

Growing Texas

Community Forest Planning: Storms

Guide for Texas Communities



**Texas A&M Forest Service
Urban & Community Forestry
TFSweb.tamu.edu**



"The few times I have cried [since the storm], it's been over the trees."

Jackie Cole, Galveston

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How to Use this Guide

This guide is intended to provide a basic framework to assist communities in assessing their community forest storm readiness, mitigating tree risk, reducing tree-related storm damage, and developing a *Community Forest Storm Mitigation Plan*.

As you fill in the blanks, check off completed activities, and circle appropriate selections within brackets, you will begin the assessment of your storm readiness and the development of your plan. During the process, gaps in storm readiness, tree risk mitigation and community forest management will be identified. As these gaps are addressed, the plan should be revised and updated.

Texas A&M Forest Service (TFS) can provide guidance in developing your plan; please contact the Regional Urban Forester for your area. Visit <http://tfsweb.tamu.edu> for a listing of program personnel and more information on trees and community forests.

INTRODUCTION

A community forest storm mitigation plan is an essential part of your community's hazard mitigation and emergency management plans and systems. The plan should focus specifically on ways to avoid or mitigate the damage trees cause during a storm or other catastrophic event and ways to avoid the loss of trees and tree canopy across a community.

The guide is divided into four (4) parts:

PART I. COMMUNITY SETTING

PART II. STORM PREPARATION

PART III. STORM RESPONSE

PART IV. STORM RECOVERY

Your plan should include a description of your community setting for storm exposure and tree damage, the activities you will undertake to prepare for storms, how you will respond and begin short-term recovery, and then the actions you will take for long term recovery and restoration of your community forest.

PLAN OBJECTIVES AND BENEFITS

The objectives of a community forest storm mitigation plan are to:

- Reduce the amount and severity of the damage and losses to people, property, the economy and the environment that results from tree failures during storm events
- Reduce tree canopy cover losses resulting from storm events

The development and implementation of a community forest storm mitigation plan will provide the following benefits:

- Reductions in damage and losses of people and property due to trees
- More efficient and effective response to storms
- Increased reimbursement for tree losses
- Reductions in tree failures and tree canopy losses
- Improved community forest health, safety, and benefits
- Maintain and enhance community confidence in elected officials, city staff and programs

EMERGENCY MANAGEMENT AGENCIES

Responses to minor emergency events involving trees that require less than 24 hours to clear roadways, repair utilities and restore public safety are often handled by the street or public works departments. Major events that require longer periods of response, external resources, and longer periods of recovery usually require the involvement of county, state and federal emergency management agencies.

The local emergency management director will contact the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) as needed prior to, during or after a storm event according to the protocol outlined in the community's hazard mitigation and emergency response plans.

The community tree care manager should work with the local emergency management agency director to fully understand and agree on the responsibilities, procedures and information required of them in hazard and storm mitigation.

Texas Division of Emergency Management (TDEM)

www.txdps.state.tx.us/dem/

Federal Emergency Management Agency (FEMA) Region VI

<https://www.fema.gov/region-vi-arkansas-louisiana-new-mexico-oklahoma-texas>

FEMA publishes a useful glossary of disaster terms at <http://www.fema.gov/glossary>.

PART I. COMMUNITY SETTING

The degree of storm preparation necessary in your community and the type and amount of damage that is likely to result depends on:

- Your geography and size
- Your storm history and exposure, including climatological & meteorological conditions
- The level to which your community forest resource is being managed

A. COMMUNITY GEOGRAPHY AND SIZE

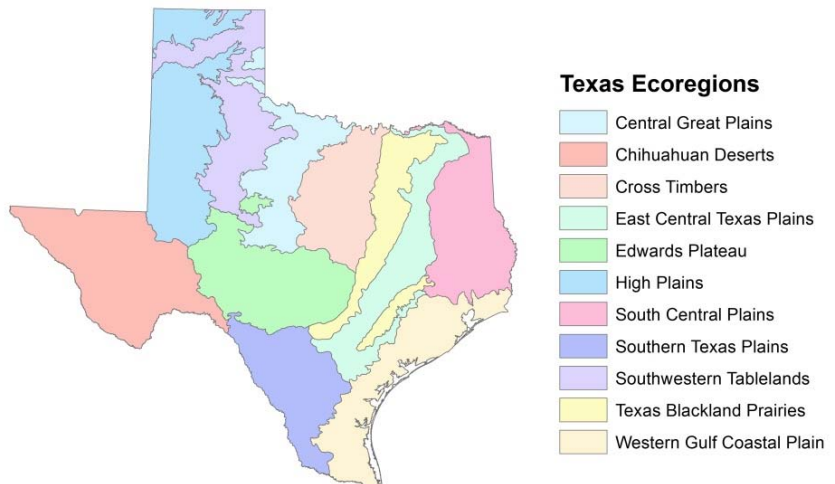
This **Storm Mitigation Plan** has been developed for _____, Texas.

Date of adoption: _____ Date of last update: _____

Our community is located in the _____ region of Texas.

Our jurisdiction encompasses an area of _____ square miles and has _____ miles of public roadways.

Our community has a population of _____ as of the last official census.



B. STORM HISTORY AND EXPOSURE

1. Potential Storms and Emergency Events

All of the possible storm events that can occur in Texas can cause considerable damage to trees and those tree failures in turn may result in damage to roads, utilities, facilities, buildings, vehicles and in some cases, people.

Visit the *NOAA National Climatic Data Center* (<http://www.ncdc.noaa.gov>) to research the primary weather and catastrophic events that are likely to occur in your community.

Descriptions of the damage to trees that can be expected at various wind speeds are included in the Enhanced Fujita Scale degrees of damage charts for softwoods, reproduced below. Expected damage for hardwoods is similar.

Degree of Damage	Damage Description	Expected Wind Speed	Lower Bound Wind Speed	Upper Bound Wind Speed
1	Small limbs broken (<1" dia.)	60	48	72
2	Large branches broken (1" to 3")	75	62	88
3	Trees uprooted	87	73	113
4	Trunks snapped	104	88	128
5	Trees debarked with only stubs of largest branches remaining	131	112	153

The damage that occurs to trees from fire and major storm events is usually immediately apparent after a storm. Subsequent damage to trees as a result of chemicals, flooding, or insect or disease infestations may only be evident later; tree decline and death may eventually result.

The primary events that are likely to occur in our community that can affect trees include:

- | | |
|---|---|
| <input type="checkbox"/> Earthquake | <input type="checkbox"/> Tornado |
| <input type="checkbox"/> Flood | <input type="checkbox"/> Hail |
| <input type="checkbox"/> Hurricane | <input type="checkbox"/> Wildfire |
| <input type="checkbox"/> Tropical storm | <input type="checkbox"/> Wind/microburst |
| <input type="checkbox"/> Ice storm | <input type="checkbox"/> Pest Infestation (list type) |
| <input type="checkbox"/> Salt intrusion | _____ |
| <input type="checkbox"/> Snow | <input type="checkbox"/> Other _____ |

2. Snow and Ice Storms

Snow and ice storms are most likely to occur during the months where freezing temperatures are possible—including the following months in our area: _____

3. Rainfall and Flooding

Excessive rainfall and flooding, usually as a result of high amounts of precipitation, causes destabilization of trees, whole tree failures, or tree death.

The months in our area with the highest average precipitation are: _____

The driest months of the year are: _____

4. Droughts and Fires

Tree damage can result from periods of high temperatures and low moisture. These drought conditions, combined with high winds, can predispose trees and communities to wildfires.

The warmest months of the year are: _____

5. Other Significant Conditions

Other significant geographic, climatological and meteorological conditions that predispose our community to storms or catastrophic events include: _____

C. COMMUNITY FOREST RESOURCE MANAGEMENT

1. Tree Care Manager

For storm mitigation planning (and community forest resource management), it is recommended that someone be designated as the tree care manager and given the responsibility for both coordinating community forest resource management and storm mitigation planning.

Communities that do not have a forester or arborist on staff should designate an existing staff member as the tree care manager, or hire a consulting forester or arborist to fill this role.

The designated tree care manager should have technical expertise, field experience and knowledge in community forest management, tree risk assessment, and tree maintenance standards and best management practices. Ideally your tree care manager should be an ISA Certified Arborist®.

The Tree Care Manager is: _____

2. Management Plan

Many communities have developed a management plan to guide their community forest management programs. These plans may be basic or more complex, may be developed annually or may have a 5 year or longer time frame, and include plans for administration, field operations, and information and education.

We have a community forest management plan in place (included in the appendix)

Our community forest management plan was first adopted on _____ (date).

Our community forest management plan was last revised on _____ (date).

The person responsible for administering and updating our community forest management plan is: _____

PART II. STORM PREPARATION

Preparation for anticipated storm events will reduce the storm impact and damage that occurs during an event. Storm preparation has the following additional benefits:

- Improvement of local, state and federal information sharing
- Identification of critical infrastructure
- Coordinated response plans
- Facilitation of mutual aid agreements for communities to share resources
- Identification of capacity needs
- Provides opportunities for training and field exercises

Keeping in mind the storm damage potential in your area, you should begin preparations for storm events by taking the following steps.

- Develop a storm mitigation team
- Assess the community forest resource
- Inventory available equipment and services
- Develop memoranda of understanding and advanced readiness contracts
- Develop a storm mitigation map
- Implement a tree risk mitigation program
- Develop a communication, information and education program

A. STORM MITIGATION TEAM

Assemble a team of individuals that can contribute not only to storm preparation, but also to storm response and recovery. Your tree care manager should lead the team and coordinate storm mitigation planning, preparation, and response, as well as community forest recovery.

Specific roles and detailed responsibilities should be assigned to team members or reconfirmed during annual meetings and job descriptions further developed to promote an organized approach to mitigation, preparation, response and recovery.

Your storm mitigation team should include individuals from the agencies, departments, organizations and companies listed below, as applicable to your community.

1. Emergency Management Personnel

Local Emergency Management Director

Name: _____

Title: _____

Dept: _____

Phone: _____

Alt phone: _____

E-Mail: _____

TDEM Field Coordinator

Name: _____

Phone: _____

E-Mail: _____

FEMA Region VI Regional Administrator

Name: _____

Phone: _____

E-Mail: _____

2. City Staff

[City Manager] [County Administrator]

Name: _____

Title: _____

Phone: _____

E-Mail: _____

Public Works Director

Name: _____

Phone: _____

E-Mail: _____

Public Information Officer

Name: _____

Phone: _____

E-Mail: _____

[Streets Superintendent]/[Traffic Engineer]

Name: _____

Title: _____

Phone: _____

E-Mail: _____

[Public Safety Officer]/[Police Chief]

Name: _____

Title: _____

Phone: _____

E-Mail: _____

Tree Care Manager

Name: _____

Dept/Title: _____

Phone: _____

E-Mail: _____

Fire Chief

Name: _____

Title: _____

Phone: _____

E-Mail: _____

Parks and Recreation Director

Name: _____

Phone: _____

E-Mail: _____

Planning Director

Name: _____
Phone: _____
E-Mail: _____

[GIS Manager][Other City Staff]

Name: _____
Phone: _____
E-Mail: _____

3. Utility Companies and Departments

Electric Utility

Name: _____
Title: _____
Company/Dept: _____
Phone: _____
E-Mail: _____

Water and Sewer Utility

Name: _____
Title: _____
Company/Dept: _____
Phone: _____
E-Mail: _____

Gas Utility

Name: _____
Title: _____
Company/Dept: _____
Phone: _____
E-Mail: _____

Other Utility

Name: _____
Title: _____
Company/Dept: _____
Phone: _____
E-Mail: _____

4. State Agencies

Texas A&M Forest Service

Name: _____
Title: _____
Phone: _____
E-Mail: _____

Other State Agencies

Name: _____
Agency: _____
Phone: _____
E-Mail: _____

5. Contractors

Debris Removal Contractor(s)

Name: _____
Title: _____
Company: _____
Phone: _____
E-Mail: _____

Tree Service Contractor(s)

Name: _____
Title: _____
Company: _____
Phone: _____
E-Mail: _____

6. Equipment and Materials Vendors (equipment rental, tree nursery)

Equipment Rental Vendor(s)

Name: _____
Title: _____
Company: _____
Phone: _____
E-Mail: _____

Tree Nursery Vendor(s)

Name: _____
Title: _____
Company: _____
Phone: _____
E-Mail: _____

7. Volunteer Organizations

Tree Board Chair

Name: _____
Title: _____
Organization: _____
Phone: _____
E-Mail: _____

Local Agency or Non-profit

Name: _____
Title: _____
Organization: _____
Phone: _____
E-Mail: _____

8. Additional Team Members and Emergency Contact(s)

Reforestation Sponsor(s)

Name: _____
Organization: _____
Phone: _____
E-Mail: _____

Other

Name: _____
Organization: _____
Phone: _____
E-Mail: _____

B. COMMUNITY FOREST RESOURCE ASSESSMENTS

One of the first tasks of the tree care manager in storm mitigation planning should be to review or gather information on the community forest resource, including:

- Total amount of tree canopy cover across the community
- Number, location and size of public trees, especially street trees
- Number, location and size of trees at risk for failure
- Estimate of the dollar value of the benefits that trees provide
- Total annual cost of community forest management
- Benefit to cost ratio of community forest management and tree risk mitigation

Using the tree canopy and tree inventory data, the value of the benefits provided by all trees within the community, and specifically the public street trees, can be estimated. With information on the value of tree benefits and the total cost of management, a benefit to cost ratio can be used to justify community forest management activities.

Visit www.texasforestinfo.com/utc to learn about Urban Tree Canopy in your community
Additional tools to conduct your own analysis are available at www.itreetools.org.

1. Tree Canopy Assessment

We have completed a tree canopy assessment, and _____% of our community is covered with tree canopy as of _____ (year)

The method used for determining our tree canopy is described below:

Previous tree canopy assessments have been made.
_____ % in _____ (year) _____ % in _____ (year) _____ % in _____ (year)

Our tree canopy cover has [increased] [decreased] over the _____ # years of measurement. Additional changes in our tree canopy cover over time are described below.

A tree canopy goal of _____% has been set by the community.

2. Public Tree Inventory

An inventory of public trees was last completed in _____ (year), and the community has the number of public trees shown below growing on:

- Street rights-of-way _____ (# of trees)
- Public parks _____ (# of trees)
- Public cemeteries _____ (# of trees)
- Public school campuses _____ (# of trees)
- Yards around public offices and facilities _____ (# of trees)

Our public tree inventory information is available in an [Excel spreadsheet] [GIS shapefile] [hardcopy format] and is available from the tree care manager

Our public tree inventory is included as a layer on our community's GIS

Our inventory includes the location of all street trees determined using GPS and we have a GIS shapefile of our street trees

- We have _____ (# of trees) large street trees, _____ inches DBH and greater
- A map of the locations of street trees _____ inches DBH and greater is available from the tree care manager

3. Tree Risk Assessment

An assessment of tree risk can be completed during the inventory of public trees or as a separate activity focusing specifically on identifying trees with an elevated risk of failure. Tree risk assessment procedures should conform to the following standards and best management practices published by the International Society of Arboriculture:

- *ANSI A300 (Part 9) – American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management—Standard Practices (Tree Risk Assessment a. Tree Structure Assessment)*
- *Tree Risk Assessment Best Management Practices* (companion publication to the ANSI A300 Part 9 standard practices)

Using the methodology described in the ANSI standards, a Level 1 tree risk assessment should be performed on all trees growing along high priority streets within the community—those streets leading to and from emergency and critical facilities.

To facilitate assessments, TFS has developed a *Level 1 Tree Risk Assessment mobile app* available through app stores and <http://texasforestinfo.com/mobileapps>.

Tree risk mitigation may require:

- Pruning to remove deadwood or structurally weak branches, or increase clearance
- Supplemental support
- Further inspections (Level 2 or 3)
- Removal if in irreversible decline or their risk of failure cannot be otherwise mitigated

Once the need is identified, basic activities should be completed as soon as possible to mitigate tree risk and should also become routine activities within the community forest program.

- Our community has on file in the tree care manager's office a copy of the ANSI standards and best management practices for tree risk assessment.
- Our community has a tree risk assessment program or plan.
- A Level 1 tree risk assessment is conducted every _____ [months][years].
The date of the most recent Level 1 tree risk assessment is _____.

4. Tree Benefits and Value

Using assessment data, the value of the benefits provided by trees can be calculated:

- **Urban Tree Canopy of selected Texas communities** www.texasforestinfo.com/utc/
- **i-Tree Tools for Assessing & Managing the Community Forest** www.itreetools.org
- **Council of Tree and Landscape Appraisers. Guide for Plant Appraisal, 9th Edition, International Society of Arboriculture, www.isa-arbor.com.**
- **National Tree Benefits Calculator, <http://treebenefits.com/calculator/>**

We have information on the dollar value of the benefits that our trees provide.

The total dollar value of the annual benefits provided by our community trees, based on our [tree canopy] [street trees] assessment, is \$_____ (A).

The dollar values of the benefits our [tree canopy] [street trees] provides include:

- \$_____ aesthetic and other benefits
- \$_____ air quality benefits
- \$_____ carbon dioxide benefits (carbon stored and sequestered)
- \$_____ energy benefits
- \$_____ stormwater benefits (gallons intercepted, etc)

The annual benefits per tree average \$_____.

5. Community Forest Management Costs

We have information on our annual community forest management costs.

The total annual cost of managing our public [street] [park] [cemetery] [school] [facility] trees include costs for:

- | | |
|---|------------------------------------|
| \$_____ Tree inventory | \$_____ Irrigation (staff) |
| \$_____ Tree risk assessment (E) | \$_____ Inspection (staff) |
| \$_____ Tree purchases | \$_____ Removal [staff] [contract] |
| \$_____ Planting [staff] [contract] | \$_____ Pruning [staff] [contract] |
| \$_____ Mulching (labor) | \$_____ Equipment/Supplies |
| \$_____ Mulch materials | \$_____ Leaf and limb pick-up |
| \$_____ Pest management | |
| \$_____ Infrastructure repairs due to trees | |
| \$_____ Liability/claims for damages | |
| \$_____ Consulting services (management, planning, tree risk, etc.) | |
| \$_____ Administration (describe) _____ | |
| \$_____ Other costs (describe) _____ | |

\$_____ Total annual community forestry program expenditures (B)

Street trees represent _____% of our total public tree population (C)

The pro-rated cost of managing our street tree population is \$_____ (B X C = D).

6. Benefit to Cost Ratio of Community Forest Management

Divide the dollar value of the annual benefits by the total annual cost for management to arrive at *the value of benefits returned by the trees for each dollar spent* on their management.

The total value of the benefits provided by our [tree canopy][street trees] is \$_____ (A).

The total cost of our annual community forest management program is \$_____ (B).

The total cost of managing just our street tree population is \$_____ (D).

The total cost of our annual tree risk assessment program is \$_____ (E).

For every \$1 our community spends on community forest management, we receive \$_____ back in benefits from our [tree canopy] [street trees] (A divided by B).

For every \$1 our community spends on management of the street tree population, we receive \$_____ back in benefits from our public street trees. (A divided by D)

For every \$1 our community spends for tree risk assessment, we receive \$_____ back in benefits from our public street trees $([A-(B-E)]/E)$.

C. STORM MITIGATION MAP

A storm mitigation map (GIS or paper) that includes the locations of critical facilities, transportation corridors (especially high priority roads to critical and emergency facilities), street trees (especially very large trees and trees at risk), and emergency response sites is an essential tool for storm preparation, response and recovery. *Priorities for tree risk mitigation become apparent where priority roads, large trees, and critical facilities intersect and overlap.*

- A storm mitigation map has been developed and is included as part of our plan.
- Copies of the storm mitigation plan are available in the office(s) of the:
 - Emergency Response Manager
 - [Public Works Director]/[Engineer]
 - Tree Care Manager
 - Online _____

Our storm mitigation map includes the following information:

Critical Facilities

- Hospitals
- Other critical health care facilities

- Fire & Fire stations
- Communications networks/facilities
- Electric utilities

- Other utility networks/ facilities
- Water system
- Sanitary sewer system

Transportation Network

- Street network
- Priority streets to critical facilities

Trees

- All public trees
- Large canopy public trees
- Tree canopy density

Emergency Response Sites

- Emergency management centers
- Homeland Security offices
- Personnel/equipment staging areas
- Debris staging and storage areas

The person responsible for developing and updating our storm mitigation map is:

THE URBAN TREE RISK INDEX

Urban Tree Risk Index (UTRI) is a tool to help city foresters and emergency management personnel define, rank, and map the areas of greatest need for tree risk mitigation. This GIS based system results in the development of a map and database that can be used for prioritizing tree risk mitigation activities prior to, during, and after a storm event. For more information on the *Urban Tree Risk Index*, visit www.UrbanForestrySouth.org.

D. TREE RISK MITIGATION

1. Short-term Tree Risk Mitigation

Trees found to have an elevated risk of partial or whole tree failure should be pruned, removed, or cabled and braced where feasible and effective, as soon as they are identified to mitigate the immediate risk.

- We have a short-term tree risk mitigation program in place.

The number of trees identified during our tree risk assessment that require mitigation total _____, including:

- _____ that require risk reduction pruning
- _____ that require supplemental support
- _____ that require pest management
- _____ that require removal

The number of trees scheduled to be pruned for risk mitigation each year is _____.

The number of trees scheduled for supplemental support each year is _____.

The number of trees scheduled for pest management each year is _____.

The number of trees scheduled to be removed for risk mitigation each year is _____.

The number of trees scheduled to be planted to replace trees removed each year is _____.

2. Long-term Tree Risk Mitigation

A long-term plan for tree risk mitigation that involves improvements in the overall community forest management program and health of the tree resource should be developed and implemented. Additional activities and program components in place in our community to further mitigate tree risk and storm damage on a long-term basis are:

- | | |
|--|---|
| <input type="checkbox"/> Tree care standards and best management practices | <input type="checkbox"/> Routine tree mulching, irrigation, and soil aeration |
| <input type="checkbox"/> Tree ordinance | <input type="checkbox"/> Recommended tree species list |
| <input type="checkbox"/> Ongoing training program for tree care personnel | <input type="checkbox"/> Species selection guidelines |
| <input type="checkbox"/> Established tree care budget | <input type="checkbox"/> Site selection guidelines |
| <input type="checkbox"/> Alternate program funding mechanisms | <input type="checkbox"/> Minimum rooting area and soil volume requirements |
| <input type="checkbox"/> Routine street tree inspection | <input type="checkbox"/> Growing space requirements |
| <input type="checkbox"/> Routine large tree inspection | <input type="checkbox"/> Critical root zone protection |
| <input type="checkbox"/> Routine pruning program | <input type="checkbox"/> Public information and education program |
| <input type="checkbox"/> Routine tree planting program | <input type="checkbox"/> Program analysis and feedback |

E. EQUIPMENT AND SERVICES

The available equipment for storm mitigation, response, and recovery (inventoried annually) by the department or source committed to supply the equipment (rental, contractor, or other).

EQUIPMENT DESCRIPTION	NUMBER OF UNITS NEEDED/AVAILABLE	DEPARTMENT/SOURCE OF SUPPLY
Crew Vehicles	/	
Aerial Lift Trucks	/	

EQUIPMENT DESCRIPTION	NUMBER OF UNITS NEEDED/AVAILABLE	DEPARTMENT/SOURCE OF SUPPLY
Loaders	/	
Chippers	/	
Refuse Packers	/	
Dump Trucks	/	
Barricades	/	
Traffic Safety Cones	/	
Lighting Equipment	/	
Chain Saws	/	
Hand Saws	/	
Pole Pruners	/	
Portable Radios	/	
Computers/Tablets	/	
GPS Units	/	
Cameras	/	
Clipboards	/	
DBH Tapes	/	
Safety Vests	/	
Hardhats	/	
Eye Protection	/	
Ear Protection	/	
First Aid Kits	/	
Other	/	

F. MEMORANDA OF UNDERSTANDING AND ADVANCED READINESS CONTRACTS

Depending on the size, severity and impact of a storm event, the community will likely have to rely on outside sources of materials and services.

1. Memoranda of Understanding

Memoranda of understanding (MOUs) that outline the sharing of personnel, materials, functions, services and equipment for storm mitigation, response, and recovery should be completed between the city and those willing and able to provide such resources. MOUs are not binding, but clearly establish expectations for providing and receiving, needed assistance.

Included in the appendix are copies of MOUs for storm preparation, response and recovery that have been executed by the city with the communities, agencies, organizations, groups and individuals listed below:

Neighboring communities: _____

Local agencies: _____

Non-profit organizations: _____

Other individuals and groups: _____

2. Advanced Readiness Contracts

Advanced readiness contracts (ARCs) are legally binding and include a description of services to be provided, cost of the services, and standards to be met when executing the services. By preparing and executing these ARCs before a storm occurs, the capacity for storm preparation, response and recovery is increased and the overall cost should be reduced.

Included in the appendix are copies of ARCs for storm preparation, response and recovery that have been executed by the local government with the vendors and contractors listed below:

Equipment Rental Vendors: _____

Debris Removal Contractors: _____

Mulch Grinding Contractors: _____

Tree Service Contractors: _____

Tree Suppliers: _____

G. COMMUNICATION, INFORMATION, EDUCATION AND AWARENESS

1. Communication

We have a designated call center established for notification of fallen and hazardous trees and tree damage.

The name and contact information for the call center is:

Name of Call Center: _____

Address: _____

Phone: _____ E-Mail _____

Website: _____

Call Center Director/Contact: _____

2. Information and Education

Internal Information Sharing

During storm preparation, information will be shared internally by:

- Phone
- E-mail
- Cloud-based storage site
- Meetings [annual] [semi] [quarterly]

The person responsible for coordinating internal information sharing is:

External Information Sharing

- City/Community forestry program website _____
- Neighborhood association websites _____
- Social media _____
- Cloud-based storage site _____
- Pamphlets and brochures

The person responsible for coordinating external information sharing is:

Information and Education Topics

- The community has information readily available to disseminate to the public on storm preparation, response and recovery.

The information available by topic and format is indicated in the chart below.

TOPIC	WRITTEN SCRIPT	RECORDED PSA	ARTICLE/ PRESS RELEASE	WEBSITE/ SOCIAL MEDIA	BROCHURE/ PAMPHLET/ HANDOUT
Benefits of trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tree maintenance standards/BMPs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When and how to hire an arborist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chainsaw safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris pick-up schedule/procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expected clean-up time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caring for storm damaged trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tree selection and planting BMPs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The outlets that will be used for disseminating information on storm preparation, response and recovery include:

- | | |
|---|--|
| <input type="checkbox"/> Websites | <input type="checkbox"/> Television stations |
| <input type="checkbox"/> Social media | <input type="checkbox"/> Newspapers |
| <input type="checkbox"/> Radio stations | <input type="checkbox"/> Public meetings |

The person responsible for distributing information to the public and the media is:

The person responsible for coordinating educational opportunities for the public is:

H. PREPARATION RECORD KEEPING

The following records are maintained and kept in the tree care manager's office and online in a cloud-based storage service as appropriate.

- Storm mitigation team contact information
- Community Forest Storm Mitigation Plan
- Storm mitigation map
- Memoranda of understandings (MOUs) and Advance readiness contracts (ARCs)
- Data and cost information for community forestry management activities (Section B.5)
- Public information scripts, public service announcements and press releases

PART III. STORM RESPONSE

Community forest storm response begins with the mobilization of resources immediately prior to an anticipated event and continues through the short-term recovery efforts required to restore community-wide clearance of fallen trees and woody debris.

A. MOBILIZATION

The removal of fallen trees and debris will begin immediately as storm damage is identified by debris removal crews and calls are received on the location of downed trees and damage.

Crews will be mobilized to clear fallen trees and woody debris from the highest priority areas first, as identified on the *Storm Mitigation Map*. These priority areas include:

- Priority roads
- Priority facilities, including debris staging areas
- Buildings, vehicles or other situations with a personal injury
- Utility repair
- Remaining rights-of-way, public buildings and public facilities

The person responsible for mobilizing resources to respond to storm damage and dispatching crews to remove fallen trees and woody debris is:

B. DEBRIS MANAGEMENT

1. Debris Staging and Storage

- One or more debris storage sites that will accommodate large volumes of woody debris and logs have been established.

Debris storage sites have been established in the following locations:

The person responsible for coordinating debris staging and storage is:

The person responsible for debris estimation is:

www.fema.gov provides information on debris management and estimation:

- *Public Assistance Debris Management Guide*, FEMA 325, July 2007
- *Debris Estimating Field Guide*, FEMA 329, September 2010

C. TREE RISK AND DAMAGE ASSESSMENTS

After the initial response and roads are clear, the community can assess tree damage and risk.

- Tree risk and damage assessments will be performed within 30 days of the storm event by one or more of the following groups or individuals:
- Government staff Trained volunteers
 - Consultants Urban Forest Strike Teams¹

The person responsible for coordinating tree risk and damage assessment crews is:

Trees with the following conditions should be pruned or removed to reduce damage potential:

- Hangers (detached limbs hanging in the crown; remove limb only)
- Splitting limbs or trunks (prune, cable, or remove)
- Leaning trunk with soil broken and heaved opposite the lean (remove)
- Other conditions _____
- We have a policy in place that trees which do not pose an imminent risk of failure will not be removed until a tree damage assessment has been completed to avoid the removal of trees that are still viable and valuable to the community.

To facilitate assessments, TFS has developed a *Level 1 Tree Risk Assessment mobile app* available through app stores and <http://texasforestinfo.com/mobileapps>.

¹ Contact your TFS Regional Urban Forester to request tree damage assessment assistance from the Urban Forest Strike Team.

D. INFORMATION

During storm response, information provided to the community should focus on safety, tree risk and debris cleanup efforts. The person responsible for providing information to the public during a storm event is:

E. RESPONSE RECORD KEEPING

During initial storm response and short-term recovery, the following records will be retained:

- Tree and debris removal call log
- Debris removal costs
- Debris volume estimates
- Number and location of trees and stumps removed
- Number and location of tree pruned
- Hazardous tree, limb, and stump removal costs
- Contractor invoices
- Staff hours by person
- Equipment hours by piece of equipment
- Volunteer hours by person and activity; volunteer contact information
- Tree damage assessment data and costs

F. FEMA PUBLIC ASSISTANCE GRANTS

FEMA provides Public Assistance grants for the removal of hazardous trees, limbs, and stumps that present immediate threats to lives, public health and safety, and meet other eligibility criteria specified in the *Debris Management Guide, FEMA 325*.

FEMA's *Disaster Assistance Policy* outlines documentation required to receive funding:
<http://www.fema.gov/9580204-documenting-and-validating-hazardous-trees-limbs-and-stumps>

The person responsible for documenting hazardous trees, limbs and stumps removed is:

PART IV. STORM RECOVERY

As storm response efforts are completed, long-term recovery of the community forest begins.

Recovery efforts focus on the replanting of trees lost and restoration of the community’s tree canopy. Replanting projects provide the community with opportunities to work together and build long-term partnerships. The city can also assist private property owners in their replanting efforts by facilitating partnerships and providing information and education on tree replacement and planting.

A. SUMMARY OF TREE LOSSES

An accounting of the total number of public trees lost during the storm should be made using tree damage assessment data and subsequent inventories of public trees.

- A summary of the number of public trees lost by species and DBH category will be completed after each storm event, using the following chart:

Species Common Name	Number of Trees by DBH Category						
	< 6"	7-12"	13-18"	19-24"	25-30"	31-36"	>36"
All other species							
TOTAL							

B. INVENTORY OF POTENTIAL PLANTING SITES

Public trees lost during a storm should be replaced as resources permit on a one-to-one or greater basis, with trees equal to or greater in mature size, to maintain no net loss of tree canopy cover.

- An inventory of the location and type of available planting sites on public property will be performed as soon as practical after storm response and short-term recovery are completed.

C. TREE SPECIES SELECTION

Tree species selected for replacement planting on a site should be compatible with the site conditions, including above and below ground growing space. The mature size, crown shape, form, compatibility with the area’s soils and climate should also be considered during tree selection decisions.

- Our community has adopted an official list of trees recommended for planting in our area that is used as a guide for selecting trees for planting on public property.

D. TREE REPLACEMENT PLAN

A small number of tree losses can be replaced during the next planting season. Replacement planting for heavy tree losses should be spread over multiple years. The recommended season for planting trees in Texas is December through February.

- We have developed a written 3-year maintenance plan that includes mulching, watering, pest management, training pruning and inspection of all newly planted trees.

The person responsible for developing and coordinating the tree replacement plan is:

The person responsible for new tree maintenance is:

E. TREE REPLACEMENT PARTNERS

Financial, labor, and material assistance for large scale and multi-year public tree replacement projects should be solicited from local companies, non-profit organizations, and citizens.

The person(s) responsible for soliciting financial, labor and material assistance for tree replacement are:

- Tree care manager
- Storm mitigation team members
- _____

Tree replacement program partners include:

F. ONGOING TREE RISK MITIGATION

Tree risk mitigation should continue on an ongoing basis as noted in Part II, Storm Preparation.

- We have an ongoing tree risk mitigation program that focuses on:
- Improvement of tree health
 - Routine pruning & maintenance
 - Tree protection
 - Tree species, tree & site selection

The person responsible for coordinating ongoing tree risk mitigation is:

G. INFORMATION AND EDUCATION

During long-term recovery, our community forest information and education program will continue and will focus on the following topics:

- Tree and tree canopy loss results
- Tree planting programs and grants
- Availability of assistance / materials
- When to hire an ISA Certified Arborist®
- Ongoing tree risk assessment
- Tree health maintenance
- Recommended species for planting
- Tree planting techniques
- Tree benefits

Information / education for long-term recovery to communicate with the public will include:

- Responder recognition programs
- Neighborhood workshops
- Website content / Newspaper articles / PSAs

H. RECOVERY RECORD KEEPING

Accurate records on community forest management and storm mitigation activities will provide the basis for gaining additional program capacity and improving existing programs.

- Staff / Volunteer / Equipment hours
- Contractor invoices
- Donations by source
- Tree purchase data and costs
- Tree planting data and costs
- Tree survival data

The person(s) responsible for maintaining long-term recovery records are:

APPENDICES

Additional supplemental information and documents included as part of our *Community Forest Storm Plan* are located in the appendices that follow.

- Appendix A _____
- Appendix B _____
- Appendix C _____
- Appendix D _____
- Appendix E _____
- Appendix F _____
- Appendix G _____
- Appendix H _____
- Appendix I _____
- Appendix J _____



Material for this guide provided by the Georgia Forestry Commission

References and Resources:

- **Texas A&M Forest Service**
<http://tfsweb.tamu.edu> information on trees and community forests and a listing of Urban & Community Forestry program personnel
- **Texas Division of Emergency Management (TDEM)**
www.txdps.state.tx.us/dem/
- **Federal Emergency Management Agency (FEMA) Region VI**
<https://www.fema.gov/region-vi-arkansas-louisiana-new-mexico-oklahoma-texas>
Glossary of disaster terms at <http://www.fema.gov/glossary>.
Public Assistance Debris Management Guide, FEMA 325, July 2007 www.fema.gov
Debris Estimating Field Guide, FEMA 329, September 2010 www.fema.gov
FEMA's *Disaster Assistance Policy* <http://www.fema.gov/9580204-documenting-and-validating-hazardous-trees-limbs-and-stumps>
- **NOAA National Climatic Data Center**
<http://www.ncdc.noaa.gov>
- **Level 1 Tree Risk Assessment mobile app** available through app stores and <http://texasforestinfo.com/mobileapps>
- **Urban Tree Canopy of selected Texas communities**
www.texasforestinfo.com/utc/
- **i-Tree Tools for Assessing & Managing the Community Forest**
www.itreetools.org
- **International Society of Arboriculture**
www.isa-arbor.com
Guide for Plant Appraisal (Council of Tree and Landscape Appraisers)
Hire a Certified Arborist
- **National Tree Benefits Calculator**
<http://treebenefits.com/calculator/>
- **Urban Tree Risk Index (UTRI)** a GIS based tool to help define, rank and map the areas of greatest need for tree risk mitigation. www.UrbanForestrySouth.org

Growing Texas

Community Forest Planning: Storms

Guide for Texas Communities

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