ENVIRONMENT

Vision

Rockville strives to assure clean land, air and water, and efficient use of resources, to foster healthy, sustainable, and resilient environments for living, working, and recreation.

Integrating stormwater treatment with outdoor recreation and wildlife habitats, as shown here at College Gardens Park, brings together several of Rockville's environmental goals and provides attractive amenities in the Rockville community.

Rockville aspires to be a green, sustainable community. The City acts locally to protect critical environmental resources and address pressing environmental challenges. The City provides regulatory structures, incentives, and implementation programs, in partnership with County, regional, State, and federal agencies. For example, most stream valleys and steep banks are protected by City ownership, and ongoing restoration efforts help to protect critical wildlife habitat. Stormwater management, as required by State law, has specific, measurable targets, as discussed in the Water Resources Element. Forest cover is maintained and enhanced in City-owned forest preserves and through regulations that promote tree preservation and planting on private property.

Rockville regulations and incentives for 'green' building promote energy efficiency, environmental site design, and the use of sustainable building materials. Strides have been made to expand recycling, and other solid waste management services, in order to divert waste from landfills.

While recognizing that the issue of climate change is national and global in scope, the City of Rockville works in partnership with hundreds of other cities to seek solutions to the growing crisis and cut greenhouse gas emissions.

The policies in this Element set a framework for continued efforts regarding energy efficiency, 'green' building, waste management, food systems, and sensitive areas that provide wildlife habitat.

Summary of Community Input

Rockville 2040 participants consistently communicated the importance of environmental quality, frequently in the context of discussing other areas of the Plan because environmental quality spans all Plan elements. For instance, concentrating development near transit stations was viewed as beneficial to air quality by reducing use of the automobile, as was promotion of bicycling, rolling and walking. Preservation of environmental areas, including within City parkland, will ensure continued open space and assist in protection of both waterways and native species of plants and animals. Protecting and promoting Rockville's tree canopy will provide visual beauty, shade, and improvements to air quality. Some participants also mentioned their awareness of the importance of addressing climate change, and their desire for Rockville to contribute to regional efforts in that regard.

Goals for Rockville's environmental efforts include:

1. Bring an environment ethic when setting City policies and weighing options or actions.
2. Cut greenhouse gas emissions and increase resiliency to climate change.
3. Promote sustainable, healthy, and resilient green building design and practices.
4. Enhance community health and quality of life.
5. Reduce, reuse, and recycle solid waste and yard waste.
6. Manage a sustainable urban forest and protect stream corridors, wildlife habitat, and water quality.

GOAL 1
Bring an environment ethic when setting City policies and weighing options or actions.

The City of Rockville commits itself to protection of our shared natural resources in the city's land, water resources, and air. The policies and actions in this Comprehensive Plan are guided by a recognition of the need to:

- Reduce air pollution and greenhouse gas emissions,
- Plan for an efficient land use pattern and transportation network,
- Develop and retrofit buildings to use less energy,
- Protect the health and well being of Rockville's population, reduce solid waste, protect and restore critical environmental and wildlife areas.

Taken together, this approach is the foundation of an environment ethic, which the City will use in decision making for City facilities and actions, and promote to the rest of the community. The City of Rockville will act as a champion of this environmental ethic, placing environment concerns at the center of discussion when considering a course of action. This ethic will be confronted by other considerations, particularly the upfront cost of implementing efficiency measures and sustainable development practices. Lifestyle choices, which favor convenience, also challenge Rockville citizens in terms of changing behaviors that impact the overall environment.

Newly hatched painted turtle and red eared slider turtles from the City's Hungerford-Stoneridge Stormwater Management Facility during 'Operation Turtle Lift' in 2018.

Policy 1
Establish and promote an environmental ethic, or set of values and principles, that guide the policies and actions of the City of Rockville.

There is an urgent need to act to address threats in multiple areas. This environment ethic seeks to inspire civic engagement and partnerships with our residents, neighborhoods, businesses, and institutions. The first step is an awareness of the serious issues confronting the community, leading to sustained engagement with all interested parties on prevention of further damage and a commitment to act together on solutions.

Actions

1.1 Educate and engage with residents, businesses, neighborhoods, and institutions to be partners in environmental stewardship.

1.2 Incentivize action by residents, businesses, and institutions that support environmental goals.

1.3 Lead by example by piloting new innovative City practices, policies, technologies, and programs to promote a healthy and sustainable environment.

1.4 Develop a framework that provides the flexibility to assess and reconcile competing policy demands, such as stormwater management, tree canopy, renewable energy, recreation, housing, transportation, and historic preservation.

1.5 Demonstrate results by identifying sustainability metrics to track and assess performance.

1.6 Maintain Rockville's status as a Sustainable Maryland Certified community. (*See also Policy 16 of the Economic Development Element*).

GOAL 2
Cut greenhouse gas emissions and increase resiliency to climate change.

Looking to the future of Rockville in the year 2040, one thing is a near certainty: average daily temperatures will be much higher than when the community was founded in the 1790s. The scientific analysis regarding carbon pollution was established decades ago, and now the predicted impacts are clear to see, including in Rockville, as described below. The use of fossil fuels is ubiquitous to our current lifestyles, and therefore the Comprehensive Plan is the right place to set basic policies and strategies to address the issue. This Plan outlines two main policies to address the climate crises: (1) cut greenhouse gas emissions as quickly as possible to reduce the city's contribution to climate change, and (2) prepare for the impacts that climate change will bring to Rockville through increased resiliency and preparedness.

The phenomenon of climate change caused by an overabundance of greenhouse gas emissions (GHG) in earth's atmosphere is global and civilizational in scale. Many of the necessary actions will be determined at the international, federal, and State levels. And yet cities both large and small are taking a leading role in addressing climate change, both by necessity in terms of preparing for flooding, drought, and heat events, and also with a recognition that a part of total emissions is generated at the community, business, and individual level where municipal governments are adept at acting.

A resolution adopted by the City of Rockville Mayor and Council in June of 2017 recommits the City to the goals set by the Paris Climate Agreement signed in December 2016, including a reduction of GHG emissions to 40 percent of 2006 levels by 2030, as mandated by Maryland's Greenhouse Gas Reduction Act of 2016. This reduction target is very challenging and the 2030 deadline fast approaching. In addition, as this plan was being prepared the City was developing a comprehensive Climate Action Plan with specific and measurable action items to reduce greenhouse gas emissions and increase resiliency in the city.

A number of elements in this Plan seek to respond to the fact that the development pattern that previous City master plans shaped is energy intensive and produces high amounts of carbon emissions per capita. Policies on climate change are stated in the Land Use Element and the Transportation Element in regard to the need to plan future development in a way that reduces and eliminates carbon emissions, primarily by creating a more-walkable and transit oriented community.

Policy 2
Reduce Rockville's greenhouse gas emissions through a coordinated and sustained campaign to make our built environment, and our systems and practices, more efficient and less reliant on fossil fuels.

The City of Rockville is committed to slowing climate change by reducing greenhouse gas emissions in support of State law and in keeping with our regional partnerships. This significant and critically important effort must engage the whole community, challenging our neighborhoods, businesses, institutions, and individuals to reduce emissions.

Actions

2.1 Promote and support collective and individual actions by the City, residents, and businesses to reduce greenhouse gas emissions and other air pollutants.

2.2 Create a Rockville Climate Action Plan that outlines the short term and long term actions and strategies the City will undertake to promote and realize cuts in carbon emissions.

Individual homeowners in Rockville have taken action to reduce greenhouse emissions, such as by installing photovoltaic solar panels on their houses.

Community Greenhouse Gas Emissions

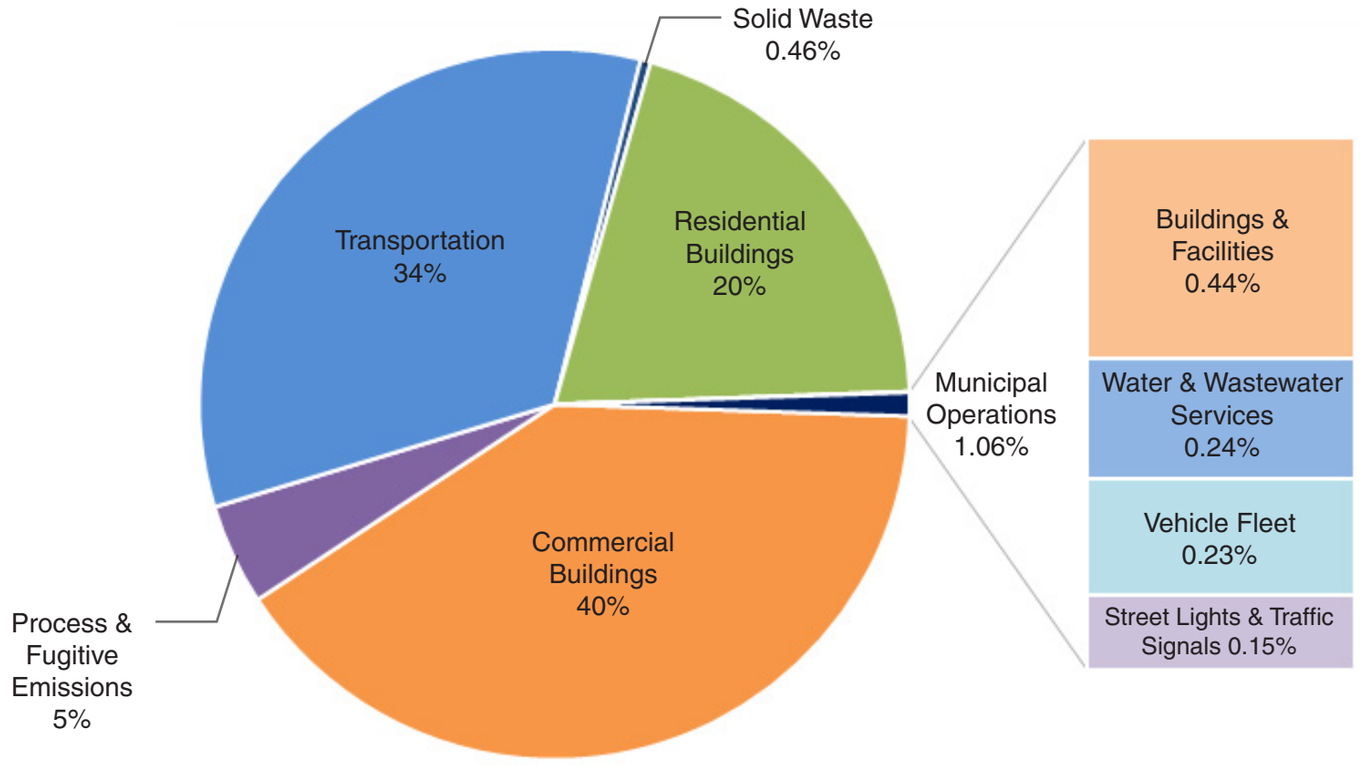
An inventory of Rockville's greenhouse gas emissions in 2015, shown in the pie chart below, was developed by the Metropolitan Washington Council of Governments using the ICLEI U.S. Community Protocol and ClearPath tool. The three big sectors that generate 94 percent of Rockville's emissions are commercial buildings (and all the machinery and equipment in those buildings), residential buildings, and transportation.

Commercial buildings generated approximately 40 percent of emissions (31 percent from electricity and 9 percent from natural gas).

Residential buildings account for 20 percent of emissions (10.4 percent from electricity, 9 percent from natural gas, and 1% from home heating fuels).

Transportation generated 34 percent of emissions, with approximately 30 percent of total emissions from diesel and gasoline consumed by on-road sources, such passenger vehicles, buses and commercial vehicles. The remaining four percent from transport sources came from aviation, rail, and off-road vehicles.

Emissions from Rockville government operations contributed one percent of total emissions. Fugitive emissions are gases that leak into the atmosphere from pressured tanks and pipes; these emissions do not produce any energy and yet account for five percent of the total emissions.



2.3 Advocate for State and federal programs that reduce air pollution and greenhouse gas emissions.

2.4 Coordinate with the Metropolitan Washington Council of Governments (MWCOG) and other agencies as they collect data to calculate Rockville's greenhouse gas emissions, and as regional goals and targets are set.

Policy 3
Maximize building energy efficiency and increase capacity to generate renewable energy and deliver clean energy from regional utilities.

About 60% of Rockville's greenhouse gas emissions are generated to operate and occupy our residential and commercial buildings. This includes heating and cooling and all other activities powered through the electrical systems, natural gas lines, and fuel oil used within our buildings.

Progress in reducing emissions is being made in Rockville in two areas: first, the amount of energy consumed per capita and per square-foot of commercial space is decreasing; and second, reductions have been achieved in carbon emissions produced to generate power for the electricity grid that serves Rockville (see box at right).

Rockville's population grew between 2005 and 2015 by roughly 12,000 residents and the city also added over 3 million square feet of commercial space, and yet the consumption of electricity went down by 10% for residential uses and by 13% percent for commercial uses. Rockville is using less electricity than in the recent past. This shows real progress toward efficiency in lighting, appliances, and equipment.

Actions

3.1 Implement projects at City facilities to improve energy efficiency, use of renewable energy, and back-up power generation for critical City facilities and services. Work toward meeting or exceeding LEED, ASHRAE, ENERGY STAR, or similar 'green' building certification standards.

3.2 Transition all City-owned lighting and street lights to high efficiency lighting, such as light emitting diodes (LED).

3.3 Work with and educate property owners and commercial and residential tenants to make new and existing buildings more energy efficient in regard to heating, cooling, lighting, refrigeration, computing, and other equipment and systems.

3.4 Explore opportunities for the City to partner to develop renewable energy systems, microgrids, energy storage, and district energy systems.

3.5 Increase green power generation by utilities and property owners.

3.6 Encourage increased awareness of energy conservation.

The City of Rockville purchases renewable energy certificates for wind generated power that offset nearly all of the electricity used by City facilities. The City will continue to seek energy efficiencies, including switching all City-owned lighting to high efficiency light emitting diode (LED) fixtures. These lights use less energy, meaning less emissions, and reduce maintenance costs. New LED lights were installed in the City Hall parking lots in 2018.

Greenhouse Gas Sources and Emissions by Rockville Users			
	2005	**2015**	**% Change, 2005 to 2015**
Residential Electric Grid Average	257,387,469 kWh	232,238,356 kWh	- 10%
Commercial Electric Grid Average	808,439,228 kWh	701,245,760 kWh	- 13%
Residential Electric	133,725 $MTCO_2e$	87,922 $MTCO_2e$	- 34%
Commercial Electric	420,022 $MTCO_2e$	265,482 $MTCO_2e$	- 37%
Transportation, On Road	263,348 $MTCO_2e$	252,426 $MTCO_2e$	- 4%
Per Capita Emissions	18.2 $MTCO_2e$	13.2 $MTCO_2e$	- 28%
Note: Data based on MWCOG Community Greenhouse Gas Inventory. kWh = Kilowatt hours; $MTCO_2e$ = Metric Tons of Carbon Dioxide-equivalent emissions.			

Data from MWCOG indicates a reduction in energy use and emissions between 2005 and 2015, as shown at left. For emissions, the reduction was dramatic, with a 34 percent drop in electric grid emissions for residential and 37 percent for commercial.

This trend corresponds with an increase in cleaner-burning natural gas and reduction in coal as a share of the fuel source of the electricity grid serving Rockville. Whether or not industry will continue this conversion is unclear, with coal remaining one third of the fuel mix. About one third of Rockville's electric energy comes from nuclear power, which is relatively carbon neutral.

In terms of electrical energy, the amount of carbon emissions depends on the source of the power. Pepco, a private utility company serving Rockville, provides data on its energy sources to customers every year. A comparison of Pepco data from 2013 and 2018 shows a switch from coal to natural gas during this period; a relatively easy conversion to make. Both are fossil fuels and both add greenhouse gases and other pollutants into the atmosphere when burned, yet, per unit of heat, coal produces more GHG emissions than natural gas. Natural gas also takes much less energy to transport and burning it puts less sulfur dioxide and particulate matter into the air.

Looking at renewable energy, the region remains stuck at roughly five to six percent as a share of grid power. Other regions and countries have made great strides in solar and wind production. Maryland can do better, especially in regard to wind power. Rockville policies in this Plan support more solar installations in the city to produce power. Developers are also encouraged to consider district heating and co-generation plants. The City is interested in microgrids and battery installations to secure power at the neighborhood level.

Energy Fuel Source for Grid Electricity in Rockville			
FUEL TYPE	2013 % OF TOTAL	2018 % OF TOTAL	% CHANGE OF TOTAL
COAL	43.8	29.8	- 14.0
NATURAL GAS	16.2	28.7	+ 12.5
NUCLEAR	34.6	35.3	+ 0.7
OIL	0.2	0.3	+ 0.1
RENEWABLE ENERGY	5.2	5.9	+ 0.7
Solar	0.1	0.3	+ 0.2
Wind	1.9	3.1	+ 1.2
Hydro	1.1	1.4	+ 0.3
Other	2.1	1.1	- 1.0
Note: Based on data from Pepco energy source reports 2013 and June 2018.			

Policy 4
Reduce greenhouse gas emissions from transportation sources.

The energy sector that has not seen significant reductions in recent years is 'on road' transportation. The cars, trucks, and sport utility vehicles that Rockville residents use to move around the city and region, and the trucks that Rockville businesses and institutions use to deliver goods and services, generate carbon emissions from consumption of gasoline and diesel fuel. In 2015, Rockville vehicles generated more than a quarter million metric tons of carbon dioxide-equivalent emissions ($MTCO_2e$) (see table in the box on previous page). These emissions were nearly three times the amount of emissions from all of the energy used within our homes. As reductions are made in residential and commercial building emissions through efficiency and renewable energy sources, the relative percentage of total carbon emissions from the transportation sector will increase.

It is likely that addressing carbon emissions from mobile sources will be our most difficult challenge, in particular because a large part of the city was designed for access by automobiles. Many vehicle trips in the city, and their related tail-pipe emissions, are part of the regional transportation network and stem from worldwide vehicle production systems, limiting the impact of City policy on the transportation sector. Still, City policies and actions can have some influence at the local level. Encouraging residents and visitors to shift trips to non-polluting and healthy modes of transport is an important strategy. Locating new housing next to rail and bus transit stations is another as it promotes the use of more efficient or non-polluting transit, rolling, and walking. Opposing transportation projects crossing the city's borders that result in greater use of single-occupancy vehicles, as the City has done in response to the State of Maryland's proposed I-495/I-270 Managed Lane Study, is yet another way for City policy to influence the emission of greenhouse gases from the transportation sector.

The City operates a number of low- and zero-emissions vehicles as part of its municipal fleet.

New transport technologies will also need to play a major role in cutting greenhouse gas emissions. Advancements in battery storage are encouraging a transition from diesel buses to battery-powered bus fleets, which are cheaper to fuel and maintain. Battery-powered bus rapid transit can make a contribution to reducing carbon emissions along Rockville's main highways and to major destinations. Electric cars are also becoming more available and affordable for private purchase. The City supports the installation of electric vehicle charging facilities, including a new charging station installed at City Hall in 2018 that powers a fully electric parking enforcement vehicle. Additional policies and actions are stated in the Transportation Element.

Actions

4.1 Facilitate the use of non-polluting modes of transportation, specifically walking, rolling, and bicycling, through land use planning and infrastructure projects. (*See also Goal 4 of the Land Use Element and Goal 2 of the Transportation Element*)

4.2 Support and work with regional partners on projects that will increase transit ridership and reduce vehicle miles traveled in single occupancy vehicles.

4.3 Significantly expand alternative vehicle fuel infrastructure, including charging stations for electric vehicles, in locations across the city as well as on City property for use by the public and City fleet vehicles, and adopting new building code requirements for electric vehicle charging stations in new construction and existing office, commercial, and multi-unit residential buildings. (*See also Policy 14 of the Transportation Element and Action 2.7 of the Community Facilities Element*)

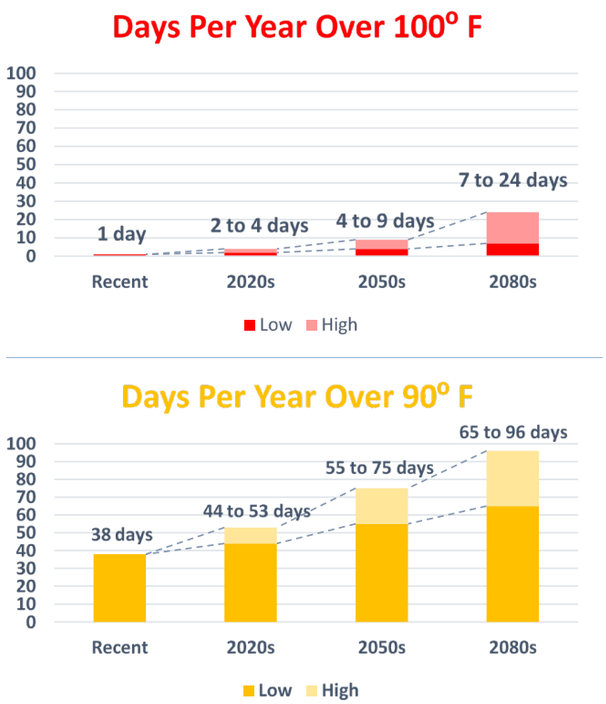
4.4 Incorporate energy efficiency, renewable energy, and alternative fuels in City facilities, operations, and fleet vehicles. Work to transition the City vehicle fleet to low or no emission vehicles as soon as possible, while considering the operational needs of specialized fleet vehicles. (*See also Policy 14 of the Transportation Element and Action 2.7 of the Community Facilities Element*)

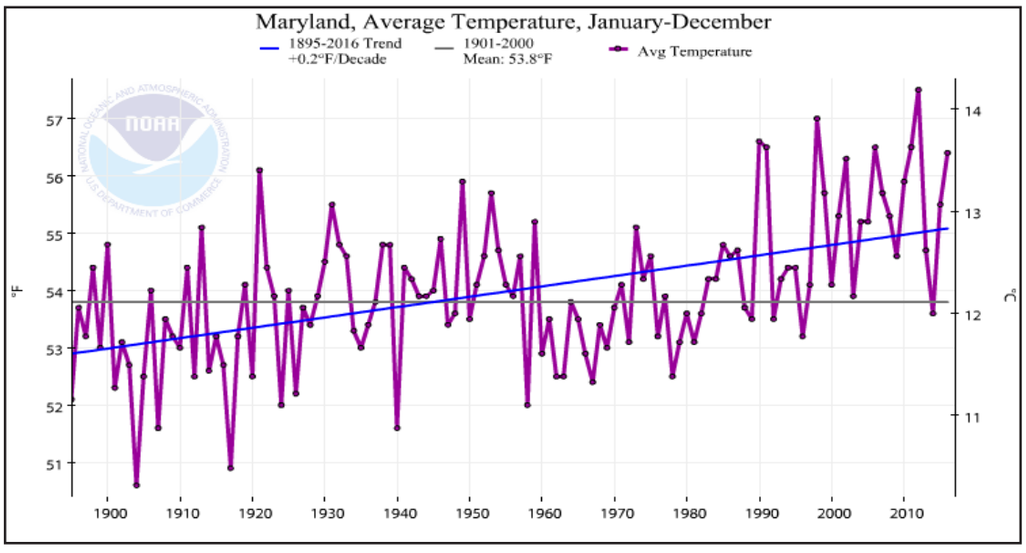
4.5 Oppose transportation infrastructure projects proposed by Montgomery County government or the State of Maryland that would facilitate increased use of single-occupancy vehicles where non-polluting and/or mass transit options are available. (*See also Policies 14 and 15 of the Transportation Element*)

Policy 5
Assess Rockville's climate-related risks and identify actions to reduce vulnerability and enhance local adaptation and resiliency capacity.

Rockville and our region are experiencing effects of climate change, and projections indicate these trends will continue. Given the city's distance from tidal ocean waters and location on high ground, coastal flooding is unlikely to be a significant problem. The major impacts will be in the increased number of very hot days and changes in precipitation patterns. Heat

Temperature projections for the Washington, D.C. metropolitan region.

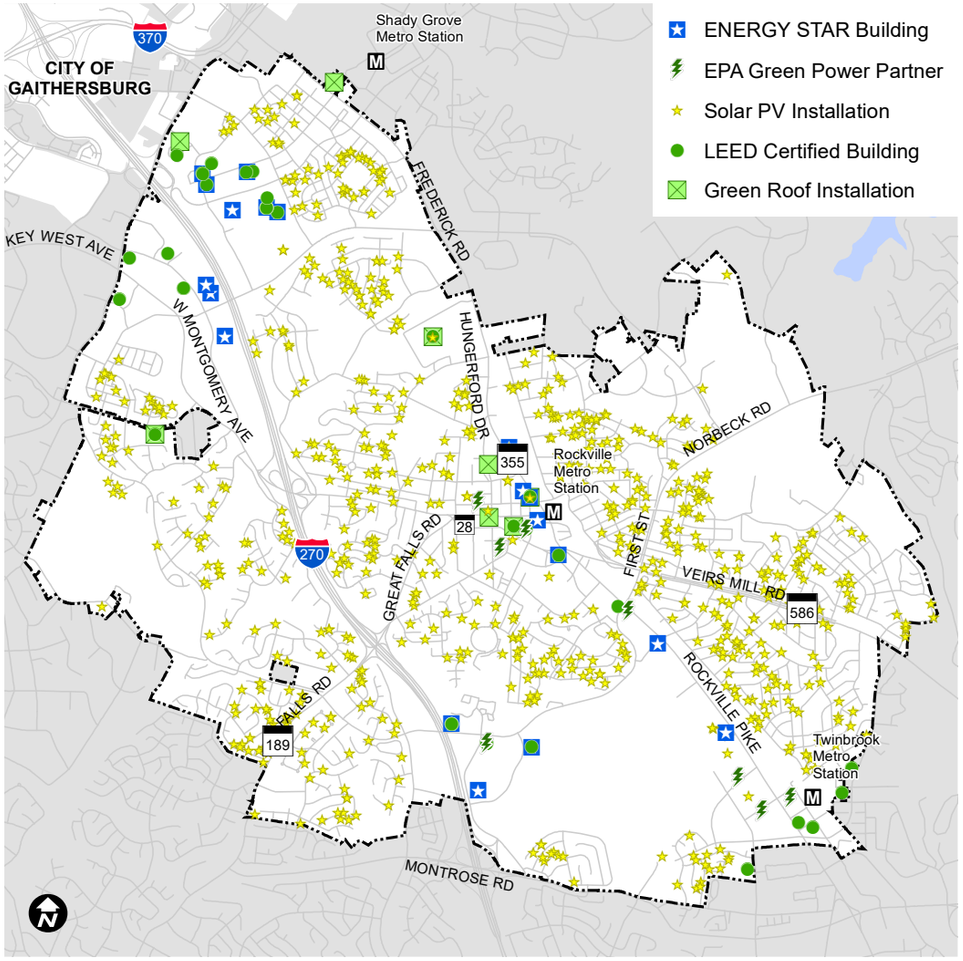




The National Oceanic and Atmospheric Administration (NOAA) demonstrates historic temperature trends in Maryland from 1900 to 2010 (at left). The National Aeronautics and Space Administration (NASA) projects an increase in the number of days over 100 degrees Fahrenheit from rare to a handful by 2040 (above), and in the range of 60 or more days over 90 degrees Fahrenheit.

Source: NASA ,"Adapting to Climate Change, Federal Agencies in the Washington, D.C. Metro Area," 2012.

Figure 21: Clean Energy and Green Building Locations in Rockville



A number of rating systems track and recognize green building practices, including the federal Environmental Protection Agency's Green Power Partners and Energy Star programs. Commercial building owners promote their efforts by seeking certification through green building rating systems, with LEED from the U.S. Green Building Council the most widely recognized certification. Leadership in Energy and Environmental Design, or LEED, is a rigorous evaluation of sustainability with a quantitative ranking in categories including:

- *Energy performance,*
- *Water performance,*
- *Sustainable sites,*
- *Materials and resources,*
- *Innovation in design.*

As of 2018, there were 21 ENERGY STAR and 47 LEED certified buildings in Rockville.

and humidity alone will stress our population during summer months, and the City must prepare to assist vulnerable populations, especially in emergencies.

Because a warmer atmosphere holds more water vapor, Rockville's infrastructure is most vulnerable to an increase in heavy precipitation events, including large snowfalls and heavy rainfall in short periods of time. These events may challenge our stormwater and transportation infrastructure, and the City must plan accordingly.

Actions

5.1 Work with federal, State, and regional partners, including Montgomery County's Health and Human Services Department and Office of Emergency Management, to identify local climate change risks.

5.2 Continue assessing the vulnerability of Rockville's critical infrastructure and services, and prioritize areas for improved resiliency.

5.3 Address climate impacts on vulnerable populations to protect public health, safety, and equity.

5.4 Factor in changing rain patterns, increased temperatures, and heat events, shifting ecosystems, and more intense weather events in City site planning and building design standards to ensure that new development is more resilient to the impacts of climate change.

5.5 Work with utilities and government agencies on grid reliability, resiliency, and security improvement efforts.

5.6 Consider climate change impacts and effects in the planning, design, and construction of City capital improvement projects and other projects.

5.7 Continue to plan for and install back-up power generation for emergencies at all critical facilities.

GOAL 3
Promote sustainable, healthy, and resilient green building design and practices.

Sustainable design is a holistic approach to the design and construction of new or retrofitted 'green' buildings that looks at all aspects of a project, including site design, energy efficiency, building material selection, water consumption, stormwater management, and the health of occupants. The goal of 'green' buildings is to reduce the impact of buildings, during and after construction, on the environment and human health.

While 'green' building practices are typically associated with new construction, the approach is also applicable for improving existing commercial, civic, and residential structures. Older structures may contain health risks, such as lead paint, mold, radon, asbestos, as well as inefficient lighting and heating, ventilation and air conditioning systems. An important challenge going forward is bringing Rockville's older buildings, including public facilities such as City Hall, and its older housing stock up to current standards.

More than half of the houses in Rockville were constructed prior to the adoption of modern energy codes. Many lack sufficient insulation and energy-efficient windows, posing a problem for keeping a house warm in the winter and cool in the summer. City inspections follow energy standards set by the International Code Council (ICC) with the 2018 International Energy Conservation Code (IECC) adopted by the City and took effect Jan 1, 2020 when reviewing commercial and home improvement projects. In addition to being essential to reduce carbon emissions, 'green' building practices can provide dramatic cost savings for commercial and public buildings, which help to justify the upfront expenditures. Lowering utility costs for houses is also helpful to reaching affordable housing goals.

Nevertheless, investing in affordable 'green' and efficient upgrades is complicated and requires collaborative efforts of many stakeholders, including, but not limited, to tenants, landlords, utility companies, creditors, contractors, non-profits, and housing and community service agencies. While the metropolitan Washington D.C. region is a leader in the number and square footage of 'green' and energy efficient

buildings, continued collaboration with regional partners is necessary to further advance the 'green' building market.

Policy 6
Promote holistic sustainable design, or 'green' building, as an approach to site planning, architecture, and material selection for new construction and rehabilitation of older structures.

The City of Rockville supports 'green' building through its building code and energy efficiency incentive programs, in coordination with County and State programs. In addition to what is required by the City's building code, the City can support a virtuous cycle in the adoption of 'green' building design and practices in Rockville by incentivizing and supporting building owners and building permit applicants to exceed the City's minimum required green building codes by obtaining higher certification levels in LEED, ASHRAE, ENERGY STAR, or similar 'green' building certification standards. This more concerted approach may require additional funding and resources in the City's building permit and inspection process.

On a larger scale, older commercial, office and light industrial properties can reduce their environmental 'footprint' and contribute to regional 'smart' growth by retrofitting or redeveloping at greater densities and using 'green' design practices. Redevelopment or retrofitting of these established locations should be carefully considered to balance their future potential with their existing importance as affordable spaces for local businesses.

Actions

6.1 Provide education, outreach, and incentives for new commercial and residential buildings to exceed City code and/or be certified by a high-performance 'green' building standard. 'Green' building techniques that should be encouraged include, but are not limited to, stormwater management treatments, biophilic design, 'green' roofs, pervious surfaces, shade trees or structures, and small-scale energy generation.

6.2 Continue to work with Montgomery County government on programs that support 'green' building retrofits and the 'green' building market.

6.3 Promote the use of 'green' building techniques and materials to make older structures more energy efficient as well as healthier and comfortable for occupants.

6.4 Incorporate 'green' building strategies in the construction, expansion and retrofit of City facilities.

6.5 Work with local utilities, property owners, homeowner and condominium associations, community groups, and real estate professionals to promote the long-term value of 'green' buildings, including safer materials and lower utility costs.

6.6 Update City codes each code cycle to set new high-performing building standards that reflect the most practicable and sustainable 'green' building code requirements for the City. Allocate appropriate staff resources and funding to support a more proactive and dedicated approach to 'green' building design in the City permitting and inspection process.

6.7 Encourage 'green' retrofitting or redevelopment of large, older commercial, office and light industrial properties by adding environmental elements, such as stormwater management treatments, biophilic design, 'green' roofs, pervious surfaces, shade trees or structures, small-scale energy generation, etc. Consider encouraging and supporting the retention of existing businesses to avoid displacement as a result of 'green' site redevelopment. (*See also Action 10.4 of the Water Resources Element*).

GOAL 4
Enhance community health and quality of life.

A key concern in environmental protection is how the built environment affects human health and happiness. The interaction between the shape and mechanics of our city and people living and working in our neighborhoods and activity centers is complex. Many different aspects could be considered, but the focus in this Environment Element is placed on impacts of noise and air pollution, access to healthy food, and proximity of green living plants and wildlife. Related policy recommendations may also be found as part of Goals 3 and 4 of the Land Use Element and Goals 1 and 2 of the Transportation Element.

Policy 7
Foster individual and community health by reducing stress and exposure to toxins, while providing access to healthy foods and a verdant environment.

Background and episodic noise can impact human health. Rockville is not a factory town, so sources of noise and air pollution are primarily from movement of traffic and trains. Many of Rockville's neighborhoods enjoy a low level of noise from traffic, but residential areas next to State highways, Metrorail and CSX railroad tracks, and commercial and industrial buildings can create real conflicts that affect personal well being. The City and County have ordinances related to noise conflicts and the City works to solve conflicts

Community gardens at Woottons Mill Park in the spring of 2018.

Prior to European settlement a dense, old forest covered all of what is now Rockville. This forest was cut to clear fields for small-scale agriculture and to provide wood for energy and material culture. As fields gave way to subdivisions, the number of trees increased again in most of the city. Long-term management of the urban forest includes planting new trees to replace mature trees as shown above in Wilma Shelton Bell Park.

between land uses through mitigation, sometimes including the building of walls or enclosures.

Noise from major transportation facilities can be more challenging because the source and scope of the noise is spread along a route. The City works with Maryland Department of Transportation State Highway Administration to mitigate noise from traffic on I-270 through installation of sound walls. However, constant traffic generating noise on State routes that run through the city is difficult to mitigate, for instance along MD-355, MD-586, and MD-28.

The ongoing and planned construction of new residential units in these corridors increases the challenge in regard to noise. Heavy traffic also means air pollutants entering homes from the highway, including asbestos from brakes, carbon monoxide, and particulate matter from diesel truck exhaust. Soundproofing is an important aspect of mitigation, and recommendations for regulation are included in the Land Use Element.

Another important approach to reducing stress and ameliorating local air pollutants is to provide living plants as part of development projects and the city streetscape. The vegetation of trees, shrubs, and groundcover help to reduce stress and are important additions in areas of land use change. Living plants also produce oxygen and remove some air pollutants. Shade from trees is important to reducing the heat island effect of hard surfaces. A biophilic approach, connecting people with plants and nature both indoors and outdoors, can be incorporated in City greenspace management planning.

Planning for healthy communities integrates active transportation, recreation options, healthy buildings, and access to healthy and affordable food choices. Food access is not simply a health issue, but also a community development, equity, and sustainability issue.

A growing national obesity crisis is related to climate change and energy use issues because a lack of exercise, particularly walking, has led to sedentary lifestyles. Children, who in the past ran around Rockville's neighborhoods, are increasingly at home staring at video screens, or are driven to activities. Combine this lack of movement with unhealthy food choices and obesity and related diseases, including diabetes and heart disease, are reaching epidemic levels in all age groups.

Rockville is generally well served by a range of full-service supermarkets and specialty food stores. However residents without access to a car may face challenges, particularly those residents with lower incomes. Rockville's support for local foods systems includes the provision and promotion of community gardens, farmers markets, and programs and policies that support home gardening, healthy eating, and social services. The Montgomery County Food Council, which addresses the wide variety food issues, is another local resource available to Rockville residents.

Actions

7.1 Work to mitigate the impacts of noise and localized air pollution.

7.2 Create a green, living cityscape to reduce stress and provide opportunities to engage with nature.

7.3 Cultivate a local food system that provides residents of all income levels access to healthy fresh food and improves food security.

7.4 Preserve existing and identify new community garden sites on public property, including parks, recreation and senior centers, public easements and right-of-ways, and surplus property.

Rockville Solid Waste Facts and Opportunities

A combination of public and private entities provide solid waste services in Rockville. Special collection services are available from the City for bulk item pick up, metal and electronics recycling, and household hazardous waste. The City also schedules seasonal collections of leaves sin the spring and fall.

In 2018, the City collected a total residential waste stream of roughly 19,000 tons, which is 7.3 pounds of waste per household per day. Of the residential waste collected by the City in 2018, 4,825 tons were recycled, 3,788 tons were composted, and 9,915 tons were sent to the County's waste-to-energy facility. Residential recycling rates increased after the City implemented single stream, or commingled, collection.

Montgomery County government's Shady Grove Processing Facility and Transfer Station offers drop-off services just outside city limits on Frederick Road. This facility allows for disposal of a wide variety of materials, including hazardous items that are banned from the collection stream, such as paint, car batteries, or tires.

Recyclables are collected as a single stream and transported to a private stream materials recovery facility for sorting, processing, and marketing. Collected scrap metals are sold to a private scrap contractor located in Rockville. The market for these materials, which are processed into new products, fluctuates due to regional and global factors.

Food waste, like yard waste, is organic material and can be managed in a number of ways. Some food scraps go into garbage disposals and the sewer system. Separating and diverting food waste for composting has potential to reduce the total amount of trash. Composting can be large scale, or in backyard compost bins. The large number of restaurants and cafeterias in Rockville may have potential to manage food waste.

Another potential option for managing organic waste materials, including food waste, is to use biodigester technologies to produce methane gas from anaerobic digestion processes, which can be used as natural gas or burned for electricity.

Vegetable oil and grease from restaurants can be processed into biodiesel.

Looking to the future, the City is exploring alternative fuel powered refuse vehicles. Battery-powered refuse vehicles are also just entering the market. The City has the option to consider a transition away from the current diesel refuse vehicle fleet, which would cut fuel and maintenance costs, as well as greatly reduce emissions and air pollution.

GOAL 5
Reduce, reuse and recycle solid waste and yard waste.

A key environmental impact of a consumer-oriented society is solid waste. Rockville residents, businesses, and institutions use a wide variety of products and materials every day that result in discarded materials. These materials represent embodied energy in their manufacture and also a challenge for disposal or reuse. The City of Rockville groups its solid waste into three main types: refuse, recyclables, and yard waste.

The City of Rockville provides weekly curbside refuse, recyclable, and yard waste collections for 14,000 single-unit detached and attached residential properties. Property owners of businesses, apartments, and condominiums are responsible for contracting with private waste management services.

The environmental challenge of Rockville's solid waste stream is to manage a large volume of waste after collection. The City delivers refuse and yard waste to Montgomery County government facilities, which charges per-ton tipping fees. Rockville refuse is taken to the waste-to-energy incinerator in the Dickerson, Maryland area. This system saves land from being used as a dump and produces electricity, but the ash still requires disposal. Progress in waste management is measured as a reduction in the waste stream and the amount diverted from the incinerator by recycling and composting.

Recycling is mandatory in the city for common items such as glass and plastic bottles, jars and cans, mixed paper, newspaper, and cardboard. The value of recyclables, and associated revenues or costs, fluctuates in a global market. Yard waste is taken to the County's Dickerson complex where it is composted, or turned to mulch. One major opportunity is to develop new systems that separate food waste from refuse and send it to composting or biodigester facilities.

The best way to manage refuse is to the reduce the amount generated. The next step in sustainable solid waste management is to eliminate the concept of waste as something to be disposed of, instead viewing it as valuable and open to conversion to energy or new commodities or useful material.

Policy 8
Provide a safe, environmentally sound, integrated solid waste management program that promotes waste prevention and progressive goals for waste diversion and recycling.

Actions

8.1 Develop regional solutions to solid waste issues by working with regional jurisdictions and agencies, such as Montgomery County government, the Metropolitan Washington Council of Governments, and the Maryland Department of the Environment.

8.2 Promote backyard and neighborhood composting in the city, including exploring options to partner with regional jurisdictional to increase its adoption.

8.3 Monitor technological advancement in organic waste processing, including biodigesters that produce energy from methane gas, and biodiesel.

8.4 Incorporate and clarify current recycling, refuse, and yard waste storage, handling and collection practices into Chapter 20 (Solid Waste) of the City Code.

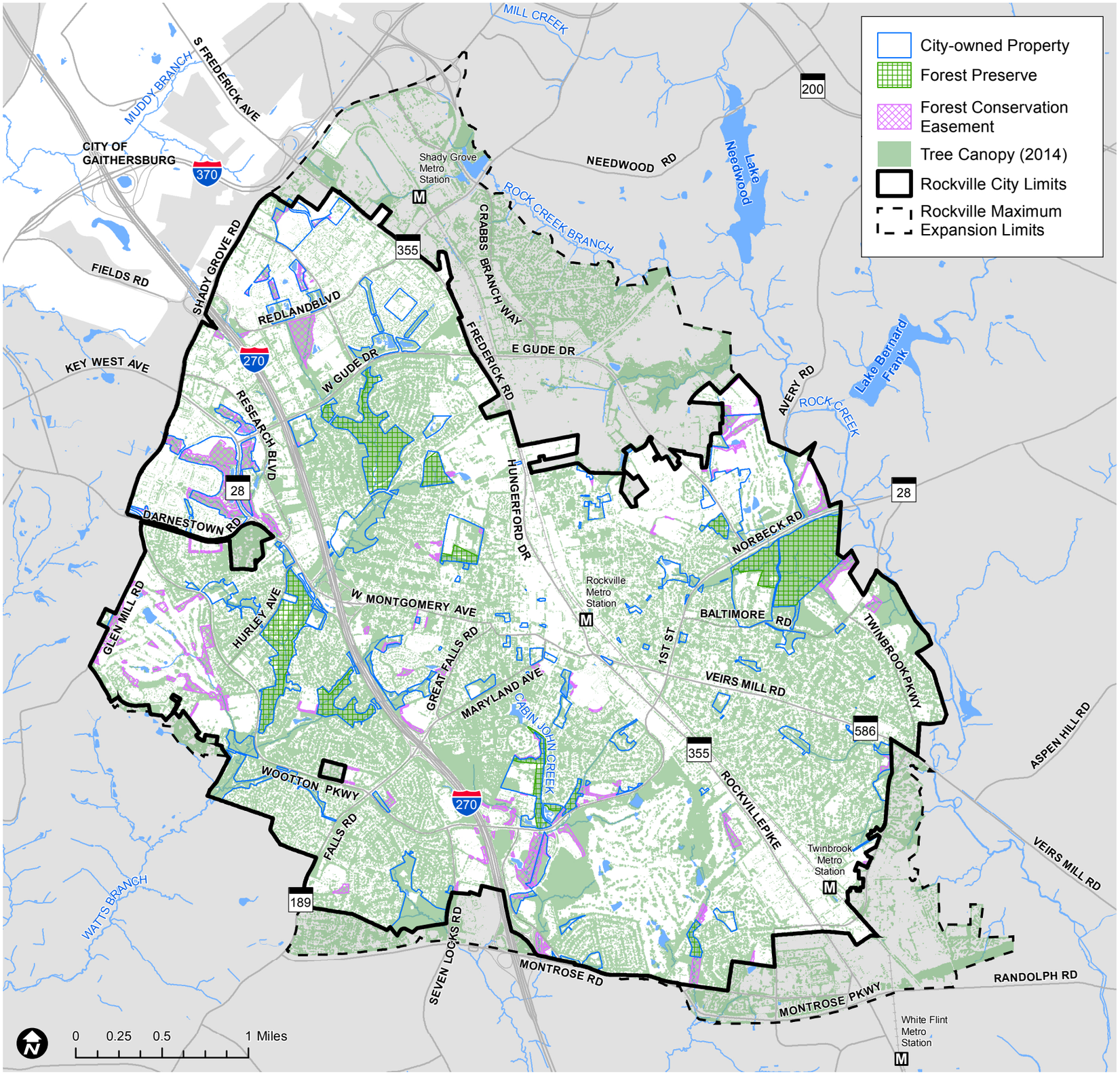
8.5 Analyze the potential to transition our refuse vehicle fleet to more efficient and lower emission technologies.

8.6 Continue to implement 'green' building standards that require construction and demolition waste management provisions, promote building life-cycle impact reduction, and promote the use of reused and recycled materials.

8.7 Encourage 'green' purchasing, waste reduction, and recycling at all levels, including City facilities and events and in commercial establishments.

8.8 Expand education and outreach initiatives to encourage sustainable consumption, resourcefulness, recycling, and composting.

Figure 22: Forest Preserves, Conservation Easements, and Tree Canopy



GOAL 6
Manage a sustainable urban forest and protect stream corridors, wildlife habitat, and water quality.

The City of Rockville has a robust urban forestry program, including ordinances that promote the preservation and planting of trees. The best of Rockville's forest overlaps with critical wildlife habitat along stream corridors and tributaries, meaning that policies to support the urban forest also support habitat protection.

Policy 9
Promote the importance and value of trees.

Trees provide a multitude of benefits to the community that extend beyond the private property on which they are planted. In addition to their aesthetic beauty, trees add to overall neighborhood character and pride and offer shady and peaceful places to gather. Among their many contributions to the environment, trees help decrease stormwater runoff, improve air quality, shelter wildlife, and moderate heat effects from buildings and paved areas. Often overlooked, trees also have both indirect and direct economic benefits. By providing shade, consumer energy expenses can be reduced, and many studies show that abundant landscape, including mature trees, can increase home values. The City has adopted a number of strong policies related to the protection and enhancement of its trees, and will continue to promote their preservation as new challenges and opportunities arise.

Urban Tree Canopy and Forest Protection

Property Type	Acres	Percent of Total UTC
Total Urban Tree Canopy (UTC) in Rockville	4,301	100% (50% of city area)
Private Property	2,856	66%
Forest Conservation Easements (FCE)	195*	-
City-owned Property	765	18%
Forest Preserves	323*	-
Road Right-of-Way	680	16%

Note: Tree Canopy calculations from analysis conducted by the University of Vermont Spatial Analysis Lab in 2014.
* FCE and Forest preserves are a subtotal of private property and City-owned, respectively.

Actions

9.1 Commit to further studying the multi-faceted benefits of trees and providing education about those benefits.

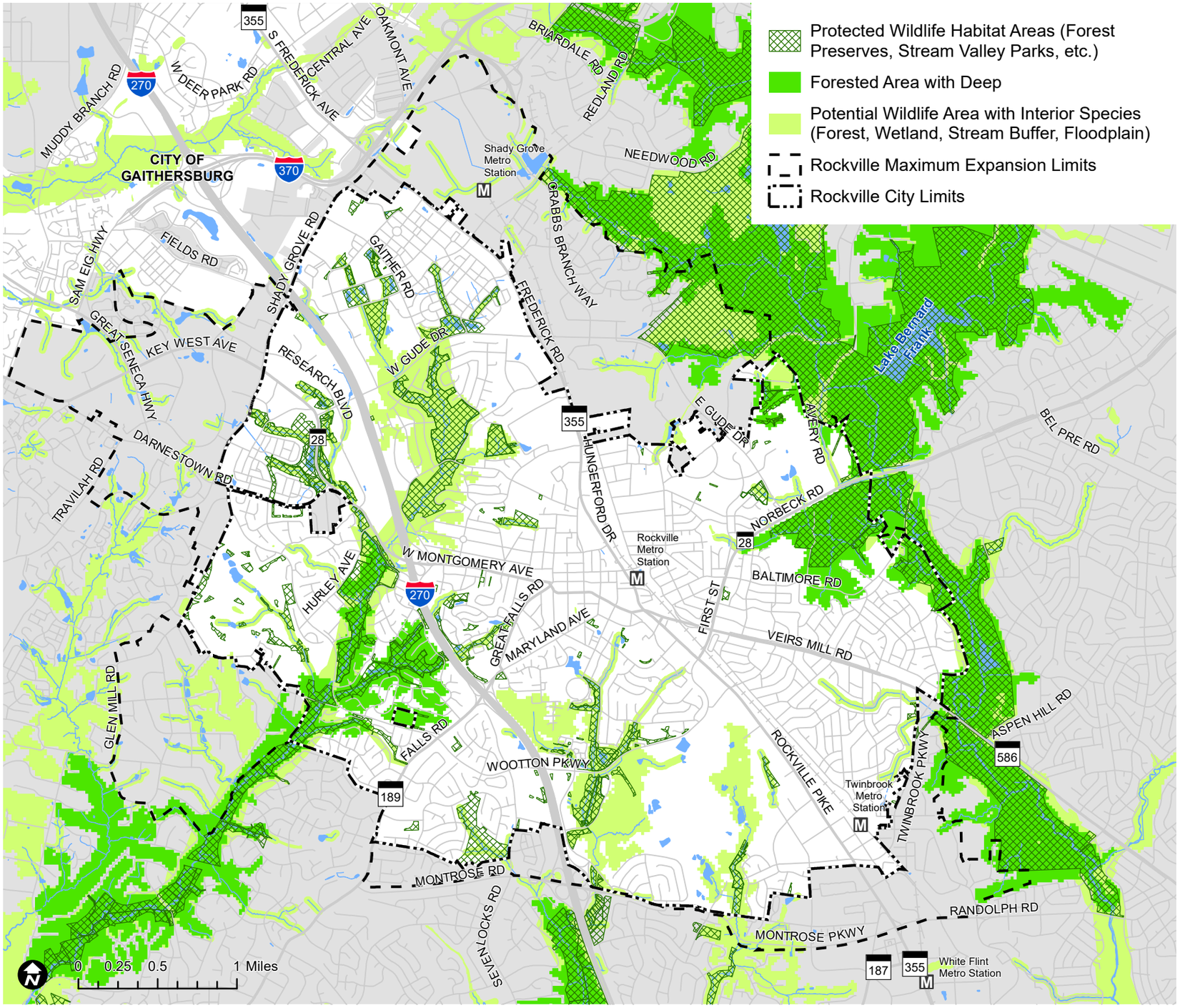
9.2 Encourage additional planting and proper maintenance of trees on both public and private property.

Policy 10
Preserve and enhance tracts of contiguous forest areas and tree canopy along stream valley buffers, wildlife corridors, and adjacent to existing forest networks.

Forest preserves are designated areas on City-owned property, set aside from disturbance for the promotion of environmental and wildlife preservation and education. The Mayor and Council has designated twelve forest preserves totaling 335 acres. As Figure 22 indicates, the City's forest preserves are primarily located along stream valleys of the main stem and tributaries of Watts Branch, Rock Creek, and Cabin John Creek. While these areas are preserved from development, the actual condition of the woods is challenged by exotic vines that damage trees and deer that can denude the forest understory. An ecosystem approach to forest management is needed to address challenges and preserve species diversity and habitat. Protecting and restoring woodland plant communities and tree canopy along streams and ponds is also a priority for improving water quality, protecting stream health, and providing wildlife habitat.

Forest conservation easements on private property are an integral part of the City's forest and tree protection strategy,

Figure 23: Protected and Potential Wildlife Habitat Protection Areas



Rockville's best wildlife habitat is contiguous with our stream corridor parks and forests. For some species, including rare plants, survival depends on a specific set of environmental factors, such as soil types, amount of sun or shade, and protection from disturbance. Populations of species that require deep forest interiors are extremely vulnerable due to fragmentation of woodland areas. Wootton Mill Park and Civic Center Park present the best habitat in Rockville with deep forest interiors. A 2014 review by Maryland DNR identified potential habitats in Rockville for five species listed as rare, threatened or endangered plant and animal species: Sedge Wren, Least Weasel, Purple Fringeless Orchid, Low Bindweed, and Tesselated Rattlesnake Plantain.

as well. Easements are generally created as part of a forest conservation plan, which is required for certain projects during the development approval process. As of this writing, there are approximately 222 acres under private forest conservation easements in the city, of which 195 acres are covered by trees. Additionally, some private properties in Rockville contain easements that protect individual trees. Tree removal is also regulated on properties designated as a Local Historic District and along known street tree corridors.

Actions

10.1 Maintain City-owned forest preserves through an ecosystem approach to forest management that considers the whole forest and its long-term viability.

10.2 Acquire or protect selected properties that will add to a connected and contiguous urban forest network.

10.3 Work with regional agencies to reduce invasive plants, insects, diseases, and pathogens that impact our urban forest.

10.4 For new development on land with existing forest stands and/or significant tree canopy, the City should encourage the preservation of tree canopy and natural features to the greatest extent possible, through site and architectural design that integrates existing natural features and/or minimizes impacts, protective construction measures, and development review incentives or relief, especially for development projects in Planning Areas 11 (Woodmont) and 12 (Tower Oaks).

Policy 11
Continue to assess tree canopy coverage, the health and condition of city forests and landscaped areas, and maintain and enhance a robust urban tree canopy.

A common measure to assess a community's urban forest is the urban tree canopy, or UTC, which consists of the layer of living leaves, branches, and stems that cover the ground when viewed from above. The tree canopy can be categorized in four contexts:

1. Trees that line Rockville's roads,
2. Forested parkland,
3. Non-forested parkland with individual trees, and
4. Forest and individual trees on private property.

Figure 22 illustrates Rockville's tree canopy coverage based on aerial imagery taken during the summer of 2014, utilizing data and methodology from the Maryland Department of Natural Resources (DNR) and University of Vermont Spatial Analysis Laboratory. The analysis shows that approximately 50 percent of the city was covered by tree canopy during the summer of 2014 This is an increase from the 43 percent of tree canopy calculated in 2009, and above the target of 40 percent that was previously recommended by American Forests, a non-profit conservation organization.

While three quarters of Rockville's park land is covered by tree canopy, privately owned trees and woods make up nearly 80 percent of Rockville's overall tree canopy. The largest portion of the city's tree canopy is in large-lot residential neighborhoods. These trees and woods are not protected with easements or other regulations, yet their presence and growth show the value Rockville citizens place on their trees.

A tree assessment conducted in 2009 predicted that natural tree mortality may lead to a decline in tree canopy in residential areas over the next several decades. Maintaining the tree canopy presents several challenges, including difficult urban growing conditions, invasive species, extreme weather and climate change, overhead utilities, and land development. Educational programs on tree stewardship and incentives to plant trees will be crucial to sustaining tree canopy in the long term.

Given the city's relatively high tree canopy coverage, this Plan recommends that the City continue to monitor and evaluate its tree canopy and, based on this assessment, create a greenspace management plan. This type of plan would take a broad approach to greenspace and the urban forest. Attention would be given to stream buffers and floodplains, expanding urban wildlife habitat, mitigating the urban 'heat island' effect, and managing tree canopy.

Actions

11.1 Continue to monitor Rockville's tree canopy.

11.2 Create a greenspace management plan to guide ongoing greenspace and urban tree canopy practices.

11.3 Develop public education, stewardship, and incentive programs for planting and maintaining trees and natural landscapes to sustain and enhance tree canopy on private property.

11.4 Implement policies and programs that encourage the use of native plants and sustainable landscaping practices and discourage invasive species.

Policy 12
Update the Forest and Tree Preservation Ordinance to incorporate flexibility in decision-making when there are two or more environmental goals in conflict.

Forest conservation plans are required for new developments within the city in accordance with the Forest and Tree Preservation Ordinance.

The ordinance requires the following:

- A minimum amount of tree cover to be planted on-site;
- Replacement planting for removing certain trees; and
- Reforestation for cleared forest area.

An update to the Forest and Tree Preservation Ordinance in 2007 requires that existing trees and forest be preserved on development sites to the extent possible. Off-site planting to meet requirements is no longer an option due to a lack of receiving areas. The options for development projects are on-site or a fee-in-lieu payment to support conservation.

The level of tree canopy in the city's commercial corridors is very low. In fact, many properties along Rockville Pike have virtually no canopy, reflecting the lack of attention to the issue in the past. Today however, the City's site plan review process requires that a certain number of trees be included in all new development projects, based on factors such as the size of the site, but with less emphasis on the existing context. This goal conflicts to some extent with other goals for more intense, sustainable development in these corridors and in Metro station areas. In order to balance between environmental goods, the number of required trees should be less in areas targeted for intense urban growth.

Actions

12.1 Revise the Forest and Tree Preservation Ordinance to: 1) consider context; 2) find a balance, including analyzing costs, benefits, and trade-offs, between the number of required trees and City objectives for stormwater management, solar or renewable energy, improved air quality through the reduction of vehicle miles traveled, 'green' building features, such as green rooftops, green walls, and solar panels, and tree placement and type; and 3) other important environmental goals.

12.2 Update and implement the Street Tree Master Plan to maintain healthy and diverse trees on municipal lands and public streets.

12.3 Implement best practices for tree and landscape planting to maintain tree health and growth, provide shade and relief, and add value to streets and private property.

Policy 13
Protect and enhance wildlife habitat.

Rockville's forested land, large-lot residential areas, and even our commercial corridors all provide habitat for wild plants and animals. However, human induced changes to the landscape—from deep forests with interiors to yards with more 'edge' conditions—have created an ecological imbalance. Some species have acclimated to human presence and urban development patterns and infrastructure, including coyote, white-tailed deer, beaver, Canada goose, raccoon, red fox, Virginia opossum, skunk, eastern cottontail rabbit, eastern gray squirrel, and brown bat. The number of white-tailed deer, a species that thrives at the forest edge, soars without wolves and cold winters with deep snow. Browsing deer can damage forests, as well as landscaping and gardens, if populations get too dense.

Other species, both plants and animals, are no longer present or are threatened due to loss of habitat. Even with Rockville's long history of human settlement, the Maryland Department of Natural Resources has identified important habitat areas within the city for rare, threatened, and endangered species. These areas are known and mapped on Figure 23, and in many cases are protected from disturbance and development.

Homeowners, businesses, schools, parks, civic and community organizations throughout Rockville are creating landscapes friendly to wildlife on their properties. As recommended by the National Wildlife Federation, community wildlife habitat sites provide food, water, cover and places to raise young. City gardening programs support planting native species of plants and replacing lawns with trees, shrubs and other plants. These collective stewardship efforts benefit wildlife by preserving and restoring habitat, supporting biodiversity, and creating corridors for wildlife to thrive throughout the community.

This Plan supports using a variety of actions to protect and enhance wildlife habitat. The City has acquired and conserved large land buffers along our stream corridors, protecting them from development through zoning protections, and as forest preserves. When parcels are available to purchase that are contiguous to these protected corridors, the City will consider adding them; for example the City purchased land from the County to add to Woottons Mill Park in 2018.

Actions

13.1 Protect natural areas and priority habitats through City codes and ordinances, land acquisition, conservation easements, land donations, grants, or dedication of stream valleys and environmentally sensitive areas.

13.2 Develop and implement wildlife management practices that minimize human-wildlife conflicts and support sustainable wildlife populations, by working with regional experts and stakeholders.

13.3 Include wildlife habitat protection and enhancement strategies in the review and approval of development projects, to maintain corridors for safe wildlife movement, prevent fragmentation of forested lands, and protect and restore habitats.

13.4 Monitor and manage invasive species and enhance habitats on City-owned lands.

13.5 Provide community education programs to foster wildlife appreciation and tolerance.

13.6 Implement programs and incentives to maintain and replace tree canopy and habitat loss on private property that is currently not regulated by City codes and ordinances.

13.7 Expand upon the City's current education and incentive programs (e.g., Rainscapes Rewards, fall tree give-away, Weed Warriors, etc.) and certification under the National Wildlife Federation's Community Wildlife Habitat program to enlarge and strengthen a connected network of wildlife habitats in residential yards, building rooftops, open spaces, and public parks.