

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 warning and evacuating South Carolina citizens and visitors.
- 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 assess the interconnection of geography, watersheds, and people, highlighting risk and vulnerabilities.

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 is a regional/interstate event.
3. Evacuations will occur in the event of a forecasted flood.
4. Flash flooding may prevent the timely execution of local evacuations.
5. There are ongoing flood mitigation projects throughout the state (See the South Carolina State Hazard Mitigation Plan for further information about flood mitigation).
6. Search and rescue missions will occur during incident response and initial recovery.
7. 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, state-to-state, county-to-county, and municipality-to-municipality.
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.
6. Federal resources will not be available to provide significant lifesaving or life-sustaining capabilities until after the event.

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 extensiveness 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.



Figure 1

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

F. Historical Impacts:

1. South Carolina has experienced several widespread flooding events and many local flooding events. The most significant recent event was the October 2015 historic flood event. Some portions of the state recorded more than 20 inches of rainfall over the period of 1-5 October. The heavy rainfall resulted in moderate to major 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 reported.
2. Several recent hurricanes caused severe flooding across the state. Hurricane Matthew made landfall near McClellanville as a Category 1 storm on October 8, 2016. Portions of the state received significant rainfall; a station in Edisto Island recorded 16.90 inches. High rainfall rates resulted in flash flooding, especially in the Pee Dee region. Approximately \$122,000,000 in public assistance damages were reported. 4 fatalities were attributed to the storm.
3. Hurricane Florence was a slow moving Category 1 storm when it made landfall near Wrightsville Beach 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. Riverine flooding was severe. The Waccamaw crested at 22.1 feet in 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 flooding events.
- B. Plan Activation:
 1. State agencies or the SEOC may conduct some level of response operations at any OPGON level but responses requiring ESF-level coordination typically occur at OPGON 2 (partial activation).

2. An increase 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 – EMD will use a variety of data and models to identify potential impacts of flooding, to include Quantitative Precipitation Forecasts, Department of Natural Resources model data and National Weather Service recommendations. If it is determined that the projected rainfall amounts are high enough to have significant impacts the SEOC may be activated.
 - b. Flash Flood – Due to the typical limited duration and area of a flash flood it is unlikely for the SCEOP to activate. Depending on the event, SCEMD will consider moving to OPCON 2 to monitor the situation at a heightened level of readiness and will consider increasing readiness to OPCON 1 if state assistance is required to meet local requirements that includes, but is not limited to, 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 EMD 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. Operational Areas

1. A major flood has the potential to isolate impacted communities due to standing water and damaged infrastructure. The damage may make movement of resources difficult, resulting in the need to target specific areas with a significant response effort.
2. The Operational Area Model within Attachment A (Operations Area Concept) to Appendix 9 (South Carolina Catastrophic Incident Response Plan) of the SCEOP provides detail into the state’s Operational Area concept of operations.

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. In order to effectively respond to disasters the Joint Disaster Intelligence and Assessment Cell will consider the type, severity, and area of flood, effects on citizenry, critical infrastructure and lifeline sectors and resources available when developing response and initial recovery plans.
3. For additional information see Section VII (Disaster Intelligence and Communications) and Attachment E of the SCEOP.

E. Coordinated Rescues

1. If a no-notice event occurs and 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 an emergent 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 as quickly as possible.

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 bi annual 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 in the deployment of flood mitigation devices.
 - d. Support flood assessment analysis in conjunction with JDIAC Hydrology Team consisting of USGS, NWS Hydrologist, Southeast River Forecast Center, and Office of Water Prediction.
2. ESF-2 (Communications).
- a. Assist private sector partners in the identification of key facilities in river basin flood plains that may be at risk in a flooding event.
 - b. In conjunction with stakeholders, identify mitigation actions to sustain communications backbones during response efforts if facilities are compromised by flood waters.
 - c. Provide mitigation and damage assessment of state and private sector communications infrastructure.
3. ESF-3 (Utilities Infrastructure).
- a. Coordinate with USACE to provide augmented engineering support and flood fight subject matter experts to advise on protection 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 for inspection of water and sewer facilities and dams as required.
 - e. Coordinate for identification of alternative water sources in areas where water and sewer infrastructure has been impacted.
4. ESF 4/9 (Fire/SAR).
- 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 and stage Swift Water Assets at the State Fire Academy 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. Coordinate the deployment of additional Swift Water Rescue and Search and Rescue capabilities through EMAC as required.
 - e. Integrate federal SAR assets into the operational response schemes.
 - f. Coordinate the onward movement of evacuees from collection points with ESF-6 and SCEMD Plans.
 - g. Provide communications, heavy equipment and personnel to support firefighting and search and rescue 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 JDIAC and local jurisdictions determine transition from hurricane to flood shelter operations as required.
 - 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 500 year floodplain.

- c. Open, manage, and operate medical needs shelters as required.
- 6. ESF-8 (Health and Medical Services).
 - a. In coordination with county emergency managers, identify licensed health care facilities requiring transportation assistance.
- 7. ESF-10 (Environmental and Hazardous Materials Operations)
 - a. Coordinate activation of contingency plans for spills & releases of oil & hazardous substances as required.
 - b. As needed communicate with state regulated dam owners about lowering water levels.
 - c. Monitor status of state regulated dams.
 - d. Assist ESF-3 with flood fight operations as required.
- 8. ESF-12 (Energy).
 - a. Provide assessment of damage to at risk electric generating facilities within the river basin flood plain.
 - 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-16 (Traffic Management).
 - a. In conjunction with county law enforcement authorities, develop and coordinate traffic management plans to assist with evacuation of impacted areas.
 - b. Provide disaster intelligence and reports of roads or bridges that have been flooded.
- 10. ESF-17 (Animal/Agriculture Emergency Response).
 - a. In coordination with county emergency managers identify emergency animal shelters located outside of flooded areas.

- b. Coordinate and provide technical assistance for aquatic rescue of livestock, equines and other animals as required.

11. ESF-19 (Military Support)

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

12. ESF-24 (Business and Industry).

- a. Assess business impacts in impacted communities as a result of flooding.
- b. Publish communiqués to businesses to assist in the activation of emergency action plans and installation of protective measures.
- 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 State Climatology Office

- 1. Coordinate the execution of flood models to assist response operations with the JDIAC.
- 2. Secure modeling support through interagency agreements or disaster contract support to assess impacts.
- 3. Synchronize interagency hydrology reports, models and data to support response and initial recovery operations.

VIII. River Basin Assessments

A. Pee Dee Basin

- B. Catawba Basin
- C. Broad Basin
- D. Saluda Basin
- E. Savannah Basin
- F. Salkehatchie Basin
- G. Edisto Basin
- H. Santee Basin

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.