SPECIAL EDITION:
Hurricane Florence
This special edition of the Palmetto Castle is dedicated to all those who have been impacted during this unprecedented storm season. Whether it was by Hurricane Florence or Michael you are in our thoughts and prayers. The U.S. Army Corps of Engineers is proud to be able support our communities in need.

Hurricane Florence impacted the northern part of our state with torrential flooding, closing businesses, damaging homes and making many roads impassable. The Charleston District was honored to be able to serve South Carolinians in the largest flood fight the District has fought in over a decade. The District’s employees worked tirelessly in partnership with many local, county, state and federal agencies to protect the people and property most severely impacted in Horry, Georgetown, Florence and Marion Counties.

Over 20 inches of rainfall flooded several rivers in South Carolina, including the Waccamaw, the Black, the Lumber, the Lynches, the Pee Dee and the Little Pee Dee. The District sent seven liaison officers to various state and county emergency operation centers to ensure they received the support and supplies they needed. USACE Flood Fighting subject matter experts were also called in from around the country to provide technical assistance to our state and local partners.

The District used Hesco barriers for the first time as we fought to keep U.S. Highway 501 in Conway open for emergency vehicles and to prevent Myrtle Beach residents from becoming isolated by area flooding. The military has long used Hesco barriers for force protection, but this was the first time the Charleston District used them for flood protection. They were tested for this use by USACE’s Engineer Research and Development Center and our technical experts used them in previous years for flood fights all around the country. With a request from Horry County helps from the South Carolina Department of Transportation and the South Carolina Army National Guard, and technical knowledge from USACE, the team placed 10,105 linear feet of Hesco barriers and over 1,000 supersack gil-ant sandbags on this critical highway. I am proud to report the hard work by this great team resulted in the highway remaining open.

The Town of Pawleys Island and City of Georgetown also asked the state for help. You will see our efforts in those communities highlighted as well. We partnered with state and county organizations to protect a vital pump station, a hospital and a stretch of U.S. Highway 17 as dangerously high flood waters flowed toward Winyah Bay.

I have never been prouder to be part of the USACE team than during this time. Our employees didn’t hesitate to set aside their personal and professional commitments to selflessly serve their fellow South Carolinians in a time of need. They are a true asset to the people and resources of our region. The Charleston District is absolutely one of the most professional and dedicated teams I have worked with!
Hurricane Florence Special Edition

By Sean McBride

Hurricane Florence barreled toward the east coast of the United States at a historically slow pace for weeks before making landfall on Wrightsville Beach, N.C. on September 14, 2018. The coastline of South Carolina was spared the direct force of Hurricane Florence, however impacts were felt throughout the state for weeks after due to extreme flooding.

The path of Hurricane Florence was unprecedented. The storm collided with the coast in North Carolina and stalled against a high pressure front that caused Florence to come to a standstill over Wilmington. Once Hurricane Florence did move, it dropped southwest after having travelled northwest for weeks. This took the path of the storm down into South Carolina, where it crawled along at less than five miles per hour for its duration in the state.

While the storm stalled, the rain did not. Hurricane Florence dumped more than 20 inches of rain in many parts of upper South Carolina and lower North Carolina over several days. Many homes were destroyed from the effects of wind and downed trees and more than 50 people were killed. In South Carolina, the biggest impacts came in the weeks after Hurricane Florence had inchéd out of the state.

Throughout this issue, you will learn all about the missions that the Charleston District undertook and about the partnerships that made them work. The Charleston District Emergency Management Division coordinated efforts throughout the state with the help of volunteers and successfully handled all the issues that were presented to them. We’ve structured this issue of the Palmetto Castle to tell you about the various post-hurricane response activities that the Charleston District undertook and the partnerships that were utilized.

Hurricane Florence response was a joint effort throughout the state and could not have been successful without the help the Charleston District received from other Corps districts, the South Carolina Army National Guard, the South Carolina Department of Transportation, FEMA and state and local agencies. Team South Carolina was on full display after Hurricane Florence and provides lessons for the future.

Prior. Rain inundation throughout the state caused river levels to rise to heights never before seen and that water had to work its way to the coast. As tributaries rushed water to the Waccamaw, the Black, the Lumber, the Lynches, the Pee Dee and the Little Pee Dee Rivers levels slowly rose and the U.S. Army Corps of Engineers was there to help.

The historic rain bested the previous rain levels that had occurred during the 1,000 Year Flood just two years prior. Rain inundation throughout the state caused river levels to rise to heights never before seen and that water had to work its way to the coast. As tributaries rushed water to the Waccamaw, the Black, the Lumber, the Lynches, the Pee Dee and the Little Pee Dee Rivers levels slowly rose and the U.S. Army Corps of Engineers was there to help.
Our teams have put in a heroic performance, and some are still working around the clock to save lives, boost safety, assess damage and restore critical infrastructure. Professionals engaged, anticipating what will be needed where, and ready to deliver this is what world-class disaster response looks like! I am honored to be leading such a dedicated team of professionals committed to making a positive difference in the lives of the most vulnerable. I could not be prouder of your—leaders of superior integrity and technical competence who have stepped up and answered the call to serve.

Michael Hind
Charleston District
Chief, Emergency Management Branch

Every event is different and brings a variety of challenges and situations that need to be addressed, you work with partners that were established with the local communities and across the State. Everyone has a job to do and everyone pulls together to meet the challenges to save lives and to do as much as possible to save property. It’s a team effort and when one part of the team needs help, others spring forward to assist. It’s all about the working relationships with local and state partners. I strongly believe local and state partnerships are crucial to expand on current capabilities which will go a long way for future event response operations.

Pre-emergency planning and preparation is crucial. Every community should conduct what is called, in the emergency management community, a THIRA (Threat & Hazard Identification and Risk Assessment) to identify potential risk areas depending upon the threat. Based on those assessments, identified pre-emergency preparations can be implemented, as was the case in the Conway and Georgetown areas.

Tommy Fennel
Charleston District
Regulatory Branch Chief
Hurricane Florence Liaison Officer

Being located physically in the Emergency Operations Center during the event gave people confidence that the Corps was 100% available and engaged. My role consisted of ensuring the right people were in place to make an impact based on needs, knowledge, and skill. In addition, as questions or needs arose, I was readily available to initiate actions and provide feedback. “Real time” accessibility was a key to the effectiveness of the mission.

Douglas Weber
Seattle District
Chief, Emergency Management Branch
Hurricane Florence Flood Fight SME

My primary take away from the Florence flood response effort was that by working together, the Corps of Engineers, National Guard, State DOT, and Horry County were able to quickly and effectively plan and execute flood fight measures. The close communication and coordination between these agencies was definitely a key to the success.

For the Highway 501 flood fight, USACE was engaged in the early planning and provided input on which flood fight products would be most effective. We also provided Hescos, Supersacks, plastic sheeting, and sandbags delivered directly to the flood fight location. It was challenging to have the flood fight materials delivered on time so that the State and National Guard’s progress on installing the materials was not impacted. When the forecasted inundation levels changed, USACE assisted DOT and the National Guard with adjusting the plan to increase the flood protection height.
Joining Forces with the National Guard

By Edward N. Johnson

U.S. Army Corps of Engineers logistics and technical advisors joined forces with South Carolina Army National Guard engineering battalions as part of Hurricane Florence response and recovery operations in Horry County, S.C.

“I just want to say what an honor it is for the Corps of Engineers to support our FEMA, local, and state partners in this post-storm period,” said the USACE South Atlantic Division Commander, Brig. Gen. Diana M. Holland. “One of the ways we helped here is with flood mitigation efforts along U.S. Highway 501.”

Philip Bethea, a construction engineer with the South Carolina Department of Transportation underscored the importance of keeping the 501 corridor open as long as possible.

“Our goal was to keep at least one lane open in each direction of the highway to ensure local residents had access to medical services, food and supplies,” said Bethea. “Fortunately, the Army Corps and National Guard helped make that happen.”

Lt. Col. William A. Matheny, commander, 122 Engineer Battalion, was the South Carolina Army National Guard’s senior engineer on the ground and at the center of efforts to mitigate the risk of flooding in the area.

“This actually wasn’t the first time I’d had the privilege of serving with Brig. Gen. Holland,” said Matheny. “She was my commander during a 2013 deployment to Afghanistan and we really appreciated the resources she and her personnel were able to provide in support of our operations on the ground in Horry County.”

With that in mind, USACE personnel worked around the clock to support the effort.

According to Tommy Fennel, USACE’s on-site liaison officer assigned to the Horry County Emergency Operations Center, there were USACE personnel from across the country integrated into state and local efforts to provide logistics and technical advice regarding Hurricane Florence flood response efforts.

“We supplied more than 10,000 linear feet of wire mesh barrier material and 5,000 sandbags to this site alone,” said Fennel. “These mission critical supplies were deployed at the direction of the South Carolina Department of Transportation to help protect areas impacted by flooding.”

This page: Members of the South Carolina Army National Guard install wire mesh Hesco barriers provided by the U.S. Army Corps of Engineers along the U.S. Highway 501 corridor in Horry County, S.C., to help mitigate the risk of flooding and keep the route open for emergency responders and food deliveries.


Opposite middle: Charleston District employee Tommy Fennel (center) provides logistical update and technical advice during flood risk management operations to Lt. Col. William A. Matheny, Jr., SCANG, and Phillip Bethea (second from left), SCDOT.

Opposite bottom: Capt. Joseph Varin (right), commander, 125th Engineer Multi-Role Bridge Company, SCANG, discusses bridging operations with South Atlantic Division Commander, Brig. Gen. Diana M. Holland.

Hydraulic Sandbag Machine Helps Fill the Gap

By Edward N. Johnson

When it comes to disaster response, one of the U.S. Army Corps of Engineers’ top priorities is supporting immediate life-saving and public safety efforts in partnership with FEMA, state and local emergency management officials.

Meeting this priority often includes providing sandbags and other resources to protect vital roadways and critical infrastructure during a flood event.

Following the impact of Hurricane Florence, this priority was met, in part, by rapidly deploying the latest emergency management equipment on-hand in the USACE inventory. This piece of equipment, known as a hydraulic sandbag filler, made its way here from the USACE Louisville District while the storm was still raging across the region.

“Once called upon to deploy, we literally packed our bags and hit the road with the sandbag filler in tow,” said Louisville District’s Emergency Operations Manager George Minges. “Once we arrived, we began helping produce sandbags around-the-clock at multiple locations.”

Between their work supporting the coastal counties of Horry and Georgetown, Minges’ team filled more than 25,000 bags working hand-in-hand with members of the South Carolina Army National Guard, as well as state, county and municipal personnel.

Under normal conditions the machine can fill up to 500 bags per hour, but during this mission the sandbagging machine crew often exceeded that capacity.

“Our goal was to fill more than 6,000 sandbags for the Georgetown municipality,” said Minges. “We were getting really good numbers there and at one point we were filling just under 700 sandbags per hour with the help of our local and state partners.”

Jud Kneuvean, Kansas District readiness contingency operations chief, deployed to Horry County and echoes that sentiment.

“The hydraulic sandbag filling machine greatly increased our ability to serve the public,” said Kneuvean. “With this capability, we can reduce the need for personnel on the front end, which is the most labor intensive, and focus on getting sandbags to where they are needed as quickly as possible.”
The coastline of South Carolina was spared the direct force of Hurricane Florence, however the exact extent of any impacts still needed to be determined by the U.S. Army Corps of Engineers, Charleston District.

The Charleston District has been working on coastal storm damage reduction projects at both Myrtle Beach and Folly Beach for several months in an effort to put sand back on the beach and reduce the risk of damage to infrastructure behind the dunes from storms like Hurricane Florence. With word that the storm may make a direct strike on either of these beaches, the projects were halted and all equipment removed from the beach.

The Charleston District's survey team was then tasked to conduct pre-storm assessments of each beach to determine location of the sand and how much sand was on the beach in each place. This data would then be used in comparison to post-storm assessments.

After Hurricane Florence crawled out of the Carolinas, the survey team quickly mobilized to conduct post-storm surveys. Surveys at Folly Beach were conducted with a real-time kinematic GPS receiver, which is rolled along the ground at 1,000 foot increments and uses GPS technology to collect data to determine the elevation and quantity of the sand every three feet.

At the much longer Myrtle Beach project, the survey team used the RAMbLR, or Rapid Assessment Mobile LiDAR, an ATV outfitted with the same detection equipment used at Folly Beach. This method allowed the survey team to conduct their assessment quicker over the longer span of beach.

"It's critical to conduct these assessments so that we can determine if there was any impact to the projects from Hurricane Florence," said Lt. Col. Jeff Palazzini, Charleston District commander. "It's also important to get the projects started again as quickly as possible so that they can finish on schedule. The contractor began remobilization as soon it was safe and are hoping to get started pumping sand again within a week."

The engineering team compared the post-storm data with the pre-storm data to determine if there was any sand loss or relocation from Hurricane Florence. During storm events such as these, sand isn't always washed away, just sometimes displaced to other areas. The team was able to quickly determine that Folly Beach and Myrtle Beach Reach 2 suffered losses of 200,000 cubic yards and 300,000 cubic yards, respectively. As a result of the quick response, both projects quickly received contract modifications to replace the sand that was lost. The results of Myrtle Beach Reaches 1 and 3 have not yet been determined.

The Folly Beach coastal storm damage reduction project is scheduled for completion in November, while the Myrtle Beach project is scheduled for completion in December. Even though the projects were not yet complete at the time Hurricane Florence made an impact, every cubic yard of sand that was placed on the beach as a result of these projects helped to reduce the risk of damage from the storm to the infrastructure behind the dunes.
Resuming the Renourishment at Myrtle Beach

By Edward N. Johnson

South Carolina is no stranger to hurricanes and each one takes its toll on shorelines and beach communities located here and across the Atlantic coastal region.

After each significant storm, U.S. Army Corps of Engineers personnel assess erosion impacts, work hand-in-hand with state and local partners to determine mitigation measures for erosion damage to shoreline projects and take authorized measures to rehabilitate affected areas.

According to USACE Deputy Commanding General for Civil and Emergency Operations, Maj. Gen. Scott A. Spellmon, these efforts are extremely beneficial to both local communities and nationwide efforts to protect the environment and foster economic growth.

“Our scientists venture out and measure where shoreline erosion has occurred,” said Spellmon. “At Myrtle Beach, it appears the impacts of Hurricane Florence were enough that we’re adding additional quantities of sand to an existing contract that was underway to address damages from Hurricanes Matthew and Irma.”

Work was paused here because dredging vessels and equipment were moved to safe harbor during the storm. Work was able to resume a little more than a week later.

“We deployed high-tech equipment to quantify the losses and then utilizing dredging vessels and ship-to-shore pipelines to rehabilitate the federal project, thus ensuring beaches and dunes are ready to provide their full benefits whenever the next storm may impact the area,” added Spellmon.

Brian Williams, Charleston District chief of programs and civil project management, says this project covers more than 25 miles of beach shoreline.

“Under normal conditions, we cost-share 65 percent of this work at the federal level,” said Williams. “But in emergency situations like the one following Hurricane Florence, we fully fund all rehabilitation operations, subject to Congressional appropriations, in support of our state and municipal partners.”

Great Lakes Dredge & Dock LLC, contracted to complete this project, utilizes hopper dredges to pump sand from the sea floor through drag arms from a location approximately three miles from the impacted shoreline.

The sand being pumped to the beach comes from an underwater area about 30 feet below the Atlantic Ocean’s surface.

The re-nourished shoreline beaches and dunes serve to reduce the impacts of future hurricanes and other coastal storms to communities and infrastructure. With that in mind, USACE partners with state and municipal officials on shoreline restoration initiatives like the one in Myrtle Beach.
In a disaster event, one group that is often overlooked is the communicators on the ground. In the Army, they are called public affairs specialists, who worked quickly to begin communicating storm related information according to pre-established guidance and plans.

One focus of the Charleston District’s Florence communication plan was to leverage the power and reach of social media platforms to keep key audiences informed of the actions being taken by USACE to help mitigate the risk of flooding during and after the storm made landfall. At the same time, significant effort was made to actively engage traditional media outlets, like radio, television and newspapers, in order to keep the general public informed of potential hazards and real-time, or near real-time, actions being taken by USACE, in coordination with FEMA, state and local partners to mitigate the risk of flooding.

“During a flood event like the one brought on by Hurricane Florence, it’s critically important for leaders at all levels to engage the media early and often,” said Lt. Col. Jeffrey S. Palazzini, Charleston District commander. “Doing so helps provide those impacted by a storm a better understanding of what steps are being taken to help their communities and what they should do individually to remain safe during an emergency.”

To that end, USACE officials on the ground in the South Carolina counties of Horry and Georgetown took part in 44 media engagements in three weeks. Of that number, Palazzini was personally involved in 26 interviews with local, state and national media outlets.

“Our public affairs professionals were standing ready to help subject matter experts and emergency management leaders prepare for media engagement opportunities throughout the crisis,” said Palazzini. “Of course, like other key competencies, media relations preparation is something that should always be included in pre-emergency exercises and training so that we are ready to effectively engage the media when the need occurs.”

The District’s Public Affairs Office, augmented by a PAO brought in from another district to assist during the crisis, took a deliberate and aggressive approach to social media communications.

“Today, social media is the main way we tell the District’s story, especially during an emergency situation,” said Sean McBride, Charleston District’s social media specialist. “It’s important to show our audience the work we’re doing in their area to minimize risk to their community and keep them informed. Allowing our audience to see what we’re doing is part of our mission to be a transparent organization. Social media lets people interact with us and ask questions about critical issues in real time, giving them immediate answers and results.”

By any measure, that is precisely what happened throughout the flood, as the District set all-time viewership records across numerous social media platforms, including gaining 902 followers on Facebook during the flood event, a 33 percent increase.

One post, using Facebook’s live video feature to broadcast an aerial reconnaissance of areas impacted by the flood from a UH-60 Blackhawk helicopter, reached more 127,000 people with 38,000 views, 377 shares, 1,392 likes and 430 comments. The most viewed storm-related message consisted of an aerial photo of U.S. Highway 501, depicting measures being taken to keep the highway clear of flood water and open to traffic. That post alone reached 119,553 people, garnering 2,839 likes, 438 comments and 1,558 shares.

“Twitter was our best resource for sharing information from partner agencies during Florence,” added McBride. “We were able to retweet their messages and add information specific to our mission.

McBride added that partner agencies were able to reciprocate by retweeting USACE messaging as well.

“We have such impactful stories to tell and it was an honor to be able to share what our leadership, the flood fighting subject matter experts and the many other partner emergency management staff were contributing to aid the city, counties and state,” said Glenn Jeffries, Charleston District’s public affairs chief. “Our partnership with communication offices from other responding agencies was key to successfully reaching the public and we could not have done it without their support.”

By Edward N. Johnson

Assisting Georgetown and Pawleys Island

By Glenn Jeffries

Georgetown County had an agonizing wait for the flood waters to recede. "It was an emotional rollercoaster," said Gov. Henry McMaster, who called the situation "unprecedented."

Eleven trillion gallons of water were dumped on the Carolinas, much of which drained down six major rivers in South Carolina over the course of two weeks, so Georgetown County needed to prepare for the aftermath of this terrible storm. They in turn distributed them to residents and businesses to use to protect their property.

The state’s third-oldest city, Georgetown, along with nearby Pawleys Island, requested the state’s aid to help prepare. The state’s third-oldest city, Georgetown, along with nearby Pawleys Island, requested the state’s aid to help prepare. The state’s Army National Guard members filled Hesco barriers at the Georgetown Hospital. If the data center and HVAC plant were impacted by the flood waters, the hospital could have been in danger of closing, leaving no major medical center for residents. Hesco barriers and sandbags were used and the SCANG worked around the clock to get them in place.

Additional critical asset to the area was the Georgetown Memorial Hospital. If the data center and HVAC plant were impacted by flood waters, the hospital could have been in danger of closing, leaving no major medical center for residents. Hesco barriers and sandbags were used and the SCANG worked around the clock to get them in place.

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The District provided 300 linear feet of Hesco barriers that was used around the Pawleys Island pump station that supplies island residents with clean water. If the pump station became disabled, residents could potentially have run out of clean water within one to two days.

The District was honored to be able to help Georgetown County. "The DTOS is completely self-sufficient, which is crucial during a crisis," said Michael Hind, chief, Charleston District emergency management.

The DTOS provides the ability to quickly set-up a mobile operation and communication platform, which enabled the District to provide the necessary support to Georgetown County’s and Horry County’s Emergency Operation Centers, South Carolina Army National Guard and South Carolina Department of Transportation. It also gave the Corps the ability to reach back to the Charleston District’s EOC to align communication and coordinate mission efforts.

Using the DTOS to Mitigate Flooding

By Sara Corbett

During a disaster, communication is vital to response and recovery efforts, but it’s often impossible due to power outages. This is where the U.S. Army Corps of Engineers’ Deployable Tactical Operations System truck comes into play.

"The DTOS is completely self-sufficient, which is crucial during a crisis," said Michael Hind, chief, Charleston District emergency management.

During Hurricane Florence response efforts, the Charleston District used a DTOS to position and track flood fighting materials, as well as personnel, in an effort to mitigate the rising floodwater in Horry and Georgetown Counties.

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"We were fortunate that we had the DTOS during our response efforts," said Hind. "Having a team that was completely self-sustaining on the ground tracking materials and personnel helped make this mission a success."

In addition to the ECCV, the Corps has other several types of VTC options, and satellite and cellular capabilities that can deliver both voice and data communications.

Since the flood fighting efforts were in Horry and Georgetown Counties, the DTOS was situated in Conway, S.C., making it central to the impacted areas.

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USACE Charleston

Hurricane Florence Response

Hurricane Florence made landfall on September 14th in North Carolina, then made its way through upper South Carolina very slowly, causing tremendous rain and flooding. The U.S. Army Corps of Engineers, Charleston District responded with various missions.

- **6** Missions undertaken by the Charleston District
- **40** Private dams assessed throughout South Carolina
- **63** Corps subject matter experts deployed to help respond
- **10,105** Linear feet of flood barriers installed to protect Highway 501
- **30,000** Sandbags created by the hydraulic sandbagger
- **20** Miles of beach surveyed for sand loss or movement