



COMMUNITY FOREST STORM MITIGATION PLANNING

A Guide for Communities

BOOK 4 — STORM RECOVERY



AND APPENDIX



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BOOK 4— STORM RECOVERY AND APPENDIX

Workbook

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STORM RECOVERY

A. POST-STORM MITIGATION ANALYSIS

As storm response and short-term recovery efforts are completed, long-term recovery of the community forest can begin. This recovery includes the following steps:

- ◆ Post-storm mitigation analysis;
- ◆ Inventory of tree losses;
- ◆ Inventory of potential planting sites;
- ◆ Selection of appropriate species for planting for each site;
- ◆ Development of tree replacement plan;
- ◆ Mobilization of tree replacement partners;
- ◆ Continuation of ongoing tree risk mitigation;
- ◆ Ongoing distribution of information and education focusing on community forest recovery, and
- ◆ Maintaining records of storm recovery costs and activities.

After major tree losses, recovery efforts will 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. Engage storm mitigation team members in your restoration efforts, along with the communities, organizations, agencies, contractors and vendors with whom you have in place a current memorandum of understanding or advanced readiness contract.

During this period, the government will focus on the replacement of trees on public properties—along streets and around public facilities, on school campuses and in parks and cemeteries. The government can also assist private property owners in their replanting efforts by facilitating partnerships and providing information and education on tree replacement and planting.

The storm mitigation team should meet within 30 days after short-term recovery activities are complete to review the community forest storm mitigation plan and make any changes necessary to the information, policies and action steps it contains.

Discuss the activities that contributed the most to the mitigation of tree-related damage during the most recent storm. List the greatest areas of need in preparing for future storms.

- ✓ **Record on the template the activities that contributed most to the mitigation of tree-related damage and losses during the most recent storm(s).**
- ✓ **Record on the template the greatest areas of need identified during the most recent storm(s) for preparation and mitigation for future storms.**



B. 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. Summarize the data by species and DBH (minimum) and if known, include a reason for the tree failure. It may be the tree was overly large for its planting space, lacked adequate room for roots, or was planted in an area subject to high winds. Understanding situational reasons for tree failure can help to avoid repeating the same mistakes with the next planting. Use the summaries to assist in the selection of replacement tree species.

- ✓ **Record on the template the total number of public trees lost in the most recent storm by species, DBH category, and reason for the tree failure (if known).**



C. INVENTORY OF POTENTIAL PLANTING SITES

Public trees lost during a storm should be replaced on a one-to-one or greater basis, with trees equal to or greater in mature size, as resources permit to maintain no net loss of tree canopy cover. Large canopy trees should be planted wherever space permits to further maintain tree canopy. Where it is not possible for trees to be replaced in the same or nearby location, they should be planted on other streets or public property. Refer to the community’s list of trees recommended for planting for guidance on typical mature tree height.

Trees that typically grow to heights of 50 feet or taller at maturity are considered to be large trees. Trees that typically grow to heights of greater than 25 feet but less than 50 feet at maturity are considered to be medium trees. Trees that typically grow to heights of less than 25 feet at maturity are considered to be small trees.

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

- ✓ **Record on the template in the spreadsheet provided (or develop your own spreadsheet in Excel) all tree replacements and recommended species to be planted by site type (streets, parks, cemeteries, schools, public facilities), location name, street, address, available growing space.**



E. TREE REPLACEMENT PLAN

A small number of tree losses can be replaced during the next planting season. The preferred season for planting trees in most of the U.S. is October through April. Replacement planting for heavy tree losses should be spread over multiple years. Cities should develop contingency budgets for planting tree replacements after storms.

The number of public trees planted each year to replace losses will depend on the amount of resources available—budgets, donations, staff and volunteer time and labor and trees. Based upon the number of tree losses; the number of planting sites available, and the resources available on an annual basis, determine the number of years it will take to replace the trees lost and establish a goal of planting a specific number of trees per year over that time period.

The community should include in its public tree replacement plan a schedule for new tree maintenance to include, at a minimum:

- ◆ Mulching (annually);
- ◆ Irrigation (during the growing season—typically April through October—in the absence of adequate rainfall);
- ◆ Pest management (as insect and disease problems are identified);
- ◆ Young tree structural pruning (beginning the winter after the first growing season and annually as necessary), and
- ◆ Routine inspections (annually).

- ✓ **Record on the template whether or not your community has a written three-year maintenance plan for newly-planted trees.**

- ✓ **Record on the template the persons responsible for developing and coordinating the community’s public tree replacement plan and for the maintenance of newly-planted trees.**



D. TREE SPECIES SELECTION

The 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. Fast-growing species with weak wood and species with inherent structural defects or significant pest issues should be avoided for planting along street rights-of-way, in parks and cemeteries and around public buildings and facilities.

Some example species include:

- Bradford pear
- Silver maple
- Brazilian pepper tree
- Ash
- Mimosa tree
- Hemlock
- Blue gum eucalyptus
- Russian olive
- Royal Paulownia (Princess Tree)

Information on the frequency of failure of individual tree species during storm events should also be used to make tree-planting decisions and may be used to revise the city’s/county’s list of trees species recommended for planting in the community.

- ✓ **Record on the template whether or not your community has an official tree species list to guide tree species selection.**

F. 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. Some of these partners may already have been identified and have entered into a memorandum of understanding or advanced readiness contract for providing some of this assistance.

The tree care manager, storm mitigation team members and other community leaders should develop additional partnerships and solicit additional assistance to the level necessary for a successful replacement program.

- ✓ Record on the template the person(s) responsible for soliciting financial, labor and material assistance for large-scale and multi-year tree replacement projects.
- ✓ Record on the template the names of program partners who could provide financial, labor and material assistance for tree replacement.



G. ONGOING TREE RISK MITIGATION

Tree risk should continue to be mitigated on an ongoing basis as described in the storm preparation section of this workbook. Tree risk mitigation should be a consideration in all community forest management activities, including replanting. Mitigation efforts during replanting and recovery should focus on tree health, tree pruning, tree and site selection, routine tree maintenance and tree protection.

- ✓ Record on the template whether or not the community has an ongoing tree risk mitigation program and the activities included in that program.
- ✓ Record on the template the person responsible for coordinating ongoing tree risk mitigation.



H. INFORMATION AND EDUCATION

After short-term recovery and response has been completed, the community will continue to benefit from guidance on tree replanting, maintenance and mitigation efforts. With initial response and recovery completed, recognition programs for the response teams should also be a priority.

- ✓ Indicate on the template whether or not your community has a program in place to identify the individuals, organizations and companies that deserve recognition for their storm response and recovery efforts.
- ✓ Record on the template the person responsible for coordinating the community's recognition program.

During long-term recovery, the community's information and education program should continue and should focus on the following topics:

- ◆ Tree and tree canopy loss results
- ◆ Tree planting programs and grants
- ◆ Availability of assistance and materials, including volunteer labor, replacement trees, mulch
- ◆ When and how to hire an ISA Certified Arborist
- ◆ Ongoing tree-risk assessment

- ◆ Tree health maintenance
- ◆ Crown restoration pruning
- ◆ Recommended species for planting
- ◆ Tree planting techniques
- ◆ Tree benefits

- ✓ Record on the template the topics that will be the focus of a long-term recovery information and education program.

The types of information and education programs during storm recovery may include:

- ◆ Recognition programs for responders
- ◆ Field demonstrations
- ◆ Neighborhood workshops
- ◆ Maps of trees lost or planting spots where new trees will be added
- ◆ Website content
- ◆ Newspaper articles
- ◆ Public service announcements

- ✓ Record on the template the types of information and education programs that will be utilized for communicating with the public.

I. RECOVERY RECORD KEEPING

The maintenance of accurate records on community forest management and storm mitigation activities should continue during the recovery phase. These data and records will provide the basis for gaining additional program capacity and improving existing programs. They may also be helpful in securing grants for future mitigation projects.

- ◆ Staff hours;
- ◆ Federally compliant procurement process that was used to issue contracts;
- ◆ Co-operative Agreements (previously discussed);
- ◆ Volunteer hours;
- ◆ Equipment hours;
- ◆ Contractor invoices;
- ◆ Donations by source and donation value with contact information;
- ◆ Tree purchase data (nursery, number purchased by species and cultivar) and costs;
- ◆ Tree planting data (species, location, date) and costs, and
- ◆ Tree survival data (annual results).

✓ **Record on the template the types of records that will be maintained during long-term recovery.**

The person responsible for maintaining long-term recovery records will most likely be the tree care manager, but others may share that responsibility.

✓ **Record on the template the person responsible for maintaining long-term recovery records.**



SUMMARY

Storm recovery is often a multi-year process. As communities rebuild housing and infrastructure, they must also replace lost tree canopy. A well-coordinated, data-driven process that involves both the public and private sectors is key to the long-term recovery of tree canopy.



STORM RECOVERY ACTION ITEMS:

1. Map your tree canopy pre-disaster and post-disaster.
1. Set a tree canopy goal.
2. Develop a tree planting plan.
3. Build community tree planting partnerships.
4. Review and update your tree species list.
5. Inventory tree losses and removals.
6. Continue to mitigate tree risk after initial response.
7. Educate and engage the public in recovery.

APPENDIX A.

RESOURCES

The following documents, websites and presentations were either used as resources for the development of the *Community Forest Storm Damage Mitigation Plan Template* or are recommended for review by communities for storm damage mitigation planning:

Burban, Lisa L. (USDA Forest Service) & Andresen, John W. (University of Illinois). *Storms Over the Urban Forest: Planning, Responding and Regreening—A Community Guide to Natural Disaster Relief*, Second Edition, 1994, USDA Forest Service. <http://www.na.fs.fed.us/spfo/pubs/uf/sotuf/sotuf.htm>

Burban, Lisa L. (USDA Forest Service), Hermann, Jim (Minneapolis Park and Recreation Board) & Himanga, Katie (Heartwood Forestry). *Tree Emergency Plan Worksheet*, Updated May 2006. <http://www.na.fs.fed.us/urban/inforesources>

Department of Public Services, Columbus Consolidated Government. *Emergency Storm Response Plan*, publication date unknown.

Escobedo, Francisco, Northrop, Robert & Zipperer, Wayne. *Developing an Urban Forest Management Plan for Hurricane-Prone Communities*, Publication FOR121, University of Florida, Institute of Food and Agricultural Sciences Extension, September 2007. <http://hort.ifas.ufl.edu/woody/documents/FR176.pdf>

Fazio, James R. *Helping Communities Recover in the Wake of Storms*, ARBOR DAY, September/October 2012, National Arbor Day Foundation. www.arborday.org

FEMA Mitigation Planning. <http://www.fema.gov/multi-hazard-mitigation-planning>

Hartel, Dudley R. *Storm Resources* (Slides with Notes 30 May 07), Storms Conference presentation, USDA Forest Service Southern Center for Urban Forestry Research & Information.

Pokorny, Jill D. (Coordinating Author). *Urban Tree Risk Management: A Community Guide to Program Design and Implementation*, USDA Forest Service, Northeastern Area, State and Private Forestry, Publication NA-TP-03-03. <http://na.fs.fed.us/spfo/pubs/uf/utrmm/>

Tree Care Industry Association, Inc. *ANSI A300 (Part 9)-2011 American National Standard for Tree Care Operations—Tree, Shrub and Other Woody Plant Management—Standard Practices (Tree Risk Assessment a. Tree Structure Assessment)*, 2011, Tree Care Industry Association, Inc.

Letson, Neil. *Making Our Urban Forests Safer, ANR1210*, Alabama Cooperative Extension Service, 2001. <http://www.aces.edu/pubs/docs/A/ANR-1210/index2.tmpl>

Additional organizations, websites and publications that provide information on tree risk assessment, storm mitigation planning and community forest management are listed below.

Citizen Corp Councils

https://community.fema.gov/Register/Register_Search_Programs



Community Emergency Response Teams (CERTs)

<https://www.ready.gov/citizen-corps>

Firewise Communities

<http://www.firewise.org/>

Storms Over the Urban Forest Toolkit (CD-ROM)

Copies of the CD may be obtained from:

Southern Center for Urban Forestry
Research & Information,
USDA Forest Service,
320 Green Street, Athens, GA 30602-2044
(706) 559-4236

Other Resources

In addition to the many websites and resources cited in the plan template, there are many other resources available on the Internet addressing tree risk, storm damage and storm mitigation. You can find these resources by searching using one of the following key phrases:

- ◆ Tree risk
- ◆ Tree damage
- ◆ Storm damage
- ◆ Storm mitigation
- ◆ Hazard mitigation
- ◆ Trees as green infrastructure



APPENDIX B.

DISASTER ASSISTANCE FEMA POLICY DAP9580.204 DOCUMENTING AND VALIDATING HAZARDOUS TREES, LIMBS AND STUMPS

Reproduced from <https://www.fema.gov/pdf/government/grant/pa/demagde.pdf>

OVERVIEW

Removal of hazardous trees, limbs and stumps that present immediate threats to lives, public health and safety or improved property and meet other eligibility criteria specified in the *Debris Management Guide*, *FEMA 325*, may be eligible for Public Assistance grant funding. The regulations governing FEMA's Public Assistance Program (Code of Federal Regulations, Title 44: Emergency Management and Assistance, Part 206, Subparts G (*Public Assistance Project Administration*) and H (*Public Assistance Eligibility*) require states and local government applicants to provide documentation of costs and work performed to support requests for reimbursement from FEMA (44 CFR §206.202(b) (4), Application procedures, Grantee). The regulations also require states to monitor grant- and subgrant-supported activities, such as debris removal and disposal operations. 44 CFR §206.205(b) (1), *Payment of claim, Large projects*, states: "The Grantee shall make an accounting to the RD [Regional Director, now Regional Administrator] of eligible costs for each approved large project. In submitting the accounting, the Grantee shall certify that reported costs were incurred in the performance of eligible work... [and] that the approved work was completed." Additionally, 44 CFR §206.205(b)(2) states: "The RD shall review the accounting to determine the eligible amount of reimbursement for each large project and approve eligible costs. If a discrepancy between reported costs and approved funding exists, the RD may conduct field reviews to gather additional information."

This fact sheet provides guidance on the documentation applicants should provide in their requests for Public Assistance funding for removing hazardous trees, limbs and stumps. It also describes the process FEMA will use in coordination with states and local government applicants to validate that eligible work was completed when a discrepancy between reported costs and eligible funding arises.



DOCUMENTING HAZARDOUS TREES, LIMBS AND STUMPS

General

Applicants should provide documentation that directly supports their requests for Public Assistance funding and certification that they performed the work in accordance with FEMA eligibility criteria. The documentation may include photographs, maps and other documents that show the location of the work on public rights-of-way; evidence of the immediate threat, and details of the work performed to remove the threat. If applicants perform the work, they should submit documentation of labor and equipment charges required to do the work, such as payroll records, applicant-owned equipment usage records and equipment rental invoices. If applicants hire contractors to perform the work, the applicants should submit the contract and invoices to FEMA.

Applicants should separate costs for the removal of hazardous trees, limbs and stumps from debris removal paid on a cubic yard or ton basis to avoid



double payment, unless they can clearly show that costs for cutting are separate from costs to remove and dispose of the debris.

Specific eligibility criteria and documentation requirements for each item of work are provided below. Failure to provide sufficient documentation may jeopardize the applicant's request for Public Assistance funding.

Hazardous Trees

Eligibility Criteria: Trees that are leaning such that they are in an imminent state of falling over and trees with broken canopies may pose an immediate threat to life, public health, safety and improved property. Trees should be six inches or larger in diameter, measured 4.5 feet above ground level.

Documentation: Applicants should submit a spreadsheet showing the number of trees cut and the size and location of each tree. The location should include the street/road name and GPS coordinates of each tree removed along public rights-of-way and the property address and GPS coordinates of each tree removed from private property. Applicants may also provide photographs of the flush-cut trees and certify that the trees were six inches or larger in diameter, measured 4.5 feet above the ground.

Hazardous Limbs

Eligibility Criteria: Broken limbs two inches or larger in diameter measured at the point of break that pose an immediate threat to life, public health or safety, or pose an immediate threat of significant damage to improved property, are eligible for removal.

Documentation: Applicants should submit a spreadsheet containing the location of the trees; the number of limbs cut on each tree, and a certification that the limbs were two inches or larger in diameter. The location should include the name of the street/road and GPS coordinates for each tree or cluster of trees along public rights-of-way and the street address or parcel number for hazardous limbs cut on private property. Applicants may also submit photographs to document the number of hazardous limbs cut. If the applicants contracted for the removal of hazardous limbs on a per-tree basis, the number of limbs cut per tree is not necessary.



Hazardous Stumps

Eligibility Criteria: Stumps that are 24 inches or larger in diameter measured 24 inches above the ground and have 50 percent or more of their root ball exposed are eligible for removal on a per-stump basis. Reimbursement for the removal of stumps measuring less than 24 inches in diameter will be based on the reasonable cubic yard prices for vegetative debris. Please see Disaster Assistance Policy DAP9523.11, *Hazardous Stump Extraction and Removal Eligibility*, for additional information on the estimated volume of various size stumps.



VALIDATING ELIGIBLE WORK

FEMA, in coordination with the state and the applicant, may select a small sample of hazardous trees, limbs and/or stumps to validate eligible scopes of work and eligible project funding if a discrepancy among documentation, work performed and eligible funding exists. The validation process will include field visits to verify that the applicant performed work in accordance with FEMA eligibility criteria. FEMA will use the results of the validation process to determine eligible project funding.

FEMA, State and Applicant Validation Team

The validation of work to remove hazardous trees, limbs and stumps should be a coordinated and collective effort among FEMA, the state and the applicant. Validation teams performing physical inspections should be comprised of representatives from FEMA, the state and the applicant who are familiar with debris removal operations; FEMA policy and debris removal eligibility, and debris monitoring documentation practices. The validation teams should meet prior to conducting validations to identify expectations and objectives and hold meetings as necessary to resolve issues. The validation teams should work to achieve consensus on validation determinations.

Validation Samples

FEMA, the state and the applicant should select a sample of at least 500 work items to validate the applicant's request(s) for reimbursement. Separate validations should be conducted for hazardous trees, limbs and stumps and for work performed on public and private property. Only one validation should be conducted for each scope of work selected for validation.

Interim Validations

FEMA may conduct interim validations before the completion of the debris removal operation as a quality control measure and to establish Public Assistance grant amounts for the applicable scope of work. The decision on whether or not to conduct an interim validation should be a joint decision among FEMA, the state and the applicant. Interim validations should include a sample of at least 500 work items

Documentation: Applicants should complete a Hazardous Stump Worksheet, found in Disaster Assistance Policy DAP9523.11. The Worksheet captures information on the number of hazardous stumps removed; hazardous stump location and size, and the quantity of fill material required to fill the resultant hole. Applicants who request reimbursement for force account labor and equipment should provide all of the above information except the sizes of the stumps removed.

The documentation requirements stated above apply only when applicants are collecting, hauling and disposing of the debris. They do not apply during the emergency debris clearance phase when crews clear roads to provide emergency access to critical facilities.

Additional information on the eligibility of hazardous trees, limbs and stumps can be found in Part I of *FEMA's Debris Management Guide*, FEMA 325 and in Disaster Assistance Policies DAP9523.11, *Hazardous Stump Extraction and Removal Eligibility* and DAP9523.13, *Debris Removal from Private Property*.

completed up to the date of validation. The results from any validation should apply exclusively to the scope of work that the applicant completed before FEMA conducted the validation. For example, an interim validation may occur 30 days after the applicant initiates a debris removal operation and focus on work performed during the first 30 days. FEMA may conduct a final validation for the remainder of the work after the applicant completes the debris removal operation. The final validation should include a sample of at least 500 work items completed after the date of the interim validation. The results from the first validation will be used to determine the eligible scope of work for work and costs claimed during the first 30 days, and the final validation results will be applied to determine the eligible scope of work for the remaining work and associated costs claimed.



Documentation Requirements

The documentation for the validation process should include:

- ◆ Names and affiliations of validation team members;
- ◆ Date and locations of inspections;
- ◆ The number of hazardous trees, limbs and stumps selected for validation;
- ◆ The debris removal load tickets or invoices for the hazardous trees, limbs and stumps selected for validation;
- ◆ The validation results;
- ◆ Name of the debris removal contractor that performed the work (if applicable);
- ◆ Name of the applicant's debris monitor that provided oversight for the work claimed (if applicable), and
- ◆ Rights of entries and indemnification agreements when the applicant performed work on private property.

Applying Validation Percentages to Determine Eligibility

FEMA will apply the percentage of the debris removal work that it validated to the applicant's total claim for reimbursement. However, FEMA will approve 100 percent funding for the applicable scope of work if it validates at least 80 percent of the sample of work items. Eligible funding for scopes of work validated at less than 80 percent will be based on the actual percentage of validated work.

Timeframe

FEMA should validate the removal of hazardous trees, limbs and stumps within 45 days of project completion.

For further information contact FEMA's helpline through this link: <https://www.disasterassistance.gov/help/contact-us>

NOTES:

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