

APPENDIX 19
(SOUTH CAROLINA FLOOD RESPONSE PLAN)
TO THE SOUTH CAROLINA EMERGENCY OPERATIONS PLAN

I. INTRODUCTION

- A. As required by state and federal law, South Carolina’s policy is to be prepared for any emergency or disaster, including flooding events.
- B. South Carolina State Regulations 58-1 and 58-101 require contingency plans and implementing procedures for major hazards, such as tropical cyclone and rainfall induced flooding, coordinated by the State with counties that have the potential of being impacted.

II. PURPOSE

- A. Prevent or minimize injury to people and damage to property and the environment resulting from a flood.
- B. Identify roles and responsibilities of local, state, and federal agencies when preparing for and responding to a flood event caused by heavy rainfall or dam failure.
- C. Plan and coordinate state and local resources for flood response.
- D. Identify unique requirements to support preparedness, mitigation, and response actions with local, interagency and private sector partners.

III. SCOPE

- A. The South Carolina Flood Response Plan addresses operations to be conducted in coordination and mutual support with the South Carolina Emergency Operations Plan (SCEOP).
- B. This plan complements the SCEOP and addresses responsibilities, processes, and actions specific to flooding events.
- C. This plan defines the threat, terminology, and the utilization of planning scenarios as a basis for flood preparedness and planning.
- D. River basin attachments are under development and will include information related to basin specific flood inundation mapping, critical infrastructure, vulnerable areas, at-risk populations, and available resources.

IV. FACTS AND ASSUMPTIONS

A. Facts:

1. The state is vulnerable to flooding due to both tropical cyclones and non-tropical rainfall events.
2. Major flooding may be a regional/interstate event.
3. There are ongoing flood mitigation projects throughout the state (See the South Carolina State Hazard Mitigation Plan for further information about flood mitigation).
4. Search and rescue missions will occur during incident response and initial recovery.
5. Critical infrastructure will be flooded or damaged from water or flood carried debris, resulting in a loss of services across the lifelines sectors.

B. Assumptions:

1. Mutual aid compacts and agreements will enable assistance in the areas of personnel, equipment, and logistics.
2. Environmental health conditions will be negatively affected.
3. Large numbers of people will require temporary shelter.
4. Large numbers of people will require long-term housing assistance.
5. Federal assistance may be available pre-flood in the form of mitigation grants.
6. Federal resources may not be available to provide significant lifesaving or life-sustaining capabilities until after the event.
7. Evacuations may occur in the event of a forecasted flood.

V. SITUATION

- A. The entire state is vulnerable to the effects of flooding.
- B. Flooding may be a result of a tropical cyclone, a prolonged heavy rainfall, short term heavy rainfall (flash flooding), or a dam failure.

C. Types of Flood Events:

1. 100-year flood – a magnitude of flood that has a 1% chance of happening in any given year.
2. 500-year flood – a magnitude of flood that has a 0.2% chance of happening in any given year.
3. Flash Flood – Flooding that begins within 6 hours of heavy rainfall. Urban areas are especially susceptible.
4. Dam Failure – see Appendix IV in the SCEOP.

D. The timing and extent of flooding will vary across the river basins.

E. River Basins

1. The state has 8 surface –water basins that contain a number of tributaries drawn along hydrological lines: the Broad, Catawba, Edisto, Pee Dee, Salkehatchie, Saluda, Santee, and Savannah (Figure 1). These river basins are further divided into regional watersheds.



2. The Savannah, Saluda, Broad, Catawba and Pee Dee basin headwaters are in North Carolina.
3. Many river basins contain man-made reservoirs that support hydroelectric production and are used to manage flow.

F. Historical Impacts:

1. South Carolina has experienced numerous flood events. The most significant recent event was the October 2015 flood. Some portions of the state recorded more than 20 inches of rainfall over the period of 1-5 October. The heavy rainfall resulted in widespread flash flooding as well as significant riverine flooding. 20 locations exceeded established flood stages. 36 state regulated dams failed. There were more than 1,500 water rescues and approximately 410 road and bridge closures. 19 fatalities were attributed to the flood event.
2. Two recent hurricanes caused severe flooding in the state. Hurricane Matthew made landfall near McClellanville as a Category 1 Hurricane on October 8, 2016. Portions of the state received significant rainfall, with up to 17 inches in some areas of northeast and southern South Carolina. . , The result was widespread flash flooding and an extended period of river flooding, especially in the Pee Dee region. The widespread heavy rain in the Pee Dee River Basin of South Carolina caused several rivers to reach major flood stage. This included the Little Pee Dee, Lumber, and Waccamaw Rivers. Approximately \$122,000,000 in public assistance damages were reported. 4 fatalities were attributed to the hurricane.
3. Hurricane Florence was a slow- moving Category 1 hurricane when it made landfall near Wrightsville Beach, NC on September 14, 2018. The northeastern portion of South Carolina experienced 2 days of heavy rainfall. A station in Loris recorded 23.63 inches of rain, setting a new state tropical cyclone rainfall record. Georgetown, Horry, Marlboro, Dillon, Marion, and Chesterfield counties all received rainfall in excess of 15 inches. In addition to the rain in South Carolina, portions of southeastern North Carolina received up to 35 inches of rain.. This resulted in extensive river flooding throughout the Pee Dee River Basin where the Little Pee Dee, Lumber, and Waccamaw Rivers all reached record levels, with the Waccamaw River at Conway rising nearly 4 feet higher than it did during Hurricane Matthew. The Waccamaw crested at 22.1 feet at Conway. Approximately \$322,000,000 in public assistance damages was reported. 9 fatalities were attributed to the hurricane.

VI. CONCEPT OF OPERATIONS

- A. SCEMD is the coordinating agency during flood events.
- B. Plan Activation:
 - 1. State agencies or the SEOC may conduct some level of response operations at any OPCON level but responses requiring ESF-level coordination typically occurs at OPCON 2 (partial activation).
 - 2. A move to OPCON 1 (full activation) is normally accompanied by a Governor’s State of Emergency and activation of the South Carolina Emergency Operations Plan (SCEOP), along with this appendix.
 - 3. For additional information see the SCEOP, Section VII, Concept of Operations for All-Hazards.
 - 4. Most flood response activities occur locally. The trigger for SCEOP activation varies by the type of flood:
 - a. Heavy Rainfall – SCEMD will use precipitation forecasts from the Weather Prediction Center (WPC) and local National Weather Service Offices. If it is determined that the projected rainfall amounts are high enough to have significant impacts, the SEOC may be activated.
 - b. Flash Flood –SEOC activation is unlikely in the event of a limited duration or localized flash flood. SCEMD may consider moving to OPCON 2 to monitor the situation and consider moving to OPCON 1 if state assistance is required to meet local needs such as search and rescue, mass care, and infrastructure repair.
 - i. A prolonged heavy rainfall event or flash flood scenario can result in a dam failure. If SCEMD is notified of a potential or imminent failure at a Federal Energy Regulatory Commission (FERC) dam, all key stakeholders will be informed as per the call-down list for the particular dam in question and if the situation dictates, the SEOC will be activated. See Appendix 4- SC Dam Emergency Response Plan for the full response plan for a dam break scenario (including a non-rainfall induced dam break).
 - c. River Flooding – Depending on the severity of the event, SCEMD may consider moving to OPCON 2 to monitor the situation at a heightened level of readiness and consider increasing readiness to OPCON 1 if state assistance is required to meet local requirements that include needs such as, but not limited to, search and rescue, mass care, and infrastructure repair.

C. Isolated Communities

1. Floods have the potential to isolate impacted communities. Damage and standing water may make movement of resources difficult, resulting in the need to target specific areas with a significant response effort.
2. The JDIAC will develop contingency plans and informational products, as needed, for any identified isolated communities using GIS based estimates of resource needs (See Attachment E to the SCEOP).

D. Disaster Intelligence and Assessment

1. SCEMD is the coordinating agency for organizing, integrating and conducting disaster intelligence assessments enabled by federal agencies, state agencies and stakeholders.
2. The JDIAC will focus on impacts to the population, critical infrastructure and lifeline sectors when developing flood related disaster intelligence products.
3. For additional information see Section VII (Disaster Intelligence and Communications) and Attachment E of the SCEOP.

E. Coordinated Rescues

1. If a water rescue is necessary, the ESF 4/9 lead will coordinate the appropriate resource with SERT leads, SC Helicopter Aquatic Rescue Team (HART), SC Department of Natural Resources SCDNR, Civil Air Patrol (CAP), and South Carolina State Guard (SCSG).
2. While activated, the Search and Rescue Planning Cell (SARCELL) meets as needed to coordinate response between all federal, state, and local entities.
3. If a request for assistance is received, the request is routed to the Emergency Response Task Force, SCDNR and SCNG for the most appropriate resource to respond.

VII. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

- A. See Section IX (Organization and Assignment of Responsibilities) of the SCEOP for the general roles and responsibilities to all hazards, for State and Federal agencies in preparation, response, and recovery from disaster impacting the State.

- B. Roles and responsibilities in this plan are specific to flood hazards.
- C. Emergency Support Functions. Coordinating agencies will conduct biennial reviews of their ESF specific functions with primary and supporting agencies to address flood response operations.
 - 1. ESF-1 (Transportation)
 - a. Develop concepts and processes to address the movement of emergency supplies and personnel to and from isolated areas.
 - b. Coordinate and compile damage assessments and estimated clearance times of roads and bridges for use by emergency and supply vehicles, to include load limitations. Priorities for ground transportation lifeline routes are:
 - i. Access to Critical Facilities
 - ii. Interstate Highways
 - iii. US Highways
 - iv. County/ Secondary Roads
 - c. Coordinate with USACE and SCNG to deploy flood mitigation devices.
 - d. Support flood analysis in conjunction with JDIAC Hydrology Team consisting of DNR, USGS, NWS Hydrologists, Southeast River Forecast Center, and NOAA Office of Water Prediction.
 - 2. ESF-2 (Communications)
 - a. Assist in the identification of key facilities in river basin floodplains that may be at risk in a flood event.
 - b. In conjunction with stakeholders, identify mitigation actions to sustain communications if facilities are compromised by flood waters.
 - c. Provide mitigation and damage assessment of communications infrastructure.
 - 3. ESF-3 (Public Works and Engineering)

- a. Coordinate with USACE to provide augmented engineering support and flood fight subject matter experts to advise on protective actions.
 - b. Lead coordination for the distribution of sandbags and specialized flood fight equipment from the USACE to assist in the protection of critical infrastructure.
 - c. Participate in USACE Hydrology Coordination Calls to synchronize modeling and assessments information.
 - d. Coordinate with DHEC to provide technical support for water and wastewater facilities and dams as required.
 - e. Coordinate the identification of alternative water sources in areas where drinking water and infrastructure are impacted.
4. ESF 4/9 (Firefighting/Search and Rescue)
- a. Coordinate activation of the South Carolina Emergency Response Task Force (SCERTF) Incident Support Team (IST) for potential deployment to affected areas for all-hazard assessment, response, and incident support as required.
 - b. Request Swift Water Assets through the SC Firefighter Mobilization process and stage at the State Fire Academy or designated pre-staging locations until assessment and resource requirements are determined. Coordinate deployment of assets as required.
 - c. Coordinate with SCDNR and other partners on availability of water rescue assets.
 - d. In coordination with SCEMD Logistics, request the deployment of additional Swift Water Rescue and Search and Rescue capabilities through EMAC as required.
 - e. Integrate federal search and rescue (SAR) assets into the operational response schemes.
 - f. Coordinate the hand-off of survivors at areas of refuge or collection points designated and coordinated by ESF-6 local authorities for the onward movement of evacuees and survivors.
 - g. Provide communications, heavy equipment, and personnel to support firefighting and SAR efforts as requested.

- h. Coordinate with ESF-1, Air Branch, for HART and other SAR rotary and fixed wing platforms to support SAR.
- 5. ESF-6 (Mass Care)
 - a. In coordination with the JDIAC, SCEMD Operations Support and local jurisdictions, determine the support needed for mass feeding operations and points of distribution (PODs).
 - b. Work with counties to identify suitable shelters to support flood response operations and to support evacuees from flooded areas. Shelter identification should be outside the 500year floodplain.
 - c. Open, manage, and operate medical needs shelters as required.
 - d. Assist with reunification efforts as needed.
- 6. ESF-8 (Health and Medical Services)
 - a. Identify licensed health care facilities in impacted area(s) and assist with evacuation.
 - i. Coordinate medical transport assets to support health care facilities as needed.
 - ii. Maintain situational awareness of patient census before, during and after facility evacuation.
 - iii. Conduct facility damage assessment inspections as needed.
- 7. ESF-10 (Environmental and Hazardous Materials Operations)
 - a. Coordinate response action for spills and releases of oil and hazardous substances as required.
 - b. Communicate with state regulated dam owners about lowering water levels as required.
 - c. Monitor status of state regulated dams.
 - d. Assist ESF-3 with flood fight operations as required.
- 8. ESF-12 (Energy)
 - a. Provide damage assessments of at-risk electric generating facilities

- within the river basin floodplains.
- b. Coordinate with utilities for mitigation and protection actions to reduce impact of flooding on facilities.
 - c. Coordinate with utilities on reservoir storage and release to assist in managing flood impacts.
9. ESF-13 (Law Enforcement)
- a. Develop plans to assist local law enforcement authorities with security in the inundation area.
 - b. In conjunction with ESF-16, develop plans to clear the upstream areas and downstream waterways affected by flooding.
 - c. Provide DNR staff to support the JDIAC Hydrology Team in the SEOC.
10. ESF-16 (Emergency Traffic Management)
- a. In conjunction with county law enforcement authorities, develop and coordinate traffic management plans to assist with possible evacuation of impacted areas.
 - b. Provide reports of flooded roads or bridges to the SEOC and Executive Group.
11. ESF-17 (Agriculture & Animals)
- a. Coordinate potential resources for technical assistance for aquatic rescue of livestock, equines and other animals as required.
 - b. Mitigate risks to critical infrastructure related to agribusiness, food and public health by coordinating messaging and resources.
 - c. Coordinate resources to support response activities for impacted critical infrastructure to minimize effects on the economy and public health related to food and agriculture, support critical supply chains.
 - d. Coordinate response to and reporting for contamination of the SC food supply from flood waters. Embargo impacted food as needed.
 - e. Coordinate and report damage assessments of agribusiness and animal business.

12. ESF-19 (Military Support)

- a. Coordinate with ESF-1 to support route clearance and debris push operations.
- b. Augment local security efforts to include search and rescue and wellness checks.
- c. Support sandbag/flood mitigation efforts.
- d. Support HART requests as needed.
- e. Coordinate air asset needs through EMAC as needed.

13. ESF-24 (Business and Industry)

- a. Provide the latest disaster information to the SC business community, so they can make informed decisions regarding their businesses and potential impacts.
- b. Assess business impacts in impacted communities as a result of flooding.
- c. Coordinate with National Business Emergency Operations Center (NBEOC) and other business supporting entities for resources as required to support flood fight operations.

D. SCDNR Flood Mitigation Program

- 1. Coordinate the execution of flood models and produce inundation boundaries to assist response operations in partnership with the JDIAC, as funding is available.
- 2. Support assessment of flood impacts for other agencies and partners by providing flood inundation boundaries, when funded.
- 3. Participate and coordinate with partner agencies in the sharing of information and data to support response and recovery operations.

VIII. RIVER BASIN ASSESSMENTS (currently under development)

IX. CONTINUITY OF GOVERNMENT (COG)

See section VII, paragraph L (Continuity of Government) in the SCEOP.

X. CONTINUITY OF OPERATIONS (COOP)

See Section VII, paragraph M (Continuity of Operations) in the SCEOP.

XI. PLAN DEVELOPMENT AND MAINTENANCE

SCEMD and designated stakeholders and partners identified in this plan will review this Appendix on a biennial basis and update/revise as necessary once the full plan is complete.

XII. ADMINISTRATION, LOGISTICS, AND FINANCE

See Section VIII (Administration, Logistics, and Finance) in the SCEOP.

XIII. AUTHORITIES AND REFERENCES

See attachment C (Authorities and References) in the SCEOP.

XIV. ACRONYMS AND GLOSSARY

See attachment B (Acronyms and Glossary) in the SCEOP.