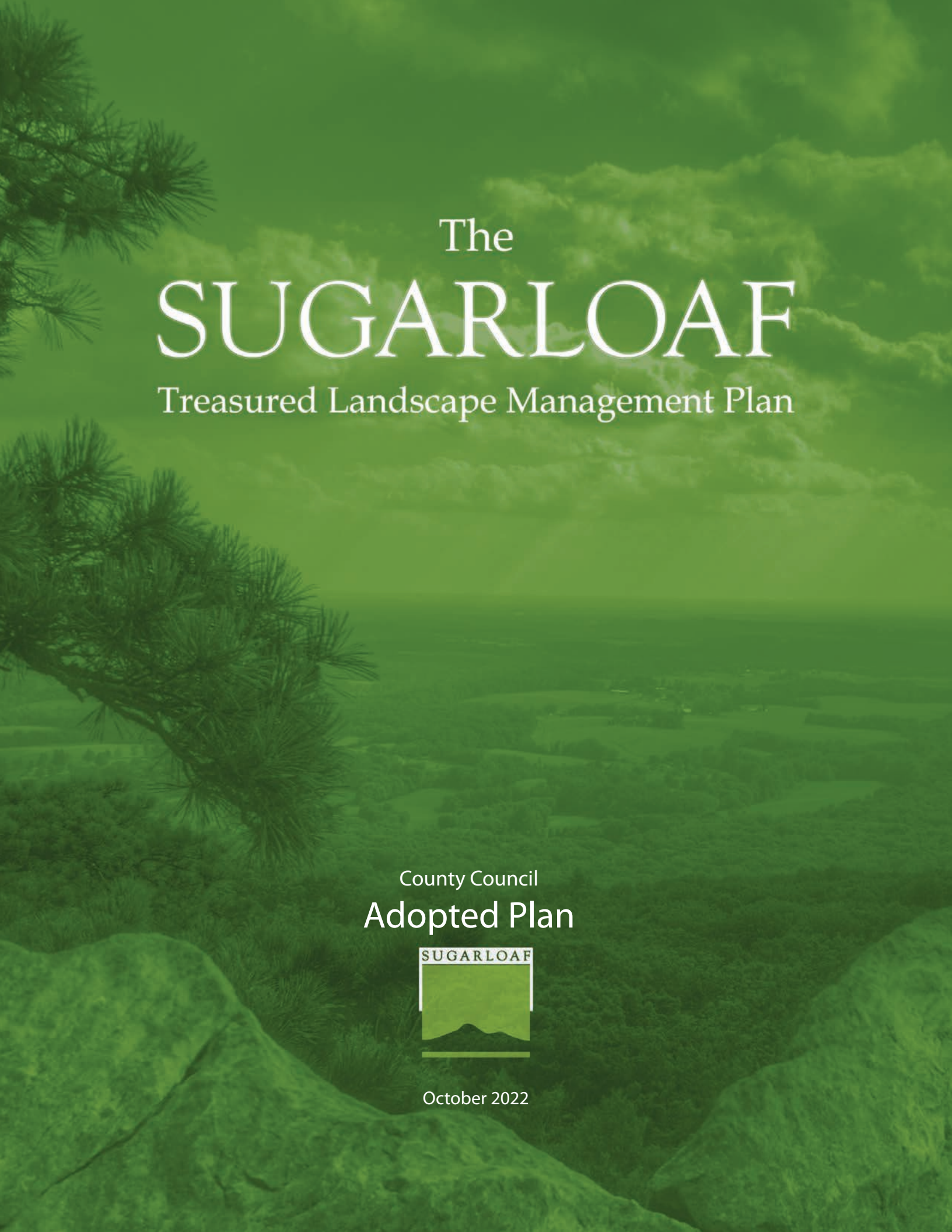

The SUGARLOAF

Treasured Landscape Management Plan

County Council

Adopted Plan

October 2022

The SUGARLOAF

Treasured Landscape Management Plan

A Large Area Plan Element of the Livable Frederick Comprehensive Plan

Frederick County, Maryland

Adopted October 2022

Ms. Jan H. Garder, County Executive

Frederick County Council

President, Ms. M.C. Keegan-Ayer

Vice President, Mr. Michael Blue

Mr. Phil Dacey

Mr. Jerry Donald

Ms. Jessica Fitzwater

Mr. Kai Hagen

Mr. Steve McKay

Frederick County Planning Commission

Mr. Sam Tressler, Chairman

Mr. Joel Rensberger, Vice Chairman

Mr. Terry Bowie

Mr. Tim Davis

Mr. Craig Hicks

Ms. Carole Sepe

Mr. Robert White

Planning and Permitting Division

Steve Horn, Director

Livable Frederick Planning and Design Office

Kimberly Gaines, Director

Tim Goodfellow, AICP

John Dimitriou, R.A.

Dial Keju

Denis Superczynski, AICP

Amanda Whitmore

Beau Lockard

Karin Flom

Interagency Information Technologies, GIS Department

Kevin Szatmary

Mary McCullough

Tim Riley


SUGARLOAF

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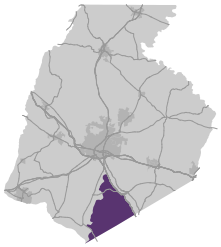
The logo represents the goals, initiatives, and supporting initiatives from the Livable Frederick Master Plan that correspond and provide guidance to the concepts, policies, and initiatives contained in the Sugarloaf Treasured Landscape Management Plan.



Chapter 1

Introduction and Background

The Sugarloaf Treasured Landscape Management Plan is a long-range planning document that exists within the context of a broader planning initiative known as Livable Frederick. With the adoption of the Livable Frederick Master Plan in September 2019, Frederick County created a new framework for making strategic decisions about the County's future. The Livable Frederick Comprehensive Plan serves as an umbrella under which a multitude of plans, policies, studies, and regulations are continuously emerging and evolving. The Sugarloaf Treasured Landscape Management Plan is one such document. The Livable Frederick Master Plan's themes of Community, Health, Economy, and Environment and their specific goals and initiatives most closely linked to the Treasured Landscape of the Sugarloaf Mountain Area are listed at the beginning of each chapter.

1.7.1 Ensure that the places, buildings, and environments that exemplify the distinct identity of Frederick County continue to thrive as important elements in our community.

4.1.1 The natural environment and its habitat provision and ecosystem services are critical to our quality of life, and so they should be the primary consideration in all land planning and governmental decision-making processes.

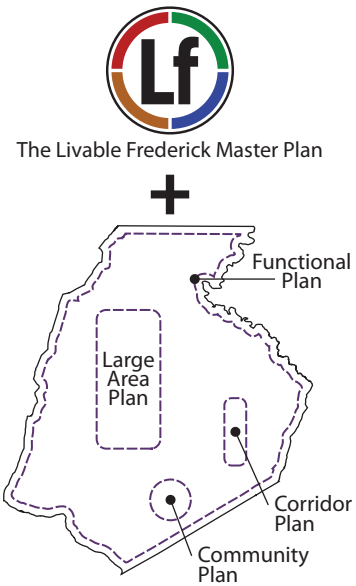
The Livable Frederick Comprehensive Plan is composed of:

The Livable Frederick Master Plan A vision-based strategic plan for the county's long term future well-being. The LFMP features a Vision, a Development Framework featuring a Thematic Plan Diagram, and an Action Framework detailing goals and initiatives addressing the four fundamental themes of Community, Health, Economy, and Environment.

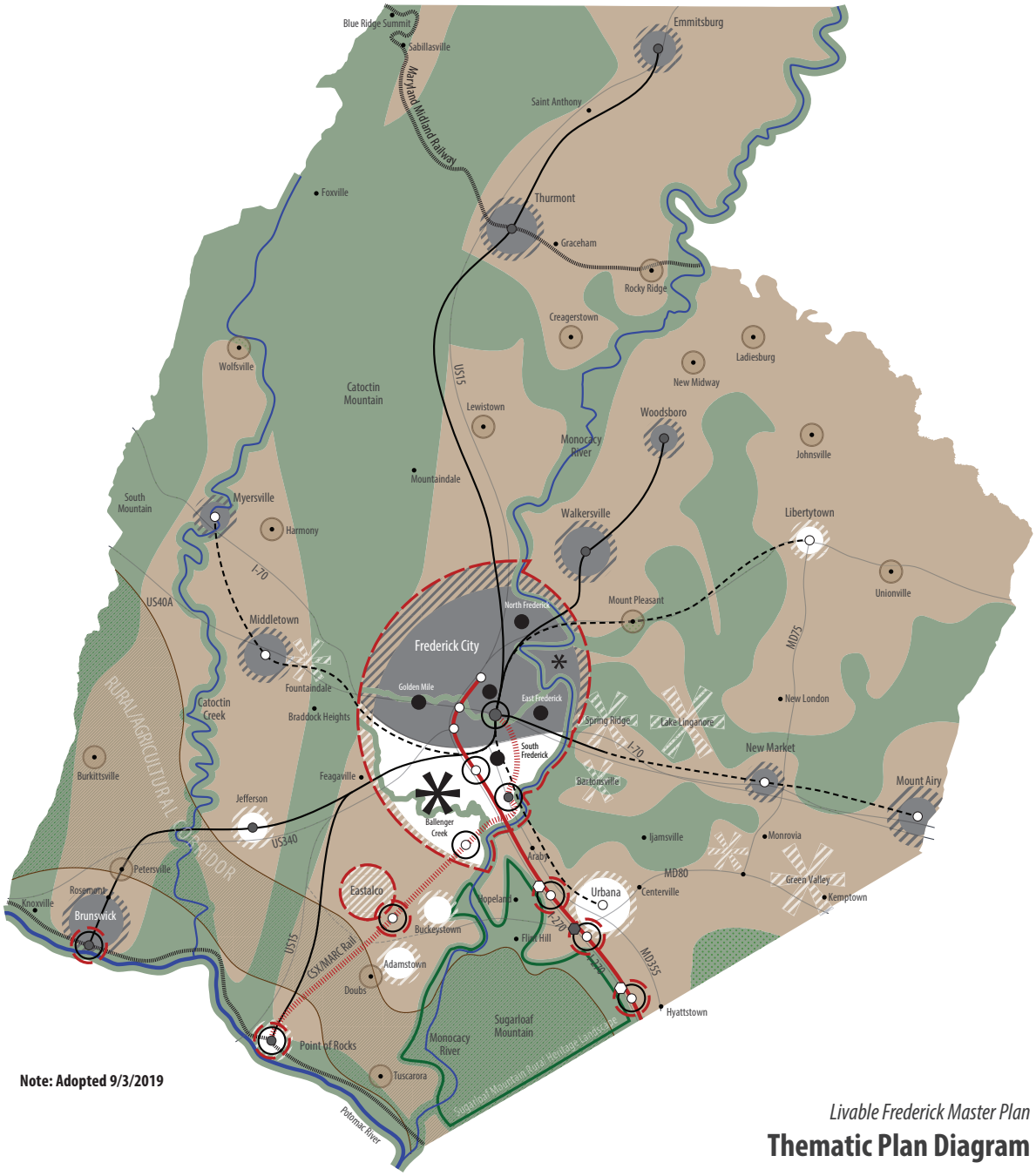
The Thematic Plan graphically represents the Livable Frederick Master Plan's focus on opportunities to enhance existing places, and create new places that are less auto-dependent, more walkable, bikeable, and transit supportive and that support the goals for housing affordability, community health, transportation choice, environmental sustainability, and economic development.

The Comprehensive Land Use Plan Map A map, or map series, that identifies broad categories of land uses and other related long-range planning features. Generally, this map is revised and updated with the adoption of new plans under the Livable Frederick framework.

LIVABLE FREDERICK COMPREHENSIVE PLANNING



Note: Plan types and locations shown are purely illustrative and do not indicate any proposed future planning efforts.



Note: Adopted 9/3/2019

Livable Frederick Master Plan

Thematic Plan Diagram

Primary Growth Sector

- Primary Growth Area
- Rail Corridor
- Highway Corridor
- Development Focus Area
- Multi-Modal Places (1/2 mile radius)
- E / P Multi-Modal Spokes

Secondary Growth Sector

- County Growth Area
- Municipal Growth Area
- Suburban Retrofit

Agricultural Infrastructure Sector

- Agricultural Lands
- Rural Hamlet / Agricultural Support
- Agricultural/Rural Corridor

Green Infrastructure Sector

- Natural Resource Lands
- Major Waterway
- Sugarloaf Mountain Rural Heritage Landscape

E P
- Transit Center
- Highway Interchange

E=Existing P=Proposed

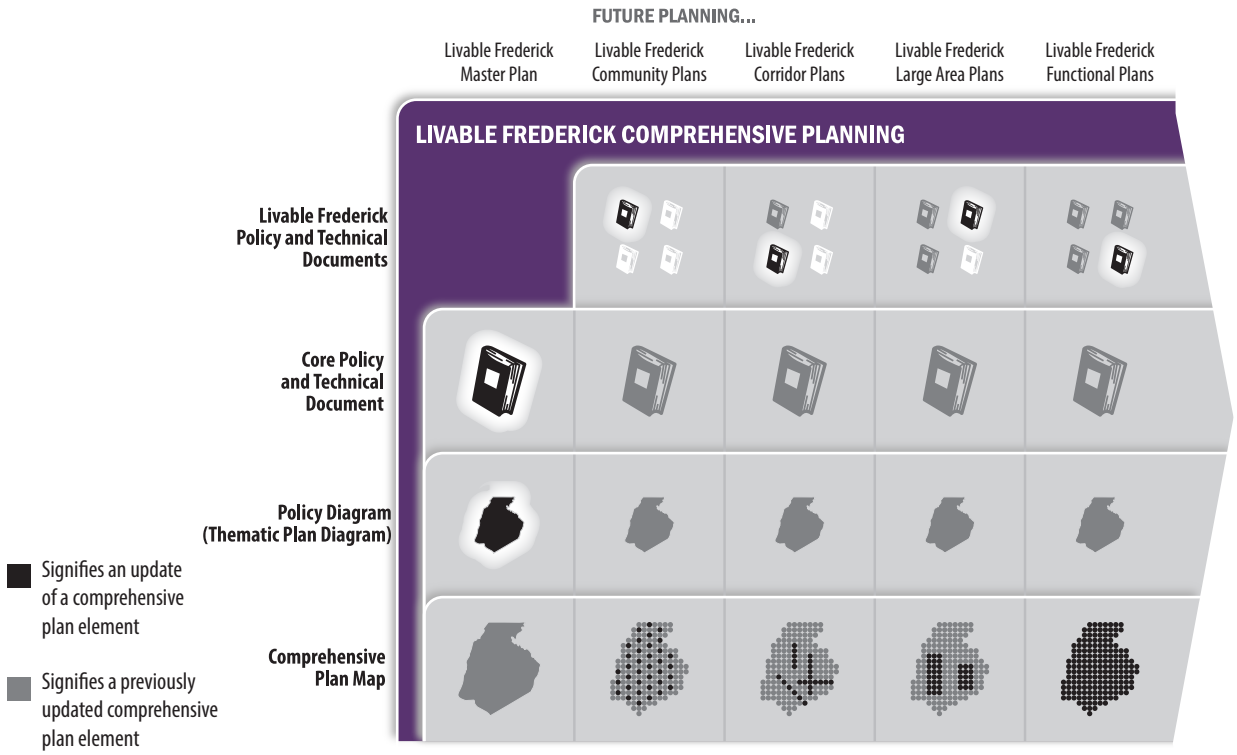
Community and Corridor Plans These plans are the beating heart of the Livable Frederick concept, and will constitute the primary means of implementing the vision presented in the Livable Frederick Master Plan. Plans are prepared for community growth areas, key economic or transportation corridors, county lands surrounding the county's incorporated municipalities, and other geographic places in need of detailed study. These plans are focused on creating great places to live and work in Frederick County.

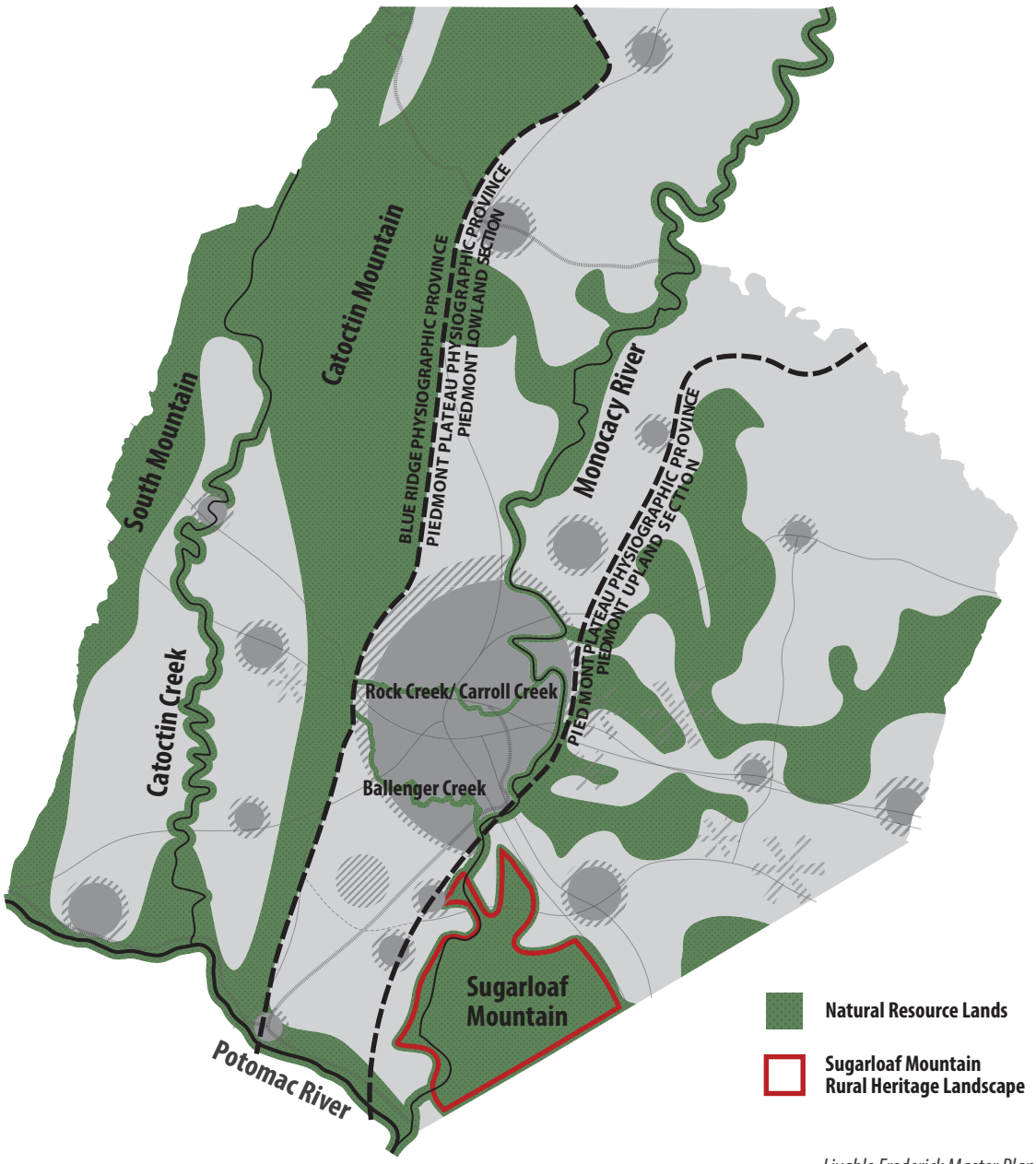
Large Area Plans These planning documents are prepared to address larger geographic areas that include multiple communities or neighborhoods, significant natural landscapes or features, or broad land areas under the influence of forces or conditions warranting dedicated planning attention by the county. The Sugarloaf Treasured Landscape Management Plan is a large area plan.

Functional Plans A functional plan addresses issues related to planning for the systems or networks that are generally not tied to a specific geography within the county. Two such documents identified in the Livable Frederick Master Plan are the Green Infrastructure Plan and the Agricultural Infrastructure Plan, each serving to establish a coordinated planning approach to topics involving an array of places, activities, and forces.

Opportunity Plans These planning documents are deployed to address time-sensitive challenges faced by the county. The Livable Frederick framework acknowledges the need to remain nimble in the face of challenges and opportunities. This type of focused planning work allows the county to work within the Livable Frederick framework, while addressing issues that may not arise in the normal course of long-range planning. Such documents may address specific economic, environmental, or mobility opportunities.

As each of these plans is developed and adopted by elected officials, the new documents will constitute amendments to the Livable Frederick Comprehensive Plan.





Sugarloaf Mountain is a Natural Resource Area, identified as a Rural Heritage Landscape, and constitutes part of the Green Infrastructure Sector in the Livable Frederick Master Plan.

Livable Frederick Master Plan

Thematic Plan Diagram

Green Infrastructure Sector

With the adoption of the Sugarloaf Treasured Landscape Management Plan, the Livable Frederick Comprehensive Plan now reflects the county's long-range vision for the Sugarloaf area and anticipates actions, both public and private, to achieve that vision.

Why do we choose to undertake a plan for the Sugarloaf Area?

The Livable Frederick Master Plan articulates a long-range vision for Frederick County that includes a concept called "Treasured Landscapes." These Treasured Landscapes are places that stand out in a county with many inspiring, productive, and naturally-diverse lands. The LFMP identifies these landscapes as ones that can benefit from the focused attention that a separate planning effort affords. The Sugarloaf Area

is, perhaps, the ultimate example of a Frederick County Treasured Landscape — visually-prominent and recognized by nearly everyone. Yet the Sugarloaf Area is still subject to the same forces that impact all of our neighborhoods, no matter where in Frederick County we call home. It is time for us to acknowledge that if this mountain — and its surrounding lands and waterways — is beautiful and recognizable enough to grace the covers of our government documents, inspire the logos and trademarks of local businesses and organizations, and serve as the namesake of our children's schools, it is clearly important enough for us to make every effort to plan for its continued health, beauty, and economic vitality.

The global Covid-19 pandemic has caused distortions and radical shifts in everyday life, work, and commerce, in addition to causing sickness and mortality. The pandemic underscores the importance of planning as a defense against the unpredictability of the future.

While our future, generally, may be difficult to predict with complete accuracy, the future of our climate and weather patterns are more certain, albeit dire, based on current observations, data trends, and climate and weather models from the vast majority of scientists from academic, research, and governmental institutions. Our future climate poses serious environmental, public health, and economic threats to our society. These threats, though global in origin, affect how we might choose to plan locally. Among the most impactful changes as a result of our changing climate are: increased storm intensity and frequency, flooding and associated stream erosion, heat waves, urban heat island effects, droughts, species loss, and habitat alterations. Increased energy costs, negative impacts on food production, water supply shortages, and damage to our community infrastructure are other grim predictions of our future. This affects, and must inform, how we prepare for the coming decades.

With adoption of Council Resolution No. 20-22 on July 21, 2020, the Frederick County Council formally acknowledged the climate emergency and pledged to evaluate local policy and legislative actions through the lens of climate change. The resolution established a climate emergency mobilization workgroup to develop recommendations to: address global warming, reduce County-wide greenhouse gas emissions, and sequester carbon.

On a smaller, localized level, the Sugarloaf Treasured Landscape Management Plan addresses reducing greenhouse gas emissions, mitigating and adapting to climate change, and working towards climate change resilience through a variety of policies, land use recommendations, and community initiatives.

The Sugarloaf Planning Area possesses multiple environmental elements that make it highly sensitive to change, including extensive and contiguous forestlands, significant wildlife habitat, high-quality waters, portions of a Civil War Battlefield, and the only mountain in the Maryland Piedmont. The Sugarloaf Treasured Landscape Management Plan articulates the rationale and need for stewardship, preservation, and enhancement of these environmental resources. The Plan focuses on the protection of the natural resource base and rural landscape of the Sugarloaf Area.

To provide insight and focus in the development of the Sugarloaf Treasured Landscape Management Plan, the County convened a Sugarloaf Stakeholders' Advisory Group comprised of landowners, community residents, business owners, and individuals with professional and personal ties to the Sugarloaf Area. Crafted in collaboration with the Sugarloaf Stakeholders' Advisory Group, the Sugarloaf Area Vision Statement is a positive and descriptive narrative that articulates a preferred future for the Sugarloaf Planning Area. The Vision Statement forms the aspirational basis from which the overarching goals, policy declarations, and specific initiatives are derived.

The Plan contains both policies and initiatives to guide future decision-making and action. A policy is composed of ideas, concepts, principles, goals, and procedures that are endorsed as a primary means for setting a course for future action in the County, especially concerning community planning and land conservation and development.

An initiative is a task or an item connoting action. The following description of an initiative is included in the Livable Frederick Master Plan: an initiative can include content that could be interpreted as either an objective or action, or in some cases, as a more specific form of a goal statement. The notion of an initiative implies the flexibility needed to allow community institutions, residents and landowners, and elected officials to make the plan work in the real world. "Initiative" implies that implementation can be initiated through leadership from any sector of our community. The future is often unpredictable, yet planning to face the challenges of the future remains our best option as a community. To that end, a shared community vision of our desired future for the Sugarloaf area will guide our land use planning, refine our public policies, and bring resources to bear on the challenges and opportunities that lie ahead.

The Sugarloaf Planning Area's contextual location in southern Frederick County

Sugarloaf Area Vision Statement

A unique geologic landform in Maryland, Sugarloaf Mountain is a defining element of Frederick County's treasured scenic and rural landscape. The mountain and the area surrounding it possess a sublime beauty and significant biodiversity, where a high-quality environment is maintained. Forestlands, aquatic resources, wildlife habitat, inspiring vistas, and historic resources are valued and protected. Land uses are sensitive to both the natural environment and rural character of the area. Stewardship of the area's natural assets and cultural resources ensures healthy, resilient, and economically productive lands for current and future generations. As we face climate change challenges, Sugarloaf Mountain and the surrounding landscape provide ecosystem benefits to the residents of both Frederick County and the wider region, enhancing the sustainability of our shared environment.

Distilled from the Vision Statement are broad goals that identify what the Sugarloaf Treasured Landscape Management Plan strives to accomplish and achieve. Policies and initiatives are dispersed throughout the Plan with associated narratives to provide contextual linkage.

Sugarloaf Treasured Landscape Management Plan Goals

Protect and enhance the Sugarloaf Area's natural resources and environmental assets, including its forests, waters, biodiversity, and wildlife habitats.

Strengthen the distinct place-based identity of the Sugarloaf Area through the stewardship of its scenic and rural character, and its agricultural and cultural resources.

Foster resilient relationships between the natural and built environment through the mitigation of, and adaptation to, climate change.

Geographical Context

The Sugarloaf Planning Area is 19,719 acres in size. Physical proximity and visual relationships to Sugarloaf, overall landscape-related associations with the mountain, and expansive rural landscapes to the north determined the Planning Area boundary, which is bordered by the Monocacy National Battlefield to the north and Interstate 270 to the east. The western boundary includes the Monocacy River, Greenfield Road, and a portion of MD 28, Tuscarora Road. The Planning Area ends at Frederick County's southern border with Montgomery County. See Map 1-1 for a graphical representation of the Sugarloaf Planning Area.

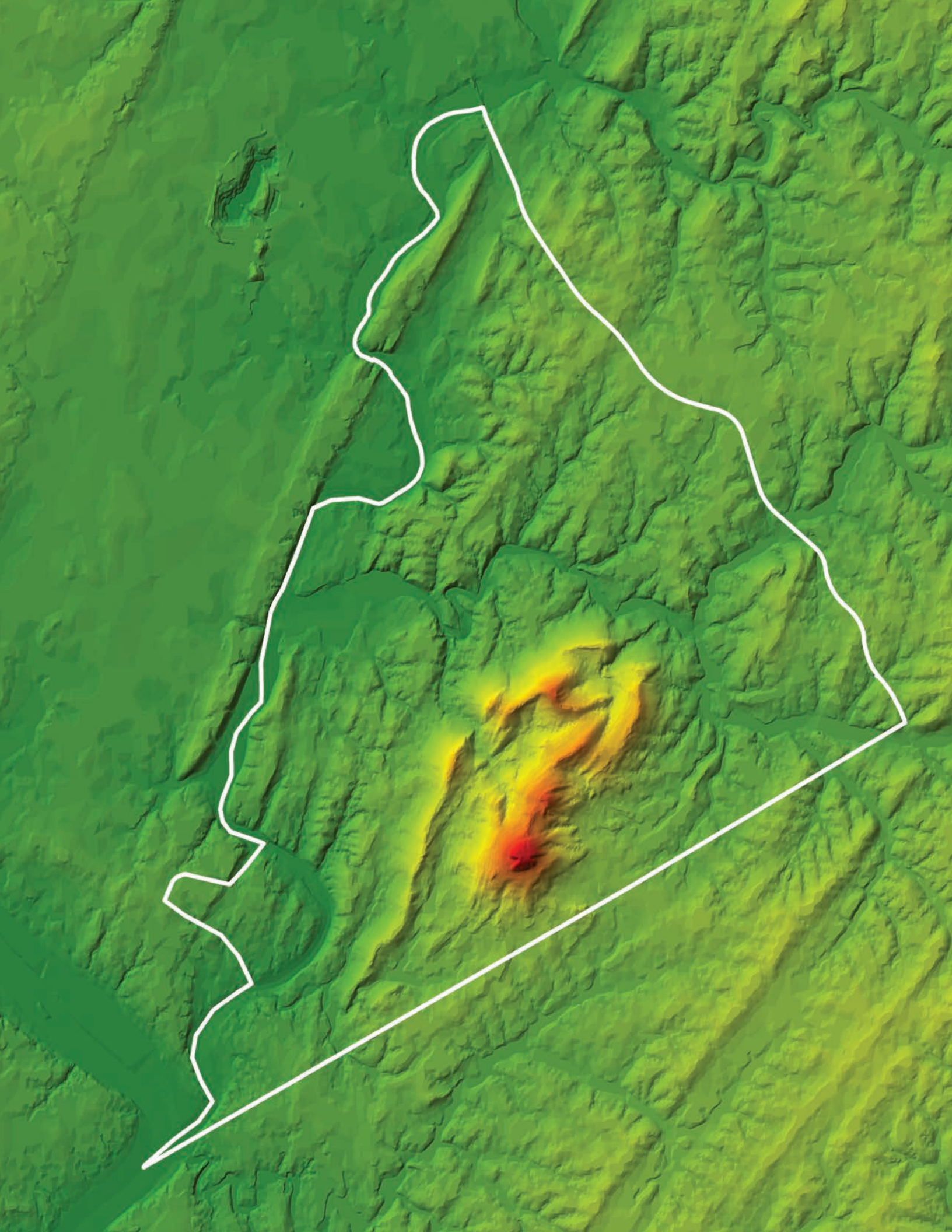
The most prominent and defining feature of the Sugarloaf Planning Area is Sugarloaf Mountain, a unique and isolated geologic feature known geologically as a "monadnock." A monadnock is a type of mountain and is what remains after surrounding lands have eroded over the course of millennia. Sugarloaf Mountain rises 800 feet above the surrounding flat lands and is comprised of Sugarloaf Quartzite, a large, white quartzite stone resistant to erosion, with tight fracture joints intermixed with slate and phyllite. Rising 1,282 feet above sea level, Sugarloaf Mountain has two primary summits, as well as accessory ridgelines with lesser peaks and lower elevations.

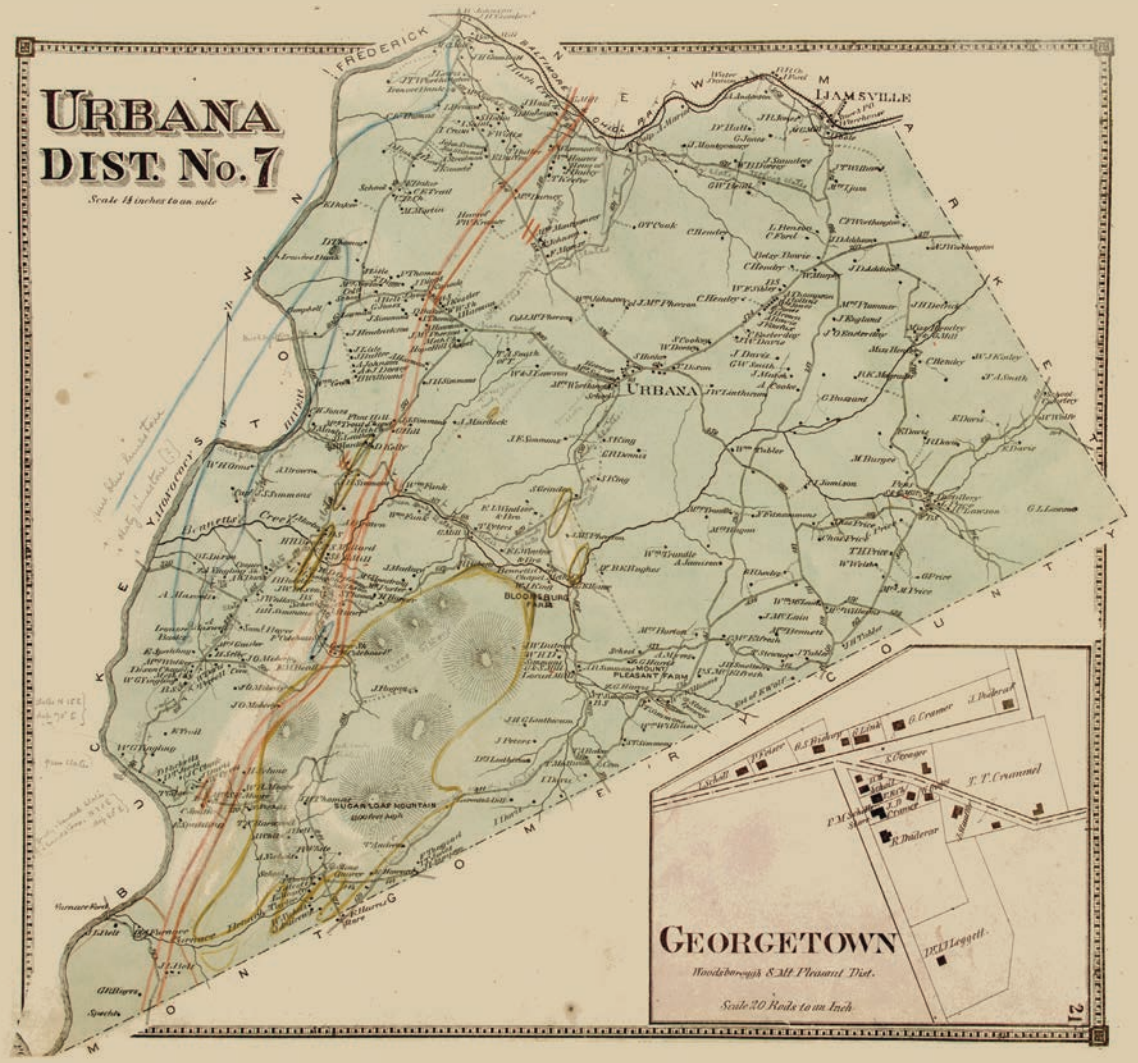
Sugarloaf Mountain towers above a landscape of forestlands, low hills, streams and rivers, agricultural fields, and very low-density residential development. The roadway network today mirrors its late-19th century antecedents on the 1873 Titus Map. The iconic mountain contributes significantly to the area's unique place identity. In a landscape setting with distinctive scenic qualities, rich natural assets, and a unique history, the mountain dominates the visual landscape for miles around.

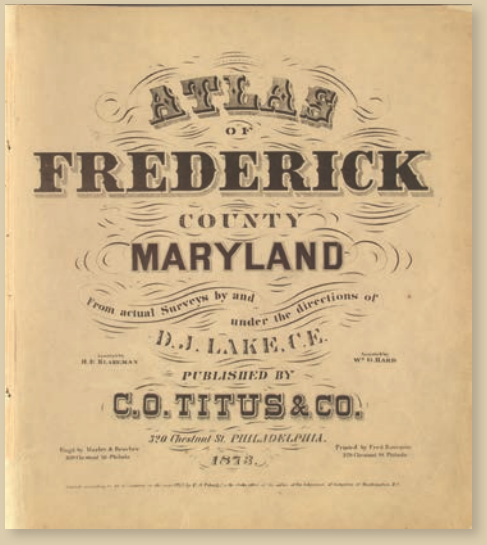
Sugarloaf Mountain is the centerpiece in an expansive assemblage of natural communities, ecosystems, connected forestlands, and open space that include the C&O Canal Historic Park, Monocacy National Battlefield, Monocacy Natural Resource Management Area, Little Bennett Regional Park, Montgomery County's Agricultural Reserve, and the Monocacy and Potomac River systems. These linked landscapes comprise a larger ecoregion in southern Frederick County and northern Montgomery County. Destinations like Sugarloaf Mountain, the Monocacy National Battlefield, and adjacent areas not only offer opportunities to experience natural environments, but also to explore the surrounding communities, places, and culture in this section of Maryland. The Sugarloaf Mountain region constitutes localized ecotourism and heritage tourism, whereby appreciation and wonderment of the natural world and historical sites are paired with positive economic impacts from visitors' patronizing area restaurants, wineries, stores, specialty artisan shops and galleries, and other commercial businesses.

Adding to the Sugarloaf Area's grand, natural resplendence is the Monocacy Natural Resource Management Area (MNRMA), which consists of approximately 1,800 acres under management and ownership of the Maryland Department of Natural Resources (DNR). These public lands are adjacent to the Monocacy River and the privately-owned Sugarloaf Mountain and contain expansive forestlands, fields, and agricultural lands. Ecological research and environmental studies are conducted at MNRMA, including riparian buffer research and experiments with rotational timber harvesting, deer exclusions, and agroforestry practices. Map 1-2 displays the locations of the MNRMA, lands comprising Sugarloaf Mountain, and other private lands under protective conservation easement.

The exceptional beauty, expansive forest cover, and rural qualities of the landscape around Sugarloaf Mountain also make the area an attractive place in which to live. Small, distinctive, historic communities — Buckeystown, Comus, Hyattstown, Barnesville, Beallsville — are nestled in the mountain's environs and are emblematic of the area's historic economic value, as well as its rural qualities and characteristics. However, the character of an area and the health of the land can change over time. Land use changes are shaped by a wide variety of factors including demographic trends, economic markets, access to transportation infrastructure, laws and regulations, civic engagement, cultural preferences, politics, and technology.



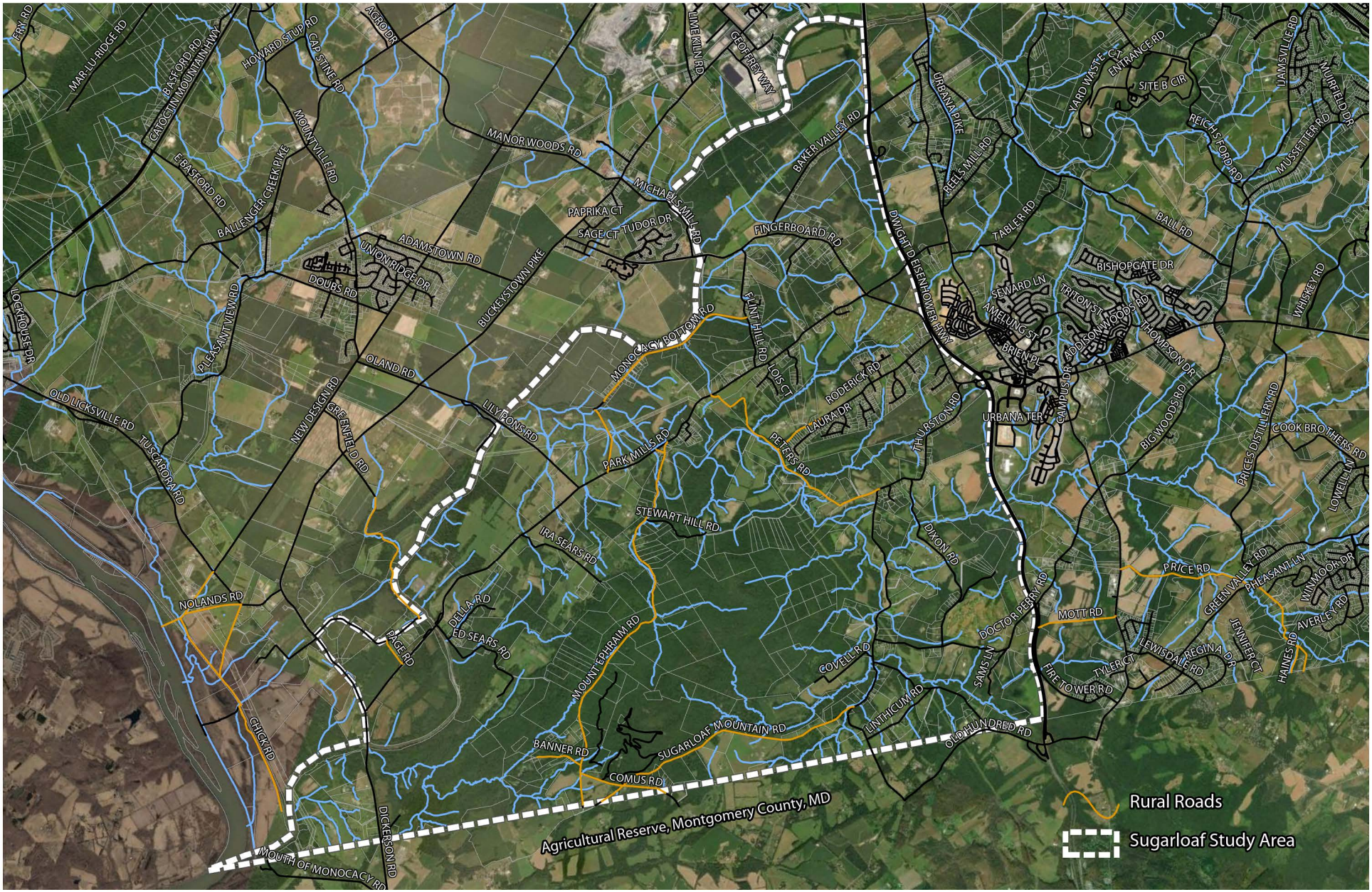




"Titus" Map, Urbana District No. 7. In: Atlas of Frederick County Maryland. Philadelphia, PA: C.O. Titus & Co., 1873. As reproduced by: Unigraphic, Inc., 1976. Page 21

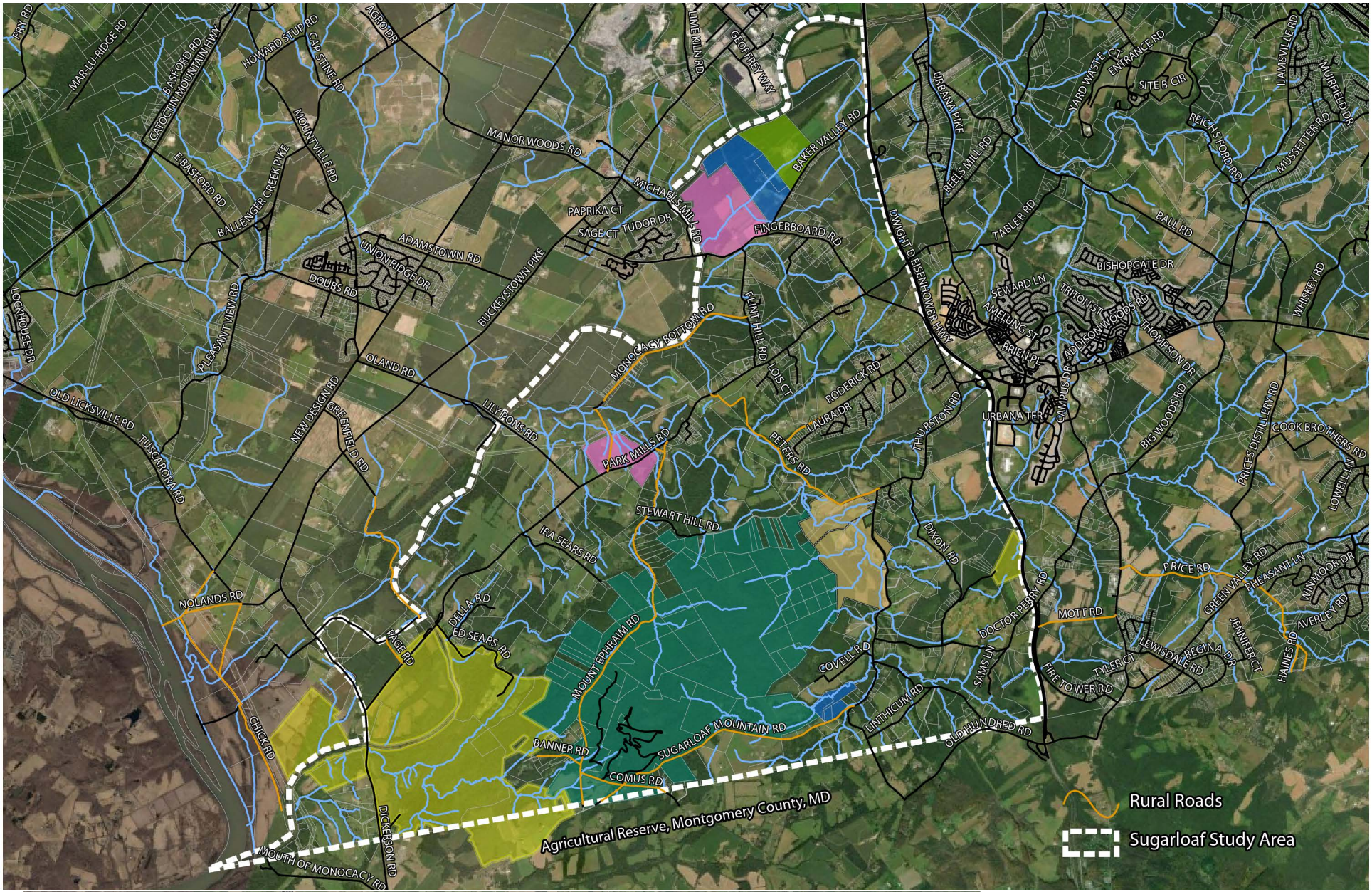
Policy 1.1 **Support natural resource protection, respond to climate change, and ensure the scale and location of development is compatible with surrounding rural land uses and achieves the Vision for the Sugarloaf Planning Area.**

Policy 1.2 **Protect the scenic landscape character and rural setting of the Sugarloaf Planning Area to ensure its continued beauty and unique charm.**



Planning Area Boundary

Map 1-1



Sugarloaf/Stronghold, MD Department of Natural Resources (MD-DNR), and Conservation Easements

- Monocacy Natural Resource Management Area and Urbana Lake
- Maryland Agricultural Land Preservation Foundation (MALPF) Easements
- Maryland Environmental Trust Easements
- Stronghold, Inc.
- Rural Legacy Easements
- Maryland Department of Natural Resources Easements

Map 1-2

Chapter 2

History and Culture

1.7.3 Foster public education and greater appreciation and understanding of historic and archeological resources, and public support for heritage preservation in Frederick County.

1.7.4 Support tourism geared towards experiencing the places, artifacts and activities that authentically represent the stories and people of the past and present in Frederick County, including cultural, historic, and natural resources, while maintaining the integrity of those irreplaceable resources.

1.7.1.1 Locate, designate, and then protect and maintain Frederick County's most important historic structures and districts, archeological sites, distinctive natural features, and cultural landscapes.

1.7.4.3 Protect and maintain the integrity of the grand views and critical corridors within our working and historic landscapes.

1.9.1.1 Acknowledge, identify, and protect locally important historic and cultural resources.

1.9.3.3 Encourage growth policies that are respectful of local history.

A major impetus for the development of the Sugarloaf Treasured Landscape Management Plan is the historic and cultural status of the Sugarloaf Area in Frederick County and the surrounding region. Its location and natural characteristics, while important in many critical ways, are best understood as the catalysts for decisions — large and small — made by communities, individuals, and elected officials over the previous three centuries. The sum of these decisions, whether made by farmers, merchants, industrialists, soldiers, or adopted Frederick Countians such as Gordon Strong, have given us the Sugarloaf area we know today.

In addition to providing residents, business owners, land stewards, and planners with a basic inventory and deeper comprehension of the many historic and cultural resources that remain in the Sugarloaf planning area, the following section of the plan gives us something that is arguably of greater importance. It gives us critical insight into why we are developing a plan in the first place.

The historic and cultural resources of the Sugarloaf area, and the stories they continue to tell us, should inform the decisions we make on behalf of our future selves. Let us understand the historic and cultural context of Sugarloaf Mountain and use this understanding to establish a plan for the area that protects its character, honors and acknowledges its past, expands and improves its environmental and economic vitality, and establishes a clear direction for public and private decision-making over the course of the next generation.

The Appendix contains a listing of properties and sites in the Planning Area that are listed on the National Register of Historic Places and/or the Maryland Inventory of Historic Properties (Historic Resources Inventory pp. A-1 to A-12). Also included is a list of historic properties from the County's 1993-1995 Urbana Region Field Survey, which describes properties and sites that are potentially significant, and the 1993 Stronghold Survey District Form.

These lists are not comprehensive and may not reflect the broader and more encompassing understanding of this area's history that is emerging as the community seeks to represent the stories of people and places traditionally left out of our historic record. Of particular note here are communities founded by African-American Frederick County residents who, in the latter half of the 19th century, established

schools, churches, homes, and businesses to support these settlements. Communities such as Della, Greenfield, and Hope Hill provided a central location for African-American Frederick Countians to provide for social, cultural, religious, educational, political, and economic needs in a time when such needs could be difficult or impossible to attain in the community at large.

Moving forward, Frederick County – its public and non-profit sectors specifically – is actively pursuing projects that build on the stories of resilience and excellence in the African-American community, as well as those that expose the brutal reality of the institutions of slavery and Jim Crow, and their rippling effects across many generations of County residents. All of these stories – the tragic ones, the inspiring ones, the ones that make us feel uncomfortable and hurt, and those that make us laugh or swell with pride – ultimately serve to deepen our understanding of how the experiences of Black men and women form a crucial part of the Frederick County story. This is a story that remains incomplete until it is told in its entirety.

Prehistory

The heritage of the Sugarloaf Mountain area began far earlier than the founding of Frederick County in 1748. Native peoples called this area home for at least the past 10,000 years. Various communities of people migrated for thousands of years, following the Potomac and Monocacy rivers and their tributaries throughout the seasons, while exploiting the abundant available resources. Because of its varied topography and plentiful natural resources, the Sugarloaf Mountain area has always been a desirable location for populations. In fact, archeological evidence suggests that native people used the same areas again and again over the millennia since the environment was so conducive to occupation.

There are currently 37 prehistoric archeological sites recorded within the boundaries of the Sugarloaf planning area; additionally, dozens more have been recorded near the area. Thanks to recent archeological studies and current research, we now have a portrait of these early residents. Radiocarbon dating of charcoal and other organics found in association with artifacts have established time periods for changing artifact types. These artifacts include, for example, spear points, arrowheads, and pottery. The changes were developed in response to slow environmental shifts over thousands of years; therefore, the early inhabitants developed new technologies to utilize what they found. Separate cultural periods have been established to describe the prehistoric era in the region.

Paleoindian Period (10,000-8,000 B.C.)

The term "Paleoindian" traditionally refers to the earliest phase of human occupation in the region. This term is based essentially on a stylistic sequence of finely manufactured chipped stone "fluted" spear points. A single Paleoindian spear point was found at each of two separate archeological sites recorded within the planning area boundaries. Both sites are located near the Monocacy River.

At that time, to the north and west, the Wisconsin glacial advance created a cool, wet climate resulting in increased vegetation, which led to a population of large animals. Nearer the Sugarloaf Mountain area, however, these changes created a more diverse animal population that included white-tailed deer, black bear, caribou, moose, bison, and musk ox in addition to a variety of smaller animals. A mosaic pattern of vegetation provided an assortment of plant foods. A mixed deciduous forest existed near the Monocacy and Potomac rivers; a mixed coniferous and deciduous forest existed in the foothills; grasslands proliferated in the foothills and valley floors; and coniferous forests comprised the high ridges.

Evidence from excavated archeological sites in the region indicates that the social organization of the small population was based on territorial semi-nomadic bands. The settlement system consisted of a series of satellite sites such as hunt/kill sites, butchering stations, quarries, and other limited-activity areas surrounding a larger base camp where bands met during part of the seasonal cycle.

As well as fluted spear points, the Paleoindian tool kit included stone choppers, hammers, abraders (for polishing), and scrapers (used for skinning and other tasks). High quality lithic (stone) raw materials were the preferred resources for the manufacture of tools, making them last longer (e.g., they could be easily resharpened or reshaped to extend their use).

Archaic Period (8,000 – 1,000 B.C.)

While the beginning of the Archaic Period was a continuation of Paleoindian lifeways, the Archaic pattern developed more fully through time and centered around exploiting a broader resource base through hunting, fishing, and gathering. Archeologists have divided the Archaic Period into sub-periods (Early, Middle, and Late Archaic), based largely on the changes in styles of radiocarbon-dated spear points. Twenty-one sites yielding Archaic Period artifacts comprise most of the archeological resources recorded in the planning area.

Smaller notched, stemmed, and serrated type spear points are the earliest representative of the *Early Archaic Period*. There was an extensive use of rhyolite (a major stone resource readily available northwest of Frederick on Catoctin Mountain) for tool making. The Early Archaic tool kit also included stone scrapers, gravers (for engraving), wedges, serrated tools, choppers, knives, utilized flakes of stone, hammerstones and abraders, all used for a variety of tasks.

The five sites recorded with an Early Archaic occupation in the area have been found mostly near the Monocacy and Potomac rivers, situated along terraces and hillslopes. Elsewhere, some sites have been found in high order stream environments and along the high terraces of the Potomac River in addition to stream junctions, floodplains, swamps, marshes, and ponds.

Social systems still centered around bands and settlement revolved around temporary campsites. However, seasonal cooperation by groups is indicated at larger camps where specific resources like fish and nuts were likely to have been cooperatively collected.

A major change in the *Middle Archaic Period* artifact assemblage was the advent of a variety of ground stone tools including the atlatl (a stick used to propel a spear) and bannerstone (used as a weight to help increase velocity). In addition, axes, grinding stones and plain adzes (axe-like cutting tool), hafted drills and scrapers commonly found in upland, riverine and rock shelter settings, suggesting a well-adapted hunting/gathering subsistence strategy. The five sites with Middle Archaic components recorded in the planning area are defined by the presence of a variety of spear point styles. Plant resources, like hickory nuts and acorns, were plentiful in the forests, and may have also become more extensively distributed in the upland regions.

During Middle Archaic times, the settlement pattern shifted to a more sedentary life with bands occupying small temporary camps and seasonal camps. Wide-spread occupations took place on the Potomac River floodplain and upland stream drainages. Base camps were located along the floodplains, while, in the uplands, most sites consisted of small resource procurement campsites near small swamps and bogs, at springs and seeps, and along small tributaries.

By the *Late Archaic Period*, the tool kit expanded to include a wider range of ground stone tools such as winged bannerstones, grooved axes, adzes, and gouges. Cobbles were utilized for grinding food stuffs and as hammerstones for percussion flaking in the manufacture of chipped tools and spear points. All rhyolite sources in the area were intensively exploited for tool manufacture. There was also an emphasis on utilizing other locally available lithic sources like quartz and quartzite for tool manufacturing.

Based on the fifteen sites with Late Archaic components recorded in the planning area, populations began to settle away from the rivers with a preference for the foothill areas near the uplands. A warming episode created an expansion of oak-hickory forests along hillslopes and along valley floors. From the large increase in the number of sites found, the valley floors became the focus of seasonal movements. The differences in tool types found on sites along the river versus in the foothill areas indicate that the floodplains were used as habitation sites while the foothill and valley floor areas were utilized as short-term hunting camps.

Near the end of the Late Archaic Period, there was an increase in population, evidenced by larger sites with denser concentrations of lithic debitage (the waste left from making stone tools) and more diverse styles of spear points. Archeological excavation of some undisturbed Late Archaic sites yielded "features" (such as rock hearths and storage pits) associated with specialized processing or general cooking.

Woodland Period (ca. 1,000 B.C. – A.D. 1600)

During the Woodland Period the native population increased and became more sedentary. Hunting, gathering, and the development of subsistence farming provided the economic base. Artifacts related to domestic life, like pottery, began to appear. Because techniques in the manufacturing process (such as tempering – adding different types of crushed material to the clay to make it more resilient) and decoration of pottery changed through time, archeologists have divided the period into sub-periods (Early, Middle, and Late), based on radiocarbon dated artifacts.

The *Early Woodland Period* in the planning region followed the same general cultural pattern as the Archaic Period except for the stylistic difference in spear points and the presence of pottery. The large spear point tradition and preferred use of mainly coarse stone materials was replaced with the use of a variety of small notched and stemmed forms. In addition to rhyolite, locally available quartz was equally utilized for manufacturing tools; additionally, local quartzites, cherts, jaspers, and other suitable materials were not ignored. While ground stone tools continued to be produced and utilized during this period, there was a distinct increase in the numbers and types of elaborately manufactured, polished tools, implements and ornaments such as bone beads and awls, hairpins, disk beads, turtle shell bowls and cups, shell beads and pendants.

In terms of ceramics, the first such artifacts in the area have been associated with small villages or hamlets with a typical "wigwam" or hut type of dwelling that was used for shelter. This ware is characterized as steatite (soft crushed stone) tempered, thick hand molded and plain ceramics exhibiting flat bottoms and lug handles. Another type found is characterized as also steatite tempered but exhibiting net and mat impressions.

The six archeological sites recorded with Early Woodland components in the area are located primarily near the Potomac and Monocacy rivers and in nearby upland stream drainages. Although existing archeological data suggest an intensive use of floodplains, this inference is based on evidence from few site excavations.

During the *Middle Woodland Period* cultures exploited riverine resources such as freshwater mussels and fish. Five of the archeological sites recorded in the planning area yielded Middle Woodland occupations and all were located nearer the Potomac and Monocacy rivers. Winter base camps may have also been situated along the rivers. Deer, turkey, and waterfowl were hunted in the foothills and upland areas of Sugarloaf Mountain. Hunting and collecting berries and grass seeds throughout the valley would have been summertime activities.

The archeological record for the *Late Woodland Period* has produced more information than any other time in prehistory because sites are large and are relatively well preserved. Eight archeological sites containing a Late Woodland occupation have been recorded in the planning area. However, no professional excavations have been conducted at any of the sites. Based on excavations that have been conducted nearby, some conclusions can be drawn about the inhabitants of the period.

One Late Woodland occupation site, located immediately outside the planning area boundaries and along the Monocacy River, yielded limestone tempered pottery along with lesser amounts of limestone and quartz tempered ware. Excavations revealed overlapping circles of post hole impressions suggesting that a circular village (or two overlapping villages) were located at the site.

By the latter part of the Late Woodland Period, pottery was typically tempered with crushed shells and decorated with notched lips or

geometric or rectilinear patterns; vessels were all collared. Smaller triangular projectile points, hafted on to smaller shafts, signaled the transition from using the spear to the bow and arrow. Many points were manufactured from quartz, which emphasized a more localized use of available lithic materials. Bone tools such as fishhooks, beamers, awls, and bone and shell beads have been found at Late Woodland sites.

While villages were the main habitation sites, small outlying camps served special purposes. Small groups from the main village utilized rock shelters and bench edges as refuges during hunting and gathering forays. The demands at certain times (such as during the planting season) placed on the village population may have necessitated short-term stays near fields. Artifacts have been found in association with small sites that relate to village activities.

Some of the earliest Native American paths followed the Potomac and Monocacy rivers and likely provided the means for groups to take advantage of the available resources in the Sugarloaf Mountain area. Throughout the latter part of the 17th century, European settlers and native populations lived within reach of each other. The early colonists settled primarily along the Chesapeake Bay and major waterways, while the native tribes sought refuge in the interior regions. Historic documents describe the native populations in the area as small communities of displaced groups that became more dispersed over time. According to a map drawn by Philemon Lloyd in 1721, one group, the Tuscarora, had established a village on the floodplain of the Potomac River near the mouth of the Monocacy River. By the mid-18th century, due to the pressures associated with European settlement, most of the native groups were gone from the region.

European Settlement

Forests covered the area prior to European settlement. Native Americans were the first to utilize the area for camps, seasonal hunting, and migration. Archeological evidence of hunting trails and camps have been identified along the Potomac and Monocacy Rivers. European fur traders were next to find use in the Sugarloaf Mountain area in the late 16th and early 17th centuries, including Christoph de Graffenried who was the first to name and describe the mountain in 1712. A few years earlier, in 1707, Louis Michael made a map of the Potomac area that included the mountain ranges and Sugarloaf.

English and German settlers began to permanently settle in the area by the 1740s. English settlers were traveling northwest from southern Maryland and Virginia, while German settlers were traveling south from Pennsylvania and New York. The English brought tobacco farming and corn, while the Germans brought small grains and subsistence farming. The German farmsteads also consisted of large bank barns, wagon sheds, corncribs, hog pens, chicken houses, and small shops.

African-Americans in Frederick County

Upon the establishment of Frederick County by European settlers in the 18th century, African-descended people included both free and enslaved individuals. Fugitive Blacks formed "Maroon" communities with local Native Americans before the arrival of the English and German settlers to the area. African-Americans throughout Frederick County labored in agriculture, industry, were skilled artisans, and engaged in business endeavors both as free citizens and as enslaved people throughout the early colonial history of Frederick County.

After the War for Independence, the population of free Blacks in the Frederick region grew. This inspired greater abolitionist efforts as well as the passage of severe laws intended to restrict the freedoms of all African-Americans. Despite this, free Blacks established crucial organizations for social, cultural, religious, educational, and economic advancement including support for the Underground Railroad during the 19th century.

With the Civil War, the status of African-Americans changed drastically as over 3,000 Blacks from Frederick fought for freedom in the conflict. The Reconstruction Era in Frederick witnessed a proliferation of African-American churches, cemeteries, schools, political

associations, as well as the establishment of black communities throughout the County, including those previously mentioned in the Sugarloaf region. Some of these settlements have vanished, leaving behind only an overgrown burial ground or a row of house and building foundations. For some of these places, there remains no physical trace at all.

As Reconstruction ended, "Jim Crow" laws and policies heralded a new era of segregation and violent treatment for African-Americans in America, including in Frederick County, referred to as the nadir of race relations. Frederick County's Black community responded with the creation of important institutions to address the needs of African-American citizens in medicine, education, religion, culture, economics, politics, and other social support institutions.

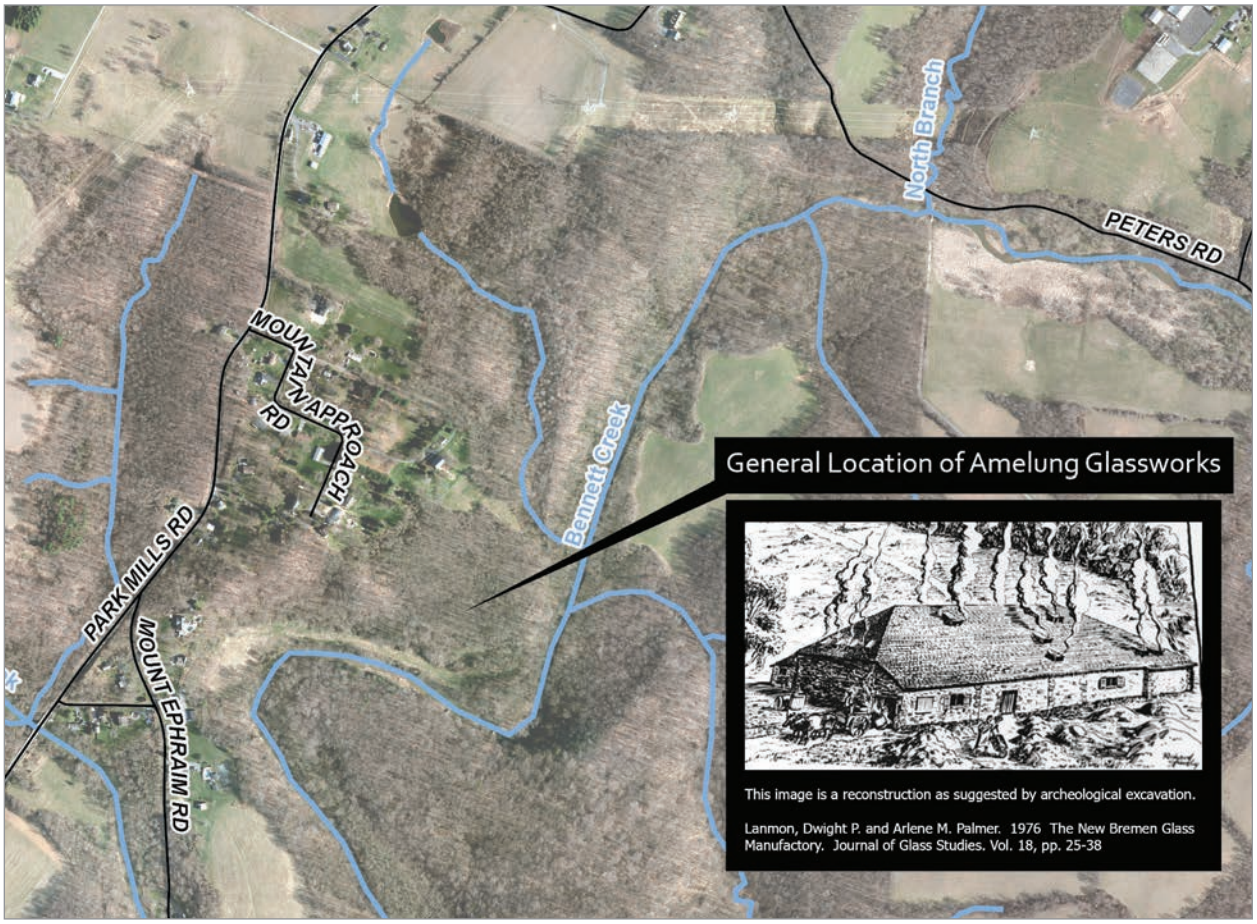
Early Industry

Soon after German and English settlers arrived, local industries were established, first with mills to support the new agricultural uses of the land. The Johnson Furnace, built by Roger Johnson — whose brother was Thomas Johnson, the first governor of Maryland — was one of the earliest industries to be built in the region in about 1775-1780. This furnace was built near the confluence of the Monocacy and Potomac Rivers and a forge was established on what was known as the "Bloomsbury" tract on Bennett Creek. The pig iron produced at Johnson's Furnace was taken in shallow draft barges up the Monocacy River and onto Bennett Creek during high flows to the Bloomery forge near Urbana for the production of bar iron. In 1784, Johann Friedrich Amelung established a glass works near the Park Mills village, the New Bremen Works on Bennett Creek, followed by Adam Kohlenberg's glass factory near the same location. These mills and industrial sites are no longer standing; however, a few houses associated with the Johnson Furnace and Amelung's glass works are extant. Other industries that were established in the Sugarloaf area by the mid-1800s include stone and slate quarries. The principal rural industries continued to be small service shops such as blacksmiths, wheelwrights, cobblers, distilleries, lumbermills, and flourmills.

Early Transportation

In addition to the industrial and agricultural development occurring in the region in the 18th and 19th centuries, the transportation network was also growing. Charles Varle's 1808 map of Frederick and Washington counties shows only the Georgetown Turnpike constructed near Sugarloaf Mountain. On Titus' 1873 atlas, several roads, the Baltimore and Ohio Railroad, and the C&O Canal are depicted. The C&O Canal began construction on July 4, 1828 and reached the Sugarloaf area in 1833 with the completion of the 516-foot-long, seven-arch aqueduct over the Monocacy River. The Metropolitan Branch of the B&O Railroad, a portion of which runs between Point of Rocks and Dickerson southwest of Sugarloaf Mountain, was completed in 1873. The B&O provided a direct rail connection to Washington, D.C., as well as points west. The enhanced transportation network provided access to more markets for the industries and farmers in the region.

The improved transportation network also brought tourism from areas such as Washington, D.C. One such tourist who travelled to Frederick County in 1899 was Gordon Strong, who was in search of a secluded retreat. After exploring the Catoctin Mountains, Strong was on his way back to Washington when he noticed the physical prominence of Sugarloaf Mountain and took an interest in the area. In the early 1900s, Strong began to acquire large tracts of land on the mountain, developing the property as a private preserve, while also pursuing philanthropic goals. At the time of his death in 1954, he had amassed over 2,000 acres, including the mountain. Strong conveyed the land to a private, non-profit corporation, Stronghold, Incorporated, for the long-term care of the land. Since its inception, Stronghold has made the property available to the public for the enjoyment of nature and outdoor beauty. Principal historic resources onsite include two large Georgian Revival mansions, a vocational school, and two local schools. The property also includes formal gardens near Strong Mansion, hiking trails, and overlooks around the mountain summit.



Amelung Glass: From 1795 to 1875, a factory called the New Bremen Glass Factory run by John Frederick Amelung operated in the Sugarloaf area and rivaled many European glass factories in its size. Amelung's production is best known from a small group of copper-wheel-engraved covered goblets and flips — large flaring glasses — now in museums and private collections. Amelung's late-Georgian c. 1785 brick house still remains, restored by previous owners. The house overlooks Bennett Creek, where workers' cottages, furnaces, and ovens were established.

Monocacy National Battlefield Park

The start of the Civil War saw the citizens of Frederick County divided on the issue of secession from the Union and the question of slavery and the rights of freed persons of color. Despite the local formation of Union companies, the federal government exerted pressure to ensure that Maryland did not secede from the Union. During the War, Frederick County experienced numerous confrontations between Union and Confederate troops. Monocacy National Battlefield (originally Monocacy National Military Park) was created by Congress on June 21, 1934 to commemorate the Battle of Monocacy fought on July 9, 1864. Here, a small Union army successfully delayed a larger Confederate force advancing on Washington, D.C. This delay provided Union General Ulysses S. Grant sufficient time to reinforce defenses at the nation's capital and prevent its capture. Because of this, Monocacy came to be known as the "Battle that Saved Washington, D.C."

The park comprises 1,647 acres where visitors can experience an historic landscape, structures, and transportation corridors that have changed little since the battle. As a result, it offers many opportunities for understanding the Civil War within the broader context of American history and the evolution of settlement in the region. Since opening to the public in 1991, the National Park Service (NPS) has acquired all the component properties that make up the battlefield's historic landscape.

Over 1/3 (36.7% or 606 acres) of the Park's entire acreage is located within the Sugarloaf Planning Area, which includes the Worthington Farm, the Baker Farm, and a portion of the Lewis Farm, all on the west side of I-270. The remaining major sections of the Battlefield – the Best Farm, the Gambrill Tract, and the Thomas Farm – are located outside of the Sugarloaf Planning Area.

Natural Resources

Although established to commemorate an important historic event, the battlefield is made up of significant natural resources as well. These resources are an integral part of the cultural landscape that allows visitors to connect with the history of the battlefield.

Geology

The battlefield's geology consists primarily of limestone, shale, sandstone, blue, purple, and green phyllite, slate, and quartz. Alluvium surface deposits are contained mainly in the river valley and consist of clay, silt, sand, gravel, and cobbles. The river's floodplain through the battlefield is primarily broad and prone to extensive flooding during large precipitation events or episodes of rapid snow melt. In some areas of the floodplain, alluvial deposits can be as much as 20 feet thick.

Water Resources

The battlefield lies within several watersheds, including the Lower Monocacy River and Potomac River drainage basins, and the Chesapeake Bay watershed. Over two miles of the Monocacy River, which bisects the park from northeast to southwest, and over three miles of its tributaries flow through the battlefield. According to the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) database, there are approximately 113 acres of wetland area within the boundary of the battlefield, mostly classified as forested wetlands along the river and its tributaries.

Vegetation

The battlefield's vegetation composition and the mix of forested areas, open meadows, and agricultural fields are characteristic of the region's rural, agricultural landscape. Approximately 33% of the park is forested, while more than 60% is either open meadow or in agricultural production. Common tree types include oaks, hickories, maples, American beech, tulip poplar, and American sycamore. This matrix of different land uses and vegetation types provides numerous, diverse habitat types for a wide variety of plant and animal species. The park has more than 500 documented plant species, and several have been designated as State-listed rare, threatened, or endangered by the Maryland Department of Natural Resources Wildlife and Heritage Service. The battlefield also has several large diameter trees that may have existed around the time of the battle. These possible "witness" trees require special management and care due to their advanced age and importance in the historical context.

Wildlife

The diverse mix of vegetation, land use, and habitat types provides conditions suited to hosting a wide range of wildlife. The battlefield's proximity to suburban and developed areas of Frederick County, namely Urbana and the City of Frederick, make it an even more attractive sanctuary for native species. There are more than 20 species of mammals, over 100 species of birds, 18 species of reptiles and amphibians, and approximately 40 species of fish documented in the battlefield. While not all of these species are classified as breeding within the park, they all utilize park resources as habitat and forage. Of these species, several have been designated as State-listed rare, threatened, or endangered by the Maryland Department of Natural Resources Wildlife and Heritage Service or are listed as Partners in Flight Watch List or Stewardship Species.

Cultural and Historic Resources

The battlefield contains many historic and prehistoric cultural resources which reflect the broad regional settlement trends. It contains numerous archeological sites, historic structures, and cultural landscapes as well as a collection of museum objects and artifacts related to the site. The battlefield was listed on the National Register of Historic Places and designated a National Historic Landmark in 1973, and two of its resources are individually listed on the National Register as well – the Gambrill House (1985) and the Best Farm Slave Village (2008), known as L'Hermitage.

Archeological Sites

Known prehistoric and historic archeological sites at the battlefield are located on the Baker, Best, Thomas, and Worthington Farms as well as on the Gambrill tract. Eleven prehistoric sites date from the Early Archaic to the Late Woodland periods including both short-term base camps and lithic scatters. Nine historic archeological sites have been identified, including the battlefield itself, two short-term Civil War encampments, the Best Farm historic complex and the L'Hermitage slave village, the Middle Ford Ferry Tavern site, the Thomas Farm historic complex, the Thomas Farm Blacksmith Shop, and the Worthington Farm historic complex.

Historic Structures

Fifty-two historic structures are located on the battlefield. The structures include those that existed during the battle as well as those that are not battle related but contribute to the significance of the cultural landscape. Structures range from eighteenth- and nineteenth-century houses and dependencies to twentieth century buildings related to the area's agricultural development.

A cultural landscape is an area with significant cultural and natural resources, associated with historic events or people, which helps us understand the evolution of human use of the site. The battlefield preserves a large historic landscape that is made up of several component landscapes, including L'Hermitage (Best Farm), Araby (comprising the Gambrill Tract, Lewis Farm, and Thomas Farm), Clifton (Worthington Farm), and the Baker Farm. The battlefield's landscape still retains a high level of its historic character and integrity. The inclusion of the Battlefield in the Sugarloaf Planning Area reflects the vitality of the area's natural, historic, and cultural resource base. Similar to Sugarloaf Mountain, the Battlefield anchors and solidifies the Planning Area's rural landscape setting. The Sugarloaf Plan ensures that the prominence of this rural landscape setting endures, and that encroachment by incompatible land uses on the Park's "doorstep" is minimized.

General Store in Park Mills Survey District: A former general store, built sometime between 1850 and 1870, is located in the Park Mills Survey District at Bear Branch and Mt. Ephraim Roads. It is identified in Maryland Historical Trust records as MIHP F-7-26. The district is moderately significant for its association with several demolished rural industrial sites in the vicinity that operated from about 1800 to 1870. These industrial sites include the Amelung Glassworks, the Kohlenberg Glassworks, the Fleecy Dale Woolen Factory, and the Ordeman's Distillery.

Flint Hill Methodist Church is located off of Park Mills Road with a cornerstone in the southeast corner stating "Flint Hill Church 1898." It is identified in Maryland Historical Trust records as MIHP F-7-30. The building is framed construction with gothic windows and an extended tower and belfry on the façade.

Historic Designations

In 1990, Sugarloaf Regional Trails, a volunteer group dedicated to the conservation and preservation of historic resources in the Sugarloaf Mountain area, completed a National Register nomination for the Sugarloaf Mountain Historic District. The nomination included

approximately 16,000 acres of cultural landscapes and natural areas around Sugarloaf Mountain in both Frederick and Montgomery Counties. This nomination involved surveying historic architectural and cultural resources and researching the history and significance of the area. Influence of early German settlement and distinct regional characteristics (especially before 1830) are apparent; however, a variety of building materials and styles are also evident.

While the Sugarloaf Mountain Historic District was not submitted to the National Park Service for consideration, it was determined eligible for listing on the National Register by the Maryland Historical Trust (MHT), the State Historic Preservation Office. This determination triggers a review of projects by the MHT for compliance with State and federal laws only if State or federal funds, licenses, or permits are involved. In such cases, MHT determines if cultural resources within the district will be impacted and seeks to mitigate the effects. The surveyed area is inventoried in MHT's database as MIHP F-7-120.

Small communities and villages were established in the immediate areas surrounding Sugarloaf Mountain, including Park Mills, Hope Hill, Flint Hill, and Della. The small village known as Park Mills grew near the glass works industries and included a couple of small general stores, a few residences, a school, and a church. Hope Hill and Della were African-American communities built largely by formerly enslaved persons at the edges of the farms and industrial sites where they worked. Della was located on the Monocacy River near Greenfield Mills and centered on the St. Paul's A.M.E. Church. Hope Hill, located in the northern part of the Planning Area, is where the Hope Hill A.M.E. Church and the Hope Hill Colored School still stand today near the center of the original settlement.

The 20th century brought a few notable changes to the landscape of the Sugarloaf area. By the 1930's, several farms in the region had switched their operations to dairy farming to meet increased demand from the expanding Washington, D.C., regional market. Additionally, following World Wars I and II, much of the local agricultural labor force left to work in cities. As employment in the Washington, D.C., region increased, and as the U.S. government incentivized suburban development through lending programs serving returning military veterans, commuting became convenient and necessary. Interstate

The Abraham R. Simmons House, located off of Thurston Road, is a two-story log dwelling with a modern addition. The house was probably built circa 1850 in the vicinity of a mill known as Simmons Mill (now demolished) on Bennett Creek. The house likely had a two-story porch on the façade, which has been replaced with a deck. The Maryland Historical Trust records identify this historic resource as MIHP F-7-72.

Strong Mansion

270, which borders the eastern edge of the study area, was built during the 1950's as US 240 connecting Washington, D.C., with its burgeoning suburban communities in Montgomery and Frederick Counties. Lily Pons, an aquaculture operation, was established during the early 20th century on the western edge of the area near the Monocacy River. A few small residential developments were established on former farmland in the late 1960's and early 1970's. Two golf courses and two power transmission lines were developed during the latter half of the 20th century in the planning area. The golf courses, both 18-hole facilities, include a clubhouse, restaurant, and maintenance buildings, and were approved in the late 1990's under the agricultural zoning regulations in place at that time. Despite this development activity and the success of Sugarloaf Mountain as a natural, recreational, and educational destination primarily accessed by motor vehicles, rural gravel roads still exist in the area including Peters Road, Banner Road, Monocacy Bottom Road, Page Road, Mt. Ephraim Road, and Comus Road, plus portions of Roderick Road and Sugarloaf Mountain Road.

Most building types in the Sugarloaf area in the mid-18th through 19th centuries were of log and stone construction. Homes were often expanded as needed with rear wings and additional stories, while weatherboard siding was frequently added to log structures. For the most part, the houses in the study area follow a vernacular style of architecture, typically L-shaped farmhouses with a gable roof or side gabled houses. Very few structures exemplify a more refined or high style of architecture. Gordon Strong's Georgian Revival mansion and Johann Amelung and Roger Johnson's Georgian-style masonry houses are some of the better examples of buildings demonstrating the formal styles of the day.

Today, portions of the Sugarloaf area look similar to their appearance in the early 20th century. Over 100 historic resources have been identified in the planning area; however, in many cases these resources are deteriorating or have been altered so as to diminish their historic integrity. Without further protection for these cultural resources, this rural area will lose a significant feature of its history and character.

Gordon Strong's former vocational school at the intersection of Comus Road and Sugarloaf Mountain Road.

Also part of the Park Mills Survey District, located off of Bear Branch Road, this two-story stone dwelling is three bays wide with a central entrance and was built about 1820-1850.

George W. Horman House, located off of Roderick Road, is a circa 1901 Queen Anne style house that has had moderate exterior alterations. The house was once part of a thriving dairy farm that included a milking barn, a silo, a milk house, and a dairy processing and bottling building. Today the dairy barn, silo, and milk house still exist. George Horman and his sons Elmer, Russell, George, and William ran the dairy farm in the first half of the 20th century under the name "Tip Top Dairy."

Sugarloaf Mountain in the Civil War

Sugarloaf Mountain stood at the heart of troop movements, military encampments, and minor skirmishes during America's Civil War. The mountain played an important role in the prelude to the catastrophic Battle of Antietam. Although Maryland did not secede from the Union, many men from Montgomery and Frederick Counties crossed the Potomac River to join up with the Confederate fighting forces.

Because of its strategic location and unimpeded view, Sugarloaf's summit (then owned by William Corcoran) became a signal station for the Union cause and served as a field training center for the Signal Corps. Signals were relayed back and forth across the countryside from the mountain ridges to the west and on to Poolesville and Washington, D.C., through the use of signal flags, flares, and telegraph.

On a day in early September 1862, a Lieutenant Miner was in command of the Sugarloaf signal station. What he saw from the summit that day was the prelude to what still stands as the bloodiest single day in American history: the Battle of Antietam. Miner signaled news of his observations on toward the capital in Washington, D.C., where George McClellan's Union forces were gathering. Lee's army was crossing the Potomac River into Maryland at White's Ford (about a mile downriver from the present-day Dickerson Conservation Park).

Soon after the White's Ford crossing, Confederate forces captured the Sugarloaf signal station and held it for several days before it was recaptured by Union forces. During the war at least one makeshift hospital was set up at the base of the mountain in a cottage that still stands. Many Civil War artifacts have been recovered on and near the mountain, including buttons, shells, swords, and bullets.

From Sugarloaf. The Mountain's History, Geology, and Natural Lore by Melanie Choukas-Bradley with illustrations by Tina Thieme Brown

Policy 2.1 Design new buildings, subdivisions, infrastructure, and signs in the Sugarloaf Planning Area to be compatible in scale and siting with existing, adjoining historic structures and settlements.

Initiative 2A Develop historic context statements for the Planning Area, with potential themes including prehistoric use of the area, the communities established by African-American residents, and settlement and development from 1700 to the 1960's.

Initiative 2B Utilizing research from the context statements, conduct architectural and archaeological surveys to identify sites of significance in the Planning Area.

Initiative 2C Update the Maryland Inventory of Historic Properties for the Planning Area.

Initiative 2D Provide support for a Stronghold, Incorporated-initiated National Register District nomination for the Stronghold Survey District, which is included in the Maryland Inventory of Historic Properties as record F-7-32.

Initiative 2E Actively promote the Frederick County Rural Historic Preservation Grant Program to eligible property owners in the Sugarloaf Planning Area.

Initiative 2F Study the creation of a locally designated Rural Historic District within the Sugarloaf Planning Area.

Historic Sites Within the Sugarloaf Planning Area

- Historic Villages
- National Register of Historic Places (NRHP)
- Maryland Inventory of Historic Properties (MIHP)

Maryland Inventory of Historic Properties Districts (400 acres or larger)

- Monocacy Natural Resources Management Area
- Stronghold Survey District
- Sugarloaf Mountain Historic District

Map 2-1

Chapter 3

Stronghold Incorporated and Sugarloaf Mountain

2.1.3.3 Acknowledge and pursue a greater understanding of the role that the physical environment plays in supporting "place attachment."

1.7.3.2 Capitalize on the "power of place" to illustrate and teach how our places and physical surroundings have shaped our thoughts, actions, and emotions throughout our history.

3.1.1.3 Foster relationships and formal partnership agreements with and between non-profit agencies, businesses, governments, educational institutions and others to maximize resources and take advantage of shared investments between public and private stakeholders in the economic vitality of Frederick County.

Sugarloaf Mountain and the immediate adjacent lands owned by Stronghold, Incorporated comprise approximately 3,000 acres. The privately-owned mountain is open to the public for hiking, bird watching, educational activities, and communing with nature. Sugarloaf Mountain is a unique geologic and environmental asset in the region, with its vast woodlands, distinctive topography, biodiversity, and ecological significance, including Wetlands of Special State Concern (Md. Code Regs. 26.23.06.01). Recognizing Sugarloaf's exceptional qualities, the National Park Service designated Sugarloaf Mountain as a National Natural Landmark in 1969. One of just six such sites in Maryland, National Natural Landmarks are chosen for their "condition, illustrative character, rarity, diversity, and value to science and education."[1]

Policy 3.1 Promote Sugarloaf Mountain and the surrounding lands owned by Stronghold, Incorporated as an exemplary model for privately-owned open space conservation that provides environmental and health benefits to residents of a major metropolitan area.

Forest cover dominates the Stronghold lands; however, approximately 230 acres of agricultural land is also included in the corporation's approximately 3,000 acres. Steeper, rockier sections of the mountain with south- to west-facing slopes contain tree species that are more tolerant of dry conditions, like white and red oak and pine. Flatter sections and areas with northeast to northwest facing orientation are slightly wetter and contain a wider variety of trees and shrubs. The riparian areas and bottomlands contain numerous wooded swamps, small seeps, and springs, plus trees that are tolerant of seasonally-wet conditions. According to the Maryland Department of Natural Resources (Maryland DNR), there are five main forest cover types associated with the Stronghold lands: Oak-Hickory, Oak-Pine, Mixed Hardwood, Northern Floodplain, and Early Successional forests. Common trees include tulip poplar, black oak, chestnut oak, black birch, eastern hemlock, dogwood, and sassafras.

The quartzite that forms Sugarloaf Mountain causes soils to be acidic in nature, supporting an array of plants that thrive in this type of soil. The understory forest includes mountain laurel, pinxter flower, flowering dogwood, wild hydrangea, and maple-leaved viburnum. Native wildflowers like pink lady's slipper, Canada mayflower, and rattlesnake weed are found in pockets of soil and rocky outcrops all over the mountain. Along streams and in swampy areas, skunk cabbage dominates, along with species including downy arrowwood, yellow corydalis, tall meadow-rue, and marsh blue violet. The mountain and surrounding lands provide habitat for many animals, such as deer, fox, bear, coyote, bobcat, and mountain lion. Birds, such as the red-shoulder hawk, wild turkey, pileated woodpecker, and great horned owl, as well as smaller migratory birds like the scarlet tanager and black and white warbler are present on the mountain and surrounding lands.

Mountain view from Mt. Ephraim Road

The forestlands of Sugarloaf Mountain contain State Forests of Recognized Importance (FORI). According to the DNR, these woodland areas contain exceptional ecological, social, cultural, or biological resource value. The forested areas that comprise the Bear Branch Watershed are a State-identified FORI (Bear Branch Watershed is shown on Maps 6-2 through 6-6). The majority of the Stronghold lands are also part of the State's Green Infrastructure Network and within Ecologically Significant Areas (ESA) as described by the DNR's Wildlife and Heritage Service (ESAs are depicted on Map 7-2). ESAs are buffered habitats of rare, threatened, and endangered species, as well as significant or rare habitats and ecological systems. Some of the plant populations at the Sugarloaf Mountain ESA have a Maryland conservation status ranking of "Highly State Rare" and "State Rare," indicating the organism is at high or very high risk of extinction or extirpation due to restricted or very restricted ranges, few or very few populations or occurrences, steep or very steep declines, severe or very severe threats, or other factors.

Mountain view from Peach Tree Road

Sugarloaf Mountain's forests and the surrounding forestlands in the Sugarloaf Planning Area are part of Maryland's Lower Monocacy-Potomac Forest Legacy Area. Maryland has eight (8) Forest Legacy Areas which, according to MD-DNR, have the highest environmental and economic value that benefit Maryland's wildlife, wood products industry, and residents.[2] Forest Legacy Areas possess one or more of the following characteristics:

- Is threatened by present or future conversion to non-forest use or fragmentation into smaller non-contiguous forest tracts
- Support ecologically significant forests, including habitat size and quality, and importance for water quality and biodiversity
- Support forests with high economic potential
- Support outdoor recreation and natural resources through proximity to scenic resources and publicly protected lands

The Forest Legacy Area designation identifies these critical lands and, in conjunction with the U.S. Forest Service, provides programmatic funding for perpetual conservation easements or fee-simple purchase of forestlands from willing landowners.

Standing Strong for Sugarloaf

Two Men and Their Competing Visions for the Mountain

For a brief moment in the 1920's, America's pre-eminent architect of the period focused his efforts on the development of a grand structure to occupy the crest of Sugarloaf Mountain. It was never built.

Frank Lloyd Wright, the charismatic and influential architect whose work in the Chicago area earlier in the century piqued the interest of Gordon Strong, was beginning a period of exploration utilizing new geometric forms in his designs for buildings such as the National Life Insurance Building (Chicago, IL 1924), the San Marcos-in-the-Desert Resort (Chandler, AZ 1928), and a structure that would be known as the Gordon Strong Automobile Objective, to be constructed atop Sugarloaf Mountain, south of Frederick, Maryland. While none of these projects would come to fruition, the ideas born during their development provided Wright with design elements that he would use throughout the remainder of his long career.

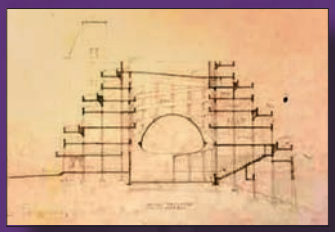
In the Summer of 1924, Strong met with Wright to discuss possible designs for "a structure on the summit of Sugar Loaf Mountain" that would "serve as an objective for short motor trips" emanating from Baltimore and Washington, D.C. Seeking to create a destination that would enhance visitors' enjoyment of the views from the top of the mountain, Strong indicated that he wanted the architect to incorporate the "element of thrill, as well as the element of beauty" further stipulating that the destination's appearance be "striking, impressive. . . enduring, so that the structure will constitute a permanent and credible monument."

Frank Lloyd Wright and his wife, Olgivanna, in their 1937 A.C. Roadster at Wright's Taliesin West studio complex in Scottsdale, Arizona (Photo Credit: Dr. Joe Rorke)

Wright's initial schemes varied, incorporating various uses for the structure as well as various vertical tower elements, perhaps to be used for radio transmissions or as a mooring post for dirigibles. Strong's original concept for a dance hall became a theater in an initial scheme of Wright's. In its final iteration, developed in the Summer of 1925, the Automobile Objective would include a domed planetarium, natural history exhibits, restaurants, and even accommodations for overnight stays. But despite the changing program, Wright's designs all centered around the simple and elegant idea of the spiral. The circular ziggurat-style provided the perfect form — and a practical mechanism — for bringing automobiles onto the structure in such a way as to allow passengers unobstructed panoramic views of the surrounding countryside. With a domed structure serving as a solid armature, the intertwined vehicle ramps could be cantilevered and articulated to encase the dome in an organic wrapper of concrete and glass block. Visitors would be able to park their vehicles and enjoy similar views of the surrounding landscapes from an additional layer of cantilevered structure circling the dome.

Working from detailed topographic mapping provided by Strong, Wright designed a building that made good use of the existing landforms. Promenades linked visitors to adjoining natural features, including a second summit, allowing an array of outdoor activities to complement those provided inside of the building. Furthermore, Wright's design evolved between 1924 and 1925 in a way that attempted to enhance and complete the natural features of the existing mountain rather than to compete with those elements of the terrain that defined Sugarloaf.

Design drawings of Automobile Objective
Images copyright of the Frank Lloyd Wright Foundation, obtained from the Library of Congress.



Despite the architect's efforts, Gordon Strong ultimately rejected Wright's design believing that the plan did not allocate space appropriately and violated the integrity of the mountaintop.

Wright's response to the criticism revealed his feeling of personal rejection as well as the financial difficulties he had begun to experience during this period: "I have given you a noble 'archaic' sculptured summit for your mountain. I should have diddled it away with platforms and seats and spittoons for. . . expectorating businessmen and the flappers that beset them." (Letter from Wright to Gordon Strong, Oct. 20, 1925)

In the years following the Sugarloaf design work, Frank Lloyd Wright continued to find ways to exploit his understanding of the spiral form in other projects including his V.C. Morris Gift Shop (San Francisco, CA 1948), the Point Park Civic Center (Pittsburgh, PA 1947/unbuilt), and the Baghdad Cultural Center (Baghdad, Iraq 1957/unbuilt). However, it is in one of his most notable works that contemporary lovers of architecture see most clearly the DNA of the Gordon Strong Automobile Objective once planned for Sugarloaf Mountain: New York City's Solomon R. Guggenheim Museum (1943-1959). It is in The Guggenheim that Wright's vision for an architectural spiral of movement takes form as an inverted ziggurat. Instead of automobiles looking outward over a landscape, the program accommodates strolling art lovers — on foot this time — observing and enjoying the creative output of painters, printers, and sculptors.

Would a monumental structure designed by Frank Lloyd Wright sitting atop Sugarloaf Mountain have altered the history of the Stronghold properties? Would its existence have reshaped our perception and appreciation of the surrounding landscapes, or the mountain itself? One thing remains absolutely clear to the many thousands of people who visit the mountain or live in its midst. . . in rejecting a design by one of American architecture's most forceful and driven personalities, Gordon Strong did indeed stand strong for the mountain and for those who wake up in its shadow each day. And for those visiting the Stronghold property, there is no doubt that their "objective" is the mountain itself.

To see a circular ziggurat, there is always the Guggenheim, a mere 250 miles to the north.

Guggenheim Museum in New York City

Rendering by David Romero, architect and 3dD visual artist, www.hookedonthepast.com

The Many Roles of Stronghold, Incorporated: Nature, Recreation, and History

Gordon Strong, a patent attorney and conservationist, visited Sugarloaf around the turn of the 20th century and was immediately charmed with its breathtaking beauty and serenity. Over the next several decades, he slowly acquired the tracts of land that comprise most of today's Sugarloaf Mountain. Gradually, the property was improved with roadways, landscaping, and buildings, including his own residence, a Georgian Revival mansion. Strong envisioned Sugarloaf Mountain as a place that everyone could enjoy and opened the more picturesque portions of the mountain to the public in 1926. Upon Strong's death in 1954, he bequeathed most of his fortune to an irrevocable trust, and all of the land he acquired to Stronghold, Incorporated. Gordon Strong's desire to open his mountain to the public was based on his belief that "those who appreciate natural beauty will be better people, people who will treat others with respect." *From Sugarloaf Mountain: The Promise of Private Parkland by Daniel T. Oliver, May 2000*

In 1946, Gordon Strong created Stronghold, Incorporated, a 501c(3) non-profit corporation, and an irrevocable trust to fund the preservation of the mountain, acquire more land, and maintain the park and Strong Mansion. Stronghold's mission is to promote environmental education and appreciation.

Stronghold's sustainable management of the land is evidenced by numerous Forest Stewardship Plans (1948, 1966, 1979, 1987, 1992, 2010, 2014, 2019) prepared by the DNR to address forest and tree health, sustainable supply of tree products through sound timber harvest management, biodiversity, and carbon sequestration. In addition to the Forest Stewardship Plans, Stronghold, Incorporated has engaged in other notable forestry initiatives over the years, including:

- A pine plantation established in 1966.
- Riparian forest buffer plantings through the Conservation Reserve Enhancement Program (CREP).
- Experimental chestnut tree plantings.
- Timber harvest demonstration areas, where five methods have been employed to evaluate and study forest recovery over time.
- Control of gypsy moth, oak spanworm, and other invasive species.

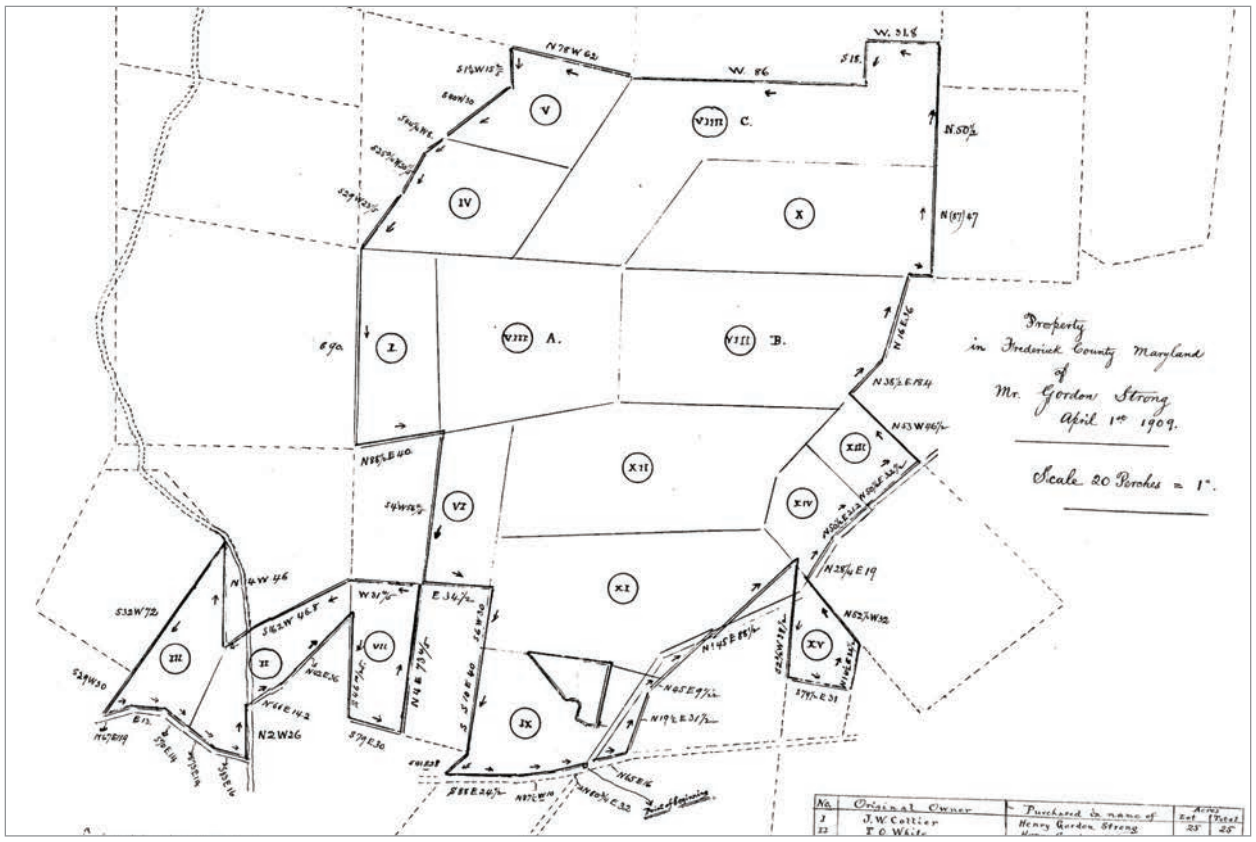
Initiative 3A ***Work with Stronghold, Incorporated, the State of Maryland, and Frederick County Tourism to clarify Sugarloaf Mountain's status as a privately-owned and operated park.***

Initiative 3B ***Collaborate with Stronghold, Incorporated and DNR to explore the desire and feasibility of extending and connecting the Monocacy Natural Resource Management Area's Rustic Trail Network to the Sugarloaf Mountain trail network to create a longer and linked trail system.***

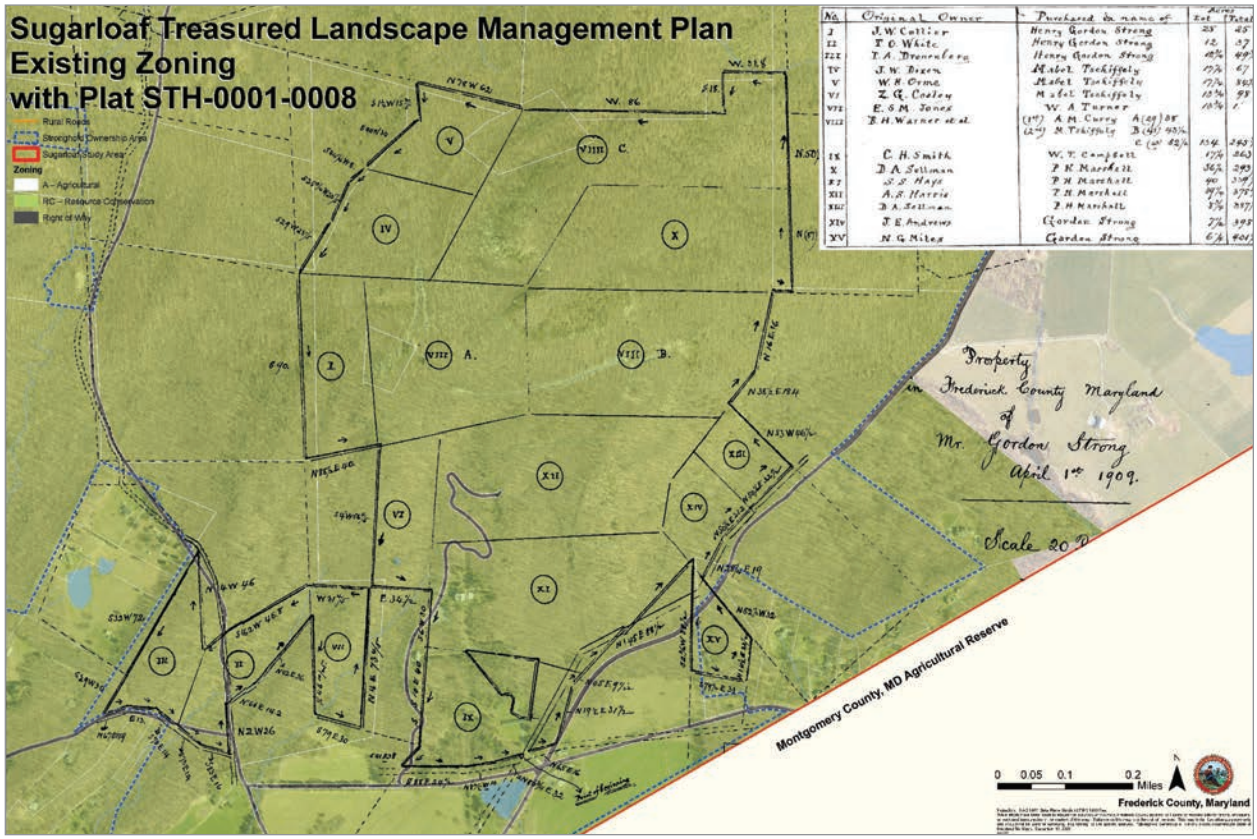
Stronghold's stewardship mission, including free access to the mountain, reflects significant elements of the "public trust doctrine," whereby Sugarloaf exists, essentially, as a resource held in custodianship — or trust — by the Stronghold Board of Directors for the benefit of the public. In cooperation with Stronghold, private and public sector entities can help perpetuate this arrangement to ensure continued public access to the mountain, wildlife protection, and sustainable management of the mountain's environmental and cultural resources with no diminution in size, environmental function, or resource integrity.

Initiative 3C ***Partner with Stronghold, Incorporated to establish mechanisms to ensure long-term public access to Sugarloaf Mountain and identify ways in which the Frederick County community (residents, government, private organizations) can assist in these endeavors.***

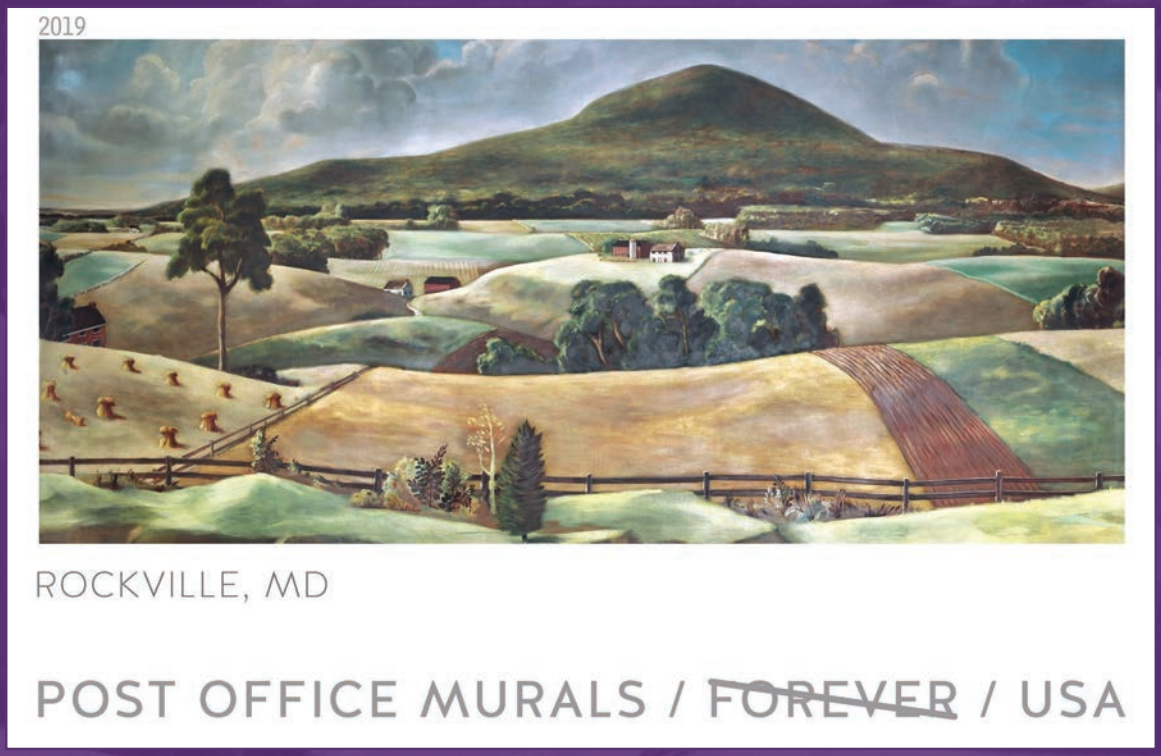
1909 plat showing Gordon Strong's parcel acquisition.



Aerial photograph overlaid on 1909 Gordon Strong plat. The mansion and overlook lanes are visible.



Postcard view of the U.S. post office in Rockville, Maryland where Sugarloaf mural was installed in 1940.



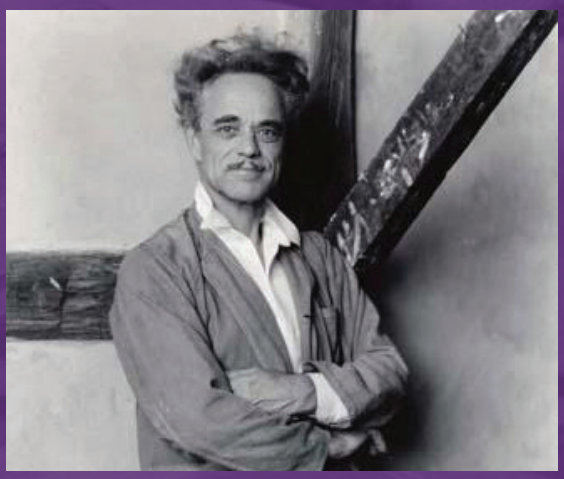


Photo of Judson Smith (1880-1962), the American painter who painted the Sugarloaf mural (courtesy Peter A. Juley & Son Collection, Smithsonian American Art Museum, J0070621)

The Sugarloaf post office mural in its original (and current) location within a Rockville, Maryland police substation that formally was a post office

The Maryland State Highway Administration promotes Sugarloaf Mountain as a regional resource by grouping the privately-owned Sugarloaf Mountain with federal, state, and local public parks and public recreational lands on roadway signage with identical coloring, lettering, and formatting for all facilities. Identical signage for the private Sugarloaf Mountain and the public parks in the region has created confusion among users related to the differences in operational management between the public and private recreational resources.

Initiative 3D ***Initiate inter-governmental communication with the Maryland State Highway Administration to request a revised signage palette along I-270 and Comus Road for Sugarloaf Mountain that contains variations in color, style, and type design to distinguish the privately-owned mountain from publicly-owned parkland.***

Mountain view from Greenfield Road

From its inception in 1946, the Stronghold Trust was created to exist for 100 years. The Trust's sunset in 2046 should not presage the end of Gordon Strong's foresighted protection of the natural resources, forestlands, and wildlife habitats of Sugarloaf Mountain. Will Stronghold's future operational status and management continue to realize Gordon Strong's vision of Sugarloaf Mountain as memorialized in Stronghold, Incorporated's mission — environmental protection, education, and appreciation of natural beauty? Will the lands be managed to ensure continued abundance of wildlife and preservation of the habitats on which they rely? Will opportunities for enjoyment of these wildlands be provided in perpetuity for all people in future generations?

The enduring preservation of the geologic uniqueness and ecological significance of Sugarloaf Mountain — and all of the Stronghold lands — is critically important for our environmental heritage and legacy. Momentum gained over the past century sparked by Gordon Strong's conservation ethic calls for modern approaches to ensure that the Stronghold lands and their environmental health, ecological resilience, and biodiversity will be permanently protected. There are several local, state, and federal preservation and conservation easement programs, described in Chapter 4, that Stronghold, Incorporated could pursue to address protection of wildlife habitats, ecosystem integrity, and sensitive environments in perpetuity. Enrollment in a permanent protection program, pursuit and acceptance of a conservation easement, is fully voluntary and dependent on landowner action.

1 https://www.nps.gov/subjects/nnlandmarks/index.htm

2 https://dnr.maryland.gov/forests/pages/programsapps/forestlegacy.aspx

View of Sugarloaf Mountain from Dixon Road

Chapter 4

Land Use

4.1.3.2 Ensure the location and scale of the future built environment preserves green infrastructure and other sensitive environmental resources.

4.1.3.3 Evaluate land development's overall ecological 'footprint' and minimize its environmental impact and externalities.

3.2.2 Support and protect Frederick County's agricultural community and existing and emerging agricultural industries, to promote an environment where agricultural operations continue to be competitive, sustainable, and profitable in Frederick County.

1.5.3.2 Explore the expansion of design review procedures in the county to ensure quality development and lasting aesthetic appeal.

1.9.4.3 Work to increase the number of tools and options available to implement county preservation policies.

3.2.2.1 Minimize non-agricultural land uses within the agricultural zoning district in order to protect the land for food and fiber production and maintain the viability of agricultural operations, while allowing for diversification of farms.

3.2.2.5 Maximize the present and future viability of our agricultural assets through the permanent preservation of a minimum of 100,000 acres of land in the county by 2040 and the retention of a total agricultural land base of at least 200,000 acres.

The Livable Frederick Master Plan's (LFMP) Thematic Plan — a key component of the LFMP Development Framework — reflects an expansive vision for Frederick County's future land uses. The Thematic Plan graphically depicts the preferred pattern and generalized distribution of new development in our community growth areas, organized as Primary and Secondary Growth Sectors. The Thematic Plan also illustrates a visionary framework for protecting our natural resource base through the identification of a Green Infrastructure Sector and an Agricultural Infrastructure Sector.

The Green Infrastructure Sector of the LFMP is identified to support the conservation of natural resources and environmentally sensitive areas, to direct urban/suburban growth away from green infrastructure and sensitive areas, and to ensure the protection and integration of green infrastructure within areas targeted for growth. Sugarloaf Mountain and its environs are components of this Green Infrastructure Sector within the LFMP, described as the Sugarloaf Rural Heritage Landscape.

The LFMP's Development Framework includes targeted planning initiatives, such as the creation of large area plans, where the focus is directed upon broad and contiguous areas of the County in a more detailed and less conceptual manner than the LFMP Thematic Plan. The Sugarloaf Treasured Landscape Management Plan is such a Plan.

The Planning Area

The Sugarloaf Planning Area is 19,719 acres in size. Physical proximity and visual relationships to Sugarloaf Mountain, overall landscape-related associations with the mountain, and expansive rural landscapes to the north determined the Planning Area boundary, which is bordered by the Monocacy National Battlefield and Interstate 270 to the east. The western boundary includes the Monocacy River, Greenfield Road, and a portion of MD 28, Tuscarora Road. The Planning Area extends to Frederick County's southern border with Montgomery County.

Two, small historic communities — Flint Hill and Hope Hill — are located in the northern portion of the Planning Area and are designated "Rural Community" on the Comprehensive Plan Map to reflect these older crossroad settlements. A 14-acre surface mining operation on MD 80 in the northwest portion of the Planning Area has approval from the Maryland Department of the Environment's Mining Program for the extraction of shale. This sedimentary rock is used to make bricks and tile and is also used for pottery and in the production of cement.

Land Use in the Sugarloaf Planning Area

Policy 4.1 Limit forest loss, forest fragmentation, and increased impervious cover through modifications to land use designations, zoning classifications, and development densities.

Policy 4.2 Assess future land use changes in the context of the rural character of the Sugarloaf Planning Area.

In addition to residential development, sixteen commercial operations, private institutional centers, and agricultural-related facilities are located within the Planning Area, including golf courses, residential retreat centers, equestrian facilities, and an environmental education center/camp. These are principal permitted uses or uses allowed by special exception in the Agricultural and Resource Conservation zoning districts.

The existing, very low-density development pattern in the Sugarloaf Planning Area, consisting primarily of large-lot, single-family residential dwellings, is suitable for a rural area with significant and sensitive environmental resources. A constrained and limited transportation network, sensitive forested watersheds with high-quality waters, and the surrounding open space and low density, rural characteristics of the Sugarloaf Planning Area warrant further evaluation and scrutiny of new large-scale commercial and institutional land uses or additional residential growth.

Replacement of forests or fields with impervious surfaces, and development of residential, large-scale institutional, or commercial land uses have the potential to disrupt and degrade the rural landscape setting in the Sugarloaf area. Noise from land uses with high occupancy or attendance can disturb the area's tranquility. Localized air quality is negatively impacted by additional traffic-generating land uses.

Dixon Road


Sugarloaf Mountain Road

Land Use Tools

The scale and location of development, and the extent of various land uses in the Sugarloaf Planning Area, are established in County plans and through the County's Zoning Ordinance and Subdivision Regulations. Land use planning, subdivision regulation, and zoning jurisdiction are components of the constitutionally-recognized authority of local governments in the U.S. in order to advance and protect the health, safety, and welfare of a community. The Zoning Ordinance permits over 60 land uses and activities on land in the Agricultural and Resource Conservation Zoning Districts, which comprise 94% of the Sugarloaf Planning Area. Uses permitted in these zoning districts can vary widely in the level of impact on the surrounding community in terms of intensity, occupancy, noise, traffic generation, and environmental footprint. Some of these activities require public review, such as site development plan approval from the Planning Commission, Board of Zoning Appeals approval for a Special Exception or Variance, or simply a building permit or zoning certificate that requires no formal public review process prior to approval by County staff.

Septic Systems, Groundwater, and Land Use

All development in the Sugarloaf Planning Area relies on private groundwater wells and on-site sewage disposal systems, commonly referred to as septic systems. The provision of public water and sewer service to the Sugarloaf Area has not been evaluated or planned due to the area's 60+ year history of land use planning for rural, very low-density uses, agriculture, and conservation.

Large institutional and commercial uses have higher effluent generation potential than would be expected for an average, or even a substantially larger-than-average, single-family dwelling. For example, a typical 4-bedroom house would have a septic system designed for a maximum capacity of approximately 600 gallons per day. The volume of effluent and flow rates for institutional uses can be four or five times that of single-family residences. Subsequent nitrogen concentrations entering the ground water can be significant. Large facilities and their considerable septic system needs have the potential for substantial effects on the surrounding environment.

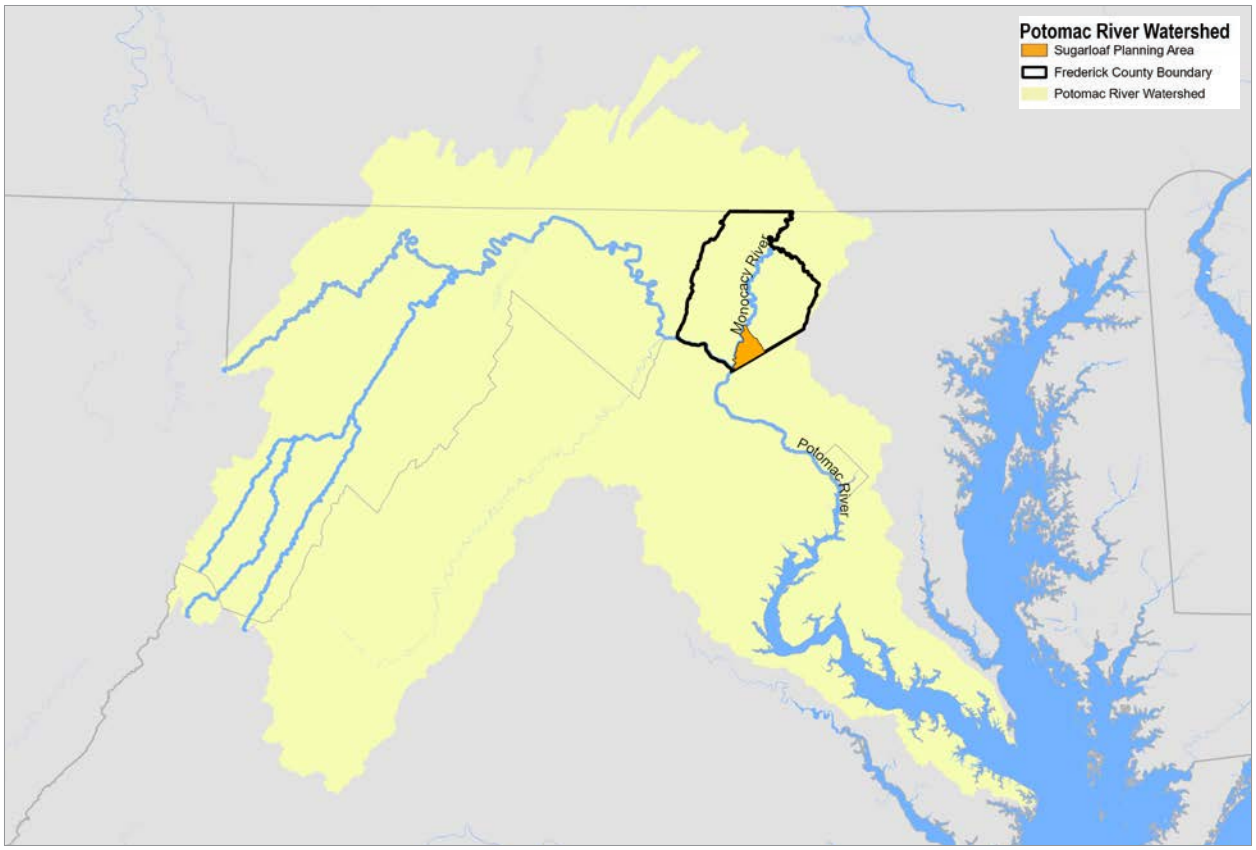
Reducing nitrogen pollution from septic systems is beneficial from a water quality viewpoint and a public health/safety perspective, as well as meeting Clean Water Act requirements. Public health protection has ancillary benefits for aquatic environments.

Policy 4.3 Minimize the growth of new residential and non-residential development that utilizes wells and septic systems through non-expansion of the Rural Residential Land Use Designation into undeveloped Agricultural and Natural Resource areas, and through the use of restrictions in the Sugarloaf Rural Heritage Overlay Zoning District.

Frederick County is part of the Chesapeake Bay Watershed. All of the County's streams and rivers eventually flow into the Potomac River, which empties into the Chesapeake Bay. In 2009, Executive Order 13508, Chesapeake Bay Protection and Restoration,[1] was issued, declaring the Chesapeake Bay a "national treasure constituting the largest estuary in the United States and one of the most biologically productive estuaries in the world."

The U.S. Environmental Protection Agency (EPA) established the Chesapeake Bay Total Maximum Daily Load (TMDL) on December 29, 2010.[2] The TMDL and its subsequent Watershed Implementation Plans (WIPs) established maximum pollutant (nitrogen, phosphorus, sediment) levels that can enter the Chesapeake Bay, as well as the actions needed to reduce the sources of these pollutants in our waterways: agricultural land uses, stormwater runoff from developed lands, wastewater treatment plants, and on-site waste water disposal systems.

While not the largest source of nutrients to the Chesapeake Bay, septic systems do contribute approximately 8 million pounds of nitrogen to the Bay annually, representing approximately 4% of the overall load to the Bay.[3]



Nitrogen concentrations of influent to septic systems will vary, but typically average about 60 mg/L, with concentrations from some institutional uses (schools) as high as 72 mg/L nitrogen.[4] The Chesapeake Bay Program Watershed Model uses a nitrogen concentration figure of 39 mg/L in the effluent leaving a drainfield from a single-family dwelling. Traditional septic systems discharge approximately 9 pounds (lb)/person/year of nitrogen from the drainfield into groundwater, which over time flows into one of the thousands of streams on the landscape, following partial attenuation in the soil. Alternative treatment components can be added to a traditional septic system, often between the septic tank and the drainfield, which can reduce this nitrogen load by 50%.[5]

Sole Source Aquifer

The Sugarloaf Planning Area relies solely on groundwater wells and a portion of the Planning Area lies within the Piedmont Sole Source Aquifer (SSA), which also includes portions of Green Valley in Frederick County and large parts of upper Montgomery County, Maryland. Drainage basins in Frederick County within the SSA include portions of the Bennett Creek Watershed and the Little Bennett Creek Watershed, as shown on Map 4-1 at the end of this chapter. Designated by the U.S. EPA in 1980 (45 FR57165, 08/27/80), the SSA is defined as a sole or principal source aquifer that supplies at least 50% of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s). Impacts to the aquifer could physically, legally, and economically affect all those who depend on it for drinking water.

The EPA's SSA program provides federal oversight of federally-funded projects within the designated area. According to the federal Safe Drinking Water Act, once SSA designation is obtained, projects that could contaminate the aquifer may not receive federal financial assistance. Although this may not stop a project, it will put it within the purview of the EPA, which will seek to mitigate any adverse consequences. Projects and land uses that are not federally-funded are not subject to federal oversight under the SSA program.

Whenever feasible, the EPA coordinates review of proposed projects with other federal, state, or local agencies that have a responsibility for groundwater quality protection. This coordination helps the EPA understand local hydro-geologic conditions and specific project design concerns, and ensures that the SSA protection measures enhance and support existing groundwater protection efforts.

As the entire Sugarloaf Planning Area relies on private wells, simple groundwater analysis is a planning tool that can identify groundwater pollution risk and potential problem areas. Selective well testing combined with analysis of physical features that affect groundwater conditions, such as soil type and infiltration capabilities, slope, and depth to the water table, can identify characteristics of GUDI — groundwater under direct influence of surface water. This in turn helps determine the source of any identified groundwater contamination.

Initiative 4A ***Expand the County's stream survey program to include monitoring of local groundwater conditions and aquifer recharge areas, with a focus on the northeast portions of the Sugarloaf Planning Area adjacent to lands with existing or planned higher density development, in order to study land use impacts to groundwater resources.***

Sensitive landscape areas where GUDI occurs include wetlands and spring/seep/sink areas where water moves between surface and subsurface conditions. The most well-known sources of groundwater pollution include improperly protected well heads or abandoned wells, poorly designed or functioning septic leach fields, or leaking storage tanks containing petroleum products or other hazardous substances or aquatic pollutants. Environmentally sensitive areas where surface water, including stormwater runoff, can mix with groundwater require vigilant protection.

Initiative 4B ***To ensure that nitrogen inputs to ground and surface waters are minimized, and to help safeguard the Piedmont Sole Source Aquifer, consider, in consultation with the Health Department, the requirement for all non-residential land uses in the Sugarloaf Planning Area to utilize Best Available Technology (BAT) for new or replacement on-site sewage disposal systems.***

Initiative 4C ***Support the coordination of the staffing, training, and equipment among the surrounding fire departments, including the Urbana Volunteer Fire and Rescue Company, the Hyattstown Volunteer Fire Department, and the Upper Montgomery County Volunteer Fire Department in Beallsville, in order to respond to a hazardous material spill within the Piedmont Sole Source Aquifer along I-270 and local roadways in both Montgomery and Frederick Counties.***

Livable Frederick Master Plan and Comprehensive Plan Land Use and Zoning Maps

The Sugarloaf Planning Area land use designations depicted on the County Comprehensive Plan Land Use Map are shown on Map 4-2 and described in the Livable Frederick Master Plan as follows:

Natural Resource. This designation identifies significant natural resource features and provides guidance for the application of the Resource Conservation zoning district and other protection strategies. The primary environmental features with this designation include mountain areas, contiguous forestlands, major stream systems, and the State's Green Infrastructure elements.

Agriculture/Rural. Applied to lands outside of the Community Growth Areas, the Agricultural/Rural designation may include active farmlands, fallow lands, and residential lots and subdivisions that have been developed under the Agricultural Zoning District.

Rural Community. This designation recognizes existing rural communities that have historically developed as crossroad communities with an identifiable concentration of residences and, in some cases, commercial uses.

Public Parkland/Open Space. Applied to lands primarily under public ownership for local, state, or federal parklands, this designation is also applied to watersheds that protect public water supplies. Additionally, it may also be applied to large land holdings under private ownership which may have some degree of protection from land development.

Rural Residential. The intent of the Rural Residential designation is to recognize areas of existing major residential subdivision that utilize private wells and individual septic systems, and are located outside of Community Growth Areas. Rural Residential areas are not intended to be served by public water and sewer and should not be expanded into surrounding agricultural or resource lands.

Mineral Mining. Applied to areas under active mining operations and more recently has been applied to areas where future mining and associated activities may occur. The corresponding zoning district is Mineral Mining (MM), which is a floating zone that can only be applied through a piecemeal rezoning process. The MM zoning district also permits associated processing uses related to mining such as asphalt plants and concrete block manufacturing.

Table 1A. Adopted Comprehensive Plan Land Use Designations within Sugarloaf Planning Area

Comprehensive Plan Designation	Acreage*	Land Area
Natural Resource	7,719	22.8%
Agricultural/Rural	8,368	42.4%
Rural Community	232	1.2%
Rural Residential	513	2.9%
General Commercial	21	<1%
Public Parkland/Open Space	2,141	27%
Mineral Mining	18	<1%

*Roadways and their rights-of-way and the Monocacy River comprise the remainder of the acreage within the Planning Area

Zoning

The Resource Conservation (RC) zoning district is the primary classification in the Sugarloaf Planning Area, defined below as contained in § 1-19-5.210 of the Zoning Ordinance:

The purpose of the Resource Conservation Zoning District is to allow low intensity uses and activities which are compatible with the goal of resource conservation to be located within mountain and rural wooded areas. Areas 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. Adopted zoning in the Sugarloaf Planning Area is shown on Map 4-3.

§ 1-19-5.220 defines the Agricultural Zoning District: The purpose of the Agricultural District is to preserve productive agricultural land and the character and quality of the rural environment and to prevent urbanization where roads and other public facilities are scaled to meet only rural needs.

All of the lands owned by Stronghold, Incorporated and the State of Maryland within the Sugarloaf Planning Area are zoned RC, as they contain forestlands, environmentally-sensitive lands, aquatic systems, steep topographical gradients, and the distinctive landform — the monadnock — that is Sugarloaf Mountain.

Table 1B. Adopted Zoning Districts within Sugarloaf Planning Area

Zoning Districts	Acreage*	Land Area
Resource Conservation	9,751	49.3%
Agricultural	8,928	45.5%
R-1 Residential	660	3.4%
Mineral Mining	18	<1%
General Commercial	21	<1%
Village Center	0.29	<1%

*Roadways and their rights-of-way and the Monocacy River comprise the remainder of the acreage within the Planning Area

Land Subdivision

Pockets of the Planning Area are dominated by residential land uses. From the early 1960's to 2021, the exercise of land subdivision within the Planning Area has resulted in the creation of 760 lots. This figure includes the actual lots created through the subdivision process for residential development, and larger lots (formerly referred to as farm lots) for agricultural purposes or residential use, and the remainder parcels that are left after lots have been subdivided off a larger parcel. (See Map 4-4 for the location of subdivision activity). With the exception of the majority of Stronghold, Incorporated lands and the DNR holdings, approximately 93% of the parcels and lots within the Sugarloaf Planning Area are developed, bringing the total number of dwellings in the Sugarloaf Planning Area to 890 (2020 U.S. Census). Further analysis of data from the 2020 U.S. Census shows the area's population to be 2,400.

The RC zoning district, as with most zoning districts, provides the opportunity for property owners to subdivide land parcels to create new lots for purposes of development and establishment of land uses or activities permitted by the Zoning Ordinance. The minimum lot size for new subdivision lots in the RC zone is 10 acres; thus, a 50-acre parcel could, theoretically, create five new residential lots through the current zoning and subdivision regulations. The RC zoning district's development prohibition on steep topographical gradients, plus soil percolation limitations, and other environmental protection measures result in far fewer lots than the theoretical maximum permitted in the RC zone.

Urbana Community Growth Area

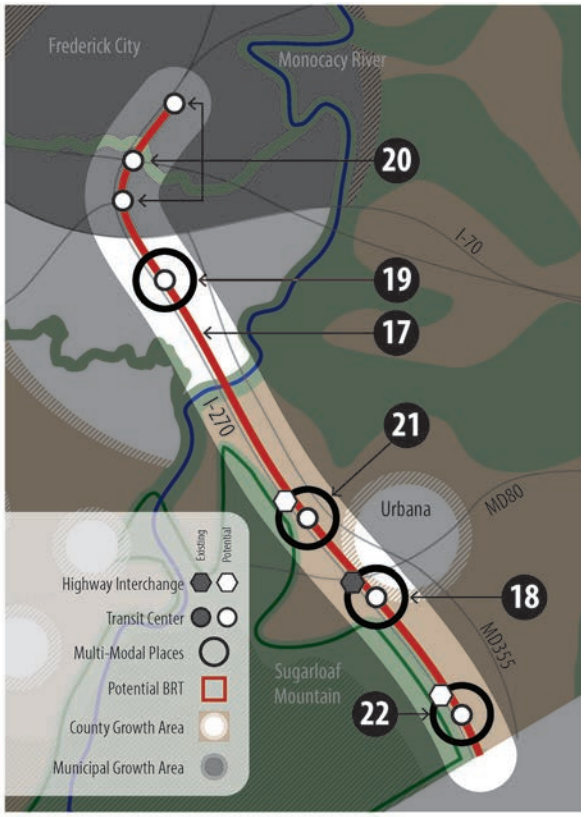
The County's Comprehensive Land Use map, the Livable Frederick Master Plan, and its Thematic Plan map all provide policy guidance for, and describe and depict, appropriate locations for future growth and development, as well as areas intended to retain rural qualities and protect natural landscapes. The Community Growth Area (CGA) boundary is a land use planning mechanism that establishes a finite geographical area where community infrastructure investments (schools, parks, roads, etc.) and public water and sewer service provision will be made. It signifies areas where zoning could be applied to facilitate efficient, compact development patterns and create vibrant neighborhoods. A CGA depicts preferential areas and locations for land use conversions to accommodate our housing, commerce, and employment needs, consistent with County policies and initiatives, and community goals.

The Urbana CGA borders the Sugarloaf Planning Area along I-270, which is currently a boundary that demarcates a large mixed-use (commercial, employment, residential) community from an area with dispersed residences, unique environmental and historic resources, and a distinctively rural sense of place; however, minor commercial development exists in the Sugarloaf Planning Area in the vicinity of the MD 80/I-270 interchange. The Urbana CGA embodies the characteristics of a typical CGA in Frederick County where population growth, public and private investments, and employment growth are focused and targeted. It contains four public schools, a library, a YMCA facility, a variety of housing types, plus numerous commercial services and businesses, including several in the biological and information technology sectors. These existing and planned employment, residential, commercial, and industrial land uses follow the entire east side of

I-270, from just north of the existing Urbana community southward to the Montgomery County border. Future improvements to I-270 may influence and shape future planning for the Urbana Community Growth Area east of I-270 (refer to Chapter 5 for a more detailed narrative on the transportation network in and near the Sugarloaf Planning Area).

The long-range conceptual vision of the I-270 corridor as depicted in the LFMP's Thematic Plan includes transit service, mixed-use, and multi-modal development nodes at the future I-270 interchanges at Park Mills Road and Dr. Perry/Mott Roads, and at the existing MD 80 interchange. Achieving this future land use pattern will require inter-governmental coordination to establish transit, federal and State funding for design and construction of the potential interchanges, along with new planning initiatives, policy and regulatory evaluation, and legislative action at the local level.

The last comprehensive land use plan update and comprehensive rezoning in the Urbana area occurred in 2004, with the adoption of the Urbana Region Plan on June 24, 2004. Since then, there has been considerable growth and development in the Urbana area and along the I-270 corridor. Recognizing this, the Livable Frederick Master Plan Implementation Program (October 2019) in its Planning Area Catalogue described an Elective Plan for a larger, thematically-conceived *Urbana Corridor* that could include a plan for the South Frederick Triangle, the Urbana Community Growth Area, or the I-270 Corridor. The South Frederick Triangle has now been incorporated into the South Frederick Corridors Plan.



17) Potential Future Mass Transit Corridor
18) Urbana Multi-modal Development Surrounding Potential New Transit Station
19) Potential Multi-Modal Development at Future Mass Transit Station
20) Potential Future Mass Transit Stations
21) Potential Multi-Modal Development at Future Mass Transit Station
22) Potential Multi-Modal Development at Future Mass Transit Station

Land Conservation

Land conservation has many forms and styles with different functional attributes. Structuring tools for the perpetual management and protection of significant environmental assets requires strategic designs and tactical methods. The goals of the stakeholders influence the structure and function of the conservation instrument. Three major approaches to protect and steward land resources are described below.

Acquisition

A straight-forward preservation technique involves the purchase of land in order to obtain fee simple ownership from a willing seller to protect or conserve the land. The purchaser can be either a public-sector entity (e.g., a county or state), a non-profit or non-governmental organization, or — as in the case of Sugarloaf — a private individual who buys property to preserve in its current state or to improve the land environmentally via tree planting, wetland creation, or other habitat enhancement. Properties are sometimes donated to public or private sector entities for protection purposes. Gordon Strong's foresight and vision created one of the largest areas in the entire mid-

Atlantic region of privately-owned, publicly-accessible lands for environmental conservation, education, and appreciation of the natural world's beauty. The simple formula that Gordon Strong employed to acquire and steward thousands of acres of land is more rare today than common.

Conservation Easements

A more commonly-used device for land protection is a conservation easement. With this approach, the property owner agrees to some use limitation (e.g., subdivision development), protection of existing resources (e.g., forest retention), or landscape enhancement (e.g., new tree plantings or wildlife habitat improvements) in exchange for a payment by a public sector entity or a private organization. Conservation easements can be structured to create tax benefits for the landowner. Conservation easements are legal encumbrances on a property made voluntarily and are normally perpetual, even in the event of a change in property ownership.

Land Use Regulation

Land use regulation through zoning codes and subdivision ordinances is the prescription of specific standards to land uses, physical design, and development densities and scale to achieve a health and safety purpose or environmental, cultural, or historic preservation goals as articulated in a land use plan. Conservation goals can sometimes be achieved, at least in part, through comprehensive land use plan policies and regulations. If employed to advance conservation goals, zoning — an exercise of a local government's constitutional power — must be used fairly and judiciously, with a direct correlation between the regulatory effects on land owners and the goals to be achieved.

Conservation management of the large and rich landscapes on and around Sugarloaf Mountain has bestowed innumerable benefits to society and the environment. These ecosystem services protect us and our human-constructed systems. Monetary equivalents have even been established for their function and overall societal benefit. Some of these benefits include:

- Protecting air quality through retention of vast forestlands and active forest management for maximum carbon sequestration.
- Maintaining high quality waters through retention of forestlands around aquatic systems.
- Natural filtering of sediments and chemicals in stormwater runoff and better flood control.
- Providing habitat for fish and wildlife, including pollinators and rare, threatened, and endangered species.
- Providing opportunities for educational, scientific, and nature immersion activities.
- Enhancing overall biodiversity, environmental resilience, and quality of life.

Current methods for land conservation acknowledge modern-day economic realities and generally involve monetary compensation or tax benefits, or both. Essentially, there is a price for the environmental services that natural lands provide and a price to prevent future alteration or degradation of a landscape and those services.

The following is a listing and short description of various federal, state, and local programs for land preservation that could be engaged in order to foster conservation in the Sugarloaf Planning Area.

Frederick County

Frederick County Installment Purchase Program

In 2002, Frederick County began the Installment Purchase Program for purchasing easements on agricultural land through the use of Installment Purchase Agreements. Agricultural land owners receive tax-free, interest-only payments over a period of 10 to 20 years and a balloon lump sum principal payment at the end of the term. As of October 2021, nearly 21,000 acres have been preserved through the Installment Purchase Program in Frederick County.

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 an option to acquire a preservation easement on the property. Once Frederick County has granted the option funds to a farmer, they must apply for a period of 5 years to sell an easement under the Maryland Agricultural Land Preservation Foundation (MALPF) or another governmental land preservation program. Frederick County has assisted 40 farmers in acquiring farms since the inception of the program, which has transferred over 5,100 acres to full-time farmers for continued agricultural use.

State of Maryland

Rural Legacy

This preservation program was created as part of the state's Smart Growth initiatives to target properties within large contiguous areas of agricultural and ecological significance. The program promotes natural resource-based industries, preserves critical habitats for native plant and wildlife species, provides greenbelts, and protects riparian forests and wetlands. Nearly 7,000 acres of the Frederick County landscape has been preserved through the Rural Legacy Program. (See the following paragraphs for more details about the Rural Legacy Program in southern Frederick County).

Conservation Reserve Enhancement Program

The Conservation Reserve Enhancement Program (CREP) is a cooperative program between the State of Maryland and the U.S. Department of Agriculture. CREP pays land owners to plant poorly productive agricultural field edges and borders in an approved practice that protects water quality and enhances wildlife habitat, while continuing to allow farming or grazing on the most productive land. Frederick County administers a CREP easement program, sponsored by the Maryland Department of Natural Resources. Since the CREP easement program began in 2009, over 3,500 acres have been protected in Frederick County.

Program Open Space, Stateside Program

Program Open Space (POS) funding is used to preserve sensitive natural areas, wildlife habitats, and areas with high ecological value through either a conservation easement or a fee-simple purchase. Lands encumbered by a POS Stateside Easement remain in private ownership; fee simple purchases through the POS Stateside Program are managed by the Department of Natural Resources as State Parks, Forests, or Wildlife and Fisheries Management Areas.

Maryland Environmental Trust

The Maryland Environmental Trust works with landowners, local communities, and land trusts to protect Maryland's most treasured landscapes and natural resources as a legacy for future generations through the acquisition of donated conservation easements. There are currently 4,500 acres protected by MET in Frederick County.

Maryland Agricultural Land Preservation Foundation

The Maryland Agricultural Land Preservation Foundation Program (MALPF) is a state land preservation program aimed at conserving prime farmland for food and fiber production by paying farmers to extinguish their development rights through the use of agricultural easements. Frederick County also provides funding to this program. Over 23,000 acres of agricultural land has been protected through the MALPF program through October 2021.

Maryland Agricultural and Resource-Based Industry Development Corporation (MARBIDCO) Next Generation Program

This is the State's version of the County Critical Farms program. Established in 2017, this program works to help qualified young or beginning farmers purchase farmland. The Next Generation program has helped eight farmers purchase farmland in Frederick County.

MARBIDCO Small Acreage Next Generation Program

The Small Acreage Next Generation Program (SANG) is available to help qualified young or beginning farmers who have trouble entering the agricultural profession, because of relatively high farmland costs and lack of access to adequate financial capital, to purchase smaller farmland properties that are between 10 to 49 acres. These properties are not eligible for the original Next Generation Farmland Acquisition Program, but need specialized financial assistance to enter or continue in agriculture. One farm in Frederick County has entered into a SANG easement since the program began in 2020.

Federal

Forest Legacy

Administered by the Maryland Department of Natural Resources, the Forest Legacy Program targets lands identified in the State's Forest Legacy Areas that have high value to Maryland's wildlife, water quality, and landscapes. The program is designed to protect environmentally important forests through the use of permanent conservation easements, where at least 75% of the land under easement is forested and the remaining 25% is a compatible land use such as agriculture.

NRCS Agricultural Conservation Easement Program

The Natural Resource Conservation Service (NRCS) helps landowners to protect working cropland, pasture, grasslands, rangeland, and forests associated with an agricultural operation through the use of conservation easements of varying term lengths.

Healthy Forests Reserve Program

The goal of this USDA conservation program is to protect and enhance private forest ecosystems to: promote the recovery of endangered and threatened species, improve plant and animal biodiversity, and enhance carbon sequestration. Conservation easements may be permanent or for 10-year or 30-year terms, with a share of costs paid to implement conservation practices.

Wetland Reserve Easements

This USDA program targets wetlands that have been altered for agricultural purposes that can be successfully and cost-effectively restored. Program goals include improving water quality and protecting and enhancing habitat for migratory birds and other wildlife. Easements may be permanent or for 30-year or shorter terms. Property owners are paid to implement restoration and conservation practices.

Maryland's Rural Legacy Program

Rural Legacy's mission is to protect areas rich in agricultural, forestry, natural, and cultural resources that, if conserved, will promote resource-based economies, protect greenbelts and greenways, and maintain the fabric of rural life. Protection is provided through the acquisition of easements and fee estates from willing landowners, and the supporting activities of Rural Legacy sponsors and local governments.

There are two Rural Legacy Areas in Frederick County: the Mid-Maryland/Frederick Rural Legacy Area and the Carrollton Manor Rural Legacy Area. The Mid-Maryland Area is in the western portion of the County along South Mountain. The Carrollton Manor Area, established in 2003, is in the southern part of the County east of the Catoctin Mountains to Mt. Ephraim Road, within the Sugarloaf Planning Area. In 2015, the County combined the two Rural Legacy Areas in the application process with the State so awarded grants could be allocated in either Rural Legacy Area. To date, the State has awarded over $28 million in grant funding to purchase easements in the County's Rural Legacy Areas.

The Carrollton Manor Rural Legacy area extends into the western portion of the Sugarloaf Planning Area, comprising 8,553 acres or 43% of the Planning Area. Mt. Ephraim Road, a portion of Park Mills Road, and Flint Hill Road are the eastern boundaries of the current Carrollton Manor Rural Legacy Area within the Sugarloaf Planning Area. This current boundary excludes Sugarloaf Mountain, significant areas of

forestlands, and some large agricultural areas within the Planning Area. To advance the options and opportunities for property owners to preserve sensitive natural resource lands, unique environments, and working landscapes in the Sugarloaf Planning Area, the Plan recommends an expansion of the Carrollton Manor Rural Legacy boundary. State approval of the proposed expansion will be required.

Policy 4.4 Maintain agriculture as a significant land use in the Sugarloaf Planning Area through easements, incentives, policies, and regulation.

Initiative 4D Pursue the expansion of the Carrollton Manor Rural Legacy Area within the Sugarloaf Planning Area.

Policy 4.5 Support an evolving agricultural industry and farming at many scales that contributes to a local food supply and conservation of agricultural land, rural open space, and environmental resources in the Sugarloaf Planning Area.

Policy 4.6 Promote local agricultural growers and commodity producers in the Sugarloaf Planning Area and assist with reaching residents through on-farm, wholesale, regional grocery, and culinary outlets.

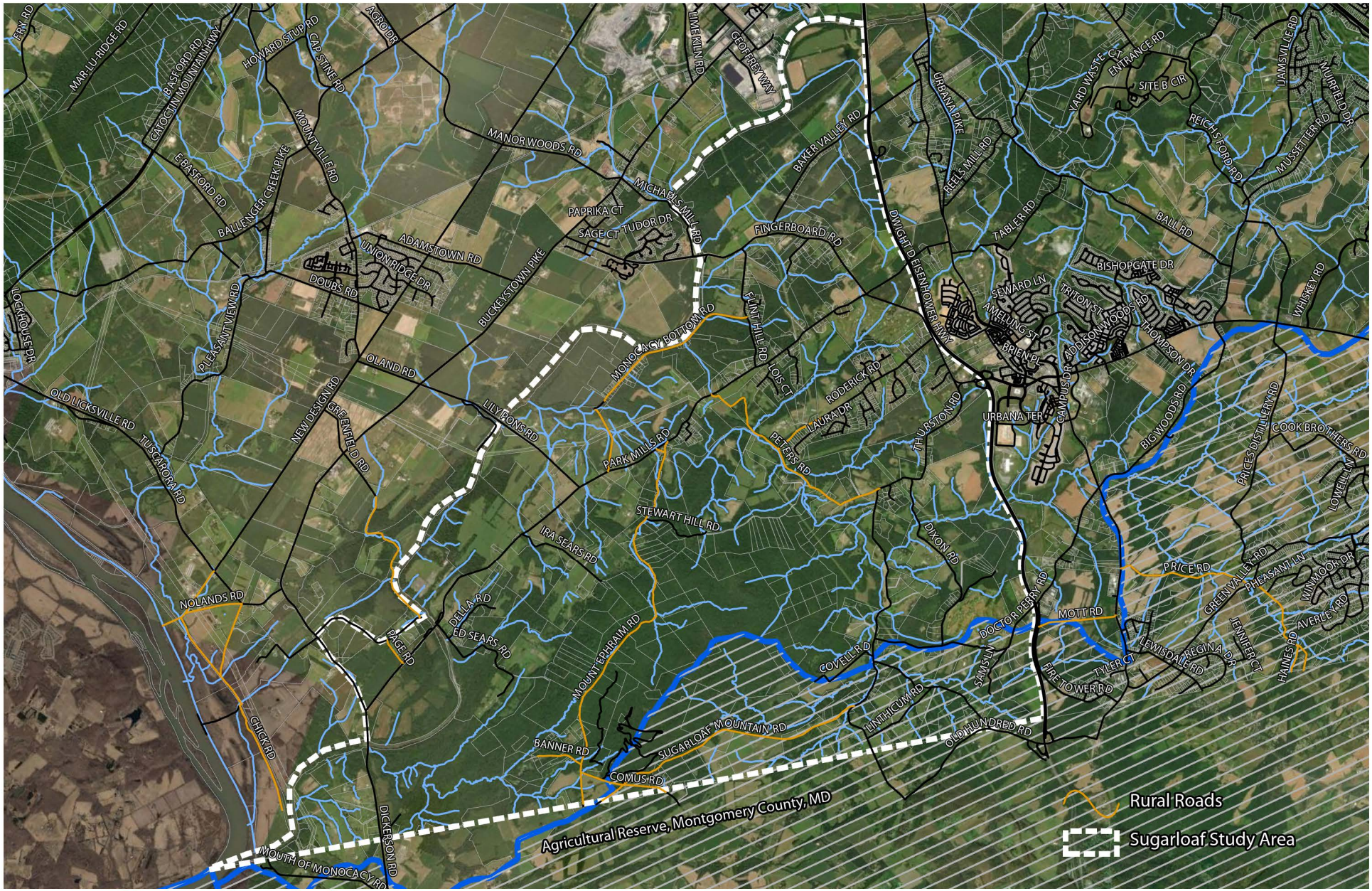
Policy 4.7 Support innovative and high-tech farmers and agricultural practices that enhance the competitiveness of local farms in the Sugarloaf Planning Area.

1 http://federalleadership.chesapeakebay.net/EO/file.axd?file=2009%2f8%2fChesapeake+Executive+Order.pdf

2 https://www.epa.gov/chesapeake-bay-tmdl

3, 5 EPA, 2013. A Model Program for Onsite Management in the Chesapeake Bay Watershed. June 2013. U.S. Environmental Protection Agency, Office of Wastewater Management, Washington, DC. https://federalleadership.chesapeakebay.net/130627_ches_bay_tech_assist_manual.pdf

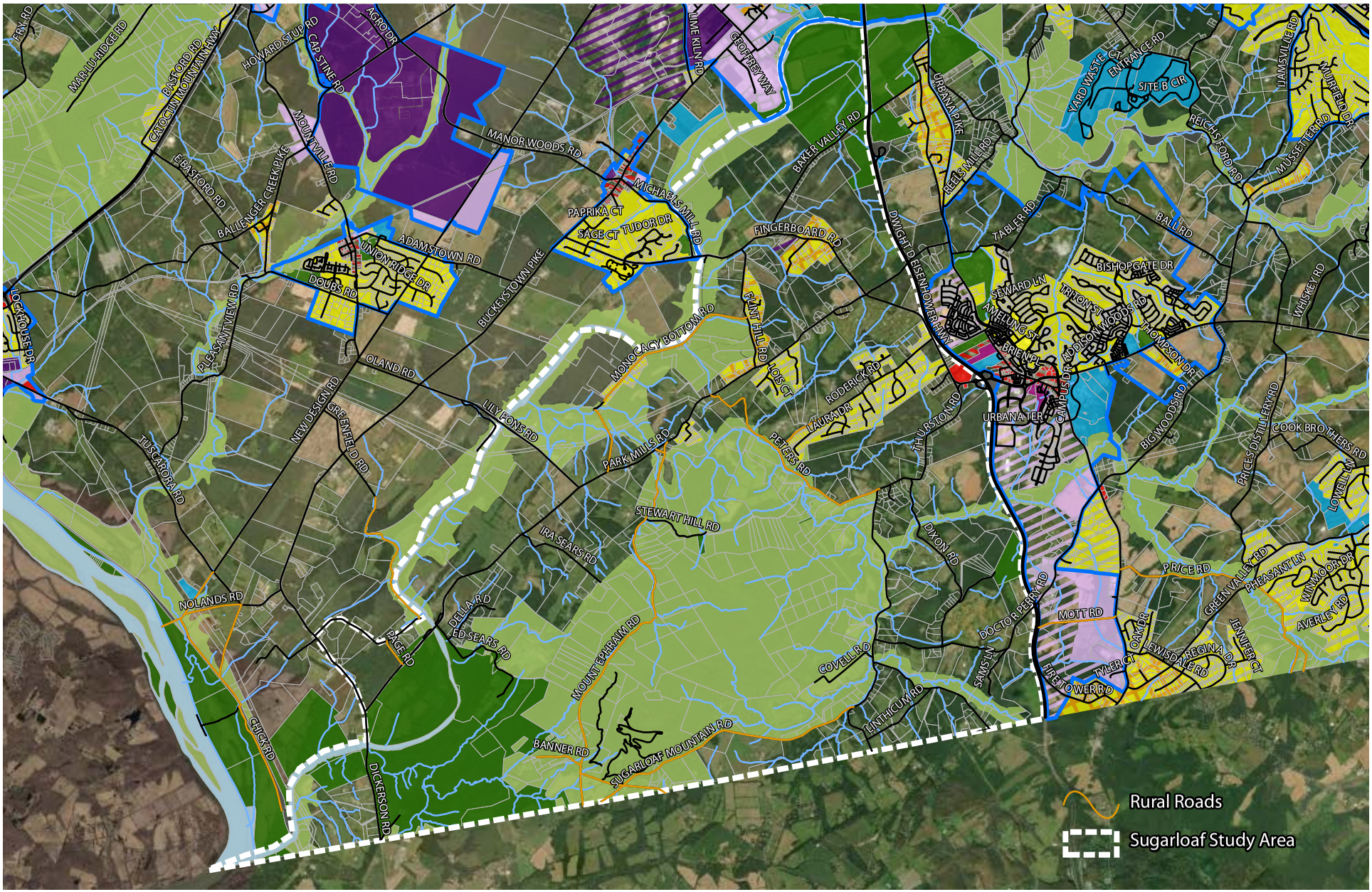
4 Lowe, K.S., N. Rothe, J. Tomaras, K. DeJong, M. Tucholke, J. Drewes, J. McCray, and J. Munakata-Marr (2007). Influent Constituent Characteristics of the Modern Waste Stream from Single Sources: Literature Review. Water Environment Research Foundation. 04-DEC-1. www.ndwrcdp.org/publications.



Piedmont Sole Source Aquifer

Piedmont Sole Source Aquifer

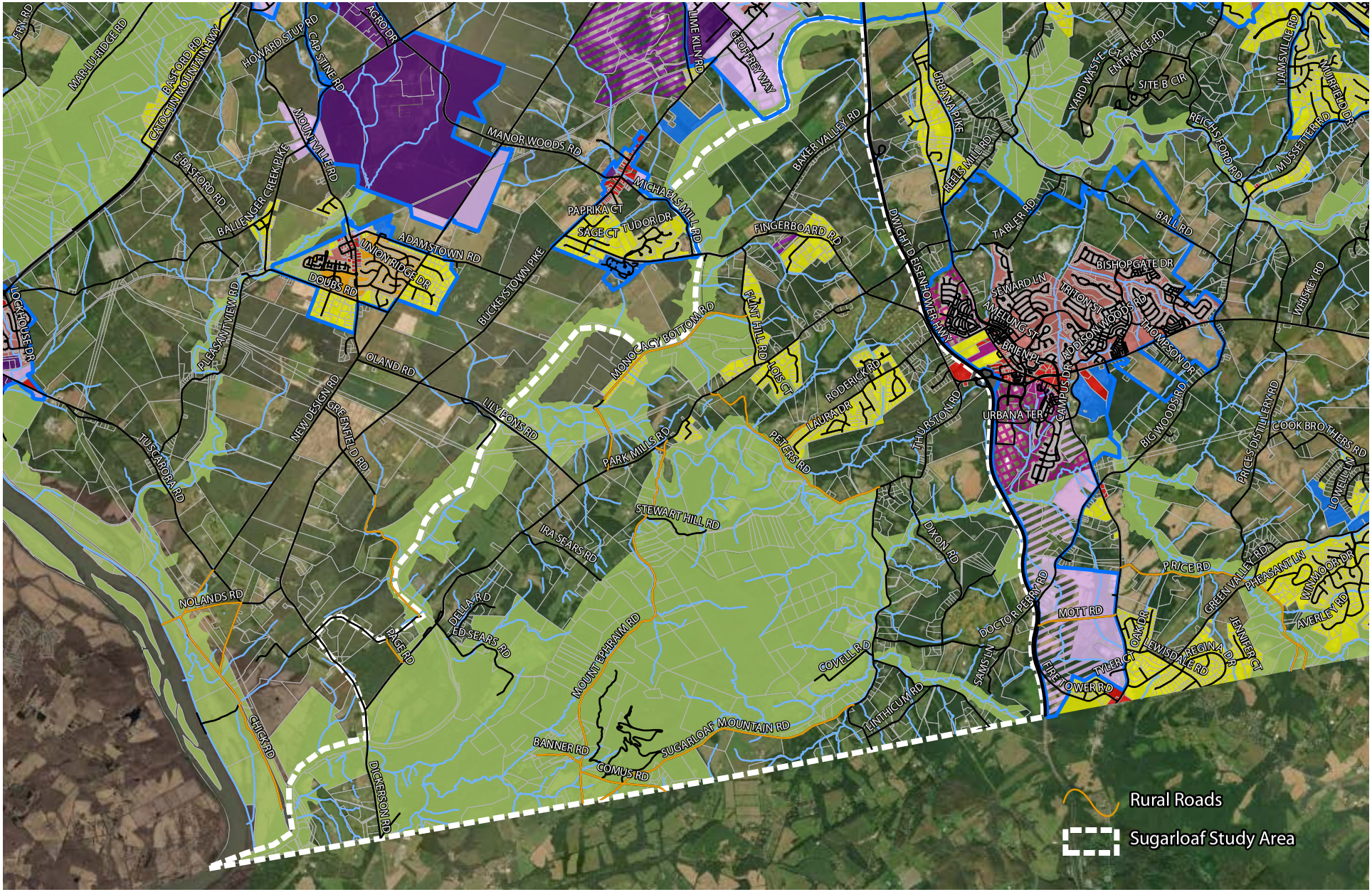
Map 4-1



County Council Adopted Land Use Plan – October 26, 2022

- 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
- Municipal Comment Area
- Water
- Right of Way
- Community Growth Area

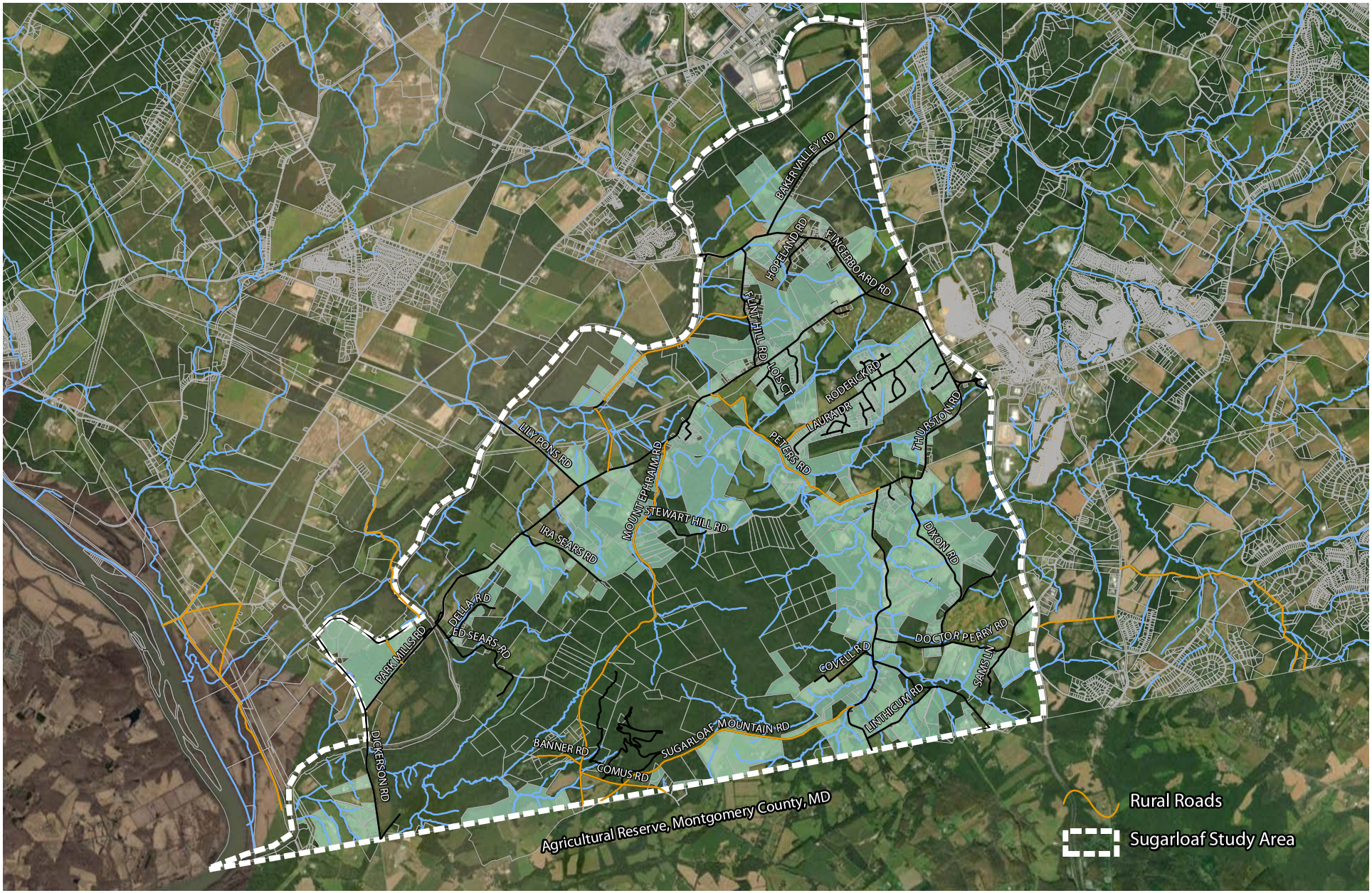
Map 4-2



County Council Adopted Zoning – October 26, 2022

- 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
- MUN – Municipality
- Right of Way
- Community Growth Area

Map 4-3



Subdivisions

Subdivision Lots

Map 4-4

Chapter 5

Transportation Network

1.3.2 Ensure that transportation and public infrastructure investments provide maximum value, sustainability, and resilience to citizens through responsible stewardship and continuous, deliberate improvement.

1.1.3.3 Minimize or eliminate adverse ambient environmental impacts on people, sensitive land uses, and the natural environment that are caused by transportation, industrial uses, or building operations.

1.3.2.3 Support environmentally responsible management and maintenance practices.

Commonplace throughout the U.S., most new "roads" in the 18th and 19th centuries began as Native American foot trails or wildlife migration paths that were cleared, widened, and leveled to facilitate commerce and population growth. Within the Sugarloaf Planning Area, the transport of supplies and products to and from lumbermills, flourmills, and early industrial uses such as stone quarries, blacksmiths, wheelwrights, and cobblers helped to shape the area's historical road network. Some of these early roads were constructed along routes that follow high points or minor ridge tops to aid in drainage and avoid low areas closer to waterways. Examples include Roderick Road, Park Mills Road, and Fingerboard Road (MD 80). These roads also define watershed boundaries; for example, Roderick Road and the northern sections of Park Mills Road demarcate the Urbana Branch and North Branch subwatersheds. Today, the road network in the Sugarloaf Planning Area is remarkably similar to that depicted on the 1873 Titus Map.

The early roads that carried infrequent and slow-moving, horse-drawn freight wagons and carts now carry thousands of vehicles each day for access to hundreds of dwellings and large commercial and institutional facilities. In addition, many roads in the Planning Area function as alternative commuter routes, as the network parallels the north/south routes of I-270 and MD 355 that funnel travelers into Montgomery County and points further south. Park Mills Road, Thurston Road, Slate Quarry Road, Sugarloaf Mountain Road, and Comus Road have the highest number of daily trips of all roads in the Planning Area according to the Frederick County DPW, Office of Transportation Engineering.

Reflective of the geographic and topographic constraints from the period of initial roadway establishment, the Sugarloaf Planning Area's roadway network of today can be analyzed and evaluated through basic properties of roadway geometry, including:

- Alignment — the straight sections and horizontal curves on a road.
- Profile — the hills and valleys on a road, formally called crest curves (top of hill) and sag curves (bottom of hill).
- Cross-section — the width of the travel lanes, their cross-slope (roadway banking), and associated drainage features.

A road's characteristics — its geometric profile — affect its safety performance and ultimately the accommodation of development and increased traffic volumes. Second only to human error, a road's design is a contributing factor to accidents. Road geometry affects sight distance — the driver's line of sight on a roadway. Insufficient sight distance can adversely affect the safety and operation of a roadway or intersection. Sudden or hidden curves, narrow-width roadways with hills, or adjacent and obstructing vegetation impact a driver's reaction time (stopping sight distance), avoidance-maneuver time (decision sight distance), and sight lines needed to safely proceed through an intersection (intersection sight distance). Additionally, steep road grades have high velocity flows after storm events, contributing to roadside erosion and direct flow of run-off into streams.

Thurston Road, north of Doctor Perry Road

Thurston Road

Slate Quarry and Old Hundred Road intersection

Thurston Road and Peters Road intersection

Increased vehicular trips on a transportation network with many roadway alignment challenges (curves and hills), intersections with poor sight distance, and constrained travel lanes (widths, adjacent vegetation) can impact efficient and safe vehicular mobility. Numerous intersections and road segments in the Sugarloaf Area have sight distance constraints, and can pose extra challenges to maneuvering and movement by the motoring public. The County has not programmed the redesign of intersections or the rebuilding of roadways in the Sugarloaf Planning Area primarily due to the impacts to sensitive environmental lands and relatively low traffic volumes. Increased development densities or high trip-generating land uses would strain an already challenged transportation network in much of the Sugarloaf Planning Area.

There are no roadway-adjacent sidewalks in the Sugarloaf Planning Area except for a very small portion along Comus Road near the entrance to Sugarloaf Mountain. Many of the roadways are frequently used by bicyclists and walkers. Due to the relatively low traffic volumes on many of the roads and the inherent speed-calming characteristics of some of the roadways, many residents and visitors perceive a level of safety and security in utilizing the roads in the Sugarloaf Planning Area for recreational activities — walking, bicycling, running, and horse-crossing.

According to the Frederick County Sheriff's Office, just two roadways — Thurston Road and Park Mills Road — comprised 59% of the reported crash incidents in the entire Sugarloaf Planning Area from 2015-2019. These two roads generate the most complaints about speeding and requests for speeding enforcement in the Sugarloaf Planning Area. The characteristics and geometry of Thurston Road and Park Mills Road present challenges not just for safe travel, but also for traffic enforcement to monitor and stop motorists. Map 5-1 illustrates locations of reported car accidents from 2015 through 2019 in the Sugarloaf Planning Area.

Initiative 5A ***With the Sheriff's Office and the Division of Public Works, explore the application of speed calming techniques to deter motorists who exceed the speed limit on Thurston Road and Park Mills Road.***

Initiative 5B ***Engage the Office of Transportation Engineering within the Division of Public Works to commence a transportation analysis in the Sugarloaf Planning Area that includes vehicular traffic enumeration and evaluation of automobile crash frequency and location.***

Maryland Interstate Highway System Projects

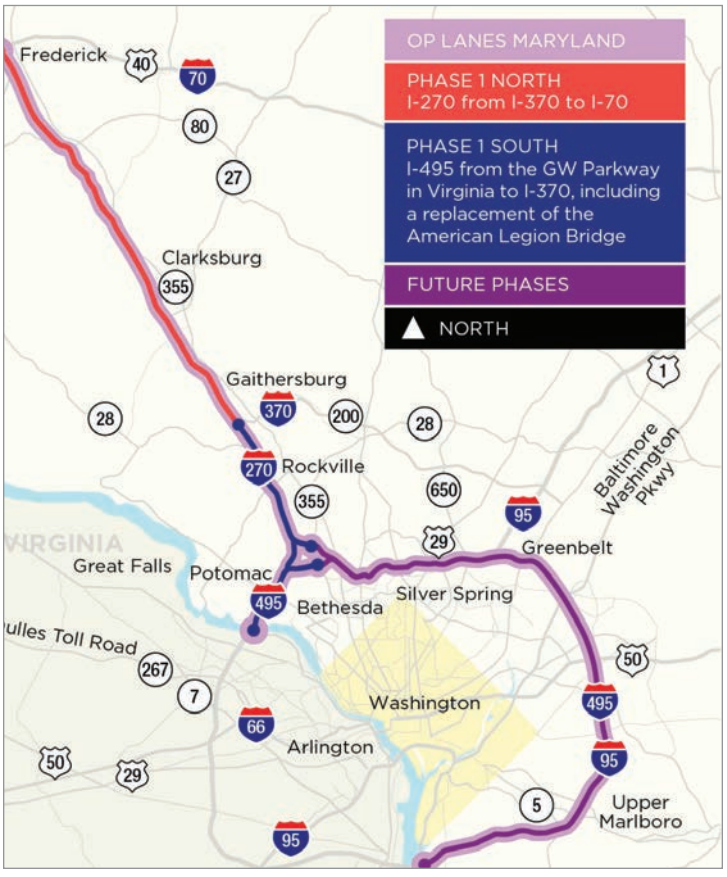
To address the impacts of population growth, land development, and their demands on the interstate highway network in the greater Washington, D.C., region, the State of Maryland has three major projects underway or under study:

- Op (Option) Lanes Maryland
- I-270 Innovative Traffic Congestion Management Projects
- I-270 Transit Enhancements

Op (Option) Lanes Maryland

Op Lanes Maryland is a regional transportation effort aimed at improving roadway capacity and reducing congestion for travelers in the National Capital Region, specifically along the I-270 and I-495 corridors. According to the Maryland Department of Transportation State Highway Administration, the project will "address the need to accommodate existing and long-term traffic growth, enhance trip reliability, expand travel options, accommodate homeland security, and improve the movement of goods and services." The project is, essentially, a travel demand-management solution that addresses congestion and will enhance existing and planned multi-modal mobility and connection. The project is being advanced as a public-private partnership with the intent of having the private sector design, build, finance, operate, and maintain the ultimate improvements. The ongoing Op Lanes Maryland Study includes a review of the existing and future traffic, roadways, and environmental conditions to identify the best alternatives and assess potential impacts.

Op Lanes Maryland - Phase I



Phase I of the Study is identified as the section from the George Washington Parkway in Virginia to I-270, including the replacement of the American Legion Bridge (ALB), and I-270 from I-495 to I-70. Phase I was further split into two phases. Phase I North is I-270 from I-370 to I-70 in Frederick County. Phase I South is from the George Washington Parkway across the ALB to west of MD 5, and on I-270 from I-495 to north of I-370 (figure 1).

The potential improvements include adding High Occupancy Toll (HOT) managed lanes in each direction on I-495 within the limits of Phase 1 South. Phase 1 North is currently in the early stages of a planning study assessing basic environmental planning activities prior to starting a study under the National Environmental Policy Act (NEPA). Phase I North Improvements are necessary with or without the improvements for Phase 1 South and may include HOT lanes as part of the recommended alternative. In Frederick County, the construction of HOT lanes would come with the following potential advantages:

- Enabling more efficient transit operations through a more reliable and faster system.
- Providing opportunities for existing transit services to use the managed lanes.
- Allowing vehicles with 3 or more passengers to travel free, boosting ridesharing and reducing dependence on single occupancy vehicles.
- Acting as new "fixed guideways" for transit.
- Facilitating the opportunity for new market trials.
- Offering the ability to more effectively provide transit services to underserved suburban-to-suburban markets.
- Enhancing opportunities for partnership with Virginia to offer transit services.

Upon completion of the Pre-NEPA, it is anticipated that the proposed transit improvements will focus on Frederick County needs identified in the Transit Service Coordination Report dated May 2020 (see Potential Transit Service Concepts map). This report was developed by transit representatives and focuses on the following activities:

- Review of existing and planned transit services.
- Review of managed lanes access points.
- Analysis of casual carpooling, van pooling and other ridesharing methods.
- Evaluation of park and ride lot locations near the I-495 and I-270 corridors and their current capacity and usage.
- Examination of potential markets for regional express bus service that would benefit from implementation of managed lanes.
- Identification of potential new or modified routes.

The report identifies transit infrastructure improvements needed at the Frederick and Monocacy MARC stations, as well as park and ride improvements at Monocacy, Urbana (North and South), and Hyattstown. Additionally, the report identifies potential managed lane access points at Monocacy, Urbana, and Hyattstown.

Policy 5.1 Maintain coordination and collaboration with the Maryland Department of Transportation-State Highway Administration in all aspects of future planning, design, and construction associated with Interstate 270.

Initiative 5C ***Work with Maryland Department of Transportation-State Highway Administration to support localized mitigation of forest and wetland impacts from any future construction associated with I-270.***

Initiative 5D ***Coordinate with Maryland Department of Transportation-State Highway Administration and Montgomery County to retain full operational movements at the MD 109/I-270 interchange for efficient access to the southern Sugarloaf area once the MD 75/I-270 interchange is constructed.***

I-270 Innovative Congestion Management Project

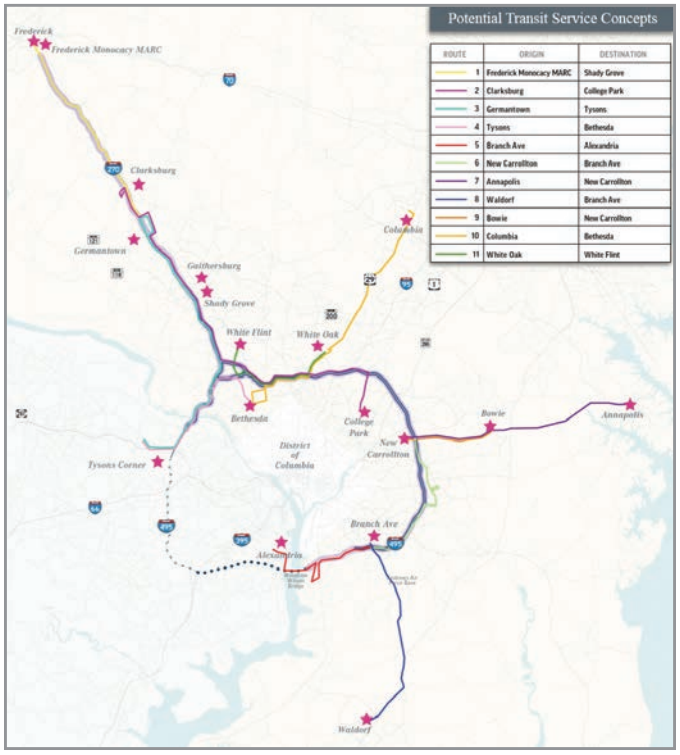
This project proposes to improve multiple bottlenecks, add new lane miles, add real-time traffic communication signs, and add intelligent signals that work together to deliver dynamic traffic management along the entire I-270 corridor. In Frederick County, the improvements include on-ramp improvements involving acceleration lane lengthening and placement of ramp signals designed to meter the flow onto the interstate highway. These ramp signals will be placed at the MD 80 and MD 85 interchanges along with the MD 109 interchange in Montgomery County. These improvements are intended to appreciably reduce severity of delays at current choke points and reduce the duration of peak period congestion.

I-270 Transit Enhancements

Generally, transit is considered a system of shared transportation and mobility that is accessible to the public. Examples include:

- Bus Rapid Transit – Runs on dedicated lanes that have physical separation from normal traffic lanes. Some BRT systems like Montgomery County's new FLASH BRT on Rt. 29 between Burtonsville and Silver Spring use a combination of dedicated lanes and normal travel lanes.
- Express Bus – Fewer stops than a local bus, normally serving large employment hubs, such as Maryland Transit Administration's (MTA) Commuter Bus Routes 515 and 204 that stop at the Urbana park-and-ride lot.
- Heavy Rail – The Washington, D.C., area Metrorail system, Baltimore's Metro Subway, and the Maryland Area Regional Commuter Rail (MARC) trains.
- Light Rail – The Baltimore Light RailLink system and the Purple Line under construction in Montgomery and Prince George's Counties.
- Monorail – Rail cars on an elevated fixed guideway like in Seattle and many Asian cities like Kuala Lumpur and Mumbai.
- Local Bus – Fixed routes mixed in normal travel lanes, such as Frederick County's TransIT Services and Montgomery County's Ride-On system.

Potential Transit Service Concepts



The proposed HOT lanes along I-270 and I-495 offer an opportunity to implement a contemporary transit network that moves more people more quickly and efficiently, thus helping to reduce greenhouse gas emissions by lowering "emissions per passenger" compared to single-occupant vehicles. Transit use can be an effective tool in reducing traffic congestion and, for those commuting outside of the immediate area, can be a more viable and affordable alternative to commuting by car.

Suburban counties in the greater Washington metropolitan region including Frederick, Charles, Anne Arundel, and Howard are in need of all-day bus services connecting to the Washington, D.C., Metrorail system. The proposed addition of managed lanes between Tyson's Corner, Virginia and Maryland will enable time-competitive transit across the American Legion Bridge. Several transit routes using the managed

lanes are being evaluated. In Frederick County, future, expanded transit along the I-270 corridor is designed primarily to reduce single-occupant vehicle travel by expanding mobility choices for travel to job centers in Montgomery County, Washington, D.C., and Northern Virginia. The MTA's Express Bus operates in this fashion along the I-270 corridor, with stops at the 300+ space park-and-ride lot in Urbana on the routes to College Park, Rockville, and Bethesda.

The State's goal for service includes bi-directional Bus Rapid Transit (BRT) running between the City of Frederick and the Shady Grove Metro Station, with single point transfers to other locations such as College Park, North Bethesda, and Tyson's Corner, Virginia. The realistic and probable future scenario for transit service along the I-270 corridor is enhanced commuter or express bus service from the City of Frederick to points south, with commuter/express bus travel within the HOT lanes on I-270. The completion of the Op Lanes Maryland Project and I-270 Transit Enhancements is probably 10-15 years away or longer, depending on the negotiations and contract issues related to the public-private partnership the State of Maryland is pursuing for the project.

New transit centers and additional park-and-ride facilities will be needed to support the new transit services in Frederick County. The Maryland Department of Transportation State Highway Administration has identified a new park-and-ride lot at the proposed I-270/ relocated MD 75 interchange, and expanded park-and-ride lots along the I-270 corridor at Urbana (MD 80) and the Monocacy MARC Station.

Policy 5.2 Future transit centers, park-and-ride facilities, and transit-oriented development projects associated with future interchanges on I-270 should be thoroughly evaluated in order to serve the Urbana Community Growth Area, as well as potential points along the I-270 Corridor that may support compact employment and mixed-use development.

Scenic Roads

Roadways act as thresholds or entryways to specific areas, places, or even regions. Sugarloaf Mountain stands as a visible gateway beacon welcoming both residents and visitors to Frederick County. The roads in the Sugarloaf Area have significant visual elements, such as majestic roadside trees, wooded landscapes, bucolic fields, historic buildings and structures, interesting topographic gradients, and other natural features. These scenic and cultural resources are part of the area's heritage and should be retained.

Several roads within the Planning Area are designated Rural Roads in the County's Rural Roads Program. The Frederick County Rural Roads Program was created to protect the scenic and historic qualities of roads in the rural areas of the County and to provide for continued maintenance of the road surface. The Rural Roads in the Planning Area include all or portions of Sugarloaf Mountain Road, Comus Road, Banner Road, Peters Road, Roderick Road, Mount Ephraim Road, Greenfield Road, Monocacy Bottom Road, and Page Road. These rural roads are not only characterized by their road surface, but also by their geometric profiles, natural features, vistas, recreational value, and historic significance.

Policy 5.3 Support and perpetuate the Sugarloaf Area's rural character and unique elements in the forthcoming redesign of the County's Rural Roads Program.

Slate Quarry Road

Freshwater Salinization Syndrome

University of Maryland researchers have reported that streams and rivers across the U.S. have become saltier and more alkaline (higher pH) over the past 50 years due to increased use of road deicers (e.g. sodium chloride and calcium chloride), fertilizers, and other salty compounds that we indirectly release into waterways. The scientists also studied Paint Branch in Prince George's County Maryland and Rock Creek in Washington, D.C., and found elevated salt concentrations in these local waterways after snow and ice weather events.

High salinity levels in streams are toxic to the entire aquatic food chain from tiny zooplankton to macroinvertebrates (mayflies, stoneflies) to fish like brook trout. Road salt runoff can also harm plants, wildlife, and drinking water supplies. Elevated chloride levels in the Flint River, together with chemical treatments, contributed to the leaching of lead from water pipes in Michigan.

The University of Maryland scientists also found that salty, alkaline freshwater can release a variety of chemicals, including toxic metals and harmful nitrogen-containing compounds from streambeds and soils in watersheds where salt is applied on roadways. Many of the chemicals — copper, zinc, cadmium, manganese — form 'chemical cocktails' and can severely harm ecosystems and drinking water supplies more than individual pollutants alone.

Given the pristine water quality in many of the streams in the Sugarloaf Planning Area that support brook trout and other sensitive aquatic organisms, a reduction in road salt usage should be implemented for the Sugarloaf Planning Area.

Sources:

Novel 'Chemical Cocktails' in Inland Waters are a Consequence of the Freshwater Salinization Syndrome
Sujay S. Kaushal, Gene E. Likens, Michael L. Pace, Shahan Haq, Kelsey L. Wood, Joseph G. Galella, Carol Morel, Thomas R. Doody, Barret Wessel, Pirkko Kortelainen, Antti Räike, Valerie Skinner, Ryan Utz and Norbert Jaworski
Philosophical Transactions of the Royal Society B.
Published: 03 December 2018 https://doi.org/10.1098/rstb.2018.0017
Freshwater Salinization Syndrome
Sujay S. Kaushal, Gene E. Likens, Michael L. Pace, Ryan M. Utz, Shahan Haq, Julia Gorman, Melissa Grese. Proceedings of the National Academy of Sciences Jan 2018, 115 (4) E574-E583; DOI: 10.1073/pnas.1711234115

Dixon Road one-lane bridge over Little Bennett Creek

Some roads within the Sugarloaf Planning Area have scenic attributes but are not currently included in the Rural Roads Program. These roads could be designated as County Scenic Roads in an expanded Rural Roads Program to preserve and maintain their scenic, natural, and cultural attributes and qualities. Scenic Roads could have the following characteristics:

- Contribute to an area's unique and iconic qualities and characteristics.
- Abut significant cultural landmarks, native vegetation, notable stands of trees, or other significant natural features along the majority of their length.
- Afford vistas of exceptional rural or natural landscapes or geologic features, such as Sugarloaf Mountain, agricultural fields, or historic buildings.
- Have wider road widths than a Rural Road.
- Have higher posted speed limits than a Rural Road.
- Have a variety of travel surfaces, such as gravel, tar and chip, and asphalt.

Initiative 5E ***Establish a new "Scenic Road" designation to augment and complement the County's Rural Roads Program, as shown below in Table 3.***

Table 3. Sugarloaf Plan Scenic Road Recommendations

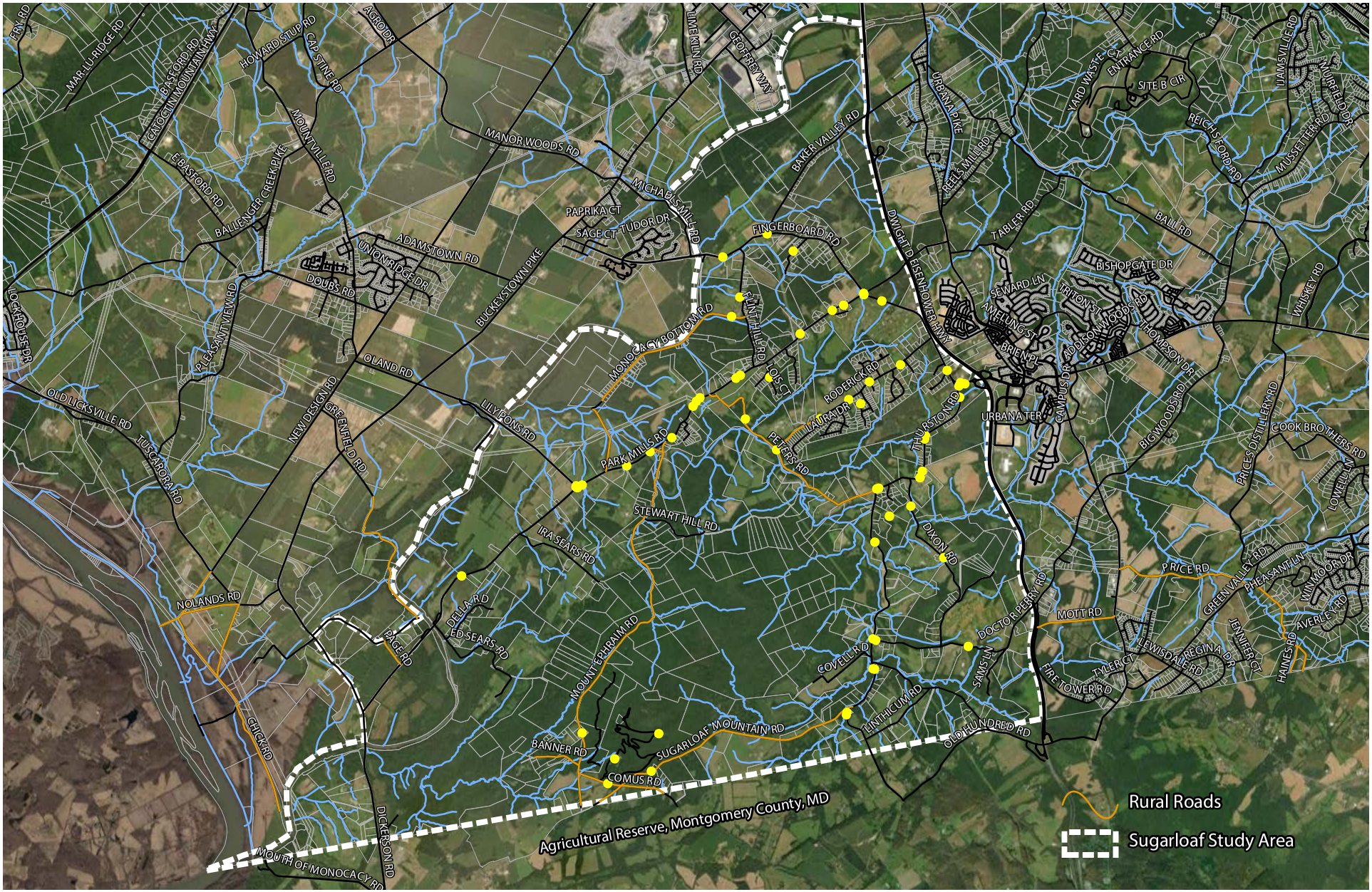
Road Name	Limits	Scenic Characteristics
Stewart Hill Road	Mt. Ephraim to terminus	Extensively wooded, adjacent to Stronghold, Incorporated lands
Slate Quarry Road	Thurston Road to County boundary	Dense forested landscape present along virtually entire length
Dixon Road	Doctor Perry Road to Thurston Road	Dramatic east view of Sugarloaf Mountain and one-lane historic bridge
Ed Sears Road	Park Mills Road to terminus	Parallels Monocacy River, just west of a DNR "critically significant" landscape of old growth Oak/Heath Forest
Ira Sears Road	Park Mills Road to terminus	Surrounded by picturesque agricultural fields at the forested foothills of Sugarloaf Mountain
Doctor Perry Road	I-270 to Thurston Road	Entire southern and western travel movement affords prominent views of Sugarloaf Mountain
Della Road	Ed Sears Road to terminus	Historic African-American village adjacent to the Monocacy River

Precast Concrete Guardrail

Rough Stone Masonry Guardrail

Nature Guardrail

Steel Backed Timber Guardrail



Reported Vehicle Crash Incidents (2015 - 2019)

- Reported Vehicle Crash Incidents

Map 5-1

Chapter 6

Watershed Water Quality

4.2.1 Improve and protect water quality for human and environmental health by eliminating impairing levels of pollution to local waterways and adequately funding and implementing water quality restoration and protection efforts.

4.2.2 Ensure groundwater and surface waters remain safe, reliable, and sustainable sources for public consumption.

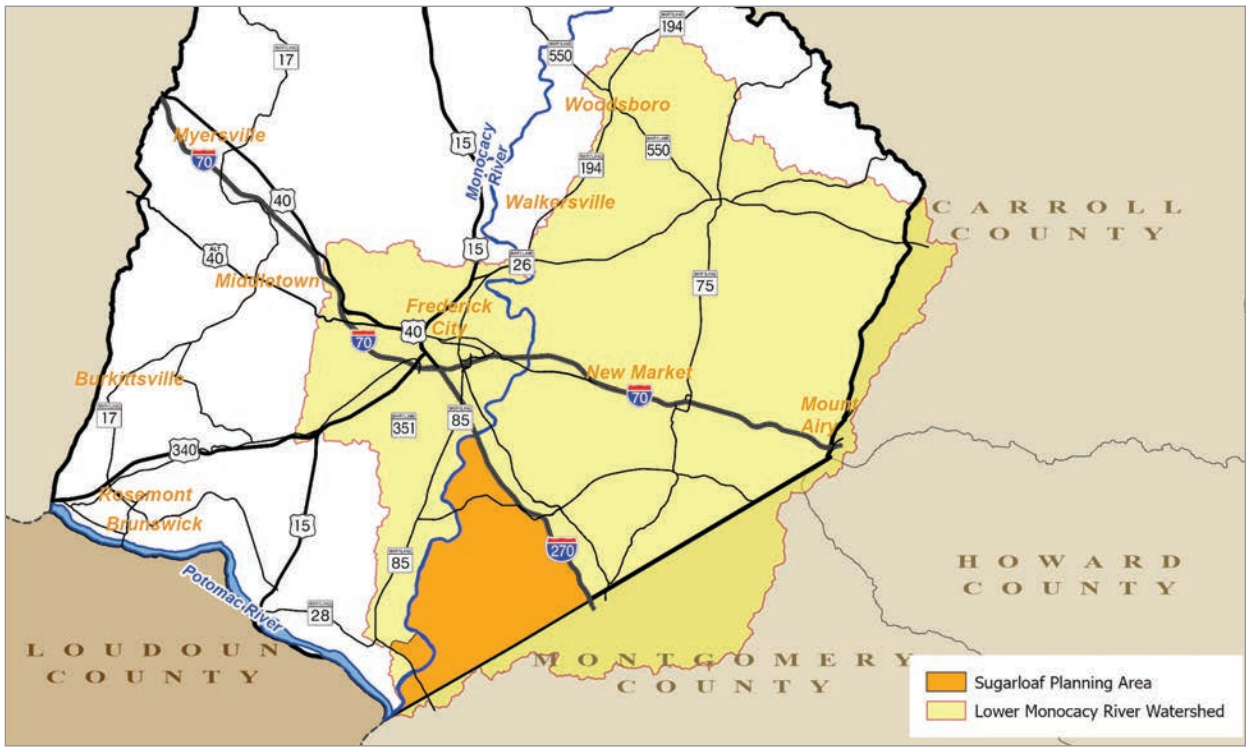
4.2.1.1 Implement Best Management Practices in all land use sectors and activities to improve water quality, in-stream, and riparian habitat.

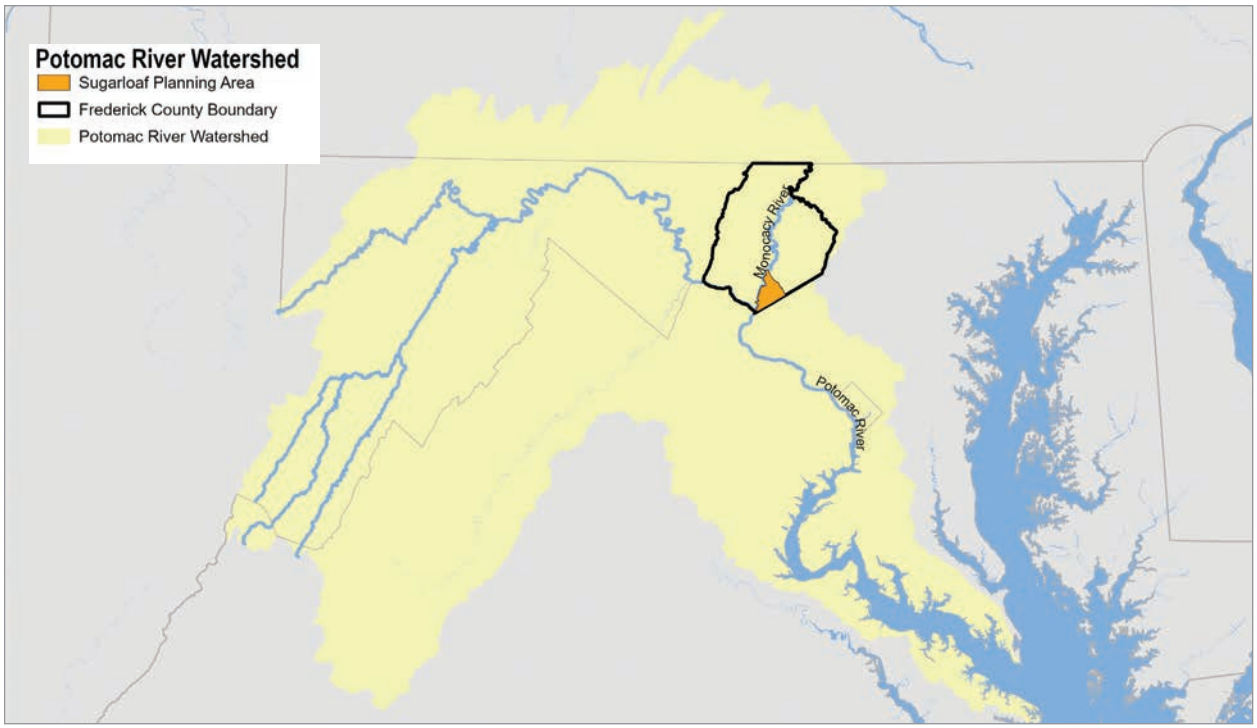
4.2.1.2 Protect and re-stabilize brook trout populations in local waterways.

4.1.1.4 Support locally produced agricultural products and sustainable and innovative farming practices, such as regenerative farming, which build healthy, biologically active soil and protect water quality.

The Sugarloaf Planning Area is located primarily within the Bennett Creek Watershed, with small portions in the Monocacy Direct Watershed and the Little Monocacy River Watershed (see Map 6-1). The vast majority of the Sugarloaf Planning Area is situated within the larger Lower Monocacy River Watershed, a 169,100-acre watershed. The Lower Monocacy River Watershed is "nested" in the even-larger Middle Potomac River Basin. This entire area's drainage is part of the Chesapeake Bay Watershed.

Through the Maryland Biological Stream Survey, Frederick County and the State of Maryland have monitored the Bennett Creek Watershed, analyzing nutrients in waterways, stream system structure and habitat, and fish and stream insect (benthic macroinvertebrates) populations to determine the overall health of the streams in the watershed.





Freshwater streams are highly sensitive and valued natural ecosystems. Aquatic ecosystems provide the critically important services of storing water in floodplains and wetlands, supporting fisheries, providing recreation, and linking the terrestrial landscape. Land cover (e.g., forests, fields, development) and land use management are the primary determinants of the overall condition of waterways, which is defined and measured by the following features of aquatic systems: physical (instream and riparian habitat, flow levels), chemical (nutrients, toxins), and biological (fish and other aquatic organisms). The Sugarloaf Planning Area contains significant and valuable natural and aquatic resources.

Policy 6.1 Foster increased awareness and appreciation of environmental resources in the Sugarloaf Planning Area and their relationship to man-made systems, and support management actions to sustain and protect resource function, resilience, and quality.

Maryland's Designated Use Classes for Surface Waters (COMAR 26.08.02)

The State of Maryland is the owner of waters that occur in or flow through the State either above or below ground. As the guardian of these waters, the State of Maryland has adopted policies and regulations regarding the use and protection of water.

In Maryland, each body of water has been classified according to the most critical use for which it must be protected. Specific numeric criteria for the water quality standards (e.g., temperature, pH, turbidity, dissolved oxygen, bacteria, etc.) are found in COMAR 26.08.02.03. The "P" designation indicates that these streams, like most in the County, ultimately drain to a source of the public raw water supply (e.g., Potomac and Monocacy Rivers). See Appendix for a listing of all streams in Frederick County and their Use Classes. See Map 6-6 for Designated Use Classes for Surface Waters in the Sugarloaf Planning Area.

Use Class I: Water Contact Recreation and Aquatic Life

Waters suitable for water sports and leisure activities where the human body may come in direct contact with the surface water, and suitable for the growth and propagation of fish (other than trout), other aquatic life, and wildlife.

Use Class II: Shellfish Harvesting (none in Frederick County)

Waters where shellfish are propagated, stored, or gathered for marketing purposes including actual or potential areas for harvesting of oysters, soft-shell clams, hard-shell clams, and brackish water clams.

Use Class III: Non-tidal Cold Water ('Natural Trout Waters')

Waters suitable for the growth and propagation of trout, and which are capable of supporting natural trout populations and their associated food organisms.

Use Class IV: Recreational Trout Waters

Waters capable of holding or supporting adult trout for put-and-take fishing, and which are managed as a special fishery by periodic stocking and seasonal catching.

The Frederick County Stream Survey (FCSS) is a program designed to monitor and assess the status and health of County streams in terms of water quality and biological and habitat conditions. Since its inception in 2008, the FCSS has sampled over 500 stream locations. For each of the sampling years, 50 randomly selected sites were monitored, stratified across 20 watersheds in the entire County. Data were collected and analyzed on water quality (nutrients), physical habitat (stream bank erosion, riparian forest), and biological communities (benthic macroinvertebrates) at each of the stream sites. See Map 6-3 for the locations of the stream survey sites within the Sugarloaf Planning Area and their biological and physical habitat scores. Detailed results from Round 1 (2008-2011), Round 2 (2013-2016), and Round 3 (2018-2022) of the FCSS can be found on the Office of Sustainability and Environmental Resources' web page: https://www.frederickcountymd.gov/8134/Program-Reports

Stream Habitat

Stream health, as characterized by the condition of biological communities, is often directly correlated to the quality of physical habitat within a stream. Habitat loss and degradation have been identified as critical factors affecting biological diversity in streams worldwide. Habitat degradation can result from a variety of impacts occurring within the stream itself or in the surrounding watershed. Typical instream impacts include sedimentation, stream channelization, and bank erosion. Land development, timber harvesting, agriculture, livestock grazing, and the draining or filling of wetlands are well-known examples of human activities affecting stream habitat at the watershed scale. These human activities may cause changes in vegetative cover, sediment loads, and hydrology, and influence stream habitat quality.[1]

The FCSS collects data on many aspects of physical stream habitat, including the extent and type of vegetated riparian buffer, the severity of bank erosion observed, and other metrics that can be combined and used as an overall indicator of habitat quality called the Physical Habitat Index (PHI). The PHI for Maryland streams was developed using data from the Maryland Biological Stream Survey (MBSS). This index combines several measures of physical habitat characteristics into one value that is then compared to minimally impacted sites throughout the state, which are referred to as reference streams and conditions.[2]

Maryland Biological Stream Survey

The Maryland Biological Stream Survey provides the best possible information for ensuring the protection and restoration of Maryland's stream ecological resources by:

- Assessing the current condition of ecological resources in Maryland's streams and rivers.
- Identifying the impacts of acidic deposition, climate change, and other stressors on ecological resources in Maryland's streams and rivers.
- Providing an inventory of biodiversity in Maryland's streams.
- Assessing the efficacy of stream restoration and conservation efforts to stream ecological resources.
- Continuing to build a long-term database and document changes over time in Maryland's stream ecological condition and biodiversity status.
- Communicating results to the scientific community, the public, and policy makers.

https://dnr.maryland.gov/streams/Pages/mbss.aspx

Maryland's Stream Waders Program

Maryland's Stream Waders program is a volunteer-based, "citizen-science" program sponsored by the Maryland Department of Natural Resources' Monitoring and Non-Tidal Assessment Division, and is an integral part of the DNR's professional stream monitoring program, the Maryland Biological Stream Survey. Goals of the Stream Waders Program are:

- To increase the density of sampling sites for use in stream quality assessments.
- To educate the local community about the relationship between land use and stream quality.
- To provide quality assured information on stream quality to state, local, and federal agencies, environmental organizations, and others.
- To improve stream stewardship ethics and encourage local action to improve watershed management.

https://dnr.maryland.gov/streams/Pages/streamWaders.aspx

Table 4. Maryland Physical Habitat Index – Condition Class Thresholds

Physical Habitat Index (PHI) Score Range (Paul et al. 2002)	Condition Class or Rating	Description (Roth et al. 1999)
81-100	Good/Marginally Degraded	Comparable to reference streams considered to be minimally impacted
66-80	Fair/Partially Degraded	Comparable to reference conditions, but some aspects of biological integrity may not resemble the qualities of minimally impacted streams
51-65	Poor/Degraded	Significant deviation from reference conditions, with many aspects of biological integrity not resembling the qualities of minimally impacted streams
0-50	Very Poor/Severely Degraded	Strong deviation from reference conditions, with most aspects of biological integrity not resembling the qualities of minimally impacted streams

The FCSS sites within the Sugarloaf Planning Area showed a variety of physical stream habitat conditions, from severely degraded (1 site) to degraded (3sites), partially degraded (5sites), and marginally degraded (8 sites) during Rounds 1, 2, and 3 of monitoring (2008-2011, 2013-2016, 2018-2022). As previously mentioned, conditions at these specific sites can be caused by activities in the immediate site area (e.g., livestock access to a stream without a riparian buffer), or influenced by land uses and management upstream in the watershed. See Map 6-3 for PHI scores in the Planning Area.

Water Quality

Nutrients, such as nitrogen and phosphorus, are important for life in all aquatic systems. In the absence of human influence, streams contain low background levels of nutrients that are essential for aquatic plant and animal survival. However, since European settlement, concentrations of nitrogen and phosphorus in many North American streams have increased. Anthropocentric activities such as agriculture and urbanization result in nutrient-rich runoff from fertilization, wastewater discharge, and storm water flow into streams.[3]

Elevated nitrogen and phosphorus concentrations are major contributors to nutrient over-enrichment in Frederick County streams — and all streams in Maryland. Excessive nutrient loading in aquatic systems can cause eutrophication, or excessive plant growth, and facilitate low dissolved oxygen conditions, particularly in downstream waterways and estuaries like the Potomac River and Chesapeake Bay. For example, eutrophication can cause algal blooms that lead to decreased concentrations of dissolved oxygen. After prolonged exposure, this can asphyxiate fish, shellfish, and other animals.[4]

High nitrogen levels were found in eight locations in the Bennett Creek Watershed during a 2003 nutrient synoptic survey conducted for the watershed characterization component of the Lower Monocacy River Watershed Restoration Action Strategy[5], a watershed management plan developed by the Maryland DNR, local governments, and a community-based workgroup.

All of these sites were located in the upper Bennett Creek Watershed, east of I-270, with the exception of one site just west of I-270 on the main stem of Bennett Creek within the Sugarloaf Planning Area. In the area known as Green Valley, the Bennett Creek Watershed east of I-270 has very high concentrations of well and septic residential development. Sources of nutrients in this area include fertilizers being applied to lawns in the surrounding low-density residential development, fertilizers being applied to agricultural lands in the upstream catchment area, and septic systems.[6]

Biological Condition

Biological monitoring, or biomonitoring, is the use of living organisms or their responses to determine the quality of the aquatic environment. Freshwater benthic macroinvertebrates are bottom-dwelling aquatic insects that live in water during some stage of their lifecycle and dwell on rocks, logs, sediment, debris, and aquatic plants. Stream benthic macroinvertebrates includes crustaceans (crayfish), mollusks (clams and snails), aquatic worms, and immature forms of aquatic insects such as stoneflies and mayflies. Many fishes, amphibians, shorebirds, waterfowl, and other animals forage heavily on both the aquatic and terrestrial stage of aquatic insects, which are essential to their survival.

Benthic macroinvertebrates represent an extremely diverse group of aquatic animals, with over 600 taxa known to occur in Maryland.[7] These insects have a wide range of recognized responses to stressors such as organic pollutants, sediments, and toxic chemicals and can serve as an early warning sign of declines in environmental quality. Benthic macroinvertebrates are relatively stationary and their migrations come largely from downstream drift, so they are less able to escape the effects of sediment and other pollutants that diminish water quality and degrade habitat. Therefore, benthic macroinvertebrates can serve as reliable indicators of stream condition.[8] Chemical water quality information was previously the main factor that was considered in water quality, but newer efforts have also been considering biological data for a more comprehensive understanding of water quality and overall stream health.[9]

The Benthic Index of Biotic Integrity (BIBI) is a scientific measuring tool used to identify and classify stream health based on the characteristics of the stream insects and metrics, such as pollution tolerance/intolerance; composition (diversity, abundance of organisms); population attributes such as feeding (e.g., filter, collector) and habitat preference (e.g., burrower or clinger). The multi-metric approach compares what is found at a monitoring site to what is expected using a regional baseline condition that reflects little or no human impact.[10] Biological monitoring provides insight into a stream's overall condition and ability to provide habitat, food, and shelter for aquatic organisms. The condition and health of streams is directly influenced by land cover and land use in the surrounding watershed.

Maryland's BIBI was formulated according to specific regional conditions and uses a scale ranging from 1 to 5 to facilitate statewide comparisons and to be consistent with the State of Maryland's fish IBI scores. The development of the State of Maryland's Benthic Index of Biotic Integrity can be found at: https://dnr.maryland.gov/streams/Publications/1998_Benthic-IBI.pdf

Table 5. Maryland Benthic Index of Biotic Integrity – Condition Class Thresholds

Benthic Index of Biotic Integrity (BIBI) Score Range	Condition Class or Rating	Description (Roth et al. 1999)
4.0—5.0	Good/Marginally Degraded	Comparable to reference streams considered to be minimally impacted
3.0—3.9	Fair/Partially Degraded	Comparable to reference conditions, but some aspects of biological integrity may not resemble the qualities of minimally impacted streams
2.0—2.9	Poor/Degraded	Significant deviation from reference conditions, with many aspects of biological integrity not resembling the qualities of minimally impacted streams
1.0—1.9	Very Poor/Severely Degraded	Strong deviation from reference conditions, with most aspects of biological integrity not resembling the qualities of minimally impacted streams

In the Planning Area, results of the BIBI scores from the FCSS Rounds 1, 2, and 3 included very poor conditions (2 sites), poor conditions (3 sites), fair conditions (7 sites) and good conditions (5 sites), indicative of a wide variety of in-stream habitat and riparian conditions for stream insects. See Map 6-3 for BIBI scores in the Planning Area. Additional BIBI scores from the Maryland Biological Stream Survey (MBSS) in the Planning Area show fair and poor biological conditions. See Map 6-4 for MBSS sites.

Additionally, the FCSS results included a regression analysis to examine the relationship of land use, habitat, and water chemistry parameters to the biological health of the streams, using the BIBI scores for each site sampled in Round I and Round II of the countywide survey. While the relationship of the BIBI to land use in the catchments upstream of the sample sites was not very strong, BIBI scores did significantly decrease with increasing urban and agricultural land uses. BIBI scores showed a significant increase with increasing forested land use.

Initiative 6A ***In coordination with the State of Maryland and the Frederick County Office of Sustainability and Environmental Resources, enhance biological, physical, and chemical monitoring of streams, including evaluation of physical impediments that block brook trout movement and acute "hot spots" with degraded in-stream conditions that imperil survival of coldwater aquatic communities.***

Impervious Surface

The replacement of forest and fields with impervious cover has multiple negative impacts to environmental systems. The features and functions of landscapes change when land is cleared of trees, graded, and developed. Removal of trees and their canopy, spongy topsoil and leaf litter, as well as grading and altering natural land depressions results in the loss of the land's natural capacity to absorb and store water runoff generated during rainfall and snowmelt. Compaction of soil and placement of impervious surfaces — such as roads, rooftops, parking lots, and driveways — results in the loss of the land's natural features that enable water to percolate into the soil. Impervious surfaces eliminate natural recharge areas for groundwater that feeds stream base flow. Since impervious surfaces cover natural recharge areas, more water from rainfall eventually enters the stream as surface water runoff and less as groundwater-derived base flow, which can alter stream flow and negatively impact springs, seeps, and wetlands. During the summer months, rain that falls on warm pavement is heated. This hot water can flow directly to streams via storm drains and be stressful or even fatal to stream inhabitants.

Impervious surfaces contribute to overall non-point source water pollution. Non-point source pollution originates from multiple and diffuse sources, not from a discernible or specific source of origin. For example, petroleum products or metals on roads or pesticides and fertilizers on a lawn that wash off and get carried in surface water runoff to a stream are non-point source pollutants. Compounds discharged into a stream or river from a wastewater treatment plant outfall pipe are point sources of pollution.

The location of impervious cover in a watershed is important in determining adverse impacts to a stream system. For example, paved surfaces located in the headwaters of a stream system can create greater adverse impacts on the system than paved surfaces situated farther down in the watershed of the stream system. Soil types, geology, topography, and the extent and location of vegetative cover in a watershed can also influence impervious cover impacts to waterways. As a rule, water quality decreases as impervious surface cover increases, leading to degraded stream conditions.

Current practices and regulations for stormwater runoff management utilize what is known as environmental site design. These practices are designed to achieve on-site water quality and quantity treatment and infiltration so less water from impervious surfaces run off the land. Conventional stormwater ponds are still used to manage stormwater, but to a lesser extent. The latest run-off controls use a combination of vegetation and structural practices and techniques, an approach called bioretention, in an attempt to recreate pre-development conditions and hydrology of a site.

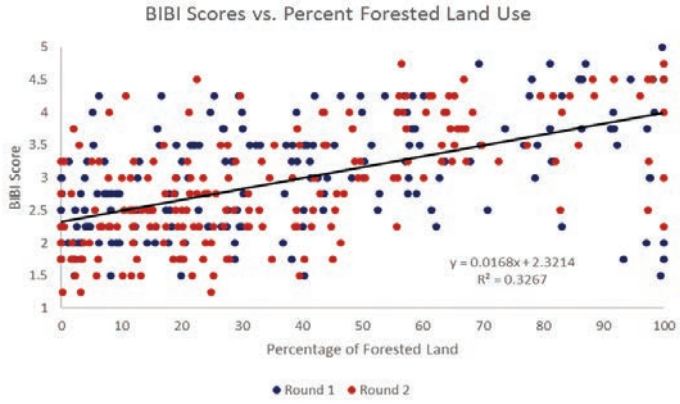


Figure 1. Relationship Between the BIBI and Forested Land Use

Regression relationship between the Benthic Index of Biotic Integrity (BIBI) and forested land use in upstream catchments, countywide, for Rounds I and II of the Frederick County Stream Survey (Versar 2017)

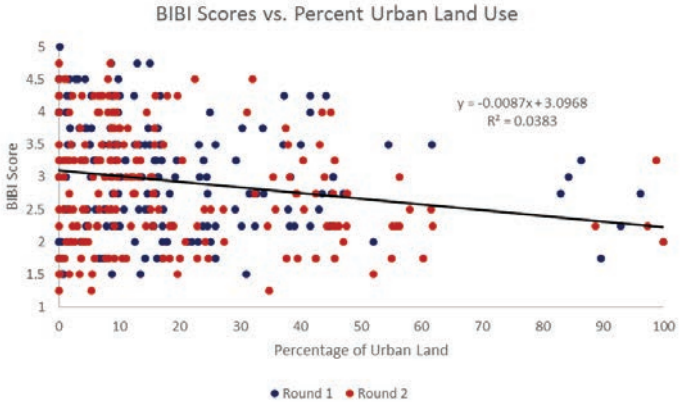


Figure 2. Relationship Between the BIBI and Urban Land Use

Regression relationship between the Benthic Index of Biotic Integrity (BIBI) and urban land use in upstream catchments, countywide, for Rounds I and II of the Frederick County Stream Survey (Versar 2017)

Policy 6.2 Minimize parallel streamside roads and road crossings of streams in all future planning, subdivision and site plan approvals, and construction designs to lessen impacts to aquatic systems from land development.

Initiative 6B Establish development standards in the Sugarloaf Planning Area to reduce impervious surfaces, stormwater runoff, and degradation of aquatic resources.

Monitoring Water Quality Impacts from Impervious Cover and Land Use

As required by the Maryland Department of the Environment (MDE), Frederick County initiated a long-term water quality monitoring program in the Peter Pan Run Watershed in 1999. Peter Pan Run originates in Urbana and is a tributary to Bush Creek, which flows into the Monocacy River at the Monocacy National Battlefield. To assess the long-term water quality impacts associated with land development in the Urbana area, the County established baseline, pre-construction stream and water quality conditions in the Peter Pan Run Watershed. The program involved monitoring and evaluating stream flow volumes, water quality in streams and from the outfalls or discharges from stormwater management facilities, and biological communities in the main stem of Peter Pan Run and its tributaries. Specifically, the Peter Pan Run study examined sedimentation and stream bank erosion from an increase in impervious surfaces, heavy metals from road and parking lot runoff, nutrient loading caused by application of lawn fertilizers, and the illegal disposal of oil and chemicals via storm drains.

With water quality conditions in Peter Pan Run documented, the County identified 15 stormwater management structures for upgrades and retrofits in the Urbana area in 2017. These projects were completed in 2019. The pollution treatment efficiencies and subsequent improvements in stream and water quality between the State stormwater management regulations in effect during the years from 1999 to

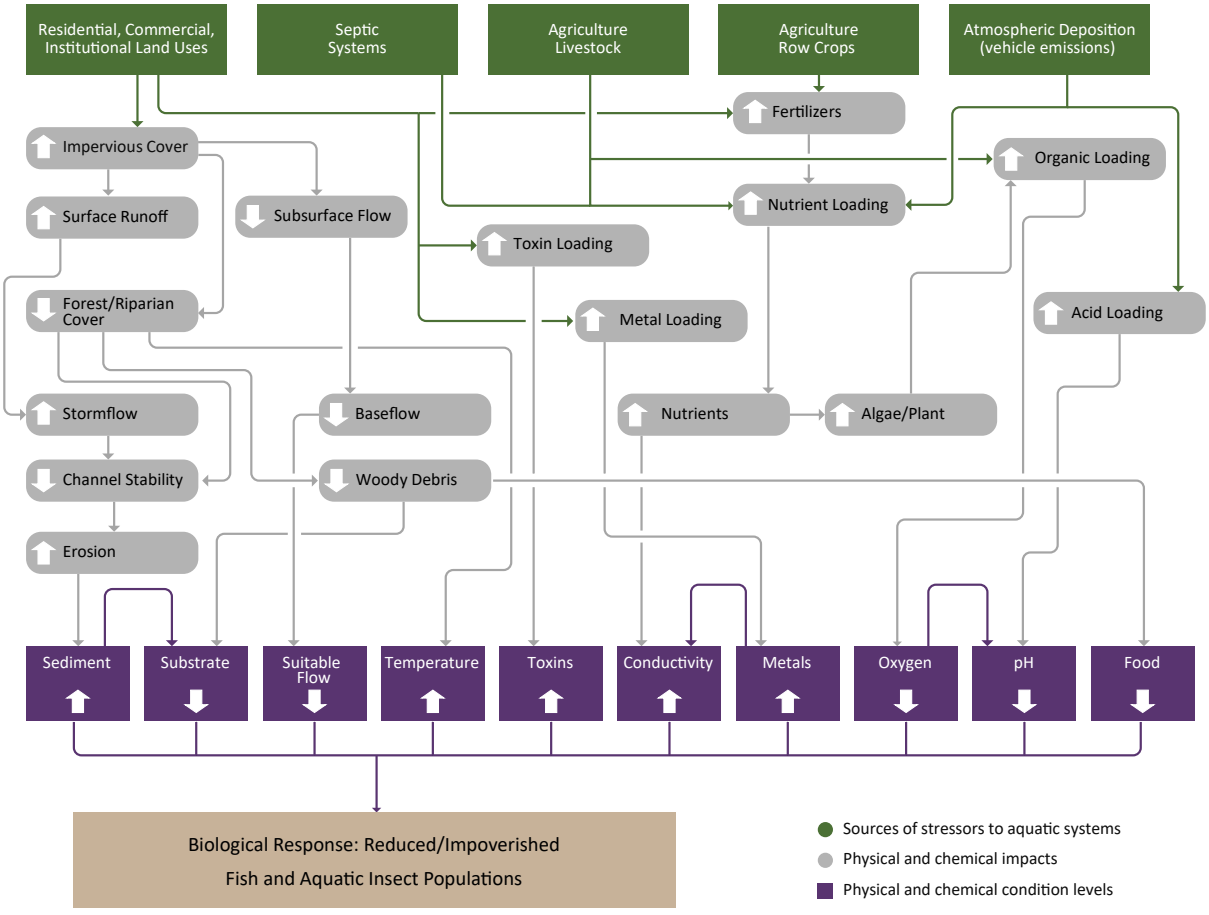
2017 and today's stormwater laws can now be analyzed. The goals of monitoring and retrofit programs are to identify the impacts of urban development on a stream and study the benefits of restoration projects on overall watershed health.

For more information and links to the 2017 and 2019 Peter Pan Run Long Term Monitoring Reports, see https://frederickcountymd.gov/7578/Water-Quality-Monitoring

Policy 6.3 Support public and private watershed restoration initiatives such as stormwater management system upgrades and retrofits, infrastructure repair, reforestation, and stream restoration projects that minimize riparian vegetation removal in the Sugarloaf Planning Area.

The following generalized Stressor Identification Index identifies how land uses can cause stress to the aquatic system, plus the chemical, physical, and biological response to such stressors. Human-induced impacts to the environment are increased when natural landscapes and land cover (e.g., forests, fields) are replaced with rooftops, roads, and parking lots. Impervious surfaces increase with development and urbanization, and can cause negative impacts on stream health, so it is important that actions be taken to combat these changes and minimize their effects, especially in the Sugarloaf Area where sensitive aquatic communities are found. Brook trout are very sensitive to landscape alterations in Maryland and disappear at low levels of impervious land cover. Locally, brook trout are rarely found in watersheds where impervious land cover exceeded 4%.[11] For more information on brook trout watersheds, see https://dnr.maryland.gov/fisheries/Documents/LandUseCharacteristics_TroutWatersheds.pdf

Figure 3. Stressor Identification Index (adapted from Tetra-Tech, 2008, Bennett Creek Watershed Assessment)



Coldwater Biological Resources in the Sugarloaf Planning Area

Water temperature is a key factor in the distribution of organisms in the aquatic environment. Coldwater streams are stream reaches that maintain year-round water temperatures that can support a coldwater aquatic community. Maximum stream temperatures of 20° C (68° F) are generally considered the thermal threshold for long-term trout survival (DNR). In Maryland, coldwater biological communities are identified by the presence of reproducing trout (brook, brown, and rainbow) and/or obligate coldwater benthic macroinvertebrate, such as the stonefly taxa, *Tallaperla* and *Sweltsa*.

These coldwater species have a narrow range of required environmental conditions and are more sensitive to alterations in temperature, stream flow, and water quality. Their presence in a stream indicates a watershed with minimal land use impacts and high water quality conditions. Forested land cover within a catchment is the overall best landscape-scale predictor of brook trout occurrence at a given site, with measures of impervious land cover and urbanization also important predictors.[12] Several watersheds in the Sugarloaf Planning Area currently support coldwater resources, based upon monitoring data from the Maryland DNR Freshwater Fisheries Program and the Frederick County Stream Survey. These streams support a combination of naturally reproducing brook trout populations and obligate coldwater benthic macroinvertebrates. See Map 6-2 for cold water resource monitoring.

Brook trout in Maryland are valuable for cultural, recreational, economic, and biological reasons. They represent the only native trout species in the State. Because of their habitat, brook trout are typically found in the more environmentally pristine areas of Maryland.[13] Anthropogenic alterations to Maryland's environment over the last several centuries including clear cutting of forests, establishing large agricultural areas, and urbanization have resulted in the extirpation of brook trout from 62% of their historic habitat in Maryland.[14]

Silt-free, spring-fed streams that contain mixed gravels, cobbles, and sand with some deep-water areas characterize ideal brook trout habitat. Benthic macroinvertebrates need the space between and beneath gravel and cobble substrate on the stream bottom for attachment sites, feeding areas, and shelter from predation. Keeping sediment inputs to streams at low levels through fine-scale, protective buffering of flow paths and natural landscape drainage networks in the Sugarloaf Planning Area will help ensure that stream habitat areas are available for brook trout and benthic macroinvertebrates.

Across the Mid-Atlantic Region, the number streams that support coldwater biological communities has been greatly reduced due to an increase in water temperature and degraded water quality caused by development and land use changes. Habitat loss and local extinctions of fish and other aquatic species are projected from the combined effects of increased water withdrawal and climate change.[15]

Policy 6.4 Maintain high-quality watershed conditions to sustain coldwater biological communities.

Aquatic research has been employed to evaluate the status and condition of biological resources in waterways within the Sugarloaf Planning Area. The Sugarloaf Treasured Landscape Management Plan promotes a commitment to conserving and enhancing aquatic resources and biological communities in the Sugarloaf Area by identifying the following watersheds as Sugarloaf Resource Watersheds of Concern. Due to having the highest quality waters and extensive forest resources, the majority of the Resource Watersheds have high potential for degradation from the effects of various land uses, conversions, and development activities. This designation will focus attention and actions to maintain a high-quality environment and the long-term sustainability of the Resource Watersheds and, concomitantly, the rural landscape and character of the community. See Map 6-5 for the Sugarloaf Resource Watersheds of Concern.

The following guidelines and best practices will provide a high level of environmental mitigation for any potential future development or land use conversion, not just in the Resource Watersheds of Concern, but in all watersheds:

- Close examination of all aquatic system components, including zero and first-order streams, including field verification if necessary, to determine necessary protective or expanded riparian buffering.
- Utilization of stormwater best management practices for future development that include structures, devices, or designs that provide the highest level of stream channel and water quality protection, and reduce thermal impacts to receiving streams.
- Enhanced protection of the FEMA floodplain to reduce the risk of harm to property and life.

Table 6. Sugarloaf Resource Watersheds of Concern

Watershed	Size (ac.)	Forest Cover (ac.)	Forest Cover (%)	Impervious Surface (ac.)	Impervious Surface (%)
Bear Branch	865.5	787.4	90.9%	12.7	1.4%
Furnace Branch*	2,094.9	1,696.1	80.9%	24.3	1.1%
Little Bennett Creek Subwatershed	813.2	599.1	73.6%	9.4	1.1%
Bennett Creek Subwatershed 1	378.0	313.6	82.9%	2.0	0.553%
Bennett Creek Subwatershed 2	469.0	316.5	67.4%	7.1	1.5%
North Branch	918.4	238.2	25.9%	49.9	5.4%
Urbana Branch	1,280.0	367.3	28.6%	109.6	8.5%
Urbana Branch within the Sugarloaf Planning Area	1,076.4	353.1	32.8%	51	4.7%

*Extends into Montgomery County, Maryland

Initiative 6C ***Engage the Division of Public Works' Highway Operations Division in a critical examination of the need and use of road salt within the Sugarloaf Resource Watersheds of Concern in order to protect high quality waters that support brook trout and coldwater aquatic organisms from the threat of elevated chloride levels.***

Brook Trout Watersheds - Bear Branch and Furnace Branch

Bear Branch, the only pristine trout-bearing stream in all of the Lower Monocacy River Watershed, is located in the Sugarloaf Planning Area. Two watersheds with the Sugarloaf Planning Area (Furnace Branch and Bear Branch), are designed Use Class III-P, Natural Trout Waters and Public Water Supply. The remaining streams in the District are Use Class I-P, Water contact recreation. Based on biological monitoring and stream temperature data, additional streams in the Sugarloaf Planning Area are anticipated to be redesignated to Use Class III. This designation will afford additional in-stream habitat protections related to time-of-year prohibitions for stream crossings and construction activities. (See Maryland's Designated Use Classes for Surface Waters on page 74 and on Map 6-6.)

Policy 6.5 Protect sensitive aquatic resources, including brook trout populations, in Bear Branch Watershed.

Policy 6.6 Support efforts to achieve Tier III Use Class Status for additional streams in the Sugarloaf Planning Area and ensure that the unique high-quality features of these streams are maintained.

Stream Categories

Five categories of streams are defined based on how much impervious surface exists in their upstream catchment:

- Excellent – less than 4% impervious surface in the upstream catchment
- Sensitive – 4% to 10% impervious surface in the upstream catchment, are generally able to maintain their hydrologic function and support good to excellent aquatic diversity
- Impacted – 10% to 25% impervious surface in the upstream catchment, show clear signs of declining stream health
- Non-supporting – 25% to 60% impervious surface, no longer support their designated uses in terms of hydrology, channel stability, habitat, water quality, or biological diversity
- Urban drainage – greater than 60% impervious surface, functions basically as a conduit for rainfall or flooding events and consistently have poor habitat and biodiversity scores

Source: Shueler, T., L. Fraley-McNeal, and K. Cappiella. 2009. Is Impervious Cover Still Important? A Review of Recent Research. Journal of Hydrologic Engineering. April 2009

Table 7. Brook Trout Populations, Bear Branch Watershed – Mt. Ephraim Road (Maryland DNR)

Year	Adult	Young	Total
1992	26	6	32
2001	7	0	7
2008	4	0	4
2010	8	9	17
2014	4	25	29
2018	17	25	42

Furnace Branch was stocked with wild brook trout by Maryland DNR in the late 1970s. These trout were able to survive for several years, but chronically elevated summer temperatures prevented their long-term survival. Subsequent monitoring surveys by the DNR in the last 15 years have not collected any brook trout from Furnace Branch. Automated stream temperature sampling data including over 6,000 samples in 2019 showed a greater percentage of samples exceeding the brook trout thermal threshold (20° C) in Furnace Branch compared to Bear Branch, which maintains a reproducing brook trout population. The monitoring data is evidence that watersheds with coldwater biological resources have fewer temperature readings over the critical level, which positively impacts the survival capacity of a local brook trout population.

Table 8. Brook Trout Temperature Exceedance for Furnace Branch and Bear Branch

Stream	Percentage >20°C (68°F)	Percentage >21°C (69.8°F)	Percentage >22°C (71.6°F)	Percentage >23°C (73.4°F)
Bear Branch	11.4%	1.7%	0%	0%
Furnace Branch	29.9%	11.2%	2.5%	0%

Data from 2019 monitoring period (June 1 –August 31). Values depict percentage of observations above specific temperature values. Remaining percentages represent temperatures below 20° C. (Maryland DNR)

Although the Furnace Branch is a large watershed with high forest cover (80.9%) and low impervious cover (24.3 acres or 1.1% of the entire watershed), and had good water quality as measured by the high BIBI scores and good physical habitat scores from the FCSS (see Map 6-3), brook trout have not remained viable within the streams in the watershed. Additional monitoring of streams and their structure in the Furnace Branch Watershed — plus the extent of forest buffering around streams and identified springs, seeps and wetlands, especially in agricultural headwater areas — is warranted. Through implementation of policies and initiatives contained in this Plan to improve water quality in the Sugarloaf Planning Area, the goal of returning a sustainable population of brook trout to the Furnace Branch Watershed can be achieved.

Policy 6.7 Improve and restore aquatic habitat and biological diversity, including brook trout populations, in the Furnace Branch Watershed.

Initiative 6D ***Continue engagement with and support of the Eastern Brook Trout Joint Venture, a unique partnership between state and federal agencies, regional and local governments, businesses, conservation organizations, academia, scientific societies, and private citizens working toward protecting, restoring, and enhancing brook trout populations and their habitats across their native range.***

Urbana Branch Watershed

Population, development, and impervious cover within this watershed are the highest in the entire Sugarloaf Planning Area. Forest cover in this watershed is relatively low at 28.6%. In 2012, 74 acres within this watershed were rezoned from Agricultural to R-1 Residential, resulting in the creation and development of 32 residential lots. This development project added approximately 5.6 acres of impervious surface to the watershed based on recent GIS analysis using an impervious footprint of 4,500 square feet per lot that includes a house, parking area, driveway, plus impervious cover of 0.50 of subdivision street right-of-way. Planned high density development within the Urbana Community Growth Area and potential development areas around the MD 80/I-270 interchange, both within the headwaters of Urbana Branch, will further increase the levels of impervious cover within the most sensitive portion of the watershed in the future. For these reasons, Urbana Branch Watershed is designated a Resource Watershed of Concern.

Three locations in Urbana Branch Watershed were evaluated in 2003 through the State's "Stream Waders" program, a volunteer monitoring effort used to supplement the larger Maryland Biological Stream Survey. DNR conducted monitoring in Urbana Branch Watershed in 2020 (see Map 6-2). Additional water quality monitoring is warranted to assess the health of Urbana Branch Watershed to: obtain baseline data of aquatic conditions in a watershed with current 8.5% impervious cover; track environmental changes in the streams over time; evaluate the general effectiveness of upstream stormwater management systems; and study the benefits of focused efforts to increase forest cover in the watershed.

Headwater Stream

Water in streams comes from several sources including: water held in soil adjacent to stream banks and riparian areas, runoff from precipitation, and groundwater. Rivers, lakes, and streams originate from countless numbers of very small streams and wetlands, many of which are so small they do not appear on maps. This network of small streams and their associated complexes, whose waters join together above and below ground, flow down gradient, eventually growing larger and intersecting with rivers. Headwater streams, also called channel heads, rills, rivulets, drainage swales, depressions, flow paths, and seeps, act as the primary conduits of water, sediment, nutrients, and other materials to larger streams in a watershed during rainfall and snowmelt events. Regardless of discharge permanence, headwater channels dictate the delivery of sediments, nutrients, and pollutants to downstream waters. Knowledge of their location is critical to understanding watershed processes, and evaluating human and ecological values of stream channels (Meyer, et al.).

Headwaters comprise most of the total length of an entire stream system. Meyer, et al. (2003) reported that 20% or less of the actual stream network is shown on USGS maps, and that topographic maps commonly used as catalogues of stream networks are not detailed enough to serve as a basis for stream management and protection. Because of their prevalence on the land, headwater streams — and associated wetlands and springs — are connected with, and drain, large land areas. Thus, these small streams have much interaction and interface with the surrounding terrestrial landscape.

Headwater streams and their associated wetland and spring linkages:

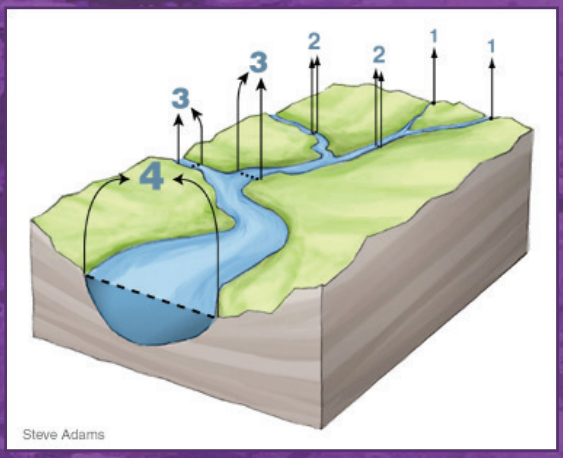
- Capture, store, and hold rainwater, thus reducing flooding threats to people and property. Headwater wetland complexes recharge aquifers by slowly releasing water into streams and groundwater. This is critically important for households and businesses relying on wells for drinking water.
- Trap excess sediment. Healthy and intact headwater systems can modulate the amount of sediment transported to downstream ecosystems. Wetland areas associated with headwater streams — or wetlands without a surface connection to a nearby stream — are areas where rainwater and stormwater runoff slows, allowing for the settling of sediment and debris carried in the water.
- Modify and transform potential pollutants. Water volumes in small headwater streams have more "contact" with a stream channel and stream bed, where microorganisms, bacteria, and fungi live. These organisms consume, transform, and reduce nutrients. They also colonize leaf and limb litter, creating food sources for other larger stream organisms like mayflies, frogs, and fish.

Headwater streams convey water and nutrients to larger streams and, despite their relatively small dimensions, play a disproportionately large role in nitrogen transformations on the landscape (Peterson, et al. 2001). Restoration and preservation of small stream ecosystems should be a central focus of management strategies to ensure maximum nitrogen processing in watersheds, which in turn will improve the quality of water delivered to downstream lakes, estuaries, and oceans (Peterson, et.al 2001).

If connections between soil, surface waters, and groundwater are disrupted — as from impervious surfaces and land development — water levels in streams, rivers, and groundwater can be reduced, imperiling aquatic organisms. Impervious surfaces increase the amount of precipitation that runs off the ground and lessen the amount of rainfall that soaks into the soil, short-circuiting the groundwater recharge process.

The entire Sugarloaf Planning Area contains countless headwater streams that populate and drain the landscape, linking the terrestrial with the aquatic. Headwater protection will sustain critical environmental functions, such as base flow maintenance of these aquatic systems, wetland and groundwater recharge, efficient nutrient cycling, and aquatic habitat conservation. Through expanded buffering and protection measures for the Sugarloaf headwater system, increases in water pollution, stream erosion, and sedimentation will be minimized and prevented.

Sources: Control of Nitrogen Export from Watersheds by Headwater Streams, Science 06 Apr 2001: Vol. 292, Issue 5514, pp. 86-90 DOI: 10.1126/science.1056874 Meyer, J. L., L. A. Kaplan, J. D. Newbold, D. L. Strayer, C. J. Woltemade, J. B. Zedler, R. Beilfuss, Q. Carpenter, R. Semlitsch, M.C. Watzin, and P. H. Zedler (2003): Where rivers are born: The scientific imperative for defending small streams and wetlands. Sierra Club and American Rivers.



The Strahler Stream Order system. First-order streams (1), also called headwater streams, can join another first-order stream to become a second-order stream (2). Further merging results in additional stream orders with ascending numbers (3, 4, etc.). Credit: Steve Adams, Minnesota DNR

Table 9. Urbana Branch Watershed – Stream Waders Biological Monitoring

Site No. (Maryland DNR)	Location	Benthic Index of Biotic Integrity (BIBI)
224-1-2003	West side Thurston Road, 0.60 miles north of Dixon Road	1.85 – Poor
224-2-2003	East of Virginia Lane	3.00 –Fair
224-4-2003	West side of Thurston Road, 0.60 miles north of Dixon Road	1.57 --Poor

Geographic Information Systems (GIS) analysis shows two watersheds in the northern portion of the Planning Area that have higher levels of impervious cover than the brook trout threshold of 4%: North Branch (5.4%) and Urbana Branch (8.5%). While still within the "sensitive" category based on Schueler, et al (2009), these two watersheds have the lowest proportional forest cover of any Resource Watershed in the Sugarloaf Planning Area. The Sugarloaf Treasured Landscape Management Plan promotes efforts to increase forest cover in all of its watersheds, with special focus on the Urbana Branch and North Branch watersheds through the incentive programs described within Chapter VII, Forestlands, Green Infrastructure, and Biodiversity.

Policy 6.8 Focus existing incentive programs in the Urbana Branch and North Branch Watersheds to expand and increase the amount of forest cover to address environmental and climate resilience and aid in water quality protection.

Policy 6.9 Examine quantities of groundwater requested by large-scale commercial and institutional uses through the MDE groundwater appropriation and use permitting process in order to maintain springs and seeps, and to ensure stream base flows needed for sensitive cold-water aquatic biota and protection of nearby private residential wells.

The sensitive coldwater biological resources in the Sugarloaf Area of southern Frederick County highlight the quality of these minimally impacted watersheds, where development densities and impervious cover are very low and forest cover is high. Heavily forested watersheds often represent areas with the least impacts from human development or that have had enough time to recover from historic disturbances. Many high-quality streams have evolved in response to the forest or native cover of their subwatersheds, and have unique habitat conditions that support trout or spawning anadromous fish.[18]

Establishing new forestlands and enhancing riparian buffers along all waterways in the Sugarloaf Planning Area will help ensure the continued presence of high-quality waters in the Planning Area. Buffering and protecting springs, seeps, and headwater stream areas will enable cold groundwater to keep downstream temperatures low during summer months, and help maintain and support coldwater biological resources. Riparian buffers provide additional environmental benefits such as bank stabilization, addition of woody debris and leaf matter to the stream for habitat and food, uptake of nutrients, and the provision of shade to modulate water temperatures.

Additionally, minimizing the overall loss of forest cover through land use management and refining the standards for timber harvesting to enhance preservation of high-quality waters and critical breeding areas for Forest Interior Dwelling Bird species will protect natural resources, maintain the area's rural landscapes, and improve overall environmental quality.

Initiative 6E ***Preserve and enhance environmental functions, such as flood control, temperature modulation, and downstream water quality protection, by enhancing the buffering of aquatic systems, including headwater areas and mapped natural flow and drainage paths.***

Initiative 6F ***Establish a physical, chemical, and biological water quality monitoring program for the Urbana Branch Watershed to assess current conditions and evaluate the effects of land use change on stream quality.***

Policy 6.10 Support efforts for implementing conservation practices on all agricultural lands, including livestock exclusion from streams, wetland protection and enhancement, and regenerative agricultural practices to sequester carbon and increase soil and water health.

1,2 Paul, M.J., J.B. Stribling, R.J. Klauda, P.F. Kayzak, M.T. Southerland, and N.E. Roth. 2002. A Physical Habitat Index for Freshwater Wadeable Streams in Maryland. Prepared by Tetra Tech Inc., Owings Mills, MD; Versar, Inc., Columbia, MD; and Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division

3,4 Versar, Inc. 2017. Frederick County Stream Survey 2013-2016 Four Year Report. Prepared by Versar, Inc., Columbia, MD for Frederick County Office of Sustainability and Environmental Resources.

5, 9 https://dnr.maryland.gov/waters/Pages/Watershed-Action-Strategy.aspx

6 Maryland Department of Natural Resources (MDDNR), Watershed Services, Landscape and Watershed Analysis, Management Studies. 2003b. Report on Nutrient Synoptic Survey in the Lower Monocacy River Watershed Restoration Action Strategy, Frederick County, Maryland, April 2003 as part of the Watershed Restoration Action Strategy. Maryland Department of Natural Resoruces, Annapolis, MD in Tetra Tech, Inc. 2008. Bennett Creek Watershed Assessment. Prepared by Tetra Tech, Incorporated for the Frederick County Division of Public Works.

7 Jessup. B.K., A. Markowitz, J.B. Stribling, E. Friedman, K. Labelle, N. Dziepak. 2003. Family-level Key to the Stream Invertebrates of Maryland and Surrounding Areas, 3rd edition. Maryland Department of Natural Resoruces, Chesapeake Bay and Watershed Programs, Monitoring and Non-Tidal Assessment Division. CBWP-MANTA-EA-99-2.

8 Roth, N.E., M.T. Southerland, G. Mercurio, J.C. Chaillou, P.F. Kazyak, S.S. Stranko, A.T. Prochaska, D.G. Heimbuch, and J.C. Seibel. 1999. State of the Streams: 1995-1997 Maryland Biological Stream Survey Results. Prepared by Versar, Inc., Columbia, MD and Post, Buckley, Schuh, and Jernigan, Inc., Bowie, MD for the Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division

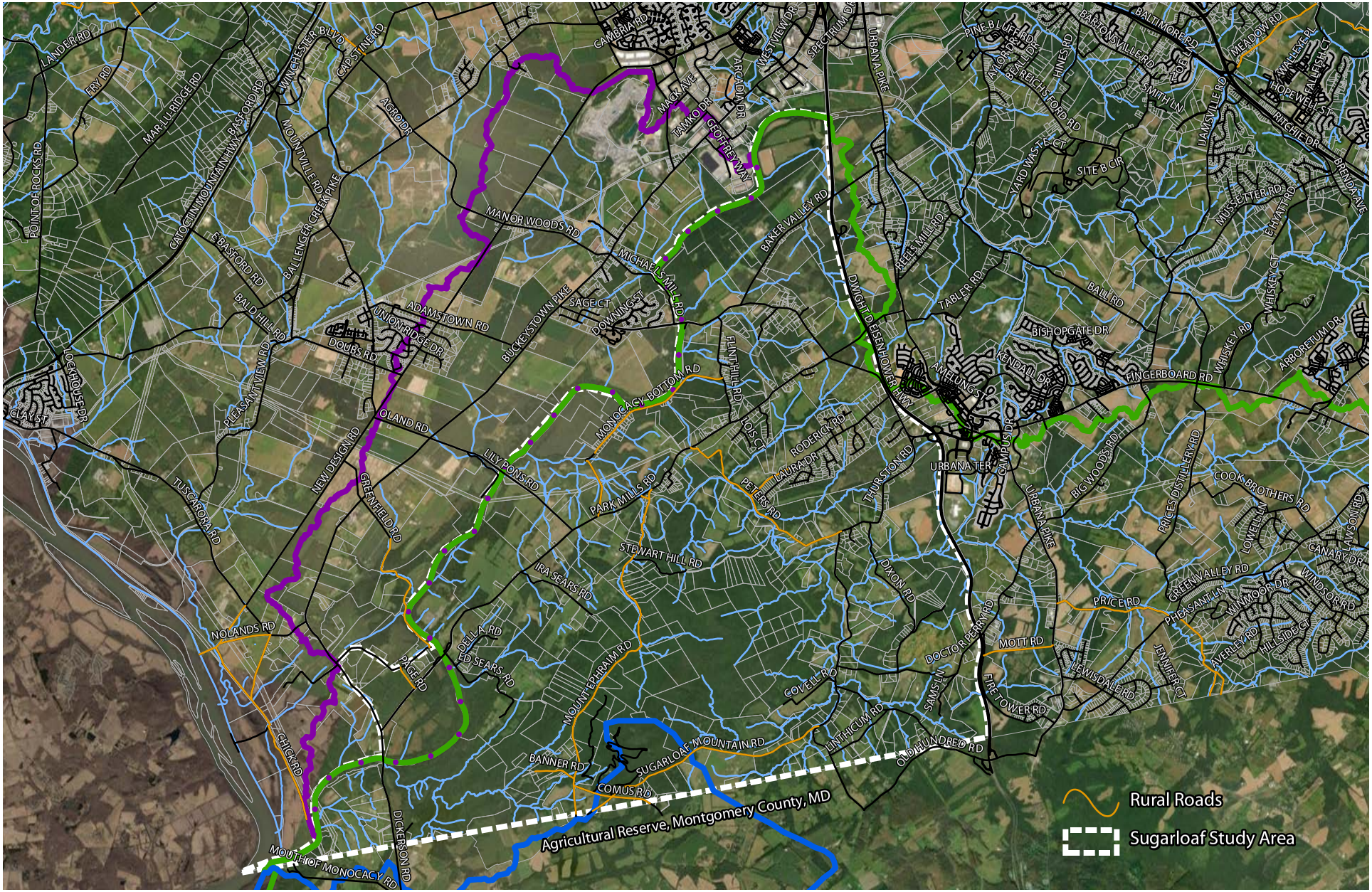
10 Karr, J.R. 1996b. Rivers as Sentinels: Using the biology of rivers to guide landscape management in RJ. Naiman and R.E. Bilby, eds. The Ecology and Management of Streams and Rivers in the Pacific Northwest Coastal Ecoregion. Springer-Verlag, New York.

11 Stranko, S.A., R.H. Hilderbrand, R.P. Morgan, M.W. Staley, A.J. Becker, A. Roseberry-Lincoln, E.S. Perry, and P.T. Jacobson. 2008. Brook Trout Declines with Land Cover and Temperature Changes in Maryland. North American Journal of Fisheries Management. 28: 1223-1232.

12, 13 Maryland Department of Natural Resources, Inland Fisheries Management Division. 2006 Maryland Brook Trout Fisheries Management Plan, A. Heft (eds.), Annapolis, Maryland

14 Spooner, D.E., M.A. Xenopoulos, C. Schneider, and D.A. Woolnough, 2011: Coextirpation of host-affiliated relationships in rivers: The role of climate change, water withdrawal, and host-specificity. Global Change Biology, 17, 1720-1732, doi: 10.111/j.1365-2486.2010.02372.x.

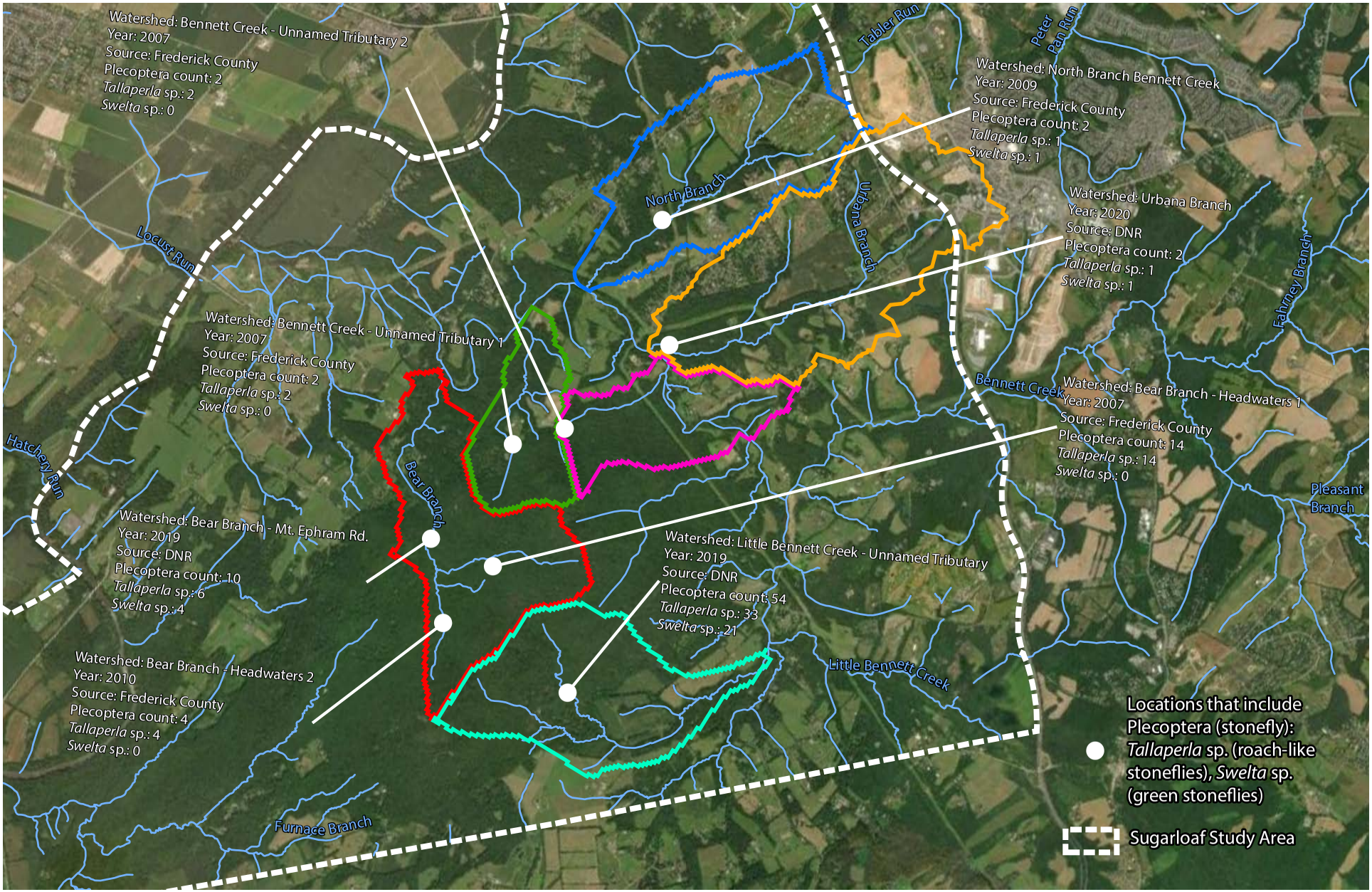
15, 16 Chesapaeake Stormwater Network. 2011. Technical Bulletin No. 3, Implications of the Impervious Cover Model: Stream Classification, Urban Subwatershed Management and Permitting.



Watersheds

- Monocacy Direct Southwest
- Bennett Creek (Extends into Montgomery County, Maryland)
- Little Monocacy River watershed (Extends into Montgomery County, Maryland)

Map 6-1

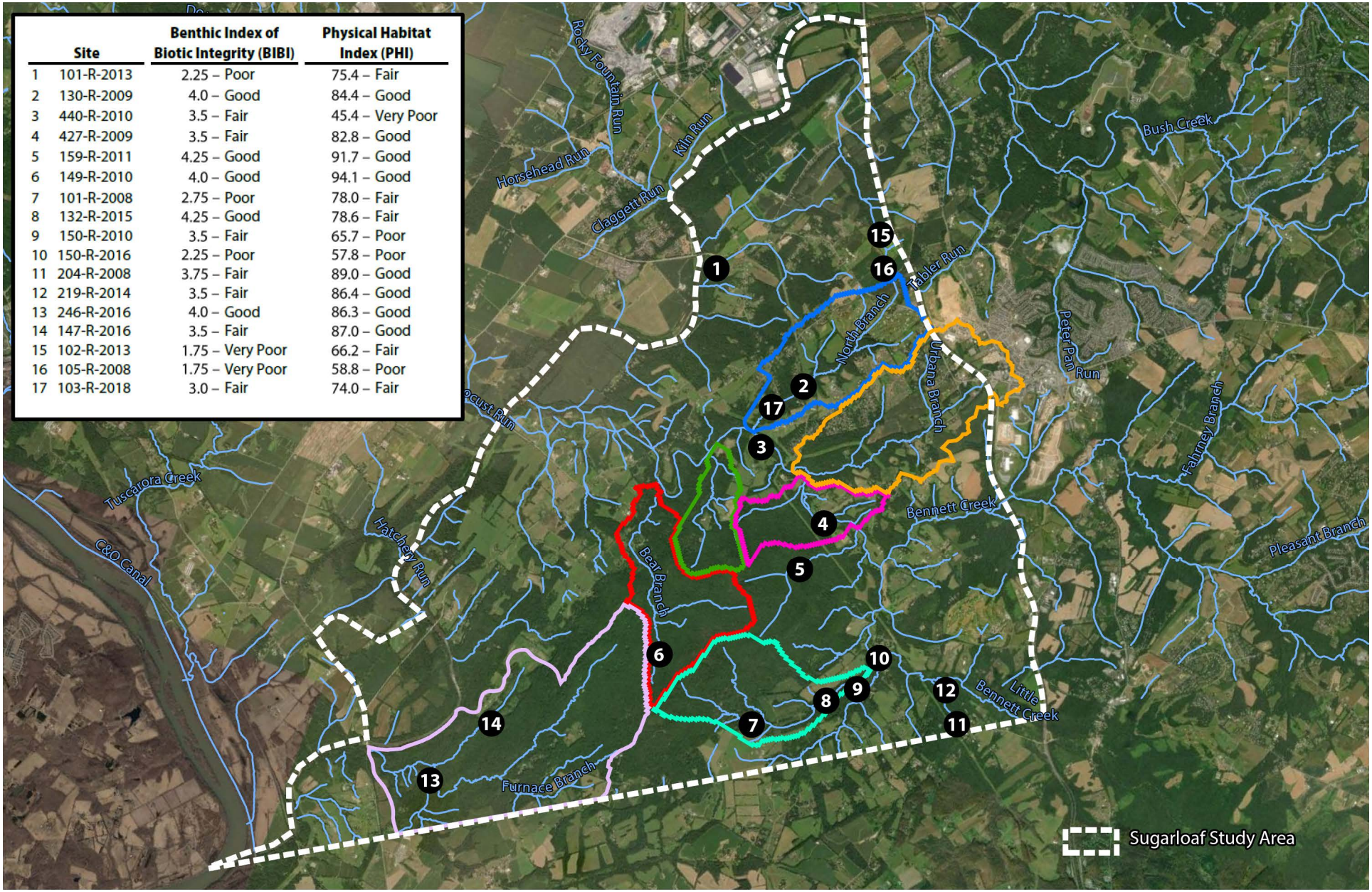


Aquatic Monitoring Sites - Coldwater Resources

Bear Branch Watershed
Bennett Creek Subwatershed 1
Bennett Creek Subwatershed 2
Little Bennett Creek Subwatershed
North Branch Watershed
Urbana Branch Watershed

Source: Maryland Department of Natural Resources, Frederick County

Map 6-2



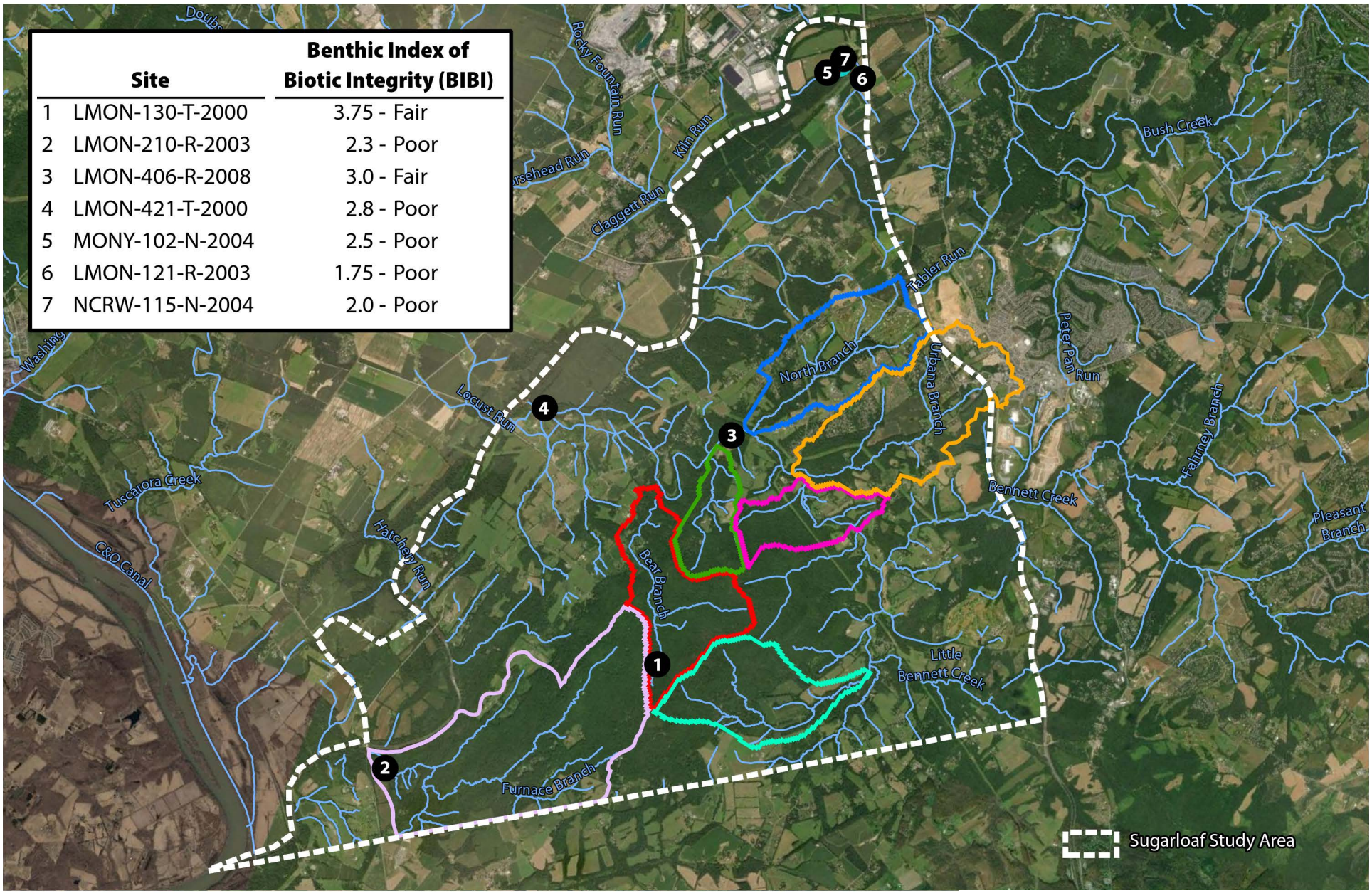
	Site	Benthic Index of Biotic Integrity (BIBI)	Physical Habitat Index (PHI)
1	101-R-2013	2.25 – Poor	75.4 – Fair
2	130-R-2009	4.0 – Good	84.4 – Good
3	440-R-2010	3.5 – Fair	45.4 – Very Poor
4	427-R-2009	3.5 – Fair	82.8 – Good
5	159-R-2011	4.25 – Good	91.7 – Good
6	149-R-2010	4.0 – Good	94.1 – Good
7	101-R-2008	2.75 – Poor	78.0 – Fair
8	132-R-2015	4.25 – Good	78.6 – Fair
9	150-R-2010	3.5 – Fair	65.7 – Poor
10	150-R-2016	2.25 – Poor	57.8 – Poor
11	204-R-2008	3.75 – Fair	89.0 – Good
12	219-R-2014	3.5 – Fair	86.4 – Good
13	246-R-2016	4.0 – Good	86.3 – Good
14	147-R-2016	3.5 – Fair	87.0 – Good
15	102-R-2013	1.75 – Very Poor	66.2 – Fair
16	105-R-2008	1.75 – Very Poor	58.8 – Poor
17	103-R-2018	3.0 – Fair	74.0 – Fair

Aquatic Monitoring Sites – Frederick County Stream Survey

Bear Branch Watershed
Bennett Creek Subwatershed 1
Bennett Creek Subwatershed 2
Furnace Branch Watershed *
Little Bennett Creek Subwatershed
North Branch Watershed
Urbana Branch Watershed

* extends into Montgomery County

Map 6-3



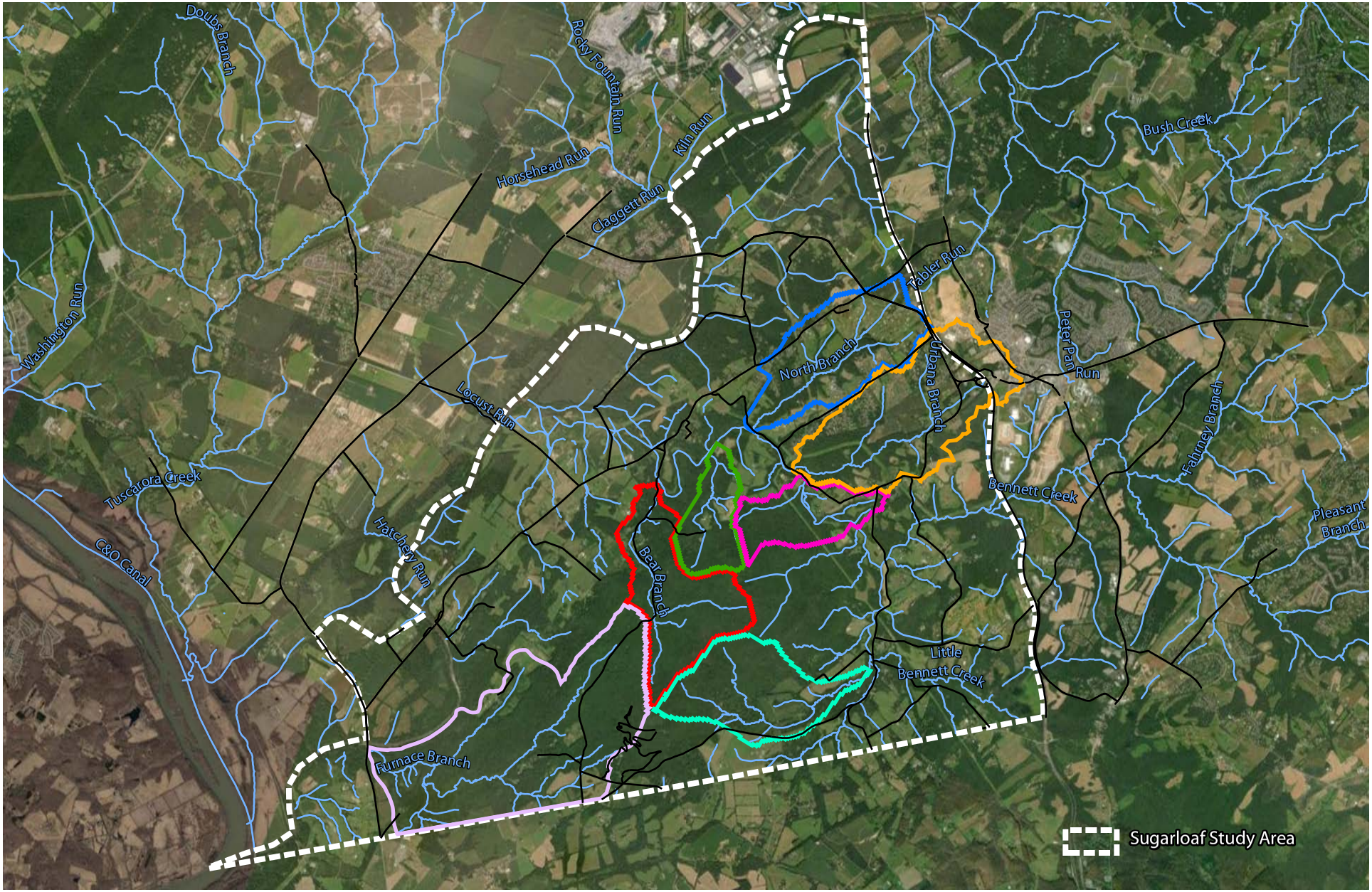
	Site	Benthic Index of Biotic Integrity (BIBI)
1	LMON-130-T-2000	3.75 - Fair
2	LMON-210-R-2003	2.3 - Poor
3	LMON-406-R-2008	3.0 - Fair
4	LMON-421-T-2000	2.8 - Poor
5	MONY-102-N-2004	2.5 - Poor
6	LMON-121-R-2003	1.75 - Poor
7	NCRW-115-N-2004	2.0 - Poor

Aquatic Monitoring Sites – Maryland Biological Stream Survey (MBSS) – Maryland Department of Natural Resources

Bear Branch Watershed
Bennett Creek Subwatershed 1
Bennett Creek Subwatershed 2
Furnace Branch Watershed *
Little Bennett Creek Subwatershed
North Branch Watershed
Urbana Branch Watershed

* extends into Montgomery County

Map 6-4

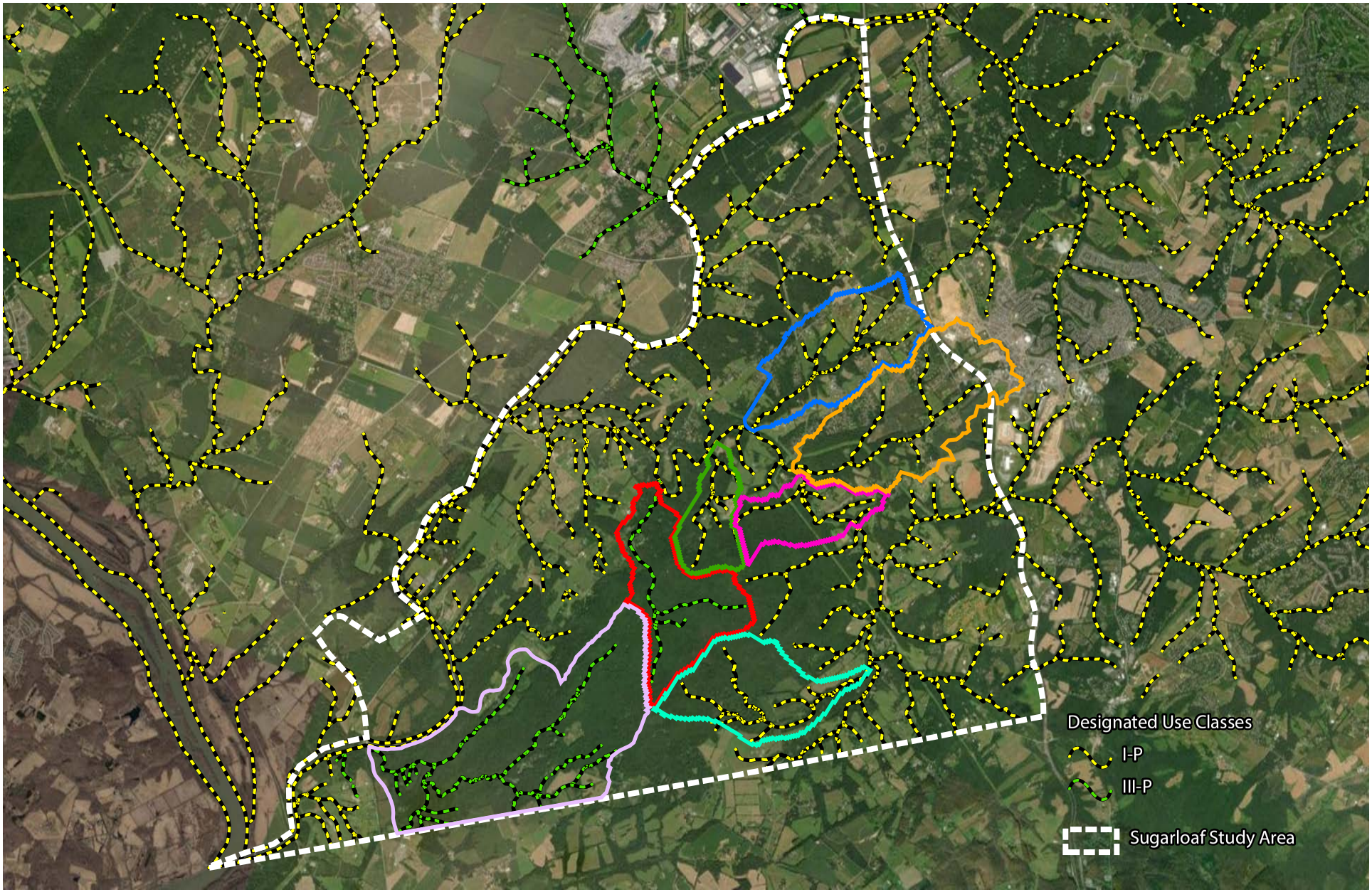


Resource Watersheds of Concern

- Bear Branch Watershed
- Bennett Creek Subwatershed 1
- Bennett Creek Subwatershed 2
- Furnace Branch Watershed *
- Little Bennett Creek Subwatershed
- North Branch Watershed
- Urbana Branch Watershed

* extends into Montgomery County

Map 6-5



Designated Use Classes For Maryland's Surface Waters – Maryland Department of the Environment

Bear Branch Watershed
Bennett Creek Subwatershed 1
Bennett Creek Subwatershed 2
Furnace Branch Watershed *
Little Bennett Creek Subwatershed
North Branch Watershed
Urbana Branch Watershed

* extends into Montgomery County

Map 6-6

Chapter 7

Forestlands, Green Infrastructure, and Biodiversity

3.2.2.2 Support the multiple benefits of forested conditions that can be sustained over time in a cost-effective manner through viable forest products markets and good forest management.

4.1.1.1 Develop and implement a function green infrastructure plan to protect, connect, and enhance the county's natural assets and support their role in ensuring future resiliency in the county.

Prior to European settlement, about 95% of Maryland's six million acres of land was covered in forest. Today, forest cover is around 40%. In Maryland's early post-colonial history, forest loss was due to primarily agricultural conversion. In the early part of the 20th century, many marginal farms were abandoned and reverted to forest. However, in the last half of the century, urban development replaced an estimated 7,200 acres of forestland per year (Maryland DNR). Maryland's trees and forests are the foundation for native wildlife, recreation, and scenic beauty. Forests also support healthy streams, fish and wildlife habitat, and clean air. Forests provide renewable natural resources for rural economies, forest product companies, and wood manufacturing, as well as supplying wood for heat. Maryland faces many challenges in sustaining ecologically functional and economically viable forests in the face of rapid urban development and other threats, such as pests, disease, and wildfire.[1]

The Sugarloaf Planning Area is 19,719 acres in size. Forest cover is 55.4% of this total, or 10,931 acres. See Map 7-4 for identification of the forest cover in the Sugarloaf Planning Area. The contiguous and unfragmented condition of the vast majority of these forestlands provides exceptional landscape quality and environmental benefits, such as watershed protection and wildlife habitat. Additionally, many stream valleys and other areas within the Sugarloaf Planning Area have large amounts of forest. Forest cover and growth on the landscape is generally shaped by soil type, climate, topography, disturbance frequency (pests, disease, fire), and human activity.[2]

The forested landscape in the Sugarloaf Planning Area is a living testament to its ecological history, scenic beauty, and natural resource significance. Evolutionary processes over millennia and decades of land management for the long-term health and sustainability of the forests by the largest landowners, Stronghold, Incorporated and Maryland DNR, have contributed to the rich landscapes and exceptional habitat in the Sugarloaf Planning Area. The vast forestlands in the Sugarloaf Planning Area provide air and water quality protection, biodiversity, aesthetic inspiration, and physic sustenance. They have inherent worth and intrinsic value.

Green Infrastructure

The Sugarloaf Planning Area contains part of the State's Green Infrastructure Network. Green Infrastructure describes an area's significant natural resource base — the mountains, forestlands, wetlands, and natural landscapes (hubs) — and the connections between them (corridors). The State's Green Infrastructure Hub within the Sugarloaf Planning Area contains approximately 5,600 acres, as shown on Map 7-5. These significant natural resource lands within the Sugarloaf Planning Area have county, state, and region-wide environmental, cultural, and historical significance.

The Conservation Fund describes Green Infrastructure as an interconnected network of natural areas and other open spaces that conserves natural ecosystem functions, sustains clean air and water, and provides a wide array of benefits to wildlife and people. Green Infrastructure areas are environmentally rich and valuable areas, providing multiple ecosystem benefits or "services," such as:

Peters Road

- Storing and cycling nutrients
- Filtering and cooling water in streams and aquifers
- Conserving and generating soils
- Pollinating crops and other plants
- Sequestering carbon and purifying the air
- Protecting property from storm and flood damage
- Providing wildlife habitat

Green Infrastructure is defined as more than just open space, agricultural land, parks, or land not yet developed. Green Infrastructure emphasizes the linkages and connections between natural resource features and promotes the ecological processes of the natural environment. Conservation Biology principles and their application to Green Infrastructure hubs and corridors emphasize that interconnected blocks of habitat are better than isolated blocks, and that larger forest patches are better than smaller patches. Protecting biodiversity and natural systems is the broader goal of Green Infrastructure.

Green Infrastructure hubs are large natural areas that provide habitat for animal and plant species, as well as other environmental processes. Many species require large, unbroken tracts of forest, offering deep interior forest conditions, to carry out some portion of their life cycle. These are called FIDS — Forest Interior Dwelling Species. For example, many songbirds depend on Maryland's interior forests. Some of them are neotropical migrants, whose summer habitat here and winter habitat in tropical areas are increasingly threatened. Many unique and rare plant and animal communities are also threatened by habitat fragmentation that can increase the risk of predation or the displacement of native species by invasive, exotic species.

Policy 7.1 Promote the creation of Forest Management Plans and Forest Stewardship Plans that address increasing species and landscape diversity over time, including the extent and quality of older forests and early successional habitat. Such plans should include methods to control invasive pests, destructive insects, and diseases to prevent widespread forest mortality and loss of native forest types.

The Maryland Department of Natural Resources has modeled, using GIS technology, the locations where FIDS habitat is most likely to occur in Maryland. Due to the significant amount of contiguous forest cover, the Sugarloaf Planning Area contains thousands of acres of probable FIDS habitat. Refer to Map 7-3 for a depiction of FIDS habitat, as described in the chart below.

Table 10. Forest Interior Dwelling Species Criteria – Sugarloaf Planning Area (MD DNR)

Class	Name	Definition	Acreage
I	FIDS Core Area	A forest patch that contains over 200 hectares (approx. 500 acres) of forest interior habitat*	6,611
II	High Quality FIDS Habitat	A forest patch at least 40 hectares (approx. 100 acres) in size that contains either at least 25% of forest interior habitat or riparian forest that averages 200 meters (656 feet) in width and is a minimum of 300 meters (984 feet) long	3,453
III	Potential FIDS Habitat	A forest patch at least 20 hectares (approx. 50 acres) in size that contains either at least 4 hectares (approx. 10 acres) of forest interior habitat or riparian forest that averages at least 100 meters (328 feet) wide and is a minimum of 150 meters (492 feet) long	1,283

*Forest Interior Habitat is defined as the portion of a forest tract that is at least 100 meters (328 feet) from the nearest forest edge.

Policy 7.2 Ensure timber harvesting activities in the Sugarloaf Planning Area achieve: enhanced protection of all waterways and drainages; minimal risk of stream sedimentation; and no degradation or negative impacts to forest quality, resilience, and wildlife habitat.

Policy 7.3 Support efforts of landowners and organizations to improve deer herd management to reduce deer browsing of native trees.

Maryland's Green Infrastructure Hubs contain one or more of the following:

- Large blocks of contiguous interior forest, containing at least 250 acres
- Important plant and animal habitats of at least 100 acres, including rare, threatened, and endangered species locations
- Significant ecological communities and migratory bird habitats
- High-quality stream and river segments and their associated riparian forests, floodplains, and wetlands that support trout, mussels, and other sensitive aquatic organisms
- Large wetland complexes

Maryland's Green Infrastructure corridors or links are portions of the landscape — usually in a linear assemblage — such as wooded stream valleys, forest belts, or ridges that allow animals, plant seeds, pollen, and water to move from one area to another, linking hubs together. Corridors are normally 1,000 feet wide and have long been considered an effective means of linking isolated "islands" of wildlife habitat that have been fragmented by development, agriculture, or some other impediment.

As the amount of land developed has increased, natural areas have not only decreased in area, but have undergone a significant increase in fragmentation. As human population and development pressures grow, it becomes increasingly important to have a plan to maintain the integrity and functionality of Green Infrastructure.[3]

The Maryland Department of Natural Resources (DNR) prepared its first Green Infrastructure Atlas in 2000, followed by a Green Infrastructure Assessment to identify the statewide network of natural resource lands. The Green Infrastructure Assessment, based on principles of landscape ecology and conservation biology, identified an ecological network using satellite imagery to characterize land cover, Geographic Information System (GIS) data on road, stream, wetland, and other natural resource features, and biological databases.

An important component of the State's Assessment is the identification of gaps in the links/corridors that create impediments to the ecological systems. Gaps are disturbed lands within the green infrastructure network that produce corridor breaks or reduce interior habitat. Green Infrastructure gaps are areas with potential for restoring forest cover and wetland and riparian buffers to strengthen the ecological network, improve water quality, and provide habitat benefits.

Initiative 7A ***Initiate the development and creation of a functional Green Infrastructure Plan for the County that prioritizes areas for forest restoration and conservation across ownerships to increase natural landscape continuity and reduce forest fragmentation***

The Green Infrastructure Assessment identifies Targeted Ecological Areas, lands and watersheds of high ecological value that are priorities for conservation by DNR through easement purchase, fee-simple acquisition, or other mechanisms from willing sellers. Sugarloaf Mountain and surrounding lands are within a Targeted Ecological Area. For more information on the State's Green Infrastructure Assessment, see: https://dnr.maryland.gov/land/Pages/Green-Infrastructure-Mapping.aspx or https://dnr.maryland.gov/land/Pages/ProgramOpenSpace/Program-Open-Space-Evaluation.aspx

The key functions of Maryland's Green Infrastructure Assessment are to:

- Systematically identify and protect ecologically important lands
- Address problems of forest fragmentation, habitat degradation, and water quality
- Emphasize the role of a given place as part of a larger interconnected ecological system
- Consider natural resource and ecosystem integrity in the context of existing and potential human impacts to the landscape
- Maximize the effectiveness of public and private conservation investments
- Promote shared responsibilities for land conservation between public and private sectors

The State, through its Green Infrastructure Network and Targeted Ecological Areas, has identified the best remaining ecological lands in Maryland. As a first step towards protection, opportunities for restoration of natural ecosystems have also been identified. Through examination of the location, extent, and configuration of forest cover in the Sugarloaf Planning Area, opportunities to improve forest connectivity in the larger Sugarloaf Green Infrastructure Network are apparent. Protecting, connecting, and restoring these natural landscapes will also help to enhance water quality, improve stream stability and flood attenuation, offset CO2 emissions, and improve

wildlife habitat in the Planning Area. The Green Infrastructure hubs and corridors in the Sugarloaf Area can be strengthened, and connectivity between all natural areas can be increased through widening forest corridors, enhancing vegetative riparian buffers, filling corridor gaps, enlarging and connecting small forest patches, and broadening the core Sugarloaf Green Infrastructure hub with additional forest cover.

There are many forested stream valleys and wooded areas in the Sugarloaf Planning Area that didn't meet the State's criteria for inclusion in the GI Network. These areas are also important and sensitive environmental features. Expanding these natural areas will benefit aquatic systems, habitat, and functional landscape integrity. The Sugarloaf Treasured Landscape Management Plan recommends their enhancement and restoration through the programmatic opportunities listed in the following section.

Policy 7.4 Retain existing forestlands, promote sound forestry management, and expand tree planting, including riparian forest buffers and the conversion of lawn to forest in the Sugarloaf Planning Area, to help achieve climate change resilience.

Policy 7.5 Collaborate with stakeholders, agencies, and organizations to plant trees and establish forest cover through programs that improve watershed conditions, including the conservation of forests critical for protecting high quality waters.

Policy 7.6 Emphasize forest connectivity when Forest Resource Ordinance easements are proposed during the land development process.

Initiative 7B Establish the Sugarloaf Area Forest Initiative, modeled after the Linganore Watershed Forest Program, to utilize the County's Forest Resource Ordinance mitigation funds to plant new forest on private lands.

Maryland's 2020 Forest Action Plan

Part I of the State's Forest Action Plan contains a forest assessment, designed to:

- Describe forest conditions on all ownerships in the state
- Identify forest-related benefits and services
- Highlight issues and trends of concern, and opportunities for positive action
- Delineate high priority forest landscapes

Part II of the State's Forest Action Plan lists the State's goals, objectives, strategies, and actions to address the wide variety of forestry issues identified in the forest assessment in Part I of the Plan. Following is a list of the State's goals from the Forest Action Plan.

Goal I: Grow Forests, Habitats, Markets, and Jobs

Goal II: Manage Forest Health and Fire

Goal III: Provide Clean Water

Goal IV: Create Healthy, Livable Communities with Trees and Forests

Goal V: Respond to Climate Change

Forest

A forest is a dynamic and complex community of different plants (primarily trees), animals, and soils. A forest has multiple layers that provide varied habitats for many types of animals. The canopy is the "roof" of the forest, dominated by the tallest trees and the outer layers of leaves. The forest canopy captures rainfall and protects the ground surface. When rainfall hits tree leaves, some water flows to the branches and down the trunk for slow release into the soil. Rainfall is also slowed by hitting and dripping off leaves to the ground. Groundwater, pumped from the soil by the tree roots, is released from the leaves through transpiration and contributes, along with sun shading, to a cooler climate within a forest. Trees absorb carbon dioxide, which help purify our air. Trees combine atmospheric carbon (CO2 gas), sunlight, and water to created glucose and oxygen during photosynthesis. The CO2 gas from the air is transformed into the tree's components and its wood. Trees and forests are remarkably simple — and remarkably beneficial — in the way they reduce erosive impacts of storm events on the land surface and clean the air we breathe.

Just below the canopy is the understory, which is a layer of smaller trees and shrubs. Young trees grow here to eventually replace older ones as they die. The forest floor is the ground level and includes small plants and seeds, plus fallen leaves, downed limbs and trees that provide shelter for wildlife. The forest floor is highly absorbent and stores large amounts of nutrients and water. The soil is also considered a layer in the forest, containing microorganisms, worms, insects, with leaves and twigs and other items undergoing decay and recycling. Tree roots in the soil remove nutrients and filter pollutants from groundwater flowing beneath the surface on its way to a stream or river.

Programmatic Opportunities for Reforestation

Sugarloaf Area Forest Initiative (Frederick County)

This proposed program is modeled after the Linganore Watershed Forest Program of 2011, whereby the County's Forest Conservation Act mitigation funds were used to plant new riparian forest and preserve existing riparian forest on private lands in the Linganore Watershed. The new application of this initiative will involve the planting of new trees on lands to address forest fragmentation and create connectivity in the Sugarloaf Planning Area. This program will provide monetary compensation, planting, and maintenance in exchange for a permanent conservation easement on the area planted.

Creek ReLeaf (Frederick County)

The Creek ReLeaf program is a reforestation program assisting with the County's stormwater treatment requirements that is designed to increase the total amount of forested area within Frederick County, including privately owned lands and public properties. The program provides private landowners with native trees and shrubs planted on their property, five years of maintenance to establish the forest stand, and payment for a permanent reforestation easement that will be placed on the planted parcel. After the initial five years, the property maintenance reverts to the landowner with County inspections every three years.

Healthy Forests, Healthy Waters Program (Maryland DNR, Alliance for Chesapeake Bay)

This program provides opportunities for private landowners to establish new woodland cover on their property. Personalized tree planting plans that match landowner goals and site conditions are developed by the DNR Forest Service, with two-year maintenance provided. There is no perpetual easement placed on the new plantings or payment provided to the landowner.

Backyard Buffers (Maryland DNR)

In cooperation with the Potomac Watershed Partnership, this program assists landowners who have a stream or other waterway on or adjacent to their property to create a streamside buffer of native trees and shrubs.

Marylanders Plant Trees (Maryland DNR)

This program encourages residents and organizations to plant new trees through a State coupon program that provides a discount on the purchase of a native tree at dozens of participating nurseries across the state.

Lawn to Woodland Program (Maryland DNR)

In partnership with the National Arbor Day Foundation, this program provides assistance to landowners with the planting of trees, shrubs, and native plants in order to convert portions of mowed lawn to forest.

Tree-Mendous Maryland (Maryland DNR)

This program provides funding and assistance to help residents restore tree cover on public lands, private lands, and community open space.

Conservation Reserve Enhancement Program (USDA)

The Conservation Reserve Enhancement Program (CREP) is a cooperative program between the State of Maryland and the U.S. Department of Agriculture. CREP pays landowners to plant poorly productive agricultural field edges and borders in an approved practice that protects water quality and enhances wildlife habitat while continuing to allow farming or grazing on the most productive land. Frederick County administers a CREP easement program, sponsored by the Maryland DNR.

Healthy Forests Reserve Program (USDA)

The goal of this program is to protect and enhance private forest ecosystems; promote the recovery of endangered and threatened species; improve plant and animal biodiversity; and enhance carbon sequestration. Conservation easements in this program are designed for varying term lengths, or in perpetuity with a share of costs paid to implement conservation practices.

Initiative 7C ***Through partnerships with natural resource professionals, provide technical and financial assistance to help private landowners practice sustainable forest resource management and to transition lawn to natural areas.***

Policy 7.7 Support education and outreach efforts of the Maryland DNR Firewise Program to promote fire awareness and prevention in the wildland-urban interface in the Sugarloaf Planning Area.

Initiative 7D ***Ensure existing capacities (e.g., plans, personnel, equipment) of local fire departments and emergency response agencies are sufficiently adequate for effective wildfire response and suppression.***

Initiative 7E ***Engage the services of the Maryland DNR Forest Service to prepare Community Wildfire Protection Plans for eligible areas in the Sugarloaf Planning Area.***

Biodiversity

Biodiversity is the overall variety of life on our planet. It describes the differences and variability in organisms or life forms, habitats, species, and genetic types. Biodiversity and ecosystems produce the rich abundance of life on earth and the ecosystem services on which we rely. Ecosystem services contribute to jobs, economic growth, health, and human well-being.[4]

Human activities are causing massive impacts on biodiversity at all levels, but the impacts are most apparent to the general public at the species level and above as people witness loss of habitat, species extinction, disrupted communities, and polluted or otherwise damaged ecosystems.[5] The impact of human activities on genetic diversity within a species is least apparent and, hence, is often ignored.[6] Genetic diversity is at the lowest hierarchy in this biodiversity sequence, which enhances — not diminishes — its importance.[6] Without genetic diversity, a population cannot evolve and adapt to environmental change.[6]

Adult with poults, Comus Road

A recent study documented a 29% reduction in hundreds of bird species in North America over the past 50 years, signaling an "overlooked biodiversity crisis."[7] Birds provide ecosystem services such as dispersing seeds, consuming harmful crop pests and insects, acting as pollinators, and playing a key role in predator/prey relationships. The Cornell Laboratory of Ornithology cites agriculture (intensification, pesticide use), habitat loss, light pollution, building crashes, and outdoor cats for the decline in North American bird populations. Habitat alterations in Central and South America and climate change are also contributing to the decline. Sustainable agricultural practices, including the incorporation of hedgerows, trees, and grassy margins with cultivation and grazing operations provide food, cover, and habitat that can help increase bird populations.[7]

The Biodiversity Conservation Network (BioNet) is an ecological database and digital map that integrates the Maryland DNR's vast data and prioritizes areas for terrestrial and freshwater biodiversity conservation. It was developed by the DNR to use for proactive land conservation activities, such as targeting for acquisitions and easements, locating appropriate areas for project mitigation or habitat restoration, and planning for areas that require management to sustain dwindling species and habitats. In addition to focusing on vanishing species and habitats, and on high quality common habitats, the criteria used in BioNet also were designed to incorporate the large landscape required for migratory animals, population dispersal, and habitat shifts from climate change. In summary, BioNet includes and prioritizes:

Only known occurrences of species and habitats
Globally rare species and habitats
Animals of Greatest Conservation Need
Watch List plants and indicators of high-quality habitats
Animal assemblages (e.g., forest interior species)
Intact watersheds
Wildlife corridors and concentration areas

These areas are prioritized into a five-tiered system based on a continuum of rarity, diversity, and quality with Tier I being the highest for biodiversity conservation, as shown on the BioNet Map for the Sugarloaf Planning Area (Map 7-1):

Tier 1: Critically Significant for Biodiversity Conservation
Tier 2: Extremely Significant for Biodiversity Conservation
Tier 3: Highly Significant for Biodiversity Conservation
Tier 4: Moderately Significant for Biodiversity Conservation
Tier 5: Significant for Biodiversity Conservation

The DNR's five-tiered system was designed to capture and support the full array of biological diversity within Maryland — not just those places that are one-of-a-kind — but also the places that area needed to maintain viable populations of more common species. Keeping common species common is a goal that will provide enormous benefits to both our quality of life and our economy. Society cannot afford

to wait until herculean efforts are necessary to save species from the brink of extinction; the costs of these efforts are staggering. Therefore, even Tier 5 BioNet Areas are still significant to conserve, both for the species they directly support and for maintenance of the larger fabric of our natural landscape (MD DNR).

Over 60% of the Sugarloaf Planning Area has biodiversity significance and conservation value. By focusing on the protection of the natural resource base and rural setting of the Sugarloaf Area, the Sugarloaf Treasured Landscape Management Plan strives to maintain landscapes and habitats, thus preserving biodiversity.

Table 11. Biological Conservation Network (BioNet) – Sugarloaf Planning Area (Maryland DNR)

BioNet Tier	Acres	Percentage of Sugarloaf Planning Area
Tier I – Critically Significant	185	<1%
Tier II – Extremely Significant	2,968	15%
Tier III – Highly Significant	4,914	24.9%
Tier IV – Moderately Significant	2,635	13.4%
Tier V – Significant	3,493	17.7%

Ecologically Significant Areas

The Sugarloaf Planning Area contains eight State-designated Ecological Significant Areas (ESAs), attesting to the unique landscapes and species found there. This community of living organisms and the interactions they have with physical elements (air, soil, water, sunlight) is an ecosystem. ESAs are buffered habitats of rare, threatened, and endangered species, as well as significant or rare habitats and ecological systems. The plant and animal populations in six of the ESA areas in the Planning Area have a Maryland conservation status ranking of "Highly State Rare" or "State Rare," indicating the organism is at a high or very high risk of extinction or extirpation due to restricted or very restricted ranges, few or very few populations or occurrences, steep or very steep declines, severe or very severe threats, or other factors (MD DNR).

Table 12. Ecologically Significant Areas in the Sugarloaf Planning Area

ESA	Acres	Conservation Significance within Biodiversity Conservation Network (BioNet)	Elements of
1) Bells Chapel Woods	185	Tier I – Critically Significant	1
2) LilyPons	314	Tier III – Highly Significant	5
3) Lower Monocacy River	123	Tier II – Extremely Significant	3
4) Potomac River-Monocacy	1,223 (58 ac. within Sugarloaf Area)	Tier III –Highly Significant	4
5) Sugarloaf Mountain	2,773	Tier II – Extremely Significant	5
6) Monocacy River-Michael's Mill	65 (35 ac. within Sugarloaf Area)	Tier III –Highly Significant	2
7) Monocacy Spring	190 (6 ac. within Sugarloaf Area)	Tier II –Extremely Significant	2
8) Monocacy Tributary 2	290 (216 within Sugarloaf Area)	Tier III –Highly Significant	1

(Maryland DNR, Wildlife and Heritage Service)
1 Biodiversity elements include rare species, threatened species, endangered species, colonial-nesting waterbirds, or significant ecological communities.

Below are descriptions for several of the ESAs as provided from the Maryland DNR, Wildlife and Heritage Service, with generalized depictions on Map 7-2:

- Bells Chapel Woods – A rare example of old-growth forest in Frederick County. This site is primarily on rocky slopes and relatively free of invasive plants. Canopy trees reaching over 80 feet in height are present, including chestnut oak, northern red oak, and tulip poplar, with some oaks reaching 35 inches in diameter. These large trees are over 250 years old. Understory and shrub layers include red maple, American beech, black gum, mountain laurel, and blueberry. Vertical structural diversity, downed woody debris, large snags, and canopy gaps caused by the mortality of old trees are additional characteristics of old growth forest in this natural area. Although there are a few stumps in the northern section, indicating some tree removal, multiple growth layers and older trees still occur throughout the natural area. The forest contains the highest quality or "core" habitat for forest interior dwelling species (FIDS), especially birds such as wood thrush and scarlet tanager, and for other species that benefit from old growth forest habitat characteristics.
- Lily Pons – The man-made freshwater ponds at LilyPons Water Gardens provide habitat for some rare breeding birds, as well as a total of 252 birds that have been reported from this general area. These rare wetland breeding birds are found in freshwater marshes in primarily coastal counties in Maryland. However, these ponds provide a wetland oasis along the Monocacy River that replicates natural freshwater marsh habitat that these species require for breeding. The ponds also provide stopover habitat during spring and fall migrations, as birds head north for the summer and then south for the winter after the summer breeding season.
- Lower Monocacy River – This area is a Montane-Piedmont floodplain terrace forest along the lower Monocacy River, located north of the confluence with the Potomac River. Sections of this area regularly flood, depositing rich organic matter into the soil. These alluvial soils support a floodplain forest composed mainly of silver maple, box elder, and American sycamore, with an understory dominated by spicebush. The area also contains a diverse herbaceous layer, which includes rare and endangered plants.
- Potomac River-Monocacy – This area extends for 5.2 miles along the Potomac River, beginning approximately 0.63 miles above the Monocacy River, south to Mason Island in Montgomery County, Maryland. Within the Sugarloaf Planning Area, this ESA covers 58 acres and extends 0.60 miles upstream on the Monocacy River from its confluence with the Potomac River. The area contains a species of dragonfly that is highly rare in Maryland.
- Sugarloaf Mountain - Wooded areas of the mountain provide habitat for abundant wildlife species. Oak trees, mostly red and white oaks, grow on drier, higher slopes and tulip poplars dominate lower, moister slopes and stream margins. Black oak, chestnut oak, black birch, eastern hemlock, dogwood, and sassafras are also common here. Vegetation grows thickly along main streams, while on the drier slopes, the herbaceous layer is sparse and composed of a few hardy species. The quartzite that forms Sugarloaf Mountain causes soils to be acidic in nature, supporting an array of plants that thrive in this soil type. The understory of the Sugarloaf Mountain forest is composed of mountain laurel, pinxter flower, flowering dogwood, wild hydrangea, and maple-leaved viburnum. Native wildflowers like pink lady's slipper, Canada mayflower, and rattlesnake weed are found in pockets of soil and rocky outcrops all over the mountain.

  Along streams and in swampy areas, skunk cabbage dominates, associated with species including downy arrowwood, yellow corydalis, Canada mayflower, tall meadow-rue, and marsh blue violet. Blunt-lobe grapefern (*Sceptridium oneidense*, state-listed as Endangered) can be found in these swampy environments, and some showy, uncommon flower species find safe growing spaces in mucky, tangled thickets. Reflexed flatsedge (*Cyperus refractus*, state listed as Rare) occurs in seeps and ditches in the area.

  The mountain and surrounding land provide habitat for many animals, including an array of forest-dwelling birds. These include larger birds such as the red-shouldered hawk, wild turkey, pileated woodpecker, and great horned owl, as well as smaller migratory birds like the scarlet tanager and black-and-white warbler.

The Maryland DNR Natural Heritage Program completed a State Wildlife Action Plan in 2015. The plan details key wildlife habitats, natural communities, and Species of Greatest Conservation Need statewide, and provides information on threats and conservation needs of Maryland's wildlife resources and supporting habitats. The Maryland Wildlife Action Plan can be accessed at http://dnr.maryland.gov/wildlife/Pages/plants_wildlife/SWAP/Submission.aspx

Policy 7.8 Foster increased awareness and appreciation of environmental resources and their relationship to man-made systems, and support for management action to sustain and protect resource function and quality.

Initiative 7F ***Collaborate with conservation groups, governmental entities, and willing landowners to establish a "Forest Management for Wildlife" demonstration area to showcase ecological forestry techniques to improve desired wildlife habitats, from managing towards mature forest conditions to designing early successional habitat to benefit declining shrubland species, such as American woodcock, bobwhite quail, and ruffed grouse.***

Initiative 7G ***To improve public safety and reduce the costs of property insurance for residents and businesses within the Planning Area, establish a network of water storage tanks to be owned and maintained by the County for rural fire suppression.***

1 Maryland Department of Natural Resources. 2020. Forest Action Plan 2020-2050. Part I: Forest Resource Assessment, Part II: Strategy

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3 Benedict, Mark A., Edward T. McMahon. 2006. Green Infrastructure: Linking Landscapes and Communities. Washington, D.C.: The Conservation Fund/ Island Press.

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5 Millennium Ecosystem Assessment, 2005: Ecosystems and Human Well-Being. Health Synthesis. Island Press.

6 Disrupting evolutionary processes: The effect of habitat fragmentation on collared lizards in the Missouri Ozarks Alan R. Templeton, Robert J. Robertson, Jennifer Brisson, Jared Strasburg Proceedings of the National Academy of Sciences May 2001, 98 (10) 5426-5432; DOI: 10.1073/pnas.091093098

7 Kenneth V. Rosenberg, Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Stanton, Arvind Panjabi, Laura Helft, Michael Parr, Peter P. Marra, Decline of the North American Avifauna, Science, Vol. 366, Issue 6461, 04 Oct 2019, pp. 120-124, DOI: 10.1126/science.aaw1313

Wildland Fire

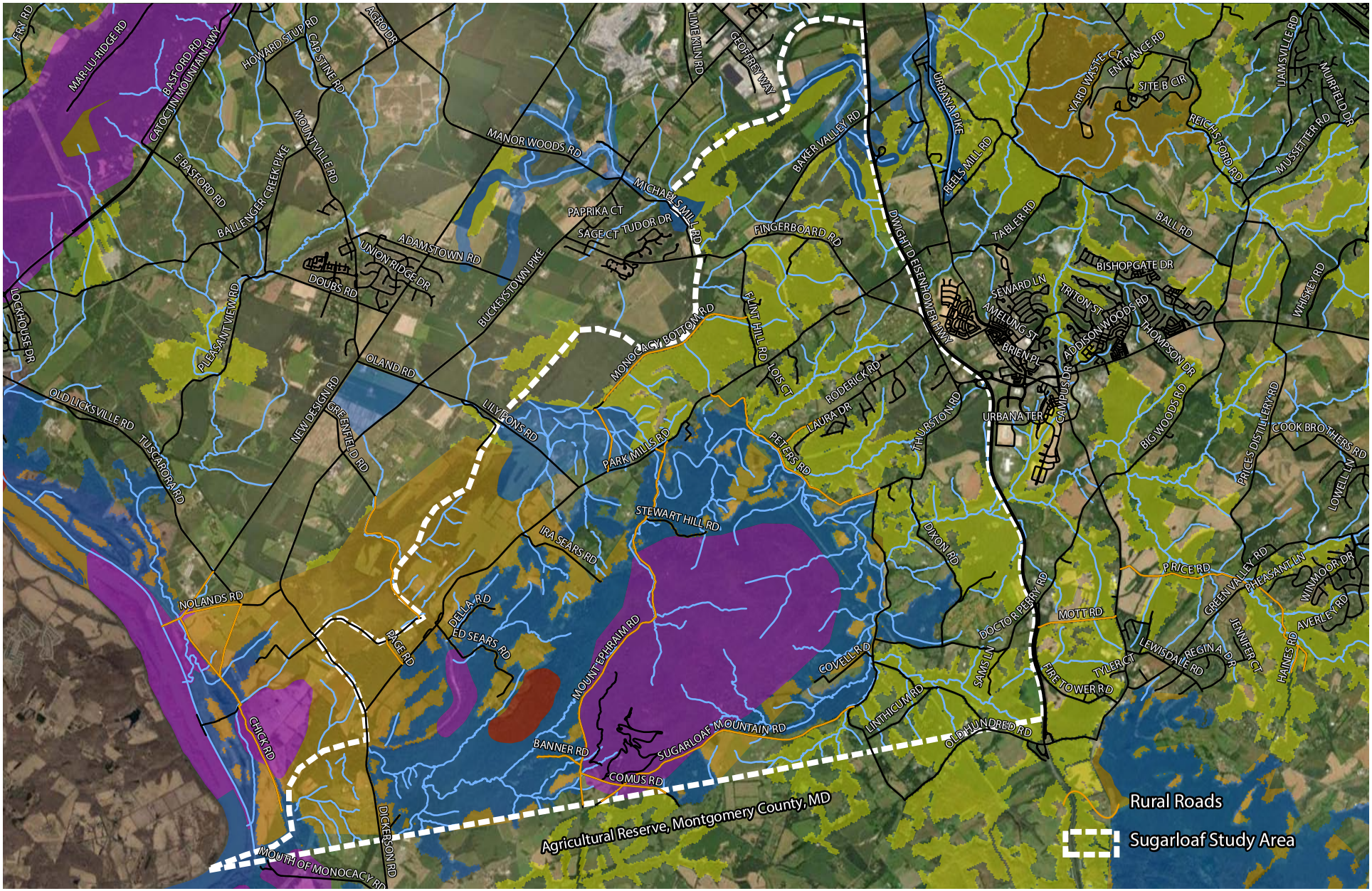
Wildfire is a common occurrence in Maryland. In fact, the Maryland Forest Service responds to over 500 wildfires in an average year, which burn more than 4,000 acres of land. Fire departments respond to even more wildlife incidents, averaging over 5,000 per year. Compared to other counties in Maryland, Frederick County has a disproportionately high number of wildlife ignitions due to the abundance of people in close proximity to wildland fuels. This makes wildfire a very real threat in Frederick County, where in the past 35 years approximately 700 wildfires have burned over 1,000 acres of land.

The wildland-urban interface is a zone where houses and other structures intermingle with wildland fuels, and is an area where homes and lives are at high risk of the dangers associated with wildfires. This zone has been rapidly expanding in Maryland in recent years as more and more people build houses in or near the forest.

Wildfire is a very real threat in Maryland. Since humans cause 98% of the fires in Maryland, the wildland-urban interface is also an area where the risk of wildfire ignitions increases. In 2011 alone, 29 structures in Maryland were destroyed by wildfires, with an additional 15 structures damaged and 141 threatened. Maryland's leading cause of wildfires is improper debris or outdoor burning, which ignites about 29% of wildfires each year. Arson, the second leading cause, accounts for around 25% of ignitions. Other causes of wildfire include equipment use, children playing with fire, campfires, railroads, downed power lines, discarded woodstove or fireplace ashes, and fireworks.

For these reasons, the Firewise Maryland Program of the Maryland DNR Forest Service is promoting fire awareness and prevention through community outreach and education. This includes instructing homeowners on how to protect themselves from wildfire by changing how they landscape around their homes and maintain their yards. The Firewise Maryland Program will also prepare Community Wildfire Protection Plans for at-risk Wildland-Urban Interface communities.

Maryland Department of Natural Resources - https://dnr.maryland.gov/forests/Pages/fire/firewise.aspx

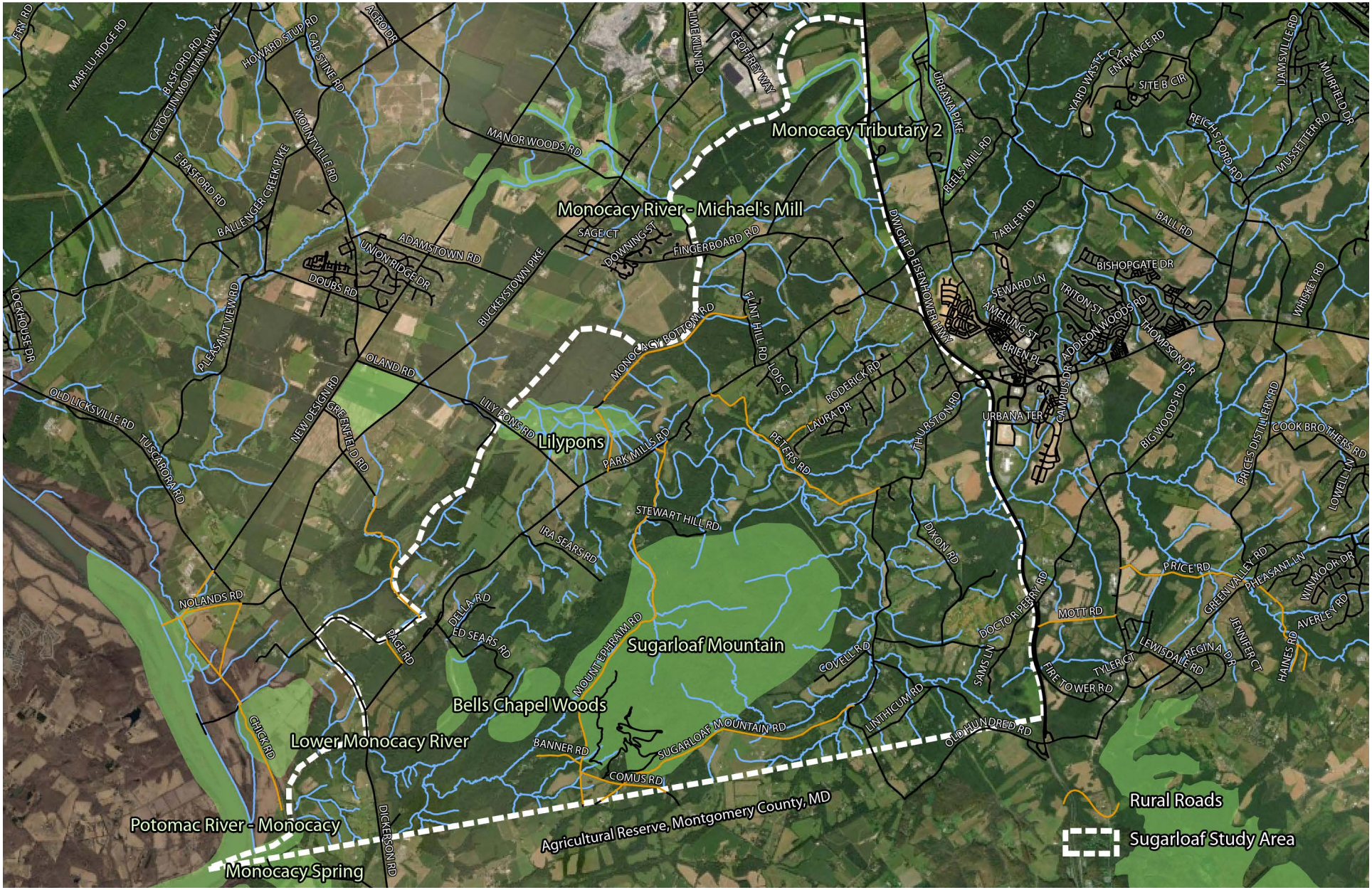


Biodiversity Conservation Network

Conservation Significance within Biodiversity Conservation Network (BioNet)

Tier 1 - Critically Significant | Tier 2 - Extremely Significant | Tier 3 - Highly Significant | Tier 4 - Moderately Significant | Tier 5 - Significant

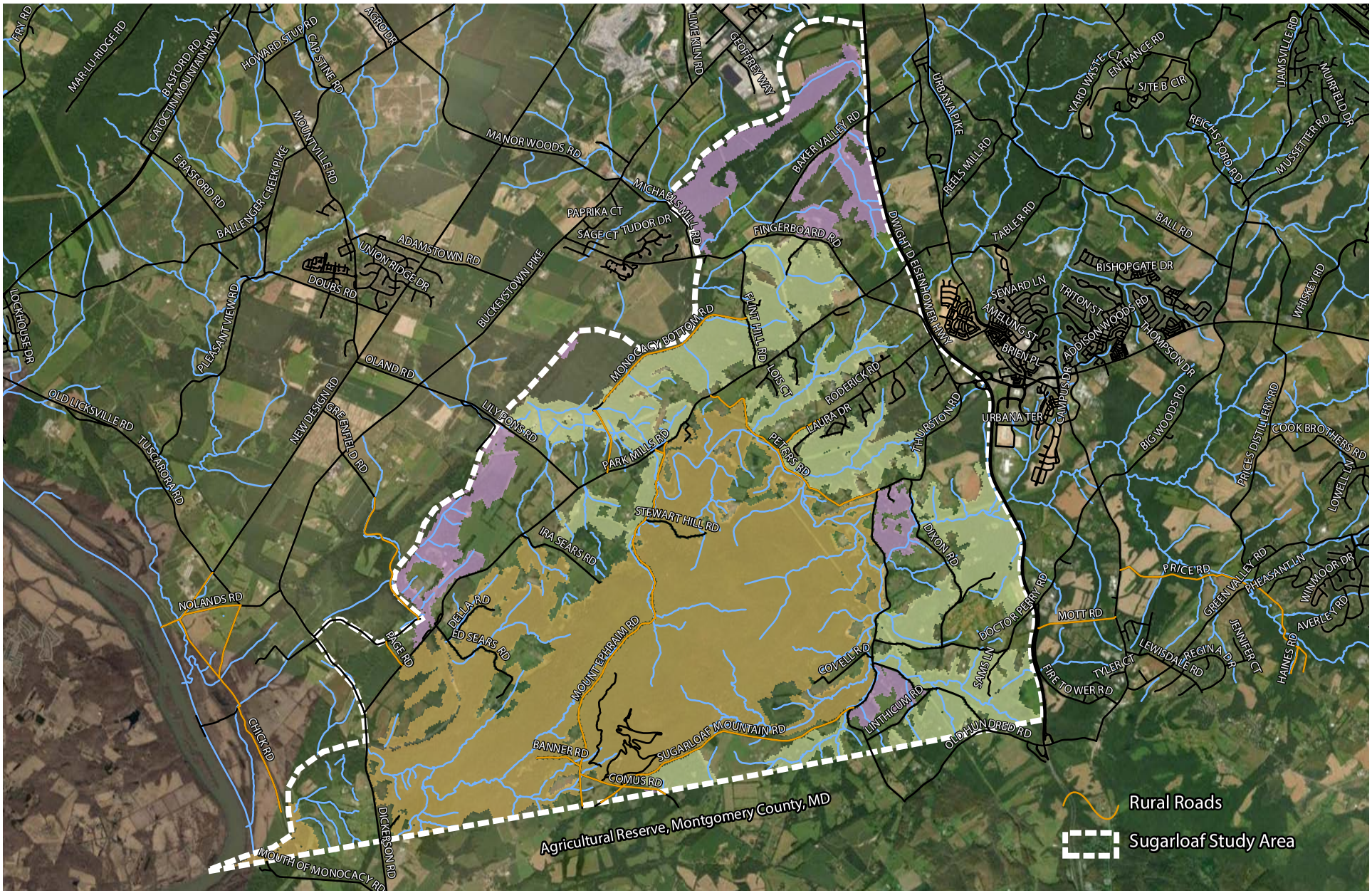
Map 7-1



Ecologically Significant Areas

ESAs - Broad areas depicting Maryland's significant ecosystems and generalized locations of rare, threatened, or endangered species and their habitats

Map 7-2



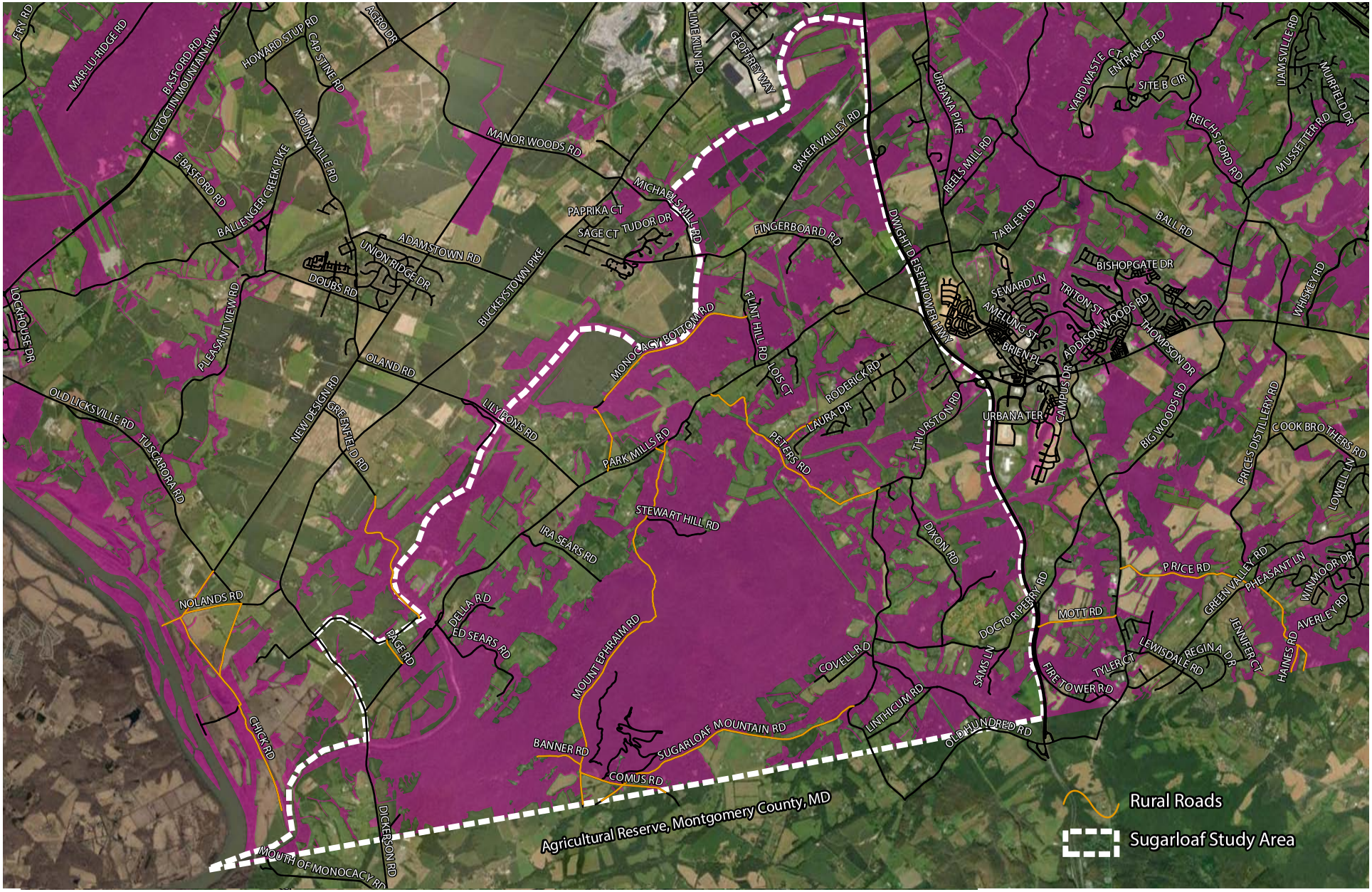
Forest Interior Dwelling Species (FIDS) Habitat Areas as Modeled by MD-DNR

Class I - Core Area

Class II - High Quality Habitat

Class III - Potential Habitat

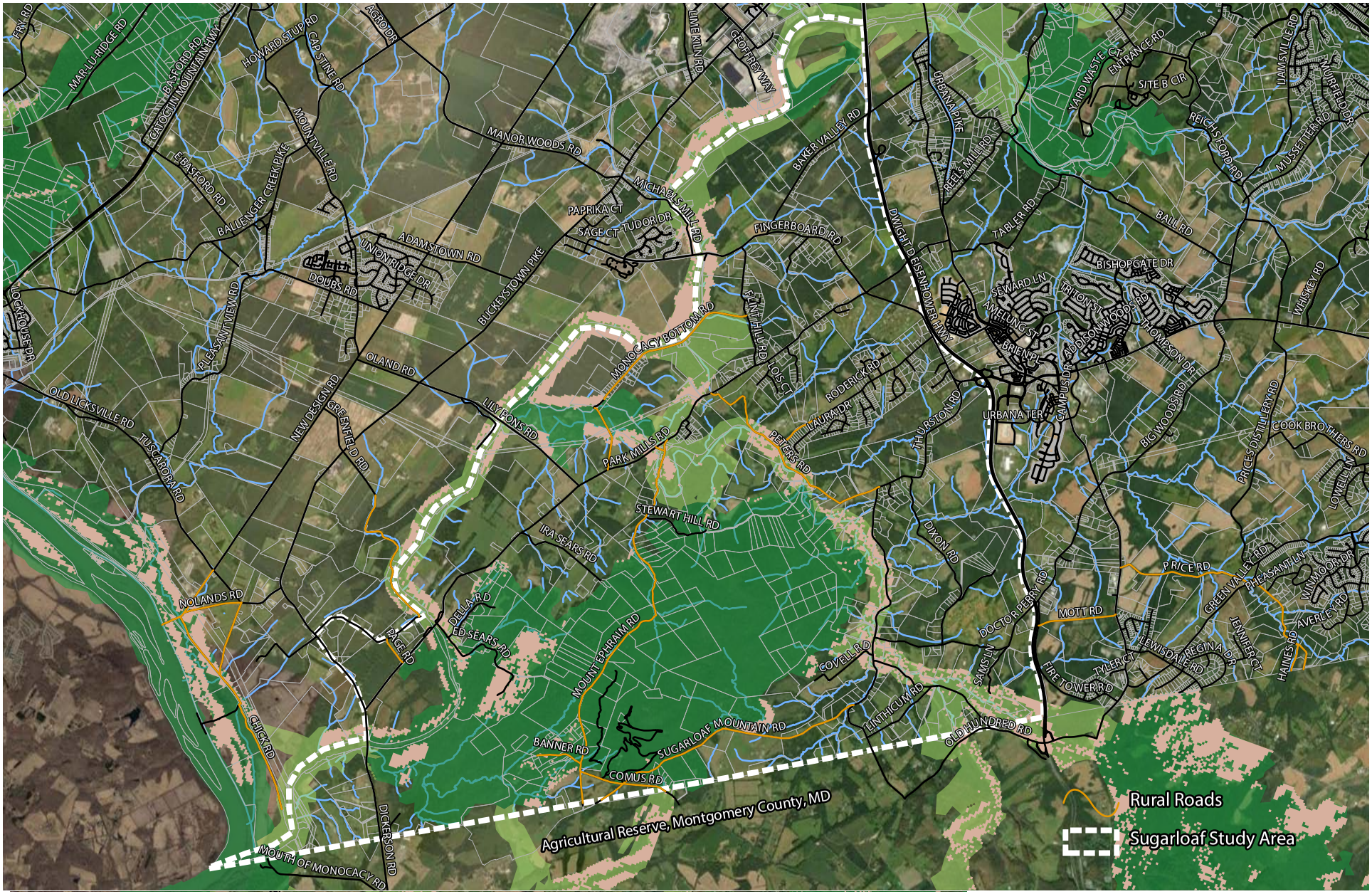
Map 7-3



Forest Cover

Forest Cover
Rural Roads
Sugarloaf Study Area

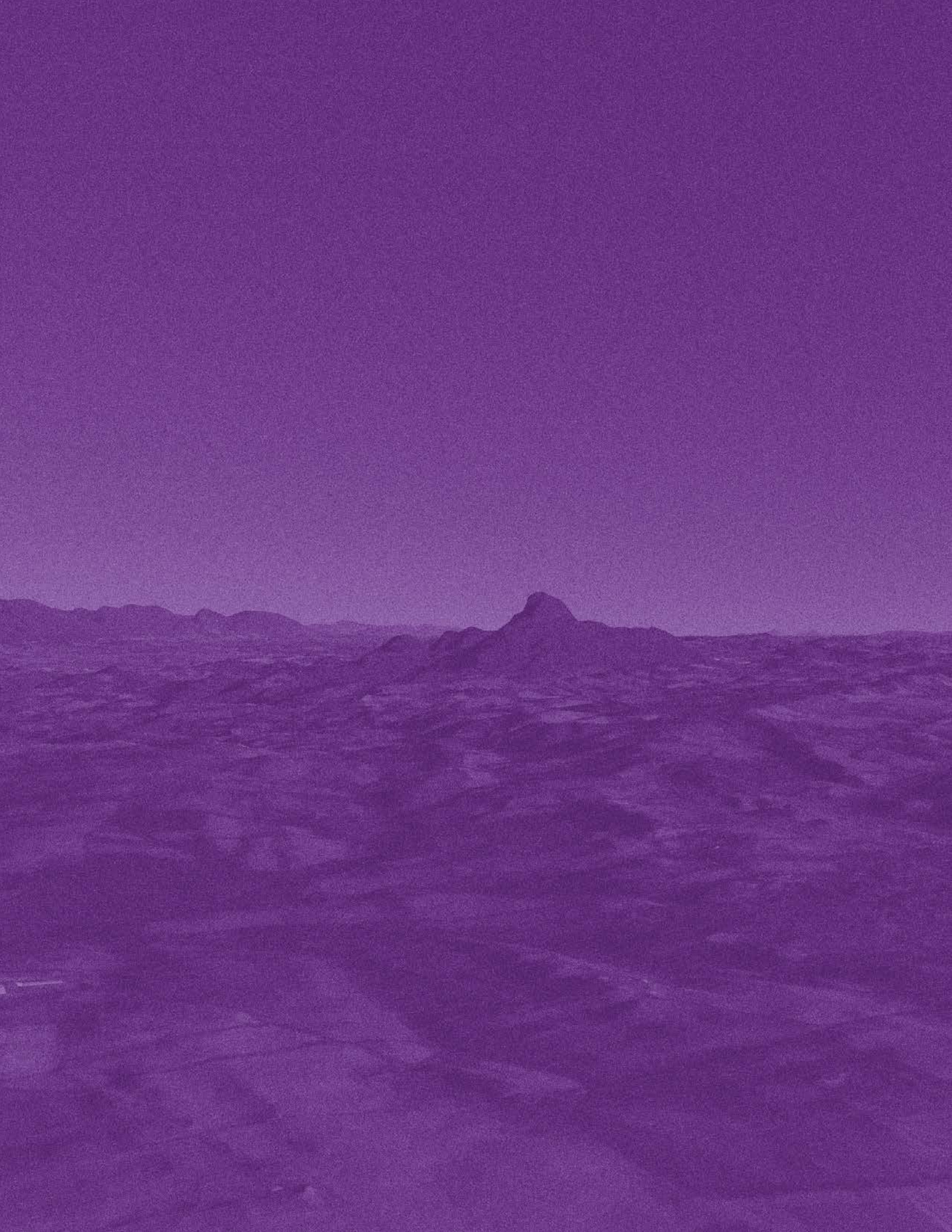
Map 7-4



DNR Green Infrastructure

Hubs Corridors Gaps

Map 7-5



Chapter 8

Climate Change

4.4.1 Plan and prepare for the impacts to public infrastructure, human health, private property, and the environment from increasing flooding, fires, droughts, crop and tree damage, temperature extremes, and intense storm events.

4.4.1.1 Thoroughly examine, evaluate, and implement the resiliency, adaptation, and mitigation actions needed to prepare the county for future climate related impacts.

4.4.1.3 Plan for and anticipate the impact of increased stormwater flows.

4.4.1.4 Capitalize on the mutually reinforcing benefits of soil health and carbon sequestration to reduce or prevent the emission of greenhouse gases.

The accuracy of scientists' predictions that climate change would bring more severe storms, increased flooding, higher temperatures, more drought, and reduced agricultural yields is evident with each passing year. Our planet is experiencing melting glaciers and ice sheets that raise sea levels. Higher air temperatures are thawing permafrost, which releases more carbon dioxide and methane into the atmosphere. Marine heat waves, altered sea currents, and stronger hurricanes are all consequences of oceans absorbing the extra heat in the atmosphere. A "compound" or "cascading" disaster is the concept scientists apply to the massive forest fires in the western U.S. in 2020: record heat, droughts, extreme weather fronts from unstable jet stream air patterns creating intense storms with lightning strikes — all exacerbated by changes in our climate from increasing global greenhouse gas emissions. Climate change models predict that we will see meteorological extremes that produce catastrophic fires in unexpected places and outside of normal fire seasons.[1] In the east, for instance, an exceptional drought helped to produce a fatal wildfire in the Great Smokey Mountains of Tennessee in 2016. Blazes near Gatlinburg burned more than 10,000 acres and killed 14 people. To put the size of the 2016 Tennessee fire in perspective, the 10,000 acres that burned in the Great Smokey Mountains is equivalent to all the forestlands in the Sugarloaf Planning Area (10,036 acres).

Volume II of the Fourth National Climate Assessment (NCA4), released in November 2018 by the United States Global Change Research Program, reported that climate change is affecting the natural environment, agriculture, energy production and use, land and water resources, transportation, and human health and welfare across the U.S. and its territories.[2]

Over 11,000 scientists from a broad range of disciplines warned in a November 2019 report[3] that planet Earth clearly and unequivocally faces a climate emergency and described six broad categories that must be addressed in order to avoid potentially irreversible climate tipping points and nature's reinforcing feedbacks (atmospheric, terrestrial, marine) that could lead to catastrophic warming.

1. Energy: sources, efficiencies, conservation
2. Short-lived pollutants: methane, black carbon-soot, hydrofluorocarbons
3. Nature: restoration, carbon sequestration
4. Food: animal production
5. Economy: resource extraction and overexploitation
6. Population: fertility, consumption, waste

East view overlook, Sugarloaf Mountain

Local and State Action

Frederick County's 2020 Climate Emergency Resolution (No. 20-22, adopted July 21, 2020)[4] strives to reach net zero greenhouse gas emissions, improve carbon sequestration, and implement measures to protect people and nature from the adverse consequences of climate change. The County acknowledges the effect temperature changes have had on ecological stability and safety, as evidenced by increased wildfires, floods, rising seas, climate refugees, diseases, droughts, and the ongoing mass extinction of species. The County also acknowledges that climate change adversely affects county infrastructure and emergency and social services, influences our access to food, water, and energy, and disrupts commerce and our quality of life.

Following adoption of Frederick County's and the City of Frederick's Climate Emergency Resolution (City Resolution No. 20-07), the Climate Emergency Mobilization Workgroup formed to provide recommendations on how emissions reductions and adaptations for buildings resilience might be identified and implemented. Focus areas with corresponding sub-groups included Agriculture, Forestry, and Land Management; Energy, Transportation, and Buildings; Health, Extreme Weather Events, and Resilience; and Public Awareness and Outreach. The Workgroup's final product, *Climate Response and Resilience*, contains 40 topical areas with detailed recommendations that identify the important steps Frederick County and Frederick City should take to minimize the impacts of the changing climate. Volume I of the report contains introductory materials, recommendations by sector, and appendices A-E. Volume II contains appendix F, which has technical details for each recommendations contained in Volume I. The Executive Summary of the *Climate Response and Resilience* report can be found in the Appendix. The entire report—Volume I and Volume II—can be found at https://frederickcountymd.gov/8113/Climate-Change-Workgroup-Information

Policy 8.1 Factor climate change into land use and planning initiatives and processes to achieve a natural and built environment that is highly resilient and adaptive.

Initiative 8A Support County efforts to develop policies and plans that address climate change and sustainability in a coordinated and comprehensive manner.

Maryland's 2016 Greenhouse Gas Emission Reduction Act - Reauthorization requires the state to achieve a minimum of a 40% reduction in statewide greenhouse gas (GHG) emissions from 2006 levels by 2030, and to develop and adopt a statewide GHG Reduction Plan (2030 Greenhouse Gas Emission Reduction Act Plan, 2030 GGRA Plan). The State is required to demonstrate that the new reduction goal can be achieved in a way that has a net positive impact on Maryland's economy, protects existing manufacturing jobs, and creates significant new "green" jobs in Maryland.

The Maryland Department of the Environment (MDE) developed the 2030 GRRA Plan in coordination with other state agencies and stakeholders, including the bipartisan Maryland Commission on Climate Change. The 2030 GRRA Plan includes a comprehensive set of more than 100 measures to reduce greenhouse gas emissions, including investments in energy efficiency, clean and renewable energy solutions, widespread adoption of electric vehicles, and improved management of farms and forests. It also supports new industries and technologies by encouraging investment in the energy and transportation sectors. The MDE estimates as much as $11.54 billion in increased economic output in the state by 2030, and the creation of more than 11,000 jobs as a result of these proposals.

The 2030 GRRA was submitted to the Governor and State Legislature on February 19, 2021.

The Carbon Cycle

The element carbon is present in the atmosphere, seawater, soils, rocks (such as coal and limestone), plants, and all living things. Carbon moves through these realms as part of the carbon cycle.

Carbon transfers and moves from:

The Atmosphere to Plants. In the air, carbon is affixed to oxygen in a gas (CO2 — Carbon Dioxide). Plant photosynthesis involves pulling CO2 from the air to produce food for plant's growth, becoming part of the plant, and stored as wood. Trees use or "sequester" significant amounts of CO2 from the air.

Plants to Animals. Through food chains, the carbon in plants transfers to animals that eat plants.

Animals to the Atmosphere. Respiration (breathing) from living organisms puts CO2 gas into the air.

Atmosphere to Oceans. Much carbon is absorbed by the oceans and other waterbodies throughout the world.

Plants and Animals to Soils. When animals and plants die, they decompose and decay, putting carbon into the ground and soil, eventually becoming fossil fuels over millions of years.

Fossil Fuels to the Atmosphere. When oil, coal, or biomass (wood and plant debris) is burned for power generation or automobiles, carbon enters the atmosphere as CO2 gas. Each year, billions of tons of carbon are released by burning fossil fuels. Wood products made from harvested trees do not contribute to CO2 emissions, but their removal from the natural environment ends additional carbon uptake. Most CO2 stays in the atmosphere where it acts as a greenhouse gas, trapping heat in our atmosphere. Without CO2 and other greenhouse gases (e.g., methane, nitrous oxides), the Earth would be frozen, but humans have released so much CO2 into the atmosphere by burning enormous quantities of fossil fuels to power our human civilization that it is causing increased warming and changes to our climate.

Key elements of the 2030 GRRA include:

- Governor Hogan's proposed Clean and Renewable Energy Standard (CARES) and its requirement for 100% clean electricity by 2040 — one of the most ambitious goals in the nation.
- An increased emphasis on clean transportation through the Maryland Clean Cars program, expanded investment in public transit, upgrades of half of the state's transit buses to clean power, and, potentially, the regional Transportation and Climate Initiative's "carbon cap-and-invest" program.
- Continued participation and leadership in the geographically expanding Regional Greenhouse Gas Initiative (RGGI), the market-based program to reduce greenhouse gas emissions from power plants.
- Programs to phase out the use of hydrofluorocarbons (HFCs), greenhouse gases that are significantly more potent than carbon dioxide, and to better identify and reduce methane leaks in the energy sector.
- Enhanced healthy soil initiatives, through which farmers can make significant contributions to climate change goals by sequestering carbon.
- Increasing the energy efficiency of buildings through investments under the EmPOWER Maryland program, along with the implementation of Governor Hogan's executive order directing state buildings to reduce energy use by an additional 10%.

For more information on the State's Climate Change Program and the Greenhouse Gas Emissions Reduction Plan, see:

https://mde.maryland.gov/programs/Air/ClimateChange/Pages/index.aspx

https://mde.maryland.gov/programs/Air/ClimateChange/Pages/Greenhouse-Gas-Emissions-Reduction-Act-(GGRA)-Plan.aspx

In 2019, the Maryland Legislature passed the Clean Energy Jobs Act (HB 1158, SB 516), which requires Maryland's Renewable Portfolio Standards (RPS) to increase to 50% by 2030, including a goal for 100% clean, renewable electricity by 2040. The RPS requires electricity suppliers to have a minimum portion of their retail electricity sales from a variety of renewable energy sources, known as Tier I and Tier II renewable sources.

Policy 8.2 Support alternative energy production and storage systems, while carefully evaluating their impact on forestlands, viewsheds, and the transportation network in the Sugarloaf Planning Area.

Agriculture and Carbon Sequestration

Agricultural land comprises over 1/3 of the Sugarloaf Planning Area. Agriculture has a large and pivotal role in greenhouse gas emission reductions in Maryland. Regenerative agricultural practices, such as the use of cover crop diversity, deep-rooted crops, and no-till systems, help to "regenerate" soil biology by rebuilding and increasing soil organic matter and supporting the living ecosystems of beneficial soil microbes which, in turn, improves plant health and crop productivity. Healthier soils contain more organic matter and plant biomass that sequester carbon and retain water, which limits runoff, improves filtration, and helps crops to be more resilient in drought conditions and during heavy storms. Less fertilizer and energy usage are other beneficial results of regenerative agricultural systems.

Policy 8.3 Support landowners who employ and adopt sustainable, regenerative agricultural practices that enhance soil productivity and carbon sequestration, and protect water quality, thus providing overall greater resilience to climate change.

Paris Climate Agreement

The Paris Agreement under The United Nations Framework Convention on Climate Change, also called Paris Climate Agreement or COP21, is a landmark environmental accord that was signed by 197 countries in 2015 to address climate change and its negative impacts. The Paris Agreement set out to improve upon and replace the Kyoto Protocol, an earlier international treaty designed to curb the release of greenhouse gases. The 2015 Agreement aims to substantially reduce global greenhouse gas emissions in an effort to limit the global temperature increase in this century to 2 degrees Celsius above pre-industrial levels, while pursuing means to limit the increase to 1.5 degrees. The agreement includes commitments from all major emitting countries to cut their climate-altering pollution and to strengthen those commitments over time. The pact provides a pathway for developed nations to assist developing nations in their climate mitigation and adaptation efforts. It creates a framework for the transparent monitoring, reporting, and strengthening countries' individual and collective climate goals.

Sugarloaf Mountain appeared on a U.S. postage stamp in 2019 as part of a series celebrating the post office murals of the 1930's and 1940's

Initiative 8B ***Explore the creation of a new County programmatic initiative to engage willing landowners and homeowners associations to replace turf grass with conservation landscaping to: reduce greenhouse gas emission (from less mowing), enhance pollinator habitat, and increase vegetative diversity.***

Guidance is provided in the Chesapeake Conservation Landscaping Council's Conservation Landscaping Guidelines: https://chesapeakelandscape.org/wpcontent/uploads/2014/04/8_elements_2013.pdf

In 2020, the Maryland General Assembly passed HB 687/SB597 permitting the Maryland Agricultural Water Quality Cost-Share Program (MACS) funds to be utilized for "natural filter practices." These practices are defined as: planting of riparian buffers; planting of herbaceous cover, including cost share for multi-species cover crops equal to single species; tree plantings on agricultural lands and outside of riparian buffers; wetland restoration; and pasture management, including rotational grazing systems such as livestock fencing and watering systems implemented as part of conversion of cropland to pasture.

Initiative 8C ***Establish, fund, and showcase a pilot program that engages a willing land owner/farm operator in the Sugarloaf Planning Area to convert or enhance an existing agricultural operation to a system that incorporates more regenerative practices and carbon sequestration.***

Initiative 8D ***Partner with the USDA, MDA, the Frederick Soil Conservation District and other experts to supply technical design, installation, and adoption assistance to implement HB 687/SB 597 (2020), the Agricultural Cost Share Program-Fixed Natural Filter Practices in the Sugarloaf Planning Area.***

Forests and Carbon Sequestration

Trees and forests are sometimes described as "carbon sinks," a condition where carbon dioxide is sequestered — absorbed or retained and stored by the organism or segment of the environment. When trees die, decompose, or are harvested or burned, some of this stored carbon is released back to the atmosphere. According to the U.S. Forest Service, trees can store substantial amounts of carbon — 1 acre of trees in the temperate zones (including Maryland) can sequester 40 tons of carbon annually.

Carbon storage by forestlands is valuable because carbon that would otherwise have been emitted into the atmosphere as CO2, causing climate change, is instead trapped in living trees. Sequestration, therefore, helps reduce CO2 concentrations, reducing the negative effects of climate change. The reduction of these negative effects on people and the planet provides the economic benefit of carbon stored by forests.[5] Increased carbon storage on forest lands, or expansion of forest lands via afforestation, can also involve notable changes in other valued ecosystem services, including water quality, habitat for terrestrial and aquatic species, and provision of timber.[6]

From the onset of European settlement to the start of the last century, changes in U.S. forest cover due to expansion of agriculture, tree harvests, and settlements resulted in net emissions of carbon. More recently, with forests reoccupying land previously used for agriculture, technological advances in harvesting, and changes in forest management, U.S. forests and associated wood products now serve as a substantial carbon sink, capturing and storing more than 227.6 million tons of carbon per year.[7] Forests and wood products store about 16% of all the CO2 emitted annually by fossil fuel burning in the United States.[8] Climate change and disturbance rates, combined with current societal trends regarding land use and forest management, are projected to reduce forest CO2 uptake in the coming decades.[9]

Efforts in forestry to reduce atmospheric CO2 levels have focused on forest management and forest product use. Forest management strategies include land-use change to increase forest area (afforestation), avoid deforestation, and optimize carbon management in existing forests. Carbon management in existing forests can include practices that increase forest growth, such as fertilization, irrigation, switching to fast-growing planting stock, shorter rotations, and weed, disease, and insect control. Increasing the interval between harvests,

decreasing harvest intensity, and focused density/species management are also effective carbon management practices in existing forests.[10] Forest product-use strategies include the use of wood wherever possible as a structural substitute for steel and concrete, which require more carbon emissions to produce. The carbon emissions offset from using wood rather than alternate materials for a range of applications can be two or more times the carbon content of the product.[11]

Policy 8.4 Preserve vast forestlands in the Sugarloaf Planning Area that comprise an "ecological sanctuary" and acknowledge their importance in providing clean water, sequestering carbon, and mitigating climate change.

The amount of global carbon dioxide (CO2) — a greenhouse gas — in the air reached a record of 417 parts per million (ppm) in May of 2020[12], even with the economic slowdown caused by the COVID-19 pandemic. The rate of increase of greenhouse gas emissions in the air is also accelerating, from an annual growth rate of 0.8ppm in the 1960's to 2.4 ppm per year in the last decade. A reduction in greenhouse gas emissions has occurred in 2020 but according to a Scripps Institute of Oceanography news release about the May 2020 record figure, CO2 emissions reductions of 20% to 30% would need to be sustained for 6 to 12 months in order for the increase in atmospheric CO2 to slow in a detectable way.

The National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) reported that 2019 was the second hottest year on record, caused by human activity releasing tons of CO2 into the atmosphere each year.[13] Every decade since the 1960's has been warmer than the previous decade. Climate scientists around the world predict that limiting Earth's warming to no more than 2 degrees Celsius above pre-industrial levels is needed to prevent catastrophic environmental and social consequences.

Local Impacts and Solutions

Milder winters with less snowfall are occurring in Maryland more frequently. Maryland has experienced an increase in annual average temperature of 1.5 degrees Fahrenheit since the beginning of the 20th century.[14] Maryland's annual mean precipitation has been above average for the past two decades.[15] The climate in this region is generally expected to continue trending warmer and wetter over the next century, accompanied by an increase in extreme heat waves and precipitation events.[16] Locally, severe flooding occurred in Frederick County in September 2015 and again in May 2018, damaging property and infrastructure. Increases in the frequency and magnitude of flooding events pose threats to transportation infrastructure and hazards to motorists in the Sugarloaf Area where the following roads closely parallel stream systems:

- Peters Road – Bennett Creek
- Mt. Ephraim Road – Bear Branch
- Thurston Road (southern section) – Little Bennett Creek

Additionally, multiple streams in the Sugarloaf Area flow under roads through culverts, which also have potential to cause roadway flooding since their original designs most often did not account for sizing to convey and accommodate more intense storm events. Increased runoff volumes from more rainfall, increased runoff velocities from the area's topography, and debris blockage in culverts can create hazards during flooding events.

Peters Road at Bennett Creek

Policy 8.5 All future repairs and upgrades of stream culverts in the Sugarloaf Planning Area should be designed to: ensure unimpeded upstream and downstream movement of aquatic organisms and other wildlife; minimize stream scour and erosion; and accommodate more intense storms and frequent flooding events.

Initiative 8E Explore options with the Department of Public Works and the Office of Sustainability and Environmental Resources to address the compromised stream bank stabilization structure and associated stream channel erosion located along a tributary to Little Bennett Creek, adjacent to Sugarloaf Mountain Road.

Changes in land use and land cover affect local, regional, and global climate processes such as urban heat islands, ozone pollution, and greenhouse gas concentrations.[17] Choices about land use and land cover have affected and will continue to affect how vulnerable or resilient human communities and ecosystems are to the effects of climate change.[18]

Policy 8.6 Expand the capacity of the Sugarloaf Planning Area to provide essential contributions to the County's efforts to reduce, mitigate, and adapt to climate change.

Policy 8.7 Endorse and support a variety of "green" principles and technologies and climate-sensitive methods in building and site design (e.g., energy efficient components and accessories, passive solar design as contained in the International Green Construction Code and the Energy Conservation Code) to help mitigate and adapt to climate change.

Initiative 8F ***Accelerate the promotion of the Commercial Property Assessed Clean Energy Loan (C-PACE) Program for investment in clean energy, conservation, and carbon drawdown activities, such as energy efficiency, renewable energy, water conservation projects, green infrastructure, grid resiliency, and energy management techniques.***

Incentive programs and management strategies to expand and retain forest cover in the Sugarloaf Planning Area will achieve greater carbon sequestration, and enhance wildlife habitat and natural landscape connectivity. Stewarding a healthy, vigorous forest through sound and sustainable management practices will help increase resilience to climate change-related environmental changes. Implementing regenerative agricultural practices in the Sugarloaf Planning Area can ensure a healthy, sustainable agricultural sector that helps to advance atmospheric carbon drawdown. Reducing the growth of impervious surfaces and high traffic-generating land uses will help protect water and air quality and maintain the rural characteristics of the Sugarloaf Planning Area. All of the aforementioned measures constitute "low carbon" land use strategies.

Policy 8.8 Reduce greenhouse gas emissions by limiting the growth of high vehicle trip-generating land uses in the Sugarloaf Planning Area.

The Sugarloaf Treasured Landscape Management Plan advances localized climate change adaptation and mitigation measures. Reflecting community values and priorities, the plan promotes actions and policies for stewardship of natural resources and to sustain **environmental** (ecosystem services, biodiversity), **social** (quality of life, sense of place), and **economic** (human activity, "experience" economy) benefits for future generations.

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Appendix

Sugarloaf Planning Area

Historic Resources Inventory

Below is a list of historic sites that are listed either on the National Park Service's National Register (NR) of Historic Places, or on the Maryland Historical Trust's Maryland Inventory of Historic Properties (MIHP). An eight-digit NPS Reference number identifies resources listed on the NR. Properties listed with the State are assigned an inventory number that begins with the one digit county abbreviation (F), followed by a hyphen and an Arabic numeral representing the planning area (from 1-8) and followed by a second hyphen and a sequential number.

Resource Number	Resource Name	Location	Description
NR 00001053	Bloomsbury	Thurston Road	The Roger Johnson property, known as Bloomsbury, is a farmstead consisting of a two-part sandstone house dating from the 1780s with an early 19th century addition; a log barn and frame wagon shed; and remnants of log slave quarters located immediately behind the main house.
NR 66000036	Chesapeake and Ohio Canal National Park		Built between 1828 and 1850, the canal ran 184.5 miles from Georgetown, D.C. to Cumberland, Maryland. Operators used the canal primarily for hauling coal from western Maryland to the port of Georgetown in Washington, D.C. Hundreds of original structures, including locks, lock houses, and aqueducts, serve as reminders of the canal's role as a transportation system during the Canal Era.
NR 73000919	Amelung House and Glassworks	Park Mills Road	Johann Friedrich Amelung came to Maryland in 1784 and built the Glassworks in Frederick County along with a c. 1785 late-Georgian two-story brick home. The home is six bays wide with two interior chimneys. Today, there are no longer any aboveground remains of the factory.
NR 75000151	Monocacy Site		The Monocacy Archeological Site is the deepest known stratified site in Maryland. The Marcey Creek component of the Monocacy site represents the earliest (950±95 B.C.) dated manifestation of pottery in the Potomac River valley and is one of the earliest dated appearances of pottery anywhere in the east.
NR 66000908	Monocacy Battlefield		The Monocacy Battlefield encompasses approximately 1,500 acres a portion of which is included in the Sugarloaf study area. Union and Confederate forces clashed in this area on July 9, 1864. The terrain where most of the fighting

			occurred was either farmed or in woodland with important landmarks including Worthington, Thomas, and Best houses.
F-1-28	Greenfield Mills	Greenfield Road	Site of a former town known as Greenfield Mills. The mill was described as a four-story stone structure with four pairs of six-foot burrs. The 1886 General Directory of Frederick City listed farmers, a shoemaker, blacksmith, wheelwright, general store owner, and grist and sawmill owner at Greenfield Mills.
F-1-92	Monocacy Aqueduct		The Monocacy Aqueduct crosses the Monocacy River on the C&O Canal. It is a five arch coursed sandstone aqueduct completed in 1833.
F-1-127	Amrine Farmhouse	Park Mills Road	The Amrine Farmhouse also known as the Baxter Farm is an ell shaped, two story, brick dwelling. The rear section dates to the 18th century or early 19th century whereas the main front block was built in the mid or late 19th century. A brick and frame outbuilding, frame bank barn, windmill, and wagon shed are also located on the property.
F-1-132	Bridge 10029, Furnace Ford Bridge	MD 28 over Monocacy River	Bridge 10029 is a three span, Camelback truss measuring 446 feet in total length. The bridge was built in 1931 and was not altered since its construction.
F-1-134	Carrollton Manor Rural Historic District	MD Rt 28 to Tuscarora Creek to Fountain Run and to Monocacy River	A portion of the Carrollton Manor Rural Historic District (CMRHD) overlaps the Sugarloaf Rural District Area. CMRHD is associated with the historic land patent known as “Carrollton Manor” that has variously been reported as containing 10,000 to 12,000 acres. The entire district retains a substantial number of landscape elements that illustrate the history of agriculture in Frederick County from ca. 1800-1940.
F-1-174	Forest Grove U.M. Church	Dickerson Road	The Forest Grove United Methodist Church is a one-story church with German siding, wood buttresses, and a rusticated concrete block foundation, which was originally built prior to 1874 in Washington, DC. In 1874, the Methodist Episcopal congregation acquired it, disassembled, and transported to Frederick County by C&O canal boat.
F-2-11	C&O Canal National Historical Park		See National Register info in chart above.
F-7-1-3	Cosgrave-Naylor Log House	Comus Road	This is a two-story log house with two blocks: a main block of three bays in length and one in depth and a one story shed kitchen that was

			added to the rear. It is unclear if the structure is still standing. Further research is needed.
F-7-1-4	Bene and Barbara Hallman House, site	Mount Ephraim Road	The Bene and Barbara Hallman House site was the location of a two-story log house built in the early 1880s and owned by an African-American landowning quarry worker.
F-7-1-5	James and Malinda Hallman House, site	Mt. Ephraim Road	This site was the home of one of the grandchildren of a principal founder of the African-American community in Mt. Ephraim. It resembled other log houses in the area.
F-7-1-6	Moses Hallman Log House, site	Banner Park Road	This log house site resembled the homes of other families of moderate means in the Mt. Ephraim community.
F-7-1-7	Hannah and William Hallman House	Mount Ephraim Road	This was the site of a two-story log house that was the home of John Beall one of the principal founders of the African American community in Mt. Ephraim.
F-7-1-8	Frank Nichols Log House	Banner Park Road	This house is no longer standing. It was a two-story log house built as the residence of a white land-owning family of moderate means.
F-7-1-9	Morris and Agnes Posey Log House, site	Banner Park Road	This site was the location of Morris and Agnes Posey's log house in the Mt. Ephraim community. It had two stories with two rooms down and two up built c. 1875-1895.
F-7-1-10	Charles and Laura Proctor Log House, site	Banner Park Road	This log house site resembled the other two-story log dwellings with two rooms down and two up in the Mt. Ephraim community.
F-7-1-11	David and Sally Proctor Log House, site	Mount Ephraim Road	This site was where David and Sally Proctor built their two-story log cabin. It stood on property that had been owned by direct descendants of that family since 1814 and 1833 who were freed African-Americans.
F-7-1-12	Frank and Maggie Proctor Log House, site	Banner Park Road	This site was the location of a two-story log house with two rooms and was the home of an African-American landowning family built by community labor in the last quarter of the 19th century.
F-7-1-13	Linwood Proctor Log House	Banner Park Road	This one and a half story log house was the home of an antebellum free African-American family, who had owned the property on which the house stands since 1814. The house has three bays on the façade with the door centrally located.
F-7-1-14	William and Mary Proctor House, site	Banner Park Road	This two-story log house site was the home of the matriarch and patriarch of nearby African-American families associated with the Mt. Ephraim community. This house stood at the middle of the circle at the end of Banner Park Road.

F-7-1-15	William and Rachel Proctor Log House	Banner Park Road	The William and Rachel Proctor log house appears still to be standing. It has been reduced from its two-story height to its original one and a half stories. The structure is three bays wide on the west elevation with a porch across the east elevation.
F-7-1-16	Wood-Bowie Log House	Comus Road	No Records.
F-7-2	Rock Hall	Doctor Belt Road	A two-story, Federal style stone house built in 1812 by Roger Johnson. The façade is three bays wide with a transom over the entrance door. A later two-story stone addition was added to the north end of the principal block covered by a two-story porch. A small log cabin was added to the wing addition about 1825-40.
F-7-4	Koontz Chapel	Park Mills Road	The Koontz Chapel built in 1893, is a one-story frame church with Gothic arched windows and door transom. A cemetery associated with the church is located to the north.
F-7-5	Kohlenberg Glassworks Site	Bear Branch Road	This site is the location of the former Kohlenberg Glassworks. John Amelung and his small group of artisans settled in the area and began manufacturing in two glasshouses in the late 1780s and early 1790s. After Amelung went bankrupt in 1799, the property was transferred to Kohlenberg and existed until c. 1808.
F-7-9	Johnson Furnace, site	Dickerson Road	A slagheap and charcoal pits are all that remained on the site of the Johnson Furnace at the time of the 1978 survey. Traces of roads, which led from the furnace to the forge, are evident. The Johnson brothers built the Johnson Furnace, Thomas becoming the first governor of Maryland.
F-7-11	Thurston Road Bridge 68, site	Thurston Road over Little Bennett Creek	Pony truss bridge that no longer exists.
F-7-12	Samuel T. Simmons House	Linthicum Road	The Samuel T. Simmons House, built c. 1825, is a two-story stone dwelling with a two-story open porch with a scroll-sawn balustrade on the second level and a stucco-covered north elevation. A one-story brick addition adjoins the west gable end.
F-7-13	Dixon Road Steel Truss Bridge (07-09)	Dixon Road over Bennett Creek	The Dixon Road Steel Truss bridge, constructed in 1904, is a single-span, Warren pony truss measuring 44 feet in total length. The bridge was rehabilitated in 1994.
F-7-16	Richard Johnson House	Dixon Road	The Richard Johnson House is a two-story stone dwelling built in probably three sections between 1780 and 1808. A circa 1800 stone smokehouse as

			well as a late 19th century wagon shed/corn crib, and a circa 1900 frame bank barn are also located on the property.
F-7-18	Bloomsbury	Thurston Road	See National Register info in chart above.
F-7-19	Mullican Log House	Thurston Road	The Mullican Log House was built about 1855 as a two-story log dwelling with German siding and a center entrance with a one-story porch. A log smokehouse associated with the house is no longer standing.
F-7-22	The Little House (Orrison Farm)	Peters Road	The Little House is a two and a half story frame over log building with three bays across the façade and one room deep built in the 18th century. A one-story kitchen addition was added to the west elevation in the 1800s and a more modern one-story addition was added in the 1960's.
F-7-23	Bloomsbury Forge	Peters Road	The stone dwelling built between 1774 and 1787 is the principal structure remaining at the site of the Bloomsbury Forge, an iron finishing manufactory established by the Johnson brothers. The house is a simple two-room, two-story structure with a 1940's addition to the side wing and a 1980's addition to the rear.
F-7-25	Comstock School	Mount Ephraim Road	The Comstock School is a one-story frame rural school built about 1910 with an elaborate Classical Revival door surround with a half dome and flanking columns. Gordon Strong built the school for the African-American children near his Sugarloaf Mountain estate.
F-7-26	Park Mills Survey District	Mt. Ephraim and Bear Branch Roads	Park Mills Survey District includes an area of about 5 acres centered at the intersection of Mt. Ephraim and Bear Branch Roads. The district has six contributing structures which include a circa 1810-1820 stone dwelling with two sections, three other much-altered dwellings with some log structure in each which date from about 1820-1840, and two unoccupied frame stores of the period about 1850-1870. The district is moderately significant for its association with several demolished rural industrial sites in the vicinity, including the Amelung Glassworks, the Kohlenberg Glassworks, and the Fleecy Dale Woolen Factory.
F-7-27	Bell's Chapel Methodist Episcopal Church	Mt. Ephraim Road	Bell's Chapel M.E. Church was built between 1918 and 1925, replacing a circa 1874-log building. The present structure is frame with a stone foundation and wood shiplap siding. A small bell cupola over the east end of the gable ridge has plywood panels enclosing the originally open chamber.

F-7-28	St. Paul's African Methodist Episcopal Church	Ed Sears Road	St. Paul's A.M.E. Church was built in 1916 on a foundation laid in 1908 when the lot was purchased. The church is a one-story frame building on a rusticated concrete block foundation with a gable façade and projecting foyer. The exterior is covered with German siding. Stained glass windows have segmental arched frames. A cemetery is located east of the church.
F-7-29	Hope Hill Methodist Episcopal Church	Fingerboard Road	Hope Hill M.E. Church was built in 1910 to replace the original church located on Park Mills Road about one mile east of the present building. The cemetery associated with the earlier church is still actively used. The church is the typical design of rural churches with a projecting bell tower on the north gable end and a double-doored entrance.
F-7-30	Flint Hill Methodist Church and Cemetery	Park Mills Road	Flint Hill Methodist Church is a one and a half story frame structure with an extension tower with belfry located on the second bay on the east side. Double hung gothic windows are located on all four elevations of the building. A cemetery associated with the church is located northwest of the church.
F-7-32	Stronghold Survey District	Sugarloaf Mountain Road at Comus Road	The Stronghold Survey District, covering about 400 acres including the southern slopes and the summit of Sugarloaf Mountain, contains the principal buildings associated with Henry Gordon Strong. He developed a private enclave with two large Georgian Revival mansions and a network of trails, overlooks, and formal gardens for the benefit of his family and the education of underprivileged children from Chicago. Most structures within the district date from the period from about 1910-1930 with a few surviving buildings of the last quarter of the 19th century and a 1954 stone mausoleum.
F-7-36	Hampton School	Fingerboard Road & Park Mills Road	The Hampton School is a one-story brick building with a hipped roof. The building faces south. The building was built 1908 per a stone plaque over the door.
F-7-37	Hope Hill Colored School	Fingerboard Road	The Hope Hill Colored School is a frame, two-room schoolhouse with an entrance foyer and folding doors separating two classrooms. Built c. 1890 for the Hopeland community the school is much deteriorated.
F-7-40	Bear Branch School	Flint Hill Road	Built in 1839, the Bear Branch School is a one and a half story rectangular log structure and three bays wide. Originally, the building was located on

			the west side of Bear Branch Road. The school is in a state of disrepair.
F-7-43	Riverside	Fingerboard Road	Riverside is a two-story, three-bay wide stone house built about 1845-1850. The house includes Greek Revival details in the doorway and an Italianate style cornice. A three-story corner tower was built in 1878. The property includes a two-story summer kitchen or smoke house, a chicken house, a wagon shed/corn crib, a dairy barn, and a ban barn.
F-7-44	Simmons-Ordeman House	Park Mills Road	The James H Simmons House was built about 1840. It is a two-story stone house with three bays on the façade and a centrally located door. A two-story rear wing has been altered with an extended and enclosed two-story porch. A frame smokehouse, frame granary, and a small barn of the English type are associated with the property.
F-7-45	George J.H. Kanode Farmstead	Roderick Road	The George J.H. Kanode Farmstead was established in 1912 with the buildings erected during the period 1912-1920. A Four Square dwelling is located on the property with a porch that has been extended around two additional elevations. Outbuildings include a frame and concrete block bank barn, a smoke house, and a well house.
F-7-46	Boyer-Yingling House	Lily Pons Road	They Boyer-Yingling House was built c. 1847 to 1854 and is a two-story brick dwelling with a 1 ½-story rear wing. The main block is three bays wide with a one-story entry porch over the door.
F-7-47	Worthington House	Baker Valley Road	The Worthington House is an ell shaped two story brick house. The façade contains five bays. The property is significant to the history of the Battle of Monocacy and is a contributing resource to the Monocacy Battlefield.
F-7-48	Green Valley School	Park Mills Road	The Green Valley School was built in 1889 with a gable entrance façade. In 1930, the building was sold when the school was consolidated with Urbana and is currently a residence.
F-7-50	Amelung House & Glassworks	Park Mills Road	See National Register info in chart above.
F-7-56	Samuel Schwartz Farmstead	Roderick Road	The Samuel Schwartz Farmstead is centered on a circa 1883, frame dwelling with exterior details in the Queen Anne style. A couple frame agricultural outbuildings remain, a bank barn and a wagon shed/corn crib, however several outbuildings have been lost since the 1993 including a hog barn, a tool shed, and a dairy barn and milk house.

F-7-62	Murdock-Lawson Farmstead	Roderick Road	The Murdock-Lawson Farmstead is centered on a circa 1825 brick dwelling with a side hall plan and a one-story porch, with a one-story addition on the northwest corner. Other agricultural buildings include a bank barn, wagon shed/corn crib, and smokehouse. The property is now the Bar-T Mountainside Summer Camp.
F-7-69	Matthias Geigis House	Thurston Road	The Matthias Geigis House, built circa 1860, is a two-story structure with a three-bay façade and interior end chimneys. Outbuildings associated with this dwelling include a smokehouse / meat house, wagon shed/corn crib, and stone cooling shed.
F-7-72	Abraham R. Simmons House	Thurston Road	The Abraham Simmons House is a two-story exposed log dwelling, built c. 1850, with a modern two-story addition on the northwest corner. The façade is three bays in length with a central entrance.
F-7-74	Simmons Store and Residence	Thurston Road	The Simmons Store and Residence was built about 1865-1870, a two-story frame dwelling with a one-story porch on its façade. The store is a one-story extension on the north end of the building with a projecting polygonal display window. A separate porch associated with the store was removed after 2012.
F-7-81	John F. Simmons Farmstead	Thurston Road	The John F. Simmons Farmstead is centered on a two-story brick dwelling erected in about 1835. The house has a three bay façade with a side hall entrance and an entry porch built in 1978 to replace a deteriorated full-width porch. There is a 1 ½-story brick wing on the north gable end. The only remaining contributing outbuildings are a frame bank barn and a wagon shed/corn crib.
F-7-82	George E. House Farmstead	Thurston Road	The George E. House Farmstead is a two-story stone dwelling dated 1856 with a four-bay façade with double entrances. A two-story rear wing was added between 1856 and 1868. Modern additions have been added to the dwelling since 1993. A stone springhouse, built about 1845, and bank barn built circa 1890-1900 are still on the property. A dairy barn is also located on the property and while considered not contributing in the 1993 survey, the dairy barn may now be contributing. Further research would be required.
F-7-83	Simmons-Royer-Ordeman Farmstead	Park Mills Road	The Simmons-Royer-Ordeman Farmstead is a stone two-story dwelling built about 1820 with a two-story enclosed porch covering most of the

			façade and a one-story rear addition. A lower-height two-story wing adjoins the house on the south. A log smokehouse and stone springhouse, both built about the same time as the dwelling, are also in the domestic group. A dairy barn and wagon shed/corn crib across the road complete the eligible structures on the farmstead.
F-7-94	William Horman Farmstead	Park Mills Road	The William Horman farmstead included a two-story frame dwelling built in 1894. The house has since been demolished. The bank barn, frame wagon shed/corn crib, and a dairy barn remain.
F-7-104	David O. Thomas Farmstead	Baker Valley Road	The David O. Thomas farm includes a two-story frame dwelling built circa 1850. The farm includes a frame and stone bank barn, a wagon shed/corn crib, a dairy barn, and a milk house.
F-7-105	Riverside Tenant House	Fingerboard Road	The Riverside Tenant House is a two-story frame dwelling built about 1880-1890 with a two room plan and a central chimney with a one-story rear wing.
F-7-108	George W. Horman House & Outbuildings	Roderick Road	The George W. Horman House is a two-story frame dwelling with Queen Anne style influences built about 1901 and possibly altered later in the first or second quarter of the 20th century. Outbuildings located on the opposite side of Roderick Road include a concrete block dairy barn, milk house, silo, and brick dairy, dating from about 1925 to 1935. The brick dairy was used as the processing and bottling plant for the Tip Top Dairy and has a stepped parapet with a three-bay main elevation. A 1901 stone garage associated with the house has been torn down.
F-7-116	Leona Pollack House	Fingerboard Road	The Leona Pollack House is a two-story saltbox roofed frame over log house that is five bays wide with the rear elevation only one story. The building was moved approximately one-quarter mile in 1948 to facilitate the building of I-270.
F-7-118	Keto Log House	Ed Sears Road	This log house is no longer standing. It was a two-story log house built in two parts with three bays wide and a steeply pitched gable roof.
F-7-119	Stonemetz Log House	Stewart Hill Road	No longer standing. This was the location of a two-section log house, the first probably dating to the middle of the 19th century and the second added shortly thereafter. The log house was one and a half stories, 12 to 13 logs high.
F-7-120	Sugarloaf Mountain Historic District		The Sugarloaf Mountain Historic District is an irregularly shaped area of land principally located in the southwest section of Frederick County and

			extending south into northwestern Montgomery County. It is a cohesive region of cultural landscapes and natural areas oriented around the monadnock Sugarloaf Mountain. Influence of early German settlement in this area and distinct regional characteristics (especially before 1830) are apparent, however, a variety of building materials and styles is also evident. Despite the variety of building materials, all of the dwellings relate to one another in their overall architectural styling and detail – including symmetrical facades, interior end chimneys, and two-story main block with a two-story wing.
F-7-123	Mackintosh Farmhouse	Ed Sears Road	The Mackintosh Farmhouse is a compound of two structures, one frame and one log positioned at right angles built c. 1900 and c. 1850. These sections are united at the east gable end of the frame structure by a combined extension of the frame section gable roof horizontally and the log section gable roof vertically to create a truncated hip roof at the east end of the structure. A few agricultural outbuildings from the early 1900s remain on the property; however, the bank barn is in ruins.
F-7-138	Baker-Geisbert Farm	Baker Valley Road	The Baker-Geisbert Farm contains an American Foursquare style house built in 1914. This house is located on the foundation of an earlier dwelling. Additionally, the property includes a smokehouse, bank barn, dairy barn, milk houses, silos, and several newer agricultural buildings. The property is significant for its role in the Battle of Monocacy. The farm is a contributing resource in the Monocacy National Battlefield.
F-7-141	Monocacy Natural Resources Management Area		This area occupies 2,011 acres located in southeastern Frederick and western Montgomery counties. The area is predominately rural, comprising farmland, rolling and rocky wooded hills, and single-family homes. Rock Hall and sites associated with the Johnson Furnace are the historic centerpieces of the district. The built resources constructed prior to 1960 and contained within the boundaries are associated with the regional industrial development of the 18th and 19th centuries, and with regional agriculture between the 19th and mid-20th centuries.

The following sites were recorded during the County's 1993-1995 survey of the Urbana area, which included Sugarloaf Mountain. These properties are noted in the County's Urbana Survey Field Notes as having potential for architectural significance. The resources are identified with a one digit area abbreviation (U) followed by a hyphen and a sequential number.

Resource Number	Location	Description
U-13	Ephraim Road	It is a two-story frame dwelling with a cross-gabled roof and a full-length one-story porch on the façade. The property was built c. 1910.
U-24	Park Mills Road	The dwelling is a two-story frame dwelling that is three bays wide with a one-story rear addition. The exterior is covered with German siding.
U-27	Ira Sears Road	The dwelling is a two-story frame, dwelling of the Foursquare style built c. 1910. It has a hipped roof with a center dormer and a full-width front porch covering the façade. The main block of the dwelling is three bays wide. An addition has been added. A frame bank barn is located on the property.
U-28	Ira Sears Road	This site is a cemetery. The dates able to be reviewed on the stones were 1887 and 1905.
U-29	Park Mills Road	The dwelling is 1 ½ stories with a one story porch across the façade. A frame bank barn and wagon shed are also located on the property as well as other agricultural outbuildings.
U-31	Park Mills Road	The frame dwelling is two stories, with a cross gable built c. 1900. A one-story porch is located on the façade. A frame bank barn is also located on the property and other outbuildings on the property may date to c. 1900.
U-33	Della Road	One and a half story bungalow built c. 1930 with clapboard siding, shed dormers, and a one-story porch.
U-36	Della Road	A one and a half story frame gable façade dwelling with a one-story porch the width of the façade.
U-39	Ed Sears Road	Property was not clearly visible from the road however it was noted to possibly have weatherboard siding and some brick alterations. The property is the site of B.S. & C. Smith House of 1873.
U-43	Fingerboard Road	A two-story frame dwelling, three bays across and interior end chimneys. It appears as though a front porch may have been enclosed on the façade. A bank barn and dairy barn are located on the property.
U-45	Flint Hill Road	The dwelling is two stories, frame construction, with a one-story porch and interior end chimneys.
U-46	Flint Hill Road	A two-story dwelling with five bays and a one-story porch across the façade. Interior chimneys are located on each gable end. A few agricultural outbuildings are associated with the property but are in a deteriorated state.
U-61	Fingerboard Road	A two-story, three bay structure built in the early 20th century with numerous additions. Three framed outbuildings are located to the north of the house.

U-70	Fingerboard Road	The dwelling is two-stories in height with a brick veneer and a full-width porch. Several agricultural buildings are located to the rear of the house.
U-73	Park Mills Road	Hope Hill Cemetery original site of Hope Hill Methodist Chapel.
U-74	Park Mills Road	A two-story, 3 bay framed dwelling with a cross gable. A one story bracketed porch covers the façade and the roof has a standing seam metal covering. A few agricultural outbuildings, including a bank barn are associated with the property.
U-75	Hope Mills Lane	The frame dwelling is two stories in height with double cross gables and a one-story porch. The property has an addition on the south elevation. A rear wing is on the east elevation with an exterior chimney. A bank barn, wagon shed/corn crib and a few other frame outbuildings are located on the property.
U-76	Peters Road	A two-story frame/log dwelling in a deteriorated state with what appears to be German siding. The building has a one-story porch that appears to be collapsed and a two-story rear wing. A frame bank barn and wagon shed are also located on the property.
U-78	Thurston Road	A two-story frame/log dwelling with a cross gable in the roof and a two story rear wing. A one-story porch is located across the façade.
U-79 & U-80	Thurston Road	A two-story stone/brick with stucco exterior dwelling that originally was five bays across. Windows are 6 over 6. An addition has been added to the west elevation. A frame bank barn with arched louvered vents and cupolas is located to the northeast of the dwelling.
U-85	Roderick Road	A two-story brick four-square dwelling with a hipped roof and dormers.
U-90	Fingerboard Road	A two-story, two-section log dwelling with a two-story porch on the north elevation. Several additions have been added to the dwelling and is now used as a clubhouse for a golf course. Wagon shed/corn crib and bank barn are located on the property and appear to be utilized by the golf course.
U-91	Fingerboard Road	A two-story frame dwelling three bays wide with six over six windows. A one-story porch with turned columns is located on the façade. A two-story wing is located on the rear of the building.
U-93	Baker Valley Road	A two-story dwelling built in two sections. The southern end is three-bays wide and the northern section is four-bays wide. Interior end chimneys are located on the gable ends. A wagon shed and dairy barn are the only remaining historic agricultural buildings.
U-98	Thurston Road	A two-story cross gable dwelling with a modern two-story porch across the façade. Exterior brick chimneys are located on the gable ends. The property also contains a stone foundation smokehouse and two frame outbuildings.
U-103	Thurston Road	A two-story brick dwelling, five bays wide, with a two-story rear wing. A frame bank barn and wagon shed/corn crib are located on the property.
U-105	Sugarloaf Mt Road	A two-story frame/log dwelling three bays wide with a one-story porch across the façade.

SUGARLOAF AREA PLANNING HISTORY

The significance of Sugarloaf Mountain and the protection of natural resource areas is well established in Frederick County's planning history.

1959 Land Use Plan

Frederick County's first Land Use Plan was approved in January 1959 and identified Sugarloaf Mountain proper as Recreation, with some of the surrounding woodland environment designated Conservation. Based on the 1959 Land Use Plan map, the zoning classification of C-1 Conservation was subsequently applied to Sugarloaf Mountain and the Furnace Branch stream valley. The purpose and intent of the C-1 Conservation zoning district was described in a March 1964 report by the Frederick County Planning Commission in the following manner: "*This district is created to protect watersheds and to provide permanent open space that will help organize and direct development and provide space for recreational use. It is to conserve geologic features, forest cover and historical sites for public educational purposes, and as an economic and recreational resource for the general welfare of the County.*"

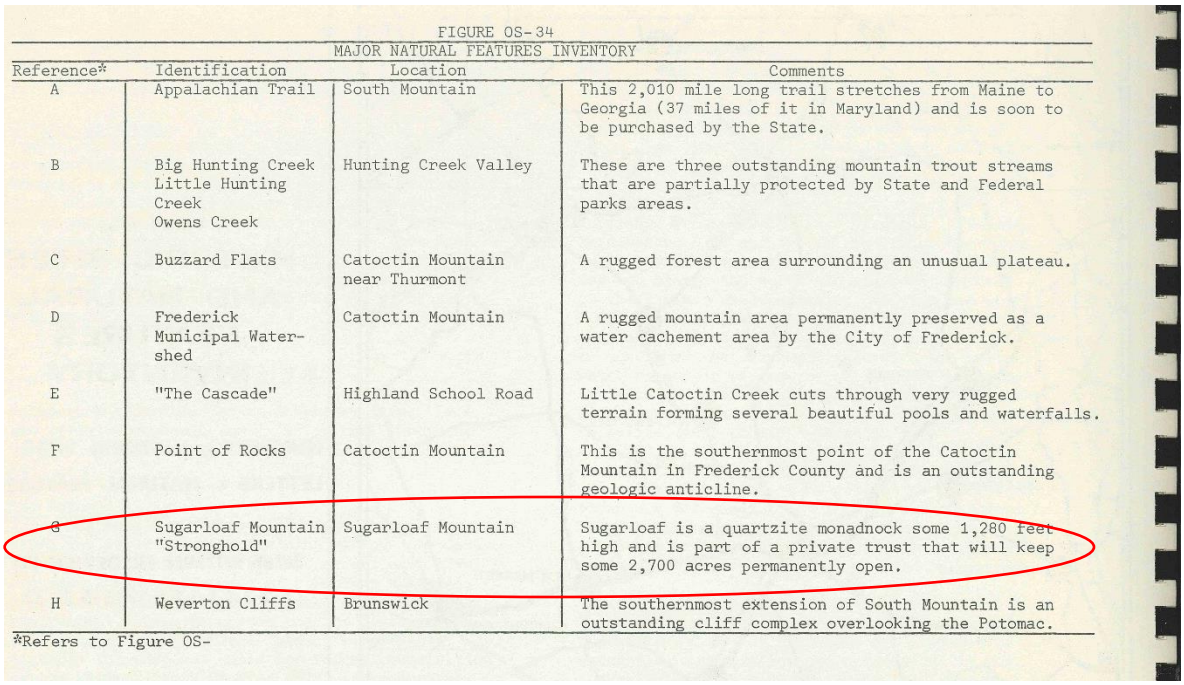


FIGURE OS-34

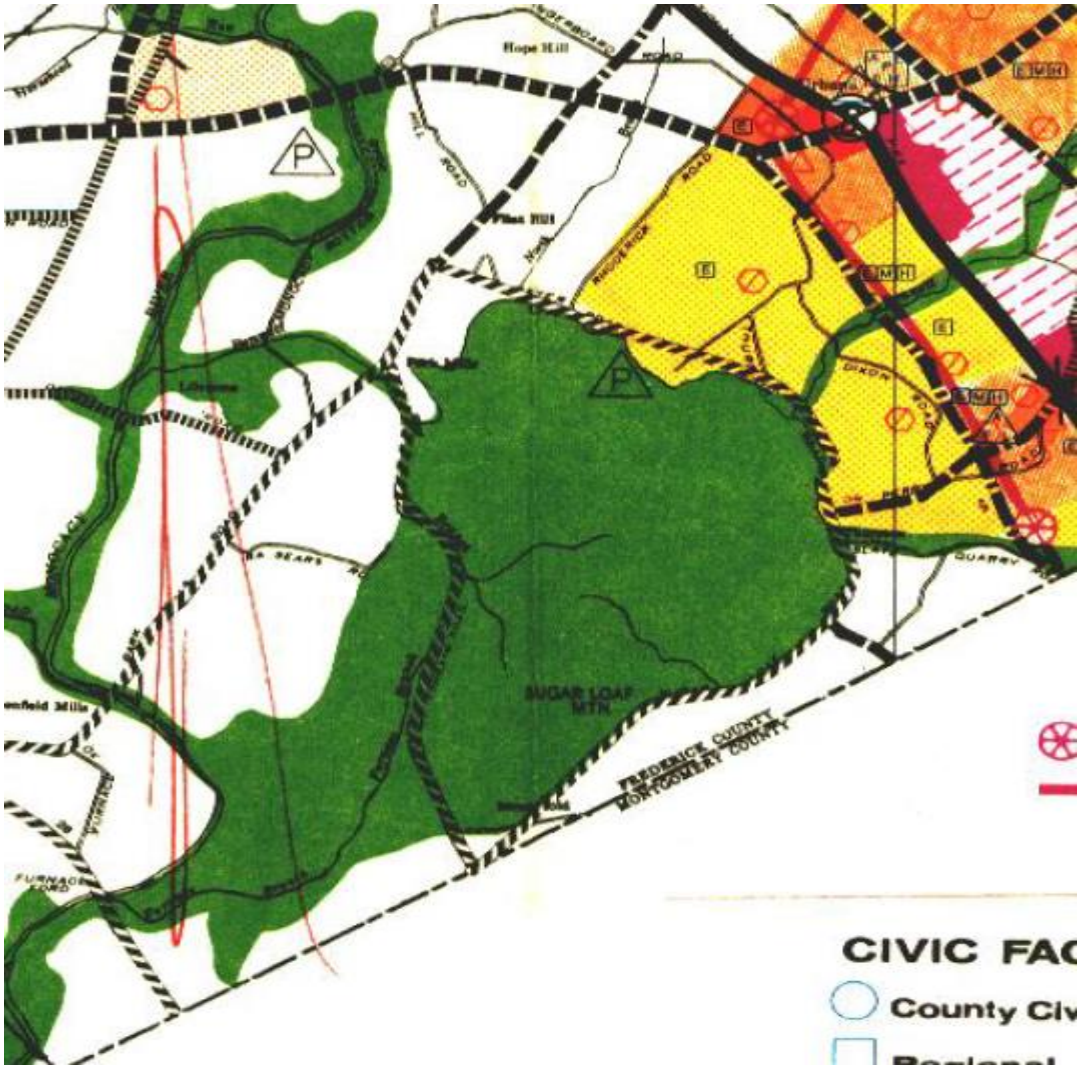
MAJOR NATURAL FEATURES INVENTORY

Reference*	Identification	Location	Comments
A	Appalachian Trail	South Mountain	This 2,010 mile long trail stretches from Maine to Georgia (37 miles of it in Maryland) and is soon to be purchased by the State.
B	Big Hunting Creek Little Hunting Creek Owens Creek	Hunting Creek Valley	These are three outstanding mountain trout streams that are partially protected by State and Federal parks areas.
C	Buzzard Flats	Catoctin Mountain near Thurmont	A rugged forest area surrounding an unusual plateau.
D	Frederick Municipal Water-shed	Catoctin Mountain	A rugged mountain area permanently preserved as a water cachement area by the City of Frederick.
E	"The Cascade"	Highland School Road	Little Catoctin Creek cuts through very rugged terrain forming several beautiful pools and waterfalls.
F	Point of Rocks	Catoctin Mountain	This is the southernmost point of the Catoctin Mountain in Frederick County and is an outstanding geologic anticline.
G	Sugarloaf Mountain "Stronghold"	Sugarloaf Mountain	Sugarloaf is a quartzite monadnock some 1,280 feet high and is part of a private trust that will keep some 2,700 acres permanently open.
H	Weverton Cliffs	Brunswick	The southernmost extension of South Mountain is an outstanding cliff complex overlooking the Potomac.

*Refers to Figure OS-

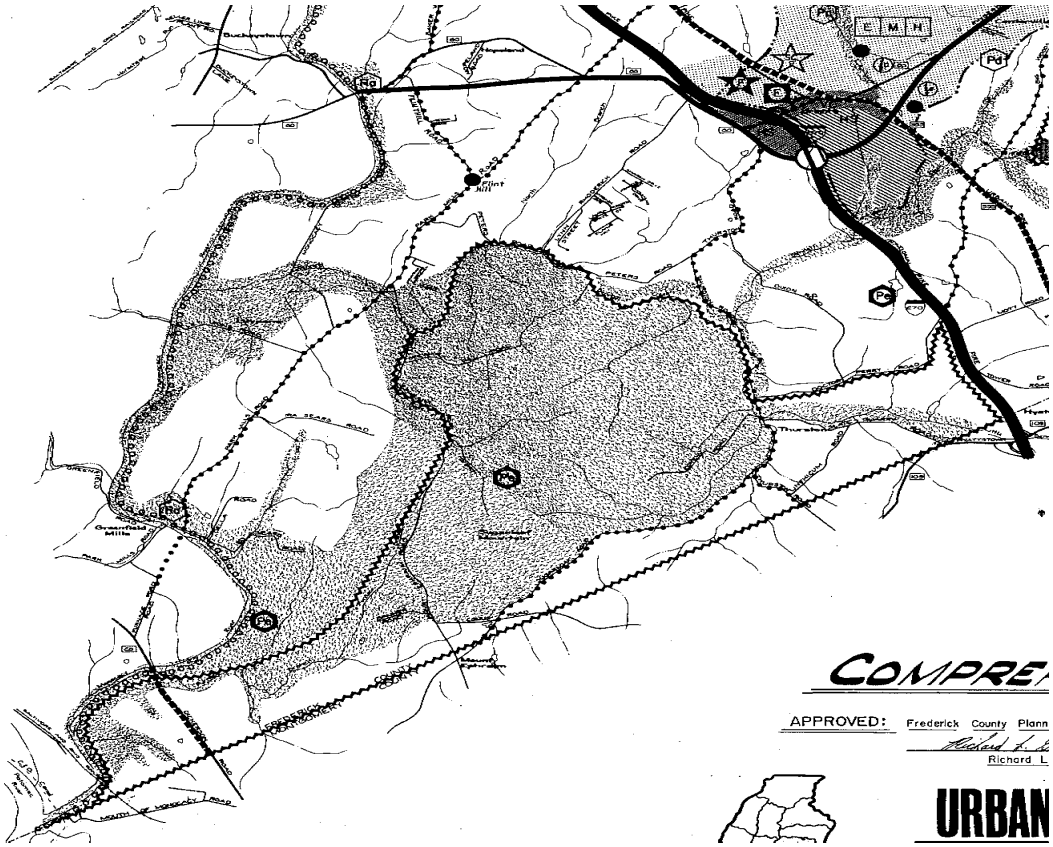
1970 Parks and Open Space Plan

A series of planning reports about the County's transportation network, parkland, open space, housing, and land use followed in the late 1960's, leading to the 1972 Comprehensive Plan. One of these background reports from 1970 (the "Parks and Open Space Plan") provided early policy guidance on environmental conservation and land use planning based on natural resources. A section entitled Natural Resources within this 1970 report states, "*Encroaching urbanization, inevitable though it is, must be shaped and controlled, so as to provide for the preservation of the County's natural resources. In addition to conservation of natural resources, it is imperative that outstanding scenic, historic, and natural beauty areas are protected so that future generations may enjoy them in an unspoiled and well-maintained state*." Describing the Urbana Region and Sugarloaf Mountain in particular, the 1970 report listed Sugarloaf Mountain as one of the eight "*most critical areas that should be preserved and for the most part this can be accomplished by appropriate zoning and through the use of other similar land use controls.*" Finally, the Parks and Open Space Plan from 1970 states, "*It is imperative that fairly large amounts of the Urbana Region remain open in order to conserve the natural resources and guide urbanization in this prime development area.*"



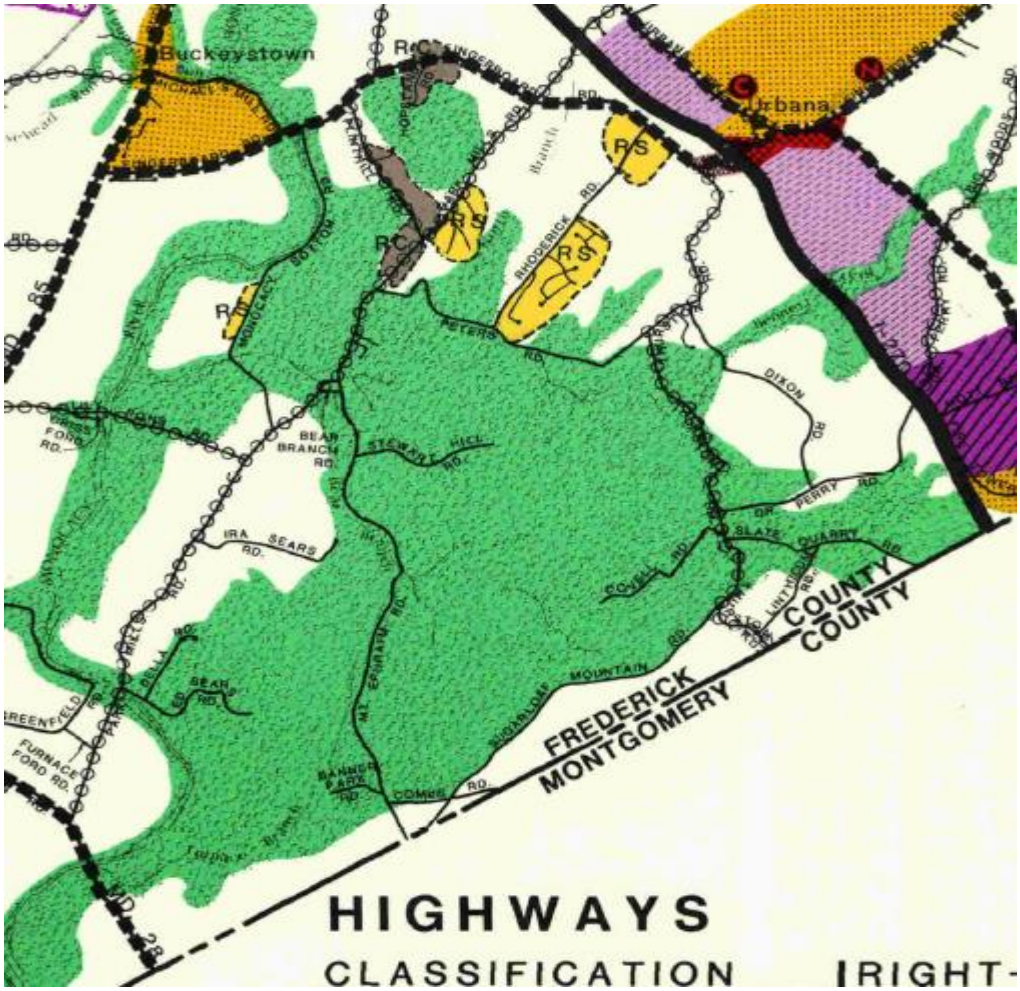
1972 Comprehensive Plan

The 1972 Countywide Comprehensive Plan depicted Sugarloaf Mountain and its close environs as Conservation on the land use map. The map also included a large area for future low-density residential development in close proximity to the mountain, from Peters Road to I-270. This 1972 residential growth area included a new roadway parallel to I-270 and one of the first depictions of the Corridor Cities Transitway, planned from Gaithersburg to Frederick. Surrounding the identified Conservation and Residential areas on the 1972 Plan were large areas with a Rural Reserve designation (shown in white), which included scattered residential development as well as forestlands and aquatic systems. The Rural Reserve land use plan designation was subsequently changed to the Agricultural/Rural designation in the 1984 Plan and has been in place since that time.



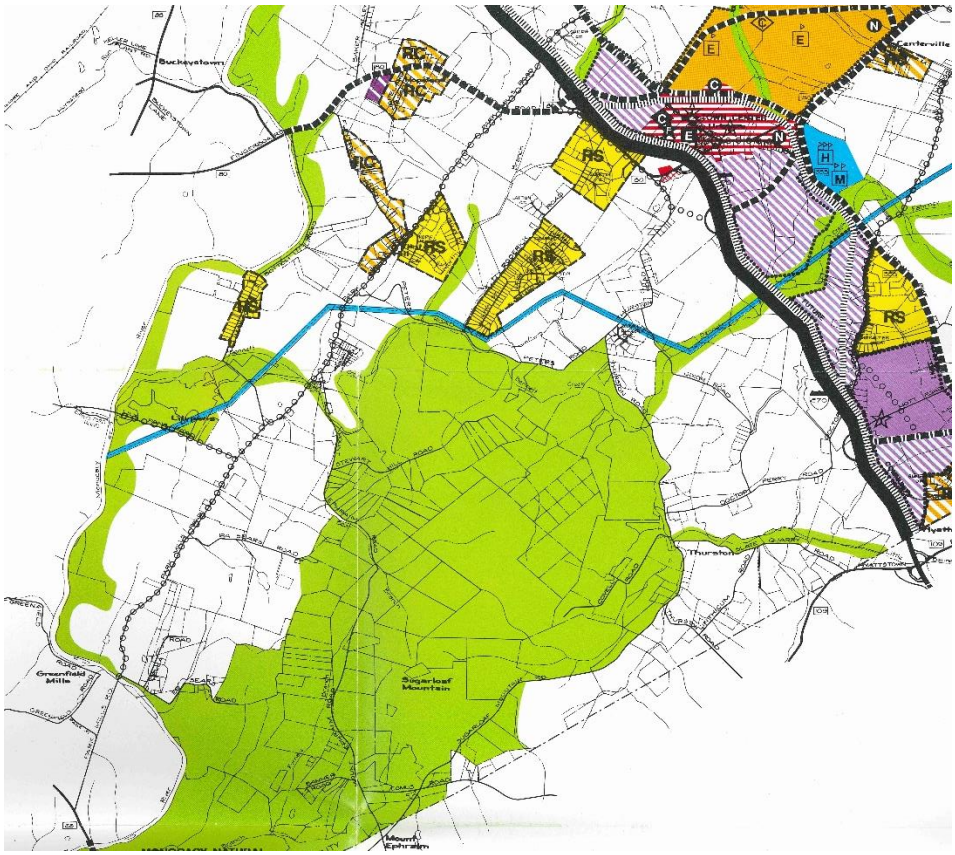
1978 Urbana Region Plan

In 1978 the first *Urbana Region Plan* was adopted. The plan identified a Sugarloaf Mountain Environmental Area as an area of "critical state concern" per legislation passed in 1974 by the Maryland General Assembly requiring all comprehensive plans to include such an element. The 1978 *Urbana Region Plan* applied the Conservation land use plan designation to the "Sugarloaf Mountain Environmental Area," and contained very brief descriptions of its characteristics, a mapped delineation, and current and future management techniques. Some of these techniques included the pursuit of scenic easements and the acquisition of sensitive lands by government agencies and other organizations. A notable feature of this 1978 Region Plan was the depiction of a new southern alignment for MD 80 (Fingerboard Road) from Park Mills Road to the Monocacy River. The presence of environmental features, such as steep forested topographical gradients, multiple stream systems, and an overhead powerline, prompted the removal of this road from future plans.



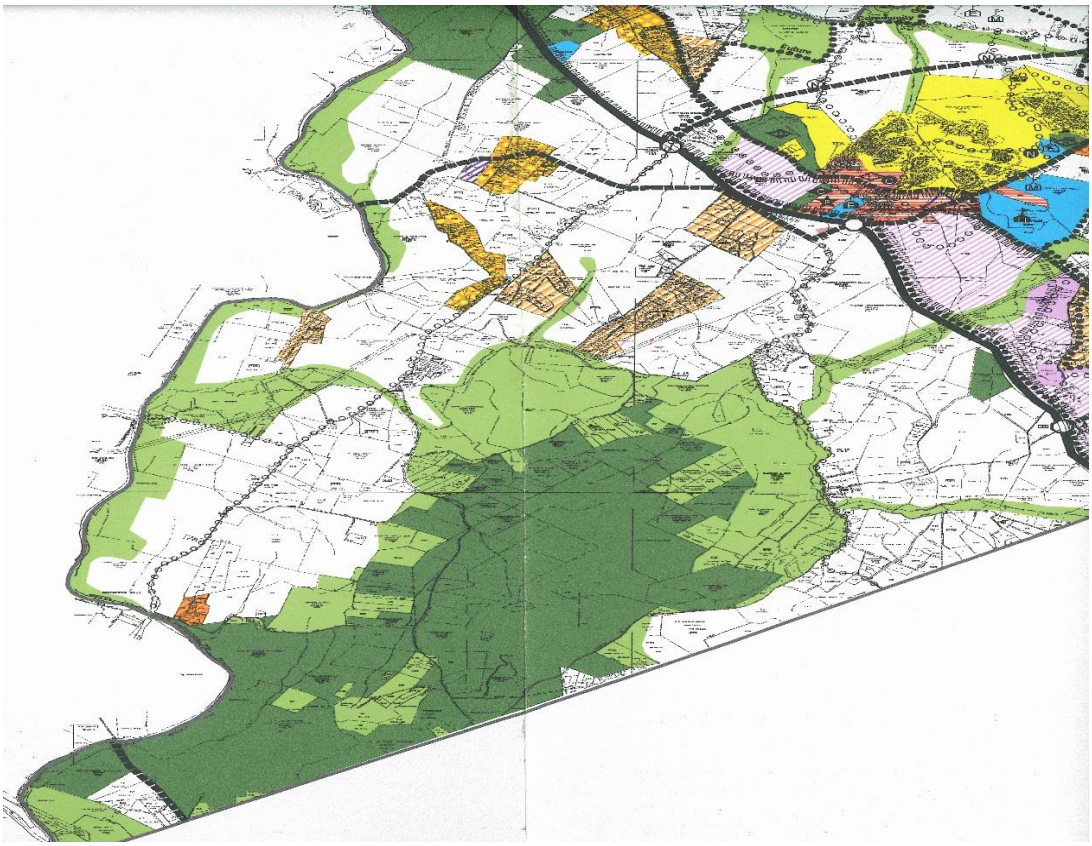
1984 Urbana Region Plan

Beginning with the 1984 *Urbana Region Plan* and continuing to the 2004 *Urbana Region Plan* and the 2010/2012 Countywide Comprehensive Plan updates, the Conservation land use plan designation in the Sugarloaf District was expanded through the use of aerial photographic analysis and GIS technology to more accurately depict the extent and location of the far-reaching forestlands and other resources in the area beyond the lands owned by Stronghold, Incorporated and the Maryland Department of Natural Resources. The 1984 Plan reflected the residential development that had occurred in the District through application of the Rural Subdivision designation and the Rural Community designation, which was applied to Flint Hill and Hope Hill. The Rural Subdivision designation was replaced with Rural Residential in the 2010 Countywide Comprehensive Plan.



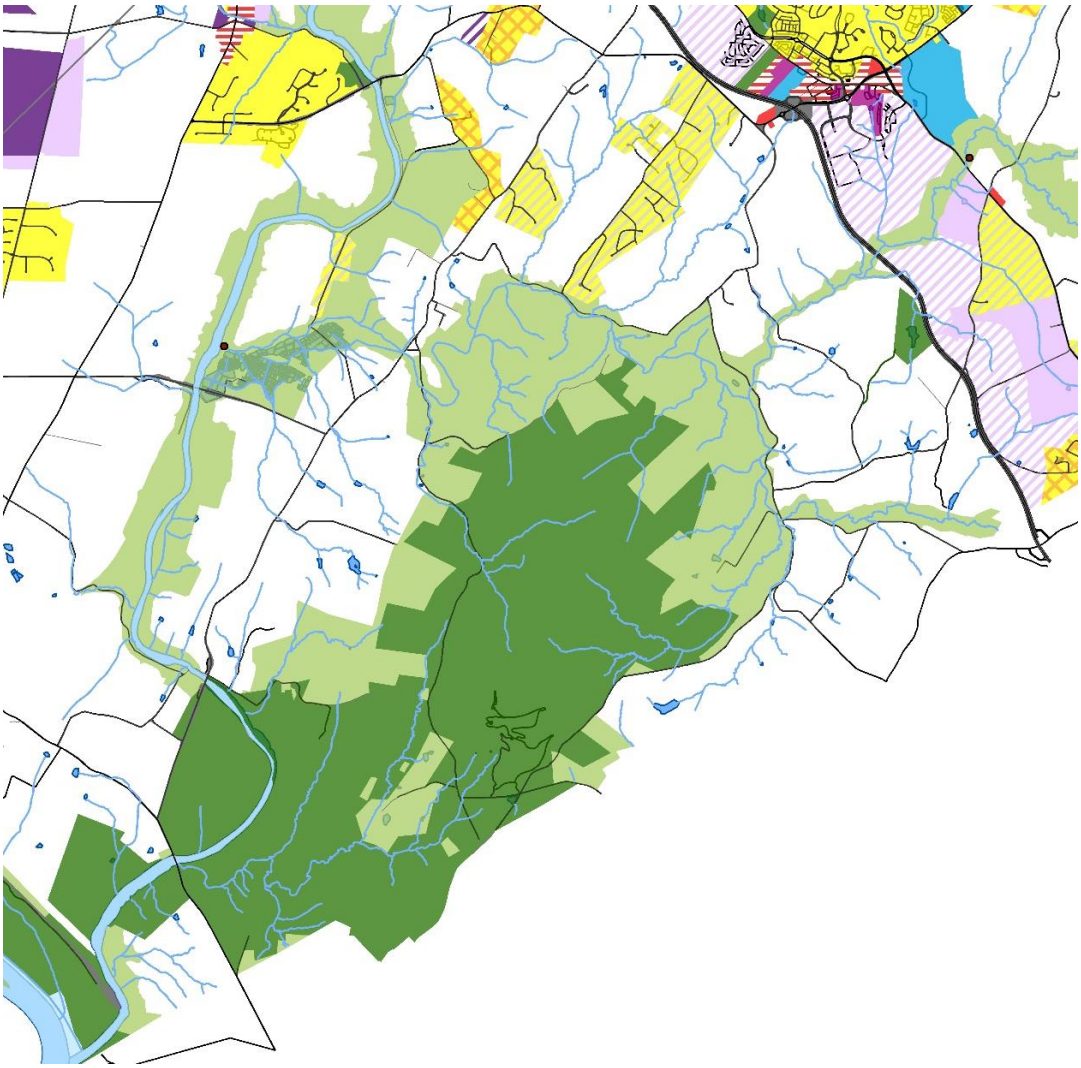
1993 Urbana Region Plan

The adopted growth scenario from the 1993 *Urbana Region Plan* supported the Community Concept in the Region by concentrating growth on the east side of I-270 in the Urbana and Green Valley communities. This scenario maintained the Conservation and Agricultural/Rural character of the west side of I-270 by focusing growth on the east side of I-270, where public water and sewer was proposed. The 1993 Plan also mirrors the Rural Subdivision and Rural Community designations on existing residential subdivisions and the Hope Hill and Flint Hill historic communities as established in the 1984 *Urbana Region Plan*. Employment areas along I-270 were still depicted and generally clustered around the three proposed interchanges (Mott Road/Dr. Perry Road; Park Mills Road; and a new MD 80 interchange south of the existing interchange) and were "*confined to the east side of I-270*." The Monocacy Natural Resource Management Area, Sugarloaf Mountain, and the Monocacy National Battlefield all were identified as Conservation areas and formed the basis for a larger conservation area west of I-270.



2004 Urbana Region Plan

The Monrovia and Urbana Growth Areas and the I-270 Employment Corridor were the major focal points in the 2004 *Urbana Region Plan*. The Plan continued to maintain the west side of I-270 as Agricultural/Rural and Resource Conservation. The Land Use Plan summary states, "*The Plan does not support the extension of public water and sewer or other public facilities that would increase the pressure to accommodate more intense development on the west side of I-270.*" The new land use designation, Public/Quasi-Public Parkland/Open Space, was applied to the lands owned by Stronghold, Incorporated and the State of Maryland. Pertinent policy statements from the 2004 Plan include: "*Maintain Urbana as the Regional Community with mixed uses and an appropriate level of community facilities. Maintain the area west of I-270 for conservation and rural and agricultural uses to protect Sugarloaf Mountain, the Bennett Creek Corridor, and other natural resources in the area.*"



2012 County Comprehensive Plan

The 2004 *Urbana Region Plan* added a Public/Quasi-Public Park or Open Space land use plan designation to distinguish natural resource areas, including lands with steep slopes and large forested tracts, from local, state, or federally owned parkland. This designation also included lands comprising Sugarloaf Mountain. These lands are shown in dark green on the 2012 land use plan map. Areas in light green are designated Natural Resource, which replaced Conservation in 2010.

Maryland's Designated Uses (COMAR 26.08.02)

- Use I: Water contact recreation and protection of nontidal water water aquatic life
- Use II: Support of estuarine and marine aquatic life and shellfish harvesting (not all subcategories apply to each tidal water segment)
    - Shellfish harvesting and subcategories unique to Chesapeake Bay only
- Use III: Nontidal cold water – usually considered natural trout waters
- Use IV: Recreational trout waters – water are stocked with trout

If the letter "P" follows the use class listing, that particular stream has been designated as a public water supply. The designated use and applicable use classes are found in the following table:

	Use Classes							
Designated Uses	I	I-P	II	II-P	III	III-P	IV	IV-P
Growth and Propagation of fish (not trout), other aquatic life and wildlife	✓	✓	✓	✓	✓	✓	✓	✓
Water Contact Sports	✓	✓	✓	✓	✓	✓	✓	✓
Leisure activities involving direct contact with surface water	✓	✓	✓	✓	✓	✓	✓	✓
Fishing	✓	✓	✓	✓	✓	✓	✓	✓
Agricultural Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Industrial Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Propagation and Harvesting of Shellfish			✓	✓				
Seasonal Migratory Fish Spawning and Nursery Use			✓	✓				
Seasonal Shallow-Water Submerged Aquatic Vegetation Use			✓	✓				
Open-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Channel Refuge Use			✓	✓				
Growth and Propagation of Trout					✓	✓		
Capable of Supporting Adult Trout for a Put and Take Fishery							✓	✓
Public Water Supply		✓		✓		✓		✓

Sub-Basin 02-14-03: Middle Potomac River Area.

Designated Use Class and Waterbody	Latitude	Longitude	Limits
(1) Class I-P: Potomac River and all tributaries except those designated below as Class III-P or Class IV-P	39.221736	-77.456451	From Frederick/Montgomery County line to confluence with Shenandoah River
(2) Class II: None.			
(3) Class III: None.			
(4) Class III-P:			
(a) Tuscarora Creek and all tributaries	39.458359	-77.375099	
(b) Carroll Creek and all tributaries	39.423513	-77.429438	Upstream of U.S. Route 15
(c) Rocky Fountain Run and all tributaries	39.332070	-77.422527	

(d) Fishing Creek and all tributaries	39.505696	-77.391445	
(e) Hunting Creek and all tributaries	39.550482	-77.358179	
(f) Owens Creek and all tributaries	39.579028	-77.332576	
(g) Friends Creek and all tributaries	39.719868	-77.389272	
(h) Catoctin Creek and all tributaries	39.450300	-77.562603	Upstream of Alternate U.S. Route 40
(i) Little Bennett Creek and all tributaries	39.279411	-77.314709	Upstream of MD Rt. 355
(j) Furnace Branch and all tributaries	39.243999	-77.439955	
(k) Ballenger Creek and all tributaries	39.362694	-77.410124	
(l) Bear Branch and all tributaries	39.292638	-77.405135	From confluence with Bennett Creek upstream
(m) Middle Creek and all tributaries	39.448829	-77.603343	Upstream of the confluence with an unnamed trib south of Geaslin Drive
(n) Unnamed tributary to Talbot Branch and all tributaries to this unnamed tributary	39.455887	-77.160651	Stream flows in southerly direction. Mouth of stream joins Talbot Branch near intersection of Black Ankle Road and Talbot Run Road
(o) Unnamed tributary to Talbot Branch and all tributaries to this unnamed tributary	39.454004	-77.154174	Stream flows in northwesterly direction. Mouth of stream joins Talbot Branch 500 meters east of the intersection of Black Ankle Road and Talbot Run Road
(p) Unnamed tributary to Big Pipe Creek and all tributaries	39.675821	-76.941553	Upstream from confluence with another unnamed tributary just south of Wine Road
(q) Bennett Creek and all tributaries	39.310961	-77.231394	From a point, 700 yards to the east of the intersection of Moxley and Clarksburg Road, upstream
(r) Unnamed tributary to Bennett Creek	39.303758	-77.286898	Near intersection of Prices Distillery Road and Haines Road
(5) Class IV: None.			
(6) Class IV-P:			
(a) Monocacy River and tributaries except those designated above as Class III-P	39.398435	-77.366868	Upstream of U.S. Rt. 40
(b) Catoctin Creek	39.309777	-77.567051	Mainstem only, from mouth upstream to Alternate U.S. Rt. 40
	39.450300	-77.562603	
(c) Israel Creek and all tributaries	39.327756	-77.682559	

EXECUTIVE SUMMARY

The impacts of climate change are being experienced regularly in the City of Frederick and Frederick County. These impacts were documented in detail in a series of articles published in the Frederick News Post between December 2020 and July 2021. Recent surveys of Frederick area stakeholders have revealed concerns about climate impacts and the threats they pose to human health, economically fragile neighbors and friends, business profitability, personal property and lifestyle preferences. Predictions from climate models have consistently underestimated the consequences of climate change, and yet these models currently predict that impacts will be increasingly destructive unless decisive action is taken very soon.

Following submission of a citizen-generated request for immediate local responses to the current and future threats of climate change, Climate Emergency Resolutions were adopted by The City of Frederick on March 11, 2020 and by the Frederick County Council on July 23, 2020. The goals of the resolutions are:

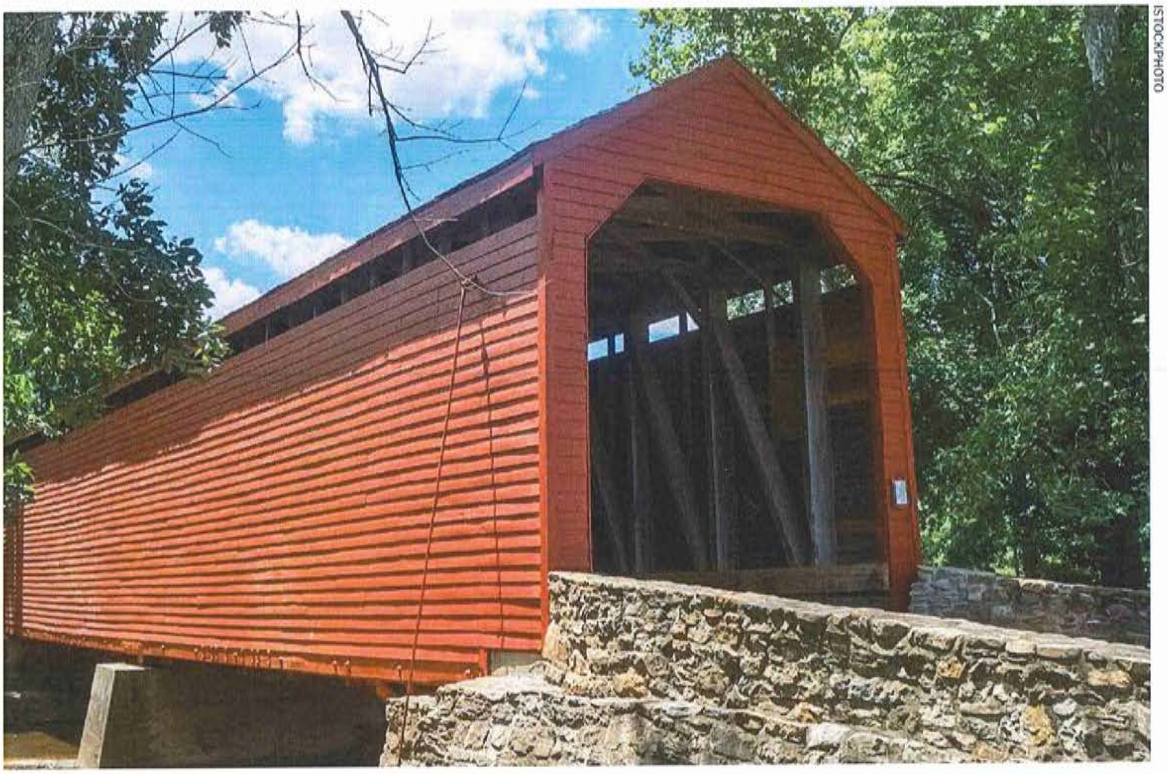
1. implement policy and legislative actions through the lens of climate change;
2. reduce County- and City-wide greenhouse gas (GHG) emissions to 50% of 2010 levels by 2030 and by 100% of 2010 levels by 2050;
3. employ efforts to safely draw down carbon from the atmosphere; and
4. develop climate adaptation measures.

The two governments requested that a joint workgroup (Climate Emergency Mobilization Work Group, CEMWG) be formed. Out of more than 70 applicants from the area, 17 members were originally selected with 14 of those still serving. These members have broad professional expertise and represent multiple industrial or commercial sectors of the community as well as the ethnic diversity from the City's and County's population. Four sub-groups, totalling 50 people, were also formed: Agriculture, Forestry, and Land Management (AFL); Energy, Transportation, and Buildings (ETB); Health, Extreme Weather Events, and Resilience (HWR); and Public Awareness and Outreach (PAO).

The CEMWG met twice each month from August 27, 2020 through May 27th (with the exception of once in December) on the second and fourth Thursday of each month. CEMWG attendance has averaged 82%. These bimonthly meetings featured subject matter experts and included progress reports from subgroups as well as consensus-driven problem-solving discussions about processes to employ, such as priority setting. A full list of speakers and topics are listed on the County Council's website, and include videos and powerpoint slides.

Main take-aways from the year together resulted in these major lessons:

- **Action on climate change is an economic imperative.** The total cost of climate-related disasters in the US last year was more than $95 billion, and that disaster-related damage is expected to grow



ISTOCKPHOTO

as storms continue to intensify, droughts become more severe, and natural systems are disrupted. Insurance companies and investors alike are pushing local governments to take action on climate and mitigate risk. Each recommendation includes cost-benefit information for this reason.

- **Governments that are setting and meeting climate action goals are innovative in their funding approaches.** Authors of recommendations included options for funding — more are likely available. Teeing up ideas now will position the City and County for increased funding competitiveness.

- **People do not experience climate change equally.** Some will lose their jobs as the economy shifts away from fossil fuels, and people who find themselves financially or medically insecure are already at high risk from the changing climate around us. We must make decisions that first do no harm, and intentionally help the most vulnerable people thrive by considering their needs first. As County Health Department officials stated, *preventing* exposures and threats to health is the most important means to *protect* residents, and any and all actions to ensure minimal encounters with illness-generating living conditions should be undertaken.

- **Making climate-responsible decisions that are within local governments' authority has rarely been so consequential — locally, nationally, and globally.** Our local governments must find ways to protect citizens, and have the power to develop land use policies and to determine how buildings are built. Local governments have extraordinary purchasing power and own property, buildings and vehicles, and can marshall communities together to incentivize major transformation. Our shared history as a nation is riddled with transformative changes brought about by small communities.

There is no time to waste. The chaos we are experiencing from weather events heretofore unheard of are happening faster than models suggest and will only get worse. Slashing GHG emissions and adapting to the changing climate are essential tasks right now.

CEMWG's recommendations fit into these main ideas:

- **Conserve as much as possible**
- **Electrify everything**
- **Restore and protect nature**
- **Build now for the future extremes ahead**

More details can be found at CEMWG's website, as well as the CEMWG Mobilize Frederick Twitter Account, and the CEMWG Mobilize Frederick Facebook Account.

Methods and Approaches

The CEMWG subgroups used approaches that are most relevant to their topical areas. AFL and ETB members focused their deliberations and activities on GHG emission reductions while HWR addressed potential remedies or adaptations to reduce climate impacts on public health, residents' properties and businesses, and the environment. PAO used media, surveys, and interviews to assess how residents and businesses were recognizing and adjusting to climate impacts.

CEMWG members recognized early in the process that many recommendations could be developed, but it was decided in the earliest stages of the work to submit high priority actions that address key criteria: expected impact on GHG emission reduction and/or resilience, equity, cost savings over time, and co-benefits, such as improved health, economic stability, and restoration of natural resources. Given the data available, actions that are suited to Frederick City and County have been deliberately chosen.

Next Steps

One concept CEMWG has discussed is "external" costs or "externalities," which are a feature of the fossil fuel-driven economy. These costs are not borne by the industries responsible for them — rather, they are passed on to society at large, and typically borne by people who can least afford them. For example, the air pollution of an incinerator is not a legal responsibility the incinerator company is expected to address beyond a certain amount, but the health and medical bills of the surrounding residents are seriously affected. This dynamic explains why Baltimore has some of the highest childhood asthma rates in the country, and why those rates are most significant in poor, Black families who live near incinerators.

Likewise, fossil fuels release greenhouse gases when they burn and cause illness in people who live near refineries, natural gas extraction facilities, and high traffic areas with minimal green infrastructure. These costs are passed on to all of us, but especially hurt people who are already vulnerable. To address these costs, the Social Cost of Carbon (SCC) is a concept used by the federal government and an increasing number of states to place a price tag on the damages caused to people and to the natural resources we all depend on. SCC is a powerful tool that guides policy makers to arrive at better decisions for the good of the community. For example, say new solar carports on school parking lots cost $8 million, and are projected to pay for themselves through energy savings within seven years, presenting a strong case for investment. The decision for this investment becomes even clearer when SCC is applied at $51 per metric

ton (the current federal rate) of carbon emitted by current energy use. Although using the federal rate to calculate costs and benefits in decision making does not appear in these recommendations, the Maryland legislature considered a bill (Climate Solutions Now Act), which would implement its use, further supported by analysis from the University of Maryland Department of Economics. Going forward, the County and City governments are urged to apply SCC at $51 per metric ton for evaluating all significant decisions.

Stakeholder feedback has been a critically important part of this exploration. Some stakeholder groups accepted the invitation to appoint representatives to serve as part of the CEMWG or a subgroup. Others made time available to meet with CEMWG representatives and share perspectives and provide specific feedback. In total, CEMWG members held more than 70 stakeholder meetings, and issued 6 surveys through stakeholder groups. More details on stakeholder engagement are provided in Appendix C and D. CEMWG members have made every effort to craft recommendations that are responsive to stakeholder preferences and concerns. To ensure optimal results, it's strongly recommended that these stakeholder outreach efforts continue as recommendations are implemented .

A final point: The formation of a County-City jointly supported Climate Response and Resilience Office (CRRO) is key to ensure future consideration, discussion, and adoption of the report's recommendations. There is an intensity of work required that current over-committed, hard-working City and County staff members will not be able to assume. The CRRO will work across both governments to identify the most urgent climate-related policies to pursue, provide needed technical insight and opinion for the governments' deliberations, track adoption and implementation, seek additional external financial support, and create and distribute progress/results to the public in simple-to-understand web-based dashboard graphics. The CRRO will provide the expertise needed to ensure future policies will be climate responsive by helping staff evaluate decisions through the lens of climate change.

There's a difficult environment ahead but there are multiple options to ameliorate the changing climate impacts through rapid actions and working together. Shared commitment throughout the community relies on public servants leading the way.

THE EFFECTIVE DATE OF THIS RESOLUTION IS July 21, 2020
RESOLUTION NO. 20-22

RESOLUTION OF
THE COUNTY COUNCIL
OF FREDERICK COUNTY, MARYLAND

Re: Climate Emergency

A RESOLUTION establishing a Climate Emergency Mobilization Workgroup and committing the Frederick County Council to consider policy and legislative actions through the lens of climate change.

WHEREAS, our present climate crisis poses an immediate and long-term threat to the well- being of all communities, including Frederick County; and

WHEREAS, the adverse impacts of climate change test our infrastructure, emergency and social services; influence our access to food, water, and energy; disrupt commerce and our quality of life; and

WHEREAS, the harm already caused by climate change demonstrates the effect temperature changes have had on ecological stability and safety, as attested by increased wildfires, floods, rising seas, climate refugees, diseases, droughts, and the ongoing mass extinction of species due to these changes; and

WHEREAS, restoring a safer and more stable climate requires an emergency mobilization to reach net zero greenhouse gas emissions within a few decades, to improve carbon sequestration, and to implement measures to protect people and nature from the adverse consequences of abrupt climate change; and

WHEREAS, Section 203 of the Frederick County Charter allows the Council to appoint special ad hoc committees for inquiry and fact finding.

NOW, THEREFORE, BE IT RESOLVED by the County Council of Frederick County, Maryland, that climate change is threatening our county, state, nation and the world as we know it.

AND BE IT FURTHER RESOLVED:

- That the Frederick County Council commits to implementing policy and legislative actions through the lens of climate change.

- That the Frederick County Council commits to equitable climate emergency mobilization efforts to address global warming, reduce county-wide greenhouse gas emissions 50% from 2010 levels by 2030 and 100% no later than 2050, and employ efforts to safely drawdown carbon from the atmosphere.

- That the Frederick County Council establishes an ad-hoc Climate Emergency Mobilization Workgroup in coordination with the City of Frederick to make recommendations to the County Council to achieve these emission goals.

- That the Workgroup will be comprised of the two sponsors of this resolution or their designees and members of the community who may include, but are not limited to, representatives of the following groups:

  Clean Water Action
  Climate Change Working Group
  Downtown Frederick Partnership
  Electric Vehicle Association of Greater Washington, DC (EVADC)
  Food Security Network
  Frederick County Building Industry Association
  Frederick County Chamber of Commerce
  Frederick County Farm Bureau
  Frederick County Food Council
  Healthy Soils Frederick
  Multifaith Alliance of Climate Stewards of Frederick County (MACS)
  Sierra Club Catoctin Group
  As well as representatives of public health, higher education, the scientific communities and other recognized and relevant stakeholders in the County.

- That the Workgroup will consider four main Climate Emergency concerns of specific relevance to Frederick County:

  - Energy, Transportation, and Buildings
  - Agriculture, Forestry, and Sequestration
  - Health and Extreme Weather Adaptation and Resilience
  - Public Engagement and Education

- That six months following the first meeting, the Climate Emergency Mobilization Workgroup will present a status report on the four main Climate Emergency concerns to the County Council on the progress of the Workgroup to date.

- That twelve months following the first meeting, the Climate Emergency Mobilization Workgroup will submit a final report to the County Council and to the public including legislative, administrative, and community recommendations to assist the County with meeting the goals of this resolution. Upon submission of this report, the County Council or their representatives, may submit questions/requests to the

workgroup for additional information. The workgroup will have eight weeks to respond to any requests after which time the workgroup will be dissolved.

- That the Frederick County Council will communicate with and educate the public about the climate emergency, including the efforts of the Climate Emergency Mobilization Workgroup.

- That this Resolution shall take effect on __July 21_____, 2020.

The undersigned hereby certifies that this Resolution was approved and adopted on the _21st_ day of __July_____, 2020.

COUNTY COUNCIL OF

FREDERICK COUNTY, MARYLAND

By: M.C. Keegan-Ayer

M.C. Keegan-Ayer, President BB

Stronghold Survey District Form (pp 1-12) (survey file F-7-32)

F-7-32
Stronghold Survey District Ca. 1812; 1900–1954
Dickerson vicinity
Private; some public access at regular times

The Stronghold Survey District, covering about 400 acres including the southern slopes and the summit of Sugarloaf Mountain, contains the principal buildings associated with Henry Gordon Strong (1869–1954) who developed a private enclave with two large Georgian Revival mansions and a network of trails, overlooks, and formal gardens for the benefit of his family and the education of underprivileged children from Chicago. For the more specific education of children both local and from Chicago, Strong built and funded a vocational school and two local schools, one of which, the Halstead School, is located within the survey district. The district also includes a designed plaza at the intersection of Comus and Sugarloaf Mountain Roads, surrounded by the Georgian Revival vocational school, now the headquarters of Stronghold, Inc., which operates the Sugarloaf Mountain Park as a public access nature conservancy, and several vernacular buildings, some occupied as residences by park employees, and others used as storage and maintenance buildings. Most structures date from the period about 1910–1930, but two of the dwellings on or near the plaza have some log structure and could date as early as the first decade of the 19th century. The Strong Mausoleum, a stone funerary structure built about 1954, is located within sight of the plaza.

The content in the Stronghold Survey District Form is for informational purposes only, not regulatory.
This survey form was completed without the involvement of the owner.

F-7-32
Stronghold Survey District
Dickerson
Frederick County

Historic Context:

MARYLAND COMPREHENSIVE HISTORIC PRESERVATION PLAN DATA

Geographic Organization: Piedmont
(Harford, Baltimore, Carroll, Frederick, Howard, Montgomery Counties, and Baltimore City)

Chronological/Development Period:
Industrial/Urban Dominance, A.D. 1870-1930

Prehistoric/Historic Period Themes
Architecture, Landscape Architecture and Community Planning
Social/Educational/Cultural

Resource Types:

Category: District

Historic Environment: Rural

Historic Function and Use:
Domestic/single dwelling/residence
Domestic/single dwelling/mansion
Education/school/schoolhouse
Education/school/technical school
Recreation and Culture/outdoor recreation/park
Agriculture/subsistence/agricultural outbuilding & barn

Known Design Source: None

M110 P26

MARYLAND INVENTORY OF HISTORIC PROPERTIES

Survey No. F-7-32

Magi No.

DOE __yes x no

Maryland Historical Trust State Historic Sites Inventory Form

1. Name (indicate preferred name)

historic

and/or common Stronghold Survey District

2. Location

street & number 7900 blk. Sugarloaf Mountain Road at Comus Road ___ not for publication

city, town Dickerson x vicinity of congressional district 6th

state Maryland county Frederick

3. Classification

Category	Ownership	Status	Present Use	
x district	___ public	x occupied	___ agriculture	___ museum
___ building(s)	x private	___ unoccupied	___ commercial	___ park
___ structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	x yes: restricted	___ government	___ scientific
	___ being considered	___ yes: unrestricted	___ industrial	___ transportation
	x not applicable	___ no	___ military	x other: recreation conservation

4. Owner of Property (give names and mailing addresses of all owners)

name Stronghold, Inc.

street & number 7901 Comus Road telephone no.:

city, town Dickerson state and zip code Md. 20842

5. Location of Legal Description

courthouse, registry of deeds, etc. Frederick County Courthouse liber

street & number 100 W. Patrick Street folio

city, town Frederick state Md. 21701

6. Representation in Existing Historical Surveys

title MHT Inventory of Historic Properties Sugarloaf Mt. Historic District (F-7-120)

date 1977 ___ federal x state ___ county ___ local

depository for survey records Md. SHPO

city, town Crownsville state MD

7. Description

Survey No. F-7-32

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	_x_ original site
_x_ good	___ ruins	_x_ altered	___ moved date of move _____
___ fair	___ unexposed		

Prepare both a summary paragraph and a general description of the resource and its various elements as it exists today.

CONTRIBUTING RESOURCE COUNT: 13

The Stronghold Survey District encompasses approximately 400 acres on the southern slope of Sugarloaf Mountain, including the 1,282-ft. summit, part of the lands of the Sugarloaf Mountain Park, a privately endowed nature conservancy area and National Natural Landmark, just north of the Frederick-Montgomery County boundary in Frederick County, Maryland. The district is primarily heavily wooded mountain land laid out with winding drives, hiking trails, and paths interspersed with scenic overlooks built of the natural stone of the mountain, but it also includes 13 principal structures built mostly from about 1910 to about 1930, with a few surviving buildings of the last quarter of the 19th century and a 1954 stone mausoleum. The early 20th century buildings and the park structures are associated with Henry Gordon Strong (1869-1954) and his efforts and plans to create a private enclave on Sugarloaf Mountain. The buildings include his own stone mansion, a Georgian Revival design by Philadelphia architect Percy Ashe; Westwood, a somewhat smaller mansion in the same general style built for Mrs. Ella Denison, Strong's sister; a brick vocational school building erected as part of Strong's philanthropic interests; the Halstead School, also erected by Strong and moved to the vicinity of the park entrance in 1991; a frame barn, three dwellings, two of which predate 19(and one of which was moved from its original location near the barn; and the stone mausoleum in which Strong and his wife are buried, built in 1954. The concentration of buildings is around the intersection of Comus Road and Sugarloaf Mountain Road, at which is located a paved plaza set off by Georgian Revival design brick gates and walls with the more rustic entrance to the park on the north side and the vocational school on the south side. The buildings are in active use as the park headquarters and the homes of the Stronghold corporation's employees or, in the case of the Strong Mansion, as a rental property for private parties and meetings. The park is heavily visited on weekends and for special events during the year. Dates for the buildings were provided principally by Mr. Benjamin Smart, the park superintendent, based on his research in land records, personal interviews with local residents, and newspaper research on the Strong family.

The 400-acre survey district is part of a much larger area of several thousand acres including both Stronghold, Inc. lands and private properties which is the subject of a National Register nomination effort by the Sugarloaf Regional Trails, a volunteer organization of citizens interested in the conservation of the entire Sugarloaf Mountain area, including both the natural and built environment, for recreational and educational purposes. This nomination project has been on-going since the late 1970's and the latest document produced by the group is currently being revised for submission to the Governor's Consulting Committee. This inventory form is intended to document the Stronghold buildings in a more detailed manner than the multiple-resource approach of the NR nomination. Several of the privately owned individual buildings being covered by the NR nomination are the subjects of separate inventory forms. The inventory list for the Frederick County Urbana Planning Regic

8. Significance

Survey No. F-7-32

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	_x_ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	_x_ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	_x_ architecture	___ education	___ military	_x_ social/ humanitarian	
___ 1700–1799	___ art	___ engineering	___ music	___ theater	
_x_ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ transportation	
_x_ 1900–	___ communications	___ industry	___ politics/government	___ other (specify)	
		___ invention			

Specific dates C. 1812; 1902-1954 **Builder/Architect** Percy Ashe, architect

check: Applicable Criteria: _x_A _x_B _x_C __D
and/or
Applicable Exception: __A __B __C __D __E __F __G

Level of Significance: __national _x_state __local

Prepare both a summary paragraph of significance and a general statement of history and support.

The Stronghold Survey District is highly significant in the theme of architecture for the variety of structures and styles represented in the buildings. The Strong Mansion and Westwood, the formal gates and the vocational school building reflect the Georgian Revival style designs of Percy Ashe, the Philadelphia architect for Henry Gordon Strong (1869-1954), the owner and guiding spirit of the Sugarloaf Mountain enclave which is included in the 400 acres of the survey district. They are representative of Strong's concept of a private architectural village in which he could indulge his appreciation of nature, the arts, and philanthropy. In addition to these high style buildings of the period 1911-1928, the district contains vernacular structures, some partially of logs and most in frame, of the period about 1850-1900, although exact dates are yet to be determined. These include the Halstead School, a barn and a garage, and three dwellings, one of which, the Snyder Cottage, was probably the work of the architect Ashe in about 1909. In addition to Ashe, the landscape architect Robert Marshall was responsible for the overlooks and hiking trails on the mountain slopes and the formal gardens near the Strong Mansion. The district is also representative of the early 20th century conservation efforts of Strong, whose wealth allowed him to acquire over several years from 1899 to about 1910 the summit and surroundings of Sugarloaf Mountain whose striking location with views over the Potomac and Monocacy Valleys and isolated elevation provided a natural landscape of rocks, wooded areas, and farms in which Strong wanted to establish a private reserve for his family's benefit, but also to pursue philanthropic goals involved in his inheritance. In this natural setting, Strong wanted to establish a school for underprivileged boys from Chicago, his hometown, where they could have a basic education and learn skills to support themselves. This involves another theme, education, in which the survey district is also significant. Although Strong's educational aims were not unique, the Buckingham School for Boys near Buckeystown having been established in the 1890's by the Baker family, his vision of locating the schools in an environment of natural and designed features under his supervision and guidance was very enlightened for the first decade of the 20th century. In reality, Strong's goals were only partially achieved. The planned Georgian Revival mansion for himself was completed as only one wing of the design. The vocational school apparently did not operate for a prolonged period, but Strong did build at least two schools both for his Chicago boys and also for the use of local children, funded and furnished largely by him. One of these, the Halstead School, is within the survey district, having been moved twice.

9. Major Bibliographical References

Survey No. F-7-32

MHT Inventory form F-7-120 Sugarloaf Mountain Historic District
Smart, Mr. Benjamin, Superintendent, Stronghold, Inc.

10. Geographical Data

Acreage of nominated property 400 acres
Quadrangle name Buckeystown, Md.-Va. **Quadrangle scale** 1:24000

UTM References do NOT complete UTM references

	Zone	Easting	Northing		Zone	Easting	Northing
A				B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

Approximately 400 acres as shown on the attached quad map section, encompassing the mountain summit, the principal trails and drives and the buildings associated with Gordon Strong's ownership.

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Janet L. Davis, Historic Sites Surveyor

organization Frederick County Planning & Zoning Dept. **date** September 1993

street & number 12 E. Church Street **telephone** 696-2958

city or town Frederick **state** MD 21701

The Maryland Historic Sites Inventory was officially created by an Act of the Maryland Legislature to be found in the Annotated Code of Maryland, Article 41, Section 181 KA, 1974 supplement.

The survey and inventory are being prepared for information and record purposes only and do not constitute any infringement of individual property rights.

return to: Maryland Historical Trust
Shaw House
21 State Circle
Annapolis, Maryland 21401
(301) 269-2438

MARYLAND HISTORICAL TRUST
DHCP/DHCD
100 COMMUNITY PLACE
CROWNSVILLE, MD 21032-2023

PS-2746

Stronghold Survey District
Frederick County

Survey No. F-7-32

7.1 Description

should be consulted for further information on other individual sites in the vicinity of Sugarloaf Mountain.

Following are brief descriptions of the principal buildings in the survey district:

Strong Mansion: The three-story concrete and stone mansion built in 1911 is the west wing of a much larger symmetrical Georgian design by Percy Ashe with terraces, balustrades, and formal gardens surrounding it. Completion of the entire composition was canceled reportedly by internal family objections to the scale and ostentation of the proposed structure. The existing building is a roughly square plan, hipped roof building with three bays on the west elevation. The walls are ashlar stone and the roof, although not clearly observed in this survey, is probably slate. The entrance is in the center bay on the ground floor, sheltered by an entry portico. The windows on the second story have blind arches in the stone above each opening. French windows fill the second story openings and the third story has smaller casement windows. The interior was not accessible for this survey; however, a photograph of the drawing room or living room published in a 1979 Frederick News-Post article shows a formally designed space with large floor to ceiling French windows with fanlights and furniture probably mostly Classical Revival or Neo-Classical in style.

Westwood: The smaller Georgian Revival mansion was built about 1913 for Gordon Strong's sister, Mrs. Ella Denison. It is currently the home of the park superintendent. The two story mansion has five bays and a full-height columned portico over the center three bays. The walls are plastered and the ground floor windows have blind arches and casements as in the Strong Mansion, although on a smaller scale. The center bay on the first story has a fanlighted entrance and the second story center bay has a decorative cast iron window basket railing. The roof, not visible from the park road in front of the building, is probably hipped and covered with slate. The interior was not accessible for this survey.

Vocational school (Park Administration offices): The long, rectangular, one-story brick school building erected about 1915 is located on the south side of the plaza at the intersection of Comus and Sugarloaf Mountain Roads. It has a center entrance to a hall which originally gave access to the two sides of the building in which were located workshops and classrooms. The exterior has windows in a regular progression along the north side flanking the slightly projecting center bay and entrance. Subsidiary entrances with molded Classical Revival surrounds are located at the east and west ends of the north elevation. The interior was not fully accessible for the survey, but at least some rooms have been partitioned for use as offices.

Snyder Cottage: The 1-1/2 story frame Colonial Revival Cape Cod house was built about 1909, probably to house school employees or students at the vocational school. It stands on the east side of the plaza at the point of

Stronghold Survey District Survey No. F-7-32
Frederick County

7.2 Description (Continued)

intersection between the two roads meeting at the plaza. It is currently occupied by Stronghold personnel as living quarters. It has a three-bay west elevation with clapboard siding and a shingle roof with three dormers on the west side. The center entrance has a pediment above the door and a molded architrave.

Plaza gates: Located in front of the Snyder Cottage and on the opposite or west side of the plaza are two formal gateways in the Georgian Revival style with brick wing walls topped by stone caps. The eastern gate has globe finials and a wood picket gate. The western one has a decorative cast iron gate, through which a man-made pond is visible in the western quadrant of the plaza. The gates were presumably designed by Percy Ashe, as were most of the early 20th century buildings, and built about 1910-1915.

Baxter House: The Baxter House is located on the south side of Comus Road east of the vocational school and southeast of the Snyder Cottage. It was possibly built about 1900 and was originally located about 75 yards northwest of its present location within the current park entrance, the location being marked by the free-standing stone chimney stack left when the house was moved about 1914. It apparently had some log structure in its original form, indicating that it may have been a smaller, mid-19th century building to which the frame surviving section was added in the last quarter of the 19th century. Currently it has five bays with a center entrance under a cantilevered hood and artificial siding. The sash is 6/6 flanked by replacement shutters. The Baxter House was Strong's original residence prior to the erection of the mansion. It is occupied as a residence by a park employee.

Halstead School: The frame one-story schoolhouse is currently located north of the park entrance, having been moved twice since its construction about 1910. Its original location was possibly just on or over the Montgomery County border and was moved in the mid-20th century to a position behind the vocational school temporarily until plans for its restoration could be finalized. In 1991, it was moved to its present location and its exterior was rehabilitated. The interior is not yet complete and plans are to use the school as an interpretive display area about Sugarloaf and its history. The school is in the typical late 19th century-early 20th century form of rural schoolhouses, having a gable facade with three bays and large 6/6 windows. The side elevations have three bays each. The exterior is covered with board and batten and a modern replacement wood porch rises to the center entrance, a paneled door under a plain transom. A small gable window lights the attic level. The school was named for Strong's mother, whose maiden name was Halstead.

Barn: The one-story frame barn is a rectangular frame structure which was built about 1910, although parts of it may pre-date Strong's ownership, since it was associated with the Baxter House. Currently it is a long, shingled building with attached storage sheds incorporated in it. Some of these have open sides on the south, while others have sliding or garage-type doors.

Garage: Located directly east of the barn is a frame garage, probably also dating from about 1910. It has vertical board siding and sliding doors on the west gable end.

Stronghold Survey District
Frederick County

Survey No. F-7-32

7.3 Description (Continued)

Mausoleum: The small stone mausoleum was built in 1954 after Strong's death. It has ashlar limestone walls and an entrance on the south gable end. The roof is covered with wood shingles. The entrance has a cast iron gate through which the interior with the undecorated tombs of Strong and his wife, who died in 1949.

Farm Cottage: The 1-1/2 story building was not closely observed for the survey, but the park superintendent described it as having some log structure with alterations in about 1948. It is said to have served as a field hospital in the Civil War during a skirmish near an observation post on the mountain in 1862. In 1977, its date was estimated by Sugarloaf Regional Trails as 1812, but no descriptive information was provided at that time to support this date. Further examination is required.

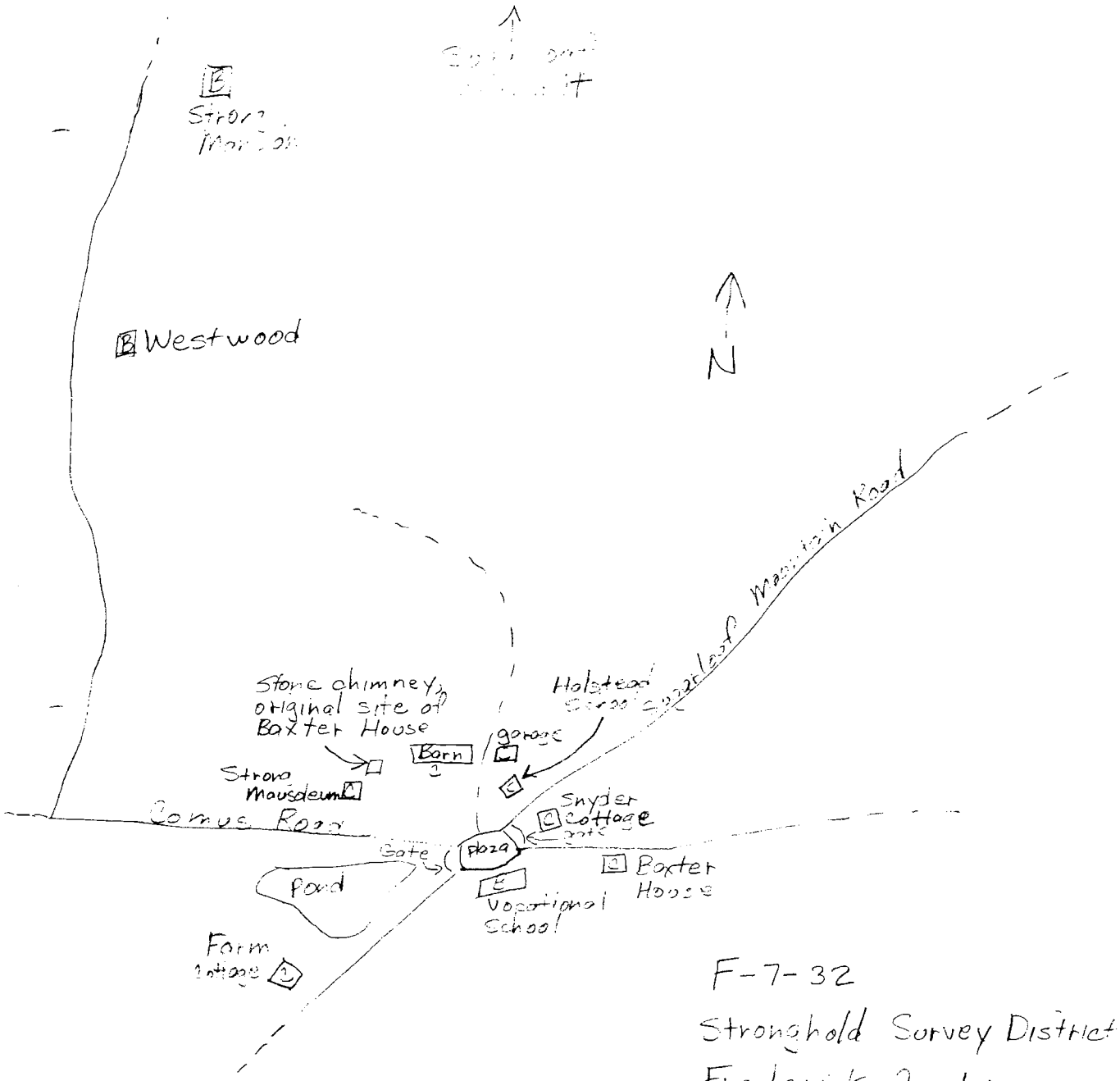
Formal gardens, trails and overlooks: The many trails and overlooks around the mountain summit include four scenic viewpoints, West View, East View, Potomac Overlook, and Bill Lambert Overlook. They are terraced and buttressed with native rock from the mountain and are designed to blend with the natural surroundings. Near the Strong Mansion are formal gardens with terraces, planting beds, balustrades, and lawns. All of these features were the work of Robert Marshall, landscape architect, in the period 1910-circa 1920.

Stronghold Survey District
Frederick County

Survey No. F-7-32

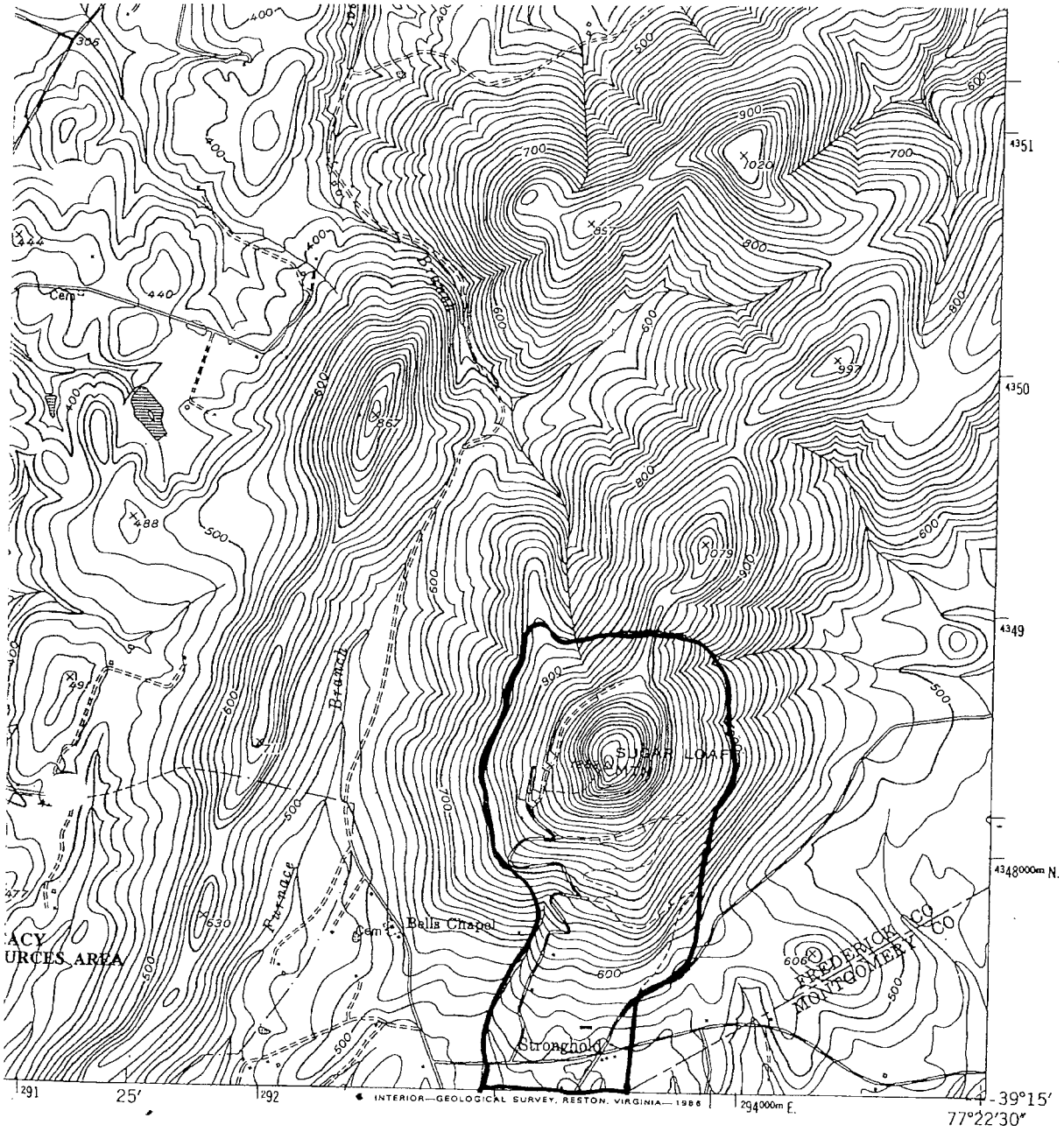
8.1 Significance (Continued)

The Stronghold Survey District is unique in Frederick County, but its statewide context is unclear. Certainly wealthy patrons established private schools in other parts of the state. One example is the Tome Institute in Cecil County, which is a National Register-listed property of the early 20th century with architectural and educational significance. The Buckingham School for Boys in Frederick County is another NR-listed complex of the same importance. Stronghold may be the only such assemblage of both natural and built features under the themes of architecture, landscape architecture, and education.



F-7-32
Stronghold Survey District
Frederick County

Janet Davis
September 1993
Not to Scale



F-7-32
Stronghold Survey District
Frederick County
USGS Buckeystown, Md.-Va.
1:24000

Planning Area Demographic Profile

Sugarloaf Planning Area

Suglarloaf Treasure Landscape Management Plan - Community Profile

Households and Population

890

Homes

Average Household Size (based on occupied housing units):

2.71 Countywide | 2.82 Sugarloaf Area

The households that are located within the Sugarloaf Planning Area comprise nearly 1% of the County's total number of households.

The Sugarloaf Planning Area has a total of 2,400 residents, representing about 1% of the County's total population.

Single, female-headed households are slightly more prevalent in the County (22%) than in the Sugarloaf Planning Area (19%).

Sugarloaf Planning Area: Owners vs. Renters

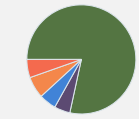
86% are homeowners

14% are renters

Age and Race

- The **median age** in the Sugarloaf Planning Area is 50, compared to 40 in the County.
- **40%** of residents in the Sugarloaf Planning Area are **55 and older**. Only **18%** are under 18 years of age.

Sugarloaf
Race and Ethnicity

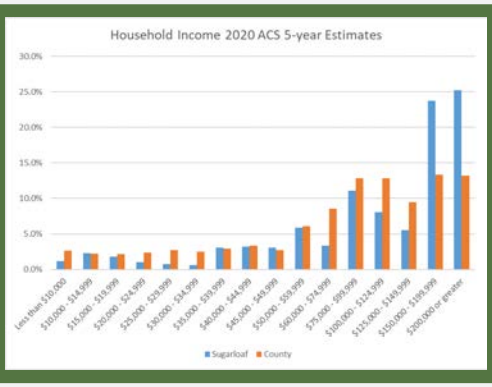


White	78
Black/Afr.Amer.	5
Asian	5
Hispanic	6
Other race	5

County
Race and Ethnicity

White	68%
Black/Afr.Amer.	10%
Asian	5%
Hispanic	12%
Other race	6%

Education and Income



49% of Sugarloaf residents have post-secondary education with Bachelor's, Graduate, or Professional degrees compared to 41% in the County.

63% of households earn $100,000 or more, compared to 49% in the County.

The Sugarloaf Planning Area's **median household income** of $123,800 is 26% **higher** than in the County as a whole.

SOURCES
US Census 2020 | 2020 American Community Survey (ACS) 5-Year Estimates
Prepared by: Livable Frederick Planning and Design Office, Division of Planning and Permitting, 30 North Market Street, Frederick, MD 21701

Note: The Sugrarloaf Planning Area is defined by the Census Tract 752201, which also includes a small area to the southwest adjacent to the Planning Area.

www.livablefrederick.org

June 2022

Livable Frederick Planning and Design Office
Division of Planning and Permitting
Frederick County Government

30 North Market Street
Frederick, MD 21701