

**TOTAL MAXIMUM DAILY LOAD (TMDL) DEVELOPMENT**

*For FECAL COLIFORM in the*

**Savannah Harbor**

Savannah Harbor Basin, Georgia



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**Approval Page*****For FECAL COLIFORM TMDL in the  
Savannah Harbor***

Georgia's final 1998 Section 303(d) list identified Savannah Harbor as not supporting its designated use, with the pollutant of concern being Fecal Coliform. This Total Maximum Daily Load (TMDL) is being established pursuant to the 1998 Georgia 303(d) list and the Consent Decree in the Georgia TMDL lawsuit.

The TMDL calculation is based the upstream "load" and on the results of the Surface Water Management Model (SWMM) loadings and the Savannah Harbor Model response to the fecal loading. The critical period was determined to be July 9 through August 7, 1997. The TMDL for Fecal Coliform to Savannah Harbor is  $4.02E+16$  counts of Fecal Coliform per 30 days.

The load allocation (LA) for this TMDL is expressed as the load being introduced from the upstream basin, including a background concentration of 40 counts/ 100 ml, a background level of 20 counts/ 100 ml and an added safety margin of 20 counts/ 100 ml. The 1997 critical period average flow was 255 cubic meters per second (cms), this yields a fecal coliform LA of  $4.0E+16$  counts per 30 days. Note, all upstream point sources are located far enough upstream to allow their fecal coliform loads to decay to background conditions.

The wasteload allocation (WLA) component of this TMDL is expressed in two parts:

The NPDES point source discharges =  $7.8+E12$  counts of fecal coliform per 30 days; and

The municipal stormwater runoff from the Savannah Harbor area =  $1.96E+14$  counts of fecal coliform per 30 days.

Approved by:



Robert F. McGhee, Director

Water Management Division

FEB 28 2000

Date

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## **Introduction**

Section 303(d) of the Clean Water Act (CWA) as Amended by the Water Quality Act of 1987, Public Law 100-4, and the United States Environmental Protection Agency's (USEPA/EPA) Water Quality Planning and Management Regulations [Title 40 of the Code of Federal Regulation (40 CFR), Part 130] require each State to identify those waters within its boundaries not meeting water quality standards applicable to the water's designated uses. Total maximum daily loads (TMDLs) for all pollutants violating or causing violation of applicable water quality standards are established for each identified water. Such loads are established at levels necessary to implement the applicable water quality standards with consideration given to seasonal variations and margins of safety. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body, based on the relationship between pollution sources and in-stream water quality conditions, so that states can establish water-quality based controls to reduce pollution from both point and nonpoint sources and restore and maintain the quality of their water resources (USEPA, 1991).

## **Problem Definition**

Georgia's final 1998 Section 303(d) list identified Savannah Harbor as not supporting its designated use, with the pollutant of concern being Fecal Coliform. This TMDL is being proposed pursuant to the 1998 Georgia 303(d) list and the Consent Decree in the Georgia TMDL lawsuit, which requires TMDLs to be developed for all waters on the current 303 (d) list.

## **Target Identification**

The target level for the development of this Fecal Coliform TMDL is the numeric criterion established in Georgia's Rules and Regulations for Water Quality Control, Chapter 391-3-6, Revised July 1999. Georgia Regulation 391-3-6-.03(5)(e)(ii)(5)(a) establishes the freshwater criterion for Fecal Coliform in the water column. Criteria were promulgated such that instream concentrations should not exceed the 30-day geometric mean of 200 counts per 100 ml.

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## **Numeric Targets and Sources - Model Development**

Two types of models were used to evaluate the impacts of the NPDES permitted discharges on the Savannah Harbor fecal coliform condition. First, a SWMM (Surface Water Management Model) was established to route the municipal stormwater loads to the harbor. Second, a simplified 2 dimensional dynamic Savannah Harbor Model was used as receiving water model to evaluate the impacts of the NPDES point source discharges.

Summer of 1997 was used as the design year. This was the year that the harbor model was hydrodynamically calibrated. The influence on the instream Fecal Coliform concentration will be the permit design flow, instream decay rate, lateral dispersion and the river flow. For the Savannah Harbor, the upstream river flow ranges around 255 cubic meters per second (cms) for the 1997 summer timeframe.

## **Total Maximum Daily Load (TMDL)**

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while achieving water quality standards. The components of the TMDL are the Wasteload Allocation (WLA) and the Load Allocation (LA). The TMDL must also take into consideration a margin of safety and seasonality. The WLA is the pollutant allocation to point sources while the LA is the pollutant allocation to natural background and nonpoint sources.

Savannah Harbor is listed for Fecal Coliform. Fecal Coliform permit limits for the Harbor NPDES point sources have been established to meet end of pipe water quality of 200 counts per 100 ml. Table 1 contains the facilities with active NPDES permits and indicates those with fecal coliform limits and loads to the Savannah Harbor.

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The Savannah Harbor municipal stormwater discharges do not have a specific NPDES fecal coliform permit limit. Their contribution to the fecal coliform load is a function of stormwater runoff in response to rainfall events. The fecal coliform loads were determined using the SWMM modeling for the Savannah Harbor area. See Table 2 for loads and concentrations and the SWMM report for modeling details. The critical 30 day modeling period, the period with highest loads, was determined to be July 9 through August 7, 1997.

### *Margin of Safety*

The margin of safety (MOS) is part of the TMDL development process. There are two basic methods for incorporating the MOS (USEPA, 1991a):

- Implicitly incorporating the MOS using conservative model assumptions to develop allocations, or
- Explicitly specifying a portion of the total TMDL as the MOS; using the remainder for allocations.

The MOS is incorporated implicitly into the Savannah Harbor modeling process by selecting conservative modeling assumptions for the summer of 1997 (a representative year) and explicitly by adding 20 counts of fecal coliform per 100 ml in the upstream flow.

The MOS is incorporated into the SWMM modeling, explicitly by incorporating a target fecal concentration of 150 counts per 100 ml, as expressed as a 30 day geometric mean. This target is 50 counts per 100 ml less than the standard of 200 counts per 100 ml, to take into account the lack of data and information the stormwater modeling was based on. If the TMDL modeling is revisited and better data and information incorporated into the SWMM modeling and analyses, then this target may change.

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### ***TMDL Calculation***

The TMDL calculation will be based the upstream "load" and on the results of the SWMM loadings and the Savannah Harbor Model response to the fecal loading. The critical period, based on the SWMM modeling, was determined to be July 9 through August 7, 1997. The TMDL for Fecal Coliform load to Savannah Harbor is  $4.02E+16$  counts of fecal coliform per 30 days. The load for the municipal stormwater loads, in the harbor area canals and tributaries, are given in Table 3. The municipal stormwater loads are expressed in both concentration (30-day geometric mean) and in mass per time (counts per 30 days). The load for the five NPDES point source discharges is given in Table 4. The NPDES point source discharge loads are expressed in both concentration (30-day geometric mean) and in mass per time (counts per 30-days).

Based on the results of the Harbor Model, the fecal coliform standards will be met in the Savannah River Harbor Area, if the NPDES permit discharges met their fecal coliform limits (200 counts per 100 ml) and the municipal stormwater wet weather discharges maintain the fecal coliform target 150 counts per 100 ml (as expressed as a 30 day geometric mean) in the receiving canals and tributaries.

### ***Allocation of Responsibility and Recommendations***

The load allocation (LA) for this TMDL is expressed as what is being introduced from the upstream basin, a background concentration of 40 counts/ 100 ml, a background level of 20 counts/ 100 ml and an added safety margin of 20 counts/ 100 ml. The 1997 critical period average flow was 255 cubic meters per second, this yields a fecal coliform LA of  $4.0E+16$  counts per 30 days. Note, all upstream point sources are located far enough upstream to allow their fecal coliform loads to decay to background conditions.

The wasteload allocation (WLA) component is expressed in two parts:

- The NPDES point source discharges =  $7.8E12$  counts of fecal coliform per 30 days; and
  - The municipal stormwater runoff from the Savannah Harbor area =  $1.96E+14$  counts of fecal coliform per 30 days
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### ***Seasonal Variation***

The summer low flow condition represents the most critical design condition and will provide year round protection.

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Table 1 Active Permitted Point Source Facilities

| NPDES     | Facility Name          | SIC Name                           | City           | Fecal Coliform Limit | Waterbody                       |
|-----------|------------------------|------------------------------------|----------------|----------------------|---------------------------------|
| GA0034355 | E.M. INDUSTRIES INC    | Bone and Lamp Black                | SAVANNAH       | No                   | SAVANNAH RIVER                  |
| GA0003671 | INTERMARINE USA        | National Security                  | SAVANNAH       | No                   | SAVANNAH RIVER                  |
| GA0048330 | ENGELHARD CORPORATION  | Other                              | SAVANNAH       | No                   | SAVANNAH RIVER                  |
| GA0003841 | GAF MATERIALS CORP.    | Asphalt Felts and Coatings         | CHATHAM COUNTY | No                   | DUNDEE CANAL AND SAVANNAH RIVER |
| GA0002356 | PCS NITROGEN FERTILIZE | Nitrogenous Fertilizers            | PORT WENTWORTH | No                   | SAVANNAH RIVER                  |
| GA0003816 | SAVANNAH ELEC-PT WENTW | Electric Power Distribution        | PORT WENTWORTH | No                   | SAVANNAH RIVER                  |
| GA0003611 | SAVANNAH SUGAR REFINER | Cane Sugar Refining                | PORT WENTWORTH | No                   | SAVANNAH RIVER                  |
| GA0002402 | HERTY FOUNDATION (SAVA | Life Sciences                      | GARDEN CITY    | No                   | DITCH TO DUNDEE CANAL           |
| GA0025348 | SAVANNAH PRESIDENT ST. | Sewerage Systems                   | SAVANNAH       | Yes                  | SAVANNAH RIVER                  |
| GA0004332 | CITGO ASPHALT REFINING | Asphalt Paving Mixtures and Blocks | CHATHAM COUNTY | No                   | SAVANNAH RIVER                  |
| GA0001988 | UNION CAMP CORPORATION | Newsprint Mills                    | SAVANNAH       | No                   | SAVANNAH RIVER                  |
| GA0003255 | GULFSTREAM AEROSPACE C | Aircraft                           | SAVANNAH       | No                   | PIPE MAKERS CL                  |
| GA0031038 | GARDEN CITY WPCP       | Sewerage Systems                   | GARDEN CITY    | Yes                  | SAVANNAH RIVER                  |
| GA0002798 | STONE CONTAINER CORPOR | Pulp Mills Producing Paperboard    | PORT WENTWORTH | No                   | SAVANNAH RIVER                  |

|           |                           |                           |                   |     |                           |
|-----------|---------------------------|---------------------------|-------------------|-----|---------------------------|
| GA0020443 | SAVANNAH<br>WILSHIRE/WIND | Sewerage<br>Systems       | SAVANNAH          | Yes | SAVANNAH<br>RIVER         |
| GA0002437 | SOUTHERN STATES<br>PHOSP  | Phosphatic<br>Fertilizers | CHATHAM<br>COUNTY | No  | KAYTON CANAL<br>TO SAV RV |
| GA0020061 | TYBEE ISLAND WPCP         | Sewerage<br>Systems       | SAVANNAH<br>BEACH | Yes | SAVANNAH<br>RIVER         |
| GA0003646 | KEMIRA                    | Bone and<br>Lamp Black    | SAVANNAH          | No  | SAVANNAH<br>RIVER         |
| GA0027588 | USA HUNTER AFB<br>STP     | National<br>Security      | CHATHAM<br>COUNTY | Yes | SAVANNAH<br>RIVER         |
| GA0001961 | GEORGIA-PACIFIC<br>GYPSUM | Gypsum<br>Products        | CHATHAM<br>COUNTY | No  | SAVANNAH<br>RIVER         |
| GA0020427 | SAVANNAH TRAVIS<br>FIELD  | Sewerage<br>Systems       | SAVANNAH          | Yes | SAVANNAH<br>RIVER         |

**COMMENT:**

There appears to be some error in the calculation of stream loading for fecal coliforms. The commenter's calculation showed a maximum of  $8.19 \times 10^{12}$  counts per 30 days but the proposal calculates only  $1.78 \times 10^6$  counts per 30 days. With such a potential magnitude of error, the commenter cannot support the recommendations without further clarification.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

**RESPONSE:**

EPA will review and correct this calculation where needed

**COMMENT:**

The documentation does not provide any support of the 40 counts per 100 ml background concentration. Is there supporting information collected at the upstream reach of the Savannah Harbor as defined? How much does this impact the Margin of Safety as incorporated into the target fecal concentration of 150 counts per 100 ml as expressed as 30-day geometric mean.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

**RESPONSE:**

The upstream value was based on the limited data available for the Savannah River.

**COMMENT:**

In the Target Identification section of the TMDL, the most recent version of the State regulations should be July 6, 1999.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL will cite the current State Regulation.

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**COMMENT:**

In the Target Identification section of the TMDL, the issue of various aspects of uses and standards needs to be addressed beyond just the summer monthly mean for fishing use.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL addressed the critical timeframe and condition.

**COMMENT:**

In the Numeric Targets and Sources - Model Development section of the TMDL, it is unclear where the WQLS for this waterbody begins. Since segments of the river upstream of the harbor are also listed for fecal, it may be that the segment flowing into the harbor is also limited for fecal. Thus, it is not clear if the background load of 40-counts/100 ml is adequate or conservative as stated.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The WQLS segments are listed in the Georgia 303(d) list. The upstream fecal numbers are for available data on the river.

**COMMENT:**

In the Critical Conditions section of the TMDL, critical conditions for decay are not the same as for upstream reaches.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

This comment is not clear, but decay rates for estuaries and for rivers are different. The decay rates were taken from studies completed on other estuary systems.

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**COMMENT:**

In the Critical Conditions section of the TMDL, the flow chosen may be acceptable, but is not justified as the critical flow for all seasons or conditions of concern. Also, since this is a harbor, and may act somewhat as a lake, and also has tidal influence, a standard protocol is needed for this type of waterbody.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL used the data and information that was readily available. To account for the lack of information an external margin of safety was incorporated.

**COMMENT:**

In the Critical Conditions section of the TMDL, permit design flow is mentioned, but it is not clear if this means maximum permitted flow and loads or otherwise.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The NPDES facilities' permit limits are expressed in the TMDL calculation.

**COMMENT:**

In the TMDL section of the TMDL, it is stated that the permitted sources must meet the criteria at the end of the pipe. If the water already exceeds allowable loads, this will not correct the problem. Unless there is a reduction of loads from other sources, it would seem that the permitted point sources would need to have limits set lower to achieve improvements. Also, there would be no room for new or increased loads of fecal.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

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**RESPONSE**

The NPDES permitted facilities evaluated in the Savannah Harbor area are permitted and discharging at water quality criteria at the end of the pipe. Because these facilities are meeting this limit, EPA has determined that they are not causing or contributing to any exceedences of the fecal coliform standard in the harbor. The source of fecal coliform violations can be directly attributed to the stormwater drainage system. Adjusting the NPDES facilities to a lower load would not reduce the current water quality violations. During storm events the permitted facilities are actually diluters to the system.

**COMMENT:**

In the TMDL section of the TMDL, it is stated that the storm water discharge does not have a fecal permit limit. If this is a source of fecal load, a limit is needed.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

This is a permits issue, the TMDL will be supplied to the appropriate permitting authority for action.

**COMMENT:**

In the TMDL section of the TMDL, the loads given in Table 2 are in counts per month. It needs to be explained if or how the daily maximum is being addressed.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

EPA regulations allow for TMDLs to be expressed in the appropriate format. The fecal coliform standard for the State of Georgia is based upon a 30-day geometric mean. To provide for a meaningful TMDL, this end point was modeled and the maximum 30-day geometric mean was calculated.

**COMMENT:**

In the Margin of Safety section of the TMDL, what is the basis for selection of the 1997 year as being conservative ?

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Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street,  
Athens, Georgia 30601, December 10, 1999

***RESPONSE:***

The selection of 1997 was based upon a representative year in which there were several large storms with different time periods between the storms. This period was also selected because recent water quality data was available. The MOS was the selection of the 150 counts per 100 ml.

***COMMENT:***

In the Margin of Safety section of the TMDL, the use of a lower target concentration may be an acceptable method of margin of safety, but it differs from the stated target on page 1. A standard protocol for this is needed.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street,  
Athens, Georgia 30601, December 10, 1999

***RESPONSE:***

EPA will address this inconsistency.

***COMMENT:***

In the Margin of Safety section of the TMDL, it is not explained how the storm water dischargers will meet the desired levels, or how it will be ascertained if there are no permit requirements.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street,  
Athens, Georgia 30601, December 10, 1999

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**RESPONSE:**

This is a permits issue, the TMDL will be supplied to the appropriate permitting authority for action.

**COMMENT:**

In the Margin of Safety section of the TMDL, there is mention of receiving canals and tributaries, suggesting that these waters may also be impaired or WQLS for fecal, and/or perhaps a part of this waterbody. This issue needs to be addressed, and perhaps the TMDL revised to assure that standards are met at all locations.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

The TMDL will also allow for these waters to meet water quality standards.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, the TMDL given appears to be just for the storm water load from the table on the previous page. Also, note that there are two Table 3's in the TMDL.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

If the standard is met at the end of the discharge pipe or end of the canals, the harbor modeling showed the standard will be met in the river harbor area. EPA will correct the tables in the TMDL.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, it is stated that upstream sources of fecal should be at background levels of 40-counts/100 ml. How does this relate to the storm water and other discharges to the canals, tributaries, or other waters flowing into the harbor, especially during runoff events?

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

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**RESPONSE:**

The background concentration of 40-counts/100 ml represents the fecal coliform concentration in the river during low flow (non storm events). This 40 is based upon measurements taken from other segments that are not influenced by point source discharges. During storm events the background of 40-counts/100 ml is insignificant.

**COMMENT:**

In the Allocation of Responsibility and Recommendations section of the TMDL, the value given in item 2 on page 9 for the storm water load of 3.85 E+12 does not match the number given in the first (top) Table 3 on the previous page of 3.26E+12. A TMDL for all loads needs to be stated.

Douglas P. Haines, Executive Director, Georgia Legal Watch, 264 North Jackson Street, Athens, Georgia 30601, December 10, 1999

**RESPONSE:**

EPA will address this inconsistency.

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**Table 2 Fecal Coliform Loads from Stormwater Areas**

| Waterbody | Maximum 30 Day Geometric Mean (Counts per 100 ml) | "Critical Period Load Calculation" (Counts per 30 Day) |
|-----------|---|--|
| Node 11   | 192   | 2.8E+13  |
| Node 24   | 255   | 7.3E+13  |
| Node 32   | 121   | 5.9E+13  |
| Node 40   | 111   | 3.8E+13  |
| Node 50   | 127   | 3.5E+13  |

**Table 3 - TMDL for Fecal Coliform Municipal Stormwater Areas**

| Waterbody                      | Percent reduction needed to meet the 150 counts per 100 ml | Present Maximum 30 Day Geometric Mean (Counts per 100 ml) | TMDL "Concentration Calculation" (Counts per 100 ml) | TMDL "Load Calculation" (Counts per 30 Day) |
|--------------------------------|--|---|--|---|
| Node 11                        | 22%  | 192   | 150  | 2.1E+13                                     |
| Node 24<br>Pipemakers<br>Canal | 41%  | 255   | 150  | 4.3E+13                                     |
| Node 30                        | --   | 121   | 121  | 5.9E+13                                     |
| Node 40                        | --   | 111   | 111  | 3.8E+13                                     |
| Node 50                        | --   | 127   | 127  | 3.5E+13                                     |
| Total                          |  |   |  | 1.96E+14                                    |

**Table 4 Loads for NPDES Permitted Sources**

| NPDES Permit # | WTF Name                  | Flow (cms)<br>(mgd) | Fecal Coliform Permit Limit | WLA in terms of<br>"Counts per 30 Days" |
|----------------|---------------------------|---------------------|-----------------------------|---|
| GA0031038      | GARDEN CITY WPCP          | 0.088<br>(2.0 mgd)  | 200                         | 440,000,000,000                         |
| GA0020427      | SAVANNAH Travis<br>Field  | 0.044<br>(1.0 mgd)  | 200                         | 220,000,000,000                         |
| GA0020443      | SAVANNAH<br>WILSHIRE/WIND | 0.20<br>(4.5 mgd)   | 200                         | 1,000,000,000,000                       |
| GA0027588      | USA HUNTER AFB<br>STP     | 0.044<br>(1.0 mgd)  | 200                         | 220,000,000,000                         |
| GA0025348      | SAVANNAH<br>PRESIDENT ST. | 1.18<br>(27.0 mgd)  | 200                         | 5,900,000,000,000                       |
| TOTAL          |                           |                     |                             | 7,780,000,000,000<br>(7.78E12)          |

Figure 1

# Savannah Harbor TMDL Site Location Map

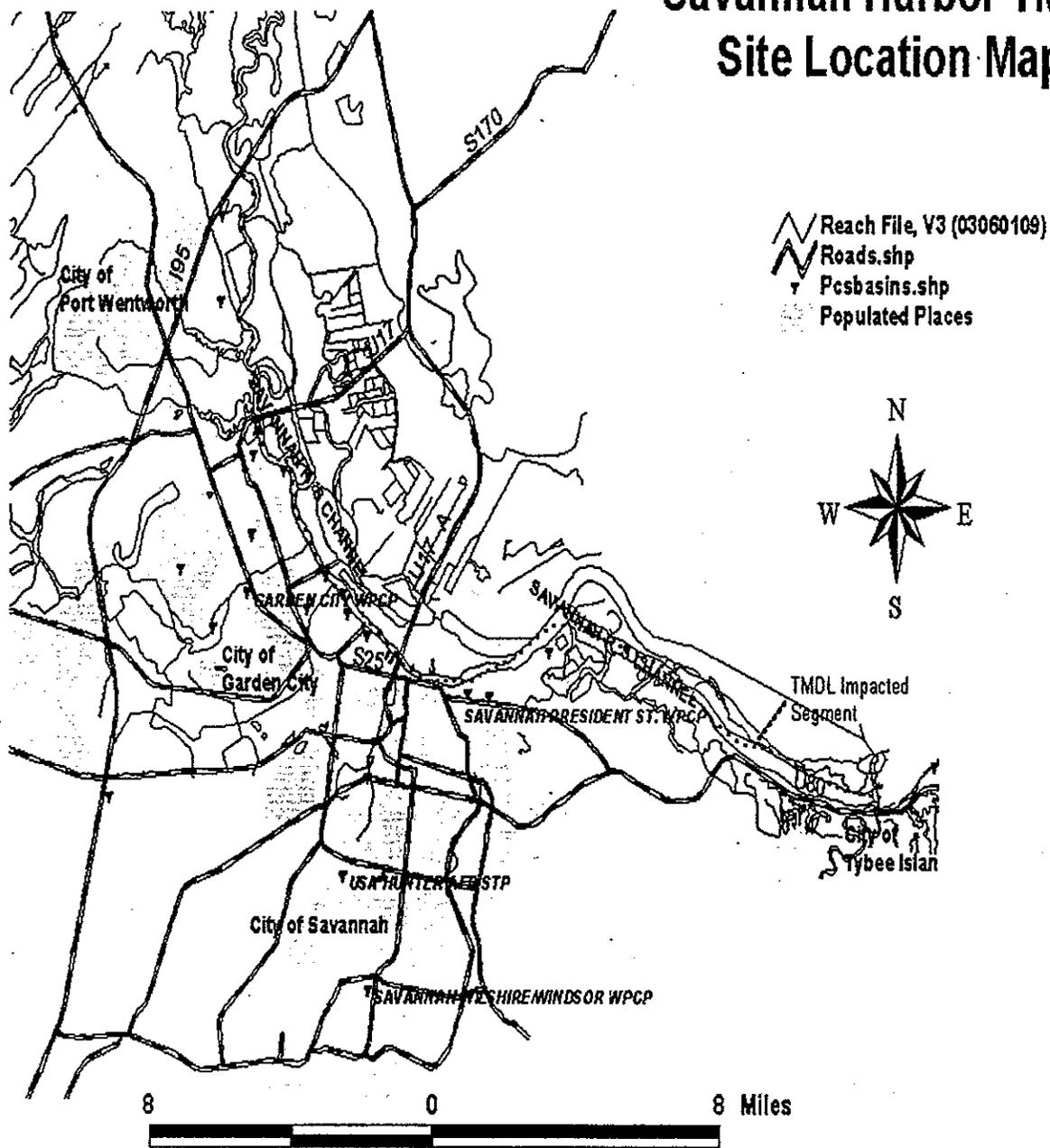
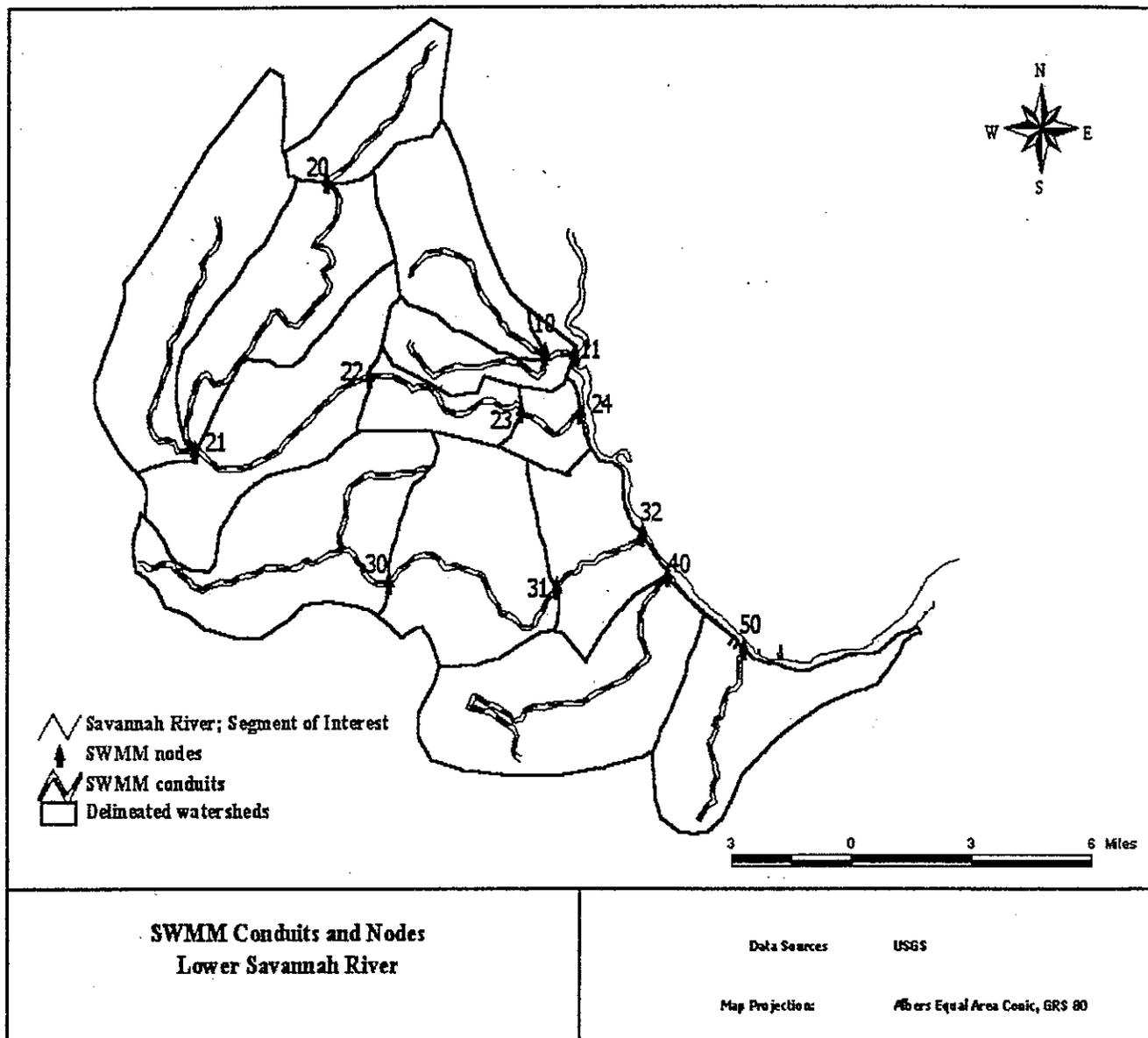


Figure 2 SWMM Model Network



## References

- Better Assessment Science Integrating Point and Nonpoint Sources, BASINS, Version 2, User's Manual. EPA-823-B-98-006
  - Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03, Water Use Classifications and Water Quality Standards
  - Sierra Club v. EPA & Hankinson USDC-ND-GA Atlanta Div. #1: 94-CV-2501-MHS
  - Lower Savannah River Watershed Characteristics, October 1999
  - 2 Dimension Savannah Harbor Modeling Assumptions, October 1999
  - Three-Dimensional Boundary-Fitted Circulation Model by Muin and Spaulding
  - Chatham County Municipal Stormwater SWMM modeling assumptions, October 1999
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## Administrative Record Index

1. Better Assessment Science Integrating Point and Nonpoint Sources, BASINS, Version 2, User's Manual. EPA-823-B-98-006 (document in office file)
  2. Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03, Water Use Classifications and Water Quality Standards (document in office file)
  3. Sierra Club v. EPA & Hankinson USDC-ND-GA Atlanta Div. #1: 94-CV-2501-MHS (document in office file)
  4. Compilation of Georgia's Current Modeling guidelines for the Development of Wasteload Allocations and NPDES Permit Limitations, January 1991 (document in office file)
  5. STORET Water quality data (In National database, stations and sample graph attached)
  6. Georgia NPDES permits – (attached)
  7. Lower Savannah River Watershed Characteristics, October 1999 (attached)
  8. 2 Dimension Savannah Harbor Modeling Assumptions, October 1999 (attached)
  9. Three-Dimensional Boundary-Fitted Circulation Model by Muin and Spaulding (Paper in office file)
  10. Chatham County Municipal Stormwater SWMM modeling assumptions, October 1999 (SWMM input deck attached)
  11. Savannah Harbor Expansion Feasibility Study Report, July 1998 - Calibration/Verification of a Hydrodynamic/Water Quality Model of the Lower Savannah River Estuary and Analysis of the Historic Data for the Lower Savannah River Estuary (Report in office files)
  12. Savannah Harbor Fecal loading spreadsheets, Savannah Harbor Area SWMM input data, Savannah Harbor model output files and illustrations (Data located on EPA disk server – too large for diskettes)
  13. NPDES Permit for Storm Water Discharges, Reapplication and 1998-1999 Annual Report for Chatham County (Reports at Georgia EPD)
  14. NPDES Permit for Storm Water Discharges, Reapplication and 1998-1999 Annual Report for City of Savannah (Reports at Georgia EPD)
  15. SWMM documentation (Document in office files) Ambrose Jr R.B., Wool T.A., Connolly J.P. and Schanz R.W. (1988) WASP4, A Hydrodynamic and Water Quality Model – Model Theory, User's Manual and Programmers guide. U.S.EPA, Environmental Research Laboratory, Athens, Georgia. EPA/600/3-87/039 (Document in office files)
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## Response to Public Comments on the Proposed TMDL

### **COMMENT:**

A TMDL must account for seasonal variations and periods of higher rainfall. Just looking at the critical or low-flow conditions in the summer is inadequate.

Eric E. Huber, Earth Justice Legal Defense Fund, 400 Magazine Street, Suite 401, New Orleans, Louisiana 70130-2453, November 8, 1999

### **RESPONSE:**

The Georgia TMDL Lawsuit Consent Decree (Sierra Club vs. Hankinson & EPA) required EPA to evaluate all NPDES permitted impaired water bodies. EPA realizes that several of the fecal coliform TMDLs developed do not account for high flow (stormwater runoff) scenarios in the development of the maximum load. The Savannah Harbor TMDL does evaluate the impacts of stormwater runoff from the City of Savannah's MS4 outfalls and wet weather impacts.

### **COMMENT:**

The TMDL is supposed to be daily, not a 30-day mean or 30-day average.

Eric E. Huber, Earth Justice Legal Defense Fund, 400 Magazine Street, Suite 401, New Orleans, Louisiana 70130-2453, November 8, 1999

### **RESPONSE:**

EPA regulations allow for TMDL to be expressed in the appropriate format. The fecal coliform standard for the State is based upon a 30-day geometric mean. To provide for a meaningful TMDL this end point was modeled and the maximum 30-day geometric mean was calculated.

### **COMMENT:**

The TMDL must be set to achieve water quality standards - in this case, no percent reduction or change in the wasteload allocation for the point sources is apparent. A percent reduction is identified for the municipal storm water areas. There is not a specific NPDES permit limit for the municipal storm water discharges and no indication of how the required percent reductions would be met. There are no "reasonable assurances" that the storm water reductions will occur and the point sources must be reduced as necessary to attain standards.

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Eric E. Huber, Earth Justice Legal Defense Fund, 400 Magazine Street, Suite 401, New Orleans, Louisiana 70130-2453, November 8, 1999

***RESPONSE:***

The NPDES permitted facilities evaluated in the Savannah Harbor area are permitted and discharging at water quality criteria at the end of the pipe. Because these facilities are meeting this limit, EPA has determined that they are not causing or contributing to any exceedences of the fecal coliform standard in the harbor. The source of fecal coliform violations can be directly attributed to the stormwater drainage system. The municipality that has been issued a NPDES Stormwater permit will be informed of the findings and results of this TMDL and will have to develop a management plan to address the required reductions in the stormwater discharge. Furthermore, the stormwater annual reports will be reviewed to determine if sufficient gains are being made to achieve water quality standards.

***COMMENT:***

Wilshire/Windsor and Hunter Army Airfield plants discharge through a common discharge point into the Savannah River.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

***RESPONSE:***

This is acknowledged and EPA made the necessary adjustment to the TMDL.

***COMMENT:***

The Garden City WPCP discharges with the Travis Field plant through a common discharge point into the Savannah River.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

***RESPONSE:***

This is acknowledged and EPA made the necessary adjustment to the TMDL.

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**COMMENT:**

Stone Container treats municipal domestic sewage for the City of Port Wentworth. Since the industrial facility is temporarily closed, virtually all of their effluent is treated domestic wastewater.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

**RESPONSE:**

EPA developed the TMDL based on existing permit conditions and the Stone Container NPDES permit is still active. If and when the permit is no longer active the TMDL will be recalculated.

**COMMENT:**

A clear description of the sampling location (Table 2) would help identify potential discharges, which may impact this waterbody.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

**RESPONSE:**

A figure is included to show the discharge locations within the TMDL.

**COMMENT:**

The commenter has additional data for fecal coliforms collected in 1998 and 1999 along the Savannah River as part of the City of Savannah's Domestic Wastewater Study.

Ebrahim Ghazi, Water and Sewer Engineering Director, Water and Sewer Bureau, City of Savannah, Post Office Box 1027, Savannah, Georgia 31402, November 8, 1999

**RESPONSE:**

EPA invites the commenter to provide this additional data.

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