

Advance Evaluation Team Report



Record rainfall caused widespread damage to roadways, dams, businesses, residences and other infrastructure Oct. 1-5, 2015.

FEMA photo / Oct. 19, 2015



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Executive Summary

Severe storms and flooding swept through the state of South Carolina October 1-5, 2015, dropping record rainfall greater than 20 inches in the cities of Columbia and Sumter as well as in Brunswick, Georgetown, and Horry counties. Ground surfaces had already been saturated from previous storms in September, inhibiting the absorption of waters during the severe storms that followed. Excessive runoff was produced, causing rivers to rise, inundating areas on and off designated floodplains.

The severe weather conditions resulted in 19 deaths and widespread damage to housing, infrastructure and the landscape. A major disaster for severe storms and flooding was declared in South Carolina by the President on Oct. 5 covering all 46 counties for direct federal assistance. The incident period extending through Oct. 23 ultimately designated 35 counties for Public Assistance, and 24 others for Individual Assistance (See Appendix A, Declared Counties for details). Hazard Mitigation Grant programs were also made available statewide for counties and tribal nations.

Due to the severity and magnitude of the disaster, Gracia B. Szczech, the Regional Administrator, Region IV, and Federal Coordinating Officer (FCO) W. Michael Moore appointed a Federal Disaster Recovery Coordinator (FDRC), Robert Haywood, on Oct. 9.

Subsequently, an Advance Evaluation Team (AET) was formed to conduct a “first look” assessment of the impacted counties and communities.

The evaluation assesses whether enhanced coordination of federal resources is recommended and determines the activation of one or more relevant Recovery Support Functions (RSFs) to conduct an in-depth technical assessment. The report also offers insight into South Carolina’s long-term recovery issues, challenges and opportunities, as the Recovery Federal Interagency Operational Plan (FIOP) provides.

Multiple criteria was used to shape this assessment that considers whether:

- The affected communities have suffered significant impacts and have limited capacity to recover from these impacts.
- The disaster has created unique issues and challenges for recovery, reconstruction and redevelopment, such that greater coordination of federal recovery assets is required to meet particularly complex recovery issues that exceed local, state, tribal, territorial and/or insular area capabilities.
- The scale of the disaster is so extensive that enhanced coordination of traditional and non- traditional recovery resource providers is anticipated.

As part of its approach, AET members coordinated with Joint Field Office (JFO) operations

components to gather data from all program areas. Comprehensive analysis of this data yielded a list of 13 counties that sustained significant impacts and that met thresholds demonstrating a low level of capacity for recovery. To supplement the statistical information, five teams of FEMA representatives (some paired with a state agency representative or emergency manager), visited the counties designated as eligible for FEMA Individual Assistance (IA) and Public Assistance (PA).

The field visits surveyed targeted cities, areas and communities within the impacted counties and met with local and county officials, state agency representatives, emergency managers, community leaders and other emergency management decision makers to gain greater understanding and perspective of the impacts and capacity for recovery. Team members analyzed this evidence and formulated the recommendations and findings published in this report.

Contributing sources consulted during the course of the Advance Evaluation are provided in Appendix B. For complete methodology background, please refer to Appendix C, Methodology.

Recommendations

Core Capability	Recommendation
Operational Coordination	Appointed FDRC Continues Coordination
Planning: Community Planning & Capacity Building	Activation/Deployment
Economic	Activation/Undetermined
Health and Social Services	No Activation/No Deployment
Housing	Activation/Undetermined
Infrastructure Systems	Activation/No Deployment
Natural and Cultural Resources	Activation/No Deployment*

**May be supportive of economic recovery core capability.*

Planning: Community Planning & Capacity Building (CPCB)

Recommendation: Activation/Deployment

Mission: Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or community-based approaches to meet defined objectives.

The team's assessment indicates the state could benefit from support as they assist low capacity or overwhelmed counties and municipalities in developing long-term recovery management strategies. The CPCB RSF can provide coordination, partner collaboration and technical assistance; leveraging the resources and programming of federal agencies, state agencies, and non-governmental organizations.

Economic

Recommendation: Activation/Undetermined

Mission: Return economic and business activities (including food and agriculture) to a healthy state and develop new business and employment opportunities that result in a sustainable and economically viable community.

The Economic RSF could play a vital role in coordinating the efforts of local, state and federal agencies to compensate, restore and ensure the long-term vitality of small businesses and two of the state's most important economic sectors, agriculture and tourism.

Health & Social Services

Recommendation: No Activation/No Deployment

Mission: Restore and improve health and social services networks to promote the resilience, independence, health (including behavioral health), and well-being of the whole community.

As currently identified needs are being met, activation and deployment of this Recovery Support Function is not recommended at this time.

Housing

Recommendation: Activation/Undetermined

Mission: Implement housing solutions that effectively support the needs of the whole community and contribute to its sustainability and resilience.

Evidence of post-disaster impacts indicates a sustainable housing recovery mission will be both complex and far-reaching. Essential cross-sector coordination of housing issues related to critical infrastructure and economic recovery must accompany and enhance efforts by the state and multi-agency programs and services. Coordination will also help to address disaster housing recovery needs and gaps including those of rural communities where conditions were exacerbated by the disaster.

Infrastructure Systems

Recommendation: Activation/No Deployment

Mission: Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.

The state-wide issue of dam recovery and the attendant multi-sector impact upon housing, transportation, wastewater facilities, commerce and families indicates activation of recovery support to conduct further analysis, develop recovery strategies, and assure interagency coordination (and integration) among the local, state and federal bodies engaged in recovery.

Natural & Cultural Resources

Recommendation: Activation/No Deployment*

*(*May be supportive of economic recovery core capability)*

Mission: Protect natural and cultural resources and historic properties through appropriate planning, mitigation, response, and recovery actions to preserve, conserve, rehabilitate, and restore them consistent with post-disaster community priorities and effective practices and in compliance with appropriate environmental and historic preservation laws and executive orders.

Significant and widespread damage to waterways, beaches and agriculture continues to have negative impacts upon tourism and agribusiness. Dam failures are both a state and local issue-- and multiple agencies are studying the failure issue from a watershed perspective. Early findings point to involvement by a mosaic of agencies including the U.S. Department of Agriculture (USDA) National Resource Conservation Service. Further study may be essential to identify recovery opportunities, coordinate federal resources and to determine the level of impact to agriculture, waterways and remaining debris as well as the Columbia Canal (built in 1824), which was overwhelmed.

Special Coordination Considerations

Advisory entities of Mitigation and Unified Federal Review have outlined proposed technical assistance to be provided during the recovery mission. They are included in the findings below. Assistance has not been requested by the state's federally recognized tribe.

Findings

Operational Coordination, Federal Disaster Recovery Coordinator

Recommendation: Continued Coordination

Complex recovery challenges, combined with a newly formed state-led interagency disaster recovery organization, calls for enhanced federal coordination. The governor has appointed a State Disaster Recovery Coordinator (SDRC) who is addressing unmet near- and long-term recovery needs.

The South Carolina Office of Emergency Management's (SCEMD) Recovery Director has also launched a parallel effort to coordinate similar immediate and near-term recovery priorities. Given these developments, these teams will benefit from activation of select federal Recovery Support Function (RSF) Field Coordinators. Coordinators would provide programmatic subject matter expertise for mission scoping and forming core recovery strategies.

The appointed FDRC will coordinate federal recovery core capabilities—working closely with the SDRC, SCEMD, and various state agencies directly supporting the governor's recovery initiatives. Additionally, Unified Federal Review (UFR) would also require significant coordination to engage the multiple agencies involved with recovery planning and program management.

The FDRC and National Disaster Recovery Support (NDRS) staff, organized and operating under the established doctrinal framework, will provide Operational Coordination to South Carolina.

Planning: Community Planning & Capacity Building (CPCB)

Recommendation: Activation/Deployment

Evidence

Every county that was declared, either for IA, PA, or both, was investigated in terms of impacts and capacity to self-organize and develop an initial recovery plan that provides an overall strategy and timeline. State, county, and local officials were interviewed and cross-cutting issues were identified. The CPCB RSF works to bring partner agencies and organizations together to maximize the impact of their collective efforts and assist the state in supporting county and local long-term recovery efforts. The state has identified several lines of effort that could benefit from the support of the CPCB RSF, specifically, mitigation/resilience efforts, long-range community planning, and strategic planning and outreach.

Issues

The widespread nature of the impacts in the state potentially poses a challenge. Several of the counties that were declared have significant populations living in unincorporated or rural areas, and several counties reported that every city in the county had some type of impact. The diffuse nature of impact within the state and individual counties could potentially hamper recovery efforts.

Many of the counties and communities visited by the AE Team appeared to have some capacity to manage the long-term recovery needs, but there will likely be challenges as more information is gathered. However, there were some communities that appeared to be overwhelmed by the prospect of addressing these needs, and some of the less populous counties may struggle in the long-term because of smaller staffs and fewer resources. Additional partner and resource coordination by the CPCB RSF and state recovery apparatus could bolster efforts of local and county leaders.

Another relevant factor is that 26 years have passed since the last major disaster event in South Carolina, Hurricane Hugo. There have been smaller events since 1989, but Hugo was generally cited as the last event with widespread, devastating impacts. While state, county, and local emergency management personnel have been maintaining high-quality standard operations, institutional knowledge of developing and organizing a long-term recovery strategy may have been lost in many instances.

Finally, many of the counties are addressing social issues that were exacerbated by the disaster; poverty, unemployment, substandard housing or lack of affordable housing, etc. (See the Social Vulnerability Index in Appendix D). In many instances, there is the opportunity to “recover better,” and a coordinated effort, supported by the CPCB RSF, could help achieve this goal.

Analysis

There are many CPCB partner agencies and organizations that could assist with sustained recovery efforts; in fact, many organizations already have efforts underway. The CPCB RSF could be beneficial in coordinating these efforts, leveraging the resources these partner organizations could bring, and reducing duplication of effort.

Because there are many partner agencies that will be or have already been pulled together to address long-term needs, coordination assistance could be of great benefit to the state.

Councils of Government that are active in the impacted areas may be a key partner entity in developing or supporting long-term recovery plan efforts. As an entity focused on capacity building and coordination, the CPCB RSF could assist as the relevant state, federal, and nongovernmental representatives come together to develop a strategy for addressing long-term recovery needs.

Evaluation of Post-disaster Impacts

Yes	Eval Needed	No	Sectors Impacted	Analysis or Input
Community Planning & Capacity Building				
X			Incapacitated or significantly overwhelmed communities	Evidence identified.
X			Communities with widespread/multi-sector damages	Scattered communities in multiple counties have cross-sector issues.
		X	Extraordinary considerations for this disaster with long-term implications	N/A

Recommendation: Activation/Deployment

Recommend that the CPCB RSF activate to assist the state in coordinating federal, state, and local partners, assist with the ongoing development of a state strategy for addressing sustained recovery needs, and leverage the resources and programming of federal agencies, state agencies, and non-governmental organizations for a more efficient and thorough recovery process.

Economic

Recommendation: Activation/Undetermined

Evidence

The major industries in South Carolina as a percentage of overall employment are: manufacturing, finance, insurance, real estate, and government.¹ Although employing only 1 percent of overall employment¹, agriculture is a significant industry in the state with the market value of agricultural products sold in 2012 more than \$3 billion.² The top four agricultural commodities in the state are broilers (chickens), turkeys, corn and cotton.³ Charleston Harbor is the nation's fourth busiest container port in the U.S., handling more than \$3 million in cargo every hour and offering direct service to more than 140 countries.⁴ Over \$15 billion is brought into the state's economy by tourism, and tourism jobs account for over 10 percent of the state's employment.⁵

Issues

Based on evidence collected, the State's economic sectors most impacted by the recent flooding are agriculture and tourism. The long-term impact on agriculture could range from \$300 million to \$1 billion according to the State Agricultural Commissioner.⁶ However, it is very difficult to estimate long-term losses until crops are harvested. Few businesses are as vulnerable to natural disasters as agriculture. It is certain that not all losses will be covered by crop insurance because of the state's 24,400 farm operations, only 12,355 crop insurance policies have been sold so far this year.⁶

On the South Carolina coast, the severe weather resulted in eroded dunes on the Isle of Palms and Folly Beach, on the east end of the island for a four-block stretch. Myrtle Beach, in Horry



Large swaths of beach were lost to erosion in high tourism areas of Horry County.
FEMA Photo/Jim Smith Oct. 29, 2015

County, anchors a stretch of beach known as "The Grand Strand".⁵ The area has over 400 hotels and 100 golf courses.⁵

Its main tourist attraction is the beach. County and state emergency management officials reported a significant

amount of beach erosion along the Strand associated with the storm event. Following the storm event, at normal high or king tides there has been virtually no useable beach east of the dune line.

The Myrtle Beach Area Chamber of Commerce estimates that a disaster event resulting in a 20 percent decrease in hotel occupancy can translate to an economic loss to the community of \$7 million per day. “Businesses will require (FEMA) support to build capacity and financial resources to prepare for recovery,” they said, and the Governor’s South Atlantic Alliance (GSAA) can help by advocating for resources needed to implement the NDRF in its coastal communities.⁷

Horry County’s emergency management official reported there is a U.S. Army Corps of Engineers, (USACE), beach re-nourishment project scheduled to be implemented sometime in early 2017 for the unincorporated beach sections. In addition to not involving the incorporated sections--Myrtle Beach for instance--next summer’s tourist season may be seriously impacted by the lack of a useable beach area. As one official said, the BP oil spill actually benefited tourism because tourists visited South Carolina beaches instead of those on the Gulf Coast.

The AE Team solicited input from the state’s Department of Commerce and completed an evaluation of post-disaster impacts, as shown below. Identified for further evaluation was the potential impact to small businesses and their potential lack of access to capital for rebuilding. While there isn’t enough data to fully analyze the impacts to small businesses, assistance for these businesses would normally be provided via Small Business Admin. (SBA) loans and Economic Development Administration (EDA) system assistance and resources.

As of Nov. 5, the SBA had received 508 applications for physical damage. Sixty-nine were approved for a total of \$3.3 million. Sixty loan applications for economic injury were filed and seven were approved for a total of \$231,800. Most of the loan applications have come from Berkeley, Charleston, Clarendon, Dorchester, Florence, Georgetown, Horry, Lexington, Orangeburg, Richland, Sumter and Williamsburg counties.

The SBA continues to encourage business owners to seek assistance for physical and economic injury losses. The SDRO has expressed concern that these figures may represent only the “tip of the iceberg.” The registration deadline for applying for SBA loans is Dec. 4, 2015.

Economic Recovery Partners

The state’s economic development agency is the Department of Commerce which coordinates with almost 100 local, state and regional economic development agencies, which is indicative of the state’s strong economic development capacity. The appropriate federal agency to support the state’s economic development recovery issues would be the EDA of the U.S. Department of Commerce. Since the economic issues delineated are farming impacts and beach re-nourishment, the primary support agency for agriculture issues is the U.S. Department of Agriculture (USDA). The EDA would coordinate with the Infrastructure RSF’s coordinator (USACE) to address beach re-nourishment issues.

Evaluation of Post-disaster Impacts

Yes	Eval Needed	No	Sectors Impacted	Analysis or Input
Economic				
		X	Significant damage to a major employer, or major business resumption issues emerge (e.g. businesses considering leaving the area).	
	X		Significant lack of capital access – businesses unable to rebuild	Information on many potentially affected small businesses is not in.
	X		Industry-wide impacts realized – (e.g. tourism, oil and gas, manufacturing, natural resources, healthcare, etc.)	Significant short-term/near-term impact on tourism. Storm and news reports kept visitors away. In the first week post-storm \$15-20 million in revenue per day was lost in coastal region. Returned generally to normal range by end of week 3. \$63.1 million in damage/costs to the timber and timber products industry--mostly to forest product mills due to transportation interruptions, infrastructure logistics.

Recommendation: Activation/Undetermined

Since a strong economy is the backbone of South Carolina's resiliency, addressing the issues above will be key to its recovery. Therefore it is recommended that the Economic RSF be activated.

Health & Social Services

Recommendation: Activation/No Deployment

The mission of the Health and Social Services (HSS) Recovery Support Function (RSF) is to assist locally led recovery efforts in the restoration of public health, health care and social services networks to promote the resilience, health and well-being of affected individuals and communities. As the Coordinating Agency for the HSS RSF, the Department of Health and Human Services (HHS) has maintained situational awareness of disaster impacts in South Carolina from the onset of the flood.

On October 13, 2015, HHS convened the primary agencies and supporting organizations of the HSS RSF for purposes of developing a common operating picture for recovery needs. HHS and the HSS RSF have taken proactive steps to disseminate recovery technical assistance to state and local partners, identify gaps that may require assistance or flexibilities, and to promote lessons learned.

Evidence and Issues

Public Health and Environmental Health

The availability of potable water is steadily being restored. At the peak of the flood, DHEC had issued a total of 40 boil water advisories impacting a total of 436,045 residents. Boil water advisories have been lifted.

DHEC is providing Tdap (Tetanus, Diphtheria, and Pertussis) vaccinations at no cost to disaster survivors as an emergency protective measure to protect public health and safety. Additionally DHEC is providing private well testing free to residents. DHEC has also distributed more than 4,378 well water testing kits statewide.

Clemson University Edisto Research and Education Center has provided technical assistance and guidance to farmers on managing flooded crops and mitigating the effects of flooding on hay and cattle production. Additionally, Clemson Livestock Poultry Health is conducting agricultural damage assessments of livestock and poultry.

Richland County began spraying for mosquitoes on Oct. 21. Additional counties have identified a need to take this emergency protective measure. DHEC has consulted with HHS' Office of the Asst. Secretary for Preparedness and Response (ASPR) Regional Emergency Coordinators on the issue and has also developed a fact sheet to inform counties of the data and documentation required per FEMA Public Assistance Recovery Policy, 9523.10 Eligibility of Vector Control (Mosquito Abatement).

On Oct. 26, the South Carolina Hospital Authority, South Carolina Emergency Management Division (SCEMD), and DHEC convened an Applicants' Briefing to explain the FEMA Public Assistance process to health care partners in the state. HHS/HRSA is also following up with its health care provider grantees in declared counties to encourage them to submit Requests for Public Assistance by the deadline.

Analysis

Based on evidence gathered and the areas of impact highlighted above, Health & Social Services actions have been taken to address the HSS RSF's Core Recovery Mission Areas, public and environmental health, food, drug and regulated medical product safety, health care and behavioral health areas. Similarly, in the area of social services and referrals to Social Services/Disaster Case Management, actions have already been taken or are underway to meet needs as identified. Regarding Children and Youth, identified needs are also being met through a variety of avenues and solutions.

Evaluation of Post-disaster Impacts

Yes	Eval	No	Sectors Impacted	Analysis or Input
Health and Social Services				
		X	Diminished capacity/access or displacement of healthcare, public health, or social services infrastructure or delivery systems or providers	Temporary disruptions in Richland County due to water supply system damage caused by flooding.
		X	Extended duration of disaster=caused social services needs and/or behavioral/mental health and/or substance abuse needs	None noted
		X	Elevated air/water environmental health risks and/or food safety risks	State programs were monitoring health risks. No incidents reported.
		X	Protracted laboratory surge	Well water test kits were issued for private wells. Sampling turn around timely.
		X	Disaster-caused healthcare workforce attrition and/or shortage	None noted.
		X	Significant long-term health issues specific to responders	None noted. Vector monitoring ongoing.
		X	Disaster-caused impacts or impairments to human or social services provided to children and youth in schools	Five-day closure due to impassable roads, either flooded or damaged outright.
		X	Prolonged disaster impacts to school facilities / educational environment.	Emergency road repairs were prioritized to school bus routes.

Recommendation: Activation/No Deployment

As currently identified needs are being met, activation of this Recovery Support Function is not recommended at this time.

Housing

Recommendation: Activation/Undetermined

Evidence

Housing inspections determined that homes across South Carolina were impacted by flood levels that varied from a few inches to greater than four feet. Over 60,000 homes have been inspected via FEMA IA programs.

Of all homes inspected, 17,000 had damage qualifying for FEMA housing assistance, according to the Nov. 4 IA Daily Status Report. Advance Evaluation Team field visits with emergency managers and county officials revealed the state's rural communities were hardest hit.

In addition, pre-existing housing conditions in many of the rural communities were exacerbated by the disaster. The urban community of Richland County sustained major damage to its housing stock due primarily to its low lying areas and dams that had been breached. Field visits identified as many as 150 residents who were temporarily displaced from their public housing units in the city of Columbia in Richland County. Further, a complex in Summerton County, Meadowfield, had as many as 48 displaced families. The families have moved back but were displaced again by recent flooding, according to the housing complex manager.

Flood Levels in Inspected Homes

As of Oct. 29, a total of 8,639 homes had more than one foot of water:

Flood Levels	12" to < 24"	24" to 48"	> 48"
Homes Inspected	5,385	2,716	538

Access to interim housing solutions were evaluated by the FEMA IA Disaster Housing Assessment Team (DHAT). A direct housing mission was not recommended. Results of questionnaires completed during field visits found that there is not a large displaced population in shelters. However, according to information provided by officials (Williamsburg County EOC Director, and the Andrews Town Administrator in Georgetown County) in two of the rural areas, flood survivors are opting to live in their damaged housing to remain in their communities.

Issues

In South Carolina, FEMA rental assistance programs have helped residents in finding temporary housing until long-term solutions can be provided. However, there have been 97 Maximum Grants distributed via Individual Assistance as of Nov. 8, which indicates the magnitude of flooding impact on housing in three of the harder hit counties.

Maximum Grants Awarded as of Nov. 8

County	Maximum Grant Award
Richland	34
Georgetown	30
Sumter	11
Total	75
Total Statewide	97

Top three counties with Maximum Grants awarded. A maximum Individual Housing Program (IHP) grant is \$33,000.

Several communities have sustained repetitive losses since Hurricane Hugo and many residents have been denied federal assistance due to preexisting conditions in their homes.

Communities located downstream (and/or adjacent to) the breached dams will require further review for evaluation of their mitigation recovery options.

There are also issues of National Flood Insurance Program (NFIP) flood management

compliance and property acquisition that are delaying families' ability to rebuild and to make informed recovery decisions. Moreover, concerns exist surrounding the property elevation and in identifying and providing "gaps" in funding for underinsured or non-compliant properties. (See Appendix E, South Carolina Severe Storms and Flooding Final Assessment, Oct. 16, 2015) Therefore, sustained housing recovery coordination is needed.

Analysis

County officials report some residents are opting to live in damaged homes. There is no anticipated population shift/loss in the vast majority of communities. Urban recovery will require resources while rural communities will likely require both resources and capacity building.

Daily & Total Individual Assistance Registrations

Individual Assistance Daily Status Registrations: As of Nov. 9, 2015	Daily	Cumulative
Registrations Total	219	80,615
Registrations (Designated Counties)	216	80,209
<i>Registrations (Undesignated Counties)</i>	3	406
Web Registrations *	83	21,647
Mobile Registrations *	28	5,360

Rental assistance distributed to flood survivors has reached \$11.9 million as of Nov. 4. Rental assistance is provided for 18 months or \$33,000 whichever comes

first. Recertification for eligibility is required after two months.

There have been 33,781 home loan applications issued, 4,789 were received, and 1,357 were approved for unmet housing needs as of Nov. 4. The majority of funds for rebuilding homes after a disaster originate from the SBA Disaster Loan Program; and they have approved \$40 million in home loans for individuals--demonstrating a potential gap in unmet needs for housing recovery.

Internal programs and the Advance Evaluation have identified 13 counties in need of housing assistance and that also have a high percentage of poverty. As housing issues continue to

emerge, further evaluation is indicated to consider evolving needs in Sumter County, Dorchester County, Horry County, Georgetown County, Florence County, Charleston County, Lee County, Lexington County, Orangeburg County, and Williamsburg County. Of particular concern due to social vulnerability and downstream effects of dam failures are Richland,

FEMA Verified Loss (As of Oct. 30)				
Status Own/Rent	Count of Registrations	Total FVL \$200 - \$5,000	Total FVL \$5,000 - \$24,999.99	Total FVL \$25,000 >
Not Specified	522	3	-	-
Own	53,370	21,480	2,589	430
Rent	17,725	3,224	276	-
Total	71,617	24,707	2,865	430

Greenwood and Clarendon counties.

While the disaster did not produce distinct areas of high-concentration

impacts, there are multiple counties with a diffused loss spread over a large geographic area.

Richland County had the highest number overall and the fourth-highest percentage of housing units with FEMA-verified loss (FVL) greater than \$5,000.

Designated Counties	Daily	Cumulative
Bamberg (County)	3	335
Berkeley (County)	22	4,030
Calhoun (County)	4	715
Charleston (County)	14	7,358
Clarendon (County)	1	3,513
Colleton (County)	7	1,440
Darlington (County)	0	1,617
Dorchester (County)	20	3,188
Fairfield (County)	0	306
Florence (County)	22	4,870
Georgetown (County)	5	3,784
Greenville (County)	2	93
Greenwood (County)	5	275
Horry (County)	8	4,383
Kershaw (County)	6	1,204
Lee (County)	4	1,714
Lexington (County)	13	3,987
Marion (County)	7	439
Newberry (County)	2	447
Orangeburg (County)	9	5,115
Richland (County)	46	17,072
Spartanburg (County)	2	84
Sumter (County)	6	9,011
Williamsburg (County)	8	5,229
Total	216	80,209

Richland County also represents the largest number of registrations for Individual Assistance to date.

Thirty-nine percent of overall registrations had FEMA Verified Loss (FVL) greater than \$200. Roughly 12 percent (or greater than 1 in 10) of eligible housing units had FVL greater than \$5,000.

Cumulative Individual Assistance registrations data shows that among the following designated counties, Richland, Sumter, Charleston and Williamsburg evidence the highest concentration of registrations to date:

A State Led Disaster Housing Disaster Taskforce (SLDHTF) is being activated to aid in coordinating the agencies that can assist with housing recovery.

The Housing Finance Authority will lead the taskforce. The partnerships identified by this taskforce are primarily voluntary agencies. The group's focus is short-term and is primarily concentrating on interim housing solutions.

A gap in identifying sustained housing solutions exists. The SLDHTF would benefit from additional resources and coordination across public, private non-profit agencies/organizations necessary to address the medium- and long-term housing challenges.

Evaluation of Post-disaster Impacts

Yes	Eval Needed	No	Sectors Impacted	Analysis or Input
Housing				
	X		Large percentage of the general population is potentially long term displaced persons	There are many unknowns at the time of report publication according to interviews with county officials. More study needed.
X			Long term or affordable housing implications	Pre-existing conditions exacerbated by this disaster.

Recommendation: Activation/Undetermined

Engagement of the housing recovery support function is recommended to coordinate federal resources. Evidence of post-disaster impacts indicates the long-term housing recovery mission will be both complex and far-reaching. Essential cross-sector coordination of housing issues related to mitigation, critical infrastructure and economic recovery must accompany and enhance efforts by the state and multi-agency programs and services. Coordination will also help to address disaster housing recovery needs and gaps, including those of rural communities where conditions were exacerbated by the disaster.

Infrastructure Systems

Recommendation: Activation/No Deployment

Evidence

South Carolina's infrastructure (especially roadways, dams, bridges and wastewater facilities) sustained significant impacts during the heavy rains and ensuing floods. According to the National Geospatial Intelligence Agency (NGA) preliminary flood extents, a total of 151,682.5 acres have been affected by flood waters.

There have been 132 Requests for Public Assistance (RPA) and 30 Applicant Briefings have been completed. Eight Kick-Off meetings have been held and 10 Project Worksheets have been obligated as of Oct. 30.

Issues

Seventy three roads and 32 bridges were closed as of Oct. 30. As of Nov. 3, 57 roads and 28 bridges remain closed, according to Situation Reports developed by FEMA and state emergency managers.

Of the 2,370 regulated dams in the state, 1.3 percent failed as a result of the floods and Emergency Orders have been issued for 3 percent of them.

DHEC is currently assessing all Class One and Class Two dams statewide as a precaution after the historic rains and flooding. They are partnered with USACE to do on-site evaluations. As of Oct. 28, they have assessed all 652 Class One and Class Two dams statewide. The assessment revealed 36 dams that have failed (31 regulated, 4 unregulated and 1 federal). Subsequently, the DHEC issued Emergency Orders covering 75 dams. As part of the overarching assessment process, the agency is evaluating overtopping, debris, structural damage, signs of erosion, flow, seepage, potential weak and or failure points, and overgrowth.

Beach Damage

Beaches were affected by the storm event from Oct. 2-5, including Garden City Beach (south end), Kiawah Island, Seabrook Island, and Hilton Head Island. Charleston County received rainfall spanning between 15 and 25 inches and elevated tides from Sept. 27 to Oct. 2 combined with offshore winds worsened coastal erosion.

Analysis

An assessment of the impacts to the wastewater treatment facilities identified that 70 facilities in the state have reported flood impacts. The severity of wastewater treatment facility impacts range from sanitary sewage overflow to significant damages to the infrastructure itself. A joint (USACE, EPA, state) assessment of the impacted facilities will determine a) current operating capacity, b) extent of damage, c) temporary measures needed to restore operations, and d) permanent repair needs.

Wastewater treatment facility damage by county and branch is charted below, correlated by severity of the damage (D.Cat). The damage categories assigned are Major/Moderate/Minor. Determination of the extent of damage is based on flood issues reported by the facilities.

**Wastewater Treatment Facilities Damages
Categorized by Major/Moderate/Minor**

Branch 1			Branch 2			Branch 3		
County	Total	D.Cat	County	Total	D.Cat	County	Total	D.Cat
Richland	8	0/1/7	Clarendon	1	0/0/1	Aiken	1	0/0/1
Lexington	11	2/3/6	Horry	3	0/1/2	Charleston	6	0/1/5
Kershaw	4	0/2/2	Georgetown	3	0/1/2	Berkeley	7	0/0/7
Greenville	1	0/1/0	Sumter	3	0/0/3	Dorchester	2	0/0/2
Anderson	2	0/0/2	Williamsburg	3	0/1/2	Orangeburg	1	0/0/1
Laurens	1	0/1/0	Chesterfield	1	0/0/1			
Saluda	1	0/1/0	Dillon	1	0/0/1			
Lancaster	1	0/0/1	Florence	6	0/1/5			
			Darlington	3	0/1/2			
Total	29	2/9/18		24	0/5/19		17	0/1/16
Total Facilities	70							

While FEMA PA programs will likely address repair to wastewater infrastructure, other federal agencies (EPA, USDA) may have resources within their program authorities to assist with recovery of damaged treatment systems. In addition to wastewater, Richland County officials reported that the flood disrupted water supply and nearly caused the closing of three major hospitals. Restoration of the Columbia Canal will be a complicated task because, in addition to being a historical landmark, it is a critical part of Richland County's water supply infrastructure.

The issue of dam recovery has drawn the highest scrutiny due to its multi-sector impacts and complexity regarding recovery resource eligibility. At the time of this report, a myriad of task forces, interagency advisory groups and state and local entities are involved with finding comprehensive solutions to this major recovery issue:

- Dam Task Force: Led by FEMA HQ Dam Safety Engineer and supported by FEMA Region IV Dam Safety team members is preparing a white paper planned for issue Nov. 16.
- Dam Advisory Group: Coordinated by FEMA-4241-DR-SC Operations. They are also scheduled to complete its internal report the week of Nov. 9.
- Dam Inspection Task Force: U.S. Army Corps of Engineers. Work has concluded.
- Watershed Rehabilitation Study: USDA Natural Resources Conservation Service. Study is ongoing.
- FEMA HMGP Risk Reduction survey. Initial report available.
- South Carolina Dam Task Force: May be headed by DHEC. Currently being developed.

Dam recovery will have far reaching consequences ranging from housing to critical infrastructure. For example, Richland county fire protection relies upon “dry hydrants” for firefighting water resupply. The hydrants are tapped into the water retained by pond dams in rural areas of the county. An interim measure of water storage using temporary devices (like swimming pools) is in place, but permanent resupply will require repairs to dams or a major public works project. In the meantime, rural areas throughout the declared counties face a serious public safety challenge.

Evaluation of Post-disaster Impacts

Yes	Eval Needed	No	Sectors Impacted	Analysis or Input
Infrastructure Systems				
X			Large numbers or major facilities or infrastructure systems impacted (schools, government, highways and ports).	Damaged facilities, roadways, bridges, dams, ports, beaches, wastewater treatment facilities etc., as outlined above.

Public roads that cross over many private dams were destroyed by breaches. Roads and highways further downstream were also severely damaged. Ensuing road closures have limited access to homes and business. Delays in repairs will affect traffic patterns, which in turn will negatively impact commerce.

Homeowners associations may find private dam repairs too costly to afford and may forego restoration of waterfront property. There may be resulting depreciation in real estate appraised values and losses of local tax revenues. Alternative resources will be required to fill funding gaps for private dam repair, since Stafford Act program eligibility limits will not permit comprehensive coverage of these projects. Other federal agencies will need to collaborate and coordinate their respective emergency and peacetime programmatic authorities in order to ensure optimal recovery strategy.

To further complicate matters, dam repairs will require considerable study and environmental review which is addressed elsewhere in this document. Adoption and enforcement of reconstruction codes/standards will also take additional time and further delay recovery.

Recommendation: Activation/No Deployment

Infrastructure issues presented by this disaster are widespread and will require significant interagency coordination for reconstruction, redevelopment and recovery. Greater coordination of federal recovery assets may be required to meet particularly complex issues that may exceed local, state, tribal, territorial and/or insular area capabilities. A unified recovery coordination strategy will assist in restoring critical infrastructure.

Natural & Cultural Resources

Recommendation: Activation/No Deployment

(May be supportive of economic recovery core capability)

The Natural & Cultural Resources Advance Evaluation was conducted in targeted disaster-affected areas during an assessment conducted October 26-31, 2015. Information and intelligence for the report was gathered from sources both internal and external to FEMA, federal, State and local agencies and public sources.

Evidence

Information gathered to date indicates that agriculture, the Columbia Canal, waterways, tourism, and commerce were impacted to varying degrees by the severe storms and flooding. The National Oceanic & Atmospheric Administration (NOAA) recorded one-day rainfall records for October were broken in at least nine cities in South Carolina, with six of them breaking the one-day record for any month. Total rainfall of 11 in. broke records that held for 80 years in Columbia. Summerville, north of Charleston, received 18 in., surpassing its record of 11 in. in October—a record that stood for 117 years.

National Weather Service figures indicated rivers across the state exceeded their flood stages, including the Congaree River, which crested at 32 ft. (flood stage 19 ft.) affecting Calhoun, Lexington and Richland Counties. The North Fork Edisto River in Orangeburg, the Lynches River at Effingham, the Edisto River near Givhans Ferry, the Waccamaw River in Horry County and the Pee Dee River at Pee Dee crested well above flood stages. The Black and Santee rivers caused severe flooding and later, evacuations downstream in Williamsburg County. Dams collapsed or overflowed in several counties, and the Columbia Canal, on the Congaree and Broad Rivers, breached a levee in two places.

Analysis

Agricultural Impact

The South Carolina Agricultural Commissioner conservatively estimated that the state's agricultural loss and crop destruction could range from \$300 million to \$1 billion. State forestry officials reported that the state's forest industry has sustained losses of at least \$65 million. The loss of access to roads, bridges and rail lines, higher operating costs for loggers, increased transportation costs for mills and overall lost productivity has resulted in economic loss for forest landowners, loggers, mills and suppliers.

Columbia Canal Impact

The Columbia Canal, listed on the National Register of Historic Places, was overwhelmed by the rising floodwaters.

FEMA is consulting with the South Carolina Dept. of Archives and History (SCDAH), and has entered into the South Carolina Historic Preservation Programmatic Agreement with SCDAH, the South Carolina Emergency Management Division (SCEMD), the Catawba Indian Nation and

the United Keetoowah Band of Cherokee Indians to provide technical assistance for recordation of the Columbia Canal District.

Dams and Waterways

Across South Carolina, 75 dams are under emergency repair orders, 28 of them in hard-hit Richland County, where floodwaters burst through or spilled over a series of earthen dams built decades ago along Gills Creek, running through the capital city area of Columbia. Engineers' detailed inspections, as well as repair or replacement plans, are still under way.



The Columbia Canal (above) breached a levee in two places, the surviving canal of a series of canals built by South Carolina in 1824. Above it is the Columbia Hydroelectric Plant.

Privately owned dams generally aren't eligible for FEMA programmatic assistance, and they're unlikely to be covered by private insurance. The Gills Creek Watershed Association Coordinator reported that rebuilding an earthen dam could cost between \$300,000 and \$1 million. Simply putting in a new outlet for controlling water levels could cost \$20,000. Assessments to date indicate the majority of breached dams are privately owned, some with public roads crossing them.

On Oct. 17, DHEC's Shellfish Sanitation Section announced it had reopened shellfish beds previously closed in Georgetown County Murrells Inlet area, and on Oct. 22, certain harvesting areas in Charleston and Colleton counties had reopened. Two harvesting areas in Charleston County and one harvesting area in Horry County remain closed. Shellfish beds are reopening as water quality improves and it is anticipated that there will be no long-term effects to the shellfish industry.

Evaluation of Post-disaster Impacts

Yes	Eval Needed	No	Sectors Impacted Natural & Cultural Resources	Analysis or Input
	X		Long term issues associated with natural resource impacts or environmental challenges	Beaches and agriculture are major sources of tourism, recreation, employment and revenue. South Carolina beaches suffered severe erosion and the agricultural industry was severely impacted. The extent of agricultural damages is not yet known.
	X		Major impacts to cultural resources	Historic Columbia Canal was impacted by the flood.
	X		Cross-sector coordination	Recovery Support Function National Coordination call requested.

Tourism and Commerce

Erosion from recent storms has resulted in the loss of hundreds of thousands of cubic yards of sand along the state's coast, according to South Carolina Beach Advocates and as evidenced by the Economic assessment provided in this report. However, FEMA regulations prohibit paying disaster funds to replace sand for any federal projects administered by the U.S. Army Corps of Engineers. Consequently, nearly nine miles of coastline that fall within the Grand Strand Storm Damage Reduction Project are not eligible for emergency funding. USACE has funding set aside for flooding and coastal emergencies, but it is unknown if funds will be made available.

Severe erosion and loss of beach depth is a major concern which, if not addressed, could become an economic issue when the 2016 tourist season begins. Horry County officials have been told it will be 14-16 months until beach nourishment will commence.

Recommendation: Activation/No Deployment

Significant and widespread damages to the Columbia Canal, beaches and the agricultural sector will have a negative impact on tourism and agribusiness. The combination of long-term impacts and concerns about existing programmatic capacity warrant continued monitoring to monitor the extent of damage and identify recovery support opportunities.

Special Coordination Considerations

Mitigation

Through the National Disaster Recovery Framework, Mitigation informs risk reduction of communities across Recovery Support Functions (RSFs) so that a community is resilient and able to sustain long-term recovery.

The role of the Mitigation Advisor to the Federal Disaster Recovery Coordinator is to advance the principles in the National Mitigation Framework (Second Edition, July 2015): resilience and sustainability; leadership and locally-focused implementation; engaged partnerships and inclusiveness; and a risk conscious culture. Mitigation works through the Core Capabilities of threats and hazard identification, risk and disaster resilience assessment, planning, operational coordination, public information and warning, community resilience, and long-term vulnerability reduction, to advance those principles. Key mitigation core capabilities support Recovery Support Function core capabilities during federal disaster recovery coordination.

Evidence

Region IV Mitigation staff have maintained situational awareness of disaster impacts in South Carolina since Oct. 1, 2015, including in the Region IV Regional Resource Coordination Center Situational Awareness and Planning Sections, through the Region IV Mitigation Division, liaising with our State Mitigation partners, and later at the Joint Field Office (JFO) FEMA and State Mitigation staff, and through the Dam Task Force, who are FEMA Headquarters and Region IV Dam Safety Engineers, as well as with other State and federal programs.

Interviews were conducted with JFO Mitigation program area leads, Federal Disaster Recovery Coordination (FDRC) liaisons to all Recovery Support Functions, FDRC Unified Federal Review Advisor, State and federal agency representatives. Those interviews indicated that current mitigation challenges related to this event appear to be fairly routine and that those challenges can be primarily addressed by the Federal and State Mitigation Team through their respective Mitigation program functions.

There do appear to be unique challenges and opportunities related to dams, dikes, and coastal resources that were impacted by the severe storms and flooding in South Carolina in October 2015. Such challenges and opportunities could benefit from additional operational coordination and planning.

The State Hazard Mitigation Officer indicated that there are three primary agencies in the State, Emergency Management Division, Department of Health and Environmental Control, and Department of Natural Resources, who currently address various aspects of mitigation of risk and this presents challenges.

The FDRC Unified Federal Review Advisor identified challenges related to coastal resources, permitting in Special Flood Hazard Areas, and related to dams and dikes that would benefit

from coordinated planning.

Based upon an interview with JFO Dam Task Force Leader, and FEMA Headquarters Senior Technical and Policy Advisor, and Program Manager for the National Dam Safety Program, the challenges related to dams could be addressed through existing FEMA programs such as the National Dam Safety Program; Risk Mapping, Assessment, Planning (Risk MAP); and the National Preparedness Technical Assistance Program. These programs are well suited to provide technical assistance to the State and communities related to threats and hazard identification, risk and disaster resilience assessment, enhanced operational coordination, watershed planning, and flood mapping with the goal of flood risk reduction. FEMA Region IV staff is positioned to:

- Act as a liaison between FEMA and federal, State, local, and private partners to identify and assess high risk dams and to work with partners to develop community and Regional preparedness, response, recovery, and mitigation strategies for those risks.
- Coordinate with State and local entities to assure a broad understanding of the need for testing and exercising dam owner Emergency Action Plans and local Emergency Operation Plans.
- Identify risk reduction strategies for the state and help link those strategies to State, local, and tribal Hazard Mitigation Plans.
- Work with the State to identify training needs to improve and sustain capabilities.
- Work with the State to assure that dam risk are adequately addressed in Threat and Hazard Identification and Risk Analysis (THIRA).
- Work across FEMA Directorates and with federal, State, local, and private partners to develop dam risk communication and public awareness strategies.

For this Advance Evaluation Team report, mitigation-specific core capabilities (threats and hazard identification, risk and disaster resilience assessment, community resilience; and long-term vulnerability reduction) were analyzed in context of the Recovery Support Function core capabilities of community planning and capacity building, economics, health and social services, housing, infrastructure, and natural and cultural resources. This analysis was used to identify gaps or issues that may warrant Federal Disaster Recovery Coordination. The table below reflects key findings from that analysis. Since the common core capabilities of Planning, Public Information and Warning, and Operational Coordination are common to both Mitigation and Recovery Support Function Core Capabilities, they were omitted; however, these core capabilities are essential to successful community-based risk reduction.

Key Findings

	Threats and Hazard Identification	Risk & Disaster Resilience Assessment	Community Resilience	Long-term Vulnerability Reduction
Community Planning & Capacity Building	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination

Economics	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination
Health & Social Services	No long-term gaps identified/likely to benefit from planning and coordination	No long-term gaps identified/likely to benefit from planning and coordination	No long-term gaps identified/likely to benefit from planning and coordination	No long-term gaps identified/likely to benefit from planning and coordination
Housing	VOLAGs have a Long-term Housing Task Force/likely to benefit from planning and coordination	VOLAGs have a Long-term Housing Task Force/likely to benefit from planning and coordination	VOLAGs have a Long-term Housing Task Force/likely to benefit from planning and coordination	VOLAGs have a Long-term Housing Task Force/likely to benefit from planning and coordination
Infrastructure	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination
Natural and Cultural Resources	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination	Likely to benefit from planning and coordination

Analysis

Issues and Gaps

There appear to be numerous complexities and opportunities in mitigating risk and enhancing resilience in the watersheds of dams, dikes, as well as coastal resources impacted by the severe storms and flooding in South Carolina. Primary challenges to mitigation of risk related to dams, dikes, and coastal resources include private ownership and jurisdiction, funding resources and eligibility, identification of and effective coordination and collaboration of new and existing planning and coordinating structures, safety and access, housing, economics, community planning and capacity building, public utility restoration, environmental compliance, economic impacts, and agricultural impacts.

These challenges cut across several emergency management, natural and cultural resource, and economic agencies, mission and program areas, and recovery support functions, which in itself, may indicate a need for strategic coordination.

There are currently multiple agencies, planning teams, and programs involved in assessment and planning related to dams, dikes, and coastal resources, including a JFO Dam Task Force, JFO Interagency Dam Advisory Group, U.S. Army Corps of Engineers Dam Inspection Task Force, Natural Resource Conservation Service, State agencies, and universities. There appears to be no gap in knowledge, rather a gap in coordination of this knowledge.

The State may wish to further assess whether the several challenges related to dams, dikes, and coastal resources may be an impediment to the State's disaster recovery coordination and mitigation core capabilities (operational coordination, planning, community resilience, threats and hazard identification, public information and warning, risk and disaster resilience assessment, and long-term vulnerability reduction).

Further, the State may want to determine if their mitigation and recovery actions would benefit from enhanced federal, state, regional, community, private sector, and organizational coordination to help resolve potential impediments to long-term vulnerability reduction, to identify resources, and to conduct effective and comprehensive locally-driven planning. There may be existing regional planning structures that could coordinate planning efforts.

Recommendation:

- Planning should be locally-driven, but inclusive, and could be through existing regional or local planning agencies or organizations. Such planning structures should include local emergency managers, hazard mitigation officers, and floodplain managers, as well as all stakeholders.
- A State Task Force on resilience with focus on dams, dikes, and coastal resources could be created to inform comprehensively locally-driven watershed planning. Such a Task Force should include the State Emergency Management Division, State Department of Natural Resources, State Department of Health and Environmental Control, State Hazard Mitigation Officer, State National Floodplain Manager, as well as stakeholders as determined by the local communities or regional planning structures.
- A separate Federal and/or State Advisory Group, could be established to advise and inform such a comprehensive locally-driven watershed and land use planning task force. The advisory group, during State recovery, could provide technical assistance related to resilience and long-term vulnerability reduction of dams, dikes, and coastal resources (and any other recovery land use challenges). Such an advisory group could be established as part of the federal/State disaster recovery coordination or operate independently.

Tribal Considerations

The Catawba Nation is the only federally recognized tribe in the state of South Carolina. The Catawba Nation is located in York County, South Carolina. York County was not designated for Individual or Public Assistance for DR-4241. The Catawba Nation did not request Preliminary Damage Assessments nor did it request disaster declaration as a sovereign nation.

During the historic flooding of October, 2015, damage to the area was minimal. The Catawba Nation reported little damage and was able to respond with tribal and local resources. There have been no unmet needs identified as a result of the flooding nor have there been gaps identified in services that can be met by enhanced Federal Coordination through the NDRF.

Unified Federal Review

The UFR process was established in July, 2014 to enhance the ability of federal agencies to expedite EHP reviews associated with disaster recovery projects. Through the UFR process, federal agencies that fund or permit disaster recovery projects and those that perform associated EHP reviews will coordinate their independent reviews to expedite decision-making, more efficiently deliver assistance and accelerate implementation of recovery projects.

The Environmental Planning and Historic Preservation (EHP) compliance issues presented by DR-4241-SC are significant. The UFR Advisor recommends continued activation of position as per EHP doctrine to continue multi-agency coordination efforts until such time when mission objectives would be best met through transition to Region IV EHP.

Evidence

Based on the current scope of the disaster, primary areas of EHP alignment span the following subjects: 1) roads and bridges, 2) USACE Clean Water Act permitting, 3) beach and coastal reconstruction, and 4) debris. Additional areas of follow up include vector control as well as other federal agency coordination for those providing disaster recovery assistance.

Inter-agency coordination may cover multiple permitting and consultation processes and could benefit from framework development and programmatic approaches. Various state and federal agencies have been briefed on potential UFR coordination and have assessed the advantages of aligning EHP approaches. Currently, guidelines have been implemented for tracking USACE CWA 404 permit EHP compliance and FEMA EHP project reviews. Furthermore, a framework is in development to leverage S.C. Dept. of Transportation (SCDOT) EHP review processes in place with FHWA to synchronize with FEMA EHP review processes.

Issues

Continued UFR coordination could greatly benefit the South Carolina recovery mission in the short and long term. This position could be supported from a deployed or regional-based UFR Advisor who is capable of further developing UFR efforts in DR-4241-SC as well as implementing these efforts in steady state operations across Region IV states. The work may also be supported through currently deployed staff within the EHP section who are subject matter experts.

Analysis of existing EHP programmatic agreements, coordination frameworks and guidelines has begun among a number of agencies involved in disaster recovery. Examples of programmatic approaches to consulting and permitting needs include FEMA's South Carolina Historic Preservation Programmatic Agreement as well as agreements, guidelines, and frameworks developed in conjunction with USACE, SCDOT, FHWA, SC SHPO, SC DHEC, USFWS and NMFS. It has been determined that synchronizing existing EHP processes as well as developing new approaches could benefit the EHP review process across these agencies assisting in expediting EHP compliance reviews to support recovery funding.

Analysis

Preliminary Damage Assessments (PDAs) have indicated that roads and bridges will be the largest single category of Public Assistance work. Almost \$40 million in damage (over 40 percent) was identified as eligible by FEMA PDA's. SC DOT has indicated that they anticipate the majority of their projects will be returned to pre-disaster conditions with some requirements with upgrading to new codes and standards.

Opportunities for UFR Coordination have been identified with partners including SC DNR, SC DOT, SC DHEC, SC SHPO, USDOT, FHWA, NMFS, and USFWS. Activities that have been identified as desired by all partner agencies include aligning environmental planning and historic preservation (EHP) compliance reviews through the development of a framework for workflow process. This framework would serve to utilize existing executed agreements and leverage liaison expertise in order to expedite compliance reviews for all involved agencies. Sharing geospatial data will enable agencies to utilize similar review materials and decrease redundant consultations. Proposed datasets include geographic locations of projects, project review documentation, and sources of EHP data such as species, cultural resources and floodplain extents.

Local and state applicants may be required to comply with Clean Water Act permit requirements for disaster-related projects. This could potentially lead to redundant EHP reviews between federal agencies. FEMA and USACE have identified areas for coordination in the EHP compliance process in conjunction with USACE's nationwide permit, general permit and individual permit. This includes implementing a data sharing strategy for project locations on current and completed USACE EHP reviews. Geospatial data sharing coordination will be completed across all USACE service areas including Charleston, Columbia, and Conway. This coordination may assist in expediting EHP reviews involving beach/coastal reconstruction, bridge/culvert repairs, upgrades, and replacements, and other project types. Sharing geospatial data will enable agencies to utilize similar review materials and decrease redundant consultations. Proposed datasets include geographic locations of projects, project review documentation, and sources of EHP data such as species, cultural resources and floodplain extents.

Preliminary Damage Assessments have indicated a potential for beach and coastal reconstruction projects. FEMA anticipates the majority of PA projects will be returned to pre-disaster conditions with some opportunities for mitigation, however the scope of work for these projects has not been identified. Opportunities for UFR Coordination have been identified with partners including SC DNR, SC EMD, SC SHPO, FHWA, USACE, NRCS, NMFS, and USFWS. Partnering on overall EHP reviews and developing a framework to utilize existing consultation and permitting processes developed by our partner agencies (including FHWA and USACE) will expedite compliance reviews for all involved agencies. Additional consultation requirements to support reviews of Magnuson-Stevens Fisheries Conservation and Management Act (MSA), Endangered Species Act (ESA), Coastal Barrier Resources Act (CBRA) and Coastal Zone Management Act (CZMA) will require coordination with multiple NMFS offices which have shown interest in achieving a multi-agency programmatic approach. Potential activities for

coordination among partner agencies include reviewing and assessing previously completed USACE reviews, identifying opportunities for coordinating intra-agency review processes, and developing new programmatic approaches for EHP review. Sharing geospatial data will enable agencies to utilize similar review materials and decrease redundant consultations. Proposed datasets include geographic locations of projects, project review documentation, sources of EHP species data, and extents of regulatory zones.

Preliminary Damage Assessments have indicated that debris removal is estimated at 1.5 percent of Public Assistance work representing up to \$1.5 million in damage. It has been identified that the majority of this debris is white goods and undergoing direct disposal to appropriately permitted landfills. A small percentage of vegetative debris has been staged at temporary debris staging and reduction sites. In DR-4166-SC, it was identified that multiple agencies would benefit from a pre-consultation EHP review process with identified responsibilities between agencies.

Opportunities for UFR Coordination have been identified with partners including SC DNR, SC EMD, SC DHEC, SC SHPO, SC DOT, FHWA, USACE, NRCS, NMFS, and USFWS. Coordinating the development and maintenance of a geospatial repository of proposed Temporary Debris Staging and Reduction (TDSR) sites would facilitate pre-approval of EHP compliant sites with appropriate review documentation stored and available to collaborating agencies. Activities that have been identified as desired by all partner agencies include development of a formal Memorandum of Understanding (MOU) outlining the following roles and responsibilities:

- Pre-identification and documentation of pre-reviewed TDSR sites
- Development of a cooperative protocol for pre-review of immediate need TDSR sites, and
- Coordination of data sharing for project locations and compliance review datasets.

The development of an MOU has been discussed with SCEMD, SC SHPO, SC DOT, and FHWA who are in agreement that a process would greatly benefit the State of South Carolina for future debris missions.

Additional UFR Coordination opportunities for alignment of EHP compliance review which require further analysis include:

1. NRCS' Emergency Watershed Operations funding
2. EPA's disaster funding for wastewater treatment plants and other water infrastructure
3. USDA's Rural Development Emergency Community Water Assistance Grants
4. HUD's Community Development Block Grant
5. Vector Control MOU.

Evaluation of Post-disaster Impacts

Yes	Evaluation Needed	No	Sector Criteria	Analysis or Input
	x		Multiple federal agencies likely taking action in the same location	Yes, agencies such as USACE may have an undertaking in the same location as a FEMA-funded project in the case of a mission assignment.
x			Federal agencies likely performing joint environmental reviews	Yes, agencies identified for joint reviews include USACE, NMFS, SC SHPO, SC DOT, SC DHEC, and USFWS.
	x		Sub-applicants likely to request a large number of Alternate Projects or Alternative Procedures for Public Assistance projects that could combine federal funding from other federal agencies	Additional information needed, such as developed PA Project Worksheets
		x	FEMA Programmatic Agreement for Sec. 106 of NHPA needs development	No, the South Carolina Historic Preservation Programmatic Agreement was executed on October 16, 2014 and remains in-effect for 7 years.
x			Other Federal agencies likely to sign on to FEMA Programmatic Agreement for Sec 106 of NHPA	Yes, FHWA and SC DOT have expressed interest in adopting the SC Programmatic Agreement. Other agencies which could adopt the SC Programmatic Agreement include NRCS, USACE, and others.
	x		Federal funding is being combined through cost-sharing	Additional information needed, such as whether other federal agencies receive supplemental appropriations
		x	The sheer number of disaster recovery projects which could present coordination challenges	Unlikely, the number of projects itself does not present coordination challenges.
		x	Multiple environmental and historic preservation resources will be impacted during disaster recovery	It is anticipated that a majority of the projects will be return to pre-disaster condition.
		x	Disaster recovery will be taking place on lands managed by federal agencies or federally-recognized tribes, etc.	Initial information does not indicate that federal land management agencies or federally-recognized tribes will need to undertake significant disaster recovery activities.

Recommendations

These UFR Coordination responsibilities could be accomplished by a UFR Advisor, or EHP subject matter experts. These ongoing objectives have been identified and supported by Region IV EHP Leadership and will meet the continuing mission objectives of Regional EHP Staff.

The UFR Advisor recommends continued activation of position as per EHP doctrine to continue multi-agency coordination efforts until such time when mission objectives would be best met through transition to Region IV EHP.

Appendices

Appendix A. Declared Counties within South Carolina

County	Individual Assistance	Public Assistance Cat A & B	Public Assistance Cat C-G
Abbeville		X	X
Aiken		X	X
Allendale		X	X
Anderson		X	X
Bamberg	X	X	X
Beaufort		X	X
Berkeley	X	X	X
Calhoun	X	X	X
Charleston	X	X	X
Chesterfield		X	X
Clarendon	X	X	X
Colleton	X	X	X
Darlington	X	X	X
Dillon		X	X
Dorchester	X	X	X
Fairfield	X	X	X
Florence	X	X	X
Georgetown	X	X	X
Greenville	X		
Greenwood	X	X	X
Horry	X	X	X
Kershaw	X	X	X
Lancaster		X	X
Laurens		X	X
Lee	X	X	X
Lexington	X	X	X
Marion	X	X	X
Marlboro		X	X
McCormick		X	X
Newberry	X	X	X
Orangeburg	X	X	X
Richland	X	X	X
Saluda		X	X
Spartanburg	X	X	X
Sumter	X	X	X
Williamsburg	X	X	X
Total	24	35	35

Appendix B:

Advance Evaluation Team Contributing Sources

Advance Evaluation Team Report: Contributing Sources	
STATE AGENCIES	NATIONAL AGENCIES
South Carolina Emergency Management Div.	U.S. Army Corps of Engineers (USACE)
South Carolina Dept. of Health & Human Services	U.S. Housing & Urban Development
State Historic Preservation Office of South Carolina	U.S. Dept. of Agriculture / Farm Service Agency
South Carolina Dept. of Health & Environmental Control	U.S. Dept. of Health & Human Services
S.C. Dept. of Agriculture	U.S. Environmental Protection Agency
S.C. Dept. of Natural Resources	U.S. Economic Development Administration
The Governor's South Atlantic Alliance	Nat'l Oceanographic and Atmospheric Admin.
S. C. Council of Governments	U.S. Small Business Administration
SC Housing Finance Authority	U.S. Fish & Wildlife Service
S.C. Manufactured Housing Board	National Oceanic and Atmospheric Admin., National Marine Fisheries Service
S.C. Dept. of Transportation	Environmental Protection Agency
S.C. Division / Federal Highway Admin.	U.S. Department of Transportation, Federal Highways Administration
S.C. Sea Grant Consortium	National Resources Conservation Service
S.C. Department of Parks, Recreation, and Tourism	
S.C. State Recovery Programs Manager	
INTERNAL SOURCES	
Hazard Mitigation (FEMA)	Planning Section (FEMA)
Operations Section (FEMA)	Dam Task Force (FEMA)
EHP (FEMA)	FDRC Unified Review Advisor (FEMA)_
RSF FDRC Liaisons (FEMA)	Disaster Survivor Assistance (FEMA)
Environmental Planning and Historic Preservation (FEMA)	External Affairs (FEMA)
Mitigation Branch/JFO/State & Program Leads (FEMA)	Disaster Housing Assessment Team
Individual & Public Assistance (FEMA)	Voluntary Agency Liaison (FEMA)

Appendix C

Methodology

Advance Evaluation Team members targeted the 13 counties and 28 communities identified on the left for priority assessment using quantitative, qualitative, and subjective criteria. In short,

Counties	Cities
Berkeley	Ladson
	Monck's Corner
Charleston	Charleston
	North Charleston
Clarendon	Manning
Dorchester	St. George
	Summerville
Florence	Johnsonville
	Effingham
	Coward
	Lake City
Georgetown	Florence
	Andrews
	Georgetown
Greenwood	Greenwood
	Little River
Horry	Conway
	Myrtle Beach
	Bishopville
Orangeburg	Orangeburg
Richland	Columbia
	Eastover
	Hopkins
Sumter	Mayesville
	Sumter
Williamsburg	Greelyville
	Hemingway
	Kingstree

the counties listed ranked higher in percentage or ratio of FEMA verified/inspected damages to total number of housing units, and/or had indicators of diminished capacity to recover.

Data from all declared localities were included; however, the short (12-day) timeframe allowed to accomplish the AET report and limited staff (8 field staff) necessitated triaging counties to maximize the utility of site inspections and interviews with local officials.

Quantitative data was derived from FIDA (FEMA Information Data Analysis) reports that captured amounts of FEMA Verified Loss (FVL), Individual Assistance Maximum Grant Awards, and flood height damage in inspected housing units. Additional quantitative data was gleaned from the Centers for Disease Control Social Vulnerability Indices (SVI) that analyzed factors such as poverty levels, unemployment, mean income, health status, etc. See Appendix D.

Qualitative data included a quick survey of county and city programs and staffing. For example: budget, number and type of functional departments, building codes enforcement, current or expired hazard mitigation plan, NFIP participation, etc. These elements were used as proxies to get a sense of potential recovery management capacity.

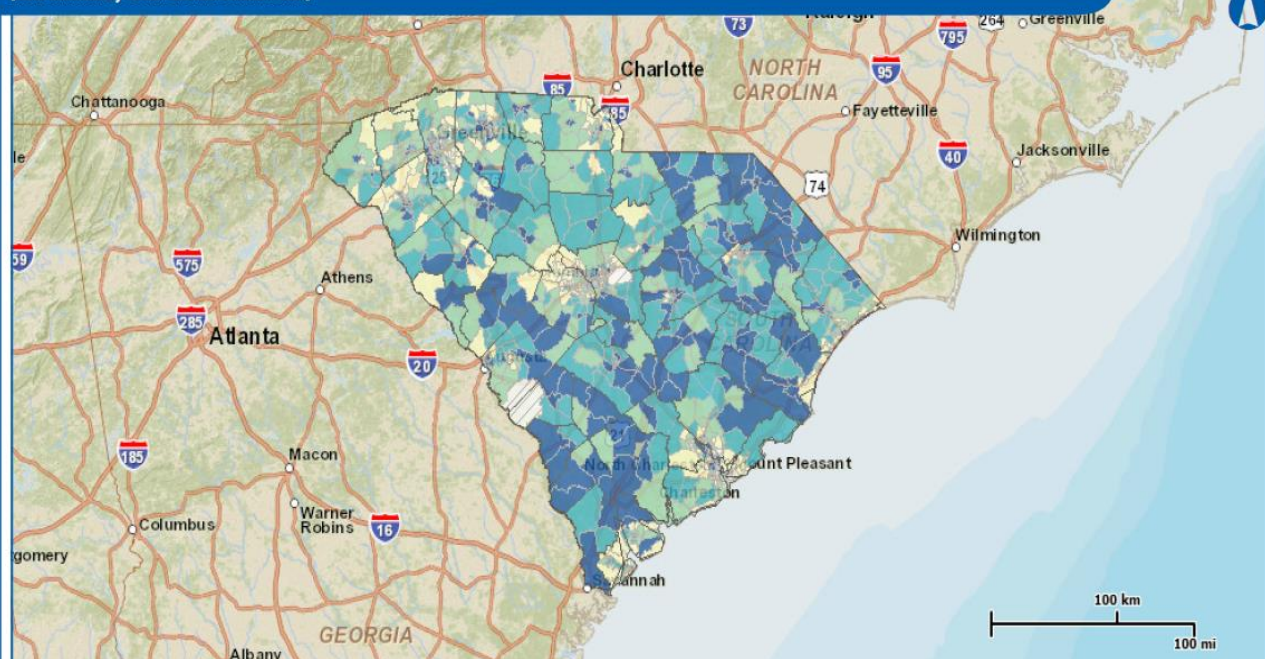
Finally, subjective elements were considered; media reports, interviews with FEMA Branch Disaster Survivor Assistance and VOAD/VAL staff, which provided anecdotal evidence related to damages and areas of concern.

Appendix D

Social Vulnerability Index for South Carolina

Social Vulnerability Index (SVI) 2010

Overall Vulnerability | South Carolina
(Data Classified by South Carolina Census Tracts)



Social vulnerability refers to the human factors within a community that negatively affect its ability to manage circumstances harmful to health. Communities must prepare for and respond to hazardous events such as environmental disasters, chemical exposures, and disease outbreaks. Preparing for these events prevents or decreases both human suffering and financial loss. The Social Vulnerability Index (SVI)¹ compares and ranks every community in the U.S. at the Census tract level, on many social factors. These factors, including poverty, lack of car access, and crowded housing, are further grouped into four related themes. Each community receives a separate ranking for each of the four, as well as an overall ranking. **To learn more** please visit [Summary of Social Vulnerability Papers by Geographic Scale](#).

Highest (Top 4th) Vulnerability (SVI 2010) Lowest (Bottom 4th) Zero population census tracts

Data sources: ATSDR GRASP. Projection: WGS 1984 Web Mercator (Auxiliary Sphere).
Reference: Flanagan, B.E., et al., A Social Vulnerability Index for Disaster Management. Journal of Homeland Security and Emergency Management, 2011. 8(1).
Print Date: 11/2/2015.

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

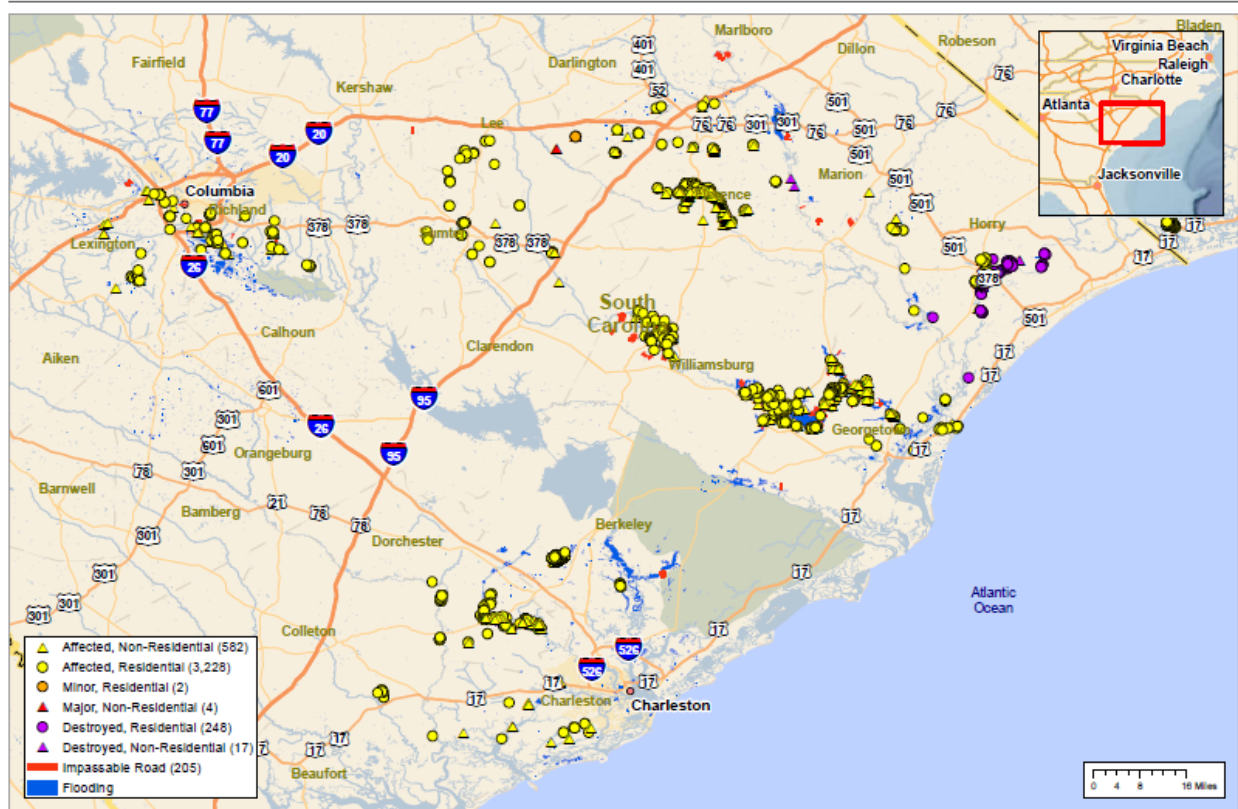


Appendix E

South Carolina Severe Storms and Flooding Final Assessment



South Carolina Severe Storms and Flooding: The Official Final Flooding Assessment October 16, 2015
Columbia, Florence, Charleston



Vector: ©NSIP 2015, ©NAVTEQ 2014

This domestic imagery was collected IAW a valid Proper Use Memorandum approved by NGA, and is not directed at U.S. persons

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