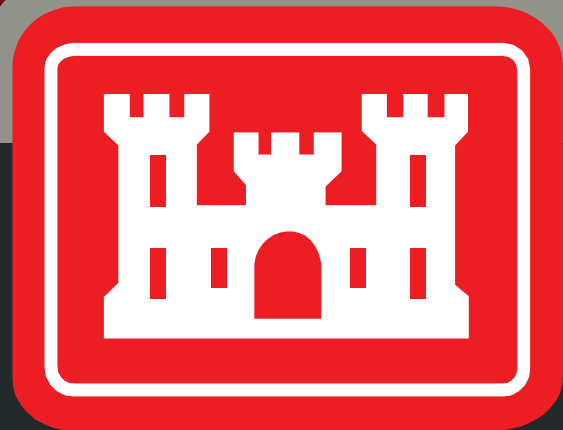


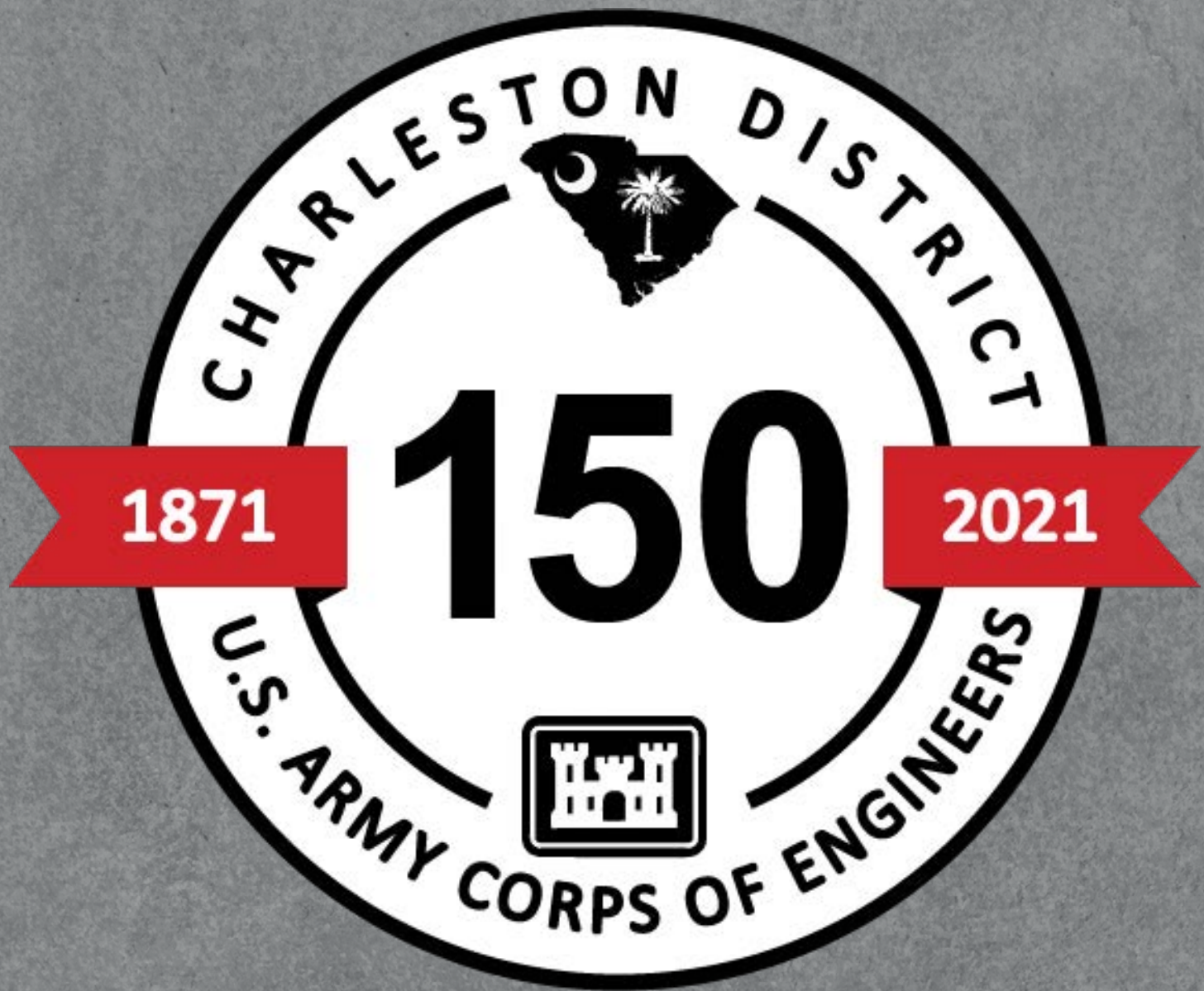
US Army Corps
of Engineers
Charleston District

The _____ Lowcountry Engineers



**Years of Challenge
Years of Change**

1978-2012



The publication of this book coincides with the Charleston District's 150th anniversary. The book is dedicated to the thousands of district employees who served from 1871 to today. Their work made the accomplishments highlighted in this book possible. We look forward to the future.

The Lowcountry Engineers

**Years of Challenge
Years of Change**

1978-2012

US Army Corps
of Engineers
Charleston District

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Foreword

A Proud Past and a Bright Future—

It is my pleasure to lead off this first update to *The Lowcountry Engineers*. The initial study traced the history of the U.S. Army Corps of Engineers' Charleston District from the Corps' inception through the modern era, ending in 1978.

This new study picks up where the initial study left off, tracing the district's development during the period 1978–2012.

Since the founding of Charleston in 1670, South Carolinians inherently knew that commerce was vital to their very existence and their future. As the deepest natural harbor along the South Atlantic Coast, the Port of Charleston facilitated that commerce.

The Charleston District dates back 150 years to 1871, when the Corps of Engineers first established a permanent office within the City of Charleston. Not surprisingly, the District's early years were dedicated to building and maintaining fortifications to protect the strategically located harbor from attacks by foreign governments, as well as improving the depth of water over the bars of sand offshore that kept larger vessels from entering the port. In the 20th and 21st centuries, the Charleston District's mission and workload grew to include hydropower generation, Clean Water Act permitting, a robust civil works portfolio, military construction, coastal and flood risk management, and emergency response to natural disasters. Despite this expansion in other mission areas, the District's commitment to its elemental mission of maintaining the federal shipping channels never wavered, and has included the Atlantic Intracoastal Waterway and the Ports of Georgetown, Port Royal, and Charleston.

The past 30-plus years have seen a continuation of the Charleston District's growth in mission scope and workload. I cordially invite you to learn about the Charleston District's missions and some of the background behind the work we have accomplished despite many challenges in the past 30 years that have paved the way for our present-day efforts.

I am proud to serve with arguably the finest team in the entire Corps. The following pages will teach readers that while the Charleston District is one of the smallest districts in the Corps of Engineers by number of employees, we hold our work to the highest of standards and our total program value currently ranks 24th amongst the 47 districts. We are honored to serve the citizens of South Carolina and the Nation.

This volume of *The Lowcountry Engineers* is dedicated to the past and current employees of the Charleston District.



ANDREW C. JOHANNES, PhD PE PMP
Lieutenant Colonel, U.S. Army
Commander and District Engineer

Acknowledgments

Jamie W. Moore authored the Charleston District's first history, titled "The Lowcountry Engineers," published in 1981. When the district needed to chronicle developments into the 21st century, they contracted with him to provide an update covering the years 1978 to 2012. Jamie W. Moore, Ph.D., is Emeritus Professor of History at The Citadel. He was joined in this work by Dorothy Perrin Moore, Ph.D., Emeritus Professor of Business Administration at The Citadel. Together, they conducted the research and created a document draft. They interviewed key district employees including Tina Hadden, Bill Stein, Braxton Kyzer, David Hubbard, Francis Limbaker, Charlie Harbin, Jimmy Hadden, Joe Moran, and Elmer Schwingen. Their draft was subsequently taken up by district chiefs and employees who reviewed it and provided comments. District employees Kayana Ladson, Sean McBride, and Don Hill made edits and sourced illustrations. The Office of History, Headquarters, U.S. Army Corps of Engineers contributed their expertise and guidance. Allen Wayne, Ltd., made the final edits and design, and prepared the book for printing.

COVER

Dredges working to deepen the Charleston Harbor entrance channel. (USACE, Charleston District)

INSIDE COVER

Logo designed to commemorate the Charleston District's 150 years. (USACE, Charleston District)

Introduction

This history of the Charleston District spans one-third of a century since the conclusion of the first volume, which covered the district's inception until 1978. It benefits from the availability of historical documents, interviews, and the substantial body of scholarly publications released during the last 30-plus years that provide fresh insight into the development of the present-day U.S. Army Corps of Engineers, Charleston District.

Lowcountry Engineers: Military Missions and Economic Development in the Charleston District described the proud legacy. The great Charleston Harbor jetty project, completed in 1895, added 10 feet of depth to the channel leading from the ocean into the harbor, making it possible to bring a naval yard and base to Charleston. The Charleston District's World War II construction of three Army Air Corps bases and the upgrading of seven municipal airports provided the foundation for the postwar rise of passenger and commercial air transportation in South Carolina. The district's terminals, buildings, and other facilities at the port of Charleston, renovated during World War II, were later transferred to the State Ports Authority. Operating from the modern harbor maintained by the district, the dollar volume of Charleston cargoes would rise to 12th in the Nation by 1970. The erection of new army training camps and the expansion of Camp Jackson outside Columbia marked the beginning of the permanent presence of major army facilities and payrolls that dwarfed private investment in South Carolina. Other achievements include the turn-of-the-century Endicott system of coastal fortifications, elements of the World War II harbor defense, and the construction projects of the Intracoastal Waterway and the W. Kerr Scott Dam and Reservoir.

The history of the Charleston District from 1978 to 2012 is a story of continuity and change. The district's chief business has continued to be the deepening and maintenance of the Charleston Harbor, with expenditures over \$390.9 million during the period. Change includes the construction of a \$207.8 million powerhouse and diversion canal to mitigate the adverse effects of the state's Santee Cooper hydroelectric project constructed in 1942. The differences in the political, economic, social, and cultural environments within which the Corps of Engineers and the Charleston District operated through the mid-1970s and those of recent years are substantial. They begin with transition from a mainly construction-oriented organization to one that is equally concerned with operations and maintenance, an organization with extensive regulatory authority, multiple partnerships, and major interactions with local and state governments and with other federal agencies.

In the first decade of the 21st century, the challenge to do more with diminishing resources was exacerbated by the economic crisis of the Great Recession. In this environment, the Charleston District was not only challenged to conduct a study on the feasibility of deepening the Charleston Harbor beyond 45 feet to accommodate the larger vessels that soon would be plying the oceans, but to do so using an entirely new and accelerated study process.

This volume opens with a recounting of efforts by the Office of the Chief of Engineers and the South Atlantic Division to close the Charleston District. The history next describes the importance of the navigation mission, including the critical impact of the Cooper River Rediversion Project in saving Charleston Harbor. It describes the contributions to wildlife preservation and recreation that came from the construction of a fish lift and the research in the placement of dredged materials. It encompasses the increased awareness of the importance of the environmental cleanup at one of the Nation's major nuclear facilities. The Corps' Continuing Authorities Program, under which the district had undertaken projects to protect structures of historical significance and ecosystems, is highlighted. The district's role in regulatory, emergency management, and shore protection in a coastal landscape is also described.

The Charleston District and the Corps of Engineers do not function in isolation. This history thus focuses on the pressures of implementing the changes driven by the adaptation of information technology and new theories of management. It notes budget difficulties stemming from the costs of maintaining the country's aging infrastructure and continuing efforts to reduce the federal workforce. Measured in constant dollars, this is an age where civil works budgets declined steadily and remained relatively flat, at less than two-thirds of their peak.

The final chapters of this history describe the dramatic changes in the Charleston District in the last decade and a half. This begins with outreach to encourage cooperation across districts, the reacquisition of a military mission, and the Great Recession projects managed under the Emergency Stabilization and American Reinvestment and Recovery Acts. This recounting concludes with the extraordinarily complex and pioneering completion of the feasibility study for the Charleston Harbor Post 45 Deepening project. For continuity in telling the District's story, certain events are followed for just a few years beyond 2012.

From a workload hovering in the range of \$40 million annually at the turn of the 21st century, the Charleston District would grow to \$60 million in 2008 and then expand more than five times to over \$300 million by 2012. The sheer magnitude of change and the complexity of its ingredients would create a new and improved district, where, in 2005, \$45.6 million in civil works accounted for 82 percent of district dollars, and in 2011, \$104.5 million in civil works represented approximately 33 percent of district revenue.

CHAPTER ONE

The Operating District

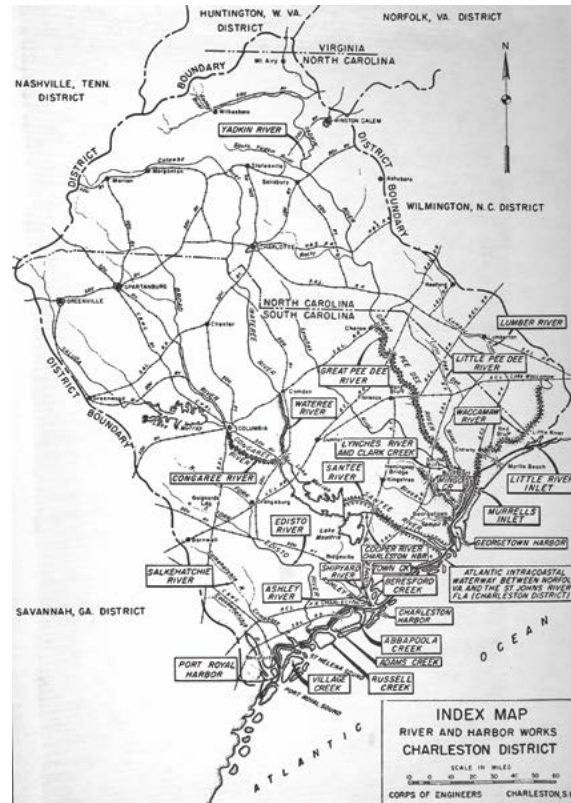
As prescribed by the Corps of Engineers, the Charleston District's geographic boundaries were based on river basins. In the mid-1970s, it encompassed the state of South Carolina, apart from the Savannah River basin on the southern boundary and some 40,000 square miles of the Catawba-Yadkin-Great Pee Dee-Little Pee Dee River basins to the north. The district also included parts of North Carolina and Virginia. The Santee-Congaree-Saluda-Broad-Wateree River basins ran through the central portion of the district. The Santee River extends from western North Carolina southeast to the coast between Georgetown and Charleston. It is one of the largest river basins draining into the Atlantic Ocean. At its greatest length, the Santee basin is about 275 miles and at its greatest width, about 115 miles. The total drainage area of some 15,700 square miles (10,400 of it in South Carolina) consists of a mountain region of high rainfall and steeply sloping streams, a Piedmont Plateau, where streams have steep slopes and narrow flood plains, and flat and marshy coastal plains.¹

In the 1970s, the district maintained five major projects: the harbors at Charleston, Georgetown, and Port Royal, the Atlantic Intracoastal Waterway between Little River and Port Royal Sound, and the W. Kerr Scott Dam in Wilkesboro, North Carolina.

The Makings of a Close-Knit District

The main office for the Charleston District since 1965 was in the L. Mendel Rivers Federal Building, located in downtown Charleston. The 7-story, international-style structure with a glass and marble facade overlooked Marion Square, a grassy, block-long park then dominated by a bronze statue of John C. Calhoun atop an 80-foot pedestal of Carolina granite.²

The Charleston District's complement of employees was small in comparison with



TOP
Map from 1978 showing District boundaries before realignment including parts of North Carolina and Virginia. (USACE, Charleston District)

MIDDLE
The Mendel Rivers Federal Building in 1990. (Historic Charleston Foundation Archives)



the neighboring districts. In 1979, Charleston had 140 authorized employees, compared to Wilmington's 409 and Savannah's 1,009. Charleston's small size made for a close-knit environment and benefited from the Federal Building's downtown location and local

amenities. While district commanders, usually with the rank of colonel, served a three-year tour of duty, the civilian workers tended to stay much longer, many spending their entire careers at the district office. There was a sense of family, with employees participating actively in the after-work bowling league, golf tournaments, barbecues, and scholarship and charity drives. Their children grew up with memories of attending the annual Corps' Day picnics, and as adults, would be surprised at the number of people who could say, "You know, I remember you back when."³

Organizational Reform

By the 1960s, the Corps was facing demands for organizational reform. Critics in government, professional engineering societies, and independent federal commissions contended that many projects on water resources neglected larger public interests, exhibited poor planning, and were unduly costly and wasteful. They called for a fundamental reshaping of federal water resource agencies.

Reportedly, the Corps' major flaw was that its divisions and districts lacked economists and other professional planners in the upper layers of the organizational hierarchy. As a 1965 Bureau of the Budget memorandum put it, "In general, the Corps' planning process is still dominated by the engineering profession, and is often very narrow in concept and unimaginative in execution . . . it will not improve greatly unless major effort is made to diversify and strengthen the planning staff and pull it out of the engineering (construction dominated) organization."⁴

The chief of planning in the Office of the Chief of Engineers in Washington, D.C., had no counterpart in the regional or district offices located throughout the country. Engineering divisions in the field generally handled planning functions. One observer in the Corps' Policy Division commented that it is "easier

to hire 1,000 engineers competent to design and build a structure, than to find one person who is competent to determine whether that structure will prove, in the long run, to increase the Nation's wealth and to fit into an optimum basin plan."⁵

In 1966, Chief of Engineers Lt. Gen. William F. Cassidy employed the Planning-Programming-Budgeting System mandated by Secretary of Defense Robert McNamara to upgrade the Corps' planning capabilities. Cassidy intended to establish a civil works planning office in each division and district headquarters. The planning chiefs would hold grades equal to those of the engineering chiefs, traditionally the most prestigious and powerful positions in the Corps. The reorganization began on March 22, 1966, when Cassidy informed division offices that a target date of May 31, 1966, had been set for activating planning divisions and that "this directive was not subject to alteration."⁶ Time would show that Cassidy's top-down change successfully addressed the organizational issues important to the future of the Corps.⁷ In 1969, the Office Corps of Engineers (OCE) required all districts to place planning functions at a level parallel and equal to that of engineering. Charleston District completed that task in 1974.⁸

From the 1960s, the federal government's reduction in military and civil works outlays caused the Corps to focus less on new construction and more on the management, repair, and modernization of existing projects and facilities. In 1961, the OCE consolidated military construction operations, leaving 12 districts, including Charleston, without a military construction mission. Some supporting functions, like real estate, were also consolidated into the larger districts.⁹ This resulted in a significant loss of workload and staffing for the district. Under the Corps' operating-support concept, the Charleston District was now self-supporting only in



contracting and procurement. It depended on the Savannah District for design memoranda, civil works planning, legal, and safety, as well as accounting, data processing, and most of its personnel policy and technical services.

Realignment and the Prospect of Closure

By the early 1970s, the OCE's hope that efficiencies gained from functional consolidations would suffice to match dwindling resources and workloads gave way to worsening economic conditions, with 10 percent annual inflation and rising unemployment. In the winter of 1973-74, fuel prices soared; in a typical Corps' construction project, fuel prices accounted for 20 to 30 percent of the costs, so the quadrupling of fuel prices undid previously prepared budget programming and contracts.

In 1977, Brig. Gen. Kenneth E. McIntyre, commander of the South Atlantic Division (SAD), announced his intent to transfer the Charleston District's two major construction projects to the Wilmington District and retain the Charleston office merely for local planning and operations. However, McIntyre rescinded his decision when both the Charleston and Wilmington Districts objected.¹⁰

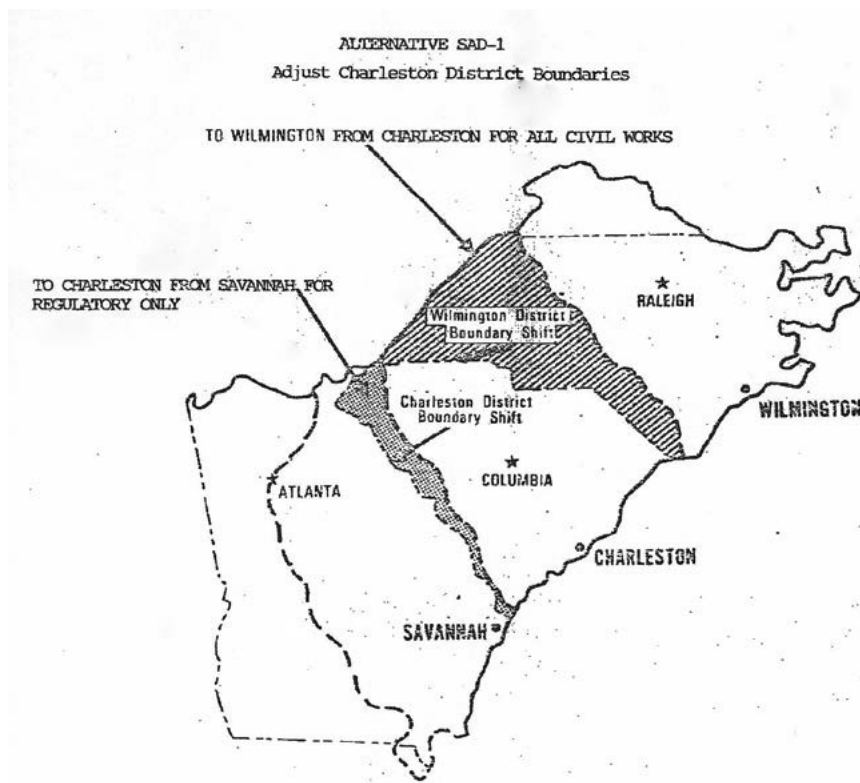
The Charleston District's 1975 annual workload of \$13.1 million was just 44 percent of Wilmington District's (\$30.2 million), and only 11 percent of Savannah's (\$122.2 million). The district's workload dropped even further the following year to just \$9.6 million. Facing budget pressures, in 1978, Chief of Engineers Lt. Gen. John W. Morris asked his division

engineers to consider closing the district offices in Charleston, Chicago, Rock Island, and San Francisco.¹¹ By 1979, the Corps found itself \$240 million short in meeting its fiscal year obligations. On January 23 of that year, Morris signed a memo informing all employees that "severe adjustments must be studied." Two days later, McIntyre informed the Charleston District by letter that the OCE had asked him to examine the "health" of "one of the smaller districts in the Corps' operation—about one-fourth the size of the average size Corps District." And while no pre-decision



TOP
Chief of Engineers Lt. Gen. John W. Morris with President Carter. (HQUSACE Office of History)

MIDDLE
Brig. Gen. Kenneth E. McIntyre, Division Engineer at SAD from 1976 to 1979. (USACE, South Atlantic Division)



had been made, McIntyre had asked his study team "to evaluate the possibility of retaining only a small area office in Charleston" and "a small coordination office" in Columbia. Shortly after, and without prior announcement, McIntyre traveled to Charleston and told key staff members he intended to close the Charleston District.¹²

McIntyre appointed his deputy division engineer for military construction, Col. Robert L. Bouffard, to lead the study team. On March 7, by memorandum, they informed employees of the Charleston, Savannah, and Wilmington Districts that a decision had to be made: either to do nothing or to close the Charleston District and transfer its responsibilities to Wilmington and Savannah.¹³ Few in Charleston were surprised.¹⁴

If carried through, the closure of the Charleston District would make South Carolina "the only state in the Union with a seacoast and a major port without a local Corps district to handle federal navigation responsibilities," explained retired Col. Robert C. Nelson, the Charleston District engineer from 1971 to 1974.¹⁵ Upon hearing of the plan, South Carolina's political leaders united in opposition. The state's General Assembly quickly passed a

concurrent resolution in support of their local Charleston Engineer District. Congressman Mendel J. Davis, representing the state's First District, called the OCE's decision callous.

Charleston Mayor Joseph P. Riley stated the closure would be "less a necessary Corps reorganization than a power play that would deprive the state of needed resources." Charleston Harbor is vital to the South Carolina economy and a port critical to national defense, said U.S. Senator Strom Thurmond who, "as a representative of the people, [would] not accept loss of vital services to the citizens of South Carolina and North Carolina which Charleston presently serves." U.S. Senator Fritz Hollings advised Bouffard, "I happen to know it was a political deal that put Fort Jackson and other construction work under the Savannah District. It makes me consider reducing the [Corps'] complement at both Atlanta and Washington."¹⁶

Sixth District Congressman John W. Jenrette, Jr. sent Bouffard another strong warning:

I made my views on this issue clear during Brig. Gen. McIntyre's appearance before the Energy and Water Resources Appropriations Subcommittee on February 15. Unless I have complete assurance that this [closure of the Charleston District] alternative will not be the Corps' proposal, I will have no choice but to seek the support of Chairman [Tom] Bevill and my other colleagues on the Subcommittee for inclusion within the fiscal year 1980 appropriations bill of limitation language which would preclude such a realignment.

The proficiency with which Alabama Congressman Bevill managed to get federal funds for public works projects in his home state was legendary. As Senator Hollings advised Morris in a letter on June 6, 1979, "nothing could be further from the truth" than your belief "that 'congressional

pressure will exist for several months' and then fade away."¹⁷

The united opposition from business groups and powerful politicians was more intense than SAD expected, forcing Bouffard's study group to re-examine their facts and findings. While the Charleston District had the fewest full-time employees in the South Atlantic Region, for the past four years it averaged highest in the dollar value of work per employee. The district's average grade, and consequently average salary, was lower at Charleston than in any other district. "In sum and substance," the study concluded, "the Charleston District does more work per person at a lower individual salary than any other district in the South Atlantic Division including the South Atlantic Division Office itself." The study committee's analysis also showed that the cost savings of closing the Charleston District would be minimal; replacing the Wilmington, Charleston, and Savannah Districts with a single district would reduce operating costs but that would be more than offset by losses in operating efficiency. The study team now suggested that if the Corps were to do anything, realigning district boundaries and responsibilities along state lines was the best course. The South Atlantic Division forwarded a two-option decision package of closure or realignment to OCE. Morris opted for realignment.

In 1980, in line with the decision to realign boundaries, the Charleston District transferred its one-third of west-central North Carolina and a small portion of Virginia to the Wilmington District, along with 12 employees who were located in the Charleston office, and another 11 employees located at the W. Kerr Scott Dam and Reservoir Office near Wilkesboro, North Carolina. The Corps also realigned the Charleston and Savannah Districts' boundary for regulatory activities along the Georgia state line (the Savannah River) and the Savannah District transferred three positions

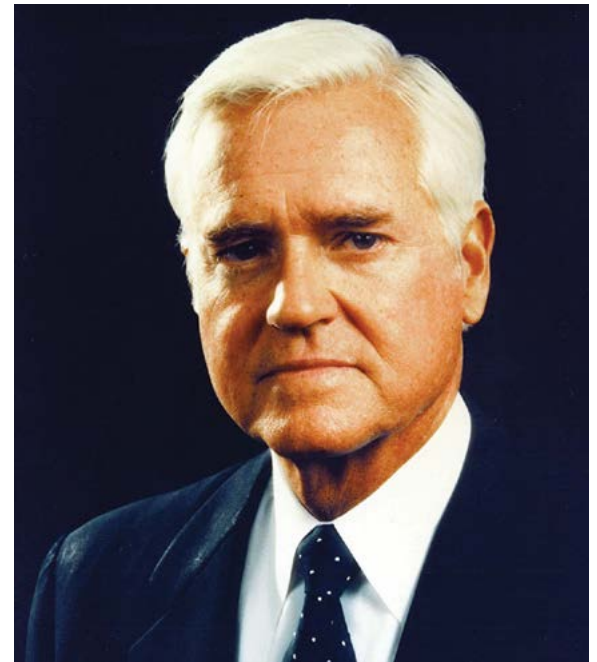
to Charleston. As for the budget concerns that had triggered the controversy, the Chief of Engineers told Congress, "There are no monetary savings."¹⁸

Even though the Corps ultimately decided not to close their office, Charleston District employees remained apprehensive. The realignment cost the District one-third of its geographic area of responsibility, one-third of its professional engineering staff, and \$1.4 million from its projected annual budgets over the next four years.

Continued Budget Pressure

Under President Ronald Reagan, budget pressure intensified as the administration aimed to reduce the federal workforce by 37,000 employees, excepting those working directly for the nation's defense. The "South Atlantic Division's proposed share of that reduction in civil works spaces would be slightly over 400," Charleston District Engineer Lt. Col. Bernard E. Stalman informed district employees in February 1981. "South Atlantic Division has appointed two task groups to study ways for reducing strength. One will address retention of the five districts, the other the elimination of one district." In May 1981, Stalman further informed employees that during his visit to OCE the previous week he learned that while the Charleston District led all other districts in letters of support, "I do not want to underplay the possibility that the Charleston District could be recommended for closure. Anything is possible!"¹⁹

On October 1, 1981, Director of the Office of Management and Budget David Stockman specifically targeted the Corps for a reduction in force. The Corps' Coastal Engineering



OPPOSITE TOP

Map showing realignment of district boundaries. (USACE, Charleston District)

TOP

Senator Fritz Hollings. (United States Congress)



While the administration pushed hard to reduce the federal workforce and the Corps struggled with deciding how best to do that, the Charleston District's employees continued to maintain their projects. Chief among them was a major project more than a quarter-century in the making to preserve Charleston Harbor as a major port.

Research Center at Fort Belvoir, Virginia, closed, but the small districts of Chicago and St. Paul, which—like Charleston—were also potentially on the chopping block, managed to survive after their boundaries were realigned. Finally, in 1983 the decision was made to also keep the Charleston District as a separate office.

This was a difficult time for the district's employees, and despite the 1983 decision, rumors about possible closing or further reducing the Charleston District office continued to circulate for years.

CHAPTER 1 ENDNOTES

¹Col. Robert C. Nelson, Charleston District, Review of Reports, Santee River System North Carolina and South Carolina, 7 June 1973, pp. 1, 6, 13, 17, 37–40, Files, SAC.

²Charleston County Library, History of the Monument, <http://ccpl.org/content.asp?id=16261&action=detail&catID=6179&parentID=5908>.

³Interv, author with Jimmy Hadden, 3 May 2015; interv, author with Francis Limebaker 23 June 2015; interv, author with Elmer Schwingen, 20 May 2015; interv, author with Tina Hadden 19 May 2015.

⁴Jamie W. Moore and Dorothy P. Moore, *The Army Corps of Engineers and the Evolution of Federal Flood Plain Management Policy* (Boulder: University of Colorado, Institute of Behavioral Science, 1989), p. 82, citing J[oe] M. Johanson, [Budget Examiner], Resources and Civil Works Division, Bureau of the Budget, to Elmer B. Staats, Deputy Director, Bureau of the Budget, Strengthening of Corps of Engineers Economic Capability, 24 Sept. 1965, RG 51, Series 61.1A, Box 159, Folder, Corps of Engineers, National Archives.

⁵Moore and Moore, *Evolution of Federal Flood Plain Management Policy*, p. 82, citing an unsigned, undated memorandum, Proposal for Improving Corps' Planning, File: 1501-07, National Archives.

⁶Moore and Moore, *Evolution of Federal Flood Plain Management Policy*, pp. 83–85; Brig Gen W.P. Leber, Circular No. 10-2-1, Establishment of Policy and Analysis Division, Directorate of Civil Works, Office, OCE, 21 July 1966.

⁷Moore and Moore, *Evolution of Federal Flood Plain Management Policy*, pp. 18–21, 83–85, 92–93; Brig Gen W.P. Leber, Circular No. 10-2-1, Establishment of Policy and Analysis Division; Gregory R. Graves and Peter Neushul, *An Era of Change: The Tulsa District, U.S. Army Corps of Engineers, 1971–1991* (Tulsa: Tulsa Engineer District, 2009), p. 11.

⁸Moore and Moore, *Evolution of Federal Flood Plain Management Policy*, pp. 83–85; Col Robert L. Bouffard to All Employees of the Charleston, Savannah and Wilmington Districts, District Realignment Study; Employee Information Sheet No. 4, 11 May 1979, pp. 4, 13, 15–16.

⁹Leland R. Johnson and Charles E. Parish, *The Falls City Engineers: A History of the Louisville District, Corps of Engineers, United States Army*, vol. 3 (Louisville: Louisville Engineer District, 2008), p. 226.

¹⁰John Romanosky, [Chief, Operation Division] Fact Sheet, 14 Oct. 1977; Charleston District News Release, 2 Nov. 1977; Bouffard to All Employees of Charleston, Savannah and Wilmington Districts, District Realignment Study; Employee Information Sheet No. 4, 11 May 1979 enclosing draft report, An Analysis of Alternative Missions and Functions for Charleston and Wilmington Districts in the Period 1978–1980, Files, SAC, pp. 5, 7.

¹¹Lt Gen J.W. Morris, Chief of Engineers to Brig. Gen. Kenneth E. McIntyre, South Atlantic Division Engineer, 20 Dec. 1978, files SAC; Johnson and Parish, *The Falls City Engineers: A History of the Louisville District, Corps of Engineers*, vol. 3, p. 226; Ralph Bailey, Jr., Paul E. Brockington, and Charles F. Philips, *History of the South Atlantic Division of the U.S. Army Corps of Engineers, 1945–2011* (Atlanta: U.S. Army Corps of Engineers, South Atlantic Division, 2012), pp. 22–29.

OPPOSITE TOP

Lt. Col. Bernard E. Stallman, District Engineer from July 1980 to July 1983. (USACE, Charleston District)

¹²Lt Gen J.W. Morris to Corps of Engineers Employees, 25 Jan. 1979; McIntyre to The Employees of the Charleston District, 25 Jan. 1979; Press Release, Proposed Realignment Studies of U.S. Army Corps of Engineers Field Offices, 25 Jan. 1979; John E. Romanosky, Chief, Operations Division Charleston District (Retired), to Sanders & Quackenbush, Attorneys at Law, Columbia, SC, 17 Dec. 1979, Files, SAC; Moore and Moore, *History of the Coastal Engineering Research Center, 1963-1983*, pp. 63-64.

¹³Col Robert L. Bouffard to All Employees of Charleston, Savannah and Wilmington Districts, District Realignment Study; Employee Information Sheet No. 1, 2 Feb. 1979; Employee Information Sheet No. 2, 7 Mar. 1979, Files, SAC.

¹⁴Interv, author with J. Hadden 3 May 2015; interv, author with Limebaker 23 2015.

¹⁵Given the recent Army recommendation to close Ft. Dix, New Jersey, Nelson suggested the study consider shifting military construction from Savannah to Charleston and Wilmington to support the likely expansion of Ft. Jackson. Col Robert C. Nelson (Retired) to Col Robert L. Bouffard, Study Team Chairman, 28 March 1979, Files, SAC.

¹⁶Senator Strom Thurmond to Col. Robert L. Bouffard, Study Team Chairman, 26 March 1979; Concurrent Resolution Adopted 18 April 1979, attached to Senator Fritz Hollings to Clifford L. Alexander, Secretary of the Army, 1 May 1979; First District Congressman Mendel J. Davis to Lt Gen J.W. Morris, Chief of Engineers, 25 Jan. 1979; Charleston Mayor Joseph P. Riley to President Jimmy Carter, 29 Jan. 1979; Hollings to Bouffard, 15 March 1979; Files, SAC.

¹⁷Hollings to Morris, 6 June 1979; Louie Estrada, "Rep. Tom Bevill, 84; Alabama Democrat," *Washington Post*, 31 March 2005. Bevill would serve from 1967 until his retirement in 1997, <http://www.washingtonpost.com/wp-dyn/articles/A14471-2005Mar30.html>. Bevill would go on to serve 15 terms in Congress.

¹⁸Bouffard to All Employees of Charleston, Savannah and Wilmington Districts, District Realignment Study; Employee Information Sheet No. 4, 11 May 1979 enclosing draft report, An Analysis of Alternative Missions and Functions for Charleston and Wilmington Districts in the Period 1978-1980; *Federal Register*, 44:133, 10 July 1979, 40374; OCE, Information for Members of Congress, U.S. Army Corps of Engineers District Realignment Alternatives, 14 Sept. 1979; Dave Doubrava and William Matthews, "Corps Projects Unaffected by District Realignment," *Charleston News and Courier*, 14 Nov. 1979, Files, SAC, 15-A.

¹⁹Schwingen Interview, May 20, 2015

CHAPTER TWO

Saving Charleston Harbor

In 1941, the State of South Carolina completed a controversial \$40 million hydroelectric project that dramatically changed the natural flow of the Santee and Cooper Rivers. While beneficial to the state for electric power, flood control, and recreation, the project had unintended consequences that threatened the viability of Charleston Harbor.

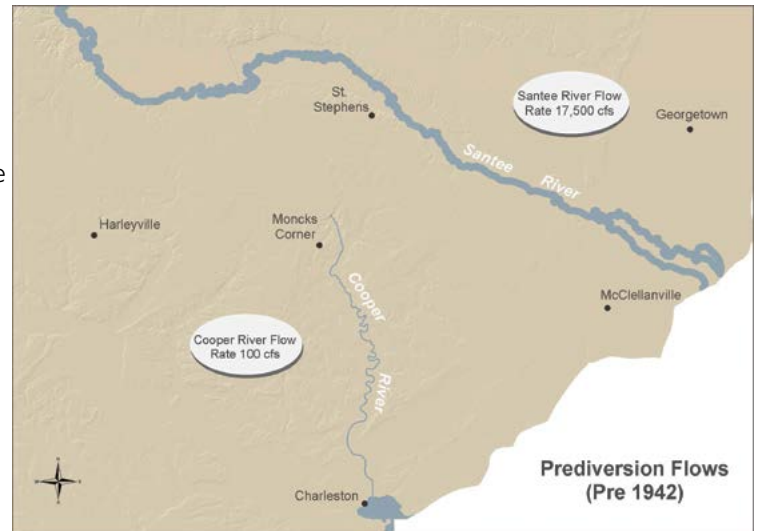
The massive project required 40 miles of dams and dikes to transform over 160,000 acres of swampy, lowcountry land into lakes. Construction of the 8-mile-long Wilson Dam on the meandering Santee River formed Lake Marion, covering 100,000 acres. Lake Moultrie, covering 60,400 acres, was created by the Pinopolis Dam, which included a hydroelectric plant located at the head of the Cooper River, roughly 30 miles north-northwest of Charleston Harbor. A key element of the project was a 6.5-mile-long canal that diverted 85 percent of the Santee River's flow from Lake Marion to Lake Moultrie, where it subsequently flowed past the turbines at the Pinopolis Dam before heading down the Cooper River and eventually reaching Charleston Harbor. The additional flow through the Pinopolis power plant provided a much greater amount of electric power. However, that diversion proved nearly catastrophic for Charleston Harbor.

As a 1954 Corps report explained, the average flow from the Cooper River into Charleston Harbor increased from an estimated 72 cubic feet per second to an average rate of 15,600 cubic feet per second. The dramatic increase in flow also meant a corresponding increase in the amount of sediment sent into the harbor. To make matters worse, the increase in freshwater flow also created an inversion within the water column that effectively slowed the suspended sediment carried down the river, allowing it to settle on the harbor's bottom before it could exit out through the jetties.¹

It took just over a decade after the diversion of the Santee River's flow for the increased shoaling in Charleston Harbor to raise alarms. The amount of material the district

dredged annually increased 29 times, from 80,000 cubic yards to 2.3 million cubic yards. Annual dredging costs soared by 35 times, from \$11,600 to \$380,000. If nothing was done, either the channels would fill or the cost of maintaining the harbor would become prohibitive. The best permanent solution was to redirect the water flowing into the Cooper River back into the Santee. But as that solution was outside the limits of the authorized harbor navigation project, in 1955 the district recommended an interim plan to buy time. This plan involved the construction of a bypass channel around the harbor's largest shoals, minor realignments of other channels, and additional improvements. Completed in 1959, this work reduced dredging costs by about \$200,000 annually,² but the cost of maintaining the channels was still high enough to threaten the future of the harbor as a major seaport. There was even talk of possibly closing the port if something was not done to fix the shoaling issue.

In 1961, the Corps asked Congress to fund a rediversion study. In opposition, Santee Cooper General Manager and former State Senator Richard M. Jefferies wrote to First District Congressman L. Mendel Rivers saying, "The bulk of the silt going into Charleston Harbor in our



TOP
Map showing flows of the Santee and Cooper Rivers before 1942. (South Carolina Department of Natural Resources (SCDNR))

opinion comes from the Cooper River." Jefferies recommended the Corps make the Cooper River wider, deeper, and straighter between Charleston Harbor and the power plant.³

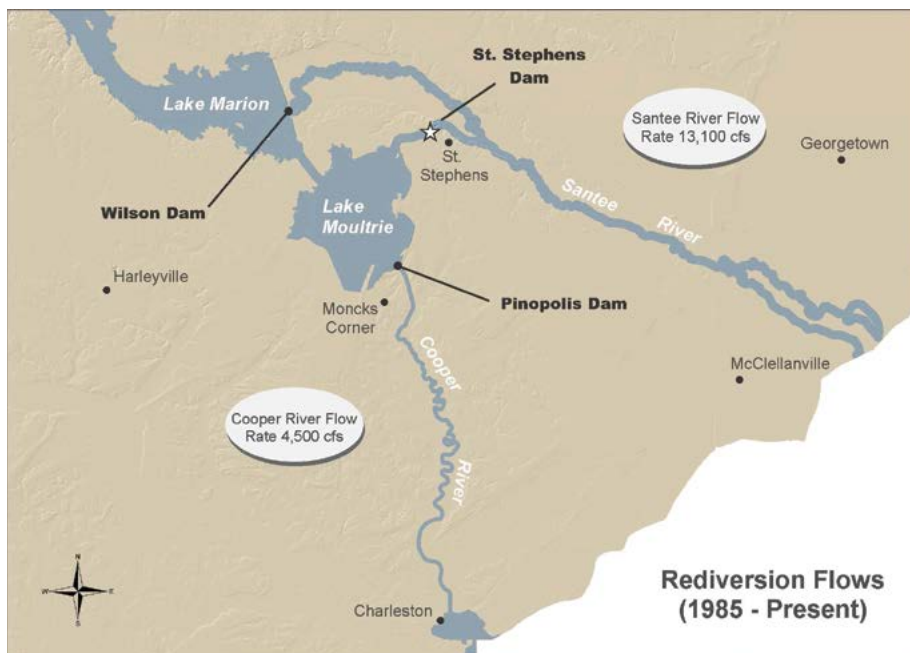
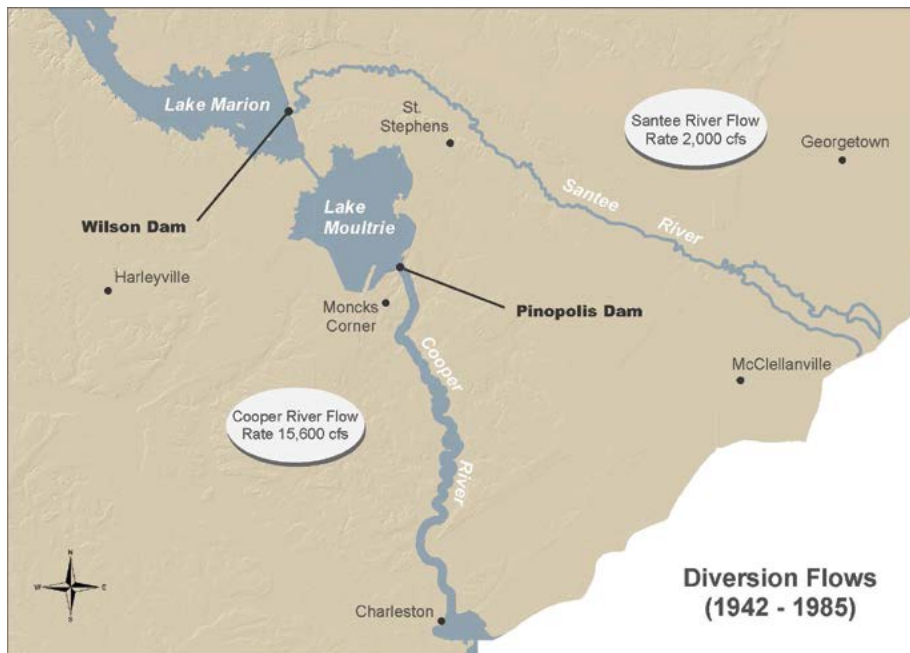
Congressman Rivers was already unhappy with the Corps. Earlier in the year, the South Atlantic Division had transferred the Charleston District's military construction and real estate functions to the Savannah District⁴ Because of the Corps' decision to

strip the Charleston District of its military mission, Rivers had championed legislation that transferred all military construction work at the Charleston, Shaw, and Myrtle Beach Air Force Bases from the Army Corps to the Naval Facilities Engineering Command.⁵ "I am strong in the conviction that the Army Engineers have neglected my harbor and, with me, it is a very sore point," he wrote Chief of Engineers Maj. Gen. Walter K. Wilson, Jr., asking him to explain the Corps' proposed redirection project⁶

Wilson immediately provided Rivers with all the Corps' studies, and then met with the congressman privately. Charleston Harbor was now his top priority, Wilson assured the congressman, and he was taking the unusual step of assigning himself as project manager for the redirection project. Rivers could not have been more pleased. "It will speed up a solution of the harbor silting problem 'far beyond' our expectations," he announced to the press following the meeting. Santee Cooper authorities continued their opposition, but their objections now had little impact.⁷

The Cooper River Rediversion Project

Authorized by Congress in 1968, the Cooper River Rediversion Project (CRRP) was deemed the most effective way to decrease the rate of shoaling in the Charleston Harbor. The plan called for redirecting approximately 75 percent of the Santee River's waters above the Pinopolis Dam on Lake Moultrie back into the Santee River below the Wilson Dam. Designed by the Corps in the 1970s, the largest feature of the project was a canal nearly 9 miles long to convey water from the northeast corner of Lake Moultrie, near Russellville, to the Santee River. The project also included a hydropower plant located roughly halfway down the canal, northwest of St. Stephen. The plant's three turbine generators were sized to effectively compensate for the generating capacity that was lost at the Pinopolis Dam because of the reduced flow over its turbines.



CRRP was completed by the Charleston District in the spring of 1985. Today, the project is owned and maintained by the Corps, but is remotely operated as a “peaking plant” by the state’s Santee Cooper Power Cooperative. Subsequent surveys and studies completed soon after construction confirmed that the redirection worked as planned, diverting approximately 71 percent of the water back into the Santee River and decreasing annual shoaling in the Charleston Harbor by approximately 5 million cubic yards.⁸

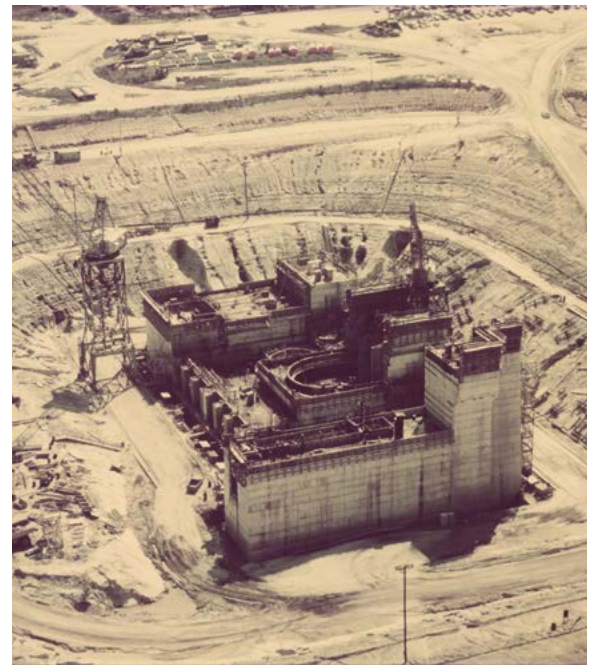
The Fish Lift

While the redirection project was being considered and advancing forward, the Charleston District engineers also had to address how the construction would affect the river’s fish populations. The Santee Cooper Diversion Project of 1941 had significant, detrimental consequences for species of fish dependent on the natural, pre-existing flows and habitat provided by the rivers. The Wilson and Pinopolis Dams blocked the migration of anadromous fish like American shad, striped bass, and blueback herring, cutting them off from their spawning grounds further upriver. In 1958, Congress passed an amendment to the Fish and Wildlife Coordination Act that required the federal government to give equal consideration to fish and wildlife conservation when planning new projects. This act prompted the Charleston District to include the provision of a fish passage while designing the redirection, and consequently, Congress included it as part of the project’s authorization.⁹

The purpose of the passage was to allow fish to safely transit past the dam while migrating both to and from the ocean. The district partnered with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service (now NOAA Fisheries), and the South Carolina Department of Natural Resources (SCDNR) to arrive at the most effective design. District personnel also examined existing fish passage structures along the Atlantic

coast.¹⁰ The structure was specifically designed to pass American shad and blueback herring, but striped bass, gar, catfish, largemouth bass, and a host of panfish and other species also utilize the facility.

Today, the CRRP fish lift—the only fish lift on the country’s southeastern coast—is operated by SCDNR and maintained by the Charleston District under a long-term agreement.¹¹ Fish migrating from the ocean swim up the Santee River, enter the Tailrace Canal, and head toward the St. Stephen Dam against the flow. As fish swim closer to the dam, they begin to encounter the more turbulent outflow, and because they prefer a riverine environment, they are drawn to the north side behind the fish lift entrance wing and continue past the gates into the crowder area. The crowder gates are attached to a trolley. When they close, the trolley moves forward, encouraging the fish to swim toward Gate 1, which opens into the lift chamber. As the fish enter the lift chamber, Gate 1 closes. As the water rises, a basket at the bottom of the chamber moves up, prompting the fish to swim upward. When the fish reach the top of the chamber, at lake level, 70 feet above the river, Gate 2 slides down to allow them to swim into the exit chamber. The dimensions of the system are huge. The crowder gates are 20 feet tall and weigh 8,000



OPPOSITE MIDDLE

Map showing the diverted flows of the Santee and Cooper Rivers after completion of the Wilson and Pinopolis dams in 1942. (South Carolina Department of Natural Resources (SCDNR))

OPPOSITE BOTTOM

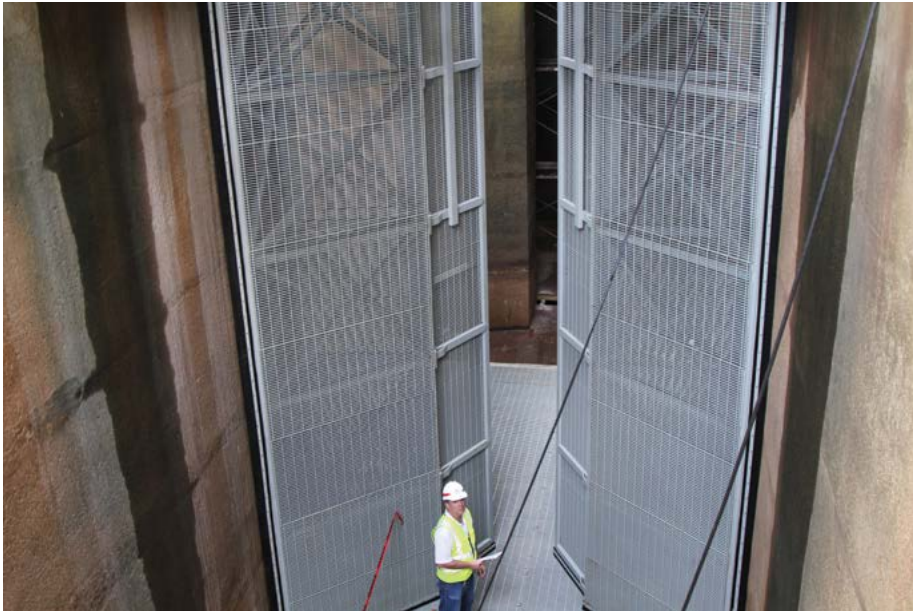
Map showing the flows of the Santee and Cooper Rivers after completion of the redirection project in 1985. (South Carolina Department of Natural Resources (SCDNR))

TOP

The completed powerhouse near St. Stephen, South Carolina. (Sean McBride, USACE, Charleston District)

MIDDLE

St. Stephen powerhouse under construction in 1982. (USACE, Charleston District)



pounds each. Before modifications were made in the 1990s, fish tended to mill around within the chamber. The changes involved adding more grating to guide the fish and “spookers”—PVC pipes with holes in them that shoot out air and spook the fish sufficiently to make them leave. SCDNR employees in a control room can observe and count the fish while controlling the entire operation.

The fish lift season runs from February to May, depending on water temperature. American shad and blueback herring typically wait for the water to reach 59 °F before starting on their migration. As the season progresses, the number of fish increases, and the facility may pass as many as 3,000 fish each 15-minute cycle. Otters and beavers have been known to go through as well, along with

an occasional cormorant and alligator. Since 1993, cameras have recorded each pass of the fish lift and personnel review the recordings frame by frame to count the fish by species. Each year, up to 350,000 shad and 400,000 blueback herring pass through the lift.

The CRRP also allows for the passage of the American eel, an important species within the aquatic food chain. Where American shad and blueback herring are anadromous, eel are catadromous, meaning they spend most of their adult lives in fresh water and migrate to saltwater to spawn. A custom aluminum ladder and a pump were designed and installed by SCDNR biologists to provide the slow water flow the tiny glass eels (a transparent stage) and elvers (pigmented juveniles) seem to prefer while making their migration. In 2012, SCDNR reported the successful passage of approximately 17,000 eels.

In 2012, a critical gate on the fish lift jammed shut as the result of a hydraulic failure. The fish lift was de-watered for the first time in 27 years to undertake a \$2 million repair and renovation that included replacing the crowder gates, the grating at the bottom of the chamber, a stainless steel Gate 4, the entire hydraulic system, the HVAC system in the hydraulics room, and three vertical bulkheads. The fish lift was also upgraded with a video system that shows two views of the fish as they travel through the system, one from the perspective of the fish.¹²

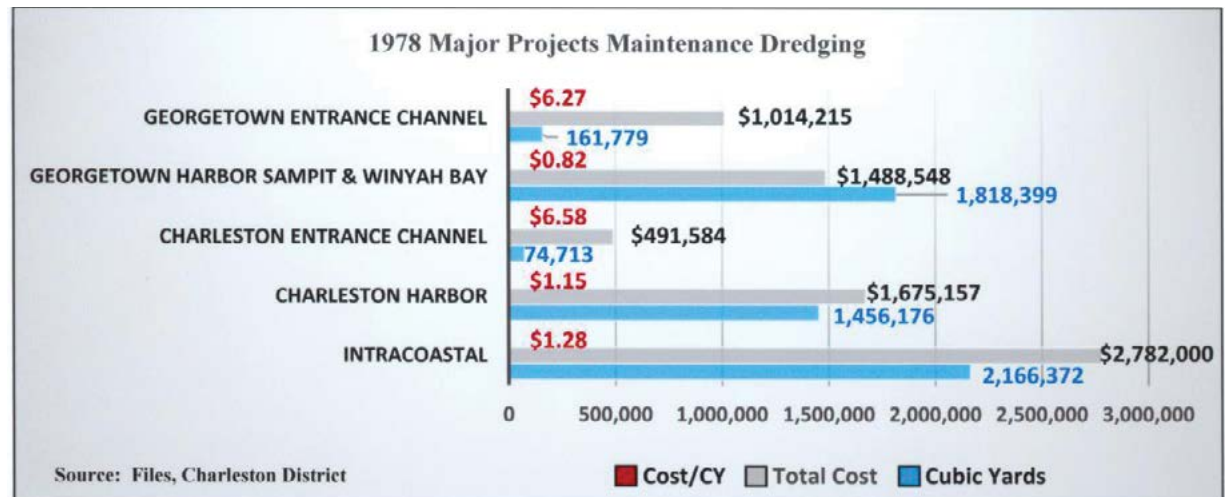
The Santee and Cooper Rivers host two endangered species: the shortnose sturgeon, which can grow to 4 feet long and weigh 50 to 60 pounds, and the Atlantic sturgeon, which can grow up to 14 feet and weigh as much as 900 pounds.¹³ The Charleston District has regularly consulted with NOAA Fisheries since 2010 to address any concerns with the impact of Corps projects on the sturgeon’s environment.

Maintaining the State's Navigation Channels

The bulk of the Charleston District's work in 1978 involved the tasks of dredging the federal navigation channels within the state to keep them at their authorized depths. It included the removal of more than 5.6 million cubic yards of dredged material from the federal channels at Charleston, Georgetown, and Port Royal, and from the Intracoastal Waterway. The work that year cost a total of \$7.5 million and consumed the time of nearly one-third of the employees working in the district's engineering division.¹⁴

In that year, a typical maintenance dredging project would have started with a marine survey conducted by either the 65-foot survey vessel named the *Blair*, or by the 38-foot *Cain*. The survey vessels would determine the condition of the channel by making a series of passes along the waterway while operating their sonar instruments and recording the indicated depths. The data was then passed to engineers in the office who would compare the recorded depths to what was authorized. The surveys would also determine the composition of the material on the bottom. After determining the amount and composition of shoaling material that needed to be removed, the engineers were then able to assign the work to dredges that were best suited to the job.

Large and powerful hopper dredges were typically used in the Charleston Harbor entrance channel because they did not interfere with shipping, could achieve a uniform depth through the length of a shoal, move the dredged material for placement, and then proceed under their own power to other sites. The *Gerig*, commissioned in 1947 and one of the four modern sea-going



hopper dredges then owned and operated by the Corps, carried a crew of 78 civil service employees. Dredge operations could be conducted around the clock for 10 days straight before returning to port for fuel and supplies. Two heavy drag-heads attached to 28-inch diameter suction pipelines were swung from both sides of the dredge and moved along the channel sucking up bottom materials through two centrifugal pumps. Each pump had a capacity of 100,000 gallons per minute. The pumps operated until the hoppers (large onboard storage areas) were filled to capacity. The dredge then moved to deep water away from the channel area and discharged the dredged material through openings in the bottom of the vessel.

The newer ocean-going dredge *McFarland* could handle a variety of materials, including silt, sand, clay, shell, and mixtures. Launched in 1966 and operating with a crew of 45, it used a drag arm on each side to vacuum dredged

OPPOSITE TOP

The fish lift crowder gates after being refurbished in 2012. (USACE, Charleston District)

OPPOSITE MIDDLE

Striped Bass passing by one of the viewing windows while traversing the fish lift. (USACE, Charleston District)

TOP

1978 Major Projects Maintenance Dredging. (USACE, Charleston District)

MIDDLE

Dredge *Gerig* Working in the Savannah Harbor in 1956. (USACE, Savannah District)



material into its hoppers. The *McFarland* could carry and discharge the dredged material into deeper water away from the channel, like the *Gerig*, or pump it to disposal areas on shore using a ship-to-shore pipeline. It could also discharge the material directly aside the channel as a side-caster. In an operating year of 140 days, the *McFarland* could remove two million cubic yards of material, enough to fill a placement area the size of a football field 900 to 1,200 feet high.¹⁵

For dredging work in the Intracoastal Waterway and inner harbors, the Charleston District often contracted with private dredging companies operating smaller pipeline dredges like the *Dauntless*, capable of dredging 7,000 cubic yards of sand a day. It had sleeping and eating quarters for a 40-person crew. The ship's lower level housed a 1,640-horsepower diesel that pumped sand 1,500 feet down the pipeline to the booster pump and another 1,640-horsepower diesel that could work an underwater pipeline stretched across an inlet bottom to re-nourish a beach. The *Dauntless* carried another 800-horsepower engine to run generators that provided electric power for the dredge and its cutter head, the giant drill with large steel teeth that broke up any hard bottom material before it got sucked into the pipeline. Made of 3/8-inch-thick pipe with an 18-inch diameter, the pipeline usually only lasted a year or two because of the abrasive

power of the fast-moving sand and the corrosive action of salt water.¹⁶

In the shallow, turbulent waters often found around inlets, the district preferred to use side-casting dredges like the *Schweizer*, one of the three government-owned, shallow draft side-casters the Corps employed along the East Coast. The side-cast dredges had small drag heads to collect shoal material, which was then cast to the side of the navigation channel. Reliable, simple, and cost-effective, the Corps' use of side-casters was not without critics. Environmental groups questioned the effects of turbidity and of depositing bottom sediments on top of living organisms. Some coastal engineers disliked the process because it did not move the sediment far enough away from the area being dredged, resulting in some of the material moving back into the channel within a short time. Along with the *Fry* and the *Merritt*, the *Schweizer* operated out of the Wilmington District, which had been responsible for their conversions from mothballed naval vessels (in the cases of the *Merritt* and the *Schweizer*). The Charleston District also used the split-hulled hopper dredge *Currituck*, converted in Wilmington from a mothballed naval vessel, and the Corps' first self-propelled barge.¹⁷

Dredged Material Placement

Prior to the 1950s, most dredged material was simply discharged into the water or pumped onto marshes. While this was the easiest and cheapest way to dispose of the material, it was not good for the environment. As citizens and government became more concerned about the environment and the need to preserve natural habitat, the practice of open placement fell out of favor, especially for the disposal of material that carried contaminants from industrial and agricultural sources. A more environmentally sound disposal method involved containing the dredged material on land within the confines of raised dikes. While more expensive than open-area disposal, the practice of placing dredged material within contained disposal areas preserves more of the natural marine and wetland environment. Construction of these sites required the acquisition of land located near the channels and waterways, and the construction and maintenance of raised dikes to contain the material.¹⁸

By the time Braxton Kyzer became the chief of the Charleston District's Dredging Maintenance Branch in 1974, the district was already experiencing three major problems with their contained disposal sites. The first problem had to do with the dredged material itself, which was a mixture of water and suspended solids called slurry. When pumped within the dikes, the slurry tended to retain the water, roughly doubling the mass. This meant that every cubic yard of solid material dredged from the bottom required two cubic yards of volume to contain it, at least until the water drained off. The second problem had to do with the how the material dried. The top layer on the surface dried faster than material underneath, since it was exposed to the wind and sun. As the material on the surface dried, it created a hard crust over the wetter, softer material below. Consequently, dikes constructed of this material tended to develop deep fissures that could fail and allow the dredged spoil to flow out.¹⁹



The third problem was that the disposal sites became huge breeding grounds for the one of the lowcountry's most hated flying insects. Mosquitoes would lay their eggs within the deep fissures of the spoil, which proved to be ideal habitat for them. In less than a week, the eggs would hatch with the combination of sufficient rain and warm weather. It was estimated that the containment sites produced up to 80 million mosquitoes per acre, and since the placement areas lacked any of the mosquitoes' natural predators, their swarms became intolerable. To make matters worse, the surface cracks also made it difficult for the abatement chemicals sprayed by aircraft to reach and kill the mosquito larvae. The result was a major problem for Charleston County and its mosquito abatement program.

OPPOSITE TOP

Dredge McFarland. (USACE, Philadelphia District)

TOP

Slurry being pumped into the Clouter Creek containment area. (USACE, Charleston District)

MIDDLE

Frank Russell (left) and David Dodds (right) with District Engineer LTC Jason Kirk at the Clouter Creek containment area in 2010. (USACE, Charleston District)



By the early 1970s, the entire Corps of Engineers was increasingly concerned about where to place the 350 million cubic yards of material dredged annually from the 25,000 miles of navigable channels it maintained.²⁰ Working with the USACE Waterways Experiment Station, Kyzer participated in some of the Corps' first studies and experiments conducted to resolve problems with the contained disposal areas. Kyzer and the team developed new techniques to effectively "dewater" newly dredged material through a process they called "crust management." They knew that dredged material would compact and resist re-liquefaction if it could be sufficiently dried. The goal then was to facilitate the process of dewatering so the material could dry as quickly as possible. Their improved process began with preparing the placement areas before dredging, including leveling the interior basins, filling ditches and holes, and adding additional spillways so the water would run off more effectively. Interior drains were added where needed. They found that subdividing the disposal areas with additional interior dikes made them more manageable. Access within the sites was improved by constructing ramps and roads atop the dikes for vehicles and earth-moving equipment.

The dredged material—a slurry of water and suspended solids—was then pumped into the prepared placement areas. As the solids settled out, the remaining water was drained and pumped back into the waterway. When the surface crust began to dry and harden, low-pressure bulldozers, self-loading scrapers, backhoes, and farm tractors ditched the interior to uncover the softer, wetter material beneath so it could dry and compact. The continuous exposures would dry and shrink the material, dramatically reducing its mass. When done properly, dredge spoil eventually became solid enough to manage, averaging three-tenths the volume of the slurry mixture first pumped into the site. The newly dried and compacted soil provided an unlimited source of suitable material for the construction of dikes that could now be built wider, stronger, and higher. Kyzer also partnered with biologists from The Citadel college on studies that confirmed the extent to which the new crust management techniques helped to reduce mosquitoes. Though the pests remain a constant problem, the reduced amount of standing water and surface cracks helped considerably, making the disposal sites and the areas surrounding them much more hospitable.²¹

By the late 1970s, the Charleston District was maintaining five diked harbor containment areas that totaled 3,541 acres and 12,085 linear feet, at an annual cost that averaged \$460 million. The techniques developed and championed by Kyzer and his team regained millions of cubic yards of volume within the sites, greatly extending their useful life, which depends on how long it will take to reach a height of 18 feet.²²

Dredged Material Placement 1980-1984 (Fiscal Years)					
Charleston Harbor	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984
Lower Charleston Harbor	\$1,870,000	\$1,870,000	\$1,870,000	\$1,870,000	\$1,870,000
Upper Charleston Harbor	\$530,000	\$530,000	\$530,000	\$530,000	\$530,000
Entrance Channel	\$2,275,000	\$2,275,000	\$2,275,000	\$2,275,000	\$2,275,000
Anchorage Basin & Shem Creek		\$1,260,000		\$1,130,000	
Dredging for Others					
Naval Channel, Naval Weapons Station	\$586,000	\$586,000	\$586,000	\$586,000	\$586,000
Naval Piers, Naval Shipyard		\$300,000		\$300,000	
Goose Creek Army Depot	\$120,000				\$120,000
Diking and Containment Area Management					
Daniel Island (696 Acres 24,100 LF)	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000
Drum Island (150 Acres, 11,100 LF)	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000
Clouter Creek (1,533 Acres, 41,450 LF)	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000
Yellow House Creek (606 Acres, 20,800 LF)	\$80,000		\$80,000		\$80,000
Morris Island (556 Acres 23,400 LF)		\$80,000		\$80,000	
Subtotal Corps	\$4,885,000	\$6,225,000	\$4,885,000	\$6,095,000	\$4,885,000
Subtotal Other	\$756,000	\$676,000	\$756,000	\$676,000	\$756,000
TOTAL	\$5,641,000	\$6,901,000	\$5,641,000	\$6,771,000	\$5,641,000
Source: Files, Charleston District					

Summary

The successful completion of the Cooper River Rediversion Project dramatically lowered the costs for maintaining Charleston Harbor. The project also benefited the Charleston District. Once construction began, the district's workload doubled to \$27.7 million, which provided enough revenue to justify the takeover of most of the supporting functions that had been provided by the Savannah District.

Early data also showed the fish lift to be a resounding success, but few people grasped the full potential of the economic and environmental benefits to the state. By the turn of the 21st century, South Carolina's striped bass would be known all over the world and praised locally as an economic engine contributing nearly \$2 billion annually to the state economy.

With some 86,000 acres open to duck and goose hunting and 160,000 acres of fishing, the Santee Cooper lakes would become an important recreational area.

OPPOSITE TOP

A Charleston District contractor digging a drainage ditch in an upland disposal area to aerate and dry the material. Note the platform of wooden beams under the vehicle to keep it from sinking in the soft dirt. (USACE Charleston District)

TOP

Dredged Material Placement 1980-1984 (Fiscal Years). (USACE Charleston District)

CHAPTER 2 ENDNOTES

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¹⁰Interv, author with Charles Harbin, 19 May 19; interv, author with David Hubbard, Cooper River Rediversion Canal Project Manager (ret.), 20 May 2015; Changes to the Santee and Cooper Rivers, South Carolina Department of Natural Resources, <http://www.dnr.sc.gov/fish/fishlift/images/fishlift.pdf>.

¹¹Interv, author with Joseph E. Moran, Jr., Fisheries Biologist, Charleston District, 22 Oct. 2014.

¹²Sara Corbett, "Passing 600,000 Fish," *Palmetto Castle*, vol. 5, issue 1, Winter 2013, pp. 10-11.

¹³National Oceanographic and Atmospheric Administration, Fisheries, <http://www.noaa.gov/fisheries.html>.

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¹⁵Matthew C. Godfrey, Joshua Pollarine, and Paul Sadin, *Responsiveness & Reliability: A History of the Philadelphia District and the Marine Design Center, U.S. Army Corps of Engineers, 1972–2008* (Philadelphia: Philadelphia Engineer District, 2012), pp. 142–150; Godfrey, Pollarine, and Sadin, *Responsiveness & Reliability*, 142; Ronald B. Hartzler, *To Great and Useful Purpose: A History of the Wilmington District U.S. Army Corps of Engineers* (Wilmington, NC: Wilmington Engineer District, 1984), 95–96, 104–106; USACE Dredge McFarland, Fact sheet, Philadelphia District Marine Design Center, USACE, <http://www.nap.usace.army.mil/Missions/Factsheets/FactSheetArticleView/tabid/4694/Article/6681/usace-dredge-mcfarland.aspx>. See also USACE Dredge McFarland, Deep-draft Hopper Dredge, May 2014, <http://www.nap.usacearmy.mil/Missions/Factsheets/FactSheetArticleView/tabid/4694/article/490816/usace-dredge-mcfarland.aspx>; interv, author with Kyzer, 4 June 2015.

¹⁶Donald Lindley, "Inlet Dredging Work Proceeds Apace: Completion Seen by End of August," *Morning Journal*, Daytona Beach, FL, 11 July 1974.

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¹⁸See USACE, Engineering and Design, Dredging and Dredged Material Management, EM 1110-205025, 31 July 2015, http://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-5025.pdf.

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²⁰William F. Willingham, "The US Moves Towards More Integrative Approaches to Water Resources Management (1970–2010)," in Lonquest, Toussaint, Manous, and Ertsen, eds., pp. 312–315; Moore and Moore, *History of the Coastal Engineering Research Center, 1963–1983*, pp. 45–46.

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²²Kyzer, "Management of Dredged Material Disposal Areas," pp. 410–413, citing William Bruce Ezell, Jr., "An Investigation of Physical, Chemical and/or Biological Control of Mosquitoes in Dredged Material Disposal Areas," *Technical Report D-78-48* (Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station, 1978) and William Bruce Ezell, Jr., and Joseph Vorgetts, Jr., "A Study of Structural Modifications of Dredged Material Disposal Sites for Mosquito Control," Contract Report for USAED Charleston.

CHAPTER THREE

Development and Restoration of Civil Works Projects

Changing Views of Infrastructure

Presidential agendas have had a great impact on the Corps' operations. President John F. Kennedy helped introduce a public works program that addressed infrastructure. A decade later, in an attempt to revise the economy, President Richard Nixon cut costs by impounding funding for civil works construction and curtailing new contract awards. The Corps was charged with spending less than the originally authorized budget on civil works; however, an effect of this effort was to drive higher administrative costs, resulting in job cuts, unfilled vacancies, and early retirements.¹

President Jimmy Carter viewed the Corps' civil works program as a controllable, discretionary governmental expense and worked to end pork barrel projects.² Between 1977 and 1983, more Corps civil works projects were cancelled than authorized. President Ronald Reagan campaigned on promises to sharply cut taxes, increase defense spending, and balance the budget. These goals required cutting 83 major programs and reducing the percentage of the gross national product spent on inherited domestic programs from 15 percent to 9 percent.³ The collective result was that between 1970 and 1986, no major bill authorizing water projects passed through Congress, and federal outlays for large water projects declined by almost 80 percent. By 1984, new construction accounted for only \$1.1 billion of the Corps' \$2.6 billion civil works budget.⁴ Corrected for inflation, this was less than one-half of what the Corps had spent for new construction just four years earlier.⁵ In the Charleston District, from 1978 through 1987, new work for Charleston Harbor (a total of



\$250,760) amounted to less than one percent of the \$43 million spent for maintenance.⁶

Conditions improved with passage of the Water Resources Development Act of 1986. This legislation reformed water resources planning and authorized the Corps to start new projects for the first time in 16 years. The act reflected a "general agreement that non-federal interests should shoulder more of the financial and management burdens, and that environmental considerations were intrinsic to water resources planning."⁷ It authorized more

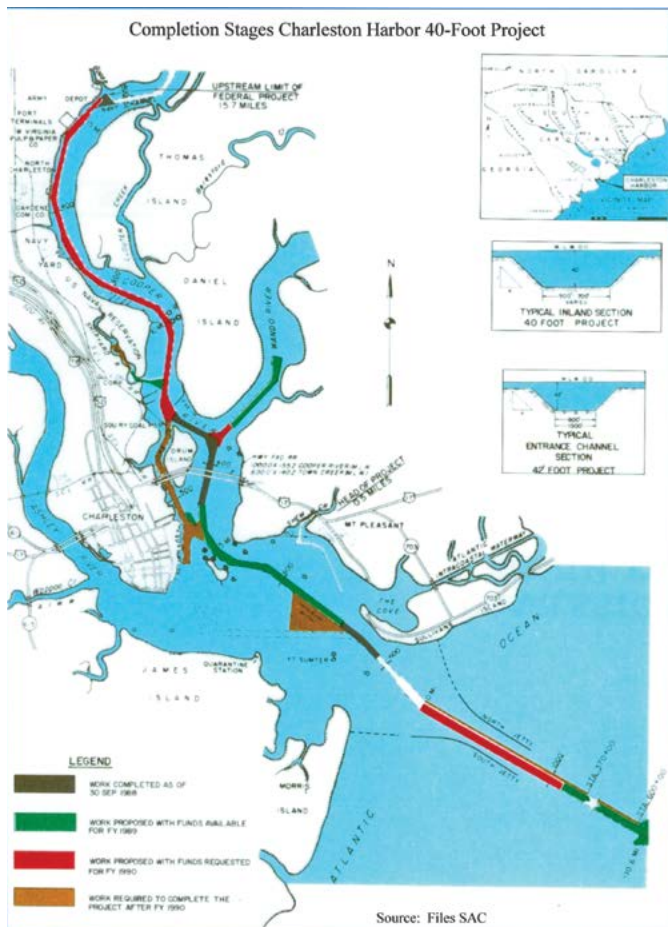
TOP
Official Portrait of
President Reagan in 1981.
(Department of Defense
Media)



additional land for dredge spoil placement areas. District engineers designed the plans and specifications, invited bids, and awarded contracts. Construction consisted of deepening the channel to 42 feet for approximately 11 miles through the ocean bar and entrance channel, and to 40 feet in the inner and upper harbors, a distance of 16 miles. Other work included deepening channels in the Wando River, Town Creek, Shipyard River, and the turning basins. The deepening work was essentially completed in August 1991, with the exception of the Wando River Extension (August 1994), and the Shipyard River entrance (June 1996).⁹

The Charleston Harbor 40-Foot Project

Congress authorized the Charleston District to evaluate deepening the harbor in 1967 and in 1974. The district recommended a new depth of 40 feet. The recommendation was reviewed at each echelon of the Corps, forwarded to the Office of the Secretary of the Army, and then transmitted to Congress, which, in Section 101 of the Water Resources Act of 1976, authorized a Phase I Advanced Engineering and Design (AE&D) study.¹⁰ Completed in 1980, the AE&D study went through a complex review process. The first series of reviews were conducted by the South Atlantic Division, the Board of Engineers for Rivers and Harbors, the Office of the Chief of Engineers, the Governor of South Carolina, and interested federal agencies.¹¹ This input was assembled into a final report that was sent to the staff of the Assistant Secretary of the Army for Civil Works, forwarded to the Secretary of the Army, ending with the Water Resources Council (WRC). The Council would determine whether the proposed project was in accord with their principles and standards, the President's Water Resources Policy initiatives, and the WRC planning procedures manual. The OCE then channeled the study back down through the Corps' chain of command to the Charleston District, which took a fresh look at



than 270 Corps projects for study or construction, including the deepening of Charleston Harbor.⁸ The Corps and the South Carolina Ports Authority (SPA), the local sponsor, signed the 40-foot project harbor agreement on February 5, 1988. Signing of the Wando River supplement followed on March 8, 1989. The SPA agreed to pay 25 percent of the project cost and furnished

the data, incorporated what was new, and sent the study back up the chain. In 1981, the 40-Foot Project was formally recommended with a signature from the Chief of Engineers and sent to Congress.¹² There it sat.

The Cooper River Seismic Project

On August 31, 1886, Charleston experienced the third largest earthquake to strike North America in recorded history, estimated at between 6.9 and 7.6 on the Richter Scale. It caused 100 deaths and almost \$6 million in damages to an estimated 2,000 buildings valued at approximately \$24 million.¹³ In the mid-1980s, engineers at The Citadel college took a fresh look at the city's preparedness for a major earthquake. They reviewed findings, conducted surveys, and concluded that the effects of an earthquake equivalent to that of 1886 would do more than \$5 billion in property damage; and leave more than 136,000 people homeless. More than 2,100 people would die, they reported, half of them children because the schools were vulnerable.¹⁴

Federal Energy Regulatory Commission (FERC) regulations required that dams producing hydroelectric power be inspected every five years.¹⁵ For reasons similar to those that led The Citadel engineers to call attention to the effects of a major earthquake, FERC upgraded the seismic requirements for the Santee-Cooper dams, requiring them to withstand an earthquake equivalent to that of 1886. In 1977 and again in 1982, inspections of the Santee dams showed that while they met or surpassed engineering requirements at the time they were constructed, they were now deemed unsafe under the new FERC standards.¹⁶ Modeling showed that failure of the 4.4-mile-long Santee North Dam would flood the Santee Swamp, a natural floodplain so broad, flat, and densely vegetated that the water would advance at only 2 miles an hour, about one-half a person's normal walking speed. The area was mostly undeveloped with minimal potential for loss of human life and property.

Failure of the West Pinopolis Dam, however, would result in considerable loss of life and property in the highly developed lower Cooper River basin, including damage to the Charleston Naval Base and Shipyard.¹⁷

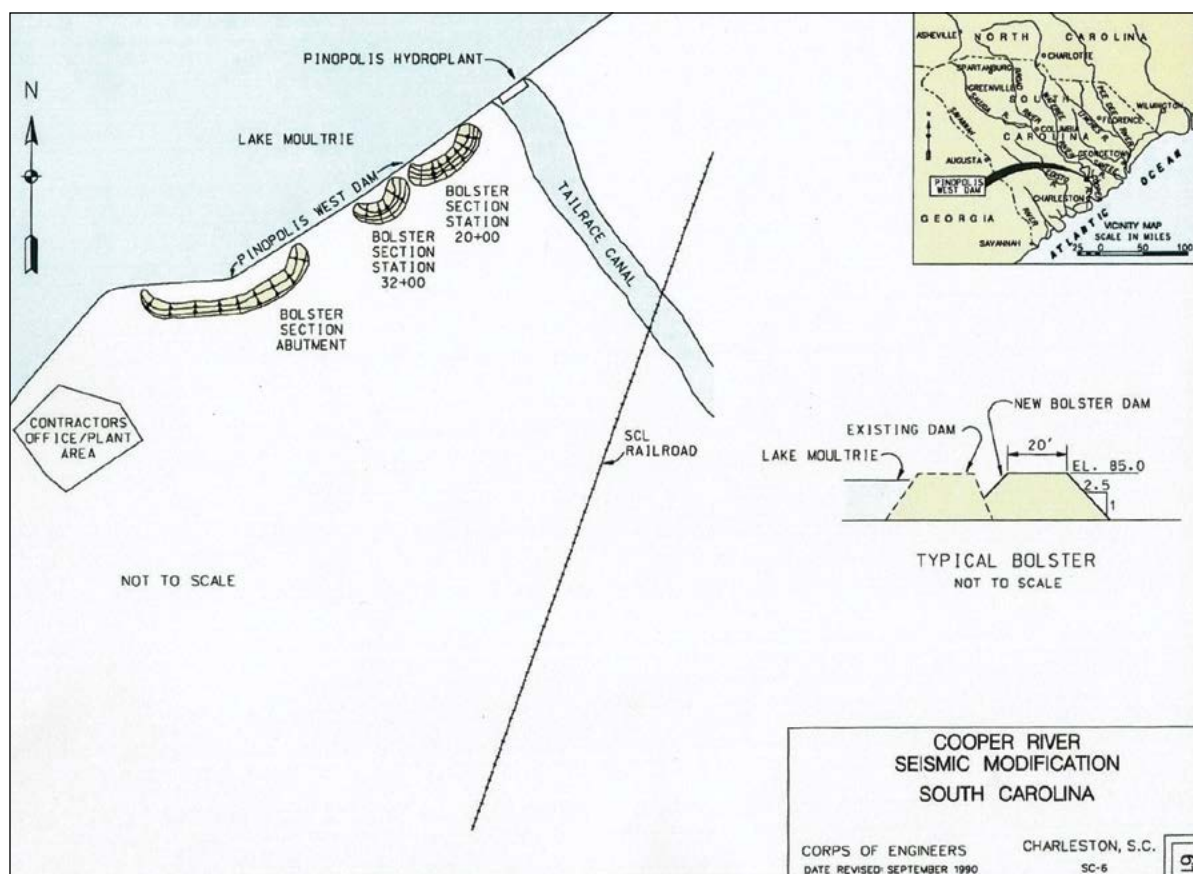
Despite the federal government's long-standing position that the repair of unsafe dams owned by states was not a federal responsibility, Santee Cooper argued that because its dams protected the Charleston Naval Base and Shipyard located downstream on the Cooper River, the federal government should pay for the two-part solution it preferred. The first part consisted of reinforcing the Pinopolis West Dam. The second part called for the construction of a closure gate in the diversion canal linking the two lakes. The gate would shut off the backflow from Lake Moultrie and preserve the generating capacity at the Pinopolis Jefferies plant in the event the North Dam was ever damaged. The South Carolina congressional delegation tucked an earmark into a 1983 legislative proposal amending the authorization of the 1968 Cooper River Rediversion Project to provide \$2 million for the Charleston District to design the seismic project Santee-Cooper wanted, and \$22 million to construct it.¹⁸ The district's study, completed in 1985, rejected Santee Cooper's proposed installation of a gate in the diversion canal because it would neither add to the North Santee Dam's safety nor be justified on a benefit-to-cost basis.¹⁹ Despite this assessment, a federally funded repair project moved ahead. The South Carolina Public Service Authority proposed a non-structural solution for the North Dam under which it would install tone alert radio receivers in dwellings located within the flood plain. It would also inform occupants how to proceed in the event of an earthquake, and coordinate evacuation procedures with local disaster preparedness agencies.²⁰ Because the subsurface at the Pinopolis West Dam was seismically unstable in three different locations totaling more than eight-tenths of a mile,

OPPOSITE TOP

A dredge working to deepen Charleston Harbor with the old Cooper River Bridges in the background. (USACE, Charleston District)

OPPOSITE BOTTOM

Completion Stages Charleston Harbor 40-Foot Project. (USACE, Charleston District)



the Charleston District proposed bolstering these sections with some 1.25 million cubic yards of material. In essence, the proposed fix would construct three new dams abutting the downstream side of the existing dam. Congress appropriated funds in 1986, work began in 1988, and the district completed construction in 1990. Santee Cooper accepted the project in 1992.²¹

The Charleston Harbor 45-Foot Project

Congress finally authorized the Charleston District to begin deepening the Charleston Harbor to 40 feet in 1990, more than nine years after the chief of engineers first recommended it. At the same time, Congress also authorized the district to start a new study aimed at widening and deepening the harbor even further. The district had proactively requested this earlier while they were waiting for authorization to start construction on the 40-foot deepening.²²

The reconnaissance phase of the new study began with the signing of a cost-sharing agreement on April 13, 1993, between the Corps and the South Carolina Ports Authority

(SPA). Once the Corps determined that there was a federal interest in a harbor channel at least 42 feet deep, the SPA requested an accelerated feasibility study to meet the deadline for its inclusion in the next water resources act.²³ Assessment of the proposed project's national economic value included the fact that in 1994 more than 10 million short tons of waterborne commerce moved through the harbor. Two-thirds of it was in the form of containerized cargo, traffic that was expected to grow.²⁴

The study also projected a continuation of military shipping, despite the recently approved recommendation of the Base Realignment and Closure Commission to close the Charleston Naval Base and Shipyard by the end of 1996. That closure would be partially offset by the Army's decision to locate a strategic logistics activity and port command at the former Charleston Naval Weapons Station. The new logistics activity would support up to 18 large cargo ships loaded with everything required to deploy and support an Army mechanized combat brigade with the vessels cycling in and out of Charleston for equipment maintenance and services.²⁵

The study also noted that commercial shipping companies were building larger, more cost-effective ships with minimum drafts of 41 feet. These larger ships could only transit Charleston's 40-foot channel by waiting for high tide, or by loading them to less than maximum capacity. This would induce shippers to move to other ports, potentially leaving Charleston behind. Panama's intent to build a new series of locks and canals alongside the old Panama Canal that would allow for vessels exceeding 40 feet in depth made the issue

even more pressing. South Carolina would face severe economic consequences if the Charleston Harbor were not deepened and improved.²⁶ Other economic benefits included cost reductions from improving turning basins, and from straightening and widening the channel to allow for two-way traffic. These improvements would reduce delays and transit times and allow ships exceeding 860 feet in length to safely pass through the channel.²⁷

Since 1896, the district had placed material dredged from Charleston Harbor's channel within an offshore site located south of the harbor entrance. It would be the location of the new Ocean Dredged Material Disposal Site (ODMDS). The new deepening plan called for two ODMDS areas. The larger, some 11.8 square nautical miles with an average depth of 11 meters, was intended for the one-time use of dredged materials during the period surrounding the deepening project. For post-project maintenance dredging, the district planned to use a smaller, newly designated ODMDS, approximately 2.8 by 1.1 nautical miles.

However, local fishermen raised alarm over concern that the proposed site might harm areas of live bottom. While most of the seabed off the shores of South Carolina is sandy and relatively barren, there are areas of live bottom with outcrops of limestone and fossilized worm tubes that support sponges, barnacles, algae, and soft corals, all of which support various fish species such as sea bass and sheepshead. A mapping survey determined the location of the live bottom areas. Based on that survey, in 1993, the South Carolina Department of Natural Resources, the SPA, and the Charleston District jointly decided to move the disposal area to minimize the potential damage to live bottom areas.²⁸

Major upland disposal sites included Clouter Creek, the largest, located along the east bank of the Cooper River east of North

Charleston and the Charleston Naval Shipyard, the southern two-thirds of which were transferred from the Navy to the Corps when the Charleston Naval Shipyard closed.²⁹



Dredging and placement of materials are critical parts of any harbor improvement project. Per cubic yard, dredging to deepen a harbor (known as construction dredging) is more than twice as expensive as maintenance dredging.³⁰ The evaluation of project alternatives for Charleston Harbor was driven by both the cost of construction dredging and the estimated amount of maintenance dredging that would be required to maintain the project depth. The time required to complete the deepening was estimated as three years for a 41- or 42-foot channel depth, four years for a 43- to 45-foot depth, and five years for a 46-foot depth. Estimates of increased dredging quantities ranged from 19.3 million cubic yards for a 41-foot depth to 42.5 million cubic yards for a 46-foot depth. A Waterways Experiment Station sedimentation study estimated the amount of annual maintenance dredging required to maintain each of the project depths. Planning also took into consideration placement of

OPPOSITE TOP

Cooper River Seismic Modification. (USACE Charleston District)

MIDDLE

District employee overlooking the vast Clouter Creek upland disposal area. (USACE Charleston District)



dredged material and assuring that lower-cost upland sites did not exceed their capacity. Final calculations determined that deepening the channel to 45 feet maximized the National Economic Development Benefit.³¹

To preserve cultural resources, the district conducted magnetic and acoustic surveys of the navigation channel and new work areas. The South Carolina Historic Preservation Office was particularly concerned that the work might destroy the wreckage of the *Patapsco*, a Union ironclad that sank near the harbor entrance after exploding a Confederate mine in the closing months of the Civil War. The survey located the wreck outside the proposed project area, eliminating it from concern.³² Environmental considerations included habitat for blue crab and shrimp in the harbor estuary—important because shrimp was South Carolina’s largest commercial fishery, with Charleston Harbor contributing 20 percent of the total. The assessment team concluded the project’s anticipated environmental effects did not require preparation of an environmental impact statement.³³

The South Carolina Highway Department voiced concern over the proposed deepening of the channel under the two Highway 17 bridges that crossed the Cooper River and Town Creek to connect downtown Charleston with Mount Pleasant. The bridges were already scouring around their foundations, and they feared a deeper channel might make it worse. The Silas Pearlman Bridge, which opened in 1961, spanned 700 feet of the navigation channel. The “new” Grace Memorial Bridge, which replaced its predecessor in 1966, spanned 1,000 feet. Though the Corps’ survey data did not bear out the highway department’s fears, its position suggested consultation was in order.³⁴

The district completed the feasibility study in time for its inclusion in the Rivers and Harbors Act of 1996. Based on the construction schedule, planners estimated the total initial project cost at \$116.6 million, of which \$43.8 million would be provided by the state, leaving \$72.8 million for the federal share.³⁵ Congress approved the project in

Section 101 of the Water Resources Development Act of 1996.³⁶

The Efforts to Expand Terminals

The South Carolina Ports Authority owned four public terminals in Charleston Harbor providing more than two miles of berthing space, room for 17 vessels to dock at one time. Anticipating greater traffic volume, especially in containerized cargo, the SPA planned to construct a fifth terminal on Daniel Island and in 1992 purchased 800 acres of land for \$7 million. That same year, a major highway bypass (I-526) was extended east over the Cooper and Wando Rivers, connecting Mount Pleasant and North Charleston. The bypass plans included a new interchange that would make Daniel Island readily accessible to vehicles, and subsequently, ripe for development. The City of Charleston and the Guggenheim Foundation, which owned the previously undeveloped property, reached an agreement under which the city would annex the island, fund the \$15 million required to provide sewer and water service, and later construct municipal buildings and a park.

The Daniel Island Development Company, created by the Guggenheim Foundation, would guide the development of a planned community. The infrastructure work began in 1995. That same year, the SPA purchased additional land from the foundation and started developing plans to construct a \$1.2 billion container facility on the island. The SPA also contributed \$7.4 million toward the construction of the highway interchange to facilitate vehicle access.³⁷

By 1997, a growing number of Daniel Island residents began to voice opposition to the SPA's plan to build a major port terminal on



their island. By 1999, when the SPA released their environmental impact report for its 12-berth, 1,300-acre container terminal, the project had attracted opposition from environmentalists, neighborhood groups, the Guggenheim Foundation, and the City of Charleston. In the end, the South Carolina General Assembly enacted legislation prohibiting the construction of the new terminal facility on Daniel Island.

In 2000, the SPA withdrew their permit application for a Daniel Island terminal and turned to an alternative site on the southern half of the former naval base that it purchased in 1999. This aroused a similar protest from the residents of the City of North Charleston. The state legislature and the federal government responded in 2002 by offering North Charleston

OPPOSITE TOP

Silas N. Pearman & John P. Grace Memorial bridges over the Cooper River in 1967. (South Carolina Department of Transportation)

TOP

Container ships at the Wando Welch Terminal. (USACE Charleston District)

MIDDLE

2008 view of the former Charleston Naval Base. The future site of the Hugh Leatherman container terminal is in the foreground. Part of the massive Clouter Creek Upland Disposal Area is at the top of the photo. (South Carolina Ports Authority)

the northern half of the former Charleston Naval Shipyard in exchange for negotiating an agreement to allow the SPA to construct its terminal. Following the signing of a memorandum of understanding, the South Carolina General Assembly directed the SPA to undertake the permitting and other actions required to move the project forward, and in January 2003, the SPA submitted a permit application to the Charleston District. The

district determined that the terminal and highway access projects were significant enough to require an environmental impact statement. After much coordination and consideration of alternatives, in April 2007, the district issued its permit for the planned 286-acre terminal. That same year, the district also completed the construction of a new turning basin in the Cooper River to support the new terminal.³⁸

Summary

During the 30-year period from 1978 through 2012, the Charleston District completed slightly more than one billion dollars in civil works projects. The yearly totals ranged from a low of \$14.9 million in 1986 to a high of \$72.9 million in 2000. Navigation projects comprised the district's most important work and the largest were related to Charleston Harbor.³⁹



Savannah River Plant

In 1948, the United States conducted nuclear bomb tests with devices that could be mass produced (Operation Sandstone). The Soviet Union exploded their first atomic bomb

in August 1949 and began their own nuclear weapons production program. The Cold War's nuclear arms race had begun. On November 28, 1950, the Atomic Energy Commission announced that E.I. Du Pont De Nemours and Company would build production plants to produce tritium and plutonium for nuclear weapons on 250,000 acres of land in a remote area east of the Savannah River in Aiken and Barnwell Counties. The Charleston District completed subsurface investigations and provided technical assistance during the initial stages of construction of the Savannah River Plant (SRP).⁴⁰

In the 1980s, the Charleston District was still working at the SRP under an interagency agreement to provide general project management, economic, and value engineering studies, cost estimates, construction management, and traditional design, procurement, and construction functions.⁴¹ The existing security facilities for the plant, dating from the 1950s, were woefully insufficient. To upgrade them, the

Department of Energy (DOE) invited the Charleston District to manage several projects. Project Manager Francis L. Limbaker remembers that DOE “soon realized we could do some projects a lot cheaper and quicker and get more bidders on the site using government specs versus DuPont specs.”⁴² District work during this period included the construction of the site’s entry point guard structures.⁴³

The district’s environmental projects at the SRP included Par Pond and the Savannah River Ecology Laboratory (SREL), a research unit of the University of Georgia established in 1951 to conduct ecological studies of the site’s plants and animals.⁴⁴ In 1979, SREL was headquartered in a large laboratory building surrounded by waterfowl pens, greenhouses, and other structures and had become instrumental in identifying the various waste sites and formulating treatment plans.⁴⁵ One district project involved the addition of a reptile house⁴⁶ to study the effects of radioactive discharges into ponds, swamps, and creeks leading into the Savannah River that contaminated some areas with levels approximately 1,000 times global fallout from nuclear weapons testing.⁴⁷ The SREL study evaluated alligators and the yellow-bellied slider turtle as possible “sentinel species” for determining radiological effects in the environment.

In 1989, the SRP became subject to Environmental Protection Agency regulations. The same year, DOE selected Westinghouse Electric to operate the plant, and the name



was changed to the Savannah River Site (SRS).⁴⁸ In the mid-1980s the plant’s heavy water reactors were producing fresh tritium, a radioactive component of thermonuclear bombs. But by 1986, SRS began construction of the Tritium Replacement Facility for the interim recycling of tritium from thermonuclear warheads being taken out of service as the result of nuclear arms reduction treaties. The facility, a totally confined building on a one-acre site, was the only one of its kind in the Nation. Charles Harbin led the Charleston District’s third-party observation team that oversaw the construction.

The Charleston District also renovated Building 235-F, a blast-resistant, windowless, two-story, reinforced concrete structure. The renovation was needed so the building could receive, store, and disburse plutonium-bearing materials for the continued production of plutonium-238, an important nuclear fuel used to power deep-space exploration vehicles.

OPPOSITE MIDDLE

New Ellenton security entrance at the Savannah River Site, constructed by the Charleston District. (USACE Charleston District)

TOP

Charlie Harbin receiving the coveted Employee of the Month Award from District Commander, LTC Alvin Lee. (USACE Charleston District)



The production of nuclear material results in high volumes of radioactive waste byproducts. The Defense Waste Processing Facility (DWPF) began operation in 1966 to remove low-level nuclear waste from storage tanks. Low-level waste is mixed with cement, ash, and furnace slag and poured into permanent concrete vaults for safe disposal at the SRP's Saltstone Disposal Facility. The higher-activity waste is sent to DWPF, where the radioactive elements are bonded in borosilicate glass, a stable storage form. "[This facility] was a huge, interesting project built by an architect/engineer firm that we managed and oversaw," said Harbin. "Here, nuclear waste is converted into borosilicate glass; the molten glass is poured into stainless steel cylinders about 2 feet in diameter and about

12 feet long; the cylinders are lowered through the floor for storage, and air is circulated around them to keep them from getting too hot." Since DWPF began operations, more than 10 million pounds of radioactive glass have been produced and about 36 million gallons of radioactive liquid waste are stored in 49 underground tanks.⁴⁹

Other district projects at the SRS included the calibration facility, where employees calibrated all the instruments they used to measure radiation exposure. "If the radiation level reached 35 percent, people were pulled out. That was a large project. It was what the DOE referred to as a line-item project. I think that is the only one we really ever did as a line item," said Harbin.⁵⁰

Summary

Although the Charleston District did not start to work on projects at the Savannah River Site until 1985, at a relatively small scale, by 1998, the District had completed a total of \$68.4 million in technical assistance and design and construction projects.⁵¹ This work contributed to one of the Nation's most strategically significant facilities.

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OPPOSITE TOP

District Engineer, LTC Jason Kirk visits an SRS facility under construction with his Deputy for Program Management, Bill Stein, along with Chief of Construction David Dodds, Chief of Technical Services, Matt Laws, and Program Manager Jim Whiteman along with other District employees working at the site in 2011. (USACE Charleston District)

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CHAPTER FOUR

Preserving Heritage, Ecosystems, and the Environment

Lowcountry Heritage

The Corps of Engineers' Continuing Authorities Program (CAP) is a group of legislative authorities under which the Corps of Engineers can plan, design, and implement certain types of water resource projects without additional project-specific congressional authorization. The projects are limited in size, cost, scope, and complexity, and under this program, the Charleston District has undertaken projects to protect structures of historical significance.

Drayton Hall Plantation. Located about 15 miles northwest of Charleston on the banks of the Ashley River and the only plantation house on the Ashley to survive both the Revolutionary and Civil Wars, Drayton Hall is one of the finest examples of Georgian-Palladian architecture. Erosion threatened the foundation of an 18th-century garden house, once a large-windowed building typical of those constructed on the grounds of fashionable residences of the period. The foundation was all that remained from the original structure. To protect the site, district engineers constructed a sloped surface by filling 410 feet of eroded riverbank with compacted aggregate, layered with geotextile filter fabric, and topped with a 21-inch graded riprap. The Drayton Hall project was completed in 1993.

Pompion Hill Chapel. A National Historic Landmark, described in the National Historic Register as a "miniature Georgian masterpiece," this brick chapel sits on a bluff adjacent to the East Branch of the Cooper River near the town of Huger in Berkeley County.



Erosion of the protective cypress bulkhead constructed in the 1930s left pilings exposed more than 50 feet from the bank. In March 1986, Berkeley County requested the Charleston District study methods to protect the remaining 40 feet of bluff. In 1993, the district completed the construction of a revetment consisting of a two-and-one-half-foot layer of granite riprap laid over a nine-inch layer of bedding material along 200 feet of bank.¹

Castle Pinckney. An undeclared war at sea with France was fought during the French Revolution. To defend Charleston Harbor

TOP
view of the Drayton Hall garden house foundation with the Ashley River behind. (USACE Charleston District)

MIDDLE
Picture of the historic Pompion Hill Chapel taken in 1940 as part of a historic property survey. (Historic American Buildings Survey. Photograph. Retrieved from the Library of Congress)



from potential attack, in 1798 Charlestonians hastily constructed a log and sand fort on the southern end of Shutes Folly, a low-lying sand bar located three-quarters of a mile off the tip of the Charleston peninsula. In 1809, the fort was rebuilt of brick and was used for multiple purposes during and after the Civil War. After several changes of ownership, Castle Pinckney was reacquired by the South Carolina Ports Authority in 1994.² By 1998, Shutes Folly Island had eroded from the 224 acres estimated in 1711 to less than 64 acres, and the brick fortification was in danger of falling into the water. In cooperation with the SPA, the District completed a project in 1999 consisting of a 100-yard breakwater of 1,667 tons of armor stone covered with geotextile fabric and 582 tons of bedding stone to level the island

surface, which was covered with 308 tons of coarse aggregate.³ The breakwater effectively stopped the erosion near the fort, saving it from certain destruction.

Fort Pringle. Built during the Civil War, the structure was named for a South Carolina artillery captain killed on Morris Island. It is one of the 69 major field works that comprised the Civil War defenses of Charleston. Also called Battery Pringle, it is listed on the National Register of Historic Places. The Charleston Museum owns the fortification, conducts regular tours, and maintains the site.⁴

The western earthen rampart next to the Stono River had eroded 35 feet over a span of 26 years.⁵ The protection plan called for filling eroded areas along the toe of the embankment and reshaping it. Features of the plan included removing oak trees that were in danger of falling, pruning the remaining trees to aid in the growth of plantings, and protecting the slope with 24 inches of graded riprap placed on nine inches of bedding over geotextile filter. The local sponsor, the Charleston Soil and Water Conservation District, accepted the project on behalf of the Charleston Museum in January 1996. In 1999, the District added additional protection.⁶

The Complex Process to Save the Morris Island Lighthouse

The effort to save the Morris Island Lighthouse illustrates the complexity often associated with projects the Corps undertakes—not only the challenges of water, weather, and time, but also with funding mechanisms, ownership issues, and the involvement of government entities at many levels. Morris Island is the first barrier island south of Charleston Harbor. The deepest natural channel into the harbor was off the island, so it was here that King George III authorized the construction of a lighthouse to help guide ships into the channel. The structure was completed in 1767 and stood at a height of 42 feet. A replacement lighthouse that stood

at 102 feet was destroyed by Confederate forces in 1862 to keep the Union Navy warships blockading Charleston from using it as a navigation landmark.

The third lighthouse on Morris Island was completed in 1876 at a height of 161 feet. It was erected on a base of pilings and grillage on high ground more than half a mile inland from the shore. Because of its historical significance, the lighthouse was placed on the National Register of Historic Places in 1982.⁷



For over a century, the lighthouse suffered from erosion, weathering, ocean currents, earthquakes, and hurricanes. Because of the continuing erosion of the Morris Island shoreline, by 1999, the lighthouse was completely surrounded by water reaching 10 feet deep at high tide and was in danger of falling over. A local nonprofit foundation, Save the Light, purchased the lighthouse for \$75,000 and requested assistance from the Corps to stabilize the structure. In 2000, Save the Light transferred the property as a "passive use cultural icon," to the South Carolina Department of Natural Resources (SCDNR) for a 100-year lease at a dollar a year. In return, SCDNR made available \$500,000 from the state budget. The lease provided that access would be limited.⁸ The district's initial assessment revealed that a sheet pile cofferdam placed around the lighthouse in 1938 had deteriorated, and shipworms had weakened the wooden pilings. Because the district plan for saving the lighthouse exceeded the \$500,000 federal maximum allowed for a Section 14 project (emergency shoreline and stream bank protection), the work was changed to a Section 103 project under the

Continuing Authorities Program. That section authorized the Corps to develop and construct small shore and beach restoration and protection projects costing up to \$3 million. This change required a new Letter of Intent, which the SCDNR was unwilling to provide. In 2004, the South Carolina General Assembly enacted legislation transferring ownership to the State Budget and Control Board and authorized the Board to execute the necessary agreements with the federal government. The district submitted its feasibility study in 2005 but before it could be approved, the U.S. House and Senate Conference Committee on Appropriations directed the Corps not to initiate or restart any project within the Continuing Authorities Program.⁹ During the interim, the project was deemed to qualify under Section 111 of the 1968 River and Harbor Act, which requires the federal government to pay for damage to shores caused by federal navigation projects. A study had concluded that the Charleston jetties were responsible for 75 percent of the beach erosion in the vicinity of the Morris Island Lighthouse.¹⁰

OPPOSITE TOP

The ruins of Castle Pinkney with the Ravenel Bridge and a large container ship in the background. (South Carolina Ports Authority)

OPPOSITE MIDDLE

Riprap placed along the Stono River in 1996 to protect the Fort Pringle historic site from erosion. (Courtesy of The Charleston Museum, Charleston, South Carolina)

TOP

The Morris Island Lighthouse before stabilization. (USACE, Charleston District)



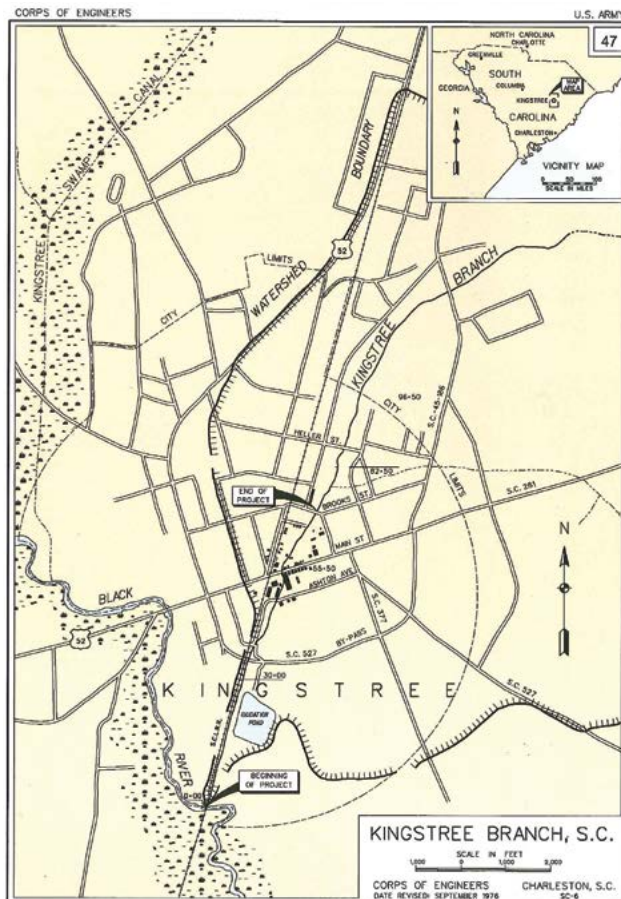
million, was completed in 2008. This highly visible district project to protect a storied local landmark received numerous inquiries from the media and resulted in multiple press conferences, newspaper articles, television coverage, and even a chapter in a book published during the construction.¹²

Kingstree and Other Flood-Control Projects

Shipbuilders in the colonial era sought tall white pine trees for use as masts on sailing ships. Those found were marked as property of the king. An unusually large white pine discovered along the Black River was never cut, and in time, became the location of the town of Kingstree. Unfortunately, much of town was located on the flood plain. During floods, the water reached ever-higher stages and even small storms produced damage. In 1997, the Charleston District designed a project to provide a rapid exit for floodwaters by enlarging the Kingstree Branch from the town center to the point where it joined the Black River upstream and by placing 1,100 tons of riprap along the bottom and banks. It also included an effort to educate public officials about non-structural methods for dealing with floods, such as designating floodways and incorporating the Federal Flood Insurance Program standards.¹³

Among the Charleston District's other flood control projects:

- Clearing and snagging 1.5 miles of Cow Castle Creek that flows from the city of Orangeburg to Four Hole Swamp (1984).
- Modifying nearly 4 miles of Eagle Creek flowing from subdivisions near Summerville to the Ashley River (1985).
- Excavating a channel and stabilizing slightly more than a mile of Scotts Creek within the corporate limits of the town of Newberry (1987).
- Clearing and enlarging 2.1 miles of channel in Socastee Creek, a small coastal stream inland adjacent to Myrtle Beach (1995).



Usually, when the Corps prepares for a project, it develops the design—typically a design with a 50-year project life span—and then calculates the budget. For the Morris Island Lighthouse project, however, a tight construction budget was already set. Nevertheless, district engineers designed the project with a 98-percent chance of resisting the breaking waves of a major 50-year storm.¹¹ Few contractors were willing to undertake the work because of the poor condition

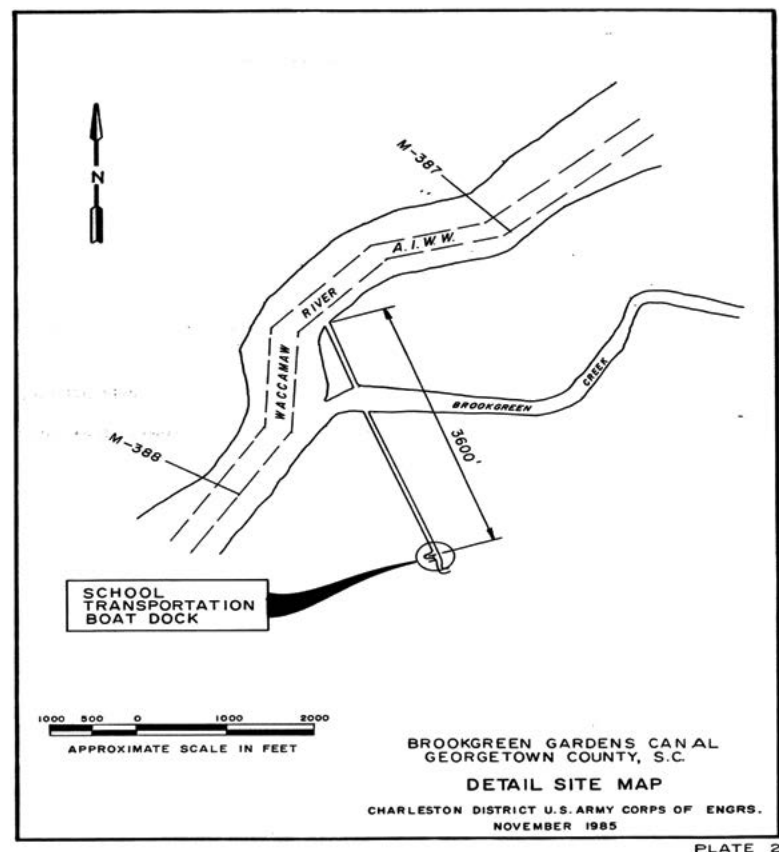
of the lighthouse's foundation. The fact that the structure was leaning off center prompted fears that it might fall over from the slightest disturbance or vibration. But finally, the district found a contractor who accepted the challenge, and the year-long restoration, totaling \$1.6

- Purchasing and removing six houses from the flood plain within the town of Cheraw, an entirely non-structural solution to flooding from Wilson Creek (1985).¹⁴

Shoreline Protection

Between 1995 and 1997, the Corps completed four shoreline protection projects¹⁵

- At Indian Bluff Recreation Park, located next to Lake Marion in Orangeburg County, wind-generated waves threatened the park and the pier. The project involved clearing and shaping the bank and protecting some 1,113 feet of roadway with 2,152 tons of riprap and 663 tons of bedding over geotextile fabric.¹⁶
- The South Carolina Department of Transportation Bridges project consisted of protecting the bridge abutments from streambank erosion at five sites where undermining of the bridge approaches threatened to close the roadways. It meant shaping existing embankments, placing geotextile fabric, and overlaying that with a double-layer mat injected with mortar to form a 6-inch-thick articulated blanket at each site.
- At the Pinopolis Dam, the original 14-inch-thick concrete embankments had showed signs of fatigue and were topped in 1970 with hand-placed riprap. In 1989, Hurricane Hugo displaced some of this protection and the winter storms of 1993 did additional damage. The Pinopolis protection project involved placing approximately 1,976 feet of a one-foot bedding stone layer topped by larger graded riprap on the lake side of Pinopolis East Dam and along approximately 85 linear feet of the Pinopolis West Dam.¹⁷
- The Santee Dam was in a similar condition. This project involved placing bedding and riprap on approximately 2,688 linear feet of the upstream face of the Santee North Dam and 115 feet along the Santee South Dam.¹⁸



Brookgreen Gardens

This public sculpture garden and nature preserve, occupies approximately 9,100 acres of forest, rice fields, and beachfront between the Waccamaw River and the ocean in Georgetown County. It was listed on the National Register of Historic Places in 1978. The 551-acre sculpture garden features some 1,445 works and was designated a National Historic Landmark in 1984. It is part of the South Carolina National Heritage Corridor and the Eastern South Carolina Heritage Region. The Brookgreen Garden Canal is a 30-foot-wide navigation channel located on its western edge. Since road access to nearby Sandy Island is difficult and limited, the canal was the primary route to the mainland for approximately 150 island residents who typically used shallow-draft boats to move between the island and the mainland. So much silting occurred that at low tide nothing could cross. In August 1990, the district completed a project that consisted of dredging the two-thirds-mile-long canal to a depth of four feet at mean low water.¹⁹

OPPOSITE TOP

Contractors working to emplace a protective coffer dam around the lighthouse. (USACE, Charleston District)

OPPOSITE MIDDLE

Project map from 1997 showing where work was accomplished to alleviate flooding in the town of Kingstree. (USACE, Charleston District)

TOP

Project map from 1985 depicting the Brookgreen Garden Canal. (USACE, Charleston District)



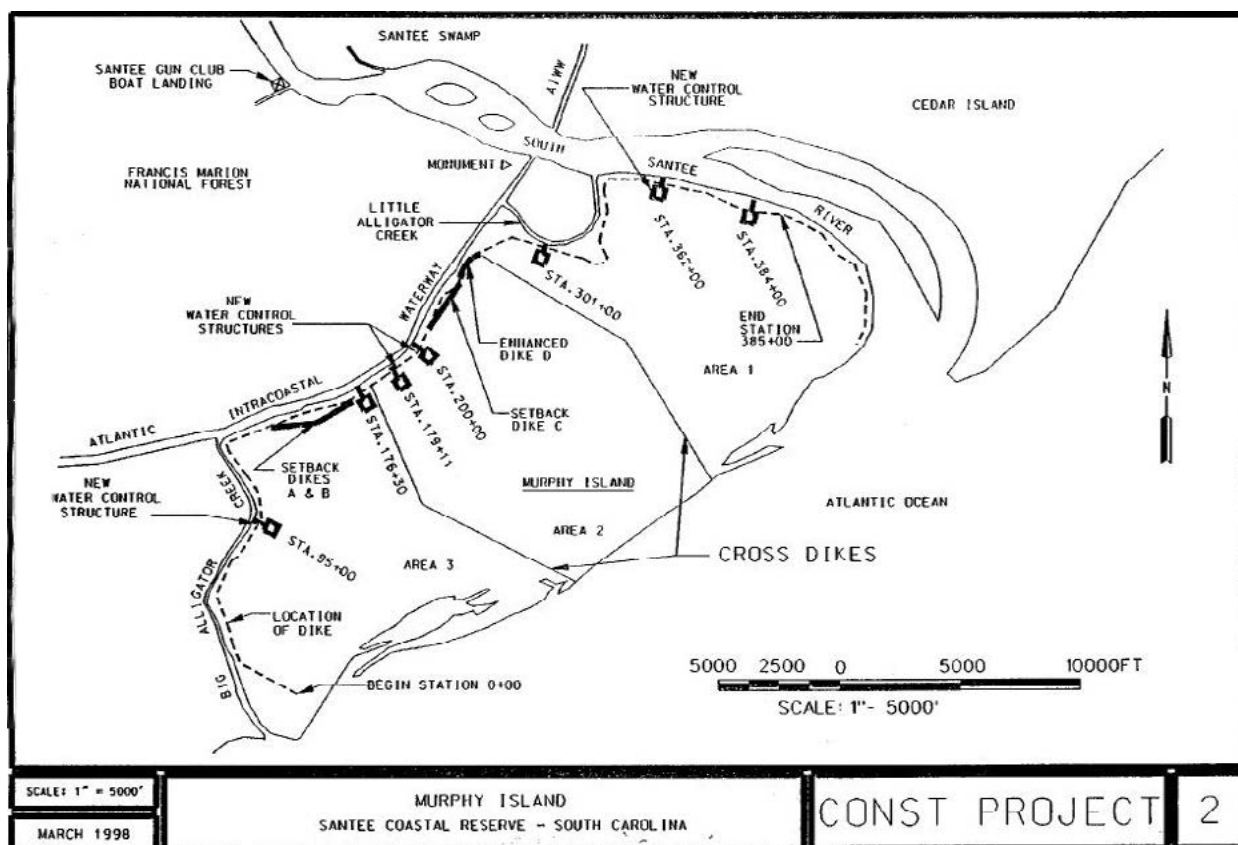
Pocotaligo Swamp

Section 206 of the Water Resources Development Act of 1996 allows the Corps to contribute its expertise to the restoration of aquatic ecosystems to improve the quality of the environment.²⁰ The Pocotaligo Swamp, located at the headwaters of the Black River between the municipalities of Sumter and Manning, had been degraded by the combined effects of logging roads, municipal discharges, and Hurricane Hugo. The once-beautiful, canopied swamp had turned into a near-septic, vegetation-clogged lake. Local efforts to reclaim the swamp began in 1974. In 1988, the Pocotaligo Swamp Reclamation Committee started working with the Charleston District as it undertook a study of the Black River and its tributaries that emphasized environmental restoration.²¹ Faculty members from the

University of South Carolina and Clemson University conducted studies and forged a partnership with the U.S. Geological Survey to install and monitor water flow gauges. Early improvement attempts included the South Carolina National Guard blasting 115 breaches in logging access roads to improve water flow, hand-clearing three miles of stream channels, and spraying five miles of channels with aquatic herbicides.²² By 2008, the many agencies, governments, and environmental organizations agreed on a Corps project consisting of clearing and snagging approximately 15 miles in two overgrown streambeds—each 20 feet wide and four feet deep—to allow the water to resume flowing and create conditions where approximately 6,000 acres could revert to its earlier state of a forested swamp that normally dried up for part of each year. A barge crew removed debris using a floating excavator and a power shovel. In time, the environmentally sensitive solution began to create a wildlife habitat.²³ As the swamp was restored, bald cypress seedlings were planted to expedite the reforestation process. The district completed the project in 2009.²⁴

Murphy Island Waterfowl Habitat Restoration

Environmental restoration projects are constructed in areas that require modification to the hydrologic regimes of rivers, lakes, and wetlands to benefit the environment through restoring, improving, or protecting the habitat for plants, fish and wildlife.²⁵ Murphy Island is part of the Santee Coastal Reserve and lies adjacent to the Atlantic Intracoastal Waterway. Approximately 5,500 of the island's 7,927 acres consist of impoundments managed by the South Carolina Department of Natural Resources to provide prime wetland habitat for ducks and geese along the Atlantic Flyway, as well as numerous other wildlife species. Impoundment management consists of manipulating salinity, water levels, and bed disturbance using the natural flow as much as possible to increase the population



of certain aquatic plants and discourage the growth of undesirables.

When the Charleston District completed construction of the Atlantic Intracoastal Waterway in 1940, it converted a shallow tidal creek 30 feet wide and 2 feet deep into a 226-foot wide, 14-foot-deep navigation channel. This caused the salt marsh buffer separating the waterway and the impoundment on Murphy Island to disappear, enabling the spring high tides, storm surge, and boat wakes to erode the dikes. A Corps improvement project, completed in 1997, constructed 5,400 feet of setback dikes, raised 4,400 feet of the existing dike, and installed seven additional control structures to enhance management of water levels and increase the desirable plant food production by 3.75 million pounds a year. An environmental assessment projected that the plan would support a 25-percent increase in the waterfowl population.²⁶

Aquatic Plant Management

During the past century, South Carolina has been affected by the proliferation of invasive aquatic plants from around the world.¹⁰¹ Since 1981, the Charleston District has worked with South Carolina agencies to control harmful plants in Lake Marion, Lake Moultrie, Lake Murray, the Goose Creek and Black River Reservoirs, and the Cooper River through a variety of strategies. To control the spread of alligator weed the agencies implemented the combination of spraying herbicide with the use of biological control agents.

To treat Brazilian elodea, *Hydrilla*, and other submerged plants, the plan involved herbicide treatment, stocking lakes with sterile grass carp, and distributing flea beetles in the coastal region to establish populations that would feed on the weeds with no adverse impact on the aquatic environment.

OPPOSITE TOP

Equipment used to help restore waterflow in the swamp. (USACE, Charleston District)

OPPOSITE MIDDLE

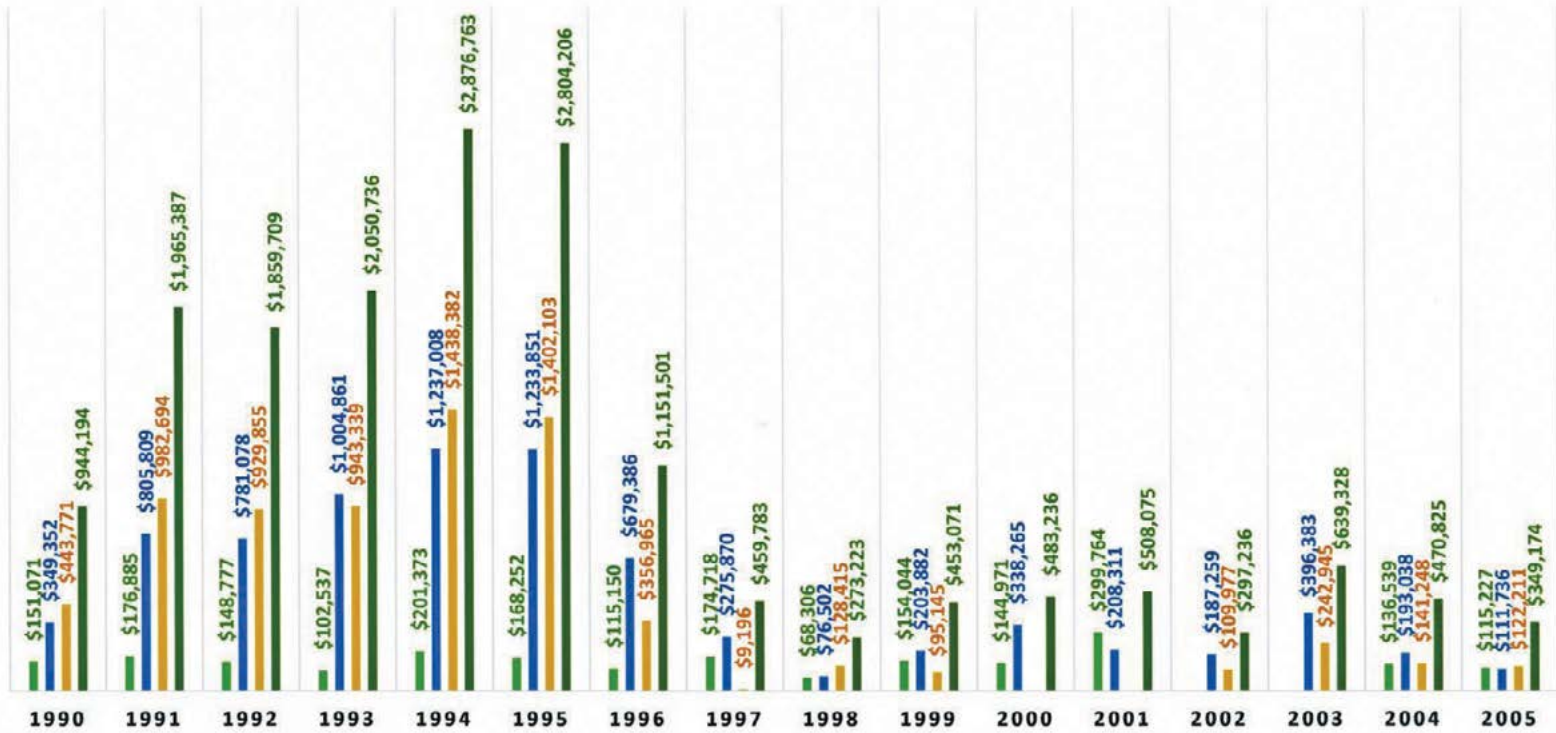
Pocotaligo Swamp. (USACE, Charleston District)

TOP

Project map from 1998 showing construction features completed on Murphy Island. (USACE, Charleston District)

South Carolina Aquatic Plant Funding 1990 - 2005 (Calendar Years)

State Local Federal Total



When the Charleston District's program began, noxious plants affected about 40,000 acres of South Carolina waters and threatened the efficiency of the Santee-Cooper hydroelectric project. By 1998, treatment programs reduced that total to slightly more than 10,000 affected acres and brought the problem in Lakes Marion and Moultrie under control. The positive results notwithstanding, the lack of funding from the late 1990s onward has allowed noxious aquatic plants to affect slightly more than 15,000 acres and new invasive plants like crested floating heart are making their way into South Carolina waters. possible.

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OPPOSITE TOP
South Carolina Aquatic Plant Funding 1990-2005 (Calendar Years). (USACE, Charleston District)

OPPOSITE MIDDLE
Hydrilla plants infesting a body of water. (USACE, Jacksonville District)

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CHAPTER FIVE

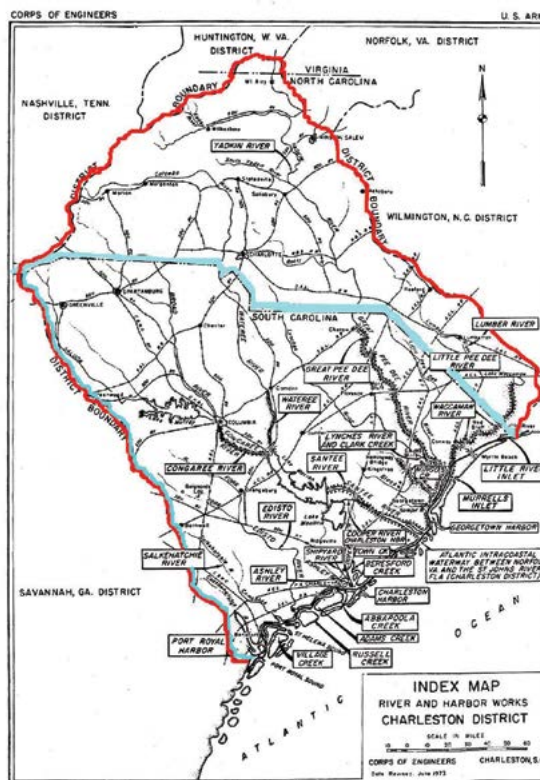
The District's Regulatory Program

South Carolina has the highest concentration of wetlands in the United States relative to its size, approximately 4.5 million acres or almost one-quarter of the land surface (23.4 percent).¹ Some of the state's greatest population expansion and heaviest development has been superimposed over this expanse of wetlands.² These two factors combine to create a challenging and demanding environment for the Charleston District's Regulatory Program.

The Corps of Engineers first established a permit process in 1905, derived from the Rivers and Harbors Act of 1899. This initial authority expanded as the result of additional legislation, executive orders, and court decisions.³ In 1975, the Charleston District established a nine-person Regulatory Functions Branch within its Operations Division, responsible for permitting actions within 3.5 million acres of wetlands in both North and South Carolina. By 1979, it was processing some 400 permit applications annually.⁴

Regulating South Carolina Waters and Wetlands

The Corps' 1981 realignment dramatically reduced the Charleston District's Regulatory Program to only cover wetlands within the state of South Carolina, excluding the Savannah River Basin. The realignment also reduced the office's staffing to only four employees, leaving them responsible for all wetlands, saltwater marshes, and 35,461 miles of rivers and streams in South Carolina. Project Manager Jimmy Hadden remembers the challenge this presented:



That was a lot of field work...I used to do air surveillance. I'd get in a small Cessna and start at the coast with a 35mm camera in my lap and a county book. We'd fly over these rivers, I'd look for what I assumed were illegal activities, jot those down, take pictures, take notes, and put it in the book. I'd land and the next day I would start ground-truthing to see if it was work and whether it had a permit or not.⁵

Under the Reagan administration, the categories of stream alterations that required Corps permits were curtailed and its staff was reduced, yet the Corps' responsibilities expanded. In the Water Resources Development Act of 1990, Congress directed the Corps to seek "no overall loss of wetlands."

During this period, the Corps' regulatory responsibilities were also becoming more complex and structured. A *Wetlands Delineation*

TOP Map from the 1970's highlighting the many rivers and coastal areas the Charleston District was responsible for permitting. Areas in red were transferred to neighboring districts in 1981. (USACE, Charleston District)



Manual published in 1987 helped regulators determine whether a particular area was a wetland or not. Implementation guidelines followed in 1991, along with a clarifying memorandum in 1992.⁶ In 1993, the Clinton administration authorized mitigation banks to offset the loss of wetlands from development.⁷

Corps-wide during the 1990s, the Regulatory Program annually processed about 80,000 permits requiring Section 10 (wildlife protection) and Section 404 (clean waters) approval. On average, the Corps denied only about 600 actions a year even though some 15,000 of the yearly applications were for individual permits. Districts sought penalties and fines for about 5,000 violations, mostly for unpermitted discharges into federal waters. In 1994, Section 404 permit authorizations took an average of 25 days and individual permits averaged 115 days for approval. The Corps set a new goal of processing 85 to 95 percent of all permit applications within 60 days. Most Section 404 permits required some form of compensatory mitigation to replace those aquatic ecosystem functions lost or impaired by an authorized activity. In 1997 alone, the Corps required 53,400 acres of wetland restoration and creation through its permit program nationwide.⁸

During the 1990s, the number of wetland jurisdiction determinations, reported violations, and individual permit applications

submitted to the Charleston District doubled, and projects were becoming more expensive, many with construction costs exceeding \$100 million. The heavy workload consistently outran planning and staffing. By 1997, the number of projects in South Carolina's section of the rapidly developing Interstate-85 corridor between Atlanta, Georgia, and Charlotte, North Carolina, had risen by 40 percent. In August 1998, the district established a Regulatory field office in Columbia to serve the upstate region. In 2000, the district's Regulatory Division consisted of 26 people—15 in its Permits Branch and 11 in Enforcement. A second field office was established in Conway the following year to support the rapidly developing Myrtle Beach area. Staffing and funding for the South Atlantic Division were not keeping up with the region's population increases. Understaffed by an estimated 40 percent, Charleston was annually processing more than three times as many individual permits per staffer compared to the Mobile, Savannah, and Wilmington Districts.⁹

In the mid-1990s, the Charleston District began a multi-year study to determine how to best allocate resources in light of the growing population and workload based on county-by-county growth projections. Its 2004 report recommended establishing six socially and economically cohesive watershed groups with a "cradle-to-grave" organizational model.

According to Regulatory Chief Tina Hadden, the cradle-to-grave approach put one person working out of a full-service field office in charge of each project.¹⁰ Given funding limitations, the reorganization began using a designed interim procedure.¹¹

In 2001, the United States Supreme Court ruled 5 to 4 in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* that the Corps and Environmental Protection Agency regulations were incorrect in asserting that, under Section 404 of the Clean Water

Act, their jurisdiction extended to isolated ponds and wetlands.¹² To conform with the ruling, the Charleston District adopted guidelines from the Corps' base master document that included a "one jump rule" that defined a wetland as adjacent if it were in proximity to a natural body of water but not adjacent if in proximity to another wetland.¹³ In 2006, in a 4-1-4 plurality in the consolidated cases of *Rapanos v. United States*, and *Carabell v. United States Army Corps of Engineers*, the U.S. Supreme Court rejected the Corps' assertion of authority under the Clean Water Act, instead holding that federal jurisdiction extends to a wetland only if (a) there is a continuous surface water connection between it and a relatively permanent water-body like a river or stream or (b) if by itself or in combination with other similar sites there is a "significant nexus" that "affects the physical, biological, and chemical integrity of a downstream navigable waterway."¹⁴ In essence, the Court said regulatory agencies had jurisdiction over wetlands that were adjacent but not isolated, offering little guidance to determine the existence of a significant nexus. Hadden explained the resulting dilemma:

After SWANCC, we had to fill out a basis of JD form—basis of jurisdiction. After Rapanos, you follow that wetland and see if it's connected or if it has a significant nexus to traditional navigable water. Now we are making decisions using Supreme Court terminology that we've never used before, and that six or eight-page form gets bigger. The base master document for a decision document when I first came to work here was three to five pages. Now the base document is probably 20 to 30 pages.¹⁵

Between 2000 and 2013, the Charleston District Regulatory Division expended an average \$3.9 million annually with 90 percent of the work for permit evaluations.¹⁶ Case-by-case evaluations of individual permits took the



most time.¹⁷ The first step in the permitting process is determining whether a site contains wetlands. This requires a specialist trained in soil chemistry and plant identification who can establish the presence of water, the existence of hydric soils (those formed in the long-term exposure to water) and the presence of plant species adapted to wetlands. If identified as a wetland, the specialist must then determine if the site is isolated, making it exempt from the jurisdiction of the Clean Water Act, or adjacent to the "waters of the U.S.," and therefore within the Act's jurisdiction. To establish that the wetland is within the jurisdiction of the Act, the specialist must identify a significant nexus

OPPOSITE TOP

Wiley Bracey checking a tributary near Conway, South Carolina in 2009. (USACE, Charleston District)

TOP

Regulatory Division Chief Tina Hadden in her office. (USACE, Charleston District)

MIDDLE

Regulator Paul Hinchcliff uses an auger to remove a plug of soil for analysis. (USACE, Charleston District)



between it and the defined waters of the U.S.¹⁸ Regarding the determination of significant nexus, “No case is black and white,” Hadden explained.¹⁹

Three Charleston District permitting activities illustrate the wide range of complex and impactful cases Regulatory has to address, some setting a mark on Carolina history.

The Hunley

The first successful submarine attack in history took place in the dark of night on February 17, 1864, when the Confederate submarine *H.L. Hunley* exploded its torpedo against the hull of the *USS Housatonic*, one of the Federal warships blockading Charleston Harbor. The *Housatonic* quickly sank to the bottom in the shallow waters north of the harbor entrance, but the fate of the *Hunley* and her eight-man crew became one of the Civil War’s most puzzling mysteries. The vessel never returned to its base. Despite numerous efforts to find the *Hunley*, her final resting place remained a secret for 131 years.²⁰

The search for the *Hunley* ended on May 3, 1995. Claimants to the wreck included the State of Alabama, which wanted the *Hunley* returned to Mobile where it was built, and South Carolina, which considered it abandoned property in its territorial waters. To protect the site from looting or unauthorized salvage, the Coast Guard established a Regulated Navigation Area using coordinates furnished by the exploration team.²¹ As Civil War wreckage, the *Hunley* belongs to the General Services Administration, wrote Clarence A. Ham, chief of the Charleston District Regulatory Branch, and the GSA should “be advised that a Department of the Army permit may be required for the work that has already occurred on the site and any further work that may be proposed.”²² Questions of ownership, preservation, and other issues were resolved by a Programmatic Agreement among the Department of the Navy, the GSA, the Advisory Council on Historic Preservation, the recently created South Carolina Hunley Commission, and the South Carolina State Historic Preservation Officer.

The wreck of the *Hunley* would be treated as both an item of historical significance and a submerged war grave. The federal government would retain title and South Carolina would have custody, with the responsibility to preserve and display the vessel.²³ After reviewing the plans to recover the *Hunley* in a complicated process of boxing the wreckage to protect and raise it carefully, the Charleston District issued the required permit.²⁴ The *Hunley* was raised successfully on August 8, 2000.²⁵ For this work, the Corps of Engineers, along with numerous other federal and state agencies, organizations, and companies, received the first annual National Trust Advisory Council on Historic Preservation Award for Federal Partnerships in Historic Preservation.²⁶

Haile Gold Mine

In January 2011, the Canadian corporation, Romarco Minerals, applied for a permit to reactivate the Haile Gold Mine that had operated sporadically from 1827 to the 1990s at a site three miles northeast of the town of Kershaw in Lancaster County. The project called for constructing a new mine on the original site, a 4,552-acre tract that contained 380 acres of wetlands. The mine would consist of pits, a processing mill to extract and refine gold, a tailings storage facility, and numerous other features. With some excavations almost 800 feet deep, it would become the largest open-pit gold mine in the history of the state. Kershaw residents backed the project in public hearings because of employment prospects for the small town. Environmental concerns included potentially contaminated drinking water, particularly the question of whether the proposed tailings facilities for storing

the processed ore would safely contain the chemicals used in the mining.²⁷

"We didn't know anything about gold mines," says Hadden, "and when it's a gold mine, you have to understand where they're getting the gold, where they are putting the tailings..., the different types of material and how that whole process works." To find that out, "I sent the project manager and our attorney out West to look at active gold mines so they could understand the whole process."²⁸ In 2011, the Regulatory Division determined that an environmental impact statement was required and finalized the jurisdictional determination in October 2012. In conjunction with the Environmental Protection Agency, the South Carolina Department of Health and Environmental Control, the South Carolina State Historic Preservation Office, and other agencies, the Regulatory Division conducted a ground water modeling study. This consisted of installing wells to determine depth and flow characteristics of ground water and underlying rock formations, transferring the data to a computer program that replicated the flows and simulated the excavation of the proposed mine pits. The completed draft environmental impact statement suggested that the project



OPPOSITE TOP

The *Hunley* being raised from the bottom of the ocean in a specially designed sling. (*Friends of the Hunley, Inc.*)

TOP

Richard Darden addressing concerned citizens at a public meeting on the Haile Gold Mine project. (USACE, Charleston District)



would directly affect 120 acres of wetlands and by lowering the water table, indirectly affect another 983 acres. The original design called for excavating and filling approximately seven and one-half miles of streams and some 160 acres of wetlands.

In fall 2013, Romarco reduced the size of their proposed operation to impact five and one-half miles of streams and 120 acres of wetlands. To compensate for the loss of these wetlands, Romarco proposed a \$9.4 million mitigation plan that would transfer three ecologically significant properties along the Wateree River, totaling 4,389 acres to the South Carolina Department of Natural Resources Heritage Trust Program, to be protected in perpetuity. Environmental groups supported the proposal. Based on the 2013 modifications

to the project, the district completed its environmental impact statement and authorized the permit on October 27, 2014.²⁹

The Regulatory Division conducted similar detailed examinations for the location of Bavarian Motor Works (BMW) in upstate South Carolina (1992), Vought Aircraft in Charleston County (2004), Google's data processing facility in Berkeley County (2007), Boeing's purchase of Vought (2009) and the BMW plant's major expansion (2014). Hadden explained how her office dealt with the different features of each project.

Google needed smaller buildings with large cooling units. They can't have an enormous warehouse with all the computers because it would get too hot. BMW likes long rectangles because it's a vehicle assembly line. We didn't understand how to build vehicles, but we did spend a lot of time investigating and looking at assembly lines and how they work. We permitted Vought Aircraft, which turned out to be Boeing. That plant also has to be a rectangle, but it has to be a very wide rectangle, almost square, and very large because it's an assembly line for planes.³⁰

Cruise Ships

The shock of the Great Recession that began in 2006 and the ensuing financial crisis sharply reduced global trade. The Port of Charleston was affected as ocean carriers idled 10 percent of the world's shipping fleet. In April 2007, the South Carolina Ports Authority shipped more than 90,000 containers. Over the next three years, that number dropped to slightly more than 50,000. Earnings plummeted from a high of \$54 million in 2008 to \$25 million in 2009 to slightly more than \$8 million in 2010.³¹ Cruise lines were among the hardest hit industries and responded by shifting from overseas bookings and adding short excursions from domestic U.S. ports. The one bright spot in the SPA's otherwise gloomy economic outlook was the decision by

Carnival Cruise Lines to homeport the *Fantasy* in Charleston, which began in 2010 to offer cruises from Charleston to Key West, Florida, and the Bahamas. The SPA recognized a “substantial increase in revenue” resulting from the “increased cruise ship passenger embarks, disembarks and vehicle storage fees earned.” With Carnival planning up to 90 departures for 2011, the SPA began developing a master plan that included the construction of a new passenger terminal at the Union Pier. The plan was endorsed by Charleston public officials and business groups because of its positive economic impact and because the plan would reduce the downtown industrial footprint and restore the natural shoreline.³²

With 1,026 staterooms, the *Fantasy* had twice as many rooms as Charleston’s largest hotel. On arrival and departure days, downtown traffic boomed, and the city had to temporarily close two streets. Residents of the historic district felt smothered and environmentalists became concerned about increased pollution.³³ Unlike airlines or railroads, which are subject to regulation by the

federal and state governments, cruise ships are lightly regulated and regulation in American ports mostly consists of a “patchwork of federal, state and, rarely, local laws.” Therefore, local groups wanted a code of conduct for cruise ships, either enforced by local law or adopted by the cruise industry voluntarily.³⁴

Endorsed by Charleston City Council in September 2010, the SPA moved ahead with plans to construct a new 100,000 square-foot terminal on the north end of Union Pier at a cost of \$35 million. The plan called for placing additional pilings in clusters beneath the existing pier to support the additional weight of three elevators and two escalators. As this was construction in a navigable river, it required a federal permit. The Charleston District conducted its review and on May 26, 2011, issued a permit to add the pilings and modify the building. The complex sequence of high-profile protests and litigation that followed reached a critical point in September 2013.³⁵ A ruling by the U.S. District Court remanded the regulatory decision to the Corps for additional review.³⁶

Summary

The Corps’ traditional missions—maintaining flood control dams and levees, dredging harbors and rivers to improve navigation and commerce—are generally recognized. However, the regulatory role of the Corps in enforcing the Clean Water Act and wetlands policies are not well understood and can bring the Corps into contention with property owners looking to develop and manage their own site as they choose. As Hadden describes:

*Every federal program has to follow the National Environmental Policy Act. Every action we do has an environmental assessment. Every one. We are required to document our decisions. Getting applicants to understand that, to appreciate that, to be willing to listen, to understand that the best way to get through the process is to provide a robust document up front that contains the answers to the questions we must ask.*³⁷

OPPOSITE TOP

The cruise ship Carnival *Fantasy* docked at the Charleston passenger terminal. (South Carolina Ports Authority)

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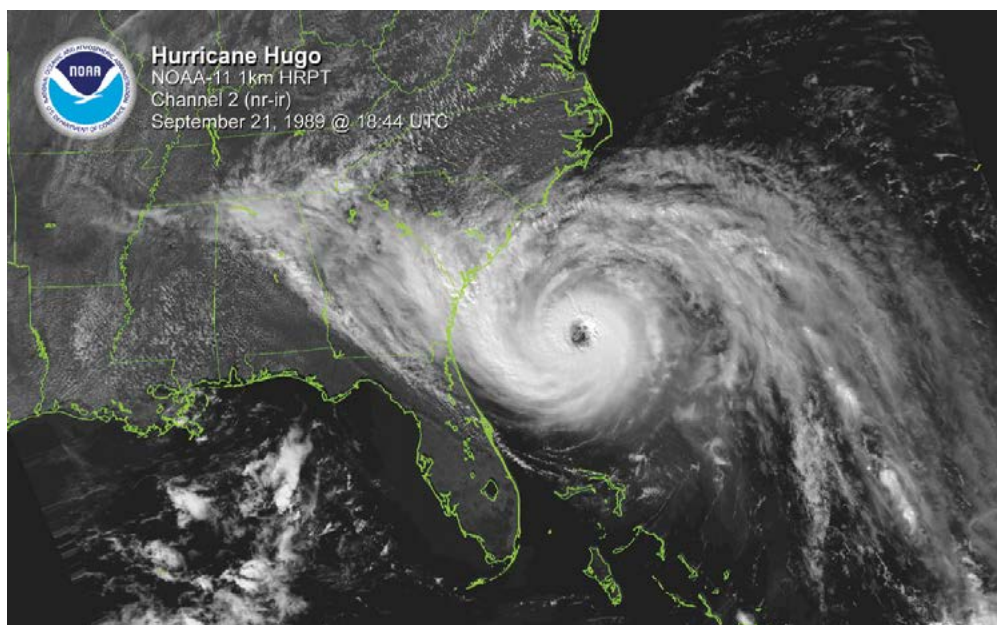
CHAPTER SIX

Disaster Assistance and Emergency Management

Charleston received its first federal disaster assistance in 1838 after a catastrophic fire that destroyed some 1,160 structures worth an estimated \$3 million. The Army Quartermaster Corps provided the homeless with temporary quarters in Army barracks and harbor fortifications.¹ Charleston received post-disaster assistance after the great earthquake of August 31, 1888; in 1916, after a hurricane caused extensive damage to crops; and in 1938, when three tornadoes touched down on the morning of September 29, causing more than \$2 billion in damages.²

The Flood Control Act of 1944 authorized the Corps to undertake flood and post-flood disaster assistance. The Disaster Relief Act of 1955 authorized the Corps to conduct preparatory and emergency operations, including hazard mitigation. In 1961, President John F. Kennedy established the Office of Emergency Planning to coordinate relief efforts once the President declared a national disaster. President Jimmy Carter created the Federal Emergency Management Agency by executive order on April 1, 1979.

Under these authorities, in 1982, the Charleston District established an Emergency Management Division (EMD) with a Natural Disaster Branch and a National Emergency Branch, but did not fully staff its positions.³ On January 7, 1985, the Departments of Defense and Transportation signed a national memorandum of understanding for the prompt repair of port facilities that supported deployment of military personnel and cargo under conditions that were less than a declaration of war or national emergency. Under this authority, the Charleston District signed a memorandum of understanding with local and federal agencies.⁴



Hurricane Hugo

Legislation enacted in 1988 provided that a presidential declaration of emergency would trigger financial and physical assistance through FEMA, with the Corps providing an emergency support function for public works and engineering. The first true test for the Charleston District arrived when the eye wall of Hurricane Hugo crossed Sullivan's Island near midnight on September 21, 1989, with hurricane-force winds ranging out 140 miles from the eye and pushing a tidal surge as high as 15 feet above sea level. As a Category 4 storm, Hugo was considered a rare event as there is only a 1 percent probability that a storm that size will strike near Charleston in any given year. In 1966, Charleston District engineers had completed a flood protection study that projected remarkably accurate estimates of the potential damages from a major hurricane hitting perpendicular to the Carolina coast.⁵

In many respects, the pre-Hugo planning had been thorough and comprehensive. A Charleston County hurricane evacuation study

TOP

Satellite image of Hurricane Hugo prior to making landfall on the South Carolina Coast. (National Weather Service, NOAA)



completed in 1986 pointed out the dangers of Category 2 and higher hurricanes and led to the development and testing of new hurricane evacuation plans.⁶ The Charleston District began its preparation for the 1989 hurricane season with an exercise that caused the EMD to update their hurricane plan. Their new plan was distributed to the District's employees just before Hugo's arrival. The District EMD also participated in a Charleston County Hurricane Preparedness Exercise conducted on August 24. In the 24 hours before Hugo hit, personnel at the district disaster management center released nonessential personnel to go home or evacuate, relocated vehicles to higher ground, filled small watercraft with water to keep them from blowing away on their trailers and moved the large survey vessel *Blair* to a safer anchorage. A primary emergency operations center was activated with an alternate center at the Charleston Air Force Base. The EMD also sent a representative to the Charleston County Emergency Operations Center.⁷ Hugo's destruction was widespread, but the Corps was prepared to help the citizens of Charleston.

The Savannah and Wilmington Districts rapidly dispatched teams to the city to help assess damages. Corps personnel assigned from other divisions included the South Atlantic (175 people), Ohio River (79), Southwest (78), and Missouri River (62). Their numbers peaked at 271 the second week in November. By March 1990, the Corps had assigned some 532 temporary duty personnel. Locally, employees dealt with personal loss and stress. Just reporting to the emergency operations center was hazardous because downed trees and power lines obstructed traffic on the highways and secondary roads throughout the tri-county area.⁸

The signature piece of the district's post-storm work was the repair of the 240-foot-long, 500-ton swing span of the Ben Sawyer Bridge across the Intracoastal Waterway, the only land connection to the barrier islands north of Charleston Harbor at the time. The bridge sits on a single 20-inch bronze bearing that rests on its center support pier. Sometime during the storm, the bridge spun and slid

into the inland waterway with its Mt. Pleasant end mired and facing Sullivan's Island and its Sullivan's Island end high in the air pointing to Mt. Pleasant.⁹

Responding to a request from the South Carolina Highway Department for technical assistance on September 23, the Charleston District mobilized a damage assessment team and on September 25 informed the South Carolina Highway Department and FEMA of a bold plan to restore the span to a fixed position within one week. Approval quickly followed. Working late into the evening, district personnel completed a streamlined procedure to shift the Ben Sawyer Bridge span to a level position, support it with temporary bracing on barges and set it back in place. The repair work was difficult but keeping it going was critical to Deputy District Engineer for Program and Project Management Elmer Schwingen because "the Coast Guard was going to make us take the bridge back down in 30 days if it was not operational." Despite the lack of "as built" drawings, weather delays, equipment problems, and the serious constraints that tides placed on the project, the repairs proceeded only slightly behind schedule. Completion took just slightly more than a week. Barges moved the bridge back into position early in the morning of October 6. In celebration, District Chief of Engineering Hal Smith raised the Corps flag over the bridge. In the afternoon, the Ben Sawyer opened to one-way traffic limited to vehicles weighing less than 10 tons. The district then turned the structure over to the Highway Department.¹⁰ "It was an opportunity to make a difference," Corps officials said. "Our staff of engineers, managers, and contract specialists knew they could get people back across that bridge to their homes."¹¹

The Corps contributed substantially to the post-Hugo recovery efforts. Fifteen engineers assigned to FEMA met with power companies to assess power losses and estimate the



time required to restore power to areas experiencing outages. FEMA completed 13,756 damage survey reports by the end of March 1990; Corps personnel did 10,968 of them.¹² The Corps conducted aerial reconnaissance to assess damages and prepared to stabilize the diking systems on Hunting Island and expedited the repair of breaches in levees protecting the Santee Coastal Reserve. Corps personnel performed habitability inspections for FEMA's Temporary Housing Program and provided technical assistance to assess coastal damage and the threat of coastal flooding. At FEMA's request, they also awarded \$3.3 million in contracts for emergency dune restoration to prevent further beach erosion. To address the problem of debris removal, Charleston District Commander Lt. Col. James T. Scott developed a plan that began with 250 engineers and soldiers from Fort Stewart and Fort Benning

OPPOSITE TOP

Corps employees assisting with recovery in Sumter, South Carolina. Damage from Hugo extended far inland. (USACE, Charleston District)

TOP

Working late into the evening to reposition the Ben Sawyer Bridge span after Hurricane Hugo. (USACE, Charleston District)

MIDDLE

Corps volunteers helping with damage assessment and debris removal after Hurricane Hugo. (USACE, Charleston District)



rolling into town with 13 front-end loaders and 40 dump trucks. Twenty-five Corps employees assigned to the Small Business Administration field office verified damages to structures and assisted in the review and processing of emergency loans. It was the first time the SBA had requested emergency loan processing assistance from another federal agency.

District personnel were also busy removing commercial uninsured, submerged, and sunken vessels along waterways, surveying approximately 200 miles of channels to identify hazards to navigation, and supporting the Coast Guard by conducting a survey to identify displaced navigation buoys. They inspected the radio tower at Huger and the St. Stephen Power Plant, both damaged by Hugo. Corps engineers aided the South Carolina Coastal Council in evaluating and formulating emergency repair measures to fill a coastal breach on Pawley's Island in Georgetown County, advised an engineering battalion of the South Carolina National Guard, and participated in the development of the Interagency Hazard Mitigation Team Report.¹³ Other disaster recovery missions included assessment of potential damage from a logjam of debris that threatened Santee Cooper's Wilson Dam.

Planning in the 1980s and 1990s

In August 1990, the district conducted a tabletop exercise under the auspices of the Charleston Port Readiness Committee to test the signatories' ability to act together to open a navigation channel in the event of a bridge failure that blocked navigation.¹⁴ The exercise scenario began with terrorists collapsing the two Cooper River bridges and inflicting the type of destruction that would prove eerily accurate in the February 23, 1993, truck bombing of the World Trade Center, the April 19, 1995, truck bombing of the Alfred P. Murrah Federal Building in Oklahoma City, and the September 11, 2001, attack on the World Trade Center's twin towers.¹⁵

In August 1992 Hurricane Andrew made landfall at Homestead, Florida as a Category 4 storm. The South Atlantic Division's resources were nearly overwhelmed during the post-disaster relief operations. The experience highlighted the need for a broader strategy that would improve the Corps' ability to support recovery efforts. In 1998, the Corps initiated the Readiness 2000 program. Under the FEMA national framework, with the Corps being the primary agency to oversee public works and engineering, districts created and staffed planning and response teams (PRTs) according to specific, pre-scripted mission assignments.¹⁶ In the South Atlantic Division, the emergency services format gave the Mobile District primary responsibility for debris removal; Wilmington, water supply; Charleston, ice supply; Savannah, power and temporary housing; and Jacksonville, temporary roofing.¹⁷ Category 4 Hurricane Georges, September 17-28, 1998, was the first test of the new response plan.¹⁸ Charleston District Emergency Operations worked in partnership with the Jacksonville District and other Corps PRTs to successfully procure and deliver more than 19.7 million pounds of ice by commercial and military airlift and barge over a period lasting more than a month.¹⁹

In 1999, the Charleston District reestablished the Emergency Management Division with an organizational structure that consisted of an emergency programs manager and two emergency management specialists, one of whom was also the district's security officer. The district's national ice mission now called for providing three million pounds of ice within 24 hours and increasing capacity to support one million people in 48 hours. In 2000, the Emergency Operations Center was activated for Hurricanes Irene, Jose, Lenny, and Debby and supported debris removal and ice missions for FEMA.²⁰

The September 11, 2001, attack on the World Trade Center towers in New York City caused a pronounced shift in the Corps' emergency response posture. In November 2001, Congress created the cabinet-level Department of Homeland Security and in December 2002, the Corps established the Homeland Security Office within the Civil Works Directorate to oversee the emergency management program.

The 9-11 attacks dramatically changed the Charleston District by raising the level of concern regarding terrorist attacks and underscoring the need to bolster security for sites storing nuclear materials. The Department of Energy reached out to the Charleston District to improve security at the Savannah River Site, including constructing modern access control points at two of the five entrances to the site; upgrading the advanced tactical and training range for security vehicles; converting the primary kennel the district had built in the 1980s for the K-9 team to a veterinary kennel to isolate injured and sick dogs; and completing a \$1.94 million project to upgrade and add a roof to a mockup building for security officer tactical training.²¹

The Ice Missions

Responding to Hurricane Isabel in 2004, the Charleston District PRT proactively



directed a pre-landfall delivery of 120,000 pounds of ice to Ft. Bragg, North Carolina, to augment the state's two-day supply.²² The post-landfall ice mission contracted the delivery of 20 tractor-trailer loads of ice a day for seven days to the North Carolina Emergency Management Warehouse in Rocky Mount, a total of 1.4 million pounds of ice.²³

By 2005, the federal National Response Plan had integrated 27 federal agencies and departments, plus the Red Cross. The Corps' structure consisted of seven major elements and under this framework, the National Ice Mission rotated annually between the Charleston and Albuquerque Districts.²⁴

On August 29, 2005, Hurricane Katrina struck the Gulf Coast with sustained winds of 100–140 miles per hour. The storm killed nearly 2,000 people, did \$100 billion in damage, and affected some 90,000 square miles of the United States.²⁵ The response to Katrina demonstrated both the strengths and weaknesses of the National Response Plan. Among the strengths was the performance of the Army and the Corps of Engineers in the relief efforts. From Katrina's landfall through September 2, the Corps delivered 1.9 million meals ready to eat, 6.7 million liters of water, and 1.7 million pounds of ice to Mississippi and Louisiana.²⁶ Charleston handled the ice mission. The task of getting as many bags of ice as possible to the affected areas fell to Contracting

OPPOSITE TOP

Corps employees working in a makeshift Emergency Operations Center in 2002. (USACE, Charleston District)

TOP

Distributing ice after a hurricane cut power to residents. (USACE, Charleston District)

Officer Henry Wigfall, chief of the Contracting Execution Branch. Working from Charleston and using the in-place Advanced Contracting Initiative with International American Products, Wigfall issued task orders for hundreds of trucks of ice throughout the post-hurricane recovery. District responders on the scene counted the trucks, inspected them to be sure they were full of ice, accepted deliveries and ensured the ice went where it was needed. The District's support during Hurricane Katrina totaled more than \$209 million.²⁷

The performance of FEMA during Katrina was broadly criticized as chaotic and ineffective. In its wake, the 2006 Post-Katrina Emergency Reform Act significantly reorganized the agency, provided new authority, and emphasized preparedness.²⁸ The interactions of three major storms in 2008 tested the new FEMA and the Charleston District's Emergency Management capabilities. Category 2 Hurricane Gustov made landfall on September 1 near Cocodrie, Louisiana. Category 2 Hurricane Ike made landfall on September 13 near Galveston, Texas.²⁹ Charleston dispatched an ice mission to Beaumont, Texas, but with the Corps-wide lack of funding for training and confusion

with FEMA operations, the mission met with significant organizational challenges.

Meanwhile, with the approach of Hurricane Hanna toward the South Carolina/North Carolina border the Charleston District had to activate its emergency operations center and hand the ice mission over to Albuquerque. Again, issues with purchasing authorization and interactions with FEMA presented further problems, including with the Corps' financial management system, which could not effectively recognize transfers of funds and contracting responsibility.³⁰ A Department of Defense Inspector General's investigation and 2009 report criticized the district's fiscal responsibility.³¹ After-action reports from both Charleston and Albuquerque Districts documented organizational and managerial issues in the relationship with FEMA.³² In 2011, the district extended operational support for Hurricane Irene and in 2012 for Hurricane Sandy. Subsequently, FEMA ended the national ice mission after determining that ice was not a lifesaving necessity. The Charleston Emergency Management Division shifted to become one of six Corps districts that support post-disaster infrastructure assessment on a rotating basis.

Summary

After Hurricane Hugo, the federal government spent nearly a quarter of a billion dollars on relief and recovery in South Carolina. The Charleston District's after-action report detailed shortcomings in the procedures to improve recovery from a disaster of this scale in the future. The district subsequently restructured its response teams and provided training for flood and other emergency response activities.³³

As the Charleston District learned from its national ice missions, pre-disaster preparation requires more than minimal funding. Other recommended changes included developing standard operating procedures for a mid-mission changeover, reviewing the basic approach to mission assignments with Corps headquarters and FEMA, having states train with the Corps on commodity delivery, and educating local public officials on planning for events.³⁴

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CHAPTER SEVEN

Shore Protection

The Corps of Engineers' early involvement in coastal areas was limited to building fortifications and protecting their sites. Beginning in 1820, Army engineers constructed log grillages, breakwaters, seawalls, and jetties in a successful effort to reclaim the eroding beach at Sullivan's Island that threatened Fort Moultrie. With shoreline development, business owners and coastal residents began lobbying the federal government to reverse the erosion of public beaches.

- **1930** – The Corps established a Beach Erosion Board to study the problem and possibly develop solutions.
- **Post-World War II** – Congress passed a Corps-drafted bill expanding the ability of the Corps to make general investigations.¹
- **1956** – Congress passed a Corps-sponsored bill providing for beach restoration and nourishment with more latitude for interpreting what could be supported with federal funds.
- **1962** – The River and Harbor Act expanded the range of projects that qualified for federal assistance.
- **1963** – Congress authorized the Corps to establish a Coastal Engineering Research Center to evaluate coastal projects.
- **1965** – The Corps produced detailed surveys of metropolitan coastal areas to assess potential storm damages and the costs of protection.
- **1966** – A study of the Charleston metropolitan area examined the costs of building a seawall around the city's peninsula 15 feet above mean high tide, constructing a \$10 million earth barrier across the Ashley River, and placing dune lines on the Isle of Palms and Sullivan's Island.²
- **1968** – Congress passed legislation allowing property owners in designated

flood-prone areas to buy federally subsidized flood insurance and mandated the Corps to make a sweeping analysis of the national shoreline.

- **1973** – Congress required that to be eligible for federal flood insurance communities had to adopt and enforce land-use and control measures.
- **1977** – The state established the South Carolina Coastal Council to take over regulation of beachfront development from local governments; however, the Council routinely issued permits for sea walls and other structural measures accelerating erosion.
- **1986** – The year's damaging winter storms prompted the Coastal Council to raise its standards for erosion control structures.
- **1988** – South Carolina passed the Beachfront Management Act.
- **1990** – Amendments added after Hurricane Hugo established an erosion retreat program requiring the Coastal Council to develop setback lines based on the expected erosion of beaches over 40 years.
- **2007** – The Corps published its first technical review of coastal projects. Updated annually, the review's qualitative analysis provides a snapshot of each project's reliability based on a comparison of its current profile condition to its design profile.³



Hunting Island State Park

The Charleston District's first shore protection project was Hunting Island State Park, where erosion had averaged 25 feet per year since the 1940s—a rate 10 times faster than the rest of the South Carolina coast. In 1968, the district placed 750,000 cubic yards of sand on the two-mile stretch of beach fronting Hunting Island State Park and constructed a pre-stressed concrete groin. Within two years, about half the sand had washed back into the ocean. The district completed additional projects in 1971 and 1975 and a renourishment of 900,000 cubic yards in 1980. In January 1987, the South Carolina Department of Parks, Recreation, and Tourism formally requested emergency assistance following a New Year's Day nor'easter. The Corps denied the permit on grounds that the state had not maintained the federal project as it had agreed.⁴

In 1999, the district built a dike to protect the freshwater wetland that receives treated effluent from the Hunting Island waste treatment plant. This work was followed by the 2002–2003 Hunting Island Waterline

project to address storm damages to Cabin Road and associated utilities by placing more than a quarter-million cubic yards of quality sand over approximately a half-mile of beach. The wave activity of four hurricanes in 2004 eroded the Hunting Island berm and in 2005, the district placed some 87,000 cubic yards of material to restore the project to pre-storm conditions. Hurricane Ophelia banged Hunting Island with several days of high surf and waves in September 2005, but the repairs held. In addition to the four district nourishments, the State of South Carolina undertook four projects over the 38-year span (1968–2006), which collectively added nearly 5.5 million cubic yards of sand to the beach.⁵

The Grand Strand

South Carolina's Grand Strand is a highly developed 37-mile stretch of coastline from Pawleys Island north to Little River. By the mid-1980s, the historically stable beach had all but ceased to exist in many places because of the construction of seawalls to protect shopping centers, restaurants, golf courses, high-rise hotels, condominiums, and more. In 1986, Myrtle Beach, the largest of the Grand Strand urban communities, placed sand along an 8.6-mile stretch of beach and in 1992, adopted a beach management plan that generally prohibited the building or repair of existing bulkheads, seawalls, revetments, or other permanent erosion control structures.⁶

In the late 1980s, the Charleston District began a feasibility study for the protection of the Grand Strand; it presented the Myrtle Beach, North Myrtle Beach, and Garden City/Surfside Beach as three independent projects, each justified economically.⁷ In 1990, the Charleston District added sand to repair the damage from Hurricane Hugo. Also, in 1990, Congress authorized a 50-year, \$59.7 million hurricane and storm damage reduction project to place 5.1 million cubic yards of sand over 25 miles of beach with the federal government paying 65 percent of the cost.⁸ Before beginning the



work in 1996, Project Manager Francis Limbaker, along with representatives from the South Carolina Department of Natural Resources and the Department of Health and Environmental Control, held preliminary public meetings at all the project sites to explain the impact of the project.

The sand for the Myrtle Beach reach, acquired from an offshore borrow site, was transferred using hopper dredges and a dustpan hydraulic dredge to pump material via a pipeline and booster plant. Work completed on North Myrtle Beach in March 1997 required 2.5 million cubic yards of sand. The Myrtle Beach reach was completed in January 1998 with 2.3 million cubic yards of sand placed on the beach. The Garden City/Surfside reach (1.5 million cubic yards) and the Arcadian Shores beachfront between Myrtle Beach and North Myrtle Beach (0.45 million cubic yards) were completed in November.⁹

In September 2005, Hurricane Ophelia washed nearly 3 million cubic yards of sand from the Grand Strand's beaches—enough

sustained damage for the federal government to cover beach repairs. From November 2007 to January 2009, the district replaced 3.3 million cubic yards of beach sand at a cost of \$37.6 million.¹⁰ The district also placed 438 cubic yards of 12-inch riprap on top of a 6-inch bedding layer and constructed 12 drainage outlets along 834 feet of Shore Dive, the only access for several large beachfront hotels, condominiums, homes, and businesses.¹¹

Folly Beach

Even Folly Beach, "Charleston's most accessible beach," suffers from erosion. Development on Folly Island accelerated in the post-World War II era with the construction of a business district, boardwalk, and a pier as a major entertainment center added to the already successful pavilion.¹² By the 1970s, significant beach erosion had taken much of the land, prompting beachfront property owners to front their houses with concrete sheet pile, asbestos corrugated sheet pile, timber seawalls, rock revetment, rubber tire walls, and sand fencing to try to check the advance of the encroaching ocean. Concrete reinforced

OPPOSITE TOP

Tree roots exposed on Hunting Island after the sand was washed away. (USACE, Charleston District)

TOP

Myrtle Beach during a renourishment completed in 2007. Bulldozers place and grade the sand after it is pumped onto the beach through the large pipe. (USACE, Charleston District)



the brand-new boardwalk that stretched for 1,700 feet. According to the official history of the South Atlantic Division, "By the 1970s, Folly was the most highly protected beach in the southeastern United States."¹³

Local officials requested a Corps study because beachfront homeowners wanted to protect their buildings and preserve the beachfront. Merchants needed the beach to attract tourists. Day-trippers from Charleston and the surrounding communities favored more sand to provide a wider beach, more parking, and improved public conveniences. But property owners on the backside of the island, away from the beach, were less interested in drawing visitors and expressed concern over the expense of a beach renourishment, fearing it would result in higher taxes. Town officials were willing to pay part of the cost of a short-term beach nourishment project but expected the federal government to fund a permanent solution. There was also a group—not limited to Folly residents—who believed the jetties leading into Charleston Harbor were contributing to the erosion, and because the Corps had built the jetties, the federal government should pay the entire cost of restoring the beach to its natural condition and maintaining it.

"Boiling all of these viewpoints down," states the 1979 Corps study, "people want a cost and environmentally effective solution that will receive significant federal funding. They also do not want to see their taxes raised. As far as hurricane surge protection is concerned, most would consider approval of this type only if the federal government picks up the tab and if the structure satisfying the purpose doesn't block

views and/or interfere with private land use and beach access." The study recommended adding sand along three miles of beach and advised the nourishment project would require more detailed surveying than normal because portions of the project were dynamic.¹⁴

Even without a formal recommendation from the chief of engineers, the Water Resources Development Act of 1986 authorized a shoreline protection project for Folly Beach as a "Congressional Add"—that is, a process whereby members of Congress appropriate funding for projects in their home districts by inserting them into the Corps' program.¹⁵ The City of Folly Beach disputed the provision that the local sponsor pay 35 percent of the cost on grounds that the Charleston Harbor jetties were causing the erosion. As Folly Island was six miles south from the jetties, the Corps disagreed. Nevertheless, a cost-shared study completed in August 1987 concluded that the jetties were responsible for 57 percent of the erosion to Folly Island because they blocked a significant portion of the southerly drift of sand along the shore, causing the offshore shoals to lose material, and doubled the wave energy on the beach.¹⁶

An August 1988 reevaluation of the Folly Beach nourishment project and a second reevaluation in 1989 after Hurricane Hugo showed the plan was still economically justified.

In 1991, the district developed a general design memorandum based on 3-D underwater mapping (using Scanning Hydrographic Operational Airborne Lidar Survey [SHOALS]) and computer simulations (using Numerical Model for Simulating Storm-Induced Beach Change [SBEACH], Generalized Model for Simulation Shoreline Change [GENESIS]). Simulations performed by the Coastal Engineering Research Center in Vicksburg, Mississippi, showed it necessary to rebuild, replace, and stabilize nine existing groins on the beach that extended some 80 yards into the surf. Planners also lengthened the shoreline rebuilding project from three miles in length to more than five miles.¹⁷

The district's contractor refitted their hydraulic cutterhead dredge, *Tom James*, for the \$11.7 million project and had it towed to Folly Beach. The completion date was set for May 15, 1993, but the project was on a tight schedule because it was the beginning of the loggerhead turtle nesting and hatching season. After 18 days of continuous production, a major winter storm in the first week of February 1993 caused severe damage to the project fill and property. A second major storm in the first week of March did more damage, and the third and strongest storm hit in mid-March. The Folly Beach project lost both sand and the pipeline used to carry the sand from the offshore borrow sites to the beach. To supplement the *Tom James*, the contractor had the *Atlas Booster* towed to the site and installed downline of the dredge in mid-April to complete the work.¹⁸



Soon after completion of the renourishment, the district suffered a public relations problem with publication of comments from a respected coastal geologist.¹⁹ The official history of the South Atlantic Division contains this version:

*In 1994, tides washed 125 of the 200 feet of dry sand placed behind the [Holiday Inn] out into the ocean. By 1995, no high tide beach existed. Though the Corps insisted that the sand was still present, but in the surf, physical investigation by a local geologist indicated that instead, not only was there no beach but the [non-federal] wall built to protect the Holiday Inn had actually increased erosion to the south. The project, which included a portion of the beach, cost the town of Folly Beach \$2.3 million.*²⁰

Other researchers disagreed. One stated that the six South Carolina project areas comprising the 42.6 miles of South Carolina coastline that received 70 percent of the nourishment volume, including Folly Beach, "have measurably wider beachfront areas compared with pre-nourishment conditions."

OPPOSITE TOP

The north end of Folly Beach at high tide, taken in 2013. (USACE, Charleston District)

TOP

Brigadier General Schroedel, Lieutenant Colonel Fleming, Major Pratt, Matt Laws and Pat O'Donnell assessing Folly Beach in 2006. (USACE, Charleston District)



This researcher contended that because of the nourishment projects, Folly Beach “gained an extra 77.6 acres between 1987 and 2006,” generally improving the beach “well beyond its pre-nourishment condition.”²¹

The project was authorized to use a Folly River borrow site located within a unit of the Coastal Barrier Resources System (CBRS). After initial construction of the project, the Department of Interior in 1994 reinterpreted the shoreline stabilization exception to exclude projects removing sand from the CBRS, and the District was required to use offshore borrow sites for scheduled periodic nourishments. Despite the gains realized on

much of Folly’s beachfront, the Folly spit—the southern tip of the island and the location of the Folly Beach County Park—continued to erode severely. In 1997, the district conducted an emergency nourishment and placed 52,412 cubic yards of sand on the beach from maintenance dredging of the navigation channel and in 1999, with only 130 of the original 400 parking spaces remaining, another 101,513 cubic yards.²²

The Folly Beach project called for renourishment of 1.74 million cubic yards of sand every eight years to maintain the beaches. On this schedule, the first renourishment would have taken place in 2001. Because the original beach nourishment held up better than expected, the district rescheduled the first renourishment for December 2005. In 2004, just as the beach had eroded away to the renourishment trigger point, it endured a series of storms that collectively removed more than one-half million cubic yards of sand.²³ The federal government awarded beach rehabilitation assistance to Folly Beach because of the damages. In May 2005, the district began placing 2.4 million cubic yards of sand along 5.34 miles of shoreline. That September, the project was nearing the halfway point when Hurricane Ophelia subjected the beach to several days of high surf and wave action. She cost the beach some 470,000 cubic yards of sand along one stretch at the eastern end of the project. Between October and December 2005, the contractor placed 2.3 million cubic yards of sand on the beach. In February 2006, the district installed 1,162 fence panels, each 20 feet long, and planted more than a quarter million sea oats, bitter panicum, sweetgrass, and American beach grass plantings to cut down on erosion and encourage the development of protective dunes. In May and June 2007, a hydraulic cutter head dredge with a pipeline running along the beach put some 486,100 cubic yards of sand over the beach that had eroded since 2005.²⁴ By 2010,



the beach had eroded to the trigger point for the next periodic nourishment. District preparations were underway when Hurricane Irene, a Category 1 storm, swept close to the South Carolina shore in August 2011 before making landfall in North Carolina. It caused erosion so heavy that Folly Beach County Park had to close. The Charleston County Parks and Recreation Commission quickly issued bonds for a \$3 million renourishment.²⁵

Sweetgrass for Erosion Control

Dunes can play a critical role in beach erosion control and planting native grasses stabilizes the dunes. Sweetgrass (*Muhlenbergia filipes*) is native to South Carolina and grows in brackish marshlands and open maritime forests. The plant is also a touchstone for the traditional Carolina culture. Slaves who worked the rice crops wove an elaborate array of baskets using sweetgrass, pine straw, palmetto, and bulrush. Sweetgrass baskets are unique to the South Carolina

Lowcountry. Passed down from generation to generation, the art of making them is part of the regional heritage. Beginning in 2005, the Charleston District planted sweetgrass plants in erosion control projects all along the Carolina coastline, at the St. Stephen Dam, and at other project areas to help stabilize the dune areas. and to contribute to preserving the Gullah-Geechee culture of the Lowcountry.²⁶ In 2014, the district began hosting annual Sweetgrass Pulling Days at St. Stephen, where the plants grew in abundance. In 2016, St. Stephen hosted an event for local schoolchildren and their families where sweetgrass basketmakers instructed the students in how to pull and care for the plants.

The Charleston District's dune plantings not only protect the beaches but also contribute to preserving an important art form of the Gullah-Geechee culture of the Lowcountry.

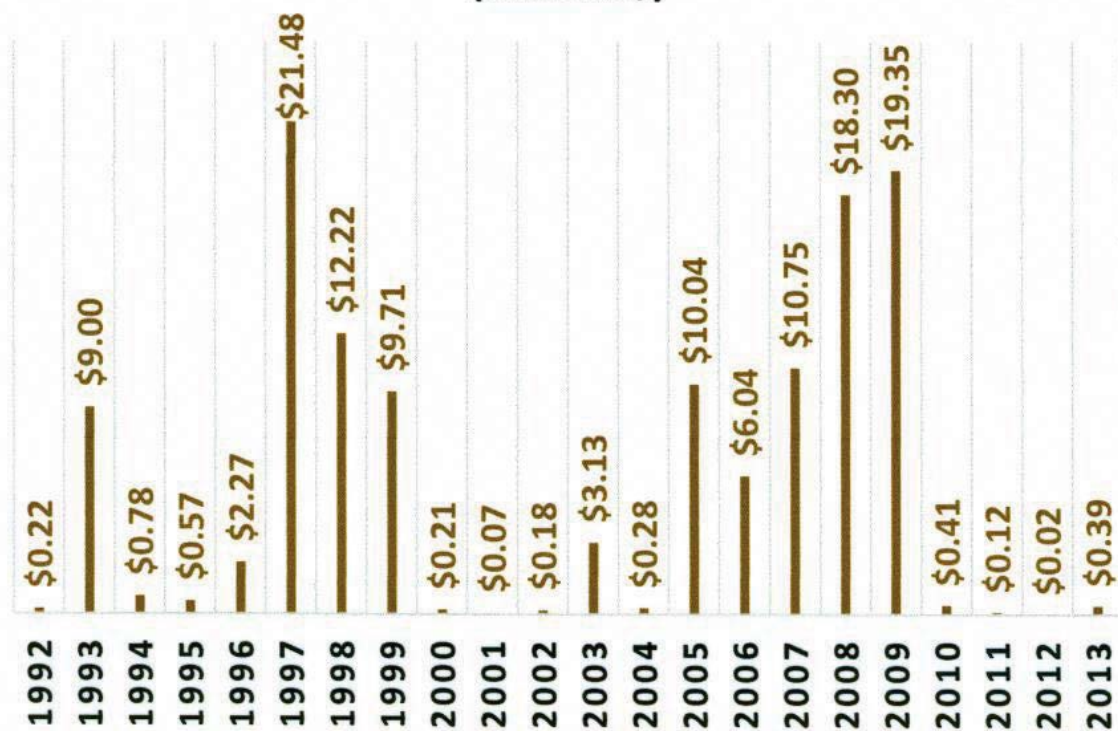
OPPOSITE TOP

District employee Tommy Socha checking the condition of plants recently planted to protect the dunes. (USACE, Charleston District)

TOP

Local citizens pulling sweetgrass from the St. Stephen Powerhouse grounds for basket making. (USACE, Charleston District)

Charleston District Beach Nourishment and Shore Protection (Millions \$)



Source: Charleston District Annual Reports to the Chief of Engineers

Summary

Evolving from a 1950s “learning from experience approach” to current computer modeling, the district has worked consistently to protect and restore shorelines suffering the ravages of water and wind. The projects have been criticized for their number, frequency, and cost. Shore protection is a question of priorities, costs, and benefits.²⁷ Studies found the Myrtle Beach project performing as expected, making it one of the most popular tourist attractions and best beaches in the United States. At Folly Beach, the three rounds of periodic nourishment appeared to work. Between 1987 and 2006, the project encompassing nearly the entire six-mile-long oceanfront generally improved and enlarged the beach well beyond its initial construction condition.²⁸

CHAPTER 7 ENDNOTES

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OPPOSITE TOP

Charleston District Beach Nourishment and Shore Protection (Millions \$). (USACE, Charleston District)

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²⁴Warren, Memorandum for Commander, Charleston District, Approval of Review Plan for Plans and Specifications for Periodic Nourishment Folly Beach Shore Protection Project, 2-3, Files, SAC; ARCE SAC 2006, 7-6; 2007, 7-5, 7-6.

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CHAPTER EIGHT

The Pressures of Implementing Change

By the late 1960s, a rising proportion of federal budgets was devoted to defense-related programs, payments to individuals (Social Security, Medicare, housing and nutrition assistance, etc.), and rising interest rates. The proportion in the category Other Outlays, which includes the Corps of Engineers civil works, decreased in dollars and as a percentage of the budget.¹ In the first few years of the Reagan administration, the Corps was provided one billion dollars annually for Corps work for the Army and another billion for Air Force work. As a result, the Corps' full-service districts increased their workloads.²

However, appropriations for Corps civil works, declined for the next decade, from \$3.14 billion in 1980 to \$3.2 billion in 1989—which turned out to be a 27.3 percent decrease in funding when adjusted for inflation.³ Operations districts reflected the effect of the cuts in domestic programs. From 1984 through 1998, the Charleston District's Civil Works projects totaled less than \$30 million annually. Between 1979 and 1987, new work for Charleston Harbor, \$290,000, totaled less than one percent of the \$43.2 million for maintenance.⁴

Corps-wide, budget pressures and demands for reform led Robert Page, appointed Assistant Secretary of the Army for Civil Works in 1987, and Lt. Gen. Henry J. Hatch, the chief of engineers in 1989, to begin a major effort to change the Corps. Both men firmly believed the civil works structure of 13 divisions and 39 districts with diverse multidiscipline planning, engineering, and construction programs was ill-prepared to deal with the realities of uneven distribution of workloads and duplicated or underused resources. They also felt the change from project construction to maintenance,



regulation, and environmental restoration was an issue for much of the Corps' upper ranks.⁵

Information Technology

To cut costs and increase efficiency, Hatch intended to employ the advantages of the information technology revolution that was changing the workplace everywhere.⁶ The Charleston District established an automatic data processing section in May 1967. However, personnel in Charleston had to enter data on forms and send them to Savannah for input using punch cards.⁷ The system was relatively inexpensive but according to Project Leader Braxton Kyzer, until well into the 1980s, "We would send two or three big boxes of cards to Savannah to run. They would come back a week and a half or two weeks later and you would find out you had made a mistake."⁸

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Assistant Secretary of the
Army for Civil Works Robert
Page. (USACE Office of
History)



In 1986, the Corps merged the automatic data processing offices and centers that existed in most Corps divisions, a step central to incorporating the new theories of management that rested on the use of mainframe computers to process huge amounts of information and run mathematical models and simulations used to evaluate alternative courses of action.⁹ The new management processes of planning, organizing, leading, and controlling required leaders to understand unpredictability as a naturally occurring phenomenon and, when the times demanded, replacing existing policies, procedures, and routines. Constructive organizational change required the ability to retain that which was still essential to the organization's future, discard what had once been critical but no longer worked, and adapt to new conditions.¹⁰

In 1989, the Energy and Water Subcommittee of the House Appropriations Committee provided funds for an organizational study of the Corps.¹¹ Hatch

launched three initiatives. One established design centers of expertise where specialists in planning, engineering, and other fields could standardize designs and project components. The second, called partnering, consisted of a formal effort to serve customers by reducing friction and inducing cooperation among the parties involved by assigning a project manager with whom the customer could deal. The third was the system of program/project management wherein the districts would assume management of an entire project from beginning to end and the divisions would oversee entire programs. Hatch mandated that districts designate a civilian deputy district engineer for project management and create an Office of Project Management. A project manager would be in charge of each major project, while a project management team would manage smaller projects. A board chaired by the deputy district engineer for project management would meet monthly to review project status. To underscore his commitment to the process and speed the completion of projects, Hatch restructured Corps Headquarters and pushed districts to automate budgeting, scheduling, and reporting in a central database. In response to district-level resistance, he issued a clarification memorandum to elevate the authority of project managers by specifying they were to be equal in rank to the positions of the chiefs of engineering and construction.¹²

National Performance Review

In 1988, the DOD created the Commission on Base Realignment and Closure to recommend bases that should be realigned, consolidated, or closed. Hatch saw the opportunity to take a bold step to reshape the Corps. His idea, proposed through BRAC, was a reorganization of the Corps that would close 13 districts and 4 divisions. This proposal resulted in political backlash from Congress. After pursuing other restructuring options, Congress provided funds for the Corps to work on its organizational structure. In November

1992, Assistant Secretary of the Army for Civil Works Nancy Dorn and Chief of Engineers Lt. Gen. Arthur E. Williams announced a compromise reorganization plan projected to save \$115 million annually. However, the plan projected elimination of 2,600 jobs. This backlash prompted the newly elected Clinton administration to put the plan on hold, removing the civil works side of the Corps from the BRAC process.¹³ People generally understood that shrinking budgets meant change was coming to the Corps. In the Charleston District, some were apprehensive that no matter what Congress said, the South Atlantic Division intended to cut costs by moving functions, positions, and people to other districts. The reason was a loophole in Congressional legislation that prevented district closures and protected people “except for those who voluntarily request to move.” The collapse of the Soviet Union and the conclusion of the Gulf War ended much of the overseas military construction and meant large numbers of high-level employees were returning to the United States, at the same time the Corps was embracing the private-sector idea that it was organizationally constructive for senior people to move from position to position. The combination meant the returnees would likely be placed in key positions. The result was that when district commanders suggested that employees sign a letter saying they were willing to move, many did so out of fear it could affect future promotions. All jobs were potentially at risk.

The National Performance Review, a Clinton Administration initiative, was aimed at creating a government that “works better and costs less.” The plan’s objectives were incorporated into the 1994 Federal Workforce Restructuring Act, which promised to reduce the federal workforce by 273,000 positions by the close of fiscal year 1999.¹⁴ The Corps was targeted to lose 3,401 full-time employees. But this had to be done without violating congressional stipulations not to



close any districts or remove any of their core engineering, planning, operations, and construction capabilities.¹⁵

In his keynote address at the restructuring workshop convened in June 1994, Undersecretary of the Army Joe R. Reeder urged participants to “focus on becoming the premier modern engineering business entity in the world.”¹⁶ Given the constraints imposed on Corps’ leadership, the workshop did what it could in warning of coming budget cuts and personnel reductions.¹⁷ Williams offered his outlook on the dilemma by saying, “We now have an opportunity to move forward.”¹⁸

With a Republican-controlled House of Representatives following the 1994 elections, the Clinton administration committed to balancing the federal budget and produced a second round of recommendations designed to save another \$70 billion by 2000.¹⁹ Actions designed to create a flatter, leaner Corps followed. In 1996, the Corps moved some technical review procedures and business practices down to the district level. Guidelines specified that all districts would continue to maintain core operations and construction capability, but these would differ by needs

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Lieutenant General Henry Hatch, Appointed by President Regan in 1988 to serve as the Chief of Engineers. (USACE Office of History)

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Former President Bill Clinton. (Official White House Photo)

and missions. In the Energy and Water Development Appropriations Act for Fiscal Year 1997, Congress directed the Corps to reduce its divisions to no less than six and no more than eight.²⁰ The South Atlantic Division regionalized military construction and, in 1995, ordered Charleston to end its work-for-others at the Marine Corps Air Station in Beaufort, and all other military installations.²¹ Budget cuts that crippled the Corps' ability to carry out the Pentagon's Homeowners Assistance Program left the Charleston and Savannah Districts to deal with the foreclosure problems of about 300 families affected by the 1993 closure of the Charleston Navy Base.²² The Charleston District stopped maintaining the harbor entrance channel to its authorized width of 1,000 feet in 1998 because funding did not keep up with rising fuel prices and the increasing costs of maintenance dredging stemming from the reduction in the Corps' dredging fleet and consolidation in the dredging industry.²³

The NPR (renamed the National Partnership for Reinventing Government in 1998) aimed to build an electronic-government infrastructure.²⁴ By the mid-1990s the Charleston District had a central server connected to individual terminals with the capacity to access the server, and a few stand-alone personal computers. Like other districts, Charleston struggled with the new Corps of Engineers Financial Management System (CEFMS) and the Project Management Information System (PROMIS), which were the end product of the Army's effort to streamline and automate business processes to save a projected \$270 million over a ten-year period.²⁵ CEFMS required expensive and time-consuming training that was seldom available.²⁶ During the Charleston District's CEFMS changeover, which took place from late May to late June in 1996, some of the district's financial transactions had to wait and 182 prospective buyers could not close on home sales.²⁷

Districts also were struggling to incorporate the new project management system into their operations. Project managers and personnel in the engineering, planning, and construction functional offices did not always have a common understanding of technical matters or share common points of view. Districts did not interpret and implement guidance from the Office of the Chief of Engineers in the same ways. The 1989 headquarters reorganization creating separate civil works and military programs, each with its own engineering and construction division but differing elsewhere, led to separate types of project management authorities in the divisions and districts.²⁸

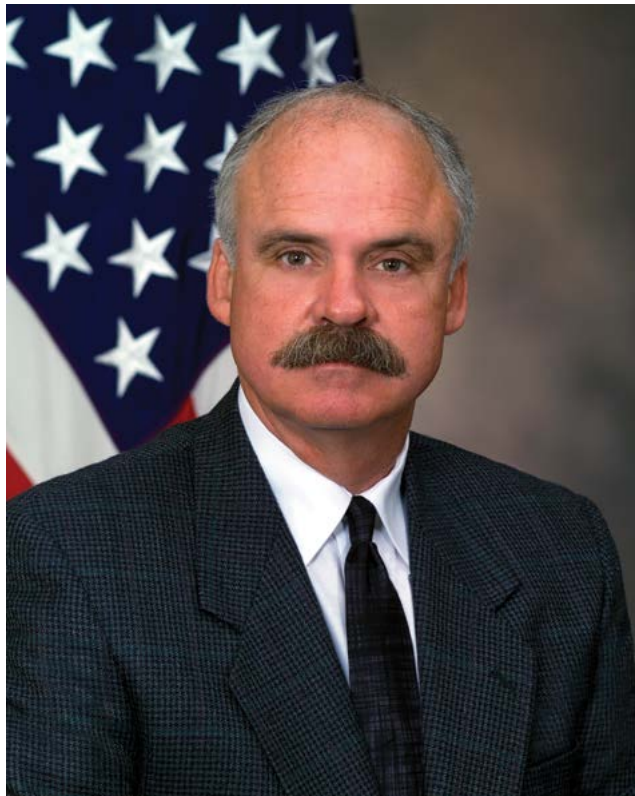
Between 1993 and 2000 the federal civilian workforce was cut by 426,200 positions, with the greatest number of cuts in the Department of Defense and related federal civilian agencies, such as the Corps.²⁹

The restrictions on the ability of the Corps to perform its civil works responsibilities mirrored the difficulties of cost-cutting and limits to its benefits being documented in numerous private-sector studies. The management practices of organizational downsizing and basically trying to do more with fewer employees often failed to increase organizational performance and often eroded employee commitment and morale. Referencing the increase in military construction from \$4.6 million in 1993 to an average of \$5.7 million for the years 1994–2001 and outlays for civil works rising from \$3.4 million in 1993 to an average of \$3.9 million during the same period, Assistant Secretary of the Army for Civil Works Mike Parker noted the harsh effects on the Corps.³⁰

The Corps has lost about 8,000 people in the past few years, so we're a leaner organization, but our missions have expanded and we have comparatively less money. Those things do not go together! We need to make sure the Corps' civilian and military employees understand that this is still a solid organization, and we will look after our own. [How people] are treated at work affects how they treat their family, how they feel about themselves, and their standard of living. When there's any type of turmoil in the workplace, and people don't want to come to work, the organization has a problem.³¹

SRS and the Threat of RIF

The effects described by Assistant Secretary Parker were felt more sharply in the Charleston District because of changes at the Savannah River Site. In the 14-year period between 1985 and 1998, the Charleston District's \$68.4 million work at SRS had become an important part of the district's operations. By 1988, the fourth year into the program, work at SRS had jumped from \$38,000 to \$6.7 million, 45 percent of the district's \$14.9 million civil works outlays for that year, and in 1991 reached \$8.1 million.³² In August 1991, the Soviet Union began to collapse, and in September, President George H.W. Bush announced unilateral cuts in nuclear arms. In January 1992, the Department of Energy increased its focus on environmental cleanup. The following year, the Clinton administration followed with funding cuts for atomic reactor research. Secretary of Energy Hazel O'Leary questioned the security of the nuclear weapons complex, and the Department of Energy began telling Westinghouse to shut down the SRS reactors. The Department of Energy announced that it would seek an open selection process for the new Savannah River contract to take effect in 1996. The Westinghouse Savannah River Company proposal, the only bid, meant



that in the future there would be a greater dependence on contracted firms to conduct operations geared to environmental cleanup.³³

With funding for nuclear operations declining rapidly from the mid-1990s onward, the SRS workforce dropped from its high of 25,200 people in 1992 to just 15,900 by 1997. The cutback in technical assistance and construction contracts had an immediate effect on the Charleston District. From its 1991 high of \$8.1 million, the district's SRS workload dropped steadily, and, with the exception of completing a number of outstanding projects in FY 1998, settled to slightly more than \$3 million annually.

In January 1998, Charleston learned the DOE planned to reduce funding for district work at SRS to \$250,000 a year and the district closed its site office.³⁴ Uncertain it would receive the funding necessary to begin deepening Charleston Harbor to 45 feet and citing the loss of funding and the increased cost of doing business, the Charleston District

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Assistant Secretary of the
Army for Civil Works Mike
Parker. (USACE Office of
History)



sought permission to conduct a reduction in force (RIF) in 1998.³⁵ Under RIF procedures, some employees would be offered incentives to retire. Some might be forced to move into lower positions, while more junior employees could find themselves bumped out of the organization and forced to seek employment elsewhere. In the end, the district took RIF-avoidance measures that cut the workforce through attrition, the dismissal of temporary, term, and contract employees, and early-out incentives and buy-out packages.³⁶

New District Office

Category 4 Hurricane Floyd bypassed Charleston as it moved along the southeastern coast in September 1999, but it pounded the roof of the L. Mendel Rivers Federal Building with five to six inches of heavy rain.³⁷ Typical of the time it was constructed, the building's skeletal system was coated with asbestos for fireproofing, and when the roof failed from the heavy rain, soaked asbestos dropped through ceilings and covered desks, filing cabinets, and the computer room on the sixth

floor. The General Services Administration said it was closing the building immediately, but before GSA could seal the contaminated areas, district personnel went into the building, "and pulled the computer systems out and put them in various rooms that weren't contaminated." Corps employees worked out of conference rooms on the second and third floors and four mobile command posts in the parking lot. When the district moved to temporary offices on Goer Drive in North Charleston, the departure was so hurried that additional files and records were either lost or destroyed.³⁸

In August 1999, The Citadel Alumni Association began construction of two 30,000-square-foot buildings located next to the college campus, one of which would be leased to the GSA. In turn, it would be available to the Charleston District. The new facility was designed to meet several of the district's needs—a less expensive, compact space, a more central layout, a modern infrastructure that could support the district's increasing

reliance on computer technology, and free parking. Renamed Hollings Hall by The Citadel Board of Visitors to honor alumnus and U.S. Senator Fritz Hollings, the building opened in 2000.³⁹ Designed in the Moorish style to match the architecture of buildings at The Citadel, Charleston enjoys a district office that closely resembles the Corps' iconic castle.⁴⁰



Summary

In carrying through on its reorganization, the Corps had been required to take actions that challenged organizational trust at the same time it was attempting to institutionalize team-based project management. The need to relocate their office under very difficult conditions further complicated the process of change for the Charleston District.

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Emergency operation vans used by district employees after Hurricane Floyd damaged the Mendel Rivers Federal Building. (USACE, Charleston District)

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Front facing of the Charleston District's new office completed in 2000. (USACE, Charleston District)

CHAPTER 8 ENDNOTES

¹Calculated from Table 11.2 Functional Composition of Outlays for Payments for Individuals 1940–2019; Table 3.1 Outlays by Superfunction and Function; Table 11.3 Outlays for Payments for Individuals by Category and Major Program, 1940–2019, Office of Management and Budget, FY 2015 Historical Tables, pp. 50–56, 221–227, 233–248.

²With regard to Corps districts see Howard L Green, *Continuing the Mission: U.S. Army Corps of Engineers A History of the New York District 1975–2005* (New York: New York Engineer District, 2009), pp. 92–103; *The U.S. Army Corps of Engineers: A History* (Alexandria, VA: COE Office of History, 2008), pp. 198–199; Gregory R. Graves and Peter Neushul, *An Era of Change: The Tulsa District, U.S. Army Corps of Engineers, 1971–1991* (Tulsa, OK: Tulsa Engineer District, 2009), pp. 15–16; Leland R. Johnson and Charles E. Parish., *The Falls City Engineers: A History of the Louisville District, Corps of Engineers, United States Army* (Louisville, KY: Louisville Engineer District, 2008), p. x. On the Regan military buildup see Edmund Morris, *Dutch: A Memoir of Ronald Reagan* (New York: Random House, 1999), pp. 422–423; *The U.S. Army Corps of Engineers: A History*, p. 103. Table 5.1, Budget Authority by Function and Subfunction: 1978–2018, Office of Management and Budget, FY 2014 Historical Tables, pp. 95, 98, 101.

³Table 4.1, Outlays by Agency: 1962–2018, Office of Management and Budget, OMB Budget for 2014, Historical Tables, pp. 82–85. \$3.2 billion in 1989 equals \$2.13 billion in 1980 dollars. Bureau of Labor Statistics, Consumer Price Index Inflation Calculator, <http://data.bls.gov/cgi-bin/cpicalc.pl>.

⁴ARCE SAC 1978–1987, 1989, 1999, Files, SAC.

⁵Graves and Neushul, *An Era of Change: The Tulsa District, U.S. Army Corps of Engineers, 1971–1991*, pp. 23–24; Gerhard Peters and John T. Woolley, "George Bush: 'Continuation of Robert W. Page, Sr., as an Assistant Secretary of the Army,'" The American Presidency Project, June 20, 1989 <http://www.presidency.ucsb.edu/ws/.pid=17181>; Bailey and Phillips, *As Mobile Goes, So Goes the Corps*, p. 19.

⁶Graves and Neushul, *An Era of Change: The Tulsa District, 1971–1991*, pp. 23–24; Peters and Woolley, "George Bush: 'Continuation of Robert W. Page, Sr., as an Assistant Secretary of the Army,'" Bailey and Phillips, *As Mobile Goes*, p. 19. For recent studies of change see Stephanie L. Dailey and Larry Browning, "Retelling Stories in Organizations: Understanding the Functions of Narrative Repetition," *Academy of Management Review*, 39, no. 1 (2014), pp. 22–43; R. Scott Livengood and Rhonda K. Reger, "That's Our Turf? Identify Domains and Competitive Dynamics," *Academy of Management Review*, 39, no. 1 (2014) pp. 48–66; L.J. Bourgeois, III, Daniel W. McAllister, and Terence R. Mitchell, "The Effects of Different Organizational Environments Upon Decisions About Organizational Structure," *Academy of Management Journal*, 21, no. 3 (1978), pp. 508–514.

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⁸Interv, author with Kyzer, 4 June 2015; IBM 1620, <http://www.columbia.edu/cu/computinghistory/1620.html>; https://www-03.ibm.com/ibm/history/exhibits/mainframe/mainframe_PP1620.html. The district also bought time from The Citadel's IBM 1620.

⁹Graves and Neushul, *An Era of Change: The Tulsa District, 1971–1991*, p. 65.

¹⁰Scott Sonenshein, "We're Changing—Or Are We? Untangling the Role of Progressive, Regressive, and Stability Narratives During Strategic Change Implementation," *Academy of Management Journal*, 53, no. 3 (June 2010), pp. 477–512; Michel Anteby and Virag Molnar, "Collective Memory Meets Organizational Identity: Remembering to Forget in Firm's Rhetorical History," *Academy of Management Journal*, 55, no. 3 (June 2012), pp. 515–540.

¹¹Energy and Water Development Appropriations for 1990, Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, One Hundred First Congress, 1st sess., Subcommittee on Energy and Water Development, pp. 11–13.

¹²William F. Willingham, "The U.S. Moves Towards More Integrative Approaches to Water Resources Management (1970–2010)," in John Lonnquest, Bert Toussaint, Joe Manous, Jr. and Maurits Ertsen, *Two Centuries of Experience in Water Resources Management: A Dutch-U.S. Retrospective*, pp. 321–322; Graves and Neushul, *An Era of Change: The Tulsa District, 1971–1991*, pp. 23–24; Peters and Woolley, "George Bush: 'Continuation of Robert W. Page, Sr., as an Assistant Secretary of the Army.'"

¹³Robert C. Powers, "Base Realignment and Closure (BRAC) 2005: Congressional dialogue and decision, (Monterey, CA: Naval Postgraduate School, 2003–06), pp. 13–14; Carl A. Strock, "Bringing Home the Bacon: Congress and the Reorganization of the Corps of Engineers," (National War College Report, Dec, 18, 1992), pp. 4–5, 8. As described by Strock, "Oversight of the Corps of Engineers is split between the House and Senate Armed Services Committees and Public Works and Transportation Committees with various subcommittees of the Appropriations Committees having final say over funding."

¹⁴A Brief History of Vice President Al Gore's National Partnership for Reinventing Government During the Administration of President Bill Clinton 1993–2001," [http:// govinfo.library.unt.edu/npr/whoware/historyofnpr.html](http://govinfo.library.unt.edu/npr/whoware/historyofnpr.html); Clinton, "Statement on Signing the Federal Workforce Restructuring Act of 1994," 20 March 1994, [http://www. presidency.ucsb.edu/ws/index.php? pid=49886](http://www.presidency.ucsb.edu/ws/index.php?pid=49886).

¹⁵Johnson and Parish, *The Falls City Engineers*, vol. 3, pp. 95–96.

¹⁶Lisa Mighetto and William F. Willingham, *Service–Tradition–Change: A History of the Fort Worth District U.S. Army Corps of Engineers 1975–1999* (Ft. Worth, TX: Army Engineer District, 2000), pp. 101–103.

¹⁷Charles A. Bowsher, Comptroller General of the United States, *Effectively Implementing the Government Performance and Results Act* (ASO/GDD 96-118 Government Performance and Results Act, Executive Guide, 1996).

¹⁸Rife, *Changes, Challenges, Champions: Fort Worth District 2000–2011*, pp. 101–103, quote at 102.

¹⁹"History of National Partnership for Reinventing Government," [http://govinfo.library.unt.edu/npr/whoware/ historypart4.html](http://govinfo.library.unt.edu/npr/whoware/historypart4.html).

²⁰Representative Steve P. LaTourette, Energy and Water Development Appropriations Act, 1998, Congressional Record vol. 143, no. 107 (25 July 1997), Extensions of Remarks; General Accounting Office, Army Corps of Engineers: Organizational Realignment Could Enhance Effectiveness, pp. 3, 16, 18–19; Johnson and Parish, *The Falls City Engineers: A History of the Louisville District*, vol. 3, pp. 95–96; Rife, *Changes, Challenges, Champions*, p. 101; Mighetto and Willingham, *Service–Tradition–Change*, pp. 101–103.

²¹Elmer Schwingen, "Notes and Such from PPMD"; Sophia Gizelle George, "District Designs Marine Corps Air Station Renovation," *Charleston District Dispatch*, v. 24, 2 (Charleston, SC: Charleston District USACE, 2001), pp. 4, 22; interv, author with Harbin, 18 May 2015; interv, author with Ronda Bath, 6 Mar 2015.

²²Terry Joyce, "Military homeowners face crisis. Money Problem: A program to help military homeowners make their mortgage payments has hit a financial snag," *Charleston Post and Courier*, 8 July 1995, Post and Courier Archive, <http://nl.newsbank.com/nl-search>.

²³Interv, author with Kyzer, 4 June 2015; Keith Snavelly and Uday Desai, "Competitive Sourcing in the Federal Civil Service," *The American Review of Public Administration* (2010), pp. 40, 83, <http://sitesduke.edu/niou/files/2011/05/Snavelly-and-Desai-Competitive-Sourcing-in-the-Federal-Civil-Service.pdf>; Tony Barteleme, "Corps to widen channel," *Charleston Post and Courier*, 24 Nov. 1998, Post and Courier Archive, <http://nl.newsbank.com/nl-search>.

²⁴"History of National Partnership for Reinventing Government," <http://govinfo.library.unt.edu/npr/whoware/historypart4.html>.

²⁵Mighetto and Willingham, *Service-Tradition - Change Fort Worth District 1975-1999*, pp. 107-108.

²⁶Bailey and Phillips, *As Mobile Goes, So Goes the Corps*, pp. 31-32

²⁷Terry Joyce, "Corps moving to new system; delay possible," *Charleston Post and Courier*, 26 Nov. 1996, Post and Courier Archive, <http://nl.newsbank.com/nl-search>.

²⁸Rife, *Changes, Challenges, Champions*, 98-101; Bailey and Phillips, *As Mobile Goes, So Goes the Corps* pp. 5-6, 15; Graves and Neushul, *An Era of Change: The Tulsa District, 1971-1991*, 24; Godfrey, Pollarine and Sadin, *Responsiveness & Reliability: A History of the Philadelphia District and the Marine Design Center, U.S. Army Corps of Engineers, 1972-2008*, p. xii; Damon Manders, *History of the U.S. Army Corps of Engineers Support Center Huntsville, 1993-1997* (Huntsville, AL: Army Engineering and Support Center, 1999), p. 14.

²⁹Table 17.1, Total Executive Branch Civilian Full-Time Equivalent (FTE) Employees: 1981-2014, OMB, Budget for Fiscal Year 2014, Historical Tables, p. 362.

³⁰"Table 5.1, Budget Authority by Function and Subfunction: 1976-2018;" "Table 4.1, Outlays by Agency: 1962-2018," Office of Management and Budget, Budget for Fiscal Year 2014, Historical Tables, pp. 84-85, 101.

³¹Parker quotes are from Bernard Tate, "ASA (CW) is Corps Advocate," *USACE Engineer Update*, vol. 25:12 (Dec. 2001), pp. 1, 8-9. Further complicating the Corps' position, Parker added, was the fact that of all congressional appropriations, those for Corps' civil works projects were the only ones where Congress demanded an economic return.

³²Annual program reports SAC.

³³Files, SAC.

³⁴Mary Beth Reed, Tracy L. Fedor, and Barbara Smith Strack, *The Savannah River Site at Fifty* (Washington, DC: U.S. Government Printing Office, 2002), pp. 518-519.

³⁵Reed, Fedor and Strack, *The Savannah River Site at Fifty*, p. 520; personal communication, James Whiteman to authors, 15 Sept. 2015.

³⁶Conducting a RIF required approval from the Office of the Assistant Secretary of the Army, Manpower & Reserve Affairs, Policy and Program Development Division. United States of America Merit Systems Protection Board Docket Number-AT-0351-98-1091-I-1 3, 1999, <http://www.mspb.gov/netsearch/viewdocs.aspx?docnumber=195399&version=195592&application=ACROBAT>.

³⁷Interv, author with Limebaker, 23 June 2015; interv, author with Whiteman, 25 Aug. 2015; interv, author with Schwingen, 20 May 2015; interv, author with Hubbard, 20 May 2015; interv, author with T. Hadden, 19 May 2015.

³⁸Robert Behre, "Last tenants vacate federal office site: Empty Building: L. Mendel Rivers Office Federal Building has been vacated, and its future is uncertain," *Charleston Post and Courier*, 27 Dec. 1996, <http://nl.newsbank.com/nl-search/we/Archives?>; Interviews, SAC.

³⁹Robert Behre, "Federal building may be razed as asbestos makes renovation costly option," *Charleston Post and Courier*, 19 Feb. 1996, <http://nl.newsbank.com/nl-search/we/Archives?>; September 2011 District Directors Report, Northeast Citadel Alumni Association, 3 Oct. 2011, <https://necitadelalumnidotcom.wordpress.com/2011/10/03/september-2011-district-directors-report/>; Ron Menchaca, "Citadel alumni to build facility," *Charleston Post and Courier*, 12 Aug. 1999, <http://nl.newsbank.com/nl-search/we/Archives?>; "The Citadel names building in honor of Senator Hollings," Citadel press release, 20 Oct. 2000, <http://www.citadel.edu/root/news-archives-sy00-01-hollings>. GSA Notice of Award Full Service Lease Solicitation Number: 2SC0206, <http://www.fbo.gov/?s=opportunity&mode=form&id=47641169ff41>.

⁴⁰Interv, author with Whiteman, 25 Aug. 2015.

CHAPTER NINE

The Charleston District's Regional Village

Col. Ralph Locurcio, the Savannah District Engineer in the late 1980s, addressed the decline in military construction by encouraging employees to search out customers to rebuild the district's workload. When Locurcio became commander of the South Atlantic Division (SAD) and learned that Charleston and Wilmington were going to turn down projects because they did not have the skill base, he began thinking about ways to use the internet to link districts together. This developed into a Regional Village for the Southeastern United States.¹ Bill Stein, who later became the Charleston District's senior civilian, was tasked with the execution. Building this cooperative endeavor required breaking down internal barriers within and among the division and the districts and the difficult task of reshaping local cultures.² Change was essential because important customers were describing the Corps as "unresponsive and arrogant," too costly, and taking too long to complete a project.³

The effort began by standardizing the information infrastructure and choosing from among the districts' individual IT systems. The next phase involved creation of "regional village teams" to develop standard project requirements, interfaces, terminology, and databases so that a project manager in one district could effectively communicate with personnel in another.⁴ The concept was consistent with a 1995 report by the Government Accounting Office (since 2004, Government Accountability Office). The report called on government agencies to employ private-sector initiatives to decentralize and become more flexible, to move toward a lattice-like structure wherein people at the top no longer had a monopoly on the flow of information and where expertise and authority took on new organizational relationships.⁵



The regional village designers optimistically observed that "there is room for improvement, but the Regional Village is a step on the way to doing our work in the most cost-efficient, timely, professional way, and with the highest possible quality."⁶

Such optimism regarding the ease of using information technology to reshape organizations was typical of the time. The Corps' top leadership was receptive. When briefed on the project in 1996, Chief of Engineers Lt. Gen. Joe N. Ballard approved the idea and said he would push it Corps-wide.⁷ Others were less receptive to change. As late as 1998, a survey of field offices revealed that most of the Corps' leaders did not fully embrace information technology. In fact, many viewed IT "as a cost center rather than a revenue driver" and routinely excluded the heads of information management offices from the inner circles of decision-making.⁸

TOP
Brigadier General Ralph Locurcio, Commander of the South Atlantic Division. (USACE, South Atlantic Division)



In 2000, newly appointed Chief of Engineers Lt. Gen. Robert B. Flowers threw his efforts behind the Project Management Business Process (PMBP), which the Corps had adopted in 1996 but not yet fully developed. Bill Stein, now the acting chief of SAD's Business Management Division, quickly absorbed the key components of the regional village planning into the PMBP. By now, the Charleston District was participating in the development of SAD's regionalization initiatives.



In 2002, the Corps introduced its Seven Environmental Operating Principles, organizationally important because they described a broader mission. The same year, Director for Civil Works Steve Stockton recommended developing a long-range organizational model.⁹ In 2003, Chief of Engineers Flowers initiated studies to "define and align missions, functions, business

processes, and stakeholder relationships," bring people together in a climate of organizational learning, and create "a non-threatening, empowering culture where leadership, management, and the workforce are focused on continually developing organizational competence."¹⁰ In part, his plan to create "One Corps" was driven by lower budgets. One aim was to reduce the management workforce in the Corps' divisions by 6 percent, or

approximately 230 positions. Under the "USACE 2012 plan," the headquarters in Washington would focus on strategic needs, plans, direction, national relationships, and policy development. Divisions would now focus more on their regional operational roles while allowing the districts to concentrate on executing their workload. Regional Business Centers would manage projects with the aid of cross-functional Regional Integration Teams. Functional offices would be transformed into communities of practice. Each element would have key technology enablers. The Corps' new project management information system, which came to be known simply as P2, would come to play an important role in the PMBP. A regional database in the Corps' financial management system, combined with leadership development programs, would further enable the Regional Business Centers.¹¹ As the majority of Corps personnel were civilians, the corporate redesign was based on the Seven S Model, an approach to building a common organizational structure.¹² Upon becoming the 51st Chief of Engineers, Flowers' successor, Lt. Gen. Carl Strock, not only expressed his support of the plan but predicted "that 50 years from now, people will look back and say the Corps of the early 21st century made the right choices and the right changes."¹³

The District Regional Village

In May 2003, South Atlantic Division Commander Brig. Gen. Peter Madsen and District Commander Lt. Col. Peter Mueller selected Stein to be Charleston District's new deputy for programs and project management. Stein would now have the opportunity to import his regional village concepts into a relatively small district where annual workloads only hovered in the \$40 million range and were expected to drop even further.¹⁴

Stein began by reaching out to potential federal partners with a willingness to take on new work. The Naval Facilities (NAVFAC) Engineering Command's Southern Division

from North Charleston to Jacksonville, Florida, presented that opportunity.¹⁵

A number of highly qualified NAVFAC employees did not want to relocate their families to Jacksonville and were eager to find employment that could keep them in the Charleston area. At the same time, changes in Department of Defense hiring policies made it easier for the Charleston District to directly target and hire them.

The financial and economic struggle of the Great Recession made it an employer's market.¹⁶ Employment in construction industries had dropped from 7.7 million in 2006 to 5.5 million in 2010, a 28 percent decline. In South Carolina, unemployment increased from 6.1 percent in 2006 to 10.7 percent in 2010.¹⁷

Taking advantage of the new hiring policies and the weak labor market, Stein and the district's leadership located and hired highly qualified NAVFAC employees to fill key vacancies. By 2011, these hires included more than 40 professionals, among them a division chief, 3 branch chiefs, 10 project managers, and 12 design and construction engineers.¹⁸

MARFORRES

The Marine Forces Reserve (MARFORRES) Centers program provided facilities management services and repairs at 180 sites. Historically, the program consumed roughly \$8 million dollars annually and consisted of numerous small-dollar purchase orders spread all over the country, which required a high level of administrative support. Reductions in manpower and budget cuts made the program even more challenging. In 2007, Stein coordinated the transfer of the MARFORRES program, its project managers, and the regional contracts to the Charleston District, which restructured the program. That success led to the Marines giving the Charleston District much of their environmental program.¹⁹ By 2009, the district had added armory and



perimeter intrusion detection systems, boiler inspections, environmental inspections and studies, energy assessments, and \$60 million in improvements to the new, 411,321-square foot MARFORRES headquarters in New Orleans. By 2012, the district was performing \$15 million worth of preventive maintenance and minor repair contracts at 181 MARFORRES installations nationwide.²⁰

Defense Logistics Agency

The MARFORRES program demonstrated the type of work the district could do for other federal agencies.²¹ On July 8, 2009, the Savannah District hosted a meeting at which a representative from the Defense Logistics Agency announced that he was looking for "one door to the Corps" to execute their annual Facilities Sustainment, Restoration and Modernization program, worth between \$50 million and \$100 million, for their 22 distribution sites located in the United States and another five overseas.²² Stein explained how the district could administer all the design and contracting work and provide quality assurance. The result was a new program management agreement signed on October 16, 2009. The Charleston District began providing preventive maintenance and service call repairs, facility maintenance and repairs, and fire suppression upgrades. With DLA offering to fund additional personnel, the Charleston District added an architect and three more engineers, giving the district

OPPOSITE TOP

Major General Flowers before his promotion to Lieutenant General. (USACE, Office of History)

OPPOSITE MIDDLE

Bill Stein (USACE, Charleston District)

TOP

Construction of the Marine Forces Reserve Headquarters located in New Orleans. (USACE, Charleston District)



repairs, growing the program to nearly \$95 million for that year.²⁵

Other Programs

In 2008, the Charleston District started working with the Charleston Naval Weapons Station under an International and Interagency Services contract to improve their channel depths and piers. One project required removing the extensive mooring and anchoring systems used to secure two nuclear-powered submarines used by the Navy's Nuclear Power Training Unit. The subs were moved to a secure, temporary location while the contracted dredge deepened the waters around their berthing sites, successfully completing this challenging \$740,000 project within the 30-day schedule.

The district also supported the Military Surface Distribution and Deployment Command, the Defense Energy Support Center, and the Army Field Support Battalion Afloat by dredging the waters around their piers located on the Cooper River. The Army's 841st Transportation Battalion was responsible for shipping 40 percent of all the surface equipment used in the Afghanistan and Iraq wars from their pier, making it a strategically vital asset for the country. Lacking their own contracting and dredging capabilities, these organizations were quick to call on the Charleston District for the work.²⁶



a greater vertical construction capability.²³ To accomplish this new workload, the district assembled a 10-person Project Delivery Team. Their first site visit in February 2010, was at the Red River Army Depot in Texarkana, Texas, where deferred maintenance had taken a substantial toll on the facilities. Other work included a \$300 million fire suppression improvement program that included upgrading fire protection systems at warehouses all over the country, and cathodic protection that helps slow down corrosion in metals at more than 350 DLA sites around the world.²⁴ By 2012, the district was providing DLA with a full range of facility maintenance services, upgrades, and

District work for other agencies included the Charleston Federal Complex in North Charleston, where the district managed the \$10.5 million dollar transformation of a 40,000 square foot bowling alley into a new administrative office space for the Department of State Human Resource Service Center. Additionally, the district also performed dredging and dock repair work for other federal agencies located at the complex, including the Coast Guard and the National Oceanic and Atmospheric Administration. Smaller projects for local federal sites included the installation

of solar power systems for the National Park Service's Ft. Sumter National Monument.²⁷

Military Construction

Between 2001 and 2008, the military construction budget increased to \$11.6 billion. In 2002, the South Atlantic Division altered its mission assignments to allow the Charleston District to execute military programs in South Carolina. The first large project in this "backyard military work," as General Engineering Team Leader Charles Harbin put it, was the \$3.3 million renovation of the officers club and the bachelor officers conference center at the Marine Corps Air Station in Beaufort.²⁸

SAD expected a substantial increase in construction work, placing additional demands on Savannah, which would need assistance that could only come from Mobile, SAD's other military construction district; and Mobile was facing a robust Air Force construction program in addition to a smaller Army program.²⁹ The Charleston District's rapid growth in capabilities and ability to hire personnel experienced in military construction positioned the district to offer to help. Savannah's Commander, Col. Ed Kertis recommended that Fort Jackson be returned to the Charleston District to handle the military building capacity and level of customer service the installation required. Stein led a transition planning team that worked with their Savannah counterparts and representatives from the Wilmington District.³⁰ On June 1, 2008, the Charleston District was assigned to assist with the 15 military construction projects already in progress at Fort Jackson totaling \$485 million. They also accepted the installation's operations and maintenance program of \$21 million that was projected to grow, and an environmental program that averaged \$1.5 million annually.³¹ Once the surge in military construction was addressed, it was expected that the military workload would revert to the Savannah District.³²



Fort Jackson is the Army's largest and most active initial and advanced individual training center, processing half of all new Army recruits and 60 percent of the women who enlist.³³ The redirection of work from the Savannah District began in 2008 with the Army's Religious Training and Education Center, the Drill Sergeant School, and some barracks construction and renovation projects that together totaled over \$120 million. Pending 2009 projects totaling \$42.9 million, and multi-year construction projects from 2010 onward totaled \$312 million. District leaders welcomed the work but realized they needed more people to get it all done.

The Charleston District welcomed a decision by the South Atlantic Division Commander to transfer the district's contracting, engineering and planning branches back from the Savannah and Wilmington Districts who had controlled them from afar as regional assets.³⁴ The district was also quick to establish a new Military Project Management Branch located at the Charleston office. The construction and resident engineer staff located on Fort Jackson transferred from the Savannah District, and the Construction Division hired additional project managers and

OPPOSITE TOP

Warehouse at the Red River Army Depot. (USACE, Charleston District)

OPPOSITE MIDDLE

North Charleston Mayor Keith Summey, Linda Thomas-Greenfield with the US Department of State and District Commander LTC Edward Chamberlayne cut the ribbon on a new administrative building the Charleston District converted from an old bowling alley. (USACE, Charleston District)

OPPOSITE BOTTOM

Sign over the entrance to the district office announcing the return of Fort Jackson to the Charleston District's workload. (USACE, Charleston District)



quality assurance representatives, anticipating a spike in workload on the installation, for a total of 60 district staff at Fort Jackson.³⁵

Military construction at Fort Jackson included a battalion headquarters and multiple barracks and dining facilities to house, feed, and train approximately 50,000 new soldiers a year.³⁶ Tasked to renovate four older barracks complexes known as “Starships” while the Army continued to train new soldiers, the district was forced to come up with innovative ideas that included turning dining areas into temporary classrooms and office space. They also constructed two units with two-story dual dining facilities at a central point to feed 5,200 soldiers at each meal. The district contracted the renovation work on a design/build basis, with district engineers completing roughly 35 percent of the basic designs. Four different contractors were selected to do both the design and construction for the four Starships. Fort Jackson celebrated completion of their new dining facility with a ribbon cutting ceremony on September 14, 2012. The District would go on to complete \$72 million in projects by the end of the year, among them the construction of three barracks complexes that included administrative office space and classrooms to billet and train roughly 250 soldiers each. The district also provided environmental cleanup services to both Fort Jackson and Shaw Air Force Base totaling \$1 million annually.³⁷

Department of Defense regulations required all new buildings to meet or exceed the stringent Leadership in Energy and Environment Design (LEED) certification standards. To meet these standards, district engineers and project managers included renewable energy features like solar water heating systems that provided a 30-percent savings in energy costs. Other “green” features included the replacement of brick exteriors with composite exterior insulation finishing systems, which provide a much

tighter building envelope to reduce energy consumption on heating and cooling.³⁸

Joint Base Charleston

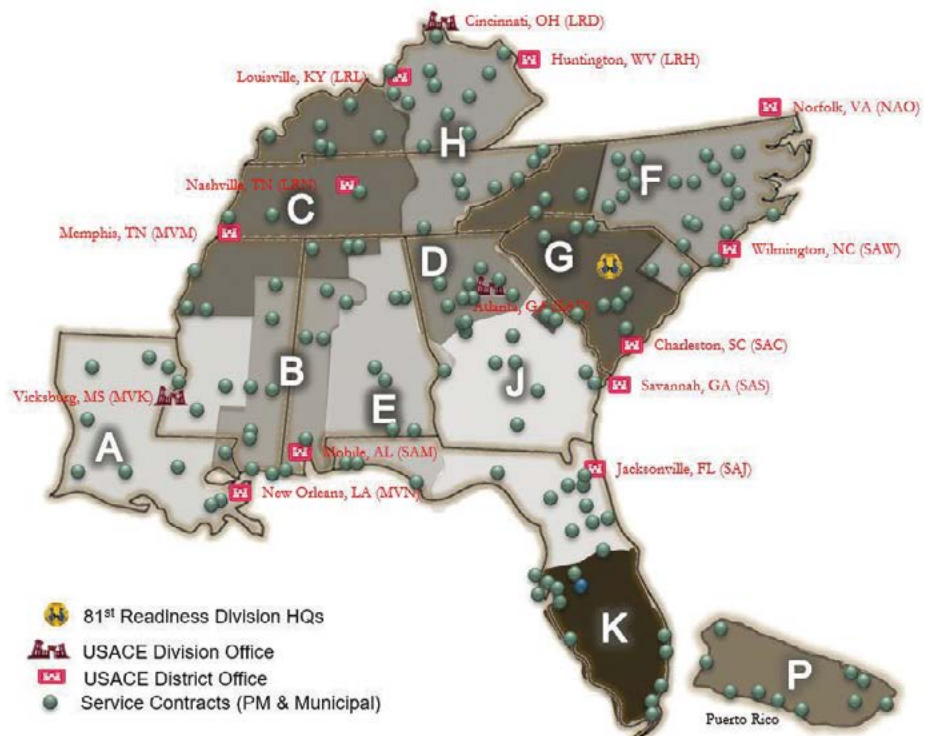
The Charleston Air Force Base and the Naval Weapons Station officially combined to become Joint Base Charleston in October 2010. Base Commander Col. Martha Meeker was interested in utilizing USACE to manage some of the base construction and facility maintenance requirements. In 2012, an agreement was reached under which all sustainment, restoration, and modernization work at the former weapons station was assigned to the Charleston District.³⁹ In June 2012, the district awarded its first Job Order Contract (JOC) to do the work. This contract allowed the district to more efficiently manage the large number of relatively minor repair jobs and smaller projects that were anticipated. Importantly, the district was able to award the contract as a set-aside for small business in a historically underutilized business zone. The district had awarded more than 30 highly varied task orders under the JOC through 2012.⁴⁰

81st Regional Support Command

The District first worked with the 81st Regional Support Command on a relatively minor construction project. Seeing an opportunity to gain another customer, the district followed up with a presentation of its capabilities that resulted in a pilot program of service, repair, and maintenance projects similar to the MARFORRES program. Currently, with an annual program budget of \$30 million, the district provides responsive maintenance and facility services for the command's 700 facilities located on 300 sites in the nine southeastern states and Puerto Rico.⁴¹

Veterans Administration

The Ralph H. Johnson Veterans Administration Medical Center, located near the District's main office in Charleston, had been among the most frequent contacts in Bill Stein's outreach program. The medical



center was anxious to improve and expand their facilities but did not have funding for the work. In 2007, congressional attention over VA conditions nationwide resulted in increased appropriations. Suddenly, the VA had \$300 million worth of work it could not accomplish with its in-house contracting and construction capability. Naturally, they turned to the Corps. Corps-wide the VA workload rose from approximately \$2 million annually to \$7 million in 2007 and \$14 million in 2008.

The Charleston District volunteered to serve as the VA's regional program manager. With the volume of work Savannah already had, Savannah District's Commander, Col. Kertis, agreed to transfer VA projects located in Georgia to Charleston. Charleston District signed an agreement with the VA to support four medical centers located in Charleston and Columbia, South Carolina, and Augusta and Dublin, Georgia. In 2008, the district assumed responsibility and oversight of contracts totaling over \$25 million (22 percent of the total program), an effort that required coordination of three different offices and resolution of numerous scope and funding issues. Eight contracts totaling 16 projects were completed in 60 days or less. The Charleston District awarded contracts that enabled it to exceed its goals for small business by 10 percent, historically

OPPOSITE TOP

District Commander, LTC Jason Kirk holds a cake celebrating the transfer of the district's contracting and engineering functions from the Wilmington and Savannah Districts. He is flanked by Chief of Contracting Lauri Newkirk-Paggi and George Ebai on the left, and by Chief of Engineering Carole Works and Deputy for Program Management Bill Stein on the right. (USACE, Charleston District)

OPPOSITE MIDDLE

Charleston District employees at a large barracks construction site on Fort Jackson. (USACE, Charleston District)

OPPOSITE BOTTOM

District Commander, LTC Jason Kirk and COL Martha Meeker from Joint Base Charleston sign a Memorandum of Agreement for Military Construction. (USACE, Charleston District)

TOP

Map showing the locations of the 81st Regional Support Command's many locations. (USACE, Charleston District)

underutilized business zones by 14 percent, women-owned businesses by 11 percent, and service-disabled veteran owned small businesses by 21 percent.⁴²

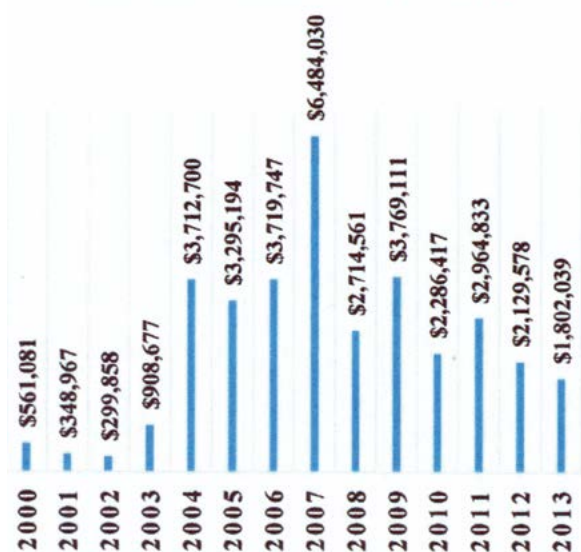
In March 2011, a new agreement between the VA, the South Atlantic Division, and the Charleston District restructured the program's requirements and extended the working relationship through March 2016. The Charleston District began serving as the program manager for SAD programs from North Carolina to Florida, Puerto Rico, and including a south-central region that comprises portions of Oklahoma, Arkansas, Texas, Louisiana, and Mississippi. By 2012, the district had completed \$41.7 million in work for the VA.⁴³

Savannah River Site

In 2000, Congress created the National Nuclear Security Administration as a semi-autonomous agency within the Department of Energy charged with securing, safeguarding, and disposing of dangerous nuclear and radiological material.⁴⁴ A great deal of this material was located at the Savannah River Site.

began three major projects to reprocess uranium and plutonium for long-term storage or use in commercial activities. The Pit Disassembly and Conversion Facility, the Mixed Oxide Fuel Fabrication Facility (MOX), and the Waste Solidification Building were to process and convert about 34 metric tons of weapons-grade nuclear fuel down to commercial grade nuclear fuel.⁴⁵ Nuclear material would come into the Pit Disassembly and Conversion Facility and be processed for transfer to the MOX Facility. The MOX Facility would be a 600,000-square-foot structure, hardened like a nuclear reactor, that would convert surplus weapon-grade plutonium, remove impurities, and mix it with uranium oxide to form pellets for reactor fuel assemblies to be irradiated in commercial nuclear power reactors. When operational, the MOX facility would be capable of annually turning 3.5 metric tons of weapon-grade plutonium into MOX fuel. Waste products would be removed to the Waste Solidification Building for long-term storage. The Corps was assigned the bulk of the construction management activities, estimated to be \$1.3 billion and the South Atlantic Division began partnering with Charleston and other districts to locate a project office at SRS, which opened in 2008.⁴⁶ Construction of the MOX Facility started on August 1, 2007, but as Congress asserted its budget constraints, other pieces of the program lagged. Construction started on the Waste Solidification Building in 2009 and the Charleston District accepted a quality assurance role for the Salt Waste Processing Facility and increased staff for a similar role at the MOX Facility.⁴⁷ In 2010, command and control of the Corps involvement with the Pit Disassembly was transferred from SAD to the Charleston District. But in its budget request for FY 2013, NNSA announced it was canceling the Pit Disassembly and Conversion Facility project. The Charleston District terminated its administrative support for that project, reduced staff, and continued to support the Salt Waste Processing Facility.⁴⁸

Charleston District Work at the Savannah River Site 2000 - 2013



Source: Files SAC

Following 9/11, the Department of Energy expanded a major program to convert the highly enriched uranium used in Cold War-era nuclear weapons into low enriched uranium that could be used in reactors for commercial power. As previously described, the National Nuclear Security Administration established an office at the Savannah River Site in 2004, took over management of the tritium complex, and

Overseas Deployment of Personnel

In 1999, the Corps developed a Field Force Engineering Doctrine to support U.S. Army operations in Kosovo and Macedonia. That experience led to the creation of several types of mission-oriented teams largely composed of Corps volunteer civilians with the right mix of technical expertise required depending on the need.⁴⁹ These contingency teams would play important roles in Afghanistan and in Iraq when the U.S. Army entered those countries after the 2001 attack on the World Trade Center. As in the first Gulf War, the ability of host nations to provide support was limited and the "Total Army Concept" meant the Corps had fewer regular army engineer units and a larger proportion of its engineering forces in the reserves.⁵⁰ The Corps mission in Afghanistan began in 2002, just a year after Army Special Forces units entered the country and helped push the Taliban out of power throughout most of the country, growing over the ensuing years to an engineer district with approximately 1,000 projects totaling \$10.9 billion dollars.⁵¹

The Corps would deploy over 9,000 civilian volunteers to Afghanistan and Iraq as engineers, construction representatives, project managers, and in other supporting roles.⁵² There was pressure on the districts to ensure a flow of volunteers and extra pay incentives helped meet the demand.

Those who volunteered were transferred to the Corps' Transatlantic Division headquartered in Winchester, Virginia, where they were fitted for Army-style uniforms and boots, learned how to put on a gas mask quickly, and trained on computers and other devices with which they could reach back anywhere in the stateside Corps for assistance.⁵³ It was normal for some to work a 12-hour day, seven days a week.⁵⁴



At the peak of operations, volunteers from the Charleston District averaged between 5 and 10 percent of the district's full-time equivalent personnel.⁵⁵ Volunteers continued traveling overseas in 2010 and 2011, while others requested deployments. During the Afghanistan and Iraq operations, John Kassebaum served two deployments as District Counsel for the Gulf Region Engineer District South.⁵⁶

Jimmy Hadden, a project manager at Bagram Airfield, was working on the Bagram Theater Internment Facility, a high-priority project.

OPPOSITE TOP

Chart showing Charleston District work at the SRS 2000 to 2013. (USACE, Charleston District)

TOP

Charleston District employees deployed to Iraq showing their South Carolina pride. (USACE, Charleston District)

MIDDLE

Safety Officer John Lindsay at a construction site in Afghanistan. (USACE, Charleston District)



Public Relations

Until 2008, district public relations largely consisted of press releases on the beginning or conclusion of a major project, command changes, or the need to respond to a print or television story or criticism. With the hiring of Glenn Jeffries to direct corporate communications, the district, began contacting print, television, and radio media, the Chamber of Commerce, and other organizations to put its name in front of the public. District leadership gave media presentations and public appearance training sessions were conducted for project managers.⁵⁶ The district website expanded to include news of projects, contracts, and bid solicitations. The internal newsletter *The Castle* became the quarterly publication *Palmetto Castle* and was posted on the web and mailed to selected recipients.⁵⁷ When the district faced criticism regarding the inconvenience caused by the Myrtle Beach renourishment project in 2009, the public relations team countered with a two-part series on a local affiliate of a national television network highlighting the community benefits of the project and a human-interest story of life aboard a dredge. The district also partnered with the College of Charleston to produce a documentary on the Intracoastal Waterway that was aired on the South Carolina Educational Television Network on Thanksgiving evening in 2009. Nearly half of the documentary featured the Corps of Engineers and at one point dealt directly with the problems involved in securing funding to maintain the waterway and the economic and social costs to the state of a deteriorating infrastructure.⁵⁸ With the rise of social media, the district reached out to new audiences with a Twitter feed in 2010 and a Facebook page in 2012. Viewers would have access to visually appealing photos, modern layouts, and human-interest stories that centered on the district's daily goings-on and illustrated how the military does have a personable side that civilians can understand.

I know a lot of projects in Afghanistan went over budget and weren't done on time, but I can tell you we did this project within budget and had it finished one day before the end date. Nineteen buildings, \$60 million, and we did it in less than 400 days. At times there were over a thousand guys on the worksite.

While supporting the Corps' overseas deployment responsibility, the focus on the Afghanistan and Iraq missions as "the number one priority" adversely affected some projects back home in the Charleston District when the Corps did not backfill positions.⁵⁵ Nonetheless, Charleston employees were proud to support the Corps' overseas responsibilities either by volunteering to go themselves, or by taking on extra work to support those who did.

Summary

The Charleston District was continually reorganizing and adding staff to keep up with their growing workload. Between 2007 and 2010, they absorbed the Fort Jackson Resident Engineers Office from the Savannah District and added a Military Program Branch and an International and Interagency Branch to the Programs and Project Management Division.⁵⁹ The dramatic increase in workload also provided sufficient funding and justification to add additional contracting specialists and engineers. As a result, the Construction, Engineering and Contracting Branches were elevated to Division-level organizations, directly responsible to the District Commander.

The rapidly growing workload also highlighted problems related to the system of regionalization that had the Charleston District's contracting staff working for the Wilmington District, and the engineering staff working for the Savannah District. In 2009, these branches were transferred to the Charleston District. In addition, the district was designated as primarily responsible for all Army construction projects in South Carolina.⁶⁰ The Charleston District workload expanded from \$39 million in 2002 to \$322 million in 2012 and personnel increased from 148 to 196.

Rapid growth, limited staffing, and mixing an "old guard" with new arrivals could have produced a difficult work environment, but it did not. For people who worked in the

Charleston District in the late 1990s and early 2000s, the positive change in the atmosphere was dramatic and welcome. District leadership advertised the increasing workload as the opportunity to build something, encouraged an "entrepreneurial spirit," and used objective factors to measure outcomes. To a large degree, the Charleston District succeeded in implementing the environment envisioned in the Corps' vision, "USACE 2012" by developing a non-threatening, empowering culture focused on developing organizational competence.

The district's growth and continued success ended any consideration of closing the Charleston District.

OPPOSITE TOP

Palmetto Castle newsletter produced by the District's Public Affairs office highlighting a visit by Vice President Joe Biden. (USACE, Charleston District)

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CHAPTER TEN

Post 45 Project: Positioning for the Shipping Future

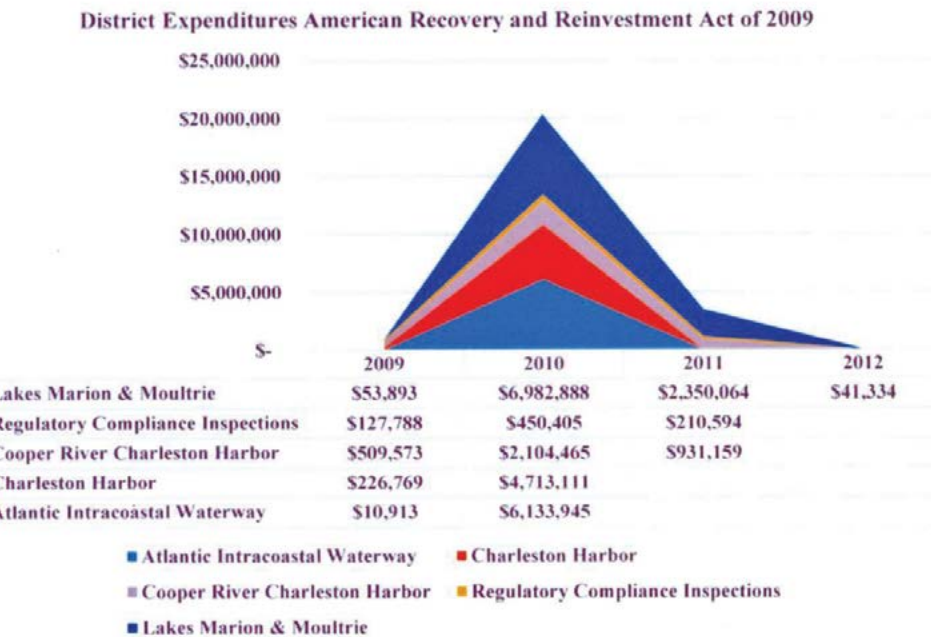
ARRA

Passed in the wake of the Great Recession, the Emergency Stabilization Act of 2008 and the American Reinvestment and Recovery Act of 2009 together appropriated one-half of one percent of their budgets to Corps civil works programs.¹ In 2009, the Charleston District awarded seven ARRA contracts, six of them ahead of schedule. They included:

- Dredging the lower reaches of Charleston Harbor to project depth
- Dredging the Atlantic Intracoastal Waterway from Winyah Bay to Port Royal for the first time in more than a decade
- Stabilizing the banks at the St. Stephen Rediversion canal, where encroachments jeopardized access roads and affected structural integrity
- Repairing the intake gate at the St. Stephen powerhouse
- Expediting the permitting process for a number of ARRA-funded projects of the South Carolina Department of Transportation.²

In 2011, the district awarded its final ARRA project—a small business set-aside to install eight miles of water transmission lines to the Town of Elloree.

ARRA funds were also awarded to the Lakes Marion and Moultrie Environmental Infrastructure Project. The project originated in 1992, as Congressman James Clyburn's effort to address the need of his largely rural district for safe, reliable drinking water.³ From 1993 onward, the Orangeburg County Council and Santee Cooper officials worked to assemble support for the water system. Voters approved



a water referendum, the Santee Cooper board approved funding half of a \$250,000 engineering study, and the Lake Marion Regional Water Agency was chartered in 1997.⁴ It broke ground for the treatment facility in Santee in 2005.

The Water Resources Development Act of 2007 authorized the Charleston District to spend up to \$60 million for planning, engineering, design, and assistance in construction.⁵ Over the years, the District's Lakes Marion and Moultrie Environmental Infrastructure Project grew to include the installation of approximately 70 miles of water transmission lines and a sewer component, in addition to design and construction assistance for the water treatment plant, to total slightly more than \$49 million in federal funds, including ARRA funding, and \$14.9 million in local funds.⁶

TOP
District Expenditures
American Recovery and
Reinvestment Act of 2009.
(USACE, Charleston District)



Contrasting views framed a political question. Was the \$60 million Corps of Engineers authorization for the Lakes Moultrie and Marion project, which began as an earmark, a “parochial pork barrel project,” as the earmark opponents contended? Or, as Representative James Clyburn said, was it an infrastructure project necessary to provide “for underprivileged minorities, the first step toward quality drinking water?”⁹

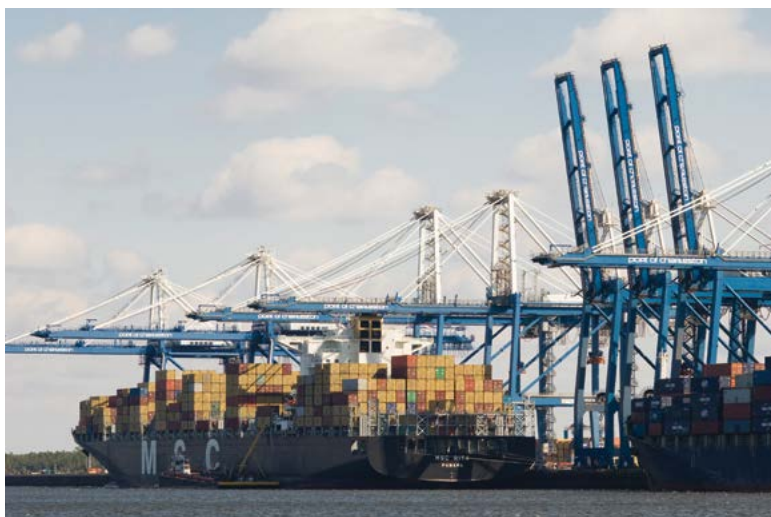
Although earmarks were never a major part of federal spending—at most accounting for only one percent of the budget¹⁰—but the initiative to end earmarks gained popular support.

Organizations dependent on earmarks to fund certain Corps projects were alarmed. As the Atlantic Intracoastal Waterway Association pointed out in 2009, the waterway is divided into five Corps districts, one in each state. The federal budget was not giving the Corps enough funding to maintain the waterway, but some states were able to get additional funding to maintain their parts of the waterway through earmarks.¹¹

In their presentations to groups about the need to address the deteriorating state of the nation’s infrastructure, senior Corps officials increasingly described the difficulty of maintaining the nation’s infrastructure in the “non-earmark environment.”¹²

Origins of the Post 45 Project

As the \$130 million project to deepen the Charleston Harbor channels to 45 feet neared completion in 2004, it became increasingly evident that an even deeper harbor would be required.¹³ Container ships were getting larger. Rising fuel prices in the early 2000s made vessels of the late 1990s more costly to operate and larger ships brought economies of scale. The volume of container traffic was growing at a rate two-and-one-half times the global economy, and international



Earmarks

Earmarks had long been a means for members of Congress to direct federal spending to specific projects, often to get funding for projects in their own district or to build political alliances.⁷ The earmark system had been under attack for some time, and opponents of earmarks charged that the Water Resources Development Act of 2007 bill enacted to deal with the post-Hurricane Katrina Louisiana Coast included “more than 800 parochial pork barrel projects for virtually every Congressional district in the nation.”⁸



trade had risen by 40 percent since 2000. Another important factor that led the trend toward larger ships with deeper drafts was the planned expansion of the Panama Canal. The new system of locks and canals being constructed alongside the original canal were wider and deeper, allowing for the passage of ships with depths up to 50 feet. The original canal could only pass ships with depths to 39.5 feet. The shipping industry was anxious to build what they termed new or neo-panamax vessels designed to the maximum dimensions that would fit through the new canal.¹⁴ Given the importance of the port to the state economy, leaders feared the consequences of not upgrading. They also expressed confidence in studies showing the metropolitan areas of the Southeast would need several major ports to support the region's continued growth.¹⁵

The depth of the channels was not the only factor limiting the size of ships that could enter the Port of Charleston. The new ships on the drawing boards would also be restricted by the air draft—the vertical clearance beneath the two bridges spanning the Cooper River

linking the Charleston peninsula to the town of Mount Pleasant.¹⁶ Any ship bound for the Wando Welch Terminal or the numerous berths along the Cooper River had to pass under the bridges, and the old bridges were not high enough for the larger ships now preferred by the industry. By 1999, state and local leaders had their funding in place to begin work on a higher replacement bridge. They also had to get a permit from the Charleston District, since the new bridge would cross the federal channel. In addition to being taller for the passage of larger ships, the new bridge would be wider to accommodate the area's continuing growth by providing eight lanes for vehicle traffic. Construction began in 2001, and in 2005 the new Arthur Ravenel Bridge was opened amid fireworks and fanfare.

With the vertical clearance issue now out of the way, South Carolina leaders turned their attention to the harbor's other limitations. In March 2007, the State Ports Authority took possession of four super post-panamax cranes. These higher cranes were needed to clear over the larger ships the SPA was working hard to accommodate. With projections for

OPPOSITE TOP

District Commander LTC Trey Jordan and members of the project delivery team ceremoniously “turn on the tap” at the newly constructed Lake Marion water treatment plant in 2008. (USACE, Charleston District)

OPPOSITE MIDDLE

The expansion of the Panama Canal locks increased the use of larger ships like the MSC Rita seen here at the Wando Welch terminal in 2011. (USACE, Charleston District)

TOP

Container ship San Marco approaching the old Cooper River bridges with the new Ravenel Bridge under construction in 2004. (South Carolina Ports Authority)

Nikki Haley all strongly supported the initiative.²⁴ In compliance with the National Environmental Policy Act, the Charleston District posted a Notice of Intent in the Federal Register on August 12, 2011, to prepare a Draft Environmental Impact Statement and Feasibility Study for the Charleston Harbor Post 45 project. The notice stressed the value of foreign trade to the nation's gross domestic product, and prospects for trade growth. It spoke to the port's dependence on container traffic and a need to accommodate the "super post-panamax" vessels of the future.²⁵ It described the likely navigational improvements, the environmental effects, and the detailed study process that would evaluate them.

It estimated the study would take between five and eight years and cost around \$20 million, the preconstruction engineering and design phase two more years, and construction four to five years after that. Presuming funding, the project would be completed between 2023 and 2026.²⁶

We Can't Wait

In October 2011, President Barack Obama announced his "We Can't Wait" initiative, essentially a process of employing his executive authority to pressure Congress and move forward a number of incentives to help revive the economy. In the non-earmark environment, only the president could write the Post 45 feasibility study into the federal budget. While in Washington for a meeting of the United States Conference of Mayors in mid-January 2012, Charleston Mayor Joe Riley took the opportunity to speak to President Obama during a photo-op, thanking "the president for his staff's work to make sure Charleston Harbor was in the president's budget." To Riley's surprise, he found President Obama was extremely familiar with and in favor of the project.



In early February 2012, the Corps announced it was including \$2.5 million for continued work on Post 45. President Obama announced that his fiscal 2013 budget included \$3.6 million for Post 45, the first commitment of federal funds. On March 22, Obama signed Executive Order 13604 to expedite major projects. On April 26, 2012, Senator Lindsey Graham announced that the Senate version of the FY 2013 Energy and Water Appropriations Act contained \$3.5 million for the Charleston Harbor deepening study and \$20.4 million for continued operations and maintenance of navigable waterways. In June, the South Carolina General Assembly committed \$300 million in the state budget for the Post 45 project to pay the SPA's share of the feasibility study costs and get the work under way in anticipation of federal funding for the deepening project's engineering, design and construction phases.²⁷

On July 11, 2012, the Charleston District informed the public they would complete the deepening feasibility study in less than four years, and for less than \$13 million. Chamberlayne reported that "the Charleston study [was] now at the forefront of a national effort to speed up the review process for undertakings such as harbor deepening."²⁸

OPPOSITE TOP

Call out highlighting the Congressional Record—Extensions of Remarks

OPPOSITE MIDDLE

District Engineer LTC Jason Kirk preparing to sign a key partnering agreement with SCPA CEO Jim Newsome. Standing behind from left to right are Senator Jim DeMint, State Senator Chip Campsen, Senator Lindsey Graham and State Senator Larry Grooms. (USACE, Charleston District)

TOP

Charleston Mayor Joe Riley with Jo-Ellen Darcy, Assistant Secretary of the Army for Civil Works. (USACE, Charleston District)



With the economy slowly improving and yearly budget deficits gradually shrinking, on July 19, 2012, the White House announced the federal government would expedite nationally significant infrastructure projects to

modernize and expand five major ports, including Charleston. The Army Corps would be implementing an aggressive planning schedule to complete the Charleston Harbor Feasibility Study in three years.²⁹

Conducting the Study

The Charleston District conducted the Post 45 Feasibility Study under a new Corps process that sought to reduce the amount of time and the cost of studies without compromising on quality. The new planning system incorporated the concept of risk

management as a central tenant.³⁰ It would assume a future of inadequate budgets and employ a three-step planning approach to identify the optimal choices for projects.³¹

The Post 45 Feasibility Study was undertaken by a Charleston-led, multi-district team on the aggressive planning schedule specified in these Corps guidelines.³² Nicknamed "3x3x3," they required districts to involve the division and headquarters early in the planning process and complete studies—including feasibility studies—in less than three years, for no more than \$3 million, that could be put into a binder no more than three inches thick.³³ In part, the strategy was driven by diminishing resources. Andrea Murdock-McDaniel, Southwestern Division chief of operations, urged cutting costs "by limiting the review to just what is needed to make our decision and reduce the number of reviews required for each step of the process."³⁴

The Post 45 planning would be governed by a SMART process—specific, measurable, attainable, risk-informed and timely. In-process reviews engaged decisionmakers up and down the line to identify the federal interest early and look beyond the requirements of the National Economic Development and Ecosystem Guidelines. The detail required in the study would be governed by the degree of uncertainty and risk involved. The study team would work under the assumption there was no single "best" plan. In reaching its conclusion, the team would employ a variety of qualitative and quantitative methods and multi-criteria to compare and then select the best approach. The concurrence of the vertical team composed of people from Charleston and other districts, the South Atlantic Division, and headquarters would be required at all stages of the study.³⁵

According to Chief of Programs Lisa Metheney:

We had the overall guidance, but nothing step-by-step specific. We would be the first study to go from start to finish. There were other feasibility studies that converted into the 3x3x3 process, but they had been underway for some time. Our team was very cognizant that they were plowing new ground and setting the standard on how things would go in the future.³⁶

Chamberlayne was involved in the technical details of the study as the Corps' new guidelines were being finalized.³⁷ The study team was far-flung and multi-disciplinary. The team leader came from the Charleston District, the plan formulator from the Jacksonville District, and the geotechnical expertise and some engineering support from the Wilmington District. The Savannah District was responsible for real estate and the Mobile District's Deep Draft Navigation Center of Expertise provided crucial navigation economics data.³⁸ At any one time, the feasibility study had between 35 and 40 people fully engaged in the project, half in Charleston, the other half scattered. Post 45 was their number one priority. Work started by bringing people to Charleston for face-to-face meetings that lasted the better part of a week. Project leaders put up 20-foot-long strips of white paper, team members attached their anticipated contributions on sticky notes that could be moved around and adjusted for sequencing, and at the end of the process the project flow chart was captured in scheduling software. "That was the key to getting everyone engaged in the process, introduced to each other to establish rapport and strong working relationships," said Project Manager Brian Williams.

We had several of those meetings at the beginning. The schedule we put together... became a roadmap that everybody agreed to. We continued to have face-to-face meetings throughout, maybe about once a quarter. We established checkpoints to determine whether it was better to have people interacting face-to-face. We had bi-weekly, every other week scheduled project delivery team conference calls and also web meetings so we could post information available onsite in Charleston or in the other districts. We took detailed notes and distributed the minutes of every meeting to all the participants.

Beyond the day-to-day work, the planning process adhered to the Corps-required peer-review by employing a quality control team consisting of members in the various districts. Retired specialists were brought in to work with groups. Planners used an agency technical review team with a lead in the New York District and team members scattered throughout the country in addition to the districts of the South Atlantic Division.³⁹

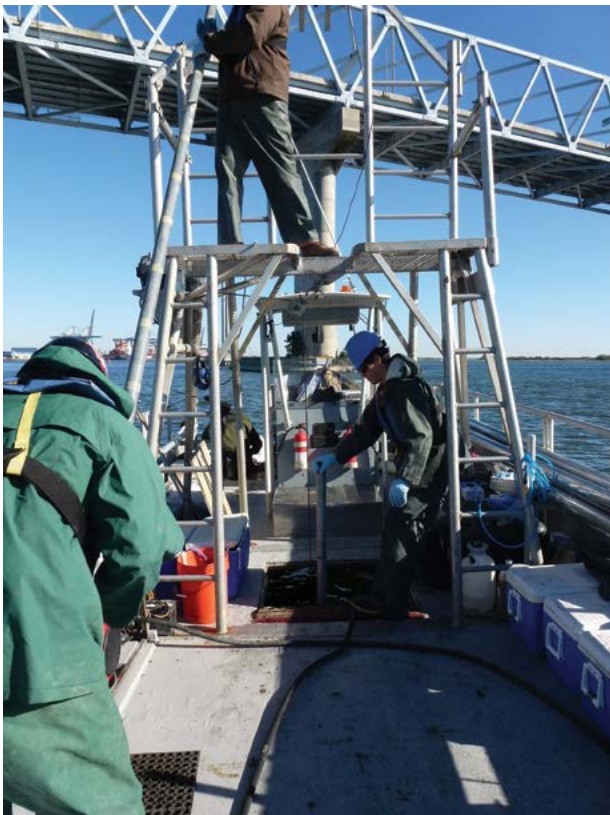
The study analyzed Post 45 in terms of commercial cargo, military necessity, economic output across South Carolina, and the need for the Charleston Port to remain competitive.⁴⁰ In terms of engineering, the project design and impacts utilized hydrodynamic modeling to predict salinity, water quality, sediment transport, shoaling, and currents to feed into the environmental impact determinations. Ship simulations were employed to configure channel depths, widths, and turning basins. Geotechnical studies evaluated the composition of the areas to be dredged, a vitally important factor. The study also addressed the possibility of saltwater intrusion further up-river that could affect groundwater drinking systems, the capacity and projected life of placement areas, and future dredging on marshlands.

OPPOSITE TOP

District Engineer LTC Ed Chamberlayne with SCPA President and CEO Jim Newsome. (USACE, Charleston District)

OPPOSITE MIDDLE

Post 45 Team members preparing to brief stakeholders, October 2011. Pictured from left to right are Mark Messersmit, Sarah Brown, Greg Wahl, Brian Williams, Lisa Metheney, and Phil Wolf. (USACE, Charleston District)



Modeling evaluated water quality, salinity, and hydrodynamic changes in the harbor and potential impact on fish and wildlife. Sediment sampling followed Environmental Protection Agency and South Carolina Department of Health and Environmental Control guidelines to calculate the potential short- and long-term air pollution from dredging, heavy equipment, and truck traffic. The economics of the study calculated the benefits derived from the reduction in the transportation

costs for imports and exports.⁴¹

A district team met with the Charleston Branch Pilots Association. Using scale model ships and maps to examine critical areas,

the team listened to the pilots and made immediate changes to the project to prepare for the simulations the Engineer Research and Development Center would complete at the Waterways Experiment Station in Vicksburg, Mississippi. A United States Geological Survey team collected water current velocities and water quality data to validate the fluid dynamics program to model key harbor elements under alternative scenarios. These simulations provided information of potential environmental impacts resulting from various combinations of channel depths and widths. Coastal Carolina University personnel worked on identifying items of cultural or historical interest using the University of South Carolina's Institute for Archeology and Anthropology's recently released map of known Civil War wrecks and artifacts. The district hosted a National Environmental Policy Act public scoping meeting for exchanges of information and the opportunity for comments. The forum yielded more than 80 suggestions.⁴²

A harbor project that ironically began its life as an earmark, Post 45 survived in a non-earmark environment. It had to navigate



in a plodding post-recession recovery amid the volatile politics of disagreements over federal spending. The success of Post 45 hinged on the district's ability to do three new things simultaneously: First, it had to form a Charleston-led, multi-district, local and virtual project team, and generate a cohesive work environment to meet the aggressive planning schedule specified by the Corps' new planning process. Second, in the extremely sensitive political environment, the district had to build on its successful outreach programs to government, industry, and the public by employing a sophisticated and systematic program of public relations. Third, the results had to be spectacular — and they were: The feasibility study, initially expected to take five to eight years, was completed in less than four, costing less than \$13 million instead of the projected \$20 million. The study results were

presented to the Civil Works Review Board in Washington, D.C., and received \$1.3 million in funding for the pre-construction engineering and design phase from the Corps' 2015 work plan. On September 14, 2015, the Chief of Engineers signed the Chief's Report for the Post 45 Charleston Harbor Deepening Project and submitted it to Congress. On January 13, 2016, the project was approved by the Office of Management and Budget.⁴³ The Charleston District had set a high standard for the future of major civil works project planning.

OPPOSITE TOP

Ship simulator used to help plan for the Charleston Harbor deepening. (USACE, Charleston District)

OPPOSITE MIDDLE

A contractor funded by the post 45 study takes core samples from the bottom of the Cooper River. (USACE, Charleston District)

TOP

Post 45 Logo.

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CHAPTER ELEVEN

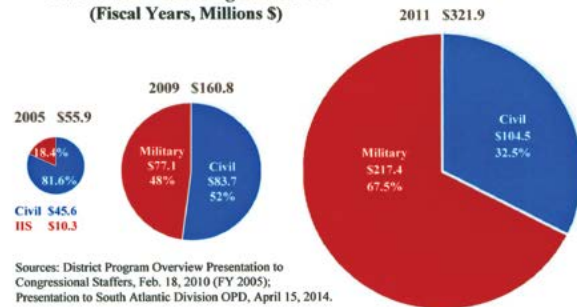
Final Summary

This history reflects how the Charleston District experienced and adapted to a challenging new operational environment. From 1978 through the turn of the 21st century, Charleston was a civil works-only district. Navigation projects were its chief business, and within this program, area projects related to Charleston Harbor were the most important. The district moved to the concept of a regional village and refocused from civil-works-driven appropriations to reaching out to federal customers. With the post-9/11 influx of defense funding, Charleston added considerable military and federal work to its civil works portfolio.¹ The district workload rose from \$55.9 million in 2005 to \$322 million in 2011, and the workforce increased from approximately 125 to 196. The change engaged the district with federal partners and benefited the nation by reducing government overhead; it utilized the district's core competencies and made it possible to maintain a highly qualified technical workforce with expertise in construction, engineering, project management, contracting, and other skill areas.

Growth created a district very different from what it had been before. Where \$45.6 million in civil works accounted for 82 percent of district dollars in 2005, \$104.5 million in civil works represented approximately one-third of the district's revenue in 2011. The volume and speed of change are reflected in the present-day approaches in design, operations, and management.

The Post 45 Feasibility Study was an important stage of a major ongoing civil works infrastructure project. Maj. Gen. John Peabody, deputy commanding general for civil and emergency operations, has called for rebuilding and improving the national infrastructure in this "age of crisis." Chiefs of engineers and others have been broadcasting similar alarms.² The

Charleston District Program Trends
(Fiscal Years, Millions \$)



Data Table

Category	2005	2008	2009	2010	2011	2012
Civil Federal Outlays	32	\$32.7	\$51.6	\$51.9	\$21.5	\$27.2
Other Civil Direct	\$13.6	\$17.1	(\$4.0)	\$23.2	\$33.6	\$1.6
ARRA-Civil			\$0.9	\$20.4	\$3.5	\$0.4
Civil Reimbursable	\$10.3	\$4.2	\$35.2	\$15.4	\$32.9	\$31.3
Military Direct		\$1.7	\$37.7	\$81.7	\$92.7	\$62.2
Military Reimbursable		\$5.0	\$39.4	\$64.6	\$124.7	\$101.2
Other				25.3	\$13.0	\$7.7
Total	\$55.9	\$60.7	\$160.8	\$282.5	\$321.9	\$231.6
Total from Charts	\$55.9	\$60.7	\$160.8	\$282.5	\$321.9	\$231.6

Sources: Civil Federal Outlay and ARRA-Civil are from the Charleston District Annual Reports for the Secretary for the Army on Civil Works Activities for the fiscal years shown. Military Direct, Military Reimbursable, Civil Reimbursable, and Total from Charts are from the SAC Program Overview to Congressional Staffers, Feb. 18, 2010 (FY 2005), and the district presentation to South Atlantic Division OPD, April 15, 2014. Other Civil Direct is calculated by subtracting the Civil Federal Outlays reported by the district from the Other Civil Direct figures originally reported on the charts in each of the fiscal years. Other represents data that were not included in the chart categories.

Definitions: ARRA-Civil, the American Recovery and Reinvestment Act of 2009. Civil Direct includes Investigations, Construction, Operations and Management, Regulatory, and Flood Control and Coastal Emergencies. Civil Reimbursable includes the Department of Energy, the National Nuclear Security Administration, the Veterans Administration, the Department of Transportation, and the Department of State. Military Direct is military construction. Military Reimbursable includes Department of Defense Dredging, the Defense Logistics Agency, Marine Force Reserves, 81st Regional Support Command, Shaw Air Force Base, and Joint Base Charleston



seriousness of the problem is underscored in the most recent comprehensive assessment by the American Society for Civil Engineers, which assigns letter grades A to F across 16 categories. The ASCE Report Card reads dams (D), levees (D-), inland waterways (D-), and ports (C).³ Infrastructure rebuilding will take money and time. There are many challenges to solving the nation's water resources and military construction projects but when the nation calls upon them, the Corps and the Charleston District will be ready to serve.

TOP
Charleston District Program Trends (Fiscal Years, Millions \$). (USACE, Charleston District)

MIDDLE
Graphic from 2011 showing the Charleston District's active military and civil works projects and programs. (USACE, Charleston District)

CHAPTER 11 ENDNOTES

¹USACE Speaker Template, SIO Guidance, Soldier–Statesman–CEO, District Commanders (LTC/COL), USACE 101, Sept 2014, Plate 12, http://www.usace.army.mil/Portals/2/docs/USACE_101_Sep_2014.pdf. http://www.usace.army.mil/Portals/2/docs/USACE_101_Sep_2014.pdf.

²Pamela Harrion, “USACE Chief of Engineers and MVD [Mississippi Valley Division] Commander Tout Infrastructure’s Value,” *Open Channels* vol. 10, issue 9, September/October 2012, pp. 1, 5, <http://www.mvd.usace.army.mil>. “USACE Civil Works Program: Challenges and Opportunities,” Presentation to the Waterways Council, 11 Feb. 2014, <http://waterwayscouncil.org/wp-content/uploads/2014/02/WCI-2014.pdf>; Society of American Military Engineers, Department of Defense and Federal Agency Programs Briefings, 25 March 2014, <http://www.ncmbc.us/construction-providers/documents/USACECivilWorks.pdf>.

³American Society for Civil Engineers, “2013 Report Card for America’s Infrastructure,” March 2013, pp. 5–6, <http://www.infrastructurereportcard.org/>.

APPENDIX

Charleston District Engineers

1870-2021

Col Q.A. Gillmore 1870 - Apr 1888
Col Henry L. Abbott Apr 1888 - Apr 1888
Capt Frederic V. Abbott . . Apr 1888 - Sep 1897
Lt Edwin A. Stuart. Sep 1897 - Oct 1897
Maj Ernest H. Ruffner . . . Oct 1897 - May 1900
Capt J.C. Sanford May 1900 - Apr 1903
Capt G.P. Howell. Apr 1903 - Jul 1907
Capt E.R. Stuart Jul 1907 - Jul 1908
Col Dan C. Kingman. . . . Jul 1908 - Jul 1908
Capt E.M. Adams Jul 1908 - Jun 1909
Capt Earl I. Brown. Jun 1909 - Aug 1909
Capt E.M. Adams Aug 1909 - Mar 1911
Col Dan C. Kingman. . . . Mar 1911 - Jul 1911
Maj G.P. Howell. Jul 1911 - Aug 1914
Col John Biddle. Aug 1914 - Aug 1914
Maj G.A. Youngberg Sep 1914 - Jul 1917
LTC W.B. Ladue Jul 1917 - Aug 1917
Col John Millis. Aug 1917 - Oct 1917
Mr. James P. Allen. Oct 1917 - Dec 1918
Col G.R. Lukesh Jan 1919 - Jul 1920
Col G.P. Howell. Aug 1920 - Oct 1920
Maj G.R. Young. Nov 1920 - Jun 1922
Col Spencer Cosby. Jun 1922 - Jul 1922
Col Edgar Hadwin. Jul 1922 - Jun 1924
Maj Dan I. Sultan. Jun 1924 - Aug 1924
Maj F.K. Newcomer Aug 1924 - Dec 1925
Col J.C. Oakes. Dec 1925 - Nov 1926
Maj Wm. P. Thompkins . . Nov 1926 - Jan 1927
Col J.C. Oakes. Feb 1927 - May 1927
Maj Wm. P. Thompkins . . May 1927 - May 1927
Maj Notley Y. Duhamel . . Jun 1927 - Jul 1931
Maj Douglas L. Weart. . . . Jul 1931 - Aug 1931
Maj Gilbert V.B. Wilkes . . Aug 1931 - Nov 1933
Maj W.G. Caples Nov 1933 - Apr 1936
Capt Fred T. Bass Apr 1936 - Aug 1937
Col Jarvis J. Bain. Aug 1937 - Apr 1938
LTC R.F. Fowler. May 1938 - Aug 1938
Col Reading Wilkinson . . Aug 1938 - Dec 1940
Col W.B. Ladue. Dec 1940 - May 1941
Col Reading Wilkinson . . Jun 1941 - Apr 1942
Col D.W. Griffiths Apr 1942 - Mar 1943
LTC J.W. Patton, Jr. Mar 1943 - Mar 1943
Col Ira F. Bennett Mar 1943 - May 1943

LTC J.W. Patton, Jr. May 1943 - Jul 1944
Col Holland R. Robb Jul 1944 - Dec 1944
LTC John P. Larsen Dec 1944 - Feb 1945
Col Carl R. Shaw Feb 1945 - Sep 1945
LTC John P. Larsen Sep 1945 - Jan 1946
Col Ellis E. Haring Jan 1946 - Sep 1946
Col John B. Hughes Oct 1946 - Apr 1947
Col Paschal N. Strong . . Apr 1947 - May 1947
Col John B. Hughes May 1947 - Oct 1947
Col Paschal N. Strong . . Nov 1947 - Jan 1948
Col Edward Daly Jan 1948 - Jun 1949
Mr. Worth Candrick Jun 1949 - Jun 1949
LTC J. B. Lampert Jun 1949 - Jul 1950
Col R. C. Brown Jul 1950 - Jan 1951
Col C. L. Landaker Jan 1951 - Aug 1953
Col Clyde C. Zeigler Aug 1953 - Jul 1956
Col Parker O. Stuart Jul 1956 - Jun 1959
Col John R. Thompson . . Jun 1959 - Jun 1962
Maj Jack G. Becker Jun 1962 - Jul 1962
Col Sears Y. Coker Jul 1962 - Jul 1965
Col Robert E. Rich Jul 1965 - Jul 1968
Col Burke W. Lee Jul 1968 - Jul 1971
LTC Robert L.
Broughton Jul 1971 - Aug 1971
Col Robert C. Nelson . . . Aug 1971 - Jul 1974
Col Harry S. Wilson, Jr. . . Jul 1974 - Jun 1977
Col William W. Brown. . . Jun 1977 - Jun 1980
LTC Bernard E.
Stalman. Jun 1980 - Jul 1983
LTC F. L. Smith, Jr. Jul 1983 - Jul 1986
LTC Stewart H.
Bornhoft Jul 1986 - Jul 1989
LTC James T. Scott Jul 1989 - Jul 1991
LTC Mark E. Vincent Jul 1991 - Jul 1993
LTC George H. Hazel Jul 1993 - Jul 1995
LTC Thomas F. Julich . . . Jul 1995 - Jul 1997
LTC Robert A.
Rowlette, Jr. Jul 1997 - Jul 1999
LTC Mark S. Held Jul 1999 - Jul 2001
LTC Peter W. Mueller . . . Jul 2001-Jul 2003
LTC Alvin B. Lee Jul 2003 - Jun 2005
LTC Ed Fleming. Jun 2005 - Jun 2007

LTC J. Richard
Jordan III Jun 2007 - Jul 2009
LTC Jason A. Kirk July 2009 - July 2011
LTC Edward
Chamberlayne July 2011 - July 2013
LTC John Litz July 2013 - July 2015
LTC Matthew Luzzatto . . July 2015 - July 2017
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LTC Rachel Honderd . . . July 2019 - July 2021

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