

APPENDIX 4
(SOUTH CAROLINA DAM FAILURE EMERGENCY RESPONSE PLAN)
TO THE SOUTH CAROLINA EMERGENCY OPERATIONS PLAN

I. INTRODUCTION

- A. A dam is defined as an artificial barrier that can impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.
- B. A dam failure is characterized by the uncontrolled release of impounded water or the likelihood of such an uncontrolled release.
 - 1. There are lesser degrees of failure, but any malfunction or abnormality outside the design assumptions and parameters that adversely affects a dam's primary function of impounding water is considered a failure.
 - 2. These lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. However, these type failures may also be addressed, minimized, or halted through corrective actions.

II. PURPOSE

- A. Prevent or minimize injury to people and damage to property resulting from a dam failure.
- B. Identify roles and responsibilities of county, state and federal agencies when preparing for and responding to the failure of a regulated dam.
- C. Identify resources to assist those affected by a dam failure.
- D. Identify operational concepts unique to dam failure preparedness and response.

III. SCOPE

- A. The South Carolina Dam Failure Response Plan addresses operations to be conducted in coordination with and supplementary to the South Carolina Emergency Operations Plan (SCEOP).
- B. This plan complements the SCEOP and addresses responsibilities, processes, and actions specific to dam failure events.
- C. Applies to all federally and state regulated dams within or affecting South Carolina.
- D. Individual dam Emergency Action Plans (EAP) and Site-Specific Plans (SSP) shall be used in conjunction with this plan.

IV. FACTS AND ASSUMPTIONS

- A. Facts

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1. There are 44 federally regulated dams and hydroelectric projects whose failure would affect South Carolina. (See Attachment A – Federally Regulated Dams Affecting South Carolina).

Federal regulatory agencies include the Federal Energy Regulatory Commission (FERC), the U.S. Army Corps of Engineers (USACE), and the National Parks Service (NPS).

2. The South Carolina Department of Health and Environmental Control (DHEC) is the regulatory authority for most of the regulated dams in South Carolina and is responsible for monitoring and inspections, coordinating with dam owners for the development of Emergency Action Plans, issuing directives, and providing permits to erect new dams and permits for repairing, altering, or removing existing dams.

- a. Directives may include emergency orders, inspection reports, repair orders, and notice of violations, in accordance with state DHEC dam regulations.

- b. Approximately 2,200 South Carolina dams are regulated and managed under State law by DHEC.

3. SC Code of Laws, Title 49 - Waters, Water Resources and Drainage, Chapter 11 is the legal base regarding dams in South Carolina.

Article 3 of the “Dams and Reservoirs Safety Act” contains definitions, exemptions, duties of DHEC, and responsibilities of dam owners.

4. Dams are categorized into Hazard Classifications based on the damage their failure would cause to downstream areas. (See Attachment B – Hazard Potential Classification Systems for Dams Affecting South Carolina)

5. Dam failures are categorized into Emergency Levels concerning the type and size of the failure and the flow and storage conditions upstream and downstream of the dam. (See Attachment C – Emergency Levels for Dams Affecting South Carolina)

6. There are thousands of unregulated dams throughout South Carolina. Over 90% hold water for recreation or agriculture and are unable to pass water for flood control.

B. Assumptions

1. Dams may fail suddenly and without notice or they may allow time for further analysis or decision-making.

If time is available, the State and impacted counties will use this warning time to prepare using existing plans, protocols, and predefined and

coordinated procedures listed in emergency action plans or site-specific plans. State agencies, county and municipal governments and other entities will support preparations for possible failure and the following response.

2. A dam failure at one or multiple larger dams could destroy infrastructure and quickly exceed state and local resources.
 - a. South Carolina Emergency Management Division (SCEMD) may request the Governor declare a State of Emergency.
 - b. Federal resources may not be available to provide significant lifesaving or life-sustaining capabilities until after the event.
3. Damage to transportation, communication, and other infrastructure systems could isolate individuals and/or communities within the dam failure inundation areas.
 - a. Affected primary and secondary roads may not be functional for extended periods of time.
 - b. Shelters in the impacted area may not be suitable for use. Sheltering operations will be established outside of the impacted area.
4. Mutual aid compacts and agreements will enable assistance in the areas of personnel, equipment, and logistics.

V. SITUATION

- A. Every county in South Carolina is susceptible to dam failure. Impacts may be caused by a dam failure within its boundaries, in an adjacent county, or in a neighboring state.
- B. Although not federally regulated, high hazard dams have failed in South Carolina. Numerous significant and destructive state and non-state regulated dam failures occurred in South Carolina during the October 2015 Flood, Hurricane Matthew in 2016, and Hurricane Florence in 2018. These incidents were all precipitated by a significant rainfall event.
- C. The integrity of dams may be compromised by flooding, earthquakes, neglect, terrorism, civil disorder, vandalism, or any combination of the above.
 1. The resulting dam failure could result in injury or death, damage or loss to infrastructure, and property damage.
 2. In certain situations, dam failures may result in a cascading effect that could cause the failure of downstream dams.

D. Historical Impacts

1. From October 1-5 of 2015, portions of the state recorded more than 20 inches of rainfall. The heavy rainfall resulted in widespread flash flooding as well as significant riverine flooding. 20 locations exceeded established flood stages. 50 state regulated dams failed. More than 1,500 water rescues were performed and approximately 410 roads and bridges were closed. 19 fatalities were attributed to this event.
2. Hurricane Matthew made landfall near McClellanville as a Category 1 hurricane on October 8, 2016. Areas in northeast and southern regions of the state received up to 17 inches of rainfall. The result was widespread flash flooding and an extended period of river flooding, especially in the Pee Dee region. Several rivers reached major flood stage including Little Pee Dee, Lumber and the Waccamaw rivers. 20 state regulated dams failed. Approximately \$122,000,000 in public assistance damages were reported. 4 fatalities were attributed to the hurricane.
3. Hurricane Florence 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 record. Georgetown, Horry, Marlboro, Dillon, Marion, and Chesterfield counties all received rainfall of more than 15 inches. Portions of southeastern North Carolina received up to 35 inches of rain, resulting in record flooding in the Pee Dee River basin. The Little Pee Dee, Lumber and Waccamaw rivers all reached new records from 2016, with Waccamaw being nearly 4 feet higher. 11 state regulated dams failed. Approximately \$322,000,000 in public assistance damages were reported. 9 fatalities were attributed to the hurricane.

VI. CONCEPT OF OPERATIONS

A. General

1. State agencies with coordinating, primary, and supporting responsibilities to the Emergency Support Functions (ESF) participate in dam planning and training, including participation and attendance at scheduled exercises and meetings. Counties are encouraged to do the same.
2. SCEMD, DHEC, the SERT, affected County Emergency Management, dam owners, and other stakeholders coordinate for an organized response to address dam issues or failures.
3. SCEMD verifies the Emergency Action Plan notification chart has been followed with the dam owner and State and local emergency management organizations to ensure accuracy and consistency.

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4. The SCEMD Dam Failure and Flood Response Program Manager coordinates off-site response with dam owners and impacted counties to develop a consequence management strategy. SSPs have been created for FERC high hazard regulated dams.
 5. State and County Emergency Managers in the potentially impacted areas should identify and be prepared to designate Alternate EOCs should primary EOCs become inaccessible.
- B. Federal and State Dam Planning and Exercise Regulations and Guidelines
1. On-Site Planning Coordination
 - a. Detailed Emergency Action Plans (EAPs) exist for federally regulated dams. These plans include roles and responsibilities, notifications flowcharts, EAP activation conditions, notification and warning protocol, and downstream impacts (inundation maps).
 - b. Federally regulated dam owners are required to have Emergency Action Plans updated annually.
 - c. For state regulated dams, EAPs are only required for high or significant hazard dams. A current EAP is required at inspections. High hazard dams are inspected every two years and significant hazard dams are inspected every three years.
 2. Off-Site Planning Coordination (Site Specific Planning)
 - a. Developing SSPs are a coordinated effort between all emergency organizations and the dam owner to coordinate a consequence management strategy to evacuate and shelter populations being threatened.
 - b. SSPs detail impacts to infrastructure, emergency procedures for alert and notification, evacuation, mass care, and responder roles and responsibilities. Supporting appendices detail pre-scripted messages, shelter locations, and evacuation routes.
 - c. All FERC regulated High Hazard Dam owners/utilities are expected to provide Geographic Information System (GIS) maps of the modeled inundation areas to state and local agencies to enable the state, counties, and municipalities to identify the affected infrastructure and population.
 - d. FEMA provides guidelines to encourage emergency action planning for dams to help save lives and reduce property damage in FEMA P-64 which can be found in Attachment D. These guidelines are required for dam owners regulated by federal agencies.

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- (1) FEMA recommends that dam owners use two dam failure planning scenarios on the inundation maps - “Sunny Day Failure” and “Probable Max Flood” conditions.
 - (a) A Sunny Day Failure is a dam failure that occurs during fair weather (i.e., non-hydrologic or non-precipitation).
 - (b) A Probable Max Flood failure occurs with precipitation (i.e., “rainy day” or hydrologic failures).
 - e. These inundation scenarios are overlaid onto the following critical infrastructure maps to determine effects to:
 - (1) Transportation (e.g., interstates, highways, roads, rail lines and airports)
 - (2) Communications (e.g., telephone lines, cell phone towers,)
 - (3) Public works and engineering (e.g., water treatment and wastewater facilities)
 - (4) Firefighting (e.g., hydrants, tanks and refill locations, fire stations)
 - (5) Mass Care (shelters and Medical Needs Shelters)
 - (6) Health and medical facilities (e.g., hospitals, emergency medical service stations, healthcare facilities, long-term care facilities)
 - (7) Cemeteries and graveyards
 - (8) Hazardous materials (e.g., above ground and underground storage units, pipelines carrying hazardous materials and landfills)
 - (9) Energy (e.g., electric facilities, distribution lines and generating stations)
 - (10) Law enforcement facilities
 - (11) Schools and Daycares
 - (12) Agriculture
 - (13) Animal care facilities (e.g., zoos, poultry farms and commercial livestock farms)

(14) Military facilities

C. Alert and Notifications

1. Emergency Management Alert and Notification: Once an emergency is confirmed at the dam, the owner should issue an emergency classification level and simultaneously initiate the notification process via the EAP notification flowchart for that emergency level. (See Attachment C – Emergency Levels for Dams Affecting South Carolina)
2. After receipt of initial notification, the State Warning Point (SWP) will execute the Dam Failure Checklist that outlines procedures for verifying and confirming notification of affected counties.
3. Federal
 - a. Federally regulated dam owners are required to develop Notification Flowcharts to identify who is to be notified of a dam safety incident, by whom, and in what order. Specifically, the notification chart should include:
 - (1) Emergency level of the Notification Flowchart if more than one flowchart is required
 - (2) Individuals who will be notified and their contact information
 - (3) Prioritization of notifications
 - b. Dam owners shall maintain communications with the affected county EOCs and SEOC for the duration of the emergency.
4. State: Depending on the emergency level, the SEOC and affected county EOCs may be activated.
5. County: Based on initial information received, a county may:
 - a. Send agency(ies) to the scene to evaluate
 - b. Activate their EOC
 - c. Close roads
 - d. Initiate swift water rescue, if needed
 - e. Initiate evacuations out of the inundation area if circumstances warrant
 - f. Open shelters or reception centers as needed
6. Alert and Notification of the Populace

a. Siren Systems

- (1) Some regulated dams in South Carolina use siren systems to alert the populace to turn on radios/televisions and listen to Emergency Alert System (EAS) messages.
- (2) These dam owners must test their sirens, according to the dam owner's regulatory procedures, to ensure functionality.
- (3) Dam owners, in coordination with the County Emergency Management and/or SCEMD/SEOC, may activate their sirens to warn portions of, or all downstream residents.
- (4) Maps of siren locations are in the dam EAPs.

b. Automated Telephonic Notification System

- (1) Some counties have systems to conduct automated telephonic notifications. Notification will be prioritized (or phased) based on threat (such as speed flow of water).
- (2) SCEMD/SEOC will use CodeRED to alert emergency responders and the threatened population of possible danger.

c. Tone Alert Radio Notifications

Once notified by a dam owner that deteriorating conditions are observed at the dam, NWS may activate tone alert radios and issue either a Flash Flood Watch or Flash Flood Warning for the affected areas, as appropriate.

d. Emergency Alert System (EAS)

SCEMD/SEOC or affected counties may activate EAS to broadcast emergency action messages after verifying notification of a potential or imminent dam failure.

- e. Counties or municipalities will use door-to-door alert notifications as a backup, as required.

D. Security Requirements

1. Dam Site

- a. Dam owners are responsible for the physical and cyber security of their facilities.
- b. Local law enforcement resources may be available to assist if necessary.

2. Downstream and Upstream Areas

- a. Upon declaration of “Dam Failure Imminent or in Progress” classification:
- (1) The SC Department of Public Safety (SCDPS) as part of ESF-16 (Emergency Traffic Management) will coordinate with local law enforcement authorities to assist with coordinating ingress and egress points and controlling access points based on evacuation and traffic management plans.
 - (2) The South Carolina Law Enforcement Division (SLED) as part of ESF-13 (Law Enforcement) will coordinate with local law enforcement authorities to assist in law enforcement and security operations.
 - (3) SCDNR, as part of ESF-16 (Emergency Traffic Management) and ESF-13 (Law Enforcement), will coordinate the clearance of waterways/boat landings and prevent unauthorized waterway access to areas downstream and upstream from the dam or the secure area.
- b. Use of South Carolina National Guard (SCNG) assets and implementation of the State Law Enforcement Mutual Aid Plan (SLEMAP) may be required.
- c. Some or all the above actions may be required during “A Potential Dam Failure” classification level.
- d. A credible terrorist threat may also require increased security during either a “Dam Failure” classification or “Potential Dam Failure” classification declaration.

E. Evacuation

1. Counties and municipal governments are responsible for evacuations and support operations. Considerations should include transportation, sheltering, health and medical, emergency traffic management, agricultural and animal emergency response, and logistics.
2. After receiving notification of a Dam Failure or Potential Dam Failure classification, SCEMD, County Emergency Management, and the dam owner should coordinate requirements for a limited or full evacuation of the inundation area.
 - a. If a situation is under control, County Emergency Management may coordinate with SCEMD to make a recommendation to the Governor to issue an evacuation order.

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- b. If conditions are deteriorating rapidly, SCEMD may recommend the Governor issue an evacuation order for selected areas, or County Emergency Management may coordinate local evacuations.

3. Evacuation Zones

- a. Evacuation zones are those areas that need to be evacuated to protect residents at risk from flooding because of dam failure. The parameters for these zones are:

- (1) Easily describable to the public over radio and television
- (2) Based upon easily identifiable roadways or natural features for boundary identification
- (3) Generally based on the inundation areas

- b. Evacuation zone information can be found in the following dam SSPs

- (1) Lake Murray (Attachment C)
- (2) Santee (Attachment C)
- (3) Lake Wateree (Attachment A)
- (4) Pinnopolis (Attachment C)
- (5) Cherokee Falls (Attachment A)
- (6) Lake Secession (Attachment A)
- (7) Lake Greenwood (Attachment A)

4. Traffic Management

- a. County and local law enforcement coordinating with the SCDPS/ESF-16 (Emergency Traffic Management) and other law enforcement agencies, will manage traffic evacuation activities.
- b. SSPs contain pre-established evacuation zones, established evacuation routes, and shelter or reception center locations for residents in each zone. For pre-established evacuation zones, SCDPS/ESF-16 has pre-selected Traffic Control Points (TCP) along evacuation routes to restrict movement into the inundation area.
- c. In most cases, diversion routing will be utilized in counties outside of inundated areas and will be maintained for the event's duration.

5. Special Evacuation Requirements

- a. Affected counties are responsible for identifying the need and providing transportation to evacuees lacking personal transportation or who require functional and access needs transportation.
- b. Priority of evacuation assistance will be given to facilities and populations located within or nearest to the inundation areas.

Consideration will be given to evacuating schools as well as functional and access needs populations in advance of a general population evacuation.

- c. Licensed health care facilities are required to develop and coordinate evacuation plans with local government.
- d. State and county corrections facilities will develop and coordinate plans with local government to relocate inmates.

6. Re-Entry. See Section VI (Concept of Operations) of the SCEOP.

F. Sheltering

- 1. In the event of an evacuation for a dam failure, the affected and neighboring counties will coordinate with ESF-6 (Mass Care) to open shelters outside of the inundation area.
- 2. DHEC, as part of ESF-6 (Mass Care), manages Medical Needs Shelter (MNS) operations in coordination with the affected or neighboring counties.
- 3. Sheltering procedures.
 - a. Counties, in coordination with ESF-6 (Mass Care), identify the sheltering requirement and the locations outside of the affected areas, as required.
 - b. DHEC will open MNSs outside of the affected area as required.
 - c. The Governor or appropriate local authority may order county schools located in the impacted or neighboring counties to be closed and utilized as shelters.
 - d. ESF-6 (Mass Care) partners will manage feeding support to the sheltering operations.
 - e. Neighboring counties may need to shelter citizens from the affected county.

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- f. While specific dam failure shelters may not have been identified, any current pre-identified shelters may be utilized.







G. Public Information



- 1. See Annex 15 (Public Information) to the SCEOP for information.
- 2. At a minimum, SCEMD, DHEC, the affected counties, and dam owners with the resources to do so, will provide public information personnel to staff the Joint Information Center (JIC).
- 3. Public Education
 - a. Federally regulated dam owners should develop a public information program to address potential hazards resulting from a dam failure, appropriate actions, self-protection, and reference State and local dam failure emergency response programs.
 - b. Federally regulated dam owners should provide this information via pamphlets, brochures, company websites and social media. This information may include the following:
 - (1) Possible causes of dam failures and potential threats to the persons and property in the affected areas.
 - (2) Public alert and notification mechanisms.
 - (3) Appropriate actions for self-protection.
 - (4) Sources of additional information prior to, during, and following a dam failure.
 - (5) If available, evacuation zones, routes, shelter locations, and personal protective measures.
 - (6) Information specifically relating to access and functional needs populations.
- 4. For examples of EAS Messages and News Releases, see SSPs.

VII. DISASTER INTELLIGENCE

- A. See Section VIII (Disaster Intelligence and Communications) of the SCEOP.
- B. Lifeline Sector Analysis

The table below lists possible impacts to the state’s lifeline sectors associated with dam failure. While not all-inclusive, this list assists the SERT’s ability to respond effectively by proactively identifying possible areas of concern before impacts occur.

Lifeline	Scope of Possible Impacts
 <p>Safety and Security</p>	<ul style="list-style-type: none"> • Inundated areas may be difficult to access, hindering lifesaving missions • Operational facilities and roadways may be inaccessible
 <p>Food, Hydration, Shelter</p>	<ul style="list-style-type: none"> • Citizens evacuated from inundated areas may require emergency shelter • Food supplies may be depleted in areas isolated by floodwaters • Crop and animal stocks could be damaged from high water and extended duration flooding
 <p>Health and Medical</p>	<ul style="list-style-type: none"> • Medical facilities in the inundation area may see damage to structures and equipment as well as reduced accessibility • Access issues and transportation disruptions may result in delayed supplies, staffing shortages and difficulties moving patients • Evacuations could lead to further injuries of vulnerable patient populations
 <p>Energy (Power & Fuel)</p>	<ul style="list-style-type: none"> • Fuel stations and transmission substations may be damaged or inoperable • Hydro power generation could be stopped entirely if dam is damaged badly enough • Fuel pipelines could be damaged or need to stop service due to flooding
 <p>Communications</p>	<ul style="list-style-type: none"> • Telecommunications and broadband equipment could be damaged by floodwater inundation which could result in a disruption of communications
 <p>Transportation</p>	<ul style="list-style-type: none"> • Roadways, bridges, railroads, port, and airport facilities in and near flooded areas may see hazardous conditions, damage, and disruptions in service

	<ul style="list-style-type: none"> • Floodwater inundation could result in release of hazardous materials
	<ul style="list-style-type: none"> • Water treatment infrastructure could be damaged, leading to decline in quality of potable water

VIII. 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. Regulated Dam Owners
 1. Ensure compliance with regulatory guidance.
 2. Develop, coordinate, test, and implement dam failure EAPs.
 3. Provide EAPs to affected Local, County, and State Emergency Management, first responders, and all other stakeholders.
 4. Participate in the development and update of SSPs for dams as required.
 5. Ensure physical and cyber security at dams where applicable.
 6. Inspect dams as required by regulatory guidance.
 7. Maintain personnel and equipment in a state of readiness.
 8. If applicable, install, operate, maintain, and periodically test siren system.
 9. For federally regulated dams, coordinate with counties and ESF-15 (Public Information) to develop a public information program (i.e., pre-scripted news releases, public information materials).
 10. Provide timely information and recommendations to SCEMD and affected counties during both a “Dam Failure Imminent or In Progress” and “Potentially Hazardous Situation Developing” classification level events.

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11. Ensure SCEMD, affected counties and local NWS office are immediately notified if deteriorating conditions are detected or likely.
 12. Initiate failure classification levels as detailed in respective EAP.
 13. For federally regulated dams, provide authorized spokesperson to support public information activities at the JIC.
 14. Prepare and disseminate public information through appropriate news media and in coordination with ESF-15 (Public Information).
 15. Secure the dam as soon as possible when an issue is identified.
 16. Continue to monitor dam conditions until conditions at the dam improve or return to “non-failure” conditions and report status to the affected counties and SCEMD.
 17. Conduct evaluations of dam failure related damage and determine ways to mitigate future failure.

C. South Carolina Emergency Management Division

1. Along with DHEC, coordinate with the following agencies to monitor current and forecasted rain events that may lead to dam failures:
 - a. National Weather Service (NWS)
 - b. Southeast River Forecast Center (SERFC)
 - c. US Geological Survey (USGS)
 - d. SC Department of Natural Resources (SCDNR) Climatology Office and Flood Mitigation Program
2. Monitor potential threats to South Carolina affect dams and coordinate appropriate preparedness and response actions.
3. Assist affected counties and dam owners with developing SSPs.
4. Analyze dam inundation maps to determine the threat to life and property in the inundation area.
5. In coordination with the affected counties, dam owners, SERFC, SCDPS, and SCDOT, develop evacuation zones based on the inundation maps.
6. Assist dam owners and other agencies with dam safety training, public information, and education.
7. Participate in dam related exercises.

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8. Advise the Governor, state agencies, local government officials, and, if necessary, federal agencies of the dam failure impact.
 9. Coordinate with county, dam owner or representatives, DHEC and NWS to release consistent emergency information through ESF-15 (Public Information).
 10. Deploy resources, as requested, to affected areas.
 11. Maintain and review copies of available Dam EAPs and ensure consistency with state and local protocol.
 12. Maintain, update, and distribute this plan on a biennial basis.
- D. Emergency Support Functions. Coordinating agencies will conduct a biennial review of their ESF-specific dam failure responsibilities with primary and supporting agencies.
1. ESF-1 (Transportation):
 - a. South Carolina Department of Transportation (SCDOT) (Coordinating Agency)
 - (1) Coordinate with ESF-16 (Emergency Traffic Management) to support evacuation operations.
 - (2) Evaluate impacted roads and bridges.
 - (3) ESF-1 (Transportation) will determine routes around the inundation area and coordinate with SCDPS/ESF-16 (Emergency Traffic Management) to establish roadblocks and TCPs or Diversion Points to facilitate traffic flow.
 2. ESF-2 (Communication):
 - a. South Carolina Department of Administration, Division of Technology Operations (Coordinating Agency)
 - (1) As required, coordinate alternate communication systems to augment damaged or inoperative systems.
 - (2) Gather post-impact communication damage assessment information (including telephone/cellular, broadcast, and commercial radio stations, and cyber related outages) for integration into recovery plans.
 3. ESF-3 (Public Works and Engineering):

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- a. South Carolina National Guard (Coordinating Agency)
 - (1) Coordinate with USACE to provide augmented engineering support and flood fight subject matter experts to advise on protective actions.
 - (2) Lead coordination for the distribution of sandbags and specialized flood fight equipment from the USACE to assist in the protection of critical infrastructure.
 - (3) Participate in USACE Hydrology Coordination Calls to synchronize modeling and assessments information.
 - b. South Carolina Rural Water Association
 - (1) Coordinate with DHEC to provide technical support for water and wastewater facilities and dams as required.
 - (2) Coordinate the identification of alternative water sources in areas where drinking water and infrastructure are impacted.

4. ESF-6 (Mass Care):

- a. South Carolina Department of Social Services (Coordinating Agency)
 - (1) Coordinate with affected county emergency managers and the American Red Cross to identify shelters to support evacuations from dam inundation areas.
 - (2) Assist with reunification efforts as required.
 - (3) Coordinate with ESF-18 as needed to determine the appropriate distribution method of emergency relief supplies (to include, but not limited to, water, non-perishable food, paper products, household cleaning supplies, infant care items and personal hygiene products) in areas where commercial trade is inoperative/insufficient to meet emergency needs.
 - (4) Coordinate with ESF-14 as needed to support the implementation of the SC Multi-Agency Shelter Transition Plan (MAST) through the coordination of voluntary agency resources to address the unmet needs of evacuated individuals.

5. ESF-8 (Health and Medical Services):

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- a. South Carolina Department of Health and Environmental Control (Coordinating Agency)

Identify licensed healthcare facilities in the inundation area and evacuation zones, review evacuation plans and verify notification mechanisms.

- b. South Carolina Coroners Association

Provide additional fatality management resources to affected county coroner(s) as needed.

6. ESF-9 (Search and Rescue):

- a. South Carolina Department of Labor, Licensing and Regulation

- 1) 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.
- 2) 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.
- 3) Coordinate with SCDNR and other partners on availability of water rescue assets.
- 4) In coordination with SCEMD Logistics, request the deployment of additional Swift Water Rescue and Search and Rescue capabilities through EMAC as required.
- 5) Integrate federal search and rescue (SAR) assets into the operational response schemes.
- 6) 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.
- 7) Provide communications, heavy equipment, and personnel to support firefighting and SAR efforts as requested.
- 8) Coordinate with ESF-1, Air Branch, for HART and other

SAR rotary and fixed wing platforms to support SAR.

7. ESF-10 (Environmental and Hazardous Materials Operations)
 - a. South Carolina Department of Health and Environmental Control (Coordinating Agency)
 - (1) Regulate South Carolina DHEC dams under DHEC's regulatory purview.
 - (2) Provide County Emergency Managers state regulated dam Emergency Action Plans for their respective counties.
 - (3) Inspect DHEC regulated dams on the following schedule:
 - (a) "High Hazard" dams – Every other year
 - (b) "Significant Hazard" dams - Every three (3) years
 - (c) Although "Low Hazard" dams are not required to submit an EAP, DHEC will survey the dams every five (5) years to determine any change in their hazard level.
 - (4) Conduct statewide dam safety public information and education.
 - (5) Coordinate with federal, state, and local agencies to assist in supporting dam safety training.
 - (6) In coordination with SCEMD and NWS, monitor precipitation forecasts and request that dam owners lower water levels as required.
 - (7) In coordination with SCEMD and NWS, monitor river and stream conditions and forecasts.
 - (8) Provide DHEC Dam Safety representative to the SEOC for activations.
 - (9) Following a dam failure:
 - (a) Assess damage and determine mitigation methods to improve dam
 - (b) Provide licenses to repair existing dams

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- (c) Provide licenses to erect new dams
 - (d) Provide permits for repairing, altering, or removing existing dams
 - (10) Initiate directives, including emergency orders, non-emergent repair orders, and notice of violations, in accordance with state DHEC dam regulations.
 - (11) Identify hazardous waste facilities in the inundation area.
 - (12) Develop system to notify affected regulated hazardous materials treatment, storage, and disposal facilities in the effected inundation area.
 - 8. ESF-12 (Energy):
 - a. South Carolina Office of Regulatory Staff (Coordinating Agency)
 - (1) Coordinate with utilities for restoration of generation facilities and transmission of electricity to damaged and affected areas.
 - (2) Coordinate with ESF-3 (Public Works and Engineering) as reports of utility company damage assessments of natural gas pipelines and facilities are received.
 - 9. ESF-13 (Law Enforcement):
 - a. South Carolina Law Enforcement Division (Coordinating Agency)
 - (1) Assist local law enforcement authorities with security in the inundated areas as requested.
 - (2) Provide or coordinate specialized support assets to include:
 - (a) Forensic support
 - (b) Investigative and crime scene services should the failure be determined to be intentional (terrorism)
 - (c) Coordination of additional assets through activation of the State Law Enforcement Mutual Aid Plan (SLEMAP)
 - b. South Carolina Department of Natural Resources

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- (1) Coordinate with ESF-16 (Emergency Traffic Management) to develop plans to clear the upstream areas and downstream waterways affected by the inundation area.
 - (2) Patrol the lake and recreational areas to prevent access downstream from the dam.
 - (3) Provide DNR hydrologists to support the Disaster Intelligence Group (DIG) in the SEOC.
11. ESF-16 (Traffic Management):
- a. South Carolina Department of Public Safety (Coordinating Agency)
 - (1) Coordinate with ESF-13 to develop plans to clear upstream lakes and downstream waterways in inundation areas.
 - (2) Coordinate with the Air Branch for aviation support for evacuation (including public address system, rescue, and security operations).
12. ESF-19 (Military Support):
- a. South Carolina National Guard (Coordinating Agency)
 - (1) Coordinate with ESF-1 to support route clearance and debris push operations.
 - (2) Provide aviation support for search and rescue, reconnaissance, and security operations in coordination with ESF-1/Air Branch etc., as requested.
 - (3) Assist ESF-16 for traffic management as requested.
 - (4) Assist ESF-13 with security operations as requested.
13. ESF-24 (Commerce):
- (1) Provide the latest disaster information to the SC business community, so they can make informed decisions regarding their businesses and potential impacts.
 - (2) Assess business impacts in impacted communities because of dam failure.
 - (3) Coordinate with National Business Emergency Operations Center (NBEOC) and other business supporting entities for resources as required to support flood fighting operations.

14. Federal

a. Federal Emergency Management Agency (FEMA)

Deploy Incident Management Assist Teams (IMAT) to the SEOC as requested.

b. Federal Energy Regulatory Commission (FERC)

(1) Regulate dams under their purview.

(2) In accordance with FERC guidelines, ensure dam owners develop EAPs and conduct drills and exercises on a scheduled or as warranted basis.

(3) Ensure EAPs are reviewed and updated per FERC guidelines.

c. US Army Corps of Engineers (USACE)

Regulate dams, dikes, and locks under their purview, provide support during flood fight operations through SME support and sandbags or artificial barriers

d. National Parks Service (NPS)

Regulate Star Fort Dam at Ninety-Six National Park and offsite recommendations.

e. National Oceanic Atmospheric Administration (NOAA)

(1) The National Weather Service provides weather forecasts and issues watches and warnings.

(2) The Southeast River Forecast Center provides river flood forecasts.

f. US Geological Survey (USGS)

Deploy rapid deployment gauges as required.

g. US Coast Guard (USCG)

Assist with port security as requested.

IX. ADMINISTRATION, FINANCE AND LOGISTICS

See section X. (Administration, Logistics, and Finance) in the SCEOP.

X. GOVERNING FEDERAL AND STATE REGULATIONS AND REFERENCES:

A. **AUTHORITIES AND REFERENCES.** See Attachment C (Authorities and References) to the SCEOP Basic Plan.

B. **ACRONYMS AND GLOSSARY.**

1. FEMA P-148, Federal Guidelines for Dam Safety, Glossary of Terms

a. https://www.fema.gov/sites/default/files/2020-08/fema_dam-safety_glossary_P-148.pdf

2. See Attachment B (Acronyms and Glossary) to the SCEOP Basic Plan.

C. **SUPPORTING PLANS AND DOCUMENTS.**

Tab 1 – Federally Regulated Dams Affecting South Carolina

Tab 2 – Hazard Potential Classification Systems for Dams Affecting South Carolina

Tab 3 – Emergency Levels for Dams Affecting South Carolina

Tab 4 – Planning Exercise Requirements from Regulatory Agencies.

XI. SITE SPECIFIC PLAN LISTING (Under separate cover)

A. Lake Murray Site Specific Plan December - 2004 (Revised) - Tab A (Lake Murray Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

B. Santee Dam Site Specific Plan, December - 2020 - Tab B (Santee Dam Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Preparedness Emergency Plan) to the SCEOP.

C. Wateree Dam Abbreviated Site-Specific Plan - 2008 - Tab C (Wateree Dam Abbreviated Site-Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

D. Pinnopolis Dam Site Specific Plan, April 2008 - Tab D (Pinnopolis Dam Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

E. Cherokee Falls Abbreviated Site-Specific Plan – April 2009 - Tab E (Cherokee Falls Abbreviated Site-Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

F. Lake Secession Abbreviated Site-Specific Plan – March 2010 - Tab F (Lake Secession Abbreviated Site-Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

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- G. Buzzards Roost (Lake Greenwood) Abbreviated Site-Specific Plan - April 2010 - Tab F (Buzzards Roost (Lake Greenwood) Abbreviated Site-Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

APPENDIX 4
(SOUTH CAROLINA DAM FAILURE EMERGENCY RESPONSE PLAN)
TO THE SOUTH CAROLINA EMERGENCY OPERATIONS PLAN

Attachment A – Federally Regulated Dams Affecting South Carolina

Any physical EAP copies held by EMD are stored in the Dam Failure and Flood Response Program Manager’s office

<u>Owner</u>	<u>Name of Dam</u>	<u>Counties/NWS stations affected</u>	<u>Digital or Physical EAP</u>
City of Abbeville, SC	Lake Secession (Rocky River)	Abbeville County GSP NWS	Physical
City of Augusta, GA	Augusta Canal	Edgefield County Aiken County Columbia NWS	Digital and Physical
City of Columbia, SC/Lockhart	Columbia Canal	Richland County Columbia NWS	Digital and Physical
Dominion Energy	Fairfield Pumped Storage Facility	Newberry County Fairfield County Lexington County Richland County Columbia NWS	Physical
	Parr Hydroelectric Plant	Newberry County Fairfield County Lexington County Richland County Columbia NWS	
	Saluda Hydroelectric Facility (Lake Murry Dam)	Lexington County Richland County Calhoun County Columbia NWS	
	Stevens Creek Hydroelectric Facility	Edgefield County Aiken County Columbia NWS	
Duke Energy	Blewett Hydro Station	Marlboro County Chesterfield County Columbia NWS	Both
	Bad Creek Hydro Station	Oconee County GSP NWS	
	Bridgewater Hydro Station	York County Chester County Lancaster County Fairfield County Kershaw County Richland County Sumter County	

		GSP NWS Columbia NWS	
	Cowans Ford Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County Richland County Sumter County Calhoun County Clarendon County Orangeburg County Columbia NWS GSP NWS	
	Fishing Creek Hydro Station	Lancaster County Chester County Fairfield County Kershaw County Columbia NWS GSP NWS	
	Gaston Shoals	Cherokee County York County Union County GSP NWS Columbia NWS	
	Great Falls Hydro Station (Dearborn)	Lancaster County Chester County Fairfield County Kershaw County Columbia NWS GSP NWS	
	Jocassee Hydro Station	Pickens County Oconee County Anderson County Abbeville County McCormick County Edgefield County Aiken County GSP NWS Columbia NWS	
	Keowee Hydro Station	Pickens County Oconee County Anderson County Abbeville County McCormick County Edgefield County Aiken County Barnwell County Allendale County	

		GSP NWS Columbia NWS	
	Mountain Island Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County Columbia NWS GSP NWS	
	Ninety-Nine Islands Hydro	Cherokee County York County Union County GSP NWS Columbia NWS	
	Oxford Hydro Station	York County Lancaster County Chester County Columbia NWS GSP NWS	
	Rock Creek/Cedar Creek Hydro	Lancaster County Fairfield County Kershaw County Columbia NWS GSP NWS	
	Tillery Hydro Station	Marlboro County Chesterfield County Wilmington NWS Columbia NWS	
	Wateree Hydro Station	Kershaw County Richland County Sumter County Columbia NWS	
	Wylie Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County Richland County Sumter County Calhoun County Clarendon County Orangeburg County Columbia NWS	
Eagle Creek Renewable Energy	Falls Dam High Rock Dam Narrows Dam Tuckertown Dam	Chesterfield County Marlboro County Darlington County Columbia NWS	Physical

		Wilmington NWS	
Georgia Power	North Georgia Hydroelectric Project	Chesterfield County Marlboro County Darlington County Columbia NWS Wilmington NWS	Physical
Greenwood County	Buzzard's Roost (Lake Greenwood Dam)	Newberry County Saluda County Greenwood County Lexington County Richland County Columbia NWS GSP NWS	Physical
Hydroland, Inc.	Cherokee Falls Hydroelectric Project	Cherokee County GSP NWS	Physical
Lockhart Power Company	Lockhart Hydro Station	Union County GSP NWS	Physical
Patriot Hydro	Lower Pelzer	Anderson County Greenville County GSP NWS	Digital and Physical
	Upper Pelzer	Anderson County Greenville County GSP NWS	
	Piedmont	Anderson County Greenville County GSP NWS	
	Ware Shoals	Laurens County Greenwood County GSP NWS	
Santee Cooper	Pinnopolis Dam	Berkeley County Charleston County Charleston NWS	Digital and Physical
	Santee Dam	Berkeley County Clarendon County Williamsburg County Georgetown County Charleston County Charleston NWS Columbia NWS Wilmington NWS	
National Parks Service (Ninety-Six National Historic Site)	Star Fort Dam	Greenwood County GSP NWS	Physical
U.S. Army Corps of Engineers (Charleston District)	St. Stephen Hydro Facility	Berkeley County Williamsburg County Georgetown County Charleston County	Physical



		Charleston NWS	
U.S. Army Corps of Engineers (Savannah District)	Clemson Upper/Lower Diversion Dams	Pickens County Oconee County GSP NWS	
	Hartwell Dam	Anderson County Abbeville County GSP NWS	
	J. Strom Thurmond Dam	McCormick County Edgefield County Aiken County Barnwell County Allendale County Hampton County Jasper County Columbia NWS	
	New Savannah Bluff Lock and Dam	Aiken County Columbia NWS	
	Richard B. Russell Dam	Abbeville County McCormick County GSP NWS	



APPENDIX 4
(SOUTH CAROLINA DAM FAILURE EMERGENCY RESPONSE PLAN)
TO THE SOUTH CAROLINA EMERGENCY OPERATIONS PLAN

Attachment B – Hazard Potential Classification Systems for Dams Affecting South Carolina

I. FERC

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally Limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

II. USACE

- A. Dam Safety Action Classification (DSAC) Class I (Very High Urgency) – Dams where progression toward failure is confirmed to be taking place under normal operations and the dam is almost certain to fail under normal operations within a time frame from immediately to within a few years without intervention; or the combination of life or economic consequences with probability of failure is extremely high.
- B. DSAC Class II (High Urgency) – Dams where failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety; or the combination of life or economic consequences with probability of failure is very high.
- C. DSAC Class III (Moderate Urgency) – Dams that have issues where the dam is significantly inadequate or the combination of life, economic, or environmental consequences with probability of failure is moderate to high.
- D. DSAC Class IV (Low Urgency) – Dams are inadequate with low risk such that the combination of life, economic, or environmental consequences with a probability of failure is low and the dam may not meet all essential USACE engineering guidelines.
- E. DSAC Class V (Normal) – Dams considered adequately safe, meeting all essential agency guidelines and the residual risk is considered tolerable

III. National Parks Service

Classification	Lives in Jeopardy	Economic Loss
Low	0	Minimal (Undeveloped agriculture, occasional uninhabited structures, or minimal outstanding natural resources)
Significant	1-6	Appreciable (rural area with notable agriculture, industry, or worksites, or outstanding natural resources)
High	More than 6	Excessive (urban area including extensive community, industry, agriculture, or outstanding natural resources.

IV. DHEC

- A. **High Hazard** – Dams whose failure or mis-operation will threaten human life or serious damage to home(s), industrial and commercial facilities, important public utilities, major roads, or railroads.
- B. **Significant Hazard** – Dams whose failure or mis-operation results in no known threat to human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can affect other concerns. These dams are often located in predominantly rural or agricultural areas but could be in areas with population and significant infrastructure.
- C. **Low Hazard** - Dams whose failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner’s property.

Attachment C – Emergency Levels for Dams Affecting South Carolina

I. Federally Regulated Dams: FEMA P-64 recommends that plain language terms be used when reporting dam failures for easier recognition and synchronization with the federal National Incident Management System guidelines.

A. Definitions:

1. **High Flow**- indicates that flooding is occurring on the river system, but there is no apparent threat to the integrity of the dam. This level is used by the dam owner to convey to outside agencies that downstream areas may be affected by the dam's release.
2. **Non-Failure**- appropriate for an event at a dam that will not, by itself, lead to a dam failure, but requires investigation and notification of internal and/or external personnel.
3. **Potential Failure**- indicates that conditions are developing at the dam that could lead to a dam failure. Potential Failure should convey that time is available for analyses, decisions, and actions before the dam could fail. A failure may occur, but predetermined response actions may moderate or alleviate failure.
4. **Imminent Failure**- indicates that time has run out, and the dam has failed, is failing, or is about to fail. Imminent Failure typically involves a continuing and progressive loss of material from the dam. For the purposes of evacuation, emergency management authorities may assume the worst-case condition that failure has already occurred.

II. DHEC:

A. No standard dam failure classification exists for state regulated dams.

Attachment D - Planning and Exercise Requirements for Regulated Dams

- I. All Federally regulated dams require an Emergency Action Plan (EAP).
- A. The primary federal guideline for Emergency Action Plan development for Dams is FEMA P-64. The purpose of this document is to provide guidelines for the preparation of an Emergency Action Plan (EAP) to facilitate the development of plans that are comprehensive and consistent. FEMA P-64 can be found here:
https://www.fema.gov/sites/default/files/2020-08/eap_federal_guidelines_fema_p-64.pdf
FERC, USACE, NPS, and DHEC each have more specific governing documents.
- B. Federal Energy Regulatory Commission (FERC) Guidelines for EAPs can be found here:
<https://www.ferc.gov/sites/default/files/2020-04/chap6.pdf>
- C. The USACE Guidelines for EAPs and exercise and training guidance can be found in Chapter 16 here:
http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1110-2-1156.pdf
- D. The National Parks Service follows the U.S. Department of the Interior's Bureau of Reclamation guidance can be found here:
<https://www.usbr.gov/damsafety/risk/BestPractices/Presentations/C1-32-ConsequenceEstimatingEmpiricalApproachPP.pdf>
- E. The SC Department of Health and Environmental Control Dam does NOT mandate an exercise or training program however, dam owners having a hazard potential rating of "High" and "Significant" are required to maintain EAPs. Dam owners with a hazard potential rating of "Low" are not required to submit EAPs, however DHEC investigates every five years to determine if their hazard levels necessitate a classification change. Details on SC DHEC Regulated Dams for planning can be found here:
<https://www.scdhec.gov/environment/WaterQuality/DamsReservoirs/LawsRegulations/>