# A. NATURAL RESOURCES

## INTRODUCTION

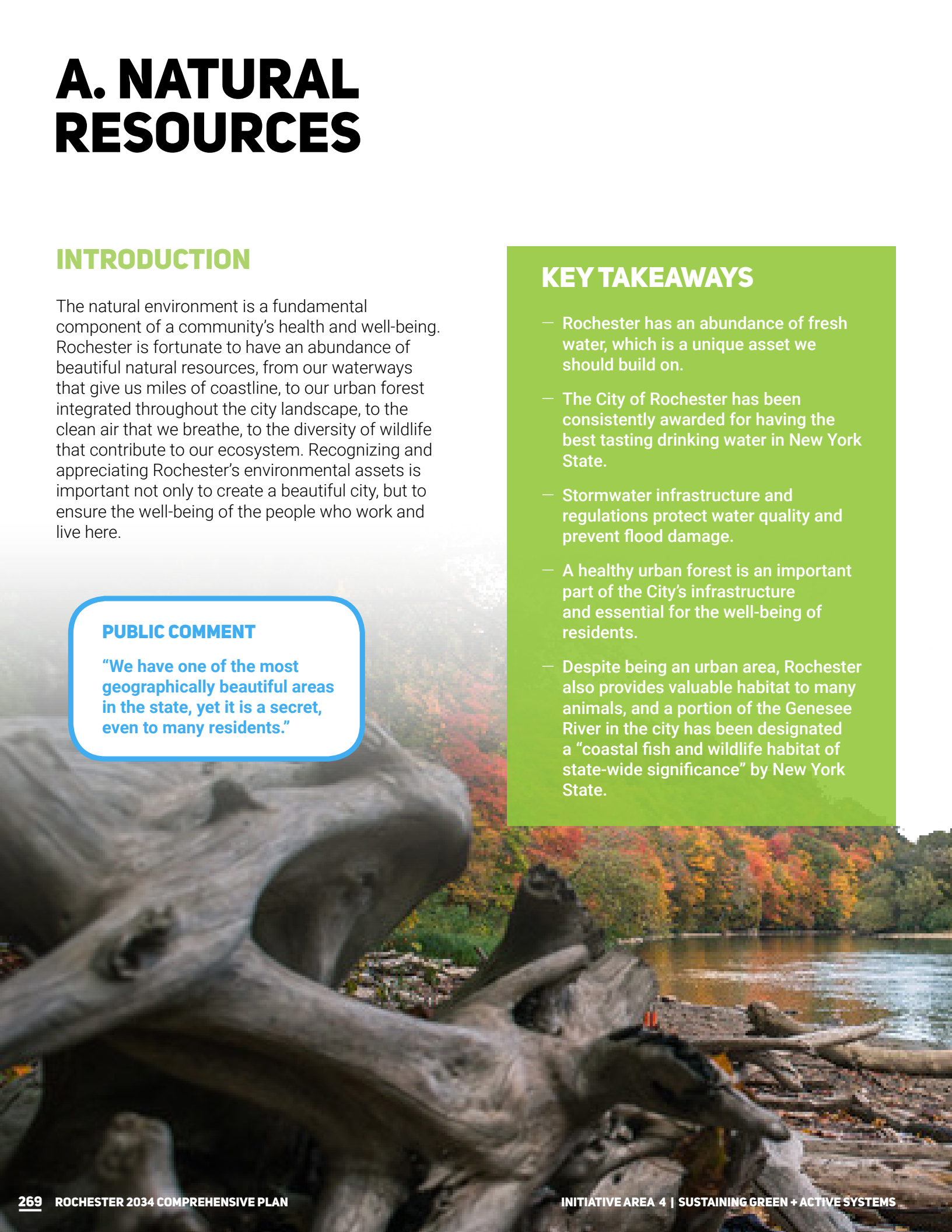
The natural environment is a fundamental component of a community's health and well-being. Rochester is fortunate to have an abundance of beautiful natural resources, from our waterways that give us miles of coastline, to our urban forest integrated throughout the city landscape, to the clean air that we breathe, to the diversity of wildlife that contribute to our ecosystem. Recognizing and appreciating Rochester's environmental assets is important not only to create a beautiful city, but to ensure the well-being of the people who work and live here.

### PUBLIC COMMENT

**"We have one of the most geographically beautiful areas in the state, yet it is a secret, even to many residents."**

## KEY TAKEAWAYS

- Rochester has an abundance of fresh water, which is a unique asset we should build on.
- The City of Rochester has been consistently awarded for having the best tasting drinking water in New York State.
- Stormwater infrastructure and regulations protect water quality and prevent flood damage.
- A healthy urban forest is an important part of the City's infrastructure and essential for the well-being of residents.
- Despite being an urban area, Rochester also provides valuable habitat to many animals, and a portion of the Genesee River in the city has been designated a "coastal fish and wildlife habitat of state-wide significance" by New York State.



## INTRODUCTION CONTINUED

**PUBLIC COMMENT**

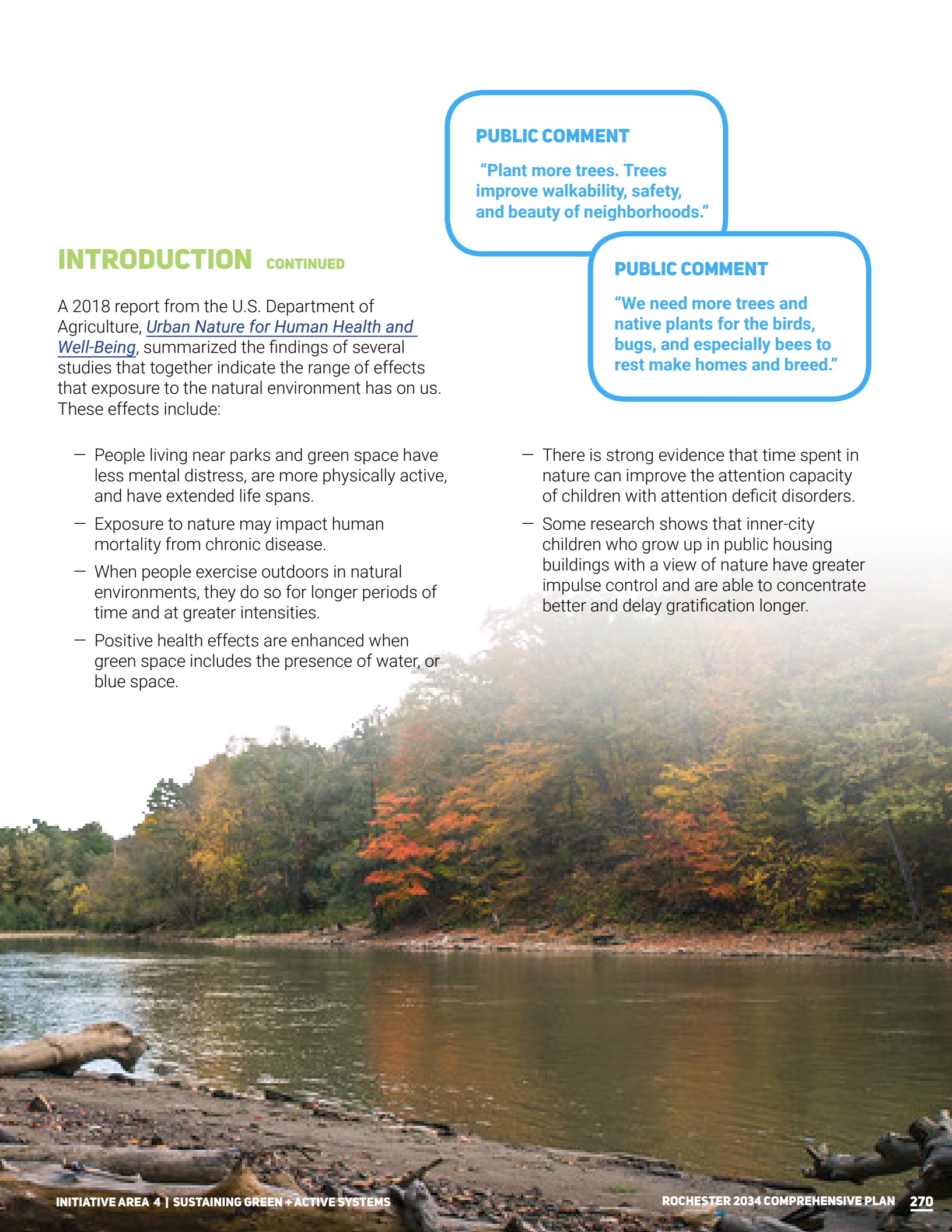
**"Plant more trees. Trees improve walkability, safety, and beauty of neighborhoods."**

**PUBLIC COMMENT**

**"We need more trees and native plants for the birds, bugs, and especially bees to rest make homes and breed."**

A 2018 report from the U.S. Department of Agriculture, *Urban Nature for Human Health and Well-Being*, summarized the findings of several studies that together indicate the range of effects that exposure to the natural environment has on us. These effects include:

- People living near parks and green space have less mental distress, are more physically active, and have extended life spans.
- Exposure to nature may impact human mortality from chronic disease.
- When people exercise outdoors in natural environments, they do so for longer periods of time and at greater intensities.
- Positive health effects are enhanced when green space includes the presence of water, or blue space.
- There is strong evidence that time spent in nature can improve the attention capacity of children with attention deficit disorders.
- Some research shows that inner-city children who grow up in public housing buildings with a view of nature have greater impulse control and are able to concentrate better and delay gratification longer.



## URBAN FOREST

A healthy urban forest is an integral part of the city infrastructure and essential for the well-being of all area residents. One of the most distinguishing characteristics of Rochester is its forest of trees. In 2019, Rochester celebrated 38 years of being designated as a "Tree City USA" community. The Tree City USA program is sponsored by the Arbor Day Foundation in cooperation with the National Association of State Foresters and the USDA Forest Service. Trees fill our parks, line our streets, and turn our cemeteries into parks; the diversity and age or our trees are without rival.

There is a strong link between urban trees and improved physical and mental health. Trees cool cities affected by the "heat island effect" and clean the air, which allows cities to be resilient against negative health effects brought on by climate change, including rising temperatures and air pollution. Trees also fight against noise pollution, increase the presence of wildlife, and allow people to connect with nature, all things that are linked to better mental health, as well as better productivity at school and work.

Updated in 2012, the City of Rochester Urban Forest Master Plan describes the unique history of our urban forest, discusses the benefits of trees, provides an overview of Rochester's current urban forest, compares benchmarks established in previous plans, details elements influencing that forest, states the City's urban forest policy, and poses a series of recommendations. The City Forester maintains an inventory including the location and characteristics of every tree on public land in Rochester. Each year, 1/6th of city trees are re-inventoried by City Forestry staff.

### ELEMENTS THAT AFFECT ROCHESTER'S URBAN FOREST

#### Construction

Construction is a major man-made influence affecting the urban forest. Often, 50% of mature street trees within a street reconstruction project are lost within five years. Vandalism and de-icing salts also profoundly affect tree establishment and longevity.

#### Pests

Pests are a considerable threat to the urban forest so they are factored into the species selection. Current arboricultural standards recommend that a tree species not exceed 10% of the forest population in order to minimize potential losses and to passively control pests attacking a specific species.

# URBAN FOREST CONTINUED

## WASHINGTON GROVE

Washington Grove is a City-owned woodland area near Cobbs Hill Reservoir. The grove comprises 26 acres of undisturbed old growth forest, with some trees hundreds of years old. The area has hiking trails, and is open to the public.

The City of Rochester has partnered with the Friends of Washington Grove to establish a fund within the City's Reforest Rochester Initiative, which focuses on replacing damaged trees and planting new trees. The fund has helped to preserve and maintain the grove for generations to come.

## ELEMENTS THAT AFFECT ROCHESTER'S URBAN FOREST CONTINUED

### Precipitation

With an annual rainfall of 34 inches and snowfall of 93 inches, there is ample moisture for tree growth. The combination of temperature and moisture allows for an extraordinarily broad range of tree species to grow in Rochester.

### Funding + Management

Funding, and management practices, along with condition survey and data collection have the most direct man-made influence on our urban forest. Without funding, trees do not get planted, pruned or removed. Planning and organizing workloads, driven by data analysis, provides the foundation for effective management of our forest resources.

## WATER RESOURCES

### GENESEE RIVER

The Genesee River runs 157 miles from its source in northern Pennsylvania to its mouth at Lake Ontario. With 13.5 miles of shoreline in Rochester, the River stretches from Genesee Valley Park in the south, cutting through the middle of Downtown, dropping down three waterfalls, and ending at Lake Ontario. The Genesee River originated as a tool for industry and navigation. Now, in addition to the hydroelectric plant, the river is celebrated for its beauty and its recreational opportunities.

### ERIE CANAL

The Erie Canal, completed in 1825, stretches from the Niagara River in Buffalo to the Hudson River north of Albany. The Canal makes up the southwestern boundary of the city, providing approximately 6 miles of shoreline within Rochester. The Canal contributed to Rochester's early growth, as it allowed for goods to be shipped around the country and the world. While the canal is still utilized for commercial shipping, its primary use is for recreation and beautification.

### LAKE ONTARIO

The City of Rochester is located on a Great Lake. Lake Ontario is the smallest of the five Great Lakes, but, at 7,340 square miles, it is the 14th largest lake in the world. Lake Ontario carries water from all the Great Lakes to the St. Lawrence River, which carries it to the Atlantic Ocean. The Lake forms Rochester's northernmost boundary, providing approximately 2.5 miles of shoreline in the city, including Durand Eastman Park. Lake Ontario provides Rochester with two natural sand beaches.

### LOCAL WATERFRONT REVITALIZATION PROGRAM

The Local Waterfront Revitalization Program is a strategy that acknowledges the unique opportunity Rochester has in its waterfront. It addresses the assets and challenges that exist along waterways, and provides strategies to guide land use and community development. Initially completed in 1990, Rochester's LWRP was updated in 2017 and its boundary was extended to include more than 4,000 parcels along the city waterways – the Erie Canal, Genesee River and Lake Ontario. For more than 4,000 individual waterfront parcels. More information can be found here.

**PUBLIC COMMENT**

**"Make our waterfronts (river/lake/canal) vibrant and beautiful!"**

**PUBLIC COMMENT**

**"We can have all of the natural resources we want, but if we don't take proper care of them we might as well not have them at all."**

LAKE ONTARIO

GENESEE RIVER

ERIE CANAL

COBBS HILL RESERVOIR

HIGHLAND PARK RESERVOIR

## WATER RESOURCES CONTINUED

### WATER QUALITY

Like many post-industrial cities, Rochester industry used waterways, primarily the Genesee River, for industrial shipping, processing, and waste discharge. Some legacy contaminants like heavy metals remain in the sediment of the Genesee River today. In addition to legacy contaminants, other pollutants continue to impact the River's water quality, including phosphorous and sediment carried to Rochester from agricultural activities and erosion in the watershed upstream.

Lake Ontario water quality continues to be the subject of study and programming. Due to federal and State water quality standards and programs, Rochester's waterways are improving. In 1987, the Environmental Protection Agency identified the area of Lake Ontario in proximity to Rochester, as well as six miles of the Genesee River from the lake to Lower Falls as an Area of Concern. This designation started an ongoing targeted effort led by the New York Department of Environmental Conservation and the Monroe County Department of Health that has led to water quality improvements throughout the Area of Concern.

The Lake Ontario waterfront has also been designated a Coastal Erosion Hazard Area of concern, meaning special precaution must be taking when developing the waterfront, to decrease runoff, ensure the preservation of the shore, and protect private property.

Stormwater runoff is a water quality concern, especially in an urban environment. Runoff can pick up and carry litter, nutrients, bacteria, chemicals, sediment and other pollutants across land or through the storm drain system to Rochester's water. Older cities often rely on sewer systems that combines household, commercial, and industrial sewage and stormwater runoff into one pipe system for conveyance to wastewater treatment plants.

During major rain events, these combined sewers are designed to overflow into water-bodies to reduce damage to homes and facilities. To substantially lessen these overflows in Rochester, a massive underground wastewater tunnel system became fully operational in 1993, completing over 20 years of design and construction. This Combined Sewer Overflow Abatement Program (CSOAP) drastically improved the quality of Rochester area waters by virtually eliminating the 60-70 annual sewer overflows that had occurred prior to its existence.

While the CSOAP system has minimized combined sewer overflows, they still occur, as designed, when the system exceeds capacity. The City of Rochester is addressing this issue through the implementation of green infrastructure techniques, as outlined in the City of Rochester *Sustainable Developer's Guide* and *Green Infrastructure Retrofit Manual*, such as:

- Permeable pavements
- **Bioretention/bioswales**
- Green roofs

# WATER RESOURCES CONTINUED

## WATER QUALITY CONTINUED

Other measures can also be implemented, including:

- Stream daylighting
- Downspout disconnection/redirecting stormwater into rain barrels or rain gardens
- Stormwater harvesting and reuse
- Use of vacant lots for stormwater management

Lastly, it should be noted that the water quality of the Genesee River is significantly impacted by the farming and development practices of suburban and rural towns south of Rochester. Substantial runoff from farms and subdivisions carries sediment and other pollutants into the river, increasing turbidity and affecting people's perception of its cleanliness.

## DRINKING WATER SUPPLY

Since 1876, the Rochester Water Bureau has been delivering quality drinking water from Hemlock and Canadice Lakes, located about 30 miles south of the City of Rochester in the Finger Lakes region. The Water Bureau maintains three finished water storage reservoirs having a combined capacity of 230 million gallons, one located in the town of Rush, NY and the other two at beautiful and historic Highland and Cobbs Hill Parks in the city.

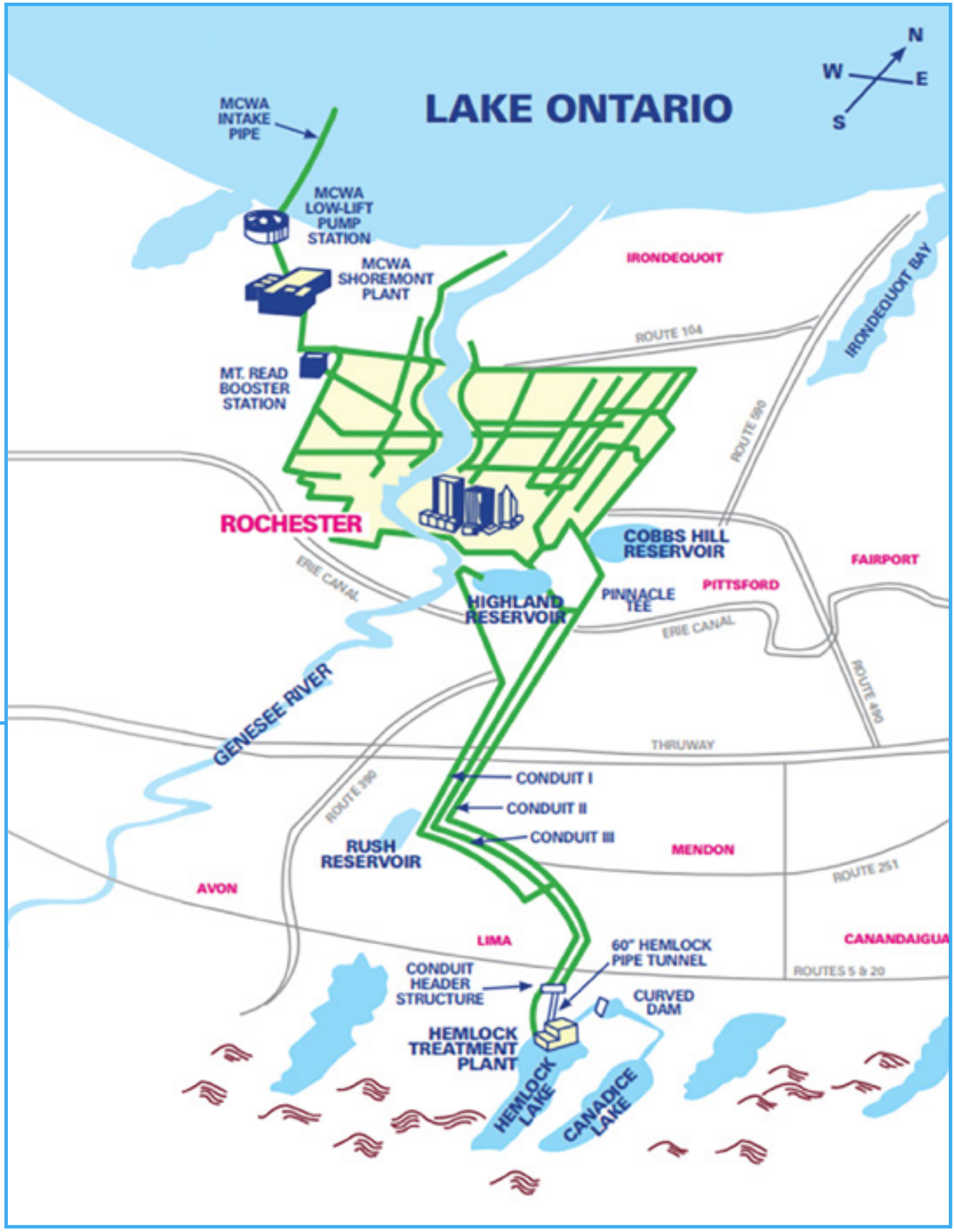
The City supplements its water supply with Lake Ontario water purchased from the Monroe County Water Authority (MCWA). This water is treated at the Shoremont Treatment Plant located on Dewey Avenue. **The City of Rochester has consistently been awarded for having the best tasting water in New York State.**

## WATER TREATMENT AND DELIVERY

The Hemlock and Shoremont treatment plants both employ similar treatment processes involving coagulation, filtration and disinfection. On a yearly average, the City's Hemlock Lake Filtration Plant produces 37 million gallons of treated water each day, which is delivered to the residents and businesses in the City of Rochester and sold to the MCWA for distribution to municipalities outside of Rochester. Water treated at the Hemlock Filtration Plant flows to the city by gravity through three large 100 year-old pipelines. This method of water transportation is unique to many Great Lakes cities, as it doesn't rely on pumping water uphill from the lake. This requires less energy, and is more resilient in the face of power outages.

Treated water is stored in the city's three reservoirs where it is re-disinfected as it exits each reservoir and enters a complex grid of water mains that distribute the water to city homes and businesses. The Water Bureau also maintains approximately 75 miles of water transmission conduits from Hemlock to Rochester, 570 miles of distribution mains, 7,600 fire hydrants, 57,800 water meters and 16,700 water valves. The **figure at right** is a graphic representation of the city's drinking water supply system. Maintaining this extensive and complex system is challenging and expensive, but critical.

In 2006 the United States Environmental Protection Agency issued new regulations for uncovered water storage facilities. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) addresses the health effects associated with contamination of drinking water. One of the requirements of the LT2 regulations is that uncovered reservoirs must be covered or provide treatment against the microbial pathogens. In response to these new regulations, Rush Reservoir was brought into compliance in 2012 with the installation of a synthetic membrane liner and floating cover. The City of Rochester is committed to having the Highland Reservoir and Cobbs Hill Reservoir in compliance with LT2 by 2023 and 2034, respectively.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ROCHESTER
COBBS HILL RESERVOIR
FAIRPORT
PITTSFORD
PINNACLE TEE
HIGHLAND RESERVOIR
ERIE CANAL
ERIE CANAL
ROUTE 490
GENESEE RIVER
THRUWAY
ROUTE 390
CONDUIT I
CONDUIT II
CONDUIT III
RUSH RESERVOIR
MENDON
ROUTE 251
AVON
LIMA
CANANDAIGUA
60" HEMLOCK PIPE TUNNEL
ROUTES 5 & 20
CONDUIT HEADER STRUCTURE
CURVED DAM
HEMLOCK TREATMENT PLANT
HEMLOCK LAKE
CANADICE LAKE

## AIR QUALITY

The New York State Department of Environmental Conservation regularly monitors Rochester's air quality, and publishes results annually. As of 2017, measurements for Sulfur Dioxide, Inhalable Particulates, Carbon Monoxide, and Nitrogen Dioxide have steadily decreased, and ozone has stayed steady. On average, all chemicals were measured to be below the established limits.

The American Lung Association monitors air quality regionally throughout the United States. The Association gave Monroe County a passing grade in air quality, with an 'A' for levels of 24-hour Particle Pollution, and a 'B' in levels of Ozone, however the weighted average number of days with "high ozone" conditions has sharply declined from nearly 20 in 2001-2003 to about one in 2014-2016.

The Federal Environmental Protection Agency monitors the number of unhealthy days for Asthma or other lung disease, which are diseases made more prevalent by poor air quality. In Monroe County, this number decreased from 12 in 2012 to three in 2017.

## WILDLIFE

Despite being an urban area, Rochester is home to a diverse number of animal species who live in the built environment, or in the city's natural areas. By protecting the habitats and well-being of animals, the entire ecosystem, including other natural resources such as trees, water, and air will be strengthened. Abundant wildlife also has the benefit of increasing tourism and enhancing residents' recreational experience.

Birds are also a common sight in Rochester. Birds such as falcons, hawks, blackbirds, sparrows, and woodpeckers have used the urban forest and built environment as habitat. In the city's riverway and wetlands, water birds such as mallards and wood ducks, herons, and sandpipers can be found. The river is also home to animals such as the Northern Water Snake and the Painted Turtle.

New York State has designated almost 6.5 miles of the river as a "coastal fish and wildlife habitat of state-wide significance". Fish can also be found in Lake Ontario, and in smaller lakes and wetlands. Some of the most common residents of Rochester's waterways include bass, salmon, and trout.

As the City of Rochester is almost entirely built out, there are minimal if any large scale future development threats to wildlife or their habitats, especially compared to development trends in the suburbs. However, each individual development project must go through a state-mandated development review process to ensure impacts are mitigated. As well, Rochester's renewed focus on its river, whether it be development projects or open space enhancements, should include not only the protection of these natural resources but the celebration and restoration of assets throughout the river corridor.

## TIMES SQUARE BUILDING: FALCON HABITAT

Pereguine falcons are the fastest birds in the world, as they can fly up to 180mph. In New York State, they are considered endangered.

In Rochester, the Times Square Building downtown has become a home for falcons and a popular destination for birdwatching enthusiasts. As of 2018, 66 falcons have hatched on the building, including 23 peregrine falcons. This site is closely monitored to ensure the protection of its habitat.

# A. NATURAL RESOURCES [NR]
# ACTION PLAN

| GOAL | | STRATEGIES | PARTNERS |
|---|---|---|---|
| **NR-1**<br>**Invest in infrastructure, policy, and advocacy efforts that protect and enhance Rochester's water resources.** | NR-1a | Promote the distribution and use of the *City of Rochester Sustainable Practices for Building Owners and Occupants Guide*, as well as the *City of Rochester Green Infrastructure Retrofit Manual,* by local developers and infrastructure project leads. | **City,** Developers, Building/Property Owners |
| | NR-1b | Expand investments in green infrastructure in areas surrounded by impervious materials to reduce the amount of storm water runoff. | **City** |
| | NR-1c | Coordinate with the Center for Environmental Initiatives' Genesee RiverWatch and other regional partners to identify strategies for improving water quality in the River. | **City**, Genesee River Alliance/ RiverWatch, Monroe County, GFLRPC, GTC |
| | NR-1d | Use the LWRP as a guideline for development, activity, and collaboration along the city's waterfront, and enforce the policies outlined in the Plan in order to protect our natural resources. | **City**, NYS, Community Groups/Funders |
| | NR-1e | Protect the coast from erosion risks through administration of Chapter 43A of the City code. | **City**, NYS |
| | NR-1f | Support the formation of a Genesee River Alliance, a coalition of area stakeholders focused on education, river health, advocacy, and community engagement. This organization, combined with the efforts of the City and the proposed downtown/riverfront management entity through ROC the Riverway, will form a critical partnership to ensure a holistic approach to the river's preservation and potential as a community asset. | **Genesee Land Trust**, City, NYS, Genesee River Alliance/ RiverWatch, Downtown/ Riverfront Management Entity |

**Notes:**

1. Partners listed in bold are recommended to lead the implementation of that strategy.
2. For a list of partner acronyms see Appendix A.

| GOAL | | STRATEGIES | PARTNERS |
|---|---|---|---|
| **NR-2**<br>**Provide ongoing upgrades and modernization of water distribution, storage, and treatment systems and facilities.** | NR-2a | Bring the Highland and Cobbs Hill Reservoirs into compliance with LT2 while respecting the surrounding significant historic and parkland resources. | **City**, NYS |
| | NR-2b | Upgrade and modernize the water supply conduit system. | **City** |
| | NR-2c | Improve the Cobbs Hill fence surrounding the Reservoir. | **City** |
| | NR-2d | Renovate and upgrade the Hemlock Water Filtration Plant. | **City** |
| **NR-3**<br>**Protect and expand Rochester's urban forest.** | NR-3a | Use the Forestry Master Plan to guide Rochester's efforts in protecting and expanding the urban forest and commission an update of the current Master Plan. | **City**, Community Groups/Funders |
| | NR-3b | Continue to administer targeted control measures to protect the urban forest from invasive insects and diseases. | **City** |
| | NR-3c | Identify a goal for the percentage of the city to be covered by tree canopy and set strategies for meeting that goal. | **City** |
| | NR-3d | Provide information about species, planting techniques, placement guidelines, and underground utility location for private property owners interested in planting trees on their property. | **City**, Building/ Property Owners |

# A. NATURAL RESOURCES [NR]
# ACTION PLAN

| GOAL | STRATEGIES | PARTNERS |
|---|---|---|
| **NR-4**<br>**Promote and protect Rochester's natural resources as assets for attracting residents, businesses, and tourists.** | NR-4a Promote Rochester's abundant fresh clean water supply as an asset to attract new residents and businesses. | **City**, GRE, Visit Rochester, FLRTC |
| | NR-4b Create a promotional video vignette about Rochester's extraordinary natural resources. | **City**, Education Institutions, Visit Rochester, FLRTC, GRE |
| | NR-4c Implement the ROC the Riverway Vision Plan and Local Waterfront Revitalization Plan. | **City**, NYS |
| | NR-4d Explore the opportunity to support bird-friendly development and design guidelines for new development within the city, which could include:<br>— Install bird-friendly, non-reflective windows<br>— Use awnings and overhangs to add visual cues to birds and reduce reflection<br>— Discourage use of angled glass windows<br>— Use glare-minimizing external lights, and reduce spill light | **City**, Rochester Birding Association, Genesee Audubon Society, Developers |

**Notes:**

1. Partners listed in bold are recommended to lead the implementation of that strategy.
2. For a list of partner acronyms see Appendix A.

| GOAL | STRATEGIES | PARTNERS |
|---|---|---|
| **NR-5**<br>**Protect natural resources and promote long-term sustainability through increased environmental awareness and education.** | NR-5a Develop targeted education and community engagement campaigns on specific issues related to the personal and community benefits of environmental sustainability. | Environmental Community, City |
| | NR-5b Develop diverse and engaging environmental programming that instills a love of the natural world and cultivates an environmental stewardship in residents from a young age. | Environmental Community, RCSD, City |
| | NR-5c Encourage and support development of "sustainability curriculum" and environmental programming in schools, rec centers, and other community venues to educate students and adults about issues related to natural history, environmental stewardship, urban planning and ecology, sustainability, climate change, etc. | RCSD, City |
| | NR-5d Support efforts to establish an ecology center or centers along the river. | City, Environmental Community |