

SOURCE WATER ASSESSMENT PLAN:

Assessment and Risk for Potential Pollution of Surface Drinking Water Supply Sources

Prepared by the Metropolitan North Georgia

Water Planning District for

Forsyth County Water & Sewer Department





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Source Water Assessment Overview

INTRODUCTION

The 1996 Amendments to the Federal Safe Drinking Water Act (SDWA) brought about new pollution prevention and protection measures to help ensure clean and safe drinking water by assessing potential contamination and promoting protection of States' drinking water sources. These amendments direct states to enact Source Water Protection Programs to protect their drinking water sources from contamination. The initial step in the development of the program was to prepare an inventory and assessment of each water supply watershed in the state. This step was called the Source Water Assessment Plan (SWAP).

In accordance with the Federal SDWA and in response to EPA's national goal, the Atlanta Regional Commission (ARC) submitted the Division's Source Water Assessment and Implementation Plan to the EPA on March 28, 2000. At that time, the Georgia Environmental Protection Division (EPD) contracted with the Atlanta Regional Commission (ARC) to coordinate and complete SWAPs for 28 Metro Atlanta public drinking water systems.

In June 2017, the Metropolitan North Georgia Water Planning District (the District) adopted its integrated Water Resource Management Plan (WRMP) that takes a comprehensive approach to water resources management planning, where water supply and water conservation, wastewater management, watershed management, and public education planning overlap. Georgia EPD enforces the WRMP through an auditing and permitting process for all members of the District. Action Item INTEGRATED-6 of the 2017 WRMP requires local water providers to develop a source water protection plan that delineates raw water sources and identifies the potential sources of contamination to the drinking water supply by January 1, 2020.

In an effort to provide implementation support to its jurisdictions, the District contracted with the Georgia Environmental Finance Authority (GEFA) and EPD to complete the update/creation of SWAPs for 45 public drinking water intakes within the 15-county metropolitan Atlanta region. Specifically, the District will develop a SWAP for each surface water withdrawal location within the region by performing the following tasks:

1. Delineate the watershed area for each public drinking water source
2. Conduct an inventory of potential sources of contamination within that watershed
3. Determine the susceptibility of the water supply to contamination within the watershed assessment area
4. Provide the assessment results to the public water system jurisdiction for development of local SWPPs

Then local water providers are required to:

1. Publish the results of the source water assessment in the Consumer Confidence Report (CCR)



2. Integrate this information into the Local Emergency Water Plan (2017 WRMP, Action Item INTEGRATED-3)
3. Update the SWAP every 10 years thereafter

METHODOLOGY

Determination of Assessment Areas

Watersheds were acquired from EPD or delineated by District staff using geographic information system (GIS) software that referenced USGS National Elevation Datasets and then clipped to relevant Hydrologic unit code (HUC) 10/12 boundary. Once the watersheds were delineated, the assessment areas or zones were determined using EPD criteria. The Inner Management Zone (IMZ) extends seven miles upstream from the intake. This area requires the most stringent identification and analysis of potential pollutant sources. The Outer Management Zone (OMZ) extends from the IMZ boundary to an additional twenty miles upstream within the watershed. In this area, EPD guidance requires fewer facilities be identified and analyzed. Outside of the OMZ is the Non-Management Zone (NMZ), and includes the remainder of the watershed area beyond the delineated 20-mile OMZ boundary.

Inventory of Potential Pollutant Sources

This assessment focused primarily on updating potential pollutant sources identified from the previous SWAP conducted by the ARC in 2000 and the Source Water Assessment Implementation Plan published by the EPD, with the addition of more potential pollutant sources that were not included in the past SWAP. Table 1 lists potential pollution sources that must be evaluated in each of the three management zones, according to EPD guidance. A more stringent assessment of sources is conducted in the IMZ and OMZ than in the NMZ due to the larger distance from the NMZ to the intake, which is greater than 20 miles upstream. A complete list of the types of facilities characterized by each potential pollutant source is provided in Appendix A.



Table 1. Potential Pollution Sources for Surface Water

IMZ (7-mile Radius)	OMZ (20-mile radius)	NMZ (Non-Management Zone)
<i>Located, Identified, Inventoried, and Assessed</i>	<i>Located, Identified, Inventoried, and Assessed</i>	<i>Located, Identified, and Inventoried</i>
<ul style="list-style-type: none"> • Agriculture: <ul style="list-style-type: none"> -AFOs -CAFOs -Dairy Operations -Manure Handlers -Poultry Operations -Waste Lagoons • Airports • Asphalt Plants • Fuel Facilities (Underground Storage Tanks) • Garbage Transfer Stations • Hazardous Waste Facilities • Junk, Scrap, and Salvage Yards • Landfills: <ul style="list-style-type: none"> -Operating -In closure -Closed • Large Industries w/ Bulk Chemical Storage • Large Industries w/ Federal Categorical Standards • Large Industries w/ Hazardous Chemicals • LAS Permit Holders • Lift Stations • Marinas • Military Bases • NPDES Permit Holders • Power Plants • Recycling • Substations • Surface Mines • Wastewater Treatment Facilities • Water Treatment Facilities 	<ul style="list-style-type: none"> • Agriculture: <ul style="list-style-type: none"> -AFOs -CAFOs -Dairy Operations -Manure Handlers -Poultry Operations -Waste Lagoons • Asphalt Plants • Fuel Facilities (Underground Storage Tanks) • Hazardous Waste Facilities • Junk, Scrap, and Salvage Yards • Landfills: <ul style="list-style-type: none"> -Operating -In closure -Closed • Large Industries w/ Bulk Chemical Storage • Large Industries w/ Federal Categorical Standards • Large Industries w/ Hazardous Chemicals • LAS Permit Holders • Lift Stations • NPDES Permit Holders • Power Plants • Recycling • Surface Mines • Wastewater Treatment Facilities • Water Treatment Facilities 	<ul style="list-style-type: none"> • Asphalt Plants • Junk, Scrap, and Salvage Yards • Landfills: <ul style="list-style-type: none"> -Operating -In closure -Closed • LAS Permit Holders • NPDES Permit Holders • Surface Mines



Individual Source

To identify the potential impact of individual sources of pollution, District staff reviewed State and Federal regulatory programs, which issue permits to these facilities. All occurrences of facilities within the watershed were mapped and analyzed. District staff also conducted field surveys, contacted local water providers for data/verification, and identified facilities not listed in the reviewed data sets. The inventory identifies those sources of potential pollution and does not indicate that a problem exists or that contamination is occurring from the site. Data sources from which facility information was obtained may be found in Appendix B.

Non-Point Source

Percent impervious surface and land use/land cover (LULC) estimates were used to identify the potential impact of non-point sources of pollution on the drinking water intake. This data was derived from the USGS National Land Cover Database 2016 (NLCD2016), for which LULC dataset was reclassified from twenty into eight classes: open water, barren land, shrub/scrub, hay/pasture/cultivated crops, wetlands, forest, developed – open space/low intensity, and developed – medium/high intensity. For a description of each land cover class visit: <https://www.mrlc.gov/data/legends/national-land-cover-database-2016-nlcd2016-legend>. Where data on agricultural and forest best management practices are unavailable, values of impervious areas are used. Other metrics considered included: effective impervious area (EIA), land in transition (Barren land), area sewered vs non-sewered, sewer lines >10' crossing streams, railroads crossing streams, major transportation corridors crossing streams, and impaired streams within the watershed. EIA is defined as the impervious area for which the runoff enters the surface water system. The EIA was determined using a mathematical model developed by Sutherland for EPA, selected for its validity at relatively low levels of impervious area.

Susceptibility Determination

Drinking water intakes are susceptible to two different types of pollution – individual source and non-point source. Individual source pollution involves actual facilities, which have contaminants on site and can pose a potential health risk if humans consume those contaminants. Non-point source pollution is caused by development and everyday activities that take place in residential, commercial, and rural areas and is carried by stormwater runoff to streams and lakes. Non-point source pollutants include sediment, bacteria, heavy metals, oil and grease, herbicides and pesticides, nutrients, and temperature increases.

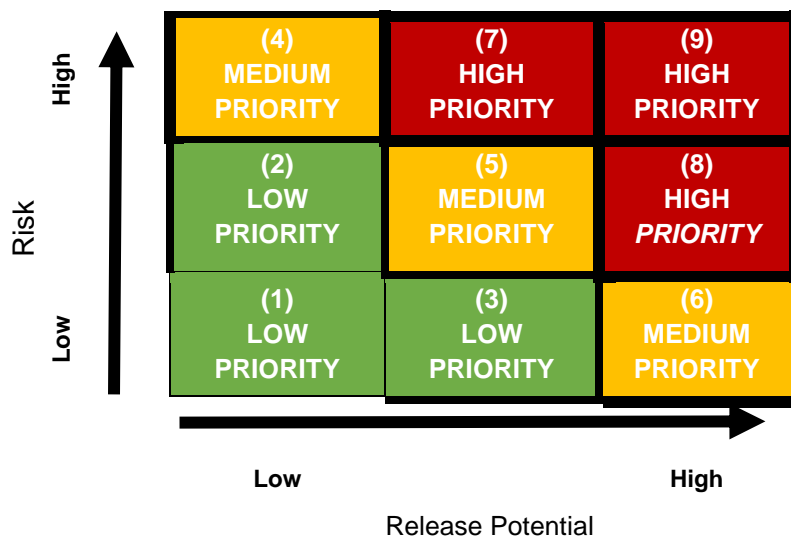
Individual Source Susceptibility Determination

To determine the potential degree of risk of the potential pollutant sources, EPD criteria for susceptibility ranking was used with adaptations made by the District. First, all facilities were ranked as either high, medium or low for potential individual source of pollution. This ranking is based on the potential of contaminant release and the potential risk to the surface water intake. The factors considered in ranking the potential for release are: distance from surface water, volume of release, duration of release and ease of transport/travel. The factors considered for risk are: distance to intake and toxicity. Detailed methodology for the determination of distance to surface water, distance to intake and ease of transport/travel can be found in Appendix C.



Both potential release and risk are ranked individually and then the two scores are combined to get an overall facility ranking using the EPD designated matrix (Figure 1). Release potential and potential risk were assigned a ranking based on the facility type represented by each potential pollutant source, supplemental information provided by local water providers, and information provided from EPD. More specifically, generalized rankings are assigned for volume of release, duration of release, and toxicity based on the individual source pollution type, and can be found in Appendix D.

Figure 1: Individual Source Susceptibility Determination



The following steps in determining individual source susceptibility were updated from EPD's implementation guidance by the District by removing the percentage thresholds in order to most accurately assess the overall watershed risk and ranking to contamination, made possible through advancements in GIS techniques and available data. After all the sources were charted on the matrix, the overall watershed is a weighted ranking based on the priority of the potential pollution source shown in figure 1: low priority sources appear in grid squares 1,2,3, medium priority sources appear in grid squares 4, 5,6 , and high priority sources appear in grid squares 7,8,9 after a weight of low (1), medium (2), high (3) is applied. The value is then divided by the size of the watershed in square miles for individual source susceptibility and can be represented by the following equation:

$$\frac{((\# \text{ of low priority} \times 1) + (\# \text{ of medium priority} \times 2) + (\# \text{ of high priority} \times 3))}{\text{Watershed size in Sq. Mi.}}$$

The ranking is then determined based on thresholds of all District region watersheds assessed, and is outlined in Table 2:



Table 2: Threshold Ranking Criteria

Low	< 3.0
Medium	3.0 - 8.0
High	8.0 <

Non-Point Source Susceptibility Determination

To evaluate non-point source pollution in the watersheds, an estimate of impervious surface area was calculated based on land use categories. Impervious surfaces collect and accumulate pollutants deposited from a variety of sources including: dust and dirt from the air, leaks from vehicles, animal wastes, yard pesticides and fertilizers, leaky sewer lines and construction and barren soil areas. During storms, accumulated pollutants can be washed off, and rapidly delivered to rivers and lakes. According to the Center for Watershed Protection, studies have consistently indicated that urban pollutant loads are directly related to the amount of impervious surface in the watershed.

The impervious surface area was estimated in conjunction with the LULC dataset, where the area for each of the eight classes of the LULC was determined. The Zonal statistics tool in ArcGIS Pro was used to obtain the mean Percent Developed Impervious (PDI) associated with each LULC class. Both were multiplied and divided by the area of the watershed.

Overall non-point source susceptibility was determined based on percentage of impervious surface in the watershed. For this assessment, greater than 20% impervious surface area was ranked as high, between 10-20% was ranked as medium and less than 10% was ranked as low susceptibility (Table 3).

Table 3: Non-Point Source Susceptibility Rankings

Impervious Area (%)	Ranking
< 10	Low
10 – 20	Medium
> 20	High



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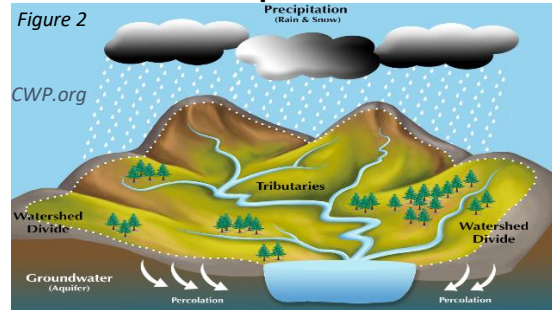


WATER SYSTEM AND SOURCE WATER DESCRIPTION

Forsyth County Water & Sewer Department

The Forsyth County Water & Sewer Department provides water service to approximately 80% of the land area of Forsyth County. The vast majority of Forsyth County's water comes from Lake Lanier and is treated by either Forsyth County or the City of Cumming. A small portion of Forsyth County's water comes from Fulton County, which withdraws water from the Chattahoochee River. In addition, Forsyth County Water & Sewer have four supplemental groundwater wells. Serving approximately 65,000 customer accounts, the water system consists of a water transmission and distribution system and a water treatment plant with a permitted capacity of 28.72 million gallons per day. The water transmission/distribution network consists of approximately 1,083 miles of pipelines, ranging in size from 2 inches to 48 inches in diameter. The water distribution system also includes eight storage facilities, consisting of three 1.0 million gallon elevated storage tanks, three 5.0 million gallon ground storage tanks, one 3.0 million gallon ground storage tank, and one 0.75 million gallon ground storage tank.

Watershed Description



A watershed is the area of land that drains into a river, stream or lake (Figure 2).

Source water is untreated water from streams, rivers, or lakes, which is used to supply public drinking water

The Forsyth Water & Sewer Department's surface water supply intake is located on Lake Lanier, which is impounded by Buford Dam. The water supply watershed has a 1014-square mile drainage area.

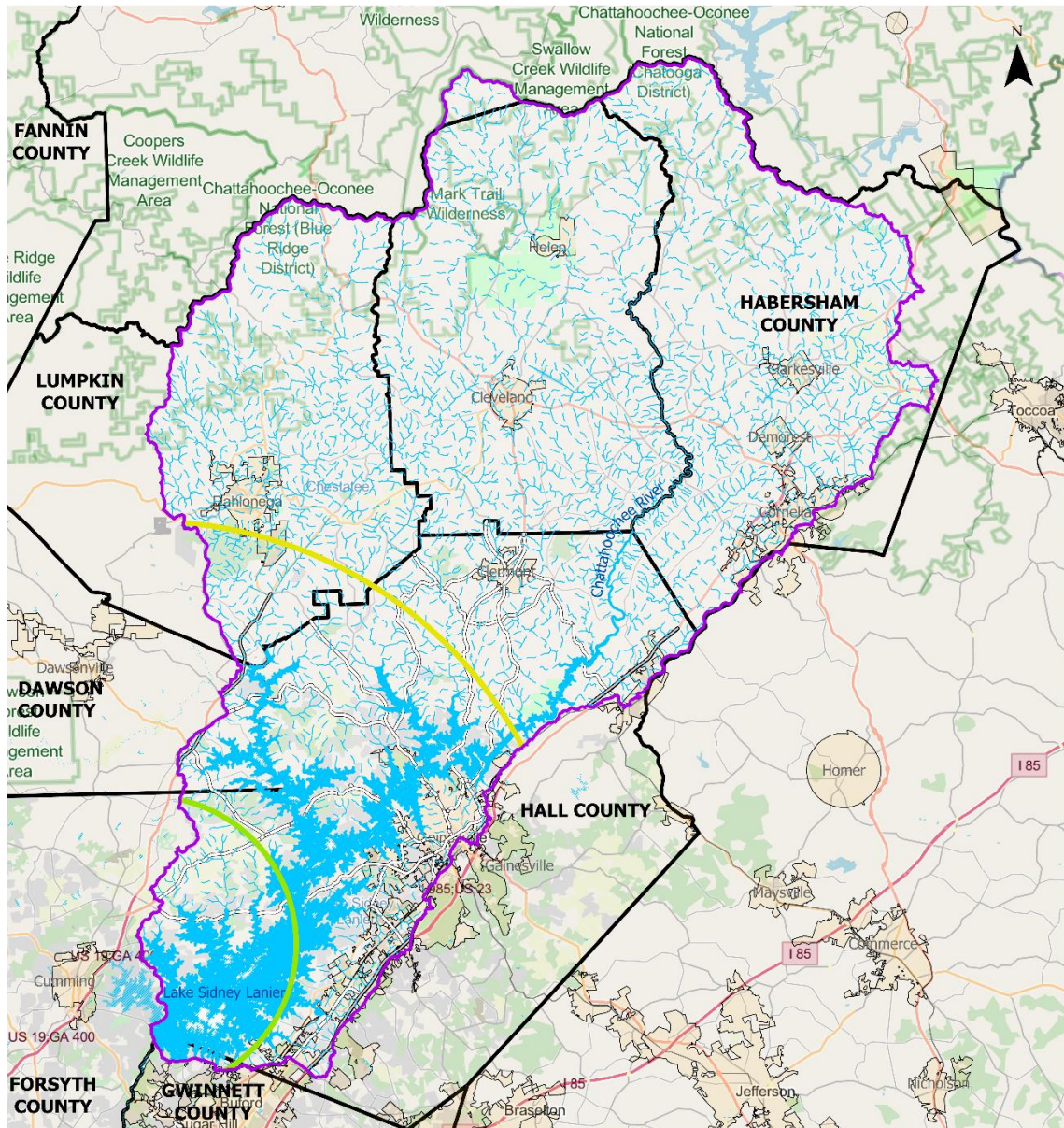
The Lake Lanier water supply watershed crosses several counties and jurisdictions above the Lanier intake. The counties include Dawson, Forsyth, Gwinnett, Habersham, Hall, Lumpkin, and White (Figure 3).

Lake Lanier





Figure 3



0 3.5 7 14 Miles

**Forsyth County
Department of Water and Sewer
Lake Lanier Water Supply Watershed**

- ▭ Watershed Boundary
- ▭ OMZ
- ▭ IMZ
- ▭ Streams
- ▭ Lakes/Ponds
- ▭ Interstates
- ▭ Major Roads
- ▭ Railroads
- ▭ City Boundary
- ▭ County Boundary



SOURCE WATER ASSESSMENT RESULTS

Susceptibility Determination

Individual Sources. The Forsyth County Water & Sewer Department watershed has 774 facilities included in the inventory of potential individual sources of pollution. Table 4 lists the type and number of facilities within the watershed. These facilities are shown on Figure 4.

Table 4. Inventory of Potential Individual Sources of Pollution

Potential Pollutant Sources	Number of Facilities
Agriculture – AFOs	1
Agriculture – Poultry Operations	161
Asphalt Plants	3
Fuel Facilities	347
Hazardous Waste Facilities	66
Junk Scrap	7
Landfills – Operating	1
Landfills - Closed	3
Large Industries which have Federal Categorical Standards	1
Large Industries which Utilize Hazardous Chemicals	68
Land Application System (LAS) Permit Holders	6
Lift Stations	54
Marinas	12
National Pollutant Discharge Elimination System (NPDES) Permit Holders	14
Recycling	4
Substations	1
Surface Mines	12
Wastewater Treatment Facilities	10
Water Treatment facilities	3
Total	774

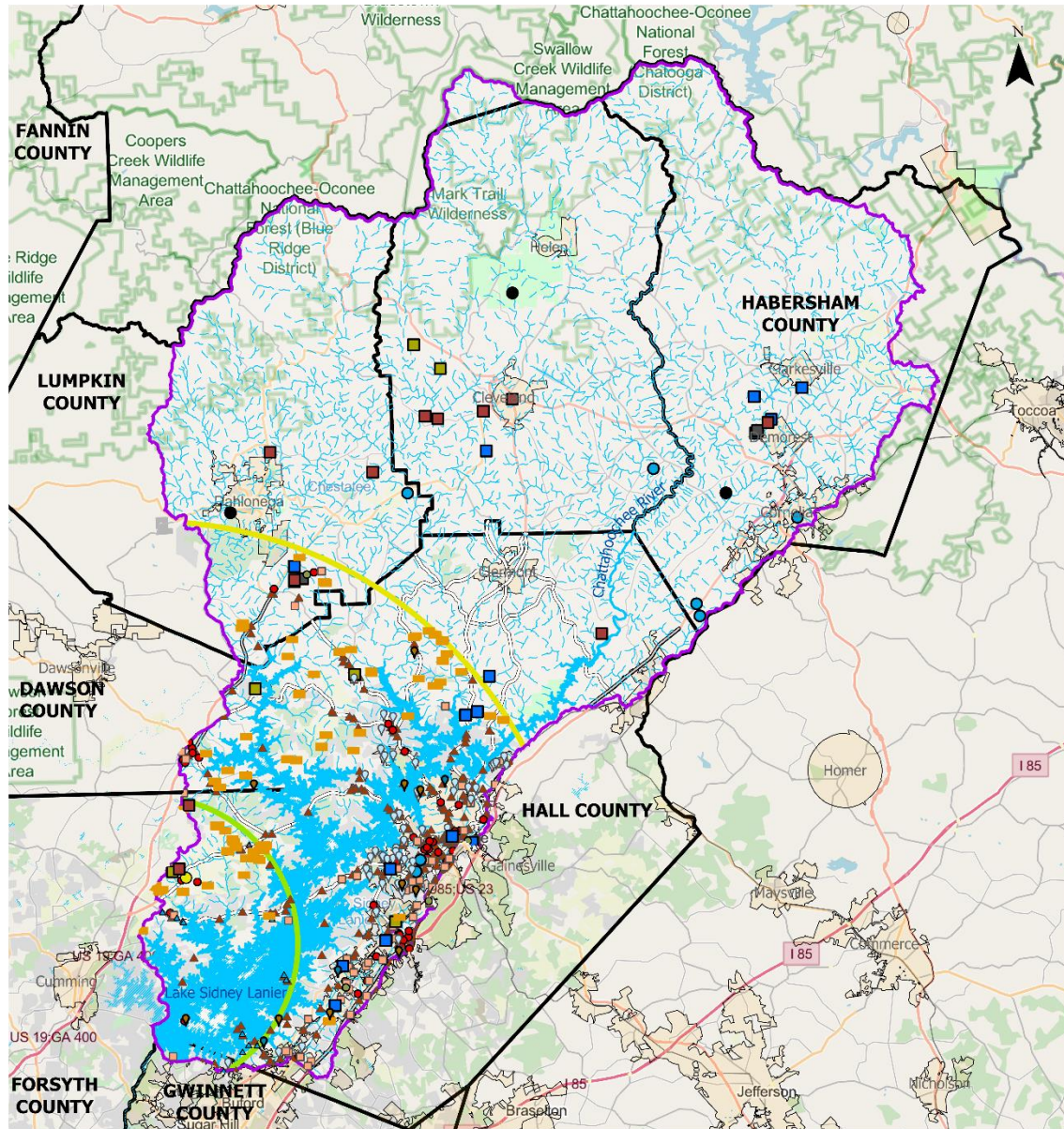


Legend: Potential Pollution Sources

Category:

Energy	<ul style="list-style-type: none"> Powerplants Underground Storage Tank Substations
Transport	<ul style="list-style-type: none"> Airports Marinas
Waste	<ul style="list-style-type: none"> Garbage Transfer Stations Hazardous Waste Sites Junk/Scrap Facilities Landfills (Closed) Landfills (In Closure) Landfills (Open) Recycling Facilities
Water	<ul style="list-style-type: none"> Lift Stations Wastewater Treatment Facilities Water Treatment Facilities
Industry	<ul style="list-style-type: none"> Asphalt Plants Large Industries - Federal Categorical Standard Large Industries - Bulk Chemical Storage Large Industries - Hazardous Chemicals LAS Permit Holders NPDES Permit Holders Surface Mines
Agriculture	<ul style="list-style-type: none"> Animal Feeding Operations Concentrated Animal Feeding Operations Dairy Operations Manure Handlers Poultry Operations Waste Lagoons
Other	<ul style="list-style-type: none"> Military Bases

Figure 4



0 3.5 7 14 Miles

Potential Individual Sources of Pollution
 Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

- Watershed Boundary
- OMZ
- IMZ
- Streams
- Lakes/Ponds
- Interstates
- Major Roads
- Railroads
- City Boundary
- County Boundary



Potential pollutant source rankings for each facility were assigned based on the EPD criteria. The following chart (Figure 5) summarizes the results of the Individual source ranking.

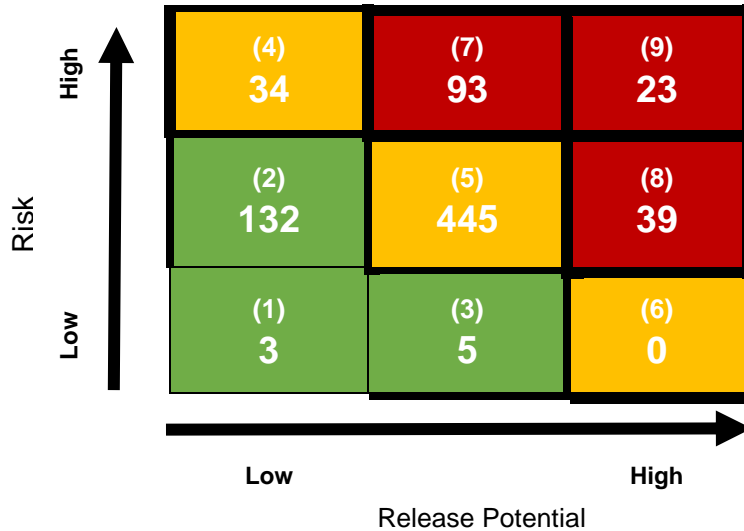


Figure 5: Forsyth County Water & Sewer Dept. Individual Source Susceptibility.

$$\frac{((140 \times 1) + (479 \times 2) + (155 \times 3))}{1014} = 1.5$$

With a ranking of 1.5, this watershed has a Low individual source susceptibility ranking.

Non-Point Source. Land use in the Lake Lanier water supply watershed in Forsyth County is predominantly forest (Figures 6 & 7). Available data covering the watershed shows a total impervious surface area of 2.8% and an effective impervious surface area of 0.46% (Table 5 & Figure 8). The watershed has 0.23% of the area “in transition” or exposed soil. Figure 9 highlights developed features throughout the watershed, including road types and core urban areas. Within the management zone (MZ) there are 89 miles of large sewer lines over 10” and approximately 5.5% of the watershed is sewered (Figure 10). A review of the EPD Integrated 305(b)/303(d) list of streams identifies segments of waters that support (305(b)) and do not support their designated uses (303(d)) (e.g. drinking, fishing, recreation). Within the watershed 250 stream miles were not supporting their designated uses. A list of the 305(b)/303(d) stream segments is included in Appendix E.

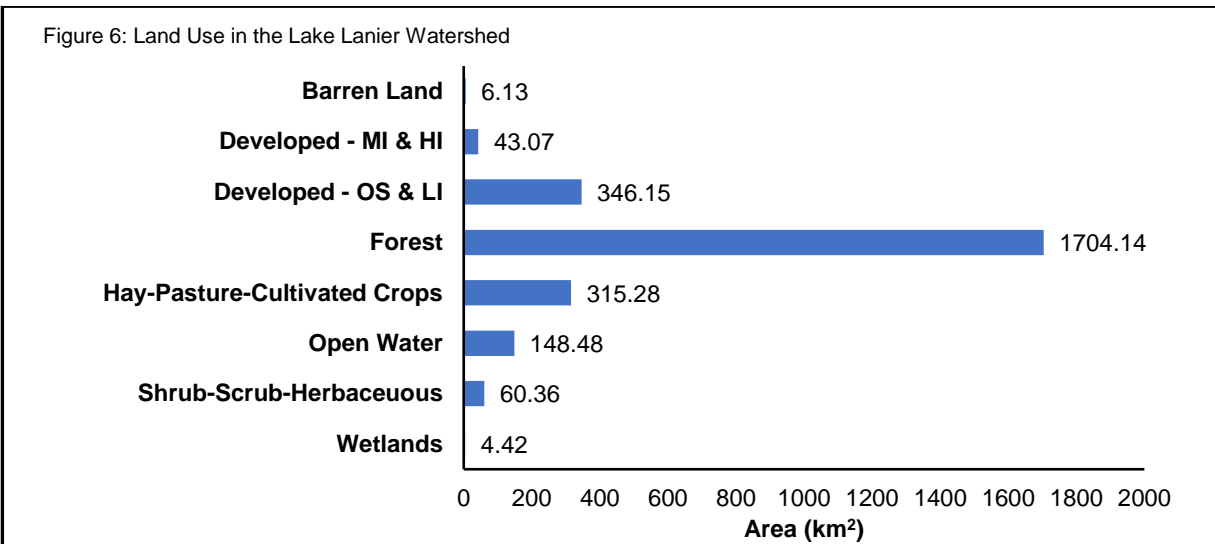


Table 5: Total Impervious and Effective Impervious Areas in the Lake Lanier watershed.

Land Cover	Area		Mean PDI (%)	Area * PDI	Class IA (%)
	km ²	%			
Barren Land	6.13	0.23	3.11	19.07	0.01
Developed (High/Medium Intensity)	43.07	1.64	62.37	2686.00	1.02
Developed (Open Space/Low Intensity)	346.15	13.17	11.15	3859.74	1.47
Forest	1704.14	64.84	0.26	447.56	0.17
Hay/Pasture/Cultivated Crops	315.28	12.00	0.73	230.33	0.09
Open Water	148.48	5.65	0.16	23.02	0.01
Shrub/Scrub/Herbaceous	60.36	2.30	0.67	40.55	0.02
Wetlands	4.419	0.17	0.114	0.506	0
Total	2628.02	100		7306.77	
				Total Impervious Area (%)	2.8
				Effective Impervious Area (%)	0.46

PDI = Percent Developed Imperviousness
IA = Impervious Area

Based on the amount of total impervious surface area in the Lake Lanier watershed, the overall non-point source susceptibility ranking is **Low**.



Overall Watershed Susceptibility to Pollution Ranking: Low

Violations in Water Quality (Appendix G): None

Additional Watershed Issues

Accidental Known Spills. Accidental spills were reviewed for each watershed. These spills represent individual source pollution within developed areas. Three sources of data were used to collect information on accidental spills within the watershed. The three sources are the Hazardous Site Inventory (HSI), EPD self-reported monthly accidental spills, and Leaking Underground Storage Tanks. All data sources include spills reported from 1985-2018 to EPD.

Within the District and MZ containing counties, approximately 25,267 accidental spills were reported. Of these spills, approximately 23,832 contained enough information to be geocoded and mapped, with 11,835 spills reported within MZs. Due to the self-reported nature of spill reporting, the quality of each report can vary thus it is difficult to rely on this data for advanced data analysis. 98% of all self-reported accidental spills within District MZs are raw sewage, 1.3% are treated effluent, and the remaining 0.7% include chlorinated effluent, grease washwater, non-contact cooling water, primary/secondary effluent, R-2 water, sludge, and unknown.

The HSI is a list of sites in Georgia, updated yearly, where there has been a known or suspected release of a regulated substance above a reportable quantity and which have yet to show they meet state clean-up standards found in the Hazardous Site Response or in the Voluntary Remediation Program Act. Each site is then assigned a class level (I, II, III, IV, V) based on the state's clean-up standards for regulated substances that are protective of human health and the environment under specific conditions. For more information on HSI classes visit: <https://epd.georgia.gov/land-protection-branch/hazardous-waste/hazardous-site-inventory>.

An underground storage tank system (UST) is a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. Nearly all USTs regulated by the underground storage tank requirements contain petroleum. Until the mid-1980s, most USTs were made of bare steel, which is likely to corrode over time and allow UST contents to leak into the environment. Faulty installation or inadequate operating and maintenance procedures also can cause USTs to release their contents into the environment. The greatest potential hazard from a leaking UST is that the petroleum or other hazardous substance can seep into the soil and contaminate groundwater, the source of drinking water for nearly half of all Americans. A leaking UST can present other health and environmental risks, including the potential for fire and explosion. For more visit: <https://www.epa.gov/ust/learn-about-underground-storage-tanks-usts>.

Within this watershed, there are 377 identifiable self-reported accidental spill sites, 7 sites inventoried in HSI, and 588 leaking underground storage tanks (Figure 11).



Railroads. Railroads are also a potential source of pollution at stream crossings and near water bodies in the event of a rail container spill. Within the Lake Lanier watershed, there are 18 areas where railroads cross streams within the MZ.

Major Roads. The Lake Lanier watershed contains portions of Interstate 985 and Georgia 400. Major roads within the watershed pose a potential threat to drinking water in the event of a tanker spill at a stream crossing or adjacent to the stream.

Oil/Liquid Gas Pipelines. Within the Lake Lanier watershed there are zero pipelines crossing streams. Large liquid oil/gas pipelines crossing streams pose a potential threat to drinking water in the event of a pipeline failure resulting in a leak or burst.

Sediment and Erosion.

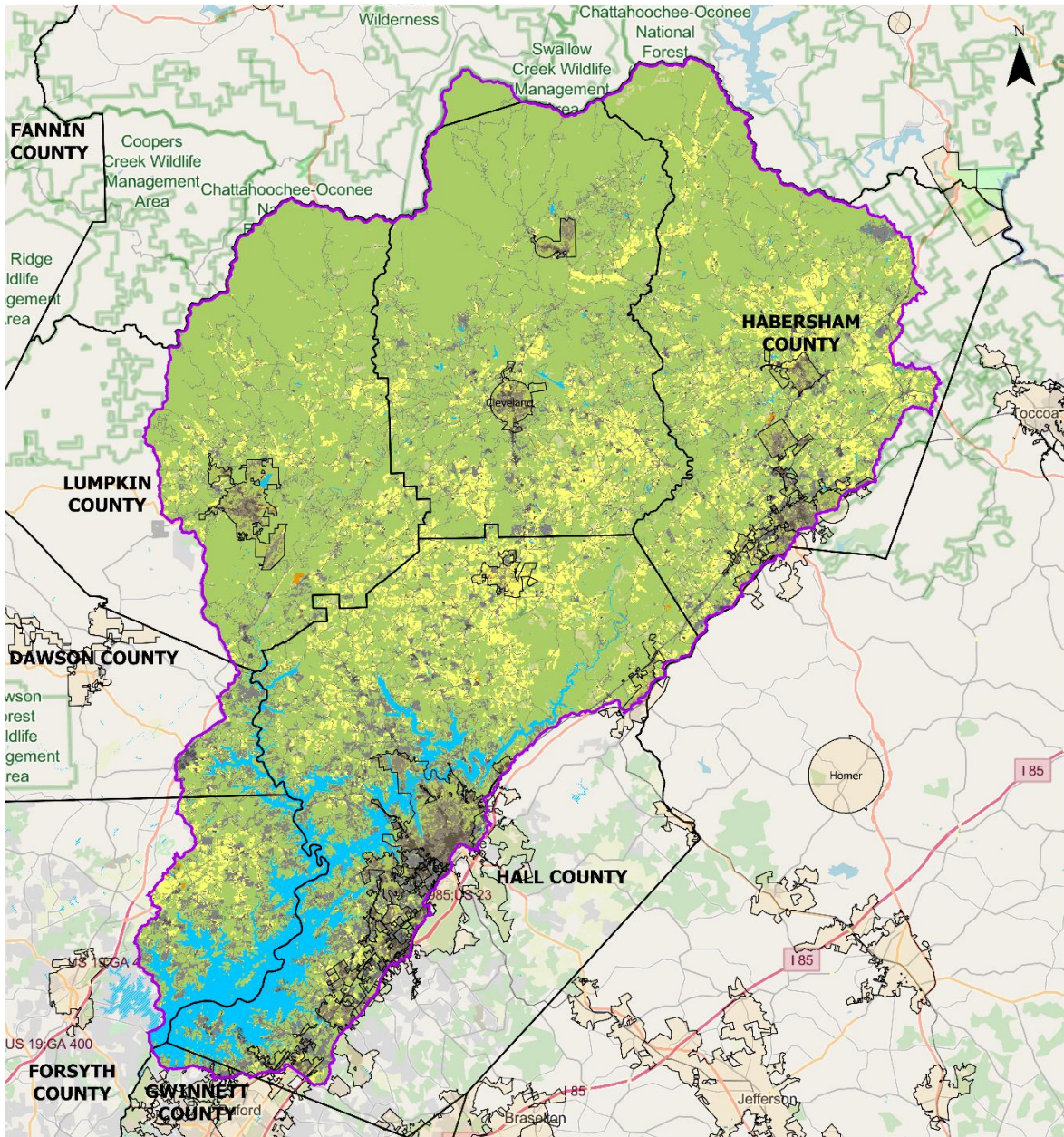
Large amounts of sediment can reach waters during construction or when land has been cleared of vegetation. Consequently, erosion and sediment control on exposed sites is an important area of a watershed management program for water quality protection. A combination of clearing restrictions, erosion prevention, and sediment controls coupled with a diligent plan review and strict construction enforcement are needed to help mitigate these impacts. This can be indicated by areas that have land cover classification as Barren Land.

Impervious Surface Area. The overall impervious surface area for the Lake Lanier watershed is 2.8%. Watershed research has discovered that urban stream quality begins to sharply decline once impervious cover in a watershed exceeds 10%.

Cryptosporidium. Cryptosporidium is a parasite commonly found in lakes and rivers, especially when the water is contaminated with sewage and animal wastes, and has been identified as a leading cause of waterborne diseases. Cryptosporidium is very resistant to disinfection through chlorination, and even a well-operated water treatment system cannot ensure that drinking water will be completely free of this parasite. Many large water systems voluntarily take actions for control of Cryptosporidium and other microbial contaminants.



Figure 7



0 3.5 7 14 Miles

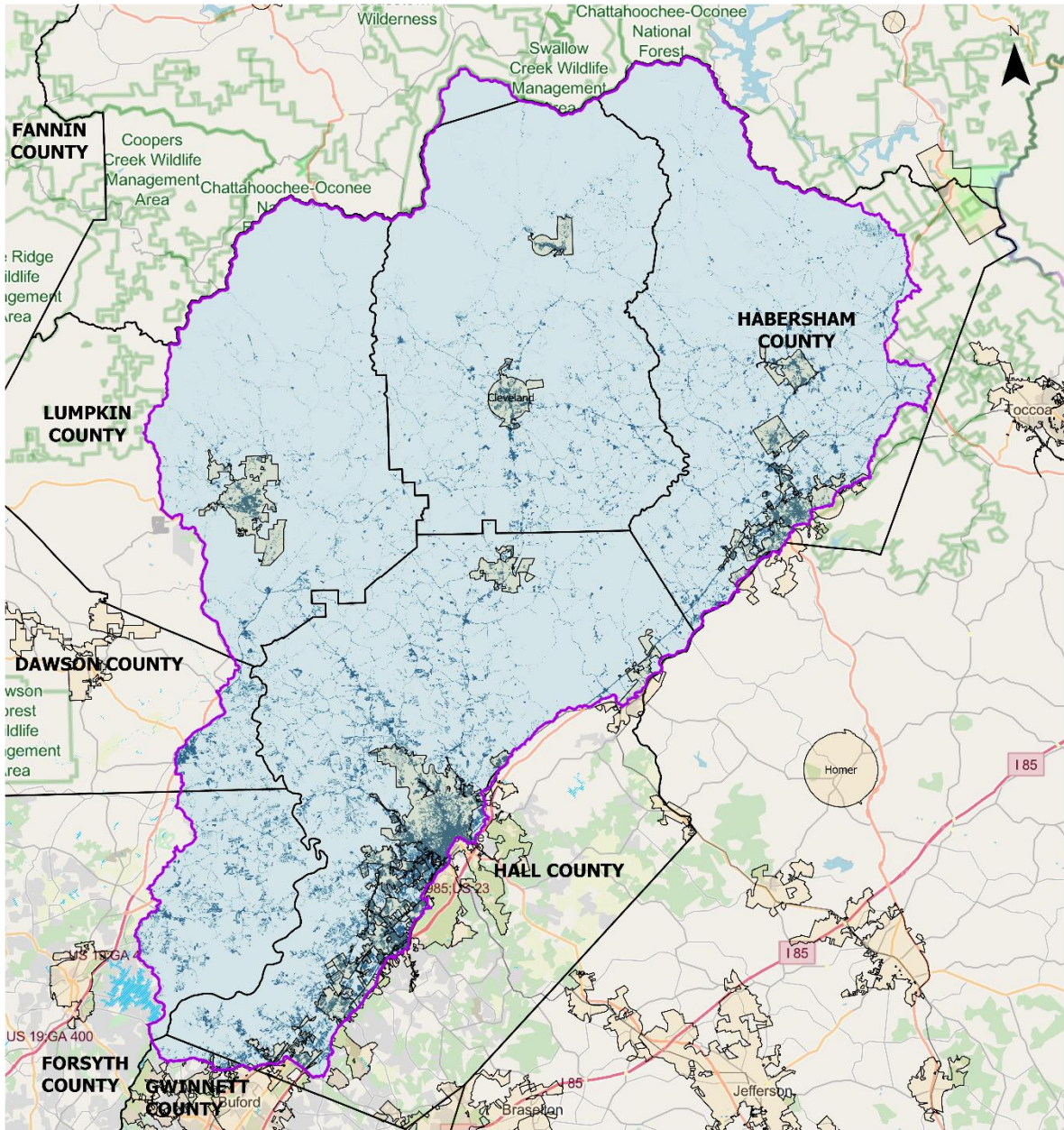
Landcover

Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

- Open Water
- Barren Land
- Shrub/Scrub
- Developed, Open Space/Low Intensity
- Developed, Medium/High Intensity
- City Boundary
- County Boundary
- Watershed Boundary
- Hay/Pasture/
Cultivated Crops
- Wetlands
- Forest



Figure 8



0 3.5 7 14 Miles

Percent Developed Imperviousness

Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

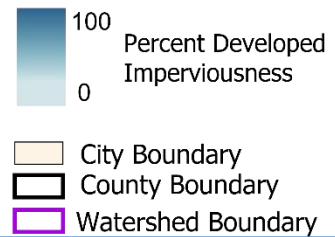
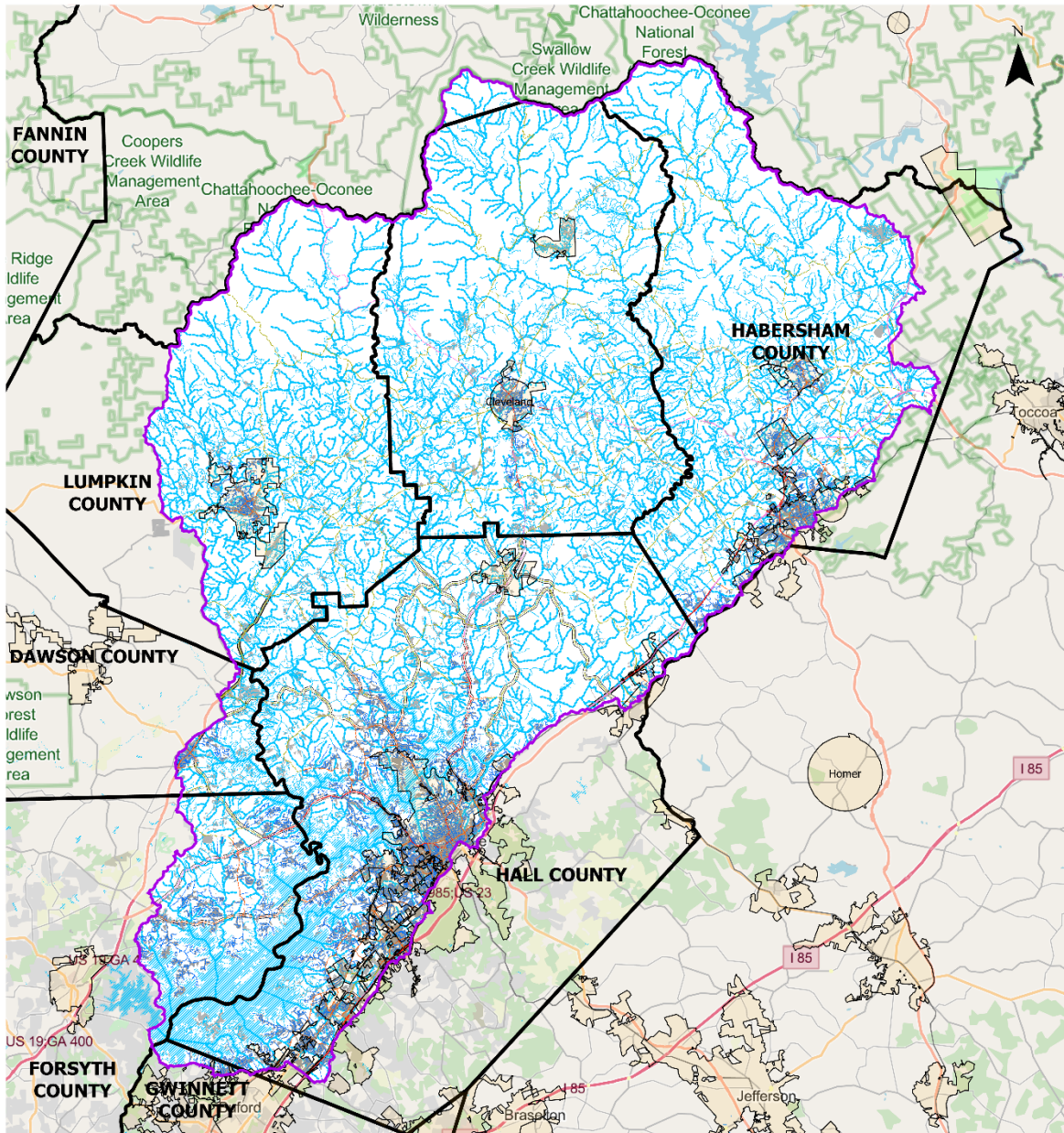




Figure 9



0 3.5 7 14 Miles

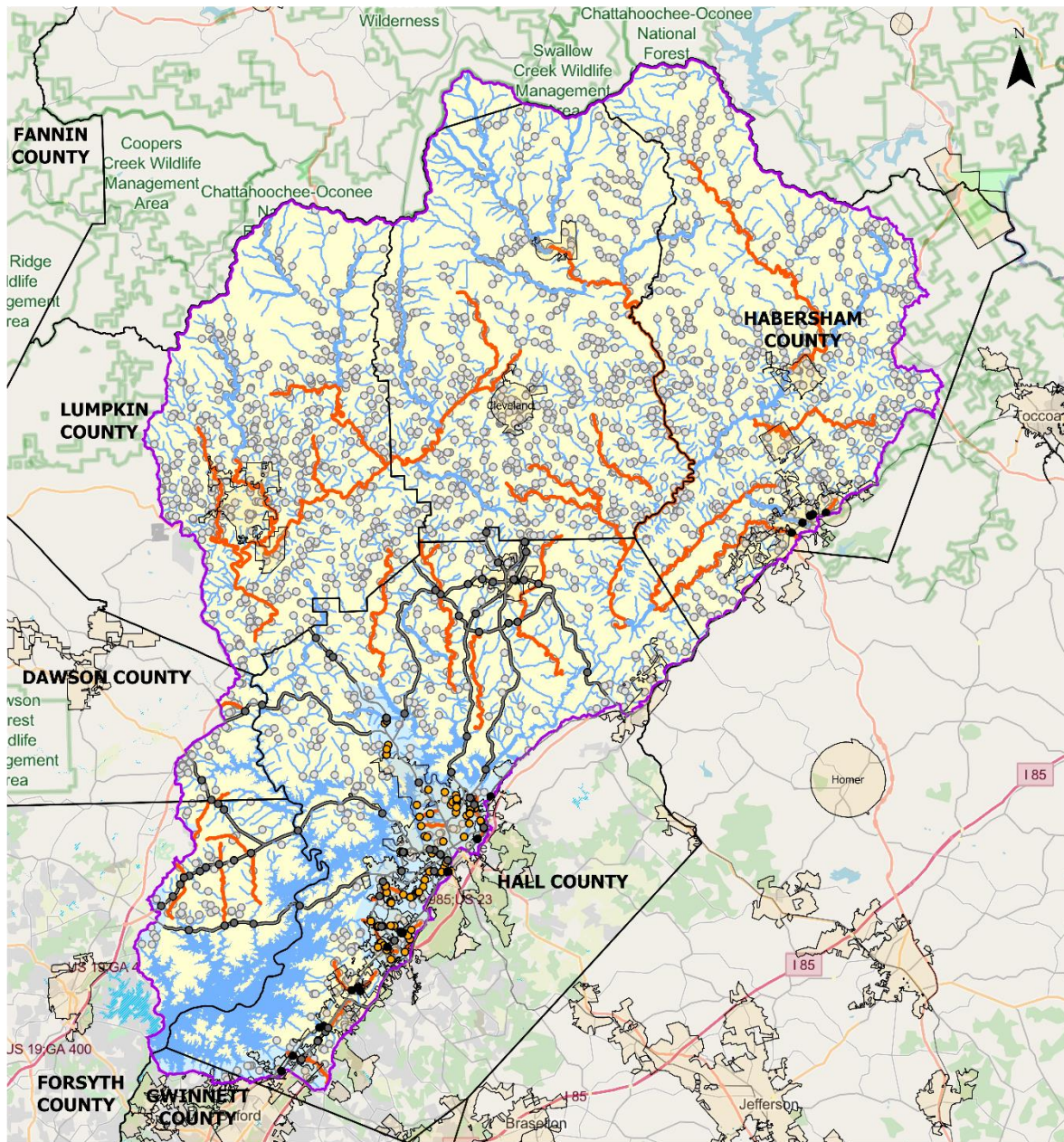
Developed Impervious Descriptor

Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

Urban area:	Outside	Inside
Primary road	█	█
Secondary road	█	█
Tertiary road	█	█
Other impervious	█	█
	 City Boundary	
	 County Boundary	
	 Watershed Boundary	



Figure 10



0 3.5 7 14 Miles

Streams/Crossings

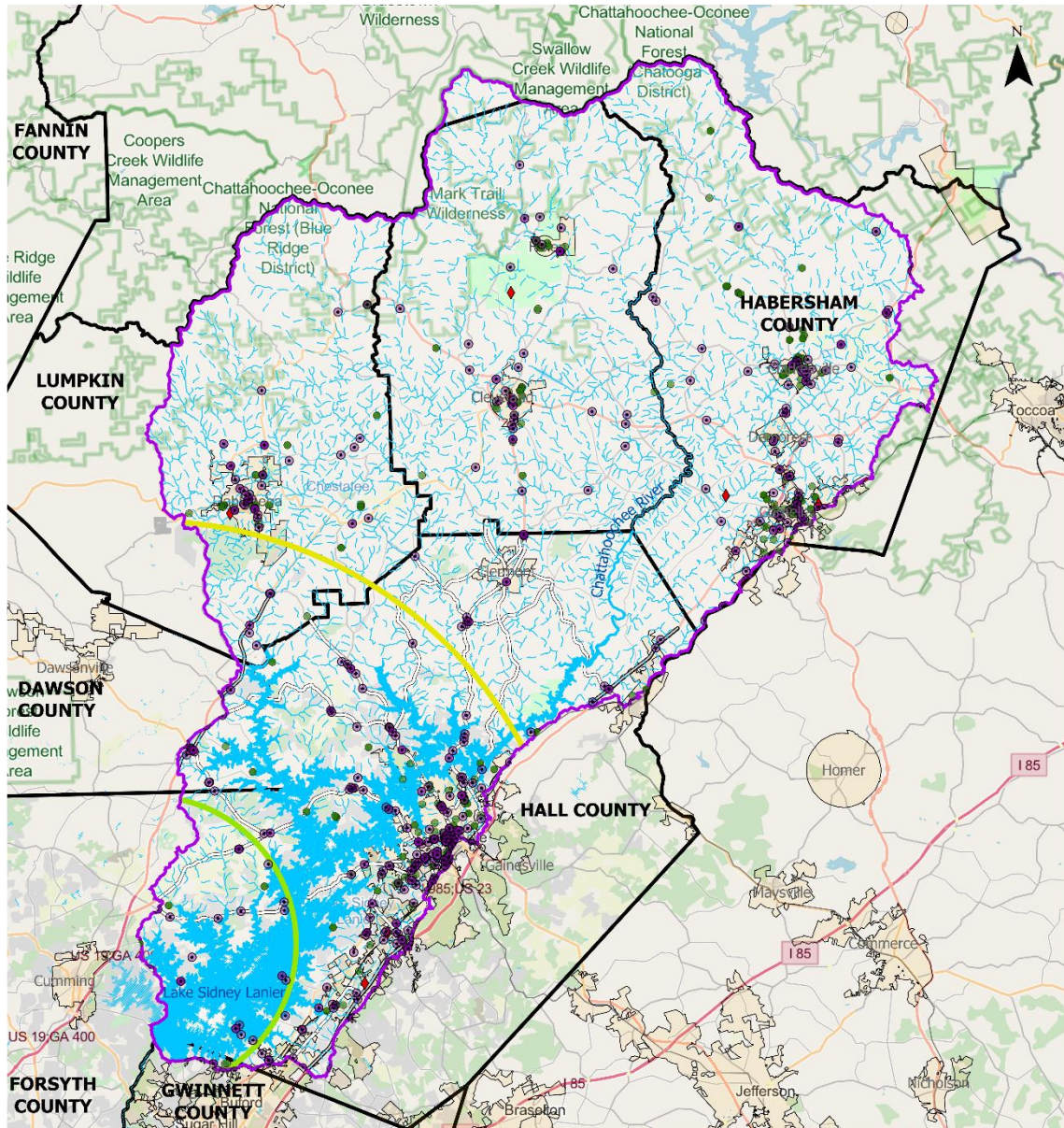
Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

- Impaired Streams
- Other Streams
- Sewered Area
- Unsewered Area
- Major Road/Stream Crossings
- Other Road/Stream Crossings
- Railroad/Stream Crossings
- Sewer >10"/Stream Crossings
- City Boundary
- County Boundary
- Watershed Boundary

MARCH 2020



Figure 11



Accidental Spill Locations
 Forsyth County
 Department of Water and Sewer
 Lake Lanier Water Supply Watershed

- Accidental Spills
- ◆ Hazardous Sites
- ⊙ Leaking Underground Storage Tanks
- ▭ Watershed Boundary
- ▭ OMZ
- ▭ IMZ
- Streams
- ▭ Lakes/Ponds
- Interstates
- Major Roads
- Railroads
- City Boundary
- ▭ County Boundary



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Appendix A. Potential Pollutant Sources

Accident Spill Locations

Agriculture

- Animal Feeding Operations
- Confined Animal Feeding Operations
- Dairy Operations
- Manure Handlers
- Poultry Operations
- Waste Lagoons

Airports

Asphalt Plants

Electric Substations

Fueling Facilities

Garbage Transfer Stations

Hazardous Waste Facilities

Junk/Scrap/Salvage Yards

Landfills (opened/in closure/closed)

Industries which have Bulk Chemical and

- Petroleum Storage
- Petroleum Bulk Stations and Terminals
- Chemical Bulk Stations and Terminals
- Paint, Varnish
- Farm Supplies

Large Industries which have Federal

Categorical Standards

- Aluminum Forming
- Battery Manufacturing
- Builder's Paper and Board Mills
- Carbon Black Manufacturing
- Coil Coating
- Copper Forming
- Electrical and Electronics Components
- Electroplating
- Feedlots
- Fertilizer Manufacturing
- Glass Manufacturing
- Grain Mills
- Ink Formulating
- Inorganic Chemicals Manufacturing
- Iron and Steel Manufacturing
- Leather Tanning and Finishing
- Metal Finishing
- Metal Moulding and Casting
- Nonferrous Metals Forming and Metal Powders
- Nonferrous Metals Manufacturing

Organic Chemicals, Plastics, Synthetics, and Fibers

Paint Formulating

Paving and Roofing Materials

Pesticide Chemicals

Petroleum Refining

Pharmaceutical Manufacturing

Porcelain Enameling

Pulp, Paper and Paperboard

Rubber Manufacturing

Soap and Detergent Manufacturing

Steam Electric Power Generating

Timber Products Processing

Large Industries which Utilize Hazardous Chemicals

Auto Supplies

Food and Kindred Products

Tobacco Products

Textile Products

Lumber and Wood Products

Furniture and Fixtures

Paint and Other Coatings

Paper and Allied Products

Printing and Publishing

Chemicals and Allied Products

Petroleum and Coal Products

Rubber and Misc. Plastics Production

Leather and Leather Products

Stone, Clay and Glass Products

Primary Metal Industries

Fabricated Metal Products

Industrial Machinery and Equipment

Electronic and Other Electric Equipment

Transportation Equipment

Instruments and Related Products

Misc. Manufacturing Industries

LAS Permit Holders

Lift Stations

Marinas

Military Bases

Mining

National Pollutant Discharge Elimination System (NPDES) Permit Holders

Municipal

Industrial

Private



Forsyth County Water & Sewer Department

Oil/Gas Pipelines
Power Plants
Railways Adjacent /Crossing Streams
Recycling Centers
Roads Adjacent /Crossing Streams
Sewer Areas and Non-sewer Areas

Sewer Pipelines Adjacent /Crossing
Streams
Transportation Corridors
Wastewater Facilities
Water Treatment Facilities



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Appendix B. Data Sources for Potential Pollutant Source

ACCIDENTAL SPILL LOCATIONS

This dataset was created from three sources of data. The first data source was the Hazardous Site Inventory (HSI) 2019. The HSI is a list of sites in Georgia known or suspected of having had a release of a regulated substance above a reportable quantity and which have yet to demonstrate compliance with the more-restrictive risk reduction standard rules for Hazardous Site Response. The HSI is compiled and published by the Georgia Environmental Protection Division (EPD). This system is self-reporting. The Hazardous Site Response Act of 1992 requires that a property owner who discovers a release of a regulated substance must report the release to the Hazardous Sites Response Program (HSRP) of Georgia EPD. When the release is reported, the HSRP evaluates the severity of the release and determines if the release is above the reportable quantity of that substance. If the site is above the quantity reportable, the site is placed on the HSI list. This data set is a draft in review by GA EPD and was current through July 1, 2019. The information included in this database includes:

Source: <https://epd.georgia.gov/hazardous-site-inventory>

The second data source was a listing of self-reported accidental spills and sewage spills within the SWAP areas provided by the EPD Water Quality Branch. These data are current through January 2019. Due to the self-reporting nature the information included in this dataset is of low quality and was only used as a basic regional generalization rather than accurate listings.

Source: <https://epd.georgia.gov/watershed-protection-branch/sewage-spills-report>

Contact: Mr. Jarell Singleton, 404.463.2382
Email: jarell.singleton@dnr.ga.gov

The third data source was a list of leaks provided by the EPD Underground Storage Tank records. The EPD maintains a record of known leaks from underground storage tanks, as collected by the Underground Storage Tank Management Program. The data goes back to 1983. Like the accidental spills data, the UST data is of low quality and provides only partial location data. It should only be used as a basic regional generalization rather than as an accurate listing of locations.

Contact: Mrs. Jarell Singleton, 404.463.2382
Email: jarell.singleton@dnr.ga.gov



AGRICULTURE – Confined Animal Feeding Operations (CAFOs), Waste Lagoons, Manure Handlers, and Poultry Houses

This data set was created from six sources of data. The first two data sets are comprised of Georgia Department of Agriculture lists of all waste lagoons and manure handlers in Georgia. These data were acquired through a Georgia Open Records Access request and contain three waste lagoons and four manure handlers in all of the SWAP counties.

Contact: Laura Frank, GA Dept. of Agriculture
Email: laura.frank@agr.georgia.gov

The third and fourth datasets on Confined Animal Feedlots (CAFOs) within the state were supplied by the Georgia Environmental Protection Division's NPDES database and supplemented by data provided directly from the DNR. These data were developed from regulation currently performed under LAS permitting standards. The NPDES database was filtered by GAG93, the starting classification of CAFOs, to extract only CAFO data.

Contact: Vicki Trent, 404-232-7012
Email: vicki.trent@dnr.ga.gov

The fifth dataset was also provided by the Georgia Department of Agriculture through a Georgia Open Records Access request and lists all dairy operations in the state of Georgia.

Contact: Laura Frank, GA Dept. of Agriculture
Email: laura.frank@agr.georgia.gov

The sixth dataset was compiled by filtering the NPDES database for any permit type containing "AFO" or "Animal Feeding Operation" and extracting them to a spreadsheet before the coordinates could be plotted.

Contact: Vicki Trent, 404-232-7012
Email: vicki.trent@dnr.ga.gov



AIRPORTS

The data for airports came from the Federal Aviation Administration's extensive list of all airfields, both public and private, operating across the nation (https://www.faa.gov/airports/airport_safety/airportdata_5010/). This data was filtered to exclude helicopter pads and other non-airport facilities in the SWAP counties. It is up to date as of January, 2019.



ASPHALT PLANTS

This data set was created from data collected from two sources- the NPDES Industrial Stormwater Permit Notice of Intent (NOI) List and the EPD Air Quality Branch Combustion Unit permit database.

The NOI database is a list of 11 facility types required under NPDES to be regulated for the point discharge of stormwater that has been exposed to any aspect of a defined industrial activity. Filing with the NOI database is the first step towards obtaining a permit. The NOI data set used in the Metro SWAP is current through August 2018.

Contact: Cameron Wolfe, GA EPD NPDES Industrial Storm Water Unit,
Email: cameron.wolfe@dnr.ga.gov

The GA EPD Air Quality Branch regulates industries on the basis of discharged airborne pollution. The portion of the Air Quality database used for this project consisted of listings for the two SIC codes representing Asphalt Paving and Roofing Materials Plants (2951 and 2952, respectively). The data set used in the Metro SWAP is current through July 2018.

Contact: Karen Hays, GA EPD Air Protection Branch,
Email: Karen.hays@dnr.ga.gov

Notes about the data set:

- We have removed duplicate facilities listed in both the NOI database and the EPD Air Quality database. These were removed by manual comparison based on facility name and address.



FIELD FACILITIES

A number of facilities were located by field observation. These facilities were found while field-verifying sites that were already mapped in our data sets from other data sources. In general, the recorded facility types were similar to those regulated and/or monitored by local or federal regulation and already included in our mapped dataset. However, it is likely that many of the field-identified facilities were not previously mapped due to rapid growth and development in many metro watersheds. If a facility were seen in the field of which ARC had no record, field personnel recorded its location information and attribute information. Facility types recorded include:

- Agricultural sites
- Airports
- Electrical substations
- Fuel facilities
- Garbage Transfer Stations (GTSS)
- Hazardous waste facilities (Dry cleaners, auto repair, etc)
- Junk/Scrap/Salvage Facilities
- Landfills (Open, Closed, and In-Closure)
- Bulk chemical storage sites
- Industries utilizing hazardous chemicals
- Industries with Federal Categorical Standards (FCSs)
- Marinas
- Military bases
- Mines and quarries
- Oil/Gas pipelines
- Sewage lift stations
- Sewer pipelines crossing streams
- Wastewater Land Application System (LAS) sites
- Wastewater treatment plants
- Drinking water treatment plants
- Other listed potential pollutant source types

Individual SWAP partners, consisting of water departments, authorities, and utilities performed much of the fieldwork. As not all of the partners were able to perform this task, ARC staff completed fieldwork as necessary.

The data in the Metro SWAP is current through September, 2019.

Contact: Alexandra Orrego, Atlanta Regional Commission Natural Resources Group, Metropolitan North Georgia Water Planning District

Email: AOrrego@atlantaregional.org



FUEL FACILITIES

The fuel facilities dataset is made of EPD's maintained list of Underground Storage Tanks (USTs - <https://epd.georgia.gov/underground-storage-tanks>), specifically the "Underground Storage Tank Facility and Owner Data" Excel spreadsheet. This data is up to date as of March, 2018. The website also includes spreadsheets of facility contact information, corrective action projects and cleanups, and a public record report for the fiscal year (2019 at the time of this report).



GARBAGE TRANSFER STATIONS

Garbage Transfer Stations are defined as “a facility used to transfer solid waste from one vehicle to another for transport to a disposal facility or processing operation.” The majority of these facilities consist of an elevated platform where individuals can drive up and deposit solid waste into a large open truck. Garbage Transfer Stations function as ‘self-serve’ collection points for areas without solid waste collection services, and may be staffed or otherwise monitored to reduce dumping of unacceptable materials. These facilities may be private or owned by local governments.

The data is from the EPD’s list of all garbage transfer stations, available online at <https://epd.georgia.gov/permitted-solid-waste-facilities> as an Excel spreadsheet titled “Collection Operations and Transfer Stations”. It is up to date as of August, 2018.



HAZARDOUS WASTE FACILITIES

The first hazardous waste facilities data source comes from the EPA. They monitor hazardous waste facilities under the Resource Conservation and Recovery Act (RCRA) and available information can be found on <https://enviro.epa.gov/facts/rcrainfo/search.html>. These data were separated into different RCRA facility categories: Treatment, Storage, and Disposal Facilities (TSD); Large Quantity Generators (LQG); Small Quantity Generators (SQG); and Conditionally Exempt Small Quantity Generators (CESQ). This data provided little information, including only location data with facility IDs and so a second data source was used to provide more detail.

Contact: Jerry R. Campbell, Emergency Response Manager, EPD
Email: Jerry.campbell@dnr.ga.gov

The second data source is from the ARC's Research and Analytics Group. The data is filtered for requested industry data on hazardous waste treatment and disposal facilities using North American Industry Classification System (NAICS) code 562211 (Hazardous waste treatment and disposal). This data was compared with the EPA's RCRA records and only unique entries were kept. This dataset is up to date as of January, 2019.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org

Contact: Jim Skinner, ARC Research and Analytics Division, Administrator
Email: JSkinner@atlantaregional.org



JUNK, SCRAP, AND SALVAGE YARDS

Junk, scrap, and salvage yard data were provided internally by the ARC's Research and Analytics division. The data is filtered for requested facilities identified by using NAICS code 423140 (Motor Vehicle Parts (Used) Merchant Wholesalers) to extract the salvage yard location data. This dataset is up to date as of January, 2019.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org

Contact: Jim Skinner, ARC Research and Analytics Division, Administrator
Email: JSkinner@atlantaregional.org



LANDFILLS

Landfills are categorized into three groups: operating landfill disposals, landfills in closure, and closed landfills. These datasets are all available on <https://epd.georgia.gov/permitted-solid-waste-facilities> under the labels Solid Waste Disposal Facilities, Landfills – In Closure, and Landfills-Closed, respectively. The datasets are current as of October, 2018. The landfills in closure dataset was largely unusable as locations were often provided as directions to the site rather than coordinates or an address. However, through extensive aerial verification of landfills in closure we were able to identify a significant amount.



LAND APPLICATION SYSTEM (LAS) PERMIT HOLDERS

This data set contains information on permitted municipal, industrial, and private LAS facilities. The data set was created from geographic information system (GIS) databases collected from the Georgia Environmental Protection Division's (EPD) NPDES list. This list tracks all discharges that enter waterways in Georgia and was filtered by IDs starting with GAG278, GAG92, and GAG94, all of which apply to land application systems (LASs). This dataset is current as of April, 2018.

Contact: Vicki Trent, Data Assessment and Management Unit, Water Protection Branch of DNR.
Phone: 404-651-8482
Email: Vicki.Trent@dnr.ga.gov



LARGE INDUSTRIES WHICH UTILIZE BULK CHEMICAL OR PETROLEUM STORAGE

This dataset was provided by the EPD and includes facilities which intend to discharge stormwater associated with industrial activity. The dataset includes permit holders which was used to provide data covering all industries with bulk chemical storage excluding those related to asphalt production. The SIC codes are provided below and the data is current as of August, 2018.

Contact: John Maddox, EPD Contact Emergency Response Manager
Phone: 770.387.4936

Based on SIC code description, industries engaged in the wholesale distribution of chemicals or petroleum were selected from the EPD data set for inclusion in this category. Industries with the following SIC codes were selected:

SIC	Name	Description
5169	Chemicals and Allied Products, Not Elsewhere Classified	Engaged in wholesale distribution of chemicals and allied product (chemicals, dyes, acids, etc.)
5171	Petroleum and Bulk Stations and Terminals	Engaged in wholesale distribution of crude petroleum and petroleum products
5191	Farm Supplies	Engaged in wholesale distribution of animal feeds, fertilizers, pesticides and other farm supplies (excluding grains)
5198	Paints, Varnishes and Supplies	Engaged in wholesale distribution of paints, varnishes wallpaper and supplies.



LARGE INDUSTRIES WITH FEDERAL CATEGORICAL STANDARDS

This dataset is collected from the EPD's website, <https://epd.georgia.gov/watershed-protection-branch-lists>, where all industrial water pretreatment systems are listed. The data included the permit holders which was used to provide a list of all of the industries with bulk chemical storage, excluding those related to asphalt production. These data are current as of August, 2018.



LARGE INDUSTRIES WHICH UTILIZE HAZARDOUS CHEMICALS

This data set was created from data collected under the Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA requires a report to EPA and the state from each manufacturer with 10 or more employees who either use 10,000 pounds or manufactures or processes 25,000 pounds of any "toxic chemical" during the reporting year. EPCRA requires reporting the following data:

- Name and location of facility
- Property owner or contact information
- State permit or ID number
- Identification of toxic chemicals
- Standardized Industrial Classification (SIC).

EPCRA data was obtained for this project from Jerry Campbell, Emergency Planning and Community Right to Know Administrator.
Phone: 770.387.4900

The second data source was obtained from the Toxic Release Inventory (TRI). These data tracked releases from 1996 to the most up to date release in 2016. This dataset tracks locations not associated with the EPCRA dataset.

As a requirement of EPCRA, air, land, and/or water releases, accidental or otherwise, are reported in the Toxic Release Inventory. Both the EPCRA and TRI data sets were compiled to create the ARC SWAP Large Industries Which Utilize Hazardous Chemicals database. EPCRA Data used in the Metro SWAP was current as of July, 2018 and TRI was updated in 2016. Due to some discrepancies between the two data sets, records from TRI not already present in EPCRA were added to supplement the database.



LIFT STATIONS

The information for this data set was acquired by the individual water authorities and/or local governments and can be considered incomplete and unverified due to a lack of response from a handful of utilities. However, the data are what is available and have been plotted appropriately to ensure the data that they are accurate.

City of Cartersville	Sidney Forsyth 09/19	sforsyth@cityofcartersville.org
Bartow County	Charles Fail 09/18	failc@bartowga.org
Butta County Water and Sewer Authority	Marcie R. Seleb 10/17	mseleb@buttswsa.com
City of Ball Ground	Eric Wilmarth 1/22	ewilmarth@cityofballground.com
Cherokee County Water & Sewerage Authority	Jennifer Arp	jennifer.arp@ccwsa.com
City of Canton Water & Sewer Department	David Hatabian 10/12	david.hatabian@cantonga.gov
City of Woodstock	Katy Leggett 09/13	kleggett@woodstockga.gov
Clayton County	Jim Quattlebaum 10/9	jim.quattlebaum@ccwa.us
Cobb County Water System	Jeff Campbell 08/21	Jeff.Campbell@cobbcounty.org
City of Smyrna	Kathe Roper 1/22	kroper@smyrnaga.gov
City of Senoia	Curtis Hindman/Greg Ashworth 10/25	chindman@senoia.com ; gashworth@gbtengineers.com
Coweta County Water & Sewerage Authority	Joe Pelletier 09/19	jpelletier@cowetawater.com
Newnan Utilities	Jeff Pecce 07/26	jeff@newnanutilities.org
DeKalb County	Sandra L. Glenn 08/13	slglenn@dekalbcountyga.gov
Douglasville - Douglas County	Brian Keel 08/22	bkeel@ddcwsa.com
City of Fayetteville	Jonas Lydon 08/08	JLydon@fayetteville-ga.gov
Peachtree City	Internal Data	
Tyrone	Brad Konwick 08/27	bkonwick@tyrone.org



Forsyth County Water & Sewer Department

City of Cumming	Mary Lipold 08/27	mary@cecincga.com
Forsyth County	Brandon R. Loggins 07/30	BRLoggins@forsythco.com
Atlanta Fulton County Water Resource Commission	kathy Crews 08/02	kcrews@afcwrc.com
City of East Point	Melissa Echevarria 01/15	mechevarria@EastPointCity.org
City of Palmetto	Diana Chumak 01/29	diana.chumak@greshamsmith.com
South Fulton	Laura Benz 8/2	Laura@lwbenz.com
City of Buford	Lamar Sudderth 10/9	LSudderth@cityofbuford.com
Gwinnett County	Michael Pappas 07/31	Michael.Pappas@gwinnettcountry.com
City of Gainesville	Horace Gee 07/31	hgee@gainesville.org
Hall County	Mark Lane 09/18	mlane@hallcounty.org
City of McDonough Water Department	Cesar Sanchez 08/24	CSanchez@McDonoughGa.org
Hampton	Jaretta Chaffin 8/21	jchaffin@hamptonga.gov
Henry County Water & Sewerage Authority	Allen Rape 09/24	allen.rape@hcwa.com
Paulding County	Corey Coats 07/27	ccoats@paulding.gov
Rockdale County	Deirdre Blackard 07/26	Deirdre.Blackard@RockdaleCountyGA.gov



MARINAS

Industry marina data were requested and provided internally by the ARC's research and analytics division. The data was then filtered by NAICS codes, similar to the methods presented earlier in this report.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org

Contact: Jim Skinner, ARC Research and Analytics Division, Administrator
Email: JSkinner@atlantaregional.org



MILITARY BASES

Military bases were acquired from the Federal Department of Transportation's shape file containing all military bases in the country (<http://osav-usdot.opendata.arcgis.com/>). These polygons were clipped to their appropriate management zones and are current as of 2017.



MINING OPERATIONS

Mining operation data were obtained from the EPD's website (<https://epd.georgia.gov/surface-mining>), in the Excel spreadsheet titled Permitted Surface Mining Facilities. The data were imported to ArcGIS Pro before their coordinates were plotted and clipped to the appropriate management zones. The data are current as of November, 2018.



NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT HOLDERS

The Georgia EPD maintains a database of facilities permitted under the National Pollutant Discharge Elimination System (NPDES) in Georgia. These permits are required by all facilities that discharge pollutants into any waterbody in the United States. While this includes points from other PPS categories, they were removed and only NPDES specific permit holders were kept.

Contact: Vicki Trent, Data Assessment and Management Unit, Water Protection Branch of DNR.

Phone: 404-651-8482

Email: Vicki.Trent@dnr.ga.gov



OIL AND GAS PIPELINES CROSSING STREAMS

The oil and gas pipeline data for Georgia was obtained from the United States Office of Pipeline Safety's National Pipeline Mapping System (NPMS). The NPMS asked that this data not be shared with anyone or even kept on shared drives so the data were kept on hard drives encrypted with password protection. The data are current as of February, 2019.

Contact: Nathaniel Thompson, National Pipeline Mapping System
Email: npms@dot.gov



POWER PLANTS AND SUBSTATIONS

These data came from two sources. For power plants, the EPA's Facility Registry Service database was used. This database includes large, potentially polluting facilities and is slightly outdated with the most current revision being 2013, so it was largely used for power plant identification as they have not changed in the 6-year interim.

The second dataset came from the Department of Homeland Security's list of important facilities for its internal information network. Special clearance was required to handle these data which was obtained through an application on their website.



RAILWAYS CROSSING STREAMS

The sources for railways crossing streams came from both the Atlanta Regional Commission (ARC) and from the Georgia GIS Data Clearinghouse (<https://data.georgiaspatial.org/>). These datasets were compared and any overlapping roads were removed. The railways polyline file was then intersected with the ARC's rivers and streams of Georgia polyline to determine where they crossed. These data are current as of 2018.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org



RECYCLING CENTERS

Recycling center industry data was requested by the ARC and provided internally by the research and analytics division. This data was then filtered by NAICS codes 423930 (Recyclable Material Merchant Wholesalers) and 562920 (Materials Recovery Facilities). These data are current as of January, 2019.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org

Contact: Jim Skinner, ARC Research and Analytics Division, Administrator
Email: JSkinner@atlantaregional.org



ROADS CROSSING STREAMS

The ARC maintains a feature class containing all major roads in the 20-county radius surrounding Atlanta. These are coupled with 2014 TIGER street line files to obtain more accurate polylines before they are intersected with the rivers and streams polyline shape file to determine where they meet or cross one another.

Contact: Ryan Barrett, ARC Research and Analytics Division
Email: RBarrett@atlantaregional.org



SEWER AREAS AND NON-SEWER AREAS (SEPTIC TANKS)

The sewer and non-sewered areas were provided as polyline shape files to the ARC from the utilities themselves in addition to the ARC's data of septic tanks in the 10-county ARC region. Some assumptions were made that include comparing the sewer areas to septic tank point data as well as using sewer service area data provided by Peachtree City.

The septic (non-sewered) areas were generated by the ARC by dissolving the sewer areas provided by utilities to the management zone in question, leaving only "non-sewered area" remaining. To the extent of our knowledge, the data are current as of January, 2019.

Data was requested from the utilities involved with the project on 4 separate occasions and a handful of utilities never responded to the requests. Therefore, some sewer area calculations may be inaccurate, though it is unlikely this would have a significant effect on the final results as the utilities who did not respond are fairly small.

City of Cartersville	Sidney Forsyth 09/19	sforsyth@cityofcartersville.org
Bartow County	Charles Fail 09/18	failc@bartowga.org
Butta County Water and Sewer Authority	Marcie R. Seleb 10/17	mseleb@buttswsa.com
City of Ball Ground	Eric Wilmarth 1/22	ewilmarth@cityofballground.com
Cherokee County Water & Sewerage Authority	Jennifer Arp	jennifer.arp@ccwsa.com
City of Canton Water & Sewer Department	David Hatabian 10/12	david.hatabian@cantonga.gov
City of Woodstock	Katy Leggett 09/13	kleggett@woodstockga.gov
Clayton County	Jim Quattlebaum 10/9	jim.quattlebaum@ccwa.us
Cobb County Water System	Jeff Campbell 08/21	Jeff.Campbell@cobbcounty.org
City of Smyrna	Kathe Roper 1/22	kroper@smyrnaga.gov
City of Senoia	Curtis Hindman/Greg Ashworth 10/25	chindman@senoia.com ; gashworth@gbtengineers.com
Coweta County Water & Sewerage Authority	Joe Pelletier 09/19	jpelletier@cowetawater.com
Newnan Utilities	Jeff Pecce 07/26	jeff@newnanutilities.org



Forsyth County Water & Sewer Department

DeKalb County	Sandra L. Glenn 08/13	slglenn@dekalbcountyga.gov
Douglasville - Douglas County	Brian Keel 08/22	bkeel@ddcwsa.com
City of Fayetteville	Jonas Lydon 08/08	JLydon@fayetteville-ga.gov
Peachtree City	Internal Data	
Tyrone	Brad Konwick 08/27	bkonwick@tyrone.org
City of Cumming	Mary Lipold 08/27	mary@cecincga.com
Forsyth County	Brandon R. Loggins 07/30	BRLoggins@forsythco.com
Atlanta Fulton County Water Resource Commission	kathy Crews 08/02	kcrews@afcwr.com
City of East Point	Melissa Echevarria 01/15	mechevarria@EastPointCity.org
City of Palmetto	Diana Chumak 01/29	diana.chumak@greshamsmith.com
South Fulton	Laura Benz 8/2	Laura@lwbenz.com
City of Buford	Lamar Sudderth 10/9	LSudderth@cityofbuford.com
Gwinnett County	Michael Pappas 07/31	Michael.Pappas@gwinnettcounty.com
City of Gainesville	Horace Gee 07/31	hgee@gainesville.org
Hall County	Mark Lane 09/18	mlane@hallcounty.org
City of McDonough Water Department	Cesar Sanchez 08/24	CSanchez@McDonoughGa.org
Hampton	Jaretta Chaffin 8/21	jchaffin@hamptonga.gov
Henry County Water & Sewerage Authority	Allen Rape 09/24	allen.rape@hcwa.com
Paulding County	Corey Coats 07/27	ccoats@paulding.gov
Rockdale County	Deirdre Blackard 07/26	Deirdre.Blackard@RockdaleCountyGA.gov



SEWER PIPES CROSSING STREAMS

Sewer data has been collected for the ten county region and for each of the additional 14 counties and numerous small cities that fall within the watersheds of concern. Data was obtained directly from each county or city, from various departments including Engineering, Public Works, City Hall, and GIS departments. Data formats include ArcInfo coverages, shape files, CAD drawing files, and paper maps that must be digitized into electronic form for analysis. The nature of the data sought is simply a map of the location of the pipes (geospatial data) and the size of the pipes (when available).

The sewer data is being analyzed for adjacency to and crossing of streams. Emphasis is placed on lines 10 inches in diameter or greater, and lines of diameter 8 inches or less are not included in the analysis. GIS is used to determine the number of miles of pipe 10" or greater within each watershed and within 25 feet of a stream, as well as the location and number of stream crossings. Wherever possible, analysis is done with a hydrology data layer obtained from the county governments to try and ensure consistency and accuracy.

(The above contact table is applicable here as well)



WATER PLANTS

Water plant data were obtained from the NPDES database provided to us by the EPD. This dataset was filtered identically to previously mentioned potential point source categories to obtain IDs starting with GAG55 and GAG64 which are associated with water treatment plants. The database was also searched manually for any permit with "WTP" or "WTF" in the name field. The data are current as of April, 2018.



WASTEWATER TREATMENT FACILITIES

Wastewater treatment facilities were found similarly as water plants were in that the EPD NPDES database provided to us was filtered to extract private and municipal plants as well as any name fields that contained "WWTP", "WPCP", "WSA", or "WRF". The data are current as of April, 2018.



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Appendix C. Methodology for Individual Source Susceptibility Determination

The following methodology was used to calculate (1) Distance to Surface Water, (2) Distance to Surface Water Intake, and (3) Ease of Transport for the individual source susceptibility determination. The rankings for each of these measurements were chosen based on the median values calculated across the 25th, 50th, and 75th percentiles.

Distance from Surface Water

Flow paths from each individual source facility to the nearest stream were calculated in ArcGIS Pro using the Flow Distance tool. The Flow Distance outputs the horizontal length of the natural flow path to the nearest stream in decimal degrees. Decimal degrees were converted to feet by multiplication of 335,000. This value was chosen based on an online conversion tool which uses several coordinates from the corresponding study area to produce a conversion value. The difference in conversion values across varying latitudes in the study area was very small, with only a ~2.9% error. The range of median Distance to Surface Water values calculated across the 25th, 50th, and 75th percentiles were 1440 ft., 2339 ft., and 3209 ft. respectively.

Distance from Water Intake

The distance from each individual facility to the surface water intake, more accurately, the mouth of the HUC10 watershed boundary, was calculated utilizing a model in ArcGIS Pro that created Cost Paths. These paths follow the “cheapest cost” path in a given region from a set of raster, or column and row pixel data that follows a reclassified 10 m-resolution National Elevation Dataset (NED) elevation raster as well as a flow direction raster generated from the same NED data using the Flow Direction tool. A path is generated for each potential pollutant source after it has been “snapped” to the stream line using the Near tool and then merged into a final polyline feature class before the original stream points are spatially joined to the lines so that the lengths are associated with their respective potential pollution sources. This can be done for individual points by using the proper tools in correct succession or for entire watersheds when placed in a model.

Ease of Transport

Ease of Transport was calculated by taking the average of the determined ranking values for Distance from Surface Water, Slope, and LULC for each individual source facility.

The elevation difference was calculated by taking the difference between the elevations at the starting and ending points of the flow path calculated using the Flow Distance tool ArcGIS Pro. Slope was then calculated by dividing the elevation difference by the flow path distance for each individual source facility. The range of median Slope values calculated across the 25th, 50th, and 75th percentiles were 0.006, 0.009, and 0.012 respectively.

LULC classes from the NCLD dataset were reclassified from 15 to 8 classes, as many of the original classes were not relevant for this study. The LULC weight was calculated in ArcGIS Pro



by taking the average of all pixel classes along the straight-line distance between each individual source facility and the nearest stream.

Table C1: Point Source Susceptibility Category Rankings and Calculations

Category	Ranking	Calculation
Distance from Surface Water	<p><u>High</u> – less than 1440 feet</p> <p><u>Medium</u> – 1440 feet < Distance <3209 feet</p> <p><u>Low</u> – greater than 3209 feet</p>	Distance from surface water is calculated based on elevation flow paths from each facility to the nearest stream.
Distance from Water Intake	<p><u>High</u> – within 7 miles upstream</p> <p><u>Medium</u> – between 7 and 15 miles upstream</p> <p><u>Low</u> – between 15 and 20 miles upstream</p>	River miles are calculated based on natural flow of pollutants downstream.
Slope	<p><u>High</u> – greater than 0.012</p> <p><u>Medium</u> – between 0.006 and 0.012</p> <p><u>Low</u> – less than 0.006</p>	Slope is calculated by dividing the elevation difference by the flow path distance for paths between point source facilities and the nearest stream.
LULC Class	<p><u>High</u> – Developed-high intensity, Water</p> <p><u>Medium</u> – Developed-low intensity, Barren Land, Hay/Cultivated Crops</p> <p><u>Low</u> – Deciduous/Mixed Forest, Shrub/Herbaceous, Woody/Wetlands</p>	LULC weight was calculated by taking the average of all LULC pixels along a straight-line distance from each point source facility to the nearest stream.
Ease of Transport (Average: Dist. from Surface Water + Slope + LULC)	<p>High – 3</p> <p>Medium-High – 2.33-2.67</p> <p>Medium – 2</p> <p>Medium-Low – 1.33-1.67</p> <p>Low - 1</p>	Ease of Transport is calculated by averaging the ranking values of Slope, Dist. from Surface Water, and LULC weight for each point source facility.



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Appendix D. General Release and Potential Risk

Source	Volume	Duration	Toxicity	Reasoning
Agriculture				
AFO's	Low-High	Low	High	Unanticipated Occurrence – natural disaster; Pathogens
CAFO's	Medium-High	Low	High	
Dairy Ops	Low-High	Low	High	
Manure Handlers	Medium-High	Low	High	
Poultry	Low	Low	High	Most operations have broiler chickens, which have dry litter; Extensive measures in place for containing waste; Pathogens
Waste Lagoons	High	Low	High	Potentially 10,000 gallon release if dam breaks; Low probability of break occurring
Airports	Medium	Medium	Medium	Emergency Response Spill Data - Spills were >1,000 GAL but <10,000 GAL; Chemicals, Jet fuel leaks
Asphalt Plants	High	Medium	High	Chemicals, mostly risk to air pollution
Fuel Facilities (UST)	Low	Medium	Medium	Emergency Response Spill Data. Spills were <1,000 GAL
Garbage Transfer Stations	Low	Low	Medium	Low potential of haulers polluting; Type of chemicals
Haz. Waste Facilities				
CEQG	Low	Low	High	> 1000 KG per Month
SQG	Medium	Medium	High	1000 KG < SQG > 100 KG per month
LQG	High	High	High	< 100 KG per Month
TSD	High	High	High	
Junk Scrap	Low	Medium	High	Small volume of release; Metals/Chemicals
Landfills				
Operating	Low	High	High	Contained landfills, no groundwater contamination, in compliance



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In Closure	Medium	High	High	Open dumps, inert waste, no groundwater contamination
Closed	High	High	High	History of groundwater contamination, uncharacterized waste.
Large Ind. w/Haz Chem	High	High	High	>25,000 lbs/year
Large Ind. FCS	High	High	High	>25,000 lbs/year
Large Ind. Bulk Chem Storage	High	High	High	>25,000 lbs/year
LAS Permit Holders	Low	Low	Low	Pathogens may be present, but treated before release; Based on permit compliance
Lift Stations	Medium	Medium	High	Sanitary sewer overflows
Marinas	Medium	High	High	Chemical types; Contaminants directly enter water system
Military Bases	High	High	High	
NPDES permit holders	Low-High	Low-High	High	Facility dependent (municipal, industrial, private)
Power plants	Low-High	Low-High	Medium	Type of facility dependent; Metal, chemicals
Recycling	Low	Low	Low-High	Facility dependent
Substations	Low	Low	Low	Mostly VOCs, low volume of spill to water
Surface Mines	Low-Medium	Low	Medium	Low probability – storm dependent; Metals
WWTP	High	High	High	Pathogens in untreated water
Water Plants	Low	Low	Medium	Types of chemicals on site



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Appendix E. Water Quality Impaired Streams in the Lake Lanier Water Supply Watershed

The following is a tabulated year 2018 Georgia 305(b)/303(d) integrated report listing impaired streams submitted by the Georgia Department of Natural Resources to the EPA. The table is a summary of extract from the GIS datasets of the report.

Stream	Location	Criterion Violated	Potential Cause(s)	Assessment Result	Actions to Reduce Impairment
Balus Creek	Headwaters to Lake Lanier (Gainesville)	FC	UR	Not Supporting	TMDL completed FC 2003 (revised 2008).
West Fork Little River	Headwaters to above Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Little Tesnatee Creek	Freeman Creek to u/s Hwy. 129	Bio F	NP	Not Supporting	TMDL 2017
Turner Creek	Headwaters to Tesnatee Creek	Bio F	NP	Not Supporting	TMDL completed Bio F 2008.
Mossy Creek	Totherow Rd. near Clermont to Chattahoochee River	FC	NP	Not Supporting	TMDL completed FC 1998.
Mud Creek	Headwaters to Little Mud Creek	FC, Bio F	NP	Not Supporting	TMDLs completed FC & Bio F 2008.
Mud Creek	Headwaters to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 2003 (revised 2008).
Big Creek	Tributary to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Fourmile Creek	Lake Lanier Tributary	FC	NP	Not Supporting	TMDL completed FC 1998.
Chestatee River	Tate Creek to Tesnatee Creek	FC	NP	Not Supporting	TMDL completed FC 2013.
Chestatee River	Tesnatee Creek To Yahoola Creek	FC	NP	Not Supporting	TMDL completed FC 2013.
Chestatee River	Yahoola Creek to Lake Lanier	FC	NP	Not Supporting	FC TMDL completed 1998.
Flat Creek	Headwaters near Clermont to Lake Lanier	Bio F	UR, NP	Not Supporting	TMDL completed Bio F 2008.
Flat Creek	Headwaters, Gainesville to Lake Lanier	FC, Bio F	UR	Not Supporting	TMDL completed FC 2003 (revised 2008). TMDL completed Bio F 2008.
Camp Creek	North Tributary to Wells Pond Tributary	TCA	I2	Not Supporting	Data from EPD's Harzardous Waste Branch. Facility under a corrective action plan.



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Cane Creek	Tributary to Chestatee River near Dahlonega	Bio F	NP	Not Supporting	TMDL 2017
Cavenders Creek	Headwaters to Chestatee River	Bio F	NP	Not Supporting	TMDL 2017
Chattahoochee River	Ga. Hwy. 17, Helen to SR255	FC, Bio F	UR	Not Supporting	TMDL completed FC 2003 (revised 2008); TMDL 2017
Chattahoochee River	Mossy Creek to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 2008. TMDL completed TWR 2003.
Chattahoochee River	Soquee River to Mossy Creek	FC	NP	Not Supporting	TMDL completed TWR 2003. TMDL completed FC 2008.
Chattahoochee River	SR255 to Soquee River	FC	NP	Not Supporting	TMDL completed FC 1998.
Dean Creek	Headwaters to Mossy Creek	Bio F	NP	Not Supporting	TMDL completed Bio F 2008.
East Fork Little River	Downstream Hwy 52 to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 2008.
Flowery Branch	Tributary to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Hazel Creek	Law Creek to the Soque River	Bio M	NP	Not Supporting	TMDL completed Bio M 2003.
Hazel Creek	Reservoir No. 12 to Law Creek	Bio F	NP	Not Supporting	TMDL completed Bio F 2008.
Little Mud Creek	Headwaters to Mud Creek	FC	NP	Not Supporting	TMDL completed FC 2008.
Longwood Park Creek	Tributary to Lake Lanier (Gainesville)	FC	UR	Not Supporting	TMDL completed FC 1998.
North Fork Balus Creek	Headwaters to Balus Creek (Gainesville)	FC	UR	Not Supporting	TMDL completed FC 2003 (revised 2008).
Six Mile Creek	Headwaters to Lake Lanier	FC, Bio F	UR, NP	Not Supporting	TMDL completed FC 1998. TMDL completed Bio F 2008.
Slaughterhouse Creek	Tributary to Lake Lanier (Gainesville)	FC	UR	Not Supporting	TMDL completed FC 1998.
Soquee River	Goshen Creek to SR 17, Clarkesville	Bio F	NP	Not Supporting	TMDL completed FC 2003 (revised 2008); TMDL 2017
South Fork Balus Creek	Headwaters to Balus Creek (Gainesville)	FC	UR	Not Supporting	TMDL completed FC 1998.
South Fork Limestone Creek/Limestone Creek	Headwaters to Limestone Creek Arm of Lake Lanier	FC, Bio F	UR, NP	Not Supporting	TMDL completed FC 1998. TMDL completed Bio F 2008.



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Taylor Creek	Headwaters to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Tesnatee Creek	Town Creek to Chestatee River	FC	NP	Not Supporting	TMDL completed FC 2003 (revised 2008).
Tesnatee Creek	U/S Hwy 129 to Town Creek, Cleveland	FC	UR	Not Supporting	TMDL completed FC 2003 (revised 2008).
Toto Creek	Headwaters to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Tributary to Limestone Creek	Breneau Lake to Limestone Creek	Bio F	UR, NP	Not Supporting	TMDL completed Bio F 2008. TMDL completed FC 1998.
Tributary to West Fork Little River	Headwaters to West Fork Little River in Clermont	FC	NP	Not Supporting	TMDL completed FC 1998.
Two Mile Creek	Headwaters to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998.
Wahoo Creek	SR 52 to Lake Lanier	FC	NP	Not Supporting	TMDL completed FC 1998 & 2003.
White Creek	Headwaters to Webster Lake, Cleveland	Bio M, Bio F	NP	Not Supporting	TMDL completed Bio M 2003. TMDL completed Bio(F) 2008.
Yahoola Creek	U.S. 19/ Business SR 60 to Chestatee River	FC	NP	Not Supporting	TMDL completed FC 2008.
Tate Creek	Headwaters to Chestatee River	Bio F	NP	Not Supporting	TMDL 2017
Bear Creek	Headwaters to West Fork Little River near Clermont			Supporting	
Cry Creek	Tributary to Lake Lanier (Gainesville)			Supporting	
Shoal Creek	Headwaters to Tesnatee Creek			Supporting	
Boggs Creek	Headwaters to Chestatee River			Supporting	
Chattahoochee River	Jasus Creek to Ga. Hwy. 17, Helen			Supporting	
Chattahoochee River	Upstream Jasus Creek			Supporting	
Deep Creek	Headwaters to Soquee River			Supporting	
Dicks Creek	Headwaters to Waters Creek			Supporting	
Dukes Creek	Headwaters(Hwy. 348) to			Supporting	



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	Chattahoochee River				
Etta Vista Creek	Tributary to Lake Lanier (Gainesville)			Supporting	TMDL completed FC 1998.
Jasus Creek	Headwaters to the Chattahoochee River (Northwest of Helen)			Supporting	
Kubota Creek	Tributary to Lake Lanier (Gainesville)			Supporting	
Low Gap Creek	Headwaters to the Chattahoochee River (Northwest of Helen)			Supporting	
Rock Creek	Tributary to Lake Lanier (Gainesville)			Supporting	TMDL completed FC 1998.
Sautee Creek	U/S Chattahoochee River			Supporting	
Smith Creek	Headwaters to Chattahoochee River near Helen			Supporting	
Soquee River	SR17, Clarkesville to Chattahoochee River			Supporting	TMDL completed FC 2008.
South Fork Mud Creek	Headwaters to Mud Creek (Cornelia)			Supporting	
Squirrel Creek	Tributary to Lake Lanier			Supporting	
Town Creek	Headwaters to Tesnatee Creek			Supporting	
Tributary to Limestone Creek	U/S Brenau Lake			Supporting	TMDL completed FC 1998.
Waters Creek	Headwaters to Dicks Creek			Supporting	
Yahoola Creek	Headwaters to U.S. Hwy 19/SR60 Business			Supporting	
Yellow Creek	Headwaters to Lake Lanier			Supporting	
Chestatee River	Boggs Creek to Tate Creek			Supporting	
Mud Creek	Little Mud Creek to the Chattahoochee River			Supporting	



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Appendix F. Potential Sources of Drinking Water Contamination Index

POTENTIAL SOURCE	CONTAMINANT
Commercial / Industrial	
Above-ground storage tanks	Arsenic, Barium, Benzene, Cadmium, 1,4-Dichlorobenzene or P-Dichlorobenzene, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Lead, Trichloroethylene (TCE), Tetrachloroethylene or Perchloroethylene (Perc)
Automobile, Body Shops/Repair Shops	Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, Copper, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, 1,4-Dichlorobenzene or P-Dichlorobenzene, Lead, Fluoride, 1,1,1-Trichloroethane or Methyl Chloroform, Dichloromethane or Methylene Chloride, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE), Xylene (Mixed Isomers)
Boat Repair/Refinishing/Marinas	Benzene, Cadmium, cis 1,2-Dichloroethylene, Coliform, Cryptosporidium, Dichloromethane or Methylene Chloride, <i>Giardia Lambia</i> , Lead, Mercury, Nitrate, Nitrite, trans 1,2-Dichloroethylene, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE), Vinyl Chloride, Viruses
Cement/Concrete Plants	Barium, Benzene, Dichloromethane or Methylene Chloride, Ethylbenzene, Lead, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, Xylene (Mixed Isomers)
Chemical/Petroleum Processing	Acrylamide, Arsenic, Atrazine, Alachlor, Aluminum (Fume or Dust), Barium, Benzene, Cadmium, Carbofuran, Carbon Tetrachloride, Chlorobenzene, Copper, Cyanide, 2,4-D, 1,2-Dibromoethane or Ethylene Dibromide (EDB), 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,1-Dichloroethylene or Vinylidene Chloride, cis 1,2 Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) adipate, Di(2-ethylhexyl) phthlate, 1,2-Dichloroethane or Ethylene Dichloride, Dioxin, Endrin, Epichlorohydrin, Ethylbenzene, Hexachlorobenzene, Hexachlorocyclopentadiene, Lead, Mercury, Methoxychlor, Polychlorinated Biphenyls, Selenium, Styrene, Sulfate, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Construction/Demolition	Arsenic, Asbestos, Benzene, Cadmium, Chloride, Copper, Cyanide, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Fluorides, Lead, Selenium, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Turbidity, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Dry Cleaners/Dry Cleaning	Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, 1,1,2-Trichloroethane
Dry Goods Manufacturing	Barium, Benzene, Cadmium, Copper, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, Lead, 1,1,1-Trichloroethane or Methyl Chloroform, Polychlorinated Biphenyls, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, Trichloroethylene (TCE), Xylene (Mixed Isomers)
Electrical/Electronic Manufacturing	Aluminum (Fume or Dust), Antimony, Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, Copper, Cyanide, Carbon Tetrachloride, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, Ethylbenzene, Lead, Mercury, Polychlorinated Biphenyls, Selenium, Styrene, Sulfate, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, 1,1,2-Trichloroethane, Trichloroethylene (TCE), Thallium, Toluene, Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Fleet/Trucking/ Bus Terminals	Arsenic, Acrylamide, Barium, Benzene, Benzo(a)pyrene, Cadmium, Chlorobenzene, Cyanide, Carbon Tetrachloride, 2,4-D, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, Epichlorohydrin, Heptachlor (and Epoxide), Lead, Mercury, Methoxychlor, Pentachlorophenol, Propylene Dichloride or 1,2-Dichloropropane, Selenium, Styrene, Toxaphene, Tetrachloroethylene or



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	Perchloroethylene (Perc), Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers)
Food Processing	Arsenic, Benzene, Cadmium, Copper, Carbon Tetrachloride, Dichloromethane or Methylene Chloride, Lead, Mercury, Picloram, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Xylene (Mixed Isomers)
Funeral Services/Taxidermy	Glyphosate, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Total Coliforms, Viruses
Furniture Repair/Manufacturing	Barium, 1,2-Dichloroethane or Ethylene Dichloride, Dichloromethane or Methylene Chloride, Ethylbenzene, Lead, Mercury, Selenium, Trichloroethylene (TCE)
Gas Stations (see also above ground/underground storage tanks, motor-vehicle drainage wells)	cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE)
Graveyards/Cemetaries	Dalapon, Lindane, Nitrate, Nitrite, Total Coliforms, Viruses.
Hardware/Lumber/Parts Stores	Aluminum (Fume or Dust), Barium, Benzene, Cadmium, Chlorobenzene, Copper, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl)adipate, Di(2-ethylhexyl) phthlate, 1,4-Dichlorobenzene or P-Dichlorobenzene, Ethylbenzene, Lead, Mercury, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Toluene, Xylene (Mixed Isomers)
Historic Waste Dumps/Landfills	Atrazine, Alachlor, Carbofuran, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Diquat, Dalapon, Glyphosate, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Oxamyl (Vydate), Sulfate, Simazine, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene(TCE)
Home Manufacturing	Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, Copper, Carbon Tetrachloride, 1,2-Dichlorobenzene or O-Dichlorobenzene, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, Ethylbenzene, Lead, Mercury, Selenium, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Toluene, Turbidity, Xylene (Mixed Isomers)
Industrial Waste Disposal Wells (see UIC for more information on concerns, and locations)	Acrylamide, Arsenic, Atrazine, Alachlor, Aluminum (Fume or Dust), Ammonia, Barium, Benzene, Cadmium, Carbofuran, Carbon Tetrachloride, Chlorobenzene, Copper, Cyanide, 2,4-D, 1,2-Dibromoethane or Ethylene Dibromide (EDB), 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or p-Dichlorobenzene, 1,1-Dichloroethylene or Vinylidene Chloride, cis 1,2 Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) adipate, Di(2-ethylhexyl) phthlate, 1,2-Dichloroethane or Ethylene Dichloride, Dioxin, Endrin, Epichlorohydrin, Hexachlorobenzene, Hexachlorocyclopentadiene, Lead, Mercury, Methoxychlor, Oxamyl (Vydate), Polychlorinated Biphenyls, Selenium, Styrene, Sulfate, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Junk/Scrap/Salvage Yards	Barium, Benzene, Copper, Dalapon, cis 1,2-Dichloroethylene, Diquat, Glyphosate, Lead, Polychlorinated Biphenyls, Sulfate, Simazine, Trichloroethylene (TCE), Tetrachloroethylene or Perchloroethylene (Perc)
Machine Shops	Arsenic, Aluminum (Fume or Dust), Barium, Benzene, Boric Acid, Cadmium, Chlorobenzene, Copper, Cyanide, Carbon Tetrachloride 2,4-D, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, 1,1-Dichloroethylene or Vinylidene Chloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, Ethylbenzene, Fluoride, Hexachlorobenzene, Lead, Mercury, Polychlorinated Biphenyls, Pentachlorophenol, Selenium, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, 1,1,2-Trichloroethane, Trichloroethylene (TCE), Xylene (Mixed Isomers), Zinc (Fume or Dust)



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Medical/Vet Offices	Arsenic, Acrylamide, Barium, Benzene, Cadmium, Copper, Cyanide, Carbon Tetrachloride, Dichloromethane or Methylene Chloride, 1,2-Dichloroethane or Ethylene Dichloride, Lead, Mercury, Methoxychlor, 1,1,1-Trichloroethane or Methyl Chloroform, Radionuclides, Selenium, Silver, Tetrachloroethylene or Perchloroethylene (Perc), 2,4,5-TP (Silvex), Thallium, Xylene (Mixed Isomers)
Metal Plating/Finishing/Fabricating	Antimony, Aluminum (Fume or Dust), Arsenic, Barium, Benzene, Cadmium, Carbon Tetrachloride, Chlorobenzene, Chromium, Copper, Cyanide, 1,4-Dichlorobenzene or P-Dichlorobenzene, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) adipate, Ethylbenzene, Lead, Mercury, Polychlorinated Biphenyls, Pentachlorophenol, Selenium, Styrene, Sulfate, Tetrachloroethylene or Perchloroethylene (Perc), , Thallium, Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, 1,1,2-Trichloroethane, Trichloroethylene(TCE), Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Military Installations	Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Hexachlorobenzene, Lead, Mercury, Methoxychlor, 1,1,1-Trichloroethane or Methyl Chloroform, Radionuclides, Selenium, Tetrachloroethylene or Perchloroethylene (Perc), , Toluene, Trichloroethylene (TCE)
Mines/Gravel Pits	Lead, Selenium, Sulfate, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Turbidity
Motor Pools	cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride,
Motor Vehicle Waste Disposal Wells (gas stations, repair shops) See UIC for more on concerns for these sources http://www.epa.gov/OGWDW/uic/cv-fs.html	Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, Copper, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, 1,4-Dichlorobenzene or P-Dichlorobenzene, Lead, Fluoride, 1,1,1-Trichloroethane or Methyl Chloroform, Dichloromethane or Methylene Chloride, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE), Xylene (Mixed Isomers)
Office Building/Complex	Barium, Benzene, Cadmium, Copper, 2,4-D, Diazinon, 1,2-Dichlorobenzene or O-Dichlorobenzene, Dichloromethane or Methylene Chloride, Diquat, 1,2-Dichloroethane or Ethylene Dichloride, Ethylbenzene, Glyphosate, Lead, Mercury, Selenium, Simazine, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers)
Photo Processing/Printing	Acrylamide, Aluminum (Fume or Dust), Arsenic, Barium, Benzene, Cadmium, Carbon Tetrachloride, Chlorobenzene, Copper, Cyanide, 1,1-Dichloroethylene or Vinylidene Chloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, 1,2-Dibromoethane or Ethylene Dibromide (EDB), Heptachlor epoxide, Hexachlorobenzene, Lead, Lindane, Mercury, Methoxychlor, Propylene Dichloride or 1,2-Dichloropropane, Selenium, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Toluene, 1,1,2-Trichloroethane, Trichloroethylene(TCE), Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
Synthetic / Plastics Production	Antimony, Arsenic, Barium, Benzene, Cadmium, Carbon Tetrachloride, Chlorobenzene, Copper, Cyanide, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) adipate, Di(2-ethylhexyl) phthlate, Ethylbenzene, Hexachlorobenzene, Lead, Mercury, Methyl Chloroform or 1,1,1-Trichloroethane, Pentachlorophenol, Selenium, Styrene, Tetrachloroethylene or Perchloroethylene (Perk), Toluene,, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers), Zinc (Fume or Dust)
RV/Mini Storage	Arsenic, Barium, Cyanide, 2,4-D, Endrin, Lead, Methoxychlor
Railroad Yards/Maintenance/Fueling Areas	Atrazine, Barium, Benzene, Cadmium, Dalapon, 1,4-Dichlorobenzene or P-Dichlorobenzene, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene,



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	Dichloromethane or Methylene Chloride, Lead, Mercury, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE).
Research Laboratories	Arsenic, Barium, Benzene, Beryllium Powder, Cadmium, Carbon Tetrachloride, Chlorobenzene, Cyanide, 1,2-Dichloroethane or Ethylene Dichloride, 1,1-Dichloroethylene or Vinylidene Chloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Endrin, Lead, Mercury, Polychlorinated Biphenyls, Selenium, Tetrachloroethylene or Perchloroethylene (Perc), Thallium, Thiosulfates, Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers)
Retail Operations	Arsenic, Barium, Benzene, Cadmium, 2,4-D, 1,2-Dichloroethane or Ethylene Dichloride, Lead, Mercury, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), Toluene, 1,1,1-Trichloroethane, Vinyl Chloride
Underground Storage Tanks	Arsenic, Barium, Benzene, Cadmium, 1,4-Dichlorobenzene or P-Dichlorobenzene, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Lead, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE).
Wood Preserving/Treating	cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Lead, Sulfate
Wood/Pulp/Paper Processing	Arsenic, Barium, Benzene, Cadmium, Carbon Tetrachloride, Copper, Dichloromethane or Methylene Chloride, Dioxin, 1,2-Dichloroethane or Ethylene Dichloride, Ethylbenzene, Lead, Mercury, Polychlorinated Biphenyls, Selenium, Styrene, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE), Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, Xylene (Mixed Isomers)
Residential / Municipal	
Airports (Maintenance/Fueling Areas)	Arsenic, Barium, Benzene, Cadmium, Carbon Tetrachloride, cis 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Ethylbenzene, Lead, Mercury, Selenium, Tetrachloroethylene or Perchloroethylene (Perc), 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Xylene (Mixed Isomers)
Apartments and Condominiums	Atrazine, Alachlor, Coliform, Cryptosporidium, Dalapon, Diquat, <i>Giardia Lambia</i> , Glyphosate, Nitrate, Nitrite, Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Camp Grounds/RV Parks	Benomyl, Coliform, Cryptosporidium, Diquat, Dalapon, <i>Giardia Lambia</i> , Glyphosate, Isopropanol, Nitrate, Nitrite, Picloram, Sulfate, Simazine, Turbidity, Vinyl Chloride, Viruses
Cesspools - Large Capacity (see UIC for more information)	Atrazine, Alachlor, Carbofuran, Coliform, Cryptosporidium, Diquat, Dalapon, <i>Giardia Lambia</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Drinking Water Treatment Facilities	Atrazine, Benzene, Cadmium, Cyanide, Fluoride, Lead, Polychlorinated Biphenyls, Toluene, Total Trihalomethanes, 1,1,1-Trichloroethane or Methyl Chloroform
Gas Pipelines	cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene or TCE
Golf Courses and Urban Parks	Arsenic, Atrazine, Benzene, Chlorobenzene, Carbofuran, 2,4-D, Diquat, Dalapon, Glyphosate, Lead, Methoxychlor, Nitrate, Nitrite, Picloram, Simazine, Turbidity
Housing developments	Atrazine, Alachlor, Coliform, Cryptosporidium, Carbofuran, Diquat, Dalapon, <i>Giardia Lambia</i> , Glyphosate, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Picloram, Simazine, Trichloroethylene (TCE), Turbidity, Vinyl Chloride, Viruses
Landfills/Dumps	Arsenic, Atrazine, Alachlor, Barium, Benzene, Cadmium, Carbofuran, cis 1,2-Dichloroethylene, Diquat, Glyphosate, Lead, Lindane, Mercury, 1,1,1-Trichloroethane or Methyl Chloroform, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Picloram, Selenium, Simazine, Trichloroethylene (TCE)
Public Buildings (e.g., schools, town halls, fire stations, police stations) and Civic Organizations	Arsenic, Acrylamide, Barium, Benzene, Beryllium Powder, Cadmium, Carbon Tetrachloride, Chlorobenzene, Cyanide, 2,4-D, 1,2-Dichlorobenzene or O-Dichlorobenzene, 1,4-Dichlorobenzene or P-Dichlorobenzene, Dichloromethane or Methylene Chloride, Di(2-ethylhexyl) phthlate, 1,2-Dichloroethane or Ethylene Dichloride, Endothall, Endrin, 1,2-Dibromoethane or Ethylene Dibromide (EDB), Lead, Lindane, Mercury, Methoxychlor, Selenium, Toluene, 1,1,1-Trichloroethane or Methyl Chloroform, Trichloroethylene (TCE), Vinyl Chloride, Xylene (Mixed Isomers)



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Septic Systems	Atrazine, Alachlor, Carbofuran, Coliform, Cryptosporidium, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Sewer Lines	Coliform, Cryptosporidium, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Stormwater infiltration basins/injection into wells (UIC Class V), runoff zones	Atrazine, Alachlor, Coliform, Cryptosporidium, Carbofuran, Chlorine, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Nitrosamine, Oxamyl (Vydate), Phosphates, Picloram, Simazine, Trichloroethylene(TCE), Turbidity, Vinyl Chloride, Viruses
Transportation Corridors (e.g., Roads, railroads)	Dalapon, Picloram, Simazine, Sodium, Sodium Chloride, Turbidity
Utility Stations	Arsenic, Barium, Benzene, Cadmium, Chlorobenzene, Cyanide, 2,4-D, 1,4-Dichlorobenzene or P-Dichlorobenzene, 1,2-Dichloroethane or Ethylene Dichloride, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Lead, Mercury, Picloram, Toluene, 1,1,2,2- Tetrachloroethane, Tetrachloroethylene or Perchloroethylene (Perc), Trichloroethylene (TCE), Xylene (Mixed Isomers)
Waste Transfer /Recycling	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate, Nitrite, Vinyl Chloride, Viruses
Wastewater Treatment Facilities/Discharge locations (incl. land disposal and underground injection of sludge)	Cadmium, Coliform, Cryptosporidium, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Dichloromethane or Methylene Chloride, Fluoride, <i>Giardia Lambda</i> , Lead, Mercury, Nitrate, Nitrite, Tetrachloroethylene or Perchloroethylene (Perc) Selenium, sulfate, Trichloroethylene (TCE), Vinyl Chloride, Viruses
Agricultural / Rural	
Auction Lots/Boarding Stables	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate, Nitrite, Sulfate, Viruses
Animal Feeding Operations/ Confined Animal Feeding Operations	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate, Nitrite, Sulfate, Turbidity, Viruses
Bird Rookeries/Wildlife feeding /migration zones	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate , Nitrite , Sulfate, Turbidity, Viruses
Crops - Irrigated + Non-irrigated	Benzene, 2,4-D, Dalapon, Dinoseb, Diquat, Glyphosate, Lindane, Lead, Nitrate, Nitrite , Picloram, Simazine, Turbidity
Dairy operations	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate , Nitrite, Sulfate, Turbidity, Viruses
Drainage Wells, Lagoons and Liquid Waste Disposal - Agricultural	Atrazine, Alachlor, Coliform, Cryptosporidium, Carbofuran, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Managed Forests/Grass Lands	Atrazine, Diquat, Glyphosate, Picloram, Simazine, Turbidity
Pesticide/Fertilizer Storage Facilities	Atrazine, Alachlor, Carbofuran, Chlordane, 2,4-D, Diquat, Dalapon, 1,2-Dibromo-3-Chloropropane or DBCP, Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Simazine, 2,4,5-TP (Silvex)
Rangeland/Grazing lands	Coliform, Cryptosporidium, <i>Giardia Lambda</i> , Nitrate, Nitrite, Sulfate, Turbidity, Viruses
Residential Wastewater lagoons	Atrazine, Alachlor, Carbofuran, Coliform, Cryptosporidium, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
Rural Homesteads	Atrazine, Alachlor, Carbofuran, Coliform, Cryptosporidium, cis 1,2-Dichloroethylene, trans 1,2-Dichloroethylene, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Sulfate, Simazine, Vinyl Chloride, Viruses
MISCELLANEOUS SOURCES	
Abandoned drinking water wells (conduits for contamination)	Atrazine, Alachlor, Coliform, Cryptosporidium, Carbofuran, Diquat, Dalapon, <i>Giardia Lambda</i> , Glyphosate, Dichloromethane or Methylene Chloride, Nitrate, Nitrite, Oxamyl (Vydate), Picloram, Simazine, Trichloroethylene (TCE), Turbidity, Vinyl Chloride, Viruses
Naturally Occurring	Arsenic, Asbestos, Barium, Cadmium, Chromium, Coliform, Copper, Cryptosporidium, Fluoride, <i>Giardia Lambda</i> , Iron, Lead, Manganese, Mercury, Nitrate, Nitrite, Radionuclides, Selenium, Silver, Sulfate, Viruses, Zinc (Fume or Dust)



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Underground Injection Control (UIC) Wells CLASS I - deep injection of hazardous and non-hazardous wastes into aquifers separated from underground sources of drinking water	see UIC
UIC Wells CLASS II deep injection wells of fluids associated with oil/gas production (for more detailed list of sites click here)	see UIC
UIC Wells CLASS III re-injection of water/steam into mineral formations for mineral extraction	see UIC
UIC Wells CLASS IV - officially banned. Inject hazardous or radioactive waste into or above underground sources of drinking water	see UIC



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Appendix G. Consumer Confidence Report for the Forsyth County Water & Sewer Department

<https://www.forsythco.com/Portals/0/Documents/WaterDept/Water%20Quality%20Reports/2019%20Water%20Quality%20Report.pdf?timestamp=1575298467819>