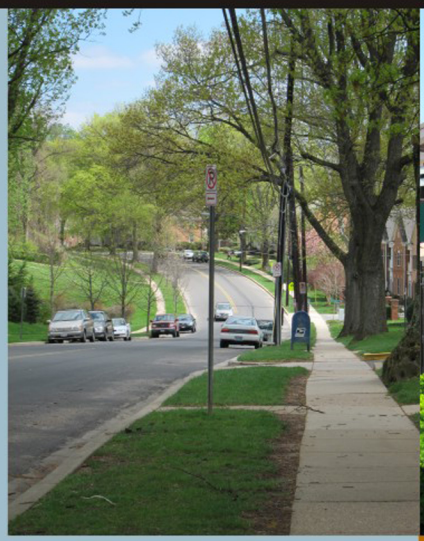
July 2012

Chevy Chase Lake Sector Plan

Appendix



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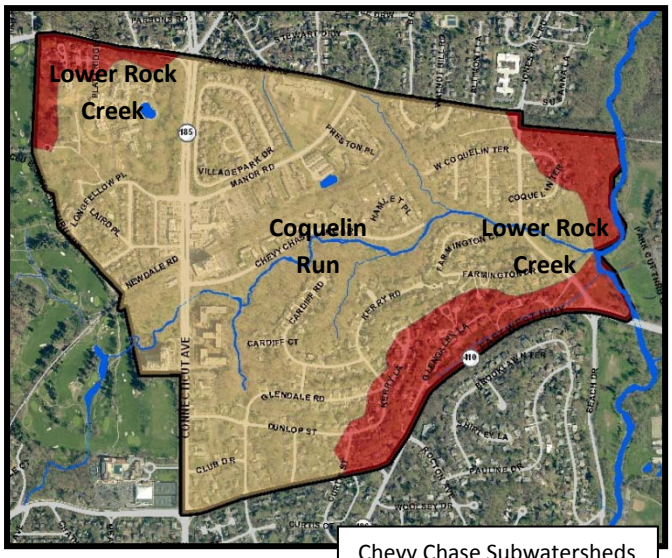
Chevy Chase Lake Sector Plan
Appendix 8 Environment

Existing Environmental Conditions

Watersheds and Water Quality

The majority of Plan area is within the subwatershed of Coquelin Run, a small tributary to Rock Creek. In 2002, Coquelin Run's water quality was surveyed as part of the Countywide Stream Protection Strategy and was determined to be "poor" based on the biological indicators found. The northeastern and western corners of the sector area drain to Rock Creek via the Lower Rock Creek watershed (shown in red). Monitoring completed in 2008 indicated "fair" water quality. Water quality is determined by monitoring the presence or absence of specific aquatic life including benthic macroinvertebrates and fish.



Chevy Chase Subwatersheds

Coquelin Run

Coquelin Run flows from west to east discharging into the mainstem of Rock Creek. It has been severely affected by urbanization in several ways: First, invasive plant species have dramatically altered the composition of the vegetation, resulting in a loss of biological diversity, especially in the floodplain where lesser celandine (*Ranunculus ficaria),* and mile-a-minute vine (*Persicara perfoliata*) has overtaken much of the forest floor and lower tree trunks. Second, uncontrolled stormwater flowing to Coquelin Run and its tributaries has resulted in erosion on both sides of the stream banks. This causes sediment deposition severely reducing stream habitat for fish and aquatic macroinvertebrates. This sediment is also transported to the Chesapeake Bay, contributing to the pollution of the Bay. Third, an escalating deer population is contributing to further alterations in the composition of the biological community.


Streambank Erosion West of W. Coquelin Terrace

In the early 1900's, just east of Connecticut Avenue, Chevy Chase Lake was constructed in the headwaters of Coquelin Run. Located at the end of the trolley line and within an amusement park, Coquelin Run was used for recreational purposes including fishing, swimming, and picnicking. In the mid-1930's community concern over insect populations and safety resulted in the draining of the lake. Little evidence of the lake remains, however there is a remnant cascading waterfall barely visible or accessible to the community (see photo #2). Slopes over 25% border most of the south side of the stream with stream valley buffer over 100'

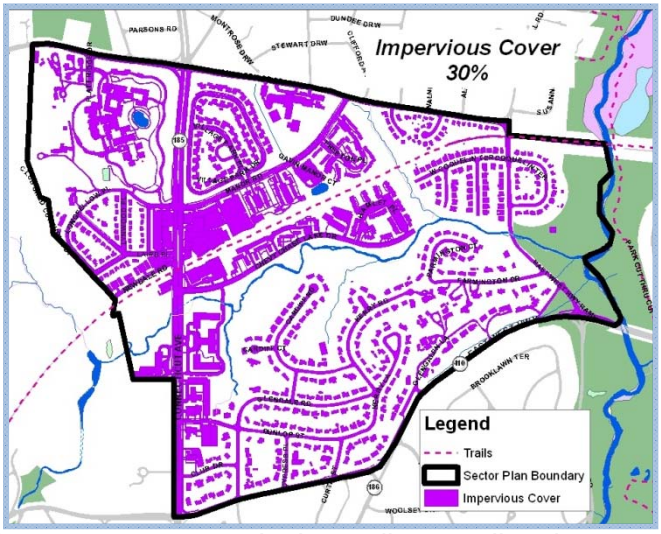
in most areas. To the north of Coquelin Run, the slopes are narrow but steep. At the top of the bank is Chevy Chase Lake Drive which crosses the 100-foot stream buffer. The severity of the slopes are likely reasons this stream valley remains a relatively hidden charm.

Rare, Threatened, and Endangered Species

In 2004 and 2005, a geographically limited subterranean macroinvertebrate (amphipod), *stygobromus kenki*, was found in a seep in a tributary to Coquelin Run. These tiny, translucent, shrimp-like creatures live in the groundwater. In November, 2010, the U.S. Fish and Wildlife Service (USFWS) released an annual Candidate Notice listing the kenki for the Endangered Species Act (ESA). USFWS selects species for candidacy based on information about each species population status and threats. The kenki is located on privately owned land within the sector plan area in a small tract of deciduous forest.

In Coquelin Run, the *kenki* is threatened from the undercutting of a stream bank where the hosting seep is located. Impervious surfaces, habitat loss, forest fragmentation, the lowering of regional water tables, and the absence of legal and residential protection all contribute to the high risk of losing the *kenki* at this and other locations in the region.

Impervious Cover



Impervious Cover and Water Quality

Impervious cover refers to anything that prevents water from soaking into the ground. Examples include driveways, roads, buildings, streets, and parking lots. Impervious surfaces prevent water from filtering naturally through the soil, reducing groundwater recharge, soil saturation, pollution reduction, and the slow release of water from saturated soils to streams, wetlands, or other water bodies. Stormwater sweeps across impervious surfaces, taking with it pollutants such as oils, de-icing salts, sand, fertilizers, pet waste, and other pollutants directly into streams and wetlands. These pollutants enter storm inlets which discharge at outfalls along stream banks causing increased stream surges, erosion, algae blooms, reduced aquatic life, and reduced water quality. Research has shown that “when impervious cover reaches 10-25%, major alterations in stream morphology occur that significantly reduce habitat quality. At greater than 25% impervious cover, streams suffer from loss of habitat, floodplain connectivity, bank

stability, as well as decreased water quality."[1] Parking, roads, roofs, and sidewalks comprise 109.75 acres, or 30% of the total impervious area in the sector plan area. In the commercial and high density zones, impervious cover is just over 87%.

Impervious Cover and Heat Island Effect

Impervious surfaces are often darker in color and act as solar energy collectors, absorbing and retaining the sun's heat. The average temperature of those surfaces can be "50-90°F hotter than the surrounding air"[2]. As these surfaces dissipate heat there are many consequences such as: reduced air quality, increased local temperatures, increased ozone levels, higher electricity demand, and heat related illnesses and mortality.

There are ways to mitigate heat island effect. In addition to reducing impervious surfaces, cool paving materials such as porous pavements, reflective surfaces, greenroofs, and additional tree planting can substantially increase albedo (reflectivity) while providing ancillary benefits such as an extended life of the surface and improve stormwater quality. A pavement's cooling attributes result from the color of the binder and/or aggregate with a lighter, more reflective material. A pavement's porosity allows for water absorption and infiltration to help cool the paving surface and ambient air temperatures through the cooling effect of evaporation. Cool paving technologies are continually expanding, a few of today's technologies include: high albedo coatings, porous pavements, interlocking concrete pavers, porous pavers, and modified asphalt using colored aggregates, sand, or mixing in colored binders.

Stormwater Management

Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not percolate into the ground. In the Sector Plan area, the majority of stormwater runoff is untreated and conveyed into storm drains where it is discharged directly into streams within the subwatersheds. For Chevy Chase, the majority of the receiving streams are tributaries to Coquelin Run. A small portion of the sector plan area flows directly into Lower Rock Creek.

As stormwater flows across hot impervious surfaces water temperatures increase and oxygen levels decrease. Sheeting water collects and transports pollutants along its path affecting stream quality. The changes in flow rates affect the morphology or physical shape and character of a stream. Significant impacts from uncontrolled stormwater discharge are noted in the tributary running south of Jones Bridge Road and west of Jones Bridge Court. The tributary is becoming wider and deeper due to the rapid runoff after storms. Stormwater impacts on another tributary running north from Glendale Road also shows bank erosion, undercutting, and sedimentation. East of Connecticut Avenue, the mainstem of Coquelin Run begins to show signs of severe bank erosion, stream widening, tree loss, and substrate sedimentation. These impacts can result in the loss of entire biological communities, sensitive fish and other aquatic life.

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[1] Center for Watershed Protection, "Impacts of Impervious Cover on Aquatic Systems", Ellicott City, MD, 20003

[2] http://www.epa.gov/hiri/resources/pdf/BasicsCompendium.pdf

Stormwater hotspots are areas that may produce higher concentrations of certain pollutants such as sediments and heavy metals with traces of zinc, copper, cadmium, and lead and can be acutely toxic to aquatic life. Examples of hotspots within Chevy Chase include fueling stations, outdoor storage areas, and commercial parking lots.


Discharge at 'Hotspot' into Coquelin Run

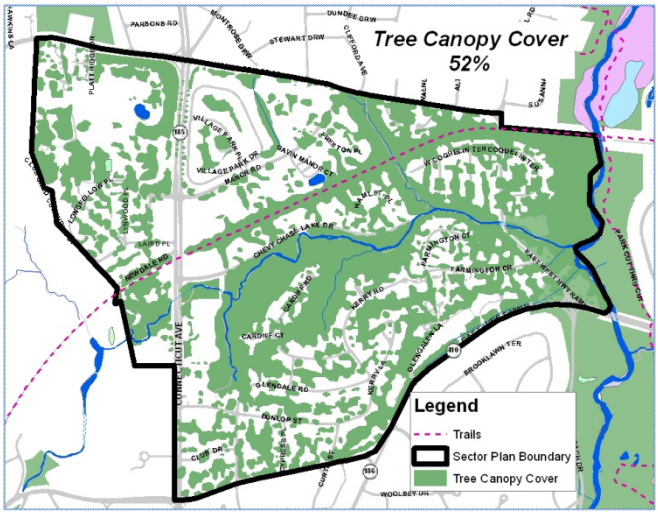
There are many techniques to minimize the effects of stormwater. In the past, stormwater management required large areas of land where the runoff was collected in pond-like depressions and released slowly over a period of time. An example of this can be seen in the stormwater pond at the end of Gavin Manor Court. However, amendments to the law now require Environmental Site Design (ESD) methods. The practices include: reducing impervious surfaces, bio-retention and infiltration systems such as bioswales, vegetated filter strips, green roofs; permeable pavements; rainwater harvesting; rain gardens; and vegetative swales. ESD is used to minimize onsite and offsite erosion and water quality impacts due to runoff by attempting to incorporate and reestablish natural hydrologic processes into the built environment. These measures can be designed and implemented in new developments as well as retrofit into existing development in cost efficient ways. ESD stormwater management practices have the capability to significantly improve the quality of stormwater runoff as well as quality of life.

For further descriptions and requirements, refer to Montgomery County Stormwater regulations and guidelines, and the Maryland Stormwater Design Manual supplemental Chapter 5 for detailed stormwater design requirements.
http://www.mde.state.md.us/assets/document/chapter5.pdf

Urban Forest

Chevy Chase has 52.4% tree canopy cover (leaves, branches, and stems of trees that cover the ground when viewed from above) including all street trees, park trees, existing forest cover, landscaping, and neighborhood trees. Trees are vital elements in the fabric of a community and provide numerous economic, social, psychological, and ecological benefits. These benefits contribute to the wellbeing and quality of life of each resident, employee, and visitor. Although the overall tree cover in Chevy Chase is relatively high for an urbanized community, the commercial and industrial zones have only around 11 percent tree canopy. Recommended canopy cover in urban areas should be a minimum of 30%.

Specific community benefits of tree cover include: improved air quality through carbon sequestration; reduced greenhouse gas, heat island effect, erosion, and noise pollution; improved water quality, groundwater recharge, wildlife nesting, brooding, and foraging areas; shading to reduce energy demand; a feeling of relaxation; a sense of solitude and security; and have been shown to improve the overall health of a community.



Forest cover (groups of trees greater than 10,000 square feet and more than 50 feet wide) exists only in a small part of the sector plan area. One such area is in a portion of the Rock Creek Stream Valley. Descriptions of the forest can be found in the Parks section of the Sector plan.

The stream buffer along Coquelin Run provides a preponderance of Chevy Chase's forest cover within the sector plan area. It is owned by the Chevy Chase Land Company and 8101 Connecticut Condominiums. The buffer width varies along the stream with a wider forest along its south edge where steep topography has discouraged development. The northern buffer is narrower with Chevy Chase Lake Drive at the top of a slope. Discharge from the developments to the north and south of the stream is causing undercutting resulting in tree loss and destabilization leading to further streambank erosion and reduced water quality. Invasive species dominate the forest floor along the tributaries to Coquelin Run as well as portions throughout the mainstem. Mile-a-minute vine (Persicaria perfoliata) is climbing into the tree canopies, smothering the trees' leaves and preventing photosynthesis. This results in tree mortality and further buffer loss and erosion.

Residential dumping of tree debris and yard waste has reduced the ability of the forest to regenerate; consequentially there is further buffer deterioration and invasive plant germination. Areas of cumulative and continued dumping within the stream valley buffers are at the end of Coquelin Terrace and Woodbrook Lane.

Network of Resource Connectivity

Resource connectivity refers to natural resource features that are linked together to form linear networks that function biologically and ecologically, providing habitat and purifying air and water. They are connected corridors that serve both people and wildlife forming a nexus of streams, forests, meadows, wetlands, or other open green space. Resource networks become a vital part of a diverse ecosystem as they provide the opportunity of genetic exchange and animal movement that would otherwise be inhibited by landscape fragmentation.

The Coquelin Run stream valley has steep slopes making human access difficult, allowing for wildlife to thrive. Although there are no official trail networks, citizen paths can be found throughout the stream valley where the slopes permit.

Water and Sewer

The Washington Suburban Sanitary Commission provides public water and sewer service to the Chevy Chase Sector Plan area. Development proposals in the Sector Plan area that might generate 100,000 gallons per day of wastewater (base sanitary flow approximately of 700 housing units or 3,500 employees) or more would be required to undergo testing (using the WSSC's sanitary sewer model) and would be required to work with WSSC in cooperation to plan improvements to the conveyance system, if the modeling yields results as detailed under its newly adopted policy, ENG-09-02. Also, any local capacity (non-CIP) issues identified in development proposals under review in the WSSC Development Services Program may require cooperation from applicants/developers under the WSSC's Letter of Findings to plan and construct local sewer system capacity improvements.

Some structural repair and rehabilitation work may be required for local sewer pipeline segments and manholes as part of the Sewer Basin Repair Replacement and Rehabilitation (SRRR) plan WSSC was required to submit as part of Consent Decree requirements for the Rock Creek Sewer Basin. However, these plans are subject to MDE approval, per the terms of the Consent Decree.

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