GREEN INFRASTRUCTURE IN FREDERICK COUNTY

BRIEFING BOOK

A Background Document of the Livable Frederick Comprehensive Plan
Frederick County, Maryland
October 2024

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LIVABLE FREDERICK MASTER PLAN

The Livable Frederick Master Plan (LFMP) was adopted by the Frederick County Council on September 3, 2019. Following adoption, the Livable Frederick Planning and Design Office, the County's long-range planning department, initiated a variety of plans including the Sugarloaf Treasured Landscape Management Plan, the South Frederick Corridors Plan, the Water Resources Element, and the Triennial Update of the Water and Sewerage Plan. While some of these plans are elective, others are required by the State of Maryland. On-going and future planning efforts are described in the Livable Frederick 2023 – 2026 Work Program, which was approved by County Executive Jessica Fitzwater.

The 2023 – 2026 Work Program establishes overall work plans and schedules. Important underlying objectives of the Work Program—and the LFMP itself—include fostering transparency and informed participation in the process for creating plans.

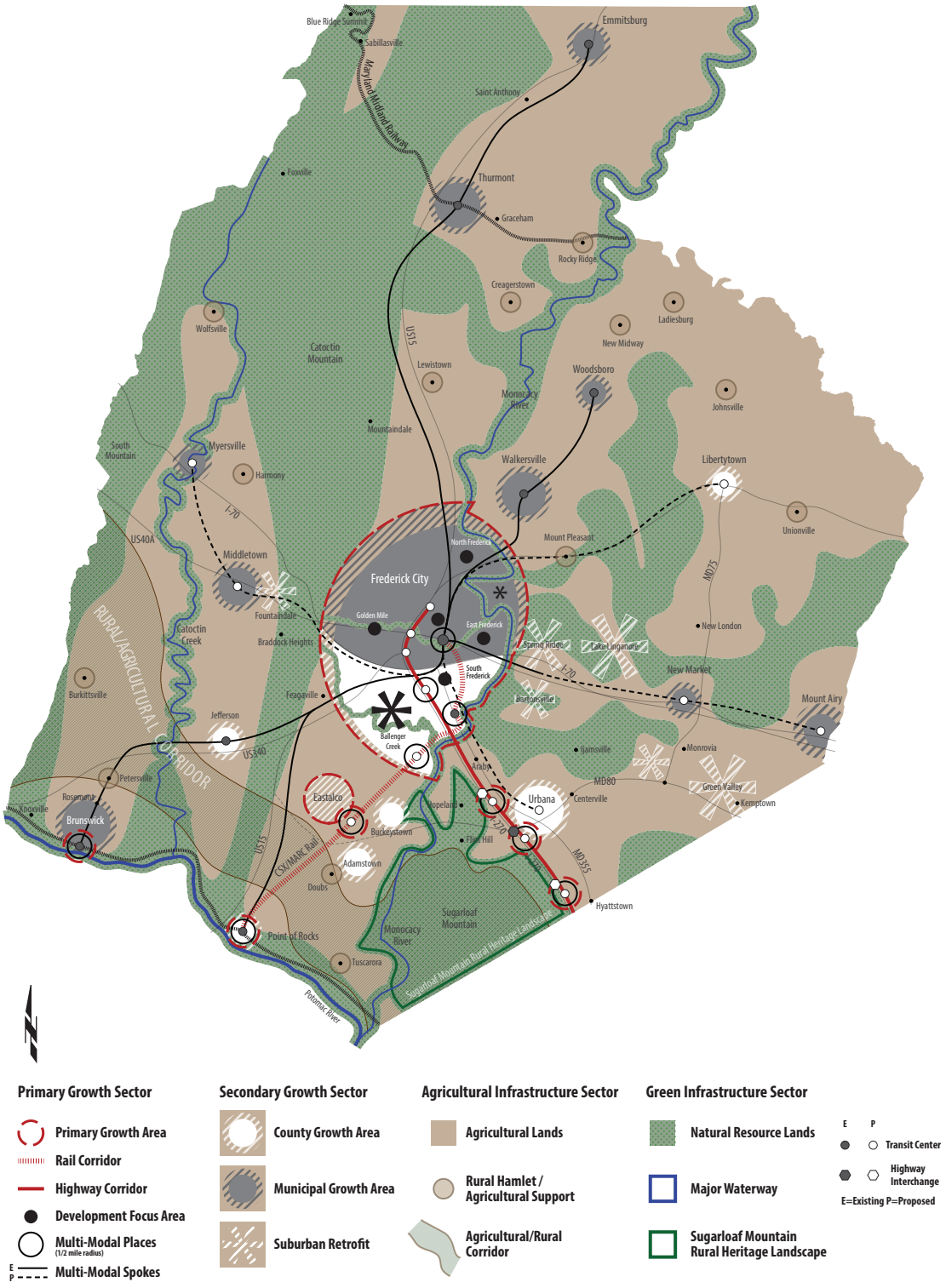
Targeted planning initiatives include the creation of "functional plans," where the focus is on specific land uses, policies, or infrastructure throughout the County. The Green Infrastructure Plan is an example of a functional plan, intended to promote focused planning efforts that will serve to update the Comprehensive Plan as a whole. A functional plan is not, necessarily, intended to target a specific area of the County but to focus on specific types of land uses, resources, or infrastructure wherever they occur within the County. The Green Infrastructure Plan may recommend changes to land use and zoning, as well as the establishment of new regulatory tools or incentives. The creation of this Green Infrastructure Plan was identified as an important initiative, critical to the achievement of the County's Core Vision for "Our Environment," as outlined in the LFMP.

THEMATIC PLAN

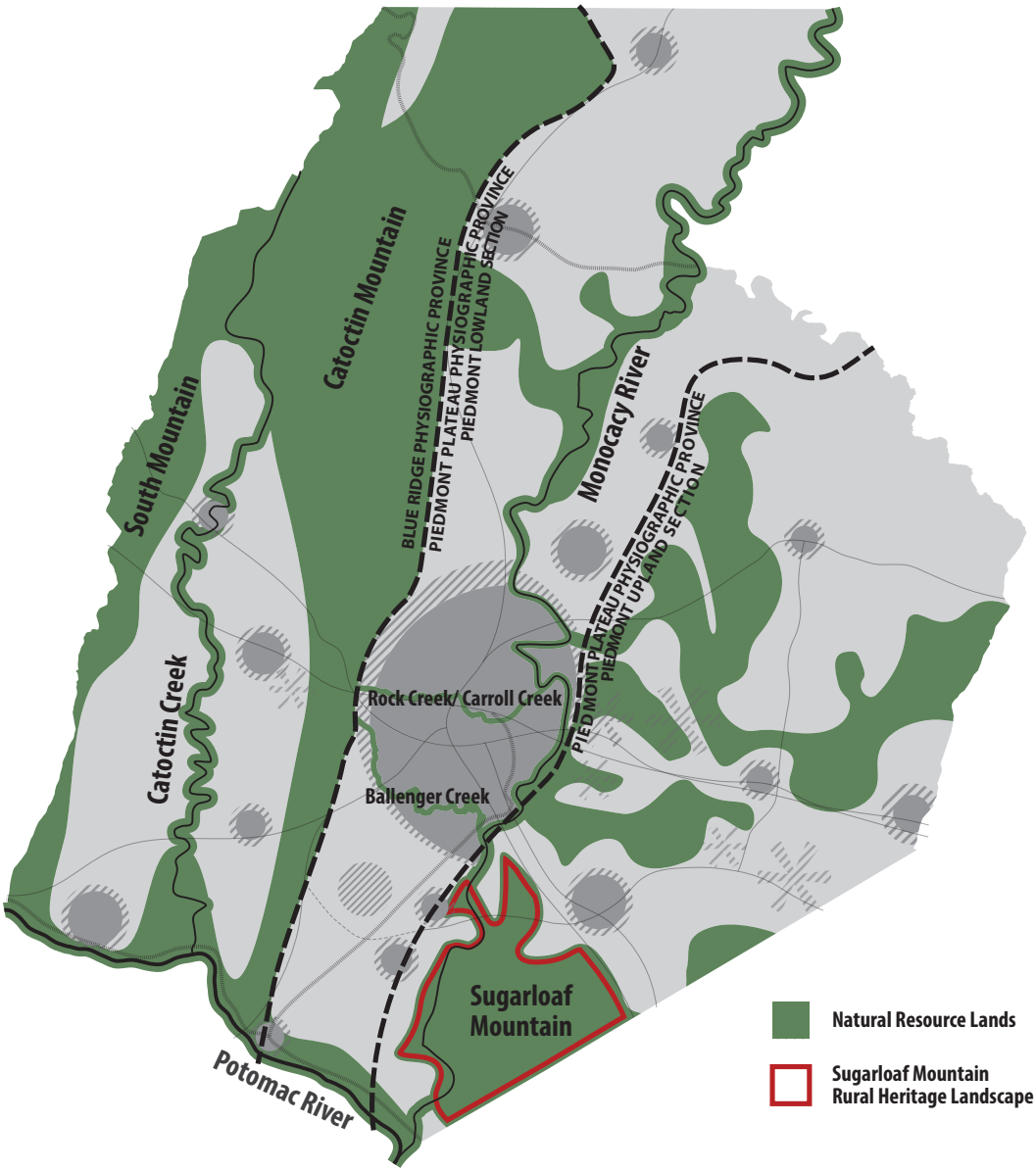
The Thematic Plan Diagram – a key component of the LFMP – broadly reflects the visions and strategies articulated in the LFMP. The Thematic Plan graphically depicts the preferred pattern and geographic distribution of new development in the County within the Primary and Secondary Growth Sectors,[1] as well as the general pattern of conservation of our natural resources within the Green Infrastructure Sector and the preservation of agricultural land in the Agricultural Infrastructure Sector.

1 The Primary Growth Sector is composed of land in and around Frederick City, including the Frederick City Growth Area, the Ballenger Creek Community Growth Area, the South Frederick Community Growth Area, and lands along major infrastructure corridors in the southern portion of the county that connect to regional employment centers. These areas include the Eastalco Growth Area, the Brunswick Community Growth Area, the Urbana Community Growth Area, and the I-270 corridor. The Secondary Growth Sector is comprised of retrofit districts (areas in which further investment can make existing suburban communities stronger) and community districts (existing municipalities and growth areas that can be strengthened and improved through further investment).

Map 1: The Livable Frederick Thematic Plan.



Map 2: The Livable Frederick Green Infrastructure Sector.



The Green Infrastructure Sector of the LFMP is identified as supporting the conservation of natural resources and environmentally-sensitive areas in the County, directing urban and suburban growth away from green infrastructure and sensitive areas, and ensuring the protection and integration of green infrastructure where it already exists within areas targeted for growth.

The Agricultural Infrastructure Sector is intended to support continued and innovative agricultural development, such as regenerative farming practices and to direct urban/suburban growth away from high-value and high-functioning agricultural land. The Green Infrastructure Plan will address some aspects of the Agricultural Infrastructure Sector because agriculture can be seen as a means of preserving and protecting open space and green space. Agricultural, or "working landscapes," also provide habitat for fish and wildlife, help protect water resources and promote aquifer recharge, and can connect or buffer green infrastructure elements. The significant economic value of working landscapes, not only in terms of crop productivity, should also be acknowledged.

Briefing Book

INTENT OF THE BRIEFING BOOK

This briefing book provides a broad introduction to the history of green infrastructure in the State of Maryland and Frederick County, including a description of current environmental regulations that have resulted from prior conservation and smart growth initiatives. A list of questions that highlight challenges and opportunities facing the County are intended to serve as a starting point for discussion between residents, landowners, institutions, employers, public officials, public and private utility operators, planners, and other stakeholders. It is hoped that the release of this briefing book will serve to facilitate discussions, engage citizens in the planning process, and allow for informed decisions by elected officials, public and private institutional partners, and private sector stakeholders.

Frederick County is roughly 660 square miles (or 422,400 acres) in size, excluding areas covered by water. It is the largest county in the State of Maryland by land area. The 2022 Frederick County Land Preservation, Parks, and Recreation Plan established the total acreage of protected land within the County at 115,342 acres, or 27% of the County's land area. Approximately 24,267 acres of public parkland (6% of the total land area) and 22,355 acres of protected natural resource lands (5% of the total land area and encumbered by a protective easement such as a Forest Resources Ordinance easement) are also identified. The remaining acreage of protected land is comprised of agricultural preservation and conservation easements, and they constituted roughly 16% of the total acreage of protected land within the County at that time. The identification of additional lands for such protection may be part of the Green Infrastructure Plan process.

The Green Infrastructure Plan will document and describe the County's ecological setting and significance, its natural resource base, and their bearing on landscape-scale land use planning. The purpose of the Plan is to leverage the setting and resources, along with a comprehensive set of policies and recommendations, to reduce habitat fragmentation, provide options for wildlife migration, sustain and regenerate working lands, mitigate the effects of climate change, reduce vehicle miles travelled, and increase access to green space and outdoor recreation opportunities for all residents of Frederick County.

CHALLENGES AND OPPORTUNITIES

Every thorough planning effort begins with a series of questions and considerations about the place or topic being studied. It is the goal of this briefing book to articulate the most critical challenges in preserving and enhancing the quality of Frederick County's natural and built environment, as well as to describe opportunities or tools that might be useful in meeting these challenges. The following questions are intended to provide a starting point for this important discussion.

- What green infrastructure themes are most important to discuss, evaluate, and map (wildlife, habitat, water, working lands, nature-based recreation, access to green space)?
- What are some of the key sources of information Frederick County should consider to become more educated about these themes?
- What is the most important green infrastructure theme for you as a resident, landowner, institution, employer, public official, public and/or private utility operator, planner, and other type of stakeholder?
- What would you like to be able to do from a conservation or recreation standpoint that cannot be done right now in Frederick County?
- What are the greatest risks to existing green infrastructure in Frederick County in general?
- How can our community best support the continued preservation of – and access to – natural lands, recreation lands, or green space in general in Frederick County?
- At what scale should Frederick County work to restore or conserve green infrastructure assets? County-wide or in targeted areas?
- Are there additional challenges that should be added to this list?

THE CLIMATE IMPERATIVE

A number of large-scale regional changes, affecting the overall terrestrial landscape of the northeastern and midwestern United States, are anticipated to occur in the coming years because of a changing climate. These effects are also certain to be experienced in the Middle-Atlantic states. A study conducted by the University of Massachusetts Amherst, in partnership with the United States Geological Survey and the Northeast Climate Science Center, was completed in 2015 to identify the potential impacts climate change could have on habitat, vegetation, and wildlife throughout the region. These changes could include:[2]

- Warming is occurring in every season, particularly in winter and particularly at higher latitudes, at higher elevations, and inland (i.e., away from the ocean and lake coasts).
- Heat waves may become more frequent, more intense, and last longer.
- Precipitation amounts are increasing, particularly in winter, with high-intensity events in summer.
- Snow is shifting to rain, leading to reduced snow cover extent and depth, as well as harder, crustier snowpacks.
- Stream flows are intensifying.
- Streams are warming.
- Thunderstorms may become more severe.
- Floods are intensifying, yet droughts are also on the rise as dry periods between events lengthen.
- Growing seasons are getting longer, with more growing degree days accumulating earlier in the season.

Summary points of the same study indicated that:

- Climate change will have cascading effects on ecological systems.
- These changes are expected in shifts of timing, distribution, abundance, and species interactions.
- Some wildlife groups, including montane (mountain slope dwelling) birds, salamanders, cold-adapted fish, and freshwater mussels, could be particularly affected by changes in temperature, precipitation, sea and lake levels, and ocean processes.
- Interspecific interactions and land use change could exacerbate the impacts of climate change.
- A focus on improving habitat connectivity and water quality and removing invasive species will increase resilience for wildlife populations in the face of climate change.

As the summary points note, habitat connectivity will be critical to mitigating the effects of a changing climate for plant and animal communities in Frederick County. It is anticipated that migration patterns for animal species will be altered because of climate change and that plant communities will shift over time from south to north, as species requiring cooler climates slowly migrate north in search of those climates. A green infrastructure network can ensure that corridors are preserved or created to facilitate the migration of plant and animal species in an uncertain climactic future.

> **Visualizing Changes to Habitat and Migration**
> The Nature Conservancy has developed a "Migrations in Motion" map that shows the average direction that mammals, birds, and amphibians need to move to track hospitable climates because of a changing climate. The map can be viewed online at: https://maps.tnc.org/migrations-in-motion/. Catoctin Mountain in Frederick County forms the easternmost edge of the Blue Ridge Province of the Appalachian Mountains, and forests of the Blue Ridge and the Appalachian Mountains provide an important sanctuary and travel corridor for many plant and animal species, including bird species utilizing the Atlantic Flyway.

Frederick County Government has also identified potential risks to County and community infrastructure that may result from a changing climate in reports like the 2023 Climate and Energy Action Plan for Local Government Operations and the 2022 Hazard Mitigation and Climate Adaption Plan. Green infrastructure is a potential tool to help the County improve the resiliency of the natural and the built environment in the face of climate change.

2 Staudinger, M. D., T. L. Morelli, and A. M. Bryan. 2015. Integrating Climate Change into Northeast and Midwest State Wildlife Action Plans. DOI Northeast Climate Science Center Report, Amherst, Massachusetts.

What is Green Infrastructure?

DEFINITIONS

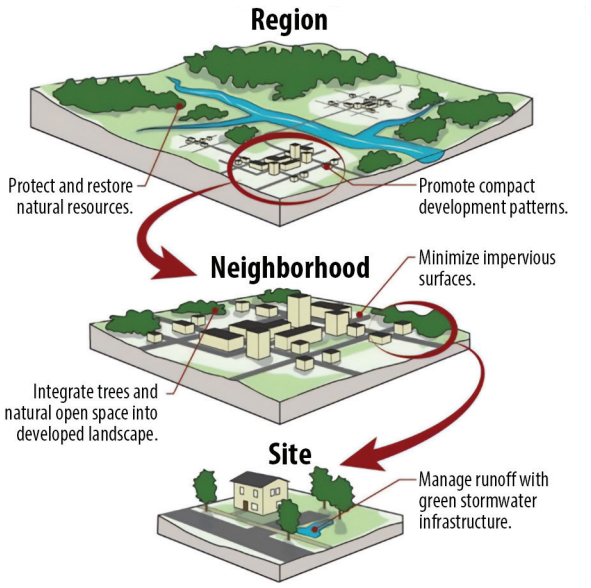
Green infrastructure can be defined in multiple ways.

At a landscape-scale, it is typically defined as "[a] strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working lands with conservation value that supports native species, maintains ecological processes, sustains air and water resources, and contributes to the health and quality of life for America's communities and people."[3]

This network is often comprised of two types of building blocks. The first are "hubs," which are often defined as large blocks of intact forest or wetland habitat that provide shelter for wildlife and perform a variety of important ecological functions (improving air and water quality, facilitating evapotranspiration and groundwater recharge, etc.), and "corridors," which are often identified as the forested stream valleys, ridgelines, or other natural areas that connect hubs. Corridors can also provide wildlife habitat, facilitate wildlife migration, and perform many of the same important ecological functions performed by hubs.

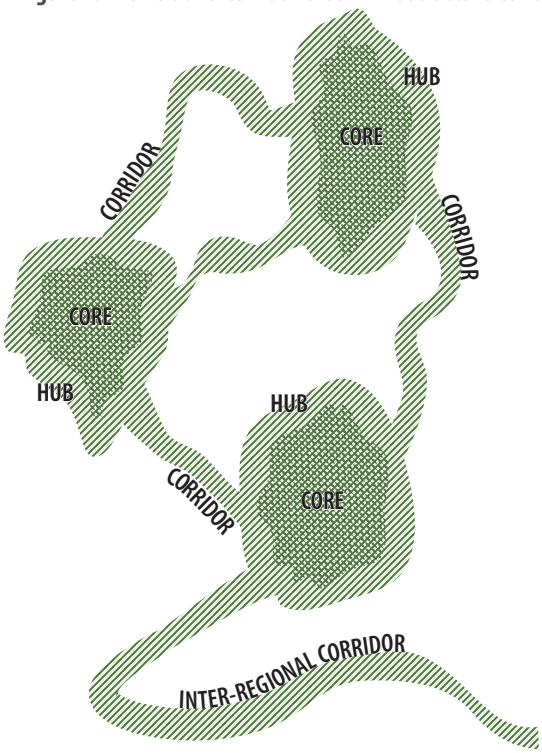
Green infrastructure has also been used to refer to site specific practices that utilize natural processes to mitigate environmental impacts inherent to cities, towns, and other aspects of the built environment. The United States Environmental Protection Agency (EPA) refers to green infrastructure as practices that use "filtration, infiltration, and evapotranspiration to treat and soak up rainwater where it falls. It [green infrastructure] can deliver multiple environmental, social, and economic benefits beyond stormwater management alone. Terms such as nature-based solutions, green stormwater infrastructure, and low-impact development are also used to describe green infrastructure installations, and there is overlap between these concepts."[4]

Figure 1: The Multiple Scales of Green Infrastructure



source: https://www.epa.gov/system/files/documents/2024-07/basics_of_green_infrastructure.pptx

Figure 2: The Hub and Corridor Green Infrastructure Concept



source: Modified from https://archive.epa.gov/region03/green/web/html/infrastructure.html

3 Benedict, M. A., McMahon, E. T., & Fund, C. (2006). Green infrastructure: Linking Landscapes and Communities.
4 https://www.epa.gov/green-infrastructure/about-green-infrastructure

This briefing book is more focused on the landscape-scale definition of green infrastructure, but the Green Infrastructure Plan may also address site-specific and other types of infrastructure. These differing types of infrastructure can include:[5]

- Hard Infrastructure: Infrastructure with a physical footprint.
- Soft Infrastructure: Systems of services provided to a community such as education, healthcare, and governance.
- Gray Infrastructure: Systems engineered and constructed by humans like roads, drinking water systems, wastewater systems, and dry utilities (electric, gas, data, etc.).
- Green Infrastructure: Often viewed as a corollary to gray infrastructure systems but can work in concert with them. Green infrastructure possesses a physical footprint like hard infrastructure that can augment soft infrastructure to build capacity, improve health, create job opportunities, and improve community cohesion.

Green infrastructure can provide a variety of benefits to states, counties, and towns that include, but are not limited to the following:

Figure 3: The Potential Benefits of Green Infrastructure

source: https://www.epa.gov/system/files/documents/2024-07/basics_of_green_infrastructure.pptx

The LFMP states (p. 49) that the Green Infrastructure Sector in Frederick County is comprised of two components: the green infrastructure network (comprised of hubs and corridors) and Environmentally Sensitive Areas (ESAs). ESAs are described in greater detail in the discussion of the history of green infrastructure in the following sections of this briefing book. The LFMP also states that green infrastructure can include other drivers and sustaining systems of communities, such as the generation, distribution, and consumption of clean energy. Within each incarnation of green infrastructure identified in the LFMP, there is an inherent recognition of the benefits that green infrastructure can provide to communities.

5 Rouse, D. C., & Bunster-Ossa, I. F. (2013). Green infrastructure: A Landscape Approach. Routledge.

Access to Nature and Green Space

BENEFITS OF ACCESS TO NATURE

Access to outdoor recreation opportunities and access to nature have a well-studied history of positive impacts on human health. Studies have indicated that the visual presence of trees can help people recover from acute stress[6] and that increasing tree canopy cover in a community has been associated with reduced risk of diabetes, hypertension, and cardiovascular disease.[7]

Additionally, studies have shown how critical unstructured time spent outdoors is to growing children. Access to nature has been shown improve cognitive function in children who relocate residences to be closer to green space, regardless of level of affluence.[8] Time spent in green space has been shown to reduce symptoms of attention deficit/hyperactivity disorder (ADHD) in children across a wide range of individual, residential, and other case characteristics.[9]

Figure 4: The Sensory Trail at Catoctin Creek Nature Center

source: Livable Frederick

6 Guo LN, Zhao RL, Ren AH, Niu LX, Zhang YL. Stress Recovery of Campus Street Trees as Visual Stimuli on Graduate Students in Autumn. Int J Environ Res Public Health. 2019 Dec 24;17(1):148. doi: 10.3390/ijerph17010148. PMID: 31878199; PMCID: PMC6982156.
7 Astell-Burt T, Feng X. Urban green space, tree canopy and prevention of cardiometabolic diseases: a multilevel longitudinal study of 46,786 Australians. Int J Epidemiol. 2020 Jun 1;49(3):926-933. doi: 10.1093/ije/dyz239. PMID: 31722373; PMCID: PMC7394941.
8 Wells N.M., At home with nature: Effects of greenness on children's cognitive functioning. Environment and Behavior. 2000;32:775–795.
9 Kuo FE, Taylor AF. A potential natural treatment for attention-deficit/hyperactivity disorder: evidence from a national study. Am J Public Health. 2004 Sep;94(9):1580-6. doi: 10.2105/ajph.94.9.1580. PMID: 15333318; PMCID: PMC1448497.

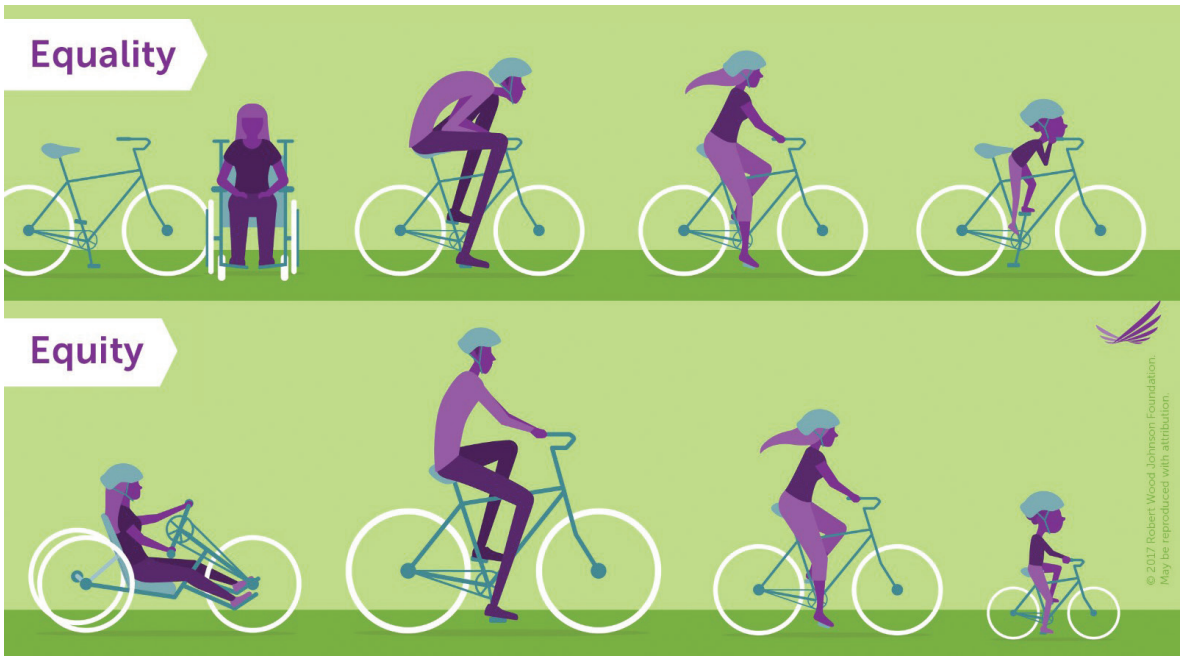
Frederick County boasts a wide variety of outdoor recreation opportunities, including national and state park land in addition to the many parks owned and operated by the County and the incorporated municipalities. Approximately 40 miles of the 2,193-mile Appalachian Trail are in Frederick County, approximately 15-miles of the 185-mile Chesapeake & Ohio (C & O) Canal National Historical Park towpath are located on the County's southern border, and Frederick County is also home to the Registered National Natural Landmark of Sugarloaf Mountain. Additionally, the Monocacy Scenic River flows for approximately 58 miles along and through Frederick County from its headwaters near Gettysburg, PA, to its confluence with the Potomac River, and Catoctin Creek flows for 28 miles in the Middletown Valley in western Frederick County to its confluence with the Potomac River on Frederick County's southern border. All three waterways, and their tributaries, provide ample opportunities for angling and water-based recreation in Frederick County.

Given the widespread positive impacts of access to green space and nature and the ample presence of quality recreation resources, a focus of the Frederick County Green Infrastructure Plan will be access to nature and green space and how the allocation of access to those places and spaces might be improved in Frederick County.

EQUALITY, EQUITY, AND ENVIRONMENTAL JUSTICE

Inherent to a consideration of the allocation of access to nature and green space is an understanding of the concepts of equality, equity, and environmental justice. Equality is defined as the even allocation of resources and opportunities across various groups. Equity recognizes that each group's circumstances are unique and allocates appropriate resources and opportunities with the intent of achieving equal outcomes. Environmental Justice is the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, income, or other social factors, in the development, implementation, and enforcement of environmental laws, regulations, and policies. It ensures Frederick County residents have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices.

Figure 5: The difference between equality and equity



source: The Robert Wood Johnson Foundation. https://www.rwjf.org/en/insights/blog/2022/11/we-used-your-insights-to-update-our-graphic-on-equity.html

The LFMP's Vision Statement provides a description of the characteristics of life in Frederick County in 2040, and, inherent to that Statement, is a guiding focus on equitable outcomes in all aspects of community life. Those aspects of the Vision Statement related to the concepts of equity and environmental justice include the following:

- Our community enables young and old to lead fulfilling lives. We ensure that all people can be successful, enjoy a high quality of life and are free from poverty.
- Good health is fundamental to our quality of life. We value a healthy environment, clear air, water, and green energy, and we are good stewards of environmental and natural resources.

In support of the Vision Statement, the Green Infrastructure Plan will analyze and discuss the relative levels of access to nature and green space experienced by communities in Frederick County.

Park Equity

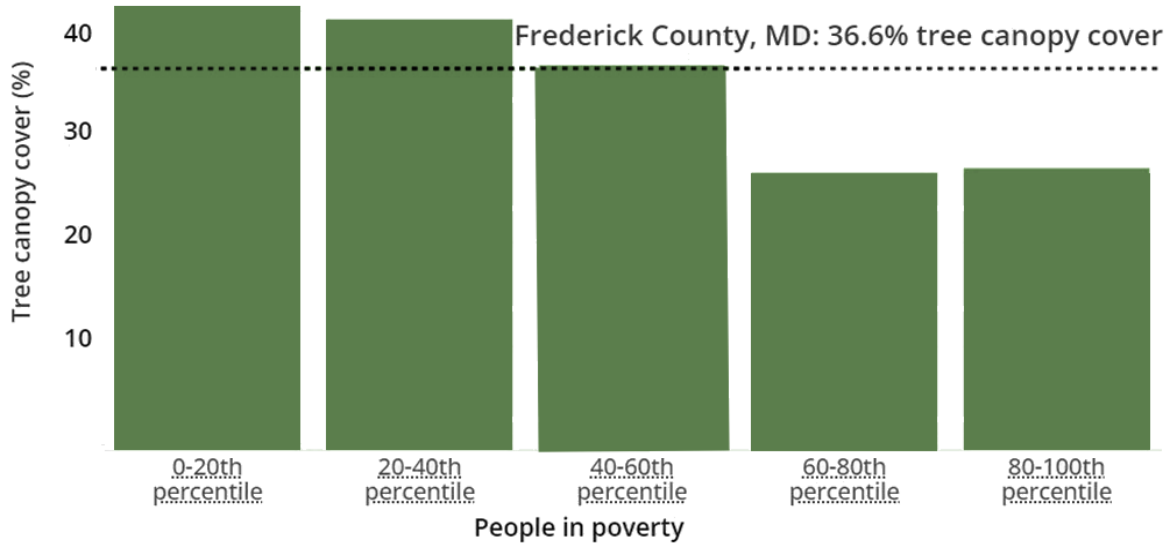
One potential tool for evaluating equitable access to green space in Maryland is the Maryland Park Equity Mapper, which was developed by the Maryland Department of Natural Resources in partnership with the National Oceanic & Atmospheric Administration (NOAA), the University of Maryland Center for Geospatial Information Science (CGIS), the National Center for Smart Growth (NCSG), and the University of Maryland School of Public Health Community Engagement, Environmental Justice and Health (CEEJH) lab. The Park Equity Mapper is an online tool that allows visitors to combine demographic and health data at the census block scale to identify disparities in access to quality park facilities across census block groups. The tool also allows for the degree of access to quality park space in a distinct census block group to be compared to Frederick County as a whole and/or averages for the State of Maryland. The tool can be accessed at: https://p1.cgis.umd.edu/mdparkequity/

Tree Equity

The non-profit conservation organization, American Forests, has developed the Tree Equity Score mapping system to aid states, counties, and municipalities in assessing existing tree canopy cover and the allocation of existing tree canopy cover based on factors like age, race, income, and health burden. The Tree Equity Score mapper utilizes tree canopy data from the Google Environmental Insights Explorer,[10] data from the 2020 US Census, and data from the US Census Bureau's American Community Survey (2017 – 2021) for mapping and analysis purposes.

For those areas of Frederick County that have been mapped by the organization, American Forests indicates that communities with population concentrations above the 60th percentile for the total number of residents living in poverty, there is a corresponding 26% +/- deficit in tree canopy cover when compared to populations in the 0 to 60th percentile. In other words, areas with increased concentrations of resident living in poverty have fewer trees and receive fewer benefits associated with the presence of trees.

Figure 6: Relationship Between the Percentage of Population In Poverty and Tree Canopy Coverage

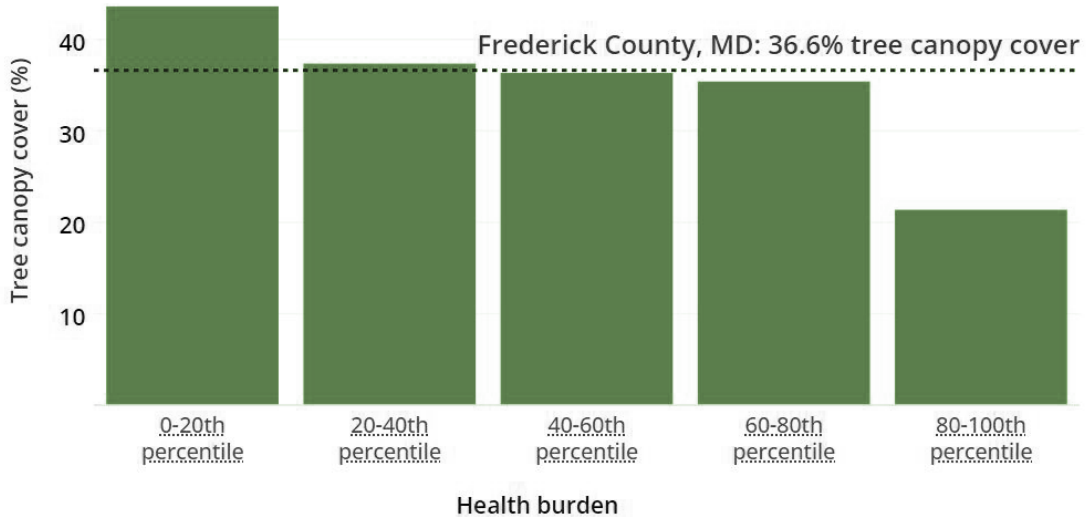


source: https://www.treeequityscore.org/insights-beta/county/frederick-county-md

10 https://insights.sustainability.google/

Tree canopy coverage can also be correlated to public health. Neighborhoods with the highest indicated levels of health burden (top 20% of surveyed tracts for self-reported prevalence of poor mental health, poor physical health, asthma and heart disease in an equally weighted index),[11] display a corresponding 42% deficit in tree canopy coverage.

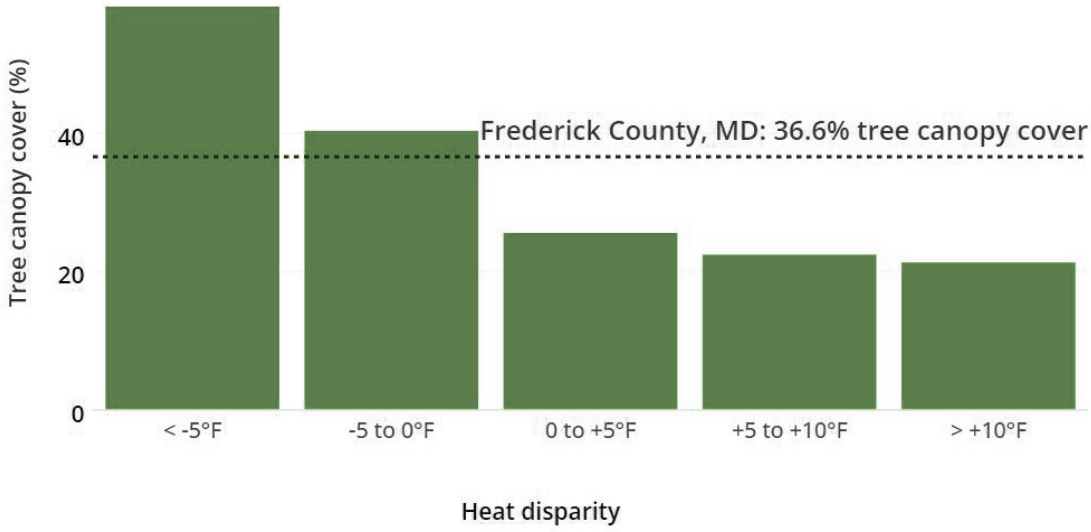
Figure 7: Relationship Between the Percentage of Population In Poverty and Tree Canopy Coverage



source: https://www.treeequityscore.org/insights-beta/county/frederick-county-md

The presence or absence of tree canopy coverage also correlates with heat disparities within communities. There is widespread evidence that the presence of trees can mitigate high summer temperatures through both shading and transpiration (the evaporation of water through leaves).[12] These benefits can be particularly important in more developed communities due to the prevalence of paved surfaces and rooves. American Forests reports that cooler neighborhoods (heat disparity of 0 to -5°F) have on average 80% more tree canopy compared to hotter neighborhoods (heat disparity of +5 to +10°F).

Figure 8: Relationship Between Tree Canopy Coverage and Heat Disparity



source: https://www.treeequityscore.org/insights-beta/county/frederick-county-md

11 Per U. S. Centers for Disease Control (CDC) PLACES data for the year 2022.
12 Ettinger AK, Bratman GN, Carey M, Hebert R, Hill O, Kett H, Levin P, Murphy-Williams M, Wyse L. Street trees provide an opportunity to mitigate urban heat and reduce risk of high heat exposure. Sci Rep. 2024 Feb 13;14(1):3266. doi: 10.1038/s41598-024-51921-y. PMID: 38351140; PMCID: PMC10864265.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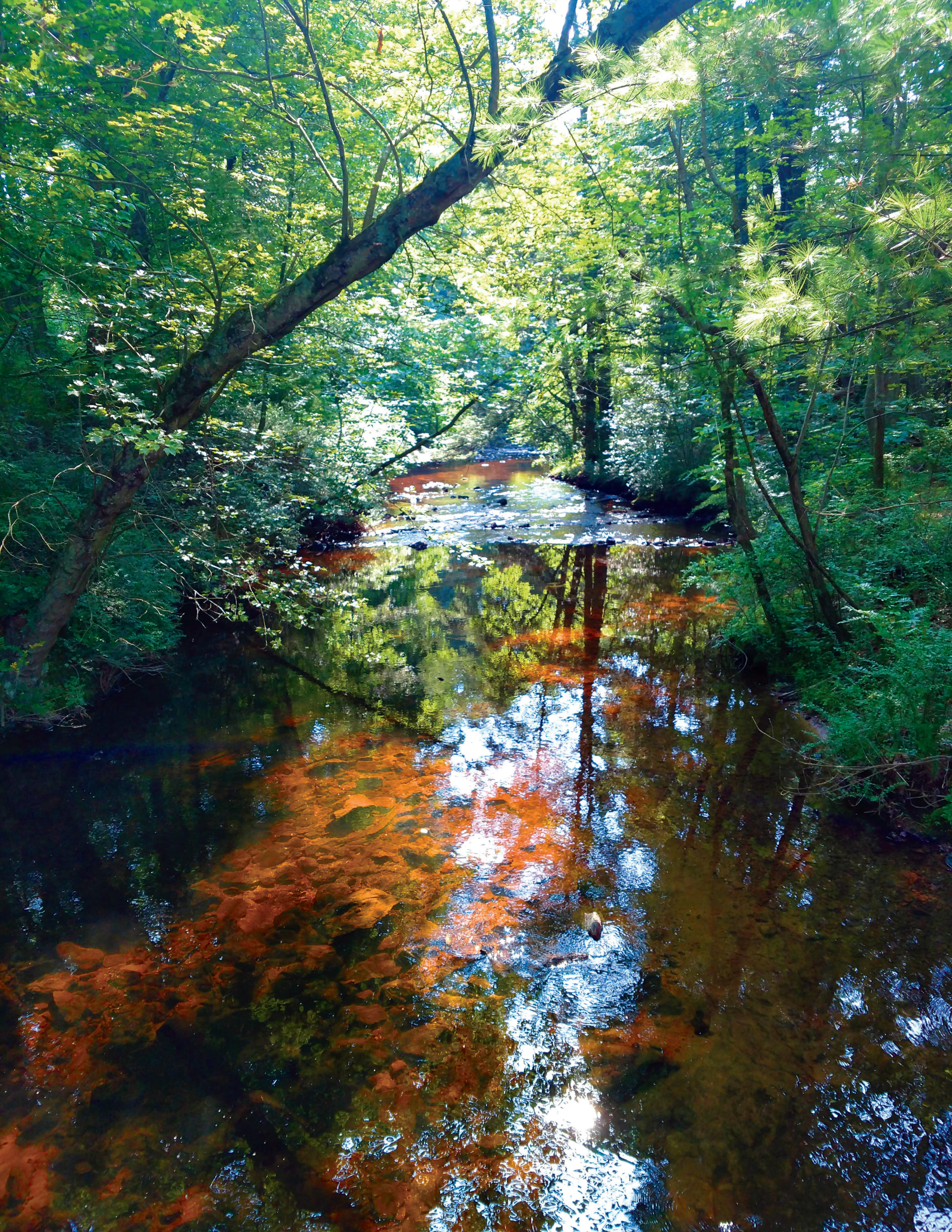


History of Green Infrastructure

GREEN INFRASTRUCTURE IN MARYLAND

The roots of green infrastructure in Maryland have been in place for decades. These roots reflect a recognition of the role that the natural environment plays in providing clean air and clean water that was inherent in federal laws adopted in the 1960's, 1970's, and 1980's such as the Clean Air Act, the Air Quality Act, the Safe Drinking Water Act, and the Clean Water Act. While certain protections were set forth for navigable waters within the United States in the Section 404 of the amendments to the Federal Water Pollution Control Act of 1972,[13] in 1985 the U.S. Supreme Court affirmed in *United States v. Riverside Bayview Homes* that Clean Water Act's regulatory jurisdiction included wetlands adjacent to headwater streams. Additionally, in the 1985 Farm Bill and the 1990 reauthorization of that Bill, protections for natural resources, specifically wetlands, were further bolstered by federal law.

This recognition of the importance the natural environment to a sustained quality of life in Maryland was also evident in the establishment of the Maryland Greenways Commission in 1991. Envisioned in 1990, the Greenways Commission worked with State agencies, local governments, land trusts, and citizens to form a system of interconnecting recreational trails and wildlife corridors that link protective buffers along Maryland's waterways. These greenways - corridors of open space that follow streams, ridgetops, rivers, or other linear features - could be used for recreation and conservation. Greenways could be publicly owned for recreation and parks, or privately owned as wildlife habitat or to enhance water quality. Protections for existing forest and a framework for restoring lost forest habitat in Maryland were implemented with the passage of the Maryland Forest Conservation Act (Natural Resources Article Section 5-1601 through 5-1613), which was also passed in 1991.

In 1992, the Economic Growth, Resource Protection and Planning Act, or Planning Act, amended Article 66B of the Annotated Code of Maryland (which was replaced with the Land Use Article in 2012), to encourage economic growth, limit development sprawl, and protect the State's natural resources and environment. The Planning Act introduced the concept of Planning Visions, as well as the concept of "Environmentally Sensitive Areas" (or "Sensitive Areas") and the "Sensitive Areas Element" to comprehensive planning in Maryland. The following "sensitive areas" were identified under the act:

- a stream or wetland, and its buffers;
- a 100–year flood plain;
- a habitat of a threatened or endangered species;
- a steep slope;
- agricultural or forest land intended for resource protection or conservation;
- and any other area in need of special protection, as determined in a plan.

The Sensitive Areas Element was intended to develop a series of goals, objectives, and standards for protecting the sensitive areas, as listed above, from the adverse effects of development.

The Maryland Department of Natural Resources (DNR) began an initiative to identify the most ecologically important and sensitive areas in the state in the late 1990's. The Maryland GreenPrint program was established in 2001 to map ecologically valuable lands, and these features were identified as "green infrastructure." These lands were also recognized for their importance for the long-term health of the State's environment. The GreenPrint program ended in 2006, but GreenPrint mapping still maintained by DNR and the mapping has received updates in subsequent years. DNR currently uses GreenPrint mapping in the Rural Legacy Grant Review System, and it was also carried forward into the Maryland Green Infrastructure Assessment in 2021 that identified gaps in the statewide green infrastructure network.

13 As amended in 1977 under the Clean Water Act.

SENSITIVE AREAS IN FREDERICK COUNTY

It should be noted that, because of federal, state, and local laws and ordinances enacted since early 1990's, protections for Environmentally Sensitive Areas have been implemented in Frederick County in the form of ordinances and land use or zoning designations. These ordinances and designations help to sustain and (in some cases) expand the footprint of protected lands in the County. For the purposes of this briefing book, a summary of the protections for Environmentally Sensitive Areas in Frederick County has been provided.

Streams, Wetlands, and Buffers

Protections for streams, rivers, lakes, and ponds and their associated buffers in Frederick County are set forth under Chapter 1-19, Article 9, Division 4 (Waterbody Buffer Requirements) of the Frederick County, Maryland, Code of Ordinances (https://codelibrary.amlegal.com/codes/frederickcounty/latest/frederickco_md/0-0-0-35842). Originally adopted in 2007, the Waterbody Buffer Requirements state that waterbody buffers shall be provided on all properties on which subdivision or resubdivision activities (associated with development) are proposed in proximity to streams, rivers, lakes, and ponds.[14]

The minimum width of buffers is defined as 100 feet in the code, but specific site conditions can warrant wider buffers. Additionally, buffers must be "maintained in a natural vegetative state unless otherwise utilized for reforestation or afforestation to satisfy forest resource ordinance obligations or for environmental enhancement projects administered or approved by federal, state, or local government agencies." Certain uses, such as public infrastructure like roads and utilities may cross waterbody buffers, but only after it has been sufficiently demonstrated to the Frederick County Division of Planning and Permitting that no reasonable alternatives to such impacts exist and that all reasonable efforts will be made to minimize disturbance to waterbody buffers.

Additionally, wetlands in the state of Maryland are regulated by the Maryland Department of the Environment (MDE) and, in specific cases, the United States Army Corps of Engineers (USACE) in accordance with the Environmental Article of the Code of Maryland (COMAR) and Section 404 of the Clean Water Act. MDE and the USACE regulate any land disturbance within 25 feet of a delineated wetland (100 feet for a wetland of special state concern) and require Nontidal Wetland and Waterway Permits or Tidal Wetland Permit applications to be submitted for review whenever proposed impacts to wetlands and adjacent waterways or tidal waters are proposed. In cases where impacts are proposed to isolated wetlands, MDE may grant a Letter of Authorization for impacts to small, isolated wetlands (not possessing significant nexus with Waters of the US), but only after a Jurisdictional Determination (JD) has confirmed the extent and specific environmental conditions associated with that isolated wetland.

100-Year Floodplain

Protection of 100-year floodplains in Frederick County is set forth in Chapter 1-19, Article 9, Division 1 (Floodplain District Regulations) of the Frederick County, Maryland, Code of Ordinances (https://codelibrary.amlegal.com/codes/frederickcounty/latest/frederickco_md/0-0-0-35723). The Floodplain District was established to "protect human life and health, minimize property damage, encourage appropriate construction practices to minimize future damage, to protect water supply, sanitary sewage disposal, and natural drainage." It encompasses the most extensive limit of mapped Federal Emergency Management Agency (FEMA) 100-year floodplains, flooding soils, and/or wetlands adjacent to or overlapping the otherwise established limits of the Floodplain District.

The Floodplain District is treated as a zoning overlay, such that the provisions of the Floodplain District are considered in addition to those otherwise associated with the underlying zoning district. In cases where the provisions of the underlying district conflict with and/or are less restrictive than the regulations of the Floodplain District, the more restrictive regulations of the Floodplain District apply.

The Floodplain District also establishes minimum required setbacks for any proposed development activity from wetlands or waterways within the District and requires proposals for development in the District to seek approval from the Frederick County Board of Appeals. Certain proposals may require additional approvals from the Maryland Department of the Environment (MDE) or the United States Army Corps of Engineers

14 Engineered stormwater management ponds are specifically excluded to allow for required maintenance.

(USACE). Review and oversight in the Floodplain District is intended to ensure that natural floodplain function is preserved and that risks to human health, safety, and welfare resulting from development in floodplains are minimized.

Habitat of Threatened or Endangered Species

Habitat of threatened or endangered species is protected in Frederick County under one mechanism in the LFMP, the Natural Resources Land Use Designation, and two separate mechanisms in the Ordinance, including the Resource Conservation Zoning District and the Forest Resources Ordinance (FRO).

The Natural Resources Land Use Designation is assigned to properties on the County's Comprehensive Plan Map as part of updates to the Comprehensive Plan. It is intended to identify significant natural resources within Frederick County and to guide the assignment of the Resource Conservation Zoning District. The primary features that are designated Natural Resources include mountain areas, contiguous forest, major streams defined by the County's 20 subwatersheds, and the State's Green Infrastructure features as mapped by the Maryland Department of Natural Resources. Additional lands may be considered for the Natural Resources Land Use Designation as part of the Green Infrastructure Plan process.

The purpose of the Resource Conservation Zoning District is to allow low intensity uses and activities that are compatible with the goal of resource conservation to be located within mountain and rural wooded areas. Lands within this district include mountain areas, rural woodlands, and cultural, scenic, and recreation resource areas. Environmentally sensitive areas within the Resource Conservation zone, including FEMA floodplain, steep slopes, wetlands and the habitats of threatened and endangered species, will be protected from development. Regulations for land use that prohibit impacts to sensitive areas containing habitat for threatened or endangered species are identified in Chapter 1-19, Article 7, Division 2 of the Frederick County, Maryland, Code of Ordinances. (https://codelibrary.amlegal.com/codes/frederickcounty/latest/frederickco_md/0-0-0-34531). Protections for steep slopes and floodplains are also afforded under the Resource Conservation Zoning District.

Additionally, all subdivision or permitted activities within Frederick County that require compliance with the Frederick County Forest Resources Ordinance (FRO), are required to document the known presence of threatened or endangered species on a property prior to the clearing of forest communities. The FRO is set forth in Chapter 1-21 of the Frederick County, Maryland, Code of Ordinances. (https://codelibrary.amlegal.com/codes/frederickcounty/latest/frederickco_md/0-0-0-9121).

To comply with FRO, permittees are required to conduct a Forest Stand Delineation (FSD) and prepare a plan and report that summarize the condition and quality of existing forests on a property and identify priority areas for forest retention. The presence of threatened or endangered species automatically qualifies a portion of forest or an entire forest stand as a high priority for conservation. The likelihood of the presence or absence of threatened or endangered species on a given property or properties is often considered in consultation with the Natural Heritage Program of the Maryland Department of Natural Resources.

Steep Slopes

Protections for naturally occurring steep slopes[15] are incorporated into multiple aspects of the Frederick County, Maryland, Code of Ordinances. Steep slopes receive specific protections from impacts or development in zoning districts like the Resource Conservation Zoning District and they are identified as priorities for the planting of new forest required by the FRO. Additionally, steep slopes must be mapped as part of the subdivision and site development processes overseen by the Frederick County Division of Planning and Permitting. The presence of steep slopes can also contribute to wider waterbody buffers and/or in the incorporation of those slopes into the waterbody buffers to mitigate the potential for erosion of steep slopes near waterways.

15 In the Frederick County, Maryland, Code of Ordinances, a "moderate slope" means a slope with a gradient of 15% to less than 25%; and the term "steep slope" means a slope with a gradient of 25% or greater.

Agricultural or Forest Land Intended for Conservation or Protection

The State of Maryland and Frederick County employ a wide variety of conservation and protection programs intended to preserve and protect agricultural and forested land within the County. Examples of conservation and protection programs include the following:

Agricultural Preservation Programs

- Conservation Reserve Enhancement Program: The Conservation Reserve Enhancement Program (CREP) Easement Program is a state-funded land preservation program that aims to protect natural resources by preserving property in perpetuity, installing practices that enhance water quality, and limiting future development potential. Properties which have an active CREP contract with the Soil Conservation District are eligible for a CREP easement. Since this program was implemented in 2009, over 3,500 acres have been permanently preserved.
- Critical Farms Program: In 1994, Frederick County started the Critical Farms Program. This program works as a lender by providing full-time farmers the up-front capital they may need to purchase farmland in the County. The funds provided to purchase the farmland are considered to be an option to acquire a preservation easement on the property.
- Installment Purchase Program: In 2002 Frederick County began the Installment Purchase Program (IPP) with the intent of purchasing easements through the use of Installment Purchase Agreements. This agreement pays the farmer tax-free interest-only installments, over a period of 10 to 20 years, with a balloon lump sum principal payment at the end of the term. Over 20,700 acres have been preserved through the Installment Purchase Program.
- Maryland Agricultural Land Preservation Fund: The Maryland Agricultural Land Preservation Foundation Program (MALPF) is a state land preservation program aimed at preserving prime farmland for future food and fiber production by paying farmers to extinguish their development rights. Since 1980, over 23,300 acres of prime farmland have been permanently protected in Frederick County and over 303,000 acres in the State of Maryland.
- Rural Legacy Program: The Maryland General Assembly enacted the Rural Legacy Program in 1997. It was created as part of the State's Smart Growth initiatives to protect large contiguous areas called Rural Legacy Areas. This program promotes natural resource-based industries, provide greenbelts, preserve critical habitats for native plant and wildlife species, and protect riparian forests and wetland.

Environmental & Historical Conservation Programs

- Creek ReLeaf: The Creek ReLeaf Program is designed to increase the total amount of forested area within Frederick County, on both privately owned lands and public properties. This program is funded in part by Maryland's Chesapeake & Atlantic Coastal Bays Trust Fund. The Creek ReLeaf program creates permanent conservation easements for eligible parcels of land at least 2 acres in size.
- Forest Resources Ordinances (FRO): The Maryland State Legislature enacted the Forest Conservation Act of 1991 (FCA) in an effort to protect and enhance forest resources in the State of Maryland. The FCA applies to all Maryland counties with less than 200,000 acres of forest. At this time, this includes all counties in Maryland except for Garrett County and Allegany County. In Frederick County, the forest law was adopted on December 15, 1992. The Frederick County version of the FCA is called the Forest Resource Ordinance (FRO). It closely follows the regulated requirements of the FCA. However, reforestation requirements are stricter in Frederick County. In Frederick County anyone required to comply with the FRO must provide the higher value of either the State FCA requirements for tree replanting and/or replacement or a 1:1 replacement value. That is, an applicant must calculate both the Standard Method under the State FCA and a 1:1 replacement acreage for all forest acreage removed. The higher value must be replanted.
- Historic Preservation: Frederick County is committed to identifying and preserving the rich historic and cultural resources of the unincorporated areas of the County. Frederick County's landmarks and historic districts enhance the County's unique identity and quality of life. Owners of historic property in Frederick County are eligible for nomination to the County Register of Historic Properties and to apply for the Rural Historic Preservation Grant Program, which helps fund rehabilitation, restoration, and preservation of historic properties located in the unincorporated areas of the County.
- Land Trust Easements: The Maryland Environmental Trust works with local land trusts throughout the State of Maryland to establish permanent conservation easements on lands with exceptional conservation value. As of December, 2023, the Maryland Environmental Trust protects 8,282 acres in Frederick County.[16]

16 https://dnr.maryland.gov/met/Documents/Protected-Acres.pdf

CURRENTLY MAPPED GREEN INFRASTRUCTURE IN FREDERICK COUNTY

The Maryland Department of Natural Resources completed a statewide Green Infrastructure Assessment, based on the principles of landscape ecology and conservation biology, and incorporating Geographic Information Systems (GIS) data for roads, streams, wetlands, and other biological databases. Mapping was developed as part of this assessment that includes more than 1.7 million acres of hubs and 250,000 acres of corridors statewide. The results of the assessment and mapping effort in Frederick County can be viewed online via the Maryland GreenPrint Map at: http://geodata.md.gov/greenprint/.

Frederick County also completed a green infrastructure assessment in 2014 in cooperation with the Environmental Protection Agency's (EPA) Region III Office and the Maryland Department of Natural Resources Forest Service. The Frederick County assessment included local biological survey data, size thresholds for hubs and corridors derived from a literature review, and a focus on the function of wetlands, streams, and forests through the incorporation of local biological survey data. The results of the Frederick County assessment can be viewed on the Frederick County Property Explorer website at: https://www.frederickcountymd.gov/PropertyExplorer. The 'Green Infrastructure' data layer can be accessed via the 'Layers' button in the bottom left corner of the map viewer window. A printed map of the results of the Frederick County assessment is also included in the reference maps at the end of this report.

The potential to revisit the extent of mapped County green infrastructure may be considered as part of the work on the Green Infrastructure Plan.

Public Engagement

GREEN INFRASTRUCTURE ADVISORY GROUP

An advisory group will be convened to provide input and perspective during the planning process. The advisory group will be comprised of residents and representatives of businesses, institutions, and non-profit organizations in the County with significant experience regarding topics that will be addressed in the Green Infrastructure Plan. Advisory group meetings will be open to the public but are not intended as forums for public comment. A community meeting, or series of meetings, will be convened to facilitate public discussion of the Green Infrastructure Plan.

COMMUNITY MEETINGS

A meeting, or a series of public outreach meetings, will be scheduled during the planning process to solicit input from landowners, residents, business owners, and institutional stakeholders. Future Planning Commission and County Council workshops and public hearings will offer additional opportunity for public commentary and feedback. Broad communication channels will provide context and explanatory guidance regarding the Green Infrastructure Plan.

COMMUNICATIONS

The following avenues of communication will be open to provide feedback on the Plan.

- Central Project Website: The site will include staff contact information, an email address for submitting questions and comments, updates on community meetings, workshops, and public hearings.
- Press Releases: Press releases will be utilized for immediate dissemination of project milestone information.
- Social Media: The Livable Frederick Planning and Design Office's social media will be utilized to share information about project milestones and upcoming community meetings, workshops, and public hearing.

Each of these platforms will provide announcements regarding public meetings and hearings regarding the Green Infrastructure Plan.

PRELIMINARY SCHEDULE

Work on the Green Infrastructure Plan is anticipated to adhere to the following schedule. Preparation of the plan may deviate from the schedule if the need to alter timelines should arise during the plan preparation process.

2024				2025												2026		
S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
							PC	PC	PC	PC	PC	PC	PC	PC	PC			
																CC	CC	AD

- SP - Staff, Public Engagement, Advisory Group Input
- PC - Planning Commission workshops, review, public hearing
- CC - County Council workshops, review, public hearing
- AD - County Council adoptions

Additional Resources

The following resources are available to anyone who wishes to explore the topics raised in this briefing book in more detail:

American Forests Tree Equity Score: https://www.americanforests.org/tools-research-reports-and-guides/tree-equity-score/

EPA Green Infrastructure Webpage and Resources: https://epa.gov/green-infrastructure/

EPA's National Menu of Best Management Practices (BMPs) for Stormwater: https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater

Enhancing Sustainable Communities with Green Infrastructure: https://www.epa.gov/smartgrowth/enhancing-sustainable-communities-green-infrastructure

Frederick County Agricultural Preservation: https://frederickcountymd.gov/7980/Agricultural-Preservation

Frederick County Floodplain / FEMA Floodplain: https://www.frederickcountymd.gov/8058/Zoning-Floodplain

Frederick County, Maryland, Code of Ordinances: https://codelibrary.amlegal.com/codes/frederickcounty/latest/overview

Frederick County GIS Mapping Applications:[17] https://gis-fcgmd.opendata.arcgis.com/

Livable Frederick Planning and Design Office: https://frederickcountymd.gov/7977/Livable-Frederick-Planning-and-Design

Maryland Department of Natural Resources, Park Equity: https://dnr.maryland.gov/pages/parkequity.aspx

Maryland Green Infrastructure Assessment: https://dnr.maryland.gov/land/Pages/Green-Infrastructure-Mapping.aspx

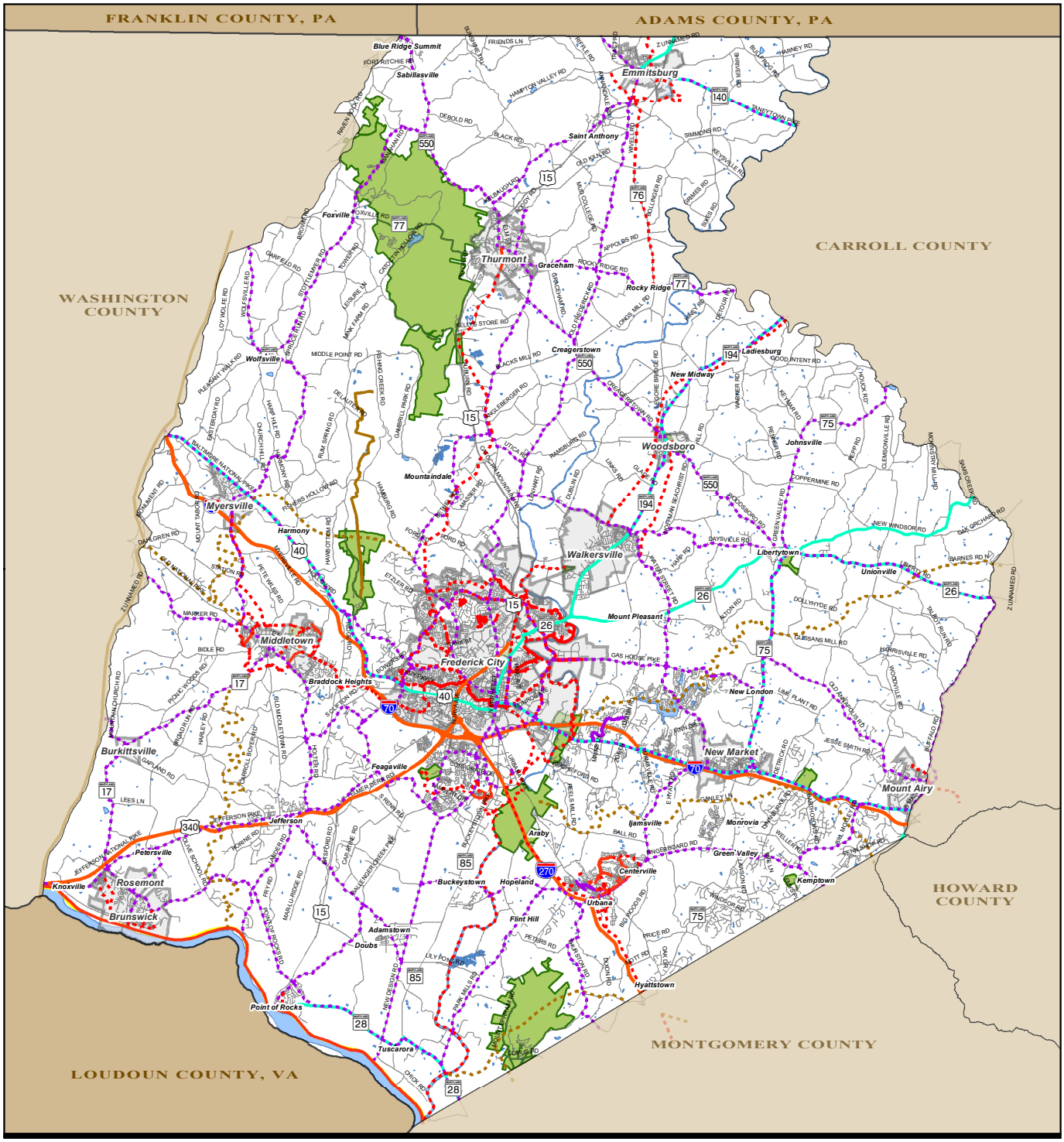
Maryland State Wildlife Action Plan (SWAP): https://dnr.maryland.gov/wildlife/Pages/plants_wildlife/SWAP_home.aspx

17 Current extents of mapped hubs and corridors in Frederick County are available for reviewing through the Property Explorer tool.

Reference Maps

The following maps have been included on the following for review and reference:

- Frederick County Landform
- Frederick County Bikeways and Trails
- Frederick County Parks and Recreation Centers
- Frederick County Green Infrastructure
- Frederick County Comprehensive Plan (Land Use)
- Frederick County Zoning



Bikeways & Trails Plan

Frederick County, Maryland

Division of Planning & Permitting

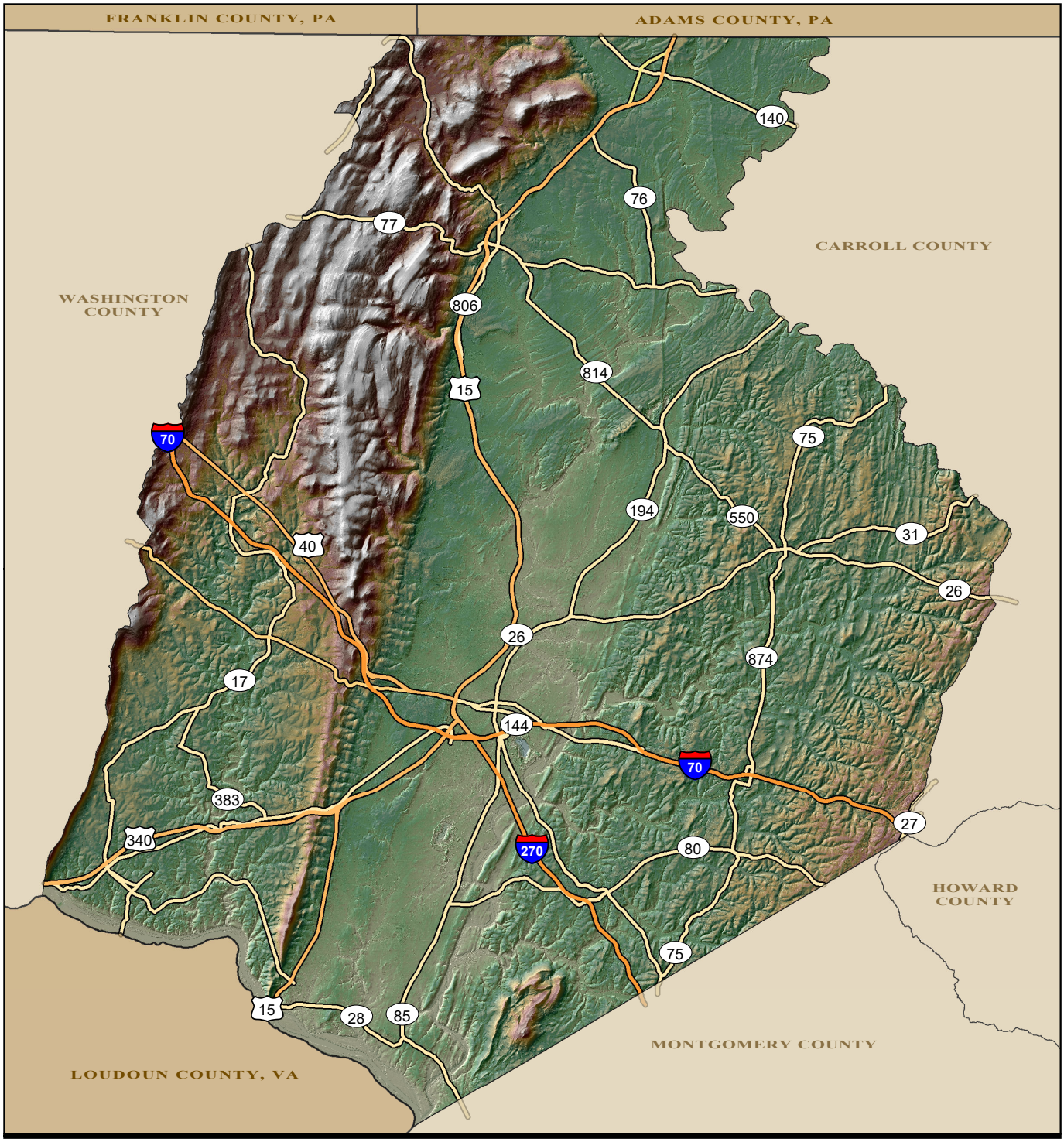
October 31, 2023
Frederick County GIS

- Bicycles Prohibited
- State Signed Bicycle Route
- Multi Use Trail, Proposed
- Multi Use Trail, Exisiting
- Natural Surface Trail, Proposed
- Natural Surface Trail, Exisiting
- On Street Bikeway, Proposed
- Bike Lane, Existing
- Parks with Designated Trails

N

0 2 4 8 Miles

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet



Landform Map

Frederick County, Maryland

Interagency Information Technologies
GIS

Major Roads

- Interstate
- US Highway
- US Alternate
- Business Route
- Maryland

Elevation (feet)

- High : 2143.65
- Low : -6

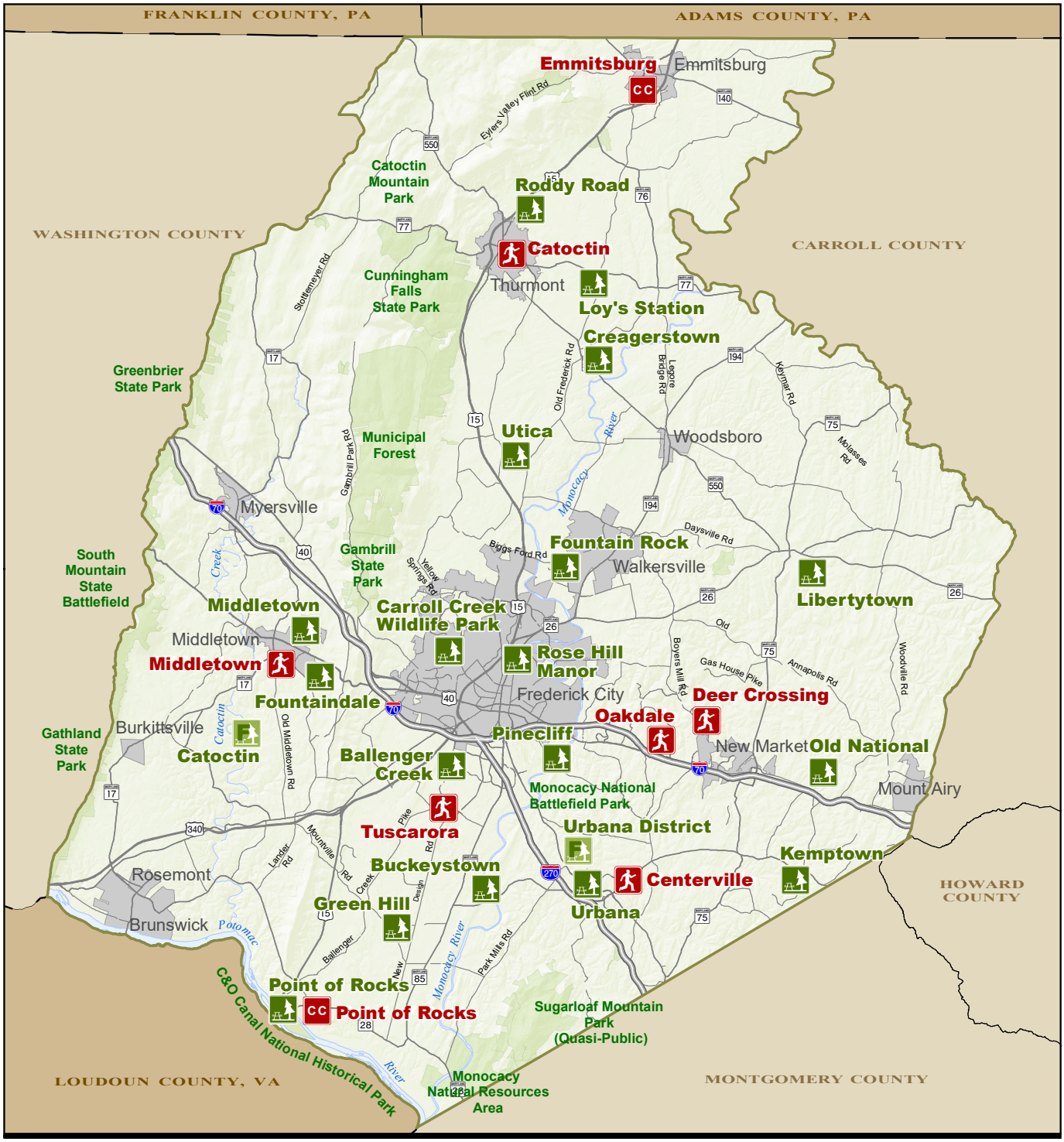
0 2 4 8 Miles

N

October 31, 2023
Frederick County GIS

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

MAPID:00123



Parks and Recreation Facilities

Frederick County, Maryland

Division of Parks & Recreation

Park
Future Park
Community Center
Recreation Center
Natural Resource or Regional Park

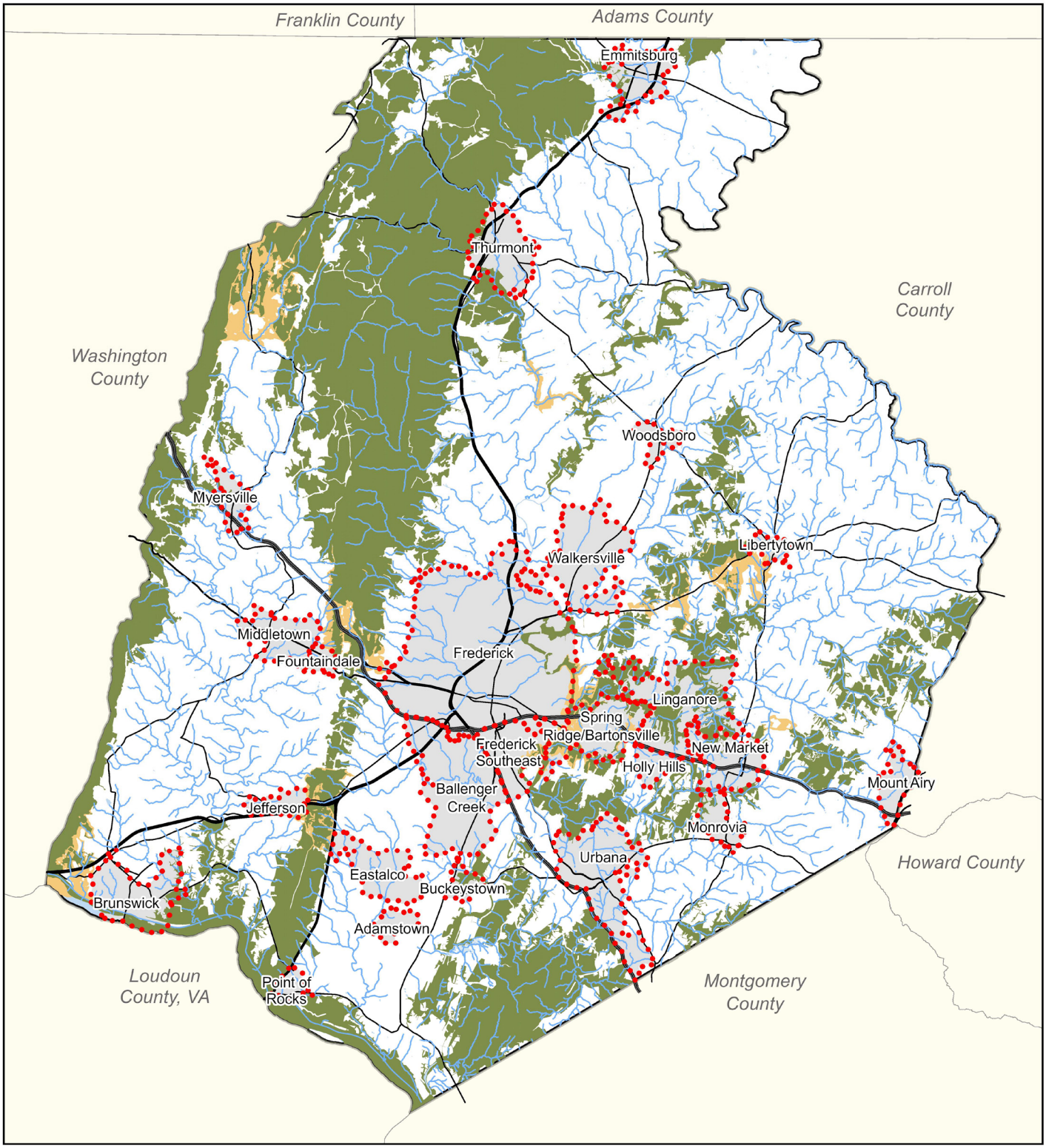
October 31, 2023
Frederick County GIS

0 2 4 8 Miles

N

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

MAPID:00123



Frederick County Green Infrastructure Network

Frederick County, Maryland
Division of Planning & Permitting

Streams

Route Type
- Interstate
- US Highway
- US Alternate

Business Route
Maryland
Frederick County Corridors
Frederick County Hubs

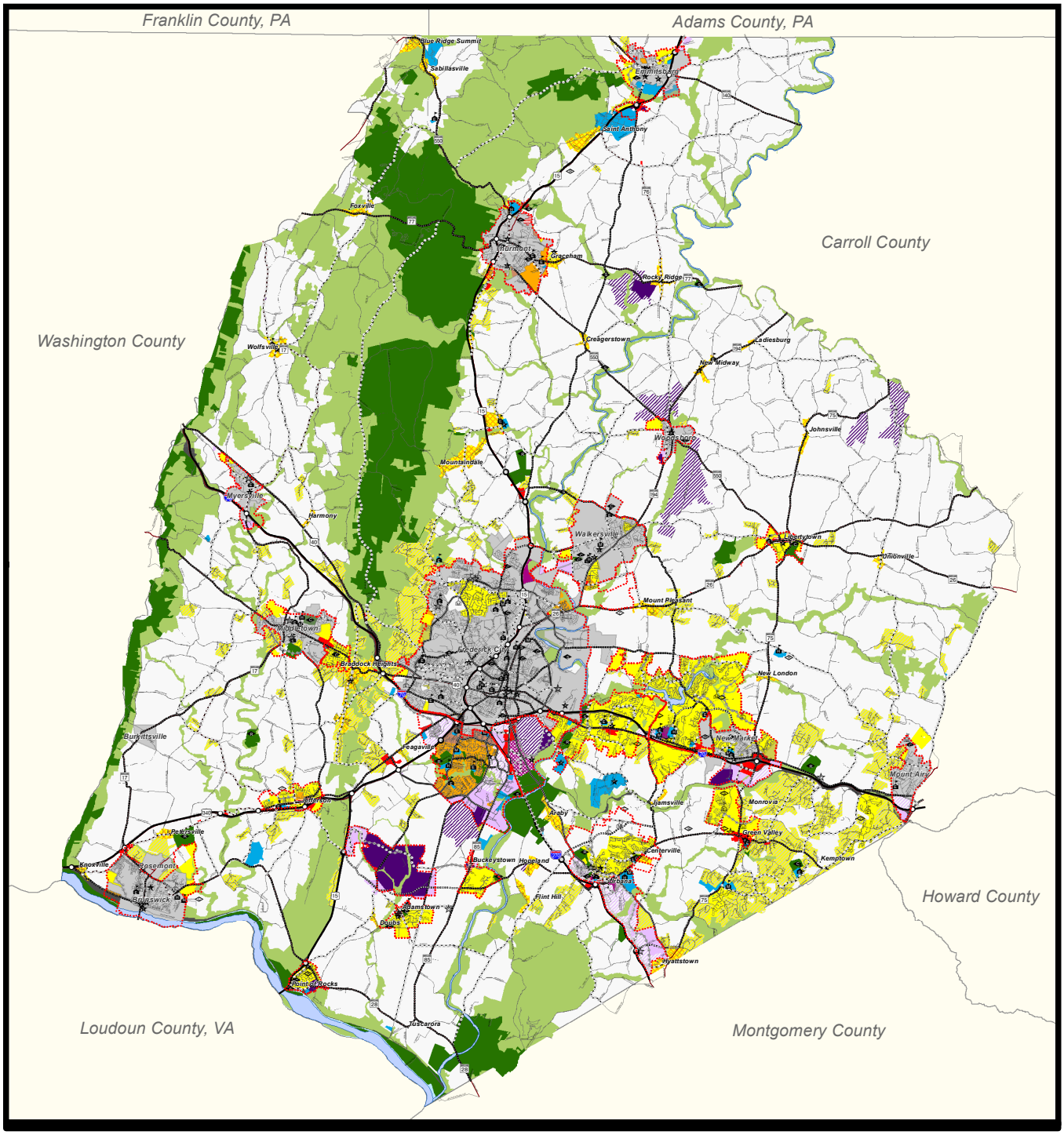
County Boundary
Community Growth Area

0 2 4 8
Miles

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

While efforts have been ma de to ensure the accuracy of this map, Frederick County accepts no liability or responsibility for errors, omissions, or positional inaccuracies in the content of this map. Reliance on this map is at the risk of the user. This map is for illustration purposes only and should not be used for surveying, engineering, or site-specific analysis. This map was printed on October 3, 2024.

N



Comprehensive Plan

Adopted as part of the Countywide Comprehensive Plan Resolution #10-06, Effective: April 8, 2010

Amended: Resolution #12-19, Effective: September 13, 2012

Amended: Resolution #22-46, Effective: October 31, 2022

Frederick County, Maryland
Division of Planning & Permitting

Community Growth Area

Land Use Plan Designations

- Agricultural / Rural
- Natural Resource
- Public Parkland / Open Space
- Rural Community
- Rural Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Village Center
- General Commercial
- Limited Industrial
- Office / Research / Industrial
- General Industrial
- Mixed Use
- Mixed Use Development
- Mineral Mining
- Institutional
- Water
- Right of Way

Community Facilities*

Existing / Proposed

Schools: Elementary (E), Middle (M), High (H), Special (S)

Parks: Community (C), Regional (R), Special (S)

Existing / Proposed

Fire Station (F)
Landfill (LF)
Library (L)
Police Station (P)
Transit Station (T)

* The symbols for proposed community facilities are not fixed on the specific properties, but identify appropriate general locations.

Highways

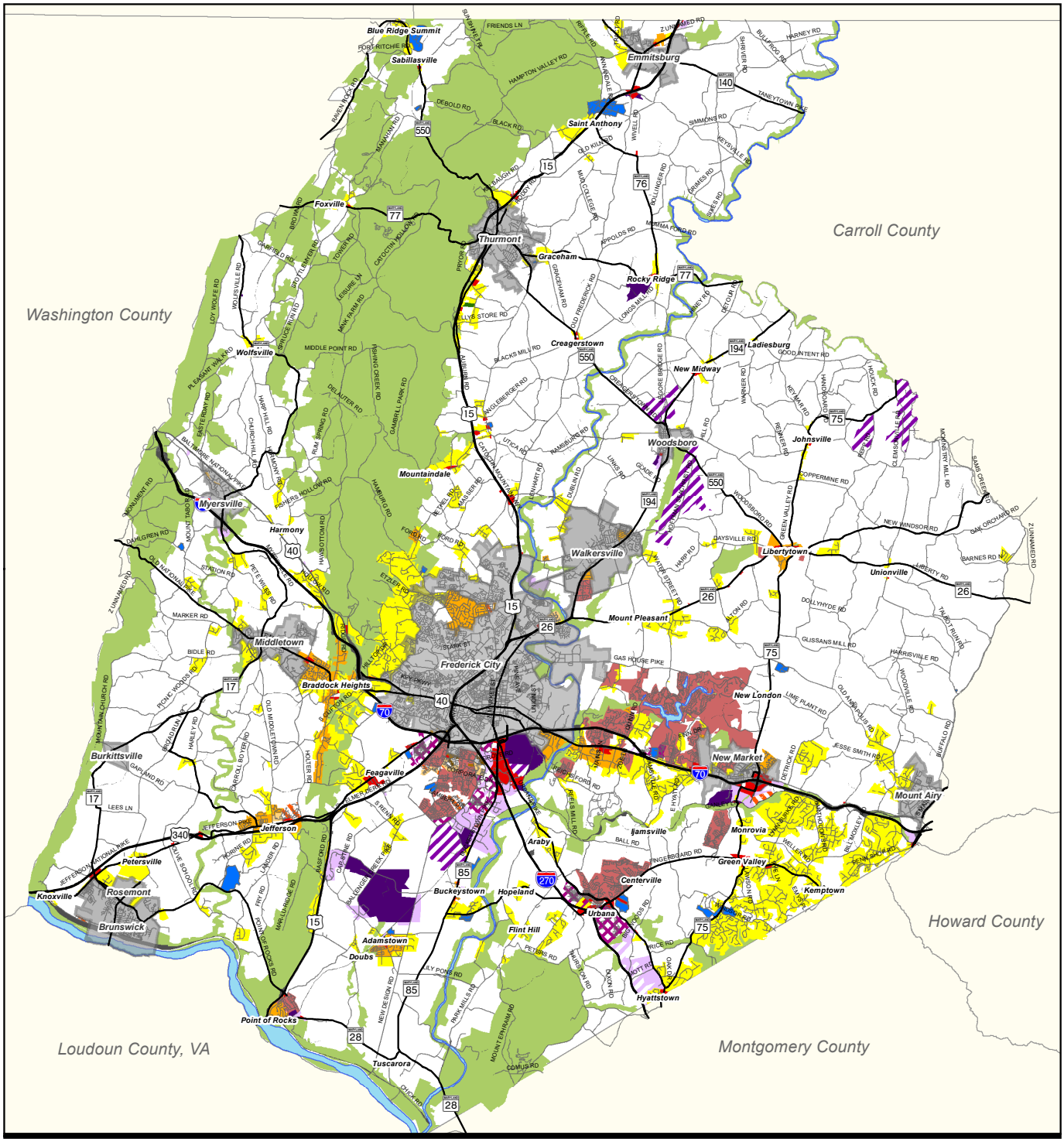
Existing / Proposed

- Freeway / Expressway
- Major Arterial
- Minor Arterial
- Collector
- Transit Easement
- Interchange

0 1 2 4 Miles

N

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet



Zoning

Adopted as part of the Countywide Comprehensive Plan Ordinance #10-05-540, Effective: April 8, 2010

Amended:

#10-27-562, 11-23-2010,
#12-25-600, 03-08-2012,
#12-22-617, 09-13-2012,
#12-28-623, 11-28-2012,
#13-14-642, 07-11-2013,
#13-26-654, 12-05-2013,
#14-03-658, 05-08-2014,
#14-04-659, 05-29-2014,
#14-17-672, 10-09-2014,
#14-18-673, 10-09-2014,
#14-20-675, 10-23-2014,
#14-27-682, 11-24-2014,
#14-29-684, 11-24-2014,
#14-28-683, 11-24-2014,
#17-02-002, 07-11-2017,
75-80 Properties, LLC v. RALE, Inc., 470 Md. 598 (2020),
#20-05-005, 11-10-2020,
#20-05-006, 11-10-2020
#22-04-004, 6-28-2022
#22-05-005, 6-28-2022
#22-07-007, 10-31-2022
#24-02-002, 5-7-2024

- A – Agricultural
- RC – Resource Conservation
- OSR- Open Space Recreation
- R1 – Low Density Residential
- R3 – Low Density Residential
- R5 – Middle Density Residential
- R8 – Middle Density Residential
- R12 – High Density Residential
- R16 – High Density Residential
- PUD – Planned Unit Development
- VC – Village Center
- GC – General Commercial
- GI – General Industrial
- LI – Limited Industrial
- ORI – Office/Research/Industrial
- MX - Mixed Use
- MXD – Mixed Use Development
- MM – Mineral Mining
- Ie - Institutional
- Municipality
- Right of Way

N

Frederick County, Maryland
Division of Planning & Permitting

0 1.75 3.5 7 Miles

Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet
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Division of
Planning and Permitting

Livable Frederick Planning and Design Office

Frederick County
Government Maryland