

# Planning for a storm, assessing damage after a storm, seeking relief

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For Anne Buckelew and John  
Parry, USFS

# Main points in the presentation

- Different types of storms in the Northeast and the types of tree damage they cause
- Phases of Emergency Response and related forestry issues: Planning, Response, Recovery, Mitigation
- Assessing storm damage: Urban Forestry Strike Team as an example
- Tools and Resources Available: Our NA publications, i-tree Storms, etc

# Storm Damage to Trees

## Common Damage and Defects

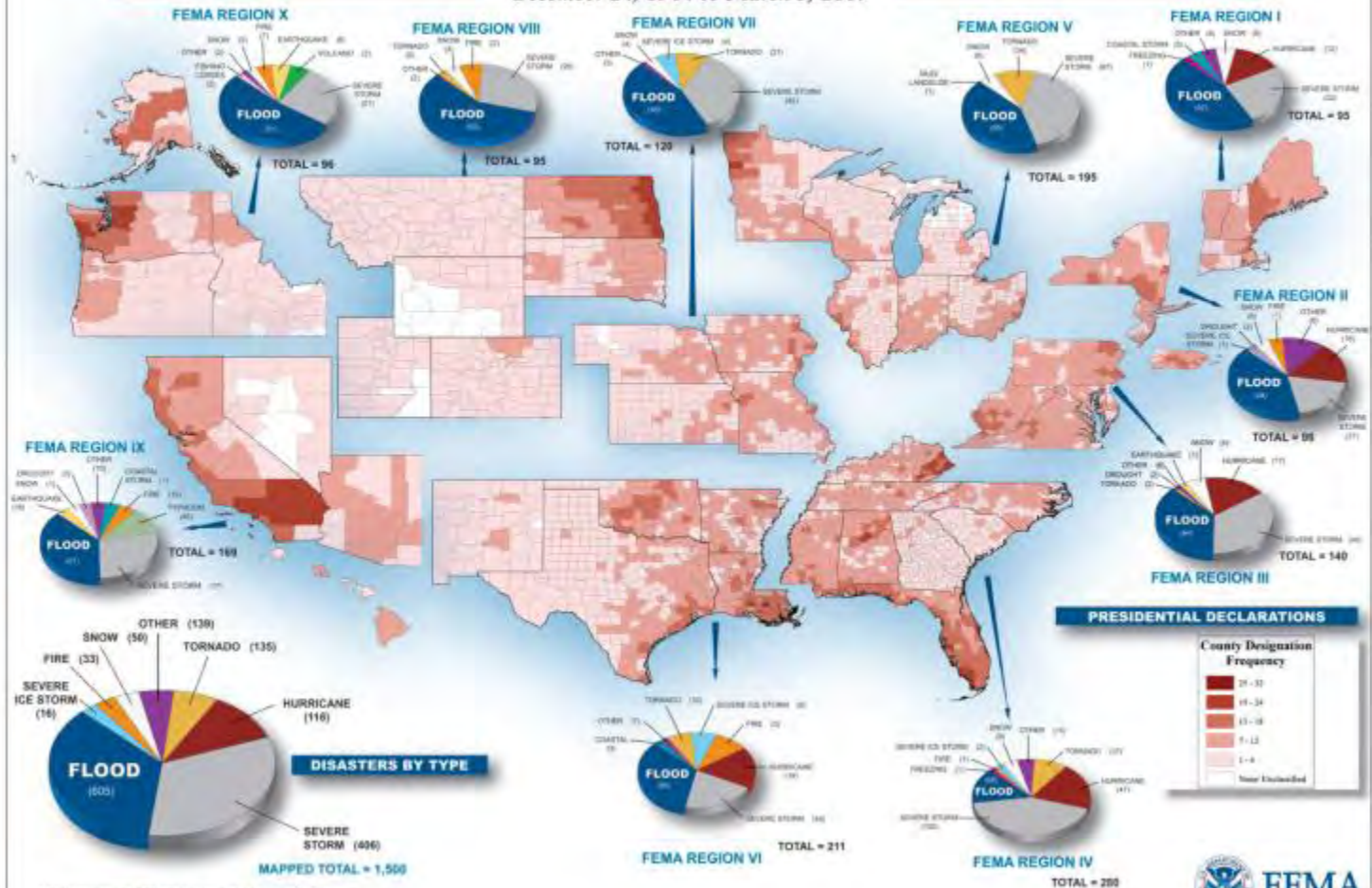


- Damage varies by storm and area
- Damage can be hard to see
- Knowing damage characteristics helps determine tree work needed
- Presentation will cover:
  - Types of Storms
  - Types of Tree Damage
  - How Severe? Can Tree Recover?

# TYPES OF STORMS

## PRESIDENTIAL Disaster Declarations

December 24, 1964 to March 3, 2007



\* Prior to December 24, 1964, 179 declarations did not have county designations. Therefore, of the total declared disaster (1,500), only 1,321 are included in the Mapped Total.

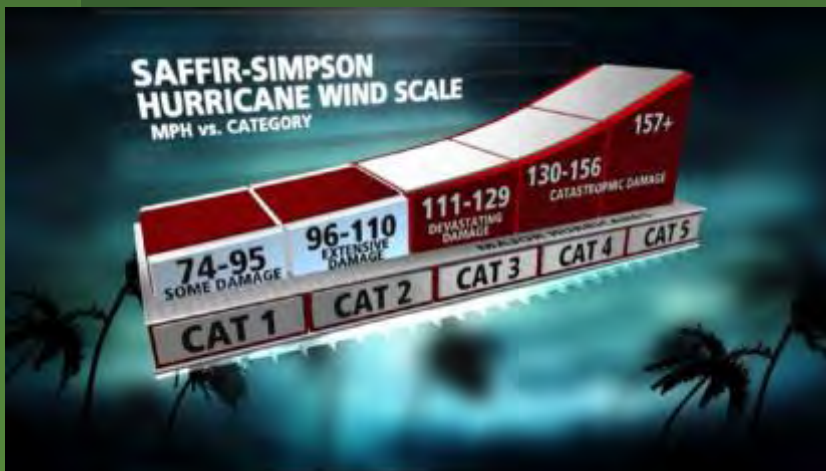
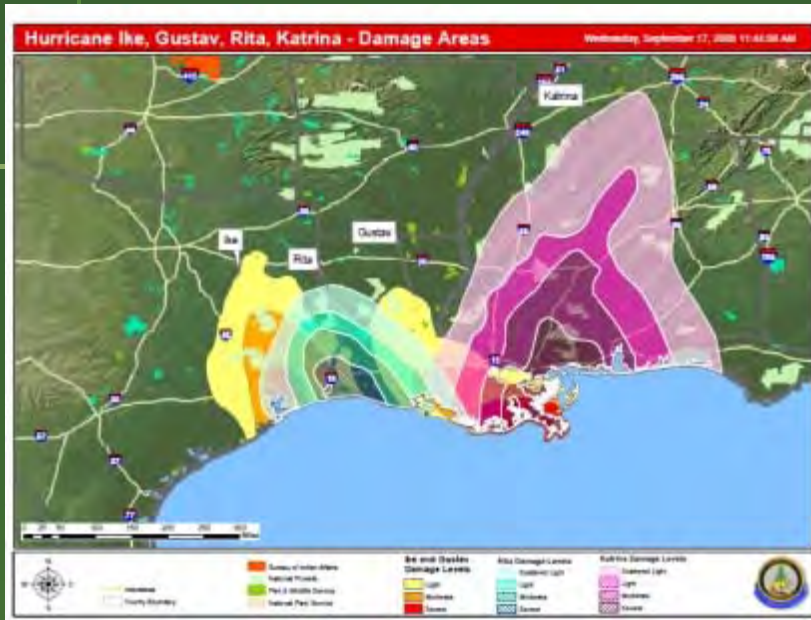




# Tornados

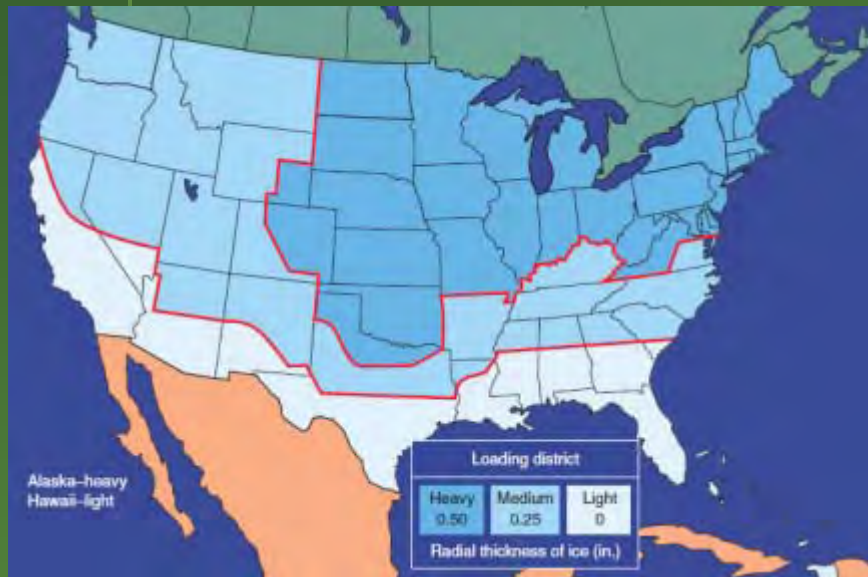


# Hurricanes





# Ice



# Snow





# Flooding



The Tar River flows into a neighborhood in Greenville, North Carolina.

Photo by Dave Saville/**FEMA News Photo**

# Storm Planning and Response for the Urban Forest: The 4 Phases of Emergency Management



# 1. Mitigation

Activities Taken To  
Minimize The Impact Of Future  
Storm Events





# A Robust Urban Forestry Management Program is Key

- Public Awareness & Education
  - 8 pre-prepared news releases: 1 post storm, 3 after danger is past, 4 as tree and care value between events: In the USFS Storms over the urban forest toolbox
- Tree Inventory – Tree Management **Plan**
- Tree **Ordinance** Or Policy
- Well Trained Professional **Staffing**
- Establish Canopy Cover Goals
- Good Planning Process – Include Trees
- Proper Tree Planting, Protection and Care



# Pre-storm Risk Tree Assessments

Many trees have pre-existing defects which help to predict failure



This also presumes sound planting and tree care practices within the community to influence the cycle and nature of tree biological and mechanical well-being.



Decayed Wood



Cracks



Root Problems



Weak Branch Unions



Cankers



Poor Tree Architecture



Dead Trees, top, branches



# Damage to Scaffold Branching





# % CROWN DAMAGE vs. Survival

**<50%**

**HIGH** chance  
of survival

Maple 35%



Birch 40%



**= 50 – 75%**

Survive with  
**varying degrees**  
of defects

50%



65%



**>75%**

**LOW** chance  
of survival

80%



85%



# Post-storm Tree Damage Assessments

Inspect Trees for Hazard Removal, Hazard Pruning and other Urgent Tree Care

- Amount of Damage
- Tree Health
- Age
- Size
- Site
- Species
- Amount of Crown Loss



# Training for observation and identification of needs is key





# Administration

- Guidelines, Policies, Ordinances
- Monitoring
  - Frequent Inspections
  - Construction Activities
- Systematic Records



## 2.Planning

- Preparing To Handle An Emergency
- Takes Place BEFORE An Emergency Occurs



# Tree Emergency Plan Worksheet (12 page worksheet)

## Tree Emergency Plan Worksheet

For: Urban and Community Foresters, Community Leaders, Public Works and Parks Departments, Planners, Councils, and other Public Officials

**1. Early Warning System/Weather Forecasting Service** — Use an early warning procedure to enhance mitigation: communicate with the National Weather Service, a consulting meteorological firm, a designated television weather channel, or the local police department. With a procedure in place, you should have at least three hours of lead time before most tree damaging weather strikes.

Staff Lead: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Mobile: \_\_\_\_\_

FAX: \_\_\_\_\_

Email: \_\_\_\_\_ Web Site: \_\_\_\_\_

Description of services provided: \_\_\_\_\_

**2. Local Emergency Manager** — Lead contact for a community and responsible for emergency planning and response activities.

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Role(s): \_\_\_\_\_ Mobile: \_\_\_\_\_

**3. Public Relations Coordinator** — This is the individual responsible for primary public relations, media contacts, citizen information and communications about the natural disaster. (Must have full knowledge of damage, community issues and capabilities, and be able to make decisions.)

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Alternate(s): \_\_\_\_\_ Mobile: \_\_\_\_\_

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Name: \_\_\_\_\_ Mobile: \_\_\_\_\_

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Name: \_\_\_\_\_ Mobile: \_\_\_\_\_

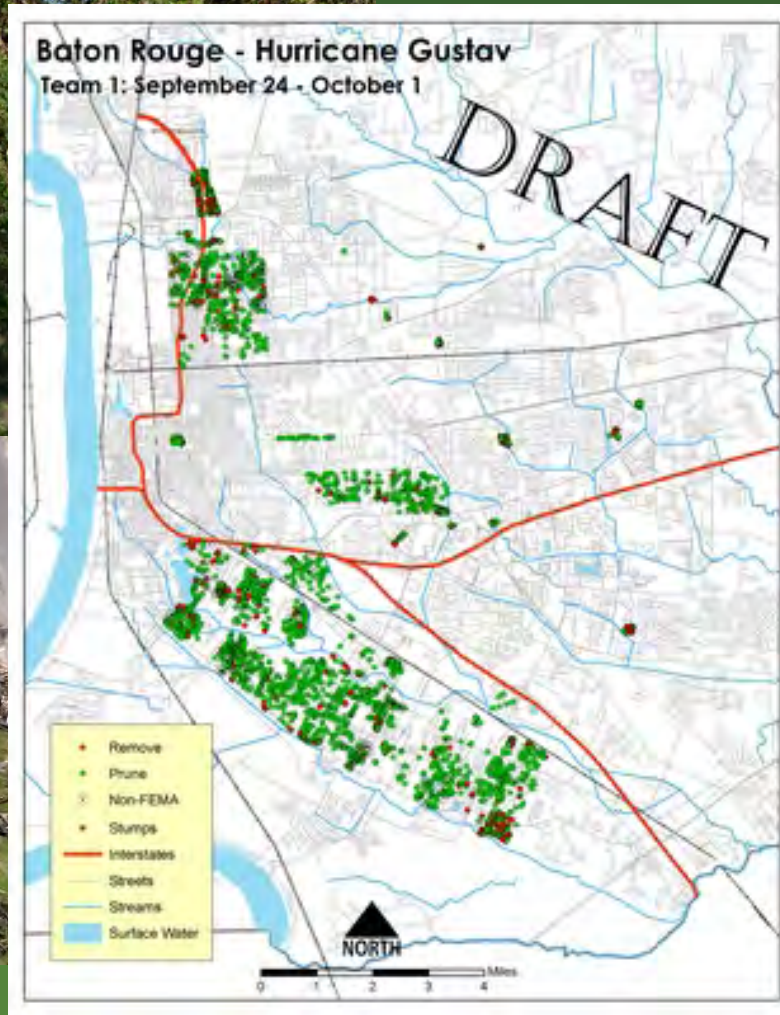
- 1. Early Warning System/Weather Forecasting
- 2. Local Emergency
- 3. Public Relations
- 4. Disaster Planning And Response Team Members
- 5. Available Disaster Response Staff And Crews
- 6. Emergency Call Out
- 7. Primary Transportation, Evacuation Corridors
- 8. Critical Areas – Power Corridor Restoration & Medical Centers
- 9. Identify Who Is Responsible For Decision Making And Prioritizing
- 10. Tree Damage Clean-up
- 11. Procedure For Debris Staging And Removal
- 12. Debris And Brush Removal From Private Property
- 13. Identify Wood Utilization Options
- 14. Equipment Listing (Available In-house)
- 15. Additional Equipment And Assistance Sources
- 16. Staff, Crew Organization And Equipment Needs
- 17. Individual's Responsible For Record Keeping
- 18. Individuals Responsible For Damage Assessment And Reports
- 19. Disaster Budget
- 20. Funding Information From Past Storms
- 21. Individual's Or Organizations Responsible For Regreening
- 22. Community Urban Forestry Comprehensive Management Plan
- 23. Community Tree Risk Management Plan
- 24. Storm Damage Assessment



# Two programs of interest

- I-Tree SDAP
- Storm Damage Strike Team training and organization

# Storm Damage Assessment Strike Teams



- New Initiative Similar To Fire
- Recruit And Train Professionals
- Deploy Crews To Disasters
- Crews Do Public Tree Assessments;
  - Hazard Tree Removals & Pruning
  - Estimate Debris Volume
  - Other Remedial Tree Work Needed
  - Provide Report That Documents Tree Work Needed & Cost

# Urban Forest Strike Team

- Developed in 2007 by states & the Forest Service in the South
- Recruit & Train Tree Professionals
- Deploy Teams To Disasters Areas
- Crews Do Assessments of Tree Risk & Damage
- Plan Needed Tree Work - Removal/Pruning Needs
- Document FEMA reimbursement

## Urban Forest Strike Team

As part of the Hurricane Gustav disaster response, experienced professional arborists from throughout the South are assessing storm-damaged trees along the public right-of-way to facilitate your local recovery.

They are working in cooperation with the Louisiana Department of Agriculture & Forestry, the City of Baton Rouge, BREC, and USDA Forest Service.





# UFST Objectives

- Help Communities Recover
- Increase Public Safety
- Reduce Loss of UTC
- More Efficient Recovery
- Reduce Recovery Costs



# Professional Arborists & Urban Foresters – Task Specialists

- ISA Certified (Or Similar)
- Tree Risk/Storm Experience
- Willing To Participate in UFST
- 2- Day Strike Team Training
- 3 NIMS (ntnl incident mngmt system)  
On-line Courses



# UFST Response Timeline



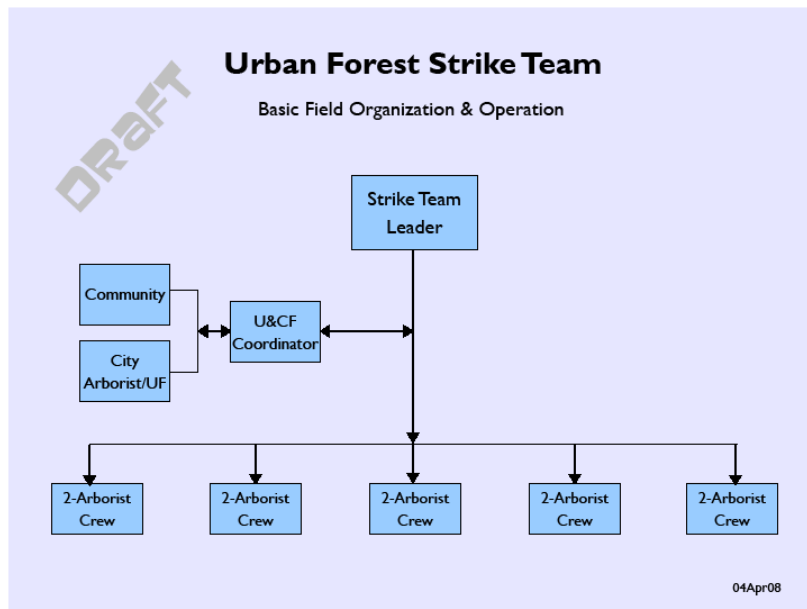


# Best Fit for UFST

- Significant Damage To Public Trees
- Find it Challenging To make Decisions on Removal Or Pruning
- Footprint Of Damage Is Concise
- Local Staff Lack Expertise Or Time
- Community Has Capacity (Staff/Funds) to Follow Up Declared Major Disaster



# Team Organization



- Team Leader & GIS
- Up to 12 people/Crew
- Up to 14 Days
- Equipment Provided
- Check TS Availability
- Travel Costs Reimbursed (No Salary)

# Assessment Data

- Location (GPS, Address)
- Genus
- DBH
- Tree Part
- FEMA Management
- Non-Storm Defects?
- Risk Rating (ISA BMPs)
  - Failure, Impact, Consequences
- Recommended Risk Management
- Hangers
- Property Ownership
- Notes
- Stumps





# Collect Data & Locations Using GPS



# Other Optional UFST Activities



- Mark Trees
- Tree Planting Spaces
- Estimate Ground Debris
- i-Tree Storms
- Other Tree Work Needed (Non-FEMA)



# Maps & Reports



## City Debris Costsheet for FEMA December 2007 Ice Storm Tulsa, Oklahoma

February 23, 2008  
 (Date of Assessment)

### Mohawk Park

**DRAFT**

Trees With Hangers	Unit Cost	Tree Count	
	\$60	877	<b>\$52,620</b>

### >50% Crown Loss (Removals)

Diameter Class	Unit Cost	Tree Count	Payment
6" - 12"	\$75	574	\$43,050
13" - 24"	\$110	318	\$34,980
25" - 36"	\$220	118	\$25,960
37" - 48"	\$295	25	\$7,375
>48"	\$425	7	\$2,975
<b>Sub-Total Tree Removals:</b>		<b>1042</b>	<b>\$114,340</b>

### Removal Debris (Cubic Yards)

Diameter Class	Cubic Yards	Tree Count	Cubic Yards	Unit Cost	Payment
6" - 12"	5	574	2870	\$6	\$17,220
13" - 24"	10	318	3180	\$6	\$19,080
25" - 36"	15	118	1770	\$6	\$10,620
37" - 48"	20	25	500	\$6	\$3,000
>48"	25	7	175	\$6	\$1,050
<b>Sub-Total Removal Debris:</b>			<b>8495</b>		<b>\$50,970</b>

### Ground Debris (Cubic Yards)

	0	\$6	<b>\$0</b>
<b>Sub-Total of All Debris:</b>	<b>8495</b>		<b>\$50,970</b>

Will city chip debris? ☒ Yes

<b>Reduction (Chips)</b>	8495	\$3	<b>\$25,485</b>
<b>Total</b>			<b>\$243,415</b>

Signatures

Date

**DRAFT**

Oklahoma Forestry Services

Urban & Community Forestry Program



# NA Initiative With MTWFA Association

- 2009 NA Cooperative Agreement to Help Introduce UFST Initiative in Northeast
- Established Advisory Committee
- Refined/promoted the process for Northeast
- Conducted Training in NA, Michigan, Delaware, Missouri & Massachusetts. Send NA trainees to the South.
- Task Specialists – NA 120+ (150+ South)  
Team Leaders – 6 (21 South).
- 3 Deployments in NE – NH, MA, MO  
Deployments in South)



(8





# Storm Damage Assessment Protocol

## SDAP

- Intended to use early soon after initial damage to provide rough estimate.
- Gives an estimate of # trees that need hazard removal, hazard pruning and amount of debris removal.
- Uses sample plots to measure 2 -5%
- Can be done quickly (1 – 2 days)
- Can be done with less experienced crews
- Can be done prior to storms as a way of estimating and planning for future damage and raising awareness
- Can be done for entire community



# Storm Response Plan for Trees

- People
  - Who will do what?
- Priorities
  - Areas most at risk
- Debris Handling
  - Establish sites and routes
- Equipment
  - In house & contractual
- Record Keeping
- Policy/Legal Issues
- Restoration

## TREE EMERGENCY MANUAL

for

Public Officials



Developed by  
Community Forestry Education Pro  
Cornell Cooperative Extension of Monroe  
Rochester, NY

supported by a grant from  
USDA Forest Service, Northeastern E

through the  
Northeast Center for Urban and Communi  
Amherst, MA

August 2000

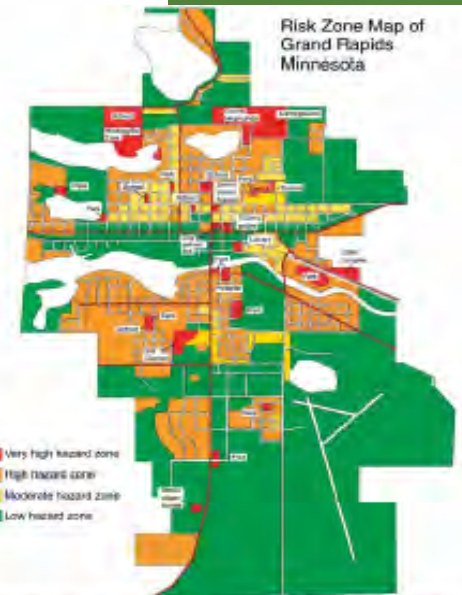


Figure 2.9. Color-coded risk assessment of Grand Rapids, Minnesota. Very high-risk areas (color-coded red), and high-risk areas (color-coded orange) require areas that should receive frequent risk inspections, using on-depth inspection methods, and where corrective actions should be implemented on an expedient basis.



# 3. Response

- Actions Taken Immediately During A Storm



# Response

- Activate Emergency Tree Service Contracts
- Work With Utility Contacts
- Clear And Move Tree Debris From Priority Traffic Lanes Walkways
- Set Up Staging Areas For Debris
- Do Immediate Tree Hazard Assessments
- Communication (Internal/External)
  - Set Up Communications with Staff
  - Work With Media To Deliver Important Messages To Public
- Document And Photograph Tree Damage And Response Work



# Evaluate Tree Damage

- Storm Damage Assessment Protocol
- Storm Response Strike Team
- Other Resources and Tools





# UFST Crews Evaluate Trees on Public Property, ROWs and Private Trees Threat to Public

- Location (GPS)
- Public or Private
- Species
- DBH
- Hazard Prune or Removal
- Justification ( code)
- Inspect?
- Immediate Hazard?
- Not Storm Related
- Does Not Meet FEMA
- Notes
- Data Entered in GPS



# FEMA Guidelines for Reimbursement

## All Of These Must Be Met:

- Located Within A Declared Disaster Area
- Eligible Applicant
- Work Is Responsibility Of Applicant
- Damage Caused By The Disaster
- Immediate Threat To Public Safety
- On Improved Public Property Or Row
- Tree Greater Than 6" Diameter



# FEMA Reimbursement

## Hazard Tree Removal

- > 6 Inches DBH

At least one of the following:

- 50% Of Crown Damaged Or Destroyed
- Split Trunk Or Broken Branches That Expose Heartwood
- Fallen Or Up Rooted In Public Area
- Leaning Greater Than 30%
- 50% Of Root Ball Is Exposed

## Hazard Limb Removal

- > 2 Inches
- Threatening A Public Use Area
- Only Minimal Amount Of Work To Remove Hazard





# FEMA Standards –

## Debris

- Generally On Public Property Or Row
- Some Allowance for Debris On Private Property
- Immediate Threat To Life, Safety And Property
- Generally on Public Property or ROW



Tree Planting – Not eligible

# Working with FEMA

- Preliminary Damage Assessments
- Documentation
- Learn From Other Cities
- Public Assistance
- Hazard Mitigation Grant Program

<http://www.fema.gov/>

# Debris Removal Estimates



24 cubic yards of debris

## Debris Estimation

yd<sup>3</sup>

24 = 15 person van

20 = 4 door full size SUV

15 = Dodge Magnum S.W.

9 = std 6'x6'x7' dumpster

5 = port-o-john

1 = dog house

Consult Whole Tree Volume  
tables for wind-thrown trees





# UFST Use/Delivery

- Regional Team To Other State
- In-state Team
- Community Could Use Ufst Method On Their Own
- Community Could Bring In Ufst If Needed
- Training For Practitioners  
Consultants, Contractors, Utility



## 4. Recovery

- Actions Taken To Return To Normal Or An Even Safer/Better Condition AFTER An Emergency
- PROGRAM
- TREES



# Recovery Programmatic



- Do Tree Damage Evaluations
  - Assess Trees For Hazards
  - Remedial Tree Pruning And Other Maintenance
- Clean-up Debris Sites
- Update Tree Inventory
- Tree Planting
- Fund Raising For Tree Program
- Review Existing Policies And Plans
- Communications/ Education On Proper Pruning Or Tree Planting Event
- Continue To Keep Records For Financial Assistance



# Recovery

- Actions taken to return to normal or an even better and safer condition AFTER an emergency
- Recovery includes both tree related and program activities



# Recovery - Part 1

## Community Related Recovery Activities

- Clean-up Debris /Sites
- Assess Tree Damage/Hazards
- Prioritize Tree Repair
- Continue To Keep Records
- Review Existing Policies
- Update Tree Inventory
- Evaluate Plans
- Seek Financial Assistance
- Evaluate Response



# Debris Management & Clean-up

- **Debris staging areas - removal**
- **Debris removal from private property**
  - Routes and Schedules
  - FEMA
- **Wood utilization options**





# Wood Utilization

In one year, logs from more than 200 cottonwood trees killed by floods on a local golf course were sold to a local sawmill and a firewood processor.



Marketing trees blown down in a windstorm turned a potential financial disaster into \$78,000 revenue through the sale of pulpwood, saw logs, and firewood permits.

# Communications/ Education



- **Work with Media**
  - Press Releases On Proper Pruning
  - Tree Planting Events
- **Provide information and Education to Citizens**
  - Teachable Moment
- **Communications Between Town Departments**
  - Training for Staff

# Evaluate Response at All Levels

How Can we do it better next time?

Local →

County →

State →

Regional →

*National*

**Revise Tree Emergency Plan**

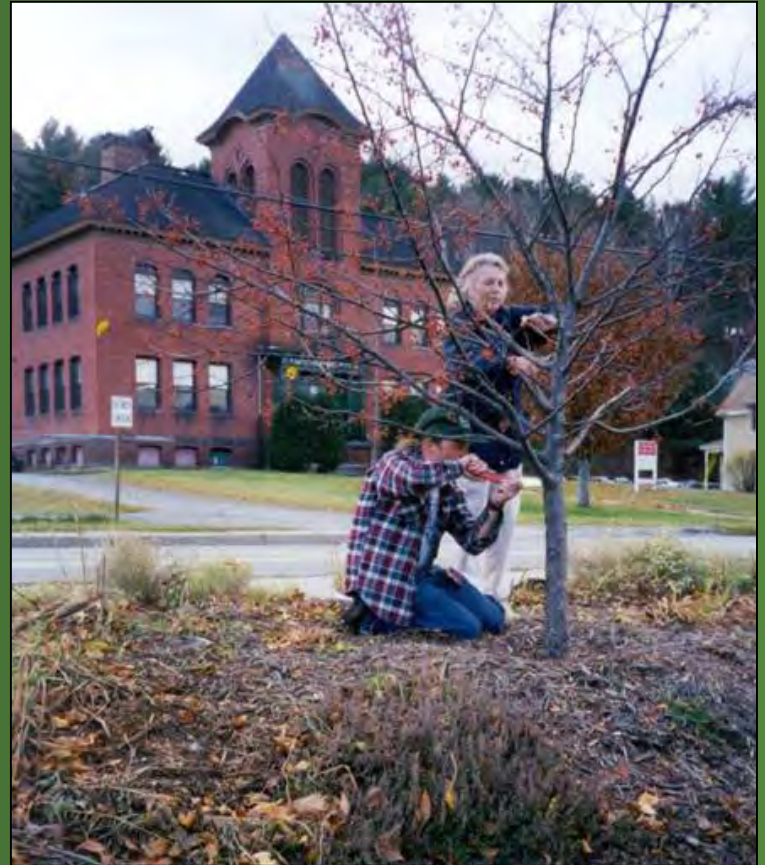


# Re-Evaluate Plans & Policies

- Urban forestry management plan
- Community tree risk management plan
- Storm damage assessment
- Public Tree Ordinance

# Engage Citizen Volunteers

- Planting
- Pruning
- Education
- Fund-raising



# Tree Planting

Inventory Available Tree Planting  
Spaces for Reforestation

- **Planting Space**
- **Utilities Present**
- **Species of Tree**
- **Develop Planting Plan**
- **Fundraising**





### What is our Goal?

The Texas Forest Service is committed to helping you, as a local leader, to organize a one-day, community-wide tree planting to mitigate for trees lost during the 2000 Ice Storms.

### Here is how NeighborWoods works

**1. Sign a Partnership Agreement:** You and the Texas Forest Service sign a letter of agreement outlining the roles each of us will have in the NeighborWoods Tree Planting Partnership. *Responsibility: Local Cooperator and TFS.*

**2. Locate The Planting Sites:** You organize volunteers or employees to walk residential streets to identify planting sites in front yards within 40 feet of the edge of the road. Your folks record the address and number of trees offered on a field form and then leave a tree planting invitation door hanger that describes the program. The door hanger includes a tear-off, self-addressed, business reply postcard for the resident to return if they are interested in participating. *Responsibility: Local Cooperator.* The resident checks off the kind of tree they want from the list on the door hanger and agrees to plant and maintain the tree by signing the card. They send the reply card back to the TFS. *Responsibility: Resident*

**3. Tree Purchase:** The reply postcards are collected, trees are ordered and the delivery is scheduled. *Responsibility: Texas Forest Service*

**4. Tree Delivery:** The trees are delivered by the nursery to a central location in your community. You organize the delivery of the trees using the TFS supplied list of residents that have accepted trees and planting instructions. *Responsibility: Local Cooperator.*

**5. Tree Planting:** The residents plant the trees. You may choose to provide planting assistance for residents. The resident becomes the owner of the tree and is thereafter responsible for its watering and maintenance. *Responsibility: Resident*

**6. Planting Survey:** Lastly your organization checks to see if the tree was planted and gives this checklist to the TFS. This inspection is important since the federal disaster recovery funds used to buy the trees must be matched with an equal value of volunteer time—and tree planting counts as the match.

*Responsibility: Local Cooperator*

# Record Keeping

- Damage Assessment And Survey Reports
- Budget
- Financial Assistance
- Photographs, Video

**City Debris Costsheets for FEMA  
December 2007 Ice Storm  
Tulsa, Oklahoma**

**March 1, 2008**  
(Date of Final Assessments)

**Creek Turnpike Trail**

**Trees With Hangers**

Unit Cost	Tree Count	
\$60	56	<b>\$3,360</b>

**>50% Crown Loss (Removals)**

Diameter Class	Unit Cost	Tree Count	Payment
6" - 12"	\$75	17	\$1,275
13" - 24"	\$110	6	\$660
25" - 36"	\$220	1	\$220
37" - 48"	\$295	0	\$0
>48"	\$425	0	\$0
<b>Sub-Total Tree Removals:</b>		<b>24</b>	<b>\$2,155</b>

**Removal Debris (Cubic Yards)**

Diameter Class	Cubic Yards	Tree Count	Cubic Yards	Unit Cost	Payment
6" - 12"	5	17	85	\$6	\$510
13" - 24"	10	6	60	\$6	\$360
25" - 36"	15	1	15	\$6	\$90
37" - 48"	20	0	0	\$6	\$0
>48"	25	0	0	\$6	\$0
<b>Sub-Total Removal Debris:</b>			<b>160</b>		<b>\$960</b>

**Ground Debris (Cubic Yards)**

	0	\$6	<b>\$0</b>
<b>Sub-Total of All Debris:</b>	<b>160</b>		<b>\$960</b>

Will city chip debris? **Yes**

<b>Reduction (Chips)</b>	160	\$3	<b>\$480</b>
		<b>Total</b>	<b>\$6,955</b>

**Signatures** \_\_\_\_\_ **Date** \_\_\_\_\_

# Recovery Part 2

## Tree Related Recovery Activities



**Do Tree Damage Assessment**

**Remove High Risk Trees**

**Pruning High Risk Trees**

**Other Tree Maintenance?**

**Stake Uprooted Trees**  
**Wounds**



# Recovery Trees

## Identify & Remove High Risk Trees

*Crown Loss*

*Wounds*

*Roots wind thrown*



# Helping Trees Recover from Damage

## General Considerations

- Severity of Damage
- Species
  - Decay compartmentalization
  - branching pattern
  - Conifer vs hardwood
- Age/ Size
- Tree Health
- Time of Year
- Duration of Storm
- Site Characteristics



# EXISTING DEFECTS

84% of storm-damaged trees had pre-existing defects that could have been predicted and prevented



Decayed Wood



Cracks



Root Problems



Weak Branch Unions



Cankers



Poor Tree Architecture



Dead Trees, top, branches

- Weak branch unions
- Dominant leaders
- Decay



# Long-term Recovery

## Avoid Further Stress

- Monitor for insect and disease problems
- Protect from construction damage, soil compaction and other damage
- Water, mulch and maintain as needed to help them recover



# Identify What Trees May be Eligible for FEMA Reimbursement

FEMA 325 Debris Management Guide  
Hazardous Tree & Limb Removal  
Standards - all below must be met

- Disaster Has Been Declared
- Eligible Applicant
- Responsibility Of Applicant
- Work is Result Of the Disaster
- Located Within Disaster Area
- On or threat to POW
- Immediate Threat To Public



# Role of UCF State Coordinator

## (Or Their Designee)

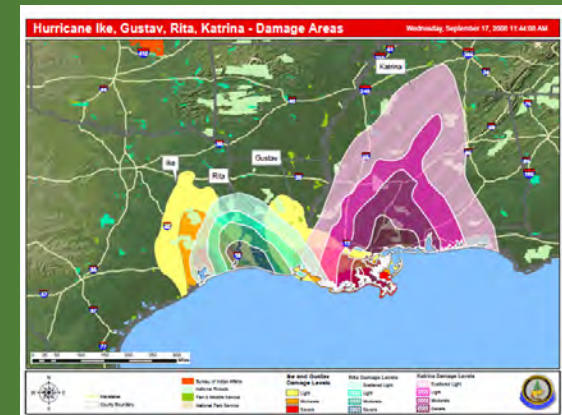
- 1. Make contact with communities.
- 2. Initial disaster assessment – ID area, damage, prioritize.
- 3. Coordinate with affected communities, and key contacts for agencies involved – local state and federal.
- 4. Is UFST appropriate? Contact USFS/UFST Advisory Committee.
- 5. Assist Community in request for UFST to SEMA/FEMA
- 6. Confirm assessment information that will be needed.
- 7. Plan for UFST needs, lodging, office space, support needs.
- 8. Meet/Brief team leader and assist them in preparations.
- 9. Coordinate communications/public information.
- 10. Support UFST Team and Leader as needed.

\*Keep State Forester informed throughout.

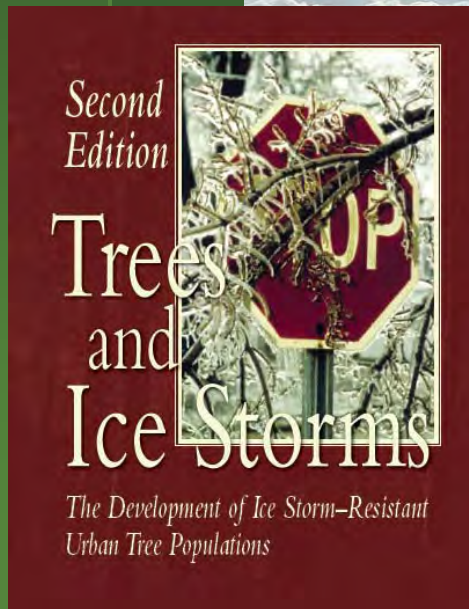
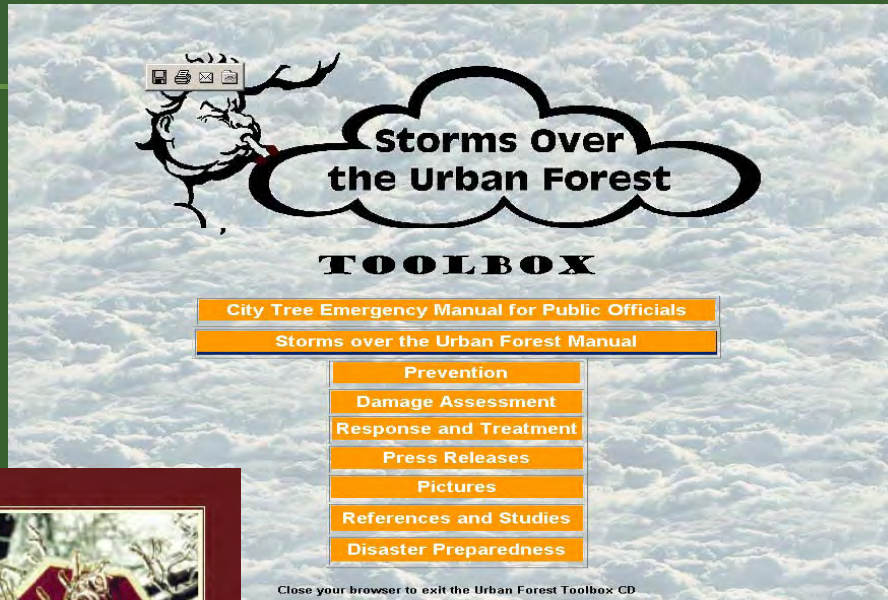



# Plans/Needs for Future

- Cultivate Partnerships (Agreements) with State EMA, FEMA, EMAC
- Inform State Foresters and NA Leadership
- Improve UFST Training
  - Task Specialist & Team Leaders
  - Recruit/Train “In-State” Teams
  - “UFST Lite” Workshops?
- Improve Early Regional/In-State Analysis & Communications
- Develop Training & Resources for General Storm Planning, Response, Recovery, Mitigation
- Current Grant Ends June 2014



# Tools and Resources





RESOURCES  
CONTACTS  
EVENTS  
CONTACT UFST


home

## Welcome to the Urban Forest Strike Team website

Providing resources to support Urban Forest Strike Teams in the Southern US.

### Role of the Urban Forest Strike Teams...

Arborists can provide assistance to communities with initial estimates of debris volume and cost of



Urban Tree Risk Management  
A Community Guide to Program Design and Implementation

#### Current Activity

- Recent Additions to UFST
- Code of Conduct
- Coordinate Tools
- Disaster Response
- ICS & Other Forms
- On-Line ICS Training
- Review Documents
- Southern Region GIS Data



# Urban Tree Risk Management:


A Community Guide to Program Design and Implementation





# For More Information

## Northeastern Area




(enter query) Search

- ▶ Northeastern Area Home
- ▶ Conservation Education
- ▶ Fire & Aviation Management
- ▶ Forest Health Protection
- ▶ Forest Legacy
- ▶ Forest Stewardship
- ▶ Publications
- ▶ Sustainability and Planning
- ▼ **Urban and Community Forestry**
  - Information Resources
  - Events Calendar
  - Partner Links
  - Contact Us
- ▶ Watershed Programs
- ▶ Wood Education & Resource Center

### Urban & Community Forestry


"Planting and Caring for the Trees and Forests Where People Live, Work, and Play"



The steady expansion of urban areas and associated decline of inner-city environments is a national problem that continues to impact basic ecological functions essential to a healthy and productive society. Healthy trees and forests in urban areas contribute to improved air and water quality, watershed function, energy conservation and social well-being.

The Urban and Community Forestry Program provides technical, financial, educational, and research services to states, cities, and nonprofit groups so they can plant, protect, maintain, and utilize wood from community trees and forests to maximize environmental, social and economic benefits.

State Urban and Community Forestry Programs



Urban Forestry Research Work Units

[Urban Forest Structure and Function](#)

[Understanding and](#)

### Hot Topics

- [i-Tree](#)
- [Benefits of Trees](#)
- [Trees & Ice Storms](#) (4.6MB pdf)
- [Urban Watershed Forestry Manual](#)
- [Tree Care Calendar](#)
- [Northern Tree Selection On-line](#)
- [Living Memorials Project](#)
- [Selecting, Planting and Caring for Trees](#)
- [A Technical Guide to Urban & Community Forestry](#)
- [Urban Projects Newsletters - 2007, Vol 10](#)

[www.na.fs.fed.us/urban](http://www.na.fs.fed.us/urban)

STATE AND LOCAL MITIGATION PLANNING  
how-to guide

## Understanding Your Risks

identifying hazards  
and estimating loss



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[www.FEMA.gov](http://www.FEMA.gov)

STATE AND LOCAL MITIGATION PLANNING  
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## Developing the Mitigation Plan

identifying mitigation actions  
and implementation strategies



U.S. Department of Homeland Security



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## Bringing the Plan to Life

implementing the hazard  
mitigation plan



**FEMA**

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