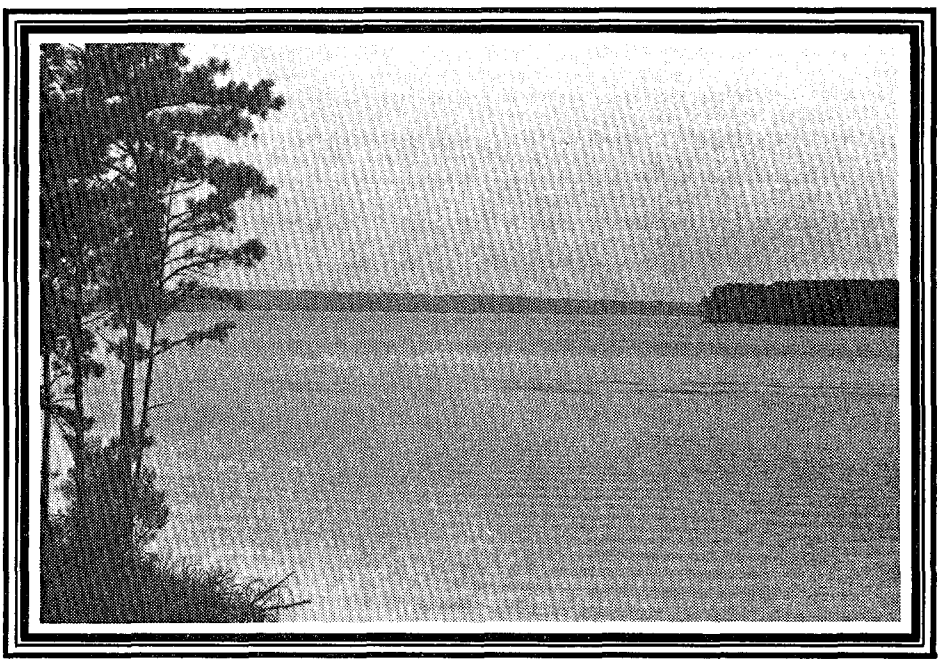
3.

1989 part C

# Statewide Water Quality Assessment

## FY 1986-1987



A Report to Congress Pursuant to Section 305 (b) of the Federal Water Quality Act

COASTAL ZONE
INFORMATION CENTER

Prepared by the Office of
Environmental Quality Control
South Carolina Department of
Health and Environmental Control
Columbia, South Carolina

C.C. Coastal Management Program

TD
224
.S6
K55
1988

# WATER QUALITY ASSESSMENT
# FY 1986-1987

Prepared and Edited by:
Sally C. Knowles

May 1988

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Division of Water Quality and Shellfish Sanitation
Bureau of Water Pollution Control
South Carolina Department of Health and Environmental Control

TD 224.S6 K55 1988
JUL 2 1997

**Property of CSC Library**

# PREFACE

This report was prepared by the South Carolina Department of Health and Environmental Control (DHEC) as a requirement of Section 305(b) of Public Law 100-4, The Water Quality Act of 1987, and as a public information document. The document presents a general assessment of water quality conditions and water pollution control programs in South Carolina.

The determinations of surface water quality were based on data collected by DHEC during fiscal years 1986 and 1987 at ambient water quality monitoring stations. Other information in this report was obtained from individuals associated with monitoring and control programs in the Department.

Comments or questions related to this report should be addressed to:

Bureau of Water Pollution Control
S.C. Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

## Table of Contents


Page

Preface . . . . . i

List of Tables . . . . . v

List of Figures . . . . . ix

Executive Summary . . . . . 1

1.0 South Carolina Statistics

1.1. Atlas . . . . . 5

2.0. Water Classifications and Standards . . . . . 5

2.1. Surface Water Classes . . . . . 5
2.2. Summary of Classified Uses . . . . . 7

3.0. Evaluation Methodology . . . . . 7

3.1. Waters Assessed . . . . . 8
3.2. Determination of Attainment of Classified Uses . . . . . 8
3.3. Determination of Attainment of 1983 Goals of the Clean Water Act . . . . . 14
3.4. Determination of Surface Waters Affected by Toxics . . . . . 14

4.0. Surface Water Quality

4.1. Rivers and Streams . . . . . 16

4.1.1. Summary of Assessment . . . . . 16

4.2. Lakes and Reservoirs . . . . . 18

4.2.1. Summary of Assessment . . . . . 48
4.2.2. Clean Lakes Assessment . . . . . 54

4.3. Tidal Saltwaters . . . . . 60

4.3.1. Summary of Assessment . . . . . 60
4.3.2. Management of Shellfish Growing Waters . . . . . 69
4.3.3. Estuary Case Study - Stono River . . . . . 88

4.4. Toxic Pollutants . . . . . 94

4.4.1. Metals in Water . . . . . 94
4.4.2 Organics in Water . . . . . 96
4.4.3. Fish Kills and Fishing Bans or Advisories . . . . . 97

4.5. Public Health Concerns . . . . . 100

4.6. Special Areas of Concern . . . . . 101

Page

4.7. Nonpoint Source Pollution Assessment. . . . . 104

4.7.1. Methodology to Determine Waters Impacted by Nonpoint Source Pollution. . . . . 104
4.7.2. List of Waters Impacted by Nonpoint Source Pollution . . 108
4.7.3. Groundwater Assessment . . . . . 110

5.0. Groundwater Quality . . . . . 129

5.1. General Overview. . . . . 129
5.2. Major Sources of Contamination. . . . . 129
5.3. Location of Groundwater Contamination . . . . . 131
5.4. Contaminating Substances. . . . . 131
5.5. State Strategies to Alleviate Groundwater Problems. . . . . 132

6.0. Water Pollution Control Programs. . . . . 134

6.1. Point Source Control Program. . . . . 134

6.1.1. Municipal Facilities . . . . . 134

6.1.1.1. Construction Grants Program. . . . . 134
6.1.1.2. Pretreatment Program and Toxics Control. . . . 137
6.1.1.3. Stormwater Controls. . . . . 137
6.1.1.4. Strategies Planned to Improve the Municipal Facility Program . . . . . 138

6.1.2. Industrial and Agricultural Facilities . . . . . 139

6.1.2.1. Industrial Facilities. . . . . 139
6.1.2.2. Agricultural Facilities. . . . . 139
6.1.2.3. Toxics Control . . . . . 140

6.1.3. Wasteload Allocations. . . . . 141

6.1.4. Permit Compliance and Enforcement. . . . . 142

6.1.4.1. Compliance . . . . . 142
6.1.4.2. Enforcement. . . . . 143

6.2. Nonpoint Source Control Programs. . . . . 146
6.2.1. General Description . . . . . 146
6.2.2. Section 319 Program . . . . . 146
6.2.3. Section 208 Programs. . . . . 148
6.2.4. Section 401 Programs. . . . . 149
6.2.5. Shellfish Sanitation Program. . . . . 150
6.2.6. BMP Requirements on NPDES Permits . . . . . 150
6.2.7. Other State and Local Government Involvement. . . . . 152

Page

6.3. Wetlands Programs . . . . . 154

6.4. Surface Water Monitoring Program. . . . . 157

6.4.1. Special Water Quality Studies. . . . . 158

6.5. Water Reclassifications . . . . . 162

6.6. Recommendations . . . . . 165

LIST OF TABLES


| TABLE | | PAGE |
|---|---|---|
| 2.1.A. | Summary of Classified Uses | 7 |
| 3.2.A. | Summary of State Numeric Standards | 12 |
| 3.2.B. | Criteria for Attainment of Designated Uses | 13 |
| 3.4.A. | 304(a) Criteria for Priority Pollutants | 15 |
| 4.1.A. | Attainment of State Classified Uses, Rivers and Streams, FY 1986-FY 1987 | 16 |
| 4.1.B. | Attainment of CWA Goals, Rivers and Streams, FY 1986-FY 198 | 17 |
| 4.1.C. | Probable Causes of Partial or Non-Attainment of Classified Uses, Rivers and Streams Statewide, FY 1986-FY 1987 | 17 |
| 4.1.D. | Probable Sources of Partial Non-Attainment of Classified Uses, Rivers and Streams Statewide, FY 1986-FY 1987 | 18 |
| 4.1.E. | Attainment of State Classified Uses and the 1983 Federal Goal, Freshwater Rivers and Streams, FY 1986-FY 1987, Pee Dee Basin | 20 |
| 4.1.F. | Attainment of State Classified Uses and the 1983 Federal Goal, Freshwater Rivers and Streams, FY 1986-FY 1987, Santee-Cooper Basin | 26 |
| 4.1.G. | Attainment of State Classified Uses and the 1983 Federal Goal, Freshwater Rivers and Streams, FY 1986-FY 1987, Edisto-Combahee Basin | 41 |
| 4.1.H. | Attainment of State Classified Uses and the 1983 Federal Goal, Freshwater Rivers and Streams, FY 1986-FY 1987, Savannah Basin | 44 |
| 4.2.A. | Attainment of State Classified Uses, Lakes and Reservoirs, FY 1986-FY 1987 | 48 |
| 4.2.B. | Attainment of CWA Goals, Lakes and Reservoirs, FY 1986-FY 1987 | 48 |
| 4.2.C. | Probable Causes of Partial or Non-Attainment of Classified Uses, Lakes Statewide, FY 1986-FY 1987 | 49 |

| TABLE | | PAGE |
|---|---|---|
| 4.2.D. | Probable Sources of Partial or Non-Attainment Classified Uses, Lakes Statewide, FY 1986-FY 1987 | 49 |
| 4.2.E. | Attainment of State Classified Uses and the 1983 Federal Goal, Lakes and Reservoirs, FY 1986-FY 1987, Pee Dee Basin | 50 |
| 4.2.F. | Attainment of State Classified Uses and the 1983 Federal Goal, Lakes and Reservoirs, FY 1986-FY 1987, Santee-Cooper Basin | 51 |
| 4.2.G. | Attainment of State Classified Uses and the 1983 Federal Goal, Lakes and Reservoirs, FY 1986-FY 1987, Savannah Basin | 53 |
| 4.2.H. | Lake Name, Location, and Indication of Public Ownership | 54 |
| 4.2.I. | Ranking of Major Lakes by Trophic State | 57 |
| 4.2.J. | Ranking of Minor Lakes by Trophic State | 58 |
| 4.2.K. | Publicly Owned Lakes with Impaired Recreational Uses - Major Lakes | 59 |
| 4.2.L. | Publicly Owned Lakes with Impaired Recreational Uses - Minor Lakes | 60 |
| 4.3.A. | Attainment of State Classified Uses, Tidal Saltwaters, FY 1986-FY 1987 | 61 |
| 4.3.B. | Attainment of CWA Goals, Tidal Saltwaters, FY 1986-FY 1987 | 61 |
| 4.3.C. | Probable Causes of Partial or Non-Attainment of Classified Uses, Tidal Saltwaters Statewide, FY 1986-FY 1987 | 62 |
| 4.3.D. | Probable Sources of Partial or Non-Attainment of Classified Uses, Tidal Saltwaters Statewide, FY 1986-FY 1987 | 62 |
| 4.3.E. | Attainment of State Classified Uses and the 1983 Federal Goal, Tidal Saltwaters, FY 1986-FY 1987, Pee Dee Basin | 63 |
| 4.3.F. | Attainment of State Classified Uses and the 1983 Federal Goal, Tidal Saltwaters, FY 1986-FY 1987, Santee-Cooper Basin | 64 |

| TABLE | | PAGE |
|---|---|---|
| 4.3.G. | Attainment of State Classified Uses and the 1983 Federal Goal, Tidal Saltwaters, FY 1986-FY 1987, Edisto-Combahee Basin | 66 |
| 4.3.H. | Attainment of State Classified Uses and the 1983 Federal Goal, Tidal Saltwaters, FY 1986-FY 1987, Savannah Basin | 68 |
| 4.3.I. | Status of Shellfish Growing Areas in South Carolina | 71 |
| 4.3.J. | Prohibited Shellfish Harvesting Areas in Class SA Waters Due to Closed Safety Zones Around Point Source Discharges | 84 |
| 4.3.K. | Prohibited Shellfish Harvesting Areas in Class SA Waters Due to Closed Safety Zones Around Marinas | 85 |
| 4.3.L. | Acreages of Shellfish Waters in Each Water Use Classification | 86 |
| 4.4.A. | Waters Affected by Metals, Statewide, FY 1986-FY 1987 | 95 |
| 4.4.B. | Waters Affected by Organics, Statewide, FY 1986-FY 1987 | 96 |
| 4.4.C. | South Carolina Fish Kills Attributed to Toxics, FY 1986-FY 1987 | 97 |
| 4.7.A. | Nonpoint Source Assessment | 112 |
| 4.7.B. | Watersheds with High Potential for NPS Runoff | 121 |
| 4.7.C. | Ground-water NPS Assessment | 122 |
| 5.2.A. | Sources of Localized Ground-water Contamination, South Carolina | 130 |
| 5.4.A. | Substances Contaminating Localized Ground-water, South Carolina | 131 |
| 6.1.A. | Treatment Works Receiving Construction Grants and Became Operational in FY 1986 and FY 1987 | 135 |
| 6.2.A. | Existing and Recommended Nonpoint Source Control Programs in South Carolina | 153 |

| TABLE | | PAGE |
|---|---|---|
| 6.4.A. | Water Quality Studies, FY 1986 and FY 1987, South Carolina | 160 |
| 6.5.A. | Waters With Reclassifications Effective During FY 1986-FY 1987 | 163 |

## LIST OF FIGURES


| FIGURE | | PAGE |
|---|---|---|
| 3.1.A. | South Carolina Department of Health and Environmental Control Fixed Monitoring Network Primary Stations . . . . . | 9 |
| 3.1.B. | South Carolina Department of Health and Environmental Control Fixed Monitoring Network Secondary Stations . . . . . | 10 |
| 4.3.A. | Station Locations in Assessment Area, A Water Quality Assessment of the Stono River, Charleston County, South Carolina, August 27-29, 1985 . . . . . | 89 |
| 4.4.A. | South Carolina Fishing Advisories, FY 1986-FY 1987 . . . . . | 99 |

# EXECUTIVE SUMMARY

South Carolina has approximately 9,900 miles of rivers; 963,000 acres of lakes; and 2,155 square miles of tidal saltwaters. Water quality data collected by the South Carolina Department of Health and Environmental Control during fiscal years 1986 and 1987 provided the data base for this assessment. Physical, chemical, and biological data were available for 3,795 miles of rivers; 405,555 acres of lakes; and 616 square miles of tidal saltwaters, and the strategic location of the monitoring stations allows these data to provide an evaluation of water quality statewide. Using criteria developed for this assessment, these data were evaluated to determine if the water quality in rivers, lakes, and saltwaters was suitable to allow attainment of State classified uses and attainment of the fishable/swimmable goal of the Federal Clean Water Act.

The Department of Health and Environmental Control (DHEC) has promulgated regulations which designate classified uses for each waterbody and establish general rules and specific standards to protect these uses. Two major tenets of the regulations are that waters which meet standards shall be maintained and waters which do not meet standards shall be improved.

The fishable/swimmable goal of the Federal Clean Water Act states "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water shall be achieved by July 1, 1983."

Approximately 90% of all waters in South Carolina have water quality suitable for protection of and attainment of State classified uses. Based on acreage and stream miles, more than 95% of all waters have water quality suitable to protect them for either fishing or swimming, or both. The 5% difference between waters meeting the Federal goal and waters meeting State

standards is primarily because some waters designated as Class SA, suitable for shellfish harvesting, did not meet the more stringent State standard for total coliform bacteria but did meet the fecal coliform criteria used to determine if a waterbody was swimmable. The following tables show percentages of waters in South Carolina where water quality was suitable to allow attainment of State classified uses and the Federal fishable/swimmable goal during FY 1986 and 1987. Approximately 66% of South Carolina's rivers and streams are Class B and do not have swimming as a designated use. This resulted in 58% of the rivers attaining the swimmable goal although 85% of the rivers partially or fully attained their classified uses.

Determination of Attainment of State Classified Uses

| | Attained | Partially Attained | Not Attained |
|---|---|---|---|
| Rivers | 75% | 10% | 15% |
| Lakes | 99% | <1% | <1% |
| Saltwaters | 88% | 3% | 9% |

Determination of Attainment of the 1983 Federal Goal

| | Fishable or Swimmable Attained | Fishable and Swimmable Attained | Fishable Attained | Swimmable Attained | Not Attained |
|---|---|---|---|---|---|
| Rivers | 95% | 55% | 92% | 58% | 5% |
| Lakes | 100% | 99% | 99% | 99% | 0% |
| Saltwaters | 99% | 93% | 96% | 96% | <1% |

In rivers, pollution from non-point sources was most responsible for partial or non-attainment of State classified uses. In lakes, unknown sources were most responsible for partial or non-attainment of State classified uses. Non-point sources were the only sources for partial or non-attainment in tidal saltwaters. The following table summarizes pollution source categories in percentages responsible for partial or non-attainment of State classified uses during FY 1986 and 1987. Less that 25% of all waters had water quality such

that State classified uses were not fully attained. Fecal coliform contamination was the most frequent cause for partial or non-attainment.

| | Point Source Discharges | Non-Point Sources | Unknown |
|---|---|---|---|
| Rivers | 23% | 55% | 22% |
| Lakes | 21% | 2% | 76% |
| Saltwaters | 0 | 100% | 0 |

Toxic pollutants are not a problem in South Carolina surface waters. Only 7% of the freshwaters, 2% of the lakes, and <1% of the saltwaters assessed had heavy metals in concentrations which exceeded EPA criteria recommended to protect aquatic life. PCB's, pesticides, and organics were not detected in the water column at any location in the trend monitoring network.

Approximately 86% of the State's coastal shellfish growing waters which have shellfish harvesting as a classified use (Class SAA or Class SA) are unconditionally approved for safe shellfish harvesting. Less that 1% of Class SA waters are permanently closed to shellfish harvesting due to buffer zones from marinas or discharges. When considering saltwaters in all use classifications, 66% of the waters are unconditionally approved for safe shellfish harvesting. Approximately 23% of the saltwaters are Class SB and Class SC where shellfish harvesting for direct marketing is not a classified use. Of these waters, 14% may be opened to harvesting under certain water quality conditions or opened to harvesting for depuration or relaying.

The overall quality of ground-water in South Carolina is excellent; however, there are 390 instances of localized ground-water contamination. The Department has made an effort to educate the public about ground-water contamination through its permitting process and by requiring the licensing of well drillers, establishing well construction standards, and regulating underground storage tanks.

South Carolina effectively regulates point source discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) permit program. All public and private municipal facilities and industrial facilities have NPDES permits which are reviewed and reissued periodically. Departmental approval and implementation of industrial waste pretreatment programs for publicly owned treatment works have improved water quality by reducing toxic discharges from these facilities. Most point source agricultural waste discharges have been eliminated through the issuance of State construction permits which require alternate non-discharging treatment systems.

Municipal compliance has been a priority throughout the 1980's and South Carolina has pursued compliance with National Municipal Policy mandates. The Department has issued orders placing all publicly owned treatment works not meeting final permit conditions on enforceable schedules to assure compliance with final effluent limits. The Department has also taken necessary enforcement action to assure effluent limit compliance and maintenance of water quality at industrial and private domestic facilities.

South Carolina's non-point source control strategy includes regulatory and voluntary programs. DHEC is involved in non-point source pollution control through water quality certification of Federal permits (mostly Army Corps 404 permits) as required by Section 401 of the Clean Water Act, stormwater control requirements on some NPDES and construction permits for wastewater treatment facilities, and "best management practices" requirements to control oil and hazardous and toxic substances at industrial facilities. Numerous other State and local agencies are involved in non-point source control programs.

## 1.0. SOUTH CAROLINA STATISTICS

### 1.1. Atlas

-State population: 3,347,000 (1985)

-State surface area (land): 30,203 square miles

-Number of River basins: 4 - Pee Dee, Santee-Cooper, Edisto-Combahee, Savannah

-State surface area (water): 909 square miles

-Total river miles: 9,900 miles (on 1:500,000 scale map)

Border miles: 408 miles
Border waters: Chattooga River, Tugaloo River, Savannah River, Lake Hartwell, Clarks Hill Lake, Lake Richard B. Russell, Catawba River, Lake Wylie

-Number and acres of lakes and reservoirs:

10 - 1000 acres: 1,400
~~492,000~~ 54,000 acres

greater than 1000 acres: 18
471,000 acres

-Area of tidal salt waters: 2,155 square miles

-Ocean coastal miles: 190 miles

-Area of freshwater wetlands: 4,200,000 acres

-Area of tidal wetlands: 500,000 acres

## 2.0. Water Classifications and Standards

South Carolina Regulation 61-68 entitled "Water Classifications and Standards" identifies five classes of freshwaters, four classes of saltwaters, and three classes of groundwaters. Each classification consists of two parts: classified uses which must be protected and water quality standards stringent enough to protect these uses. There are general rules and standards applicable to all classes as well as the specific standards for each class.

### 2.1. Surface Water Classes

Since this report is primarily a surface water assessment, only

the surface water classes are described.

CLASS AA - freshwaters which constitute an outstanding recreational or ecological resource or waters suitable for drinking water with treatment as specified by the Department - also suitable for uses listed in Class A and Class B.

CLASS A-TROUT - freshwaters suitable for supporting reproducing trout populations and a cold water balanced indigenous aquatic community of fauna and flora - also suitable for uses listed in Class A and Class B.

CLASS A - freshwaters suitable for primary contact recreation - also suitable for uses listed in Class B.

CLASS B-TROUT - freshwaters suitable for supporting reproducing trout populations and a cold water balanced indigenous community of fauna and flora - also suitable for uses listed Class B.

CLASS B - freshwaters suitable for secondary contact recreation, as a source of drinking water after conventional treatment, for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora, and for industrial and agricultural uses.

CLASS SAA - tidal saltwaters which constitute an outstanding recreational or ecological resource - also suitable for uses lised in Class SA, Class SB, and Class SC.

CLASS SA - tidal saltwaters suitable for harvesting of clams, mussels, or oysters for market purposes or human consumption - also suitable for uses listed in Class SB and Class SC.

CLASS SB - tidal saltwaters suitable for primary contact recreation - also suitable for uses listed in Class SC.

CLASS SC - tidal saltwaters suitable for secondary contact recreation, crabbing, fishing (except harvesting of clams, mussels, or oysters for market purposes or human consumption), and the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Table 2.1.A. summarizes the uses supported by each classification.

Table 2.1.A.
Summary of Classified Uses
South Carolina

| Uses | Use Classifications |
|---|---|
| Fish and Wildlife | All classes |
| Domestic Water Supply | All freshwater classes |
| Primary Contact Recreation | AA, A-Trout, A, SAA, SA, SB |
| Secondary Contact Recreation | All classes |
| Agriculture | All freshwater classes |
| Industrial | All freshwater classes |
| Navigation | All classes |
| No degradation of existing uses | All classes |
| No degradation of natural conditions | AA, SAA |

All waters in South Carolina are classified in Regulation 61-69 entitled "Classified Waters." If a specific waterbody is not listed by name, it assumes the classification of the waterbody to which it is tributary.

## 2.2. Summary of Classified Uses

| | Percent of Total Measured on 1:500,000 scale map | | |
|---|---|---|---|
| Use Classification | Rivers | Lakes | Tidal Saltwaters |
| Class AA | <1% | <1% | -- |
| Class A-Trout | <1% | 0 | -- |
| Class A | 33% | 96% | -- |
| Class B-Trout | 0 | 0 | -- |
| Class B | 66% | 3% | -- |
| Class SAA | -- | -- | 12% |
| Class SA | -- | -- | 67% |
| Class SB | -- | -- | 9% |
| Class SC | -- | -- | 12% |

# 3.0. EVALUATION METHODOLOGY

Physical, chemical, and biological data were evaluated, as described below, to determine if water quality was suitable to protect the State classified uses defined in Regulation 61-68 "Water Classifications and Standards." Data were also evaluated to determine if water quality was

suitable to provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water - the fishable/swimmable goals of the Federal Clean Water Act.

3.1. Waters Assessed

Assessed waters are those waters directly monitored as part of the trend network or during special studies. The waters assessed since the last reporting period have been increased by using secondary monitoring station data in addition to primary monitoring station data. We have assessed data from the 185 primary stations plus 152 secondary stations representing waters not covered by the primary stations. The entire secondary station network includes 358 stations. Primary stations are sampled monthly year round and secondary stations are sampled monthly, May through October.

Figure 3.1.A. shows the location of primary monitoring stations and Figure 3.1.B. shows the location of secondary monitoring stations.

3.2. Determination of Attainment of Classified Uses

In general, the determination of attainment of designated or classified uses was made by applying the State numeric standards summarized in Table 3.2.A. for each class. More specifically, a designated use was attainable if the following criteria were met:

a. Shellfish harvesting was attainable if waters met the total coliform bacteria criterion of an MPN median no greater than 70/100 ml with no more than 10% of the samples greater than 230/100 ml (Class SA waters). The Department now uses a fecal coliform bacteria criteria for Class SA waters. This is consistent with the Shellfish Sanitation Program (See Section 4.3.2.).

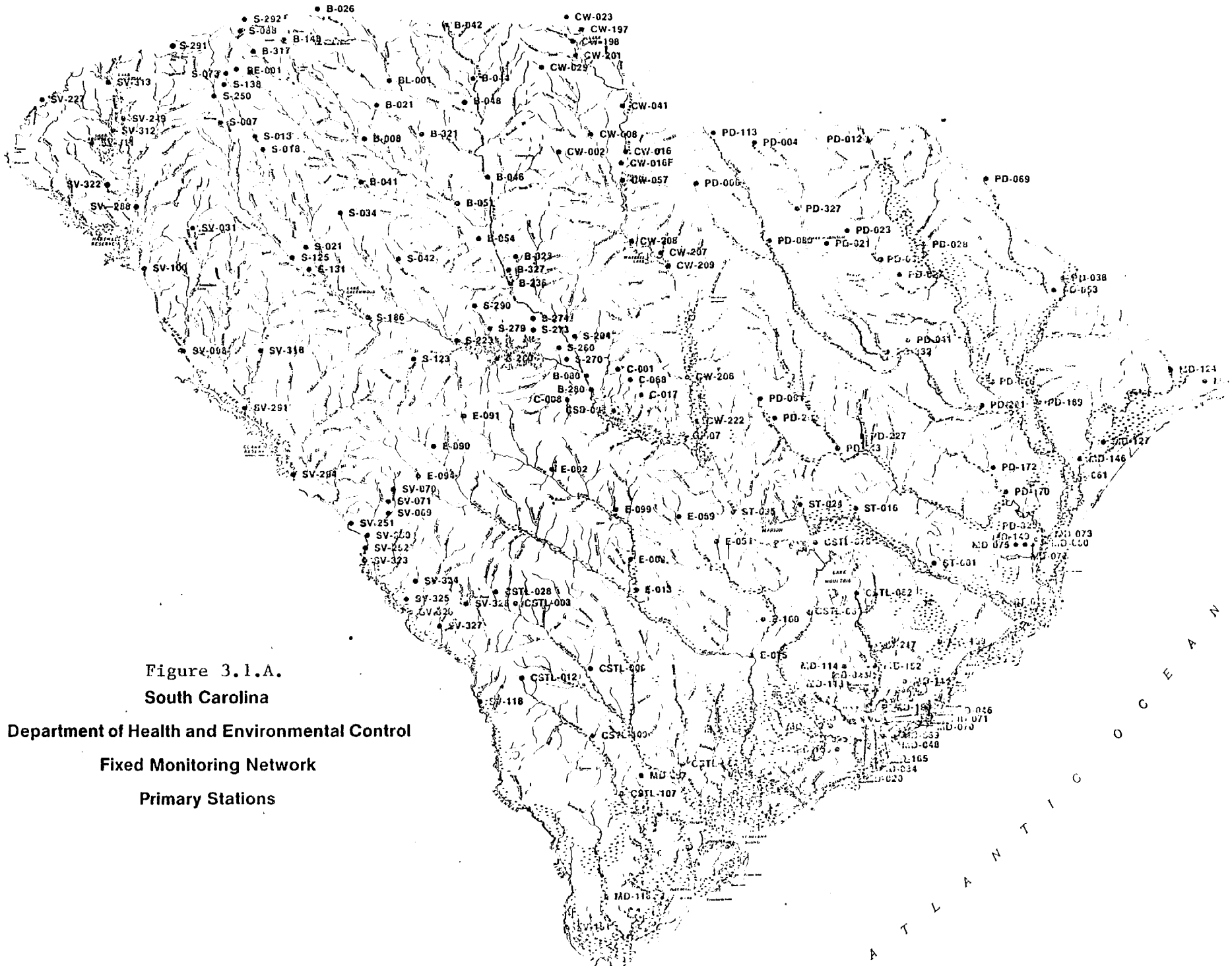



Figure 3.1.A.

**South Carolina**

**Department of Health and Environmental Control**

**Fixed Monitoring Network**

**Primary Stations**

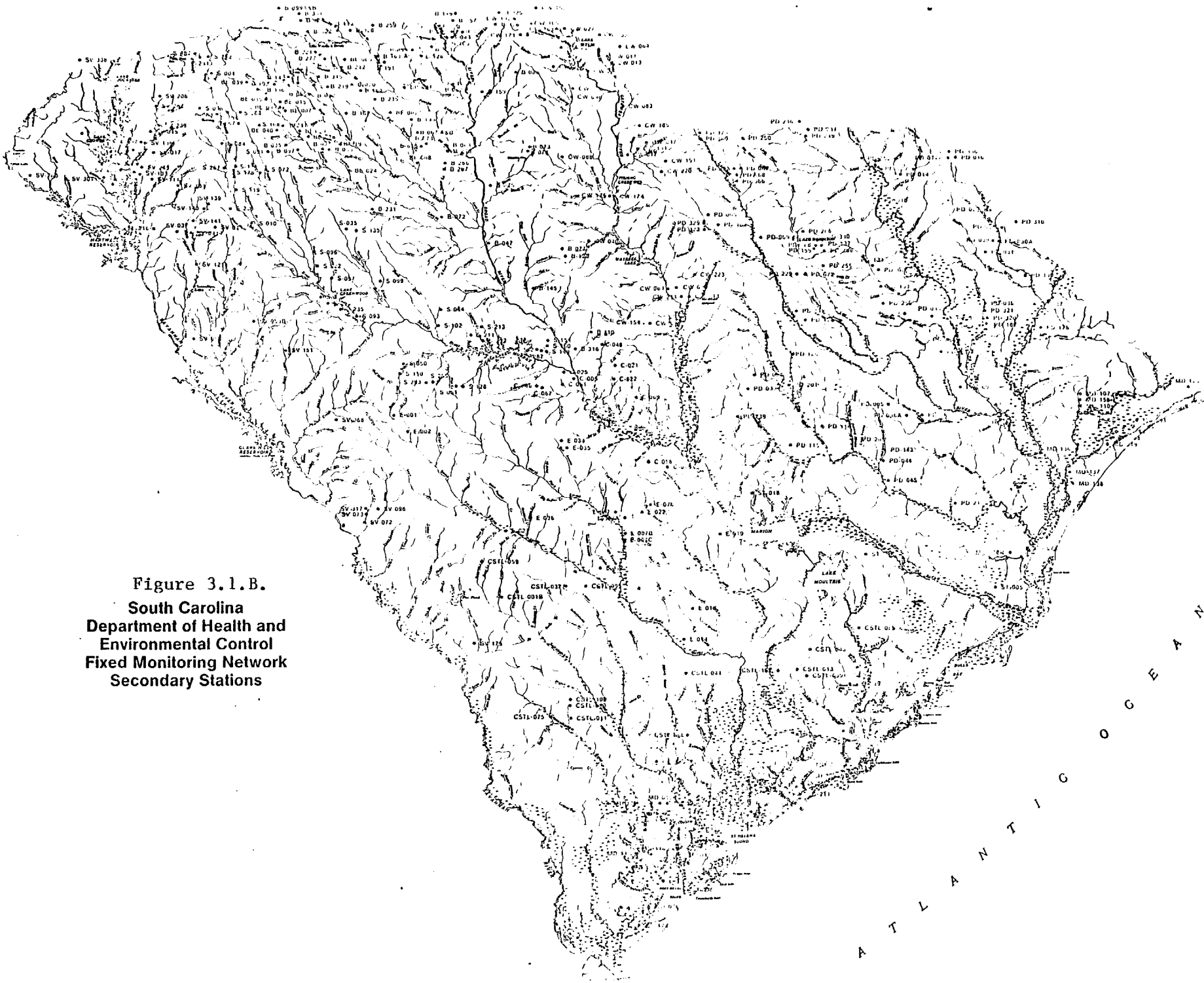



Figure 3.1.B.
**South Carolina Department of Health and Environmental Control Fixed Monitoring Network Secondary Stations**

b. Primary contact recreation was attainable if waters met the fecal coliform bacteria criterion of a geometric mean no greater than 200/100 ml with no more than 10% of the samples greater than 400/100 ml (Class A and Class SB waters).

c. Secondary contact recreation and water supply uses were attainable if waters met the fecal coliform bacteria criterion of a geometric mean no greater than 1000/100 ml with no more than 20% of the samples greater than 2000/100 ml (Class B waters, both uses, and Class SC waters, secondary contact recreation).

d. Survival and propagation of an aquatic community was attainable if waters met a daily average dissolved oxygen concentration not less than 5.0 mg/l with no concentrations below 4.0 mg/l (all class waters). Certain waters may not meet the specified numeric standard for dissolved oxygen due to natural conditions but designated uses may still be attainable. If dissolved oxygen values were consistently less than 4.0 mg/l, professional judgement and knowledge of the biological community was used to determine if the designated use was attainable.

A determination of less than full support of designated or classified uses was made by applying the criteria in Table 3.2.B. to an analysis of data for bacteria, dissolved oxygen, pH, and biological communities.

In summary, a classified use was supported for a certain class water if the specific numeric standards for pH, bacteria, and dissolved oxygen were met.

Table 3.2.A.
Summary of State Numeric Standards

| Parameter | Water Classification | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | A-Trout | B | B-Trout | SA | SB | SC |
| Dissolved Oxygen daily mean | 5 mg/l | ---- | 5 mg/l | ---- | 5 mg/l | 5 mg/l | ---- |
| Dissolved Oxygen low value | 4 mg/l | 6 mg/l | 4 mg/l | 6 mg/l | 4 mg/l | 4 mg/l | 4 mg/l |
| pH | 6-8 | 6-8 | 6-8.5 | 6-8.5 | 6.5-8.5 | 6.5-8.5 | 6.5-8.5 |
| Fecal coliform bacteria | 200/100 ml-A<br>400/100 ml-C | 200/100 ml-A<br>400/100 ml-C | 1000/100 ml-A<br>2000/100 ml-D | 1000/100 ml-A<br>2000/100 ml-D | ---- | 200/100 ml-A<br>400/100 ml-C | 1000/100 ml-A<br>2000/100 ml-D |
| Total coliform bacteria | | | | | 70/100 ml-B<br>230/100 ml-C | | |

A=geometric mean value
B=Median value, MPN
C=10% not to exceed
D=20% not to exceed

Table 3.2.B. Criteria for attainment of designated uses.

| Assessment Basis | Assessment Description | Fully attainable | Partially attainable | Not attainable |
|---|---|---|---|---|
| Monitored (Chemistry) | Fixed station sampling or survey sampling. Chemical analysis of water, sediment, or biota. | For all pollutants, criteria exceeded in $<10\%$ of measurements and mean of measurements is less than criteria. Pollutants not found at levels of concern. | For any one pollutant, criteria exceeded 11-25% and mean of measurements is less than criteria; or criteria exceeded $<10\%$ & mean is greater than criteria. Pollutants not found at levels of concern. | For any one pollutant criteria exceeded 25%. Pollutants found at levels of concern. |
| Monitored (Biology) | Site visit by qualified biological personnel. Rapid bioassessment protocols may be used. | Use fully supported; no evidence of modification of community (within natural range of control/ecoregion). | Some uncertainty about use support; some modification of community noted. | Use clearly not supported; definite modification of community. |

### 3.3. Determination of Attainment of 1983 Goals of the Clean Water Act

1. A waterbody, regardless of its use classification, has attained the fishable goal if:

    a. Less than 25% of the dissolved oxygen values were below 5.0 mg/l. If natural conditions cause the dissolved oxygen to be below 5.0 mg/l, biological data and professional judgement were used to determine if the water was fishable.

    b. There are no fishing advisories or bans for the waterbody.

2. A waterbody, regardless of its use classification, has attained the swimmable goal if:

    a. The fecal coliform geometric mean is no greater than 200/100 ml and no more than 10% of the samples exceed 400/100 ml.

    b. Known physical conditions do not preclude swimming.

3. A waterbody has attained the fishable/swimmable goal if the criteria for 1 and 2, above, are met.

### 3.4. Determination of Surface Waters Affected by Toxics

Since the 304(a) criteria for many toxics are lower than the State's analytical detection limit, all toxics analyzed for must first be evaluated to determine if measurable amounts were detected. If no toxics were detected, and the 304(a) criterion is below the detection limit, the waterbody is considered to be not affected by toxics. If measurable amounts of toxics were detected, or the 304(a) criterion is above the detection limit, the detected concentration was compared to the appropriate 304(a) criterion.

For those few metals criteria which are hardness-dependent, detected concentrations were compared with the concentration computed using a hardness of 50 mg/l. Most South Carolina waters have a hardness less than 50 mg/l, but the equations for computing metal toxicity are not reliable below 50 mg/l hardness. The 304(a) criterion which represents acute toxicity was used since most metals are collected as single grab samples.

Table 3.4.A. presents the 304(a) criteria used to evaluate waters affected by toxics. These are the toxics for which EPA has developed national criteria and for which South Carolina Department of Health and Environmental Control has conducted analyses.

Table 3.4.A.

304(a) Criteria for Priority Pollutants

| | Freshwater | Saltwater |
|---|---|---|
| Cadmium | 3.9 ug/l | 43 ug/l |
| Copper | 9.2 ug/l* | 2.9 ug/l |
| Lead | 34 ug/l* | 140 ug/l |
| Mercury | 2.4 ug/l | 2.1 ug/l |
| Nickel | 790 ug/l* | 75 ug/l |
| Zinc | 65 ug/l | 95 ug/l |
| B-Endosulfan | 0.22 ug/l | 0.034 ug/l |
| G-BHC | 2.0 ug/l | 0.16 ug/l |
| Aldrin | 3.0 ug/l | 1.3 ug/l |
| Dieldrin | 2.5 ug/l | 0.71 ug/l |
| 4,4'-DDT | 1.1 ug/l | 0.13 ug/l |
| Endrin | 0.18 ug/l | 0.037 ug/l |
| Heptachlor | 0.52 ug/l | 0.053 ug/l |
| Chlordane | 2.4 ug/l | 0.09 ug/l |
| Toxaphene | 0.73 ug/l | 0.21 ug/l |
| PCB | 2.0 ug/l | 10 ug/l |

*computed at hardness of 50 mg/l

## 4.0. SURFACE WATER QUALITY

### 4.1. Rivers and Streams

South Carolina has approximately 9,900 miles of freshwater rivers and streams. Although 3,795 miles were assessed using data collected at water quality monitoring stations, the strategic location of these monitoring stations allows these data to provide a representative assessment of water quality for the entire state. These waters were assessed using data collected at 337 DHEC water quality monitoring stations representing 3,795 stream miles.

#### 4.1.1. Summary of Assessment

Determinations of attainment of State classified uses and the goals of the Clean Water Act for individual waterbodies are presented in Tables 4.1.E. - 4.1.H. at the end of this section concerning the assessment of rivers and streams.

Table 4.1.A.
Attainment of State Classified Uses
Rivers and Streams - Reported as Miles
FY 1986 - FY 1987

| Basin | Assessed | Full | Partial | Not |
|---|---|---|---|---|
| Pee Dee | 1085 | 779.5 | 57 | 248.5 |
| Santee Cooper | 1721 | 1184 | 286 | 251 |
| Edisto Combahee | 522 | 442 | 35 | 45 |
| Savannah | 467 | 419 | 17 | 31 |
| Statewide | 3795 | 2824.5 | 395 | 575.5 |
| % Attainment Statewide | | 75% | 10% | 15% |

Table 4.1.B.

Attainment of CWA Goals
Rivers and Streams - Reported as Miles
FY 1986 - FY 1987

| Basin | Assessed | Fish/Swim | Fishable | Swimmable | Neither |
|---|---|---|---|---|---|
| Pee Dee | 1085 | 708 | 856.5 | 815 | 121.5 |
| Santee Cooper | 1721 | 641 | 1690 | 641 | 31 |
| Edisto Combahee | 522 | 388 | 500 | 398 | 12 |
| Savannah | 467 | 341 | 430 | 345 | 33 |
| Statewide | 3795 | 2078 | 3476.5 | 2199 | 197.5 |
| % Attainment Statewide | | 55% | 92% | 58% | 5% |

Table 4.1.C.

Probable Causes of Partial or Non-Attainment of Classified Uses
Rivers and Streams Statewide
FY 1986 - FY 1987

| | Miles | % of Non-Attaining |
|---|---|---|
| Low dissolved oxygen | 320.75 | 33% |
| Fecal coliform contamination | 617.75 | 64% |
| pH contraventions | 2.0 | < 1% |
| Toxics accumulation | 0 | 0 |
| Unknown | 30.0 | 3% |
| | 970.5 | |

Table 4.1.D.

Probable Sources of Partial or Non-Attainment of Classified Uses
Rivers and Streams Statewide
FY 1986 - FY 1987

| | Miles | % of Non-Attaining | % of Assessed |
|---|---|---|---|
| Point Sources | 225 | 23% | 6% |
| Municipal | 170* | | |
| Industrial | 55 | | |
| Nonpoint Sources | 531.5 | 55% | 14% |
| Agriculture | 364 | | |
| Urban runoff | 157.5 | | |
| Forests | - | | |
| Hydrologic Modification | 2 | | |
| Construction | 4 | | |
| Silviculture | 4 | | |
| Unknown Sources | 214 | 22% | 6% |
| Total Miles Partially or Not Attaining | 970.5 | | 25% |
| Total Miles Assessed | 3795 | | |

*132 miles were affected by facilities which have been eliminated, undergoing an upgrade, or had interim limits.

## 4.2. Lakes and Reservoirs

South Carolina has approximately 1,400 lakes between 10 and 1,000 acres in size covering ~~492,000~~ 54,000 acres. There are 18 reservoirs larger than 1,000 acres in size impounding more than 471,000 acres; thirteen of these reservoirs contain more than 95% of the State's impounded waters. Most South Carolina lakes and reservoirs have multiple uses: the principal uses are recreation, power production, and flood control. Approximately 455,000 acres represent publicly owned lakes and reservoirs. South Carolina lakes were assessed for this report using data collected at 50 DHEC water quality monitoring stations representing 410,407 acres.

## Legends for Tables Showing Attainment

Refer to: Tables 4.1.E. - 4.1.H.
Tables 4.2.E. - 4.2.G.
Tables 4.3.E. - 4.3.H.

### Waterbody

Name of waterbody
Basin and sub-basin
County

### Class

Water classification according to Regulation 61-69, "Classified Waters"
*denotes site-specific standards (D.O. minimum 4 mg/l, pH minimum 5)

### Cause

Parameter with contraventions that was responsible for partial or non-attainment of classified uses

DO = dissolved oxygen
FC = fecal coliform bacteria
TOX = toxics
NUT = nutrients

### Major/Minor

cause considered major if responsible for partial attainment
cause considered minor if responsible for non-attainment

### Source

Probable pollution source responsible for partial or non-attainment of classified uses

PS = point source
NPS = non-point source
UNK = unknown source

### Type

#### Point Sources

MUN = municipal facility
MUN (E) = municipal facility, eliminated since assessment period
MUN (IL) = municipal facility, had interim limits during assessment period
MUN (U) = municipal facility, facility undergoing upgrade
IND = industrial facility

#### Non-Point Sources

Ag = agricultural activity
UR = urban runoff
Forest = runoff from forested land (but not silvicultural activities)
Unk = unknown source
Con = construction activity
Sil = Silviculture

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beaverdam Creek | A | 3 | | | 3 | DO | x | | Unk | N.Car. | | | | 3 |
| 030722 | | | | | | pH | | | | | | | | |
| Dillon Co | | | | | | | | | | | | | | |
| Big Swamp | B* | 16 | | | 16 | FC | x | | NPS | Ag | | 12 | | 4 |
| 030728 | | | | | | DO | x | | | | | | | |
| Florence Co | | | | | | | | | | | | | | |
| Birch Creek | A | 8 | | | 8 | FC | x | | NPS | Ag | | 8 | | |
| 030710 | | | | | | DO | x | | | | | | | |
| Williamsburg Co | | | | | | | | | | | | | | |
| Black Creek | B | 28 | 28 | | | | | | | | 28 | | | |
| 030725 | B* | 22 | 19 | 3 | | DO | | x | PS | Ind | 22 | | | |
| Chesterfld & Darl Cos | A | 20 | | 20 | | FC | | X | PS | Ind | | | 20 | |
| Black Mingo Creek | A* | 23 | | | 23 | DO | x | | NPS | Ag | | | | 23 |
| 030708 | | | | | | | | | | | | | | |
| Georgetown Co | | | | | | | | | | | | | | |
| Black River | A* | 102 | 102 | | | | | | | | 102 | | | |
| 030710-12 | | | | | | | | | | | | | | |
| Geotown & Willmsbrg Cos | | | | | | | | | | | | | | |
| Brown Swamp | B* | 2 | 2 | | | | | | | | | | 2 | |
| 030718 | | | | | | | | | | | | | | |
| Marion Co | | | | | | | | | | | | | | |
| Buck Swamp | B* | 12 | | | 12 | DO | x | | PS | Mun | | 12 | | |
| 030720 | | | | | | | | | | | | | | |
| Dillon Co | | | | | | | | | | | | | | |
| Catfish Canal | B* | 36 | | | 36 | FC | x | | NPS | Ag,UR | | 36 | | |
| 030724 | | | | | | DO | x | | | | | | | |
| Marion Co | | | | | | | | | | | | | | |

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Chinners Mill Branch<br>030718<br>Horry Co | A | 4 | | | 4 | DO | x | | Unk | | | | | 4 |
| Cousar Branch<br>030730<br>Lee Co | B | 1 | | 1 | | FC | | x | PS | Ind | | | 1 | |
| Crabtree Creek<br>030716<br>Horry Co | A | 7 | | | 7 | FC<br>DO | x<br>x | | NPS | Ag<br>UR | | 7 | | |
| Crooked Creek<br>030726<br>Marlboro Co | A<br>B | 4<br>6 | <br>6 | 4 | | FC | | x | NPS | Ag,UR | | | 4<br>6 | |
| Fork Creek<br>030734<br>Chesterfield Co | B | 12 | 12 | | | | | | | | | | 12 | |
| Green Swamp<br>030714<br>Sumter Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Hanging Rock Creek<br>030732<br>Kershaw Co | B | 5 | 5 | | | | | | | | 5 | | | |
| High Hill Creek<br>030725<br>Darlington Co | A | 14 | 14 | | | | | | | | 14 | | | |
| Indian Creek<br>030726<br>Chesterfield Co | B | 9 | 9 | | | | | | | | | | 9 | |

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Intracoastal Waterway<br>030715<br>Horry Co | A | 8 | 8 | | | | | | | | 8 | | | |
| Jeffries Creek<br>030724<br>Florence Co | B*<br>A* | 28<br>7 | 7<br>7 | | 21 | DO | x | | NPS | Ag | 7<br>7 | 21 | | |
| Kingston Lake<br>030716<br>Horry Co | A | 15 | | | 15 | FC | x | | NPS | UR | | | 15 | |
| Kingstree Swamp Canal<br>030710<br>Williamsburg Co | A | 17 | 17 | | | | | | | | 17 | | | |
| Lake Swamp<br>030718<br>Horry Co | A | 14 | | | 14 | DO | x | | NPS | Ag | | | | 14 |
| Lick Creek<br>030732<br>Kershaw & Lanc Cos | B | 3 | 1 | | 2 | FC | x | | Unk | | | | 3 | |
| Little Fork Creek<br>030734<br>Chesterfield Co | B | 9 | | 9 | | FC | | x | Unk | | | | 9 | |
| Little Lynches River<br>030732<br>Lancaster Co | B | 12 | | 12 | | FC | | x | NPS | Ag | | | 12 | |
| Little Pee Dee River<br>030718-20<br>Dillon & Marion Cos | A<br>B | 61<br>35 | 61<br>35 | | | | | | | | 61<br>35 | | | |

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Lumber River<br>030722<br>Marion Co | A | 10 | 10 | | | | | | | | 10 | | | |
| Lynches Lake<br>030728<br>Florence Co | B* | 31 | | | 31 | DO | x | | NPS | Ag,UR | | | | 31 |
| Lynches River<br>030728-30-34<br>Chstrfld,Flor,& Kersh Cos | B | 116 | 116 | | | | | | | | 110 | | 6 | |
| Maidendown Swamp<br>030720<br>Marion Co | B | 2 | | | 2 | DO | x | | PS<br>NPS | Ind<br>Ag | | | | 2 |
| Maple Swamp<br>030720<br>Dillon Co | B* | 3 | | | 3 | DO | X | | PS | Mun | | | | 3 |
| Middle Swamp<br>030724<br>Florence Co | B* | 10 | | | 10 | DO | x | | NPS | Ag | | 10 | | |
| Nasty Branch<br>030714<br>Sumter Co | B | 3 | 3 | | | | | | | | 3 | | | |
| Newman Swamp<br>030730<br>Darlington Co | B* | 2 | 2 | | | | | | | | | | 2 | |
| Panther Creek<br>030720<br>Marlboro Co | B | 6 | | 2 | 4 | DO | | x | PS<br>NPS | Mun<br>Ag | | 2 | | 4 |

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pee Dee River<br>030702-24-26<br>Darl,Hor,Marion,& Marl Cos | B | 143 | 143 | | | | | | | | 143 | | | |
| Pocotaligo River<br>030714<br>Sumter & Clarendon Cos | B* | 36 | 30 | | 6 | DO | x | | NPS | Ag,UR,<br>Hyd.Mod | 30 | | | 6 |
| Pudding Swamp<br>030712<br>Williamsburg Co | A | 8 | | | 8 | DO | x | | NPS | Ag | | | | 8 |
| Rocky Bluff Swamp<br>030712<br>Sumter Co | B | 5 | | | 5 | DO | x | | NPS | Ag | | | | 5 |
| Smith Swamp<br>030724<br>Marion Co | B* | 13 | | | 13 | DO | x | | PS | Mun(IL) | 13 | | | |
| Snake Branch<br>030725<br>Darlington Co | B | 1 | 0.5 | | 0.5 | FC<br>DO | x<br>X | | NPS | UR | | 0.5 | 0.5 | |
| Sparrow Swamp<br>030730<br>Florence Co | B* | 34 | 34 | | | | | | | | 34 | | | |
| Swift Creek<br>030725<br>Darlington Co | A | 13 | 13 | | | | | | | | 13 | | | |
| Thompson Creek<br>030726<br>Chesterfield Co | B | 23 | 19. | 4 | | FC | | x | NPS | Ag | | | 23 | |

TABLE 4.1.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

PEE DEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Todds Branch<br>030732<br>Lancaster Co | B | 2 | | 2 | | FC | | x | NPS | UR | | | 2 | |
| Turkey Creek<br>030714<br>Sumter Co | B | 5 | | | 5 | FC | x | | NPS | UR | | | 5 | |
| Waccamaw River<br>030716<br>Horry Co | A* | 59 | 59 | | | | | | | | 59 | | | |
| Wildcat Creek (N)<br>030734<br>Lancaster Co | B | 7 | 7 | | | | | | | | | | 7 | |
| Wildcat Creek (S)<br>030734<br>Lancaster Co | B | 6 | 6 | | | | | | | | | | 6 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND/FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE: MAJOR | CAUSE: MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allison Creek<br>030836<br>York County | B | 8 | 8 | | | | | | | 8 | | | |
| Bear Creek<br>030834<br>Lancaster Co | B | 13 | 9 | 4 | | FC | x | NPS | Ag | | | 13 | |
| Beards Creek<br>030860<br>Laurens Co | B | 5 | | 5 | | DO | x | Unk | | 5 | | | |
| Beaverdam Creek<br>030836<br>York Co | B | 9 | | 9 | | FC | x | NPS | Ag | | | 9 | |
| Beaverdam Creek<br>030862<br>Greenville Co | B | 5 | 5 | | | | | | | | | 5 | |
| Beaverdam Creek<br>030864<br>Spartanburg Co | B | 10 | 10 | | | | | | | | | 10 | |
| Big Durbin Creek<br>030862<br>Grnvl & Laurens Cos | B | 12 | 7 | | 5 | FC | x | PS<br>NPS | Mun(E)<br>Ag | | | 12 | |
| Big Pine Tree Creek<br>030828<br>Kershaw Co | B | 2 | 2 | | | | | | | 2 | | | |
| Broad River<br>030850-54-56<br>Chrk,Frfld,Rich,& Uni Cos | B | 91 | 91 | | | | | | | 46 | | 45 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Broadmouth Creek 030807 Anderson Co | B | 12 | 10 | 2 | | DO | | x | Unk | | | | 12 | |
| Brown Creek 030836 York Co | B | 0.5 | | | 0.5 | FC | x | | PS | Mun(E) | | 0.5 | | |
| Brushy Creek 030846 Greenville Co | B | 2 | | | 2 | FC | x | | PS<br>NPS | Ind<br>UR | | | 2 | |
| Brushy Creek 030847 Anderson Co | B | 9 | 9 | | | | | | | | | | 9 | |
| Brushy Creek 030862 Greenville Co | B | 10 | 10 | | | | | | | | | | 10 | |
| Buffalo Creek 030856 Cherokee Co | B | 6 | 6 | | | | | | | | | | 6 | |
| Bullocks Creek 030856 York Co | A | 22 | | | 22 | FC | x | | NPS | Ag | | | 22 | |
| Bush River 030842 Laurens Co | B | 20 | | 20 | | FC | | x | PS<br>NPS | Mun<br>Ag | | | 20 | |
| Calabash Creek 030836 York Co | B | 3 | | | 3 | FC | x | | PS | Mun(U) | | | 3 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Camping Creek<br>030838<br>Newberry Co | A | 7 | | | 7 | FC | x | | PS<br>NPS | Ind<br>Ag | | | 7 | |
| Cane Creek<br>030834<br>Lancaster Co | B | 19 | | 19 | | FC | | x | NPS | Ag | | | 19 | |
| Canoe Creek<br>030856<br>Cherokee Co | B | 3 | | 3 | | FC | | x | Unk | | | | 3 | |
| Catawba River<br>030834<br>Chester & York Cos | B | 42 | 42 | | | | | | | | | | 42 | |
| Cedar Creek<br>030824<br>Richland Co | A | 22 | | 22 | | FC | | x | Unk | | | | 22 | |
| Cherokee Creek<br>030856<br>Cherokee Co | B | 3 | | 3 | | FC | | x | Unk | | | | 3 | |
| Clouds Creek<br>030840<br>Saluda Co | B | 16 | 16 | | | | | | | | 16 | | | |
| Congaree Creek<br>030824<br>Lexington Co | A | 20 | 20 | | | | | | | | 20 | | | |
| Congaree River<br>030824<br>Richland Co | B | 43 | 43 | | | | | | | | 42 | | 1 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Coronaca Creek<br>030842<br>Greenwood Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Crane Creek<br>030850<br>Richland Co | B | 12 | | 12 | | FC | | x | Unk | | | | 12 | |
| Crowders Creek<br>030836<br>York Co | B | 4 | | | 4 | FC<br>FC | x<br> | <br>x | Unk<br>NPS | N.Car.<br>Ag | | | 4 | |
| Diversion Canal<br>030804<br>Berkeley Co | A | 5 | 5 | | | | | | | | 5 | | | |
| Doolittle Creek<br>030856<br>Cherokee Co | B | 5 | 5 | | | | | | | | | | 5 | |
| Dry Fork Creek<br>030854<br>Chester Co | B | 4 | | 2 | 2 | FC | | x | NPS | UR<br>Ag | | | 4 | |
| Duncan Creek<br>030860<br>Newberry Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Eagle Creek<br>030818<br>Dorchester Co | B | 3 | | | 3 | FC | x | | Unk | | | | 3 | |
| Enoree River<br>030860-62<br>Grnvl,Laur, & Nwbry Cos | B | 86 | 86 | | | | | | | | | | 86 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Fairforest Creek<br>030864<br>Spartanburg Co | B | 19 | 19 | | | | | | | | | | 19 | |
| Fishing Creek<br>030832<br>Chester & York Cos | A<br>B | 3<br>40 | <br>40 | 3 | | FC | | x | NPS | Ag | 40 | | 3 | |
| Furnace Creek<br>030856<br>Cherokee Co | B | 5 | 5 | | | | | | | | | | 5 | |
| Georges Creek<br>030847<br>Pickens Co | B | 10 | 10 | | | | | | | | | | 10 | |
| Gilder Creek<br>030862<br>Greenville Co | B | 9 | 9 | | | | | | | | | | 9 | |
| Gills Creek<br>030824<br>Richland Co | B | 18 | 11 | 7 | | FC<br>DO | | x<br>x | PS<br>NPS | Mun<br>UR | | | 18 | |
| Gills Creek<br>030834<br>Lancaster Co | B | 11 | | | 11 | FC<br>DO | x<br>x | | NPS | Ag<br>UR | | | 11 | |
| Goose Creek<br>030810<br>Charleston Co | SC<br>(B) | 6 | | | 6 | DO | x | | NPS | UR | | 6 | | |
| Grove Creek<br>030847<br>Greenville Co | B | 8 | | 8 | | FC | | x | PS | Ind | | | 8 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Grassy Run Creek<br>030832<br>Chester Co | B | 3 | | | 3 | FC | x | | NPS | UR | | | 3 | |
| Halfway Swamp<br>030804<br>Calhoun Co | A | 14 | | | 14 | FC | x | | Unk | | | | 14 | |
| Harris Branch<br>030840<br>Saluda Co | B | 1 | | | 1 | DO<br>FC | x<br>x | | PS | Ind | | 1 | | |
| Horse Pen Creek<br>030862<br>Greenville Co | B | 3 | 3 | | | | | | | | | | 3 | |
| Huff Creek<br>030845<br>Greenville Co | B | 10 | 10 | | | | | | | | | | 10 | |
| Irene Creek<br>030856<br>Cherokee Co | B | 5 | 5 | | | | | | | | | | 5 | |
| Jackson Creek<br>030850<br>Fairfield Co | A | 9 | | | 9 | FC | x | | NPS | Ag,UR, Con | | | 9 | |
| Jimmies Creek<br>030866<br>Spartanburg Co | B | 9 | 9 | | | | | | | | | | 9 | |
| Jordan Creek<br>030866<br>Spartanburg Co | B | 8 | 8 | | | | | | | | | | 8 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Kelly Creek<br>030826<br>Kershaw Co | B | 2 | 2 | | | | | | | | 2 | | | |
| Kelsey Creek<br>030864<br>Spartanburg Co | B | 6 | | 6 | | FC | | x | NPS | UR | | | 6 | |
| Kinley Creek<br>030838<br>Lexington Co | B | 5 | | | 5 | DO<br>FC | x<br>x | | PS<br>NPS | Mun(E)<br>Ag,UR,<br>Con | | 5 | | |
| Langstson Creek<br>030846<br>Greenville Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Laurel Creek<br>030846<br>Greenville Co | B | 3 | 3 | | | | | | | | | | 3 | |
| Lawsons Fork Creek<br>030868<br>Spartanburg Co | B | 24 | | 24 | | UNK<br>NUTS?<br>TOX? | | X | PS | Mun(E)<br>(U) | | | 24 | |
| Limestone Mill Creek<br>030856<br>Cherokee Co | B | 4 | | 4 | | FC | | x | NPS | Ag<br>UR | | | 4 | |
| Little River<br>030842<br>Laurens Co | B | 35 | | | 35 | FC | x | | NPS | UR<br>Ag | | | 35 | |
| Little River<br>030850<br>Fairfield Co | B | 16 | 16 | | | | | | | | | | 16 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Little Buck Creek<br>030868<br>Spartanburg Co | B | 5 | | 5 | | FC | | x | Unk | | | | 5 | |
| Little Pine Tree Creek<br>030828<br>Kershaw Co | A | 5 | 5 | | | | | | | | 5 | | | |
| Little Saluda River<br>030840<br>Saluda Co | B | 21 | | 21 | | DO | | x | NPS | Ag | 21 | | | |
| Little Wateree Creek<br>030830<br>Fairfield Co | A | 15 | | | 15 | FC | x | | NPS | Ag | | | 15 | |
| Long Branch<br>030856<br>York Co | A | 4 | | | 4 | FC | x | | Unk | | | | 4 | |
| Lorick Branch<br>030838<br>Lexington Co | B | 1 | | 1 | | FC<br>DO | | x<br>x | NPS | Ag,UR | | 0.5 | 0.5 | |
| McAlpine Creek<br>030836<br>Lancaster Co | B | 2 | | 2 | | FC | | x | Unk | | | | 2 | |
| Meng Creek<br>030854<br>Union Co | B | 4 | | | 4 | FC | x | | Unk | | | | 4 | |
| Middle Saluda River<br>030848<br>Greenville Co | B | 15 | 15 | | | | | | | | 15 | | | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Middle Tyger River<br>030866<br>Greenville Co | B | 14 | 14 | | | | | | | | | | 14 | |
| Mill Creek<br>030824<br>Richland Co | A | 24 | | 19 | 5 | FC | | x | Unk | | 19 | | 5 | |
| Mill Creek<br>030862<br>Spartanburg Co | B | 2 | | | 2 | FC<br>DO | x<br>x | | NPS | UR | | 2 | | |
| Mine Creek<br>030840<br>Saluda Co | B | 12 | | 12 | | FC | | x | PS<br>NPS | Ind<br>Ag,Sil | | | 12 | |
| Mitchell Creek<br>030864<br>Union Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Mountain Creek<br>030862<br>Greenville Co | B | 7 | 7 | | | | | | | | | | 7 | |
| North Creek<br>030842<br>Laurens Co | B | 8 | 8 | | | | | | | | | | 8 | |
| N Pacolet/Pacolet Rvrs<br>030868<br>Cherokee & Spbg Cos | B | 58 | 58 | | | | | | | | | | 58 | |
| North Saluda River<br>030848<br>Greenville Co | B | 16 | 16 | | | | | | | | 16 | | | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| North Santee River<br>030802<br>Georgetown Co | B | 21 | 21 | | | | | | | | 21 | | | |
| North Tyger River<br>030866<br>Spartanburg Co | B | 19 | 19 | | | | | | | | 19 | | | |
| Page Creek<br>030868<br>Spartanburg Co | B | 3 | 3 | | | | | | | | | | 3 | |
| Peoples Creek<br>030856<br>Cherokee Co | B | 3 | | | 3 | FC | x | | PS | Mun(IL) | | | 3 | |
| Potter Branch<br>030868<br>Spartanburg Co | B | 2 | 2 | | | | | | | | | | 2 | |
| Princess Creek<br>030862<br>Greenville Co | B | 3 | 3 | | | | | | | | 3 | | | |
| Rabon Creek<br>030844<br>Laurens Co | B | 9 | 9 | | | | | | | | 9 | | | |
| Rawls Creek<br>030838<br>Lexington Co | B | 6 | | 6 | | FC | | x | NPS | UR | | | 6 | |
| Red Bank Creek<br>030824<br>Lexington Co | A | 9 | 5 | 4 | | FC | | x | PS<br>NPS | Mun<br>Ag | 5 | | 4 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Reedy River<br>030846<br>Grnvl & Laurens Cos | B | 57 | 51 | | 6 | UNK<br>NUTS?<br>TOX? | x | | PS<br><br>NPS | Mun(IL)<br>(U)<br>UR | 37 | 6 | 14 | |
| Rock Creek<br>030846<br>Greenville Co | B | 5 | | | 5 | FC | x | | NPS | Ag,UR | | | 5 | |
| Rocky Creek<br>030832<br>Chester Co | A | 27 | | 27 | | FC | | x | Unk | | | | 27 | |
| Rocky Creek<br>030862<br>Greenville Co | B | 8 | | 8 | | FC | | x | NPS | UR | | | 8 | |
| Ross Branch<br>030854<br>York Co | B | 4 | | | 4 | FC | x | | NPS | Ag<br>UR | | | 4 | |
| Saluda River<br>030838-42-47-48<br>Gnvl,Gnwd,Lau,Lex,&Pic Co | B<br>A | 78<br>16 | 78<br>16 | | | | | | | | 78<br>16 | | | |
| Sandy River<br>030854<br>Chester Co | A | 5 | | | 5 | FC | x | | NPS | Ag | | | 5 | |
| Santee River<br>030802<br>Berk & Chtn Cos | B | 68 | 68 | | | | | | | | 68 | | | |
| Savannah Branch<br>030824<br>Lexington Co | A | 5 | | 5 | | FC | | x | NPS | UR | 5 | | | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | STATE CLASSIFIED USES | | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Sawmill Branch<br>030818<br>Dorchester Co | B | 12 | | | 12 | DO<br>FC | x<br>x | | PS | Mun(E) | | 6 | 6 | |
| Scott Creek<br>030842<br>Newberry Co | B | 1 | | | 1 | FC | x | | NPS | UR | | | 1 | |
| Six Mile Creek<br>030824<br>Lexington Co | B | 11 | 11 | | | | | | | | | | 11 | |
| Smith Branch<br>030850<br>Richland Co | B | 4 | | | 4 | FC | x | | NPS | UR | | | 4 | |
| South Saluda River<br>030848<br>Greenville Co | B | 20 | 20 | | | | | | | | | | 20 | |
| South Tyger River<br>030866<br>Greenville Co | B | 11 | 11 | | | | | | | | | | 11 | |
| Spain Creek<br>030848<br>Greenville Co | B | 0.5 | 0.5 | | | | | | | | | | 0.5 | |
| Spears Creek<br>030826<br>Kershaw Co | B | 22 | 22 | | | | | | | | 22 | | | |
| Spivey Creek<br>030868<br>Spartanburg Co | B | 3 | 3 | | | | | | | | | | 3 | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel Creek<br>030836<br>York co | B | 7.5 | 7 | 0.5 | | FC | | x | NPS | Ag | | | 7.5 | |
| Sugar Creek<br>030836<br>York Co | B | 11 | 11 | | | | | | | | | | 11 | |
| Tailrace Canal<br>030820<br>Berkeley Co | A | 5 | 5 | | | | | | | | 5 | | | |
| Taw Caw Creek<br>030804<br>Clarendon Co | A | 7 | | | 7 | FC<br>DO | x<br>x | | NPS | Ag | | | 7 | |
| Thicketty Creek<br>030856<br>Cherokee Co | B | 19 | 11 | 8 | | FC | | x | NPS | Ag | | | 19 | |
| Tinker Creek<br>030864<br>Union Co | B | 13 | 13 | | | | | | | | | | 13 | |
| Tools Fork Creek<br>030832<br>York Co | B | 8 | | | 8 | FC | x | | Unk | | | | 8 | |
| Toschs Creek<br>030864<br>Union Co | B | 4 | 4 | | | | | | | | | | 4 | |
| Twelve Mile Creek<br>030836<br>Lancaster Co | B | 6 | 6 | | | | | | | | 6 | | | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Twenty Five Mile Creek 030828 Kershaw Co | A | 22 | | | 22 | FC | x | | PS | Mun(E) | | | 22 | |
| Tyger River 030864-66 Spbg & Union Cos | B | 39 | 39 | | | | | | | | 23 | | 16 | |
| Un Trib to Catawba River 030836 York Co | B | 2 | 2 | | | | | | | | | | 2 | |
| Un Trib to Brown Creek 030854 Union Co | B | 2 | 2 | | | | | | | | | | 2 | |
| Un Trib to Saluda River 030847 Anderson Co | B | 1.5 | | 1.5 | | FC | | x | PS | Mun(U) | | | 1.5 | |
| Un Trib to Saluda River 030847 Greenville Co | B | 0.5 | 0.5 | | | | | | | | | | 0.5 | |
| Un Trib to Crawford Creek 030856 York Co | A | 3 | 3 | | | | | | | | 3 | | | |
| Walker Swamp 030820 Berkeley Co | B | 6 | 6 | | | | | | | | | | 6 | |
| Wassamasaw Swamp 030818 Berkeley Co | B | 21 | 21 | | | | | | | | 21 | | | |

TABLE 4.1.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Wateree River<br>030826<br>Kershaw & Rich Cos | B | 59 | 59 | | | | | | | | 59 | | | |
| West Creek<br>030840<br>Saluda Co | B | 7 | | 7 | | FC | | x | Unk | | | | 7 | |
| Wildcat Creek<br>030832<br>York Co | B | 7 | | | 7 | FC<br>DO | x<br>x | | Unk | | | | 7 | |
| Wilson Creek<br>030842<br>Greenwood Co | B | 10 | | 6 | 4 | FC<br>DO | x | <br>x | PS | Mun(U) | | 4 | 6 | |
| Winnsboro Branch<br>030850<br>Fairfield Co | A | 0.5 | | | 0.5 | FC | x | | NPS | UR | | | 0.5 | |

TABLE 4.1.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

EDISTO- COMBAHEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Ashepoo River<br>030906<br>Colleton Co | B | 15 | 5 | | 10 | DO | | x | PS<br>NPS | Mun<br>Ag,UR | | | 5 | 10 |
| Black Creek<br>030922<br>Hampton Co | A | 11 | 11 | | | | | | | | 11 | | | |
| Bull Swamp Creek<br>030914<br>Lexington Co | A<br>B | 7<br>5 | 5 | | 7 | DO<br>FC | x<br>x | | NPS | Ag | 5 | 7 | | |
| Combahee River<br>030922<br>Hampton Co | A | 3 | 3 | | | | | | | | 3 | | | |
| Coosawhatchie River<br>030932<br>Allendale & Hampton Cos | A | 36 | 36 | | | | | | | | 36 | | | |
| Edisto River<br>030906-08<br>Charl,Dorch,& Orgb Cos | A | 71 | 71 | | | | | | | | 71 | | | |
| First Branch<br>030918<br>Edgefield Co | A | 1 | | | 1 | FC<br>pH | x | x | NPS | UR | | | 1 | |
| Four Hole Swamp<br>030918<br>Dorch & Orgb Cos | A | 57 | 57 | | | | | | | | 46 | | 11 | |
| Goodland Creek<br>030918<br>Orangeburg Co | A | 3 | | 3 | | FC | | x | NPS | Ag | | | 3 | |

TABLE 4.1.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

EDISTO- COMBAHEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Gramling Creek<br>030914<br>Orangeburg Co | B | 5 | | | 5 | DO<br>FC | <br>x | x | Unk | | | | 5 | |
| Home Branch<br>030912<br>Orangeburg Co | B | 5 | | | 5 | DO<br>FC | x | <br>x | PS | Ind | | 5 | | |
| Ireland Creek<br>030906<br>Colleton Co | B | 12 | | 12 | | DO | | x | Unk | | | | 12 | |
| Lemon Creek<br>030924<br>Bamberg Co | B* | 18 | 18 | | | | | | | | | | 18 | |
| Lightwood Knot Creek<br>030916<br>Lexington Co | A | 11 | | 11 | | DO<br>FC | | x<br>x | Unk | | | | 11 | |
| North Fork Edisto River<br>030914-16<br>Aiken & Orgb Cos | A<br>B | 49<br>22 | 44<br>22 | | 5 | FC | | x | NPS | Ag,UR | 44<br>22 | | 5 | |
| Polk Swamp<br>030908<br>Dorchester Co | B* | 9 | | | 9 | FC | x | | Unk | | | | 9 | |
| Providence Swamp<br>030912<br>Orangeburg Co | B* | 11 | 11 | | | | | | | | | | 11 | |
| Rosemary Creek<br>030924<br>Barnwell Co | B | 4 | 4 | | | | | | | | | | 4 | |

TABLE 4.1.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

EDISTO- COMBAHEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Salkehatchie River<br>030922-24<br>Barnwell & Colleton Cos | A | 60 | 57 | | 3 | FC | x | | PS<br>NPS | Mun(U)<br>(E)<br>Ag | 57 | | 3 | |
| Sanders Branch<br>030932<br>Hampton Co | B* | 5 | 5 | | | | | | | | | | 5 | |
| Shaw Creek<br>030918<br>Aiken Co | A | 29 | 29 | | | | | | | | 29 | | | |
| South Fork Edisto River<br>030918<br>Aiken Co | B | 71 | 71 | | | | | | | | 71 | | | |
| Spur Branch<br>030918<br>Barnwell Co | A | 6 | | 6 | | FC / | | x | PS | Mun(E) | | | 6 | |
| Turkey Creek<br>030924<br>Barnwell Co | B | 2 | 2 | | | | | | | | 2 | | | |
| Unnd Trib to Gramling Ck<br>030912<br>Orangeburg Co | B | 3 | | 3 | | DO | | x | PS | Ind | | | 3 | |

TABLE 4.1.H.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SAVANNAH BASIN

| WATERBODY | CLASS | TOTAL MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE: MAJOR | CAUSE: MINOR | SOURCE: MAJOR | SOURCE: TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beaverdam Creek<br>031306<br>Edgefield Co | B | 13 | 13 | | | | | | | 13 | | | |
| Betsy Creek<br>031310<br>Anderson Co | B | 1 | 1 | | | | | | | | | 1 | |
| Big Genersotee Creek<br>031310<br>Anderson Co | B | 5 | 5 | | | | | | | 5 | | | |
| Broadway Creek<br>031310<br>Anderson Co | B | 2 | 2 | | | | | | | | | 2 | |
| Chattooga River<br>031312<br>Oconee Co | A | 34 | 34 | | | | | | | 34 | | | |
| Cherokee Creek<br>031310<br>Anderson Co | B | 5 | 5 | | | | | | | 5 | | | |
| Coneross Creek<br>031312<br>Oconee Co | A | 5 | 5 | | | | | | | 5 | | | |
| Cupboard Creek<br>031310<br>Anderson Co | B | 5 | | 1 | 4 | DO | x | PS | Ind | | | 1 | 4 |
| E. Fork Chattooga River<br>031312<br>Oconee Co | A | 2 | 2 | | | | | | | 2 | | | |

TABLE 4.1.H.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SAVANNAH BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Eighteen Mile Creek<br>031312<br>Pickens Co | B | 21 | 10 | 6 | 5 | FC | x | | PS | Mun(IL)<br>(U) | | | 21 | |
| Four Mile Creek<br>031304<br>Aiken Co | B | 19 | 19 | | | | | | | | 19 | | | |
| Golden Creek<br>031312<br>Pickens Co | B | 5 | | 5 | | FC | | x | PS | Mun(IL)<br>(U) | | | 5 | |
| Hard Labor Creek<br>031306<br>Greenwood Co | B | 20 | | | 20 | DO<br>FC | x<br>x | | PS<br>NPS | Mun(U)<br>Ag | | 20 | | |
| Horse Creek<br>031306<br>Aiken Co | B | 11 | 11 | | | | | | | | 11 | | | |
| Little River<br>031314<br>Pickens Co | B | 3 | 3 | | | | | | | | 3 | | | |
| Little Horse Creek<br>031306<br>Aiken Co | A | 1 | 1 | | | | | | | | 1 | | | |
| Long Cane Creek<br>031308<br>McCormick Co | B | 30 | 30 | | | | | | | | | | 30 | |
| Lower Three Runs Creek<br>031304<br>Aiken Co | B | 18 | 18 | | | | | | | | 18 | | | |

TABLE 4.1.H.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SAVANNAH BASIN

| | | | STATE CLASSIFIED USES | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE MAJOR | CAUSE MINOR | SOURCE TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Norris Creek<br>031325<br>Oconee Co | B | 2 | 2 | | | | | | | | 2 | |
| Rocky River<br>031310<br>Anderson Co | B | 22 | 22 | | | | | | 22 | | | |
| Sand River<br>031306<br>Aiken Co | B | 2 | 2 | | | | | | 2 | | | |
| Savannah River<br>031304-06-08-10<br>Abb., Aiken, Allen. Cos | B | 173 | 173 | | | | | | 173 | | | |
| Sawney Creek<br>031308<br>Abbeville Co | B | 5 | | 5 | | DO | x | Unk | 5 | | | |
| Six and Twenty Creek<br>031312<br>Anderson Co | B | 12 | 12 | | | | | | | | 12 | |
| Steel Creek<br>031304<br>Aiken Co | B | 10 | 10 | | | | | | 10 | | | |
| Three and Twenty Creek<br>031312<br>Anderson Co | B | 3 | 3 | | | | | | | | 3 | |
| Tims Branch<br>031304<br>Aiken Co | B | 2 | 2 | | | | | | | | 2 | |

TABLE 4.1.H.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
FRESHWATER RIVERS AND STREAMS
FY 86 AND FY 87

SAVANNAH BASIN

| | | STATE CLASSIFIED USES | | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Twelve Mile Creek<br>031312<br>Pickens Co | B | 24 | 24 | | | | | | | | 3 | 13 | 8 | |
| Unnamed Creek near<br>Central<br>031312<br>Pickens Co | A | 2 | 2 | | | | | | | | 2 | | | |
| Upper Three Runs Creek<br>031304<br>Aiken Co | B | 8 | 8 | | | | | | | | 8 | | | |
| Woodside Branch<br>031312<br>Pickens Co | B | 2 | | | 2 | FC | x | | PS | Mun(IL)<br>(U) | | | 2 | |

### 4.2.1. Summary of Assessment

Determinations of attainment of State classified uses and the goals of the Clean Water Act for individual waterbodies are presented in Tables 4.2.E. - 4.2.G. at the end of this section concerning the assessment of lakes and reservoirs.

Table 4.2.A.
Attainment of State Classified Uses
Lakes and Reservoirs - Reported as Acres
FY 1986 - FY 1987

| Basin | Assessed | Full | Partial | Not |
|---|---|---|---|---|
| Pee Dee | 2,600 | 2,550 | 0 | 50 |
| Santee Cooper | 214,177 | 213,312 | 840 | 25 |
| Edisto Combahee | 0 | 0 | 0 | 0 |
| Savannah | 193,630 | 193,380 | 0 | 250 |
| Statewide | 410,407 | 409,242 | 840 | 325 |
| % Attainment Statewide | | 99% | <1% | <1% |

Table 4.2.B.
Attainment of CWA Goals
Lakes and Reservoirs - Reported as Acres
FY 1986 - FY 1987

| Basin | Assessed | Fish/Swim | Fishable | Swimmable | Neither |
|---|---|---|---|---|---|
| Pee Dee | 2,600 | 2,550 | 2,550 | 2,600 | 0 |
| Santee Cooper | 214,177 | 212,512 | 214,177 | 212,512 | 0 |
| Edisto Combahee | 0 | 0 | 0 | 0 | 0 |
| Savannah | 193,630 | 193,380 | 193,380 | 193,630 | 0 |
| Statewide | 410,407 | 408,442 | 410,107 | 408,742 | 0 |
| % Attainment Statewide | | 99% | 99% | 99% | 0 |

Table 4.2.C.

Probable Causes of Partial or Non-Attainment of Classified Uses
Lakes Statewide
FY 1986 - FY 1987

| | Acres | % of Non-Attaining |
|---|---|---|
| Low dissolved oxygen | 50 | 4% |
| Fecal coliform contamination | 865 | 74% |
| pH contraventions | 0 | 0 |
| Toxics accumulation | 250 | 22% |
| Unknown | 0 | 0 |
| | 1165 | |

Table 4.2.D.

Probable Sources of Partial or Non-Attainment of Classified Uses
Lakes Statewide
FY 1986 - FY 1987

| | Acres | % of Non-Attaining | % of Assessed |
|---|---|---|---|
| Point Sources | 250 | 21% | < 1% |
| Municipal | - | | |
| Industrial | 250 | | |
| Nonpoint Sources | 25 | 2% | < 1% |
| Agriculture | -- | | |
| Urban runoff | 25 | | |
| Forests | -- | | |
| Hydrologic Modification | -- | | |
| Unknown | -- | | |
| Unknown Sources | 890 | 76% | < 1% |
| Total Acres Partially or Not Attaining | 1165 | | < 1% |
| Total Acres Assessed | 410,407 | | |

TABLE 4.2.E

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
LAKES AND RESERVOIRS
FY 86 AND FY 87

PEE DEE BASIN

| | | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL ACRES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| McLaurens Millpond<br>030720<br>Marlboro Co | A | 50 | | | 50 | DO | x | | Unk | | | | 50 |
| Lake Robinson<br>030725<br>Chesterfield Co | A* | 2,250 | 2,250 | | | | | | | 2,250 | | | |
| Prestwood Lake<br>030725<br>Darlington Co | A* | 300 | 300 | | | | | | | 300 | | | |

TABLE 4.2.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
LAKES AND RESERVOIRS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| | | | STATE CLASSIFIED USES | | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | TOTAL ACRES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| William C. Bowen<br>030868<br>Spartanburg Co | B | 1,600 | 1,600 | | | | | | | | 800 | | 800 | |
| Lake Elizabeth<br>030805<br>Richland Co | A | 60 | 60 | | | | | | | | 60 | | | |
| Fishing Creek Reservoir<br>030832<br>Chester & Lanc. Cos | A | 3,370 | 2,530 | 840 | | FC | | x | Unk | | 2,530 | | 840 | |
| Forest Lake<br>030824<br>Richland Co | B | 120 | 120 | | | | | | | | 120 | | | |
| Lake Greenwood<br>030844<br>Greenwood Co | A | 11,400 | 11,400 | | | | | | | | 11,400 | | | |
| Goose Creek Reservoir<br>030810<br>Berkeley Co | SC | 600 | 600 | | | | | | | | 600 | | | |
| Lake Inspiration<br>030804<br>Calhoun Co | A | 25 | | | 25 | FC | x | | NPS | UR | | | 25 | |
| Lake Lanier<br>030868<br>Greenville Co | A | 90 | 90 | | | | | | | | 90 | | | |
| Lake Marion<br>030804<br>Clarendon & Orgb. Cos | A | 110,600 | 110,600 | | | | | | | | 110,600 | | | |

TABLE 4.2.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
LAKES AND RESERVOIRS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | TOTAL ACRES ASSESSED | STATE CLASSIFIED USES: ATTAINED | STATE CLASSIFIED USES: PARTIALLY ATTAINED | STATE CLASSIFIED USES: NOT ATTAINED | CAUSE: MAJOR | CAUSE: MINOR | SOURCE: TYPE | 1983 FEDERAL GOAL: ATTAINED | 1983 FEDERAL GOAL: NOT ATTAINED | 1983 FEDERAL GOAL: FISHABLE ONLY | 1983 FEDERAL GOAL: SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monticello Reservoir<br>030852<br>Fairfield Co | B | 6,800 | 6,800 | | | | | | 6,800 | | | |
| Lake Murray<br>030838<br>Lex. & Newberry Cos | A | 51,000 | 51,000 | | | | | | 51,000 | | | |
| North Saluda Reservoir<br>030848<br>Greenville Co | AA | 1,080 | 1,080 | | | | | | 1,080 | | | |
| Table Rock Cove<br>030848<br>Greenville Co | AA | 500 | 500 | | | | | | 500 | | | |
| Wateree Lake<br>030830<br>Fairfld & Kershaw Cos | A | 13,710 | 13,710 | | | | | | 13,710 | | | |
| Windsor Lake<br>030824<br>Richland Co | A | 46 | 46 | | | | | | 46 | | | |

TABLE 4.2.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
LAKES AND RESERVOIRS
FY 86 AND FY 87

SAVANNAH BASIN

| WATERBODY | CLASS | TOTAL ACRES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE: MAJOR | CAUSE: MINOR | SOURCE: MAJOR | SOURCE: TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bridge Creek Pond<br>031306<br>Aiken Co | B | 60 | 60 | | | | | | | 60 | | | |
| Clarks Hill Lake<br>031308<br>McCormick Co | A | 78,500 | 78,500 | | | | | | | 78,500 | | | |
| Lake Hartwell<br>031312<br>Anderson Co<br>Oconee Co<br>Pickens Co | A | 61,350 | 61,350 | | | | | | | 61,350 | | | |
| Lake Jocassee<br>031314<br>Oconee Co | A | 7,565 | 7,565 | | | | | | | 7,565 | | | |
| Lake Keowee<br>031314<br>Oconee Co | A | 18,372 | 18,372 | | | | | | | 18,372 | | | |
| Langley Pond<br>031306<br>Aiken Co | B | 250 | | | 250 | TOX | x | PS | Ind | | | | 250 |
| Lake Richard B. Russell<br>031310<br>Anderson Co | A | 26,653 | 26,653 | | | | | | | 26,653 | | | |
| Lake Secession<br>031310<br>Abbeville Co | B | 880 | 880 | | | | | | | 880 | | | |

### 4.2.2. Clean Lakes Assessment

The South Carolina Department of Health and Environmental Control conducted a lake classification survey of 40 publicly owned lakes during 1980 - 1981 and produced a report in 1982 detailing the results of this survey. The purposes of the survey were to determine the trophic status of the lakes studied and to rank them as to priority for further study and restoration. Lakes sampled for this survey were selected based on public ownership and the possible impact their restoration would have on the people of South Carolina and the nation. Table 4.2.H. lists the lakes selected for study. Major lakes have a surface area of 850 acres or greater and minor lakes have a surface area less than 850 acres.

Table 4.2.H.
Lake Name, Location, and Indication of Public Ownership

| NAME | COUNTY | LAT./LONG | PUBLIC OWNERSHIP |
|---|---|---|---|
| | Major Lakes | | |
| Lake William C. Bowen | Spartanburg | 35°06'/82°05' | 2 |
| Clarks Hill Reservoir | McCormick & State of Georgia | 34°40'/82°13' | 3 |
| Fishing Creek Reservoir | Chester & Lancaster | 34°39'/80°53' | 4 |
| Lake Greenwood | Greenwood, Newberry & Laurens | 34°10'/81°55' | 4 |
| Lake Hartwell | Anderson, Pickens, Oconee & State of Georgia | 34°32'/82°50' | 3 |

Continued on next page.

Table 4.2.H. Continued

| NAME | COUNTY | LAT./LONG | PUBLIC OWNERSHIP |
|---|---|---|---|
| Lake Jocassee | Oconee & Pickens | 35°00'/83°00' | 4 |
| Lake Keowee | Oconee & Pickens | 34°50'/82°55' | 4 |
| Lake Marion | Sumter, Clarendon, Calhoun, Berkeley, & Orangeburg | 33°41'/80°32' | 1 |
| Monticello Reservoir | Fairfield | 34°20'/81°18' | 4 |
| Lake Moultrie | Berkeley | 33°20'/80°05' | 1 |
| Lake Murray | Lexington, Richland, Saluda & Newberry | 34°03'/81°13' | 4 |
| Parr Reservoir | Fairfield & Newberry | 34°16'/81°21' | 4 |
| Lake Robinson | Chesterfield & Darlington | 34°26'/80°10' | 4 |
| Lake Secession | Abbeville & Anderson | 34°17'/82°35' | 2 |
| Lake Wateree | Fairfield, Kershaw & Lancaster | 34°25'/80°50' | 4 |
| Lake Wylie (Lake Catawba) | York & State of North Carolina | 35°01'/81°05' | 4 |
| | Minor Lakes | | |
| Ashwood Lake | Lee | 34°06'/80°19' | 1 |
| Boyd Mill Pond | Laurens | 34°28'/82°13' | 4 |
| Broadway Lake | Anderson | 34°27'/82°35' | 2 |
| Lake Edgar A. Brown | Barnwell | 33°15'/81°22' | 1 |
| Lake Cherokee | Cherokee | 35°02'/81°35' | 1 |
| Chester State Park Lake | Chester | 34°40'/81°16' | 1 |
| Lake Tom Moore Craig | Spartanburg | 34°52'/81°50' | 1 |

Continued on next page.

Table 4.2.H. Continued

| NAME | COUNTY | LAT./LONG | PUBLIC OWNERSHIP |
|---|---|---|---|
| Eureka Lake | Chesterfield | 34°38'/79°54' | 1 |
| Lake Cunningham | Greenville | 34°59'/82°15' | 2 |
| Goodale State Park Lake (Adams Mill Pond) | Kershaw | 34°17'/80°31' | 1 |
| Goose Creek Reservoir | Berkeley | 32°57'/79°43' | 2 |
| Lake Edwin Johnson | Spartanburg | 34°52'/81°50' | 1 |
| Langley Pond (Horse Creek Pond) | Aiken | 32°32'/81°50' | 4 |
| Lake John B. Long | Union | 34°48'/81°30' | 1 |
| Lake Oliphant | Chester | 34°48'/81°11' | 1 |
| Prestwood Lake | Darlington | 34°24'/80°05' | 4 |
| Reynolds Pond | Aiken | 33°38'/81°42' | 4 |
| Rock and Cedar Creek Reservoir | Chester, Lancaster & Fairfield | 32°32'/80°50' | 4 |
| Saluda Lake | Greenville & Pickens | 34°52'/82°29' | 4 |
| Lake Thicketty | Cherokee | 35°05'/81°47' | 1 |
| Vaucluse Pond | Aiken | 33°37'/81°48' | 4 |
| Lake Wallace | Marlboro | 34°38'/79°41' | 1 |
| Lake Warren | Hampton | 32°50'/81°10' | 1 |
| Lake Yonah | Oconee & State of Georgia | 34°41'/83°20' | 4 |

Public Ownership

1 State Management Authority
2 Local Government Management Authority
3 Federal Management Authority
4 Private Management Authority, Offers Public Access

Lakes were sampled once per season: fall, winter, spring, and summer, from October 1980 through August 1981. Trophic status was determined using the National Eutrophication Survey (NES) index and Carlson's trophic state index. The NES index is a six parameter percentile index which uses data for total phosphorus, inorganic nitrogen, secchi depth, chlorophyll a, dissolved oxygen, and dissolved phosphorus. Carlson's index is a single parameter trophic state index which may be based on either chlorophyll a, secchi depth, or total phosphorus. The NES trophic index and the Carlson chlorophyll a, secchi, and phosphorus trophic state indices were used to rank the 40 publicly owned lakes according to trophic state. Table 4.2.I. is a ranking of major lakes by trophic state. Table 4.2.J. is a ranking of minor lakes by trophic state.

Table 4.2.I.

Ranking of Major Lakes by Trophic State

| Rank | Major Lakes | Trophic Condition |
|---|---|---|
| 1 | Fishing Creek | eutrophic |
| 2 | Wateree | eutrophic |
| 3 | Greenwood | eutrophic |
| 4 | Secession | eutrophic |
| 5 | Wylie | eutrophic |
| 6 | Hartwell | eutrophic |
| 7 | Monticello | eutrophic |
| 8 | Murray | eutrophic |
| 9 | Moultrie | eutrophic |
| 10 | Clarks Hill | eutrophic |
| 11 | Bowen | eutrophic |
| 12 | Marion | eutrophic |
| 13 | Parr | eutrophic |
| 14 | Jocassee | eutrophic |
| 15 | Robinson | eutrophic |
| 16 | Keowee | eutrophic |

Table 4.2.J.

Ranking of Minor Lakes by Trophic State

| Rank | Major Lakes | Trophic Condition |
|---|---|---|
| 1 | Boyd Mill Pond | hypereutrophic |
| 2 | Rock and Cedar Creek | eutrophic |
| 3 | Edgar A. Brown | eutrophic |
| 4 | Warren | eutrophic |
| 5 | Johnson | eutrophic |
| 6 | Broadway | eutrophic |
| 7 | Oliphant | eutrophic |
| 8 | Chester | eutrophic |
| 9 | Goose Creek | eutrophic |
| 10 | Long | eutrophic |
| 11 | Cherokee | eutrophic |
| 12 | Langley | eutrophic |
| 13 | Saluda | eutrophic |
| 14 | Thicketty | eutrophic |
| 15 | Cunningham | eutrophic |
| 16 | Vaucluse | eutrophic |
| 17 | Wallace | eutrophic |
| 18 | Reynolds | eutrophic |
| 19 | Craig | eutrophic |
| 20 | Ashwood | eutrophic |
| 21 | Prestwood | eutrophic |
| 22 | Goodale State Park | eutrophic |
| 23 | Eureka | eutrophic |
| 24 | Yonah | eutrophic |

To assess impaired recreational uses of the 40 publicly owned lakes, DHEC mailed a questionnaire to 700 lake users. The respondents were asked to provide reported uses, impaired uses, and probable causes of use impairment. The probable causes are varied, represent public opinion, and many were field verified by DHEC personnel. Tables 4.2.K. and 4.2.L. present this information on impaired lake uses. Please remember that the lists of lakes with reported impaired uses were derived mainly from public input. The Department has taken action to address the problems which are within the Department's authority.

Table 4.2.K.

Publicly Owned Lakes With Impaired Recreational Uses
Major Lakes

| Lake | Impaired Use(s) | Reported Causes |
|---|---|---|
| Clarks Hill | F | sedimentation, low water level, litter |
| Greenwood | F | turbidity,* low water level*, algal blooms* |
| Hartwell | F,S | low water level,* sediment, PCB, litter, fishing pressure, sewage |
| Jocassee | F | low water level,* litter |
| Keowee | F,S,B, | low water level,* turbidity, litter, heat, low food supply for fish |
| Marion | F,S,B, | weed growth,* litter, low water level, silt, fishing pressure, shoreline development |
| Moultrie | F | weed in shallows,* litter, fishing pressure, shoreline development |
| Murray | F | low water level,* sediment, fishing pressure, low dissolved oxygen |
| Robinson | S | temperature |
| Secession | F | turbidity,* low water level, nonpoint runoff |
| Wateree | F,S,B | litter |
| Wylie | F,S,B, | litter |

F = fishing
S = swimming
B = boating
* = field verified

Table 4.2.L.

Publicly Owned Lakes With Impaired Recreational Uses
Minor Lakes

| Lake | Impaired Use(s) | Reported Causes |
|---|---|---|
| Ashwood | F,S | weed growth,* silt, poor fish stocking |
| Broadway | F,S,B | silt,* weeds,* algae,* litter |
| Brown | F | algae,* weeds* |
| Chester | S | sediment, weeds* |
| Goose Creek | F,S,B | weeds,* algae,* litter |
| Langley | F,S,B | pollution, weeds |
| Prestwood | F,S,B | weeds* |
| Reynolds | F,S | weeds,* sediment |
| Rock & Cedar | F,S | color increase from point source |
| Thicketty | F,B | -- |
| Wallace | F | weeds,* algae* |
| Warren | F | weeds,* alage* |

F = fishing
S = swimming
B = boating
* = field verified

There are no lakes in South Carolina with known impacts from acid deposition or acid mine drainage.

## 4.3. Tidal Saltwaters

South Carolina has approximately 2155 square miles of tidal saltwaters including marshes. These tidal saltwaters were assessed using water quality data collected at 63 DHEC monitoring stations representing 616 square miles. The assessment also included information on shellfish harvest status as determined by DHEC's Shellfish Sanitation Program. The strategic location of these monitoring stations allows the determination of water quality for these waters to provide a representative picture of the overall water quality of South Carolina's tidal saltwaters.

### 4.3.1. Summary of Assessment

Determination of attainment of State classified uses and

the goals of the Clean Water Act for individual waterbodies are presented in Tables 4.3.E. - 4.3.H. at the end of this section concerning the assessment of tidal saltwaters.

Table 4.3.A.
Attainment of State Classified Uses
Tidal Saltwaters - Reported as Square Miles
FY 1986 - FY 1987

| Basin | Assessed | Full | Partial | Not |
|---|---|---|---|---|
| Pee Dee | 14.4 | 9.1 | 2.6 | 2.7 |
| Santee Cooper | 180.2 | 120.8 | 4.7 | 54.7 |
| Edisto Combahee | 466.9 | 451.2 | 10.7 | 5.0 |
| Savannah | 1.7 | 1.7 | -- | -- |
| Statewide | 663.2 | 582.8 | 18.0 | 62.4 |
| % Attainment Statewide | | 88% | 3% | 9% |

Table 4.3.B.
Attainment of CWA Goals
Tidal Saltwaters - Reported as Square Miles
FY 1986 - FY 1987

| Basin | Assessed | Fish/Swim | Fishable | Swimmable | Neither |
|---|---|---|---|---|---|
| Pee Dee | 14.4 | 13.3 | 14.4 | 13.3 | 0 |
| Santee Cooper | 180.2 | 160.2 | 160.2 | 180.2 | 0 |
| Edisto Combahee | 466.9 | 442.6 | 463.9 | 442.6 | 3.0 |
| Sav | 1.7 | 0 | 1.7 | 0 | 0 |
| Statewide | 663.2 | 616.1 | 640.2 | 636.1 | 3.0 |
| % Attainment Statewide | | 93% | 96% | 96% | < 1% |

Table 4.3.C.

Probable Causes of Partial or Non-Attainment of Classified Uses
Tidal Saltwaters Statewide
FY 1986 - FY 1987

| | Square Miles | % of Non-Attaining |
|---|---|---|
| Low dissolved oxygen | 21.45 | 27% |
| Fecal coliform contamination | 58.95 | 73% |
| pH contraventions | 0 | 0 |
| Toxics accumulation | 0 | 0 |
| Unknown | 0 | 0 |
| | 80.4 | |

Table 4.3.D.

Probable Sources of Partial or Non-Attainment of Classified Uses
Tidal Saltwaters Statewide
FY 1986 - FY 1987

| | Square Miles | % of Non-Attaining | % of Assessed |
|---|---|---|---|
| Point Sources | 0 | 0 | 0 |
| Nonpoint Sources | 80.4 | 100% | 11% |
| Agriculture | 11.0 | | |
| Urban runoff | 48.2 | | |
| Forests | 21.2 | | |
| Hydrologic Modification | -- | | |
| Unknown | -- | | |
| Unknown Sources | -- | | |
| Total Square Miles Partially or not attaining | 80.4 | | 11% |
| Total Square Miles Assessed | 707.7 | | |

TABLE 4.3.E.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

PEE DEE BASIN

| WATERBODY | CLASS | SQUARE MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Black River 030706 Georgetown Co | SB | 0.6 | 0.6 | | | | | | | | 0.6 | | | |
| Little River 030715 Horry Co | SA | 2.7 | | | 2.7 | FC | x | | NPS | UR | 1.6 | | 1.1 | |
| Murrells Inlet 030704 Georgetown Co | SA | 2.6 | | 2.6 | | FC | | x | NPS | UR Docks | 2.6 | | | |
| North Inlet 030704 Georgetown Co | SA | 2.2 | 2.2 | | | | | | | | 2.2 | | | |
| Sampit River 030702 Georgetown Co | SC | 1.1 | 1.1 | | | | | | | | 1.1 | | | |
| Turkey Creek 030702 Georgetown Co | SC | 0.2 | 0.2 | | | | | | | | 0.2 | | | |
| Whites Creek 030702 Georgetown CO | SC | 0.1 | 0.1 | | | | | | | | 0.1 | | | |
| Winyah Bay 030702 Georgetown Co | SC | 4.9 | 4.9 | | | | | | | | 4.9 | | | |

TABLE 4.3.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | SQUARE MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ashley River<br>030818-14<br>Charleston Co | SC | 14.5 | 14.5 | | | | | | | | 12.2 | | 2.3 | |
| Bulls Bay<br>030806<br>Charleston Co | SA | 8.0 | 8.0 | | | | | | | | 8.0 | | | |
| Charleston Harbor<br>030814<br>Charleston Co | SC | 4.2 | 4.2 | | | | | | | | 4.2 | | | |
| Cooper River<br>030820-10-14<br>Berkeley & Chtn Cos | SC | 19.7 | 19.7 | | | | | | | | 19.7 | | | |
| Cooter Creek<br>030806<br>Charleston Co | SA | 1.2 | | 1.2 | | DO | | x | NPS | Forest | 1.2 | | | |
| The Cove<br>030814<br>Charleston Co | SC | 0.3 | 0.3 | | | | | | | | 0.3 | | | |
| Elliott Cut<br>030814<br>Charleston Co | SC | 3.5 | | 3.5 | | DO | | x | NPS | UR | | | 3.5 | |
| Goose Creek<br>030810<br>Berkeley Co | SC | 14.2 | | | 14.2 | FC | x | | NPS | UR | | | 14.2 | |
| Intracoastal Waterway<br>030806<br>Charleston Co | SA | 0.1 | 0.1 | | | | | | | | 0.1 | | | |

TABLE 4.3.F.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

SANTEE-COOPER BASIN

| WATERBODY | CLASS | SQUARE MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kiawah River<br>030814<br>Charleston Co | SA | 41.8 | 41.8 | | | | | | | | 41.8 | | | |
| Shem Creek<br>030814<br>Charleston Co | SC | 0.4 | 0.4 | | | | | | | | 0.4 | | | |
| South Santee River<br>030802<br>Georgetown Co | SA | 18.0 | | | 18.0 | FC | x | | NPS | Forest Ag | 18.0 | | | |
| Stono River<br>030814<br>Charleston Co | SA | 28.3 | 5.8 | | 22.5 | FC<br>DO | x | <br>x | NPS | UR | 28.3 | | | |
| Wando River<br>030802<br>Berkeley & Chtn Cos | SB | 26.0 | 26.0 | | | | | | | | 26.0 | | | |

TABLE 4.3.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

EDISTO-COMBAHEE BASIN

| WATERBODY | CLASS | SQUARE MILES ASSESSED | STATE CLASSIFIED USES: ATTAINED | STATE CLASSIFIED USES: PARTIALLY ATTAINED | STATE CLASSIFIED USES: NOT ATTAINED | CAUSE | CAUSE: MAJOR | CAUSE: MINOR | SOURCE | SOURCE: TYPE | 1983 FEDERAL GOAL: ATTAINED | 1983 FEDERAL GOAL: NOT ATTAINED | 1983 FEDERAL GOAL: FISHABLE ONLY | 1983 FEDERAL GOAL: SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beaufort River | SB | 9.6 | 9.6 | | | | | | | | 9.6 | | | |
| 030920-26 | SA | 21.5 | 21.5 | | | | | | | | 21.5 | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Bees Creek | SC | 13.3 | 13.3 | | | | | | | | | | 13.3 | |
| 030926 | | | | | | | | | | | | | | |
| Jasper Co | | | | | | | | | | | | | | |
| Bohicket Creek | SA | 2.7 | | 2.7 | | FC | | x | NPS | UR | 2.7 | | | |
| 030902 | | | | | | | | | | | | | | |
| Charleston Co | | | | | | | | | | | | | | |
| Caliboque Sound | SA | 25.0 | 25.0 | | | | | | | | 25.0 | | | |
| 030926 | | | | | | | | | | | | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Chechessee River | SA | 15.9 | 15.9 | | | | | | | | 15.9 | | | |
| 030926 | | | | | | | | | | | | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Colleton River | SAA | 29.3 | 29.3 | | | | | | | | 29.3 | | | |
| 030926 | | | | | | | | | | | | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Combahee/St.Helena Snd | SA | 108.5 | 108.5 | | | | | | | | 108.5 | | | |
| 030920 | | | | | | | | | | | | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Coosawhatchie/Broad Rvrs | SA | 55.9 | 53.9 | | 2.0 | FC | x | | NPS | Ag | 55.9 | | | |
| 030930-26 | | | | | | | | | | | | | | |
| Beaufort Co | | | | | | | | | | | | | | |
| Dawhoo River | SA | 9.8 | 9.8 | | | | | | | | 9.8 | | | |
| 030902 | | | | | | | | | | | | | | |
| Charleston Co | | | | | | | | | | | | | | |

TABLE 4.3.G.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

EDISTO-COMBAHEE BASIN

| WATERBODY | CLASS | STATE CLASSIFIED USES: SQUARE MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE | MAJOR | MINOR | SOURCE | TYPE | 1983 FEDERAL GOAL: ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| May River<br>030926<br>Beaufort Co | SAA | 24.6 | 24.6 | | | | | | | | 24.6 | | | |
| New River<br>030928<br>Jasper Co | SB | 8.0 | | 8.0 | | DO<br>FC | | x<br>x | NPS | Forest | | | 8.0 | |
| North Edisto River<br>030902<br>Charleston Co | SAA | 53.3 | 53.3 | | | | | | | | 53.3 | | | |
| Pocotaligo River<br>030926<br>Beaufort River | SA | 3.0 | | | 3.0 | DO<br>FC | x<br>x | | NPS | Forest | | 3.0 | | |
| Port Royal Sound<br>030926<br>Beaufort Co | SA | 25.3 | 25.3 | | | | | | | | 25.3 | | | |
| Skull Creek<br>030926<br>Beaufort Co | SA | 6.9 | 6.9 | | | | | | | | 6.9 | | | |
| South Edisto River<br>030904<br>Charleston Co | SAA | 9.2 | 9.2 | | | | | | | | 9.2 | | | |
| Trenchards Inlet<br>030926<br>Beaufort Co | SA | 25.8 | 25.8 | | | | | | | | 25.8 | | | |
| Whale Branch<br>030920<br>Beaufort Co | SA | 18.9 | 18.9 | | | | | | | | 18.9 | | | |

TABLE 4.3.H.

ATTAINMENT OF STATE CLASSIFIED USES AND THE 1983 FEDERAL GOAL
TIDAL SALTWATERS
FY 86 AND FY 87

SAVANNAH BASIN

| | | STATE CLASSIFIED USES | | | | | | | 1983 FEDERAL GOAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATERBODY | CLASS | SQUARE MILES ASSESSED | ATTAINED | PARTIALLY ATTAINED | NOT ATTAINED | CAUSE MAJOR | CAUSE MINOR | SOURCE TYPE | ATTAINED | NOT ATTAINED | FISHABLE ONLY | SWIMMABLE ONLY |
| Savannah River 031302 Jasper Co | B | 1.7 | 1.7 | | | | | | | | 1.7 | |

### 4.3.2. Management of Shellfish Growing Waters

The goal of the Shellfish Sanitation Program in South Carolina is to ensure that shellfish and the areas from which they are harvested meet the health and environmental quality standards provided by federal and state regulations, laws, and guidelines. Additionally, the Department promotes and encourages coastal quality management programs consistent with protected uses established through the State water classifications and standards program. Shellfish Sanitation Program management is also determined by State Regulation 61-47 and State law. Operational manuals adopted by the Interstate Shellfish Sanitation Conference (ISSC) and adopted and utilized by the U.S. Food and Drug Administration are also used as guidelines in implementing the State program. During periodic revisions of Regulation 61-47, portions of those guidelines are incorporated into the regulations as appropriate.

Sanitary surveys are conducted by DHEC to determine the harvesting classifications of the State's coastal waters. These surveys result in harvesting classifications described as follows:

Approved: Areas where a sanitary survey indicates that the water is not contaminated with fecal material, pathogenic microorganisms, or poisonous and deleterious substances in concentrations dangerous to human health. The fecal coliform MPN median does not exceed 14/100 ml in the water and 10 percent of the samples do not exceed 43/100 ml.

Conditional: Areas generally of the same quality as approved areas; however, the quality may temporarily vary because of sporadic impacts from non-point and point sources, rainfall, or seasonal activities. Shellfish may be harvested for marketing under conditions specified in a management plan.

Restricted: Areas where a sanitary survey indicates there is a limited degree of pollution which renders the shellfish unsafe for direct marketing. The shellfish may be marketed after relaying or depuration.

The median fecal coliform levels in restricted waters are between 14 and 88/100 ml with not more than 10 percent of the samples exceeding 260/100 ml.

Prohibited: Areas where a sanitary survey indicates excessive concentrations of pollutants exist or where the potential exists for excessive pollutant concentrations. The median fecal coliform MPN exceeds 88/100 ml in the water or more than 10 percent of the samples exceed 260/100 ml. Shellfish may not be harvested from prohibited areas for human food use. Closed safety zones may be established around potential pollutant sources and are classified as prohibited areas.

Table 4.3.I. presents the current shellfish harvesting classifications of coastal shellfish growing areas in South Carolina, the cause of closure if the area is not unconditionally approved, and the pollutant source responsible for the closure. Tables 4.3.J. and 4.3.K. show shellfish area closures due to closed safety zones around point source discharges and marinas in Class SA waters. Closed safety zones are established adjacent to all actual or potential sources of contamination and are classified as prohibited. These areas are not an indication of a lesser water quality but rather an indication of areas which have the potential for variable water quality. As a result, the areas within closed safety zones are closed to shellfish harvesting as a measure to protect public health.

The reported acreages include all shellfish growing waters and associated marshes measured from NOAA navigational charts 11535, 11532, 11531, 11521, 11513, 11517, and 11519 using a Compensating Polar Planimeter.

Table 4.3.I.

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA
(Waterbodies listed in geographical order from North to South on coastline)

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Little River | 1387 | SA | Restricted | FC | PS, NPS |
| Atlantic Intracoastal Waterway (AIWW) to Hwy #9 bridge) | 969 | A | Prohibited | FC | PS, NPS |
| Cherry Grove/Hog Inlet | 1357 | SA | Conditionally Approved | Rainfall, FC | NPS |
| Singleton Swash | 51 | SA | Prohibited | FC | NPS |
| Whitepoint Swash | 92 | SA | Prohibited | FC | NPS |
| Cane Patch Creek | 20 | SA | Prohibited | FC | NPS |
| Withers Swash | 30 | SA | Prohibited | FC | NPS |
| Midway Swash | 15 | SA | Prohibited | FC | NPS |
| Murrells Inlet | 3302[A] | SA | Conditionally Approved | Rainfall, FC | NPS |
| Murrells Inlet Public Grounds - North | A | SA | Conditionally Approved | FC | NPS |
| - South | | SA | Conditionally Approved | Rainfall, FC | NPS |
| Murrells Inlet - Parsonage Creek | 30 | SA | Restricted | FC | NPS |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
A = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Murrells Inlet - all other tributaries adjacent to mainland and connneting to Parsonage Creek | 5 | SA | Restricted | FC | NPS |
| Midway Inlet - North behind Litchfield Beach | 602 | SA | Restricted | FC | NPS |
| South behind Pawleys Island to Pawleys Inlet | 1122 | SA | Conditionally Approved | FC | NPS |
| North Inlet | 6454 | | Approved | | |
| North Inlet - Debordieu Ck. | 410 | SA | Restricted | FC | NPS |
| North Inlet area adjacent to Mud Bay | 3603 | SC | Restricted | FC | NPS |
| North Inlet | 1071 | SA | Conditionally Approved | High River & Rainfall Levels | NPS |
| Sampit River | 576 | SC | Prohibited | CSZ | PS |
| Winyah Bay | 10,356 | SC | Prohibited | CSZ | PS |
| Winyah Bay | 13,339[B] | SC | Restricted | FC | PS, NPS |
| Mud Bay | B | SC | Restricted | FC | PS, NPS |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
B = acreage includes all water bodies with this notation
CSZ = closed safety zone

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Atlantic Intracoastal Waterway (AIWW) (Winyah Bay to North Santee River) | 2,178 | SB | Prohibited | FC | PS, NPS |
| Santee Bay (North & South) from Highway 17 to 1000 feet below the AIWW | 20,165 | SB | Restricted | FC | NPS |
| Santee Bay (North & South) from 1000 feet below AIWW to Atlantic Ocean | 13,158 | SA | Restricted | FC | NPS |
| Cape Romain | 13,117[C] | SA | Restricted | FC | NPS |
| Cape Romain and Bull Bay | 48,094[D] | SA | Approved | | |
| AIWW (South Santee River to Jeremy Island) | C | SA | Restricted | FC | NPS |
| AIWW (Jeremy Island to Sewee Bay) | D | SA | Approved | | |
| Jeremy Creek | 377 | SA | Prohibited | CSZ | Boat Docks |
| Awendaw Creek | 581 | SA | Conditional closed | FC | NPS |

FC = fecal coliform bacteria
CSZ = closed safety zone
NPS = non-point source
C = acreage includes all waterbodies with this notation
D = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Tibwin Creek | 255 | SA | Conditional closed | FC | NPS |
| AIWW (Sewee Bay to Conch Creek) | 31,514[E] | SA | Approved | | |
| Sewee Bay | E | SA | Approved | | |
| Bull Harbor | E | SA | Approved | | |
| Mark Bay | E | SA | Approved | | |
| Copahee Sound | E | SA | Approved | | |
| Bullyard Sound | E | SA | Approved | | |
| Hamlin Sound | E | SA | Approved | | |
| Grays Bay Sound | E | SA | Approved | | |
| All creeks and marshes of - | | | | | |
| Prices Inlet | | SA | Approved | | |
| Capers Inlet | E | SA | Approved | | |
| Dewee Inlet | | SA | Approved | | |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
E = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| All waters of Breach Inlet Estuary Including: | | | | | |
| Hamlin Creek (west of AIWW) | | SA | Approved | | |
| Swinton Creek | | SA | Approved | | |
| Inlet Creek (west of AIWW) | | SA | Approved | | |
| Conch Creek west of AIWW | | SA | Approved | | |
| Inlet Creek & Conch Creek (east of AIWW) | 476 | SA | Restricted | FC | NPS, Harbor Influence |
| Hamlin Creek (east of AIWW) | 320 | SA | Restricted | FC | NPS, Harbor Influence |
| AIWW (between Conch Creek & Ben Sawyer Bridge) | 163 | SA | Restricted | FC | PS, NPS, Harbor Influence |
| The Cove | 1132[F] | SC | Restricted | FC | PS, NPS, Harbor Influence |
| AIWW (Ben Sawyer Bridge to the Cove) | F | SC | Restricted | FC | PS, NPS, Harbor Influence |
| Wando River (Headwaters to 1000 feet above Cainhoy Bridge | 5375 | SB | Restricted | FC | PS, NPS |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
D = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Wando River (from 1000 feet above Cainhoy Bridge to Cooper River Bridge) including Nowell & Horlbeck Creeks | 12,821 | SB | Conditional closed | FC | PS, NPS |
| Charleston Harbor | 8,027 | SC | Prohibited | CSZ | PS |
| Cooper River | 14,794 | SC | Prohibited | CSZ | PS |
| Shem Creek | 367 | SC | Prohibited | FC ,CSZ | NPS - Marinas |
| Ashley River | 8,160 | SC | Prohibited | CSZ | PS |
| Schooner Creek Bay and Clarks Sound | 3,958 | SC | Restricted | FC | NPS, PS |
| James Island Creek & Kushiwah Creek | 1,744 | SC | Prohibited | CSZ | PS |
| Wapoo/Elliott Cut | 898 | SC | Prohibited | CSZ | PS |
| Stono River (Pleasant Point to and including Abbapoola Creek) | 14,130 | SA | Restricted | FC | PS, NPS |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
CSZ = closed safety zone
* = included in Charleston Harbor and Stono River

Table 4.3.4. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Lighthouse Inlet Estuary | 10,733[H] | SA | Approved | | |
| Folly River Estuary | H | SA | Approved | | |
| Kiawah River, Sams Creek, Stono Inlet, Stono River, and Abbapoola Creek to Folly River | 14,474 | SA | Approved | | |
| North Edisto River | 35,105[I] | SA | Approved | | |
| Leadenwah Creek | I | SA | Approved | | |
| Wadmalaw River | I | SA | Approved | | |
| Stono River (Pleasant Point to Goshen Pt.) | I | SA | Approved | | |
| Steam Boat Creek | I | SA | Approved | | |
| Russell Creek | I | SA | Approved | | |
| Toogoodoo Creek | I | SA | Approved | | |
| Dawho River (from North Edisto to Hwy 174 bridge) | I | SA | Approved | | |

PS = point source
NPS = non-point source
E = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Wadmalaw Sound | I | SA | Approved | | |
| Bohicket Creek | I | SA | Approved | | |
| Church Creek | I | SA | Approved | | |
| Church Creek (from Raven Point to Hoopstick Island) | 1,601 | SA | Prohibited | FC ,CZS | PS, NPS |
| South Edisto River | 30,150[J] | SA | Approved | | |
| Fishing Creek (except described below) | J | SA | Approved | | |
| Fishing Creek from "The Neck" to Freedman | 450 | SA | Restricted | FC | NPS |
| St. Helena Sound | 53,578[K] | SA | Approved | | |
| Combahee River | K | SA | Approved | | |
| Ashepoo River | K | SA | Approved | | |
| Coosaw River | K | SA | Approved | | |

FC = fecal coliform bacteria
PS = point source
NPS = non-point source
E = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Whale Branch from Huspa Creek to Halfmoon Creek | 1209 | SA | Restricted | FC | PS, NPS |
| Whale Branch | 6411 | SA | Approved | | |
| Campbell Creek | 217 | SA | Prohibited | CSZ | PS |
| Halfmoon Creek | 393 | SA | Prohibited | CSZ | PS |
| Huspa Creek | 1609 | SA | Conditionally Approved | FC , Rainfall | NPS |
| McCalleys Creek | 2193 | SA | Prohibited | CSZ | PS |
| Middle Creek | 510 | SA | Restricted | FC | NPS, PS |
| Brickyard Creek | 1612 | SA | Prohibited | CSZ | PS |
| Albergottie Creek | 1142 | SB | Prohibited | CSZ | PS |
| Beaufort River from Albergottie Creek to Ballast Creek & Chowan Creek | 8150 | SB | Prohibited | CSZ | PS |

FC = fecal coliform bacteria
CSZ = closed safety zone
PS = point source
NPS = non-point source

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Beaufort River from Ballast Creek to Chowan Creek to Port Royal Sound | 8690 | SA | Approved | | |
| Chowan Creek | 4835 | SA | Approved | | |
| Battery Creek | 2458 | SA | Prohibited | CSZ | PS |
| | 1081 | SB | Prohibited | CSZ | PS |
| Archer Creek from Port Royal to Parris Island Bridge | 683 | SB | Prohibited | CSZ | PS |
| Archer Creek from Parris Island Bridge to 1000 ft above Parris Island Bridge | 102 | SA | Prohibited | CSZ | PS |
| Archer Creek from 1000 feet below Parris Island Bridge to Port Royal Sound | 1927 | SA | Approved | | |
| Morgan River Estuary | 60,021[F] | SA | Approved | | |

CSZ = closed safety zone
PS = point source
NPS = non-point source
F = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Harbor River (St. Helena to Fripp Island) | L | SA | Approved | | |
| Trenchards Inlet Estuary | L | SA | Approved | | |
| Station Creek | L | SA | Approved | | |
| Lucy Point Creek | 898[A] | SA | Restricted | FC | NPS, Agriculture |
| Fripp Island Canal | 255 | SA | Prohibited | FC | NPS |
| Rock Spring Creek to its junction with Lucy Point Creek | M | SA | Restricted | FC | NPS |
| Broad River and Port Royal Sound (except for closed safety zone at Laurel Bay S/D WTP) | 58,674[N] | SA | Approved | | |
| Chechessee River | N | SA | Approved | | |
| Hazzard Creek/Euhaw Creek | N | SA | Approved | | |

FC = fecal coliform bacteria
F = acreage includes all waterbodies with this notation
G = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Colleton River | 12,220[M] | SAA | Approved | | |
| Okatie River & Chechessee Creek | M | SAA | Approved | | |
| May River | 15,431[O] | SAA | Approved | | |
| Cooper River | 0 | SAA/SA | Approved | | |
| Bull Creek | 0 | SAA | Approved | | |
| New River and Wright River | 12,281 | SB | Restricted | FC | NPS, Savannah River Influence |
| New River and Wright River | 14,423 | SA | Approved | | |
| Calibogue Sound | 21,083[P] | SB | Approved | | |
| Mackay Creek | P | SA | Approved | | |
| Skull Creek | P | SA | Approved | | |
| Jarvis Creek | P | SA | Approved | | |
| Broad Creek/Palmetto Bay | P | SA | Approved | | |

FC = fecal coliform bacteria
NPS = non-point source
F = acreage includes all waterbodies with this notation
H = acreage includes all waterbodies with this notation

Table 4.3.I. (continued)

STATUS OF SHELLFISH AREAS IN SOUTH CAROLINA

| Waterbody | Acres | Use Classification | March 1, 1988 Sanitary Shellfish Harvest Status | Cause for Closure | Pollutant Source |
|---|---|---|---|---|---|
| Broad Creek | 245 | SA | Conditionally Approved | FC | PS |
| Baynard Cove | 834[Q] | SA | Prohibited | CSZ | Marinas |
| Lawton Creek | Q | SA | Prohibited | CSZ | PS |
| Braddock Creek | Q | SA | Prohibited | CSZ | Marinas |

CSZ = closed safety zone
PS = point source
NPS = non-point source

Table 4.3.J.

Prohibited Shellfish Harvesting Areas in Class SA Waters
Due to Closed Safety Zones Around Point Source Discharges

| Facility | Waterbody Location | County | Closed Safety Zone Acreage |
|---|---|---|---|
| Parris Island Marine Base | Archers Creek | Beaufort | 4,426[A] |
| Battery Creek H.S. | Battery Creek | Beaufort | A |
| Beaufort | Battery Creek | Beaufort | A |
| Cherry Hill | Battery Creek | Beaufort | A |
| Dowlingwood | Battery Creek | Beaufort | A |
| Palmetto Apartments | Battery Creek | Beaufort | A |
| Parris Island | Battery Creek | Beaufort | A |
| Laurel Bay | Broad River | Beaufort | 121 |
| Lobeco Chemical | Campbell Creek | Beaufort | 217 |
| James J. Davis Elem. School | Halfmoon Creek | Beaufort | 393 |
| Sea Pines PSD | Lawton Ck/Broad Ck | Beaufort | 561 |
| Wam Chemical | McCalley Creek | Beaufort | 2,193 |
| Dunmovin | Church Creek Tributary | Charleston | 3.0* |
| St. Johns/Angel Oak School | Church Creek Tributary | Charleston | 3.0* |
| Sea Island Health Care | Church Creek Triubtary | Charleston | 3.0* |
| Isle of Palms and Forest Trails | AIWW | Charleston | 173 |
| Buzzards Roost | Stono River | Charleston | 25* |
| St. Andrews PSD and Savage Road | Stono River | Charleston | 25* |
| Swygert Shipyard | Stono River | Charleston | 25* |
| Baptist Hills HS | Toogoodoo Creek | Charleston | 3.0 |

* = in prohibited or restricted SA waters

A = acreage includes all waterbodies with this notation

Table 4.3.K.

Prohibited Shellfish Harvesting Areas in Class SA Waters
Due to Closed Safety Zones Around Marinas

| Marina | Waterbody Location | County | Closed Safety Zone Acreage |
|---|---|---|---|
| Baynard Cove | Baynard Cove | Beaufort | 110 |
| Gull Point Community Dock | Braddock Cove | Beaufort | 163[A] |
| South Breech | Braddock Cove | Beaufort | A |
| Broad Creek | Broad Creek | Beaufort | 60 |
| Long Cove | Broad Creek | Beaufort | 60 |
| Palmetto Bay | Broad Creek | Beaufort | 83 |
| Shelter Cove | Broad Creek | Beaufort | 64 |
| Wexford Harbor | Broad Creek | Beaufort | 30 |
| Harbor Town | Calibogue Sound | Beaufort | 59 |
| Windmill Harbor | Calibogue Sound | Beaufort | 36 |
| Cooper River | Cooper River | Beaufort | 63 |
| Moss Creek | Moss Creek | Beaufort | 59 |
| Fripp Island | Old House Creek | Beaufort | 56 |
| Hilton Head Docking Facility | Skull Creek | Beaufort | 48 |
| Outdoor Resorts | Skull Creek | Beaufort | 60 |
| Skull Creek | Skull Creek | Beaufort | 90 |
| Villages on Skull Creek | Skull Creek | Beaufort | 57 |
| Big Bay Marina & Misc. Docks | Big Bay Creek | Charleston | 530 |
| Botany Bay & Misc. Docks | Adams Creek/ North Edisto River | Charleston | 6.0 |
| Bohicket | Bohicket Creek | Charleston | 76 |
| Folly Marina | Folly River | Charleston | 54 |
| Crosby Commercial Dock | Folly Creek | Charleston | 57 |
| Bowen Island Marina Railway | Folly Creek | Charleston | 50 |
| Backman Commercial Dock | Backman Creek | Charleston | 50 |
| Breech Inlet and Texaco Marina | Breech Inlet | Charleston | 45 |
| Mariners Cay | Folly River | Charleston | 58 |
| Carolina Seafood Dock, Bull Bay Seafood Dock and Miscellaneous Shrimp Docks | Jeremy Creek/ AIWW | Charleston | 377 |
| Wild Dunes | Morgan Creek | Charleston | 14* |
| Buzzard Roost | Stono River | Charleston | 52* |
| Stono | Stono River | Charleston | 33* |
| Marlin Quay | Murrells Inlet | Georgetown | 77* |
| Captain Dick's and Inlet Point | Parsonage Creek/ Main Creek | Georgetown | 34* |

* = in restricted SA waters
A = acreage includes all waterbodies with this notation

Table 4.3.L.

Acreages of Shellfish Waters in Each Water Use Classification

| Use Classification | Shellfish Status | Acreage | % of Total Waters | % of Class SAA & SA |
|---|---|---|---|---|
| SAA and SA | Approved | 419,394 | 66 | 86 |
| SA | Conditional | 9,542 | 1.5 | 2 |
| SA | Restricted | 46,865 | 7 | 9.5 |
| SA | Prohibited-CSZ | 11,066 | 2 | 2 |
| SA | Prohibited-PWQ | 2,064 | <1 | <1 |
| | | 488,931 total acreage in Class SAA & SA | | |
| SB | Approved | 14,423 | 2 | |
| SB | Conditional | 12,821 | 2 | |
| SB | Restricted | 39,999 | 6 | |
| SB | Prohibited-CSZ | 11,056 | 2 | |
| | | 78,299 total acreage in Class SB | | |
| SC | Restricted | 22,032 | 3 | |
| SC | Prohibited-CSZ | 44,922 | 7 | |
| | | 66,954 total acreage in Class SC | | |
| * A | Prohibited | 969 | <1 | |
| | | 635,153 total acreage in Shellfish Waters | | |

* The Atlantic Intracoastal Waterway (Little River) is presently classified incorrectly with a use classification of Class A. The Department will be initiating an effort to correct this discrepancy.

Acreages in Table 4.3.I. for each water use classification and each shellfish harvest status as well as closed safety zone acreages in Tables 4.3.J. and 4.3.K. were tallied to show total acreages of open and closed shellfish waters statewide for each water use classification. These figures are presented in Table 4.3.L.

Approximately 86% of Class SAA and Class SA waters are unconditionally approved for shellfish harvesting. This indicates an 8% decrease from the FY 1984-85 305(b) report which estimated that 94% of Class SAA and Class SA shellfish waters were unconditionally approved for shellfish harvesting. Although this reduction appears to indicate a degradation of water quality in shellfish waters, two distinctly different factors are actually responsible for this reduction. The Santee River Rediversion Project has altered water quality in the Class SA portions of South Santee and Cape Romain and subsequent shellfish harvesting classification changes in this area are responsible for 6% of the decrease. The remaining 2% reduction does not relate to water quality changes but rather to more precise methods of measurement used in acreage determination.

Approximately 2% of Class SAA and Class SA waters are conditionally approved and less than 10% of Class SAA and Class SA waters are closed to shellfish harvesting due to closed safety zones or poor water quality.

An evaluation of all shellfish growing waters, regardless of use classification, reveals that approximately 66% of these waters are approved for shellfish harvesting. Approximately 23% of all saltwaters are Class SB and Class SC and are not protected for shellfish harvesting. Less than 3% of the shellfish closures, when considering all class saltwaters, are due to activities which cause closures in Class SA waters.

### 4.3.3. Estuary Case Study - Stono River

A water quality assessment of the Stono River was conducted by the Stream and Facility Monitoring Section of the South Carolina Department of Health and Environmental Control (SCDHEC) during August 27-29, 1985. The Stono River is located just south and west of Charleston, South Carolina, and connects the Atlantic Ocean to Wadmalaw Sound. The River is located in the Charleston Harbor sub-basin (03-08-14). The entire reach of the Stono River from the Atlantic Ocean (Stono Inlet) to Wadmalaw Sound is classified as Class SA waters. Figure 4.3.A. depicts the study area.

Sampling stations were established at numerous points along the Stono River and at selected major tributaries--the Kiawah River, Elliott Cutt, Wappoo Creek and Rantowles Creek. Also, three wastewater treatment facilities that discharge to the Stono River were included in the sampling station network. These were the Buzzards Roost Marina (NPDES No. SC0035556), Swygert Shipyard (NPDES No. SC037770), and St. Andrews Public Service District/ Savage Road (NPDES No. SC0026051) wastewater treatment facilities.

Samples were collected from each stream station and facility effluent by the grab method on daylight high and low tides during August 27-29, 1985, for analyses of various physical, chemical and bacteriological parameters. Live oysters (*Crassostrea virginica*) were also collected daily at low tide from selected stations and analyzed for various bacteriological parameters. In addition to the high tide/low tide sampling at the wastewater treatment facilities, compliance sampling inspections and operation and maintenance inspections were conducted to ascertain NPDES permit

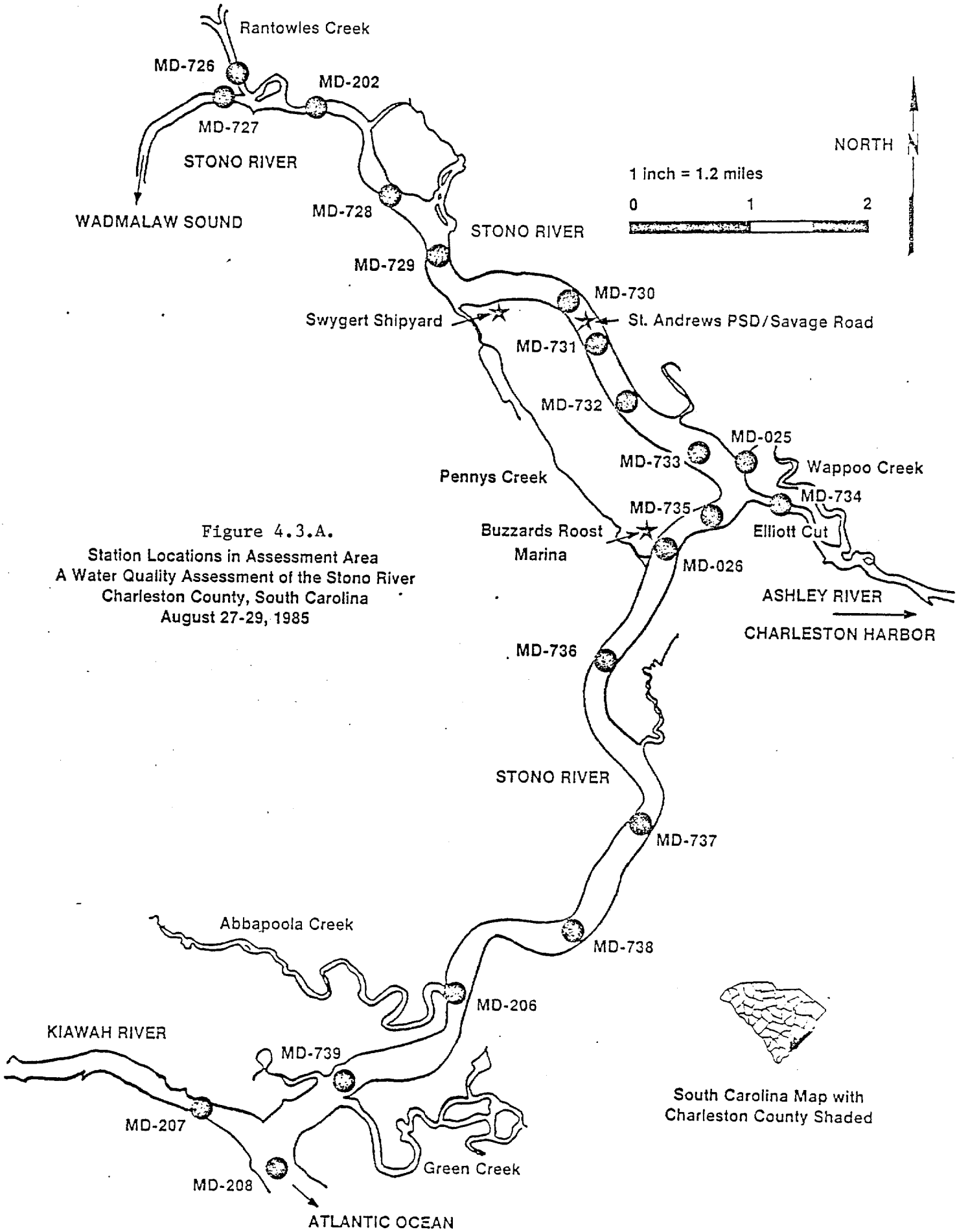



Figure 4.3.A.
Station Locations in Assessment Area
A Water Quality Assessment of the Stono River
Charleston County, South Carolina
August 27-29, 1985

compliance performance of the facilities during the assessment period. A trend analysis of the historical water quality data base from several stations along the Stono River was also conducted.

Data collected during this assessment showed no contraventions of the Class SA quality standards for pH or temperature at any station in the area. Dissolved oxygen levels were, on the face, below the State quality criterion; however, analysis of these data revealed the levels to be indicative of natural water quality of that estuarine system. When the concentration data were normalized to percent saturation data, satisfactory levels were observed that were comparable to levels seen in other estuarine river systems in the State.

The State quality standard for total coliform bacteria was contravened at eleven of sixteen stations in the Stono River and at three of the four tributaries (all except the Kiawah River). The five stations which did not contravene standards were nearest the Atlantic Ocean. The largest median total coliform density in the Stono River occurred in the upper-middle portion west of the entrances to Elliott Cut and Wappoo Creek. The largest median density recorded in the entire assessment area was in Wappoo Creek near its confluence with the Stono River where the median density was approximately two and one-half times greater than the largest median density in the Stono River. The median level observed in Elliott Cut was essentially equivalent to the largest median density seen in the Stono River. The major contributing source to the overall bacteriological water quality in the Stono River was determined to be in the input of Ashley River/Charleston

Harbor water via Elliott Cut and Wappoo Creek along with the natural input from the developed Wappoo Creek drainage basin.

Analysis of shellfish tissue from five stations in the river revealed no contraventions of State quality standards or appropriate Federal criteria. Furthermore, there were no significant differences ($p > 0.05$) in bacterial burden between any of the stations.

Hydrological reconnaissances were conducted in the upper part of the Stono River during June 13-14, 1985, to determine the dilution and dispersion characteristics of that portion of the system. These reconnaissances demonstrated substantial dilution capacity in the Stono River on ebbing tide but diminished capacity on flooding tide. Likewise, the dilution capacity of Elliott Cut was diminished on flooding tide which is the same portion of the tidal cycle that delivers the Ashley River/ Charleston Harbor system water to the upper portion of the Stono River. This diminished dilution capacity in both the Stono River and Elliott Cut concurrent with the input of water from Charleston Harbor of less than Class SA quality on flooding tide afforded the greatest opportunity for poorer water quality conditions to be localized in the upper-middle portion of the Stono River.

A trend analysis of the past eleven years of monitoring data from the Stono River showed general improvements in water quality. Dissolved oxygen concentrations either improved or remained the same over the time period. Bacterial densities also improved as decreased levels were observed at all stations except Wappoo Creek and the Stono River at SC 700 (Maybank Highway).

Further analysis of the data demonstrated this was a near-field effect due primarily to the input from Wappoo Creek.

The results of the compliance sampling inspection at the three wastewater treatment facilities were found to be in overall satisfactory condition. There were no discernible impacts on the Stono River due to the presence of the treatment facility discharges during this assessment period.

The major and overwhelming driving force of water quality in the upper-middle portion of the Stono River was the input of water from Charleston Harbor via Elliott Cut and the underlying natural hydrological regime of the Stono River. The diminished dilution capacity in the upper portion of the river along with apparent poor flushing combined to control the water quality characteristics in the upper river.

## Conclusions

1. The quality of water in the middle-to-upper portion of the Stono River did not meet Class SA quality standards during the assessment period for either dissolved oxygen or total coliform bacteria. The failure to meet the Class SA standard for dissolved oxygen was clearly due to prevailing natural, ambient conditions in the river and the strongly-controlling underlying hydrological regime. The failure to meet the Class SA standard for total coliform bacteria was due primarily to the input of poorer quality water from the Charleston Harbor/Ashley River system to the Stono River via Elliott Cut and Wappoo Creek. The lower salinity of the water from the Harbor system was an exacerbating factor in the higher densities of bacteria observed in the Stono River west of the Elliott Cut entrance. All stations in

the Stono River met the Class SB quality standard for bacteria during the assessment period.

2. There were no contraventions of the State quality standards for pH or temperature at any station in the assessment area.

3. Wappoo Creek exhibited the highest bacterial densities of any station in the assessment area. Elliott Cut exhibited densities equal to the highest observed in the Stono River. The data obtained from Wappoo Creek indicated that residential/commercial land-use activities in that drainage basin had resulted in these elevated ambient bacteria densities.

4. There were no contraventions of the State or Federal standard for bacteriological quality in shellfish tissue observed at any of the five stations sampled. Two stations were from the portion of the river closed to harvesting while the other three were from open areas.

5. Hydrological reconnaissances demonstrated substantial dilution capacity in the Stono River on ebbing tide, but diminished capacity on flooding tide. The diminution of dilution capacity concurrent with the input of poorer-quality water from the Harbor system on flooding tide clearly controlled the localization of less than satisfactory water quality conditions in the upper-middle portion of the Stono River.

6. The wastewater treatment facilities included in this assessment exhibited generally satisfactory performances.

7. Except for a minor contributing effect on the bacterial densities localized near the St. Andrews PSD/Savage Road facility, there was no evidence of water quality impacts in the Stono River due to the presence of these facilities. The prinicipal source of

water quality influence in the Stono River is the Charleston Harbor system and the overwhelming driving forces were the natural conditions and limitations imposed by the inherent hydrological characteristics of the system.

8. Analysis of the dissolved oxygen and coliform bacteria trends over the past eleven years in the Stono River showed statistically significant improvement in the oyxgen levels throughout the river and likewise significant improvement in bacteria levels in all areas except one. Wappoo Creek and the Stono River at SC 700 (Maybank Highway) exhibited increases in bacteria levels over the time period. This was a near-field effect not sustained either north or south of this immediate area in the river and was due to apparent significant increased loading of bacteria to the Stono River from Wappoo Creek.

## 4.4. Toxic Pollutants

Toxic pollutants in South Carolina's surface waters were assessed for this report through the evaluation of data collected statewide at DHEC monitoring stations. Data collected quarterly at 119 monitoring stations for metals analyses and collected annually at 69 monitoring stations for pesticides, herbicides, and other organics analyses were used for this assessment.

DHEC also annually collects sediment samples for toxics analyses at 187 monitoring stations. These data are not included in this assessment since there are no standards or criteria for comparison.

### 4.4.1. Metals in Water

The methodology used for this evaluation is explained in Section 3.4. of this report.

Table 4.4.A.

Waters Affected by Metals
Statewide
FY 1986 - FY 1987

| Waterbody Type | Size Monitored for Metals | Size with Elevated Metals |
|---|---|---|
| Rivers and streams | 2,513.5 miles | 180.5 miles |
| Lakes | 354,114 acres | 8,560 acres |
| Tidal Saltwaters | 319 square miles | 2 square miles |

Only two metals exceeded the criteria used for comparison: zinc and copper. Copper was elevated at only one monitoring station which is downstream of a metal plating facility wastewater discharge.

The elevated zinc levels are random, widespread, probably naturally occurring, and have no apparent adverse impact on the indigenous aquatic communities. Although reported here as elevated, we consider these zinc concentrations to be natural levels and not indicative of toxics problems.

Also, it is important to understand that the EPA criteria for the protection of aquatic life are not readily applicable to instream water quality conditions. These criteria were developed using laboratory bioassay data; and although no better criteria can be easily developed, these may not compare well with measurements made in the field.

Other metals assessed but which were not in concentrations above the assessment criteria are cadmium, lead, mercury, and metal.

### 4.4.2. Organics in Water

Pesticides, herbicides, and other organics concentrations in surface waters were reviewed for this assessment. These parameters were below their analytical detection limits at most monitoring stations as evidenced by results in the following table.

Table 4.4.B.
Waters Affected by Organics
Statewide
FY 1986 - FY 1987

| Waterbody Type | Size monitored for Organics | Size with Elevated Organics |
|---|---|---|
| Rivers and streams | 1,225 miles | 0 miles |
| Lakes | 155,324 acres | 0 |
| Tidal saltwaters | 56.3 square miles | 0 |

Organics monitored for but not detected at these monitoring stations are:

| | | | |
|---|---|---|---|
| p,p'DDT | aldrin | toxaphene | guthion |
| o,p'DDT | $\alpha$BHC | heptachlor | phosdrin |
| p,p'DDE | $\beta$ BHC | heptachlorapoxide | lindane |
| o,p'DDE | dieldrin | malathion | trithion |
| p,p'DDD | endrin | parathion | PCB's |
| | | | acid extractable organics |
| | | | base neutral organics |
| o,p'DDD | ethion | diazinon | volatile organics |

### 4.4.3. Fish Kills and Fishing Bans or Advisories

During FY 1986 and FY 1987 the Department recorded 144 fish kills statewide. More than 50% of the kills were due to dissolved oxygen depletion from algal blooms or increased water temperature. Nearly 70% of the kills were in private ponds or lagoons in residential developments.

Fourteen fish kills presented in Table 4.4.C. were attributed to toxics: 12 to pesticides or herbicides, one to an ammonia spill, and one to chlorine from a wastewater treatment plant. Ten of the kills by pesticides or herbicides occurred in private ponds or lagoons. The largest fish kill, which involved more than 10,000 fish, was attributed to herbicides occurred in Lake Marion from an intentional herbicide application for aquatic weed control.

There are no waters in South Carolina which routinely experience fish kills or fish abnormalities due to toxics.

Table 4.4.C.
South Carolina
Fish Kills Attributed to Toxics
FY 1986 - FY 1987

| Waterbody | Date | Number | Pollutant | Suspected Source |
|---|---|---|---|---|
| Private Pond | 8-19-85 | 40 | lindane | unknown |
| Thicketty Creek | 8-27-85 | 900 | ammonia | spill at Stouffer Foods |
| Lagoon/Wood Lake Villas | 9-15-85 | 1,000 | malathion | unknown |
| Leadenwah Creek | 5-14-86 | 2,100 | guthion | unknown |
| Private Pond | 6-18-86 | undet. | herbicide | unknown |
| Lagoon/Shipyard Plant. | 6-29-86 | 2,000 | 2,4-D | unknown |
| Lagoon/Sea Pines Plant. | 7-07-86 | 1,000 | oftanol | unknown |
| Lake Marion | 7-06-86 | 10,000 | herbicide | Santee-Cooper Weed Control |
| Private Pond | 7-27-86 | 1,000 | endosulfan | unknown |
| Private Pond | 8-12-86 | 2,000 | diquat | unknown |
| Private Pond | 9-04-86 | 50 | dursban | unknown |
| Durbin Creek | 9-15-86 | 75 | chlorine | WWTP |
| Lagoon | 9-28-86 | 200 | 2,4-D | unknown |
| Private Pond | 3-09-87 | 17 | herbicide | unknown |

The Department continues a 9 year old advisory against eating fish taken from the Seneca River area of Lake Hartwell in Pickens County because of unsafe levels of PCBs. In 1984 the U.S. Food and Drug Administration recommended that the level of PCBs in fish tissue not exceed 2.0 ppm. As a result of this action and concentrations of PCBs detected in fish tissue, DHEC has advised that people not eat any fish larger than three pounds caught any where in Lake Hartwell.

The PCB contamination in Lake Hartwell was discovered in 1975 and traced to effluent from Sangamo Electric Company in Pickens. Sangamo discontinued using PCBs in 1977; PCB use is now banned by EPA.

In July 1986, the Department issued a health advisory cautioning people not eat fish taken from Langley Pond in Aiken County. DHEC's annual monitoring showed mercury accumulations in fish tissue above the U.S. Food and Drug Administration's recommended limit of 1.0 ppm.

The sediments in Langley Pond have been monitored by DHEC since 1979 and results indicate high levels of chromium, mercury, and PCBs. The sediment contamination comes from large quantities of untreated or partially treated wastewater, primarily textile, discharged to Horse Creek and Langley Pond since the late 1800's.

In 1979 a new regional wastewater treatment facility, discharging to the Savannah River, collected and provided proper treatment for all wastewater discharges to Horse Creek. With the sources of contamination removed from Langley Pond, water quality has improved; however, the contaminated sediments remain in the pond

and fish accumulate these contaminants.

Several former dischargers to Langley Pond are under order by the Department to conduct a study to determine sources, nature, degree, and extent of contamination in Langley Pond sediments. Their final report to the Department will detail a plan of corrective action for Langley Pond which the former dischargers must implement.

Figure 4.4.A. shows cards detailing these advisories. These cards have been distributed by the Department.

Figure 4.4.A.

South Carolina
Fishing Advisories
FY 1986 - FY 1987

**ATTENTION**

**Fish Consumption Advisory — Lake Hartwell**
**S.C. Department of Health and Environmental Control (SCDHEC)**

- All fish taken from the Seneca River arm of Lake Hartwell north of SC Highway 24 and 12 Mile Creek should be released and not eaten.
- All fish larger than three (3) pounds taken from the remainder of Lake Hartwell should be released and not eaten.
- Fishing is not prohibited but SCDHEC advises that these fish not be eaten due to the presence of elevated levels of polychlorinated biphenyls (PCBs). Swimming, boating, and other water related activities are not restricted by this advisory.

For additional information, contact SCDHEC at:

| COLUMBIA | GREENVILLE | ANDERSON |
|---|---|---|
| 734-5300 | 242-9850 | 225-3731 |

**ATTENTION**
**FISH CONSUMPTION ADVISORY - LANGLEY POND**
**South Carolina Department of Health and Environmental Control**

- All fish taken from Langley Pond should be released and not eaten.
- The South Carolina Department of Health and Environmental Control advises that these fish not be eaten due to the presence of elevated levels of mercury and polychlorinated biphenyls (PCBs).

**For Additional Information, Contact**
**South Carolina Department of Health and Environmental Control at:**

| Columbia | Aiken |
|---|---|
| (803) 734-5300 | (803) 648-9561 |

## 4.5. Public Health Concerns

### Closure of Bathing Areas

South Carolina required no closures of bathing areas during FY 1986 or FY 1987 because of toxic or non-toxic pollutants.

### Incidents of Waterborne Disease

South Carolina reported no incidents of waterborne disease during FY 1986 or FY 1987.

### Closure of Surface Drinking Water Supplies

No public water supply in South Carolina had to close permanently during FY 1986 or FY 1987 because of toxic or non-toxic pollutants.

## 4.6 SPECIAL AREAS OF CONCERN

There are several areas of concern that DHEC is and will be continuing to be involved with concerning water quality of South Carolina. Issues such as nonpoint source and ground-water protection have been discussed elsewhere in this report and are only noted here as special areas. Additional areas are toxics and public perception of toxics, the need for more representative water quality criteria, and general program funding concerns.

### Toxics and Public Perception of Toxics

Actions by EPA and the states have done the public a tremendous disservice resulting in the current fear and public perception of toxics in the environment. The word "toxic" alone brings forth connotations of adverse impacts to the water environs of the state and nation. Words such as "hazardous waste", "toxic wastes", "suspected carcinogen", etc. are repeatedly used by regulators who are vying for congressional and public support for programs to regulate the waste by-products of the rapidly evolving, ever demanding American consumer. While these programs are needed to control the generation, storage and treatment of these wastes, we the regulators have painted the blackest of pictures in search of support. As such, it is not surprising for the backlash we now see from the public who challenge new permits (i.e., not in my backyard) or congress through new regulations. The states and EPA must do a better job of informing the public and congress of what is being done to control toxics in the environment while remembering the goals of the Clean Water Act. While total elimination of waste by-products, in particular toxics, may be a "motherhood and apple pie" stance to take; it is not possible with today's technology, nor is it necessary if proper controls are instituted. The findings of this report that overall only <5 percent of

state waters were impaired by toxics is an excellent indication that adequate controls are presently in place. New regulations, new reports, new program efforts, etc. trying to achieve these goals, burden those states achieving those goals already. Where the goals have yet to be reached, proper and more effective implementation of existing programs is needed.

More Representative Water Quality Criteria

Programs such as South Carolina's use national criteria to predict what controls are necessary to ensure that waters are protected. What we have observed to date is that the national levels tend to be extremely conservative and in some cases totally unrepresentative of the degree of control necessary. Furthermore, as there is a limited amount of such research, criteria are not available for all compounds in questions. For these criteria to be more representative, research at the level of a state or at most a region of water quality similarity is necessary. As this approach is economically infeasible for the wide range of substances of concern, biological testing at the discharge may be the most effective alternative. This whole wastewater analysis on a continuous basis in turn will ensure the goals of the Clean Water Act and lead to treatment plant upgrades where impact is discovered. This whole waste testing approach is currently being effectively utilized by the Department.

General Program Funding Issues

Appropriate staff support and program funding have always been important, and until recently additions to work plans, special reports, etc. could be accomplished by either doubling up the effort or putting off some other effort for a short period of time. Over the last several years the demand on the water program particularly from federal sources has significantly increased, the 1987 amendments to the Clean Water Act being

a prime example. While some additional money was provided to begin the new tasks, this seed money came in between Section 106 federal program cuts. This trend of program cuts plus a failure to recognize the resultant need for a reduction in effort is of great concern. A possible solution to this concern is the development of state Clean Water Strategy prioritizing tasks to be accomplished. Such a step takes time to develop which in turn delays some tasks from being completed.

New programs should take into account necessary resources to the states, and programs should be flexible so that states can effectively implement the programs.

## 4.7. NONPOINT SOURCE POLLUTION ASSESSMENT

### Introduction

Recent passage of Federal Law 100-4, the Clean Water Act, requires under Section 319 that each state carry out a nonpoint source (NPS) assessment within its borders. Findings are to be reported to the Environmental Protection Agency by April 1, 1988. Further, Section 319 mandates that assessment results be used to formulate a management plan to control the NPS pollution and then to implement that plan. The task of preparing the assessment in South Carolina was assigned to the Bureau of Water Pollution of the Department of Health and Environmental Control. In general terms the assessment is a list of waters, including surface and groundwaters, that are impacted by NPS runoff and the NPS category or source contributing to these impacts. The surface water list and accompanying information is shown in Table 4.7.A. and the groundwater list in Table 4.7.C.

While this assessment is a good start and a good data base from which to work, it does not include all NPS pollution problems. As survey methodology is better customized to determine waters impacted by NPS pollution, the data base will continually be updated and refined.

### 4.7.1. Methodology

As defined by the Association of State and Interstate Water Pollution Control Administrators and the Environmental Protection Agency's America's Clean Water, nonpoint sources are those sources of pollution that are not covered by a site-specific Federal permit. With this definition in mind, a methodology was developed to assess waterbodies in South Carolina that are currently impacted or have the potential of being impacted by nonpoint sources. The assessment

results include impacted waterbodies arranged by watershed, category of the polluting source, water quality parameter(s) being contravened, violations of S.C. water quality standards, and source of data.

Data from the DHEC statewide ambient water-quality monitoring network was used as a primary data source for the assessment and as a database upon which to build. The monitoring station network data provides the best representation of existing water quality in South Carolina because it is the only database that contains historical data, has a wide coverage of parameters, and is sampled monthly. This is the only data source designated as "monitored" on the table; all the others are designated as "evaluated".

An NPS database was acquired by retrieving data on selected parameters from the 543 active sampling stations in the network between 1983 and 1988. Exceedence of EPA criteria and staff professional judgement were used to identify contraventions. These waterbodies were analyzed in detail to determine which parameters had numerous contraventions and which had scattered contraventions, and were so designated on Table 4.7.A. The particular water quality parameters used as indicators of NPS pollution are: fecal coliform bacteria, dissolved oxygen, toxic materials such as heavy metals or pesticides, suspended solids or sediment, nutrients (phosphorus and/or nitrogen), pH, turbidity, biological oxygen demand, and ammonia.

Each monitoring station which had contraventions of water quality parameters was located on the appropriate county highway map and carefully examined to determine if in fact, the problem resulted from NPS pollution. In determining whether the problem is point source related, NPS related, or a combination of the two; consideration was

given to which parameters were violated and to the distance of the stations from domestic or industrial wastewater treatment discharges. Once a station with water quality parameter contraventions was determined to be NPS related or partially NPS related, further consideration was given to the geography and land use of the area to determine which NPS category, such as agricultural activities or urban development, or combination of categories was the most probable cause of the problem.

Table 4.7.A. was developed as a visual presentation of NPS impacted waterbodies. For an explanation of the abbreviations used, see the "NPS Assessment Explanation" that follows the table. As required by EPA's NPS Guidance, the data was arranged by watershed and the standardized federal eight digit hydrologic unit code was selected as the watershed designation. Various columns in the table include: watershed, waterbody, county, monitoring station number, NPS category, parameters of concern, data source, standards violations, and additional comments. The "NPS Assessment Explanation" also gives an explanation of the data type contained in each of the columns of the table.

Several additional data sources were analyzed and where appropriate, added to the table. Surveys were sent to individuals throughout the state who are knowledgeable in water quality matters, including Department of Health and Environmental Control District engineers, S.C. Land Resources Conservation Commission Districts, environmental groups, water-recreation groups, local conservationists, wildlife officers, and other interested public. The surveys were used to solicit information about specific waterbodies with existing or potential impacts from nonpoint sources, the effects on the water-

bodies, the NPS categories, and the existing and potential uses of the waterbodies. The data accrued from the surveys were compared to the monitored data. If the impacted waterbody reported by the survey had already been discovered from the monitored data, an additional data source was added as "evaluated," and where ncesssary, additional NPS categories added. Waterbodies not already discovered from the monitored data, were added as new entries to the table. Any data added to the table that did not come from a monitoring station, was designated as "evaluated".

NPS impaired waterbody data were also extracted from the South Carolina Water Quality Assessment 1984-1985 (305(b) Report); America's Clean Water, the State's Nonpoint Source Assessment 1985, Appendix produced by ASIWPCA; and the National Estuarine Inventory-National Coastal Pollution Discharge Inventory by the National Oceanic and Atmospheric Administration. These waterbodies were compared to those already listed and added where necessary along with the corresponding data source designation.

The Department has set water quality standards for three of the parameters listed in the assessment; dissolved oxygen, fecal coliform bacteria, and pH. The waterbodies which had violations of one or more of these standards were determined and the parameters violated are denoted in a separate column of the table.

The South Carolina Land Resources Conservation Commission (SCLRCC), under contract, provided computer modelling results indicating high potential NPS problems in the agriculture, urban runoff, and surface mining categories. To define them, SCLRCC used a geographic information system (GIS) and a sediment yield model called

SEDCAD. Statewide estimates of sediment yield were derived by combining four spatial data sets (I.E., watershed boundaries, land use/land cover, soil, and hydrology) to develop inputs required by the sediment yield model. As a result of the analysis, hydrologic units, by watershed, were separated into six Major Land Resource Areas (MLRA) and, upon completion of the analysis phase, were further subdivided into four distinct "potential" sediment yield categories, less than the weighted average, greater than the weighted average, more than twice the weighted average, and more than three times the weighted average.

The smallest detailed unit of area usable in the simulation modelling is that of watershed units (subdivisions of the Federal Hydrologic Unit Code areas). Each waterbody within each watershed unit of concern was located on county maps. These potential NPS impacted waters could then be compared to identified impacted waters from the monitored data. Again, where a match was realized, the additional data source was added to the table and where necessary, the additional NPS category was added.

4.7.2. Results

Based on data gathered from the several sources, 276 waterbodies were identified as probable problem areas resulting from NPS pollution. The largest source of data indicating NPS impacted waters was DHEC's surface water quality sampling network, contributing information for 78% of these areas. Other sources of data include DHEC Environmental Quality Control Districts (10%), interested public (28%), S.C. Land Resources Conservation Commission computer modelling (28%), S.C. Water Quality Assessment 1984 - 1985 (305(b) Report) (3%), America's Clean Water, the State's Nonpoint Source Assessment 1985,

Appendix (6%), and the National Estuarine Inventory - National Coastal Pollution Discharge Inventory (1%). The total percentage exceeds 100 because several of the problem areas were reported by more than one source (refer to Table 4.7.A.).

The data collected from DHEC's surface water quality sampling network was considered to be "monitored," and all other data "evaluated." Of the 276 probable NPS problem areas listed, 56% was monitored data, 23% was evaluated data and 21% was a combination of monitored and evaluated.

After analyzing the collected data, it becomes quite evident that the greatest NPS pollution contributors are agricultural runoff and urban runoff, contributing 61% and 39%, respectively. Other NPS categories include construction (9%), silviculture (4%), on-site wastewater systems (3%), mining (.4%), landfills (.4%), land disposal (.4%), and unknown (3%). Again, the total percentage exceeds 100 because several of the problem areas had more than one NPS category contributing to the problem. Eleven percent of the problem areas were also impacted by point source discharges.

Several of the NPS problem areas had contraventions of South Carolina water quality standards. Nine percent of the waterbodies had dissolved oxygen (DO) contraventions, 6% had pH contraventions, and 7% had fecal coliform (FC) contraventions. Of these particular problem area waterbodies; 3% had contraventions of both DO and pH, 1% had both DO and FC, .4% had both pH and FC, and .7% had contraventions of all three water quality standards.

South Carolina Land Resources Conservation Commission provided us with computer modelling results which indicates watersheds with high potential for NPS runoff from three of the major NPS categories; agriculture, urban, and abandoned mines (see Table 4.7.B.). Results of the modelling indicate that 136 watersheds have high potential of

NPS impacts. Of these, 61% have potential for being impacted by agriculture, 31% by urban runoff and 29% by abandoned mines. High priority should be given to those watersheds with potential for being impacted by two of the sources or all three sources. Eighteen percent of the watersheds are potentially impacted by two sources and 1% by all three sources.

### 4.7.3. Groundwater Assessment

Nonpoint sources, as defined by EPA guidance, account for the vast majority of documented sites and occurrences of ground-water contamination in South Carolina. The most recent S.C. Groundwater Contamination Inventory compiled by the Groundwater Protection Division of DHEC lists approximately 390 incidents or sources at 35 sites with about 90 percent clearly associated with some nonpoint source, e.g., lagoons, underground tanks, land fills, spray irrigation, septic-tank tilefields, above ground tanks, and unpermitted discharges. These incidents/sources are listed in Table 4.7.C. along with the parameter(s) of concern and the NPS category. About 30 percent involve leaking underground storage tanks and associated piping for petroleum products. Leaking or leaching from pits, ponds, and lagoons used for wastewater disposal or storage account for 17 percent of the sources. Major spills and slow leaks not associated with in-place petroleum tanks also comprised 17 percent, landfills (both industrial and municipal) 12 percent leachate from spray irrigation of wastewater (both industrial and municipal) or from septic tank tilefields 6 percent each, leakage from above ground storage tanks (mostly petroleum) 2 percent; and leakage or leaching from unpermitted nonpoint discharges (e.g., stored on buried drums) 2 percent. Probably a large proportion of the remaining 10 percent of

"unknown" or "other" sources are nonpoint in character, with the exception of contamination clearly derived from the well itself (i.e., oil leak from submersible pumps, accidential drainage of petroleum products or intentional drainage of chemical wastes down wells). A nonpoint source example would be leachate from saline dredge spoil.

There is considerable bias in the detection and documentation of the above sites and sources. Certain categories have received or are receiving active and comprehensive investigations: pits, ponds, and lagoons, underground petroleum tanks, RCRA facilities, and other facilities with waste disposal practices permitted by DHEC. Other sources are encountered in a much more incidental manner and are probably very under represented. Only a few instances of agricultural contamination are known with certainty or strongly suggested, but no comprehensive surveys have been conducted.

TABLE 4.7.A

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03040201 | PEE DEE RIVER | FLORENCE | PD-076 | 10 | | | S | | S | | S | | N | I,III | M,E | | |
| 03040201 | SNAKE BRANCH | DARLINGTON | PD-137 | 40 | S | | | | N | | | | | I | M | | |
| 03040201 | CATFISH CANAL | MARION | PD-097 | 10,40 | | N | | | N | S | | | | I | M | DO | |
| 03040201 | CATFISH CANAL | MARION | PD-321 | 10,40 | S | S | | | N | S | | | | I | M | | |
| 03040201 | BIG SWAMP | FLORENCE | PD-168 | 10 | S | N | | | N | | S | S | | I | M | DO | |
| 03040201 | BLACK CREEK | DARLINGTON | PD-025 | 10 | S | | S | | N | | | | N | I | M | | ALSO PT SOURCE |
| 03040201 | SNAKE BRANCH | DARLINGTON | PD-258 | 40 | S | S | | | N | | S | S | | I | M | | |
| 03040201 | BLACK CREEK | DARLINGTON | PD-021 | 40 | | | S | | S | N | | | N | I,III | M,E | | |
| 03040201 | PRESTWOOD LAKE | DARLINGTON | PD-268 | 40 | | | | | N | N | | | | I | M | pH | |
| 03040201 | THOMPSON CREEK | CHESTERFIELD | | 10 | | | | U | | | U | | | III,IV | E | | |
| 03040201 | LYNCHES LAKE | FLORENCE | PD-086A | 10,40 | S | N | | | N | S | | S | | I | M | DO | ALSO PT SOURCE |
| 03040201 | BIRCH CREEK | WILLIAMSBURG | PD-213 | 10 | S | S | | | N | | | | | I | M | | |
| 03040201 | LAKE SWAMP | HORRY | PD-176 | 10 | S | N | | | N | S | | S | | I | M | | |
| 03040201 | PEE DEE RIVER | FLORENCE | PD-236 | 10 | | | | | N | | S | | S | I | M | | |
| 03040201 | LAKE ROBINSON | DARLINGTON | PD-266 | 10 | | | | | N | N | | | | I,IV | M | pH | |
| 03040201 | MIDDLE SWAMP | FLORENCE | PD-230 | 10 | S | N | | | N | | | | S | I,IV | M | | |
| 03040201 | JEFFRIES CREEK | FLORENCE | PD-256 | 10 | S | N | | | N | | | | | I,III | M,E | DO | |
| 03040201 | CROOKED CREEK | MARLBORO | PD-107 | 10,40 | S | | | | N | N | | | | I,IV | M | pH | |
| 03040201 | PEE DEE RIVER | DARLINGTON | PD-028 | 10 | | | S | | S | | S | | N | I | M | | |
| 03040201 | JEFFRIES CREEK | DARLINGTON | PD-255 | 10 | S | N | | | N | | | | | I,IV | M | DO | |
| 03040201 | PEE DEE RIVER | MARLBORO | PD-015 | 10 | | | | | N | | N | | | I | M | | |
| 03040201 | JEFFRIES CREEK | DARLINGTON | PD-255 | 10 | S | N | | | N | | | | | I,IV | M | | |
| 03040201 | PEE DEE RIVER | MARLBORO | PD-012 | 10 | S | | S | | S | | S | | N | I,III | M,E | | |
| 03040202 | LYNCHES RIVER | CHESTERFIELD | PD-113 | 10 | N | | | | N | | | | N | I,V | M,E | | |
| 03040202 | LYNCHES RIVER | FLORENCE | PD-281 | 10 | | | S | | | | | | N | I | M | | |
| 03040202 | TODD BRANCH | LANCASTER | PD-005 | 40 | N | | | | N | | S | | | I | M | FC | |
| 03040202 | LYNCHES RIVER | KERSHAW | PD-080 | 10 | S | | S | | S | | S | | N | I | M | | |
| 03040202 | LYNCHES RIVER | FLORENCE | PD-041 | 10 | | | S | | | | | | N | I,IV | M | | |
| 03040202 | LYNCHES RIVER | KERSHAW | PD-009 | 10 | S | | | | N | | | | | I | M | | |
| 03040202 | LYNCHES LAKE | FLORENCE | PD-087 | 10 | | N | | | N | S | | | | I,VI | M,E | DO,pH | |
| 03040202 | BIG SWAMP | FLORENCE | PD-169 | 10 | S | N | | | N | S | | S | | I | M | | ALSO PT SOURCE |
| 03040202 | S BR WILDCAT CREEK | LANCASTER | PD-180 | 10 | N | | | | N | | | | | I | M | | |
| 03040202 | LYNCHES LAKE | FLORENCE | PD-085 | 10,40 | S | N | | | N | S | | S | | I | M | DO | |
| 03040202 | LYNCHES CREEK | LANCASTER | PD-006 | 10 | N | | S | | S | | | S | N | I | M | | |
| 03040202 | SPARROW SWAMP | DARLINGTON | PD-072 | 10 | S | N | | | N | S | | | | I,III,IV | M,E | DO,pH | |
| 03040202 | W BR WILDCAT CREEK | LANCASTER | PD-179 | 10 | N | | | | N | | | | | I | M | | |
| 03040202 | LITTLE RIVER | HORRY | MD-162 | 40 | S | | S | | | | S | | N | I,III | M,E | | |
| 03040202 | LYNCHES RIVER | KERSHAW | PD-066 | 10 | S | | | | N | | | | | I,III | M,E | | |
| 03040204 | PANTHER CREEK | MARLBORO | PD-306 | 10 | S | N | | | N | N | | | | I | M | | |
| 03040204 | LITTLE PEE DEE RIVER | DILLON | PD-069 | 10,20 | | | | | N | N | | | S | I,III,VI | M,E | pH | |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03040204 | BEAVERDAM CREEK | DILLON | PD-310 | 10 | | N | | | N | N | | S | | I | M | DO,pH | |
| 03040204 | MAIDEN DOWN SWAMP | MARION | PD-190 | 10 | | N | | | N | | | | | I | M | DO | |
| 03040204 | LITTLE PEE DEE RIVER | MARION | PD-189 | 10 | | S | S | | N | S | | | N | I,IV | M | | |
| 03040204 | LITTLE PEE DEE RIVER | DILLON | PD-029E | 10 | | | | | N | N | | | | I,III | M,E | | |
| 03040204 | LITTLE PEE DEE RIVER | MARION | PD-053 | 10 | | | S | | N | S | | | S | I,III,IV | M,E | | |
| 03040205 | POCOTALIGO RIVER | SUMTER | PD-091 | 10,40 | S | S | S | | N | | | | N | I,IV | M | | ALSO PT SOURCE |
| 03040205 | BLACK MINGO CREEK | GEORGETOWN | PD-172 | 10 | | S | S | | N | | | | | I | M | DO | |
| 03040205 | GREEN SWAMP | SUMTER | PD-039 | 10,40 | S | S | | | | | | | | I,IV | M | | |
| 03040205 | BLACK RIVER | LEE | PD-186 | 10 | S | S | | | N | S | | | | I,III,IV | M,E | | |
| 03040205 | PUDDING SWAMP | WILLIAMSBURG | PD-203 | 10 | S | S | | | N | S | | | | I | M | | |
| 03040205 | ROCKY BLUFF SWAMP | SUMTER | PD-201 | 10 | S | S | | | N | N | | | | I | M | FC,DO,pH | |
| 03040205 | POCOTALIGO RIVER | CLARENDON | PD-115 | 10 | | N | | | N | S | | | | I | M | DO | |
| 03040205 | SCAPE ORE SWAMP | LEE | | 10 | | | U | U | | | U | | | III,IV | E | | |
| 03040205 | POCOTALIGO RIVER | SUMTER | PD-202 | 10,40 | S | N | S | | N | S | | | N | I,IV | M | DO,pH | ALSO PT SOURCE |
| 03040205 | TURKEY CREEK | SUMTER | PD-098 | 10,40 | N | S | | | N | | S | S | | I,IV | M | FC | |
| 03040206 | INTRACOASTAL WATERWAY | HORRY | MD-089 | 40 | S | N | | | | S | | | | I | M | | |
| 03040206 | KINGSTON LAKE | HORRY | MD-107 | 40 | N | N | | | N | S | | | | I | M | FC,DO,pH | |
| 03040206 | INTRACOASTAL WATERWAY | HORRY | MD-127 | 40 | | N | S | | | S | | | S | I | M | | |
| 03040206 | CRABTREE CREEK | HORRY | MD-158 | 10,40 | S | N | | | N | | S | | | I | M | FC,DO | |
| 03040206 | INTRACOASTAL WATERWAY | HORRY | MD-088 | 40 | S | N | | | | | | | | I | M | FC | |
| 03040206 | INTRACOASTAL WATERWAY | HORRY | MD-087 | 40 | S | N | | | | S | | | | I | M | FC | |
| 03040206 | WACCAMAW RIVER | HORRY | MD-111 | 10,40 | | N | | | N | S | | | | I,IV | M | pH | |
| 03040206 | INTRACOASTAL WATERWAY | HORRY | MD-085 | 40 | S | N | | | N | | S | | | I,II,VI | M,E | | |
| 03040206 | WACCAMAW RIVER | HORRY | MD-136 | 10,40 | | N | | | | S | | | | I,IV | M | | |
| 03040206 | WACCAMAW RIVER | HORRY | MD-110 | 10,40 | | N | | | N | S | | | | I,III,IV,VI | M,E | | |
| 03040207 | SAMPIT RIVER | GEORGETOWN | | 40,65,30 | U | | U | U | | | | | | IV | E | | ALSO PT SOURCE |
| 03040207 | WINYAH BAY | GEORGETOWN | | 10 | | | | | U | | | | | IV,VII | E | | |
| 03040207 | TURKEY CREEK | GEORGETOWN | MD-076N | 10 | S | | | | | S | | | | I | M | | |
| 03040207 | INTRACOASTAL WATERWAY | HORRY | MD-091 | 10,40 | S | N | | | | | S | | | I,IV | M | FC | |
| 03050101 | BEAVERDAM CREEK | YORK | CW-153 | 10 | N | | | | N | | S | | | I | M | | |
| 03050101 | LAKE WYLIE | YORK | | 65,10 | U | | | U | | | | | | III | E | | |
| 03050103 | U. T. TO CATAWBA RIVER | YORK | CW-221 | 40 | N | | | | N | | | | | I | M | FC | |
| 03050103 | STEEL CREEK | YORK | CW-009 | 10 | N | S | | | N | | S | S | | I | M | | |
| 03050103 | BEAR CREEK | LANCASTER | CW-151 | 10 | S | S | | | N | | S | | | I | M | | |
| 03050103 | GRASSY RUN BRANCH | CHESTER | CW-088 | 40 | N | | | | N | | S | S | S | I | M | | |
| 03050103 | STEEL CREEK | YORK | CW-011 | 10 | N | | | | N | | S | | | I | M | | |
| 03050103 | FISHING CREEK | CHESTER | CW-008 | 10 | | | N | | N | | | | N | I | M | | |
| 03050103 | GILLS CREEK | LANCASTER | CW-047 | 40 | N | S | | | N | | S | | | I | M | | |
| 03050103 | CATAWBA RIVER | YORK | | 65 | U | | | | | | U | | | III | E | | ALSO PT SOURCE |
| 03050103 | CANE CREEK | LANCASTER | CW-185 | 10 | S | S | | | N | | S | | | I | M | | |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03050103 | TWELVE MILE CREEK | LANCASTER | CW-083 | 10 | S | S | | | N | | N | | | I,IV | M | | |
| 03050103 | BEAR CREEK | LANCASTER | CW-131 | 40 | N | S | | | N | | S | | | I | M | | |
| 03050103 | FISHING CREEK | YORK | CW-029 | 10 | S | | S | | S | | S | | N | I,V,VI | M,E | | |
| 03050104 | WATEREE RIVER | KERSHAW, SUMTER | | 10,30 | | | U | U | | | U | | | III | E | | |
| 03050104 | LAKE WATEREE | FAIRFIELD | CW-208 | 10 | | S | | | N | S | S | | S | I,VI | M,E | | |
| 03050104 | LITTLE WATEREE CREEK | FAIRFIELD | CW-040 | 10 | N | | | | N | | S | | | I | M | | |
| 03050104 | MILL CREEK | RICHLAND | C-021 | 90 | N | | | | | N | | | | I | M | pH | |
| 03050105 | LIMESTONE MILL CREEK | CHEROKEE | B-128 | 40 | N | | | | | | | | | I | M | | |
| 03050105 | BRUSHY CREEK | GREENVILLE | BE-009 | 40 | N | | | | | | N | | | I | M | | |
| 03050105 | BULLOCKS CREEK | YORK | B-159 | 10 | N | | | | S | | S | | | I,IV | M | | |
| 03050105 | TYGER RIVER | SPARTANBURG | B-008 | 10 | N | | | | | | N | | N | I,VI | M,E | | ALSO PT SOURCE |
| 03050105 | MIDDLE TYGER RIVER | GREENVILLE | B-148 | 10 | N | | N | | N | | N | | N | I | M | | |
| 03050105 | HEADWATERS OF LAKE BOWEN | SPARTANBURG | B-302 | 10 | N | | | | | | N | | | I,IV | M | | |
| 03050105 | THICKETTY CREEK | CHEROKEE | B-133 | 10 | N | | | | N | | N | | | I,IV | M | | |
| 03050105 | BROAD RIVER | CHEROKEE | B-042 | 10 | N | | N | | N | | | | N | I,III,VI | M,E | | |
| 03050105 | PACOLET RIVER | SPARTANBURG | B-028 | 10 | N | | | | N | | N | | | I | M | | |
| 03050105 | PACOLET RIVER | SPARTANBURG | BP-001 | 10 | S | | | | N | | S | | | I | M | | |
| 03050105 | BROAD RIVER | CHEROKEE | B-044 | 10 | N | | S | | N | | N | S | N | I | M | | |
| 03050105 | NORTH PACOLET RIVER | SPARTANBURG | B-026 | 10 | N | | S | | N | | N | | N | I,IV | M | | |
| 03050105 | BROAD RIVER | CHEROKEE | B-043 | 10 | N | | | | N | | N | | | I,IV | M | | |
| 03050105 | LAKE WELCHEL | CHEROKEE | | 10,40 | | | | U | | | | | | III | E | | |
| 03050105 | THICKETTY CREEK | CHEROKEE | B-062 | 10 | S | | | | S | | S | | | I,IV | M | | |
| 03050105 | SPIVEY CREEK | SPARTANBURG | B-103 | 10 | N | | | | | | | | | I | M | | |
| 03050105 | POTTER BRANCH | SPARTANBURG | B-191 | 10 | N | | | | N | | | | | I | M | | |
| 03050105 | LAWSONS FORK CREEK | SPARTANBURG | | 40,30,10 | U | | | U | | | | | | III | E | | ALSO PT SOURCE |
| 03050106 | ROSS BRANCH | YORK | B-086 | 40 | N | | | | N | | N | | | I | M | | |
| 03050106 | DRY FORK CREEK | CHESTER | B-073 | 40 | N | | | | N | | N | | | I | M | | |
| 03050106 | LITTLE RIVER | FAIRFIELD | B-145 | 10 | N | | | | N | | N | | | I,IV | M | | |
| 03050106 | BROAD RIVER | UNION | B-046 | 10 | N | | S | | N | | N | S | N | I | M | | |
| 03050106 | SANDY RIVER | CHESTER | B-075 | 10 | N | | | | N | | N | | | I | M | | |
| 03050106 | JACKSON CREEK | FAIRFIELD | | 10,30,40 | | | | U | | | | | | III,IV | E | | |
| 03050106 | SMITH BRANCH | RICHLAND | B-280 | 40 | N | | N | | N | | N | N | N | I,V | M,E | FC | |
| 03050106 | BROAD RIVER | NEWBERRY | B-047 | 10 | N | | | | N | | | | | I | M | | |
| 03050106 | DRY FORK CREEK | CHESTER | B-074 | 40 | N | | | | N | | N | | | I | M | | |
| 03050106 | BROAD RIVER | FAIRFIELD | B-236 | 10 | | | N | S | N | | N | | N | I | M | | |
| 03050106 | BROAD R DIVERSION CANAL | RICHLAND | B-080 | 40 | N | | N | | N | | N | | N | I,III | M,E | | |
| 03050106 | WINNSBORO BRANCH | FAIRFIELD | B-123 | 40 | N | | | | N | | | | | I | M | FC | |
| 03050107 | TYGER RIVER | SPARTANBURG | B-162 | 10 | N | | | | N | | N | S | | I,III,IV | M,E | | |
| 03050107 | SOUTH TYGER RIVER | GREENVILLE | B-317 | 10 | N | | | | N | | N | | N | I | M | | |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03050107 | ENOREE RIVER | SPARTANBURG | BE-018 | 10 | N | | | | N | | N | | | I | M | | ALSO PT SOURCE |
| 03050107 | KELSEY CREEK | SPARTANBURG | B-235 | 40 | N | | | | | | | | | I | M | | |
| 03050107 | ENOREE RIVER | NEWBERRY | B-045 | 10 | N | | N | N | N | | N | | N | I | M | | |
| 03050107 | SOUTH TYGER RIVER | SPARTANBURG | B-263 | 40 | N | | | | N | | | | | I | M | | ALSO PT SOURCE |
| 03050107 | U.T. TO FAIRFOREST CREEK | SPARTANBURG | B-242 | 40 | N | | | | N | | N | | | I | M | | |
| 03050107 | FAIRFOREST CREEK | SPARTANBURG | B-020 | 40 | N | | | | N | | | | | I | M | FC | |
| 03050107 | MITCHELL CREEK | UNION | B-199 | 10 | N | | | | N | | N | | | I | M | | |
| 03050108 | GILDER CREEK | GREENVILLE | BE-040 | 40 | N | | | | S | | S | | | I | M | | |
| 03050108 | ENOREE RIVER | SPARTANBURG | B-037 | 10 | N | | | | N | | N | | | I,III | M,E | | ALSO PT SOURCE |
| 03050108 | MILL CREEK | SPARTANBURG | B-038 | 10 | N | N | | | N | | | N | | I | M | | |
| 03050108 | ENOREE RIVER | SPARTANBURG | BE-024 | 10 | N | | | | N | | N | | | I | M | | ALSO PT SOURCE |
| 03050108 | ENOREE RIVER | SPARTANBURG | B-041 | 10 | N | | N | | N | | N | | N | I,V | M,E | | ALSO PT SOURCE |
| 03050108 | DURBIN CREEK | GREENVILLE | B-097 | 10 | N | | | | N | | N | | | I | M | | |
| 03050108 | BRUSHY CREEK | GREENVILLE | BE-035 | 40 | N | | | | S | | S | | | I | M | | |
| 03050108 | ENORRE RIVER | GREENVILLE | BE-015 | 10 | N | | | | N | | N | | | I | M | | ALSO PT SOURCE |
| 03050108 | HORSE PEN CREEK | GREENVILLE | BE-020 | 10 | N | | | | N | | | | | I | M | | ALSO PT SOURCE |
| 03050108 | ROCKY CREEK | GREENVILLE | BE-007 | 40 | N | | | | N | | N | N | | I | M | | |
| 03050109 | SALUDA RIVER | GREENVILLE | S-007 | 40 | N | | S | | | | N | | N | I,II,III | M,E | | |
| 03050109 | BRUSHY CREEK | ANDERSON | S-084 | 10 | N | | | | N | | N | | | I | M | | |
| 03050109 | NORTH CREEK | LAURENS | S-135 | 10 | S | N | | | N | S | | N | | I | M | | |
| 03050109 | U.T. TO ENOREE RIVER | GREENVILLE | BE-001 | 40 | N | | N | | | | N | | N | I | M | | |
| 03050109 | EASTSIDE CREEK | GREENVILLE | | 30,40 | | | | U | | | U | | | III | E | | |
| 03050109 | LORICK BRANCH | LEXINGTON | S-151 | 10,40 | N | N | | | N | | N | N | | I,IV | M | | |
| 03050109 | BUSH RIVER | NEWBERRY | S-042 | 10 | N | | S | | N | | N | | N | I,III,IV | M,E | | ALSO PT SOURCE |
| 03050109 | SALUDA RIVER | PICKENS | S-250 | 40 | N | | | | | | N | | N | I | M | | |
| 03050109 | SALUDA RIVER | LAURENS | S-125 | 10 | | | N | | N | | N | | N | I,III,VI | M,E | | |
| 03050109 | LITTLE RIVER | LAURENS | S-034 | 40 | N | | N | | N | | S | | N | I,V | M,E | | |
| 03050109 | RABON CREEK | LAURENS | S-096 | 10 | N | | | | S | | N | | | I,IV | M | | |
| 03050109 | SCOTT CREEK | NEWBERRY | S-044 | 40 | N | | | | N | | N | | | I | M | FC | |
| 03050109 | GEORGE'S CREEK | PICKENS | S-063 | 10 | N | | | | N | | N | | | I,IV | M | | |
| 03050109 | REEDY RIVER | GREENVILLE | S-013 | 40 | N | | | | N | | N | | N | I,II,VI | M,E | | |
| 03050109 | CLOUDS CREEK | SALUDA | | 10 | | | | U | | | U | | | III,IV | E | | ALSO PT SOURCE |
| 03050109 | MINE CREEK | SALUDA | | 10,20 | | | | U | | | U | | | III,IV | E | | |
| 03050109 | CAMPING CREEK | NEWBERRY | S-290 | 10 | N | | N | | N | | N | N | N | I,IV | M | | |
| 03050109 | ROCKY RIVER | ANDERSON | SV-031 | 40 | S | | N | | | | S | | N | I | M | | |
| 03050109 | LITTLE RIVER | NEWBERRY | S-099 | 10 | N | | | | N | | N | | | I,IV | M | | |
| 03050109 | SALUDA RIVER | LEXINGTON | S-149 | 10,40 | N | | | | N | | | | | I,III,IV | M,E | | ALSO PT SOURCE |
| 03050109 | CORONACA CREEK | GREENWOOD | | 10,40 | U | | | U | | | U | | | III,IV | E | | ALSO PT SOURCE |
| 03050109 | ROCK CREEK | GREENVILLE | S-091 | 10,40 | N | | | | S | | | | | I,III | M,E | | |
| 03050109 | SALUDA RIVER | GREENWOOD | S-186 | 10 | S | | S | | N | | S | | N | I,VI | M,E | | |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03050109 | LAKE GREENWOOD | GREENWOOD | S-131 | 10 | | | N | | N | N | N | | N | I,III,VI | M,E | | |
| 03050109 | MIDDLE BRANCH HEADWATERS | PICKENS | | 40,30,90 | | | | U | | | U | | | II | E | | |
| 03050109 | KINLEY CREEK | LEXINGTON | | 10,30,40 | | | | U | | | | | | III,IV | E | | |
| 03050109 | LITTLE SALUDA RIVER | SALUDA | | 10 | | | | U | | | U | | | III,IV | E | | |
| 03050109 | BUSH RIVER | NEWBERRY | S-102 | 10 | N | | | | N | | N | | | I,IV | M | | ALSO PT SOURCE |
| 03050109 | LAKE MURRAY HEAD WATERS | NEWBERRY | S-223 | 10 | S | N | S | | S | S | | S | S | I,III,IV,VI | M,E | | |
| 03050110 | FOREST LAKE | RICHLAND | C-068 | 40 | S | | | | | | S | | N | I | M | | |
| 03050110 | GILLS CREEK | RICHLAND | C-001 | 40 | N | | | | N | | | | N | I,III,VI | M,E | | |
| 03050110 | RAWLS CREEK | LEXINGTON | S-287 | 40 | N | | | | N | | N | | | I,III | M,E | | |
| 03050110 | SAVANNAH BRANCH | LEXINGTON | C-061 | 40 | S | | | | N | N | | | | I | M | | |
| 03050110 | LAKE INSPIRATION | CALHOUN | C-058 | 40 | S | | | | N | S | S | N | | I | M | | |
| 03050110 | RED BANK CREEK | LEXINGTON | C-067 | 10 | S | | | | N | S | | | | I,III | M,E | | |
| 03050110 | CONGAREE R AT CONFLUENCE OF BROAD R AND SALUDA R | RICHLAND | CSB-001L, CSB-001R | 10,40 | N | | S | | N | | S | | N | I,III,IV | M,E | | |
| 03050111 | TAW CAW CREEK | CLARENDON | ST-018 | 40 | N | S | | | N | | | S | | I | M | FC,DO | |
| 03050111 | LAKE MARION | CLARENDON | ST-024 | 10,60 | | | S | | | S | | | N | I,II,III,VI | M,E | | |
| 03050112 | SANTEE RIVER | BERKELEY | ST-001 | 10 | S | | N | | S | | S | | N | I,VII | M,E | | |
| 03050201 | GOOSE CREEK | BERKELEY | MD-114 | 40 | S | N | S | | N | | | | N | I,VI | M,E | DO | |
| 03050201 | CROWDERS CREEK | YORK | CW-023 | 10 | N | | S | | N | | N | S | | I | M | FC | ALSO PT SOURCE |
| 03050201 | COOPER RIVER | BERKELEY | | 10,90 | | | | U | | | | | | III,IV | E | | |
| 03050201 | SHEM CREEK | CHARLESTON | MD-071 | 40 | S | S | | | | S | | | S | I,V | M,E | | |
| 03050201 | WANDO RIVER | CHARLESTON | | 40,30 | U | U | U | | | | | | | II | E | | |
| 03050201 | U.T. TO COOTER CREEK | CHARLESTON | MD-199 | 90 | | N | S | | | N | | | N | I | M | DO,pH | |
| 03050201 | FOSTER CREEK | CHARLESTON | | 40,65,63 | U | U | U | | | | | | | II | E | | |
| 03050201 | LAKE MOULTRIE | BERKELEY | | 90 | | | | U | | | | | | III | E | | |
| 03050202 | INLET CREEK | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050202 | KIAWAH RIVER | CHARLESTON | | 40,10 | U | U | U | | | | | | | II | E | | |
| 03050202 | ASHLEY RIVER | CHARLESTON | MD-049 | 40 | S | S | S | | S | | S | | S | I | M | | ALSO PT SOURCE |
| 03050202 | FOLLY RIVER | CHARLESTON | | 40,10,65 | U | U | U | | | | | | | II | E | | |
| 03050202 | ASHLEY RIVER | CHARLESTON | MD-052 | 40 | S | S | | | | S | | | S | I | M | | ALSO PT SOURCE |
| 03050202 | JEREMY CREEK | CHARLESTON | | 40,65 | U | U | | | | | | | | II | E | | |
| 03050202 | CONCH CREEK | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050202 | ASHLEY RIVER | CHARLESTON | MD-034 | 40 | | S | | | | S | | | N | I,II | M,E | | ALSO PT SOURCE |
| 03050202 | CHARLESTON HARBOR | CHARLESTON | MD-165 | 40 | | S | | | | S | | | S | I,II,III,VII | M,E | | ALSO PT SOURCE |
| 03050202 | STONO RIVER | CHARLESTON | MD-026 | 40 | S | S | S | | | | S | | S | I,II,III | M,E | | ALSO PT SOURCE |
| 03050202 | SWINTON CREEK | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050202 | WASSAMASSAW SWAMP | BERKELEY | CSTL-063 | 90 | S | N | N | | S | | | S | N | I,V | M,E | DO | |
| 03050202 | JAMES ISLAND CREEK | CHARLESTON | MD-122 | 40 | N | S | | | | | | | | I | M | | |
| 03050202 | HAMLIN CREEK | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050202 | ELLIOT CUT | CHARLESTON | MD-025 | 40 | S | S | | | S | | S | | | I | M | | ALSO PT SOURCE |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN: FC | DO | TX | SS | NT | pH | TB | BO | AM | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 03050202 | HAMLIN SOUND | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050202 | COPAHEE SOUND | CHARLESTON | | 40,30 | U | | | | | | | | | II | E | | |
| 03050203 | N FORK EDISTO RIVER | ORANGEBURG | E-092 | 10 | N | | S | | S | N | | | N | I,IV | M | | |
| 03050203 | N FORK EDISTO RIVER | AIKEN | E-091 | 10 | N | | S | | N | | | | N | I,IV,VI | M,E | FC | |
| 03050203 | N FORK EDISTO RIVER | ORANGEBURG | E-007 | 10,40 | N | | | | N | N | | | N | I,II,IV | M,E | | |
| 03050203 | N FORK EDISTO RIVER | ORANGEBURG | E-099 | 10 | N | | S | | N | N | | | N | I,IV | M | pH | |
| 03050203 | BULL SWAMP CREEK | LEXINGTON | E-034 | 10 | N | N | | | N | N | | | | I,IV | M | DO,pH | |
| 03050204 | FIRST BRANCH | EDGEFIELD | E-001 | 40 | S | | | | | S | | | | I | M | FC,pH | LIMITED DATA |
| 03050204 | GOODLAND CREEK | ORANGEBURG | E-036 | 10 | N | | | | N | S | | | | I,IV | M | | |
| 03050204 | S FORK EDISTO RIVER | AIKEN | E-090 | 10 | N | | | | | S | S | | N | I,IV | M | | |
| 03050205 | FICKLING CREEK | CHARLESTON | | 10 | | U | U | | | | | | | II | E | | |
| 03050205 | CHURCH CREEK | CHARLESTON | | 10,65 | U | | | | | | | | | II,IV | E | | |
| 03050205 | FISHING CREEK | CHARLESTON | | 65 | U | U | | | | | | | | II | E | | |
| 03050205 | EDISTO RIVER | ORANGEBURG | E-013 | 10 | S | | | | N | S | | | | I | M | | |
| 03050205 | EDISTO RIVER | DORCHESTER | E-015 | 10 | S | | | | N | | | | | I,IV | M | | |
| 03050205 | LEADENWAH CREEK | CHARLESTON | | 10 | | U | U | | | | | | | II | E | | |
| 03050205 | DAWHOO RIVER | CHARLESTON | MD-120 | 10 | S | S | S | | S | | S | | N | I | M | | |
| 03050205 | EDISTO RIVER | DORCHESTER | E-014 | 10 | S | S | | | N | | | | | I,III,IV,VI | M,E | | |
| 03050205 | BOHICKET CREEK | CHARLESTON | MD-195 | 40 | S | S | S | | S | | | | N | I | M | FC,DO | |
| 03050206 | PROVIDENCE SWAMP | ORANGEBURG | E-051 | 10 | N | N | N | | N | | S | | N | I | M | DO | |
| 03050206 | FOUR HOLE SWAMP | ORANGEBURG | E-059 | 10 | N | | S | | N | | | | N | I,III | M,E | | |
| 03050207 | LITTLE SALKEHATCHIE R | COLLETON | | 10,20 | | | | U | | | | | | III,IV | E | | |
| 03050207 | SALKEHATCHIE RIVER | COLLETON | CSTL-006 | 10 | S | | | | N | | | | N | I | M | | |
| 03050207 | SALKEHATCHIE RIVER | BARNWELL | CSTL-028 | 10 | S | | | | N | | | | N | I | M | | |
| 03050208 | COOSAWHATCHIE RIVER | JASPER | CSTL-107 | 10 | S | | S | | S | S | | | N | I | M | | |
| 03050208 | ASHEPOO RIVER | COLLETON | | 10,40 | | | U | U | | | | | | III,IV | E | | |
| 03050208 | LUCY POINT CREEK | BEAUFORT | | 10 | U | | | | | | | | | III | E | | |
| 03050208 | NEW RIVER | BEAUFORT | MD-118 | 10 | S | S | | | | S | | | N | I,IV,V | M,E | | |
| 03050208 | IRELAND CREEK | COLLETON | CSTL-044 | 10 | S | S | | | N | N | | | | I,III,IV | M,E | DO,pH | |
| 03050208 | BEAUFORT RIVER | BEAUFORT | MD-001 | 40 | | N | | | | | | | | I | M | | |
| 03050208 | LK WARREN ON BLACK CK | HAMPTON | | 10 | | | | U | | | | | | III,IV | E | | |
| 03050208 | COOSAWHATCHIE RIVER | HAMPTON | CSTL-109 | 10 | S | S | N | | N | S | | | S | I | M | | |
| 03050208 | BROAD RIVER | BEAUFORT | | 90 | | | | | U | | | | | VII | E | | |
| 03050208 | ST HELENA SOUND | BEAUFORT | | 90 | | | | | U | | | | | VII | E | | |
| 03050208 | COLLETON RIVER | BEAUFORT | | 10 | U | | | | | | | | | III | E | | |
| 03050208 | BEAUFORT RIVER | BEAUFORT | MD-002 | 40 | | N | | | S | | | | | I | M | | |
| 03050208 | BEAUFORT RIVER | BEAUFORT | MD-004 | 40 | | N | | | | | | | | I | M | | ALSO PT SOURCE |
| 03050208 | OKATIE RIVER | BEAUFORT | | 10 | U | | | | | | | | | III | E | | |
| 03050208 | POCOTALIGO RIVER | BEAUFORT | MD-007 | 10 | | S | S | | N | | | | N | I,V | M,E | | |
| 03060101 | LAKE HARTWELL | OCONEE | | 30,40 | | | | U | | | | | | III,IV | E | | ALSO PT SOURCE |

NONPOINT SOURCE ASSESSMENT

| WATERSHED | WATERBODY | COUNTY | STATION # | NPS CATEGORY | PARAMETERS OF CONCERN | | | | | | | | | DATA SOURCE | MONITORED/ EVALUATED | STDS. VIO. | ADDITIONAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | FC | DO | TX | SS | NT | pH | TB | BO | AM | | | | |
| 03060101 | LAKE KEOWEE | OCONEE | SV-312 | 10 | | | | | | | | | N | I,IV | M | | |
| 03060101 | SIX AND TWENTY CREEK | ANDERSON | SV-181 | 10 | N | | | | N | | S | | | I,IV | M | | |
| 03060101 | TWELVE MILE CREEK | PICKENS | SV-282 | 10 | N | | | | N | | S | | | I | M | | |
| 03060101 | THOMPSON RIVER | OCONEE | | 40,10,30 | | | | U | | | U | | | III | E | | |
| 03060101 | LITTLE RIVER | OCONEE | SV-203 | 10,20,30 | N | U | | U | N | | | | | I,III,IV | M,E | | |
| 03060101 | WHITEWATER RIVER | OCONEE | | 40,10,30 | | | | U | | | U | | | IV | E | | |
| 03060101 | LAKE KEOWEE | OCONEE | SV-311 | 10 | | | | | | | | | N | I,III,IV | M,E | | |
| 03060101 | TWELVE MILE CREEK | PICKENS | SV-015 | 10 | N | | | | N | | S | | | I,III,IV | M,E | | |
| 03060101 | CONEROSS CREEK | OCONEE | | 20,30 | | | | U | | | U | | | III | E | | |
| 03060101 | BROADWAY CREEK | ANDERSON | SV-136 | 10 | S | | | | S | | N | | | I | M | | |
| 03060102 | BATTLE CREEK | OCONEE | | 20,30 | | | | U | | | U | | | III,IV | E | | |
| 03060102 | OPOSSUM CREEK | OCONEE | | 20,30 | | | | U | | | U | | | III,IV | E | | |
| 03060102 | CHAUGA RIVER | OCONEE | | 20,30 | | | | U | | | U | | | III | E | | |
| 03060102 | BRASSTOWN CREEK | OCONEE | | 20,30 | | | | U | | | U | | | III,IV | E | | |
| 03060102 | CHATOOGA RIVER | OCONEE | | 20,30 | | | | U | | | U | | | III,IV | E | | |
| 03060103 | CLARKS HILL RES | McCORMICK | | 10 | | | | U | | | U | | | III | E | | |
| 03060103 | LONG CANE CREEK | McCORMICK | SV-318 | 10 | | | S | | N | | S | | N | I,III | M,E | | |
| 03060103 | LAKE SECCESSION | ABBEVILLE | SV-121 | 10 | | | S | | S | S | | | S | I,III | M,E | | |
| 03060103 | LAKE SECCESSION | ABBEVILLE | SV-121 | 10 | | | S | | S | S | | | S | I | M | | |
| 03060103 | LAKE LEGION | ABBEVILLE | | 10,40 | | | | U | | | | | | III | E | | |
| 03060103 | LEGION LAKE | ABBEVILLE | | 10,40 | | | | U | | | | | | III | E | | |
| 03060103 | LAKE SECCESSION | ABBEVILLE | SV-122 | 10 | | | | | | S | | | S | I | M | | |
| 03060103 | LITTLE RIVER | McCORMICK | | 10 | | | | U | | | U | | | III | E | | |
| 03060103 | LAKE RUSSELL | ABBEVILLE | | 10,40 | | | | U | | | | | | III | E | | |
| 03060106 | HORSE CREEK | AIKEN | SV-250 | 40 | S | | S | | S | S | | | N | I | M | | |
| 03060106 | BRIDGE CREEK | AIKEN | SV-070 | 10 | | | S | | S | S | | | N | I | M | | |
| 03060106 | SAND RIVER | AIKEN | SV-069 | 40 | S | | | | S | S | | | N | I | M | | |
| 03060106 | HORSE CREEK POND | AIKEN | SV-096 | 40 | | | | | N | | | | S | I | M | | |
| 03060106 | LITTLE HORSE CREEK | AIKEN | SV-317 | 10. | | | | | N | S | | | | I | M | | |
| 03060106 | HORSE CREEK | AIKEN | SV-071 | 40 | S | | S | | S | S | | | N | I | M | | |
| 03060106 | LITTLE HORSE CREEK | AIKEN | SV-073 | 10 | S | | | | N | S | | | S | I,II | M,E | | |
| 03060106 | LOWER THREE RUNS CREEK | ALLENDALE | SV-175 | 10 | | | | | N | | | | S | I | M | | |
| 03060106 | SUDLOW LAKE | AIKEN | | 30,50 | | | | U | | | U | | | II | E | | |
| 03060106 | HORSE CREEK | AIKEN | SV-072 | 40 | S | | | | N | S | | | S | I | M | | |
| 03060107 | TURKEY CREEK | McCORMICK | | 10 | | | | U | | | U | | | III | E | | |
| 03060107 | HARD LABOR CREEK | McCORMICK | | 10 | | | | U | | | U | | | III,IV | E | | |
| 03060107 | CUFFEYTOWN CREEK | McCORMICK | | 10 | | | | U | | | U | | | III,IV | E | | |
| 03060107 | STEVENS CREEK | McCORMICK | | 10 | | | | U | | | U | | | III,IV | E | | |

Legend for Table 4.7.A.

Column 1 - Watershed

The standard federal eight digit hydrologic unit was selected as the watershed designation for the assessment.

Column 2 - Waterbody

The name of the body of water, i.e., stream, river, lake, wetland, etc. that evidences real or potential adverse impacts due to NPS contributions.

Column 3 - County

The South Carolina county or counties in which the problem waterbody lies. Along with the watershed identifier, it defines the location of the waterbody.

Column 4 - Station #

The DHEC surface water quality sampling station identification number.

Column 5 - NPS Category

NPS Category represents the source of pollution affecting the problem waterbody. Category number designations are taken directly from EPA guidance:

10 - Agriculture
20 - Silviculture
30 - Construction
40 - Urban Runoff
51 - Surface Mining
65 - On-site Wastewater Systems
70 - Hydrologic/Habitatal Modification
80 - Other
90 - Source Unknown

Column 6 - Parameters of Concern

The specific water quality indicators of NPS pollution. The waterbodies listed have exhibited exceedences of specific guidelines or standards of one or more of the parameters shown:

FC - Fecal Coliform Bacteria
DO - Dissolved Oxygen
TX - Toxic materials such as heavy metals or pesticides
SS - Suspended Solids or Sediment
NT - Nutrients (phosphorus and/or nitrogen)
pH
TB - Turbidity
BO - Biological Oxygen Demand ($BOD_5$)
AM - Ammonia

An S in a parameter column indicates scattered exceedences of a particular parameter, N indicates numerous exceedences, and U indicates undetermined.

Column 7 - Data Source

Several sources were utilized to identify NPS problem waterbodies for purposes of the assessment:

I - DHEC's surface water quality sampling network of 543 stations. This data was retrieved from the STORET network. It represents the largest data source in the assessment and is the only one designated as a "monitored" data source.

II - Problem locations supplied by DHEC District Engineers.

III - Problem locations supplied by the interested public including environmental groups and water based recreation groups, local conservationists, and wildlife officers.

IV - Computer modelling results by S.C. Land Resources Conservation Commission indicate high potential for NPS problems in the agriculture, urban runoff, or surface mining categories.

V - S.C. Water Quality Assessment 1984-1985 (305(b) Report).

VI - Data contained in America's Clean Water, the State's Nonpoint Source Assessment 1985 Appendix produced by ASIWPCA.

VII - Data contained in the National Estuarine Inventory - National Coastal Pollution Discharge Inventory by the National Oceanic and Atmospheric Administration.

Column 8 - Monitored/Evaluated

This denotes whether a problem waterbody was selected based on monitored or evaluated data.

Column 9 - Standards Violations

The State of South Carolina has set water quality standards for three of the parameters listed in the assessment; dissolved oxygen, fecal coliform bacteria, and pH. This column denotes at which waterbody one or more of these parameters had standards violations.

Column 10 - Additional Comments

Self-explanatory.

TABLE 4.7.B

WATERSHEDS WITH HIGH POTENTIAL FOR NPS RUNOFF

| WATERSHED | NPS CATEGORY | WATERSHED | NPS CATEGORY | WATERSHED | NPS CATEGORY |
|---|---|---|---|---|---|
| 03040201 80 | 10 | 03050105 140 | 40,51 | 03050204 40 | 10,51 |
| 03040201 33 | 10 | 03050106 20 | 10 | 03050204 70 | 10 |
| 03040201 19 | 10 | 03050106 90 | 10 | 03050204 50 | 10 |
| 03040201 41 | 10 | 03050107 10 | 51 | 03050205 20 | 10 |
| 03040201 72 | 51 | 03050107 20 | 40 | 03050205 40 | 10 |
| 03040201 70 | 51 | 03050107 30 | 10,40 | 03050205 50 | 10 |
| 03040201 110 | 51 | 03050107 40 | 10,40 51 | 03050205 70 | 40 |
| 03040201 120 | 10 | 03050107 50 | 40,51 | 03050206 10 | 40 |
| 03040201 150 | 51 | 03050107 60 | 40,51 | 03050206 20 | 40 |
| 03040201 140 | 10 | 03050108 10 | 51 | 03050206 30 | 40 |
| 03040201 160 | 10 | 03050108 30 | 10 | 03050207 10 | 51 |
| 03040202 50 | 10 | 03050108 43 | 10 | 03050207 30 | 51 |
| 03040202 60 | 51 | 03050109 10 | 10,40 | 03050207 50 | 10,51 |
| 03040202 90 | 51 | 03050109 20 | 40 | 03050207 40 | 51 |
| 03040202 97 | 10 | 03050109 40 | 40,51 | 03050207 60 | 51 |
| 03040202 110 | 10 | 03050109 50 | 40 | 03050207 80 | 51 |
| 03040202 140 | 10 | 03050109 70 | 10 | 03050207 90 | 10 |
| 03040202 150 | 10 | 03050109 90 | 10 | 03050208 50 | 51 |
| 03040204 50 | 10 | 03050109 110 | 10,40 | 03050208 80 | 10 |
| 03040204 88 | 10 | 03050109 120 | 10 | 03050208 120 | 10 |
| 03040205 30 | 51 | 03050109 130 | 40,51 | 03050208 130 | 40 |
| 03040205 40 | 10 | 03050109 170 | 51 | 03050208 90 | 51 |
| 03040205 20 | 10 | 03050109 200 | 10 | 03050208 100 | 51 |
| 03040205 120 | 10 | 03050111 29 | 10 | 03060101 50 | 40 |
| 03040205 130 | 10 | 03050111 30 | 10 | 03060101 80 | 40 |
| 03040205 140 | 51 | 03050111 40 | 10 | 03060101 40 | 40 |
| 03040205 170 | 10 | 03050111 50 | 10 | 03060101 30 | 10,40 |
| 03040206 100 | 10 | 03050112 10 | 10 | 03060101 60 | 40 |
| 03040206 110 | 10 | 03050112 20 | 10 | 03060101 90 | 40 |
| 03040206 120 | 10,40 | 03050112 40 | 10 | 03060101 100 | 40 |
| 03040206 29 | 10 | 03050112 50 | 10 | 03060102 30 | 40 |
| 03040207 50 | 10 | 03050112 60 | 10 | 03060102 60 | 40 |
| 03050104 60 | 10 | 03050201 20 | 10 | 03060102 130 | 40 |
| 03050104 70 | 10 | 03050201 30 | 10 | 03060103 20 | 10 |
| 03050104 80 | 40 | 03050202 20 | 10 | 03060103 30 | 40,51 |
| 03050104 100 | 10 | 03050202 40 | 10 | 03060103 80 | 40 |
| 03050105 155 | 40,51 | 03050202 50 | 40,51 | 03060103 70 | 40 |
| 03050105 160 | 40 | 03050202 70 | 40,51 | 03060106 30 | 10 |
| 03050105 180 | 40 | 03050203 30 | 10 | 03060106 60 | 10,51 |
| 03050105 58 | 10,40 | 03050203 40 | 10,40,51 | 03060106 100 | 10 |
| 03050105 94 | 10 | 03050203 50 | 40,51 | 03060106 110 | 10 |
| 03050105 110 | 10,40 | 03050203 60 | 10 | 03060106 130 | 10 |
| 03050105 130 | 40,51 | 03050203 70 | 10 | 03060106 140 | 10 |
| 03050105 109 | 10 | 03050204 20 | 10,51 | 03060107 40 | 10 |
| 03050105 122 | 10 | 03050204 10 | 51 | | |
| 03050105 142 | 10,51 | 03050204 30 | 10,51 | | |

TABLE 4.7.C

GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Whitlock Wool Combing | ALLENDALE | NO3 | 62 |
| Sandoz Colors and Chemicals | ALLENDALE | NO3,METALS,VOC,OTHER | 62 |
| Palmetto Dunes Plantation | BEAUFORT | NO3 | 62 |
| Plusa Inc. | BERKELEY | NO3 | 62 |
| Carolina Eastman | CALHOUN | NO3 | 62 |
| Wando River Terminal | CHARLESTON | NO3 | 62 |
| E.I. Dupont de Nemour | FLORENCE | NO3 | 62 |
| Wolverine Brass | HORRY | VOC | 62 |
| Kendall Company | KERSHAW | NO3 | 62 |
| Swansea Municipal Sewage Treatment | LEXINGTON | METALS | 62 |
| Carolina Gravure | LEXINGTON | METALS | 62 |
| Masonite | MARION | NO3 | 62 |
| Delta Mills Plant | MARLBORO | NO3 | 62 |
| Ashland Chemical Company | RICHLAND | OTHER | 62 |
| National Starch and Chemical | SPARTANBURG | NO3 | 62 |
| Hoechst Fibers | SPARTANBURG | METALS,VOC | 62 |
| Lyman, Town of | SPARTANBURG | NO3 | 62 |
| Campbell Soup | SUMTER | NO3 | 62 |
| Sonoco | DARLINGTON | OTHER | 62,63,82 |
| Sea Pines Plantation | BEAUFORT | NO3 | 62,65,82 |
| Abco | SPARTANBURG | VOC, METALS | 62,82 |
| International Wire Products | SPARTANBURG | METALS,VOC | 62,82,84 |
| Lindau Chemical Company | RICHLAND | VOC | 62,84 |
| Savannah River Plant LF DWP-087A | AIKEN | VOC | 63 |
| Savannah River Plant - Silverton Rd | AIKEN | VOC | 63 |
| Horse Creek Poll. Cntrl. IWP-161 | AIKEN | METALS | 63 |
| Savannah River Plant - CMP Pits | AIKEN | METALS,VOC,P/H | 63 |
| Singer Company | ANDERSON | VOC | 63 |
| Owens-Corning LF IWP-015 | ANDERSON | VOC | 63 |
| Barnwell County LF DWP-001 | BARNWELL | VOC | 63 |
| Beaufort County LF DWP-063 | BEAUFORT | METALS,NO3 | 63 |

GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Charleston County LF DWP-061, -079 | CHARLESTON | METALS | 63 |
| Landfill, Inc. | CHESTER | VOC, METALS | 63 |
| Chesterfield County LF DWP-036 | CHESTERFIELD | METALS | 63 |
| Chesterfield County LF DWP-017 | CHESTERFIELD | METALS | 63 |
| Colleton County LF DWP-076 | COLLETON | METALS | 63 |
| Darlington County LF DWP-060 | DARLINGTON | METALS,VOC | 63 |
| Edgefield County LF DWP-040 | EDGEFIELD | NO3 | 63 |
| Florence County LF DWP-021 | FLORENCE | METALS,VOC | 63 |
| Koppers Co., Inc. | FLORENCE | BNA | 63 |
| Andrews Wire | GEORGETOWN | METALS | 63 |
| Georgetown Steel | GEORGETOWN | METALS,NO3 | 63 |
| Piedmont LF I & II DWP-009 | GREENVILLE | VOC | 63 |
| Simpsonville LF | GREENVILLE | VOC | 63 |
| City of Greenville LF DWP-070 | GREENVILLE | VOC | 63 |
| Western Carolina Reg. Sewer IWP-152 | GREENVILLE | METALS,NO3 | 63 |
| Greenwood Co. LF DWP-100 | GREENWOOD | VOC | 63 |
| Monsanto | GREENWOOD | VOC | 63 |
| Helena Chemical | HAMPTON | P/H | 63 |
| Kershaw County LF DWP 008 & 008A | KERSHAW | METALS | 63 |
| Torrington Co. | LAURENS | VOC | 63 |
| Cryovac Dumpsite | LAURENS | METALS,CHLOROFORM | 63 |
| Lexington County Landfill DWP-030 | LEXINGTON | VOC | 63 |
| Carolina Chemicals | LEXINGTON | P/H | 63 |
| Farmers Mutual Exchange LF | MARLBORO | METALS,VOC | 63 |
| J.P. Stevens IWP-104 | OCONEE | NO3 | 63 |
| Sangamo Weston | PICKENS | PCB | 63 |
| Platt Saco Lowell | PICKENS | METALS | 63 |
| Chambers/Richland Co. LF DWP-126 | RICHLAND | VOC | 63 |
| Batchelder-Blasius | SPARTANBURG | METALS | 63 |
| Sumter County LF-Cook St. | SUMTER | METALS | 63 |
| Shaw AFB | SUMTER | VOC | 63 |

## GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Gist Brocade Fermentation | WILLIAMSBURG | NO3 | 63,82 |
| Celanese Fibers Operations | YORK | VOC | 63,82 |
| Venture Chemical | BEAUFORT | PCB,METALS,VOC | 63,82,84 |
| Ethyl Corporation | ORANGEBURG | VOC | 63,84 |
| McEntire ANG Base | RICHLAND | VOC | 63,84 |
| Groce Laboratories | SPARTANBURG | VOC | 63,84 |
| Puretown Restaurant & Truck Stop | ANDERSON | NO3 | 65 |
| Folly Island | CHARLESTON | NO3 | 65 |
| Hutchinson Trailer Park | FLORENCE | NO3 | 65 |
| Columbia Organic Chemical | KERSHAW | VOC,METALS | 65 |
| Inland Container Company | LEXINGTON | METALS | 65 |
| F.B. Johnston, Inc. | LEXINGTON | VOC | 65 |
| Wood Brothers Inc. | LEXINGTON | OTHER | 65 |
| Becton Dickinson and Co. | OCONEE | METALS | 65 |
| Greenwood Mills Liner Plant | ORANGEBURG | VOC,NO3,PHENOL | 65 |
| Fairfield Chemical Company | RICHLAND | VOC | 65 |
| Kings Laboratories | RICHLAND | VOC | 65 |
| Future Fuels | RICHLAND | VOC | 65 |
| Robbins and Myers, Inc. | RICHLAND | NO3 | 65 |
| Derrick private well | RICHLAND | PETROPROD | 65 |
| Spartan Plating and Grinding | SPARTANBURG | METALS | 65 |
| Cherryvale Subdivision | SUMTER | PETROPROD | 65 |
| Booth Farms | SUMTER | NO3 | 65 |
| Palmetto Pigeon Plant | SUMTER | NO3 | 65 |
| Kalama Specialty Chemicals | BEAUFORT | VOC | 65,82 |
| Greenwood Mills Edisto Plant | ORANGEBURG | NO3,PHENOL | 65,82 |
| Savannah River Plant M-Area | AIKEN | VOC | 82 |
| Savannah River Plant-Old TNX Basins | AIKEN | METALS | 82 |
| Savannah River Plant L-Area | AIKEN | NO3 | 82 |
| Savannah River Plant F-Area | AIKEN | RAD | 82 |
| Savannah River Plant H-Area | AIKEN | RAD | 82 |

GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Eliskim, Inc. | ANDERSON | METALS | 82 |
| Wamchem | BEAUFORT | METALS,VOC,NO3 | 82 |
| Independent Nail | BEAUFORT | METALS | 82 |
| Parker White Metals Co. | BEAUFORT | METALS | 82 |
| Mobay Chemical Corp | BERKELEY | VOC | 82 |
| Moore Drums | CHARLESTON | METALS,VOC | 82 |
| Geiger Property | CHARLESTON | VOC | 82 |
| General Electric | CHARLESTON | VOC | 82 |
| Cummins Engine | CHARLESTON | METALS | 82 |
| Lockheed-Georgia Company, Inc. | CHARLESTON | METALS,VOC | 82 |
| Mobil Chemical Company | CHARLESTON | NO3,P/H | 82 |
| Stoller-Mii | CHARLESTON | METALS,NO3 | 82 |
| Virginia Chemicals | CHESTER | VOC,SALTS | 82 |
| Ti-Caro-Knit | CHESTERFIELD | | 82 |
| Balchem Corp | COLLETON | METALS,VOC | 82 |
| Asten Hill Manufacturing Co. | COLLETON | VOC | 82 |
| Celanese Fibers | DARLINGTON | VOC | 82 |
| Sweetwater community | EDGEFIELD | PETROPROD | 82 |
| L-Tec | FLORENCE | VOC | 82 |
| Kaiser Aluminum Company | FLORENCE | P/H | 82 |
| General Electric Co. | FLORENCE | VOC, METALS | 82 |
| Floyd's Grocery | GEORGETOWN | PETROPROD | 82 |
| American Cyanimid | GEORGETOWN | Al SULFATE | 82 |
| General Battery Corporation | GREENVILLE | METALS | 82 |
| T & S Brass and Bronze Works, Inc. | GREENVILLE | VOC,METALS | 82 |
| Steel Heddle Manufacturing | GREENVILLE | METALS,VOC | 82 |
| Roy Metal Finishing Works, Inc. | GREENVILLE | METALS,VOC | 82 |
| Carolina Plating Works | GREENVILLE | METALS, VOC | 82 |
| American Hoechst Corp | GREENVILLE | METALS,VOC | 82 |
| Westinghouse | HAMPTON | PHENOLS | 82 |
| Reichold Chemical Company | HAMPTON | METALS,VOC | 82 |

GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Pine Valley Estates | HORRY | NO3 | 82 |
| Garden City Shopping Center | HORRY | MBAS,TDS | 82 |
| Hardwicke Chemical | KERSHAW | METALS,VOC | 82 |
| E.I. Dupont | KERSHAW | METALS | 82 |
| Southern Screening & Engraving | LANCASTER | VOC, METALS | 82 |
| Lehigh-Lancaster Inc. | LANCASTER | METALS | 82 |
| Simpson private well | LAURENS | PETROPROD | 82 |
| Union Switch & Signal | LEXINGTON | METALS,VOC | 82 |
| Allied Fibers and Plastic Corp. | LEXINGTON | METALS, VOC, NO3 | 82 |
| Springdale private well | LEXINGTON | PETROPROD | 82 |
| Roper Industries | ORANGEBURG | | 82 |
| Shuron, Inc. | ORANGEBURG | VOC | 82 |
| Chevron/Gulf Terminal | RICHLAND | PETROPROD | 82 |
| Bendix/Amphenol Products | RICHLAND | VOC | 82 |
| Amphenol Products | RICHLAND | VOC | 82 |
| Townsend Textron Sawchain | RICHLAND | METALS,NO3 | 82 |
| Inman Quarry | SPARTANBURG | VOC,METALS | 82 |
| Siemens Allis/ITE | SPARTANBURG | METALS,VOC | 82 |
| Blackman-Uhler Chemical | SPARTANBURG | VOC | 82 |
| International Mineral Corp. | SPARTANBURG | NO3 | 82 |
| Milliken Chemical Company | SPARTANBURG | VOC | 82 |
| Thermal Oxidation Corp. | SPARTANBURG | VOC | 82 |
| Sybron Chemicals Inc. | SPARTANBURG | | 82 |
| Southern Wood Piedmont | SPARTANBURG | BNA | 82 |
| Southern Coatings | SUMTER | METALS | 82 |
| CP Chemicals Inc. | SUMTER | METALS,VOC | 82 |
| Valchem | AIKEN | VOC | 82,84 |
| Perfection Hytest | DARLINGTON | VOC | 82,84 |
| Wellman, Inc. | FLORENCE | PETROPROD,VOC | 82,84 |
| L & M Self Service | FLORENCE | PETROPROD | 82,84 |
| Vicellon | GREENVILLE | VOC | 82,84 |

GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Crown Metro, Inc. | GREENVILLE | VOC | 82,84 |
| Para-Chem, Inc. | GREENVILLE | VOC,METALS | 82,84 |
| Seaboard System Railroad | AIKEN | VOC | 84 |
| Defense Fuel Support Point | BERKELEY | PETROPROD | 84 |
| Chevron Gulf Terminal | CHARLESTON | PETROPROD | 84 |
| Swygert's Shipyard | CHARLESTON | PETROPROD | 84 |
| Texaco Terminal | CHARLESTON | PETROPROD | 84 |
| Broad River Brick | CHEROKEE | PETROPROD | 84 |
| Carolawn Industries | CHESTER | VOC | 84 |
| Scurry Private well | EDGEFIELD | PETROPROD | 84 |
| Winnsboro Petroleum Company | FAIRFIELD | PETROPROD | 84 |
| VC Summer Nuclear Station | FAIRFIELD | PETROPROD | 84 |
| Korn Industries | FLORENCE | PETROPOD | 84 |
| Ethox | GREENVILLE | PETROPROD | 84 |
| Cone Mills Union Bleachery | GREENVILLE | METALS | 84 |
| Colonial Pipeline Spill Site 2 | GREENVILLE | PETROPROD | 84 |
| Colonial Pipeline Spill Site 1 | GREENVILLE | PETROPROD | 84 |
| General Electric Gas Turbine | GREENVILLE | PETROPROD | 84 |
| Carolina Plating and Stamping | GREENVILLE | METALS | 84 |
| Roll Technology | GREENVILLE | METALS | 84 |
| Myrtle Beach AFB | HORRY | PETROPROD | 84 |
| Suffolk Chemical Co. | LEXINGTON | VOC | 84 |
| Columbia Metropolitan Airport | LEXINGTON | PETROPROD | 84 |
| SC Recycling & Disposal-Dixiana | LEXINGTON | METALS,VOC | 84 |
| Palmetto Wood Preserving, Inc. | LEXINGTON | METALS | 84 |
| S.C. Fire Academy | LEXINGTON | VOC | 84 |
| Georgia Pacific Corp. | ORANGEBURG | PETROPROD | 84 |
| Palmetto Recycling | RICHLAND | METALS | 84 |
| SC Recycling Disposal-Bluff Rd. | RICHLAND | VOC | 84 |
| Cardinal Chemical Company | RICHLAND | VOC | 84 |
| Westinghouse Nuclear Fuel Div. | RICHLAND | NO3, Fluoride | 84 |

## GROUNDWATER NPS ASSESSMENT

| SITE | COUNTY | PARAMETERS OF CONCERN | NPS CATEGORY |
|---|---|---|---|
| Bell South | RICHLAND | PETROPROD | 84 |
| Plantation, Inc. | SPARTANBURG | PETROPROD | 84 |
| Union Oil Co. | SPARTANBURG | PETROPROD | 84 |
| British Petroleum | SPARTANBURG | PETROPROD | 84 |
| Amerada Hess | SPARTANBURG | PETROPROD | 84 |
| Crown Central Petroleum | SPARTANBURG | PETROPROD | 84 |
| Frank Elmore Site | SPARTANBURG | VOC | 84 |
| Ashland Oil Co. | SPARTANBURG | PETROPROD | 84 |
| Shell Oil Co. | SPARTANBURG | PETROPROD | 84 |
| Chevron, Inc. | SPARTANBURG | PETROPROD | 84 |
| Exxon Company, USA | SPARTANBURG | PETROPROD | 84 |
| Exide Battery | SUMTER | METALS | 84 |
| Carolina Drums | YORK | VOC | 84 |
| Leonard Chemical Co. | YORK | VOC,METALS | 84 |



| CONTAMINANTS | ABBREVIATION |
|---|---|
| Total Dissolved Solids | TDS |
| Surfactants | MBAS |
| Petroleum Products | PETRO |
| Volatile Organics | VOC |
| Metals | METALS |
| Nitrates | NO3 |
| Pesticides/Herbicides | P/H |
| PCB | PCB |
| Base,Neutral & Acid Ex. | BNA |
| Phenols | PHENOL |
| Radionuclides | RAD |
| Other | OTHER |

62 - Land Disposal - Wastewater

63 - Land Disposal - Landfills

65 - Land Disposal - Septic Tanks

82 - Waste Storage/Storage Tank Leaks

84 - Spills

## 5.0. GROUND-WATER QUALITY

### 5.1. General Overview

The general quality of ground-water in South Carolina is excellent based on criteria promulgated in the USEPA Primary Drinking-Water Standards. Portions of a statewide network of monitoring wells for ambient ground-water quality have been recently established. Other available data sources are being used such as public water supply systems that use ground water, monitoring wells at sites where ground-water contamination has been confirmed or is suspected, and private wells. Data reported from these sources confirm the general high quality of ground-water throughout the State.

Despite overall good conditions, there are approximately 390 instances or areas of localized ground-water contamination. These isolated contamination sources have been diverse and include most of the common types of sources recognized in other states such as leaking underground petroleum storage tanks, industrial wastewater disposal, municipal and industrial landfills, and accidential spills and leaks.

### 5.2. Major Sources of Contamination

Table 5.2.A. indicates sources of localized ground-water contamination in South Carolina.

Table 5.2.A.
Sources of Localized Ground-water Contamination
South Carolina

| Source | Identified Source | Relative Priority |
|---|---|---|
| Septic tanks | X | 5 |
| Municipal landfills | X | 2 |
| On-site industrial landfills (excluding pits, lagoons, and surface impoundments) | X | 3 |
| Other landfills | X | |
| Surface impoundments (excluding oil and gas brine pits) | X | 6 |
| Oil and gas brine pits | | |
| Underground storage tanks | X | 1 |
| Injection wells (include Class V) | | |
| Abandoned hazardous waste sites | X | (Included in specific type categories) |
| Regulated hazardous waste sites | X | |
| Salt water intrusion | X | |
| Land application/treatment | X | 4 |
| Agricultural activities | X | |
| Road salting | | |
| Other (specify) | | |

## 5.3. Location of Ground-Water Contamination

Lagoons (including industrial pits and ponds), landfills (industrial and municipal), and underground storage tanks that have documented association with ground-water contamination are not restricted to any particular areas of the state, but are more concentrated in the three major urban/industrial centers: Greenville/Spartanburg, Columbia, and Charleston. An additional concentration of ground-water contamination problems have been associated with high water-table recharge areas in Beaufort County.

## 5.4. Contaminating Substances

Table 5.4.A.
Substances Contaminating Localized Ground-Water
South Carolina

| | | | |
|---|---|---|---|
| Organic chemicals: | | Metals | X |
| Volatile | X | | |
| Synthetic | X | Radioactive Material | X |
| Inorganic Chemicals: | | | |
| Nitrates | X | Pesticides | X |
| Fluorides | X | | |
| Arsenic | X | Other Agricultural chemicals | X |
| Brine/salinity | X | | |
| Other $SO_4$-2 | X | Others (specify) | See Below |

Other types:

Microbial pathogens (bacteria or viruses), indicated by past analyses for bacteria and suggested by past outbreaks of gastrointestinal disorders.

Microinvertebrates, indicated in tests on very shallow wells in sands at one coastal area.

Total organic carbon (nonvolatile, nonsynthetic)

## 5.5. State Strategies to Alleviate Ground-Water Problems

Prevention is viewed as the key to alleviation of ground-water contamination. Alleviation of specific instances of ground-water contamination--either presently documented, presently existing but not yet discovered, or else initiating in the future--requires another set of strategies. The principal components of both prevention and remediation strategies are regulatory and technical in nature. The existing regulations and the mechanisms to enforce them provide the framework for monitoring and the criteria for defining ground-water contamination. Ground-water quality standards in place set the criteria upon which contamination is defined and provides the criteria with which facilities-design performance can be planned.

Alleviation of contamination usually requires a considerably greater effort than detection and initial measurement of contaminant concentration. A concerted effort is being made to routinely base decisions on most appropriate actions concerning contaminated ground-water on detailed geotechnical data. This scaling by priority allows allocation of a greater effort to the more serious problems.

Essential site-specific information that must be obtained for each site of contamination includes the following: (1) detailed characterization of the chemical nature of the contaminant plume; (2) detailed knowledge of the extent of the contaminant plume; (3) reliable prediction of the short-term and ultimate fates of the ground-water contaminants; and (4) reliable prediction of the performance of any recovery or treatment

systems. These essential types of information can be obtained only by detailed hydrogeologic investigations.

Facilities that handle significantly hazardous materials currently are required to have a minimal ground-water monitoring program including wells, procedures, and schedules. This is done to detect existing ground-water contaminants or detect the new entry of ground-water contaminants. Other facilities that are required to have waste disposal permits, on a case-by-case basis, as appropriate, are required to conduct ground-water monitoring. New or replacement underground tanks for petroleum products also require underground monitoring as do existing tanks that fail leak-detection tests or show significant inventory losses. Some potential sources of contaminants do not fall within the above groups, for example accidential leaks or spills from activities that no longer take place and illegal dumping.

## 6.0. WATER POLLUTION CONTROL PROGRAM

### 6.1. Point Source Control Program

#### 6.1.1. Municipal Facilities

DHEC has issued discharge permits under the National Pollutant Discharge Elimination System (NPDES) program to all domestic wastewater treatment works discharging to surface waters in South Carolina, whether publicly or privately owned. Permit effluent limits were derived using computerized water quality models and EPA effluent guidelines. Permit conditions insure that effluents are treated sufficiently so as to protect in-stream water uses and maintain specified numeric in-stream standards. Domestic wastewater treatment works owners are required to provide best available technology (BAT) or treatment to meet water quality limits when contructing or upgrading their treatment plant in order to meet NPDES permit limits.

##### 6.1.1.1. Construction Grants Program

EPA (Sec. 201) grants for construction of wastewater treatment works were awarded to publicly owned agencies (municipalities, counties, special purpose districts, etc.) based on order in the DHEC annual project priority list. The priority list ranks treatment works needs based on documented adverse impacts on water quality. Projects are awarded construction grants each year to the extent that funding is available with those projects appearing highest on the list being funded first. The system for determining priorities is described in the SCDHEC Project Priority Rating System for Municipal Construction Grants. Sufficient money is not available to fund all projects on the priority list.

Waterbodies expected to have shown improvements in water quality during fiscal years 1986 and 1987 as a result of construction grant

money spent would be those where treatment works were completed and put into operation during this time period. Table 6.1.A. lists those projects, the waterbody affected, and the eligible costs which are an estimation of the construction and engineering costs associated with the project. A total of $47,344,207 was spent for 17 projects completed during FY 86 and $36,183,810 was spent for 18 projects completed during FY 87.

Table 6.1.A.

Treatment Works Receiving Construction Grants and Became Operational in FY 1986 and 1987

| Owner Name | Sub-basin | Receiving Water | Eligible Cost |
|---|---|---|---|
| | | FY 1986 | |
| Leawood/Sumter | 031714 | Pine Acre Creek | $ 55,753 |
| GSWSA | 030716 | Waccamaw River | 9,143,100 |
| Mt. Pleasant | 030814 | ICWW | 5,413,757 |
| Dorchester | 030818 | Coosaw Creek | 4,839,231 |
| BCWSA/Central | 030820 | Cooper River | 1,599,683 |
| East Richland | 030824 | Congaree River | 5,303,379 |
| Columbia | 030824 | Congaree River | 7,231,748 |
| Columbia | 030824 | Congaree River | 1,862,559 |
| Lancaster | 030834 | Bear Creek | 277,829 |
| Saluda | 030840 | Little Saluda River | 93,731 |
| WCRSA/Mauldin Rd. | 030846 | Reedy River | 2,079,341 |
| Ware Shoals | 030847 | Saluda River | 2,174,013 |
| Woodruff | 030862 | Dildine Creek | 1,538,873 |
| St. George | 030908 | Polk Swamp | 1,874,254 |
| Yemassee | 030922 | Combahee River | 112,916 |
| Allendale | 031304 | Savannah River | 1,370,179 |
| Greenwood | 031306 | Hard Labor Creek | 2,373,861 |
| | | | $47,344,207 |
| | | FY 87 | |
| Georgetown | 030702 | Whites Ck/Sampit R. | $ 3,039,777 |
| Little River | 030715 | ICWW | 2,565,817 |
| N. Myrtle Beach | 030715 | ICWW | 6,628,481 |
| Darlington | 030725 | Swift Creek | 1,738,584 |
| Hartsville | 030725 | Black Creek | 1,959,567 |
| St. Matthews | 030804 | Antley Spring Ck | 473,535 |
| BCWSA/Oranto | 030810 | Goose Creek Res. | 124,116 |

Continued on next page.

Table 6.1.A. (continued)

| Owner Name | Sub-basin | Receiving Water | Eligible Cost |
|---|---|---|---|
| St. Andrews | 030818 | Ashley River | $ 1,398,701 |
| Kershaw County | 030828 | Wateree River | 1,889,971 |
| Greenwood/Metro | 030842 | Wilson Creek | 4,487,512 |
| Greenwood/Magnolia Pl. | 039842 | Wilson Creek | 86,741 |
| Easley | 030847 | Middle Branch | 5,332,206 |
| Easley | 030847 | Georges Creek | --- |
| | 031312 | Golden Creek | 1,723,690 |
| Richland County | 030850 | Crane Creek | 702,190 |
| ECWSA/Johnston | 030918 | S. Fork Edisto | 1,155,909 |
| Aiken/North Line | 030918 | Shaw Creek | 286,096 |
| Aiken/Northeast Line | 030918 | Shaw Creek | 424,161 |
| Denmark | 030924 | Little Salkehatchie | 2,166,756 |
| | | | $36,183,810 |

Direct evidence of a general improvement in in-stream water quality as a result of construction or upgrading POTWs was not available for all waterbodies at the time of this assessment because of the nature of the DHEC sampling program. Monitoring data showed improved water quality for six waterbodies and a maintenance of good water quality for eight waterbodies. There is no strategically located trend monitoring station downstream of many of the projects. Treatment requirements are based on stream conditions during low-flow periods; therefore, enhanced water quality may not be evidenced during normal streamflows. Also, the affected stream may not have had time to respond to the reduced wasteload in the short period since treatment plant improvements were put in place.

We know, however, that improved waste treatment by newly constructed or upgraded treatment works have resulted in favorable water quality benefits. Many 201 grants were awarded to construct interceptor lines in areas where there may have been several small problem dischargers. This construction eliminated poorly treated effluent into many streams. Predictive water quality models help determine

the level of treatment to maintain in-stream quality standards and when treatment facilities are constructed or upgraded these models predict increased in-stream quality commensurate with increased treatment. Improved water quality is also implied by data contained in Discharge Monitoring Reports that are submitted to DHEC by each treatment plant owner on a monthly basis. When newly constructed or upgraded POTW's meet NPDES permit conditions for effluent where before they did not, improved in-stream water quality can be assumed.

6.1.1.2. Pretreatment Program and Toxics Control

The Department of Health and Environmental Control reviewed and approved 53 pretreatment programs for POTWs during FY 84 and 85. All of these programs have been implemented at this time. There are currently four additional pretreatment programs under review by the Department.

There has been an associated direct benefit to water quality demonstrated from many of the implemented pretreatment programs. In particular, there has been a reduction in toxic discharges from POTWs which receive industrial discharges. Significant improvements in water quality are expected as all approved pretreatment programs are fully implemented.

During FY 86 the Department implemented a policy of requiring Total Residual Chlorine (TRC) limits on all new and reissued POTW and private community (domestic) NPDES permits. The Agency is entering the third year of this requirement which has resulted in approximately 40 to 50 percent of all domestic permits now containing TRC limits.

6.1.1.3. Stormwater Controls

South Carolina has no known combined stormwater/sanitary sewer discharges associated with POTWs. Stormwater slugs overload treatment

facilities and tend to disrupt the sewage treatment process; therefore, combined sewers are usually prohibited by local ordinance. Stormwater runoff control on POTW sites is mandatory in some areas of the State. The S.C. Coastal Council reviews and approves plans that address this issue for all new publicly owned treatment plants in coastal counties. DHEC withholds issuing a permit to begin construction of the facility until such plans are approved by the Council. S.C. Coastal Council has developed stormwater management guidelines that are followed when evaluating a project for a permit or certification.

The Department is currently developing a state stormwater permitting program policy in support of EPA guidelines of requirements required by the 1987 amendments to the Clean Water Act.

6.1.1.4. Strategies Planned to Improve the Municipal Facility Program

DHEC district personnel inspect the operation and maintenance programs of POTWs on a routine basis. Deficiencies noted during inspections may require DHEC to take legal enforcement action. Operational advice is also provided on a limited basis by DHEC staff. The South Carolina Environmental Training Center at Sumter Area Technical College also provides training for treatment plant operators.

DHEC has recently developed sludge management guidance for municipalities. All NPDES permits issued or reissued during the last 18 months, where applicable, direct the POTW to obtain a sludge disposal permit. The permit guidance generally requires the sludge generator to monitor the content of its sludge and to dispose of it in an environmentally acceptable manner. Enforcement action has been taken against those POTWs that have not met the schedule for obtaining a sludge disposal permit. The sludge management guidance and procedures were fully implemented during FY 1987.

### 6.1.2. Industrial and Agricultural Facilities

#### 6.1.2.1. Industrial Facilities

DHEC reviews NPDES permit applications for new and existing facilities and determines whether treatment must be based on technology or water quality. The method which results in more stringent effluent limits is used to develop applicable permit limits. Effluent guidelines, where promulgated by EPA, are used to determine technology based limits. If EPA effluent guidelines have not been developed, best professional judgement of technology based limits is used. Water quality limits are developed using computerized water quality modelling procedures which result in wasteload allocations for substances affecting in-stream oxygen levels. EPA water quality criteria and/or biological monitoring are used to determine limits for potentially toxic constituents. Where appropriate, permit limits are developed using a combination of water quality limitations, toxicity limits, and biological monitoring (end of pipe and in-stream) to insure that there are no adverse impacts from point source discharges.

#### 6.1.2.2. Agricultural Facilities

Wastewaters from concentrated animal production or fruit and vegetable processing facilities may be just as detrimental to water quality as municipal and industrial point source discharges. To prevent these untreated wastes from entering the waters of the State, DHEC requires that both solid and liquid agricultural wastes from these facilities be collected, treated, and disposed of in an environmentally acceptable manner. This is primarily accomplished through a State permitting and inspection program requiring recycling or land application of agricultural wastes. This type of disposal

has eliminated most direct surface water discharges of agricultural wastes and has thus been effective in improving water quality.

6.1.2.3. Toxics Controls

Toxic pollutants are generally defined as substances which by themselves or in combination with other chemicals are harmful to animal life or human health. They include some of the metals, pesticides, and other synthetic organic pollutants that contaminate water, fish tissue, and bottom sediments. DHEC has sought to control these substances in sewage treatment plant effluent, and biological investigations conducted by the Department and the regulated community have shown that these controls are effective. Documented toxicity problems related to point source dischargers are not widespread in South Carolina waters. In areas where localized problems have been identified, DHEC efforts have resulted in more stringent effluent limitations; modification of treatment plant processes or wastewater controls; and, in some cases, complete elimination of problem dischargers.

While chlorination is the typical method of disinfection of wastewater in the State, any excess chlorine in the effluent has been shown to have a toxic effect on fish and other aquatic life. As a result, DHEC has implemented a program requiring chlorine residual limits on all NPDES permits for wastewater treatment plants that use chlorine in the treatment process. This requirement pertains to municipal, industrial, and private domestic facilities. These effluent limits are based on water quality criteria developed by EPA. Where water quality is not a limiting factor, maximum effluent limits of 0.5 mg/l monthly average and 1.0 mg/l daily average are imposed to further reduce potential impacts.

### 6.1.3. Wasteload Allocations and Total Maximum Daily Loads

A wasteload allocation, a determination of the amount of a pollutant a waterbody can assimilate without violating in-stream standards, is developed for every wastewater discharger in the State. Computerized mathematical models which simulate in-stream conditions are used to determine WLAs for 90 percent of all dischargers. WLAs are most often used to determine NPDES effluent permit limits but are also an input to 201 Facilities Plans and 208 Areawide Water Quality Management Plans.

Total maximum daily loads (TMDLs) for oxygen-demanding substances are developed for stream segments which have competing interests for assimilative capacity. Waterbodies for which TMDLs have been calculated are Wando River, Charleston Harbor, Waccamaw River, ICWW, Bush River, Durbin Creek, Catawba River, South Tyger River, Twelve Mile Creek, Wilson Creek/Ninety Six Creek, Lower Saluda River, Wateree River, Lawson's Fork Creek, and Congaree River. As new information or data is obtained on these waterbodies, the TMDLs are appropriately revised. Streams for which new or revised TMDLs are needed include Ashley River, Cooper River, ICWW, and Beaufort River.

### 6.1.4. Permit Compliance and Enforcement

#### 6.1.4.1. Compliance

The Bureau of Water Pollution Control currently maintains the State Data Management Network System which ensures that NPDES Permit compliance status is available for all point source discharges. This system allows managers within the Enforcement Section to review results from operation and maintenance inspections, sampling inspections, effluent data, compliance schedules, and pretreatment inspections in a timely manner. Staff have made the transition from maintenance of personal files to utilization of the system which is beginning to demonstrate reliability for immediate determination of facility compliance.

Municipal compliance has received priority emphasis throughout the 80's and South Carolina has actively pursued compliance with the National Municipal Policy mandates. All non-complying major and minor municipal facilities were placed on enforceable schedules prior to FY 87 and staff have been engaged in tracking to assure schedules are met.

Compliance tracking receives a balanced effort at the State level with regard to major and minor industrial, private domestic, and municipal permittees and all instances of significant noncompliance are addressed. Tracking involves a multifaceted approach with review of effluent data, compliance schedules, facility operation and maintenance and pretreatment status. Completion of the State Data Management Network System will enhance compliance tracking capabilities and hardware purchases and staff's development of data entry skills will assure an accurate interface with the Permit Compliance System (PCS). PCS will be supported by data entry of discharge monitoring and compliance schedule data on a monthly basis.

Several other compliance tracking tools are utilized to ensure the principal staff and other interested parties are kept informed of compliance status of regulated facilities. Quarterly Activity Reports and the Quarterly Noncompliance Reports are frequently utilized documents. An inspection update developed within the past several years enhances staff's overview capabilities and affords an opportunity to determine if permit requirements for operation and maintenance are being maintained. The update is supplied monthly and is used in the prioritization of operation and maintenance activity.

Pretreatment audits and inspections are the mechanisms currently used for pretreatment compliance tracking. Compliance reviews have resulted in the identification of several noncompliant pretreatment programs in 1987 and necessitated action.

The compliance review process continues to become more efficient as overview techniques are upgraded. South Carolina seeks to pursue the most effective means of compliance review and adopt the most productive compliance review products to assure that acceptable levels of compliance are maintained.

6.1.4.2. Enforcement

The U.S. EPA National Municipal Policy, issued in 1984, placed State Enforcement programs in a position of high visibility in the mid-1980's and South Carolina met the challenge by achieving Federal mandates aimed at assuring municipal compliance by July 1, 1988. The State enforcement program was responsible for the establishment of order schedules to abate noncompliance situations for approximately sixty (60) POTW's with some twenty (20) facilities remaining under permit schedules of compliance. In all cases enforcement staff have been responsible for tracking schedule compliance and initiating

enforcement action where necessary. The emphasis placed on the issuance, tracking, and follow-up actions by the enforcement staff has yielded noteworthy results with only seven (7) of approximately eighty (80) POTW's violating schedules as July 1, 1988 approaches. These violations are currently being addressed.

While enforcement activities surrounding the National Municipal Policy gained the limelight between 1984 and 1987, other enforcement activities continued to receive staff attention necessary to assure effluent limit compliance and maintenance of water quality where industrial and private domestic permittees were involved. Violations in all categories of noncompliance involving all permittees were handled effectively and expeditiously. Categories of noncompliance not mentioned previously but receiving attention were unauthorized discharges, operation and maintenance violations, NPDES effluent violations, pretreatment violations, groundwater contamination, and unpermitted construction and operation of waste treatment facilities. The broad range of enforcement activity demonstrates the program's diverse capability to remain effective in many areas of required activity while meeting the Federal mandates of the National Municipal Policy.

As new facilities are constructed and old systems are removed from service, the enforcement program's emphasis is changing to actively address the operation and maintenance of these facilities. All permittees are presently seeing this additional emphasis due to the data handling tools available to the enforcement manager and additional O&M emphasis is assured.

As the program moves into 1988-1989, effluent quality is seen as a measure of water quality. The enforcement program sees its com-

mitment to monitor effluent quality and take timely effective actions as necessary to assure that the water quality of South Carolina is maintained where suitable and enhanced where needed.

## 6.2. NONPOINT SOURCE CONTROL PROGRAMS

### 6.2.1. General Description

The State draws from a variety of resources in its efforts to control nonpoint sources (NPS) of pollution. These take the form of both federal and state programs and may be regulatory or non-regulatory in nature. Further, these resources lie both in DHEC's Bureau of Water Pollution Control and in other state agencies with related missions.

### 6.2.2. Section 319 Program

In late 1987, Congress, as part of the "Water Quality Act" passed the most comprehensive legislation dealing with NPS to date. Section 319 of the Act requires states to assess nonpoint source pollution and to define a management program to control and abate it by August 1988. To meet this federal mandate, the S.C. Department of Health and Environmental Control has embarked on a three stage program to conduct a comprehensive NPS assessment, target specific waters where nonpoint sources need control, and develop and implement management strategies.

Objectives of the assessment include identifying nonpoint source impacted surface waters statewide, identifying causes of NPS pollution, and recommending programs and methods for controlling this pollution. The list of impacted waters and causes of those NPS impacts is included elsewhere in this document. Existing data and information were utilized to compile the list. DHEC field personnel, other state agencies, and the interested public were also consulted. Further, sophisticated computer modelling was used to identify waterbodies in areas where a greater potential for NPS impacts exist. Subsequently, this list of problem areas and associated category of NPS will be prioritized and consideration will be given to the value

of the particular water for aquatic habitat and other designated uses such as water supply and recreation, the NPS pollution threat to the environment and to public health, and the feasibility of controlling the particular category of NPS pollution at that location. The result will be a ranked list of waterbodies where nonpoint source control will be emphasized.

The second phase of this NPS program calls for a management strategy to control and alleviate the problems noted in the assessment. Nonpoint source management controls will be regulatory and non-regulatory in nature. Regulatory programs include enforcing existing laws, regulations, and ordinances or developing or revising them as needed. Sediment control ordinances and stormwater control ordinances are the most common regulatory control mechanisms for nonpoint source pollution. Non-regulatory programs include providing technical assistance to land users on establishing best management practices (BMPs) that reduce erosion, developing and producing educational publications on BMPs and general awareness of NPS pollution, and setting up demonstration projects for nonpoint source control practices. There are specific nonpoint source control practices for the various categories of activities, and they will be matched to the target waterbodies described in the assessment.

When the State has an EPA approved management plan, we will begin the implementation phase of the overall program. This involves putting in place the control strategies required in the managment plan with the idea of alleviating the most critical NPS problems within a four year period.

Funding for the effort will come mainly from EPA grants under Section 319 and 205(j), and augmented with State funds. The public

will be provided with an opportunity for input and drafts of assessment and management plans will be circulated to the interested public.

6.2.3. Section 208 Programs

The State nonpoint Source 208 Water Quality Management Plan, completed in the early 1980's, addressed agriculture, construction, mining, silviculture, groundwater contamination, residual waste disposal, hydrologic modifications, and urban runoff. The categories of greatest concern to the State are agriculture, construction, and groundwater contamination. The State's nonpoint source (NPS) control strategy incorporates both regulatory and voluntary approaches to compliance. Regulatory programs are in place for mining, residual waste disposal, hydrologic modifications, and construction activities. Voluntary programs are used for agricultural and silvicultural activities. Accelerated programs of technical, financial, and educational assistance are recommended to encourage the implementation of Best Management Practices (BMPs) to control pollution from these activities. To control construction related NPS pollution, the Plan recommended the development of a statewide regulatory program. The legislature enacted the Sediment Control Act in 1984 with the S.C. Land Resources Conservation Commission as the implementing agency.

Ground-water resources are partially protected by existing regulatory programs which cover activities such as land disposal of residual and hazardous wastes, feedlots, stockpiles, surface impoundments, hazardous materials spills, well drilling, underground storage tanks, and the underground injection of wastes.

Urban runoff has proven to be a significant nonpoint source in one of the State's most rapidly developing areas, the urbanized

coastal zone. In 1978, Myrtle Beach was designated a Nationwide Urban Runoff Program demonstration area for purposes of studying the impact of stormwater runoff upon surf water quality. The implementation of recommended BMPs, in these and other metropolitan areas of the State has lagged, primarily due to hesitancy on the part of local governments to adopt the necessary land use controls and development standards. The Coastal Areawide Water Quality Management Plans for urban runoff were updated in cooperation with the S.C. Coastal Council. Part of this update included a special water quality study of the Ashley River system located in the Charleston area. The study was completed with the cooperation of the U.S. Geological Survey. The results should provide a thorough picture of stormwater contribution of pollutant loadings in this tidal river system and indicate management approaches needed to address stormwater pollution concerns.

### 6.2.4. Section 401 Programs

Section 401 of the Federal Clean Water Act requires that all applicants for a Federal permit or license which may result in a discharge to navigable waters obtain certification from the Department. This certification insures that the project will be conducted in a manner which will not violate State water quality standards. The Department issues certification for primarily three types of projects: U.S. Army Corps of Engineers Section 10 (navigation) and Section 404 (dredge and fill) permits; U.S. Coast Guard bridge permits; and Federal Energy Regulatory Commission licenses for hydroelectric projects. Certification is often issued with conditions which become part of the Federal permit or license. These conditions usually address nonpoint pollution sources, especially sediment loss to a waterbody.

The Department also routinely reviews plans for highway and utility line construction. Recommendations are made that effective nonpoint control measures be implemented during and after construction to minimize sediment loss to affected waterbodies.

6.2.5. Shellfish Sanitation Program

Stormwater discharges and other categories of NPS pollution have had the greatest adverse impact on coastal shellfish growing waters. They carry coliform bacteria and other contaminants into the shellfish beds. As a result of sanitary surveys conducted by DHEC personnel, restricted or prohibited harvest status must be assigned to shellfish areas with increased pollutant levels. This means the shellfish may not be taken from these areas for direct marketing. It is anticipated that BMPs instituted as a result of the State's NPS control programs will open up these areas again to shellfish harvesting.

6.2.6. Best Management Practices Requirements on NPDES Permits for Industrial Facilities

All major permits and the majority of the minor Industrial Facility NPDES permits contain the following language:

The permittee shall develop and implement a Best Management Practices (BMP) Plan to identify and control the discharge of significant amounts of oils and the hazardous and toxic substances listed in 40 CFR Part 117 and Tables II and III of Appendix D to 40 CFR Part 122. The Plan shall include a listing of all potential sources of spills or leaks of these materials; a method of containment; a description of training, inspection, and security procedures; and emergency response measures to be taken in the event of a discharge to surface waters or plans and/or procedures which constitute an equivalent BMP. Sources of such discharges may include materials storage areas; in-

plant transfer, process and material handling areas; loading and unloading operations plant site runoff; and sludge and waste disposal areas. The BMP plan shall be developed in accordance with good engineering practices, shall be documented in narrative form, and shall include any necessary plot plans, drawings, or maps. The BMP plan shall be developed no later than six months after issuance of the final NPDES permit or permit modification, and shall be implemented no later than one year after issuance of the final permit or modification.

When a permit is reissued and a BMP plan had previously been required, the reissued permit will require the permittee to update and maintain the BMP plan.

Before issuing NPDES permits or State construction permits to municipal, private, domestic, or industrial waste treatment plants DHEC staff considers the potential for contamination of stormwater runoff from the plant site. If necessary, DHEC can require best management practices (BMPs) to control the runoff. Monitoring of the stormwater may also be required. Although large municipalities collect the stormwater runoff, it is discharged untreated into nearby streams and rivers.

EPA has proposed that any publicly owned stormwater discharge be permitted under the NPDES system. The permits would probably contain parameter limits and require the monitoring of these parameters. Although this proposed program may have isolated beneficial impacts on water quality, it would be very expensive for local governments and the State to administer and may not be cost-effective in terms of water quality improvements.

### 6.2.7 Other State and Local Government Involvement

The following agencies have either regulatory, educational, or assistance programs for the indicated nonpoint source categories.

| AGENCY | NONPOINT SOURCE |
|---|---|
| S.C. Department of Health and Environmental Control | Groundwater Contamination, Residual Waste |
| S.C. Coastal Council | Stormwater Runoff |
| S.C. Forestry Commission | Silviculture |
| S.C. Land Resources Conservation Commission | Agriculture, Construction, Mining |
| S.C. Water Resources Commission | Hydrologic Modification |
| Five Designated Regional Councils of Government | Urban Runoff |

Table 6.2.A. shows the specific existing and recommended nonpoint source control programs administered by the various agencies mentioned above.

Table 6.2.A.

Existing and Recommended Nonpoint Source Control Programs in South Carolina

| Type of Nonpoint Source | Type of Control Program | |
|---|---|---|
| | Existing | Recommended |
| Urban | M | M,R,S,E,T |
| Agriculture | E,T,F,M | E,T,F,M |
| Animal wastes | R,E,T,F,M | R,E,T,F,M |
| Silviculture | E,T,F,M | E,T,F,M |
| Mining | R,M | R,M |
| Construction | E,T,M | E,T,R,M |
| Hydrological modifications | R,M | R,M |
| Saltwater intrusions | R,M | R,M |
| Residual waste/landfill | R,M | R,M |

Type of Control Program

S = structural/public works
E = education
T = technical assistance
F = financial incentives
R = regulation
M = monitoring

## 6.3. Wetlands Programs

The main mechanisms for wetlands protection in South Carolina are through federal and state regulatory programs for the discharge of dredged or fill material and activities in critical areas in the coastal zone. Following is a brief description of these existing federal and state programs and their relationship to wetlands protection.

### Section 404 Permit Program

Section 404 of the federal Clean Water Act requires a permit for the discharge of dredged or fill material into navigable waters. The U.S. Army Corps of Engineers administers this program in South Carolina; the Environmental Protection Agency has ultimate authority in that it may prohibit the use of a disposal site if the discharge will have an adverse impact on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas. This permitting program applies to activities in navigable waters, their tributaries, and wetlands adjacent to these waters. Isolated wetlands are not included in the jurisdiction of the 404 program.

### Section 401 Water Quality Certification

Section 401 of the Federal Clean Water Act requires any applicant for a federal license or permit to conduct an activity which may result in a discharge to navigable waters to receive certification from the State that the discharge will not cause a contravention of the State's water quality standards. The South Carolina Department of Health and Environmental Control is the agency which issues certification in South Carolina. Those activities in wetlands adjacent to navigable waters which require Section 404 permits, also require certification. The Department evaluates whether or not the proposed

activity will adversely impact the water quality of the wetlands, but certification has not traditionally been used as a wetlands protection mechanism.

Coastal Zone Management Program

The South Carolina Coastal Council reviews Section 404 permits as well as administers its own permit program for projects within critical areas in the Coastal Zone. Critical areas are saline waters subject to tidal ebb and flow, tidelands, beaches, and primary ocean front dunes. The Coastal Council provides additional protection to isolated freshwater wetlands in the eight coastal counties through review of applications for Section 404 permits under Corps Nationwide Permit Number 26 where the activity will result in the discharge of dredged or fill material and cause the loss of modification of 10 acres or less of non-tidal waters above stream headwaters or in isolated waters, including wetlands.

South Carolina Heritage Trust Program

This program is responsible for surveying and inventoring rare or vanishing plant and animal species and plant and natural communities. This includes wetlands communities and the Heritage Trust Program has had a particular interest in Carolina Bays. The program provides protection to special areas through aquisition, easement, or landowners cooperation.

Wetlands Legislation

Two separate bills which would regulate activities in freshwater wetlands were submitted to the State legislature in FY 1987. One bill would require a permit for activities in all freshwater wetlands, even isolated wetlands; and no activity to be undertaken in these wetlands would be exempt from permitting. This bill also

includes a mandatory education program and a complete wetlands inventory.

A second bill is not as comprehensive as the first. Only wetlands adjacent to streams with an annual flow greater than 5 cfs would be regulated and only certain activities such as dredging, deposition, construction of structures, and hydrologic modification would require permits. Other activities are exempt under this proposed legislation.

Other priorities in the South Carolina legislature have kept either of these bills from moving this session.

## 6.4. SURFACE WATER MONITORING PROGRAM

The South Carolina Department of Health and Environmental Control maintains a fixed monitoring network with water quality sampling stations located statewide to define the physical, chemical, and biological conditions of streams, lakes, and tidal saltwaters. In fiscal year 1987 the network consisted of 185 primary stations, 358 secondary stations, 187 sediment stations, and 78 biological stations. Twenty-six of the 185 primary stations are included in the U.S. Environmental Protection Agency's basic water monitoring program.

Primary stations are sampled once per month, year round. The criteria used in locating primary stations are as follows:

1. Influent to segment (sub-basin)
2. Effluent to segment
3. Major streams at state lines
4. Confluence of major streams
5. Above a major industrial area
6. Below a major industrial area
7. Water quality limited area
8. Major lake
9. Above major municipal area
10. Below major municipal area
11. Mouth of major tributary
12. Major water use area
13. Above major land use area
14. Below major land use area
15. Above a water intake
16. Sites located for special studies
17. Other

Monthly measurements are made for physical parameters, bacteria, dissolved oxygen, biochemical oxygen demand, and nutrients. Heavy metals are measured quarterly; pesticides, PCBs, and other organics are measured annually.

Secondary stations are sampled once per month from May through October. The criteria used in locating secondary stations are as follows:

1. Known water quality problem areas; usually located in relation to a smaller discharge.
2. Potential water quality problem areas; these are areas with numerous complaints or nonpoint source problems.
3. Same selection criteria as used for primary stations.

Parameter coverage for secondary stations is similar to but less extensive than that for primary Stations.

Sediment samples are collected once per year at stations located influent or effluent to a sub-basin, in an environmental sink area, or in a known problem area.

Biological stations are located in the headwater reaches of selected major impoundments; in major waterbodies potentially subject to pollution from urban, industrial, or agricultural uses; and in areas of critical value for uses such as water supply, recreation, or propagation and maintenance of fish and wildlife. Biological monitoring includes identification and enumeration of phytoplankton, aquatic macroinvertebrates, and fish, as well as analysis of finfish and shellfish for toxic materials.

A complete description of the monitoring program is presented in the State of South Carolina Monitoring Strategy, a document which is updated annually.

6.4.1. Special Water Quality Studies

Forty water quality related studies were conducted during fiscal years 1986 and 1987. These studies were designed and conducted to meet a variety of objectives including the acquisition of background data in areas where the data base was minimal to non-existent; known or suspected water quality problem areas;

"before and after" studies; data collection for model calibration and/or verification; and ongoing special projects. Data was gathered, depending on the individual study objective, for a variety of media-water, sediment, biota, tissue - and included chemical, physical and/or population dynamics information. Table 6.3.A. lists the locations of intensive surveys conducted during fiscal years 1986 and 1987.

Table 6.4.A.

Water Quality Studies
FY 1986 and FY 1987
South Carolina

| FY 1986 Stream | County | Sub-basin |
|---|---|---|
| Lake Greenwood/Boyd Mill Pond | Greenwood | 03-08-44-46 |
| Lake Hartwell | Pickens/Anderson | 03-13-12 |
| Major reservoirs | Statewide | Statewide |
| Lower Saluda River | Richland/Lexington | 03-08-38 |
| Unnamed Trib. to Crane Creek | Richland | 03-08-50 |
| Fairforest Creek | Spartanburg | 03-08-64 |
| Tributary to Reedy River | Greenville | 03-08-46 |
| Tributary to 6-mile Creek | Richland | 03-08-24 |
| Sawney Creek | Abbeville | 03-13-08 |
| Campbell Creek | Beaufort | 03-09-20 |
| Lake Marion | Sumter | 03-08-04 |
| Green Swamp | Sumter | 03-07-14 |
| Unnamed Fee Ponds | Spartanburg | -- |
| Lawsons Fork Creek | Spartanburg | 03-08-68 |
| Ransom Creek | Spartanburg | 03-08-64 |
| Tributary to Ashley River | Charleston | 03-08-14 |
| Stono River | Charleston | 03-08-14 |
| Wilson Creek | Greenwood | 03-08-42 |
| Saluda River | Newberry/Greenwood/Saluda | 03-08-42 |
| ICWW/Waccamaw River | Georgetown | 03-07-02 |

Continued on next page

FY 1987

| Stream | County | Sub-basin |
|---|---|---|
| Bear/Sawneys Creeks | Fairfield | 03-08-28 |
| Lake Wateree/Fishing Creek Reservoirs | Chester/Fairfield | 03-08-30-32 |
| Lake Hartwell | Pickens/Anderson | 03-13-12 |
| Tributary to 18-mile Creek | Pickens | 03-13-12 |
| Jimmies Creek | Spartanburg | 03-08-66 |
| Tributary to Winyah Bay | Georgetown | 03-07-02 |
| Langley Pond | Aiken | 03-13-06 |
| North Inlet/Winyah Bay | Georgetown | 03-07-02 |
| Lake Marion | Sumter | 03-08-04 |
| American Legion Lake | Abbeville | 03-08-44 |
| Lower Saluda River | Richland/Lexington | 03-08-38 |
| Lake Greenwood/Boyd Mill Pond | Greenwood/ | 03-08-44-46 |
| Lake Edgar Brown | Barnwell | 03-09-24 |
| Tributary to Catawba River | York | 03-08-36 |
| Turkey Creek | Sumter | 03-07-14 |
| North Fork Edisto River | Orangeburg | 03-09-14 |
| Stono River | Charleston | 03-08-14 |
| Upper Ashley River | Charleston/Dorchester | 03-18-18 |
| Church Creek/Bohicket Creek | Charleston | 03-09-02 |
| Cove-Lake Murray | Lexington | 03-08-38 |

## 6.5. Water Reclassifications

The Department of Health and Environmental Control is very active with water reclassifications. Most reclassifications are initiated after receiving a written request from an individual, special interest group, or organization. The Department also proposes waters for reclassification where existing water quality is better than required to protect the classified uses or if there are existing uses not recognized by the present classification.

During FY 86 and FY 87 the Department held public hearings for four reclassification actions: Matthews Creek-Greenville County, North Inlet Estuary-Georgetown County, Wando River-Berkeley and Charleston Counties, and Chattooga River-Oconee County. The Department also received additional requests during the time period. Table 6.5.A. shows the current status of all reclassification actions.

Water reclassifications are an amendment to a State regulation and, as such, are not effective until approved by the South Carolina General Assembly. Reclassification for the waters listed in Table 6.5.B. became effective during FY 86 and FY 87.

Table 6.5.A.

Waters With Reclassifications Effective
During FY 1986 - FY 1987
Effective Date: March 27, 1987

ADAMS CREEK: Charleston County
The entire Creek tributary to Bohicket Creek, Class SAA

ALLIGATOR CREEK: Colleton County
The entire Creek tributary to the South Edisto River, CLass SAA

BAILEY CREEK: Charleston County
The entire Creek tributary to St. Pierre Creek, Class SAA

BIG BAY CREEK: Charleston County
The entire Creek tributary to the South Edisto River, Class SAA

BOHICKET CREEK: Charleston County
From Church Creek to Fickling Creek, Class SA; from Fickling Creek to North Edisto River, Class SAA

DAWHO RIVER: Charleston County
The entire River from the South Edisto River to the North Edisto River, Class SAA

FISHING CREEK: Charleston County
From its headwaters to a point 2 miles from its mouth, Class SA; from this point to its confluence with St. Pierre Creek, Class SAA

FISHING CREEK: Charleston County
The entire Creek tributary to Dawho River, Class SAA

FRAMPTON INLET: Charleston County
The entire Inlet tributary to the Atlantic Ocean, Class SAA

FRAMPTON CREEK: Charleston County
The entire Creek tributary to Frampton Inlet, Class SAA

GARDEN CREEK: Charleston County
The entire Creek tributary to Toogoodoo Creek, Class SAA

GIBSON CREEK: Charleston County
The entire Creek tributary to Wadmalaw River, Class SAA

INTRACOASTAL WATERWAY: Charleston County
From the South Edisto River to Dawho River, Class SA; from Dawho River to Gibson Creek, Class SAA

JEREMY INLET: Charleston County
The entire Inlet tributary to the Atlantic ocean, Class SAA

Continued on next page.

Table 6.5.A. (continued)

LEADENWAH CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

LONG CREEK: Charleston County
The entire Creek tributary to Steamboat Creek, Class SAA

LOWER TOOGOODOO CREEK: Charleston County
From its headwaters to a point 3 miles from its mouth, Class SA; from this point to its confluence with Toogoodoo Creek, Class SAA

McLEOD CREEK (also called Tom Point Creek): Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

MILTON CREEK: Charleston County
The entire Creek tributary to St. Pierre, Class SAA

MOSQUITO CREEK: Colleton County
That portion of the Creek from Bull Cut to the South Edisto River, Class SAA

MUD CREEK: Charleston County
The entire Creek tributary to the South Edisto River, Class SAA

NORTH EDISTO RIVER: Charleston County
From its headwaters to the Intracoastal Waterway, Class SAA; from the Intracoastal Waterway to Steamboat Creek, Class SA; from Steamboat Creek to the Atlantic ocean, Class SAA

OCELLA CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

PRIVATEER CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

RUSSELL CREEK: Charleston County
The entire Creek tributary to Dawho River, Class SAA

ST. PIERRE CREEK: Charleston County
The entire Creek tributary to the South Edisto River, Class SAA

SAMPSON ISLAND CREEK: Colleton County
The entire Creek tributary to the South Edisto River, Class SAA

SAND CREEK: Charleston County
The entire Creek tributary to Steamboat Creek, Class SAA

SCOTT CREEK: Charleston County
The entire Creek from Big Bay Creek to Jermey Inlet, Class SAA

SHINGLE CREEK: Charleston County
The entire Creek tributary to St. Pierre Creek, Class SAA

SOUTH CREEK: Charleston County
The entire Creek tributary to Ocella Creek, Class SAA

Continued on next page.

Table 6.5.A. (continued)

SOUTH EDISTO RIVER: Charleston and Colleton Counties
From Dawho River to Mud Creek, Class SAA; from Mud Creek to the Atlantic ocean, Class SA

STEAMBOAT CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

STORE CREEK: Charleston County
The entire Creek tributary to St. Pierre Creek, Class SAA

SWINTON CREEK: Charleston County
The entire Creek tributary to Lower Toogoodoo Creek, Class SAA

TOM POINT CREEK (also called McLeod Creek): Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

TOOGOODOO CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

TOWNSEND RIVER: Charleston County
The entire Creek tributary to Frampton Inlet, Class SAA

WADMALAW RIVER: Charleston County
That portion of the River from Gibson Creek to the North Edisto River, Class SAA

WESTBANK CREEK: Charleston County
The entire Creek tributary to the North Edisto River, Class SAA

WHOOPING ISLAND CREEK: Charleston County
The entire Creek tributary to Steamboat Creek, Class SAA

## 6.6 Recommendations

* The State continue its point source permitting policy of issuing water quality based NPDES permits.
* The State at least maintain, and when resources are available, enhance its current monitoring and assessment strategy.
* The State continue its efforts to identify and manage nonpoint sources of water quality impacts contingent on adequate funding.