7	MLK Ave. Marsh	Calumet	Project underway	Least Bittern	1-2	100	Lake County Parks, Little Calumet River Basin Development Commission, Nature Conservancy, Wetlands Initiative, City of Gary
Summary of Project: Control invasive plants and modify existing water control structures to improve hydrologic manipulation.							
CAL_8	Wolf Lake	Calumet	Seeking funding	Swan	1-5	115	Illinois Department of Natural Resources, Hammond Port Authority
Summary of Project: Control invasive species and restore native plant communities on islands. Soften and grade shoreline to establish transition marsh. Solve drainage issues at Indian Creek or establish new water control mechanism.							
CAL_9	Powderhorn Marsh	Calumet	Funding secured	Pied-billed Grebe	1-5	110	Forest Preserves of Cook County, Nature Conservancy
Summary of Project: Reconnect Powderhorn to Wolf Lake to facilitate water level control measures and improve marsh conditions.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
ELM_1	Grand River, Ottawa Sands	Eastern Lake Michigan	Project underway	Least Bittern	1-2	2,000	Ottawa County Parks
Summary of Project: Continue marsh bird monitoring. Restore emergent marsh in near-coastal wetlands.							
ELM_2	White Lake/ White River	Eastern Lake Michigan	Conceptual design	Pied-billed Grebe	5-10	1,000	City of Montague, City of Whitehall, Michigan Department of Natural Resources, key private landowners
Summary of Project: Monitor and manage interior wetlands to maintain structural diversity and hemi-marsh conditions.							
ELM_3	Muskegon Lake/ Muskegon River	Eastern Lake Michigan	Conceptual design	Common Gallinule	1-5	5,500	City of Muskegon, Michigan Department of Natural Resources
Summary of Project: Monitor and manage interior wetlands to maintain structural diversity and hemi-marsh conditions.							
ELM_4	Kalamazoo River	Eastern Lake Michigan	Conceptual design	Migratory stopover	5-10	1,700	Pottawatomie Club, Gun Lake Tribe
Summary of Project: Monitor and manage interior wetlands to maintain structural diversity and hemi-marsh conditions.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
SMR_1	Munuscong Bay	St. Marys River and the Straits of Mackinac	Conceptual design	Black Tern	1-5	2,300	Sault Tribe, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service, Chippewa Luce Mackinac Conservation District
Summary of Project: Control invasive plants and continue to create productive hemi-marsh habitat. Continue monitoring one of the area's remaining Black Tern nesting sites.							
SMR_2	Neebish, Sand, and Sugar Islands	St. Marys River and the Straits of Mackinac	Seeking funding	American Bittern	1-5	1,000	Sault Tribe, Michigan Department of Natural Resources, U.S. Fish and Wildlife Service
Summary of Project: Improve coastal resiliency of wetlands by restoring and maintaining high-quality coastal wetlands at risk of erosion.							
SMR_3	De Tour Nature Preserve, Seymour Bay, Birge Preserve	St. Marys River and the Straits of Mackinac	Seeking funding	Marsh Wren	5-10	1,100	Sault Tribe, Michigan Department of Natural Resources, Little Traverse Conservancy, Michigan Sea Grant
Summary of Project: Monitor and manage emergent marsh along the coast of Lake Huron and the Straits of Mackinac.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
SB_1	Wigwam Bay State Wildlife Management Area	Saginaw Bay	Project underway	Black Tern	1-2	820	Michigan Department of Natural Resources
Summary of Project: Create openings and interspersion in cattail-dominated marshes. Monitor Black Tern nesting success and optimize the design and method of cattail control.							
SB_2	Fish Point SWA and Crow Island SGA	Saginaw Bay	Conceptual design	Yellow-headed blackbird	5-10	3,800	Michigan Department of Natural Resources, Ducks Unlimited, Environmental Consulting & Technology, Inc.
Summary of Project: Improve and increase emergent marsh to support waterfowl hunting, marsh bird nesting, and bird migration. Convert cropland into diverse marsh vegetation with an emphasis on waterfowl food production.							
SB_3	Tobisco Marsh, Quinnacassee State Wildlife Area	Saginaw Bay	Conceptual design	Yellow-headed blackbird	1-5	3,500	Michigan Department of Natural Resources, Nature Conservancy, Saginaw Chippewa Tribe
Summary of Project: Restore and preserve wetlands by encouraging interspersion and high-quality emergent marsh. Maintain openings in emergent vegetation-dominated wetlands and optimize water level management.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
DRSCF_1	Pointe Mouillee	Detroit River and the St. Clair Flats	Conceptual design	Blue-winged Teal	5-10		Michigan Department of Natural Resources
Summary of Project: Enhance breeding marsh bird conditions through vegetation management.							
DRSCF_2	Lake Erie Metropark	Detroit River and the St. Clair Flats	Seeking funding	Osprey	1-5		Huron-Clinton Metroparks, Michigan Department of Natural Resources
Summary of Project: Improve public access to wetlands and optimize water management capacity to establish hemi-marsh conditions.							
DRSCF_3	St. Clair Flats	Detroit River and the St. Clair Flats	Project underway	Black Tern	1-5		Michigan Department of Natural Resources, Ducks Unlimited
Summary of Project: Manage openings in the cattail-dominated wetlands to maintain structural diversity and provide nesting space for black terns. This will also improve recreational access.							
DRSCF_4	Detroit River International Wildlife Refuge	Detroit River and the St. Clair Flats	Seeking funding	American Coot	5-10		U.S. Fish and Wildlife Service, Michigan Department of Natural Resources
Summary of Project: Facilitate restoration planning with a marshbird-conservation approach through optimized water management and invasive plant control.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
WLEB_1	Sandusky River Mouth	Western Lake Erie Basin	Conceptual design	King Rail	1-5	3,200	Ohio Coastal Program, Ohio Department of Natural Resources, Nature Conservancy
Summary of Project: Expand coastal wetlands at the mouth of the river to reduce phosphorus and nitrogen runoff, slow down the flow of water, and mitigate flooding.							
WLEB_2	Sandusky Bay Interior	Western Lake Erie Basin	Conceptual design	Pied-billed Grebe	5-10	1,800	Ohio Coastal Program, Ohio Department of Natural Resources
Summary of Project: Recreate wetlands, shoals, and islands to attenuate waves, capture sediments, and encourage habitat expansion.							
WLEB_3	East Sandusky Bay	Western Lake Erie Basin	Conceptual design	Blue-winged Teal	5-10	1,100	Ohio Coastal Program, Ohio Department of Natural Resources
Summary of Project: Soften the shoreline and improve connectivity across coastal wetlands by creating habitat in the interior bay.							
WLEB_4	Maumee River Mouth	Western Lake Erie Basin	Conceptual design	Bald Eagle	1-5	650	Ohio Coastal Program, Ohio Department of Natural Resources
Summary of Project: Create and restore wetlands to reduce phosphorus and nitrogen runoff, enhance flood control, and increase recreational opportunities.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
NRC_1	Buckhorn Island State Park	Niagara River Corridor	Project underway	Migratory stopover	1-2	88	New York State Office of Parks, Recreation and Historic Preservation, Buffalo Audubon Society
Summary of Project: Restore floodplain forest and reestablish canopy.							
NRC_2	Niagara Islands	Niagara River Corridor	Project underway	Common Tern	1-2	2	New York State Department of Environmental Conservation, Buffalo Audubon Society
Summary of Project: Establish native emergent marsh.							

Project Number	Location	Region	Status	Flagship Species	Time Frame (years)	Acres Restored	Partners
BBA_1	Cranberry Pond	Braddock Bay Area	Project underway	American Bittern	1-5	191	New York State Department of Environmental Conservation, Ducks Unlimited, State University of New York-Brockport, Genesee Valley Audubon Society
Summary of Project: Create potholes and channels in cattail monoculture to restore habitat diversity. Enhance and protect native fen habitat from invasive species.							

Methodology for Spatial Prioritization of Great Lakes Coastal Wetlands

Great Lakes coastal wetlands are found throughout the basin, along shorelines, at the mouths of tributaries, and lining connecting channels. There are more than 500,000 acres of Great Lakes coastal wetlands, 70 percent of which are located within the United States (our study area excluded Great Lakes coastal wetlands in Canada). To narrow the focus of our analysis, we defined our study area as encompassing the U.S. Great Lakes coastal wetland system, which included all wetlands within 30 kilometers of the shoreline. We mapped wetlands from three data sources: (1) the Great Lakes Coastal Wetland Monitoring Program (CWMP) survey, which includes all coastal wetlands within the Great Lakes basin that are larger than four hectares and have herbaceous vegetation and a surface water connection to a Great Lake; (2) Environmental Protection Agency (EPA) potential wetlands, which include coastal wetlands (within 10 kilometers of the shoreline) identified using synthetic aperture radar (SAR) and optical satellite imagery from three different seasons; and (3) remaining peripheral coastal wetlands, which encompass the emergent wetland class derived from the National Wetlands Inventory dataset and clipped to within 30 kilometers of the shoreline. Taken together, these datasets represent the comprehensive coastal wetland universe we considered for our spatial prioritization.

We selected a representative suite of marsh bird species that breed in high-quality, hemi-marsh habitat in the Great Lakes to include in our prioritization. Hemi-marsh habitat is characterized by an open mix of emergent and/or floating-leaved vegetation (at a roughly 50/50 proportion) interspersed with a submersed plant community. Combined with open water, hemi-marsh provides the structure and food resources many marsh birds require to successfully reproduce. A total of 14 species were included in our analyses: the American Bittern, Black-crowned Night Heron, Black Tern, Blue-winged Teal, Common Gallinule, Least Bittern, Marsh Wren, Osprey, Pied-billed Grebe, Sandhill Crane, Sedge Wren, Sora, Swamp Sparrow, and Virginia Rail.

We compiled observational data for all 14 species from the Great Lakes Coastal Wetland Monitoring Program. The basic sampling unit for breeding marsh bird surveys is a point count, and the study unit (or site) is defined at the wetland level; the number of points sampled in a given wetland varies from 1 to 15 points, depending on total wetland area, shape, accessibility, and habitat heterogeneity. The overall goal of CWMP breeding bird surveys is to identify species that use coastal wetlands during the primary breeding season (mid-May to mid-July) for nesting, foraging, or resting. Observers sample each survey point one to two times during each breeding season.

METHODOLOGY FOR SPATIAL PRIORITIZATION OF GREAT LAKES COASTAL WETLANDS

We used CWMP bird survey data collected from 2011 to 2017, including observations at Canadian Great Lakes coastal wetlands, to maximize species-specific sample sizes for estimating the potential factors influencing detection of marsh birds across the Great Lakes Basin. Our dataset included both time of first detection and distance of observations, which we used to estimate point-level, species-specific offsets that correct for two components of detection probability (availability and perceptibility). Availability, which is the probability that a bird provided a visual or auditory cue during sampling and was thus available to be detected, was estimated using the first minute of observation. Each individual was counted only once (i.e., individuals were "removed" once detected). Perceptibility, which is the conditional probability that birds available for detection were actually detected, was estimated as a function of distance from the observer.

To identify high-priority areas for the 14 focal species, we built a set of landscape-scale habitat suitability models. These models were built using two sets of data: bird observations gathered by CWMP monitors and habitat conditions measured through remote sensing. Bird occurrence and counts were linked to measures of habitat and environmental conditions within a 400-meter radial distance surrounding the point where the birds were observed. We incorporated nine measures of habitat conditions in our species-habitat models: proportion of open water, herbaceous wetlands, woody wetlands, agriculture (cereals and oil seeds), dense *Phragmites australis* stands, and impervious surfaces (a measure of human impact), as well as annual lake levels, latitude, and longitude. By relating bird counts with these habitat conditions, we developed an understanding of how birds respond to their environment, and we were able to use these relationships to predict bird abundance at sites where surveys were not conducted (i.e., across the entire U.S. Great Lakes Basin). Thus areas of high suitability represent locations that could support robust populations of breeding marsh birds if the necessary local-scale conditions are present.

Finally, we used conservation planning software (Zonation) to rank every cell in the landscape based on the probability of occurrence or relative abundance of each of the 14 focal species (based on results from the species-habitat models). Zonation is a decision-support tool that optimizes habitat quality and connectivity for multiple species simultaneously to produce a priority ranking based on the representation of target species. We ran the prioritization analysis using a coastal wetland mask (i.e., a wetland universe consisting of the three aforementioned wetland datasets) to exclude all other land cover types from the ranking.

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CAPTIONS AND CREDITS

Captions and Credits

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Pg. 2 Black-crowned Night-Heron. Photo: Jeff O'Keeffe/Audubon Photography Awards
Pg. 4 Photo: David Fuller
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Pg. 10 Cartography: Daniel Huffman
Pg. 11 Osprey. Photo: Mario Labado/Audubon Photography Awards
Pg. 12 Sandhill Crane. Photo: Vincent Hagel/Audubon Photography Awards
Pg. 17 Black-crowned Night-Heron. Photo: Tony Peebles/Great Backyard Bird Count
Pg. 18 Juvenile Common Gallinule. Photo: Lynn Cleveland/Audubon Photography Awards
Pg. 20 American Bittern. Photo: Leonard Hantz
Pg. 20 American Coot. Photo: Shutterstock
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Pg. 20 Blue-winged Teal. Photo: Barbara Cohen
Pg. 20 Common Gallinule. Photo: Christine Sandberg
Pg. 20 Least Bittern. Photo: Paul Roesding
Pg. 20 Marsh Wren. Photo: James Bowman
Pg. 20 Pied-billed Grebe. Photo: Donald Dvorak
Pg. 20 Sora. Photo: Roberta Blair
Pg. 20 Swamp Sparrow. Photo: Gary Robinette
Pg. 20 Virginia Rail. Photo: Janet and Phil
Pg. 21 King Rail. Photo: Carl Giometti
Pg. 21 Swamp Sparrow. Photo: Georgia Wilson
Pg. 21 Sedge Wren. Photo: Kathryn Cubert
Pg. 21 Blue-winged Teal. Photo: Meryl Lorenzo
Pg. 21 American Bittern. Photo: Joseph Mahoney
Pg. 21 Sora. Photo: Roberta Blair
Pg. 21 Common Gallinule. Photo: Mark Eden
Pg. 21 Pied-billed Grebe. Photo: Linda MacMillan
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Pg. 22 Common Loon. Photo: Shirley Donald/Audubon Photography Awards
Pg. 24 Black Terns. Photo: Shutterstock
Pg. 25 Cartography: Daniel Huffman
Pg. 25 Black Terns. Photo: Debra Potts/Audubon Photography Awards
Pg. 25 Black Tern. Photo: David Fuller
Pg. 25 Black Tern. Photo: Shutterstock
Pg. 26 Cartography: Daniel Huffman
Pg. 27 Cartography: Daniel Huffman
Pg. 29 Redheaded Woodpecker. Photo: Kathleen Johnston
Pg. 29 Scarlet Tanager. Photo: Randy Streufert
Pg. 29 Pine Warbler. Photo: Mark Eden
Pg. 29 Sandhill Crane. Photo: Rexalena Cooper
Pg. 29 Virgina Rail. Photo: Janet and Phil
Pg. 29 Wood Thrush. Photo: Megumi Aita
Pg. 29 Cerulean Warbler. Photo: Gary Robinette
Pg. 29 Sedge Wren. Photo: Shari McCollough
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Pg. 46 Piping Plover. Photo: Unsplash, Ray Hennessey
Pg. 30 Cartography: Daniel Huffman
Pg. 32 Pied-billed Grebe. Photo: Donald Dvorak/Great Backyard Bird Count
Pg. 32 American Bittern. Photo: John Skelly/Audubon Photography Awards
Pg. 32 Common Gallinule Chicks. Photo: Sam Fried/Audubon Photography Awards
Pg. 32 Sandhill Crane. Photo: Madeline Poster/Audubon Photography Awards
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Pg. 37 Photo: Audubon Great Lakes
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Pg. 39 Bald Eagle. Photo: Venu Challajpg/Audubon Photography Awards
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Pg. 52 Great Blue Heron. Photo: Leslie Weichsel/Audubon Photography Awards
Pg. 54 Prothonotary Warbler. Photo: Linda Steele/Audubon Photography Awards
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Pg. 59 American Bittern. Photo: Jennifer Warner/Audubon Photography Awards
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Pg. 67 Black Tern. Photo: David Fuller
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Pg. 73 King Rail. Photo: Shutterstock
Pg. 75 Cartography: Daniel Huffman
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Pg. 83 Cartography: Daniel Huffman
Pg. 85 Pied-billed Grebe. Photo: Shutterstock
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Pg. 92 Common Loon. Photo: Harry Collins/Audubon Photography Awards
Pg. 94 Blue-winged Teal. Photo: Marcin Kojtka/Great Backyard Bird Count
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Pg. 103 Photo: Daniel Suarez
Pg. 105 Photo: Teri Valenzuela
Pg. 106 Photo: Invonne Chavez Natzaely
Pg. 107 Swamp Sparrow. Photo: Gary Robinette/Audubon Photography Awards
Pg. 108 Common Terns. Photo: Jack Nevitt/Audubon Photography Awards
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