



United States Department of Agriculture



**Hurricane Preparation and Recovery  
for North Carolina**

# Beekeeping Guide



Forest Service  
Southern Research Station  
Hurricane Preparedness Guide  
June 2020



Southeast Climate Hub  
U.S. DEPARTMENT OF AGRICULTURE

**\*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.**

This guidance was developed by David Tarpy, PhD, Extension Apiculturist, North Carolina State University, Raleigh, NC 27695, and based on information from the NC State Apiculture Program.



# Beekeeping Guide

This guide will focus on:

- Pre-hurricane planning for Beekeepers
- Guidance for post-hurricane recovery

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# Introduction

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Preparing for and recovering from hurricane events

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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 **Apiary 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.

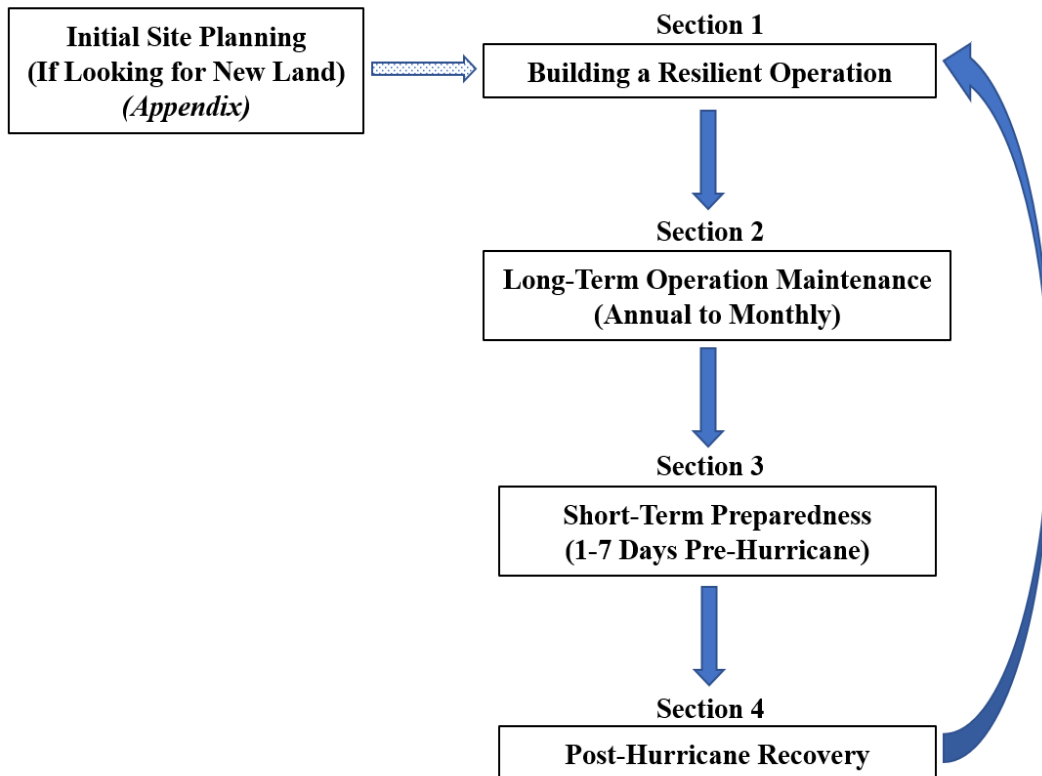


Figure 1. Flowchart for Beekeeping Guide

# Building a Resilient Operation

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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

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**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

- 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 to your apiary as well as your cleanup and recovery efforts.
- Review your business plan. 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, apiary, and other structures. 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.
- Documentation is discussed multiple times throughout this guide and its importance cannot be overstated. Establish an inventory system so that you know exactly what's on your property 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 apiary, buildings, vehicles, and other valuable equipment on your property 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 waterproof containers 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 when evacuating for a hurricane:
  - Inventories and documentation for insurance and disaster recovery
  - Apiary Emergency Plan
  - Emergency Contacts List
- For more information, see:
  - 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

### Roads

- The primary driveway onto the property 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 property, construct one if possible to provide alternative access from a different road in the event the primary entrance is blocked.

### 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 you 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.

## Hive and equipment protection

### Hives

- When identifying sites for establishing apiary operations, be sure to place the hives on sturdy stands on level ground to best brace for heavy winds.
- Have each hive tilting slightly forward so that rainwater does not pool on the floor of the hive if solid bottom boards are used.



- If the beehives are on the ground in recessed areas, make sure they have an upper entrance. Flood waters can block the lower entrances and suffocate the bees.
- Make sure that your beehives can resist strong winds. A simple brick on the top lid is not sufficient to keep the lid from flying off in winds above 50 mph. Strapping the lid down with ratchet straps or securing with duct tape is an option, particularly for outlying yards. Hive boxes may also need to be strapped together, particularly if they are relatively new and the bees have not yet propolized them together sufficiently. Also consider removing unnecessary boxes (e.g., top-hive feeders) to minimize the wind profile.

### Notification of post-hurricane spraying of insecticides

- Following heavy rains associated with hurricanes, various local and State agencies have traditionally sprayed regions containing stagnant water to control mosquito outbreaks. While important for human health, such insecticides can be extremely problematic for honey bees. While some States have no infrastructure to notify beekeepers of insecticide spraying, others have mandatory registration or voluntary programs that alert beekeepers if their area is scheduled to be sprayed. Volunteer programs will require prior registration. Contact your local Extension office for information specific to your area.
- Registration of apiary locations. To register your apiary locations, see the North Carolina Department of Agriculture & Consumer Services [website](#)

### Honey extraction facilities

- Store extracted honey frames, stored honey supers, and other beekeeping equipment indoors if possible so that it will not be damaged during severe weather. If indoor storage is not possible you can store your beekeeping equipment under carports or shed roofs to protect them from rain and wind.

## Emergency planning

### Apiary 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 workers, see the OSHA [Agricultural Safety Fact Sheet](#) to learn more about emergency preparedness for beekeepers.
- Create your Apiary Emergency Plan. See **Appendix: Apiary 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, any fuel supplies, chemical supplies, and equipment; protect your hives as best you can; and disconnect electricity and gas service if relevant.

- Make sure all of your employees know the formats (electronic or hard copy) and locations where the Apiary Emergency Plan is stored.

## 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

- Designate an Emergency Response Team. Members of the team should be:
  - Thoroughly trained and physically capable of performing assigned duties
  - Knowledgeable about the hazards found on the property
  - Trained in decision making regarding when to take actions themselves and when to wait on outside
- 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 Apiary 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.

## Communication

### Emergency Contacts List

- Maintain a list of all people connected with your beekeeping operation that should be contacted in an emergency. 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 others involved with your operation or who provide crucial emergency services. medical responders, State and local agencies, contractors and suppliers, gas and electric providers, hospitals and insurance companies, poultry company representatives, feed mill personnel, State Department of Agriculture or Board of Animal Health officials, local county

Extension personnel, and anyone else who is on your property 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.

#### Post-hurricane Communications

- Purchase a battery-powered radio 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.
- For more information about communicating before, during, and after a major disaster, see the FEMA [website](#).

#### Drones

- Consider getting an unmanned aerial vehicle (UAV) (i.e., drone) pilot license and to purchase a UAV. Small UAV quadcopters or hexacopters that can be equipped with visual or RGB cameras are relatively cheap (\$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](#)

# Long-Term Operation Maintenance

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

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## Prior to hurricane season

Survey your operations to assess the potential impact that high wind or heavy rain or flooding would have on livestock and facilities, and identify any changes that should be addressed. If in doubt, contact your local Extension office and other State and Federal resources for further information specific to your circumstances.

## Annual review of emergency planning tasks

### Apiary Emergency Plan review and reassessment

- Review your Apiary Emergency Plan with your employees to ensure that they are familiar with all elements. Make any necessary additions or updates. Review and update your Emergency contacts list.

### 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 who 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 the proper policies and coverage.
- Keep records of harvests, bee and equipment inventories, and purchases up to date. Long-term records will help to establish a production baseline from which losses can be determined. Be sure that copies of each are in each safe location as described in the **Building a Resilient Operation** section above.

## Infrastructure

### Buildings and facilities

- Inspect honey extraction 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.

### Tree maintenance

- Remove dead and dying branches from trees on your property.

## Emergency equipment and supplies

- Maintain an ample supply of emergency medical supplies and have raincoats and boots available for employees.
- Note supplies that take longer to deliver and order early to ensure they are available after a hurricane. Stockpile chemicals that are essential for your operation.
- Maintain a supply of drinking water and dry and canned food sufficient for at least 2 weeks for employees who become stranded at the apiary or who need to return to the apiary 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.

## Monthly considerations during hurricane season

See **Appendix: Resource Links** for local Extension offices and other State and Federal resources 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

- Check list for repairs that may be needed after the hurricane.
- Note supplies that take longer to deliver and order early to ensure they are available after a hurricane. Stockpile chemicals that are essential for your operation.
- 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. As the hurricane gets closer, plywood may be scarce or unavailable.

# Short-Term Preparedness

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

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## Bracing for the hurricane

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

The safety of your family and employees and your own personal safety are of utmost importance. First and foremost, take whatever precautions necessary to protect your family, your employees, and yourself. After that is accomplished, focus on protecting your bees. 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 Apiary Emergency Plan with all employees and discuss each person's responsibilities.
- Continue to monitor hurricane track and strength updates. Listen closely for evacuation orders in your area.
- Ensure that all managers know their responsibilities prior to, during, and after the hurricane. Handling the hurricane damage is too much work for 1 or 2 people.
- 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

- Ensure that all communication equipment, including weather radio, AM/FM radio, and other devices, is in good working order. Keep mobile devices fully charged. Have rechargeable battery packs or charging cables for your vehicle to maintain communication. Texting may be a more valuable form of communication than calling when mobile networks may be overwhelmed.

### Food, water, and cash

- 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 hives and honey extraction facilities. Take photographs and video (where helpful), and estimate your honey harvest, as this will aid with insurance claims and disaster recovery assistance. If the honey harvest is reduced or lost, these records will help with the damage assessment and post-hurricane claims.
- 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 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.

## Infrastructure

### Roads

- If the roads leading to the apiary are likely to flood, stage your boat in a secure, easy-to-access location.

### Hives

- If possible, temporarily move hives from low-lying or flood-prone areas to higher ground until the waters have subsided.
- Remove any hive equipment (feeders, extra hive bodies, or unused pallets, etc.) that is not secured and could become airborne during high winds. Disassemble any bear fencing or other barriers around the apiary.
- Strong winds can blow over entire hives, with many honey supers or that are otherwise top-heavy being particularly vulnerable. If the hives are on tall or unsecure stands, you will need to move them onto dry, level ground temporarily before a hurricane to lessen the chances that they topple. Beware of potential hazards such as falling trees and tree limbs near the hives, as they can crush all equipment and kill entire colonies. This is hard to prevent with a barrier or cover because of the sheer weight of many trees. Therefore, if your apiary is in a wooded location you may need to temporarily move the hives prior to a hurricane.

## Personal safety the day before the hurricane hits

- 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 property either, since they also have to prepare themselves and their families.
- Make sure your employees have evacuated to secure areas at least 1 day prior to hurricane impact. If some staff 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 apiary 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.



# Post-Hurricane Recovery

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

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## Immediately after the hurricane has passed

### Safety

- Make safety your first priority. Do not rush back into a honey extraction facility until you are sure it is safe. Use extreme caution due to the unsafe conditions 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

- 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 liquefied 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.

### Roads and buildings

- Before entering any buildings, check for levee breaches if applicable, 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.

### Groundwater

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

## Recordkeeping, documentation, and insurance

- 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 moving forward with potential damage to your apiary. (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 information about starting a claim.

## Damage to Hives

- Once the area is safe, visit all affected apiaries to inspect for any damage to beehives. Reconstruct any disassembled hives and replace damaged equipment.

## 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’s [Coping with Natural Disasters](#)
  - North Carolina State University Extension’s [Tips for Handling Family Stress After Disasters](#)

### Communications

- 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 the FSA can compensate beekeepers for repairing damage due to a natural disaster or severe drought which would create new conservation

problems. The work must be documented, and beekeepers must have received authorization from their local USDA office in advance.

#### *Photos and Video*

- Take photos or video first, before beginning any cleanup or repairs. Photograph and take video of damaged facilities and property, with written notes describing what is in the pictures and where they were taken. 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 UAV (i.e., drone), utilize it now to take aerial photographs of damage to your operation.

#### *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:
  - 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 beekeepers 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
  - Noninsured Crop Disaster Assistance Program (NAP) — FSA program that provides assistance for eligible producers who suffer losses or are prevented from planting agricultural commodities that are not eligible for protection by Federal crop insurance
  - 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 beekeepers repair damage 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.

## Hive concerns

- If you are notified that insecticide spraying will be taking place to control mosquito populations, the safest course of action would be to temporarily move hives from that area.
- Move hives back to their original locations if they were moved. Check for any changes in landscape and re-situate hives accordingly. If hives were destroyed or damaged, then rebuilding the equipment may be necessary. If colonies have died, then you may need to rebuild their populations by splitting existing colonies or purchasing new bees.

## 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.

## Honey contamination

- If floodwater has come into contact with honey, which is therefore prohibited from entering the human food supply, keep it separate from uncontaminated honey and dispose of it. See the U.S. Food and Drug Administration’s (FDA) [Guidance for Industry: Evaluating the Safety of Flood-affected Food Crops for Human Consumption](#) and [Safety of Food and Animal Food Crops Affected by Hurricanes, Flooding, and Power Outages](#). If floodwater was nearby but did not enter the hives, work with State regulators and FDA offices to determine whether your honey was adulterated. Thoroughly clean and sanitize all food contact equipment and food handling environments that may have become contaminated during the hurricane. First, physically remove dirt or debris with a brush or with water and a detergent. Then, sanitize with an antimicrobial chemical to reduce microorganisms on the surface of the equipment.

## 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.

- Stay in touch with your local FSA office throughout the recovery process.
- 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.

#### Infrastructure and equipment

- 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.

## Appendix

# Apiary Emergency Plan

Hurricane preparedness can have a direct effect on your apiary's profitability and long-term survival. For apiary operations in hurricane-vulnerable regions, it is critical to have an Apiary Emergency Plan in place outlining key tasks and different people's roles and responsibilities as you brace for the hurricane. Your Apiary 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 Apiary 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 Apiary's Emergency Response Team, who have been thoroughly trained in their respective tasks and are knowledgeable about the hazards found on the Apiary.
- 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 Apiary'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 hurricane. 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 apiary 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
- 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 at least a 2-week supply of dry and canned food and drinking water (at least  $\frac{1}{2}$  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 hurricane.

## 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 apiary, so that they don't blow away or become hazardous projectiles.

## Equipment

- Remove any hive equipment (feeders, extra hive bodies, or unused pallets, etc.) that is not secured and could become airborne during high winds. Disassemble any bear fencing or other barriers around the apiary.



- Ensure that all emergency equipment is ready (chainsaws, compressors, heavy machinery, etc.).
- Move all non-critical apiary equipment to higher elevations or store in secure buildings.
- Move pesticides, herbicides, and other chemicals to a secure place, on high ground if possible.
- Be sure your backup generator(s) are fully operational. Fill the fuel tank(s) and portable fuel storage tanks.

### Backup generators

- Retrieve backup generators and fuel and place them where needed.

### 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

### Hive care

- If possible, temporarily move hives from low-lying or flood-prone areas to higher ground until the waters have subsided.
- If the hives are on tall or unsecure stands, you will need to move them onto dry, level ground temporarily before a storm to lessen the chances that they topple.

## 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 hurricane.

## 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 apiary for unwelcome visitors like looters. Secure your equipment and apiary 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.

# 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			

# Initial Site Planning

Considerations when deciding on a new location to establish or purchase land for beekeeping

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.

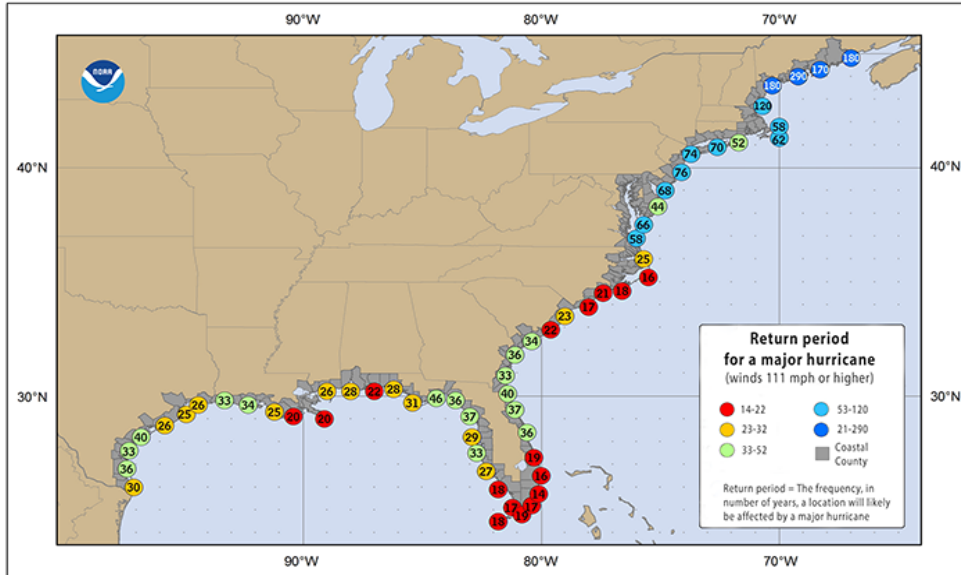


Figure A1: Return period (years) for major hurricanes for the coastal Eastern United States. Graphic provided by the National Oceanographic and Atmospheric Administration (NOAA).

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

### Topography

- When planning for long-term preparedness, evaluate a potential site for your operation 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. Land should be gently sloping with adequate drainage.

### Flood risk and storm surge

- 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](#)
- 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.

### Locating beehives

- Locate hives away from low-lying areas or areas prone to flooding. While riverbanks can be useful apiary locations because of their proximity to fresh water, in flooding conditions entire apiaries can be swept away.
- Trees can be favorable in apiary locations for their natural windbreaks and shade, but they can pose a risk during high winds. Avoid placing hives directly beneath trees or large limbs, if possible.

# Resource Links

## North Carolina Resource Links

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University Extension, State, and Federal websites

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University Extension Websites	Purpose
<a href="#"><u>Apiculture and Beekeeping*</u></a>	Resources to help beekeepers improve management and productivity
<a href="#"><u>Extension Office Locator*</u></a>	Contact information for university Extension Agents in your county
<a href="#"><u>Disaster Information Center*</u></a>	Resources to help prepare for and recover from hurricanes and other disasters
<a href="#"><u>Extension Disaster Education Network (EDEN)</u></a>	Information and program resources to help with hurricane preparedness and recovery

\* North Carolina Cooperative Extension

State Websites	Purpose
<a href="#"><u>North Carolina's Governor's Office</u></a>	News and information from the Governor, including evacuation orders and emergency declarations
<a href="#"><u>North Carolina Department of Agriculture and Consumer Services (NCDA&amp;CS)</u></a>	Main source for answers to your agricultural-related questions
<a href="#"><u>NCDA&amp;CS Beekeepers</u></a>	Assistance with registering, inspecting, and mapping of apiary sites
<a href="#"><u>North Carolina Division of Emergency Management</u></a>	News and resources to help you prepare for, respond to and recover from emergencies, including hurricanes



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

**SUGGESTED CITATION**

**Tarpy, David.** [In review]. Beekeeping guide. In: McNulty, Steven; Gavazzi, Michael; Matchett, Karin, eds. Hurricane preparation and recovery in the Southeastern United States. Gen. Tech. Rep. SRS-xxx. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station.



**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/>



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