



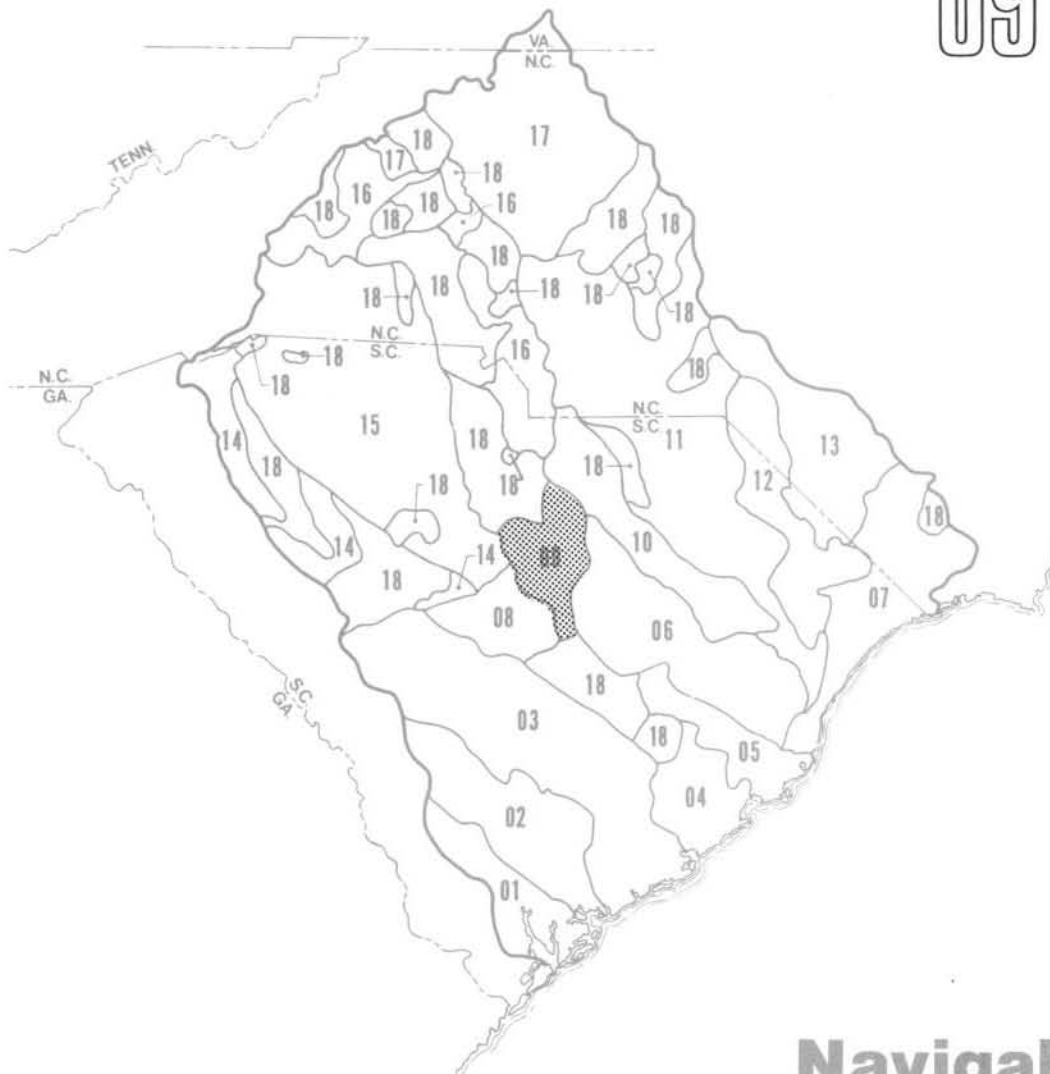
U.S. ARMY CORPS OF ENGINEERS
CHARLESTON DISTRICT
Charleston, South Carolina



WATEREE RIVER BASIN

Report No.

09



**Navigability
Study
1977**



STANLEY CONSULTANTS

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SECTION 1 - INTRODUCTION

Purpose

The purpose of this study is to collect, develop, and evaluate information on waterbodies within the boundaries of the Charleston District, Corps of Engineers, for establishing the classification of "navigable waters of the U. S." and "waters of the U. S." (During the course of this study the term "navigable waters" was changed to "waters of the U. S." Herein references to "navigable waters" are synonymous with "waters of the U. S.") Study objectives include definition of the present head of navigation, the historic head of navigation, the potential head of navigation, and the headwaters of all waterbodies within the district.

The information generated as a part of the study will be utilized by the Charleston District in administration of its programs dealing with water resource project construction permits in "navigable waters of the U. S." (River and Harbor Act of 1899), and the deposition of dredge or fill material in "navigable waters" or their contiguous wetlands (Section 404 of PL 92-500).

Scope

The scope of this project is generally summarized by the following:

1. Outline drainage areas, locate headwater points where mean flow is five cubic feet per second (cfs), summarize lake data (10 to 1,000 acres), establish stream mileage for "navigable waters of the U. S.", and prepare a stream catalog summary for the district.
2. Conduct field surveys of waterbodies to establish mean water levels and obstruction clearances for evaluating the potential head of navigation.
3. Analyze available hydrological data to estimate mean, maximum, and minimum discharge rates at obstructions and other selected locations.
4. Conduct a literature review to identify past, present, and future uses of waterbodies for interstate commerce.

5. Conduct a legal search to identify Federal and state court cases which impact on navigation classifications.
6. Prepare plan and profile drawings, maps of the district showing significant physical features, and a map delineating the recommended navigation classifications.
7. Prepare reports on all major river basins and large lakes (greater than 1,000 acres) including information on physical characteristics, navigation projects, interstate commerce, court decisions, navigation obstructions, and recommended classification of waterbodies for navigation.
8. Prepare a summary report outlining navigation-related information for the entire district as well as the methodology, procedures, and other factors pertinent to the development of each of the river basin reports.

Conduct of this study relies heavily upon available information. Compilation and evaluation of existing data from many sources and development of field survey information are the main contributions to the new water resource data base represented by this study.

Related Reports

Information pertaining to this navigability study for the Charleston District has been compiled into a series of reports, one of which is represented by this document. A complete listing of the reports is presented below to facilitate cross referencing.

<u>Number</u>	<u>Title</u>
--	Summary Report
01	Coosawhatchie River Area
02	Combahee River Area
03	Edisto River Area
04	Cooper River Area
05	Santee River Basin
06	Black River Area
07	Waccamaw River Basin
08	Congaree River Basin
09	Wateree River Basin
10	Lynches River Basin

<u>Number</u>	<u>Title</u>
11	Great Pee Dee River Basin
12	Little Pee Dee River Basin
13	Lumber River Basin
14	Saluda River Basin
15	Broad River Basin
16	Catawba River Basin
17	Yadkin River Basin
18	Lakes - Greater Than 1,000 Acres
--	Coastal Supplement

The eighteen reports covering various drainage areas in the district present information for the specific basins. The Summary Report provides an overview of the entire study of district waterbodies and presents information applicable to all waters in the district. Reference should be made to both the individual drainage area reports as well as the Summary Report to obtain a thorough understanding of the study approach and results.

Acknowledgements and Data Sources

The contribution of many project team members within the Corps of Engineers, Charleston District, and Stanley Consultants is gratefully acknowledged by Stanley Consultants. In addition to the legal search and other evaluations and input from Charleston District staff, several others made significant contributions to this study effort. Dr. John W. Gordon, Assistant Professor in the Department of History, The Citadel, prepared the narrative and literature review information for past and present interstate commerce.

Several state water resource, transportation, utility, and planning agencies also cooperated and provided useful data for compiling these reports. Federal water resource and regulatory agencies and private utilities provided information along with public and private operators of large reservoirs.

Specific numbered data sources are referenced in the reports in parentheses. These data sources are listed in the Bibliography of each report of the navigation study.

SECTION 2 - PHYSICAL CHARACTERISTICS

As shown on Plate 09-1, the Wateree River basin is located in the central portion of the state of South Carolina and makes up part of the Santee-Cooper River system. The basin is located near the fall line (between Piedmont Plateau and Coastal Plain) and undergoes somewhat of a physiographic transition from a mountainous terrain to a gently sloped, sandy terrain. Although the city of Columbia lies near the western basin boundary, the area is generally rural in nature.

The Wateree River is the major river in the basin and is formed by the confluence of the Catawba River and Big Wateree Creek at river mile (R.M.) 92.0. However, in 1915, Wateree Lake Dam was constructed approximately 16 miles downstream of this confluence, creating Wateree Lake. The resulting impoundment inundates the confluence of the Catawba River and Big Wateree Creek. As a result, the upstream end of the river, for all practical purposes, is at Wateree Dam (R.M. 76.1). From the dam the Wateree River flows to where it joins the Congaree River to form the Santee River. There are no major tributary streams in the basin. More information is available on Wateree Lake, and Catawba, Congaree, and Santee Rivers in Reports 18, 16, 08, and 05, respectively. Plates 09-2 and 09-3 are maps indicating the location of significant features in the basin.

The Wateree River undergoes a change in channel section from a well defined channel with high, narrow flood plains, in the upstream reaches, to a meandering river with sandbars and wide, low flood plains in the lower reaches. Much of the flow is regulated at Wateree Lake resulting in varying channel depth, embankment heights, and vegetation levels on a daily basis, thus distorting to some degree the general characteristics of the river. Table 1 presents selected physical characteristics, such as approximate drainage area, length, and elevation change for the Wateree River. The methodology used in developing these characteristics is defined in the Summary Report. Table 2 summarizes information on key USGS gaging stations located on

the Wateree River. Additional flows, river miles, and slopes are presented in Section 6.

TABLE 1
PHYSICAL CHARACTERISTICS (1) (2) (3)*

Length to Headwaters ¹⁾	76.1 miles
Elevation Change ¹⁾	65 feet
Drainage Area of Basin	910 square miles
Upstream Contributing Drainage Areas ²⁾	4,770 square miles
Mean Discharge at Mouth	7,020 cfs
Limit of Tidal Influence	None
Length of Present Navigable Waters of the U.S. ³⁾	76.1 miles (R.M. 76.1)

-
- 1) From confluence with Congaree River to Wateree Lake Dam.
- 2) See Reports 16 and 18.
- 3) Navigable waters of the U. S. continue upstream of Wateree Lake into the Catawba River (3).
- * See Bibliography for these references.

TABLE 2

KEY STREAM GAGING STATIONS (1)(4)

<u>Stream</u>	<u>USGS Gaging Station Number</u>	<u>Location Description</u>	<u>Drainage Area¹⁾ (sq.mi.)</u>	<u>Mean Flow (cfs)</u>	<u>Minimum Flow²⁾ (cfs)</u>	<u>Maximum Flow³⁾ (cfs)</u>
Wateree River	02148315	Located below Eastover, S. C., Richland Co., upstream of SCL Railroad Bridge (R.M. 14.8)	5,590	--	--	--
Wateree River	02148000	Located near Camden, S. C., Kershaw Co., on U. S. 1 Highway Bridge (R.M. 68.8)	5,070	6,326	1,000	11,800

-
- 1) Includes area from Catawba River basin.
 - 2) Exceeded or equaled 90 percent of the time.
 - 3) Exceeded or equaled 10 percent of the time.

SECTION 3 - NAVIGATION IMPROVEMENT PROJECTS

Federal Navigation Projects

The only authorized Federal navigation improvement project located in the basin provided for a 4 feet deep navigable channel from the mouth (R.M. 0.0) of the Wateree River to Camden (R.M. 67.0).

The last report on the project (issued in 1940) stated that snags, stumps, and logs had been removed to clear a 50 to 75 foot channel in the lower 9.5 miles of river. The project was recommended for abandonment by House Document No. 805, 64th Congress, 1st Session, because of rising costs, extensive obstruction (snags and logs) over the remaining project area, and lack of commerce on the river. No evidence of project funding after 1939 has been indicated and the project has generally been recognized as completed as of this date. Table 3 summarizes this project. (5)(6)

TABLE 3

AUTHORIZED FEDERAL NAVIGATION PROJECT (5)(6)

Waterbody	Wateree River
Work Authorized	4 feet deep navigation channelization
Date Completed	Abandonment recommended 1939
Project Location	R.M. 0.0 to R.M. 67.0
Authorization	River and Harbor Act 3 March 1881 S. Ex. Doc. 161, 46th Congress, 2nd Session

Other Navigation Projects

No other modern-day navigation improvement projects have been identified in the basin. As discussed in Section 4, several legislative efforts were directed toward the Wateree River in the late 1700's

by the state of South Carolina, however, evidence of any significant improvements has long since ceased to exist.

Inquiries made at various state and Federal agencies indicate no projects are now planned or under construction which would improve or substantially benefit navigation on the Wateree River.

SECTION 4 - INTERSTATE COMMERCE

Past

In the first years of the 18th Century, traders from Charleston succeeded in creating strong commercial linkages with both the Catawba and Wateree Indian tribes. (7) Small groups of English settlers established themselves at key locations in the Wateree region and as a result, the city of Camden was founded and was considered "at the head of schooner navigation." (8)

Scotch-Irish and English settlers from Pennsylvania and Virginia arrived in the Wateree basin in the middle 1700's. These people "looked to the rivers for transportation, but found them obstructed with logs and snags." (9) In order to correct this situation, the General Assembly of South Carolina passed, in 1753, "An act for appointing and empowering Commissioners to make the Wateree River navigable." The task proved difficult, and additional legislative efforts were directed toward the Wateree in 1778, 1784, 1785, 1787, and 1791." (10)

Unfortunately, these efforts were not successful. In 1818, John Wilson, the Civil and Military Engineer of South Carolina, reported that "The navigation of the Wateree is impeded by the accumulation of logs, by sandbars, by gravelly shoals, and ... by rocks which can be easily removed." (11) Eight years later, Robert Mills observed that the Wateree, "above Camden to the North Carolina line, is interrupted by ... falls, around which canals have been cut." These canals were the Wateree Canal (five miles long, six locks), the canal at Rocky Mount (which in 1826 was not yet finished), the Catawba Canal, and the Landsford Canal (two miles long, five locks), which "completes the navigation." Mills, optimistic as always about the prospects of inland navigation, added that "Above this the river has rapids, but the small boat navigation can be extended with care, within the Allegheny Mountains." (12)

By the time that Mills was writing his 1826 study, cotton had become the principal commodity for which these efforts at riverine improvement were being mounted. He noted, the Wateree was "navigable to Columbia and Camden for steamboats, but those most used are the bay craft (which pass roundby Bull's bay to Charleston) and canal boats, which pass through the Santee canal." The bay boats could "carry 250 bales of cotton, or 40 tons;" the canal boats, which are principally used, "could carry from 100 to 120 bales of cotton, or 20 tons." (13) Thus, before the coming of the railroads, the Wateree River was "the principal means of hauling freight between Camden and Charleston or Georgetown." This was indeed a network of interstate or international commerce, for the cotton was shipped out of the two coastal ports to New England or to British textile mills. "Lines of flat bottomed boats were poled or towed down the Wateree and Santee, through the Santee Canal, to 'Mouzon's Store', where the cargoes were transferred to schooners." The first steamboat "operated between Charleston and Camden ... in 1835," but owing to "poor dredging and low water, river navigation was never very successful, though [it was] kept up sporadically" until about 1900. (14)

The U. S. Army Corps of Engineers became involved with the Wateree in 1880. In that year, Captain C. B. Phillips examined the river and noted that the trade on it was confined to flats and rafts and "a light-draught steamer ..., engaged in purely local traffic." (15) The Rivers and Harbors Act of 3 March 1881 provided for "4-foot navigation for steamers from the mouth to Camden, a distance of 67 miles." (16) Two years later, the South Carolina Board of Agriculture reported that "steamboats carrying 800 to 1,000 bales of cotton ... passed up ... to Camden." By 1903, however, there was "no commerce annually carried in bottoms on the river," although a "considerable number of sawmill logs are rafted and drifted with the current, amounting yearly to about 16,600 tons, worth about \$56,000." (17)

By 1909, "no steamer line is now in operation" between Camden and Georgetown, although waterborne traffic on the Wateree had in 1904, comprised 15,600 tons (\$29,700); in 1906, some 16,200 tons (\$81,000); and in 1908, 35,720 tons (\$182,669). Most of this was lumber rafts,

"floated free or in tow." (18) Terminal facilities were lacking at Camden and other locations along the river. When the Corps reported on the Wateree River in 1940, it stated that "The river is entirely obstructed by snags ... from the mouth to Camden, except the lower 9.5 miles cleared in 1939, the year in which the project was completed." There was "no commerce on the river at present, and it is improbable that there will be a revival of commerce in the near future." (19)

In 1965, the Wateree had a "navigable length in miles" of 73.0, and was described as follows: "Trib. of Santee River. Nav. approved to Mil. 73, Mi 10 limit of practical navigation." (20) Nine years later, in 1974, the Wateree River navigation project was described as "Completed", and with "No commerce reported." (21)

Present

The Wateree River is not currently being used for purposes of waterborne interstate commerce. (22)

During the 19th and early 20th Centuries, however, the Wateree River -- from its confluence with the Congaree, where the two rivers join to form the Santee River, to Camden, S. C., a distance of 67 miles -- was a significant artery for moving interstate commerce by water.

Camden (R.M. 67) was the head of navigation for steamboats, but much of the commercial traffic consisted of timber sent down the river in rafts. After snagging operations in 1939 had removed some of the obstructions which had accumulated, the lower 9.5 miles were pronounced clear for navigation.

Future Potential

Comprehensive analysis of the regional economics (income, education, employment, community facilities, transportation systems, and similar factors), which would indicate growth patterns and the services needed to sustain various types of industrial and commercial activities, is beyond the scope of this study. Thus, the potential use of the Wateree River and its tributaries for interstate commerce in future years is difficult to predict.

The river has the potential to be utilized for shipment of goods into other states since it is connected with the Santee-Cooper River system, Charleston Harbor, and the Atlantic Ocean. However, future potential interstate commerce is not anticipated to be significant in the upstream reaches of the basin due in part to heavy dependence by industrial and commercial establishments on other forms of transportation including the interstate highway system, railroads, and air transport.

SECTION 5 - LEGAL AUTHORITY

General

This section presents information pertaining to the legal aspects of the navigability investigation. Such Federal and state court decisions as apply to the specific basin reported on herein are outlined. The Summary Report presents more complete documentation and references to the court cases dealing with navigation classifications and legal jurisdiction.

Navigability Interpretations

The term "navigable waters of the U. S." is used to define the scope and extent of the regulatory powers of the Federal government. Precise definitions of "navigable waters" or "navigability" are ultimately dependent on judicial interpretation, and are not made conclusively by administrative agencies.

Definitions of "navigability" are used for a wide variety of purposes and vary substantially between Federal and state courts. Primary emphasis must therefore be given to the tests of navigability which are used by the Federal courts to delineate Federal powers. Statements made by state courts, if in reference to state tests of navigability, are not authoritative for Federal purposes.

Federal courts may recognize variations in definition of navigability or its application where different Federal powers are under consideration. For instance, some tests of navigability may include:

1. Questions of title to beds underlying navigable waters.
2. Admiralty jurisdiction.
3. Federal regulatory powers.

This study is concerned with Federal regulatory powers. Unfortunately, courts often fail to distinguish between the tests, and instead rely on precedents which may be inapplicable. Thus, a finding that waters are "navigable" in a question dealing with land title may have a somewhat different meaning than "navigable waters of the U. S." which pertains to Federal regulatory functions.

In this study, the term "navigable waters of the U. S." is used to define the extent and scope of certain regulatory powers of the Federal government (River and Harbor Act); this is distinguished from the term "navigable waters" which refers to other Federal regulatory powers (Section 404 of PL 92-500).

Administratively, "navigable waters of the U. S." are determined by the Chief of Engineers and they may include waters that have been used in the past, are now used, or are susceptible to use as a means to transport interstate commerce landward to their ordinary high water mark and up to the head of navigation. "Navigable waters of the U. S." are also waters subject to the ebb and flow of the tide shoreward to their mean high water mark. These waters are deemed subject to a Federal "navigation servitude". The term "navigable waters of the U. S." defines the more restricted jurisdiction which pertains to the River and Harbor Acts -- particularly the one of 1899 which specifically defined certain regulatory functions for the Corps of Engineers.

In contrast, the term "navigable waters" defines the new broader jurisdiction with respect to Section 404 of the Federal Water Pollution Control Act Amendments of 1972. Accordingly, "navigable waters" not only include those waters subject to the navigation servitude, but adjacent or contiguous wetlands, tributaries, and other waters, as more fully defined in revised Corps of Engineers Regulations.

Although this navigability study covers both "navigable waters of the U. S." and "navigable waters", the analysis of judicial interpretation has only focused upon determining "navigable waters of the U. S." to the head of navigation. Due to common usages in court cases, the terms "navigability" and "navigable waters" may herein appear interchangeably with the term "navigable waters of the U. S." However, the summary of court cases is directed at the Federal regulatory jurisdiction of the River and Harbor Acts, and not necessarily regulatory jurisdiction under the Federal Water Pollution Control Act.

General Federal Court Cases

Powers of the Federal government over navigable waters stem from the Commerce Clause of the U. S. Constitution (Art. I, §8). Pursuant

to its powers under the Commerce Clause, Congress enacted the River and Harbor Act of 1899 which particularly specifies regulatory powers of the Federal government in "navigable waters of the U. S."

The well-established Federal test of navigability is whether a body of water is used or is capable of being used in conjunction with other bodies of water to form a continuous highway upon which commerce with other states or countries might be conducted.

Several Federal court decisions make it clear that a waterway which was navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce. The test of navigability is not whether the particular body of water is in fact being used for any form of commerce but whether it has the capacity for being used for some type of commerce. Several cases substantiate this (see the Summary Report for details on the court decisions).

The ebb and flow of the tide is another test which remains a constant rule of navigability in tidal areas, even though it has sometimes been disfavored as a test of Federal jurisdiction. Several cases note that ebb and flow should not be the sole criterion of navigability, but that extension of Federal jurisdiction into the major non-tidal inland waters is possible by an examination of the waters "navigable character". The ebb and flow test, however, remains valid as a rule of navigability in tidal areas; it is merely no longer a restriction for non-tidal areas. For bays and estuaries, this extends to the entire surface and bed of all waterbodies subject to tidal action, even though portions of the waterbody may be extremely shallow or obstructed by shoals, vegetation, or other barriers as long as such obstructions are seaward of the mean high tidal water line. Marshlands and similar areas are thus considered "navigable in law" insofar as they are subject to inundation by the mean high waters. The relevant test is therefore the presence of the mean high tidal waters. Navigable waters are considered navigable laterally over the entire surface regardless of depth.

Another factor relevant to navigability determinations is land title. Whatever title a party may claim under state law, the private ownership of the underlying lands has no bearing on the existence or

extent of the dominant Federal jurisdiction over "navigable waters of the U. S." Ownership of a river or lake bed will vary according to state law; however, the Supreme Court has consistently held that title to the bottomlands is subordinate to the public right of navigation.

Specific Federal Court Cases

Navigability, in the sense of actual usability for navigation or as a legal concept embracing both public and private interests, is not defined or determined by a precise formula which fits every type of stream or body of water under all circumstances and at all times. A general definition or test which has been formulated for Federal purposes is that rivers or other bodies of water are navigable when they are used, or are susceptible of being used, in their ordinary condition as highways for commerce over which trade and travel are or may be conducted in the customary modes of trade and travel on water.

The question of navigability of water when asserted under the Constitution of the U. S., as is the case with "navigable waters of the U. S.", is necessarily a question of Federal law to be determined according to the general rule recognized and applied in the Federal courts.

Review of legal documentation indicates two Federal court decisions which indirectly apply to navigation in the Wateree River basin. (3) These cases are briefly summarized below.

In Re Houser's Petition* - The court found that the Catawba River "... is not in any sense considered to be a navigable stream by any authority of the United States above Catawba Dam [R.M. 138.5] ... (and that) preferably a fair determination would be that it in no way is considered as navigable other than below Camden, South Carolina [R.M. 67]** However, the court failed to apply the usual tests of navigability set forth by the various Supreme Court decisions in reaching this position. Instead, the court's basis for the holding was that it "is a human impossibility" to presently traverse the waters in a boat.

* 227 F. Supp. 81 (W.D.N.C. 1964).

** Below R.M. 76.1 the Catawba River becomes the Wateree River.

The legal and factual context in which this decision was entered should also be noted. The petitioner in this case sought to invoke the Admiralty jurisdiction so as to limit his potential liability with respect to a boat accident his craft was involved in and which was the subject of the lawsuit. This invocation was dependent on a judicial determination that the waterway in question was a "navigable water of the U. S.", which determination was not forthcoming. The question thus presented is, would a court confronted with the question of whether or not the same area was a "navigable water of the U. S." in a case where the United States was asserting regulatory jurisdiction, pursuant to the Commerce Clause, be bound by the holding in this case? It is submitted that, although the holding would be accorded great weight, the purposes embodied in the Admiralty Acts vis a vis those of 33 U.S.C. 403 are so manifestly dissimilar that a court could feel justified in handing down two rulings seemingly inconsistent, which rulings would have two different bases, one stemming from admiralty jurisdiction, the other from the regulatory power of the United States pursuant to the Commerce Clause.

Additionally, as a practical matter, although the decision held that the Catawba is not navigable above R.M. 138.5, the facts of the case concerned Lake Hickory, which, at R.M. 222, is some 58.5 river miles above the furthest limit of navigability, as set out in the 1975 opinion by OCE.

United States v. Mecklenburg Abattoir and Locker Plant, Inc.* - The U. S. District Court for the Western District of North Carolina, the same court which decided the Houser case, supra, held in this case that the Catawba River "is a navigable water of the U. S. descending to the Sea". The basis for this holding was not set out, inasmuch as no formal opinion was entered, only a Judgment and Commitment. However, in light of the Houser court's finding of non-navigability having been based on a strictly factual examination of whether the river was then navigable in fact, instead of the Supreme Court's test of past, present, or future possibility of navigability, it is more than likely that the

* (W.D.N.C., 1972).

Mecklenburg court took this opportunity to reevaluate the Houser decision, at least insofar as regulatory jurisdiction is concerned, and employed in this reevaluation the standard tests of navigability that a water is a "navigable water of the U. S." if it was used in the past, is presently used, or is susceptible to use in the future as an instrument to transport interstate commerce. Especially important is the legal context in which this case arose. Unlike the Houser case, which concerned navigability for admiralty jurisdiction, this case was an action by the United States against the Defendant for violation of 33 U.S.C. 407, and as such is directly concerned with navigability for regulatory jurisdiction. Consequently, the Mecklenburg decision may be interpreted as reversing the Houser case, at least as to navigability for regulatory jurisdiction, and is thus consonant with the 1975 opinion by OCE which states that the Catawba River is a "navigable water of the U. S." from R.M. 163.5 to the sea.

South Carolina State Court Cases

The South Carolina legislative enactment defining navigability and requiring freedom from obstruction may be found in Section 70-1 of the South Carolina Code of Laws. This Section essentially provides that all streams which can float rafts of lumber or timber are considered navigable by state law.

Many of the South Carolina state cases reported are primarily concerned with state ownership questions. While the majority of states actually own streams and exercise control over their navigable waters, the ultimate authority has been granted to the Federal government by the Commerce Clause of the Constitution. The general rule, then, is that the states both own and control the navigable streams within their borders, subject to exercise of the superior right of control by the U. S. Although case histories show that state and Federal concepts of navigability do not always agree, when Federal interests are at stake, the Federal test will govern.

There are exceptions, however, to the "overwhelming majority rule of state ownership of lands beneath navigable waters," and South Carolina is in the minority. In the minority states, it was considered that property rights were vested at the time of independence from England and that the state took title only to tidal-navigable streams while riparian owners took title to all stream beds, both navigable and non-navigable, if non-tidal. Even in the minority states, however, private ownership of the bed does not affect the rights of the public to the use of navigable waters.

A review of legal documentation indicates one state court decision which applies to navigation in the Wateree River basin. (3) This case is briefly summarized below.

Early v. South Carolina Public Service Authority* - Although this case concerned the plaintiff's seeking of compensation by inverse condemnation for damages brought about by the backing of salt water into the otherwise fresh water Santee River, the court recognized that the Congaree, Wateree, Santee, and Cooper Rivers were all navigable rivers of the state and subject to a navigation servitude. The court, in setting the rights and limits of the state held:

"The right of the sovereign, in the exercise of the navigation servitude, to take or damage or destroy private property without obligation to compensate therefor extends to the bed of the navigable stream, i.e. to mean high water mark on either bank - and no farther; for damage beyond that boundary the constitution requires just compensation."

Thus, the reservation of the title between high and low water in the state allows the freedom and flexibility necessary, in some cases, to exercise the navigation servitude without the requirement of compensation.

Recent Federal Litigation

A review of recent Federal regulatory litigation concerning the Charleston District reveals no court actions pertaining to the Wateree River basin concerning navigation.

* 228 S. C. 392, 90 S. E. 2d 472 (1955).

Federal Agency Jurisdiction

The delineation of "navigable waters of the U. S.", as discussed earlier, in essence, defines the Federal navigation servitude and is applicable to Federal jurisdiction generally (not merely applicable to the Corps of Engineers). No matter which Federal agency or activity may be involved, the assertion of "navigability" ("navigable waters of the U. S.") arises under the U. S. Constitution, or under application of Federal statute.

By virtue of the Commerce Clause of the Federal Constitution, and the clause empowering Congress to make all laws necessary to carry into execution the Federal judicial power in admiralty and maritime matters, "navigable waters of the U. S." are under the control of Congress, which has the power to legislate with respect thereto. It is for Congress to determine when and to what extent its power shall be brought into activity. It may be exercised through general or special laws, by Congressional enactments, or by delegation of authority.

Thus, Congress has power which is paramount to that of the states to make improvements in the navigable streams of the U. S. and for this purpose to determine and declare what waters are navigable. The Federal government also has the power to regulate the use of, and navigation on, navigable waters.

The above presents the basis upon which Federal jurisdiction in "navigable waters of the U. S." is established. The basic definition or jurisdictional concept of "navigable waters of the U. S." remains consistent, irrespective of which department or office of the Federal government may be delegated particular responsibility. For instance, the safety, inspection, and marine working functions of the U. S. Coast Guard embrace vessel traffic within "navigable waters of the U. S." as previously defined.

With specific reference to agency regulation of construction or work within "navigable waters of the U. S.", other than by the Corps of Engineers, the Department of Transportation Act of 15 October 1966 (PL 89-670) transferred to and vested in the Secretary of Transportation, certain functions, powers, and duties previously vested in the Secretary

of the Army and the Chief of Engineers. By delegation of authority from the Secretary of Transportation, the Commandant, U. S. Coast Guard, has been authorized to exercise certain of these functions, powers, and duties relating to the location and clearances of bridges and causeways in the "navigable waters of the U. S."

An additional agency of particular interest concerning work or construction within "navigable waters of the U. S." is the Federal Power Commission. The Federal Power Act, Title 16, United States Code, Sections 791 et. seq., contemplates the construction and operation of water power projects on navigable waters in pursuance of licenses granted by the Federal Power Commission. The statute was enacted to develop, conserve, and utilize the navigation and water power resources of the nation. The act provides for the improvement of navigation, development of water power, and use of public lands to make progress with the development of the water power resources of the nation.

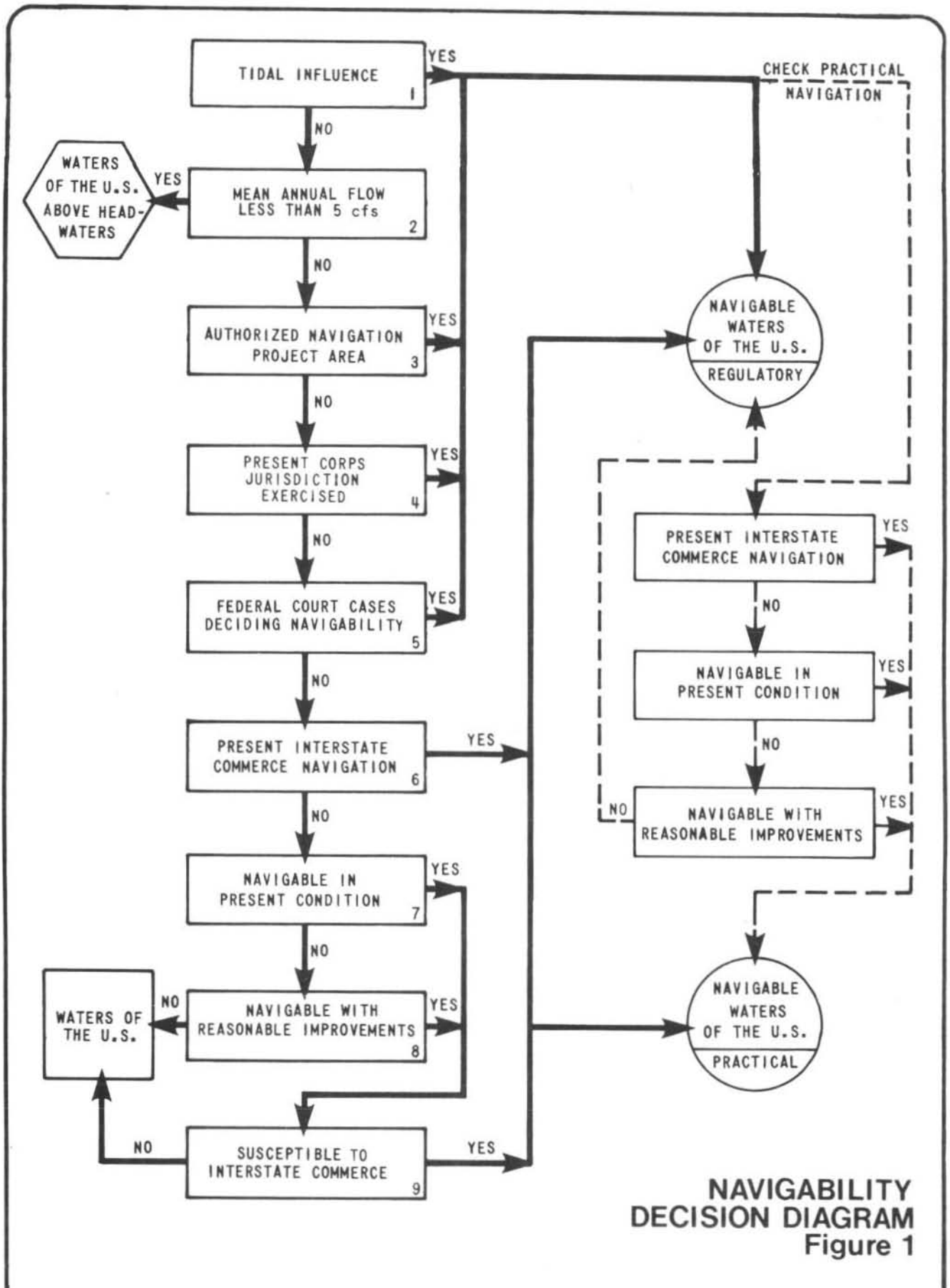
SECTION 6 - NAVIGATION OBSTRUCTIONS AND CLASSIFICATIONS

Navigation Classification Procedures

As noted in Section 5, definition of navigability is not subject to a single precise formula which applies to every circumstance. Many factors including stream physical characteristics (depth, width, flow, slope, etc.), presence of obstructions, court decisions, authorized navigation projects, potential for reasonable improvements, and susceptibility of a stream to interstate commerce activities, play a role in the decision-making process for classifying waterbodies in the Charleston District. In an effort to make the analytical process concerning stream classifications as systematic as possible, a "Navigability Decision Diagram" has been developed and is presented in Figure 1. This diagram has been utilized as a guide in assessing the various navigation classifications for streams in the Charleston District. The Summary Report includes a detailed presentation on the methodology and approaches used in the analysis; however, the following presents a brief synopsis of the techniques as indicated in Figure 1.

Tidal Influenced Areas - Tidal areas (see Item 1 in Figure 1) which are affected by mean high water are classified "navigable waters of the U. S." according to various legislative and judicial actions. The "navigable waters of the U. S." are subject to regulatory jurisdiction by the Corps of Engineers and other agencies. Even though all tidal areas are so classified and subject to regulatory procedures, many are not practically navigable based upon past and/or present requirements for vessels. Figure 1 shows that some additional "check" analyses are necessary to distinguish those tidal waters which are actually capable of practical navigation. Investigation of the tidal areas is beyond the scope of this study; however, drawings showing the "plan" of major rivers to their mouth, often tidal influenced, are presented in the interest of continuity.

Waters of the U. S. Above Headwaters - Section 404 of PL 92-500 considers the headwaters of waterbodies to be the point at which the mean annual flow is five cfs. Waterbodies or portions of waterbodies



**NAVIGABILITY
DECISION DIAGRAM**
Figure 1

located upstream of the headwaters are nationally permitted by law and will not require an individual application for dredge or fill discharge permits provided the proposed work will meet certain conditions.

However, these waters are classified "waters of the U. S." and are within Corps of Engineers jurisdiction as applicable to Section 404. Item 2 in Figure 1 shows the testing procedure for the five cfs point.

Authorized Navigation Project Area - Any streams which currently have authorized Federal projects to aid navigation are classified as "navigable waters of the U. S." (Item 3 in Figure 1). Many of the projects thus authorized were based upon conditions which are not currently applicable (for example, use of pole boats or steamboats for justifying the navigation benefits). Consequently, many of the streams having older authorized projects will not allow passage of present-day commercial navigation vessels without some additional improvement. Thus, some portions of the authorized project areas are not considered practical for navigation. Figure 1 shows the additional "check" procedure which has been followed to assess the practical limit of "navigable waters of the U. S."

Present Corps Jurisdiction Exercised - The Corps of Engineers is exercising jurisdiction on several non-tidal waterbodies which are not covered by authorized projects (Item 4 in Figure 1). (20) Determinations previously made on these waterbodies under the River and Harbor Act indicated use for interstate commerce and hence the current classification as "navigable waters of the U. S." Some of these streams are not currently navigable by present-day commercial vessels and thus have practical limits. Figure 1 shows the "check" used to assess the practical limits of "navigable waters of the U. S."

Federal Court Decisions - As noted in Section 5, Federal case law is the predominant indicator which is to be used for establishing Federal jurisdiction over waterbodies in the Charleston District (Item 5 in Figure 1). Several decisions have been rendered which classify certain streams in the district as "navigable waters of the U. S." However, some of these court decisions have been arrived at under different circumstances or without the benefit of the data developed as a part of this investigation. Therefore, even though some of the

streams are classified by judicial review as "navigable waters of the U. S.", they are not practical for navigation with present-day vessels. Figure 1 shows the steps necessary to "check" those portions of the "navigable waters of the U. S." which are capable of practical navigation.

Present Interstate Commerce Navigation - Any rivers currently involved in interstate commerce activities are classified as "navigable waters of the U. S." from both the regulatory and practical standpoint (see Item 6 in Figure 1).

Waters of the U. S. Below Headwaters - For those streams, or portions of streams, not subject to authorized projects, court cases, or present interstate commerce navigation, several additional tests for determining navigability are required (Items 7 and 8 in Figure 1). If the waterbody is not judged to be navigable in its present state or with reasonable improvements, then it is beyond the limit of "navigable waters of the U. S." and is termed "waters of the U. S." over the remaining length. These "waters of the U. S." (as well as the "navigable waters of the U. S.") up to the headwaters (five cfs points) of the streams are subject to jurisdiction under Section 404 of PL 92-500. A general or individual permit is required for discharge of dredged or fill material below the headwaters (five cfs point) of "waters of the U. S." Discharges above the headwaters are discussed in the previous subsection, "Waters of the U. S. Above Headwaters."

Interstate Commerce - Some non-tidal waters in the district are not now subject to authorized projects, court decisions, or interstate commerce navigation, but can be navigated under present or reasonably improved conditions. These streams may be considered for classification as "navigable waters of the U. S." if they are susceptible to interstate commerce activities (past, present, or future). A combined judgment considering both "reasonable improvement" factors (Item 8 in Figure 1) and "interstate commerce" factors (Item 9 in Figure 1) has often been utilized in arriving at the conclusions and recommendations concerning navigability of waterbodies in the Charleston District. The Summary Report provides further details on these factors.

Navigation Classification Categories

This study classifies streams into several different categories, each of which is discussed subsequently:

1. Present "navigable waters of the U. S." (by regulatory procedures).
2. Historically navigable waters (based on literature review).
3. Recommended "navigable waters of the U. S." (based upon data developed as a part of this investigation).
4. Recommended waters for practical navigation (within "navigable waters of the U. S.>").
5. Headwaters for all waterbodies (five cfs points).

The first four navigation classifications are displayed on the plates presented later in this report. The headwater limits are summarized in Appendix A.

Present Navigable Waters of the U. S.

Currently the Wateree River is classified as "navigable waters of the U. S." over its entire length (R.M. 76.1). The classification of "navigable waters of the U. S." actually extends upstream of R.M. 76.1, however, this area is outside the Wateree basin boundary and is presented, including map location, in Reports 16 and 18. The Federal court decision presented in Section 5 is the basis for this classification. (3)(20)

Historically Navigable Waters

Historically, navigation has extended over the entire length of the Wateree River and up the Catawba River. Further discussion including map location of these historic limits is presented in Report 16.

Recommended Navigable Waters of the U. S.

The recommended limit of "navigable waters of the U. S." for the Wateree River is at Wateree Lake Dam (R.M. 76.1). This is the same limit as the present classification, and is based on the court decision that established the present classification. This classification extends into the area presented in Reports 16 and 18. In addition, Little River, a small tributary to the Wateree River, is recommended as "navigable waters of the U. S." for 0.3 miles (based on results presented in Recommended Practical Navigable Waters of the U. S.). The conclusions

reached on the navigation limit meet the criteria established for the Federal test of navigability that the body of water is used, or is capable of being used, in conjunction with other bodies of water to form a continuous highway upon which commerce with other states or countries might be conducted.

Recommended Practical Navigable Waters of the U. S.

The recommended practical limit of "navigable waters of the U. S." for the Wateree River is at Wateree Lake Dam (R.M. 76.1). This is the same limit as the present classification, but unlike the present classification this limit does not extend any further upstream. The "practical navigable waters of the U. S." classification is based on field observations and computational analysis of channel dimensions made at the six bridges crossing the Wateree River between its mouth and Wateree Lake Dam as well as review of upstream obstruction types and locations. The results indicated an approximate water depth of at least 7 feet, an approximate channel width of at least 50 feet, and an average slope less than 2.0 feet per mile at mean water, to Wateree Lake Dam; however, beyond this point several dams, without locks or navigable entrances, cross the Wateree-Catawba River. The present potential for river commerce does not appear sufficient to justify the extensive amount of work that would be required to open these dams to navigation; therefore, the recommended practical limit of navigation has been set at R.M. 76.1 (Plate 09-3). This recommendation is discussed further in Report 16. In addition, field investigation of small tributary streams revealed sufficient water depth of at least 7 feet and channel width of at least 50 feet to justify recommendation of one small tributary (Little River) for navigability classification. Thus, the upstream recommended practical limit of "navigable waters of the U. S." for Little River is at R.M. 0.3. There are no other significant tributaries to the Wateree River within its recommended and practical limits of "navigable waters of the U. S." that are capable of supporting navigation.

Plates 09-4 through 09-7 are plan and profiles of the recommended "practical navigable waters of the U. S." The plan and profile plates

show mean water surface as determined from USGS maps, stream bed depth, 50 feet wide navigable channel depth, pier spacing for bridges crossing the river, vertical clearances at structures, and classification limits. Approximate vertical clearances for overhead utilities are shown later in this section in Table 4. It is emphasized that all references to elevation are approximate since vertical control was established from USGS contour maps and not field instrument surveys. Water depth and structure vertical clearance measurements are also approximate due to the accuracy inherent in the field techniques. Small tributaries recommended for classification as "navigable waters of the U. S." for less than one mile in length from their confluences are shown on the plan only. (See the Summary Report for a detailed description of field procedures and the methodology used to calculate water depth at mean flow.)

Obstructions to Navigation

Table 4 presents the vertical clearance to mean water level and mean water slope at all obstructions, and the mean discharge of the river at all bridges, located within the recommended "practical navigable waters of the U. S." No obstructions were found on that portion of Little River recommended for classification as "navigable waters of the U. S." It is emphasized that mean discharge, slope, and vertical clearance are only approximations based on best available data. Specific procedures for determining these are discussed in the Summary Report. Figures 2 through 16 are photographs of the obstructions starting with the one most downstream. Each photograph is identified to correspond with the data in Table 4.

Waters of the U. S.

"Waters of the U. S." are considered to be all streams beyond the recommended limits of "navigable waters of the U. S." "Waters of the U. S." with more than five cfs mean annual flow require a permit for discharge of dredged or fill material. "Waters of the U. S." with less than five cfs mean annual flow are nationally permitted by law and will not require an individual application for dredge or fill discharge permits provided the proposed work will meet certain conditions.

Appendix A lists all the five cfs flow points located within the Wateree River basin. Each point is located by stream code, stream name, latitude and longitude, and a mileage reference.

Appendix B lists the lakes located in the Wateree River basin which have surface areas between 10 and 1,000 acres. The lake summary identifies the stream basin code, lake name or owner, county location, and where data is available, the surface area and gross storage.

TABLE 4

OBSTRUCTION LISTING FROM MOUTH TO RECOMMENDED PRACTICAL
LIMIT OF NAVIGABLE WATERS OF THE U. S. (2)

<u>Wateree River Mile</u>	<u>Description</u>	<u>Mean Discharge (cfs)</u>	<u>Mean Water Slope (ft/mi)</u>	<u>Approximate Vertical Clearance To Obstruction (ft)</u>
9.6	Southern Railroad Bridge,	7,000	1.5	10.0
12.2	Utility Line (power)	--	1.5	65.0
13.2	Utility Line (power)	--	1.5	75.0
14.8	Seaboard Coast Line Rail- road Bridge	6,900	1.5	28.0
19.7	Utility Line (power)	--	1.5	43.0
25.5	Utility Line (power)	--	1.5	57.0
25.5	U. S. 378-76 (east)	6,900	1.1	27.0
25.5	U. S. 378-76 (west)	6,900	1.1	22.0
64.5	Utility Line (underground telephone)	--	1.1	On Stream Bed
65.9	I-20 Highway Bridges	6,400	0.9	33.0
66.6	Utility Line (power)	--	0.9	33.0
67.1	Utility (underground oil pipeline)	--	0.9	-3.0 ¹⁾
68.0	Seaboard Coast Line Rail- road Bridge	6,350	0.9	33.0
68.8	U. S. 601-1 Highway Bridges	6,325	0.9	36.0
68.9	Utility Line (power & telephone)	--	0.9	54.0
71.4	Utility Line (power)	--	0.9	36.0
71.4	Utility Line (power)	--	0.9	60.0

TABLE 4 (continued)

OBSTRUCTION LISTING FROM MOUTH TO RECOMMENDED PRACTICAL
LIMIT OF NAVIGABLE WATERS OF THE U. S. (2)

<u>Wateree River Mile</u>	<u>Description</u>	<u>Mean Discharge (cfs)</u>	<u>Mean Water Slope (ft/mi)</u>	<u>Approximate Vertical Clearance To Obstruction (ft)</u>
75.9	Utility Line (power)	--	0.9	62.0
76.1	Utility Line (power)	--	0.9	94.0
76.1	Utility Line (power)	--	0.9	97.3
76.1	Wateree Lake Dam	--	0.9	--

1) Estimated minimum depth below streambed at time of construction.



FIGURE 2 - SOUTHERN RAILROAD BRIDGE (R.M. 9.6)

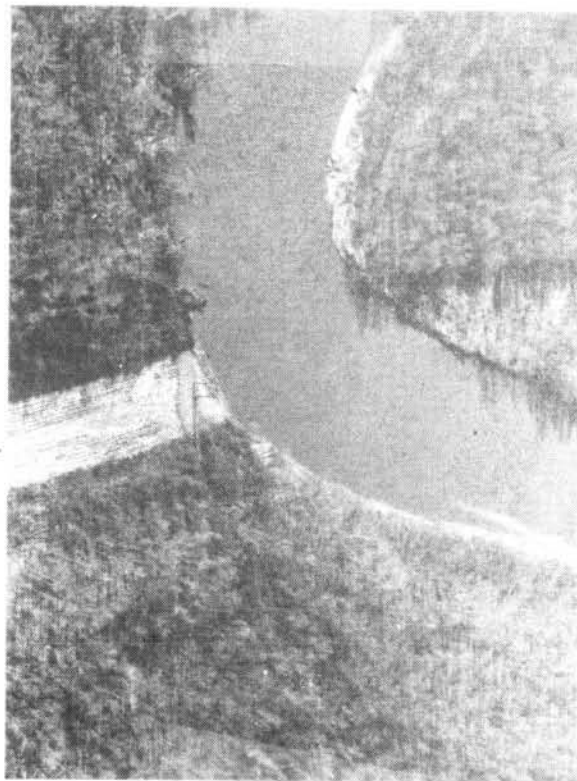


FIGURE 3 - UTILITY LINE (R.M. 12.2)

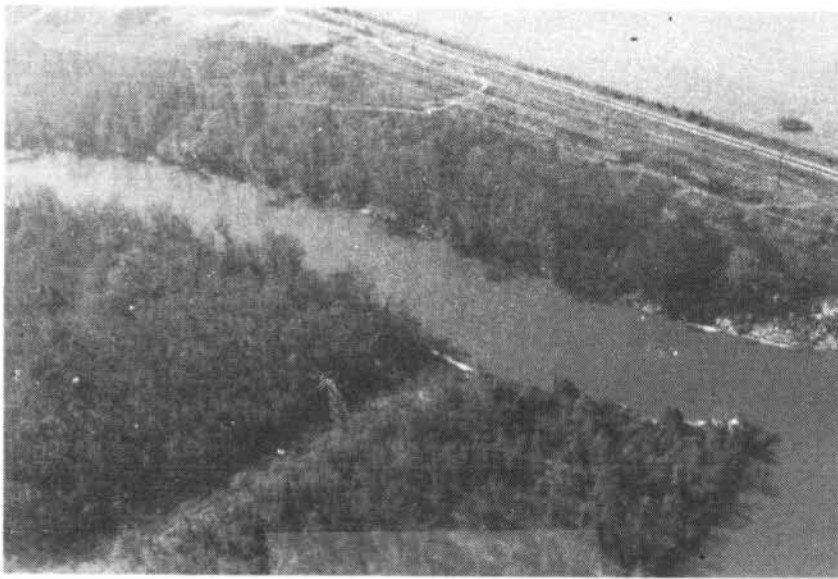


FIGURE 4 - UTILITY LINE (R.M. 13.2)

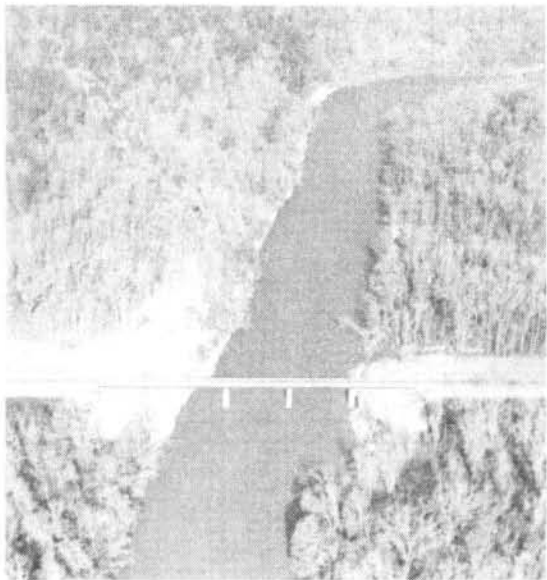


FIGURE 5 - SEABOARD COAST LINE RAILROAD BRIDGE (R.M. 14.8)



FIGURE 6 - UTILITY LINE (R.M. 19.7)



FIGURE 7 - UTILITY LINE (R.M. 25.5)
(AND U. S. 378-76 DIVIDED HIGHWAY)



FIGURE 8 - U. S. 378-76 HIGHWAY BRIDGE (WEST BOUND) (R.M. 25.5)

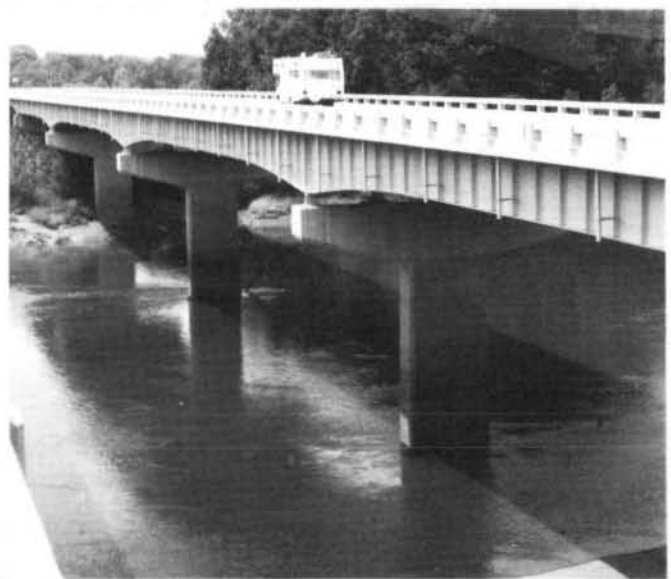


FIGURE 9 - I-20 HIGHWAY BRIDGES (R.M. 65.9)



FIGURE 10 - UTILITY LINE (R.M. 66.6)



FIGURE 11 - SEABOARD COAST LINE RAILROAD BRIDGE (R.M. 68.0)

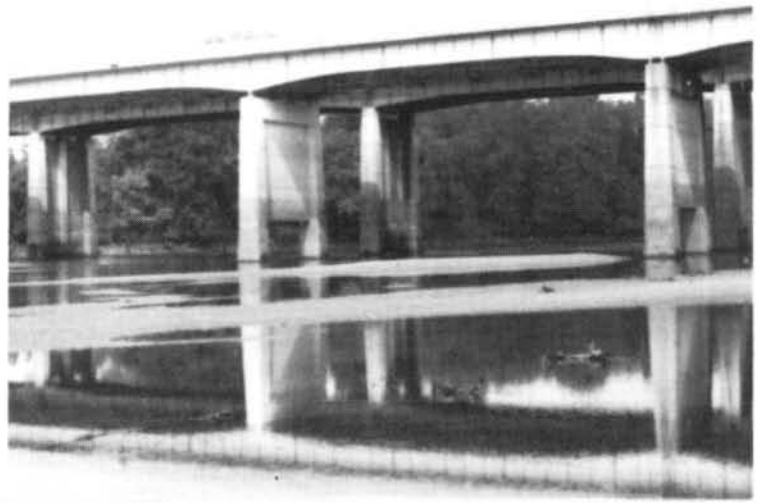


FIGURE 12 - U. S. 601-1 HIGHWAY BRIDGES (R.M. 68.8)



FIGURE 13 - UTILITY LINE (R.M. 68.9)



FIGURE 14 - TWO UTILITY LINES (R.M. 71.4)



FIGURE 15 - UTILITY LINE (R.M. 75.9)



FIGURE 16 - TWO UTILITY LINES AND DAM (R.M. 76.1)

SECTION 7 - CONCLUSIONS AND RECOMMENDATIONS

Five classifications of navigation on streams in the Wateree River basin have been determined and are presented below. The first two are classifications developed from historical evidence and current Federal stream classifications. Classification 3 is based on field measurements, observations, and data analysis for the river. Classification 4 is based on review of all previously determined limits with a recommendation of the most upstream locations with supporting evidence of navigability. The fifth classification accounts for all streams not otherwise classified and was determined based on the drainage area and hydrological aspects of the stream.

1. The Wateree River is presently classified "navigable waters of the U. S." between its mouth at the confluence with the Congaree River to its headwaters at Wateree Dam (R.M. 76.1). This classification extends beyond Wateree Dam and the basin boundary (see Reports 16 and 18).
2. Historically, navigation has extended over the entire length of the Wateree River and up the Catawba River. Further discussion, including map location of the historic limits, is presented in Report 16.
3. The recommended practical limit of navigation on the Wateree River is at Wateree Lake Dam (R.M. 76.1). Reasonable channel improvements will be necessary for commercial river traffic to actually use the river up to this point. Also, the recommended practical limit of navigation on Little River is at R.M. 0.3.
4. It is recommended that the Wateree River be classified "navigable waters of the U. S." over its entire length (R.M. 76.1). The classification of "navigable waters of the U. S." actually extends upstream of R.M. 76.1, however, this area is outside the Wateree basin boundary. Also, it is recommended that Little River be classified "navigable waters of the U. S." from its confluence with the Wateree River to R.M. 0.3.

5. All streams not recommended for classification as "navigable waters of the U. S." are recommended for classification as "waters of the U. S." throughout their entire length.

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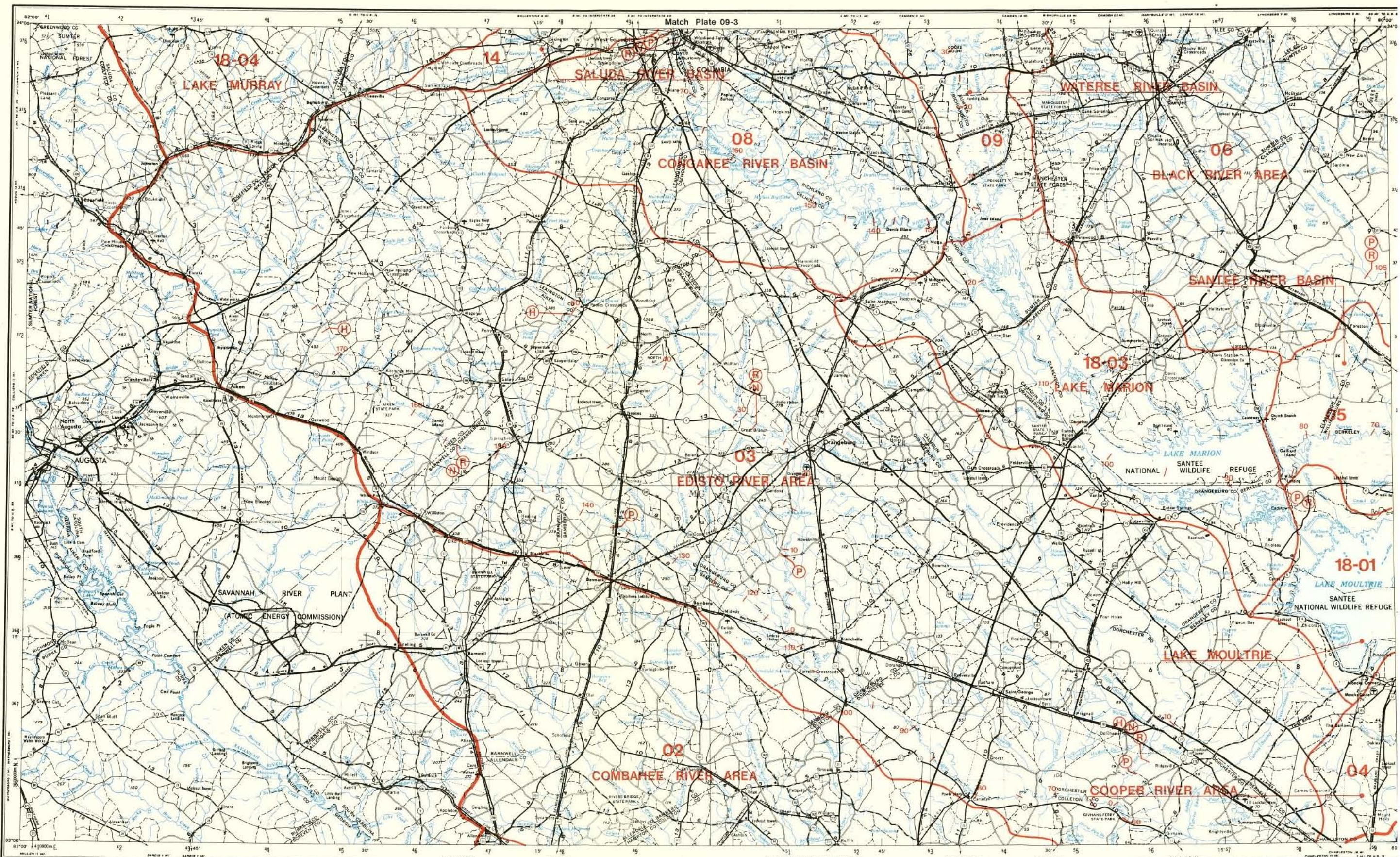
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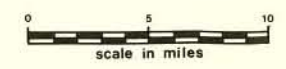
POPULATED PLACES

Greater than 100,000	Primary, all weather, hard surface
25,000 to 100,000	Secondary, all weather, hard surface
5,000 to 25,000	Tertiary, all weather, improved surface
Less than 5,000	Fair or dry weather, unimproved surface
	Interchange

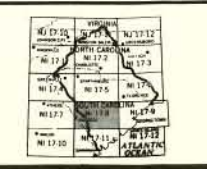
ROADS

Standard Road	State Route	Route marked Interstate, U.S. State
Express Road	Post Office	
Highway	Landmark School, Church, Other, 2 1/2	
Park or Recreation	Soil Station in field	
Canal	Soil Station in stream	
Canal	Interchange on dike stream	

USGS BASE MAP
 AUGUSTA, GA., S.C.
 1957, Revised 1969
 NI 17-8



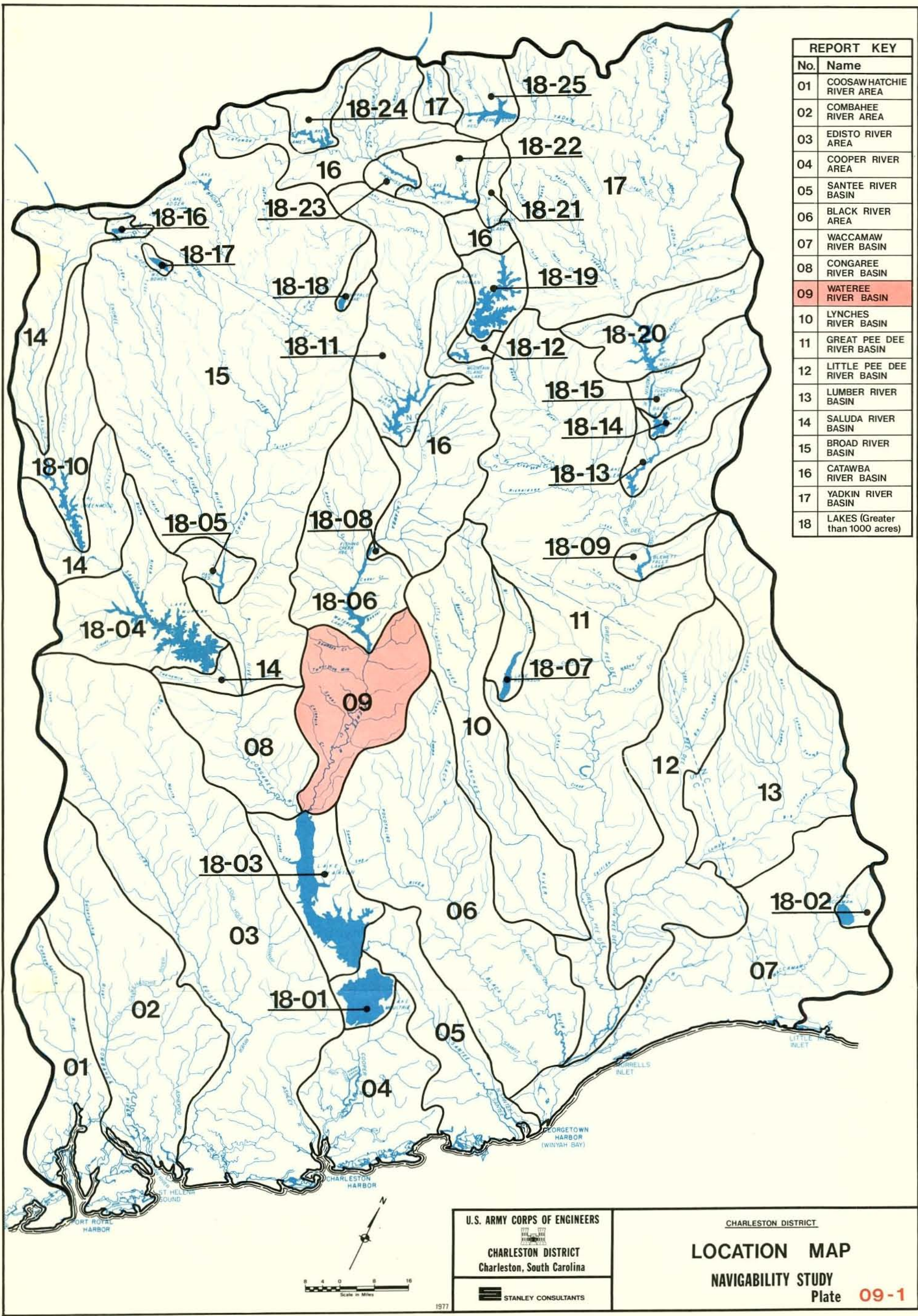
- LEGEND:**
- (N) PRESENT LIMIT OF NAVIGABLE WATERS OF THE U.S.
 - (H) HISTORIC LIMIT OF NAVIGATION
 - (P) PRACTICAL LIMIT OF NAVIGATION (RECOMMENDED)
 - (R) LIMIT OF NAVIGABLE WATERS OF THE U.S. (RECOMMENDED)
 - RIVER MILE



U.S. ARMY CORPS OF ENGINEERS
 CHARLESTON DISTRICT
 Charleston, South Carolina
 STANLEY CONSULTANTS

SIGNIFICANT FEATURES
WATEREE RIVER BASIN
 Report No. 01, 02, 03, 04, 05, 06, 08, 09, 14, 18
NAVIGABILITY STUDY
 Plate 09-2

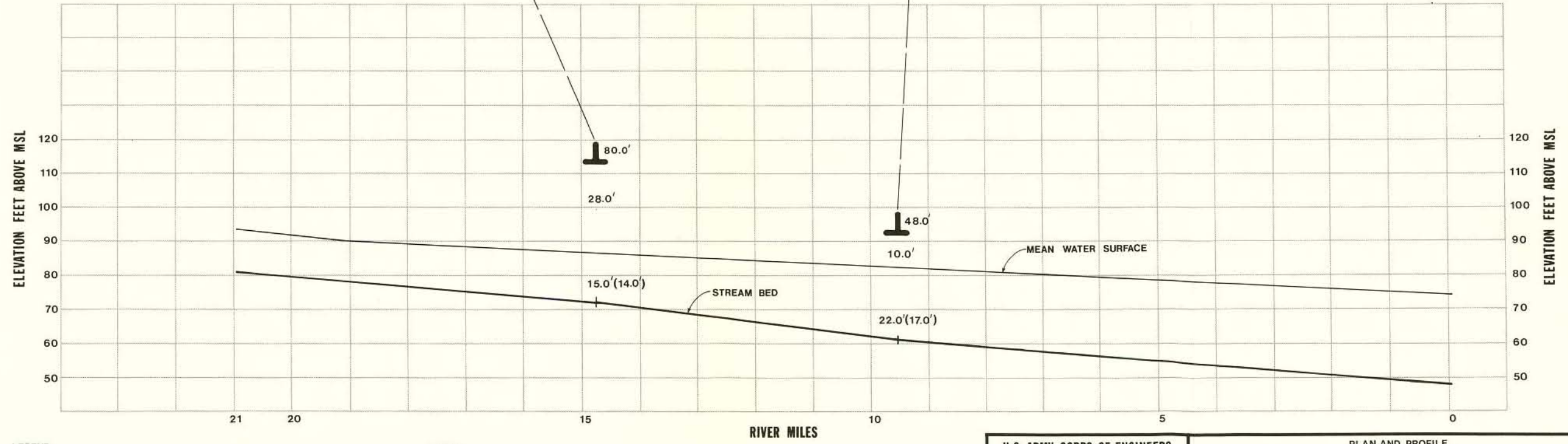
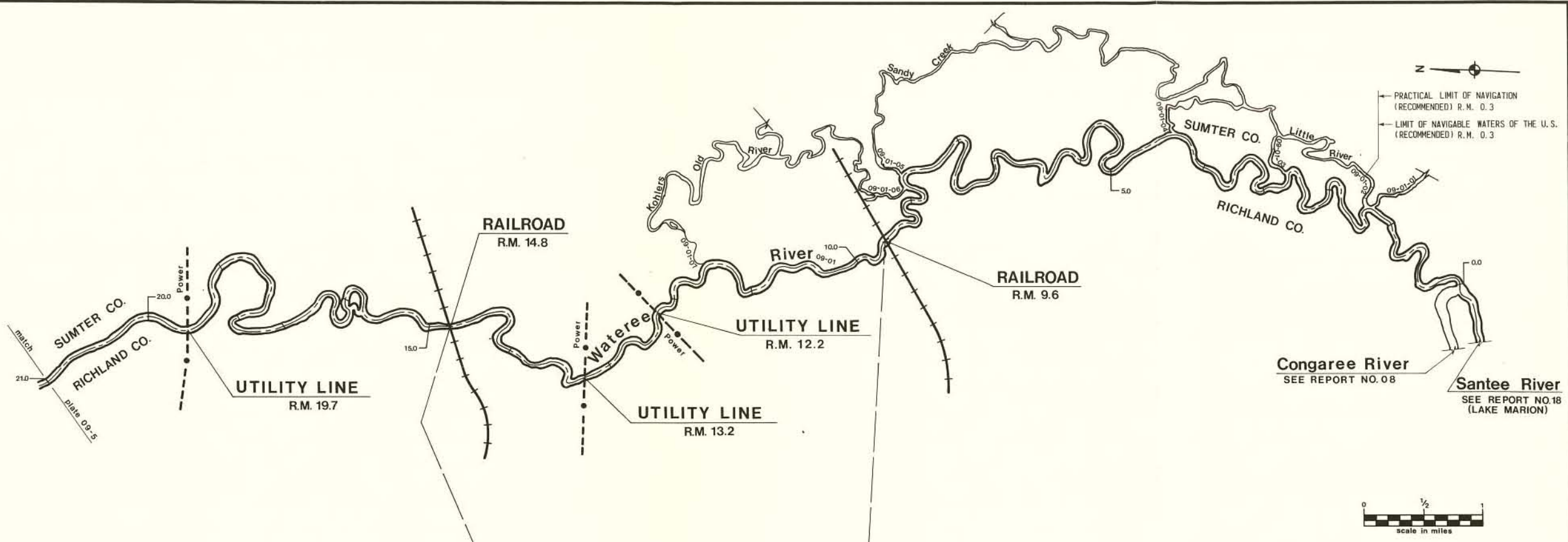
1977



REPORT KEY	
No.	Name
01	COOSAWHATCHIE RIVER AREA
02	COMBAHEE RIVER AREA
03	EDISTO RIVER AREA
04	COOPER RIVER AREA
05	SANTEE RIVER BASIN
06	BLACK RIVER AREA
07	WACCAMAW RIVER BASIN
08	CONGAREE RIVER BASIN
09	WATEREE RIVER BASIN
10	LYNCHEs RIVER BASIN
11	GREAT PEE DEE RIVER BASIN
12	LITTLE PEE DEE RIVER BASIN
13	LUMBER RIVER BASIN
14	SALUDA RIVER BASIN
15	BROAD RIVER BASIN
16	CATAWBA RIVER BASIN
17	YADKIN RIVER BASIN
18	LAKES (Greater than 1000 acres)

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 CHARLESTON DISTRICT
 Charleston, South Carolina
 STANLEY CONSULTANTS

CHARLESTON DISTRICT
LOCATION MAP
 NAVIGABILITY STUDY
 Plate 09-1



LEGEND:

OVERHEAD STRUCTURE — 75' — HORIZONTAL CLEARANCE IN MAIN CHANNEL

MEAN WATER SURFACE — 12' — VERTICAL CLEARANCE TO STRUCTURE

STREAM BED — 8' (6') — MAXIMUM DEPTH AT MEAN FLOW

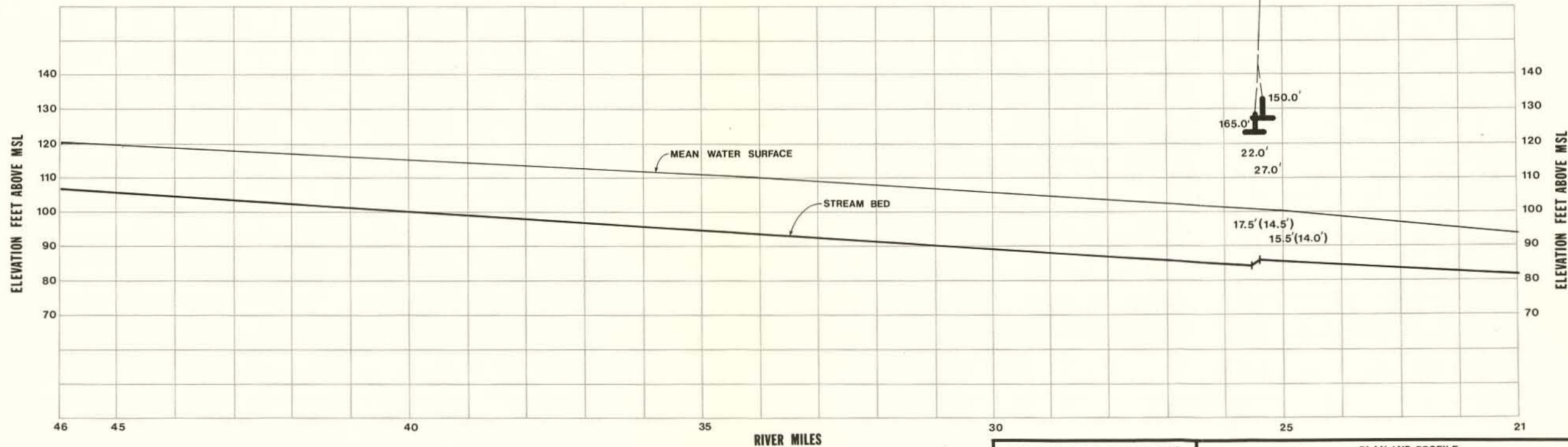
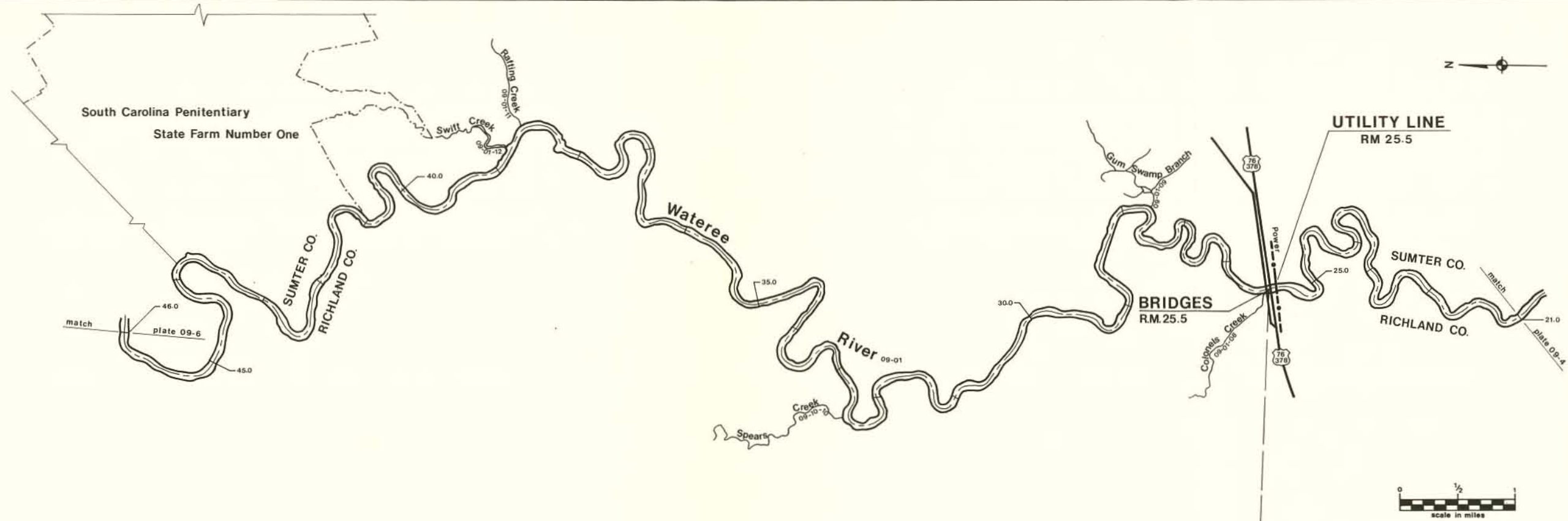
STRUCTURE RIVER MILE LOCATION — 8' (6') — MAXIMUM DEPTH OF 50 FOOT WIDE CHANNEL AT MEAN FLOW

NOTES:

1. ELEVATION AND SLOPE OF MEAN WATER SURFACE ARE BASED ON USGS TOPOGRAPHIC MAPS AND ARE THEREFORE ONLY APPROXIMATIONS. VERTICAL DIMENSIONS FROM STREAM BED TO OVERHEAD STRUCTURES ARE FIELD MEASUREMENTS. RELATIVE LOCATION OF MEAN WATER SURFACE IS APPROXIMATED FROM CONTOUR MAPS, MEASURED CROSS SECTIONS AND VELOCITIES. STREAM FLOW RECORDS, THE MANNING EQUATION, AND FIELD OBSERVATIONS. SEE SUMMARY REPORT FOR COMPLETE EXPLANATION.

U.S. ARMY CORPS OF ENGINEERS
 CHARLESTON DISTRICT
 Charleston, South Carolina
 STANLEY CONSULTANTS

PLAN AND PROFILE
WATEREE RIVER
 Wateree River Basin
 RICHLAND-SUMTER CO., S.C.
NAVIGABILITY STUDY
 Miles 0.0-21.0 Plate 09-4



LEGEND:

OVERHEAD STRUCTURE — 75' — HORIZONTAL CLEARANCE IN MAIN CHANNEL

MEAN WATER SURFACE — 12' — VERTICAL CLEARANCE TO STRUCTURE

STREAM BED — 8' (6') — MAXIMUM DEPTH AT MEAN FLOW

STRUCTURE RIVER MILE LOCATION

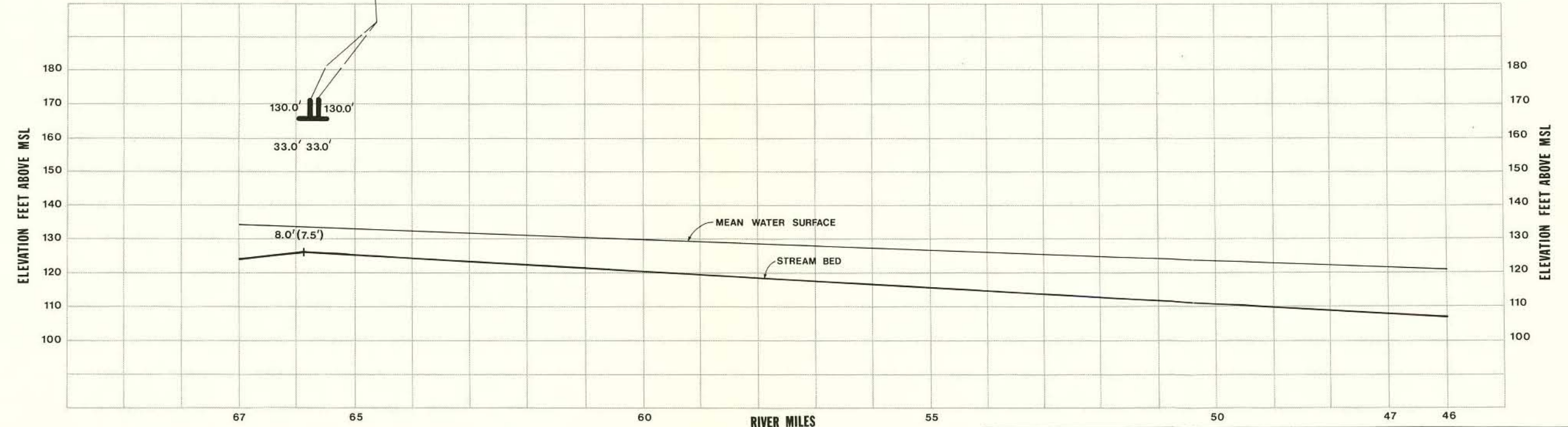
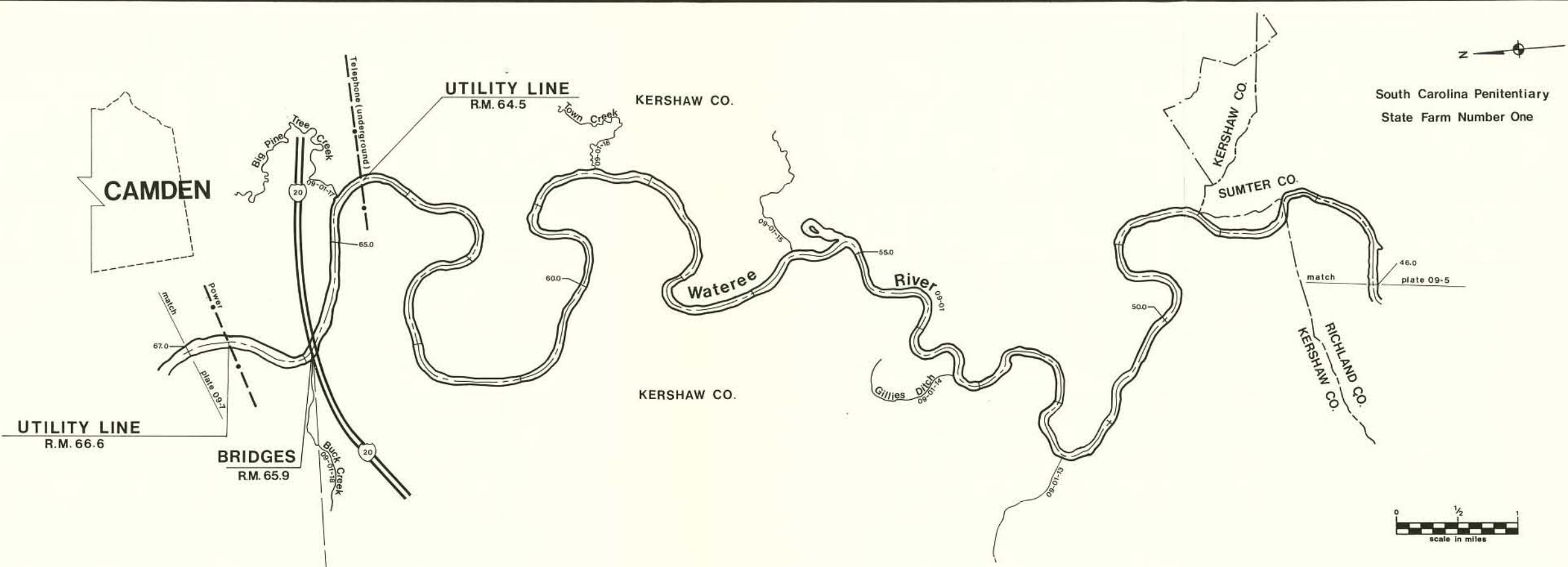
NOTES:

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U.S. ARMY CORPS OF ENGINEERS
 CHARLESTON DISTRICT
 Charleston, South Carolina

STANLEY CONSULTANTS

PLAN AND PROFILE
WATEREE RIVER
 Wateree River Basin
 RICHLAND-SUMTER CO., S.C.
NAVIGABILITY STUDY
 Miles 21.0-46.0 Plate 09-5



LEGEND:

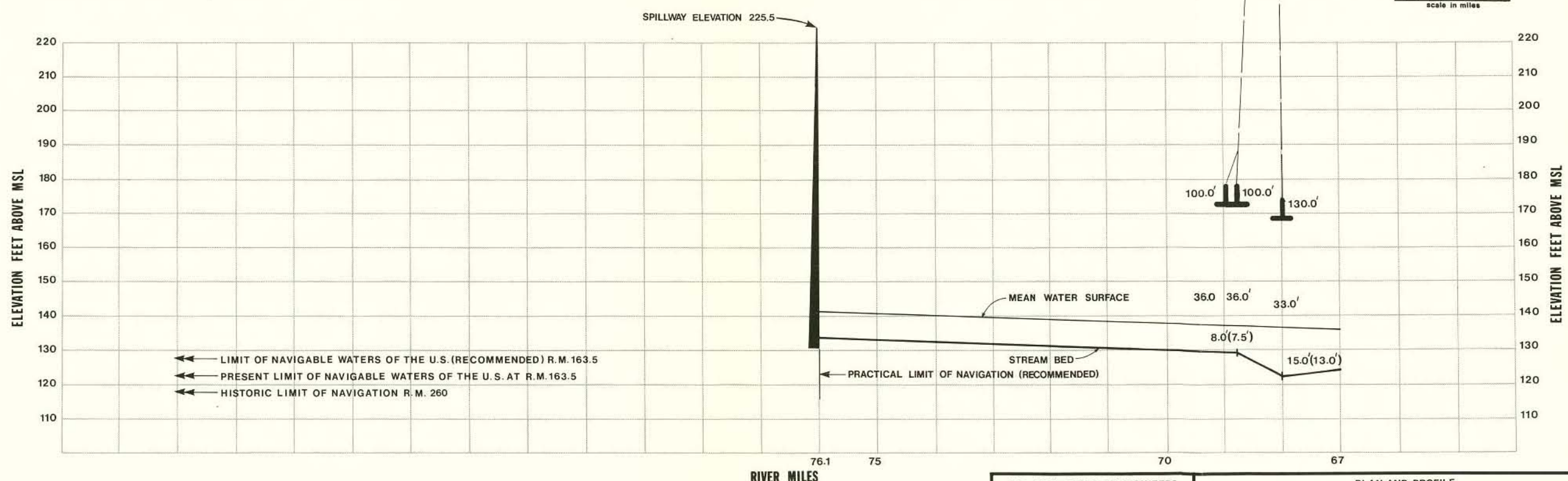
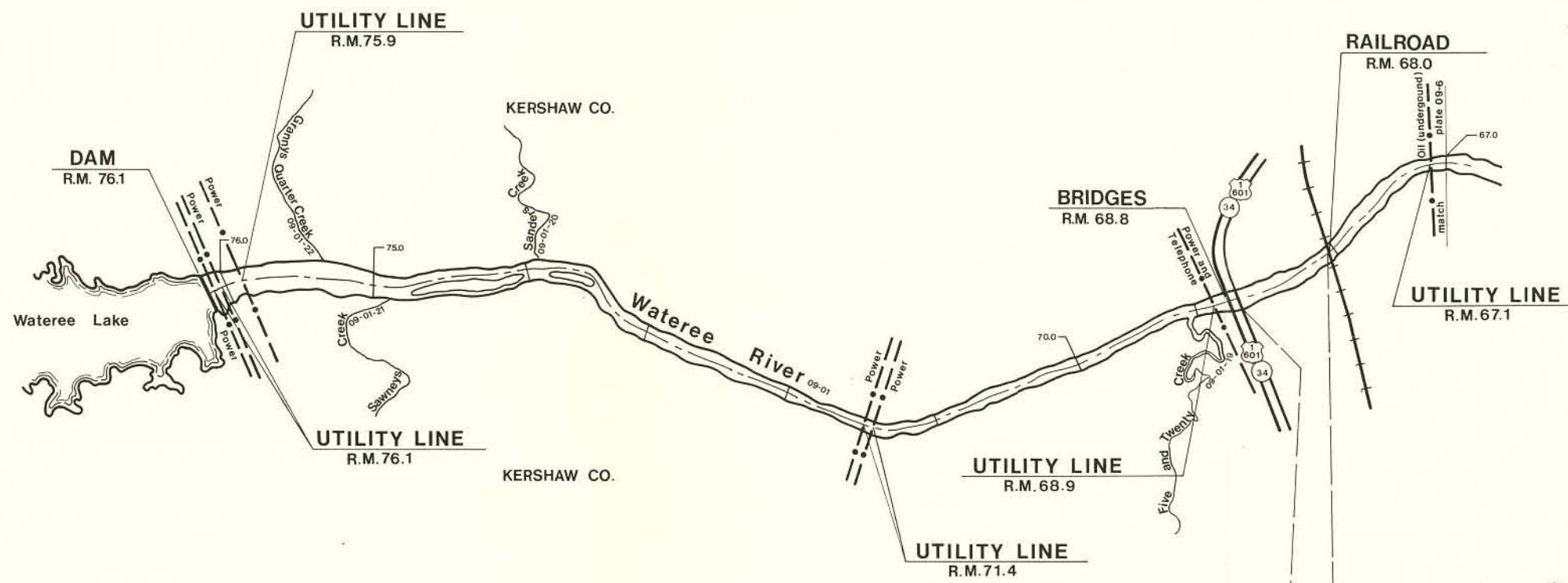
OVERHEAD STRUCTURE	75'	HORIZONTAL CLEARANCE IN MAIN CHANNEL
MEAN WATER SURFACE	12'	VERTICAL CLEARANCE TO STRUCTURE
STREAM BED	8' (6')	MAXIMUM DEPTH AT MEAN FLOW
		MAXIMUM DEPTH OF 50 FOOT WIDE CHANNEL AT MEAN FLOW
STRUCTURE RIVER MILE LOCATION		

NOTES:

1. ELEVATION AND SLOPE OF MEAN WATER SURFACE ARE BASED ON USGS TOPOGRAPHIC MAPS AND ARE THEREFORE ONLY APPROXIMATIONS. VERTICAL DIMENSIONS FROM STREAM BED TO OVERHEAD STRUCTURES ARE FIELD MEASUREMENTS. RELATIVE LOCATION OF MEAN WATER SURFACE IS APPROXIMATED FROM CONTOUR MAPS, MEASURED CROSS SECTIONS AND VELOCITIES, STREAM FLOW RECORDS, THE MANNING EQUATION, AND FIELD OBSERVATIONS. SEE SUMMARY REPORT FOR COMPLETE EXPLANATION.

U.S. ARMY CORPS OF ENGINEERS
 CHARLESTON DISTRICT
 Charleston, South Carolina
 STANLEY CONSULTANTS

PLAN AND PROFILE
WATEREE RIVER
 Wateree River Basin
 KERSHAW - RICHLAND - SUMTER CO., S.C.
NAVIGABILITY STUDY
 Miles 46.0-67.0 Plate 09-6



LEGEND:

OVERHEAD STRUCTURE	75'	HORIZONTAL CLEARANCE IN MAIN CHANNEL
MEAN WATER SURFACE	12'	VERTICAL CLEARANCE TO STRUCTURE
STREAM BED	8' (6')	MAXIMUM DEPTH AT MEAN FLOW
STRUCTURE RIVER MILE LOCATION		MAXIMUM DEPTH OF 50 FOOT WIDE CHANNEL AT MEAN FLOW

NOTES:

1. ELEVATION AND SLOPE OF MEAN WATER SURFACE ARE BASED ON USGS TOPOGRAPHIC MAPS AND ARE THEREFORE ONLY APPROXIMATIONS. VERTICAL DIMENSIONS FROM STREAM BED TO OVERHEAD STRUCTURES ARE FIELD MEASUREMENTS. RELATIVE LOCATION OF MEAN WATER SURFACE IS APPROXIMATED FROM CONTOUR MAPS, MEASURED CROSS SECTIONS AND VELOCITIES, STREAM FLOW RECORDS, THE MANNING EQUATION, AND FIELD OBSERVATIONS. SEE SUMMARY REPORT FOR COMPLETE EXPLANATION.

U.S. ARMY CORPS OF ENGINEERS
 CHARLESTON DISTRICT
 Charleston, South Carolina
 STANLEY CONSULTANTS

PLAN AND PROFILE
WATEREE RIVER
 Wateree River Basin
 KERSHAW CO., S.C.
NAVIGABILITY STUDY
 Miles 67.0 - 76.1 Plate 09-7

APPENDIX A
STREAM CATALOG

This appendix presents a coded listing of all streams located in the Wateree River basin having a mean annual flow greater than or equal to five cfs. In order to provide a sequential stream catalog along the Wateree-Catawba River network, cataloging on the Wateree River has been carried to the confluence of Big Wateree Creek and the Catawba River (R.M. 92.0). The summary does not include secondary streams in the drainage area for Wateree Lake (18-06); these stream codes are presented in Report 18.

The points where flow is approximately equal to five cfs (headwaters) are defined by approximate longitude and latitude, and river miles from the nearest named tributary, major highway, railroad, or other similar reference point. Some streams listed in the tabulation may not have headwater locations identified. This occurs when the name of a stream changes at a confluence where the flow immediately downstream is greater than five cfs. Thus, the headwater locations for streams with more than one name are associated with the appropriate upstream name found on USGS quadrangle maps. Some streams in this appendix listing are also coded in other reports for this study. Cross-references to specific reports are noted.

The coding system shown in the tabulation uses a procedure developed by the Charleston District, Corps of Engineers. Streams are summarized from the mouth of the major river upstream to the report boundary.

USGS data was used to identify the location where the mean annual stream flow is five cfs. Flow records from gaging stations throughout the Charleston District were evaluated and an isoflow map developed to indicate variations in runoff (cfs per square mile). These runoff values were then applied to the appropriate stream drainage areas (as determined from USGS quadrangle maps) so that a flow of five cfs was approximated.

APPENDIX A
STREAM CATALOG

09-A2

REPORT NUMBER	STREAM CODE						STREAM NAME	HEADWATER LOCATION (Mean Flow = 5 cfs)				
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER	FIFTH ORDER		LATITUDE (° ' '')	LONGITUDE (° ' '')	STREAM MILES		FROM
										UP	DOWN	
09	01											
		01										
		02										
			01									
			02									
			03				33 58 05	80 31 30	2.2			Southern RR Bridge
				01								
				02								
				03			33 59 25	80 32 45	1.4			Southern RR Bridge
					01		34 00 45	80 35 20	1.1			Southern RR Bridge
				04								
		03										
		04										
		05										
		06										
			01									

Dual code in Report 05.

Dual code in Report 09.

APPENDIX A
STREAM CATALOG

REPORT NUMBER	STREAM CODE					STREAM NAME	HEADWATER LOCATION (Mean Flow = 5 cfs)					
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER		FIFTH ORDER	LATITUDE (° ' '')	LONGITUDE (° ' '')	STREAM MILES		FROM
										UP	DOWN	
09	01	07										
		08				Kohlers Old River ##						
						Colonels Creek	34 05 20	80 48 25	3.5			Buffalo Creek
			01			Jumping Run Creek	34 00 10	80 45 40	2.0			Colonels Creek
		09				Gum Swamp Branch ##						
		10				Spears Creek	34 06 50	80 48 40	3.5			Kelly Creek
			01			Raglins Creek	34 05 05	80 40 35	1.1			Spears Creek
			02			McCaskill Creek	34 06 50	80 42 20				Confluence- Otterslide Branch
			03			Haig Creek	34 08 45	80 44 15	1.9			Spears Creek
			04			Kelly Creek	34 08 35	80 46 15	1.0			Spears Creek
		11				Rafting Creek						
			01			Little Rafting Creek	34 04 15	80 27 30	2.5			U. S. 521 Highway Bridge
			02			Bracey Mill Creek	34 08 15	80 27 45	4.7			Rafting Creek
				01		Unnamed Tributary	34 06 45	80 27 30	1.1			Bracey Mill Creek
		12				Swift Creek	34 11 55	80 28 35	3.0			Little Swift Creek
			01			Unnamed Tributary	34 05 25	80 34 15	1.9			Swift Creek

Dual code In Report 09.

APPENDIX A
STREAM CATALOG

09-A4

REPORT NUMBER	MAJOR RIVER	STREAM CODE					STREAM NAME	HEADWATER LOCATION (Mean Flow = 5 cfs)				
		PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER	FIFTH ORDER		LATITUDE (° ' '')	LONGITUDE (° ' '')	STREAM MILES		FROM
										UP	DOWN	
09	01	12	02				Little Swift Creek	34 10 25	80 28 20	2.4		Swift Creek
		13					Unnamed Tributary (Gum Swamp)	34 08 35	80 40 20	1.8		Wateree River
		14					Gillies Ditch					
			01				Gillies Creek ##	34 11 25 <i>-190278</i>	80 42 55 <i>80.715278</i>	1.7		U. S. 601 Highway Bridge
		15					Unnamed Tributary	34 10 00	80 35 35	1.9		Wateree River
		16					Town Creek	34 12 00	80 33 35	1.6		U. S. 521 Highway Bridge
		17					Big Pine Tree Creek	34 21 20	80 28 55	3.5		Thoroughfare Branch
			01				Little Pine Tree Creek	34 15 45	80 35 30	2.1		Big Pine Tree Creek
			02				Thoroughfare Branch	34 19 35	80 28 45	1.9		Big Pine Tree Creek
		18					Buck Creek	34 12 52	80 38 15	1.1		Wateree River
			01				Gillies Creek ##	34 11 25	80 42 55	1.7		U. S. 601 Highway Bridge
		19					Five and Twenty Creek (Twentyfive Mile Creek)	34 14 10 <i>34.23611</i>	80 55 15 <i>80.9208</i>	1.4		Simmons Creek
			01				Horsehead Branch	34 15 15	80 43 00	1.0		Five and Twenty Cr (Twentyfive Mile Cr)

Dual code in Report 09.

APPENDIX A
STREAM CATALOG

REPORT NUMBER	MAJOR RIVER	STREAM CODE					STREAM NAME	HEADWATER LOCATION (Mean Flow = 5 cfs)				
		PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER	FIFTH ORDER		LATITUDE (° ' ")	LONGITUDE (° ' ")	STREAM MILES		FROM
										UP	DOWN	
09	01		19	02			Beaverdam Creek	34 15 45	80 45 12			Confluence-Suttons Branch
							Horsepen Branch	34 12 25	80 45 35		0.1	Wolfpit Branch
							Bell Branch	34 14 45	80 47 45	1.6		Rock Branch
							Bear Creek	34 14 55	80 51 50	2.1		Donnington Branch
							Flat Branch	34 12 45	80 50 40	1.2		Five and Twenty Cr (Twentyfive Mile Cr)
							Sandy Branch	34 09 52	80 50 00	0.3		Bridge Creek
							Rice Creek	34 10 35	80 56 15	5.2		Five and Twenty Cr (Twentyfive Mile Cr)
							Simmons Creek	34 13 10	80 55 25			Confluence-Ben Hood Branch
							Sanders Creek	34 21 15	80 31 15	7.6		Gum Creek
							Gum Creek	34 21 30	80 34 30	4.0		Sanders Creek
							Sawneys Creek	34 17 25	80 54 30	6.8		Thorntree Creek
							Thorntree Creek	34 19 20	80 51 30	3.7		Sawneys Creek
							Grannys Quarter Creek	34 26 20	80 34 40	3.7		Dry Branch
							Flat Rock Creek	34 28 10	80 39 15	4.2		Little Flat Rock Cr

09-A5

APPENDIX A
STREAM CATALOG

STREAM CODE							STREAM NAME	HEADWATER LOCATION (Mean Flow = 5 cfs)				
REPORT NUMBER	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER	FIFTH ORDER		LATITUDE (° ' ")	LONGITUDE (° ' ")	STREAM MILES		FROM
										UP	DOWN	
09	01	22	01	01			Little Flat Rock Creek	34 27 35	80 37 15	4.5		Flat Rock Creek
		23					Rochell Creek #	34 23 35	80 52 05	2.3		Wateree Lake
		24					Dutchmans Creek #	34 20 05	80 59 30	0.9		Lots Fork
		25					Taylor Creek #	34 26 15	80 53 50	0.5		Wateree Lake
		26					Big Wateree Creek #	34 30 10	81 06 35	2.8		Wall Creek
		27					Singleton Creek #	34 29 25	80 49 05			Confluence-McDow Cr
		28					Beaver Creek #	34 31 25	80 42 25	1.0		Tranham Creek
		29					White Oak Creek #	34 25 45	80 43 05	3.3		Wateree Lake
		30					Catawba River ##	35 36 25	82 14 45			Confluence-Chestnut Branch

09-A6

Dual code in Report 18.

Dual code in Report 16.

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

This appendix is a compilation of lakes from 10 to 1,000 acres which are contained in the Wateree River basin.

This inventory was compiled from the following sources:

1. Inventory of Lakes in South Carolina Ten Acres or More in Surface Area.
2. USGS Quadrangle Maps.

The USGS quadrangle maps were used to locate and to detect lakes that were not listed in the other sources. Actual surface area and gross storage information is supplied where available. The lakes were coded by major stream basin in accordance with other procedures developed for identifying streams. The map data from Source 1 above generally does not permit detailed location of the small lakes. Thus, lakes are coded by basin only as far as the secondary order.

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FIFTH ORDER				
09	01					S. C. Electric & Gas Co.	80	880	Richland
09	01					S. C. Electric & Gas Co.	75	825	Richland
09	01					Thomas B. Whaley	10	72	Richland
09	01	08				Goodwill Lake	120	360	Richland
09	01	08				Murray Lake	200	600	Richland
09	01	08	01			C. W. McCants, Jr. (Caughmans Pond)	10	48	Richland
09	01	08	01			Wilson Millpond	28	71	Richland
09	01	08				Messers Pond	47	144	Richland
09	01	08				Cobbs Pond	19	93	Richland
09	01	08				DuPre Pond	35	141	Richland
09	01					Mickle Lake	--	--	Kershaw
09	01	10	02			Sadie Lee	13	60	Kershaw
09	01	10	04			Wootens Pond	10	40	Kershaw
09	01	10				Whites Pond	50	76	Kershaw
09	01	10				Tucker Lake	75	300	Richland
09	01	10				Edwin Cooper	10	45	Richland

09-B2

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FOURTH ORDER				
09	01	10				Edwin Cooper	38	184	Richland
09	01	10				F. Cooper	85	544	Richland
09	01	10				Rotoreau Lake	20	80	Richland
09	01	13				Alvo Stokes	22	40	Kershaw
09	01	18	01			Whitehead Bros. Sand Co.	20	100	Kershaw
09	01	18				Lugoff Farms	25	66	Kershaw
09	01	18				Lugoff Farms	12	50	Kershaw
09	01	18				Lugoff Farms	10	40	Kershaw
09	01	19	02			Pete Watson	20	80	Kershaw
09	01	19	02			Susie B. Barfield	12	50	Kershaw
09	01	19				E. T. Bowen	10	40	Kershaw
09	01	19				Hood Pond	12	60	Kershaw
09	01	19	08			Lotts Millpond	18	72	Richland
09	01	19	08			Columbia Country Club	75	480	Richland
09	01	19	08			Sanders L. Swygert	10	48	Richland

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FIFTH ORDER				
09	01	19	08			V. E. Barrett (Rymers Pond)	11	80	Richland
09	01	19				Edwin Cooper	13	45	Richland
09	01	02	03			State of S.C. Poinsett Park	10	40	Sumter
09	01	02	03			State of S.C. Campbells Lake	14	49	Sumter
09	01	02	03			John Mikell	52	250	Sumter
09	01	02	03			Big Lake	--	--	Sumter
09	01	11	01			Dinkins Mill	53	175	Sumter
09	01	11				Ellerbes Mill	45	135	Sumter
09	01	12				J. W. Harvin (White Oak Slash Lk)	75	450	Sumter
09	01	12				Wateree Correctional Institute	10	40	Kershaw
09	01	12				S.C. Penal Farm Wateree Inst.	120	480	Kershaw
09	01	12				Boykin Millpond	200	640	Kershaw
09	01	12	02			Segars Millpond	10	40	Kershaw
09	01	12				David Stokes	10	40	Kershaw
09	01	16				Mulberry Pond	12	48	Kershaw
09	01	16				Mulberry Plantation House Pond	10	40	Kershaw

09-B4

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FIFTH ORDER				
09	01	17				Hermitage Millpond	600	1,800	Kershaw
09	01	17				Adams Millpond	--	--	Kershaw
09	01					Camden Sewer System	30	150	Kershaw
09	01	17	01			Kendall Lake-City of Camden	50	220	Kershaw
09	01	17	01			City of Camden	16	80	Kershaw
09	01	17	01			Cool Springs-J. B. McGuirt	16	100	Kershaw
09	01	17	01			J. B. McGuirt	10	40	Kershaw
09	01	17				Kershaw Co. Rec. Park	160	512	Kershaw
09	01	17				Heyward Outlaw	10	50	Kershaw
09	01	17				Llewellyn Millpond	20	60	Kershaw
09	01	17				Lake Elliott	13	62	Kershaw
09	01					Jacklyn Hoisery	28	100	Kershaw
09	01					Jacklyn Hoisery	10	60	Kershaw
09	01	20				Vaughn Millpond	20	60	Kershaw
09	01	20				Colonial Lake	120	500	Kershaw
09	01	20	01			Shamokin Lake	18	48	Kershaw
09	01	08				Davis Pond #1	22	86	Richland
09	01	02	03			E. T. Gulledge	12	50	Sumter

09-85

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FIFTH ORDER				
09	01	21				Unnamed Lake	--	--	Fairfield
09	01	21	01			Camp Longridge	--	--	Fairfield
09	01	10	03			Kirkland Pond	--	--	Kershaw
09	01	19	07			Clemson University	--	--	Richland
09	01	19				Unnamed Lake	--	--	Kershaw
09	01	16				Unnamed Lake	--	--	Kershaw
09	01	16				Unnamed Lake	--	--	Kershaw
09	01	12				Buckingham Landing Pond	--	--	Sumter
09	01	01	01			Christmas Mill Lake	--	--	Sumter
09	01	28	02			William H. Bridges #	11	50	Kershaw
09	01	28				Unnamed Lake	--	--	Kershaw
09	01	26	06			Wateree Creek Watershed # Structure No. 1	22	90	Fairfield
09	01	26				Wateree Creek Watershed # Structure No. 2	21	68	Fairfield
09	01	26	05			Wateree Creek Watershed # Structure No. 3	17	70	Fairfield
09	01	26	04			Wateree Creek Watershed # Structure No. 4	13	71	Fairfield

9B-60

Dual code in Report 18.

APPENDIX B
SUMMARY OF 10 TO 1,000 ACRE LAKES

REPORT NUMBER	STREAM CODE					LAKE NAME OR OWNER	SURFACE AREA (acres)	GROSS STORAGE (acre-ft)	LOCATION BY COUNTY (SOUTH CAROLINA)
	MAJOR RIVER	PRIMARY	SECONDARY	TERTIARY	FIFTH ORDER				
09	01	12	04			Shiver Millpond	--	--	Lee

09-B7