

Element 9: Environmental Resources

Goals and Objectives

Goal: Continue to protect and maintain the recognized environmental resources and natural ecosystems in the Freedom area by administering land use practices that are in balance with, and minimize the effects on, the designated conservation areas.

Objective 1: Ensure that public and private land development, redevelopment, and use comply with applicable federal, state, and local environmental regulations.

Objective 2: Encourage responsible environmental stewardship through the County's goals, policies, programs and regulations.

Objective 3: Develop conservation goals, policies, programs and regulations based on verifiable science and on sound economics.

The Freedom Community Planning Area (CPA) shares its northern boundary with the Morgan Run Natural Environmental Area, the Liberty Reservoir and its wooded buffers to the east, and the wide floodplain and forested slopes of the South Branch Patapsco River to the south. These areas are transected by stream valleys, some with mature forests. Located west of MD 32, the Piney Run Reservoir and Park further contributes to the community's overall sense of character, through its conserved resources, including wetlands, forested areas, and open fields.

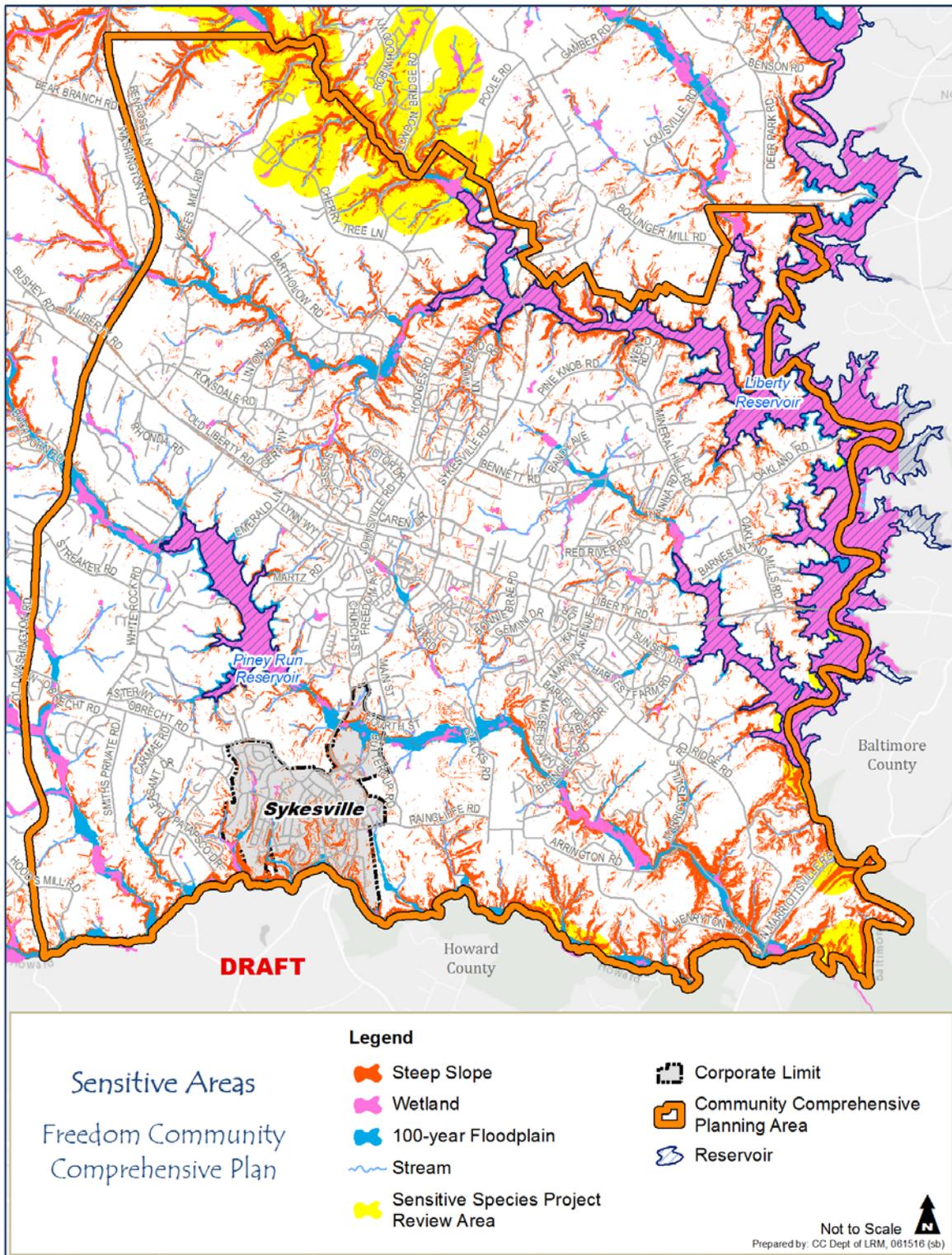
Environmental Features

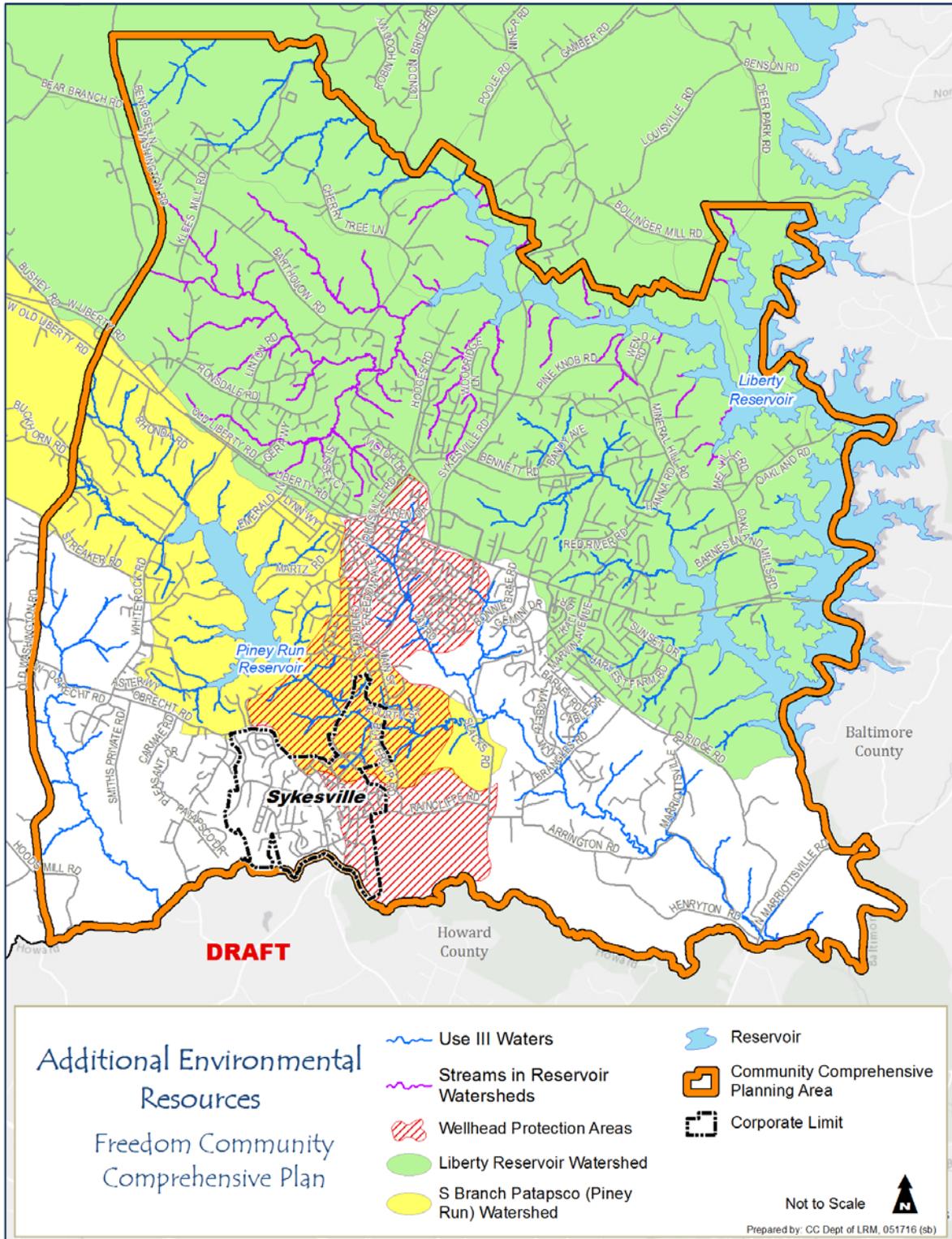
The Freedom CPA encompasses approximately 29,319 acres (44.9 square miles). Approximately 15,909 acres, or 54% of the CPA, is designated by this Plan as Resource Conservation and Reservoir. The topography of the area can be described as gently rolling hills parted by waterways. The elevation of the area ranges from approximately 300 feet above sea level near Henryton in the southeastern corner of the CPA Area to approximately 800 feet above sea level near Klees Mill in the northwest corner of the CPA. Nearly half the area flows to the Liberty Reservoir; much of the remainder flows to the Piney Run Reservoir. Only in the southern portion of the CPA is the stream system not associated with an existing or planned water supply reservoir. The Piney Run Reservoir, Liberty Reservoir, and Morgan Run Natural Environmental Area create considerable expanses of forests and essentially undisturbed woodlands. The Piney Run Reservoir and adjacent woodlands comprise approximately 1,123 acres of water and forested land. The Carroll County side of the Liberty Reservoir watershed contains approximately 5,750 acres, which includes forested land, steep slopes, and a narrow floodplain along streams. Additional expanses of forest and woodlands can be found along the North and South Branches of the Patapsco River.

Mature forests, comprised of oaks, hickories, and beech, provide food for numerous wildlife species. Morgan Run and other stream valley/slope systems are characterized by older growth forests, providing increased micro habitats and higher wildlife diversity. Animal life identified in the Freedom area includes beaver, otter, rabbit, raccoon, white tail deer, and various reptiles and amphibians. The locations of forested areas follow the stream valleys and cover steep slopes. Much of the South Branch Patapsco River Valley is part of the Patapsco Valley State Park. The Piney Run Reservoir and Liberty Reservoir also have extensive forested areas as buffers, and may be considered as wildlife corridors, as can the previously mentioned Morgan Run Natural Environmental Area.

Environmental Conservation

The Planning Act of 1992 does not specify the extent or degree of conservation to be accorded to each environmental resource. Therefore, the definitions developed for each environmental resource also identify this level of conservation. The Glossary in Appendix A includes the definition the "sensitive areas", as defined under the Planning Act. Maps of the Freedom Area's sensitive areas and the additional environmental resources may be found on the following pages. Since the Freedom area is its own CPA Area and encompasses the County's largest Designated Growth Area (DGA), the focus is away from agriculture and agriculture preservation, and more toward the conservation of sensitive resources. Therefore, the need for a separate Agriculture Element (which is an optional element in the Land Use Article) and Priority Preservation Element is not necessary for this Plan. Given Carroll County's strong agricultural heritage and its commitment to preservation, these elements are thoroughly covered in the 2014 Carroll County Master Plan.





Sensitive Areas

100-year Floodplains

The land adjacent to a water body or stream inundated by the base flood with an estimated one percent chance of occurrence in any given year is referred to as the 100-year floodplain. Floodplain conservation protects people from flood hazards and prevents destruction of property by moderating and storing floodwaters and reducing erosion and sedimentation. An undisturbed floodplain contributes to water quality, which has a positive effect on drinking water supplies. Disturbance within a floodplain, such as development, adding fill or removing vegetation, changes runoff and drainage patterns, which may adversely impact water quality. Additionally, this change in the natural landscape diminishes floodplain function, possibly resulting in local and downstream flooding in areas that have never experienced flood problems previously.

In 2010, the Federal Emergency Management Agency (FEMA) began its map modernization process by utilizing advanced stream studies, electronic data, and GIS to refine the accuracy of the County's Flood Insurance Rate Maps (FIRMS). FIRM updates are located on the County website at <http://ccgovernment.carr.org/ccg/MapServer4/GIS/webpage/FIRM-Coverpage.html>.

Carroll County has 17,388¹ acres of 100-year floodplain, 4,494 acres of which are located in the Freedom CPA. Chapter 153, Floodplain Management, of the County Code primarily protects the 100-year floodplain from grading and/or development impacts. Accompanying Chapter 153 is the Floodplain Management Manual: <http://ccgovernment.carr.org/ccg/resmgmt/>.

Forest Land

Forest habitats support different species of plants and animals; have abilities to protect streams, soils and water; provide economic value via timber management and wood products; and have positive effects on air quality and carbon sequestration. The size and location of forests also matter. Forests located on floodplains are particularly important for protecting streams, rivers and riverside communities against potentially devastating effects of floods.

Healthy, managed forests provide valued habitat and allow for natural processes that maintain water quality and flow downstream. Trees intake water through their roots, intercept rainfall before it reaches the ground and facilitate evapotranspiration. Forest floors also stabilize soils and act as temporary reservoirs, releasing water slowly into ground water aquifers. During periods of low rainfall, the forest floor acts as a natural sponge storing water and filtering sediment, nutrients and pollutants through large soil pore spaces. During periods of excessive rainfall, the forests also act as a natural sponge, trapping water, sediment, nutrients and

¹ Effective FIRM, 2015.

pollutants through large soil pore spaces. Forests also provide wildlife and plant habitat, and act as a wind barrier reducing wind erosion.

There are 15,026 acres of forest land in the Freedom CPA. Freedom's forest lands account for eighteen percent (18%) of the County's total. The County manages potential development and/or grading impacts to forest lands primarily through Chapter 150 of its County Code, Forest Conservation, which implements the State's Forest Conservation Act of 1991.

Accompanying Chapter 150 is Carroll County's Forest Conservation Manual:

<http://ccgovernment.carr.org/ccg/resmgmt/forconsmanual.pdf>. The County's Floodplain Management Chapter compliments this effort.

The County's Bureau of Resource Management (BRM) is conducting watershed assessments and developing restoration plans for each of nine 8-digit watersheds in the County.

Assessment of our local streams will be performed on all nine watersheds through a stream corridor assessment (SCA). Potential stream buffer planting sites are determined through the SCA. The BRM has established a "Stream Buffer Initiative", which assists property owners in having the stream buffers planted on these properties. As of May, 2016, the Bureau of Resource Management reported approximately 26.27 acres (1.103 stream miles) had been planted in the Liberty, South Branch of the Patapsco, and North Branch of the Patapsco watersheds, within which the CPA wholly or partially lies. Funding for these plantings has been provided by Maryland Department of Natural Resource through the Governor O'Malley Stream Restoration Challenge and by Carroll County Government through the Community Investment Program (CIP).

Rare, Threatened and Endangered Species

In Maryland, over 200 plant and animal species have become extinct over the past 350 years. Habitat destruction and degradation threatens another 413 native Maryland species. The key to protecting rare, threatened, and endangered species (RTEs) is to protect their habitat. The map on page 3, "Sensitive Areas", includes the locations of Sensitive Species Project Review Areas (SSPRA) in the Freedom CPA which have been identified as areas that may have endangered or threatened species and habitats. These areas are mainly in the Morgan Run Natural Environmental Area and the Patapsco Valley State Park.

DNR and the U.S. Fish and Wildlife Service (USFWS) regulate state and federal RTEs respectively. The County will not issue a forest conservation approval unless the Maryland Department of Natural Resources' (DNR) RTE determination letter, and if applicable, USFWS review and applicable protection plan(s) and/or federal permits are submitted to the County. Habitats for the RTE plant and animal species, or those in need of conservation as listed by DNR may be found at <http://dnr.maryland.gov/wildlife>.

Steep Slopes and Highly Erodible Soils

Carroll County's highly erodible soils are mitigated primarily through Chapter 152, Grading, Erosion and Sediment Control. Steep slopes also are protected when determining the width of the water resource easement associated with stream buffers regulated in Chapter 154 of the County

Code, Water Resource Management. Protective measures during construction are designed to minimize disturbance of steep slopes and highly erodible soils to maintain water quality.

Streams

Healthy streams contain a diversity of characteristics, including slow-moving runs, deep pools, gravel riffles, bends, and vegetative cover, sufficient dissolved oxygen and suitable temperatures. These features have a direct effect on the stream's ability to manage rainfall events, including the level and consistency of flow; and to serve as healthy habitat. Changes in ground cover and land use intensity impact water quality and habitat function of streams. Soil disturbance can cause soil to erode and wash into streams if not managed properly during construction. Stormwater runoff management is required to decrease surface flow and water temperatures; and allow filtration of nutrients and pollutants. If improperly managed, stormwater could erode stream banks, widen stream channels, increase sedimentation and water pollution, and result in inconsistent stream flow, dissolved oxygen levels, and turbidity. These conditions diminish the stream's viability as a habitat for plant species and aquatic life, more so under extreme wet or dry conditions. These conditions can also contribute to increased localized flooding.

All of the County's environmental codes provide some level of protection to the County's streams and water quality. Chapter 151 of the County Code, Stormwater Management, significantly controls the adverse impacts associated with increased stormwater runoff. The County also manages potential development and grading impacts to streams through Chapter 154 of the County Code, Water Resource Management, which requires a minimum fifty-foot stream buffer extending to the protective zones of the: (1) Surface Watershed Area, and (2) Surface Water Management Zone to protect reservoirs and tributary streams. Streams and their buffers are protected by easements that are conveyed to the County and recorded in the Land Records of Carroll County.

Stream Buffers

Stream buffers are naturally vegetated areas along a stream which often include floodplains, wetlands; and may be forest lands, grasslands, or a combination of both. Stream buffers function to protect water quality, quantity, and plant and animal habitat through stabilization of stream banks; filtration of stormwater, sediment, nutrients and pollutants by slowing runoff through accentuation; filtration of nutrients by plant uptake and/or other biological activities occurring in soils; reduced stormwater velocity; and shade from tree canopy maintaining and/or cooling waters.

Forested buffers contain deep root systems that stabilize soil, and reduce erosion from high surface water flows. The forest floor filters water, encouraging percolation into groundwater, absorbs air pollutants, intercepts rainfall before it reaches the ground and facilitates evapotranspiration. This process allows intercepted water to evaporate and be utilized by the trees during photosynthesis. Forested stream buffers also provide wildlife and plant habitat,

and act as a wind barrier reducing wind erosion. Grassland buffers provide many of the same functions as forest buffers but on a varying degree.

Carroll County has approximately 1,380 miles of streams within its borders, 131 miles in the Freedom CPA. The County manages potential development and/or grading impacts to streams and their buffers primarily through the regulatory mechanisms discussed in the *Streams* subsection above.

Wetlands

Wetlands serve an important function in maintaining quality and quantity of water supplies. In wetlands, inorganic nutrients are converted to organic materials and stored in the hydrophytic vegetation. Hydrophytic plants grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Stems, leaves, and roots slow the flow of runoff entering the wetland area thereby allowing sediment to settle out and be deposited in the wetlands prior to the runoff reaching stream waters. Wetlands also have a positive impact on the volume and speed of water that reaches the streams, functioning as natural stormwater management facilities. They absorb and retain water, slowly discharging it into the streams. Therefore, stream flows are maintained in normal conditions, as well as extreme wet and dry conditions. Wetland areas provide essential habitats to a wide variety of flora and fauna, including migrating waterfowl. Wetland impacts are managed through the previously mentioned Natural Resources regulations.

County Code Conservation Measures for Sensitive Areas

Several Chapters of the County Code protect sensitive areas. The table below contains a brief description of each. All of these regulations provide some degree of protection to 100-year floodplains; Rare, Threatened, and Endangered Species (RTE) habitat; steep slopes; streams and their buffers; and wetlands and their buffers.

Chapter of County Code

Chapter 150, Forest Conservation. To maximize the benefits of forests in a cooperative effort with development, thereby slowing the loss of forested land in the County and improving the environment of both developed and undeveloped areas.

Chapter 151, Stormwater Management. To manage stormwater by using environmental site design (ESD) to the maximum extent practicable (MEP) to maintain after development as near as possible, the pre-development runoff characteristics, and to reduce stream channel erosion, pollution, siltation, and sedimentation, and local flooding, and use appropriate structural best management practices (BMPs) only when necessary.

Chapter 152, Grading and Sediment Control. To establish minimum standards for the control of soil loss through erosion to minimize sediment transport through runoff.

Chapter 153, Floodplain Management. To secure the public safety, promote health and general welfare, minimize property damage, encourage appropriate construction practices to minimize future damage, and to protect water supply, sanitary sewage disposal, and natural drainage.

Chapter 154, Water Resource Management. To protect and maintain the ground and surface water resources of the County by establishing minimum requirements for the protection of groundwater and surface water resources that contribute to existing or future community water supplies, standards for review of development activities, management standards, and design criteria for land use activities that occur subsequent to that review, and enforcement procedures for violations of standards adopted herein that contribute to or become a source of pollution.

Chapter 155, Subdivision and Development of Land. Requires delineation on the Environmental Site Design portion of the subdivision plan

Chapter 155, Subdivision and Development of Land. Allow up to 50% of open space in clustered subdivisions (15% of the entire parcel must be preserved as open space).

Conservation of Additional Environmental Resources

The following section discusses the additional “sensitive areas” that the County believes should be conserved. These additional sensitive areas are categorized as either groundwater resources or surface water resources. Groundwater resources include aquifers, carbonate rock areas (a type of aquifer), wells, and wellheads. Surface water resources include reservoir watersheds, Tier II waters, Use III waters, and Use III-P waters.

Groundwater

Groundwater is the water located beneath the ground’s surface stored in soil pores and in the fractures of rock formations. It is naturally replenished by precipitation which infiltrates into the ground. Groundwater is often contained in aquifers. Aquifers are underground layers of water-bearing permeable rock from which groundwater may be extracted. Carroll County relies heavily on groundwater from aquifers for its drinking water sources. The Freedom/Sykesville water service area (WSA), however, relies on groundwater and surface water.

A wellhead is where groundwater is extracted from the subsurface for use. Every municipality and the Freedom/Sykesville water service area utilize wells/wellheads for drinking water, although not as a sole source. Protecting wellheads protects groundwater used for drinking water supplies and can reduce or eliminate costly water treatment. Wellhead protection areas are those subsurface regions which are estimated to contribute groundwater to a specific well. The protection and management of these areas ensures that water infiltrating the ground will

remain clear and viable as a water supply source. Groundwater conservation is accomplished primarily through Chapter 154 of the County Code, Water Resource Management. For a more detailed discussion, refer to Chapter 13 of the Adopted 2014 Carroll County Master Plan.

Surface Water

Surface water comes from precipitation and groundwater. It includes streams, rivers, lakes, reservoirs, wetlands, and oceans. Streams, rivers, reservoirs and other waterbodies provide the County with recreational uses and, in some instances, drinking water sources.

Surface water conservation is accomplished primarily through Chapter 154 of the County Code, Water Resource Management. For a more detailed discussion, refer to Chapter 13 of the Adopted 2014 Carroll County Master Plan.

Reservoir Watersheds

A reservoir may be used as a drinking water source. A reservoir watershed is the land area that drains into a reservoir, including tributary streams. One-hundred thirty-six square miles of Carroll County's southeast portion drains into Liberty Reservoir, including more than half of the Freedom CPA that lies within the Liberty Reservoir watershed. Additionally, a smaller reservoir watershed, the Piney Run Reservoir, lies within Freedom's borders.

Reservoir Management Agreement

Dating back to 1979, Carroll County, along with Baltimore City and Baltimore County, and various other state and local agencies, have participated in the Reservoir Watershed Management Agreement. The signatories of this voluntary agreement stay abreast of land use activities that impact the lands draining into the three metropolitan water-supply reservoir watersheds. These are the Loch Raven, Liberty and Prettyboy Reservoirs. As stated above, over half of the Freedom CPA lies within the Liberty Reservoir Watershed. The County withdraws and treats an average of 2.207 million gallons per day from Liberty Reservoir for delivery to the citizens of the Freedom area. This watershed is critically important to the residents and businesses of the Freedom area; approximately 23,500 residents and 430 businesses get their water from this source².

In 1990 and again in 2003 and 2005, the parties reaffirmed the commitments made in the agreement and the working committees established in the 1984 Agreement. The most fundamental goals of the Reservoir Program are to encourage that the three reservoirs and their respective watersheds will continue to serve as a source of high-quality raw water for the Baltimore Area and the surface waters will continue to support existing environmental, wildlife habitat, and aesthetic purposes, as well as beneficial recreational uses.

² Carroll County Bureau of Utilities, April, 2016.



To ensure this water quality, specific technical goals in the reservoirs and their tributaries have been established. These are summarized as follows:

- work to reduce phosphorus, sediment, bacteria, sodium and chloride loadings to the reservoirs and their tributaries to acceptable levels
- eliminate existing and prevent future water quality impairments
- prevent health and nuisance conditions from developing in treated water
- assist counties in meeting the requirements of the federal Safe Drinking Water Act
- improve the safety and security of the water supply by reducing the risk of contamination to the reservoir watersheds
- promote patterns of land use and landowner stewardship practices that will help meet these technical goals

The Reservoir Technical Group, which is facilitated by the Baltimore Metropolitan Council, reviews and evaluates existing problems and conditions, as well as proposed policies, programs and actions anywhere in the reservoir watershed that might prevent the three reservoir watersheds and tributaries from attaining the fundamental goal, the water quality standards and specific technical goals. This includes, but is not limited to, addressing existing or proposed reservoir protection policies, master plans, and land use plans; proposed zoning ordinances; zoning reclassification proposals; local water and sewer master plans; development proposals; proposed discharge permits; proposed best management practices; and other policies, plans, or activities which could affect reservoir water quality.

This presents a unique challenge to the Freedom CPA, because it is the County's largest Designated Growth Area and contains the most and highest density development in the County. Freedom also includes the County's largest Priority Funding Area, comprising over 9,000 acres (not including the Town of Sykesville). With this in mind, Carroll County

has an unwavering commitment to its storm water management programs and policies, as well as sediment and erosion control. As previously discussed in this Element, all new development is subject to the County's environmental protection measures, minimizing its impact. Also, in recognition of how important the Liberty Reservoir is to the County and the region's drinking water supply, this Plan reduces the Freedom DGA from over 28,000 acres to just over 19,000 acres, a reduction of approximately 9,000 acres, or thirty-two percent (32%). This was accomplished by reviewing properties that were in the current DGA, and eliminating the areas around the periphery that have sensitive environmental features or have reservoir protection status. This adjustment helps to focus development to those lands best able to accommodate it. See the Land Use Element for further details regarding the revised boundaries of the Freedom DGA.

Use III Waters and Use III-P Waters

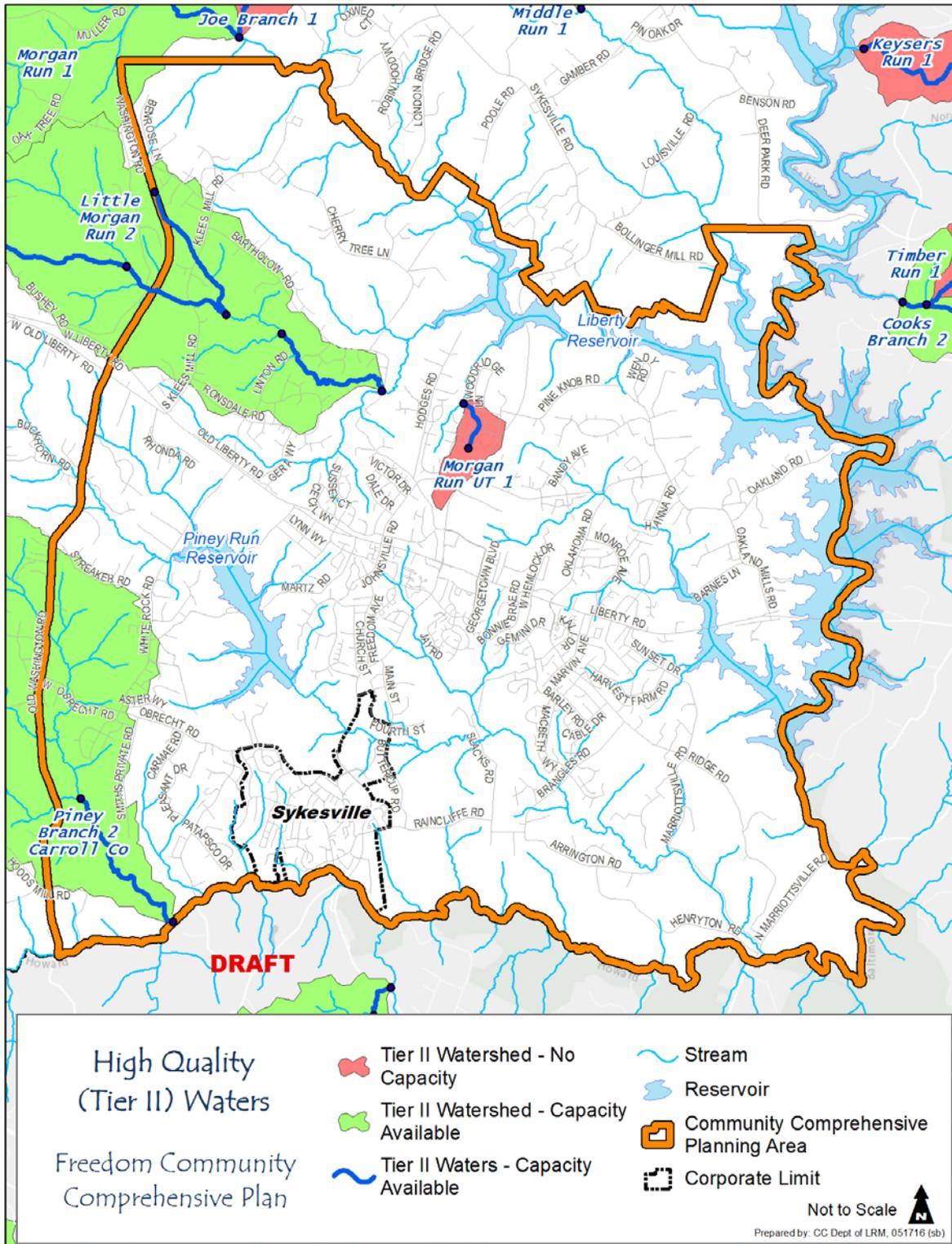
All streams in the State of Maryland are grouped into different use categories; the highest are the Use III-P streams, which are streams that drain into a public water supply reservoir and are protected for the natural propagation of trout. The tributaries of the Liberty Reservoir are classified as Use III-P, notably Snowden's Run, Stillwater Creek, Carroll Highlands Run, Autumn Run, and Morgan Run. The tributaries of these streams are also classified as Use III-P streams. Reproducing brook trout have been identified in several of these small streams. Portions of Piney Run stream in the South Branch Patapsco drainage area are also classified as Use III and further as Use III-P. There are a number of wetland areas in association with the streams in Freedom, providing a filtering of rainwater as well as a habitat for a variety of plants and animals. There are 47.8 miles of Use III-P streams and 27.2 miles of Use III streams in the Freedom CPA.

Regulations are more stringent for Use III-P water standards compared to Use III water standards. The remaining streams in the County are Use IV or Use I waters, which are recreational trout waters. Fishing is an important recreational activity in Use III and Use III-P streams. The presence and health of fish can be an important indicator of water quality.

Tier II Waters

"Tier II waters" are regulated by Maryland's antidegradation policy, which prohibits new or increased pollutants, including nutrient loads to impact water quality. All of Maryland's current Tier II waters were designated on the basis of biological indices of integrity. Tier II waters in Freedom may be found on MDE's map, High Quality (Tier II Waters) on the following page. For a more detailed discussion of Tier II waters see p. 54 of the County's Water Resources Element (WRE).

<http://ccgovernment.carr.org/ccg/compplan/functional.asp>.



Recommendations

1. Conserve sensitive area lands through continued assessments, best management practices, and existing policies and programs.
 2. Minimize the impact of development upon sensitive areas.
 3. Continue participation in regional, state and watershed based partnerships, including the Reservoir Technical Group.
 4. Establish and maintain existing wildlife corridors in the Piney Run and Liberty Reservoirs, and the Morgan Run Natural Environmental Area, linking environmental features in the community, thereby providing habitat for plants and wildlife.
 5. Continue to design and implement successful stormwater management facilities that are creative, cost effective, and where possible, can be integrated into existing environmental features.
 6. As previously recommended in the Land Use Element, reduce the boundaries of the Freedom Designated Growth Area (DGA) to remove environmentally sensitive areas, thereby reducing development impacts in these areas.
 7. Work with the Department of Natural Resources and the City of Baltimore to promote natural resource assets in lands under their control to promote the aesthetics and recreational value to Carroll County residents.
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