Dunwoody
Smart people – Smart city

City of Dunwoody Impaired Waters Plan

December 2014

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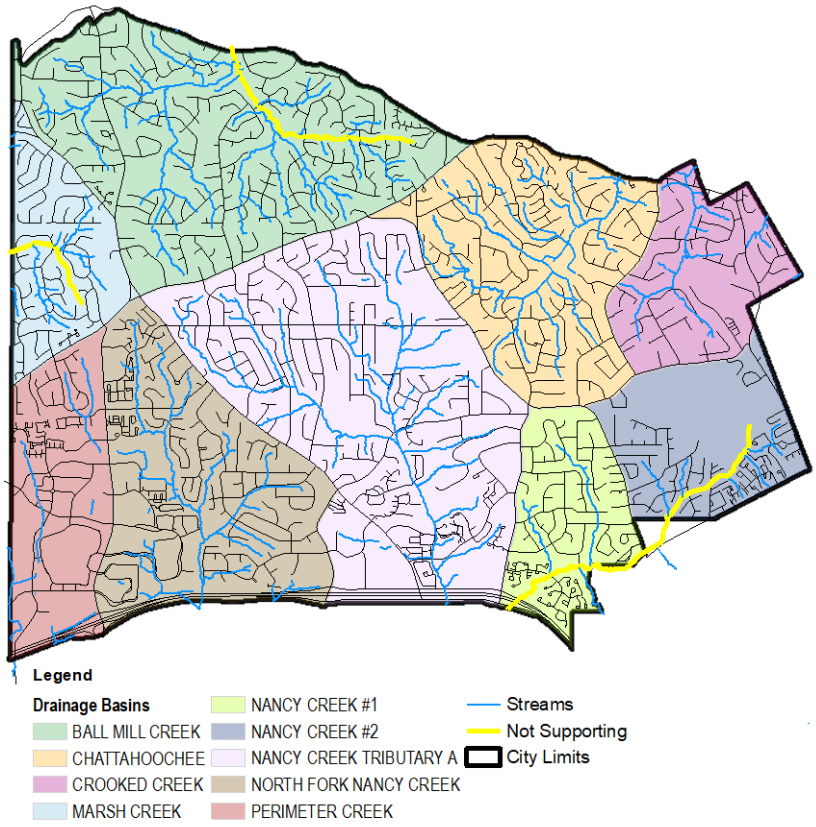
Executive Summary

The City of Dunwoody has a National Pollutant Discharge Elimination System (NPDES) Phase II permit. One of the requirements under this permit is the development of this Impaired Waters Plan. This Plan was developed consistent with the permit guidance provided by the Georgia Environmental Protection Division (EPD). Although this document was developed to comply with state requirements, the City of Dunwoody has a strong commitment to sustainability and has ongoing programs in place to protect and improve water quality.

Figure E-1. City of Dunwoody's Impaired Waters



The City of Dunwoody has three streams that have been classified by the state as impaired; Ball Mill Creek, Marsh Creek, and Nancy Creek as shown in Figure E-1. Ball Mill Creek is considered impaired for fecal coliform bacteria and both Marsh Creek and Nancy Creek are considered impaired for fecal coliform bacteria and fish biota. The most likely sources of fecal coliform bacteria in the watershed include sanitary sewer overflows, domestic animals, and wildlife. The most likely sources of the fish biota impairment are sediments from historic agricultural lands or from stream bank erosion.

Most of the data used to classify these three streams as impaired were collected downstream of the City limits. Therefore, this Impaired Waters Plan presents a phased approach that emphasizes the collection of additional data to better characterize watershed conditions and potential sources of pollution within Dunwoody. Once a source or sources are identified the City can then develop an informed solution to address the specific challenges. The phased schedule also aligns with DeKalb County Watershed Department's ongoing sanitary sewer improvements program that may eliminate the need for further action by the City. The DeKalb County Priority Sewer Repair Areas document is located in Appendix A of this Impaired Waters Plan.

As the City collects additional data to characterize watershed conditions, they will continue to implement actions to protect water quality consistent with their approved Stormwater Management Plan as part of their Municipal Separate Storm Sewer System (MS4) permit. These activities among others include implementation of the illicit discharge detection and elimination program, erosion and sedimentation control program, and post-development stormwater management requirements. Following an adaptive management model, the City will continue to learn, assess, and adapt programs to protect stream health and promote sustainability within Dunwoody.

1.0 Background

The purpose of this Impaired Waters Plan is to identify the waters within the City of Dunwoody that are classified by the state as impaired and present a plan of actions to improve watershed conditions. This plan is a required element under the City's National Pollutant Discharge Elimination System (NPDES) permit.

There are currently three stream segments that are classified as impaired according to the state's 303(d) list of impaired waters. These stream segments include Ball Mill Creek, Marsh Creek, and Nancy Creek. These stream segments are shown in Figure 1-1 and listed in Table 1-1.

Figure 1-1. Streams Listed as Impaired within the City of Dunwoody

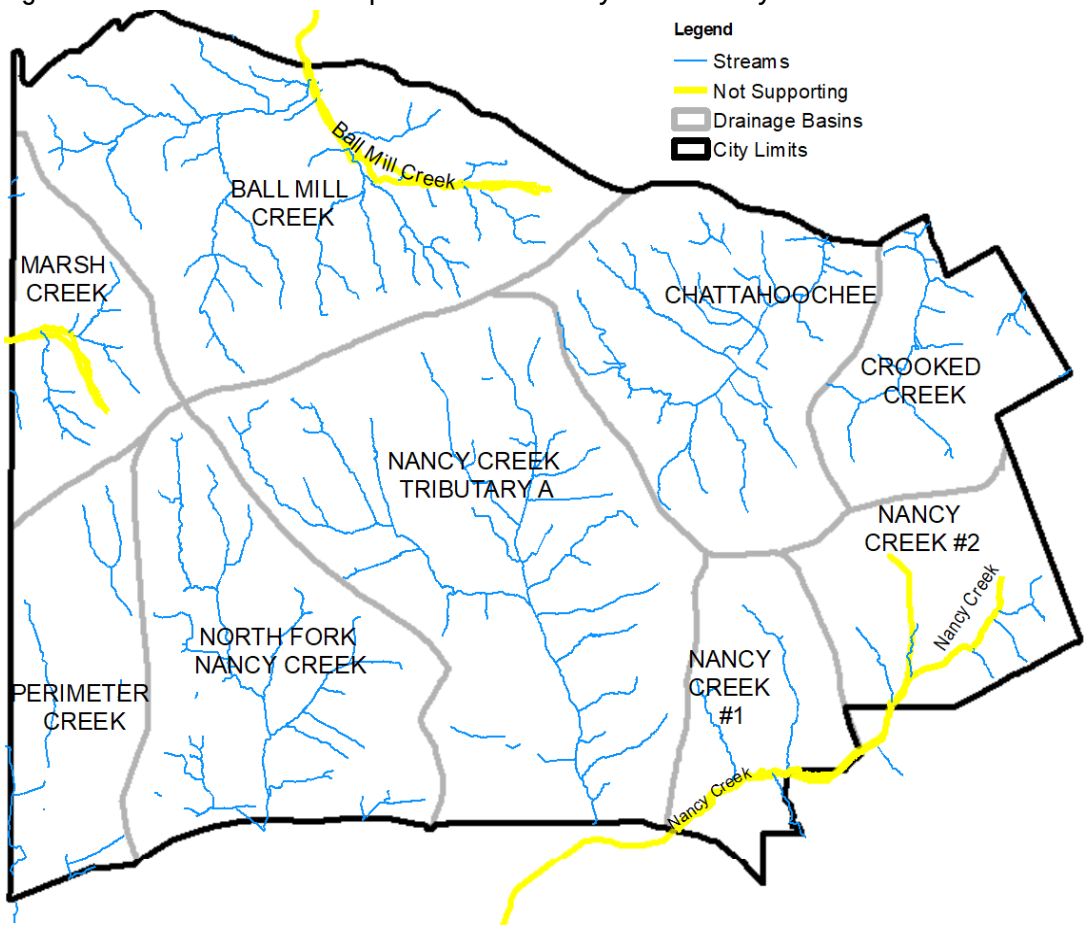


Table 1-1. Streams Listed as Impaired within the City of Dunwoody

Impaired Stream Segment	Parameters
Ball Mill Creek (headwaters to Chattahoochee River)	Fecal Coliform
Marsh Creek (headwaters to Chattahoochee River)	Fecal Coliform, Fish Biota
Nancy Creek (headwaters to Peachtree Creek)	Fecal Coliform, Fish Biota

This section presents background information intended to provide context for the remainder of the Impaired Waters Plan. There is an overview of applicable regulations as well as of the parameters of concern for the three listed streams.

1.1 Regulatory Overview

The Georgia Environmental Protection Division (EPD) is responsible for establishing water quality standards for waterbodies in the state. Consistent with the U.S. Clean Water Act, the state collects water quality sampling data and identifies streams that do not meet these water quality standards. The list, published bi-annually, of waters that do not meet state standards is referred to as the 303(d) list of impaired waters (after the section in the Clean Water Act where the state requirement is identified). As noted before, three streams within Dunwoody were classified as impaired on the 2014 list because they do not meet state water quality standards.

Some important considerations regarding the 303(d) list of impaired waters:

- The list is generated by EPD based on the best available sampling data that is collected by a state agency or a local jurisdiction with an adopted Sampling Quality Assurance Plan (SQAP).
- Dunwoody has the option to develop a SQAP and, once approved by the state, submit water quality data to support removing a stream segment from the list of impaired waters.
- Jurisdictions were not required to have a SQAP prior to 2005 in order to have data used for listing and TMDL purposes. Much of the data used for listing purposes prior to 2000 was sampling data collected following a sanitary sewer overflow. As the state was building its water quality database, this was the only data available for use.
- Impaired streams remain on the list until sufficient data is collected to show that the impairment no longer exists. Therefore, conditions may have changed but monitoring has been insufficient to remove a stream from the list.
- Typically, the entire headwaters of a stream will be considered impaired if a downstream sample exceeds the standard. Meaning a sample downstream of Dunwoody may have shown impairment that classifies the upstream area as impaired; however the stream may meet state standards within the City limits.

The sampling data needed to remove a stream from the impaired waters list is summarized by parameter in Section 1.2.

Total Maximum Daily Loads: The state must further evaluate impaired streams and develop a Total Maximum Daily Load (TMDL), which accounts for the likely sources of pollution as well as activities in the watershed to reduce pollution loads. The TMDL presents a percent reduction in the pollutant load that would be needed in order for that waterbody to meet state standards. These reductions are shown in Table 1-2 for each of the listed streams by parameter. TMDL implementation plans often summarize likely sources of pollution as well as planned activities to address potential pollution sources.

Table 1-2. Percent Reduction Needed in Pollutant Loads as Outlined in the TMDL

Impaired Stream Segment	Parameters	Reduction Needed
Ball Mill Creek (headwaters to Chattahoochee River)	Fecal Coliform	51%
Marsh Creek (headwaters to Chattahoochee River)	Fecal Coliform	60%
	Fish Biota	n/a
Nancy Creek (headwaters to Peachtree Creek)	Fecal Coliform	84%
	Fish Biota	36%

Stormwater Program – The City of Dunwoody is responsible for a National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase II permit. The permit includes six minimum control

measures and requires that the City establish and then meet measurable goals for each of these six measures. The six minimum measures under the MS4 permit include public education, public involvement, illicit discharge detection and elimination, construction site runoff management, post-development stormwater management requirements, and implementation of pollution prevention/good housekeeping practices for municipal activities. This Impaired Waters Plan is one facet of compliance with this permit. The City has adopted ordinances and developed programs in order to comply with these requirements. These ongoing efforts are all related to protecting water quality and reducing stream impairment.

Watershed Assessment and Protection Plan - The DeKalb County Watershed Department, as part of its NPDES wastewater discharge permit, must implement a watershed assessment and protection plan. Among other elements, this plan includes water quality monitoring. This program is unique to Georgia and is based on the concept that when the state approves additional wasteload allocations for additional wastewater treatment capacity; this act permits additional development that could negatively impact water quality. As part of this program, DeKalb County monitors watershed conditions and has adopted ordinances similar to the ones adopted by the City of Dunwoody as part of the MS4 permit program.

DeKalb County Consent Order – DeKalb County has entered into an agreement with EPA and EPD in order to reduce the occurrences of sanitary sewer overflows within the county service area as well as decrease the time to respond to these occurrences. The consent order agreement establishes a schedule for completing specific actions to reduce the number of overflows with emphasis on certain priority areas. This program is relevant to this Impaired Waters Plan, as all three streams are impaired for fecal coliform bacteria. Planned rehabilitation of the collection system may reduce the fecal coliform bacteria loading to these waterbodies such that no additional actions are required. There are a number of different documents related to the Consent Order. The most relevant of these documents is the DeKalb County Priority Sewer Repair Areas report, which is included in Appendix A.

1.2 Parameters of Concern

There are two different parameters of concern for the City of Dunwoody which are described in greater detail below: fecal coliform bacteria and fish biota.

Fecal Coliform Bacteria

Fecal coliform bacteria are found in the digestive tract of all warm blooded mammals (humans, dogs, cats, deer, etc.). Although most of these bacteria are not harmful, their presence is used as an indicator that there is potential for health impacts. In suburban areas, like Dunwoody, sources of fecal coliform bacteria may include pet waste runoff, native animals such as deer and raccoon, overflows from the sanitary sewer system, leaking septic tanks, or improperly connected wastewater plumbing. Fecal coliform is the most common impairment seen in Georgia waterbodies.

The state's fecal coliform standard varies based on the time of year. The "winter" standard from November to March is 1,000 counts/100mL and the "summer" standard from April to October is 200 counts/100mL. The summer standard is lower to reflect the higher probability that people will be recreating in the state's waterways thus increasing the chance for possible health impacts.

Fecal coliform is typically reported in terms of a geometric mean, or 4 samples taken within a 30 day period. The geometric mean provides some flexibility for natural variability in levels. For example, if one out of the four samples exceeds the water quality standard, it is possible that the geometric mean will meet state standards. In order to remove a stream from the 303(d) list for fecal coliform bacteria, 4 geometric means collected over 4 calendar

quarters (or 16 total samples) are needed in accordance with an approved SQAP. The timing of the samples must ensure that the geometric means do not overlap from April to May or from October to November, as the standards are seasonal.

Fish Biota

The state periodically performs assessments to look at the quantity and health of fish in streams around the state. The state's bioassessments were based on Fish Index of Biotic Integrity (IBI) protocols. Streams that ranked "poor" or "very poor" on the IBI index are classified as impaired. Often the fish impairment is due to high sediment loads that impact the fish spawning habitats and also generally impact their well-being. Sediment loads in suburban areas like Dunwoody include migration of historic sediment in streams from former agricultural practices in the area and instream bank erosion aggravated by suburban runoff. Erosion from new development projects is also a source of sediment in some communities; but is likely not a major contributor in Dunwoody because of the City's erosion and sedimentation control program. Impairment for habitat, such as fish biota, is relatively common in the urbanized areas around metropolitan Atlanta.

Due to the complexity of fish sampling protocols, the state does not currently accept locally collected fish data to support removing streams from the 303(d) list. The only entity who can affect the impairment classification is the state's Wildlife Resources Division. A community may request that sampling be performed on a stream listed as impaired, but typically the state requires compelling evidence such as the completion of a water quality improvement project in order to justify additional sampling.

Sediment is often used as a surrogate parameter for fish biota in TMDL modeling; therefore, total suspended solids (TSS) sampling is recommended as part of this plan to determine whether conditions in Dunwoody's impaired streams are improving. The sediment data may also be used as a justification to request the state to collect fish samples at the City of Dunwoody limits.

2.0 Ball Mill Creek Watershed

Ball Mill Creek is located in the northwest portion of the City, as shown in Figure 2-1. The headwaters for the drainage basin are located within the City of Dunwoody, the stream flows north into Sandy Springs for an additional 1.75 miles until it joins the Chattahoochee River.

2.1 Land Use

The watershed is primarily single-family residential (96.4%) with some commercial and institutional land use interspersed, as shown in Table 2-1. Dunwoody Village and the Mount Vernon shopping centers are located in the southern and western headwaters of the watershed, respectively.

Figure 2-1. Ball Mill Creek Watershed

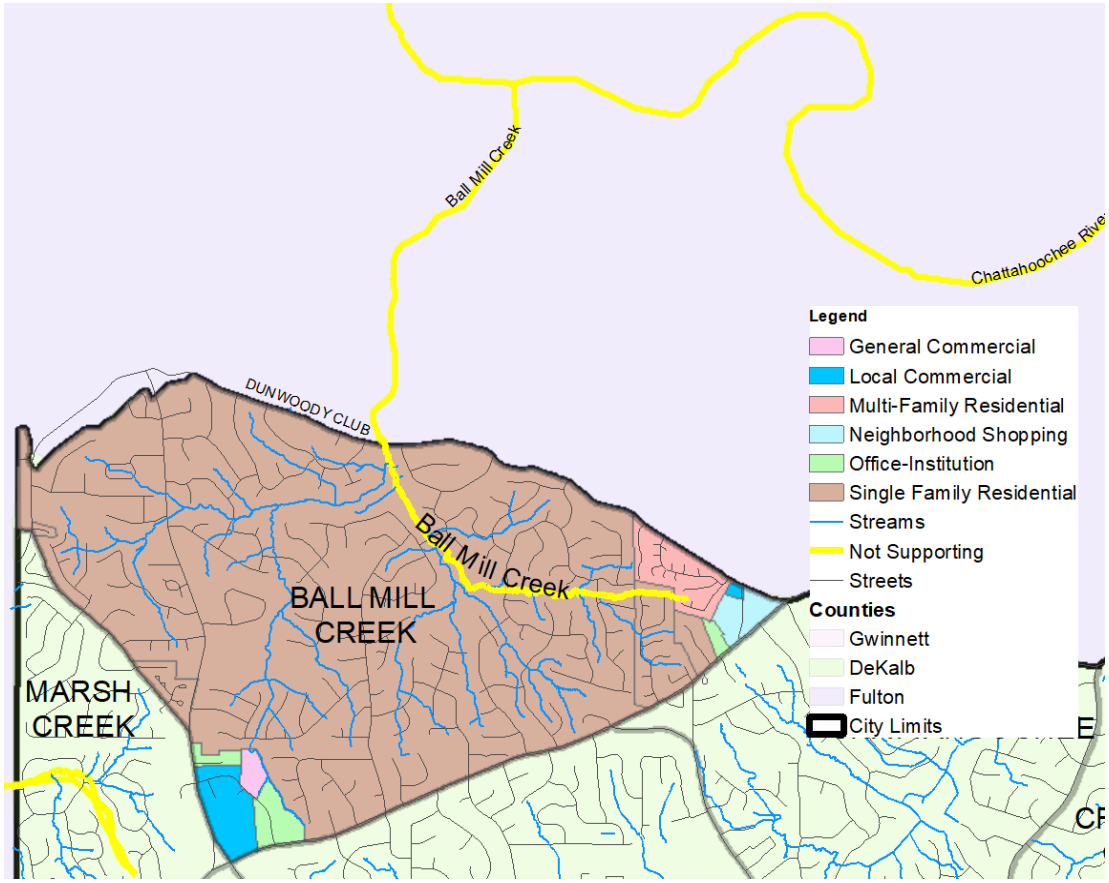


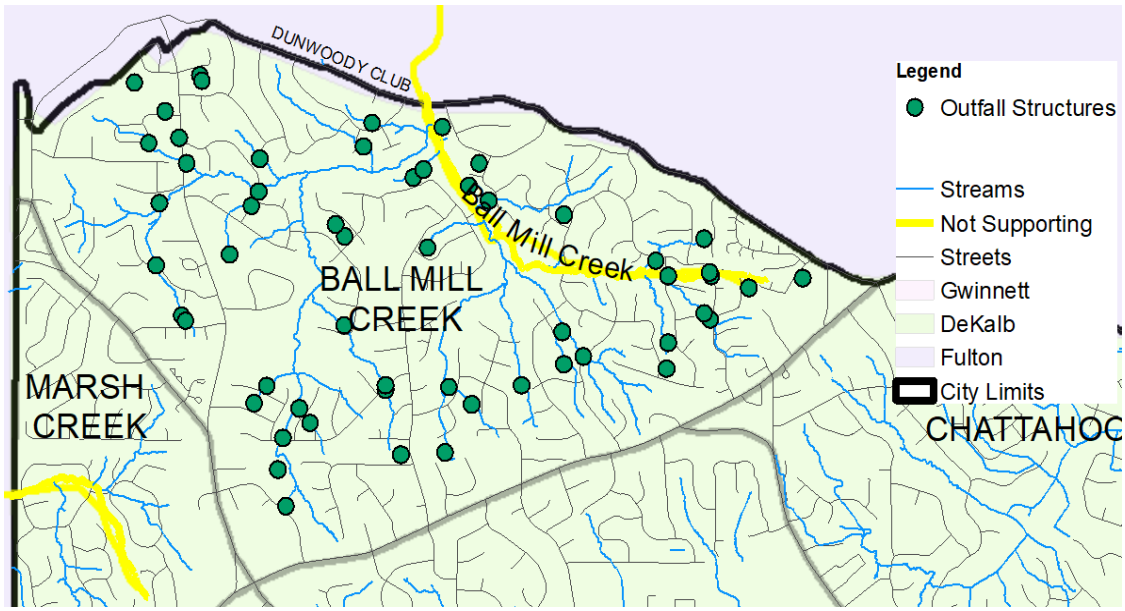
Table 2-1. Estimated Percentage of Land Use by Zoning Category in the Ball Mill Creek Watershed

Land Use (based on Zoning Category)	Acres	% of Watershed
Single-Family Residential	4,912	96.4%
Office-Institutional	35	0.7%
General Commercial	8	0.2%
Local Commercial	81	1.6%
Multi-Family Residential	39	0.8%
Neighborhood Shopping	18	0.3%
TOTAL	5,093	100.0%

2.2 MS4 System Outfalls

Figure 2-2 shows the outfalls within the Ball Mill Creek Watershed according to the City's stormwater infrastructure inventory.

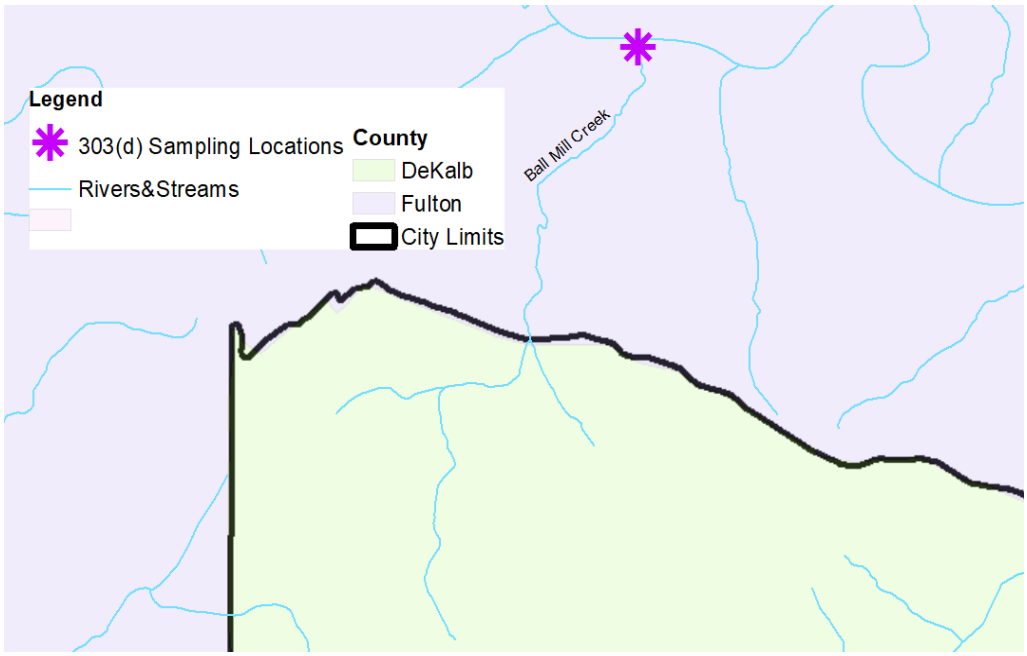
Figure 2-2. Ball Mill Creek Outfalls



2.3. Summary of Available Water Quality Data

Ball Mill Creek is considered impaired for fecal coliform bacteria. The 303(d) list indicates that there are three sources of data that were used as the basis for the impaired determination on Ball Mill Creek; EPD Watershed Planning Unit, DeKalb County, and Fulton County. However, through discussions with EPD, the only data used for the listing was data provided by Fulton County in the 1990's as part of the Chattahoochee River Management Project (CRMP). This data was collected almost 2 miles downstream of the City of Dunwoody limits, as shown in Figure 2-3. It is uncertain whether this data was to determine overall stream health or in response to a sanitary sewer flow. EPD was unable to provide a copy of this data or the CRMP.

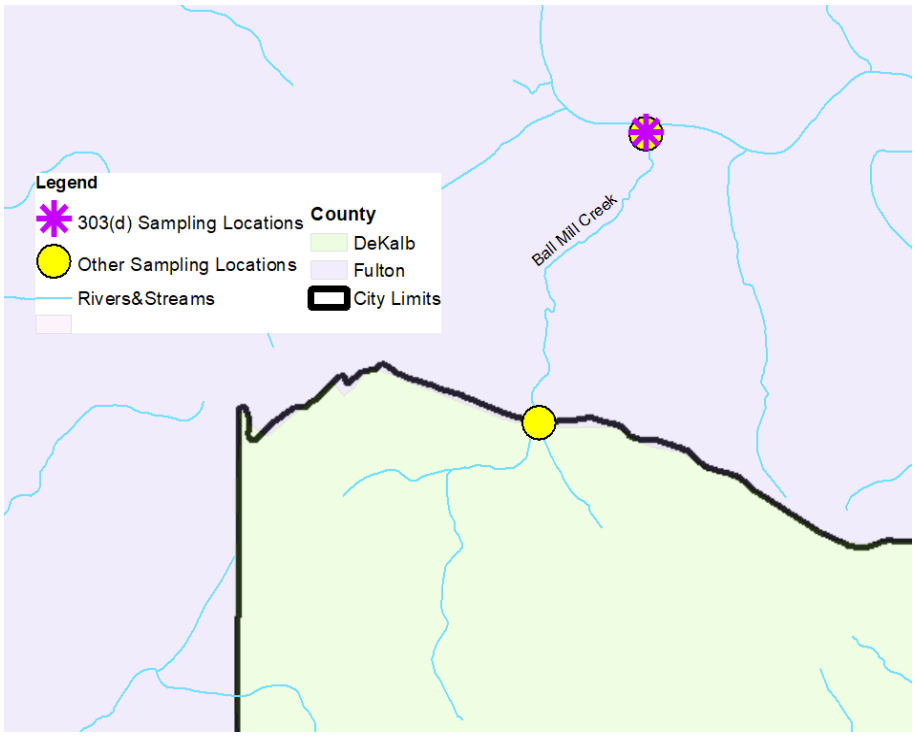
Figure 2-3. Ball Mill Creek 303(d) List Sampling Stations



The most recent TMDL for Ball Mill Creek (Appendix B) indicates that a 51% reduction in fecal coliform bacteria is needed to meet water quality standards. The data used to develop the TMDL was considered "limited" and included 23 samples. The TMDL indicates that DeKalb County sampling data from 1994-1995 was used in addition to the CRMP data from 1992 – 1996. The overall geometric mean for the sampling data was 512 counts/100 mL, which exceeds the summer standard of 200 counts/100mL but is lower than the winter standard of 1,000 counts/100mL.In order to meet the summer standard, a 51% reduction is needed in overall loads. Although not indicated in the TMDL document, EPD staff confirmed that the sampling data from the CRMP was taken near the Chattahoochee River as shown in Figure 2-3.

Although the data was not used in the state's 303(d) listing evaluation, DeKalb County and Sandy Springs have collected and/or currently collect water quality data on Ball Mill Creek for the locations shown in Figure 2-4 and described below.

Figure 2-4. Ball Mill Creek Sampling Stations by Others



DeKalb County monitors Ball Mill Creek at Dunwoody Club Drive as part of their ongoing Bacteria and Water Quality Sampling program. This program is part of the ongoing Watershed Management Plan activities required as part of the County's wastewater treatment program. The County collects geometric means (i.e., four samples within a 30 day period) every quarter or 16 samples per year. Data from 2005 through 2014 show that all of the summer geometric mean samples exceeded the summer standard while none of the winter geometric means exceeded the winter standard. Approximately two-thirds of the summer means exceeded the winter standard. The highest geometric mean exceeded 10,000 colonies per 100mL, significantly greater than the 200 colonies per 100mL summer standard in October 2006. A copy of this sampling data is located in Appendix C.

The Sandy Springs Watershed Improvement Plan for Fecal Coliform (Appendix D) includes a summary of Fulton County sampling data from 2007 to 2009. Ball Mill Creek near the Chattahoochee River had an average fecal coliform level of 355 counts/100mL. Similar to the data collected by DeKalb County, these fecal coliform levels are below the winter standard and just above the summer standard.

2.4. Possible Sources of Pollutants of Concern

The most recent TMDL (Appendix B) calculated that a 51% reduction in fecal coliform is needed in order for Ball Mill Creek to meet state standards. The source of fecal coliform bacteria identified within the TMDL is stormwater runoff which includes sources such as; sanitary sewer sources, septic systems, domestic animals (dogs, cats, etc.), wildlife (deer, raccoons, etc.), and illegal stormwater connections. A listing of the most likely of these sources is presented below; however this information is only based on available evidence.

As part of DeKalb County's ongoing sewer maintenance program, they are completing a mapping update and condition assessment of the sanitary sewer system in the Ball Mill Creek watershed in 2014 (Appendix A). Any issues associated with the sanitary sewer system will be identified and prioritized across the county service area. Based on

the periodic high spikes in fecal coliform bacteria, it is likely that there are older sections of sanitary sewer within the Ball Mill Creek watershed that leak or overflow into the creek. As an example, DeKalb County addressed a grease blockage in the Ball Mill Creek watershed in September 2014 which resulted in an overflow. Like most communities, DeKalb County is working to address the impact of their aging infrastructure on a prioritized basis with available funding.

Another source of fecal coliform that may be present in the watershed is from domestic animals and wildlife. The area is highly developed with residential properties and domestic animals are popular.

Illegal stormwater connections are a possible source although the contribution from these sources is likely small. It is possible that illegal sanitary sewer lines associated with basement remodels and/or illegal construction practices have been connected to the storm drain system instead of the sanitary sewer system. The City's stormwater infrastructure inventory and ongoing asset management program will continue to look for these rare occurrences.

2.5. Existing Watershed Activities

The City of Dunwoody implements the MS4 stormwater program that is outlined in Section 1.1. This program includes activities designed to monitor and reduce potential pollution in the city. The specific activities are outlined within the City's Stormwater Management Plan and not duplicated in this Impaired Waters Plan.

DeKalb County Watershed Management is responsible for the maintenance of the sanitary sewer collection system. As mentioned previously, DeKalb County is currently inventorying the collection system within the Ball Mill Creek watershed. Based on the inventory and condition assessment, DeKalb County will prioritize and complete any needed rehabilitation projects. DeKalb County has a consent order with EPD and EPA that outlines a schedule for assessing and rehabilitating the system in order to reduce sanitary sewer overflows (http://www.dekalbwatershed.com/ConsentDecree.html and Appendix E).

2.6 Recommendations for the Watershed

DeKalb County Watershed Management currently monitors fecal coliform levels in Ball Mill Creek at Dunwoody Club Drive. This is an excellent monitoring location because it is located at the city limits. As data is currently being collected, this Impaired Waters Plan recommends monitoring further upstream to Ball Mill Creek and Barcroft Way. This will provide additional data on conditions within the watershed. Section 3 of this Impaired Waters Plan outlines the details of the recommended monitoring program.

Additional monitoring as well as continued implementation of the MS4 program activities by the City of Dunwoody will help collect additional information to inform future actions. The completion of the sanitary sewer evaluation in the Ball Mill Creek watershed may assist with narrowing the list of possible sources within the watershed. Similarly, having two sampling locations within the watershed may help to isolate potential sources.

3.0 Marsh Creek Watershed

Marsh Creek (also known as March Creek) is located in the western portion of Dunwoody as shown in Figure 3-1. The headwaters are located within the City limits and the stream flows west into Sandy Springs where it flows into the Chattahoochee River.

3.1 Land Use

The watershed is primarily single family residential (98.3%) with some commercial property in the very upper headwaters. The commercial property is part of Dunwoody Village. The land use data for the watershed based on Dunwoody's zoning is summarized in Table 3-1.

Figure 3-1. Marsh Creek Watershed

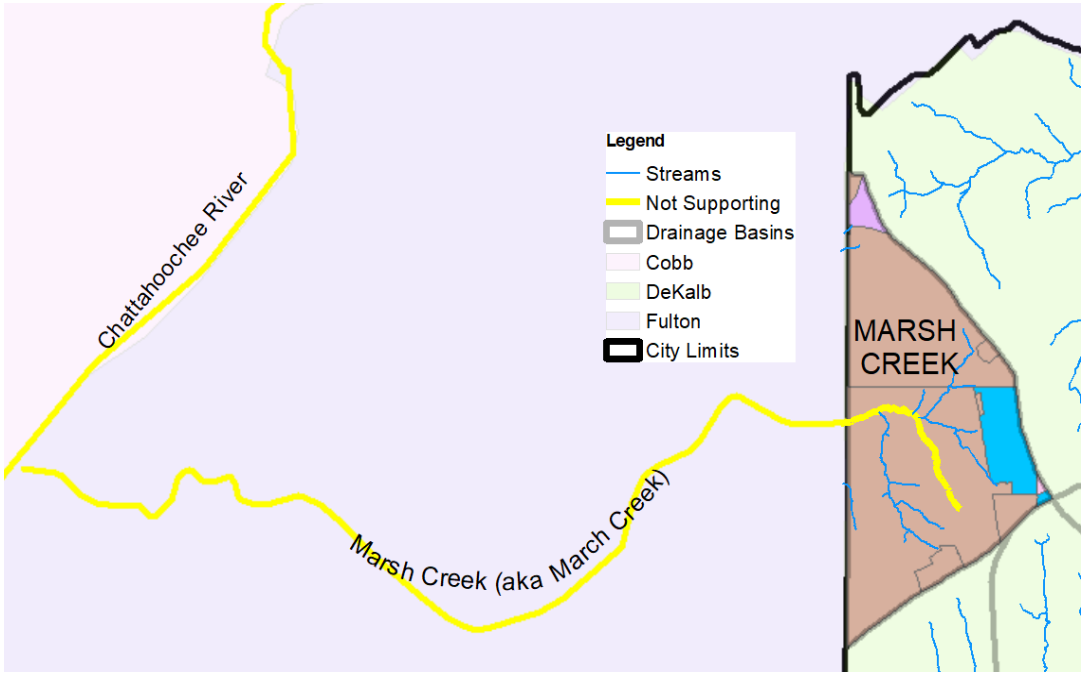


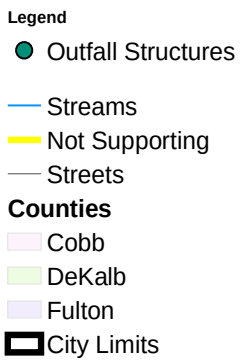
Table 3-1. Estimated Percentage of Land Use by Zoning Category in the Marsh Creek Watershed

Land Use (based on Zoning Category)	Acres	% of Watershed
Single-Family Residential	5233	98.3%
Single-Family Cluster Residential	9	0.2%
General Commercial	1	0.0%
Local Commercial	79	1.5%
TOTAL	5322	100.0%

3.2 MS4 System Outfalls

Figure 3-2 shows the outfalls within the Marsh Creek Watershed according to the City's stormwater infrastructure inventory.

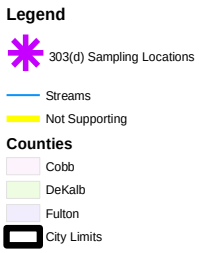
Figure 3-2. Marsh Creek Outfalls



3.3. Summary of Available Water Quality Data

Marsh Creek is considered impaired for fecal coliform bacteria and fish biota. The 303(d) list indicates that there are two sources of data that were used as the basis for the impaired determination on Marsh Creek; EPD Watershed Planning Unit and Fulton County. However, through discussions with EPD, the only data used for the fecal coliform listing was data provided by Fulton County in the 1990's as part of the Chattahoochee River Management Project (CRMP). This data was collected on Marsh Creek at Brandon Mill Road, NW (3.6 miles downstream of Dunwoody) and Riverside Drive, NW (4.4 miles downstream of the City of Dunwoody limits), as shown in Figure 3-3. It is uncertain whether this data was to determine overall stream health or in response to a sanitary sewer flow. The fish biota data was collected by the Georgia Wildlife Resources Division at the same 2 stations shown in Figure 3-3.

Figure 3-3. Marsh Creek 303(d) List Sampling Stations



3.3.1 Fecal Coliform Bacteria

The most recent TMDL for Marsh Creek (Appendix B) indicates that a 60% reduction in fecal coliform bacteria is needed to meet water quality standards. The data used to develop the TMDL was considered "limited" and included 38 samples and an overall geometric mean of 5,623 counts/100mL. Some of the data used for the TMDL was collected from 1992 to 1996 as part of the CRMP. These results are significantly above the winter standard.

The Sandy Springs Watershed Improvement Plan (Appendix D) summarizes Fulton County monitoring of Marsh Creek (aka March Creek) at Brandon Mill Road from 2007 to 2009. The average fecal coliform level was 615 colonies/100mL which is under the winter fecal coliform standard of 1,000 colonies/100mL but exceeds the summer standard of 200 colonies/100mL.

3.3.2 Fish Biota/ Sediment

Marsh Creek was listed for fish biota by data collected by the Department of Natural Resources on behalf of the EPD. The listing was just made in 2014 and the TMDL is scheduled to be developed in 2017. Therefore, very little data was available regarding the potential impairment. The fish sampling data was collected on Marsh Creek at Riverside Drive within the City of Sandy Springs, which is the most downstream station shown in Figure 3-3.

3.4. Possible Sources of Pollutants of Concern

The possible sources of fecal coliform bacteria and fish biota impacts are presented in the following two sections.

3.4.1 Possible Sources of Fecal Coliform Bacteria

The TMDL indicates that a 60% reduction in fecal coliform bacteria is needed. Sources mentioned in the TMDL include sanitary sewer sources, septic systems, domestic animals (dogs, cats, etc.), wildlife (deer, raccoons, etc.), and illegal stormwater connections. A listing of the most likely of these sources is presented below; however this information is only based on available evidence.

Fulton County has a program to address aging infrastructure and like most communities, has some areas where aging infrastructure results in sanitary sewer leakage and/or overflows. One example of efforts that Fulton County has taken is the 2010 construction of the new Marsh Creek Pump Station located at Marsh Creek and Riverside Drive within Sandy Springs. The old pump station was first built in the 1960's as a wastewater treatment plant but had been converted to a pump station to improve water quality. The pump station was replaced to increase reliability, which may also contribute to reduced overflow events within the Marsh Creek watershed.

There are still periodic sanitary sewer issues within Fulton County. A group of Kennesaw State University students recently sampled E-coli bacteria levels on Marsh Creek at Mabry Road within Sandy Springs and found levels of 36,350 MPN, well above the acceptable range of 1,000 MPN for urban streams. A manhole overflow and pipe break were identified as the sources and this issue was addressed, bringing the e-coli levels down to 720 MPN. These are common challenges faced in metropolitan Atlanta as our infrastructure ages.

DeKalb County manages the sewer system within the City of Dunwoody and in the Marsh Creek watershed. As part of the county's Consent Order agreement with EPD and EPA, DeKalb County has identified the Marsh Creek watershed as an area where capital improvement projects are needed to upgrade the sanitary sewer capacity and minimize the threat of overflows.

Additional sources of fecal coliform bacteria within the watershed may include domestic animals, wildlife, and illegal stormwater connections. The City's stormwater infrastructure inventory and ongoing asset management program will continue to look for additional sources of fecal coliform bacteria within the watershed.

3.4.2 Possible Sources of Sediment

The TMDL for biota for Marsh Creek has not been completed. However, for similar watersheds within the Chattahoochee River Basin, the primary source of habitat impairment is considered to be due to runoff from medium-density and high-density residential properties.

Common thought is that instream sediment loads in urbanized areas are the dominant source of fish habitat impairment. This is likely to be true for the City of Dunwoody as there is an active Erosion and Sediment Control Program that minimizes the new sediment loads to the streams. Historic agriculture practices as well as development prior to modern stormwater and erosion requirements contributed sediment that continues to wash downstream. If peak flows are not detained in more urban watersheds, the velocity of the stream flows can also result in stream bank erosion that contributes to instream sediment loads.

The sampling data for the biota listing was collected on Marsh Creek at Riverside Drive, which is downstream of the City of Dunwoody limits.

3.5. Existing Watershed Activities

The City of Dunwoody implements the MS4 stormwater program that is outlined in Section 1.1. This program includes activities designed to monitor and reduce potential pollution in the city. The specific activities are outlined within the City's Stormwater Management Plan and not duplicated in this Impaired Waters Plan.

DeKalb County Watershed Management is responsible for the maintenance of the sanitary sewer collection system. As mentioned previously, DeKalb County is currently inventorying the collection system within the Marsh Creek watershed. Based on the inventory and condition assessment, DeKalb County will prioritize and complete any needed rehabilitation projects. DeKalb County has a consent order with EPD and EPA that outlines a schedule for assessing and rehabilitating the system in order to reduce sanitary sewer overflows (Appendix A and E).

3.6 Recommendations for the Watershed

The sampling data reflects conditions downstream of the City of Dunwoody. Additional monitoring data at the City boundary will provide data that is more reflective of conditions within the city. The recommended monitoring plan is outlined in Section 5 of this Impaired Waters Plan.

4.0 Nancy Creek Watershed

Nancy Creek begins in Dunwoody near DeKalb County Water Treatment Plant. It flows through portions of Dunwoody, Doraville, Chamblee, Brookhaven, Sandy Springs, and Atlanta prior to flowing into the Chattahoochee River. The Nancy Creek watershed is unusual because it flows from Dunwoody, into Chamblee, back into Dunwoody, and then flows downstream. The subwatersheds within the City limits include Nancy Creek #1, Nancy Creek #2, and Nancy Creek Tributary A as shown in Figure 4-1.

4.1 Land Use

The land cover in this watershed is more intense than the other two impaired watersheds but is still dominated by single-family residential land use (87.0%). There is a higher percentage of multi-family residential (5.8%), office, and commercial development inside Dunwoody. The land use data for the watershed based on Dunwoody's zoning is summarized in Table 4-1.

While outside of the City of Dunwoody, it is notable that the southern boundary of the City is I-285. This major interstate system is upstream of the sampling locations used for the impaired water listing.

Figure 4-1. Nancy Creek Watershed

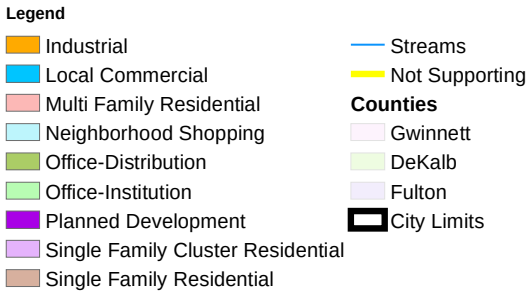


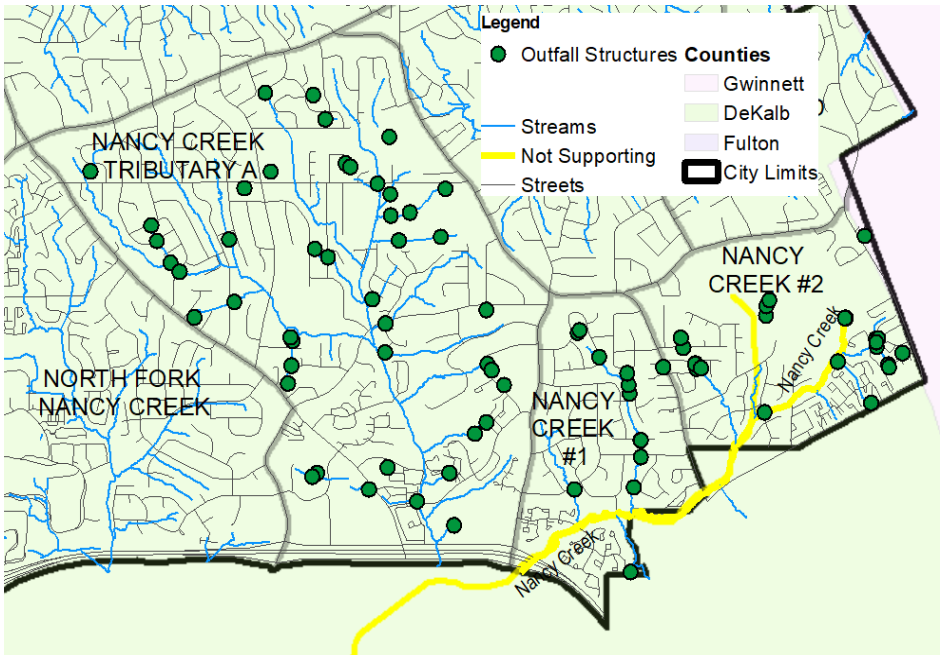
Table 4-1. Estimated Percentage of Land Use by Zoning Category in the Nancy Creek Watershed

Land Use (based on Zoning Category)	Acres	% of Watershed
Single-Family Residential	5853	87.0%
Single-Family Cluster Residential	40	0.6%
Local Commercial	141	2.1%
Industrial	13	0.2%
Multi-Family Residential	388	5.8%
Neighborhood Shopping	2	0.0%
Office-Distribution	66	1.0%
Office-Institution	220	3.3%
TOTAL	6723	100.00%

4.2 MS4 System Outfalls

Figure 4-2 shows the outfalls within the Nancy Creek Watershed according to the City's stormwater infrastructure inventory.

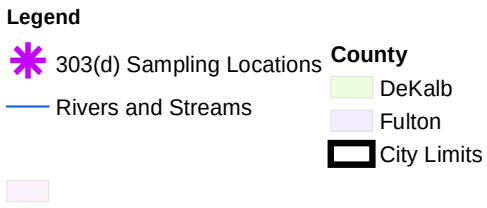
Figure 4-2. Nancy Creek Outfalls



4.3. Summary of Available Water Quality Data

Nancy Creek is considered impaired for fecal coliform bacteria and fish biota. The 303(d) list indicates that there are three sources of data that were used as the basis for the impaired determination on Nancy Creek; EPD Watershed Planning Unit, DNR Wildlife Resources, USGS. However, from discussions with EPD the listing for fecal coliform was based on data collected by the City of Atlanta on Nancy Creek at West Wesley and the fish biota data was collected by the state Wildlife Resources Division at Johnson Ferry Road, Northside Drive, and West Wesley. As shown in Figure 4-3, these sampling locations are significantly downstream of Dunwoody; Northside Drive is approximately 12 miles downstream and West Wesley is 17 miles downstream.

Figure 4-3. Nancy Creek 303(d) List Sampling Stations



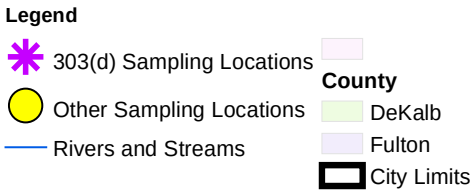
4.3.1 Fecal Coliform Bacteria

The most recent TMDL for Nancy Creek (Appendix B) indicates that an 84% reduction in fecal coliform bacteria is needed to meet water quality standards. The TMDL includes 16 miles of Nancy Creek from the headwaters in Dunwoody to the confluence with Peachtree Creek in the City of Atlanta.

The data used to develop the TMDL was collected in 2000 by the City of Atlanta on Nancy Creek at West Wesley, just upstream of the confluence with Peachtree Creek. The geometric means range from 170 counts/100mL to 1,363 counts/100mL. Three of the geometric means were collected under the summer standard with one mean meeting the standard and two exceeding the standard. The one sample collected under the winter standard exceeded the winter standard (Appendix B).

Although the data was not used in the state's 303(d) listing evaluation, DeKalb County collects water quality data on Nancy Creek for the locations shown in Figure 4-4 and described below.

Figure 4-4. Nancy Creek Sampling Stations by Others



DeKalb County monitors Nancy Creek at Chamblee Dunwoody Road, just south of the City of Dunwoody limits and also further downstream at Johnson Ferry Road. These sampling stations are part of the County's Bacteria and Water Quality sampling associated with their wastewater collection and treatment operations. The data from Nancy Creek at Chamblee Dunwoody, which is just outside the City of Dunwoody limits, shows that all of the summer geometric means are above the summer state standards and half of the winter geometric means are above the winter state standard (Appendix C). The fecal coliform data for Nancy Creek at Johnson Ferry Road were slightly better than the results at Chamblee Dunwoody.

4.3.2 Fish Biota/ Sediment

The monitoring data for the biota impairment were collected between 1998 and 2003 and include locations that are classified as upstream, midstream, and downstream in the TMDL (Appendix F). The upstream location is located in DeKalb County and has a habitat score of good to poor, depending on the indices as shown in Table 4-2. The midstream location, however, has an IBI score of very poor for both indices.

Table 4-2. Nancy Creek TMDL Biota Sampling Data

Stream Name	Area upstream Drainage (sq. mi.)	Date	IBI Score	IBI Category	IWB Score	IWB Category	Habitat Total
Nancy Creek u/s (Johnson Ferry)	12.6	7/31/03	28	Poor	7.7	Good	85.7
Nancy Creek mid (Northside Drive)	30.9	10/07/03	18	Very Poor	5.4	Very Poor	57.1
Nancy Creek d/s (W Wesley)	37.2	10/07/03	24	Very Poor	6.8	Fair	87.4
IBI = Index Biotic Integrity IWB = Index of Well-Being							

4.4. Possible Sources of Pollutants of Concern

The possible sources of fecal coliform bacteria and fish biota impacts are presented in the following two sections.

4.4.1 Possible Sources of Fecal Coliform Bacteria

The TMDL indicates that an 84% reduction in fecal coliform bacteria is needed. Sources mentioned in the TMDL include sanitary sewer sources, septic systems, domestic animals (dogs, cats, etc.), wildlife (deer, raccoons, etc.), and illegal stormwater connections. A listing of the most likely of these sources is presented below; however this information is only based on available evidence.

As part of the DeKalb County consent order agreement with EPD and EPA, they have identified a number of locations in their sewer service area that are priorities for improvement projects. Some of the highest priority projects are located within the Nancy Creek watershed. Hopefully, as the capital improvement projects are completed within the Nancy Creek watershed, the fecal coliform bacteria spikes will reduce to meeting state standards.

The City of Atlanta has also had challenges with sanitary sewer overflows on Nancy Creek that are evident in the data used to develop the TMDL. The City of Atlanta has been working to address their aging sanitary sewer infrastructure to reduce contributions of fecal coliform bacteria to local waterways as well.

In addition to sanitary sewer sources, domestic pets and wildlife are also potential sources as are failing septic systems or improper connections of domestic sewage to the storm sewer system. These sources are considered secondary to the sanitary sewer sources however as part of the City's MS4 program implementation, the City staff will continue to look for issues and address them when identified.

4.4.2 Possible Sources of Sediment

The most recent Biota TMDL for Nancy Creek (Chattahoochee River Basin Biota Impacted – January 2008) indicates that a 35% reduction in sediment load is needed. The majority of the sediment load in the TMDL for Nancy Creek is classified as "stormwater" and associated with runoff from high and medium density residential land uses within the watershed.

The Nancy Creek watershed is more urbanized than the Marsh Creek watershed and includes I-285 (although this is outside of the City's limits). The increased urban runoff from a major interstate system that has not been historically retained or treated could result in an increase in instream sediment loads that would impact fish habitat conditions.

The City will continue to be diligent with the erosion and sediment control program and continue to look for other potential sources of sediment loads.

4.5. Existing Watershed Activities

The City of Dunwoody implements the MS4 stormwater program that is outlined in Section 1.1. This program includes activities designed to monitor and reduce potential pollution in the city. The specific activities are outlined within the City's Stormwater Management Plan and not duplicated in this Impaired Waters Plan.

DeKalb County Watershed Management is responsible for the maintenance of the sanitary sewer collection system. As mentioned previously, Nancy Creek is considered a priority watershed for rehabilitation of the aging sanitary sewer system in order to reduce overflows. DeKalb County has a consent order with EPD and EPA that outlines a schedule for assessing and rehabilitating the system in order to reduce sanitary sewer overflows.

4.6 Recommendations for the Watershed

Although the data used to develop the TMDL reflects conditions further downstream from the City limits, the DeKalb County watershed monitoring results indicate that Nancy Creek just south of the City limits does not typically meet water quality standards. The Nancy Creek watershed is a priority for sanitary sewer rehabilitation projects that will hopefully reduce the fecal coliform bacteria loading. The recommendation is to collect samples at two locations; both near where Nancy Creek leaves the city and flows into an adjacent jurisdiction. The recommended monitoring plan is outlined in Section 5 of this Impaired Waters Plan.

5.0 Monitoring and Implementation Plan

This section outlines the proposed monitoring locations, monitoring details, and proposed monitoring schedule. This monitoring plan presents a data-focused approach. The City hopes to collect data to better characterize the impairment within the city limits. The data evaluation will establish the City's future actions as outlined in Section 6.0.

5.1 Sample Location

The City of Dunwoody has identified four monitoring stations with the following goals in mind:

- Monitor as close to the City boundary as possible in order to reflect conditions within Dunwoody
- Sampling location with safe access
- Sites that would be conducive to habitat assessments or biota assessments in the future
- Avoidance of duplicate monitoring sites to provide for additional data collection
- Sites that would represent the watershed conditions

The proposed sampling locations are shown in Figure 5.1. Figures 5-2 through 5-5 show pictures of the four recommended locations.

Figure 5-1. Recommended Water Quality Monitoring Locations

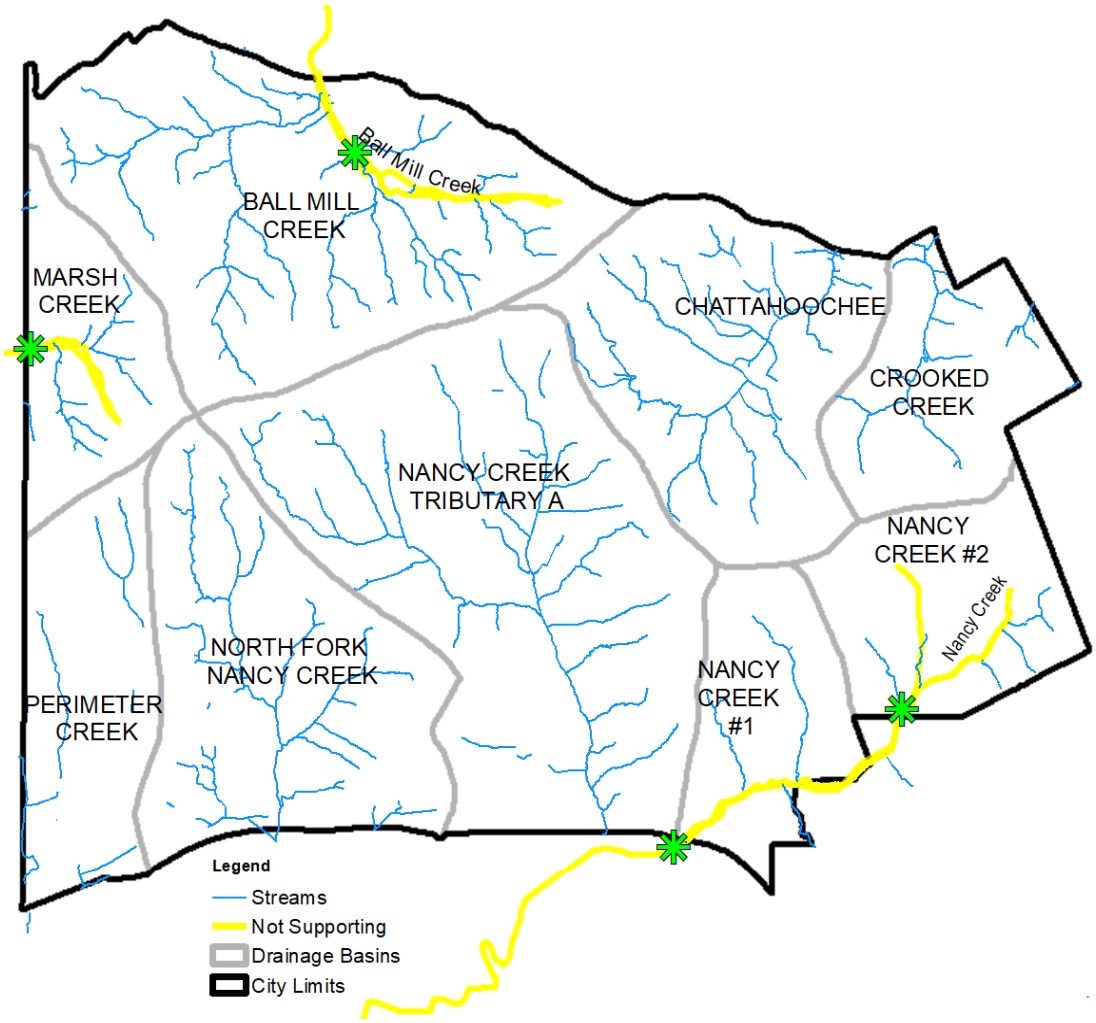


Table 5-1. Recommended Water Quality Monitoring Locations

Sampling Station Location	Sampling Location Details	Recommended Frequency
1. Ball Mill Creek at Barcroft Way	Upstream of the City of Dunwoody limits on Ball Mill Creek.	Bi-Monthly
2. Marsh Creek at Winding Branch Circle (western intersection)	Located in a residential subdivision just inside the City limits.	Bi-Monthly
3. Nancy Creek at Binghamton Drive	Just inside the city limits before Nancy Creek flows into Chamblee.	Bi-Monthly
4. Nancy Creek at N Peachtree Road	Just downstream of the city limits in Brookhaven.	Bi-Monthly

Figure 5-2. Ball Mill Creek at Barcroft Way Monitoring Location

Figure 5-3. Marsh Creek at Winding Branch Circle (upstream or downstream)

Figure 5-4. Nancy Creek at Binghamton Drive

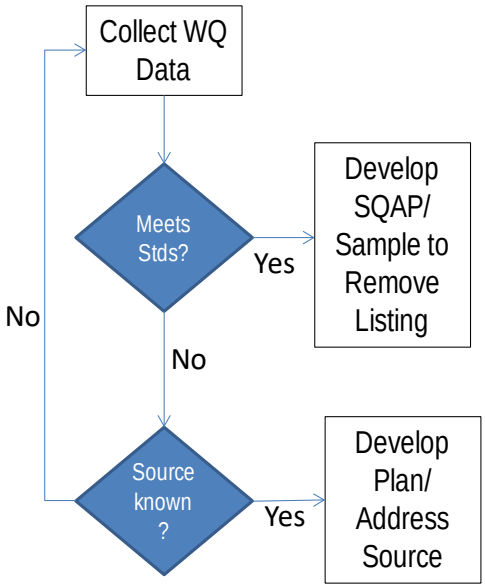
Figure 5-5. Nancy Creek at N Peachtree Road

5.2. Sample Characteristics

Fecal coliform bacteria and TSS monitoring is recommended as an element of this plan in order to better characterize conditions in all three listed streams. Six bi-monthly samples for all four sampling stations is recommended with both TSS and fecal coliform bacteria monitored together. While this monitoring is not consistent with state requirements for official listing purposes, it will guide and inform City staff to the extent of the watershed issues within Dunwoody. The sampling procedures will follow the Metropolitan North Georgia Water Planning District's *Standards and Methodologies for Surface Water Quality Monitoring* (March 2007 or most recent version), specifically Part IIB, which outlines the procedures for water quality monitoring grab samples.

Year 1 Samples: The characterization during Year 1 is intended to gain a greater understanding of conditions within the City of Dunwoody. The bi-monthly characterization samples will be grab samples for fecal coliform and can be either probe or grab samples for TSS. They will be taken every other month on a consistent schedule and initially will not be tied to wet weather or dry weather conditions. Because samples will be taken bi-monthly, the fecal coliform samples will reflect conditions during the summer standard (May through October) and the winter standard (November through April).

Figure 5-6. Adaptive Management Approach



Year 2 Samples: The Year 2 characterization will be tied to the results of Year 1 following an adaptive management approach. For example, if the sample results from Year 1 show that the stream is not impaired within the City limits, the City will likely submit a SQAP for approval and increase the number of samples to quarterly geometric means in order to remove the stream from the 303(d) list. The SQAP would outline the specific procedures but sampling would include both summer and winter geometric means consistent with guidelines for submitting data to the 303(d) list. If the data from Year 1 shows that the stream is not meeting state standards and a likely source of the impairment is identified, then Dunwoody will work to resolve the issue. If the data from Year 1 shows that the stream is not meeting state standards but a likely source is not identified, the City will likely identify additional monthly monitoring stations and/or perform stream walks to narrow the City's focus. For TSS, if the results show that TSS is increasing, the City may also look at additional upstream watershed sampling or stream walks in order to identify potential sources. Figure 5-6 shows a representation of the evaluation process that Dunwoody may use.

The City will continue to follow an adaptive management approach that emphasizes the evaluation of data to guide future actions to improve water quality. The sampling for future years will also be guided by continued coordination with DeKalb County's Watershed Department as they implement the actions within the Consent Order.

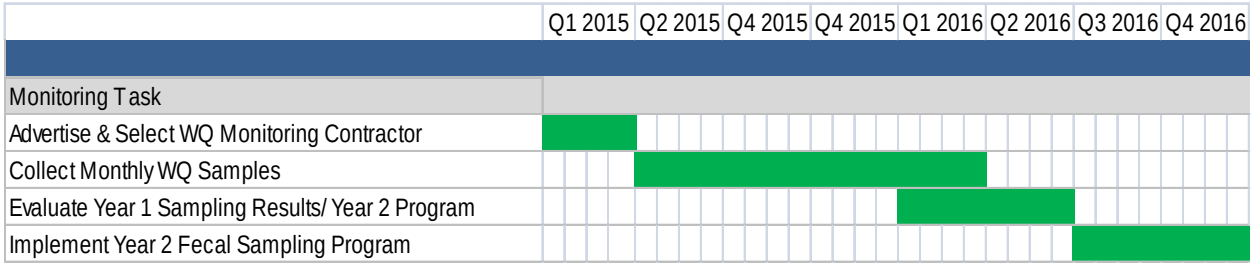
5.3 Data Trend Analysis

The City will analyze the collected fecal coliform and TSS water quality data using separate excel spreadsheets. A simple plot of the results plotted on the y-axis with the dates from first to last on the y-axis will be used. The plot will allow for the identification of trends. Any known sanitary sewer overflows can be correlated with the fecal coliform sampling results. Additionally, the fecal coliform analysis will show the summer and winter averages.

5.4 Monitoring Implementation Schedule

The proposed monitoring implementation schedule is presented below. The schedule shown in Figure 5-7 includes time needed by the City to advertise and secure a contractor and/or laboratory to perform the monitoring outlined within this Plan.

Figure 5-7. Water Quality Monitoring Implementation Schedule



6.0 Proposed Best Management Practices (BMPs)

Both fecal coliform bacteria and sediment are tough parameters to address. The City's phased approach reflects the complexity and dynamics associated with both of these parameters. For example, studies have shown that no single BMP type is able to consistently reduce bacteria to levels below summer standards and in some instances structure BMPs can even increase the levels of fecal coliform bacteria because they provide habitat for wildlife. Gwinnett County has been studying sediment loads in their county and found that most of the sediment is either legacy or instream and the ability to distinguish between the two loads is difficult. The phased and adaptive approach suggested in this Impaired Waters Plan will allow Dunwoody to advance their approach based on data. A few specific BMPs are recommended:

1. Continued coordination with DeKalb County Watershed Management Department. As noted in this Impaired Waters Plan, DeKalb County is evaluating the sanitary sewer system in both the Ball Mill Creek and Marsh Creek watersheds. The Nancy Creek watershed has already been classified as a priority watershed for rehabilitation. It is likely that the fecal coliform levels in these watersheds will reduce as DeKalb County continues to rehabilitate their system.
2. Continued Public Education and Outreach. One source of fecal coliform bacteria in suburban areas, similar to the three impacted watersheds, is domestic animal waste. There are a number of campaigns including the Clean Water Campaign's "Here's the Scoop" brochure (shown on the right). Distributing these in partnership with local domestic animal providers (veterinary clinics, pet food stores, groomers, and trainers) could help distribute the information in a targeted fashion. These brochures are available either for free or for a reduced cost from the Metropolitan North Georgia Water Planning District. Many communities in the region have also elected to install pet waste stations in public parks and require pet waste stations in multi-family developments. Some communities have partnered with single-family neighborhoods to install these in appropriate areas. Even if domestic animals are not the source of the fecal coliform bacteria, educating pet owners on their responsibilities to protect the community may be an important message.

3. Continued Illicit Discharge Detection and Elimination. As part of Dunwoody's MS4 permit, the city performs inspections of industrial and commercial facilities on a rotating basis. Confirmation that facilities that cater to domestic animals are following best practices is one aspect of these inspections. Similarly, the City through the ongoing asset management program and MS4 outfall inspection program are looking for areas where illicit discharges may be occurring to the stormwater system. These will be addressed as found by the City during these routine inspections.
4. Continued Implementation of Ordinances for new developments and redevelopments. While it is difficult to control the migration of historic sediment through a watershed, it is relatively easy to control the new contribution of sediment into waterbodies. The City has an active Erosion and Sediment Control program that includes plan review and inspections throughout construction. Working closely with the development community to limit the sediment that enters local waterbodies helps limit the sediment impact to fish habitat. Instream sediment loads from bank erosion is drawing greater attention in metropolitan Atlanta and several communities are performing bank studies to better estimate the contribution. Ensuring new developments have the proper post-development stormwater controls that mitigate peak flows will reduce the bank erosion that is common in more urban stream systems.

With the data available and the ongoing work by DeKalb County's Watershed Management Department, these ongoing BMPs are seen as the best strategies for protecting water quality in Dunwoody. As additional monitoring is performed, additional BMPs or other Watershed Improvement Projects may be added based on the result of that data.

APPENDIX A: DEKALB COUNTY PRIORITY SEWER REPAIR AREAS

APPENDIX B: REVISED TOTAL MAXIMUM DAILY LOAD EVALUATION FOR SEVENTY-NINE STREAM SEGMENTS IN THE CHATTAHOOCHEE RIVER BASIN FOR FECAL COLIFORM

APPENDIX C: DEKALB COUNTY WATERSHED MONITORING DATA

APPENDIX D: SANDY SPRINGS WATERSHED IMPROVEMENT PLAN

APPENDIX E: PRESS RELEASE REGARDING DEKALB COUNTY AGREEMENT WITH EPA, EPD

APPENDIX F: TOTAL MAXIMUM DAILY LOAD EVALUATION FOR TWENTY-FIVE STREAM SEGMENTS IN THE CHATTAHOOCHEE RIVER BASIN FOR SEDIMENT (BIOTA IMPACTED)