

Geomorphology of the Maryland Lower Piedmont

Piedmont Physiographic Province

Cabin John Regional Park is located in the eastern half of the Piedmont physiographic province of Maryland. This lower area of the Piedmont is located near the border with the Atlantic Coastal Plain province which stretches from the Montgomery-Prince George's County line out to the Chesapeake Bay and the Atlantic Ocean.

The specific part of the Piedmont physiographic province that Cabin John Regional Park lies within is the Hampstead Upland District. This region is characterized by a combination of upland areas and steep-walled gorges. The uplands can be hilly or gently rolling and are interrupted by streams that lie within areas that have weathered differently to produce steep valleys. This type of Piedmont district is common and representative of about half of Montgomery County.

Montgomery County Geology

The area around Cabin John Regional Park is underlain by Precambrian bedrock which includes the Upper Pelitic Schist formation. This thick layer of metamorphic rocks was originally formed more than 500 million years ago and experienced heat and pressure that transformed it to its current state. The rock is fairly coarse-grained and contains albite, chlorite, muscovite, and quartz.

There is an area of Paleozoic igneous bedrock located near Cabin John Regional Park that may affect the topography of the area. This later intrusion was likely formed from magma underground that reached into the area and cooled slowly in place. These rocks include gabbro and serpentinite and may weather differently than the surrounding Precambrian bedrock, resulting in the upland and valley topography described above.

Some gold deposits have been reported in Montgomery County. The geology of the Piedmont hosts a belt of metamorphic rocks that can contain gold in grains, sheets, or wires within quartz veins. No gold has been reported within Cabin John Regional Park.



Figure 1. *Astrodon johnstoni*
Astrodon johnstoni, originally found in Prince George's County, was named the Maryland state dinosaur in 1998.

Maryland Fossils

A variety of fossils have been discovered in Maryland, though none are reported in Montgomery County. Those in nearby counties include trilobites and dinosaurs in Frederick County, along with dinosaurs, mollusks, plants, and shark teeth in Prince George's County. The first dinosaur fossils ever discovered in Maryland were teeth found in a mine in Prince George's County and belonged to the *Astrodon johnstoni*, now the state dinosaur of Maryland.

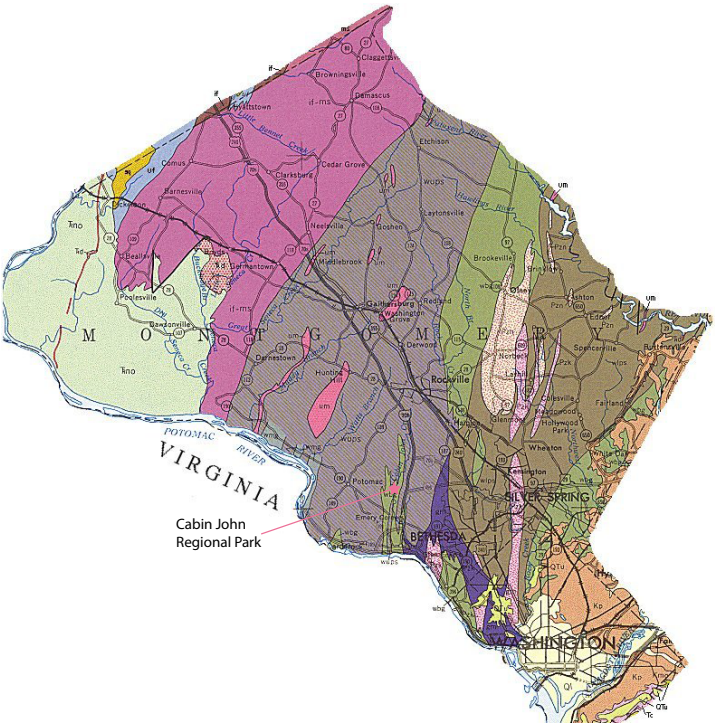


Figure 3. Geologic Map of Montgomery County (left)
Geologic map of Montgomery County based on the Maryland Geologic Survey from 1968. The gray area in the center of the county represents the Upper Pelitic Schist formation; the green area by the Cabin John Regional Park area represents Boulder Gneiss, the Paleozoic intrusive formation.

Figure 2. Physiographic Map of Montgomery County (above)
Clip of Montgomery County from Physiographic Map of Maryland produced by the Maryland Department of Natural Resources and Maryland Geological Survey. The red star shows the approximate location of Cabin John Regional Park within the Hampstead Upland District of the Piedmont Plateau.



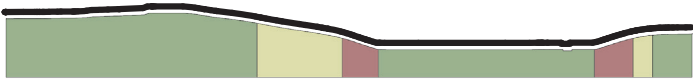
Figure 2. Slope Gradients
Sources: Montgomery County Planning Data

Site Topography



This portion of the Cabin John Creek runs along the bottom of a deep gorge with many steep slopes. All along the sides of the floodplain are slopes with a 25% incline or greater. As per the Montgomery County Environmental Guidelines, a 150 foot buffer must be created along both sides of the stream bed. All areas within the buffer cannot be constructed on except for bike paths and trails where they are necessary to the function of the park, and nature center.

Slope Profile

The section cut below shows the slope profile from the frontal area, across the small plateau behind the picnic shelter and down to the floodplain. There is an 80 ft difference in altitude between the plateau and the floodplain with a majority of slopes at a 15-25% Grade.



Map Legend

-  Buildings
-  Impermeable Surfaces

Gradients & Buffers





-  0-15% Slope
-  >15 - 25% Slope
-  >25% Slope
-  Creek w/ 150' Buffer



Figure 2. Site Drainage
Sources: Montgomery County Planning Data; National Wetlands Inventory

Site Drainage

The gorge is flanked by heavy development on both sides. Large swaths of impermeable surfaces including, roads, parking, and buildings generate a large amount of stormwater runoff. As the water runs rapidly into the creek down a series of drainage ditches, it creates significant erosion, which could lead to a greater sediment load on the creek. The amount of water flowing through the drainage channels makes them excellent candidates as locations for stormwater management features, such as an RSC (Regenerative Stormwater Conveyance). These could help to slow down the water, allowing it to release sediment and other solid contaminants, as well as infiltrate into the ground before flowing into the lake. Channels draining from heavily developed areas are the best suited as they tend to carry more stormwater, as well as more contaminants.

Soil Drainage Suitability

The map shows that the best draining soil in the gorge is in the southern portion, while the northern portion is made up somewhat to poorly drained soils. This is partially caused by the presence of wetlands.

Map Legend

- Buildings
- Impermeable Surfaces
- Stormwater Drainage
- Well Drained
- SOIL
- Poorly Drained

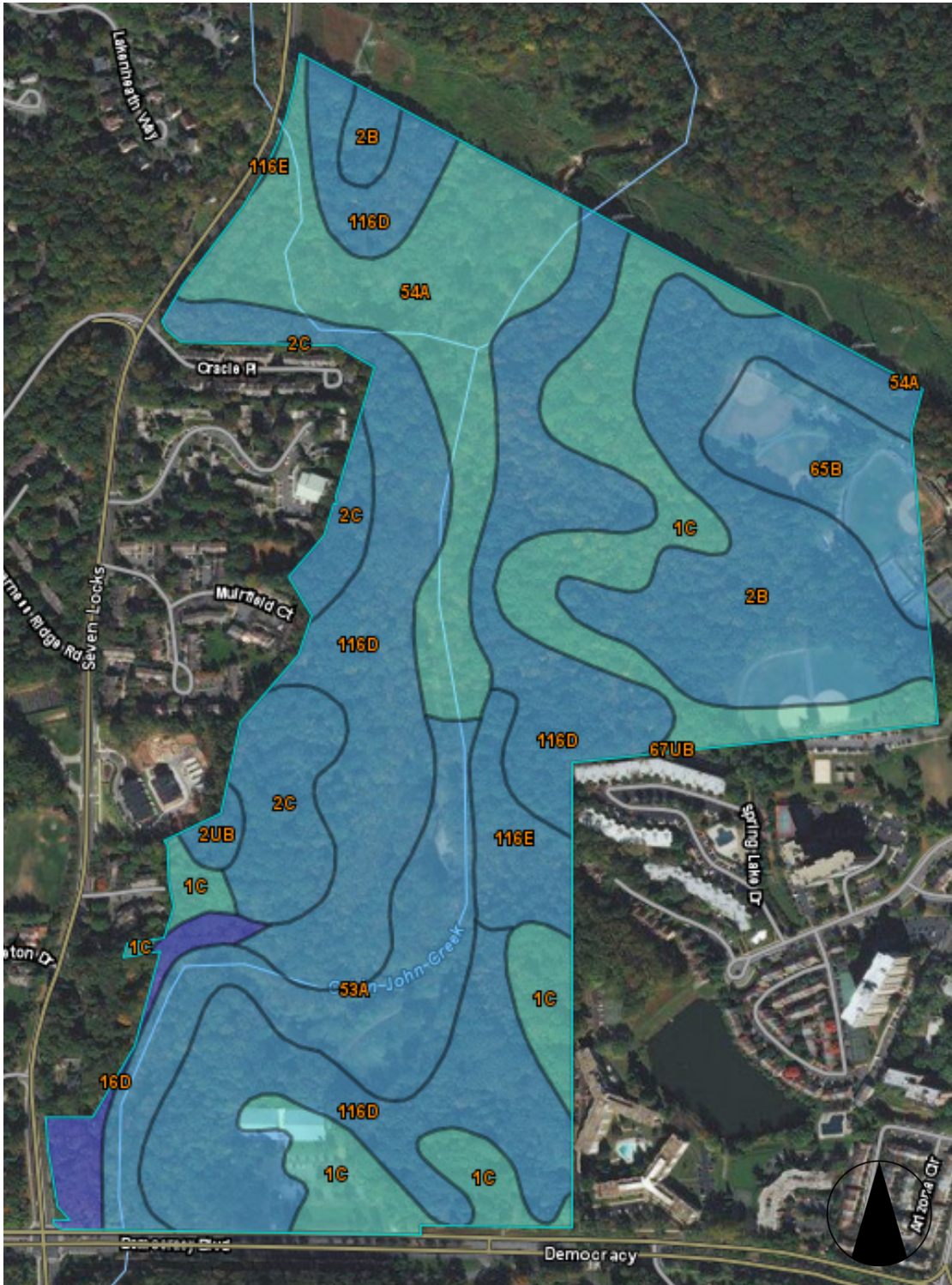
SITE ANALYSIS: Geomorphology

Geomorphology



The K factor indicates the susceptibility of the soil to sheet and rill erosion. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Figure 3. Factor K
Sources: USDA Web Soil Survey



Wind erodibility groups (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible, and those assigned to group 8 are the least susceptible.

Figure 4. Wind Erodibility Group
Sources: USDA Web Soil Survey

Soil Erodibility

Soil Type	Description	K	Wind
1C	Gaila silt loam, 8 to 15 percent slopes	.43	5
2B	Glenelg silt loam, 3 to 8 percent slopes	.37	6
2C	Glenelg silt loam, 3 to 8 percent slopes	.37	6
2UB	Glenelg-Urban land complex, 0 to 8 percent slopes	.28	6
16D	Brinklow-Blocktown channery silt loams, 15 to 25 percent slopes	.24	7
53A	Codorus silt loam, 0 to 3 percent slopes, occasionally flooded	.32	6
54A	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded		5
65B	Wheaton silt loam, 0 to 8 percent slopes	.43	6
67UB	Urban land-Wheaton complex, 0 to 8 percent slopes		
116D	Blocktown channery silt loam, 15 to 25 percent slopes, very rocky	.28	6
116E	Blocktown channery silt loam, 25 to 45 percent slopes, very rocky	.28	6

Susceptibility to Erosion



Terrestrial Habitats

Cabin John Regional Park Maryland's Piedmont

BASIC MESIC FORESTS

The Basic Mesic Forest wildlife habitat develops over bedrock that weathers to make soils high in calcium and magnesium. Trees common to these rich and moist forests include Tulip Poplar (*Liriodendron tulipifera*) American Beech (*Fagus grandiflora*), Black Walnut (*Juglan nigra*), Northern Red Oak (*Quercus rubra*), Eastern Redbud (*Cercis canadensis*) and Eastern Hop Hornbeam (*Ostrya virginiana*).

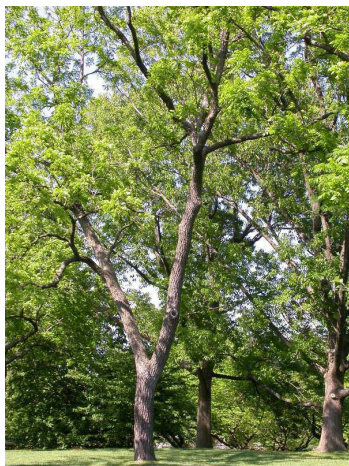


Figure 1. Black Walnut



Figure 2. Hornbeam



Figure 3. Tulip Poplar

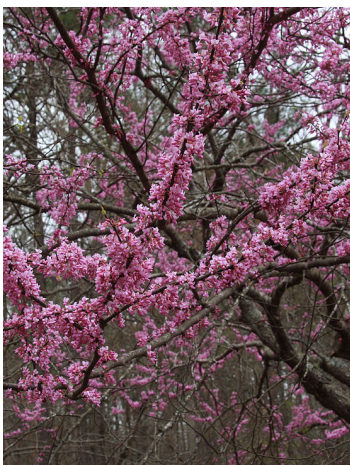


Figure 4. Eastern Redbud

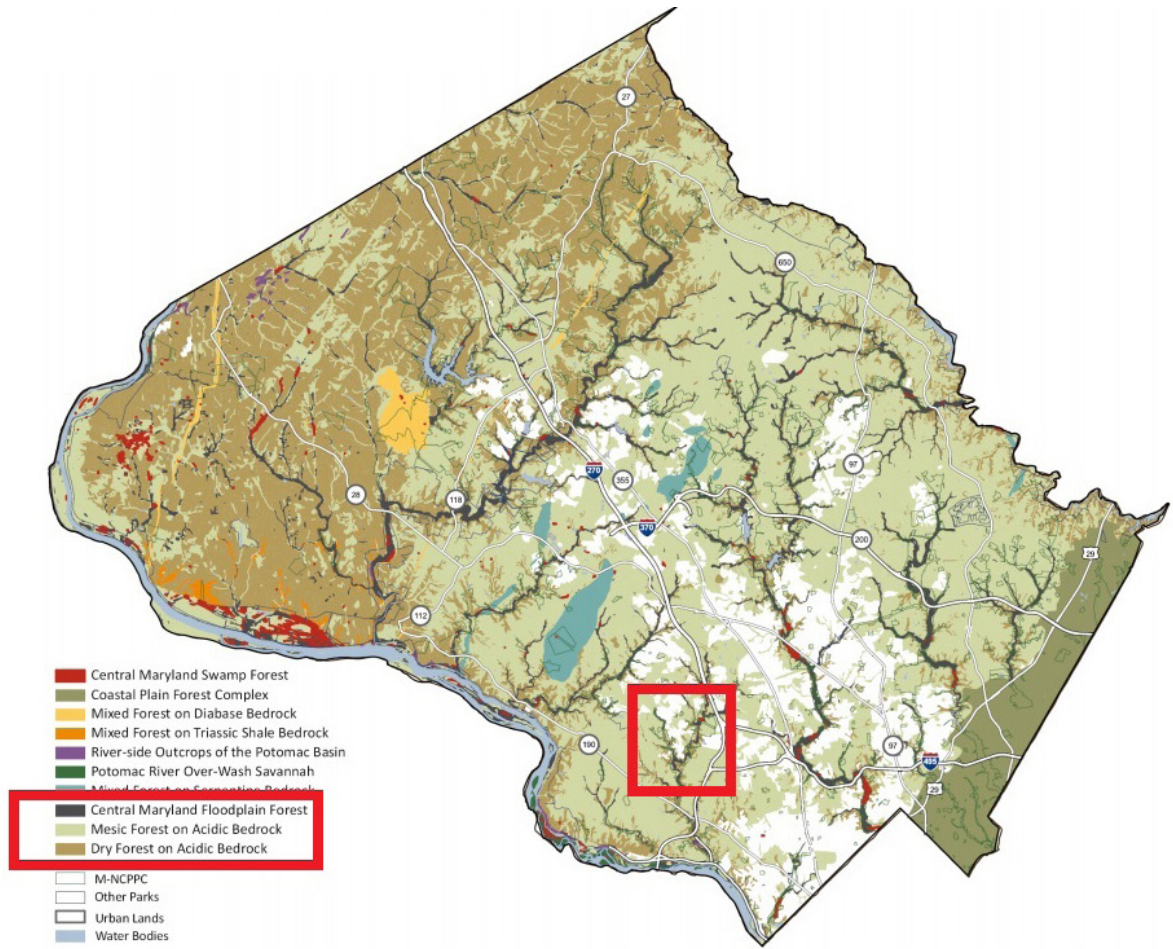


Figure 5. Major Terrestrial Natural Communities
Cabin John Creek, Montgomery County, MD

FLOODPLAIN FORESTS

In the Piedmont, non tidal rivers and stream floodplains can be temporarily and intermittently flooded. These bottomland forests consist of Sycamores, Silver maple and Boxelder. Along smaller streams Sugar maple, Basswood, and White pines can be found. This habitat has been used for agriculture over the history of Maryland and are threatened by dams and invasive species.

Figure 6. The Grand Daddy Sycamore (on the right)
This outstanding specimen in the flood plain along the Cabin John stream is a beloved site for gathering and evening open fires.



Maryland Greenprint Implications for Locust Grove Nature Center CORRIDORS AND CONTIGUOUS FOREST

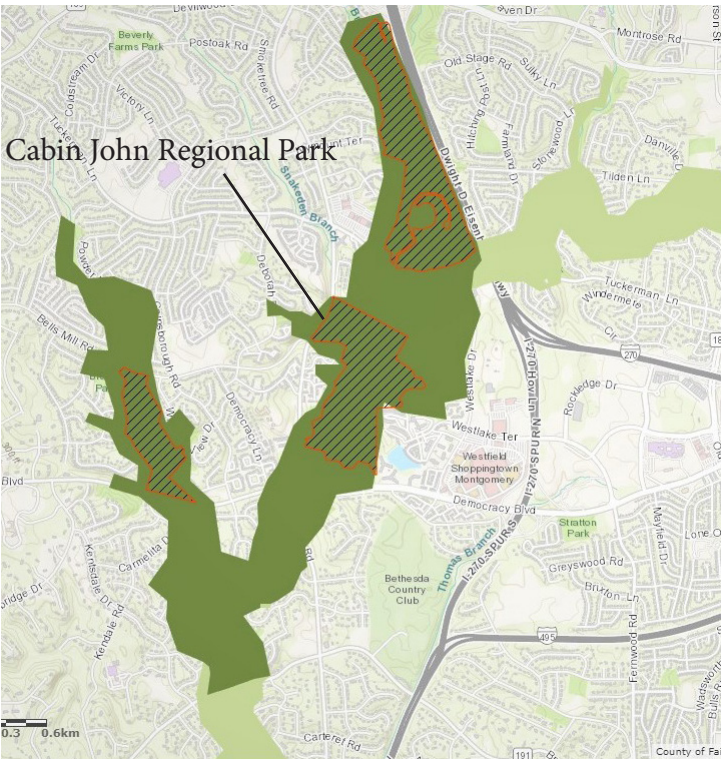


Figure 7. Maryland Green Print Program Mapping
Detail for the Cabin John Regional Park area

Maryland has carefully identified and protected areas that will contribute to the long term goals of open, continuous corridors of forest for wildlife habitat. Ecosystems that are along streambeds are some of the easiest and best to include in the corridor system because these areas are protected from development by their inclusion in the “critical habitats”. These critical habitats include streams and stream bed buffers, 100 year floodplains, steep slopes, areas of known endangered species and wetlands.

Terrestrial Habitats

MANAGED GRASSLANDS

Prior to European settlement, acres of grassland covered northern Maryland. Much of this grassland ecosystem is now lost to development, agriculture and the lack of grazing animals. Managed grasslands are now, for the most part, active pastures and fallow fields where species are both native and nonnative. Cabin John is the site of former agricultural land and if the meadow areas are not grazed, mowed or burned, the grassy areas will naturally succeed to shrub land and then forest within 10-20 years.

The stewards of the Montgomery County Parks are motivated to maintain open habitat areas with various stages of succession with the goal of encouraging species diversity.



Figure 8. Locust Grove Nature Center Lower Meadow

Ecotones (the border between different habitats) are especially important because some species are known to be “edge” species. The meadow consists of warm season grasses, native wildflowers and are an important habitat for bluebirds, meadowlarks, bobwhite, and box turtles.

Grasslands are disappearing in the Eastern U.S. Areas of 100 acres are required to support the breeding of some grassland birds, but 25 acres may be enough if the areas are one half mile apart or less. Even smaller areas of grasslands are home for feeding and nesting to many species.

Basic Mesic Forest Species of Conservation Need

- Big brown bat
- Delmarva fox squirrel
- Smoky shrew
- Many other bats
- Northern bobwhite
- Wood thrush
- Scarlet tanager
- Giant swallowtail



Figure 9. Scarlet Tanager



Figure 10. Northern Bobwhite



Figure 11. Shrew



Figure 12. Delmarva Fox Squirrel

Vital Microhabitats in the Forest

- Downed trees (logs)
- Standing trees (snags) – 10 species of birds in the Montgomery County Parks are dependent on snags for nesting and foraging
- Exposed bedrock



Figure 13. Piliated Woodpecker

Resources:
Maryland Wildlife Diversity Conservation Plan: Chapter 4
Maryland’s Key Wildlife Habitats, 2015-2015 Maryland State Wildlife Action Plan
Natural Resources Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland February 2013
“Balancing Stewardship and Recreation in Montgomery County Parks,” Hench, J.E.

SITE ANALYSIS: Interior Land Uses

Locust Grove Aquatic Habitat: Maryland Upper Piedmont

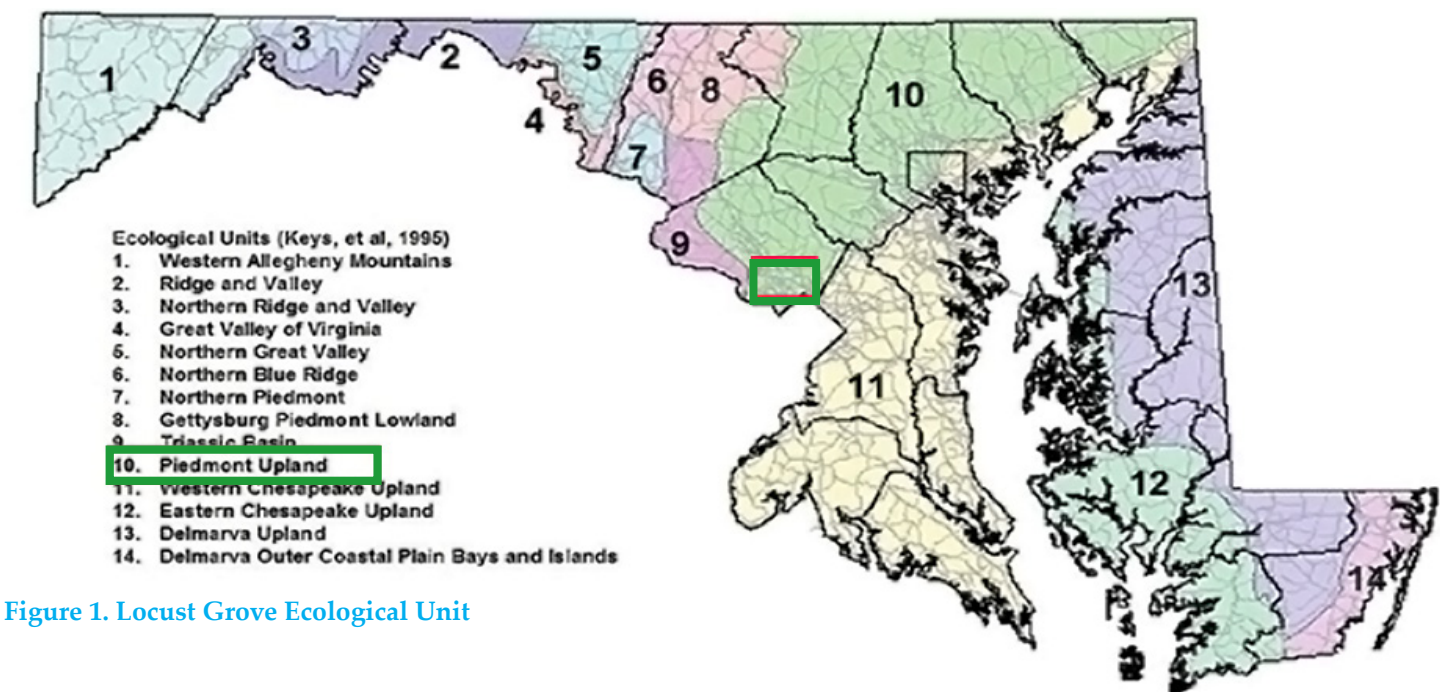


Figure 1. Locust Grove Ecological Unit

Stream Habitat

Stream habitat is one of the important factors that affect aquatic communities. Stream habitat describes the quality of the place or environment where wild-life live.

Figure 2. Montgomery County Stream Conditions

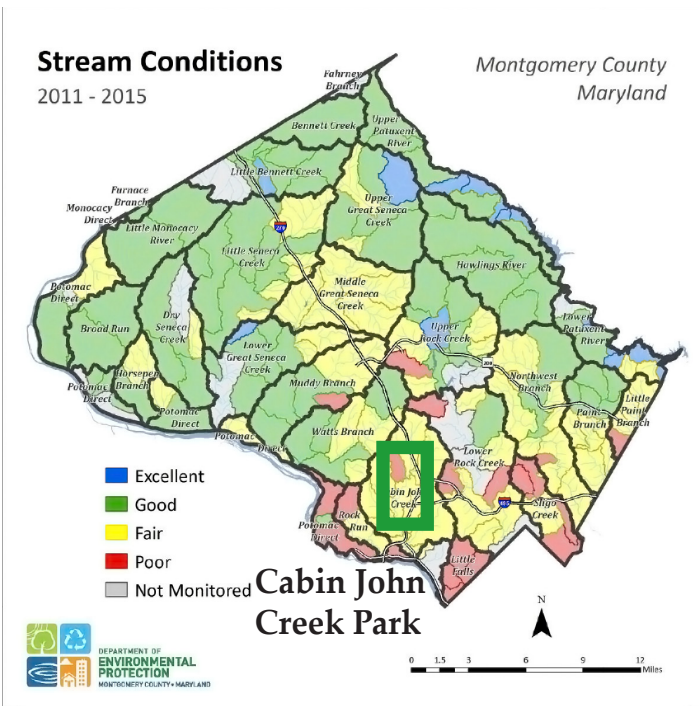
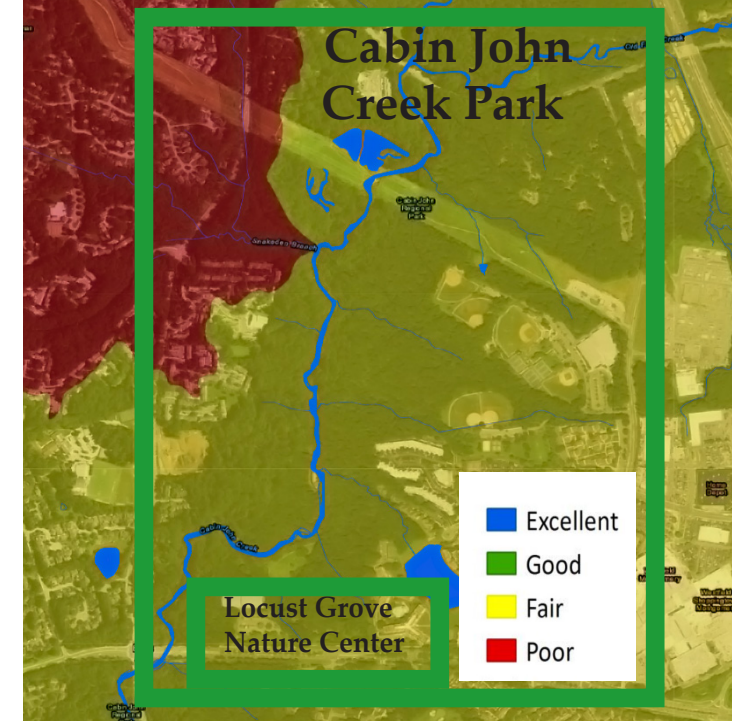


Figure 3. Cabin John Creek Park Stream Conditions



Degraded Stream Habitats

In Montgomery County, poor habitat is usually the most likely cause of a lack of aquatic species diversity, poor health, and decreased population sizes. Degraded in-stream habitat often results from uncontrolled storm water runoff and uncontrolled runoff from intensively grazed or cultivated agricultural land. Other reasons for poor stream habitat include:

- Altered stream flows,
- Excess sediment,
- Loss of surrounding trees and shrubs that help slow the erosion of the stream,
- Chemicals and pollutants also negatively impact stream habitat.

Effects on The Aquatic Community

Stream habitat affects the aquatic community in many ways.

- Too much sediment can smother bottom living organisms and communities by filling in the spaces

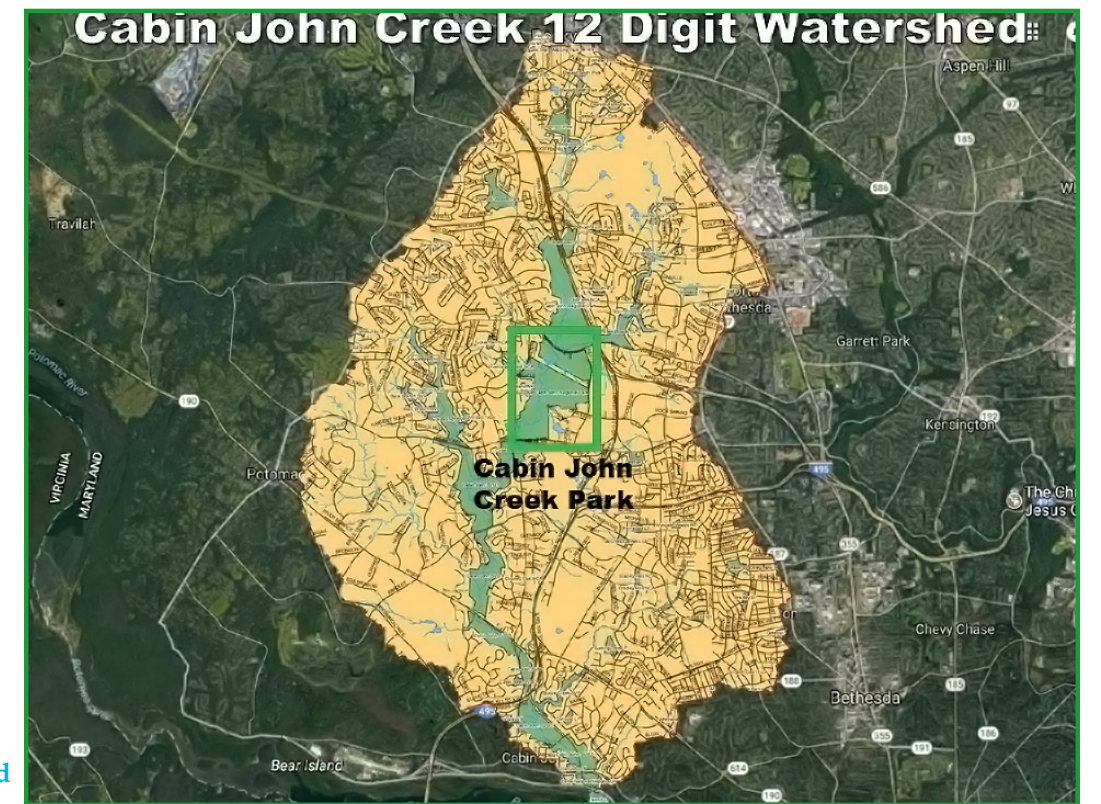
between the stream bed material that the aquatic community needs for respiration and habitat space.

- Lack of stream cover can impact the fish community by removing places for them to hide and rest.
- Lack of clean stream gravel, clean running water and small pools removes places aquatic organisms need for egg laying and for nurseries for small fish fry.
- Lack of riffles, pools and runs can impact separate life stages of aquatic organisms.
- Murky, cloudy water prevents fish from seeing their food.
- Too much sediment can cover the gills of aquatic insects affecting their ability to respire
- In addition to habitat conditions in the stream, the condition of the adjacent stream banks and stream valley also affect the aquatic community. Some of the problems in the stream valley and stream bank include:
 - Uncontrolled access by agricultural animals into the stream causing siltation and muddy conditions.
 - Lack of trees on the bank to provide shade for cooler water conditions.
 - Stream bank erosion caused by mowing up to the edge of the stream.

Cabin John Watershed

The Cabin John Watershed is located in an densely-developed portion of Montgomery County, Maryland, just northwest of Washington, DC. The main-stem headwaters of Cabin John Creek originate in the city of Rockville and the mouth flows into the Potomac River between the towns of Cabin John and Glen Echo.

Figure 4. Cabin John 12-Digit Watershed



SITE ANALYSIS: Aquatic Habitat

Site Analysis: Aquatic Habitat

Determining Stream Conditions

Stream Conditions are determined by sampling of stream fish and bugs such as the species shown here that are native to various streams in Montgomery County. Fish and bugs live in streams year round and are subject to any the changes in water quality or habitat that might occur. If conditions are poor, sensitive fish and bugs can't survive and won't be found in that stream the following year. After sampling fish and bugs, the resulting data, including the number and types or organisms, are input into an Index of Biotic Integrity (IBI). IBIs are multi-metric (utilizing several measurements) equations that rate a waterbody with a unit-less score. These scores can then be used to determine if the stream is in Poor, Fair, Good, or Excellent condition.

- **Poor** stream condition is a combined IBI score (**fish and bugs**) of 0-41. Poor conditions most often occur in places where changes made by humans to the natural environment have substantially altered the structure of the biological community. These areas are often highly developed or urban and don't have good stormwater management.
- **Fair** stream conditions have combined IBI scores of 42-63. These conditions occur most often in places anthropogenic stressors have impacted an area, but the area still supports viable biological communities. This condition describes many streams in suburban areas with some stormwater management, as well as areas that have had major agricultural impacts.
- **Good** conditions are described by combined IBI scores of 64-88. These conditions are often found in the less developed areas of the county, suburban areas with the latest stormwater management techniques, and areas with lots of protected land in their watershed.
- **Only Montgomery County's best streams are rated excellent** and must have a combined IBI score of 89-100. Most often, only highly forested watersheds with minimal development are in excellent condition. Here our most sensitive fish and stream bugs live. Fish like trout, shield darters, and comely shiners are found. Highly sensitive stream bugs like stoneflies and mayflies are common in these watersheds.

Stream Conditions: Fish Species

Montgomery County is home to more than 60 species of freshwater fish, representing nearly every family of freshwater fish known in Maryland. County biologists study fish communities to provide insight on the health and condition of County streams. Montgomery County divides fish into three groups based on their ability to survive in polluted waters. **Sensitive fish** are only able to survive in the county's highest quality streams. **Moderately tolerant fish** can survive and sometimes thrive in areas that receive minor pollution. **Tolerant fish** live in most streams in the county, but they are the only fish that can survive in heavily polluted waters.

Figure 5. Tolerant Fish Species

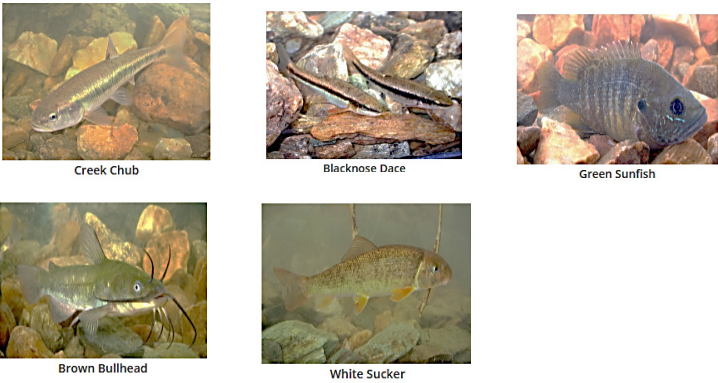


Figure 6. Mildly Tolerant Fish Species



Figure 7. Sensitive Fish



Stream Conditions: Aquatic Bugs

Montgomery County is home to hundreds of species of aquatic bugs (Benthic Macroinvertebrates). These aquatic bugs process nutrients and energy, powering the stream ecosystem! Because they are crucial to the stream, they are excellent indicators of stream health.

- What is a Benthic Macroinvertebrate or Stream Bug?
 - A small organism that is visible to the naked eye,
 - Does not have a backbone
 - Lives on the bottom of streams for at least part of their lives

They include aquatic insects, crayfish, mussels, worms and leeches, snails, sponges, and flatworms.

- Why Call them Benthic Macroinvertebrates?
 - Benthic = bottom dwelling
 - Macro = visible without a microscope
 - Invertebrates = lack a backbone

- Why are Stream Bugs Important?

Stream bugs are an important member of aquatic communities. Many stream bugs eat aquatic plants, algae, and terrestrial plants that fall into the water. Those bugs form the base of the food chain and are called Shred-ders.
- Stream bugs are great indicators of stream health, because they:
 - Live in the water for all or most of their life
 - Stay in areas suitable for their survival
 - Are easy to collect
 - Differ in their tolerance to amount and types of pollution
 - Are relatively easy to identify in laboratory
 - Often live for more than one year
 - Have limited mobility

Montgomery County categorizes stream bugs into groups based on their ability to withstand pollution. Each genus has a unique tolerance value that helps DEP assess the health of our streams.

Figure 8. Aquatic Bugs: CommonStream Bugs

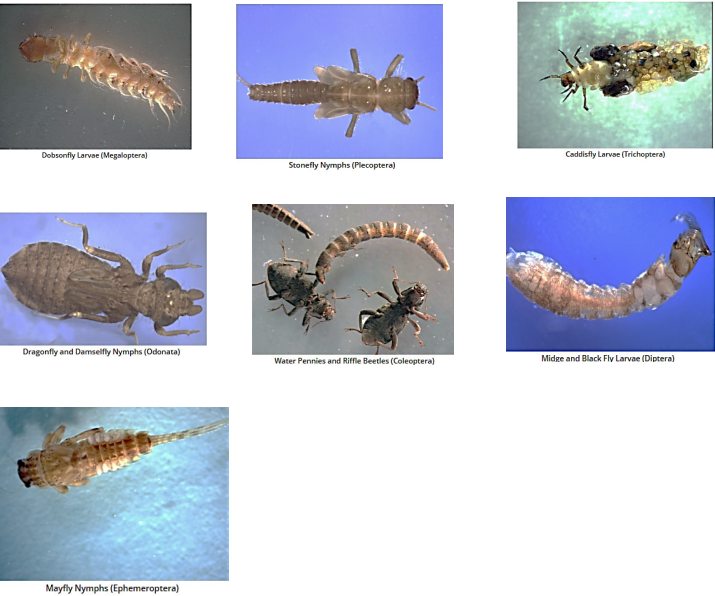


Figure 9. Aquatic Bugs: Non-Insect Groups



Figure 10. Aquatic Bugs: Worms



Interior Land Uses

Locust Grove Nature Center is situated at the southern end of Cabin John Regional Park in Montgomery County, Maryland. Cabin John Regional Park is run and maintained by the Maryland-National Capital Park and Planning Commission.

Cabin John Regional Park

Cabin John Regional Park spans 528 acres along Cabin John Creek, a tributary of the Potomac River. The park offers a wide variety of public activities.

One of the primary amenities in the park is its four mile long natural surface trail for hiking and biking. This trail falls within the 8.8 mile long Cabin John Stream Valley Trail that terminates at the stream’s confluence with the Potomac River. The trail follows the course of the creek, and it serves to connect the rest of the park’s amenities.



Figure 1. Cabin John Stream Valley Trail trailhead

Cabin John Regional Park has eleven picnic shelters distributed throughout the park, including its designated Group Picnic Area which has 40 picnic tables split between two shelters, restrooms, a ballfield with a backstop, three horseshoe pits, volleyball area, a playground, and the resources for sport equipment rentals.

One of the most popular amenities in the park is the Athletic Area which contains five softball fields and a baseball field, home to a prestigious summer collegiate team.

Cabin John Ice Rink is accessible from the ballfields and is a hub of activity year-round, with three ice rinks, a dance studio, and three rentable party rooms.

The main park entrance houses the park headquarters and the Cabin John Miniature Train, a seasonal favorite activity for young families. The Train traverses a two mile track that winds through the forest.



Figure 2. Cabin John Miniature Train

The southern half of the park includes the Locust Grove Nature Center and its associated trails, as well as the Pauline Betz Addie Tennis Center.

Locust Grove Nature Center

Locust Grove Nature Center provides a convenient, tranquil nature getaway in the heart of Montgomery County. The center’s trails and creek-access are treasured by the local community.

Locust Grove offers public programs for all ages, including Nature Immersion school programs, a nature pre-school program, spring and summer break programs, and naturalist-led walks. Locust Grove is also a popular destination for scout troupes, youth groups, and school groups.

The nature center has exhibits open for self-exploration, both indoors and outdoors.



Figure 3. Locust Grove provides a wide variety of programming centered on learning about the natural environment.

Locust Grove is a popular destination for group gatherings. The center has three separate fire ring spaces with ample seating a short walk from the nature center. These spaces are rented out frequently for evening events and gatherings, including birthday parties.

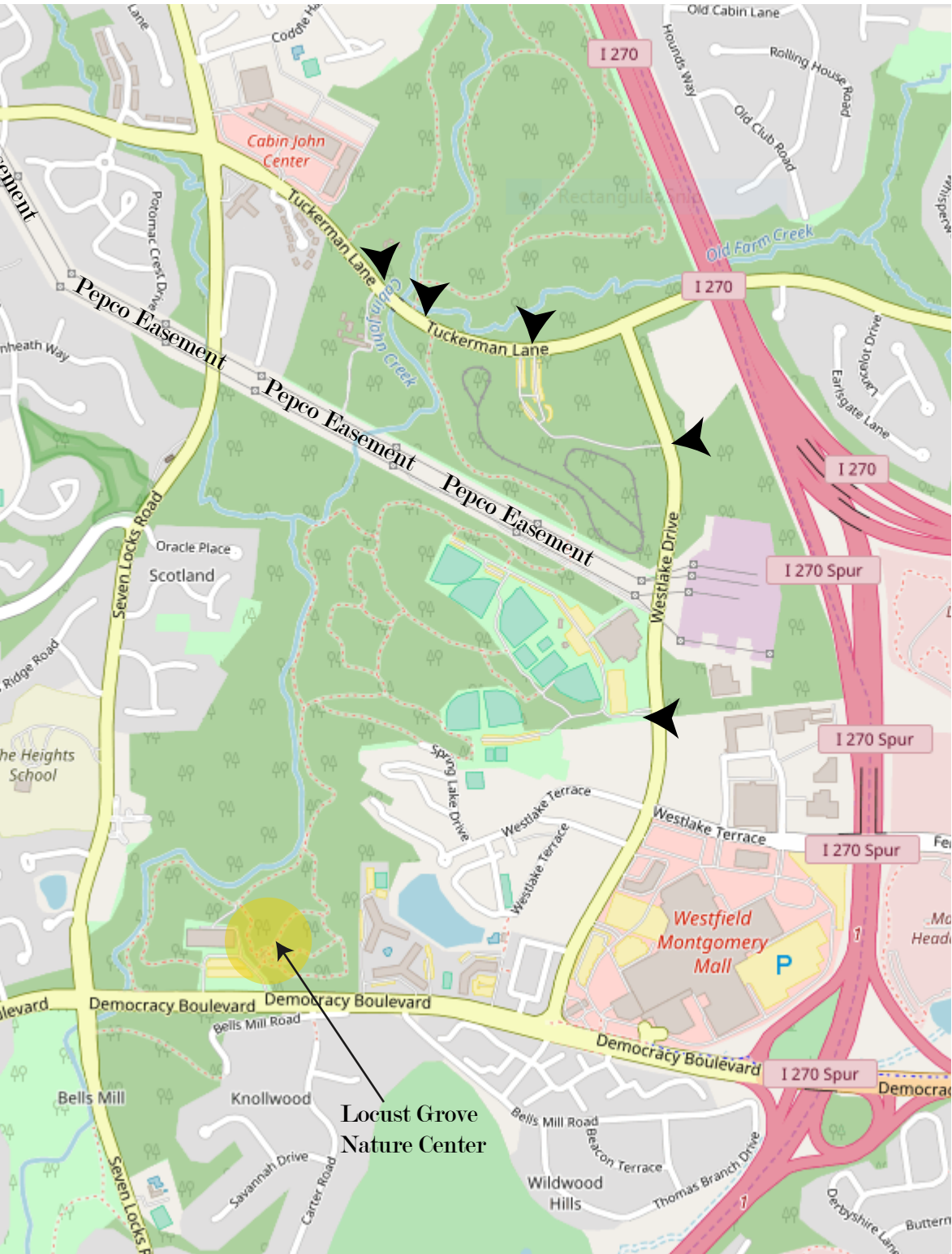


Figure 4. One of three rentable fire-ring spaces, popular for group gatherings



Figure 5. Locust Grove’s convenient access to the creek from the nature center caters to all ages.

Circulation



Road and Interstates

Figure 1. Major roads and access points around Cabin John
Five local streets surround Cabin John Regional Park, Democracy Blvd, Westlake Terrace, Westlake Drive, Seven Locks Road, and Tuckerman Lane. Access points from motorway I-270.



Trails

Figure 2. Existing and Proposed Trails
Bike and nature trails around the whole of Cabin John Regional Park. Also, proposed trail that extends towards the Inverness Recreation Club.

Locust Grove Nature Center is easily accessed from I-270 and several major roads. The Cabin John Creek flows along the trails of Cabin John Regional Park.

Cabin John and has 5 existing trails and pedestrian made trails close to Pepco's easement. A new nature trail can be created from the Inverness Recreation Club that would connect to the Pine Ridge existing trail. Cabin John has 5 existing parking lots connections and 1 parking lot that is shared with the Pauline Betz Addie Tennis Center.

The forest in front of Democracy boulevard and near Lakeside Terrace condominiums limits the view and acknowledgment of the nature center to the local neighborhood along Democracy Blvd. The forest may need to have trees cut or removed upfront to invite the tenants, who live next door to the Locust Grove.

Transit Systems

The site as two main local streets and Ride On buses that are close to the Inverness Recreation Club, which is nearby point of interest area that can connect the community members with Locust Grove Nature Center. The Redline metro station is the closes line to the site. Democracy Blvd and Tuckerman Lane have existing parking lots. The main entrance of the site centered around Democracy boulevard, so additional parking is more beneficial in this area. The third parking bay can allow 75 additional parking spaces upfront , if existing vegetation is moved.

Public transit commuters estimated travel times range from 18 to 46 minutes, during the early afternoon. The local RideOn buses are the shortest route to the site. The 42,47 RideOn buses stop right in front of Democracy boulevard, which allows pedestrian foot traffic access into the site. Tuckerman Lane is less inviting because, public transit stops are not connected along the road. Even though , Tuckerman Lane isn’t public transit friend it still invites nature lovers to connect to Cabin John trails, and nearby picnic and adjacent campgrounds.

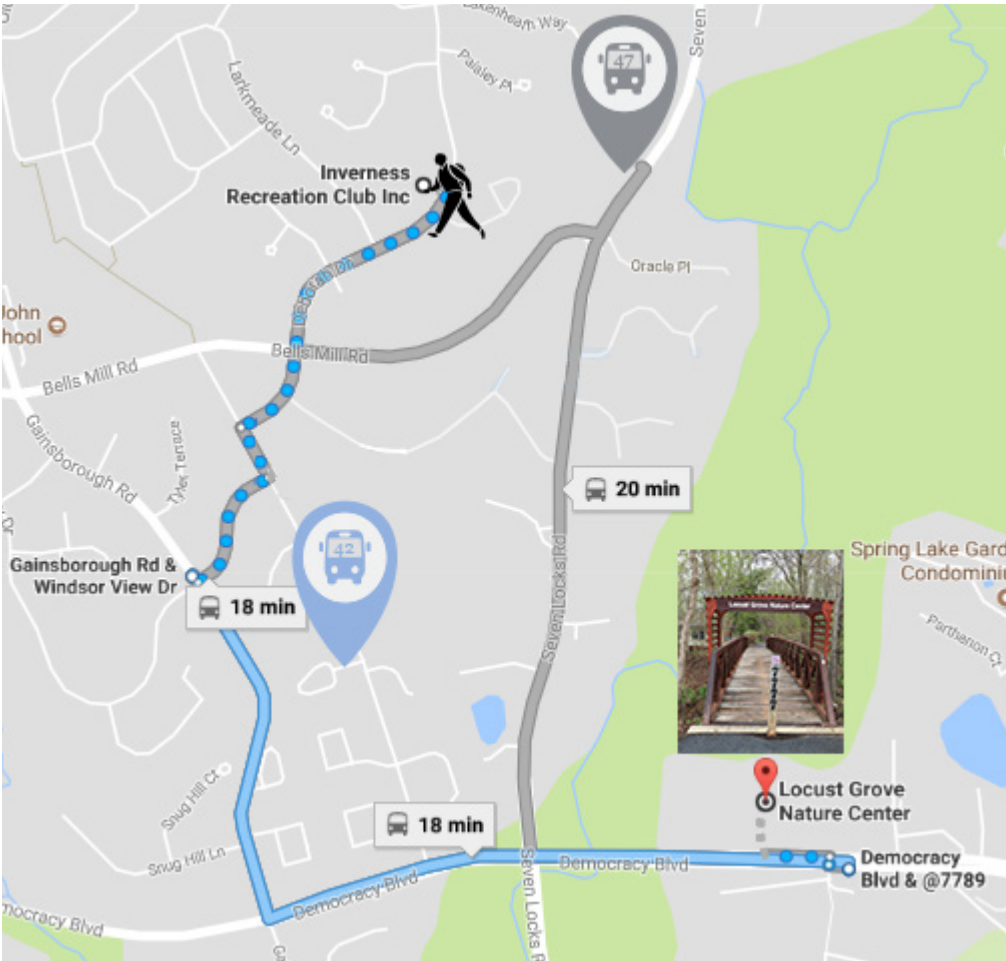


Figure 3. Bus routes to the site
Two local buses ,42, 47 Ride On. The nearest bus stop is Democracy Blvd, about a 5 minute walk from the Locust Grove Nature Center.

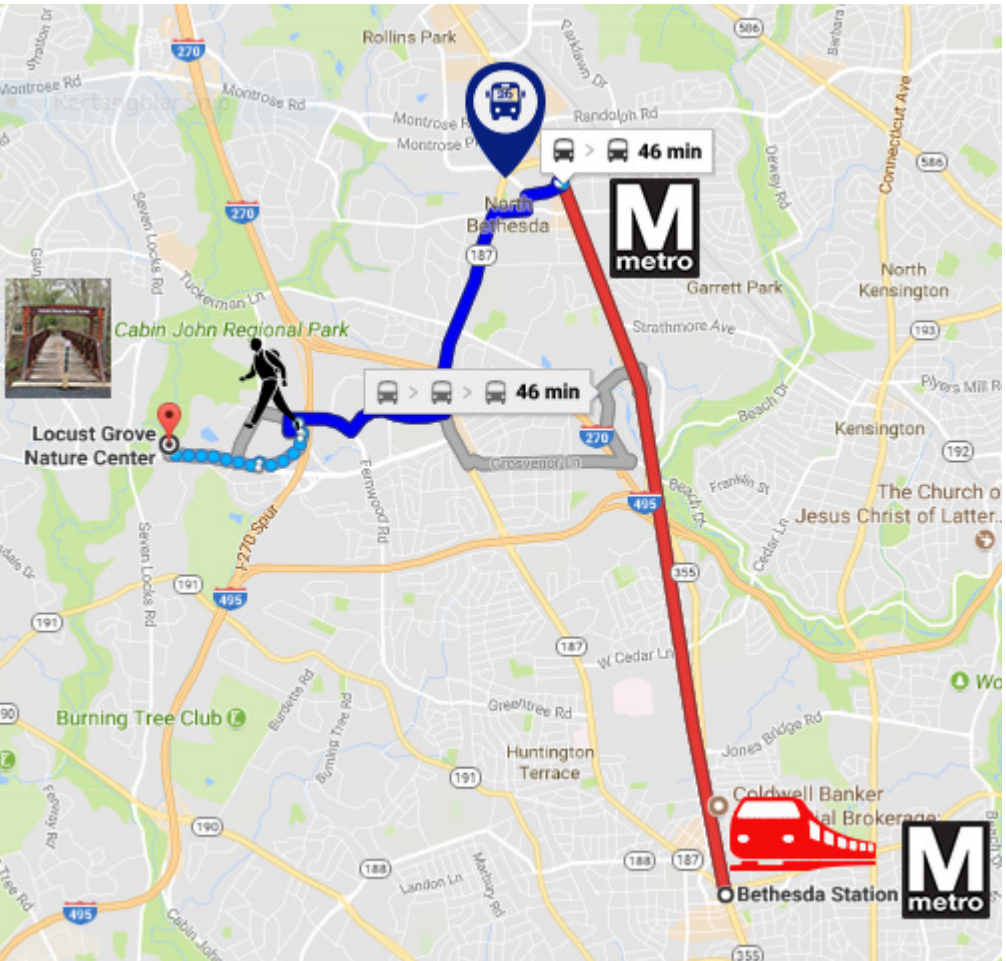


Figure 4. Train routes to site
Bethesda metro rail station Redline is the primary connection to the site, but Rockville station also is nearby with alternate transfer to the 26 bus .

Vehicular Circulation

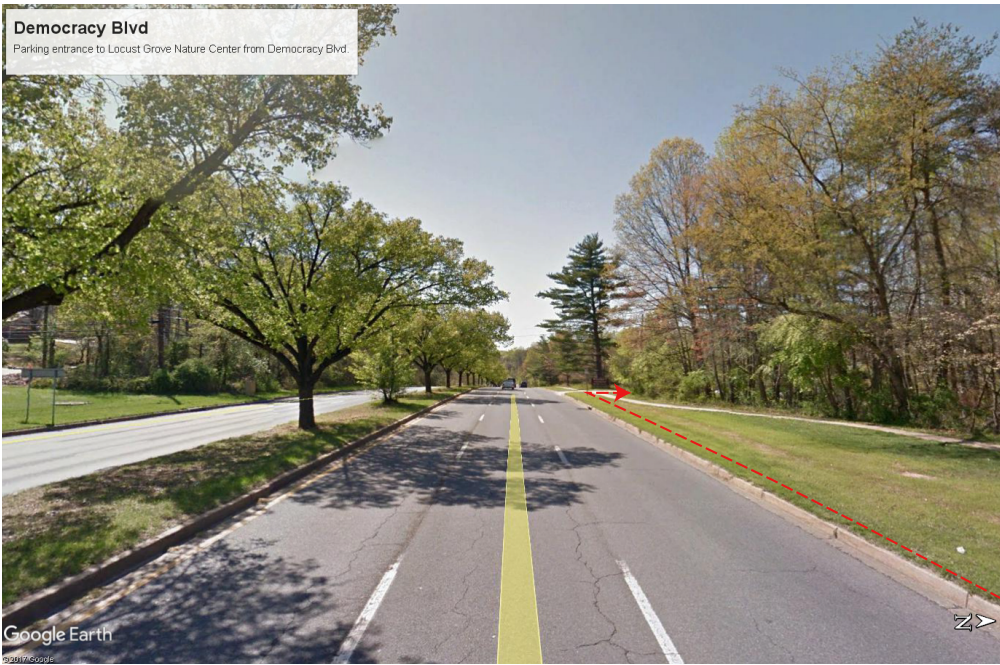


Figure 5. Democracy Blvd main existing road to site
Main local road with shared parking lot to community tennis center and nature center.



Figure 6. Tuckerman Road Parking Lots
Three of Cabin Johns Regional Park’s parking lots are placed on opposite sides of Tuckerman Lane.



Figure 7. Tuckerman Lane Trail Entrance
Trail to Cabin John Regional Park from Tuckerman lane adjacent Robert C . McDonnell Campground.

Neighbourhood Land use

Locust Grove Nature Center, located in Montgomery County, is within the Cabin John Creek park. The park is bordered by Democracy Boulevard to the south, Tuckerman lane to the north, Seven Locks road to the west and Westlake drive to the east. Locust Grove Nature Center is at the southern end of the park bordering Democracy Boulevard.

The land use around the nature center is included the Agriculture, Hospital Rural Residential, Residential detached, Residential Multi unit, educational, Commercial and Catholic church.

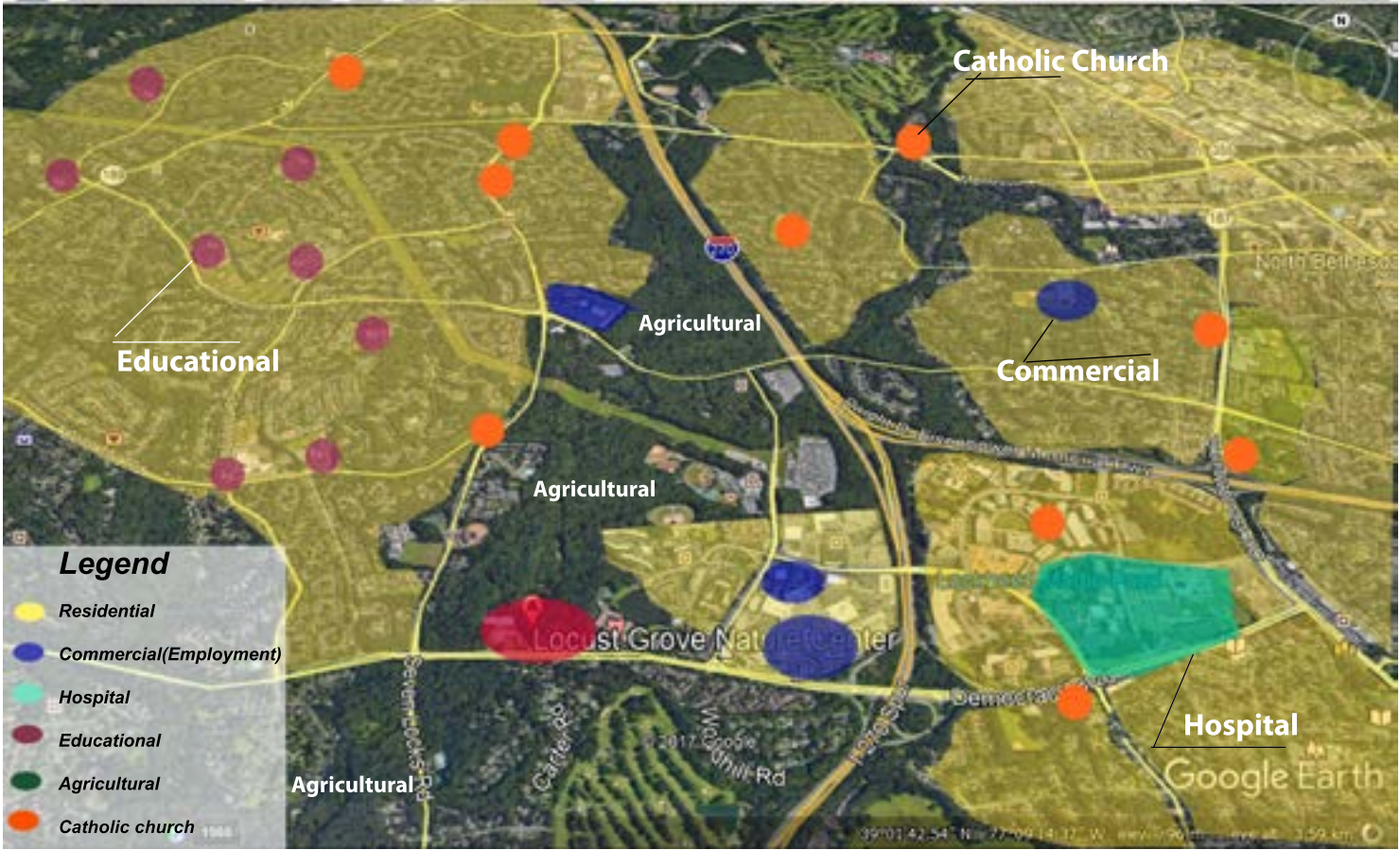


Figure1. Neighbourhood Land use

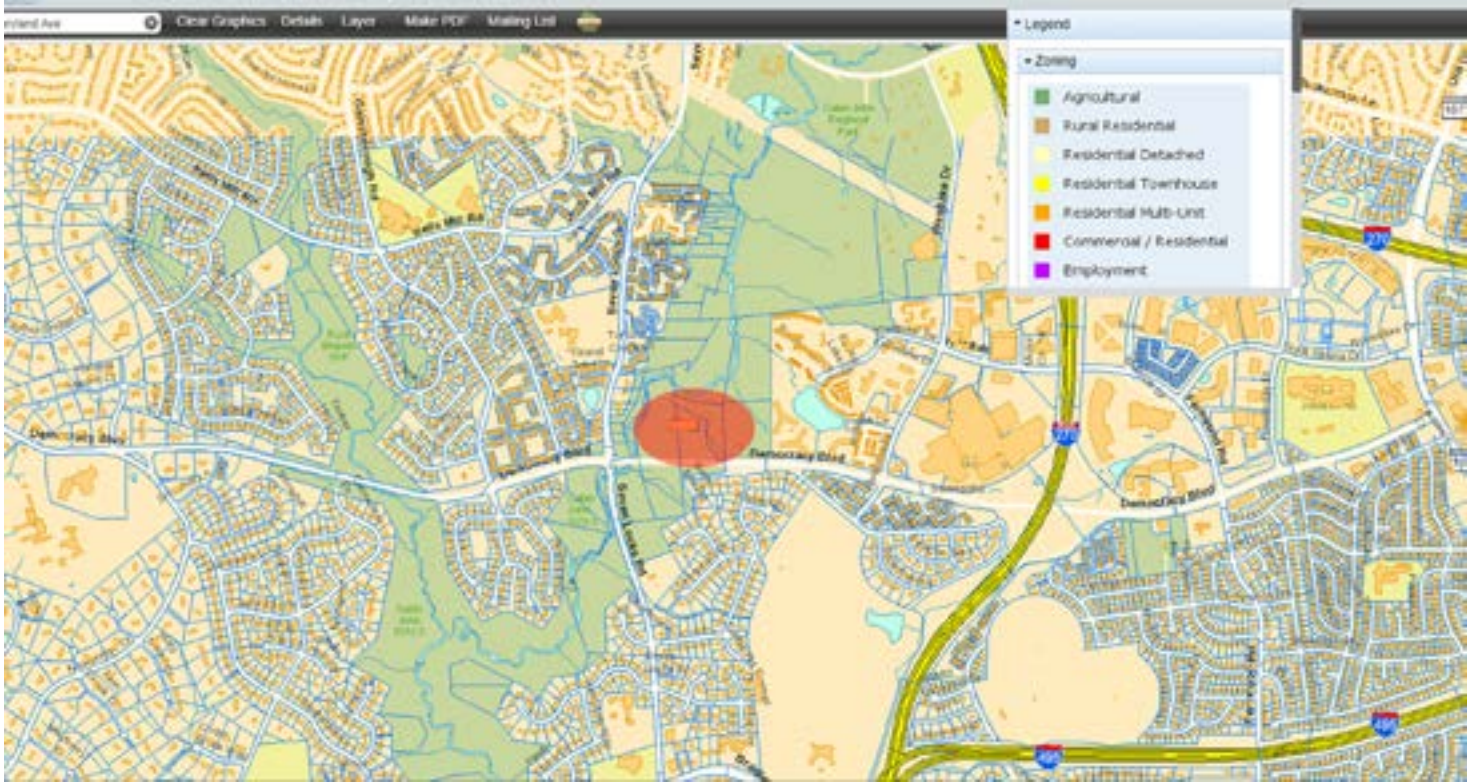


Figure2 Neighbourhood land use



Figure 3. Park - part of agricultural landuse



Figure 4. Residential



Figure 5. Residential

Photo credits :
-Moungomery county mapviewer
- Google earth
- <http://www.montgomerycountymd>.

History of Cabin John Area and Locust Grove

History of Cabin John Area

Before Nineteenth Century

Native Americans were the first people to live in the Cabin John area.

In the early seventeenth century, the first European explorers found this place.

Maryland became a settled colony in the middle of the seventeenth century, Lord Baltimore made several land grants along the Potomac River, Cabin John was among them.

Nineteenth Century

In the nineteenth century, due to the construction of the C & O canal, a large number of settlers were brought to the Cabin John area, but land ownership was concentrated. At the end of this century, three families owned all the property of this area.

During this period, most parts of Cabin John were farmland.

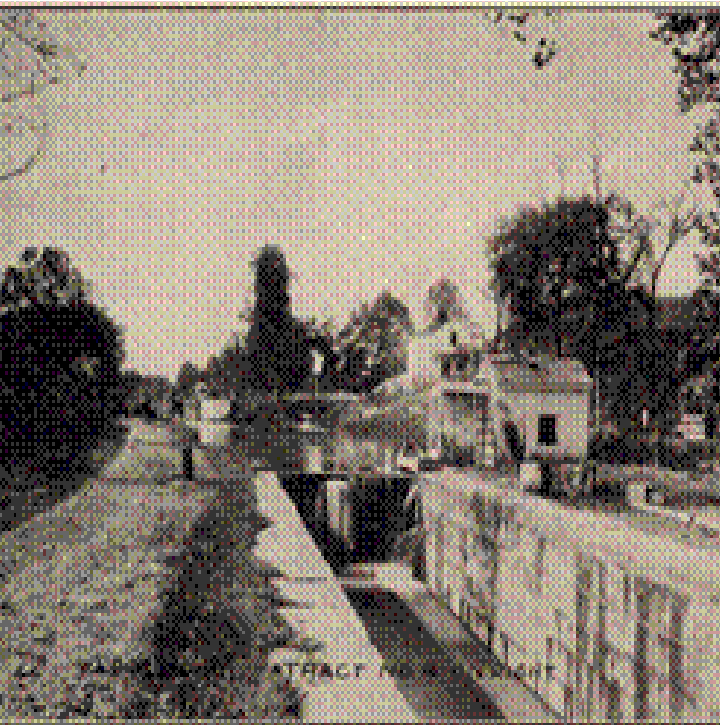


Figure 1.C&O Canal
Locks 9 & 10 on the C & O Canal.
<http://glenecho-cabinjohn.com/CJ-02.html>



Figure 2.Farm Land
A large flock of sheep in Cabin John area. In nineteenth century, most of Cabin John was farm land.
<http://glenecho-cabinjohn.com/CJ-02.html>

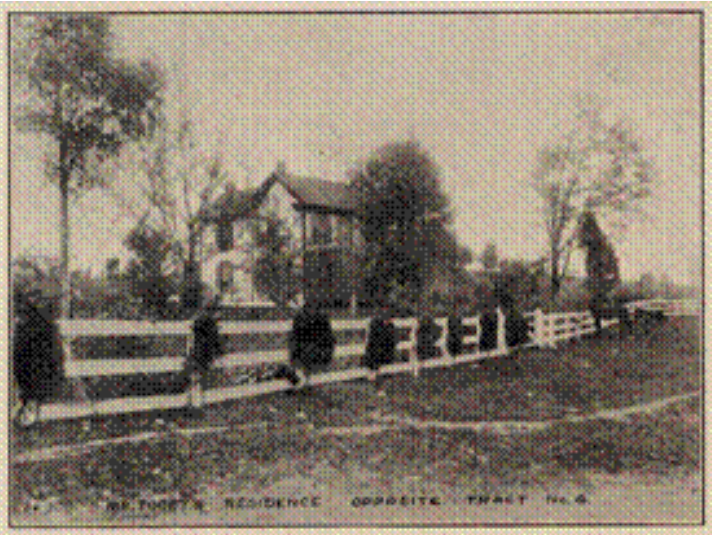


Figure 3. The Old Cabin John Family Home
<http://glenecho-cabinjohn.com/CJ-02.html>

Twentieth Century

In 1912, the American Land Company purchased a large amount of land in the area, divided it into separated residential lots and started selling the plots. That year, the population of this region began to grow steadily and developed a community atmosphere.

In 1919, the inhabitants living in the area set up the Cabin John Park Citizens Association, and began to focus on and improve the infrastructure for the communities. For example, in 1930, the community established the Cabin John Volunteer Fire Department, which was composed of Cabin John residents.

In the late 1960s and early 1970s, the real estate developers wanted to buy unused land and establish high-density housing in the area.

Due to residents concerned about the changes in the regional ecology and the lifestyle, negotiations with the government resulted in a community development plan that included a new commercial area. It is still around today.

Nowadays

Today, the Cabin John area is a woodsy residential area. There are 860 families(about 2,300 people). There are dozens of businesses and it has a community center.



Figure 4. The Present Cabin John Family Home
<https://www.redfin.com/MD/Cabin-John/6516-77th-St-20818/home/10645008>



Figure 5. The Present C&O Canal
<http://www.candocanal.org/>

History of Locust Grove

Locust Grove Nature Center was originally opened in 1972 as a topoggan run. The construction of the runway was started in 1972, and it had two chutes, and a warm-up room. The runway was closed in 1977 due to a decrease in snowfall. Nowadays, Locust Grove Nature Center has become a nature conservation center.

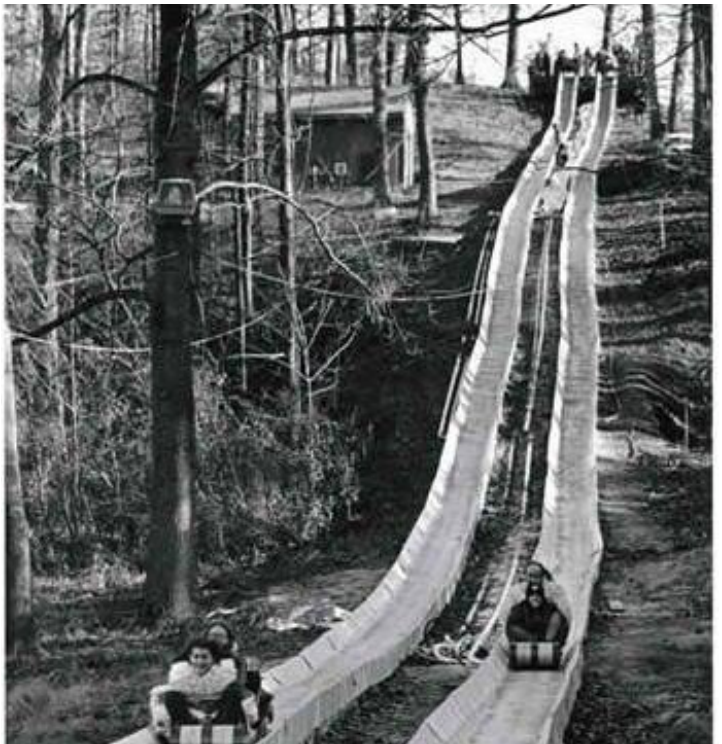


Figure 4. The Old Topoggan Run
<http://www.montgomeryparks.org/parks-and-trails/cabin-john-regional-park/locust-grove-nature-center/history/>

Now, Locust Grove is a nature center, it provides various programmas for all ages, it also offers a nature landscape for people to away from the noise of city.



Figure 5. The Building of Locust Nature Center
<http://www.culturespotmc.com/venue/locust-grove-nature-center/>