FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Hurricane Preparation and Recovery in South Carolina

Pecan Producers Guide

This file compiles State-specific excerpts from the following report:

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This is 1 of 23 guides to help Southeastern U.S. producers of economically important agricultural commodities build resilience to, prepare for, and recover from hurricane impacts. All guides can be found on the USDA Southeast Climate Hub Hurricane Preparation and Recovery Commodity Guides website.

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. This guidance should not be interpreted as required actions by regulatory or insurance agencies. STATE OR LOCAL GUIDANCE/REGULATIONS AND INSURANCE POLICIES SUPERCEDE THE RECOMMENDATIONS IN THIS GUIDE. 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.

Pesticide Statement: Pesticides used improperly can be injurious to humans, animals, and plants. Follow the directions and heed all precautions on the labels.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Note: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Environmental Protection Agency, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.

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Hurricane Preparation and Recovery in South Carolina

Pecan Producers Guide

This guide will focus on:

- Pecan orchard establishment considerations where hurricanes and tropical storms are a potential threat
- Annual, seasonal, and imminent considerations due to hurricane threats on pecan orchard management
- Pecan orchard recovery management after hurricane or tropical storm damage

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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.

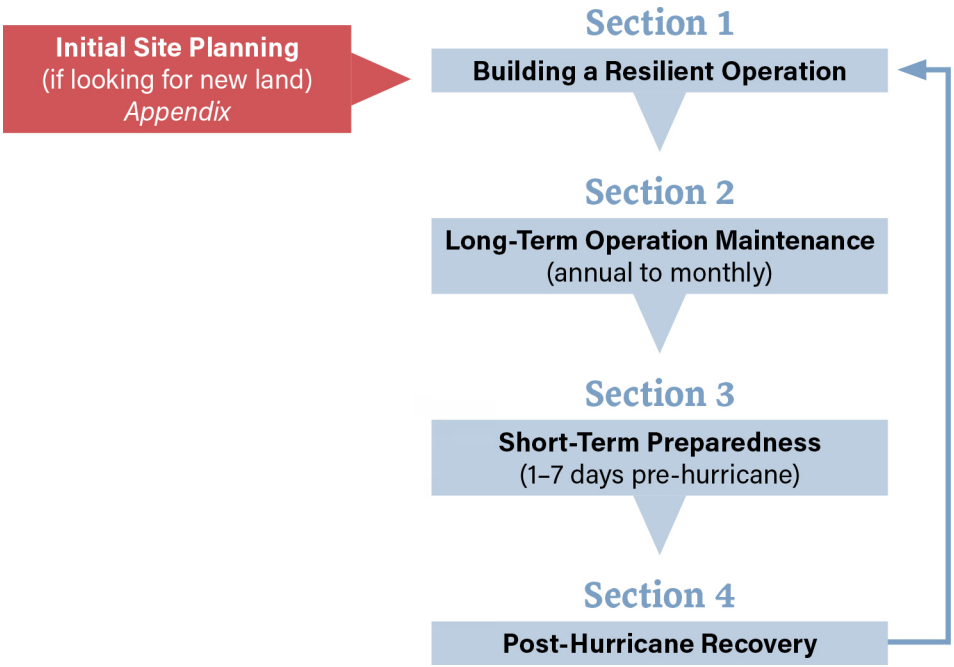
To help producers remain resilient and productive in the face of this threat, the U.S. Department of Agriculture (USDA) Southeast Climate Hub developed this guide containing steps that can be taken to prepare for and recover from hurricane events. This guide is separated into four primary sections:

- 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 and 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 appendix includes an **Initial Site Planning** guide that describes considerations to be kept in mind if someone is deciding on a new location to establish, lease, or purchase land for pecan orchards, and the **Resource Links** section consolidates helpful Federal, State, and Extension websites that are also referenced throughout the guide.

The flowchart below shows the layout of this guide and how it is intended to be used. Note that after recovering from a hurricane, producers should start back at the **Building a Resilient Operation** section, and incorporate guidance and any lessons learned into their operational and emergency management plans.



Layout and use of the hurricane preparation and recovery guide.

SECTION 1

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 recovery time

Pecan producers in the Southeastern United States can implement a range of measures, described below, 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 Ready.gov Hurricanes website and U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA) Hurricane Safety Tips and Resources website.

Crop concerns

Soil preparation

- When establishing orchards in hurricane-prone areas, prepare the site to encourage optimal root development. Before planting, do soil testing to assess pH and nutrient levels throughout the soil profile, and adjust pH and nutrient levels as appropriate.
- For more information about soil testing, see:
  —Clemson University Cooperative Extension Service Soil Testing website
- Use a sub-soiler to deep-till parallel and perpendicular to the tree rows and plant the trees where the tillage lines intersect. Sub-soiling will distribute lime and nutrients deeper into the soil and will break up any existing compacted layers that may limit root distribution laterally and vertically.

Cultivar selection

- The choice of cultivar can affect the pecan trees' susceptibility to wind damage.
- Cultivars with wide crotch angles and central leaders are more likely to resist tree breakage and wind damage. Additionally, cultivars with open canopies—rather than dense, closed canopies—provide more protection from wind when grown at standard orchard spacing.
- The use of cultivars that mature earlier (e.g., Pawnee pecan trees) can be beneficial, as they allow for a portion of the crop to be harvested before the height of the hurricane season.
- To learn more about pecan cultivars, see:
  - USDA Agricultural Research Service Pecan Cultivars Alphabetic Search by Cultivar Name website
  - Alabama Pecan Growers Association Pecan Cultivar Recommendations for the Southeast website

Training and pruning

Eliminate sharp crotch angles whether a tree is trained to a central leader or an open center. A wide angle where branches meet the main trunk helps trees to withstand the high winds that accompany major hurricanes. For publications and videos on producing and training tree fruit, see the North Carolina Cooperative Extension Comprehensive Resources for Fruit Trees website.

Optimal root development

Plant pecan trees only on well-drained soil with at least 2 to 3 feet between the soil surface and water table under normal conditions. Orchard trees planted where the water table is excessively high develop a horizontally spreading, shallow root system. Such trees are especially susceptible to uprooting by winds because large brace roots are required for strong anchorage of the tree.

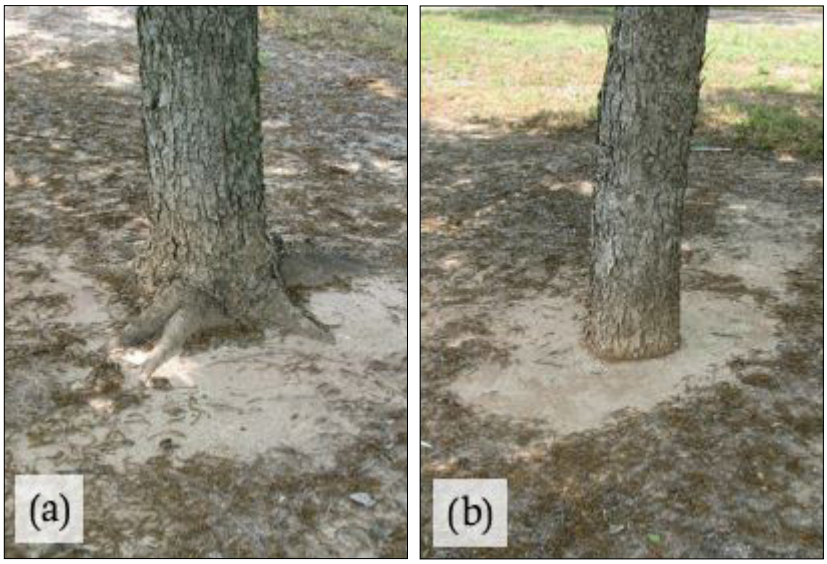
Planting depth and support system

- When planting trees, ensure that the graft union will be at least 3 to 4 inches above the soil after the soil has settled for optimal tree growth, strength, and integrity.
- Trees planted too deeply, with root collars more than 2 inches below the soil surface, are much more prone to blowing over in high winds. The deeper the root collar beyond 2 inches, the greater the likelihood that brace root development will be suppressed. Such trees are recognizable in orchards by a sizable crack in the soil at the soil-trunk interface, allowing trees to wobble in the wind. While these trees can survive and produce fairly well for many years of non-extreme weather, they are typically the first in an orchard to be uprooted or blown over during major hurricanes.

- Ensure that the uppermost lateral root is even with or no more than 1 inch below the soil surface at planting. Dig tree holes to approximately 24 to 36 inches and prune the taproot to that length to ensure the trees do not settle too much. Trees planted at the proper depth will show root flaring at the soil surface (see below).

Recordkeeping, documentation, and insurance

- The importance of pre- and post-hurricane documentation cannot be overstated. Assistance for disaster recovery may not be available for months or longer after a hurricane. Therefore, it is important for purposes of insurance compensation and recovery assistance to do thorough recordkeeping of the damages and losses sustained on your pecan orchard as well as your cleanup and recovery efforts.



Pecan tree planted at the appropriate depth with proper brace root development (a) and pecan tree planted too deep (b) (note absence of brace roots)

- A recent inventory, including an accurate and up-to-date count of trees in the orchard, is useful for determining pre-hurricane fair market value of your pecan operations, assessing loss after the hurricane, and filing for casualty loss with the Internal Revenue Service. Keep copies of this inventory in multiple places such as on your computer, offsite in a safe location, and on a cloud-based server.
- The worst time to find out that you don't 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 vehicles, equipment, and orchards. 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. Federal crop insurance is not currently available for North Carolina and Virginia pecan producers. Contact your local USDA Farm Service Agency (FSA) office for more information.

- For more information, see:
  - USDA Risk Management Agency (RMA) Crop Insurance website for news and information about insurance, including the Hurricane Insurance Protection – Wind Index (HIP-WI) Endorsement, Pecan Tree Fact Sheet, and Whole-Farm Revenue Protection (WFRP) plan
  - RMA Agent Locator to search for approved insurance providers
  - U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA) Flood Insurance website to learn more about flood insurance options for qualifying home and business owners

Infrastructure

Roads

- The primary driveway into the orchard 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 and irrigation

- Understand the drainage profile within your orchard. Given the large quantities of rain accompanying hurricanes and tropical storms, you may need to modify the orchard site to allow for proper drainage, either by using preplant land grading to allow for natural drainage or by creating active drainage by tilling the orchard.
- In addition to increasing nut production, it can be beneficial to establish an irrigation system that will cover a larger area and encourage broader root development. A larger, more widespread root system will help to anchor the tree in high winds and allow the tree to take up water more efficiently.

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 Ready.gov Emergency Alerts website.

Post-hurricane communications

- 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).
- For more hurricane-related communication recommendations, see the U.S. Federal Communications Commission FCC and FEMA: How to Communicate Before, During and After a Major Disaster website.

Equipment operation

- Check that equipment needed to access the sites (e.g., chainsaws, chains, heavy equipment) is working properly.
- Train employees to safely operate emergency equipment they may be unfamiliar with.

Drones

Consider getting 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 fields directly is impossible or unsafe. For regulations and information about operating a UAV, see:

- U.S. Department of Transportation (DOT) 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

SECTION 2

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

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, see the Ready.gov Hurricanes website.
- Download the FEMA Mobile App to learn emergency safety tips, and 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 coverage.
- Keep records of harvests, equipment inventories, and purchases of supplies 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 chosen in the Building a Resilient Operation section above.

Drainage

- Clean out culverts and ditches to improve drainage, both 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 DOT 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.

Crop

- Optimize tree growth throughout the season through practices such as maintenance of a vegetation-free strip underneath the tree, annual fertilization based upon soil and foliar analysis, annual training and pruning for optimal and proper tree structure, and annual insect and disease management. For recommendations on insect and disease control in pecan orchards, see the University of Georgia Cooperative Extension Commercial Pecan Spray Guide.
- To reduce potential limb breakage and uprooting during a hurricane, use pruning strategies that reduce tree height and create open canopies. To learn more about pruning pecan trees, see:
  —University of Georgia Cooperative Extension Pruning Young Trees website
  —North Carolina Cooperative Extension Pruning Pecan Trees YouTube video
- Mechanically hedge-pruning orchard trees could potentially reduce wind damage, as the practice keeps trees relatively small and limbs relatively short, thus minimizing tree exposure to winds and the associated leveraging side effects on root systems. For example, during Tropical Storm Irma in 2017, hedge-pruned pecan trees in Georgia suffered 60 percent less damage to tropical storm-force winds compared to non-hedge-pruned pecan trees. In addition, the relatively small size of orchard trees under a hedging management system reduces the time required to refill vacated space with transplants when trees are destroyed. The increasing popularity of large-tree transplanting allows for refilling orchard space within a few years, thus accelerating orchard recovery.
- Breakage of tree limbs commonly occurs during the late water stage of fruit development and during kernel filling of pecans, which happens to coincide with the peak of hurricane season in August, September, and October. Hurricanes during this period can devastate orchards because of the immense weight being supported by long limbs carrying heavy fruit crop loads. Associated fruit are especially heavy due to the volume of water contained to ensure proper kernel filling. To greatly increase trees' resistance to wind damage, reduce excessive crop loads in late July or early August via timely mechanical fruit thinning. For more information about crop load management, see:
  —University of Georgia Cooperative Extension Cultural Management of Pecan Orchards
  —Louisiana State University AgCenter Pecan Crop Load Management

SECTION 3

Short-Term Preparedness

Bracing for the hurricane: specific actions to be done in the week before a hurricane arrives

1–7 days before a hurricane is forecast to strike

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

Communications

- Continue to monitor hurricane track and strength updates. Listen closely for evacuation orders in your area.
- Ensure that all communication equipment is available and working properly. Cellular phones are good for communications, but ensure radios are available and in good working condition. 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 the phone networks may be overwhelmed.

Supplies

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.

Fuel

- Make sure that you have a minimum of a 2-week supply of fuel for equipment and generators.
- 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 onsite poses a contamination risk if storage tanks cannot be adequately protected from anticipated flooding. Move them to higher ground or secure in a safe location.

Records and documentation

- Take pictures of your orchards. These will serve as a record of conditions prior to the hurricane. Google Earth is a good tool to print out a map and document the condition of the orchards once they are several years old.
- Make sure that you have enough batteries for flashlights and radios to last at least 2 weeks.

Equipment

- Move equipment under cover and secure if possible.
- If there is flooding potential, move equipment to higher ground.

Irrigation

Turn off all irrigation systems as soon as a hurricane is forecast for your area to allow soils to dry out. This will help to stiffen soils and help minimize windthrow of trees as soils become more saturated. If time permits, check drain lines and clean ditches if present.

Crop

- Harvest as much of the crop that is mature.
- Do not remove a portion of the trees' canopy, either through aggressive pruning or chemical defoliants, in an effort to reduce the wind drag on the tree. These practices can exacerbate damage and can reduce the potential for any harvest if the hurricane misses your area or causes less damage than anticipated.

SECTION 4

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

Safety

- Make safety your first priority. Use caution when going into an orchard immediately after a hurricane or tropical storm. Damaged or weakened trees are safety concerns due to the potential for falling branches.
- 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.

Crop

Although your initial inclination may be to pull the trees upright as soon as possible, know that the damage has already been done; making the trees look better will not result in increased tree survival. When a tree is blown over, it has damaged roots all around the tree, and pulling the tree upright causes more damage. The root system is not fluid within the soil and does not have a "give-and-take" flexibility. Extensive experience in North Carolina and Georgia with storm-damaged pecan trees has led to the conclusion that pulling up and staking established trees is of little benefit. Although the trees will look better, they are usually the first trees to blow over again when a nor'easter or tropical storm moves through. Newly planted trees with less than 30-percent lean, however, can be staked up and held with a trunk support.

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:

- U.S. Department of Health and Human Services Disaster Mental Health Resources website
- North Carolina Cooperative Extension 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

Documentation of damage

- Document damage before cleanup begins, in as much detail as possible. Although most insurance policies will not cover the lost trees, there may be coverage for the lost crop and lost income. You will need digital photos of the trees and crop loss, especially if disaster payments may be an option.
- Many disaster assistance programs will come after the disaster, perhaps even years later, and an operation can only receive assistance for damage that was documented.

Photos and video

- Take photos or video first before beginning any cleanup or repairs. Photograph and take video of damaged trees 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.
- Obtain aerial imagery of hurricane damaged areas. State agencies such as State forestry commissions usually conduct a survey flight to ascertain general areas of impact. Satellite imagery may also be available to view impacts with more precision.

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 fields. Some 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 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 Disaster Recovery Center Locator and Individual Assistance website to find the closest recovery center and other resources to assist you during your recovery
  - USDA Disaster Resource Center website for updates on emergency designation areas and available assistance programs
  - Farmers.gov Protection and Recovery website, 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:
  - Noninsured Crop Disaster Assistance Program (NAP)—FSA program that provides assistance to eligible pecan producers who suffer losses or are prevented from planting agricultural commodities that are not eligible for protection by Federal crop insurance
  - Tree Assistance Program (TAP)—FSA program that provides financial assistance to qualifying orchardists to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters
  - Emergency Farm Loans—FSA program that provides eligible pecan producers 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 Conservation Program (ECP)—FSA program with technical assistance through the USDA Natural Resources Conservation Service (NRCS) that helps eligible pecan producers repair damage to orchards caused by natural disasters
  - Emergency Watershed Protection (EWP) Recovery Assistance—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 flood plain 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

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 start the paperwork now since insurance claims can take months to resolve following hurricane events.

Crop

- Following a hurricane, maintain optimal management and minimize competition from vegetation.
- Do not fertilize. Hurricanes and tropical storms typically move through later in the season, and fertilizing at this time could make the trees more susceptible to cold damage from an early winter cold event.
- Remove fallen debris from the orchard.
- Although the orchard may not look well managed for several months, leave hanging branches until the dormant season, as carbohydrates will be translocated from the green leaves to the tree as the tree go dormant.

Potential salt damage

- Higher soil salt levels can accompany hurricane surges and cause severe damage and dieback to pecan trees if your orchard is impacted by storm surge or coastal flooding. Pecan trees are classified as moderately sensitive to saltwater, and yields will decrease at elevated salt levels.
- Contact your local Extension office if you suspect your pecan trees have been damaged by saltwater.

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.
- See the USDA Disaster Resource Center website for updated information about FEMA aid and other disaster programs.
- Continue to document everything 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.

Crop

- Continue monitoring trees for delayed damage. With perennial tree fruit crops, damage from a tropical storm or hurricane may not be evident for a long period of time. Trees experiencing heavy winds can have below-ground root damage resulting in weakened tree growth, limb dieback, and reduced production in future years. Monitor the trees for the next year or two for pathogens and insects that thrive on compromised trees, especially ambrosia beetles (*Xylosandrus* spp.) which tend to key in on weakened trees.
- Fill significant ruts within the orchard that developed from the hurricane. These ruts can cause management and harvest issues since they may make the passage of harvest equipment difficult.
- For the latest news and guidance related to hurricane impacts on your pecan orchard, visit your local Extension website.

Drainage

- Examine drainage ditches and canals to determine to what extent they were silted in by floodwaters. Dredge and/or repair them if necessary.
- Pecan trees can tolerate saturated soil for up to 2 to 3 weeks during the growing season. Once dormant, pecans can survive in standing water for a longer period of time with no negative effects.

APPENDIX

Initial Site Planning

Considerations when deciding on a new location to establish or purchase farmland

Hurricane risk

No model or long-term forecast can determine when and where hurricanes will strike during any given hurricane season; however, return period maps have been developed to give a good indication of relative hurricane risk. Return period maps display the number of years between hurricane events and help quantify the vulnerability of coastal areas to hurricanes. To learn more about your area's hurricane return period, see the NOAA What are the chances a hurricane will hit my home? website.

It is important to remember that return period maps represent a long-term average and that even if the average return period for a hurricane is 25 years, hurricanes can 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.

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 and drainage

- When planning for long-term preparedness, evaluate a potential site for your pecan orchard 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. Avoid steeper slopes if possible.
- Drained orchards need to have well-installed and maintained ditch and channel systems.

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 resources for estimating flood risk:
  - FEMA Flood Map Service Center website (for official flood maps)
  - South Carolina Department of Natural Resources Flood Mitigation Program 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.

Resource Links

Extension, State, and Federal websites

South Carolina

Extension Websites	Purpose
Extension Office Locator*	Contact information for Extension agents in your county
Emergency Preparedness and Post Hurricane Impact Resources*	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

*Clemson University Cooperative Extension Service

State Websites	Purpose
South Carolina Governor's Office	News and information from the Governor, including evacuation orders and emergency declarations
South Carolina Department of Agriculture	Main source for answers to your agriculture-related questions
South Carolina Emergency Management Division	News and resources to help you prepare for, respond to, and recover from emergencies, including hurricanes
Team South Carolina Emergency Response	Disaster assistance resources for residents

State (FSA and NRCS) and Federal

State Websites	Purpose
USDA FSA South Carolina USDA NRCS South Carolina	Focus on State FSA and NRCS resources, including financial and technical information sharing

Federal Websites	Purpose
Ready.gov Hurricanes	Resources to help individuals prepare for and recover from hurricanes
U.S. 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 Natural Resources Conservation Service (NRCS)	Financial and technical assistance for farmers, ranchers, and forest landowners
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
U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA)	News and information to help you prepare for and recover from hurricanes and other disasters
U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA)	Resources to view historical, current, and predicted hurricane activity and warnings in your area
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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