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Hurricane Preparation and Recovery for North Carolina

Beef Producers Guide

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DISCLAIMER

Information in this document was provided by USDA and various university Extension staff and based on shared experiences preparing for and recovering from hurricane impacts. However, individual producer situations will vary, and STATE OR LOCAL GUIDANCE OR REGULATIONS, AND INSURANCE POLICIES SUPERCEDE THE RECOMMENDATIONS IN THIS GUIDE. This guidance should not be interpreted as required actions by regulatory or insurance agencies. Check with your local Extension agent; county, State, or Federal contact; consultant; or insurance agent regarding the appropriateness of these recommendations to your specific situation.

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Photos courtesy of Dr. Carla Huston, Mississippi State University

Hurricane Preparation and Recovery for North Carolina

Beef Producers Guide

This guide will focus on:

- Mitigating the impact of a hurricane on cattle and facilities and reducing financial losses through proper planning
- Preparing and securing facilities to protect people, cattle, and property
- Ensuring proper cattle management and care following a hurricane

Contents

Introduction

Preparing for and recovering from hurricane events

People who live and work in the Southeastern United States are unfortunately familiar with the devastation and loss of life and property that can accompany a hurricane event. While hurricanes have always been a threat to the Southeast, with an average of over two strikes per year since 1900, the threat posed by hurricanes is growing. Recent studies suggest that as ocean temperatures continue to rise, hurricane intensity is increasing. Hurricanes of the future will likely be slower-moving, higher category hurricanes that produce destructive winds and flooding.

To help producers remain resilient and productive in the face of this threat, the U.S. Department of Agriculture (USDA) Southeast Climate Hub developed this manual containing steps that can be taken to prepare for and recover from hurricane events. This manual is separated into four primary sections:

- The **Building a Resilient Operation** section outlines a range of considerations and systems that producers can put in place to increase their resilience to hurricanes.
- The **Long-Term Operation Maintenance** section lists specific pre-hurricane actions and periodic checks to be done on an annual basis (before hurricane season) and monthly basis (during hurricane season).
- The **Short-Term Preparedness** section lists specific actions to be done in the week before a hurricane arrives.
- The **Post-Hurricane Recovery** section outlines activities that producers can take to minimize their losses following a hurricane. It begins with actions immediately following a hurricane that are focused on safety and continues with ongoing actions a week out and a month out.

The guide also includes four appendices, including two customizable templates for a **Farm Emergency Plan** and an **Emergency Contacts List**. Directions on what to include in these two documents is outlined in the **Building a Resilient Operation** section. Their use is described in the **Short-term Preparedness** section. Both the plan and list should be periodically reviewed, as mentioned in the **Long-term Operation Maintenance** section. The appendix also includes an **Initial Site Planning** guide that can be referenced if purchasing or leasing new land, and **Resource Links** to helpful Federal, State and University Extension websites that are also referenced throughout the guide.

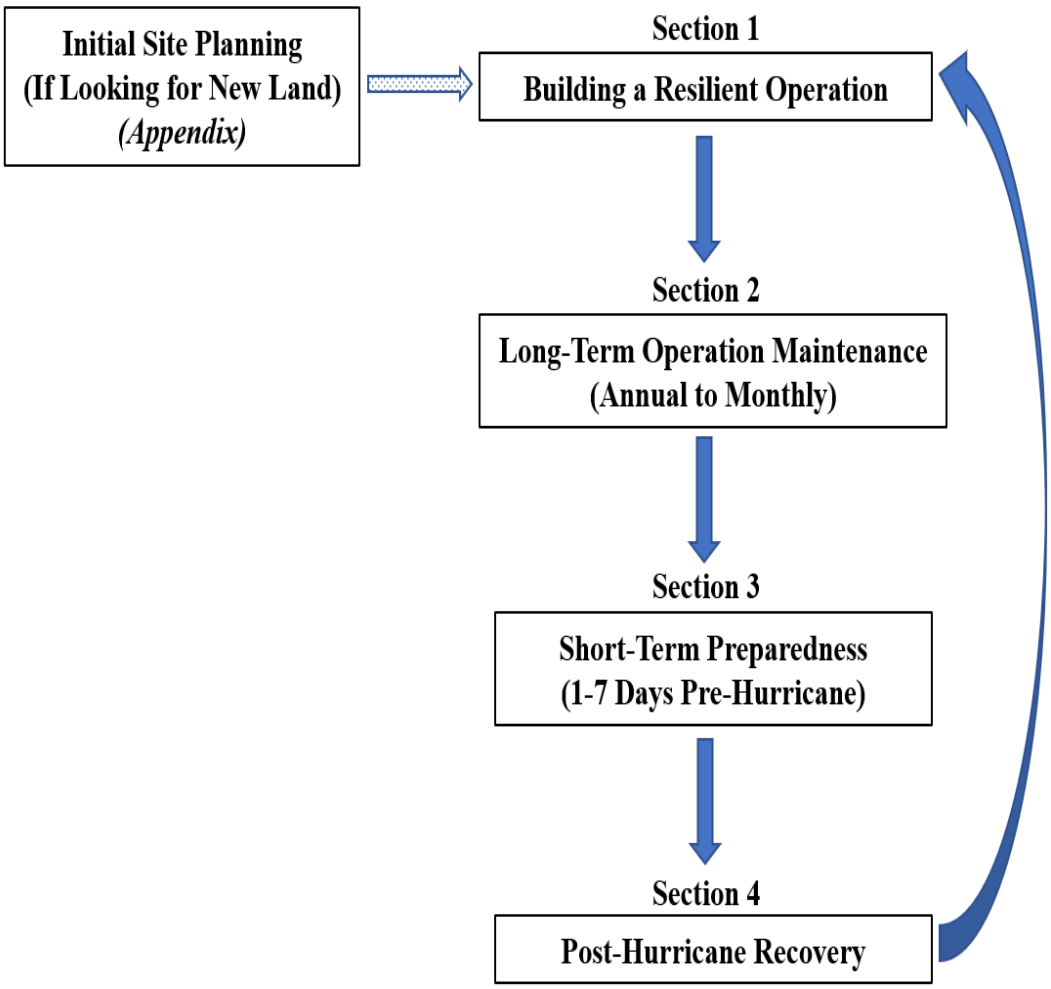

Figure 1. Flowchart for Beef Producers Guide

Building a Resilient Operation

Systems that are recommended to be put in place well before the arrival of any hurricane to increase productivity and reduce your risk of damage and reduce recovery time

Agricultural operations in the Southeast U.S. can implement a range of measures to increase their resilience to hurricanes and tropical storms. Contact your local Extension office and other State and Federal resources for further information.

Personal Safety

- For safety tips and resources that facilitate informed decision making before, during, and after a hurricane strikes, see the U.S. Department of Homeland Security (DHS) Ready.gov website and NOAA National Weather Service Weather-Ready Nation Hurricanes website.

Recordkeeping, documentation, and insurance

- Check insurance policies concerning which type of perils and animals are covered. Following a hurricane, claims can range from animal injuries and deaths due to storm impacts to vehicular accidents resulting from compromised livestock fencing.
- General farm business policies may only provide protection against certain types of claims such as vehicle collisions or accidental shootings. Optional livestock coverage may include losses due to natural weather events, such as flooding or severe storms, and disease mortality. If evacuating hazardous areas with beef cattle, livestock in transit may also need additional coverage. Coverage can be based on a per head or herd basis, or blanket policy based on farm value. With any coverage, proper animal identification and documentation of ownership will be necessary.
- The importance of pre- and post-hurricane documentation cannot be overstated. Assistance for disaster recovery may not be available until weeks or months after a hurricane. Therefore, it is important for purposes of insurance compensation and recovery assistance to do thorough record keeping of the damages and losses sustained on your farm as well as your cleanup and recovery efforts.

- The worst time to find out that you do not have enough insurance, or the right insurance, to cover your damages is when you need help recovering. Regularly review your insurance policies with your agent to be sure you have adequate coverage, including flood insurance, for your facilities, vehicles, farm buildings and other structures, and livestock. Be aware that there are limitations on how soon insurance coverage will take effect. Generally, insurance policies will not cover damage if the policy was not in place before a hurricane has formed.
- Establish an inventory system so that you know exactly what's on your farm at all times for potential insurance claims and disaster recovery assistance. It is critical to have a documented inventory (photos, videos, and written lists and descriptions) of your farm buildings, vehicles, valuable equipment, and livestock on your farm *before* a disaster occurs. Maintain accurate records of harvest, equipment inventories, and supplies purchased. This inventory and documentation will be essential for filing insurance claims after the hurricane. Keep copies of this inventory in multiple places such as on your computer, off-site in a safe location, and on a cloud-based server using an established procedure to update and transmit the information weekly.
- Take these records with you should you choose to evacuate for a hurricane:
  - Inventories and documentation for insurance and disaster recovery
  - Farm Emergency Plan
  - Emergency Contacts List
- For more information, see:
  - The USDA Risk Management Agency (RMA) Crop Insurance website for news and information about insurance. Use their agent locator to search for approved insurance providers.
  - The U.S. DHS Federal Emergency Management Agency (FEMA) National Flood Insurance Program website to learn more about flood insurance options for qualifying home and business owners.

Infrastructure

Buildings

- Consult topography and flood maps when building new facilities, storing feed and hay, and moving animals. Buildings and working facilities should be built on well-drained soil, on level land or sloped away from streams and other bodies of water.
- Locate buildings above the 100-year flood zone whenever possible, and construct buildings and other structures to meet the building code requirements in your area. Consider the potential for higher elevation areas on the property to become evacuation sites.

- Reinforce building structures and use hurricane straps in accordance with the manufacturer's recommendations. For more guidance on protecting farm structures and buildings from winds and flooding, see the FEMA Compilation of Wind-resistant Provisions, Agricultural Structures and Design Guide for Improving Critical Facility Safety from Flooding and High Winds.
- In hurricane-prone areas, when possible, care should be taken that buildings and structures are not located in the path of trees that may fall or become damaged.
- Pay special attention to feed storage bins and other equipment housed outside of the buildings. Make sure these structures are well anchored and able to withstand hurricane force winds.

Power and backup power

Circuit Breakers

- Know the location of your main circuit breaker and breaker box. The box is generally located inside of buildings, but additional breakers may be located outside.
- Ensure that the breakers, including the main breaker, are correctly labeled. Correct labeling will help you ensure power is cut to the appropriate appliances or to the entire building.

Back-up power

- Back-up power requirements for beef cattle operations can be supplied through either power takeoff (PTO) driven units or engine-driven units. On a beef cattle operation, power may be needed to run water well pumps, feed mixers and stock waterers, provide lighting for examining or treating affected animals, and run other equipment.
- Vehicle and animal collisions are one of the most common adverse events to a livestock operation following a major storm due to fence damage. Permanent fence can become damaged and electric fencing can lose power following a major storm. A backup fencing power source such as a battery or solar energizer and extra polywire or polytape conductors should be kept on hand in case emergency or temporary fencing is needed. A backup generator can also be used as described above to power a fence energizer to provide a maximum of 50 – 60 watts, depending on length of perimeter fence and number of strands used.
- Create a Back-up Power Plan, and store with your Farm Emergency Plan (see "Emergency Planning" below).
- Check local, county, and state codes for any requirements to supply back-up power during short-term emergencies.
- To provide power when the main power goes out, supply critical operating areas with a standby generator wired with a transfer switch. Install generators with enough fuel storage for two weeks of full operation.

- If your facility uses well water, provide backup power for the well until services can be restored.
- Post the operating procedures near each generator. Consult your owner's manual for specific safety, maintenance, and operational recommendations.

Roads, access lanes, and bridges

- Roads, access lanes, and bridges should be maintained to ensure that good accessibility to buildings and animals is available. Plan on alternate routes or access points in the event that roads are blocked by fallen trees or flooded areas. This will also ensure response to an emergency or disaster situation can occur more quickly and efficiently.
- The primary driveway into the farm should have adequate drainage to prevent flooding. The road should be well packed with a solid base that will hold up to heavy equipment and trucks during extreme conditions. For more information on maintaining unpaved roads, see the USDA Environmentally Sensitive Road Maintenance Practices for Dirt and Gravel Roads.
- If you do not have a secondary entrance to your farm, construct one if possible to provide alternative access from a different road in the event the primary entrance is blocked.
- If the facility is in a location where all roads leading in and out may flood, purchase or make arrangements to rent or borrow a boat that can safely navigate the floodwaters to gain faster post-hurricane access to your property.

Drainage

- Total water management is essential, including drainage systems, and must take into account the water table and soil drainage.
- Make sure that the farm is designed according to NRCS standards and that proper drainage away from the buildings is provided.
- Consider creating water retention areas to reduce overall flooding during low to moderate-intensity hurricanes.
- For more information about water management, see Sustainable Agriculture Research & Education's (SARE) *Building Soils for Better Crops* Irrigation and Drainage chapters
- Make sure culverts are properly designed regarding size and location.

Water table

- The amount of flooding will be determined by your land's topography, the amount of precipitation received, and the pre-hurricane water table. The higher the pre-hurricane water table, the more likely that flooding will occur for a given amount of precipitation. The chance of flooding can be estimated by measuring the pre-hurricane water table and considering the effects of varying precipitation amounts:

  A general rule of thumb is that 1 inch of rain will cause the water table to rise about 10 inches in fine-textured soils, 6 inches in most of the flatwoods sandy soils, and 4 inches in coarse sands. It may take 4 to 6 days for the water table to return to its desired levels following rains of 1 inch or more. For example, if the water table is at 50 inches, 6 inches of precipitation will cause localized flooding on fine textured soils, but no flooding would occur on sandy soils.

Trees and windbreaks

- Construct windbreaks. Windbreaks can protect cattle in both the winter and the summer. Natural tree windbreaks can allow summer winds to circulate and provide shade and evaporative cooling to cattle. In the winter, windbreaks can help cattle retain body heat when chilled or wet, or whenever haircoat is unable to provide adequate insulation as in high wind conditions.
- Trees and shrubs used as a windbreak should be native species that will develop strong, deep root systems and be hardy enough to resist breaking during high winds. Permanent plantings commonly used for windbreaks include pine trees. Red cedar (Juniperus virginiana) also resists strong winds well.
- When used as natural windbreaks, trees should be at a density and height to allow for the optimum amount of shade and air movement. Forestry specialists knowledgeable in the topography of the area being utilized should be contacted for further information.
- Windbreaks should be constructed so that they are far enough from buildings that they will not damage buildings if they fall.
- Clear trees away from gates and facilities. Remove trees that could potentially blow down and block the entrance to the farm. Keep trees or shrubs pruned and free of dead or dying branches.
- For more information about how windbreaks can provide economic, environmental, and commercial benefits, see the USDA National Agroforestry Center website.

Fuel and chemical storage

- Store liquid fuel and other chemicals in secure locations away from low laying areas. Always secure large containers and barrels in an upright position to prevent spills and leaks. Maintain material safety data sheets (MSDS) on all chemicals stored in case of emergency. These can be obtained by the manufacturer or retailer of the product.

Debris disposal

- Create a plan for salvage operations including a method of debris disposal. Learn what materials and the specifications regarding composition of materials the landfill nearest your farm will accept, and identify alternatives if needed. For disposal of chemicals or other hazardous materials, follow specific procedures to meet U.S. Environmental Protection Agency (EPA) requirements.

Livestock concerns

- Livestock should not have direct access to streams and ponds when possible. A well-designed stream crossing can protect the stream while still allowing for emergency water access. A 50-300 ft wide buffer of grass or trees should be applied to streams by fencing out pastured livestock.
- If sufficient water trough space is unavailable, access to ponds and streams should be limited. If utilized for drinking water, water can be piped in and supplied from drinking tanks or troughs, or made available at designated stream crossings. Water should be provided through a limited access point to reduce erosion. Contact the local NRCS office for more information on creating crossings and access points.
- Be sure that cattle have access to shaded areas in all pastures and paddocks, not only to protect against heat stress in hotter months but also to provide wind breaks in more extreme weather.
- Areas known to be at risk for sinkholes should not be used to pasture animals during storm season if possible. When used, they should be checked regularly for new formations.
- Ideally, pastures should be free of overhead power lines and debris or large objects, and have two levels of fencing (i.e., interior fencing around the animals, and exterior fencing bordering the property) to reduce the likelihood of cattle escape.
- For more information about planning for and evacuating during hurricanes, see the American Veterinary Medical Association Large Animals and Livestock in Disasters website.

- Develop a continuity of business plan that takes into account the possible emergence of foreign animal diseases such as foot and mouth disease. For more information, see the Secure Beef Supply website.
- For information about beef cattle water requirements and source management, see:
  - Mississippi State University Extension Service website
  - Texas A&M AgriLife Extension website

Animal Identification

- Provide unique and permanent identification for all cattle, as this is important not only for good management practices but also in case there are questions later about ownership of cattle. Animal identification and appropriate documentation can also protect against theft. To learn more about cattle identification, see the USDA Animal and Plant Health Inspection Service (APHIS) Cattle Identification website.
- Determine livestock movement requirements for going to nearby or neighboring states in case evacuation is needed. For individual state requirements, see the InterstateLivestock.com website.
- Register the herd with the state animal health official through an animal or premise identification number (PIN). This allows animal health officials to quickly identify where animals are located in the event of a hurricane. To find state-specific guidance for obtaining an animal PIN, see the APHIS website.

Burial protocols

- Know the regulations concerning animal disposal and locate potential burial sites in areas in accordance with state and local environmental laws.
- Some states require that operations have an approved emergency disposal plan in place before disposing of livestock following a catastrophic event. The plan should include who to contact for approval and assistance. For more information, contact the North Carolina State Veterinarian website.

Emergency planning

Farm Emergency Plan

- U.S. Department of Labor Occupational Safety and Health Administration (OSHA) regulations require an employer with more than 10 employees to have a printed copy of an emergency action plan readily accessible to all employees. (If you have 10 employees or fewer, the emergency plan may be reviewed orally.) For more information about emergency preparedness for farm workers, see the OSHA Agricultural Safety Fact Sheet.

- Your Farm Emergency Plan details how your operation will respond in the event of a hurricane, preparing the operation for a worst-case scenario and ensuring continuity of operation. Additional information can be found on the Penn State Extension website and the Secure Beef Supply website.
- See Appendix: Farm Emergency Plan for a sample plan that you can customize for your operation. The plan should include a checklist of tasks necessary to secure the facilities, fuel supplies, chemical supplies, and equipment; protect any animals on site; disconnect electricity and gas service; ensure that critical supplies are well stocked; etc.
- Make sure that all of your employees know the locations and formats (electronic or hard copy) where the Farm Emergency Plan is stored.
- Review and practice your plan yearly and ensure that it is clear who is responsible for what activities.
- Consider creating a "hurricane suggestion box" where employees can place ideas for training and planning they believe would increase the operation's resilience and safety in the face of a hurricane, based on their previous experience.

Maps and signage

- Keep farm premise maps updated to include fences, gates, and roads to make moving cattle safer in the event of a storm surge or flooding. Given the frequency of animal movements, a brief description of animals kept and photos of types of identification used, such as ranch tags or brands, will also be helpful.
- Detailed premise maps should be included with the emergency plan that illustrate the topography and general location of cattle, roads, bridges, crossings, equipment, buildings, and other large structures.
- Prepare or update maps for all facilities, including locations of alternate entry/exit routes, electrical equipment (with shut-off options), fuel storage tanks (both above and below ground), propane tanks, compressed gas (for welding, etc.), and chemical spill equipment.
- Post signs around the premises stating that trespassing is not permitted. Following a disaster, unauthorized and unwanted visitors such as on-lookers, rescue agencies, humane organizations, or other persons trying to assess damage or gain information about animal care may be attempting to access your property. Agriculture authorities can assist with proper language and signage.

Evacuation planning

- Identify potential evacuation sites well in advance of hurricane season, keeping in mind that public facilities normally used for agriculture or exhibition purposes may be allocated for other purposes during a disaster situation. Collaboration with other farms to provide evacuation space will help free up the usual public facilities for housing rescued animals or other uses. Alternate sites include fairgrounds, racetracks, stockyards, or other show facilities.

- An evacuation route should be identified in advance, along with a backup route. Meetup locations and return and reunification plans should also be made and communicated.
- Partner with other farms for potential transportation needs, noting the number and types of livestock trailers available. Ensure that agreements are in place with other farms or facilities so that cattle can be evacuated quickly if necessary.

Hurricane tracking apps

- Download one or more computer and mobile device applications (apps) that model hurricane track predictions, send alerts, and track hurricane impacts. Given the rapid advance of mobile technologies, check for new options each year prior to hurricane season. The NOAA National Hurricane Center website is a good source for keeping up to date on the latest hurricane activities. For more information about emergency alerts, see the U.S. DHS Ready.gov website.

Roles and responsibilities

- Consider bringing together a disaster planning team, which could consist of the farm owner and engaged family members, the farm manager, herd veterinarian, an insurance representative, county extension agent, and other individuals. Members of the team should be:
  - thoroughly trained and physically capable of performing assigned duties
  - knowledgeable about the hazards found on the farm
  - trained in decision making regarding when to take actions themselves and when to wait on outside emergency responders
- Define a chain of command with clearly defined primary and secondary roles and each person's responsibilities. Some individuals may not be reachable after a hurricane, so alternative levels of authority need to be established to resolve critical issues quickly. In your Farm Emergency Plan, list who will be responsible for each task and how they'll report fire, flooding, building collapses, and other emergencies. Identify procedures to be followed by the people who remain to handle critical operations.
- Develop protocols for animal triage, treatment, humane euthanasia, and depopulation if that should become necessary. Only trained persons should perform such activities. To learn more about euthanasia for animals, see the American Veterinary Medical Association Guidelines for the Euthanasia of Animals website.

Communication

Emergency Contacts List

- Develop relationships and maintain a contact list of all people connected with your operation that should be contacted in an emergency, including your veterinarian, county Extension agent, and local emergency management agency.

- Establish communication with your local emergency management agency, law enforcement and fire departments, electricity and gas providers, and other key groups to help them understand the nature of your business so that they can respond as needed in the event of a hurricane. Let them know the number of employees typically on site, the potential impact of the hurricane on animal welfare, and the potential hazards that could lead to environmental contamination in the event of flood or structural damage. It is a good idea to share your Farm Emergency Plan with these groups as well. Detailed farm maps should be included with the emergency plan, along with a description of animals kept and types of identification used so that animals can be quickly identified after an event.
- See Appendix: Emergency Contacts List for a template that you can customize. The Emergency Contacts List should include names, phone numbers, email addresses, locations, and all other pertinent information for individuals (owners, family members, employees, employee family members), emergency responders, state and local agencies, contractors and suppliers, and anyone else who is on your farm on a regular basis or provides crucial emergency services.
- Keep copies of your Emergency Contacts List—hard copies as well as electronic copies—in multiple locations including your home, office, and vehicle; with all family members and key employees; and in additional safe locations. It is a good idea to have this information stored on your and your employees' mobile devices.

Lines of communication with local businesses and officials

- Consider putting a buddy system in place with other farms to decide which neighbors are responsible for checking on each other and identify which resources may be shared.
- Develop a communication tree with neighboring farms and business partners and have alternate communication plans in place.
- Discuss biosecurity issues with your neighbors and partners in case animals have to be commingled during transportation or evacuation. Cattle that undergo evacuation before or after a disaster will be stressed and likely to become more susceptible to infectious diseases.
- Establish relationships with local agriculture businesses and farm cooperatives to ensure a supply of fencing panels, electrical fencing, water tanks, and other equipment that may be needed quickly following a hurricane.

Post-hurricane Communications

- A two-tiered system of communication (primary and backup) should be established for both personal and business/farm contacts. For example, in addition to phone or text modes of communication, email or electronic board

services may be utilized. A personal reunification point or out-of-state point of contact should also be designated.

- Purchase a battery-powered or hand-crank radio to stay up to date about conditions beyond your property in case you lose electricity for an extended period of time.
- Consider ahead of time the locations where producers and others could meet if all communication lines are down (e.g., a local feed or equipment supplier).
- Contact a local AM radio station to see whether it could serve as a communication channel in the aftermath of a hurricane. The local emergency management agency may also have a communication plan for critical business operations.
- For more information about communicating before, during, and after a major disaster, see the FEMA website.

Electricity and gas

- Contact your local utility company for guidance on how to disconnect power in the event of downed lines. Record their instructions in your Farm Emergency Plan.
- If certain equipment requires specialized shutdown procedures, train employees in these procedures.

Equipment operation

- Train personnel in the safe operation of unfamiliar equipment (such as generators or drainage pumps) that they may have to use in case of a hurricane.
- Make sure the appropriate employees are prepared to set up your back-up generators. They should refer to your Back-up Power Plan for information about where generators and generator fuel can be found, where they should be placed in preparation for a hurricane, and how they are to be connected to the electrical loads they will power.

Drones

- Consider obtaining an unmanned aerial vehicle (UAV) (i.e., drone) pilot license and purchasing a UAV. Small UAV quadcopters or hexacopters that can be equipped with visual or RGB cameras are relatively inexpensive ($500 to more than $2,000). Use of UAVs will help with damage assessment if accessing your operation directly is impossible or unsafe. For regulations and more information about operating a UAV, see:
  - U.S. Department of Transportation Federal Aviation Administration Unmanned Aircraft Systems website
  - University of Florida IFAS Extension Preflight and Flight Instructions on the Use of Unmanned Aerial Vehicles (UAVs) for Agricultural Applications

Chemical safety

- Producers should be trained in the proper storage, use, and disposal of all chemicals used on the operation. Some states require applicator licenses for all persons applying chemicals into the environment. Judicious use of medications and chemicals used on cattle such as insecticides should also be practiced during disasters. Safe handling instructions, including the use of appropriate personal protective equipment, should be included on all product labels.

Basic emergency response skills

- Cattle handling and transportation skills will be extremely important during disaster situations. Training in these and other management areas can be obtained through your local Extension livestock specialist or the state or national Beef Quality Assurance Program.
- For an overview of hazard assessment, the reduction of economic losses, human and animal suffering, and continuity of business, see the FEMA Livestock in Disasters website.

Long-Term Operation Maintenance

Periodic checks of systems already in place
(described in the previous section)

Prior to hurricane season

Contact your local Extension office and other State and Federal resources for further information specific to your circumstances.

Annual review of emergency planning tasks

Farm Emergency Plan review and reassessment

- Review and practice your Farm Emergency Plan with your employees, ensuring that they are familiar with all elements and giving them a refresher course in the activities they are responsible for. After each practice run, create an "after action review" to document what went right, what went wrong, and what can be improved in the plan. Make any necessary additions or updates (contract numbers, permit numbers, etc.).
- Contact third-party vendors to make sure they are still willing to provide services. Farm managers should keep this information on site in a secure location as well as in their personal electronic devices.
- Review your Emergency Contacts List with your employees and update it with current names and contact information.
- Review and revise livestock disposal plans (described above) as necessary.
- Review items provided in the "after action review" and "hurricane suggestion box," and add them to your Farm Emergency Plan or training list as relevant.

Employee training

- Identify key tasks that employees will need to complete during hurricane preparation and recovery operations.
- Once each year, provide training for all employees that will participate in the key tasks identified above.

Personal health and safety tasks

- Make sure you and your employees have up-to-date tetanus shots.
- For information and links to time-specific guidance for preparing yourself and your home, visit the U.S. DHS Ready.gov Hurricanes website.

- Download the FEMA Mobile App to learn emergency safety tips, receive real-time weather alerts and important disaster planning reminders, information about shelters and recovery centers, and more.

Recordkeeping, documentation, and insurance

- At the time of renewal, review your insurance policies with your agent to be sure that you have adequate flood insurance and coverage for vehicles, farm buildings and structures, and livestock.
- Work with local emergency management and State Extension personnel to determine what disaster assistance you may be eligible for after the hurricane.
- Maintain a detailed inventory list of cattle, equipment, supplies, hazardous chemicals, fertilizer, and fuel. Take pictures and video of livestock and other farm implements and structures for insurance and disaster payment purposes after a hurricane. This may also help recover lost property in the event of theft.
- Maintain and update records on your cow herd, including animal identification, breed registrations, treatments, and vaccination procedures. Proper records must be maintained for cattle identification efforts to be meaningful and can also ensure that animals that have been treated do not enter the food supply until drug withdrawals have been met. Store copies of these records in a remote or cloud-based location.
- Keep animal production records and update them at minimum after breeding/pregnancy exam and calving. Farms that do not keep adequate production records are unlikely to be able to claim full compensation for lost production. Reimbursement for animals is usually based on fair market value at the time of loss.

Infrastructure

- Routinely walk around the farm premises and identify potential problems such as compromised fences, sinkholes, and downed trees to reduce potential accidents and liabilities.

Buildings, facilities, and transportation

- Inspect all buildings and all facilities for structural soundness. Perform maintenance on facilities and infrastructure to repair items such as loose roofing materials or improperly/inadequately grounded electrical equipment to reduce hazard risk during a hurricane.
- Always keep cattle trailers in good repair so they will be safe for hauling livestock on short notice. Trailers should have safe flooring, working lights, and good tires (including spares).

- Keep barns, water systems, and other essential farm components in good repair. Doing so will decrease the amount of work that will need to be done before the arrival of a storm. Repair loose boards and tin on barns, pens, and other farm structures near livestock.
- Maintain penning and loading facilities in good working order. Make fencing repairs, such as replacing rotten or damaged fence posts, ahead of time so that fencing will be as strong as possible before a storm hits.

Drainage

- Clean out culverts and ditches and other drainage areas especially before and during the peak hurricane season. Keep ditches clear through a good maintenance program including chemical weed control. Regrade areas of the property that are prone to flooding to improve drainage.
- Check any new construction areas, housing developments, or Department of Transportation projects nearby to see whether they are affecting your land's drainage. Determine where the water is draining now, and address any new drainage needs before hurricane season begins.

Maintenance of trees, windbreaks, and roads

- Remove dead and dying branches from trees on your property.
- Windbreak sites should be monitored carefully for mud buildup and soil erosion and damage since cattle may tend to congregate in these areas. If these conditions exist, artificial windbreaks that can be moved, such as fences or large round bales, should be considered.
- Maintain windbreaks with regular pruning, especially if they are close to aerial power or telephone lines. To learn more about proper pruning practices, see:
  - Inland Urban Forest Council A Practical Guide to Proper Pruning of Trees and Shrubs
  - OSHA Line-Clearing Tree Trimming Operations website
- Evaluate roads for any repairs or improvements that need to be made before storm season.

Generators

- Perform routine maintenance every six months (or more often if recommended by the manufacturer) on backup electric and water systems as well as all other essential equipment.
- Do routine annual maintenance on backup generators. Replace old stored fuel with new, fresh fuel. Replace fuel filters, test all generator circuits, and make sure you have all necessary supplies on hand, including spare belts and fuel filters.
- Ensure that all essential equipment functions when powered by the backup generator.

Emergency supplies

- Maintain an ample supply of emergency medical supplies and have raincoats, boots, and gloves available for employees.
- Maintain a supply of drinking water and dry and canned food sufficient for at least 2 weeks for employees who become stranded at the facility or who need to return to the facility before utility and emergency services are restored.
- Maintain an ample supply of weather-proofing supplies such as tarps and sandbags; fencing supplies; plumbing supplies; lumber, construction tools, nails, and ropes; portable lights; batteries; and battery-powered or hand-crank radios.

Livestock considerations

Animal health

- Ensure a proper herd health program is in place with assistance of a licensed veterinarian. Cattle should be current on vaccinations and maintained in an adequate body condition score of 5 to 6 depending on age and stage of lactation. Proper vaccinations will help protect cattle from conditions that may increase following stress and injury, such as respiratory disease, gastrointestinal disorders, and tetanus.
- Maintain emergency medical supplies for your cattle. Basic veterinary care products and livestock pharmaceuticals are often needed following a major storm and should be readily available. Gather these items ahead of time and place in a secure area. Items that should be included in a livestock emergency kit would include medications, syringes/needles and dosing guns, feed supplements, halters, ropes/lariats, health records, animal identification and proof of ownership.

Crop and pasture rotations

- Depending on the season, cattle may not be easily accessible if they have been moved for calving or grazing purposes. Plan crop and pasture rotations so that livestock will have easy access to higher ground in times of hurricane and flooding threats.
- If in a flood-prone coastal area, consider planting grasses that are fairly tolerant of salinity such as Bermudagrass and Bahia grass. Saltwater contamination of soils or water standing on pastures or hayfields for extended periods of time may result in stand losses and soils that will not produce acceptable forage growth.
- To learn more about hurricane preparation and recovery for forage crops, see the USDA Southeast Climate Hub website.

Monthly considerations during hurricane season

See Appendix: Resource Links for local Extension offices and other State and Federal resources which you may consult for further information.

Weather monitoring

- During the June to November hurricane season, pay regular attention to long-term weather forecasts. Check your weather tracker daily if a hurricane is forecast to move closer to your area.

Equipment and supplies

- Inspect buildings and make repairs if needed.
- Supplies that take longer to deliver should be reviewed monthly to ensure they are available during a hurricane.
- Check list of equipment and supplies for repairs that may be needed after the hurricane.
- Refresh emergency medical supplies, water, and dry and canned food supplies.
- Obtain sufficient quantities of plywood to protect windows and doors and store in a dry area. Once a hurricane is actually approaching, plywood may be scarce or unavailable.

Farm equipment

- Contact your equipment manufacturers to establish procedures for dealing with damaged equipment. Make sure you won't invalidate your warranty if you attempt repairs yourself.

Fuel

- Consider fuel needs for tractors, generators and farm vehicles. Any fuel stored on site poses a contamination risk if storage tanks are not adequately protected from flooding, especially if stored at a low elevation. If secure storage facilities are available on site, arrange for fuel deliveries several days prior to the expected hurricane impact.

Generators

- Verify there is adequate fuel to power generator for at least 2 weeks.
- Test backup generators monthly. Make sure all critical equipment—including ventilation, feed, and waste management systems and the well (if you use one)—can be attached to the generator and that the generator has adequate power to supply all critical loads.

- Provide routine maintenance on generators, which includes checking the belts, checking fluid levels, tightening clamps and connections, and making sure rodents haven't chewed up any wires.

Short-Term Preparedness

Specific actions to be done in the week before a hurricane arrives

Bracing for the hurricane

(1–7 days before a hurricane is forecast to strike)

First and foremost, take whatever precautions necessary to protect your family, your employees, and yourself. After that is accomplished, focus on protecting your farm. Once forecasters have put your area in a hurricane's path, there are a number of precautions you should take to prepare.

Employees' roles and responsibilities

- Review your Farm Emergency Plan with your employees and make sure that it is up to date. Discuss each person's responsibilities and develop a care schedule for the animals. At no time should any employee be expected to put their life in danger to care for the animals. Employees should stay on site only if they can do so safely—if people will remain on site, make arrangements for food and water. If the facility is located where incoming roads may flood, locate and stage a boat that can safely navigate the floodwaters.
- Continue to monitor hurricane track and strength updates. Listen closely for evacuation orders in your area.
- Determine whether individual employees plan to evacuate or stay during the hurricane. For those who evacuate, establish a schedule for checking in after the hurricane so that they know the extent of the damages and when it is safe to return. For employees who stay, be sure they have safe lodging, sufficient food and water, and an established plan for checking in.
- Ensure that personnel have training in first aid and key personnel know how to operate unfamiliar equipment (for example, a chainsaw to remove trees blocking roads)

Communications

- Confirm communication methods and update contact information for emergency planning team and emergency management resources (veterinarian, feed distributor, local emergency manager, etc.).
- Make sure you have communicated with employees and suppliers to verify your hurricane plans. Communicate with employees any last-minute modifications to the emergency action plan.

- Ensure that all communication equipment is in good working order. Mobile devices are good for communication, but ensure radios are available and in working condition. Keep mobile devices fully charged. Have rechargeable battery packs or charging cables for vehicles to maintain communication. Texting may be a more valuable form of communication than calling when phone networks may be overwhelmed.

Food, water, and cash

- Make sure persons on your operation still have a 2-week supply of drinking water as well as dry and canned food.
- Secure cash reserves for purchasing supplies after the hurricane. In widespread power outages, credit and debit cards will not work, and many vendors do not accept checks.

Recordkeeping, documentation, and insurance

- Ensure that important documents are in a safe dry, place and that duplicates are in alternative locations off site.
- Document the condition of your facilities, equipment, and animals. Take photographs and video where helpful
- If you have insurance through FEMA's National Flood Insurance Program, your policy may cover up to $1,000 in loss avoidance measures such as installing sandbags and water pumps to protect insured property. Check with your insurance provider to confirm. Keep copies of all receipts and a record of the time spent performing the work and submit these documents to your insurance adjuster when you file a claim to be reimbursed.

Equipment

- Most injuries following a hurricane are caused by flying objects. Minimize the presence of equipment, supplies, and debris that may become airborne with high winds or encountered in floodwaters to lessen the risk of injuries to animals, people, or structures.
- Fill troughs, bins, and other large vessels with water to help hold them down under high wind conditions.
- Move machinery to a secure location, or higher ground, or secure in place using ropes or chains or other restraint methods. Remove keys from equipment, set brakes, and lower spears.
- Secure farm tools such as rakes and shovels that can serve as projectiles in a hurricane.
- Charge solar fence energizers.

- In the event of an impending storm, move essential items such as chainsaws, generators, fuel, portable lighting, and other emergency equipment to an easily accessible yet protected area.

Infrastructure

Backup generators

- Be sure your backup generators are fully operational, with full fuel tanks and portable fuel storage tanks. Your generators may have to run for several days until the power company can restore electricity. Review the owner's manual for the maximum run time and other unit specifics.

Fuel

- Service stations will not be able to supply fuel if they do not have electric power for the pumps, so make sure portable fuel storage tanks are full.
- Any fuel stored on site poses a contamination risk if storage tanks cannot be adequately protected from anticipated flooding. Move them to higher ground or secure in place.

Buildings and grounds

- Nail down or board up windows and doors if necessary, so that they cannot come open or become hazards during a storm.
- Look for any protrusion on fences and gates and make appropriate repairs (e.g. nail down boards, remove nails or protruding objects, secure gates in position).
- Protect electrical switchboxes to reduce hazards around the premises.

Electricity and gas shut-off

- Consult your Farm Emergency Plan and follow procedures for disconnecting electrical power and gas to some or all buildings and any non-critical equipment in danger of being flooded.

Roads

- If the roads leading to the farm are likely to flood, stage your boat in a secure, easy-to-access location or confirm availability of an unmanned aerial vehicle (UAV) (i.e. drone) for post-disaster assessment.

Supplies

- Review inventories of essential items and order any additional supplies that can be delivered before the hurricane.

Livestock

Fencing and housing

- Padlock gates to areas that cannot be supervised unless they contain critical water or feed sources.

- Keep fencing supplies on hand for repairing existing boundaries. Consider investing in temporary electrical fencing or orange plastic-mesh fencing for temporary use after the storm.
- High winds, rushing water, and falling trees can wreak havoc on fencing. Downed fences mean roaming cattle. Make sure cattle are uniquely and permanently identified in case they get displaced, lost, or even stolen.
- Cover sharp edges of implements and equipment with straw bales or other padding to protect livestock from these objects in the event that high winds push them loose. Avoid using hay, as animals may try to eat it and become injured by underlying structures.
- If not evacuating animals, determine who will check on them after the storm and care for them. Work with neighbors to take care of each other.

Feed, water, and veterinary supplies

- Ensure adequate feed and water supplies for cattle and purchase additional feed if necessary. Cattle should have access to plenty of food and a steady supply of fresh water to sustain them for 7 – 10 days following a severe weather event. A staging area for feed and hay may be located with the help of local emergency management officials.
- Move stored or bagged feed and supplements to a secure area to protect against flooding and ensure feed will be easily accessible after the storm.
- Protect hay supplies as well as possible by stacking on higher ground and covering bales to prevent water damage. Extra hay can be put out on higher ground - this will be especially important if you aren't able to reach the cattle for several days.
- Locate fresh water sources, which should be made available as storm surge and floodwaters are likely to contaminate local water sources with elevated bacterial counts and may also contain toxic substances or high levels of salt.
- Make sure you are well stocked with the basic veterinary care products and livestock pharmaceuticals that may be needed following a major storm. Your veterinarian can help you be prepared to treat common post-storm injuries such as punctures and lacerations, footrot, and mastitis. Ensure medications have not expired.

Identification

- In an emergency, cattle and calves can be temporary identified by farm name, location, and phone number using spray paint or paint sticks. This should not take place of permanent animal identification, but may provide a quick, visible method of identification following a storm.

Evacuation

- A general rule is to start evacuation procedures of livestock 96 hours prior to a predicted hurricane landfall. If you wait too long, you run the risk of severe traffic backup and contraflow traffic patterns, which could delay evacuation and put animal health at risk. Cattle stranded in trucks for long periods of time are more susceptible to heat stress and injury. Furthermore, evacuation of cattle may not be allowed at all once mandatory human evacuation has been declared.
- Know the possible evacuation routes and any emergency traffic patterns. Be sure to plan alternate routes. This information and other important emergency-related resources can be found on the North Carolina Emergency Management website.
- Preplace or stage portable facilities and gates to allow cattle to become familiar with the equipment before evacuation begins.
- Confirm livestock movement requirements if going out of state, and acquire proper health papers, or certificates of veterinary inspection (CVIs). Electronic CVIs may also be available. Many states will waive interstate movement requirements when a disaster is declared or pending or in emergency situations. Individual state requirements can be found at InterstateLivestock.com website, but should be confirmed with the State Animal Health Official when a disaster declaration is made or expected.
- Take plenty of water, feed, hay, and veterinary supplies to the evacuation destination. Adult cattle can require 10 to 25 gallons of water per day, and up to double this amount in hot weather. Confirm who will be taking care of the animals at the evacuation site.
- In the event that it is not possible to evacuate or save all animals, prioritize the protection measures implemented based on market value, age, breeding status, and other factors so that genetics can be preserved, and economic losses can be minimized.
- Record the number and animal identifications of those left behind to expedite recovery, identification, and reunification after the storm.
- Storm surges (flooding) can be even more destructive than the hurricane itself in coastal areas. In these areas it is especially important to allow cattle access to higher ground. If necessary, tie interior gates open to give cattle access to more drinking water and to provide them with a better chance of moving to safer/higher ground. Do not leave any gates loose or open.

One day before the hurricane strikes

Personal Safety

- Perform a final verification of the hurricane track and strength. Listen closely for evacuation orders for your area.
- Obey all mandatory evacuation orders. Failure to do so can put you and your workers at risk and could tie-up rescue resources. Do not require your personnel to be present on the farm either, since they also have to prepare themselves and their families.
- Employees who will evacuate should do so at least 1 day prior to hurricane impact. For staff who will remain on site, confirm that they have access to structures on high ground or elevated slabs or pylons that can withstand hurricane winds and rain, sufficient stores of clean water and food, medical supplies, working radios or cell phones, and sufficient battery or generator power. Those workers remaining on site will likely need to rely on mobile device communication with evacuated supervisors and colleagues, since local radio and television communications often black out for several hours as a hurricane passes. Local first responders may also be out of communication at the time of hurricane impact.
- Personnel remaining on site to monitor the farm until the last moment should keep an eye on water levels in low-lying areas so that they may give sufficient warning and allow workers to exit the operation before levees, surrounding roads, and highways are blocked with floodwaters.

Infrastructure and livestock concerns

- If there is danger of flooding or water damage, move remaining machinery, feed, grain, pesticides, and herbicides to higher elevation within 24 hours of a hurricane forecast to impact your area.
- Gas and electricity to power boxes located in barn structures should be turned off within 24 hours of a hurricane forecast to impact your area.
- Turn cattle that have not been evacuated loose in large pastures or pens on high ground, in areas free of overhead power lines and debris or large objects. When available, move the cattle to a pasture or paddock that is contained within an additional outside perimeter fence to provide another layer of security if fence lines are compromised. If unfamiliar pastures are used, do this at least 24 hours prior to expected impact so that cattle can inspect boundaries.
- Within 24 hours of a hurricane forecast to impact your area, fill water troughs for animals in areas without a pond and have portable water tanks ready to water cattle after the storm.

Post-Hurricane Recovery

Activities that can be taken to minimize losses immediately after, a week after, and a month after a hurricane

Immediately after the hurricane has passed

When the hurricane has passed, proceed with extreme caution as you begin to inspect for damage. Consider all downed power lines to be energized and lethal! If there are structures that were damaged, there will be debris that could have exposed nails, screws, splinters, or sharp edges that could potentially cause injury to people and animals.

Safety

- Make safety your first priority. Do not rush back into a facility until you are sure it is safe. Use extreme caution due to the potentially injurious situations presented by weakened trees and damaged structures, equipment, and electrical and gas systems.
- Continue to watch the weather forecast. Are waters still forecast to rise more than they are now? Some floodwaters peak up to a week after the hurricane.

Electricity and gas

- If damage to the premises has occurred, gas and electricity should not be turned on until inspected by the gas company and/or electrician.
- If electricity is out, generator power may be needed to pump water from wells. Power may also be needed for permanent or temporary electric fencing.
- Avoid downed power lines as these may still be live and represent an electrocution hazard. Operate on the assumption that all downed power lines are live.
- When restoring electricity to buildings that have flooded, use extreme caution and consult with an electrician and your power provider. See the Alabama Cooperative Extension System guidance on restoring electrical power after flooding.
- Natural gas or liquid petroleum (LP) gas leaks can cause deadly explosions. Check for natural gas or LP gas leaks, and if a leak is suspected, turn off the gas, evacuate the area, and notify your gas company and local law enforcement. Tell employees to stay clear.

Groundwater

- After a flood event, groundwater should be used with caution for any purpose if contamination is suspected anywhere in the general vicinity.

Roads and buildings

- Before entering any buildings, check for levee breaches, rising or incoming water, and evidence of structural fire or damage.
- As soon as it is safe, call in the employees needed for inspection and clearing debris from roads. Cordon off areas that are unsafe.

Security

- Watch your farm for unwelcome visitors like looters and activists. Secure your equipment and farm entrances, and make sure any security cameras are operational.

Recordkeeping, documentation, and insurance

- In the aftermath of a hurricane, take detailed notes of livestock, pastures, and crops damaged with accompanying photographs demonstrating the losses, as this may be critically important later. Do not begin cleaning up or repairing damage until you have thoroughly documented the damage.
- Contact your insurance agent and provide preliminary report of any livestock losses or injuries. Be sure to document all claims before animals are buried or disposed of. (See "Within a week following hurricane impacts" below regarding post-hurricane documentation)
- If you have experienced flooding and have flood insurance through the FEMA National Flood Insurance Program, visit their website for more information about starting a claim.

Livestock

- Wait and check on livestock only once conditions are safe to do so. Pay special attention to rising water levels and downed power lines. Likewise, barns or other structures should not be entered until determined to be structurally safe.
- Ensure confinement of animals for their own safety as well as the safety of people. Perimeter fencing is the first priority. Restore fencing as soon as possible (temporary or permanent) to keep cattle contained. Cattle that are roaming free could be a hazard to motorists, first responders, or others in their vicinity.
- As you round up cattle, take great care to avoid downed power lines and other hazards.
- Behavioral changes in cattle are not uncommon following stressful events, and animals that are normally calm may have altered demeanors. As always, work safely and utilize low-stress cattle-handling techniques when gathering and moving cattle.

- Working facilities should be inspected for fitness of use in case animals have to be gathered for inspection or treatment.
- Common injuries are caused by flying debris and collapsing structures. Provide immediate veterinary care for punctures, lacerations, and other wounds as soon as animals can be safety contained.
- If flooding has occurred where animals are located, consider moving them to drier area if safe to do so. If standing water may be present for prolonged periods of time, mounds can be built for cattle to access dry areas for resting and feeding when equipment and dirt is available.

Feed and water

- Stressed cattle may have a reduced feed intake. While water and feed consumption are dependent on many factors, adult cattle will need approximately 15 – 20 gallons of fresh water and 20 – 25 pounds of grass or baled hay per day. Ample medium-quality hay should be provided, grain and other supplements should be limited to 0.5% of body weight per day, and abrupt diet changes or feeding unfamiliar feeds should be avoided immediately after the storm.
- Ensure fresh water supply for cattle. Adequate tank space (1 foot/head) should be provided for 10% of the animals. If water contamination is suspected following a flood, have water tested for hydrocarbons, coliforms, and heavy metals before use. Until results can be returned, avoid water with suspicious odors, pigments, or oily residues.
- If biological or waste contamination is suspected, stored water can be treated with 2 gallons of unscented liquid household chlorine bleach (5.25%) per 100 gallons of water. Wells can be treated by adding 1 gallon of bleach in 3 gallons of water to the well, running water until chlorine is smelled, then letting the water system sit for 24 hours before using.
- If animals were without water for an extended period (more than 6 – 12 hours), take precautions to prevent salt toxicity by gradually offering small amounts of water at a time. Frequent offerings (every 1 – 3 hours) of small amounts (1/2 – 2 gallons per head) of water should be delivered. All confined animals should have equal access to water to avoid any under or over- consumption.

Within a week following hurricane impacts

Personal health and safety

- Take care of yourself during recovery. Disasters and the recovery period afterward take a toll on human health. Disaster recovery takes a long time and can be very stressful. For guidance to help you through this difficult time, see:
  - Colorado State University Extension Coping with Natural Disasters
  - North Carolina State University Extension Tips for Handling Family Stress After Disasters

Communications

- Stay current with local response activities and events that may impact your farm. The local supply/seed stores are often natural sources of information if the power is down and electronic communication is limited. In addition, radio stations have generators that allow them to transmit if their towers are not damaged.

Recovery assistance

- Before beginning cleanup, talk with your insurance company and consult with disaster assistance program agents to learn about available programs, eligibility requirements, and application procedures (see "Disaster assistance" below for more information about assistance programs).

Documentation of damage

- Many disaster assistance programs will become available after the disaster, perhaps even years later, and an operation can only receive assistance for damage that was documented. For instance, the Emergency Conservation Program (ECP), administered by FSA can compensate farmers for repairing damage due to a natural disaster which would create new conservation problems. The work must be documented, and farmers must have gotten authorization from their local USDA office in advance.
- Contact insurance agent as soon as damage is discovered. Continue to document all damage to property and livestock with photographs to assist with insurance recovery purposes.

Photos and video

- Continue to photograph and take video of damaged facilities and property as soon as damage is discovered, with written notes describing what is in the pictures and where they were taken. Take photos or video before beginning any cleanup or repairs. This "after" documentation will be used with your pre-hurricane "before" documentation to clearly show your losses.

Drones

- If you own and have a license to operate a drone, utilize it now to take aerial photographs of damage to your operation. Local extension offices might have access to drones and personnel with a drone pilot license to assist you

Written records

- Keep a notebook with you throughout the recovery period. Describe the work you did and record all expenses. Keep a running log of names and what was discussed during conversations with insurance, State, and Federal agency contacts to create a valuable, third-party record of your recovery efforts that can be used later as documentation for disaster assistance programs. You may not remember everything that was discussed at these meetings, so have a second person involved in the conversations if possible so that one can ask questions and the other can take notes.

Disaster assistance

- Communicate early and often with recovery assistance contacts. Check in with them throughout the recovery process. Note that assistance will vary from one hurricane to the next and one budget year to the next.
- Call your local FSA Office to report any losses or damages and inquire about available assistance programs, application procedures, and deadlines.
- Check in with your local Cooperative Extension office, USDA agencies, and your State department of agriculture to see what assistance may be available following the hurricane.
- Consult the following resources:
  - FEMA Individual Disaster Assistance website to find the closest recovery center and other resources to assist you during your recovery
  - USDA Disaster Resource Center's Storms website for updates on emergency designation areas and available assistance programs
  - Farmers.gov, including the five-step Disaster Assistance Discovery Tool to learn which USDA disaster assistance programs are available to assist you with your recovery
  - U.S. Department of Labor's Disaster Unemployment Assistance Program website
- To learn more about USDA Disaster Assistance Programs that may be right for you, see:
  - Livestock Indemnity Program (LIP)—FSA program for eligible livestock owners and contract growers who experience above-normal livestock deaths due to specific weather events as well as disease. To receive benefits, producers must file a "notice of loss" within 30 days of livestock death or injury and submit an application for payment within 60 days after the calendar year in which the loss condition occurred.

- Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish Program (ELAP)—FSA program that provides payments to qualifying producers to help compensate for losses
- Emergency Farm Loans—FSA program that provides eligible farmers and ranchers low-interest loans to help them recover from production and physical losses
- Disaster Set-Aside Program—FSA program that allows eligible FSA borrowers to skip an annual installment payment and move it to the end of the loan repayment period
- Emergency Watershed Protection (EWP) Recovery Assistance—USDA Natural Resources Conservation Service (NRCS) program that provides financial and technical assistance to quickly address serious and long-lasting damage to infrastructure and land
- EWP Floodplain Easement Program (EWPP-FPE)—NRCS program option for converting land to permanent easements for the purpose of improving floodplain management and reducing the threat to life and property
- Environmental Quality Incentives Program (EQIP)—Year-round NRCS rehabilitation program with funding authority to provide financial assistance to repair and prevent excessive soil erosion caused or impacted by natural disasters
- Emergency Conservation Program (ECP)—FSA program with technical assistance through NRCS that helps eligible farmers and ranchers repair damage to farmlands caused by natural disasters

Insurance claims process

- Begin the insurance claims process (Federal, private, or both). Accurate losses of inventory and equipment may not be fully documented yet, but insurance claims can take months to resolve following hurricane events, so start the paperwork now

Infrastructure assessment and repairs

- Assess damage to equipment and infrastructure and form a prioritized list of needed repairs.
- Gather quotes from qualified vendors to make repairs to facilities and equipment. Vendors are often overwhelmed in the months following a hurricane, so making contact soon after the hurricane is important for an expedient response.
- Monitor fuel levels in backup generators and order additional fuel as needed.
- Examine pastures and remove trees and branches that could potentially harm animals when their leaves or nuts are consumed, such as buckeye (horse chestnut), wild cherry (black cherry), and oak trees (acorns).

- Metal, old wire, batteries, paint cans, and other debris can be hazardous to both people and animals. Remove debris from pastures and animal areas. This is a good task for volunteers who may be wanting to help with recovery efforts.

Floodwater contamination

- "Floodwater" refers to the overflow of external sources of water such as rivers or canals and not to direct precipitation that may pool in or near your fields or facilities. Contact your local environmental or health authority to ensure that floodwater contamination has not occurred on or near your premises.

Feed and water supply

- If you have a well, regardless of whether the wellhead was flooded, submit groundwater samples for microbial and chemical testing to ensure that the aquifer was not contaminated. Also monitor wells for coliform contamination.
- Floodwaters may contain elevated levels of pathogenic bacteria and chemicals, which cannot be removed from feed once contaminated. The U.S. Food and Drug Administration (FDA) considers all human and animal foods that come into contact with floodwaters to be adulterated. If you must destroy and dispose of food products, keep documentation showing that the crop did not enter the food supply.

Forage Crops

Crops for animal consumption

- All forage that has not been harvested should be inspected to determine its suitability as feed. Do not harvest forage from fields contaminated by floodwater containing chemicals or human pathogens. Forage in non-flooded fields will have reduced quality due to increased ash contamination from wind and rain, could have increased concentrations of toxins from prussic acid (forage sorghum, sudan grass, and sorghum-sudan grass), and will be subject to mycotoxin contamination after the hurricane.
- If your crop was intended for animal food, see FDA guidance at:
  - Crops Harvested from Flooded Fields Intended for Animal Food: Questions and Answers
  - Resources for Animal Food Producers in Flooded Areas
- If your fields have been flooded with off-farm water sources, be aware of weed seeds that have not traditionally been a problem on your farm but could have been carried in and be aware of the management implications from this in subsequent seasons.

Soil contamination

- If floodwater entered your fields, consult your local U.S. Food and Drug administration (FDA) office and State, industry, and/or university Extension specialists for guidance before harvesting forage. The U.S. FDA recommends determining the source of floodwaters (and the likelihood that they carried human pathogens), letting fields dry before reworking, and testing for pathogens. Other specialists suggest a 30- to 60-day wait period to reduce bacterial contamination of soil. Chemical contamination may require a longer waiting period depending on the chemical and the level of contamination. Pastures contaminated with salt water may be unsuitable for grazing until purged with fresh water (i.e., rainfall).
- Collect soil samples throughout the flooded portion of your fields and test them for known contaminants and general chemical contamination. For more information about soil testing, visit the North Carolina Cooperative Extension website.
- Take measures to avoid cross-contamination between flooded and non-flooded fields. Do not use equipment in a non-flooded field that was used in a flooded field unless it has been cleaned and sanitized.

Livestock

Cattle handling safety

- Check cattle inventory, and report any missing or lost animals to neighbors, animal health officials, brand commissions, and sale barn personnel as soon as possible.
- Do not return cattle to the affected area until the hurricane has passed, resources are available, and it is safe to return. Be careful not to overcrowd cattle in small areas for extended periods of time.
- Make notes of commingling situations and isolate any animals that appear injured or ill. Identify any animals exposed to potentially hazardous chemicals or toxins which may cause food safety concerns if contacted or ingested. For example, pesticides or chemicals that contact the skin or hide could be absorbed by the animal and make the meat from the animal adulterated. In addition, many "well-wishers" after a disaster try to treat or comfort animals by giving them prohibited drugs or substances such as antibiotics or fly sprays which would render the animal unsafe for consumption.
- Some management practices may need to be altered if multiple livestock species are suddenly managed together. For example, common cattle mineral supplements can contain ingredients that are unsafe for horses or sheep.
- Temporary shade may need to be provided to prevent heat stress in hot weather, which is common during much of hurricane season, if previous shade-providing structures (e.g., barns and trees) were damaged.

- Separate cattle once necessary facilities are repaired and/or fencing issues are resolved.
- If animals are to be consumed or sent to slaughter, check records to ensure that all drug withdrawals have been met and that the animal is safe for consumption.

Feed and water

- Check stored feed containers for damage and debris. Evaluate stored forage and feed for wetness and monitor for evidence of spoilage or contaminants.
- Livestock may be without food or water for a few days. Since rapid resumption of eating and drinking may contribute to tetany and bloat in the days immediately following the storm, reintroduce feed and water carefully. If you are unsure of the best feeding regimen in these circumstances, feed only hay and reserve grain until cattle can be adjusted back to normal diets over a period of one to two weeks, or until fecal matter consistency returns to normal pre-storm levels.

Illness and injury

- Monitor cattle closely for signs of gastrointestinal illnesses such as salt toxicity/water deprivation or bloat and seek veterinary attention immediately if you observe any of the following abnormal signs: Cattle with salt toxicity will have visible neurological problems and stumble, circle, or appear uncoordinated. Cattle experiencing bloating will appear rounded and may have difficulty breathing. Watery, greasy, or discolored fecal material may also be an indication of a gastrointestinal illness.
- Monitor cattle closely for other signs of internal injuries such as discoloration of skin, abnormal urine or feces, hunched up posture, or reluctance to move, eat, or drink. These may not be immediately evident for days to weeks following a traumatic event. Contact your veterinarian if you suspect internal injuries.
- Monitor for conditions such as respiratory disease, footrot, cellulitis, and mastitis. Outbreaks are most likely to occur within seven to 10 days after a stressful event. Contact your veterinarian if you suspect any infectious disease or condition that does not improve with standard treatment.

Severe injuries and livestock mortality

- Fractures or other severe injuries may require humane euthanasia. This should be performed as quickly and humanely as possible by trained individuals. Proper burial/disposal should be performed in accordance with local environmental regulations.
- Refer to your approved emergency disposal plan if you experience catastrophic loss of cattle.

Within a month after hurricane impacts

Recovery assistance and insurance claims

- After many natural disasters that result in widespread damage, additional programs often become available to aid with agricultural losses. These programs are not guaranteed, however, and are generally handled on a case-by-case basis depending on the hurricane's impact. In addition, some programs require additional processing time for a special appropriation from the U.S. Congress and Presidential approval.
- While a special allocation may not be immediately available, it is important to document losses and to illustrate to your legislators the impact of the hurricane on your operation. This information will help promote policy decisions and additional allocations that may become available.
- Continue to follow up on the insurance claims process. Begin filing for any additional State or Federal disaster assistance programs for hurricane recovery.
- Visit the USDA Disaster Resource Center Storms website for updated information about FEMA aid and other disaster programs.
- Continue to document damage and livestock loss and keep a record of conversations with agency contacts. This creates a valuable, third-party record of your recovery efforts that may be used later as documentation for assistance programs.

Organic certification

- If your farm is organic, it is important to consider how the hurricane impacts may affect your certification. Temporary variances from some organic practices are possible, so contact your certifier to determine whether your practices qualify. It is most important to report prohibited substances that may have infiltrated your farm during the hurricane.

Infrastructure and equipment

- Continue to check for any structural or equipment damages or losses and document each incident when discovered. Check feed storage bins for any damage or leaks that may have developed, and repair as needed.
- Continue to gather quotes from qualified vendors to make repairs to facilities and equipment. Vendors are often overwhelmed in the months following a hurricane, so making contact soon after the hurricane is important for an expedient response.
- Monitor buildings for water damage or mold development and monitor wells for coliform bacteria.
- Continue to refill fuel tanks and check backup generators until full power is restored.

- Perform general and preventative maintenance on any equipment that was flooded. Keep all receipts for parts and labor as well as a list of any equipment that is determined to be a total loss.
- Examine drainage ditches and canals to determine to what extent they were silted in by floodwaters and need repair and cleaning of debris. Clean and/or repair drainage ditches if necessary.

Inspections of livestock houses

- Inspect all structures for damage and determine if they are safe for housing animals. Safely remove any debris that may have blown in and become a hazard to animals or employees.

Livestock feed

- Continue to monitor feed and hay for mold or other contaminants. Pastures that were flooded with saltwater may die quickly. Inspect pastures frequently for presence of debris, overgrazing, and growth of toxic plants.

Livestock health

- Continue to monitor cattle closely for delayed signs of internal injuries.
- Work with your veterinarian to determine pregnancy status and overall health of the herd. Both environmental and nutritional stress can compromise pregnancies and cause internal problems that may not be immediately evident.

Appendix

Farm Emergency Plan

Hurricane preparedness can have a direct effect on your farm's profitability and long-term survival. For agricultural operations in hurricane-vulnerable regions, it is critical to have a Farm Emergency Plan in place outlining key tasks and different people's roles and responsibilities as you brace for the hurricane. Your Farm Emergency Plan can save valuable time in a chaotic situation when multiple challenges clamor for immediate attention, helping you prioritize your actions and recover from the hurricane as efficiently as possible.

Use this sample plan to customize for your operation. Preparation for these tasks—putting the systems in place—is described in the main guide (see "Emergency planning and creation of Farm Emergency Plan" in the Building a Resilient Operation section). Though there is some overlap with the tasks listed in the Short-term Preparedness section, this sample plan is intended to be a document you can use during an actual emergency.

Before the hurricane

Tracking the hurricane

- Use your storm tracking app. The NOAA National Hurricane Center website is a good source for keeping up to date on the latest hurricane activities. Learn more about emergency alerts at the U.S. DHS Ready.gov website.

Emergency Response Team

- Gather the members of your farm's Emergency Response Team, who have been thoroughly trained in their respective tasks and are knowledgeable about the hazards found on the farm.
- Review the chain of command and individuals' primary and secondary roles and responsibilities.
- Discuss modes of communication as well as alternatives in case any communication channels become unusable during or after the storm.
- Review your farm's Emergency Contacts List.

Employees' status and location

- Review procedures to account for all people and employees after an emergency evacuation. Determine who will evacuate and who (if anyone) will stay during the storm. For those who evacuate, establish a schedule for checking in after the storm. For those who stay, be sure they have safe lodging and sufficient food and water and establish a clear plan for them to check in.

Maps and emergency escape routes

- Using the map of your farm with all buildings and contents, review emergency escape routes and hurricane preparation procedures for each building, facility, and area of the operation.

Emergency equipment and supplies

- Locate the following equipment and supplies:
  - Emergency medical supplies for both humans and animals
  - Raincoats and boots
  - Weather-proofing supplies such as tarps and sandbags
  - Fencing supplies
  - Plumbing supplies
  - Lumber, construction tools, nails, and ropes
  - Portable lights, batteries, and battery-powered or hand-crank radios

Food, water, and cash

- Make sure there is a 2-week supply of dry and canned food and drinking water (at least ½ gallon per person per day) stored on site if personnel will be staying on site.
- Secure cash reserves to use for purchasing supplies after the storm.

Facility security

- Ensure that important documents are in a safe, dry place.
- Check on the security of roofing and siding materials and windows and doors, and make sure all other building components are tied down securely.
- Secure outside objects around your farm, so that they don't blow away or become hazardous projectiles.
- If there is a perimeter gate to the facility, close it to ensure that any animals that get loose during the storm are contained within the center area (e.g., pens, pasture).
- Protect greenhouses [if applicable].
- Check drainage ditches and culverts around your facilities for debris.
- Pump down all water from ditches.

Equipment

- Ensure that all emergency equipment is ready (chainsaws, compressors, heavy machinery, etc.).
- Move all non-critical farm equipment to higher elevations or store in secure buildings.
- Move pesticides, herbicides, and fertilizers to a secure place, on high ground if possible.
- Make sure that farm equipment you will need after the storm, such as tractors with front-end loaders or skid-steer loaders, is fully fueled.
- Be sure your backup generator(s) are fully operational. Fill the fuel tank(s) and portable fuel storage tanks.

Fuel

- Make sure you have a minimum of a 2-week supply of diesel and gas. Be sure the supplier understands how much you use daily and that it is necessary for farm operations. If secure storage facilities are available on site, arrange for fuel deliveries several days prior to the expected storm impact. Consider fuel needs for tractors, generators, and farm vehicles.
- Any fuel stored on site poses a contamination risk if storage tanks cannot be adequately protected from anticipated flooding. Move to higher ground or secure in place.
- Since fuel may be unavailable if service stations have no power, make sure portable fuel storage tanks are full.
- Ensure that tanks containing fuel, fertilizer, and other liquids are kept full and are tied down.

Backup generators

- Retrieve backup generators and fuel and place them where needed.
- Connect generators to critical electrical loads as outlined in your Backup Power Plan.

Electricity and gas shutdown

- [Outline the shutdown procedures for electricity and gas, according to instructions you are given by your utilities and other experts.]

- [Outline the shutdown procedures for specific equipment.]

Service or equipment to be shut down	Procedures for shutdown

Forage Crop

- [Add actions specific to your crop.]

Animal care

- Develop a care schedule for the animals, making sure that your employees' safety comes first.
- Check your feed inventory and schedule a delivery from the feed mill ahead of the storm if necessary.

Immediately after the hurricane

Safety

- Make safety your first priority. Do not rush back into a facility until you are sure it is safe. Use extreme caution due to the potentially injurious situations presented by weakened trees and damaged structures, equipment, and electrical and gas systems.
- Continue to watch the weather forecast. Are waters still forecast to rise more than they are now? Some floodwaters peak up to a week after the storm.

Electricity and gas

- Avoid downed power lines, as these may still be live and represent an electrocution hazard. Operate on the assumption that all downed power lines are live. Remember that a downed power line on a fence may energize the fence.
- When restoring electricity to buildings that have flooded, use extreme caution and consult with an electrician and your power provider. See the Alabama Cooperative Extension System guidance on restoring electrical power after flooding.
- Natural gas or liquid petroleum (LP) gas leaks can cause deadly explosions. Check for natural gas or LP gas leaks, and if a leak is suspected, turn off the main property gas line, evacuate the area, and notify your gas company and the authorities. Tell employees to stay clear.

Roads and buildings

- Before entering any buildings, check for levee breaches, rising or incoming water, and evidence of structural fire or damage.
- As soon as it is safe, call in the employees needed for inspection and clearing debris from roads.
- Cordon off areas that are unsafe.

Security

- Watch your farm for unwelcome visitors like looters. Secure your equipment and farm entrances, and make sure your security cameras are operational.

Insurance and documentation

- Do not begin cleaning up or repairing damage until you have thoroughly documented the damage. Contact your insurance adjuster as soon as possible to decide on the best plan for moving forward with potential damage assessment, cleanup, and repair.
- If you have experienced flooding and have flood insurance through the FEMA National Flood Insurance Program, visit their website to learn how to start a claim.

Initial Site Planning

Considerations when deciding on a new location to establish or purchase land for beef cattle operations

The National Oceanic and Atmospheric Administration (NOAA) developed a map for illustrating the probability that an area of the country will be hit by multiple hurricanes, expressed as the number of years between storms (known as the return period, Figure A1). While no model can determine when and where hurricanes will strike during any given hurricane season, the map below is a good indication of relative hurricane risk.

It is important to remember that this map represents a long-term average and that even if the average return rate for a hurricane is 25 years, hurricanes could still occur at one spot on successive years or even in the same year. It is also important to understand that while most data show only where hurricanes have made landfall, hurricanes can also move hundreds of miles inland causing significant wind damage and flooding.

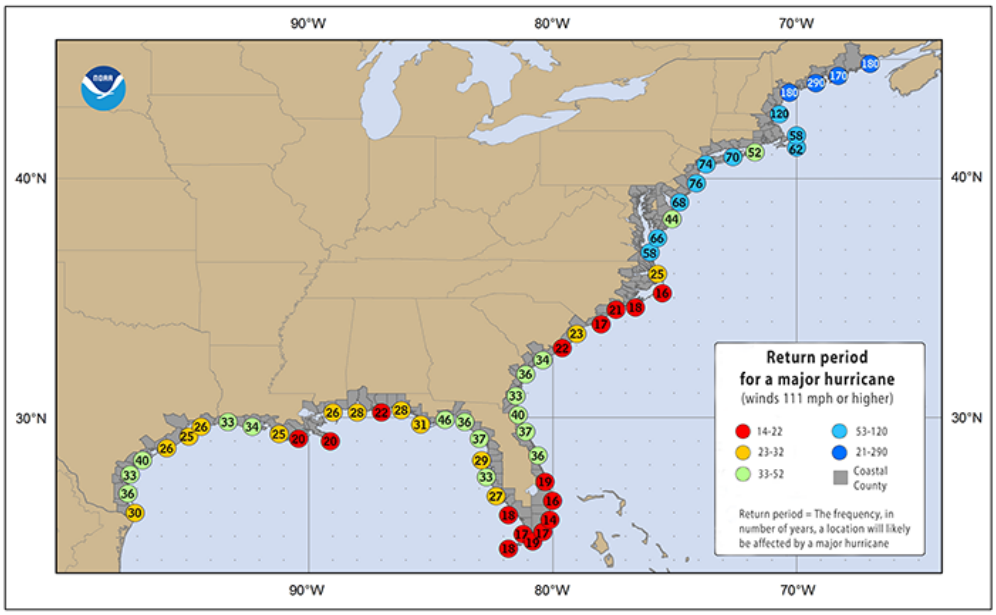

Figure A1: Return period (years) for major hurricanes for the coastal Eastern United States. Graphic provided by the National Oceanographic and Atmospheric Administration (NOAA).

Use NOAA's Historical Hurricane Tracks tool for a map and dates of hurricanes that have impacted your area in the past 150 years. The timing and track of historic hurricanes may be different than those for future hurricanes and should be used with caution.

Site characteristics

- Site selection for beef cattle operations will be dependent upon many factors such as geographical location, climate, availability of pasture and feed sources, water, electricity, and facility requirements. Facilities required for beef cattle operations may include confinement and quarantine pens, working facilities, animal housing, hay and equipment sheds. Easy access to feeding, handling and transport of animals should be considered.
- A continuous supply of clean water is essential for beef cattle. Ideally, wells and community water supplies will provide fresh water to cattle through troughs or tanks. Ponds, springs and streams are also good and inexpensive water sources, but can have environmental impacts and pose health risks such as the transmission of waterborne pathogens (i.e. leptospirosis).
- In coastal areas, the availability of fresh water will become even more important in flood-prone areas since salt water contamination has the potential to affect pastures and crops grown for forage.

Topography

- When planning for long-term preparedness, evaluate a potential site for your operations with an eye toward reducing the risk of surface flooding or coastal storm surge. It is unlikely that all risks can be avoided. However, the negative considerations of an elevated open site are often less than those of low-lying areas susceptible to flooding.
- Avoid building on poorly drained sites, flood plains, or areas with high water tables if possible. Muddy conditions can negatively affect cattle health, in addition to making pasture management extremely challenging. Soil surveys can also be done through your local Extension office or other forage specialist.
- Land should be gently sloping with adequate drainage.
- If possible, choose a site that has higher-elevation areas so that equipment can be easily moved to avoid flooding.

Flood risk and storm surge

Flooding

- Floodplain zone and proximity to surface water bodies should be determined prior to establishing beef cattle operations for proper disaster planning and mitigation. Detached structures such as barns and sheds should be anchored to a foundation to reduce flotation, collapse, or lateral movement caused by flowing water during storm surges or flood conditions. For additional information on floodplain management for agricultural structures, see the FEMA website.
- Assess historic and predictable patterns of flooding to determine which areas are at the highest risk of damage during extreme weather.
- Consult the following Federal and State-level resources for estimating flood risk:
  - U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA) Flood Map Service Center—for official flood maps
  - North Carolina Flood Risk Information System website

Storm surge

- Determine proximity to bodies of water at risk for storm surge. In some areas, storm surge can cause flooding many miles inland from the coast. View the NOAA National Storm Surge Hazard Map to assess your risk and plan a safe evacuation route.

Facilities and roads

- Choose a site with good roads that will allow multiple escape routes when evacuating from hurricanes and tropical storms that can cause rising flood waters, storm surge, or downed trees.
- For new facilities, the local and/or state environmental protection agency and building officials should be contacted regarding regulatory inspections and permits that may be necessary. Depending on the location, distance to neighboring residencies and direction of prevailing winds may be considered in site selection for cattle holding areas.
- For biosecurity purposes, quarantine or isolation areas should be planned as far away from the resident herd as possible, not allowing nose-to-nose contact with other animals in the herd, and not draining into areas holding animals that may be more susceptible to disease such as calving cows or younger animals.

Utilities

- Plan to have utilities and other critical infrastructure permanently constructed on higher ground to avoid equipment and infrastructure damage during flooding.
- Search for areas with resilient electrical grids. Avoid relatively isolated sites with limited access to electrical utilities.

Natural windbreaks

- Natural windbreaks may be used to help reduce wind damage to the buildings. However, make sure that wind breaks are located far enough from buildings that downed trees will not damage buildings.

Burial site

- Identify a location for an approved burial site for catastrophic losses approved by the State department of agriculture or appropriate agency in the event there is a large number of animal deaths.

Emergency Contacts List

You may customize this for your operation. Delete items that do not pertain to your commodity or location and add companies or organizations specific to your commodity.

Individuals

Name(s)	Role(s)	Phone number(s)	Notes
	Owner(s)		
	Members of the Emergency Response Team		
	Other key employees or managers		

Emergency Services

Organization	Name(s)	Phone number(s)	Notes
Emergency medical responders			
Hospitals			
Fire department			
Sheriff's office			
Emergency management agency			
Veterinarian			

Utilities, Roads, and Trees

Organization	Name(s)	Phone number(s)	Notes
Electric utility or cooperative			
Natural gas utility			
Water utility			
County road department or State Department of Transportation			

Insurance Companies

Organization	Name(s)	Phone number(s)	Notes
Commodity insurance companies			

Contractors

Organization	Name(s)	Phone number(s)	Notes
Electrical contractor			
Plumbing contractor			
Mechanic			
Fuel supplier			
Generator servicing			
Equipment dealer			
Equipment rental company (emergency generators, lifts, etc.)			

Federal, State, and County Organizations

Organization	Name(s)	Phone number(s)	Notes
State Department of Agriculture			
State Board of Animal Health			
County/university Extension office			
County emergency management agency			
County Health Department			
USDA Farm Service Agency			
USDA Natural Resources Conservation Service (NRCS)			
U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA)			
State Department of Agriculture or agency responsible for permits and inspection			

Resource Links

North Carolina Resource Links

University Extension, State, and Federal websites

University Extension Websites	Purpose
Beef*	Resources to help beef cattle producers improve management and productivity
Extension Office Locator*	Contact information for university Extension Agents in your county
Disaster Preparedness and Recovery*	Resources to help prepare for and recover from hurricanes and other disasters
Extension Disaster Education Network (EDEN)	Information and program resources to help with hurricane preparedness and recovery

* North Carolina Cooperative Extension

State Websites	Purpose
North Carolina Governor's Office	News and information from the Governor, including evacuation orders and emergency declarations
North Carolina Department of Agriculture and Consumer Services (NCDA&CS)	Main source for answers to your agricultural-related questions
NCDA&CS Veterinary Division Cattle Health	Main source for answers to your cattle health-related questions
North Carolina Division of Emergency Management Agency	News and resources to help you prepare for, respond to and recover from emergencies, including hurricanes

Federal Websites	Purpose
United States Department of Agriculture (USDA)	News and announcements related to agricultural commodities and disaster recovery programs
USDA Disaster Resource Center	Resources to help you build long-term resilience to and recover from hurricanes and other disasters
USDA Office Locator	Contact information for USDA offices in your county, including FSA, NRCS, Rural Development, and Conservation Districts
USDA Farm Service Agency (FSA)	Assistance with securing loans, receiving payments, and applying for disaster relief programs
USDA FSA North Carolina	Focus on State FSA resources, including financial and technical information sharing
USDA Natural Resources Conservation Service (NRCS)	Financial and technical assistance for farmers, ranchers and forest landowners
USDA NRCS North Carolina	Focus on State NRCS resources, including financial and technical information sharing
USDA Risk Management Agency (RMA)	Assistance with Federal Crop Insurance and managing risk
USDA RMA Agent Locator	Contact information for local RMA offices in your county
US Department of Homeland Security Federal Emergency Management Agency (FEMA)	News and information to help you prepare for and recover from hurricanes and other disasters
US Department of Homeland Security Hurricane Preparedness	Resources to help individuals prepare for and recover from hurricanes
US Department of Commerce National Oceanic and Atmospheric Administration (NOAA)	Resources to view historical, current and predicted hurricane activity and warnings in your areas
NOAA National Hurricane Center	Current and forecasted tropical cyclone activity, educational resources, and advisory warnings for your area of interest
NOAA National Weather Service Weather-Ready Nation	Latest news, information and technology to enable informed decision-making before, during, and after a hurricane strikes

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USDA Southeast Climate Hub

https://www.climatehubs.usda.gov/hubs/southeast/

To access this guide, as well as those produced for other commodities, please visit:

https://www.climatehubs.usda.gov/hubs/southeast/topics/