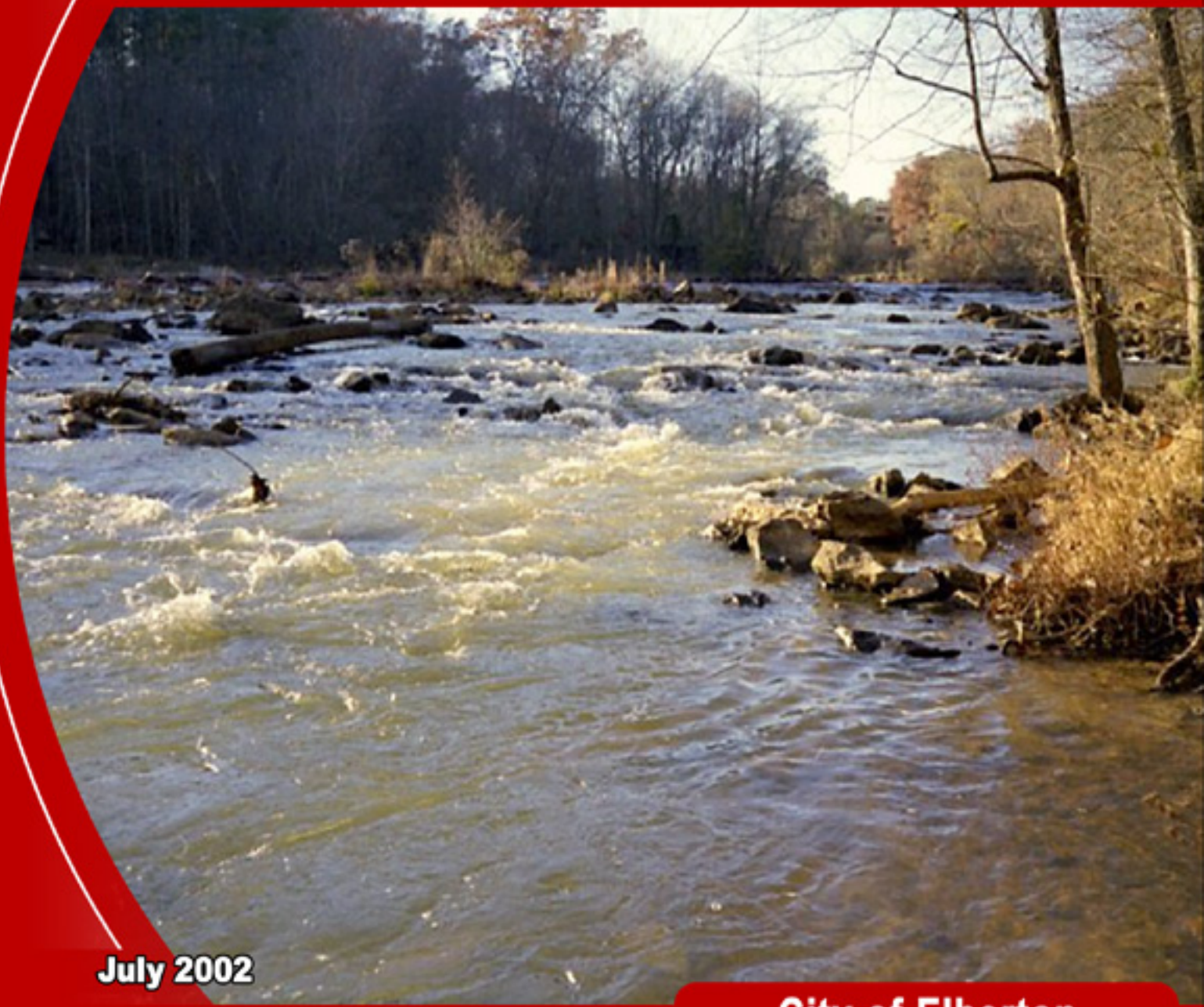
# Northeast Georgia Source Water Assessment Project



July 2002

City of Elberton

BROWN AND CALDWELL

NorthEast Georgia Regional Development Center



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## Special Thanks

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# SECTION 1 – EXECUTIVE SUMMARY

Georgia's Source Water Assessment Program is aimed at protecting public drinking water supplies at their source – rivers, lakes, streams – all across Georgia. Source Water Assessment Plans (SWAPs) are being conducted throughout the state and must be completed by May 6, 2003. The requirements for completing SWAPs for public drinking water sources come from the 1996 Amendments to the Federal Safe Drinking Water Act. The statute requires that states submit an Implementation Plan to the U.S. Environmental Protection Agency (USEPA) for conducting the assessments. Georgia submitted such a plan on January 29, 1999, which became effective on May 1, 2000. The plans are intended to identify potential sources of pollution within a drinking water supply watershed (all the land area that drains to a particular drinking water intake) and assess the overall susceptibility of the water supply based on the sources identified upstream. By understanding where the potential pollutant sources are located, source water protection plans (SWPPs) can be developed to effectively protect public water supplies from contamination of upstream sources (i.e., urban and agricultural run-off, accidental spills and releases from businesses, direct discharges to waterways, etc.).

This source water assessment is prepared for the City of Elberton's Beaverdam Creek and Lake Russell intakes, in accordance with Georgia's Source Water Assessment and Protection Implementation Plan for Public Drinking Water Sources, effective May 1, 2000. This assessment is part of a larger effort called the Northeast Georgia SWAP project that encompasses 20 public drinking water intakes in the Northeast Georgia region. To obtain a copy of any of the SWAP reports from this project, please contact Joe Tichy at the Northeast Georgia RDC (706) 369-5650 or visit the project website at www.negrdc.org then click on "Departments", "Water Planning", and "SWAP".

## Sampling Results

As part of the SWAP, EPD established a pilot program to collect and analyze raw water samples at each of the drinking water supplies for *Cryptosporidium* and *Giardia*. These disease-causing microorganisms can exist in the intestines of mammals and be difficult to remove from raw water using traditional water treatment techniques, since they are resistant to chlorine. During the six-month sampling program from July to December 2001, no *Cryptosporidium* oocysts were found in Elberton's raw water supply. *Giardia* cysts were identified at low levels in the December 2001 sample (0.4 organisms per liter), but there were no other detections during the rest of the sampling.

## Susceptibility Ranking

Based on the data gathered and analysis completed, the overall susceptibility score for Elberton's water supply is **LOW**. The assessment identified a total of 125 potential point and non-point pollutant sources within the City's two water supply watersheds. Many of the pollutant sources in the watersheds were related to granite mining practices, but most of these practices ranked as a low priority potential pollution source. Based on the analysis, it was determined that the highest priority pollutant sources in these watersheds are:



- Sites listed on the Hazardous Sites Inventory
- Landfill
- Wastewater treatment plants
- Railroad and Pipeline crossings

## Conclusions

Because the Lake Russell water supply watershed covers a large area, working with other municipalities to ensure a safe drinking water source will be important for the City of Elberton. There are several stream crossings near the city's intake. Therefore, prevention and notification are critical to protecting the community's water supply. The source water assessment is only the first phase; protection is the ultimate goal and outcome from this project. Specific protection efforts for the Lake Russell and Beaverdam Creek watersheds may include:

- Presenting SWAP results to local community groups, emphasizing the need to protect the water quality within the water supply watershed,
- Distributing flyers to businesses, especially the railroads and pipeline companies, in the drinking water supply watershed with a map of the watershed and information about who to contact in case of a spill,
- Verifying businesses in the watershed have secondary containment and up-to-date spill prevention and emergency response plans in place,
- Managing the types of growth and new development that occurs within the watershed,
- Working with local farmers, the Natural Resource Conservation Service, and Farm Bureau representatives to ensure that stream buffers and agricultural best practices are being followed,
- Developing a emergency response plan for handling an accident with a spill along the railroads, pipelines, Parkers Ferry Road, Old Don Tucker Cemetery Road, State Route 72 and 77, and
- Developing a water protection plan with cooperation from the county.

To this point, there has been limited growth and development in the Lake Russell and Beaverdam Creek watersheds. In order to continue to ensure a safe, reliable drinking water supply, efforts must be made to protect the water supply watersheds. As Elberton and the surrounding area continue to grow, this will become an increasing challenge. Roadway or railroad expansion or new road construction through the area will need to be planned, managed, and well routed to keep from posing significant risk to the watershed. In addition, extra measures, such as reducing speed or installing containment barriers, are recommended on railroad crossing located in close proximity to the drinking water supply intakes. These measures will help to minimize the impact a spill or accident along the railroad line would have on the drinking water supply of the City of Elberton.



# SECTION 2 – PROJECT OVERVIEW

This section presents an overview of the Northeast Georgia Source Water Assessment Plan (SWAP) project, including background information on the project, relevant regulatory requirements related to source water assessments, the methodology used to conduct the study, and assumptions made during the evaluation.

## Project Background

### Northeast Georgia Region

The Northeast Georgia Regional Development Center (NEGRDC) is a state-funded resource center for local governments in the Northeast Georgia region. The region comprises twelve counties (Barrow, Clarke, Elbert, Greene, Jackson, Jasper, Madison, Morgan, Newton, Oconee, Oglethorpe, and Walton) and 54 municipal governments. The Northeast Georgia service area encompasses approximately 3,260 square miles in the Piedmont physiographic region of northern Georgia, with an estimated population of 438,300. Most of the area is rural, with population densities as low as 26 persons per square mile. The central metropolitan area, Athens-Clarke County, is quite different from the rest of the area and has a density of approximately 750 persons per square mile. However, many of the other counties, notably Jackson, Barrow, Walton, Oconee, and Newton, are rapidly developing as urbanized areas.

Most of the region is drained by three river systems. The Savannah River and its tributary, the Broad River, drain most of Elbert, Madison, and Oglethorpe counties. The Oconee River drains the central portion, including all or most of Barrow, Clarke, Greene, Jackson, Jasper, Morgan, Oconee, and Walton counties. Finally, portions of Walton, Newton, and Jasper counties are drained by the Alcovy River (a tributary of the Ocmulgee River) and tributaries of the Yellow River. The public water system intakes along the Alcovy River in the Northeast Georgia region were assessed as part of the Alcovy River Watershed Protection Project. For more information about this project, please visit the NEGRDC website, www.negrdc.org, then click on “Departments”, “Water Planning”, and “SWAP”.

### Study Area

The study area for this project includes the water supply watershed areas for 12 public water supply systems in the Northeast Georgia region, which utilize surface water as their drinking water source. Figure 2.1 shows an overview of the entire study area for the SWAP project. It should be noted that even though the NEGRDC service area incorporates 12 counties, the project study area incorporates portions of 14 counties. The study area was based on delineations of water supply watersheds, not political boundaries.

Table 2.1 indicates the 12 systems included in the study, along with their water system identification number and the number of intakes each maintains. There are a total of 20 intakes included in the



study. Ten of the intakes are in the Upper Oconee River Basin, and their watersheds overlap substantially. The remaining ten are scattered throughout the rest of the region.

**Table 2.1. Northeast Georgia SWAP Public Water Systems**

| Participating Water System Name | WSID # | No. of intakes | Intake Names |
|---|---|---|---|
| *Upper Oconee River Basin region* | | | |
| Athens-Clarke Co. | 0590000 | 3 | Middle Oconee River<br>North Oconee River<br>Sandy Creek |
| Jefferson, City of | 1570003 | 1 | Curry Creek |
| Statham, City of | 0130001 | 1 | Barber Creek |
| Upper Oconee Basin | 1570121 | 2 | Bear Creek<br>Middle Oconee River |
| Winder, City of | 0130002 | 3 | Cedar Creek<br>Marburg Creek<br>Mulberry River |
| *Remainder of the Region* | | | |
| Crawford, City of | 2210000 | 1 | Long Creek |
| Elberton, City of | 1050001 | 2 | Beaverdam Creek<br>Lake Russell |
| Greensboro, City of | 1330000 | 1 | Lake Oconee |
| Madison, City of | 2110002 | 1 | Hard Labor Creek<br>Lake Oconee/Apalachee River |
| Monroe Water Light & Gas | 2970001 | 1 | Jacks Creek |
| Monticello, City of | 1590000 | 2 | Lowry Branch<br>Popes Branch |
| Union Point, City of | 1330002 | 1 | Sherrills Creek |



There are five additional intakes in the Northeast Georgia region that were not included in this project because they were assessed as part of separate studies. In addition, only existing intakes were evaluated in this study. A few of the public water systems are in various stages of getting new water withdrawal permits, but these new intakes were not covered under this project.

## Regulatory Requirements

The 1996 Amendments to the Safe Drinking Water Act (SDWA) require states to perform source water assessments for all water supply watersheds within the state's boundaries. The goal of the Act is the development and implementation of prevention and protection strategies to address those potential threats to the water supply system identified through the assessment process. This law represents a movement towards a more preventive approach of avoiding contamination of public water supply systems.

The statute requires that states submit an Implementation Plan to the U.S. Environmental Protection Agency (USEPA) for conducting the assessments. Georgia submitted such a plan to the EPA on January 29, 1999. The plan was approved on April 24, 2000, and became effective on May 1, 2000. The SWAP project for the NEGRDC has been conducted in accordance with Georgia's approved Plan.

The new SDWA requirements apply to public water systems that get their water from surface water supplies, such as lakes, rivers, or streams. Surface water systems that supply water to at least 50,000 people are given the primary responsibility for developing and implementing an assessment and protection plan for their system. However, these systems may make requests to the State of Georgia's Environmental Protection Division (EPD) for technical assistance and funding. EPD has primary responsibility for conducting assessments for all surface water systems supplying water to less than 50,000 people. To accomplish this, EPD has generally funded projects through the Regional Development Centers (RDCs) in local communities. This is why the NEGRDC is managing the development of SWAPs for the surface water intakes in the Upper Oconee River Basin and Northeast Georgia region.

## Source Water Assessment Plan Methodology

This section summarizes the assessment methodology used for each of the 20 water supply intakes in the study. The SWAP was conducted following the guidelines outlined in Georgia's Source Water Assessment and Implementation Plan, effective May 1, 2000.

### Assessment Area

Under the Source Water Assessment Plan, the entire watershed that drains to the drinking water intake is within the assessment area; however, the USEPA has given the states flexibility to identify and assess smaller areas or segments of the watershed for a cost and time-effective analysis. Georgia's Plan is based on assessment distances defined in the EPD Rules of Environmental Planning Criteria, as part of the Georgia Planning Act of 1989. The plan identifies three assessment zones within the water supply watershed upstream from a given drinking water intake:



- The inner management zone (IMZ) – within a 7-mile radius above the intake,
- The outer management zone (OMZ) – radius between 7 and 20 miles of the intake, and
- The non-management zone (NMZ) – remainder of watershed above the OMZ.

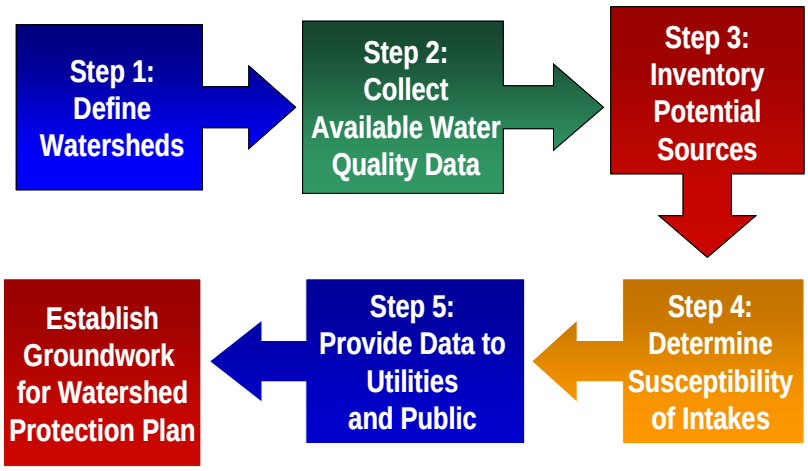
Since the risk to the water supply decreases the further from the intake a contaminant source is, fewer potential sources are identified and evaluated in the OMZ and, especially the NMZ, than in the IMZ.

## Assessment Requirements

SWAPs are conducted in a systematic, phased approach for each of the surface water intakes. Each assessment must include a delineation of the drinking water supply watershed, collection of water quality data, an inventory of potential pollution and contaminant sources, a determination of the susceptibility of the drinking water source to potential contamination, and a final report. The information from the assessment may be used for developing source water protection plans as part of local comprehensive planning efforts.

### Watershed Delineation

Each assessment must include a delineation of the drinking water supply watershed that drains to the intake location. Topography, hydrology, and placement of roads help to determine the water supply watershed delineations. The delineation draws a boundary around the area that can impact the quality of the source water. Activities within the delineated area can impact the water supply intake. For instance, certain business practices, land use activities, accidental spills, and stormwater run-off from the delineated area have the potential to flow downstream and impact the water supply.




### Water Quality Data Review

Evaluating the numerous sources of available data in the region is important to understand the water quality concerns within each water supply watershed. As part of the source water assessment, water quality data were gathered from many different sources, including the Agricultural Research Service, United States Geological Survey (USGS), US EPA STORET and BASINS databases, EPD's 305(b) and 303(d) lists of impaired waters, Upper Oconee Watershed Network, and local public utilities. A full summary of the data sources reviewed is provided in Appendix A. In addition, information from water supply watershed protection ordinances and wetlands protection plans that utilities had developed were also reviewed.



In addition to gathering existing water quality data, the only new data that were collected for this study were for *Cryptosporidium* and *Giardia*. *Giardia* and *Cryptosporidium* have been identified as leading causes of waterborne diseases in the United States. As part of the SWAP, each public water system was required to collect samples at each drinking water supply intake for six months from July to December of 2001. The samples were collected from the source prior to any chemical additions and then shipped to EPD's laboratory in downtown Atlanta for analysis. All samples were analyzed by the EPD using USEPA Method 1623 to determine the presence or absence of *Giardia* cysts and *Cryptosporidium* oocysts. All 20 intakes were sampled for these microorganisms as part of this study, except for the three Athens-Clarke County intakes, which were sampled as part of a previous pilot study performed by Athens-Clarke County to determine the levels of these micro-organisms from 1999-2001. The samples collected by Athens-Clarke County were analyzed by Environmental Associates, Ltd. in Ithaca, New York.

Potential Pollutant Source Inventory

An inventory of potential point (direct discharges to a water body) and non-point (indirect runoff to a water body) pollution and contaminant sources within a water supply watershed is compiled and classified according to SWAP categories. A list of potential pollution sources that must be evaluated in each of the 3 management zones, according to EPD guidance, is included in Table 2.2. As seen in the table, a more rigorous evaluation of sources is conducted in the IMZ and OMZ, than the NMZ. This is simply due to the distance the NMZ is from the intake – greater than 20 miles upstream.

**Table 2.2. Potential Pollution Sources for Surface Water**

| IMZ (7-Mile Radius) | OMZ (20-Mile Radius) | NMZ (Non-Management Zone) |
|---|---|---|
| • Agricultural Waste Lagoons | • Agricultural Waste Lagoons | Reference by River Basin Management Plan: |
| • Airports | | |
| • Confined Animal Feedlot | | |
| • Garbage Transfer Stations | | |
| • Hazardous Waste Facilities | • Hazardous Waste Facilities | |
| • LAS Permit Holders | • LAS Permit Holders | • LAS Permit Holders |
| • Landfills | • Landfills | • Landfills |
| • Large Industries which utilize hazardous chemicals | • Large Industries which utilize hazardous chemicals | |
| • Large Industries which have bulk chemical and petroleum storage | • Large Industries which have bulk chemical and petroleum storage | |
| • Large Industries which have federal categorical standards | • Large Industries which have federal categorical standards | |
| • Large Quantity Generators | | |



| IMZ (7-Mile Radius) | OMZ (20-Mile Radius) | NMZ (Non-Management Zone) |
|---|---|---|
| • Lift Stations | • Lift Stations | |
| • Marinas | | |
| • Military Bases | | |
| • Mining | • Mining | • Mining |
| • NPDES Permit Holders | • NPDES Permit Holders | • NPDES Permit Holders |
| • Non-sewer areas | | |
| • Oil Pipelines | • Oil Pipelines | |
| • Power Plants | • Power Plants | |
| • Railways adjacent to or crossings over streams | • Railways adjacent to or crossings over streams | |
| • Roads adjacent to or bridges crossing over streams | • Roads adjacent to or bridges crossing over streams | |
| • Sewer Pipelines adjacent to or crossing streams | • Sewer Pipelines adjacent to or crossing streams | |
| • Sewer Areas | | |
| • Wastewater Plants | • Wastewater Plants | |
| • Water Plants | • Water Plants | |

Potential pollutant and contaminant source data are obtained and crosschecked against other resources to verify that data are as current as possible and relevant to the source water assessment. The inventory of contaminant sources is conducted by individual intake, based on the watershed delineation already completed. It is important to note that including businesses or other activities in this list does not necessarily indicate that a problem exists or that contamination is occurring from the site. The inventory merely identifies those sources of "potential" pollution.

Locations for potential pollution and contaminant sources were obtained using the Georgia GIS Clearinghouse (http://gis.state.ga.us/Clearinghouse/clearinghouse.html). These data included sites from the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Industrial Facility Discharge (IFD), Toxic Release Inventory (TRI), Hazardous Site Inventory (HSI), and National Pollution Discharge Elimination System (NPDES). Color infrared aerial photographs from the USGS from 1999 and 2000 were used to identify agricultural waste lagoons and confined animal feedlots. In addition to the Georgia GIS Clearinghouse, the following agencies or agency websites were used to identify potential point sources:

- EPA EnviroFacts database (http://www.epa.gov/enviro/index_java.html)
- EPD data sources (http://www.ganet.org/dnr/environ/)
- Local municipalities and utilities
- Natural Resource Conservation Service in Watkinsville, Georgia



- EPD – Northeast Georgia Department in Athens
- Elberton Granite Association (http://www.egaonline.com/members.htm)

A complete list of pollutant inventory data sources used in this project is outlined in Appendix B. Businesses or facilities no longer in existence or operation or those that have moved out of the study area were eliminated from the contaminant inventory.

For non-point sources, land use or land cover was used to help assess non-point source influences to water quality in water supply watersheds. Land use data, collected from each county's community plan and compiled by the NEGRDC, were dated from 1992 to 2001, depending on the area covered. According to EPD's guidance document, four categories of non-point source runoff were considered for the assessment – Agriculture, Forestry, Urban, and Non-Sewer (areas served by septic tanks). Sewer Areas were assessed together with Urban Areas due to the overlap of these two categories within the study area.

Even though these data were the most current land use available for the assessment, it was problematic since agriculture and forestry were grouped together as one classification. Land use and land cover data from EPA GIRAS (c. 1978) were used to distinguish between the agriculture and forestry practices in the more current land use coverages.

Susceptibility Analysis

After the pollutant source inventory had been completed for each intake, a determination of how prone the drinking water source was to potential contamination from each of the point and non-point sources was determined. This step is called the susceptibility analysis and is based on the potential for contaminants to be released into the environment, as well as the associated risk to the drinking water supplies. Determining the susceptibility of drinking water supplies to potential contaminants is done by using the methods established by EPD. A qualitative measure (high, medium, low) is used to rank both the likelihood of a release of a contaminant to a surface water (the release potential) and the risk of that contaminant to the drinking water supply intake (the risk potential).

*Point Sources.* Potential pollutant point sources can include agricultural waste lagoons, confined animal feedlot operations, industries and businesses that generate hazardous wastes or store chemicals on site, NPDES permit holders, land application systems, mining operations, pump stations, airports, landfills, garbage transfer stations, wastewater and water treatment plants, power plants, marinas, military bases, and stream crossings by roads, railroads, and pipelines. Factors that impact the likelihood of a release for point sources include distance from surface water, volume of release, duration of release, and topography or ease of transport. Risk factors for point sources include distance to surface water intake and toxicity.

Geographic information system (GIS) technology was used to calculate the distance from surface water intake, distance from surface water and topography/ease of transport for each potential pollutant source. Specifically, Digital Raster Graphic (DRG) technology was used to determine the topography or slope of the watershed. Toxicity and volume of release were based on facility-specific



information of what and how much of different chemicals, petroleum products, and other substances were stored on-site. This information was obtained through the EPA Envirofacts Database, SARA Title III Tier II reports, facility surveys and interviews with company representatives, best professional knowledge and judgment, as well as information from local utility staff. The volume of release was based on past releases from individual facilities, as well as the potential for future or ongoing releases to the surface waters (i.e., catastrophic event or regulated NPDES discharges). The existence of spill prevention plans, containment or control measures, high level alarms, and emergency spill response plans for individual facilities were accounted for and helped to lower the volume and duration of release rankings that were assigned. Table 2.3 shows the EPD guidance for ranking each of the risk and release factors described above.

**Table 2.3. EPD Guidance for Ranking Potential Pollutant Sources**

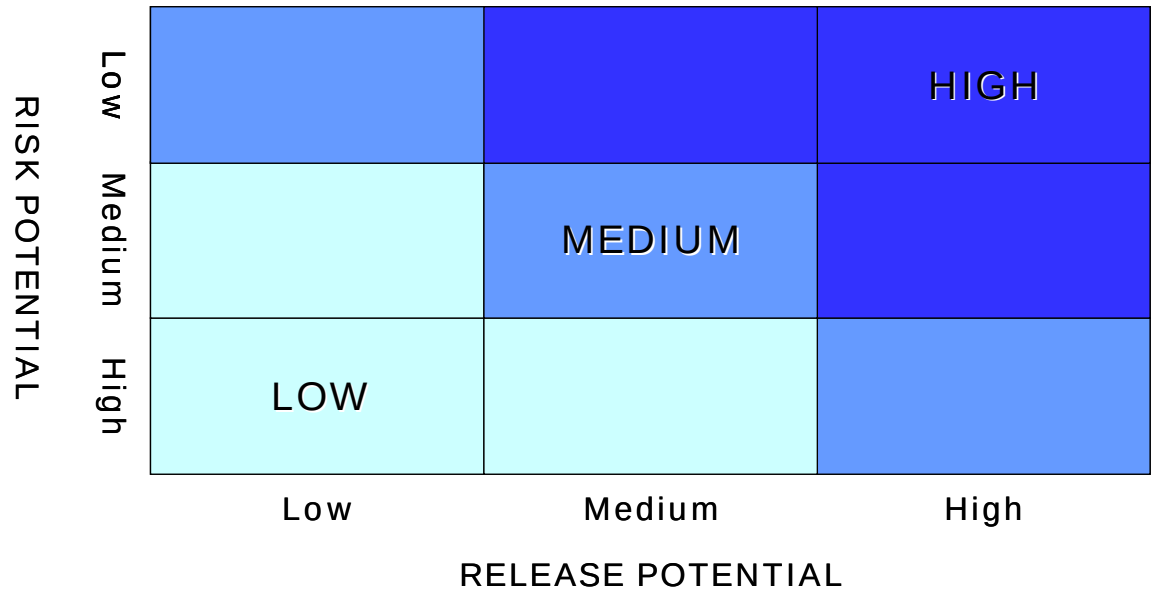
| Ranking Factors | Ranking Criteria |
|---|---|
| **Release Factors** | |
| Distance from surface water | High = within 500 feet<br>Low = further than 500 feet |
| Volume of release | High = greater than 10,000 gallons<br>Medium = between 1,000 and 10,000 gallons<br>Low = less than 1,000 gallons |
| Duration of release | High = ongoing unpermitted releases, high likelihood of catastrophic event<br>Medium = ongoing permitted releases, chronic small events, likelihood of continued releases<br>Low = little likelihood of a release, no reported releases |
| Topography / Ease of Travel | High = hilly topography, overland flow very likely<br>Medium = moderate topography, overland flow likely<br>Low = flat topography, overland flow not likely |
| **Risk Factors** | |
| Distance from surface water intake | High = within 7 miles upstream<br>Medium = between 7 and 15 miles upstream<br>Low = more than 15 miles upstream |
| Toxicity | High = acute, pathogens<br>Medium = chronic, chemicals<br>Low = secondary, taste, odor |



For regulated point sources, EPD provides supplemental guidance that may be incorporated into the risk and release potential rankings. Supplemental guidance is provided for landfills and dumps; hazardous waste large quantity generators, treatment storage or disposal (TSD) facilities, and Superfund sites; and NPDES and land application system (LAS) permit holders. After each ranking factor is given a ranking of high, medium, or low, and the supplemental guidance is factored in for certain facilities, the rankings are averaged together to give an overall Release Potential ranking and an overall Risk Potential ranking for each potential pollutant source.

*Non-Point Sources.* The susceptibility analysis was also performed for four non-point source categories based on the density of specific land use and land cover within each of the management zones for the water supply intakes. The four categories evaluated were Agriculture, Forestry, Urban, and Non-Sewer or Septic. For the Agriculture, Forestry and Urban non-point source categories, EPD provides supplemental guidance to rank potential contaminants. For non-point evaluation, the release potential criteria include density of an activity in the watershed, existence or evidence of Best Management Practices, buffer zones, and topography. Risk factors include proximity to water, volume of release, and toxicity.

*Overall Susceptibility Ranking.* Once the individual sources are ranked, the sources are charted on a matrix, as shown on the schematic below, based on their release and risk potential. The matrix is based on the EPD guidance document and provides a visual summary of the sources in the watershed that provide the highest concern regarding the contamination susceptibility of the intake. Sources that rank in the top-right corner of the matrix indicate a high priority of concern, those that rank down the diagonal middle of the matrix indicate a medium priority of concern, and the sources that rank in the bottom-left part of the matrix pose a low priority of concern for the intake.





After plotting all of the potential point and non-point pollutant sources for one water supply watershed on the matrix above, the overall susceptibility of the intake can be determined. The basic guidelines to make this determination are shown in Table 2.4 and are based on EPD guidance.

**Table 2.4. Guidelines for Determining Overall Susceptibility**

| Breakdown of Sources in Matrix | Susceptibility Ranking for Watershed |
|---|---|
| 50 percent or more of the sources plot in the low priority area of the matrix | Low Susceptibility |
| 50 percent or more of the sources plot in the medium priority area of the matrix | Medium Susceptibility |
| 40 percent or more of the sources plot in the high priority area of the matrix | High Susceptibility |

If the breakdown of priority sources does not meet one of the requirements in Table 2.4, then the watershed is ranked based on where the average would be located. In other words, if one third of the potential sources fell in each of the categories, the ranking would be medium since the average of one high, one low, and one medium number would result in a medium average.

Reporting and Public Involvement

The SWAP for each of the public water systems included in this study will be made available to the population served by the public water system at the State of Georgia's Environmental Protection Division (GA EPD) office in Atlanta, the public works offices for each public water system, and the NEGRDC's office in Athens. A summary of the findings from the SWAP report for each of the public water systems, including the overall susceptibility determination, will be made available in their annual Consumer Confidence Report.

One goal of the SWAP is to educate residents in the assessment area about potential impacts to source water quality and to provide opportunities for meaningful input into the recommendations being considered for inclusion in the protection plan. Results of the SWAP are being made available to residents served by the public water system so that informed decisions can be made about the appropriate source water protection measures for each community. In an effort to reach as many interested citizens and organizations as possible, the public involvement effort associated with this project has been comprehensive. The effort has included task force meetings, stakeholder identification, public meetings, a Speakers Bureau, a website, and a Regional Leaders Water Quality Workshop. A brief overview of the components of the public involvement plan is provided below.

*Task Force Meetings.* A Task Force has been developed to provide direction to the Northeast Georgia SWAP and make decisions on critical issues. The Task Force includes representatives from the



counties and public water systems participating in the assessment, as well as interested stakeholders throughout the region. A preliminary kick-off meeting was held with the entire regional SWAP Task Force to discuss the goals and objectives of the project. In addition to this meeting, two sets of meetings were held throughout the SWAP region with interested residents and others. The timing of the meetings coincided with completion of the potential contaminant inventory and mapping, and with the results of the susceptibility analysis. A summary of each set of meetings is included below:

- The first round of task force and stakeholder meetings for the Northeast Georgia SWAP was held from November 12-14, 2001, throughout Northeast Georgia. The objectives of the meetings were to provide communities with background information on what a SWAP is, the steps involved, and the status of the current SWAP being conducted in Northeast Georgia. The meetings provided communities with all of the data that had been collected for the Northeast Georgia SWAP including existing water quality data, results from Cryptosporidium and Giardia sampling, and a list of potential pollution sources within the drinking water supply watersheds. Community members were encouraged to give their input on any data that had not been included in the water quality packets, as well as to report any potential pollution sources that should be either added or removed from the current list of potential sources.
- The second round of task force and stakeholder meetings was held from March 6-7, 2002. The objectives of the meetings were to update communities on the status of the SWAP since the last set of meetings, and provide information on the susceptibility analysis for each water supply intake. The meetings focused on reviewing the draft susceptibility tables that had been developed and receiving input on these. These tables listed the potential pollution sources for each intake and summarized the information that was used to rank each source's susceptibility of polluting or impacting the water supply. In addition, the ranking given to the non-point sources of pollution (run-off urban, agricultural, forestry, and non-sewered areas) was also reviewed by the task force members and stakeholders.

Table 2.5 summarizes the meetings held and the public entities that were represented.

*Identifying Key Stakeholders.* To ensure productive public involvement, it was necessary to actively identify key local and regional stakeholders through research, interviews, and Task Force team referrals. The objectives of stakeholder interaction included determining common concerns regarding source water protection and allowing for efficient information transfer between the different entities. Stakeholders identified and invited to participate in the study include the Upper Oconee Basin Water Authority, water treatment plant representatives, the Upper Oconee Watershed Network, the Farm Bureau Association, Concerned Citizens of Madison-Morgan County, local chamber of commerce representatives, Natural Resources Conservation Service, and the Elberton Granite Association. A project stakeholder database was established and updated throughout the project. This database was a critical tool in maintaining communication with interested parties throughout the project. Stakeholder groups were invited to the Public Meetings in the Upper Oconee region and to Task Force meetings in the remainder of the region.

**Table 2.5. Northeast Georgia SWAP Task Force Meetings**

| Water Systems Invited | Entities Represented | Attendance |
|---|---|---|
| **First Round of Task Force Meetings** | | |
| *November 12, 2001*<br>Greensboro/Union Point/Crawford | Greene County Commissioners, City of Greensboro, City of Greensboro Water Department, City of Union Point Water Department, City of Union Point, Georgia Power, Oglethorpe County Code Enforcement Department, City of Crawford Water Department | 13 |
| Monticello | Jasper County Water and Sewer, Jasper County Development Authority, Jasper County Cooperative Extension Service, City of Monticello Water Department, City of Monticello | 6 |
| *November 13, 2001*<br>Upper Oconee Basin | Barrow County Planning and Development, State of Georgia Environmental Protection Division, Oconee County Public Works, Athens-Clarke County Public Utility Supply Department, Jackson County Planning and Development, City of Jefferson Water Department, and Gwinnett County Department of Public Utilities | 8 |
| Elberton | Elbert County Chamber of Commerce, City of Elberton Water Department, and Hart County Public Works | 5 |
| *November 14, 2001*<br>Monroe | Walton County Adopt-A-Stream, Keep Walton Beautiful, Walton County Planning and Development, City of Monroe Code Enforcement, Monroe Utility Network, and Natural Resources Conservation Service (NRCS) | 7 |
| Madison | City of Rutledge, Morgan County Planning Department, Morgan County Building and Zoning Department, Morgan County Cooperative Extension Service, and City of Madison | 5 |



| Water Systems Invited | Entities Represented | Attendance |
|---|---|---|
| **Second Round of Task Force Meetings** | | |
| *March 6, 2002* | | |
| Greensboro/Union Point/Crawford | City of Greensboro, City of Union Point, Greene County Environmental Health and Safety, Greene County Board of Commissioners, Greene County Code Enforcement, EPD Source Water Assessment Group | 6 |
| Madison/Monroe/ Monticello | City of Rutledge, Morgan County Board of Commissioners, Morgan County Planning Department, Morgan County Building and Zoning Department, Natural Resources Conservation Service (NRCS), private citizens | 7 |
| *March 7, 2002* | | |
| Upper Oconee Basin | City of Winder, Barrow County Planning and Development, Oconee County Public Works, Natural Resources Conservation Service (NRCS), City of Jefferson Water Department | 5 |
| Elberton | City of Elberton City Managers Office, City of Elberton Water Department | 4 |

*Public Meetings and Speaker's Bureau Training.* Two open public meetings were held during the project to present information on the SWAP project and related issues. Stakeholders and the general public from the entire region were invited to these meetings. Display boards, maps, tables with susceptibility information and a presentation were developed to educate stakeholders on the purpose and processes of the SWAP project, as well as to present the SWAP information in a manageable way to citizens and stakeholders. The first meeting was held on November 28th and the second was held on March 21st, both at the Oconee County Civic Center. A summary of each meeting is included below:

- The first Public Meeting for the Northeast Georgia SWAP was held on November 28, 2001, from 7:00 p.m. to 8:30 p.m. The objectives of the meeting were to provide the public with background information on what a SWAP is, the steps involved, and the status of the current SWAP being conducted in Northeast Georgia. Interested citizens, environmental groups, and utility and community representatives from cities participating the study were in attendance. The meeting provided an overview presentation and a question and answer session, which were followed by an opportunity for the residents to learn about the data that had been collected for the SWAP within their particular communities. Data presented on each of the 12 water supply



systems represented in the Northeast Georgia SWAP focused on the list of potential pollution sources within each drinking water supply watershed. Community members provided input on any industries or pollutant sources that should be either added or removed from the current list of potential sources.

- The second Public Meeting for the Northeast Georgia SWAP was held on March 21, 2002, from 7:00 p.m. to 8:30 p.m. The objectives of the meeting were to provide the public with background information on what a SWAP is, the steps involved, and the status of the susceptibility analysis for the SWAP currently being conducted in Northeast Georgia. Interested citizens, environmental groups, media representatives, and utility and community representatives from cities participating in the study were in attendance. The meeting provided an overview presentation and a lively question and answer session, which was followed by an opportunity for the public to learn about the specific susceptibility analysis being conducted within their particular communities. Data presented on each of the water supply systems represented in the Northeast Georgia SWAP included a list of potential pollution sources along with information ranking their susceptibility of polluting or impacting the water supply intake, as well as an overall matrix summarizing the susceptibility table for each drinking water supply.

In addition to the task force and public meetings, a Speakers Bureau was developed with a "canned" presentation that can be used to educate community groups such as Rotary clubs, Parent-Teacher Associations, environmental groups, and other civic organizations across the Northeast Georgia region. A training workshop was held on March 12th to help interested stakeholders prepare themselves to take the presentation to their local audience. The Speakers Bureau offers a cost-effective method for reaching a wider audience within each community.

*Project Website.* For exposure to an even larger audience, a project website was developed that to keep stakeholders apprised of project developments, educate them on issues related to source water protection, promote interest in the project, and disseminate project deliverables and data. The website is a more cost-effective and timely method than a newsletter and has been integrated into the Northeast Georgia RDC's existing website. Visit www.negrdc.org and click on "Departments, "Water Planning", "SWAP" to view the site.

*Regional Leaders Water Quality Workshop.* A Regional Leaders Water Quality Workshop breakfast meeting was held on March 12th to bring together municipal, business and policy leaders in the region to discuss the source water assessment plans in the context of other regional water quality and water supply issues. The goal of the workshop will be to provide information on the SWAP project, discuss issues related to source water protection, and develop strategies for encouraging businesses to assist and participate in achieving improved source water protection.



## Assessment Assumptions

This section identifies the assumptions made during the source water assessment process for the Northeast Georgia SWAP.

### General Assumptions

- When assigning values for the Overall Release and Risk Potentials, the individual high, medium, and low rankings are typically averaged. However, the toxicity determination typically carries more weight than the distance from surface water intake in the Overall Risk Potential for a facility. For example, if a low toxicity pollutant is in close proximity to a surface water intake (i.e., medium risk) the Overall Risk Potential is usually assigned a low value.
- Duration of release is determined through TRI reports, indicating releases to the environment, and databases available on the EPD website, indicating where environmental releases and spills have occurred over the past 10 years. If a facility does not exist on EPD's TRI reporting of releases or other data sources indicating environmental spills and releases, it is assumed that no reported releases have occurred at the site and the duration of release is ranked low.
- A determination of the toxicity is made by reviewing information from the TRI reports, SARA Title III Tier II data, NPDES permit parameters, spill information, and best professional judgment to understand the types of hazards stored on site. Fecal coliform is typically rated as having a high toxicity because it is an indicator of the potential presence of pathogens that are an immediate risk to human health.

### Point Source Assumptions

Assumptions were made during the susceptibility analysis that were specific to the type of point source being evaluated. The following paragraphs indicate the types of assumptions made for a variety of potential pollutant point sources.

Agricultural Waste Lagoons

Agricultural waste lagoons present a potential risk to drinking water supplies if a lagoon dam breaks and releases high concentrations of nutrients, bacteria and other contaminants to nearby streams. Lagoons were located and delineated using aerial photography. The volume associated with such a release could be over 10,000 gallons, indicating a high ranking for volume of release. The duration is assumed to be low, since there is a low possibility of the lagoon failing and since there had been no previously reported releases. The toxicity is high, due to the high concentrations of bacteria and potential pathogens in the lagoons, unless the lagoon is no longer in active operation.

Confined Animal Feedlot Operations (CAFOs)

Row houses were delineated based on aerial photography. EPA's newest rules on Animal Feeding Operations (AFOs) require facilities with more than 300 but less than 1,000 animal units to obtain a LAS permit. AFOs with more than 1,000 but equal to or less than 3,000 animal units must apply for an NPDES permit. Most of the facilities identified in the Northeast Georgia region are small to medium-sized poultry operations that do not fall into any of the above mentioned categories, but



were still listed as CAFOs for this assessment. There are some dairy operations in the region, primarily in Morgan and Greene counties. Volume and duration of potential releases are considered low because the animals are under cover. Toxicity is considered medium because poultry wastes have the potential to carry pathogens, but they are typically dry products and are not readily transported to surface waters.

NPDES Permitted Facilities

Facilities with NPDES permits for discharge to local surface waters are included in this category. The duration of release ranking for all NPDES facilities is medium, since they have ongoing releases to the surface waters. Supplemental guidance provides a ranking for how effective the facility has been at meeting established permit limits. The toxicity ranking for NPDES facilities depends on what is stored on-site and the NPDES parameters that are listed in the permit.

RCRA Facilities

This category includes small and large industries that generate hazardous wastes on-site. Small quantity generators, as designated in the RCRIS database in EPA's Envirofacts system, are given a low volume of release unless additional data from the SARA Title III Tier II reports indicate additional storage of chemicals and other substances on-site. For RCRA sites without a designation, the volume of release is also ranked low (less than 1,000 gallons). Large quantity generators typically store more wastes on-site and warrant a medium volume ranking.

Landfills and Garbage Transfer Stations

Abandoned, closed, and operating landfills are a potential pollutant source for water supplies, with the degree of impact depending upon the type of waste collected at the site and the design of the landfill itself (i.e., lined vs. unlined, leachate collection system, landfill cap design, etc.). In addition, garbage transfer stations can be a source of pollution due to liquids leaching from the waste haulers. For landfills, the volume of release is low if the site is closed or capped and medium if the site is open, since the majority of the release is due to percolation of stormwater through the wastes. Similarly, the duration of release is low if the landfill is closed and there is no evidence of groundwater contamination. Duration is medium if the site is still open/operating (and subject to direct stormwater influence) or if there is any evidence of groundwater contamination. The toxicity is dependent upon the type of the landfill and is low if the site is an open/operating, municipal solid waste landfill and medium if it is a closed/non-operating, municipal solid waste landfill or an industrial or construction and demolition landfill. If there is a history of groundwater contamination and toxic chemicals have been identified, then the toxicity ranking is high.

Lift Stations

Municipal lift stations (i.e., pumping stations) transfer sanitary sewer flows from one location within the wastewater collection system to another location, generally at a higher elevation. These facilities can pose a threat to the surrounding water bodies during storm events or when operational problems exist, causing sanitary sewer overflows (SSOs) in the vicinity of the station or in the upstream collection system. The volume of release is based on the average flow capacity of the station, but engineering controls, such as high-level alarms and automatic dialers, can lower the

volume of release ranking. The toxicity ranking for lift stations is always high since human pathogens exist in the raw sewage.

Granite Sheds and Mines

Granite sheds and mines were included in the point source pollutant inventory because they can have significant contributions of sediment to the surface waters. Prospect mines were not included in the inventory, but abandoned mines were. The volume of release is low for both sources since the volume is based on the amount of stormwater run-off, unless large amounts of chemicals or other substances are stored on-site. The toxicity is also low since the primary pollutant of concern is sediment. The duration of release for granite sheds and current mining operations is medium because releases are ongoing during wet weather events. The duration is low for mining operations that have been abandoned.

Land Application Systems

Operations that have land application systems (LAS) and permits have the potential to impact the surface water. The volume of release is based on the permitted capacity or the size of the operation or facility that the LAS is serving. The duration of release is medium because there are ongoing releases from the LAS. The toxicity is typically medium since pathogens may be present, but the waste has been treated prior to application.

Stream Crossings

*Roadways.* Primary and secondary road crossings over streams and rivers present a potential for contamination through spills or accidents from vehicles traveling on the roadways. The materials being transported vary greatly; however, to gauge the potential risk, hazardous materials are assumed to be transported on roads. Volume of release from roadways is estimated to be between 1,000 - 10,000 gallons (a medium ranking) due to tractor-trailers. The duration of release is assumed to be a one-time unanticipated release, which is a medium ranking. The toxicity is assumed to be medium because of the potential for transporting hazardous chemicals and other substances on tanker-trucks. The distance from surface water and ease of transport are high since the road crossings are directly over surface waters. The distance from the surface water intake is based on the management zone that is being evaluated (i.e., medium for the OMZ and high for the IMZ).

Total crossings for each primary road (interstates and highways) were counted within each management zone and used to give a supplemental guidance ranking based on the breakdown in Table 2.6. Crossings for all secondary roads were counted within each management zone and used to give a supplemental guidance ranking.

*Railroads.* Railroad crossings over streams and rivers also present a potential for contamination through spills and accidents. As with roadways, the materials being transported will vary greatly. Hazardous materials are assumed to be transported on the railroads, with the volume of the release assumed to be greater than 10,000 gallons (a high ranking). The duration of the release is high, with a likelihood of a one-time catastrophic release. The toxicity is assumed to medium because of the variety of chemicals that can be transported via railroad. As with the roads, the distance from



surface water and ease of transport are high since the road crossings are directly over surface waters and the distance from the surface water intake is based on the management zone that is being evaluated. The supplemental guidance used for railroad crossings was the same as used for primary roads, and took density of crossings within each management zone into account. Table 2.6 breaks down the density criteria used for the supplemental ranking.

*Pipelines.* Oil and natural gas pipelines over streams and rivers present a potential for contamination through spills and pipe breaks. For oil pipelines, the volume and duration of release are high because they can release more than 10,000 gallons to the stream and there is a likelihood of a one-time catastrophic release. The toxicity is assumed to medium because oil is being transported. For natural gas pipelines, the volume and duration of release are low, since the chemicals and substances being transported are volatile and there is little likelihood of a release. The toxicity is also low, due to rapid loss through volatilization. As with the other crossings, the distance from surface water and ease of transport are high since the pipeline crossings are directly over surface waters. The distance from the surface water intake is based on the management zone that is being evaluated. As shown in Table 2.6, the supplemental guidance used for pipeline crossings took density of crossings within each management zone into account just as the primary road and railroad crossings did.

**Table 2.6. Supplemental Release Ranking Guidance for Stream Crossings**

| Type of Crossing | Ranking Criteria |
|---|---|
| Primary Road Crossings | High = 10 or more crossings<br>Medium = between 5 and 9 crossings<br>Low = less than 5 crossings |
| Secondary Road Crossings | High = 100 or more crossings<br>Medium = between 50 and 100 crossings<br>Low = less than 50 crossings |
| Pipeline Crossings | High = 10 or more crossings<br>Medium = between 5 and 9 crossings<br>Low = less than 5 crossings |
| Railroad Crossings | High = 10 or more crossings<br>Medium = between 5 and 9 crossings<br>Low = less than 5 crossings |

### Non-Point Source Assumptions

In addition to assumptions made about point sources, there were also some assumptions made during the evaluation of non-point source impacts for the SWAP. Assumptions for the four non-point categories evaluated for the management zones of each water supply watershed are documented below.



*Agriculture.* The non-point runoff from agricultural areas was assessed for each intake and management zone. Land use and land cover files from GIS were used to determine relative density of agricultural lands. Agriculture generally covers grazing lands, row crops, poultry and other livestock operations. Agricultural non-point source pollution is considered a low to medium risk to source waters in all management zones. Risk factors include livestock density, chemical application buffers, and proximity to surface waters.

*Forestry.* Forestry activities have limited risk to water supplies. Sediment is the main pollutant associated with this activity. Risk of sedimentation is raised when forestry activities are conducted on steeper slopes or adjacent to streams.

*Urban.* Urban areas constitute a potential contaminant source for source waters from commercial and industrial stormwater runoff, road runoff, runoff from fertilizers and pesticides applied to lawns, other types of stormwater runoff, and sanitary sewer overflows from sewer lines which cross creeks. The impacts from the sewered areas are included in the analysis of the urban areas. In addition, due to the increased impervious surfaces, stormwater velocities are higher in urban streams, which increases in-stream erosion.

*Non-Sewer (Septic).* Septic tanks provide a threat to drinking water supplies when systems fail. National studies have determined that approximately 5 to 10 percent of septic systems are failing at any one time. The potential presence of pathogens presents a high toxicity risk. Transport through soil to surface waters generally mitigates the overall risk with a low or medium release potential.



# SECTION 3 – INTAKE SPECIFIC INFORMATION BEAVERDAM CREEK

This section presents background information specific to the City of Elberton's Beaverdam Creek public water supply intake and source water assessment. Information on the water withdrawal permit and the assessment steps conducted for the intake is provided. The SWAP information covers the watershed delineation, the review of water quality data, potential pollutant source inventory and susceptibility analysis, and conclusions and recommendations.

## Water Withdrawal Permit

The City of Elberton reportedly treats an average of 1.6 million gallons per day (mgd) of raw water, serving an area of approximately 5 square miles in Elbert County. According to the Comprehensive Plan for Elbert County, there were 3,205 customers on the city system in 1991. The City of Elberton has one operational permit (No. 052-0104-01), which expires September 30, 2010, and allows the city to withdrawal a daily average of 2.2 mgd and a monthly average of 1.7 mgd from Lake Russell. Beaverdam Creek intake is used as an emergency water source. According to city officials, the current treatment plant capacity is 3.0 mgd.

## Source Water Assessment Plan Steps

### Watershed Delineation

The water supply watershed for the City of Elberton's Beaverdam Creek intake (i.e., the area upstream of the drinking water intake) is approximately 51,433 acres or 81 square miles, and covers parts of Elbert and Hart County with a small fraction of the watershed in Franklin County. Beaverdam Creek is a tributary to Lake Russell, located in the Savannah River Basin. The watershed is considered a small drinking water supply watershed by the Department of Community Affairs (DCA). As shown in Figure 3.1, the watershed extends from Hart County south of the City of Bawersville to just north of the City of Elberton. Elberton is located approximately 40 miles east/northeast of Athens and 160 miles northeast of Atlanta.

The City of Elberton withdraws water from one intake directly on Beaverdam Creek. Due to the size of the upstream watershed, the Beaverdam Creek water supply watershed has three management zones the IMZ, OMZ, and NMZ.

### Available Water Quality Data

Existing Water Quality Data

Water quality upstream of the Beaverdam Creek intake appears to be affected by high levels of fecal coliform bacteria as demonstrated in the USGS water quality data and the EPD 305 (b) List. Beaverdam Creek was not supporting its designated use for fishing due to excessive fecal coliform. The potential source of fecal coliform bacteria for Beaverdam Creek was listed as nonpoint source pollution. Land use upstream of the intake is primarily agricultural. Other water quality parameters appear to be within expected ranges.



*Cryptosporidium* and *Giardia* Sampling

The City of Elberton conducted *Cryptosporidium* and *Giardia* sampling at the Beaverdam Creek water supply intake, prior to any chemical additions, from July 2001 to December 2001. Table 3.1 provides a summary of the sampling results. Neither *Cryptosporidium* oocysts nor *Giardia* cysts were detected in any of the samples over the six-month sampling period.

**Table 3.1. *Cryptosporidium* and *Giardia* Sampling Results for City of Elberton – Beaverdam Creek**

| Sampling Date | *Cryptosporidium* (organisms/Liter) | *Giardia* (organisms/Liter) |
|---|---|---|
| 7/9/01 | ND | ND |
| 8/13/01 | ND | ND |
| 9/10/01 | ND | ND |
| 10/10/01 | ND | ND |
| 11/13/01 | ND | ND |
| 12/4/01 | ND | ND |

*Note: ND = Not Detected*

## Potential Pollutant Source Inventory and Susceptibility Analysis

The susceptibility of the water supply to various point and non-point sources was evaluated using the EPD source water methodology that attempts to balance risk and release potential. A table of the potential point pollutant sources for the Beaverdam Creek water supply watershed that were included in the susceptibility analysis is found in Appendix C. The table presents the susceptibility rankings and support information for each of the potential point pollutant sources in the watershed, broken down by management zones (inner, outer, and non). Figure 3.2 illustrates the delineation of assessment areas and gives the location of the potential point pollutant sources for the Beaverdam Creek water supply watershed. For Beaverdam Creek, there are three management zones the IMZ, OMZ, and NMZ. The susceptibility rankings and support information for each of the potential non-point pollutant sources in the Beaverdam Creek watershed are provided in the following paragraphs.

Non-Point Source Assessment

According to EPD's guidance document, four categories of non-point source runoff are considered for the assessment of non-point sources – agriculture, forestry, non-sewer, and urban areas. For this assessment, sewer areas were included in the urban area assessment. Information on the specific analysis of the four non-point pollutant sources is provided below. Figure 3.1 shows the distribution of land use within the watershed.



*Agriculture.* Agriculture factors that present a risk to the water supply include livestock density, moderate topography, use of agricultural chemicals, and risks associated with chemicals, animals, and waste products. There is some agricultural use in the Beaverdam watershed but most of it is located in the OMZ, located over 7 miles from the intake. Agriculture areas were ranked as low release and risk potentials.

*Forestry.* Forestry activities pose limited risk to the Beaverdam Creek water intake. These activities were ranked as low risk and low release potentials.

*Urban.* The Beaverdam Creek intake is located northeast of the City of Elberton. There is some urbanization in the IMZ especially to the west of the intake in Elberton. The release potential is low and risk potential is medium in the IMZ. Neither the OMZ nor the small NMZ are significantly urbanized. Release and risk potentials are low for the OMZ and the NMZ.

*Non-Sewer (Septic).* Non-sewer areas present high potential risk due to the possible presence of pathogens leaching from failing systems. However, the release is tempered by transport through soil and groundwater to reach surface water supplies. The majority of the watershed is not serviced by sewer lines but nor is it densely populated. The release and risk potentials are medium in the IMZ. In the OMZ, the release potential is low and risk potential is medium and in the NMZ the risk and release potentials are low.

Special Considerations

Within the Beaverdam Creek watershed, there are a few special considerations that should be noted that were not specifically included in the susceptibility analysis.

- The Railroad section that crosses the stream was included in the analysis but there is a large section of the railroad that forms the western boundary of the Beaverdam Creek watershed that doesn't cross any streams. Even thought the railroad does not cross any streams in this section, it is located in close proximity to the stream and may impact the stream if there were a large spill.

Summary of Susceptibility Analysis

Table 3.2 illustrates the matrix of potential pollutant sources based on each source's individual risk and release potential rankings. For Beaverdam Creek, there were two potential pollutant sources that have a high priority based on their susceptibility analysis – an oil pipeline and, according to the table in Appendix C, the railroad crossing. The vast majority of the pollutant sources identified in this watershed have a medium or low priority.



**Table 3.2. Susceptibility Summary for the Elberton– Beaverdam Creek Water Supply Watershed**

| Risk Potential \ Release Potential | LOW | MEDIUM | HIGH |
|---|---|---|---|
| HIGH | | | |
| MEDIUM | ▪ Urban areas (IMZ)<br>▪ Non-sewer areas (OMZ)<br>▪ 7 point sources<br>▪ 2 CAFOs | ▪ Non-sewer areas (IMZ)<br>▪ 8 point sources<br>▪ 6 Road crossings | ▪ 1 Railroad crossing<br>▪ 1 Pipeline crossing |
| LOW | ▪ 3 Agricultural areas (IMZ,OMZ,NMZ)<br>▪ 3 Forest areas (IMZ, OMZ, NMZ)<br>▪ 2 Urban areas (OMZ, NMZ<br>▪ Non-sewer areas (NMZ)<br>▪ 3 point sources | ▪ 2 point sources | |

The high priority sources in the Beaverdam Creek watershed include:

- Pipeline crossings
- Railroad crossings

The medium priority sources in the watershed include:

- Bell Granite Company
- Consolidated Granite Co., Inc.
- Johnson & Johnson Consumer Products, Inc.
- King's Monument Company, Inc.
- Lexington Blue Granite Co., Inc.
- River Edge Granite Company, Inc.
- Walker Granite Co.
- Yeargin & Childs Granite Co., Inc.
- Primary and secondary road crossings
- Non-sewer areas (IMZ)



The sources that are a low priority in the watershed include:

- Apex-Mize Granite Company, Inc.
- Blue Ribbon Quarry
- Burton Monument Co., Inc.
- Chevron USA, Inc. #1111
- Childs Brothers Quarry
- City of Elberton – Closed landfill
- Green Rose Mine
- Horse Head Mine
- Hunter Granite Sales, Inc.
- Moon Rock Granite Quarries, Inc.
- Royston, LCC (AWH Corp.)
- Star Granite Co., Inc.
- Confined Animal Feedlot Operations
- Agriculture areas
- Forestry areas
- Urban areas
- Non-sewered areas (OMZ and NMZ)

According to the EPD source water assessment guidance, the number of sources in each susceptibility ranking was counted and the percent of sources in each priority area was calculated to achieve an overall susceptibility for the watershed. As indicated in Table 3.3, the largest number of potential sources (60 percent) is a low ranking, followed by 36 percent that are a medium ranking. A very small percentage (4 percent) has a high susceptibility ranking. Based on this information, the overall susceptibility for the Beaverdam Creek water supply watershed is **LOW**.

**Table 3.3. Overall Susceptibility for the Beaverdam Creek Water Supply Watershed**

| Ranking | Number of Points | Percent |
|---|---|---|
| Low Susceptibility | 25 | 60 |
| Medium Susceptibility | 15 | 36 |
| High Susceptibility | 2 | 4 |

## Conclusions and Recommendations

### Current Assessment

Because of the size of the Beaverdam Creek water supply watershed, any significant spill or release to the creek or one of its tributaries has a likelihood of reaching the intake. Therefore, prevention and notification are the keys to protecting the intake and the community's water supply. The source water assessment is only the first phase in ultimate protection of the water supply watershed. The information contained within this assessment should be used to follow-up and identify specific areas where protection efforts are necessary to ensure safe drinking water for the community. The most important first step in protection is communication. Public outreach can be a powerful tool in delivering a message about prevention and encouraging buy-in for protection programs. This effort could include:



- Presenting the SWAP results to local community groups, with the emphasis on prevention and who to contact in case of a spill, and
- Distributing flyers to businesses in the drinking water supply watersheds with a map of the watershed and with information on it about who to contact in case of a spill, good housekeeping practices, etc.

It is important to notify the management at Johnson & Johnson Consumer Products, various granite mining industries, Plantation Pipeline Company, and the  Railway to let them know that they are in the drinking water watershed. Giving these facilities contact information at the water treatment plant and letting them know that the activities they perform on site may impact the community's water supply if they release a substance or large amount of sediment to the surface water is critical. In addition, ensuring that these facilities provide secondary containment for chemical, waste, and fuel storage areas would mitigate releases to the surface water. Reviewing and ensuring that these facilities' on-site emergency response plans and spill prevention plans are up-to-date will also mitigate the potential for releases.

Plantation Pipeline and a railroad both run through the Beaverdam Creek watershed. The location of the pipeline and railroad in the Outer Management Zone (OMZ) gives a potential spill a longer distance to travel than if the pipeline was located closer to the intake. The advantage of having a longer travel time is that there would be some time to potentially contain a spill before it reaches the intake. It is recommended that the City of Elberton develop an Emergency Response Plan that will outline the procedures and steps necessary should an accident occur along the pipeline or railroad that introduces contaminants to the surface water. The City may work with the railway and Plantation Pipeline Company to proactively develop prevention measures that could minimize the likelihood of an accidental spill to the waterway. These measures may include installing monitoring systems along the pipeline especially along the pipeline that crosses the creek, decreasing the speed of the trains moving within the watershed, or installing dikes around the railroad crossings to contain material if there were an accident.

State Route 77 runs through the Beaverdam Creek watershed and is located within a few hundred feet of the intake. It is recommended that the City develop an Emergency Response Plan for State Route 77 that will address responses to a spill and immediate notification. The city may work with the State Department of Transportation to develop spill prevention measures. These measures may include decreasing the speed over the bridges, installing guardrails or diked bridge crossings, or placing signs notifying the driver to drive with caution.

The majority of the pollutant sources identified in the watershed are related to granite mining. These include both the mines and manufactures of granite monuments. In general, granite manufacture's potential susceptibility ranking is low. In order to ensure that these operations are not a higher risk than indicated in this study, further verification may be necessary. Water is often used in the manufacturing process and may introduce excess sediment in the streams especially during a storm event. Following EPD best management practices such as installing settling ponds may help to minimize potential surface water impacts from mining and manufacturing practices. In



addition, any chemical stored on-site such as oil and petroleum should be kept in an area with the proper containment.

In addition to some of the protective and preventive measures mentioned for point source pollution, non-point source pollution can be addressed through a variety of methods. These measures may include education and outreach programs, implementation of urban runoff controls, enforcement of stream buffer requirements for small source water watersheds, and other programs targeted at each specific land use. The Cooperation with local farmers, NRCS, and Farm Bureau representatives through education may help to minimize potential surface water impacts from agricultural practices (i.e., pesticides, herbicides, fertilizers). Information on stream buffers and on-site best management practices and guidance design supplied by NRCS may prove beneficial. These guidelines may be found at http://www.ga.nrcs.usda.gov

**Future Assessment**

There are limited industrial and commercial activities within the City of Elberton's Beaverdam Creek water supply watershed. Whether through good planning or coincidence, The City has managed to keep excessive growth and development out of the watershed. However, as Elberton and the surrounding area continue to grow, the City must be proactive at keeping the majority of this growth out of the water supply watershed. The City may need to establish protective measures to keep from allowing a high priority pollutant source from being sited within the watershed. For example, if the railroad would like to expand its current tracks, serious consideration should be given to routing options before it is constructed through the water supply watershed. History indicates that roads and railroads have serious potential to impact water supply watersheds in the event of a spill or accident.



# SECTION 4 – INTAKE SPECIFIC INFORMATION
# LAKE RUSSELL

This section presents background information specific to the City of Elberton's Lake Russell public water supply intake and source water assessment. Information on the water withdrawal permit and the assessment steps conducted for the intake is provided. The SWAP information covers the watershed delineation, the review of water quality data, potential pollutant source inventory and susceptibility analysis, and conclusions and recommendations.

## Water Withdrawal Permit

The City of Elberton reportedly treats an average of 1.6 million gallons per day (mgd) of raw water, serving an area of approximately 5 square miles in Elbert County. According to the Comprehensive Plan for Elbert County, there were 3,205 customers on the city system in 1991. The City of Elberton has one operational permit (No. 052-0104-01), which expires September 30, 2010, and allows the city to withdrawal a daily average of 2.2 mgd and a monthly average of 1.7 mgd from Lake Russell. Beaverdam Creek intake is used as an emergency water source. According to city officials, the current treatment plant capacity is 3.0 mgd.

## Source Water Assessment Plan Steps

### Watershed Delineation

The water supply watershed for the City of Elberton's Lake Russell intake (i.e., the area upstream of the drinking water intake) is approximately 78,745 acres or 123 square miles, and covers parts of Elbert and Hart County with a small fraction of the watershed in Franklin County. Lake Russell is located in the Savannah River Basin. The watershed is considered a large drinking water supply watershed by the Department of Community Affairs (DCA). As shown in Figure 3.1, the watershed extends from Hart County south of the City of Bawersville to just north of the City of Elberton. Elberton is located approximately 40 miles east/northeast of Athens and 160 miles northeast of Atlanta in the eastern portion of the State of Georgia near the South Carolina State border.

The City of Elberton withdraws water from one intake on Lake Russell. Due to the size of the upstream watershed, the Lake Russell water supply watershed has three management zones the IMZ, OMZ, and NMZ.

### Available Water Quality Data

Existing Water Quality Data

Water quality upstream of water supply intake at Lake Russell appears to be affected by high levels of fecal coliform bacteria. Over 26 stream miles upstream of Lake Russell do not support fishing due to fecal coliform. Both Beaverdam Creek and Fortson's Creek are listed on the 303(d) list for high levels of fecal coliform. The Northeast Georgia Regional Development Center (NGRDC) has developed a Total Maximum Daily Load (TMDL) fecal coliform implementation plan for Fortson's



Creek. The implementation plan is aimed at reducing the number of fecal coliform in this stream reach.

Lake Russell only partially supports its designated recreational use due to the high levels of fecal coliform and due to fish consumption guidances. Most of the land use upstream of the intake is agricultural in the headwaters and a mix of residential and industrial in and around the city of Elberton. In 1999, the city of Elberton developed a water supply watershed ordinance that has since been passed.

*Cryptosporidium* and *Giardia* Sampling

The City of Elberton conducted *Cryptosporidium* and *Giardia* sampling at the Lake Russell water supply intake, prior to any chemical additions, from July 2001 to December 2001. Table 4.1 provides a summary of the sampling results. *Cryptosporidium* oocysts were not detected in any of the samples over the six-month sampling period. *Giardia* cysts were detected in low levels in the December sample (0.4 organisms per liter) but were not detected in any of the other samples over the six-month sampling period.

**Table 4.1. *Cryptosporidium* and *Giardia* Sampling Results for City of Elberton – Lake Russell**

| Sampling Date | *Cryptosporidium* (organisms/Liter) | *Giardia* (organisms/Liter) |
|---|---|---|
| 7/9/01 | ND | ND |
| 8/13/01 | ND | ND |
| 9/10/01 | ND | ND |
| 10/10/01 | ND | ND |
| 11/13/01 | ND | ND |
| 12/4/01 | ND | 0.4 |

*Note: ND = Not Detected*

## Potential Pollutant Source Inventory and Susceptibility Analysis

The susceptibility of the water supply to various point and non-point sources was evaluated using the EPD source water methodology that attempts to balance risk and release potential. A table of the potential point pollutant sources for the Lake Russell water supply watershed that were included in the susceptibility analysis is found in Appendix C. The table presents the susceptibility rankings and support information for each of the potential point pollutant sources in the watershed, broken down by management zones (inner, outer, and non). Figure 3.2 illustrates the delineation of assessment areas and gives the location of the potential point pollutant sources for the Lake Russell water supply watershed. For Lake Russell, there are three management zones the IMZ, OMZ, and



NMZ. The susceptibility rankings and support information for each of the potential non-point pollutant sources in the Lake Russell watershed are provided in the following paragraphs.

Non-Point Source Assessment

According to EPD's guidance document, four categories of non-point source runoff are considered for the assessment of non-point sources – agriculture, forestry, non-sewer, and urban areas. For this assessment, sewer areas were included in the urban area assessment. Information on the specific analysis of the four non-point pollutant sources is provided below. Figure 3.1 shows the distribution of land use within the watershed.

*Agriculture.* Agriculture factors that present a risk to the water supply include livestock density, moderate topography, use of agricultural chemicals, and risks associated with chemicals, animals, and waste products. There is some agricultural use in the large watershed but mostly in low densities. Agriculture areas ranked as low release potential and risk potential for the IMZ, OMZ, and NMZ.

*Forestry.* Forestry activities pose limited risk to the Lake Russell water intake. These activities were ranked as low risk and low release potentials.

*Urban.* The intake for the City of Elberton is located in Lake Russell. There is some urbanization in the City of Elberton, which is near the IMZ border and around the lake itself. Future development around the lake would increase the risk and release of nonpoint sources in this area. The risk potential is medium and the release potential is low in the IMZ. The risk and release potentials are low for the OMZ and NMZ.

*Non-Sewer (Septic).* Non-sewer areas present high potential risk due to the possible presence of pathogens leaching from failing systems. However, the release is tempered by transport through soil and groundwater to reach surface water supplies. The majority of the watershed is not serviced by sewer lines. Septic tanks are especially common around Lake Russell where they pose a high risk potential for impacting the surface water. The risk potential is high and the release potential is medium in the IMZ. The risk is medium and the release is low in the OMZ and the risk and release potentials are low in the NMZ.

Special Considerations

Within the Lake Russell watershed, there are a few special considerations that should be noted that were not specifically included in the susceptibility analysis.

- The Norfolk Southern Railroad sections that have stream crossings were included in the analysis but there is a large section of the railroad that forms the western boundary of the Lake Russell watershed and a section of CSX Transportation that runs in close proximity of the Lake, which doesn't cross any streams. Even thought these railroads do not cross any streams in these sections, it is important to know they are located in the watershed and frequently they are in close proximity to the stream.



- Lake Russell is a popular recreation area. Marinas are included in the susceptibility analysis but none where identified using aerial photography. Boat use is allowed and prevalent on Lake Russell and although there may not have been any large identifiable marinas, there may be small public access areas for boats. Boats pose a potential risk to the water quality due to potential gasoline and oil spills, as well as, increasing the human waste potential by boaters and swimmers.

Summary of Susceptibility Analysis

Table 3.2 illustrates the matrix of potential pollutant sources based on each source's individual risk and release potential rankings. For Lake Russell, there were seven potential pollutant sources that have a high priority based on their susceptibility analysis. The vast majority of the pollutant sources identified in this watershed have a medium or low priority.

**Table 4.2. Susceptibility Summary for the Elberton– Lake Russell Water Supply Watershed**

| Risk Potential | LOW | MEDIUM | HIGH |
|---|---|---|---|
| HIGH | ▪ 1 point source | ▪ Non-sewer areas (IMZ)<br>▪ 2 point sources | ▪ |
| MEDIUM | ▪ Urban areas (IMZ)<br>▪ Non-sewer areas (OMZ)<br>▪ 9 point sources<br>▪ 3 CAFOs | ▪ 14 point sources<br>▪ 6 Road crossings | ▪ 2 point sources<br>▪ 1 Railroad crossing<br>▪ 1 Pipeline crossing |
| LOW | ▪ 3 Agricultural areas (IMZ, OMZ, NMZ)<br>▪ 3 Forest areas (IMZ, OMZ, NMZ)<br>▪ 2 Urban areas (OMZ, NMZ)<br>▪ Non-sewer areas (NMZ)<br>▪ 17 point sources | ▪ 15 point sources | ▪ |

Release Potential



The high priority sources in the Lake Russell watershed include:

- CSX Transportation – Middleton Derailment Site
- Elbert County Landfill (Hull Chapel Road)
- Elberton Fortson Creek Water Pollution Control Plant
- Silt Mill Wastewater Pump Station
- Pipeline crossings
- Railroad crossings
- Septic areas (IMZ)

The medium priority sources in the watershed include:

- Baston Monuments, Inc.
- Beaverdam Elementary School
- Wastewater Pump Station
- Elbert County – Patz Field
- Elberton Granite Industries, Inc.
- Hillcrest Granite Company, Inc.
- Honeywell International
- J & R Finishing Company
- J&B Granite Co.
- Johnson & Son Memorials, Inc.
- L & M Granite Co., Inc.
- Net Granite Company, Inc.
- T&J Granite Counter Tops
- Trinity Granite Company
- Welchs Granite Company
- Willis Granite Co., Inc.
- Primary and secondary road crossings

The sources that are a low priority in the watershed include:

- Ameristone
- Apex-Mize Granite Company, Inc.
- Beaver Dam Quarry
- Bell Granite Company
- Blue Ribbon Quarry
- Bluestone Granite Co., Inc.
- Burton Monument Co., Inc.
- Central Granite Co. – Div. of Ga. Marble Co.
- Childs Brothers Quarry
- Colonial Granite Co.
- Conagra (formerly Seaboard)
- Consolidated Granite Co., Inc.
- Continental Quarry
- Coronet Quarry
- CSX Transportation Elberton
- Diamond Blue Quarry, Inc.
- Dixie Granite Co., Inc.
- Geneva Granite Co., Inc.
- Georgia Synthetics
- Green Rose Mine
- Harmony Blue Granite Co., Inc.
- Horse Head Mine
- Howell Granite Imports, LLC
- Hunter Granite Sales, Inc.
- King's Monument Company, Inc.
- Lexington Blue Granite Co., Inc.
- Martin Fireproofing Georgia Inc.
- Moon Rock Granite Quarries, Inc.
- Old South Granite Co.
- Ray Claude Ford Sales
- Republic-Highpoint-Sterling Granite Companies
- River Edge Granite Company, Inc.
- Saxon Granite Co., Inc.
- Smiths Auto Service
- Star Granite Co., Inc.
- Superior Granite Company
- Walker Granite Co.
- Worley Blue Quarry
- Yeargin & Childs Granite Co., Inc.
- Closed City of Elberton landfills
- Confined Animal Feedlot Operations



- Septic areas (OMZ and NMZ)
- Urban areas
- Forestry areas
- Agricultural areas

According to the EPD source water assessment guidance, the number of sources in each susceptibility ranking was counted and the percent of sources in each priority area was calculated to achieve an overall susceptibility for the watershed. As indicated in Table 4.3, the largest number of potential sources (66 percent) is a low ranking, followed by 25 percent that are a medium ranking. A very small percentage (8 percent) has a high susceptibility ranking. Based on this information, the overall susceptibility for the Lake Russell water supply watershed is **LOW**.

**Table 4.3. Overall Susceptibility for the Lake Russell Water Supply Watershed**

| Ranking | Number of Points | Percent |
|---|---|---|
| Low Susceptibility | 55 | 66 |
| Medium Susceptibility | 21 | 25 |
| High Susceptibility | 7 | 8 |

## Conclusions and Recommendations

### Current Assessment

Prevention and notification are the keys to protecting the City of Elberton's intake and the community's water supply. The source water assessment is only the first phase in ultimate protection of the water supply watershed. The information contained within this assessment should be used to follow-up and identify specific areas where protection efforts are necessary to ensure safe drinking water for the community. The most important first step in protection is communication. Public outreach can be a powerful tool in delivering a message about prevention and encouraging buy-in for protection programs. This effort could include:

- Presenting the SWAP results to local community groups, with the emphasis on prevention and who to contact in case of a spill, and
- Distributing flyers to businesses and boating areas located in the drinking water supply watershed with a map of the watershed and with information on it about who to contact in case of a spill, good housekeeping practices, etc.

It is important to notify the management at CSX Transportation, Elbert County Landfill (Hull Chapel Road), City of Elberton Fortson Creek Water Pollution Control Plant, Silt Mill Wastewater Pump Station, Plantation Pipeline Company, and the Norfolk Railway to let them know that they are in the drinking water watershed. Giving these facilities contact information at the water treatment

plant and letting them know that the activities they perform on site may impact the community's water supply if they release a substance or large amount of sediment to the surface water is critical. Specifically, the airport should be notified of the location of their fuel storage areas in relation to the water supply watershed. In addition, ensuring that these facilities provide secondary containment for chemical, waste, and fuel storage areas would mitigate releases to the surface water. Reviewing and ensuring that these facilities' on-site emergency response plans and spill prevention plans are up-to-date will also mitigate the potential for releases.

CSX Transportation Company, Plantation Pipeline, Norfolk Railway all run through the Lake Russell watershed. The CSX Railroad runs within a few hundred feet of the intake and poses a high risk potential to the intake. If a spill should occur, there has already been a previous spill, the intake would need to shut down immediately. The City of Elberton has a second intake located on Beaverdam Creek for emergency use. The City of Elberton should develop an Emergency Response Plan that will outline the procedures and steps necessary should an accident occur along either of the railroads or the pipeline located within the watershed that introduces contaminants to the surface water. The City may work with the CSX Transportation Company, Norfolk Southern Company and Plantation Pipeline Company to proactively develop prevention measures that could minimize the likelihood of an accidental spill to the waterway. These measures may include installing monitoring systems along the pipeline especially along the pipeline that crosses the creek, decreasing the speed of the trains moving within the watershed, or installing dikes around the railroad crossings to contain material if there were an accident.

Parkers Ferry Road runs through the Lake Russell watershed and is located within a few hundred feet of the intake. The City should develop an Emergency Response Plan for that will outline steps that should be taken should a spill. The Emergency Response Plan will be similar to the plans used for the railroads and pipelines. In addition, Emergency Response Plans should be developed from Old Don Tucker Cemetery Road, State Route 72 and 77. The city may work with the State Department of Transportation to develop spill prevention measures. These measures may include decreasing the speed over the bridges, installing guardrails or diked bridge crossings, or placing signs notifying the driver to drive with caution.

Several of the pollutant sources identified in the watershed are related to granite mining or granite monument manufacturing. In general, granite manufactures pose a low potential risk to the water supply. In order to ensure that these operations are not a higher risk than indicated in this study, further verification may be necessary. Water is often used in the manufacturing process and may introduce excess sediment in the streams especially during a storm event. Following EPD best management practices such as installing settling ponds may help to minimize potential surface water impacts from mining and manufacturing practices. In addition, any chemical stored on-site such as oil and petroleum should be kept in an area with the proper containment.

In addition to some of the protective and preventive measures mentioned for point source pollution, non-point source pollution can be addressed through a variety of methods. These measures may include education and outreach programs, implementation of urban runoff controls within the city limits, enforcement of stream buffer requirements for small source water watersheds, and other programs targeted at each specific land use. The Cooperation with local farmers, NRCS,



and Farm Bureau representatives through education may help to minimize potential surface water impacts from agricultural practices (i.e., pesticides, herbicides, fertilizers). Information on stream buffers and on-site best management practices and guidance design supplied by NRCS may prove beneficial. These guidelines may be found at http://www.ga.nrcs.usda.gov

## Future Assessment

There are limited industrial and commercial activities within the City of Elberton's Lake Russell water supply watershed. Whether through good planning or coincidence, The City has managed to keep excessive growth and development out of the watershed. However, as Elberton and the surrounding area continue to grow, the City must be proactive at keeping the majority of this growth out of the water supply watershed. The City may need to establish protective measures to keep from allowing a high priority pollutant source from being sited within the watershed. For example, if the railroad would like to expand its current tracks, serious consideration should be given to routing options before it is constructed through the water supply watershed. History indicates that roads and railroads have serious potential to impact water supply watersheds in the event of a spill or accident.



# APPENDIX A
# Water Quality Data Sources

As part of the source water assessment, water quality data have been gathered from a number of different sources. The following contains a list of all of the data sources that were evaluated and summarized for this report.

## Agricultural Research Service (USDA)

Three different sets of data were collected from USDA and used in the Northeast Georgia Source Water Assessment. The first set of water quality data was collected over 20 years at the North Oconee River near the Athens, GA water municipal water intake (33° 58' 28" North and 83° 22' 56" West) and at the Oconee River at Barnett Shoals Rd south of Athens, GA (33° 51' 21" North and 83° 19' 35" West) and down river from Athens' waste water treatment. Agricultural Research Service (ARS) compiled data that had been collected by GA EPD and WRD and made available by through the EPA STORET.

The second set of water quality data provided by ARS was collected at 9 sampling sites in the upper Oconee Basin from 1999 to 2000 (Fisher et al, 2001).

The third set of data originated from a 1993 assessment on Georgia Watershed Agricultural Non-point Source Pollution by the USDA. The assessment documented and examined hydrologic units with high potential for non-point source pollution problems associated with agriculture.

## BASINS data

Originated from the U.S. Environmental Protection Agency Office of Water. The data were extracted from the U.S. EPA Storage and Retrieval of US Waters Parametric Database (STORET), which is contributed to by a number of organizations including federal, state, interstate agencies, universities, contractors, individuals and water laboratories. Each provider of data is responsible for the data it submits to STORET.

## EPA STORET Data

The U.S. Environmental Protection Agency (EPA) maintains two data management systems containing water quality information for the nation's waters: the Legacy Data Center and STORET.

The Legacy Data Center, or LDC, contains historical water quality data dating back to the early part of the 20th century and collected up to the end of 1998. STORET contains data collected beginning in 1999, along with older data that has been properly documented and migrated from the LDC.

Both systems contain raw biological, chemical, and physical data on surface and ground water collected by federal, state and local agencies, Indian Tribes, volunteer groups, academics, and others.

All 50 States, territories, and jurisdictions of the U.S., along with portions of Canada and Mexico, are represented in these systems.

Each sampling result in the LDC and in STORET is accompanied by information on where the sample was taken (latitude, longitude, state, county, Hydrologic Unit Code and a brief site identification), when the sample was gathered, the medium sampled (e.g., water, sediment, fish tissue), and the name of the organization that sponsored the monitoring.

In addition, STORET contains information on why the data were gathered; sampling and analytical methods used; the laboratory used to analyze the samples; the quality control checks used when sampling, handling the samples, and analyzing the data; and the personnel responsible for the data.

There were a total of 22 STORET monitoring sites within the area of the Northeast Georgia source water assessments.

**Environmental Protection Division 305 (b) List**

Georgia Environmental Protection Division (EPD) is required to submit a status of streams, rivers and lakes. EPD determines if a water body meets its designated use based on available data. Designated uses include fishing, recreational, and drinking water. The list of streams either not supporting or partially supporting were reviewed and mapped. The spatial data and corresponding map represent the State of Georgia's 1998-1999 assessment of water quality and resulting 2000 305(b)/303(d) list of waters with June 2001 updates. Table 1 identifies data source codes used in the lists for criterion that are being violated and potential causes of the violations.

**Table 1. Data Source Codes for EPD's 305(b) and 303(d) Lists**

| **Criterion Violated Codes** | | |
|---|---|---|
| As = Arsenic | DO = Dissolved Oxygen | Pb = Lead |
| Bio = Biota Impacted | CFB = Commercial Fishing Ban | SB = Shellfishing Ban |
| Cd = Cadmium | FC = Fecal Coliform | Se = Selenium |
| CN = Cyanide | FCG = Fish Consumption Guidance | Temp = Temperature |
| Cr = Chromium | Hg = Mercury | Tox = Toxicity Indicated |
| Cu = Copper | Ni = Nickel | Zn = Zinc |
| **Potential Cause Codes** | | |
| CSO = Combined Sewer Overflow | MA = Marina | UR = Urban Runoff |
| I1 = Industrial Facility | M = Municipal Facility | SB = Shellfish Ban |
| I2 = Residual from Industrial Source | NP = Non-point sources/ Unknown Sources | NAT = Natural |

*Northeast Georgia Regional Development Center, Athens, GA*

The Northeast Georgia Regional Development Center (NEGRDC) serves 12 counties and 54 municipal governments in northeast Georgia. The agency was created in 1963 to be a focal point for regional issues concerning local government and to be a resource for those governments in a variety of specialized areas. These areas include local government planning, economic development, grant preparation and administration, job training, aging services, and the development of implementation plans to meet Total Maximum Daily Loads (TMDL) in accordance with the Clean Water Act. The service area encompassed by NEGRDC is 3,260 square miles with an estimated population of 438,300.

**Public Utilities Data**

Data available from raw water sampling and watershed protection plans.

*Upper Oconee Watershed Network*

Upper Oconee Watershed Network (UOWN) is a community-based watershed group that has been monitoring water quality in and around Athens, Georgia since 1998. UOWN has an annual event, River Rendezvous, which involves over 100 sampling sites and quarterly monitoring events that involve 11 sites. The basic water quality parameters were measured with calibrated instruments with trained operators. The biological index was performed following Adopt-A-Stream protocols. A PhD candidate in the Environmental Health Sciences Department at the University of Georgia analyzed the fecal coliform bacteria in the laboratory. UOWN collected samples for E. coli and Enterococci in the spring of 2001. The Agricultural Research Service in Watkinsville, Georgia analyzed both bacteria using standard methods. Table 2 provides values for different parameters that may indicate degradation.

**Table 2. Values indicative of degradation**

| Visual Score | Temp (°C) | pH | Turbidity (NTU) | Conductivity (µS/cm) | Dissolved oxygen (DO) (mg/l) | Fecal Coliform (CFU/100 ml) | Biological Index |
|---|---|---|---|---|---|---|---|
| <15 | >32.0 | < 6.0 – 8.5 > | >25 | > 80 | < 4.00 | > 200 summer >1000 Oct-May | < 11 |

** Note: Degradation values are from EPD (temp, pH, DO, and Biological Index), US EPA (fecal coliform), or Scientific Panel on Sediment for the State Legislator (turbidity).*

**USGS Water Quality Data**

The USGS collects and analyzes chemical, physical, and biological properties of water, sediment and tissue samples from across the United States. USGS has put the data they have collect on their web site www.usgs.gov/. Within the main web site, there is a water quality database that is a compilation of over 3.5 million historical water quality analyses in the USGS district databases through September 1999. The discrete sample data is a large and complex set of data that has been collected

by a variety of projects ranging from national programs to studies in small watersheds. There were a total of 47 monitoring sites found within the Northeast Georgia study area.

**References:**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# APPENDIX B
## Contaminant Inventory Data Sources

*Agricultural Waste Lagoons* – 1999 Color Infrared Digital Orthophoto Quads and 1994 Digital Orthophoto Quarter Quadrangles were used to identify and delineated agricultural waste lagoons. All of the orthophoto quarter quadrangles (aerial photography) were compiled by the Georgia GIS Clearinghouse through funding provided by Georgia Department of Natural Resources (DNR).

*Airports* – 1999 Color Infrared Digital Orthophoto Quads and 1994 Digital Orthophoto Quarter Quadrangles were used to identify and delineated areas used as airports. All of the orthophoto quarter quadrangles (aerial photography) were compiled by the Georgia GIS Clearinghouse through funding provided by Georgia Department of Natural Resources (DNR).

*CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act* – Commonly referred to as Superfund, CERCLA was enacted on December 11, 1980. CERCLA provides EPA authority to respond to releases or threatened releases of hazardous substances, pollutants, or contaminants that may endanger human health or the environment. EPA follows the procedures outlined in the National Contingency Plan (NCP) to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. CERCLA also requires that EPA maintain the National Priorities List (NPL), a list of sites across the United States that require remedial action due to releases or threatened releases of hazardous substances. Finally, CERCLA requires reporting of releases, establishes the liability of persons responsible for releases of hazardous substances, and established a trust fund to provide for cleanup when no responsible party can be identified.

*Confined Animal Feedlots (CAFOs)* – 1999 infrared aerial photographs were used to identify and designated areas containing confined animal feedlots. All of the orthophoto quarter quadrangles (aerial photography) were compiled by the Georgia GIS Clearinghouse through funding provided by Georgia Department of Natural Resources (DNR).

*Garbage Transfer Stations* – Transfer station locations were identified by the local public utilities and through a list of statewide permit by rule solid waste transfer stations obtained from the Solid Waste Management Program at the Environmental Protection Division. These locations were then geocoded into Arcview.

*HSI = Hazardous Site Inventory* – The Georgia Environmental Protection Division (EPD) has published the Hazardous Site Inventory (HSI) since July 1, 1994. The HSI is a list of sites where releases of regulated substances have occurred that are deemed to be reportable by the Rules for Hazardous Site Response, Chapter 391-3-19 (Rules). The Rules require persons who have had a release exceeding specified thresholds to complete a Release Notification/Reporting Form and send it to EPD. This information is then evaluated by EPD in terms of both the nature of the release and the proximity of human and environmental receptors. If this evaluation demonstrates that a potential threat to human health or the environment exists, the site is listed on the HSI.

*Hazardous Waste Facilities* – A shapefile was downloaded from the Georgia Environmental Protection Division (GA EPD) containing all of the Hazardous Waste Facilities in Georgia. Site locations were identified and those not located within the source water assessment area were eliminated.

*IFD = Industrial Facility Discharge* – These sites are industrial or municipal point sources discharging to surface waters. The IFD was designed and implemented in late 1970s under a contract for the specific purpose of providing the Monitoring and Data Support Division (MDSD) of the Office of Water Regulations and Standards with a comprehensive database of industrial point source dischargers to surface water in the United States. The major components of the IFD are the Permit Compliance System (PCS), the National Pollution Discharge Elimination System (NPDES), the Construction Grants Needs Survey, the Publicly Owned Treatment Works Study, the regulations and standards from EPA/OW Effluent Guidelines Division, EPA's Duluth Laboratory's Complex Effluent Toxicity Information System (CETIS) database, the Organic Chemical Producer's (OCP) database, EPA Enforcement Form 2C data in STORET, the Hazardous Waste National Priority List (NPL) sites, the Reach File, the In-House System (IHS) Stream Gage File, and input from EPA Region and State applications. General Information about each facility was first extracted from the PCS to form the building block upon which more information was added. The IFD is organized as a hierarchical information system of three levels: facility, discharge pipe, and contributing indirect discharge. The facility level contains identification information and summarized discharge data. The discharge level includes the components of each individual discharge such as location of pipe, flow, and SIC code activity. Indirect discharge level includes data on industrial flow from industries that discharge to another facility such as a Publicly Owned Treatment Works (POTW), rather than directly to surface water.

*Land Application System (LAS) Permit Holders* – A list of LAS permit holders was obtained for the State of Georgia from the Environmental Protection Division. Locations were geocoded in ArcView, those outside the assessment area were eliminated.

*Landfills* – A shapefile was obtained from Georgia EPD containing all of the landfills in Georgia. Sites not located within the source water assessment area were eliminated.

*Large Industries which utilize hazardous chemicals* – Large Industries that utilize hazardous chemicals were compiled using the Environmental Protection Agency's (EPA) Envirofacts Database. Envirofacts is a national information system that provides a single point of access to data extracted from seven major EPA databases.

*Large Industries which have bulk chemicals and petroleum storage* – Large Industries that have bulk chemicals and petroleum storage were compiled using the Environmental Protection Agency's (EPA) Envirofacts Database. Envirofacts is a national information system that provides a single point of access to data extracted from seven major EPA databases.

*Large Industries which have federal categorical standards* – Large Industries that have federal categorical standards were compiled using the Environmental Protection Agency's (EPA) Envirofacts Database. Envirofacts is a national information system that provides a single point of access to data extracted from seven major EPA databases.

*Large Quantity Generators* – These are generators who create more than 1,000 kg/mo of hazardous waste. Such generators are required to follow a long list of steps, including preparation of biennial reports, and procedures for handling hazardous waste. Large Quantity Generators were compiled using the Environmental Protection Agency's (EPA) Envirofacts Database. Envirofacts is a national information system that provides a single point of access to data extracted from seven major EPA databases.

*Lift Stations* – Pump station locations were identified by the local public utility. These locations were then geocoded into Arcview.

*Marinas* – 1999 Color Infrared Digital Orthophoto Quads and 1994 Digital Orthophoto Quarter Quadrangles were used to identify and delineated marinas. All of the orthophoto quarter quadrangles (aerial photography) were compiled by the Georgia GIS Clearinghouse through funding provided by Georgia Department of Natural Resources (DNR).

*Military Bases* – Georgia Dept of Transportation maps were used to identify military bases. These locations were then geocoded onto GIS maps.

*Mining* – Aerial photographs were used in conjunction with a coverage of mine sites for the State of Georgia provide by the U.S. Department of the Interior and located within the Georgia GIS Data Clearinghouse. Sites located within the coverage were verified and geocoded with aerial photographs.

*NPDES Permit Holders* – A list of NPDES permit holders was obtained for the State of Georgia from the Environmental Protection Division. This list was cross-referenced to a list obtained from the Georgia GIS Data Clearinghouse provided by the Georgia EPD. The locations were geocoded into Arcview. Locations outside of the assessment area were eliminated. Limited ground-truthing was performed to determine the accuracy of the locations.

*Non-Sewer Areas* – Northeast Georgia Regional Development Center provided a coverage of all the sewer areas.

*Oil pipelines adjacent to crossing over streams* – A coverage containing all of the oil pipes for the State of Georgia, provided by the Georgia Department of Transportation, was obtained from the Georgia GIS Data Clearinghouse. 1999 Aerial photography used for verification.

*Power Plants* – A coverage containing all of the power plants was obtained from the Georgia GIS Clearinghouse. The Georgia Department of Transportation created this coverage.

*Railways adjacent to or crossing over streams* – USGS topographic maps were used to identify and digitize railways adjacent to or crossing over streams within the assessment area. Georgia Dept of Natural Resources

*RCRIS = Resource Conservation and Recovery Information System* – National program management and inventory system of RCRA hazardous waste handlers and is used by the EPA to support its implementation of RCRA (Resource Conservation and Recovery Act), as amended by the Hazardous and Solid Waste Amendments of 1984 (HWSA). The system is primarily used to track a

handler's permit or closure status, compliance with Federal and State regulations, cleanup activities, waste handler inventory, and environmental program progress assessment. Handlers can be characterized as fitting one or more of the following categories: treatment, storage, and disposal facilities (TSDFs), large quantity generators, small quantity generators, and transporters.

*Roads adjacent to or over bridges crossing streams* – Road and stream coverages were downloaded from the Georgia GIS Data Clearinghouse. Data analysis was performed to determine the location of the roads relative to the streams using ArcView.

*Sewer Areas* – Northeast Georgia Regional Development Center provided sewer areas for the assessment area.

*TRI = Toxic Release Inventory* – EPA requires annual reports of toxic chemical releases to the environment under section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). These reports are submitted on EPA Form R, the Toxic Release Reporting Form. The reports are required to provide the public with information on the releases of listed toxic chemicals in their communities and to provide EPA with release information to assist the Agency in determining the need for future regulations. Facilities must report the quantities of both routine and accidental releases of toxic chemicals, as well as the maximum amount of the listed toxic chemical on-site during the calendar year and the amount in wastes transferred off-site. Reports must be files by owners and operators of facilities which meet all of the following criteria: 10 or more full-time employees (part-time equivalent), Facility is included in Standard Industrial Classification (SIC) 20 though 19, Manufacturers or processes more than 25,000 lbs. or uses more than 10,000 lbs. of any listed chemical during the calendar year.

*Wastewater Plants* – GA EPD, through NPDES permits, provided the location of all the wastewater plants. These plants were verified with 1999 aerial photography.

*Water Plants* – GA EPD, through NPDES permits, provided the location of all the wastewater plants. These plants were verified with 1999 aerial photography.