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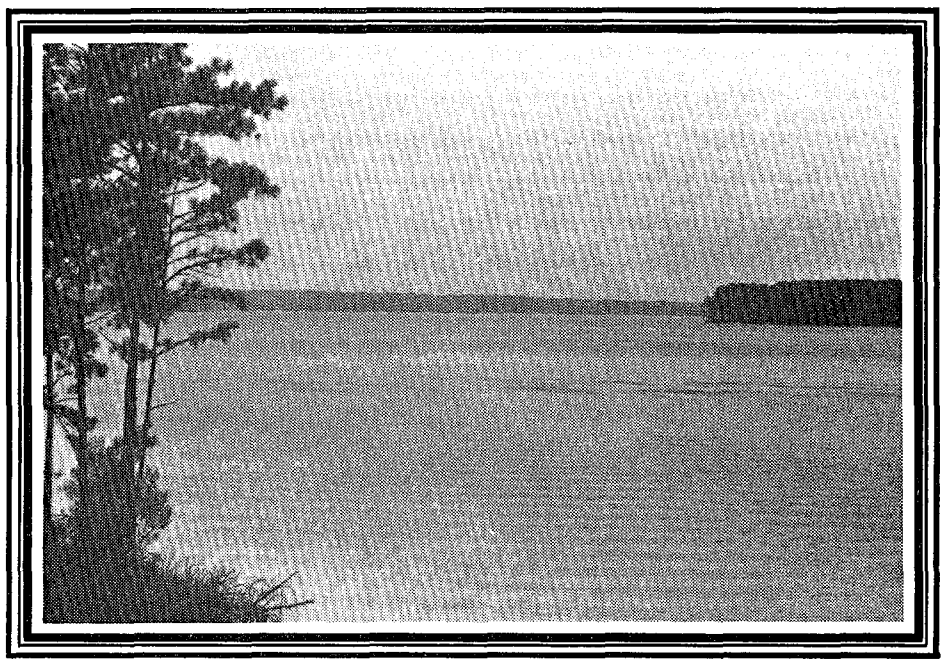
Statewide Water Quality Assessment

FY 1986-1987



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

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

WATER QUALITY ASSESSMENT
FY 1986-1987

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May 1988

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

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:

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Columbia, South Carolina 29201

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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.).

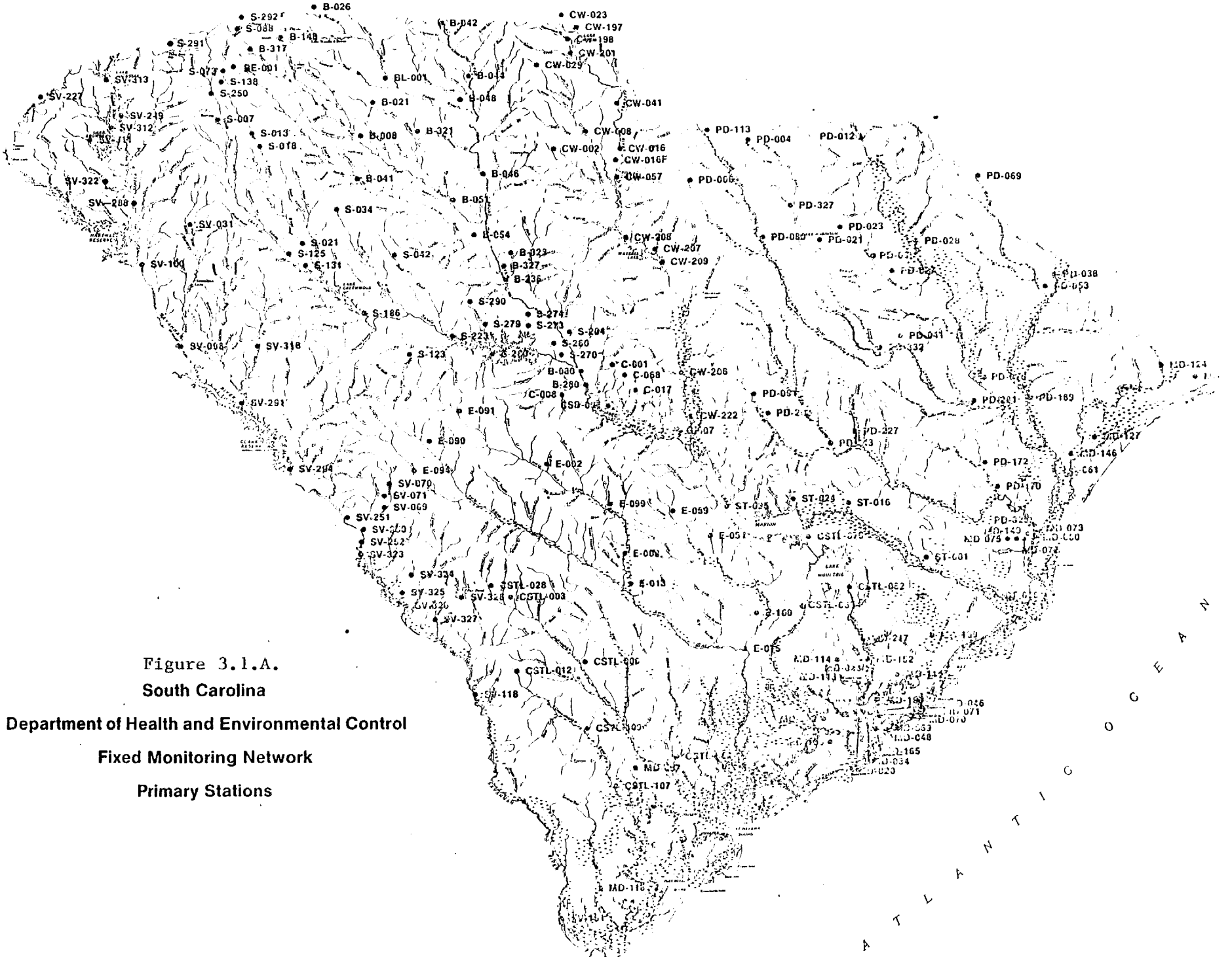

Figure 3.1.A.

South Carolina

Department of Health and Environmental Control

Fixed Monitoring Network

Primary Stations

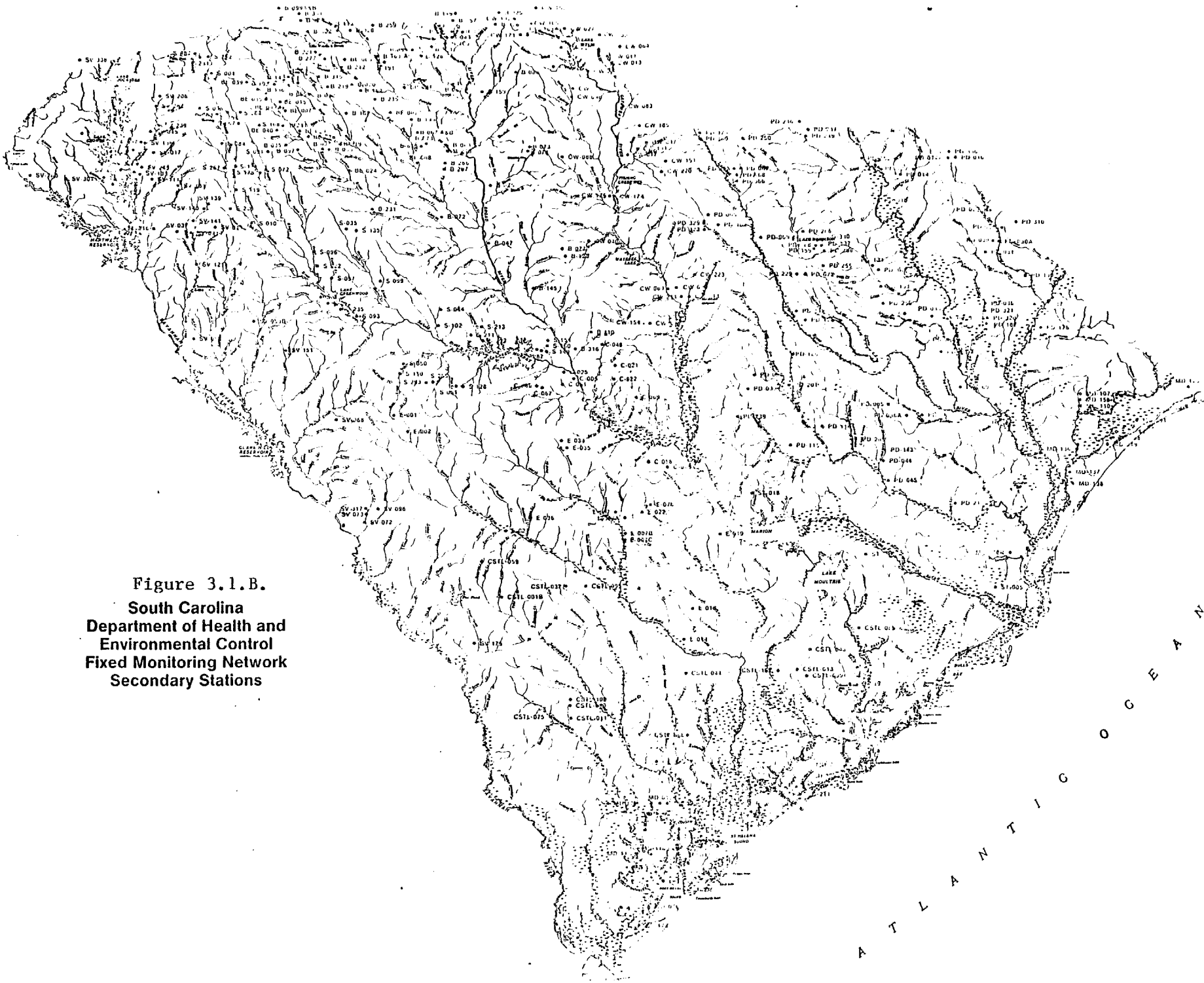

Figure 3.1.B.
South Carolina Department of Health and Environmental Control Fixed Monitoring Network Secondary Stations

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 400/100 ml-C	200/100 ml-A 400/100 ml-C	1000/100 ml-A 2000/100 ml-D	1000/100 ml-A 2000/100 ml-D	----	200/100 ml-A 400/100 ml-C	1000/100 ml-A 2000/100 ml-D
Total coliform bacteria					70/100 ml-B 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	1035	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	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Beaverdam Creek 030722 Dillon Co	A	3			3	DO pH	x		Unk	N.Car.				3
Big Swamp 030728 Florence Co	B*	16			16	FC DO	x x		NPS	Ag		12		4
Birch Creek 030710 Williamsburg Co	A	8			8	FC DO	x x		NPS	Ag		8		
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 030708 Georgetown Co	A*	23			23	DO	x		NPS	Ag				23
Black River 030710-12 Geotown & Willmsbrg Cos	A*	102	102								102			
Brown Swamp 030718 Marion Co	B*	2	2										2	
Buck Swamp 030720 Dillon Co	B*	12			12	DO	x		PS	Mun		12		
Catfish Canal 030724 Marion Co	B*	36			36	FC DO	x x		NPS	Ag,UR		36		

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 030718 Horry Co	A	4			4	DO	x		Unk				4
Cousar Branch 030730 Lee Co	B	1		1		FC		x	PS Ind			1	
Crabtree Creek 030716 Horry Co	A	7			7	FC DO	x x		NPS Ag UR		7		
Crooked Creek 030726 Marlboro Co	A B	4 6	6	4		FC		x	NPS Ag,UR			4 6	
Fork Creek 030734 Chesterfield Co	B	12	12									12	
Green Swamp 030714 Sumter Co	B	4	4									4	
Hanging Rock Creek 030732 Kershaw Co	B	5	5							5			
High Hill Creek 030725 Darlington Co	A	14	14							14			
Indian Creek 030726 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

WATERBODY	CLASS	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE: MAJOR	CAUSE: MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Intracoastal Waterway 030715 Horry Co	A	8	8							8			
Jeffries Creek 030724 Florence Co	B* A*	28 7	7 7		21	DO	x	NPS	Ag	7 7	21		
Kingston Lake 030716 Horry Co	A	15			15	FC	x	NPS	UR			15	
Kingstree Swamp Canal 030710 Williamsburg Co	A	17	17							17			
Lake Swamp 030718 Horry Co	A	14			14	DO	x	NPS	Ag				14
Lick Creek 030732 Kershaw & Lanc Cos	B	3	1		2	FC	x	Unk				3	
Little Fork Creek 030734 Chesterfield Co	B	9		9		FC	x	Unk				9	
Little Lynches River 030732 Lancaster Co	B	12		12		FC	x	NPS	Ag			12	
Little Pee Dee River 030718-20 Dillon & Marion Cos	A B	61 35	61 35							61 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	SOURCE	TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Lumber River 030722 Marion Co	A	10	10						10			
Lynches Lake 030728 Florence Co	B*	31			31	DO x	NPS	Ag,UR				31
Lynches River 030728-30-34 Chstrfld,Flor,& Kersh Cos	B	116	116						110		6	
Maidendown Swamp 030720 Marion Co	B	2			2	DO x	PS NPS	Ind Ag				2
Maple Swamp 030720 Dillon Co	B*	3			3	DO X	PS	Mun				3
Middle Swamp 030724 Florence Co	B*	10			10	DO x	NPS	Ag		10		
Nasty Branch 030714 Sumter Co	B	3	3						3			
Newman Swamp 030730 Darlington Co	B*	2	2								2	
Panther Creek 030720 Marlboro Co	B	6		2	4	DO x	PS NPS	Mun 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	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Pee Dee River 030702-24-26 Darl,Hor,Marion,& Marl Cos	B	143	143								143			
Pocotaligo River 030714 Sumter & Clarendon Cos	B*	36	30		6	DO	x		NPS	Ag,UR, Hyd.Mod	30			6
Pudding Swamp 030712 Williamsburg Co	A	8			8	DO	x		NPS	Ag				8
Rocky Bluff Swamp 030712 Sumter Co	B	5			5	DO	x		NPS	Ag				5
Smith Swamp 030724 Marion Co	B*	13			13	DO	x		PS	Mun(IL)	13			
Snake Branch 030725 Darlington Co	B	1	0.5		0.5	FC DO	x X		NPS	UR		0.5	0.5	
Sparrow Swamp 030730 Florence Co	B*	34	34								34			
Swift Creek 030725 Darlington Co	A	13	13								13			
Thompson Creek 030726 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

WATERBODY	CLASS	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE: MAJOR	CAUSE: MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Todds Branch 030732 Lancaster Co	B	2		2		FC	x	NPS	UR			2	
Turkey Creek 030714 Sumter Co	B	5			5	FC	x	NPS	UR			5	
Waccamaw River 030716 Horry Co	A*	59	59							59			
Wildcat Creek (N) 030734 Lancaster Co	B	7	7									7	
Wildcat Creek (S) 030734 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			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE		ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Allison Creek 030836 York County	B	8	8							8			
Bear Creek 030834 Lancaster Co	B	13	9	4		FC	x	NPS	Ag			13	
Beards Creek 030860 Laurens Co	B	5		5		DO	x	Unk		5			
Beaverdam Creek 030836 York Co	B	9		9		FC	x	NPS	Ag			9	
Beaverdam Creek 030862 Greenville Co	B	5	5									5	
Beaverdam Creek 030864 Spartanburg Co	B	10	10									10	
Big Durbin Creek 030862 Grnvl & Laurens Cos	B	12	7		5	FC	x	PS NPS	Mun(E) Ag			12	
Big Pine Tree Creek 030828 Kershaw Co	B	2	2							2			
Broad River 030850-54-56 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

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

WATERBODY	CLASS	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Coronaca Creek 030842 Greenwood Co	B	4	4										4	
Crane Creek 030850 Richland Co	B	12		12		FC		x	Unk				12	
Crowders Creek 030836 York Co	B	4			4	FC FC	x	x	Unk NPS	N.Car. Ag			4	
Diversion Canal 030804 Berkeley Co	A	5	5								5			
Doolittle Creek 030856 Cherokee Co	B	5	5										5	
Dry Fork Creek 030854 Chester Co	B	4		2	2	FC		x	NPS	UR Ag			4	
Duncan Creek 030860 Newberry Co	B	4	4										4	
Eagle Creek 030818 Dorchester Co	B	3			3	FC	x		Unk				3	
Enoree River 030860-62 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 030864 Spartanburg Co	B	19	19										19	
Fishing Creek 030832 Chester & York Cos	A B	3 40	40	3		FC		x	NPS	Ag	40		3	
Furnace Creek 030856 Cherokee Co	B	5	5										5	
Georges Creek 030847 Pickens Co	B	10	10										10	
Gilder Creek 030862 Greenville Co	B	9	9										9	
Gills Creek 030824 Richland Co	B	18	11	7		FC DO		x x	PS NPS	Mun UR			18	
Gills Creek 030834 Lancaster Co	B	11			11	FC DO	x x		NPS	Ag UR			11	
Goose Creek 030810 Charleston Co	SC (B)	6			6	DO	x		NPS	UR		6		
Grove Creek 030847 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

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

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
Kelly Creek 030826 Kershaw Co	B	2	2								2			
Kelsey Creek 030864 Spartanburg Co	B	6		6		FC		x	NPS	UR			6	
Kinley Creek 030838 Lexington Co	B	5			5	DO FC	x x		PS NPS	Mun(E) Ag,UR, Con		5		
Langstson Creek 030846 Greenville Co	B	4	4										4	
Laurel Creek 030846 Greenville Co	B	3	3										3	
Lawsons Fork Creek 030868 Spartanburg Co	B	24		24		UNK NUTS? TOX?		X	PS	Mun(E) (U)			24	
Limestone Mill Creek 030856 Cherokee Co	B	4		4		FC		x	NPS	Ag UR			4	
Little River 030842 Laurens Co	B	35			35	FC	x		NPS	UR Ag			35	
Little River 030850 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 030868 Spartanburg Co	B	5		5		FC		x	Unk			5	
Little Pine Tree Creek 030828 Kershaw Co	A	5	5							5			
Little Saluda River 030840 Saluda Co	B	21		21		DO		x	NPS Ag	21			
Little Wateree Creek 030830 Fairfield Co	A	15			15	FC	x		NPS Ag			15	
Long Branch 030856 York Co	A	4			4	FC	x		Unk			4	
Lorick Branch 030838 Lexington Co	B	1		1		FC DO		x x	NPS Ag,UR		0.5	0.5	
McAlpine Creek 030836 Lancaster Co	B	2		2		FC		x	Unk			2	
Meng Creek 030854 Union Co	B	4			4	FC	x		Unk			4	
Middle Saluda River 030848 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 030866 Greenville Co	B	14	14									14	
Mill Creek 030824 Richland Co	A	24		19	5	FC		x	Unk	19		5	
Mill Creek 030862 Spartanburg Co	B	2			2	FC DO	x x		NPS UR		2		
Mine Creek 030840 Saluda Co	B	12		12		FC		x	PS Ind NPS Ag,Sil			12	
Mitchell Creek 030864 Union Co	B	4	4									4	
Mountain Creek 030862 Greenville Co	B	7	7									7	
North Creek 030842 Laurens Co	B	8	8									8	
N Pacolet/Pacolet Rvrs 030868 Cherokee & Spbg Cos	B	58	58									58	
North Saluda River 030848 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			CAUSE			SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED		MAJOR	MINOR		TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
North Santee River 030802 Georgetown Co	B	21	21								21			
North Tyger River 030866 Spartanburg Co	B	19	19								19			
Page Creek 030868 Spartanburg Co	B	3	3										3	
Peoples Creek 030856 Cherokee Co	B	3			3	FC	x		PS	Mun(IL)			3	
Potter Branch 030868 Spartanburg Co	B	2	2										2	
Princess Creek 030862 Greenville Co	B	3	3								3			
Rabon Creek 030844 Laurens Co	B	9	9								9			
Rawls Creek 030838 Lexington Co	B	6		6		FC		x	NPS	UR			6	
Red Bank Creek 030824 Lexington Co	A	9	5	4		FC		x	PS NPS	Mun 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

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

WATERBODY	CLASS	TOTAL MILES ASSESSED	STATE CLASSIFIED USES			CAUSE			SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED		MAJOR	MINOR		TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Sawmill Branch 030818 Dorchester Co	B	12			12	DO FC	x x		PS	Mun(E)		6	6	
Scott Creek 030842 Newberry Co	B	1			1	FC	x		NPS	UR			1	
Six Mile Creek 030824 Lexington Co	B	11	11										11	
Smith Branch 030850 Richland Co	B	4			4	FC	x		NPS	UR			4	
South Saluda River 030848 Greenville Co	B	20	20										20	
South Tyger River 030866 Greenville Co	B	11	11										11	
Spain Creek 030848 Greenville Co	B	0.5	0.5											0.5
Spears Creek 030826 Kershaw Co	B	22	22								22			
Spivey Creek 030868 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	STATE CLASSIFIED USES: TOTAL MILES ASSESSED	ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Steel Creek 030836 York co	B	7.5	7	0.5		FC		x	NPS	Ag			7.5	
Sugar Creek 030836 York Co	B	11	11										11	
Tailrace Canal 030820 Berkeley Co	A	5	5								5			
Taw Caw Creek 030804 Clarendon Co	A	7			7	FC DO	x x		NPS	Ag			7	
Thicketty Creek 030856 Cherokee Co	B	19	11	8		FC		x	NPS	Ag			19	
Tinker Creek 030864 Union Co	B	13	13										13	
Tools Fork Creek 030832 York Co	B	8			8	FC	x		Unk				8	
Toschs Creek 030864 Union Co	B	4	4										4	
Twelve Mile Creek 030836 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			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	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

WATERBODY	CLASS	TOTAL MILES ASSESSED	STATE CLASSIFIED USES							1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Wateree River 030826 Kershaw & Rich Cos	B	59	59							59			
West Creek 030840 Saluda Co	B	7		7		FC		x	Unk			7	
Wildcat Creek 030832 York Co	B	7			7	FC DO	x x		Unk			7	
Wilson Creek 030842 Greenwood Co	B	10		6	4	FC DO	x	 x	PS Mun(U)		4	6	
Winnsboro Branch 030850 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 030906 Colleton Co	B	15	5		10	DO		x	PS NPS	Mun Ag,UR			5	10
Black Creek 030922 Hampton Co	A	11	11								11			
Bull Swamp Creek 030914 Lexington Co	A B	7 5	5		7	DO FC	x x		NPS	Ag	5	7		
Combahee River 030922 Hampton Co	A	3	3								3			
Coosawhatchie River 030932 Allendale & Hampton Cos	A	36	36								36			
Edisto River 030906-08 Charl,Dorch,& Orgb Cos	A	71	71								71			
First Branch 030918 Edgefield Co	A	1			1	FC pH	x	x	NPS	UR			1	
Four Hole Swamp 030918 Dorch & Orgb Cos	A	57	57								46		11	
Goodland Creek 030918 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

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

WATERBODY	CLASS	TOTAL MILES ASSESSED	STATE CLASSIFIED USES			CAUSE			SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED		MAJOR	MINOR		TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Salkehatchie River 030922-24 Barnwell & Colleton Cos	A	60	57		3	FC	x		PS NPS	Mun(U) (E) Ag	57		3	
Sanders Branch 030932 Hampton Co	B*	5	5										5	
Shaw Creek 030918 Aiken Co	A	29	29								29			
South Fork Edisto River 030918 Aiken Co	B	71	71								71			
Spur Branch 030918 Barnwell Co	A	6		6		FC /		x	PS	Mun(E)			6	
Turkey Creek 030924 Barnwell Co	B	2	2								2			
Unnd Trib to Gramling Ck 030912 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			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE		ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Beaverdam Creek 031306 Edgefield Co	B	13	13							13			
Betsy Creek 031310 Anderson Co	B	1	1									1	
Big Generotee Creek 031310 Anderson Co	B	5	5							5			
Broadway Creek 031310 Anderson Co	B	2	2									2	
Chattooga River 031312 Oconee Co	A	34	34							34			
Cherokee Creek 031310 Anderson Co	B	5	5							5			
Coneross Creek 031312 Oconee Co	A	5	5							5			
Cupboard Creek 031310 Anderson Co	B	5		1	4	DO	x	PS	Ind			1	4
E. Fork Chattooga River 031312 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

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

WATERBODY	CLASS	TOTAL MILES ASSESSED	STATE CLASSIFIED USES			CAUSE		SOURCE	1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Norris Creek 031325 Oconee Co	B	2	2								2	
Rocky River 031310 Anderson Co	B	22	22						22			
Sand River 031306 Aiken Co	B	2	2						2			
Savannah River 031304-06-08-10 Abb., Aiken, Allen. Cos	B	173	173						173			
Sawney Creek 031308 Abbeville Co	B	5		5		DO	x	Unk	5			
Six and Twenty Creek 031312 Anderson Co	B	12	12								12	
Steel Creek 031304 Aiken Co	B	10	10						10			
Three and Twenty Creek 031312 Anderson Co	B	3	3								3	
Tims Branch 031304 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	CAUSE MINOR	SOURCE TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Twelve Mile Creek 031312 Pickens Co	B	24	24						3	13	8	
Unnamed Creek near Central 031312 Pickens Co	A	2	2						2			
Upper Three Runs Creek 031304 Aiken Co	B	8	8						8			
Woodside Branch 031312 Pickens Co	B	2			2	FC	x	PS Mun(IL)(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

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

WATERBODY	CLASS	TOTAL ACRES ASSESSED	STATE CLASSIFIED USES			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE		ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
William C. Bowen 030868 Spartanburg Co	B	1,600	1,600							800		800	
Lake Elizabeth 030805 Richland Co	A	60	60							60			
Fishing Creek Reservoir 030832 Chester & Lanc. Cos	A	3,370	2,530	840		FC	x	Unk		2,530		840	
Forest Lake 030824 Richland Co	B	120	120							120			
Lake Greenwood 030844 Greenwood Co	A	11,400	11,400							11,400			
Goose Creek Reservoir 030810 Berkeley Co	SC	600	600							600			
Lake Inspiration 030804 Calhoun Co	A	25			25	FC	x	NPS	UR			25	
Lake Lanier 030868 Greenville Co	A	90	90							90			
Lake Marion 030804 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					1983 FEDERAL GOAL		
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE MAJOR MINOR	SOURCE TYPE	ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Monticello Reservoir 030852 Fairfield Co	B	6,800	6,800					6,800			
Lake Murray 030838 Lex. & Newberry Cos	A	51,000	51,000					51,000			
North Saluda Reservoir 030848 Greenville Co	AA	1,080	1,080					1,080			
Table Rock Cove 030848 Greenville Co	AA	500	500					500			
Wateree Lake 030830 Fairfld & Kershaw Cos	A	13,710	13,710					13,710			
Windsor Lake 030824 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			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE		ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Bridge Creek Pond 031306 Aiken Co	B	60	60							60			
Clarks Hill Lake 031308 McCormick Co	A	78,500	78,500							78,500			
Lake Hartwell 031312 Anderson Co Oconee Co Pickens Co	A	61,350	61,350							61,350			
Lake Jocassee 031314 Oconee Co	A	7,565	7,565							7,565			
Lake Keowee 031314 Oconee Co	A	18,372	18,372							18,372			
Langley Pond 031306 Aiken Co	B	250			250	TOX	x	PS	Ind				250
Lake Richard B. Russell 031310 Anderson Co	A	26,653	26,653							26,653			
Lake Secession 031310 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'/32°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	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
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			CAUSE		SOURCE		1983 FEDERAL GOAL			
			ATTAINED	PARTIALLY ATTAINED	NOT ATTAINED	MAJOR	MINOR	TYPE		ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Ashley River 030818-14 Charleston Co	SC	14.5	14.5							12.2		2.3	
Bulls Bay 030806 Charleston Co	SA	8.0	8.0							8.0			
Charleston Harbor 030814 Charleston Co	SC	4.2	4.2							4.2			
Cooper River 030820-10-14 Berkeley & Chtn Cos	SC	19.7	19.7							19.7			
Cooter Creek 030806 Charleston Co	SA	1.2		1.2		DO	x	NPS	Forest	1.2			
The Cove 030814 Charleston Co	SC	0.3	0.3							0.3			
Elliott Cut 030814 Charleston Co	SC	3.5		3.5		DO	x	NPS	UR			3.5	
Goose Creek 030810 Berkeley Co	SC	14.2			14.2	FC	x	NPS	UR			14.2	
Intracoastal Waterway 030806 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 030814 Charleston Co	SA	41.8	41.8								41.8			
Shem Creek 030814 Charleston Co	SC	0.4	0.4								0.4			
South Santee River 030802 Georgetown Co	SA	18.0			18.0	FC	x		NPS	Forest Ag	18.0			
Stono River 030814 Charleston Co	SA	28.3	5.8		22.5	FC DO	x	 x	NPS	UR	28.3			
Wando River 030802 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	PARTIALLY ATTAINED	NOT ATTAINED	CAUSE	MAJOR	MINOR	SOURCE	TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
Beaufort River 030920-26 Beaufort Co	SB SA	9.6 21.5	9.6 21.5								9.6 21.5			
Bees Creek 030926 Jasper Co	SC	13.3	13.3										13.3	
Bohicket Creek 030902 Charleston Co	SA	2.7		2.7.		FC		x	NPS	UR	2.7			
Calibogue Sound 030926 Beaufort Co	SA	25.0	25.0								25.0			
Chechessee River 030926 Beaufort Co	SA	15.9	15.9								15.9			
Colleton River 030926 Beaufort Co	SAA	29.3	29.3								29.3			
Combahee/St.Helena Snd 030920 Beaufort Co	SA	108.5	108.5								108.5			
Coosawhatchie/Broad Rvrs 030930-26 Beaufort Co	SA	55.9	53.9		2.0	FC	x		NPS	Ag	55.9			
Dawhoo River 030902 Charleston Co	SA	9.8	9.8								9.8			

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	CAUSE: MINOR	SOURCE: TYPE	1983 FEDERAL GOAL: ATTAINED	NOT ATTAINED	FISHABLE ONLY	SWIMMABLE ONLY
May River 030926 Beaufort Co	SAA	24.6	24.6						24.6			
New River 030928 Jasper Co	SB	8.0		8.0		DO FC	x x	NPS Forest			8.0	
North Edisto River 030902 Charleston Co	SAA	53.3	53.3						53.3			
Pocotaligo River 030926 Beaufort River	SA	3.0			3.0	DO FC	x x	NPS Forest		3.0		
Port Royal Sound 030926 Beaufort Co	SA	25.3	25.3						25.3			
Skull Creek 030926 Beaufort Co	SA	6.9	6.9						6.9			
South Edisto River 030904 Charleston Co	SAA	9.2	9.2						9.2			
Trenchards Inlet 030926 Beaufort Co	SA	25.8	25.8						25.8			
Whale Branch 030920 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 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	834Q	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	110A
Gull Point Community Dock	Braddock Cove	Beaufort	163A
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

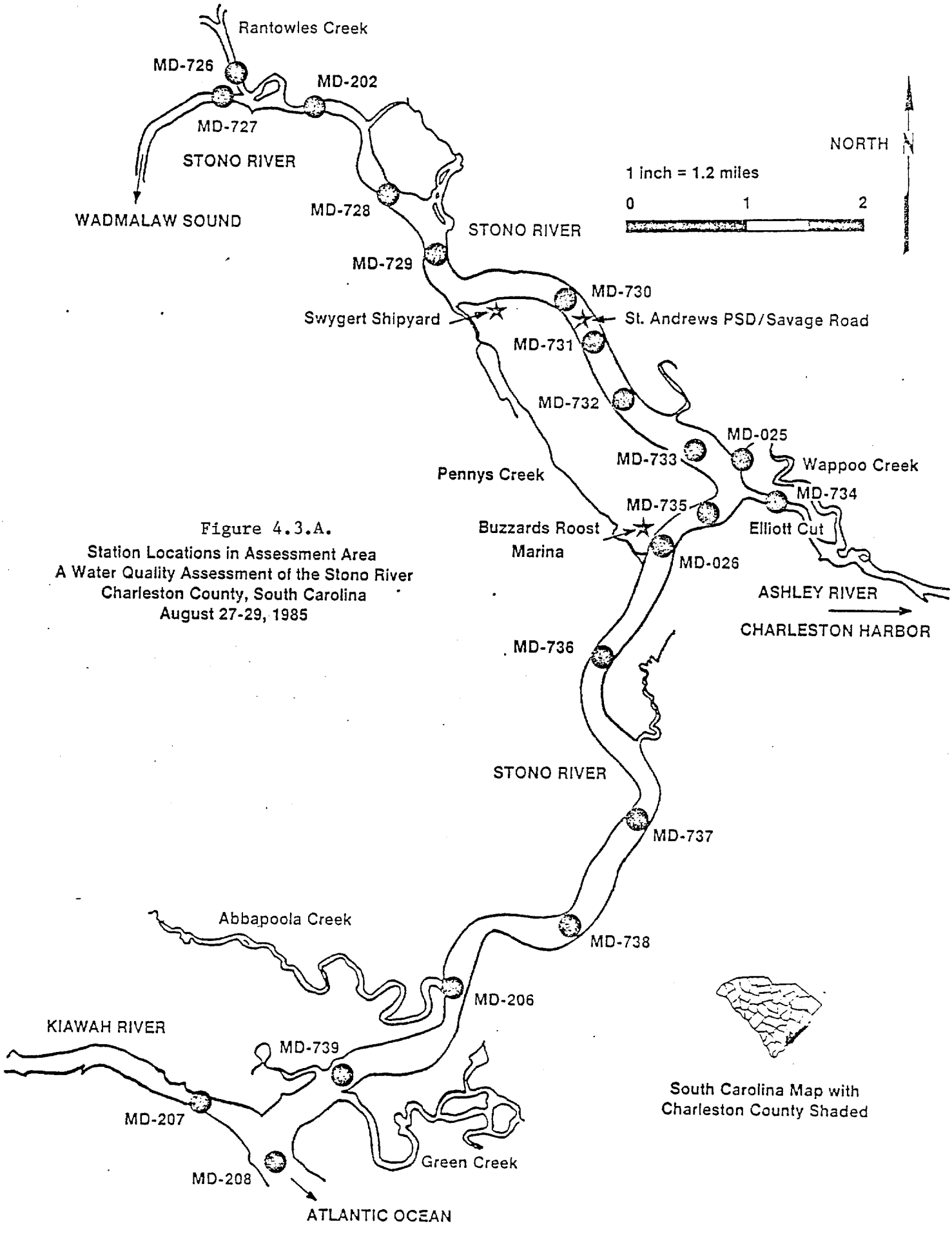

Figure 4.3.A.
Station Locations in Assessment Area
A Water Quality Assessment of the Stono River
Charleston County, South Carolina
August 27-29, 1985

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	αBHC	heptachlor	phosdrin
p,p'DDE	β BHC	heptachlorapoxide	lindane
o,p'DDE	dieldrin	malathion	trithion
p,p'DDD	endrin	parathion	PCB's
			acid extractable organics
o,p'DDD	ethion	diazinon	base neutral organics
			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,T 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									DATA SOURCE	MONITORED/ EVALUATED	STDS. VIO.	ADDITIONAL COMMENTS
					FC	DO	TX	SS	NT	pH	TB	BO	AM				
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.

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.