



COMMUNITY FOREST STORM MITIGATION PLANNING

A Guide for Communities

BOOK 1— INTRODUCTION & COMMUNITY SETTING





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BOOK 1— INTRODUCTION AND COMMUNITY SETTING

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HOW TO USE THIS WORKBOOK

This Community Forest Storm Mitigation Planning Workbook and the accompanying Community Forest Storm Mitigation Planning Template are intended as tools for communities to use in assessing their community forest storm readiness; mitigating tree risk and reducing tree-related storm damage, and developing a community forest storm mitigation plan.

The workbook guides you through filling in the template, which serves as a basic framework for developing your Community Forest Storm Mitigation plan. As the template is filled in, 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. Communities may find it helpful to work with their neighbors to develop plans that are similar and include agreements to share resources.

Not all sections within the template will be applicable to every community. And some sections, while applicable, will require you to gather additional information or finish mitigation activities before they can be completed.

Copies of your current storm mitigation plan and other important storm mitigation documents should be stored in hard copy format in the office of the county emergency response manager and the tree care manager. They should also be made available on the government website or a cloud-based storage site where they can be viewed in the field using a smart phone, tablet or computer by those involved in storm preparation, response and recovery.

You can access the workbook and template through the Green Infrastructure Center’s website at www.gicinc.org/storm_mit.htm. Additionally, both the workbook and template are available at the U.S. Forest Services, National Urban and Community Forestry Advisory Council’s website at <https://urbanforestrysouth.org/resources/nucfac/forest-storm-mitigation-manual-workbook-and-template>. Copies of the workbook and template can be printed out, placed in a 3-ring binder and distributed to those developing your plan. The completed template should be distributed to your storm mitigation team members, who should meet at least annually to review and update the document.



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 workbook and template are divided into four (4) parts:

Book 1. Community Setting

Book 2. Storm Preparation

Book 3. Storm Response

Book 4. 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 the actions you will take for long-term recovery and restoration of your community forest.

This workbook includes suggested activities for preparation, response and recovery and, using the template, will guide you through the process of developing your plan.



A. PLAN OBJECTIVES AND PURPOSES

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, and
- ◆ Reduce tree canopy cover losses resulting from storm events.

The purpose of the plan is to:

- ◆ Provide information;
- ◆ Set policies;
- ◆ Describe actions to be taken related to trees and the community forest, and
- ◆ Effectively prepare for, respond to and recover from a storm event.
- ◆ Support the expansion of funding resources for tree management and post-storm replacement.

The plan is intended to be an active document that should be implemented on an ongoing basis and reviewed at least annually as well as just prior to and after each event.



B. PLANNING STRATEGIES

The strategies recommended for community forest storm mitigation planning are to:

- ◆ Focus on preparation to improve response and reduce the level of recovery efforts;
- ◆ Gather, maintain and utilize accurate pre-storm, baseline data about the community forest resource and its management;
- ◆ Utilize a community forest storm mitigation team led by the tree care manager (preferably an arborist or urban forester) to manage the storm mitigation process;
- ◆ Provide regular information, education and communication to staff, team members and the community about storm mitigation;
- ◆ Reduce losses by implementing a routine tree risk assessment and management program and a long-term, comprehensive community forest management program, and
- ◆ Utilize an annual planning process to update the storm mitigation plan.
- ◆ Expand and enhance communication between team members that will need to work together for a successful implementation.

C. PLAN BENEFITS

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

- ◆ Reductions in tree failures and tree canopy losses;
- ◆ Improved community forest health and safety;
- ◆ Increased funding for maintaining and expanding existing tree network.
- ◆ Increased community forest 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, and
- ◆ Maintain and enhance community confidence in elected officials, city staff and community forest management program.

D. EMERGENCY MANAGEMENT PROGRAMS

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 programs.

The community tree care manager should work with the local emergency management agency director or designee, as well as city department heads, including public works, finance, and community development, and the local power utilities to fully understand and agree on the responsibilities, procedures and information required of them in hazard and storm mitigation. They should also understand what procedures and documentation are required for the community to be eligible for federal disaster assistance for storm debris removal, mitigation grants, and potential reimbursements to replace lost or damaged trees during a federally declared event.



The local emergency manager will contact their respective state-run emergency management agency 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 following information describes the various agencies' missions and roles in hazard and emergency management.

1. State/Tribes/Territory's Emergency Management Agency

<https://www.fema.gov/emergency-management-agencies>

Mission: Each state, tribes, or territory in the U.S. has an agency that coordinates emergency responses following a natural disaster. These agencies' mission often include the protection of the lives and property of its citizens and visitors from emergencies and disasters by coordinating the state's emergency preparedness, mitigation, response and recovery efforts.

2. Departments of Forestry, Forestry Commissions, Departments of Natural Resources

<https://www.stateforesters.org/>

<https://www.arborday.org/programs/treecityusa/forestrycoordinators.cfm>

Mission: Each state, tribes, or territory in the U.S. has a "state forester" who manage and protect public and private non-federal forest resources through a designated state agency. In addition to a "state forester" each state or territory has an urban forestry coordinator who specializes in providing support to communities to care for their trees.

3. Federal Emergency Management Agency (FEMA)

<https://www.fema.gov/fema-regional-contacts>

FEMA's regional offices work closely with emergency management agencies to help states, tribes, and territories prepare for, protect against, respond to, recover from and mitigate all hazards. To help accomplish its mission, FEMA maintains strong partnerships through councils, subcommittees, and working groups.



FEMA also publishes a glossary of disaster terms relevant to community forest storm mitigation planning, which can be found at: <http://www.fema.gov/glossary>



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 your climatological and meteorological conditions, and
- ◆ The level to which your community forest resource is being managed.



A. COMMUNITY GEOGRAPHY AND SIZE

Your physical location in United States; the topography within your jurisdiction; the size in square miles of your community; the number of miles of roads, and the population of your community all will have an effect on storm and damage potential.

There are twenty-five physiographic provinces in the United States - Locate your physiographic province on the map provided.

Record on the template:

- ✓ **The name of your community;**
- ✓ **The date of adoption and last update of your storm mitigation plan;**
- ✓ **Your physiographic province;**
- ✓ **Physical size of jurisdiction in square miles;**
- ✓ **Number of miles of roads, and**
- ✓ **Population according to the latest official census.**



B. STORM HISTORY AND EXPOSURE

1. Potential Storms and Emergency Events

Your local hazard mitigation plan includes information on the types of hazards, including weather and storm events, which could occur in your community.

Consider these hazards and storm events in terms of the amount of tree damage possible and how these events may increase the risk of tree failure—including uprooting, trunk failure, co-dominant stem failure and loss of large limbs.

In addition to reviewing your local hazard mitigation plan, do some additional research on the primary weather and catastrophic events that have occurred or are likely to occur in your community. Visit the *NOAA National Climatic Data Center* storm event database, or other sources of historical weather data listed here, for details on past storm events in your community.

Hail, wind damage and lightning can accompany a severe storm at any time of the year, but severe storms are more likely to occur in the spring and summer months with warm temperatures and strong weather fronts. Tornadoes may also accompany these fronts and severe storms.

Hurricane season across the Atlantic and Gulf coasts begins in late spring and ends late fall. States regularly experiences flooding, wind and tornadoes during tropical storms and hurricanes accompanied by significant tree damage.



Tornados occur in all fifty state and at any time of the year, but “peak tornado season” varies on geographic region, with the Southern Plains (Texas, Oklahoma, and Kansas) peaking from May to early June, while in the Northern Plains and Upper Midwest (Nebraska, South Dakota, North Dakota, Iowa, and Minnesota) the season peaks in June and July.

Drought conditions, high temperatures and wind during the summer months can result in an increase in wildfire risk.

All of the possible storm events can cause considerable damage to trees, and those tree failures, in turn, result in damage to roads, utilities, facilities, buildings, vehicles and, in some cases, people. While we cannot control the occurrence of most of these events, we can prepare the community forest to withstand their effects.

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 hardwoods and softwoods shown below. Note that damage occurs to softwoods at slightly lower wind speeds than hardwoods.

As these descriptions show, the primary types of tree damage that occur during storms involving high winds are limb failures, trunk failures, and whole tree failures.

SOURCES OF HISTORICAL WEATHER DATA

National Oceanic and Atmospheric Administration (NOAA)
<http://www.noaa.gov/>

NOAA Storm Prediction Center
<http://www.spc.noaa.gov/climo/historical.html>

NOAA National Hurricane Center
<http://www.nhc.noaa.gov/>

NOAA National Climate Data Center
<http://www.ncdc.noaa.gov/stormevents/>
<http://www.ncdc.noaa.gov/oa/climate/sd/>
<http://www.ncdc.noaa.gov/oa/climate/severeweather/tornadoes.html>

University of Minnesota
<http://climate.umn.edu/doc/historical.htm>

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 chemical contamination, flooding, hail or major insect or disease infestations may be evident only later. The damage may not even be visible, but tree decline and death may eventually result, at which time dying and dead trees pose a considerable risk.



- ✓ Check off on the template the primary types of weather and other catastrophic events that have occurred and impacted trees, or are likely to occur, in your community.

For hardwood trees:

DEGREE OF DAMAGE	DAMAGE DESCRIPTION	EXPECTED WIND SPEED	LOWER BOUND WIND SPEED	UPPER BOUND WIND SPEED
1	Small limbs broken (up to 1" diameter)	60	48	72
2	Large branches broken (1" to 3" diameter)	74	61	88
3	Trees uprooted	91	76	118
4	Trunks snapped	110	93	134
5	Trees debarked with only stubs of largest branches remaining	143	123	167

For softwood trees:

DEGREE OF DAMAGE	DAMAGE DESCRIPTION	EXPECTED WIND SPEED	LOWER BOUND WIND SPEED	UPPER BOUND WIND SPEED
1	Small limbs broken (up to 1" diameter)	60	48	72
2	Large branches broken (1" to 3" diameter)	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



2. Snow and Ice Storms

Snow and ice storms typically occur in between the months of November through March (longer in more northern latitudes) where freezing temperatures are possible.

- ✓ Record on the template the months of the year when freezing temperatures are possible.
- ✓ Record on the template the largest single event snow totals that have occurred during the snowiest months in your 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.

- ✓ Record on the template the months that have the highest average annual precipitation in your area.
- ✓ Record on the template the months that have the lowest average annual precipitation in your area.

4. Droughts and Fires

Tree damage can result from periods of high temperatures and low moisture, such as during droughts. These drought conditions, combined with high winds, can predispose trees to root loss, decline and tree failures can result.



- ✓ Record on the template the warmest months of the year in your area.

The National Fire Protection Association (NFPA, www.nfpa.org) conducts a Firewise Communities Program that teaches residents about the hazards of wildfire and how they can prepare for and reduce the risk of home destruction due to wildfires. The program is co-sponsored by the USDA Forest Service, the US Department of the Interior and the National Association of State Foresters. Visit the Firewise website at www.firewise.org for a guide to Firewise principles and a Firewise tips checklist for homeowners.

- ✓ Record on the template the months with the most frequent wildfire activity.
- ✓ Record on the template if your community is a designated Firewise Community.

5. Other Significant Conditions

- ✓ Record on the template any other significant geographic, climatological or meteorological conditions that predispose your community to storms or catastrophic events.

6. Storm History and Records

- ✓ Record on the template, in the chart provided, the severe storms and catastrophic events that have occurred over the last 30 years in your community.

You may also use this chart to record storm events as they occur. Include the year, date if known (at least the month, if possible), the type of event, the severity and the type of damage that occurred.

C. COMMUNITY FOREST RESOURCE MANAGEMENT

1. Tree Care Manage

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. Ideally your tree care manager should be an arborist, urban forester or horticulturist and an ISA Certified Arborist.

See www.isa-arbor.com for information on the International Society of Arboriculture's arborist certification program.

For communities that do not have an urban forester or arborist on staff, they should consider designating an existing staff member, or hire a consulting urban 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, tree maintenance standards and best management practices. Computer software skills that include Microsoft Word, Excel, PowerPoint and geographic information systems are also desirable.

- ✓ Record on the template the name, title and contact information of the community's tree care manager.
- ✓ Record on the template whether or not your tree care manager is an ISA Certified Arborist.

2. Tree City USA

Many communities have been designated as a Tree City USA by the National Arbor Day Foundation. To be eligible, four (4) standards must be met. The community must:

1. Have a tree ordinance;
2. Hold an annual Arbor Day Celebration with an Arbor Day Proclamation;
3. Have a tree board or committee, and



TREE CITY USA®

4. Spend at least \$2 per capita on community forest management.

- ✓ Record on the template whether or not your community is a Tree City USA community; indicate the first year that you were designated as such.
- ✓ Record on the template the type of ordinance you have, your annual program expenditures, the number of members of your tree board and the date of your last Arbor Day celebration.
- ✓ Include in the template appendix a copy of your tree ordinance and a list of your tree board members and their contact information.

3. Management Plan

Many communities have also 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 five-year or longer time frame and may include plans for administration, field operations and information and education.

- ✓ Indicate in the template whether or not your community has a forest or natural resources management plan; indicate when it was adopted and the most recent revision.
- ✓ Include in the template the name of the person responsible for administering and updating your community forest management plan.

SUMMARY

Urban forest natural disaster planning and preparation results in more efficient emergency responses and decreased impacts on community forest resources. The benefits of disaster planning include:

- ◆ Reduced tree failures and tree canopy loss;
- ◆ Decreased damages and losses to people, property, and trees;
- ◆ Efficient and effective response to and cleanup from storms;
- ◆ Improved rates of reimbursement for tree losses;
- ◆ Faster recovery of the urban forest through plantings and partnerships;
- ◆ Enhanced public confidence in elected leaders and urban forest programs.

URBAN FOREST NATURAL DISASTER PLANNING STEPS:

1. Document federal, state, tribal and local partners in emergency management response.
2. Research types and frequency of natural disasters common in your region.
3. Compile and document your community forest management resources:
 - a. Identify and involve the Tree Care Manager
 - b. Record and update your Tree City USA status
 - c. Refer and relate any emergency planning to the Urban Forest Management Plan

NEXT BOOK: BOOK 2. STORM PREPARATION





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