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Section 1: The Guide

This user-friendly guide provides urban forestry professionals concrete approaches when preparing for natural disasters that impact the urban forest.

- **Planning**
- **Safety**
- **Communications**
- **Contracts**
- **Incident Command**
- **Inventory**
- **Mutual Aid Agreement**
- **Training**
- **Vegetative Debris**
- **Vulnerability**
- **Conducting a Vulnerability Assessment**
- **Resources**

Section 2: The Process

Section 2 describes the process used to develop the guide and includes information about the survey, the interviews, the expert meeting and next steps.

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- **Interviews**
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- **Conclusion**
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Urban forestry is left on the back burner and urban foresters need to be at the table making decisions about trees in the community.
– *Walter Dodge, Lewis Tree Service, MA*

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URBAN FORESTRY EMERGENCY OPERATIONS PLANNING GUIDE FOR STORM RESPONSE –THE PROCESS

A description of the process used to develop the **Urban Forestry EOP Guide,** including information about the survey, the interviews, the expert meeting and next steps.

Section 2: The Process

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Why Plan for Storm Response

The purpose of planning is to mitigate, respond, and recover from an emergency or natural disaster in a timely manner. Planning establishes protocols.
We know that planning in advance goes a long way toward minimizing the impacts of natural disasters on the urban forest. But that is only part of the process. A plan for the urban forest must be user-friendly and based directly on feedback from the industry.

> Planning happens before the event, without it you will be running blind.
> –*Andrew Stenbeck, WA DNR, WA*

Recommendations:

- The plan should be focused and reflect the capabilities of an organization to implement.
- A strong plan that addresses a specific situation (e.g. storm) is better than a weak plan that attempts to address many situations.
- The plan must be readily accessed, exercised and/or tested periodically.
- A defined chain of command must be clear across agencies with respect to authority, decision-making and emergency resources and funding.
- The plan should be updated regularly.

Planning Components:

> Plan A is a good plan, but plans B, C, D, and E are even better.
> –*James Maloney, National Grid, NY*

1. Overview of the planning process:

- Define the compelling reasons for planning.
- Form a planning team, have a core group of people that manage activities. Be sure members of this group are empowered to make decisions.
- Define the outcomes and goals and objectives.
- Determine who should be part of the process.
- Define roles including leadership.
- Identify resources needed to plan.
- Understand legal implications if any.
- Identify gaps and exposures.
- Identify resources, for example, experienced, on-the-ground professionals.
- Understand stakeholder issues.

2. Contracts and Mutual Aid Agreements: (See Chapters on Contracts and Mutual Aid Agreements)

- Ensure that contracts and/or mutual aid agreements with other cities include urban forestry.
- Maintain a current listing of tree services companies with phone numbers and email contact information that could help in a storm event.

3. Contingency Planning:

- Plan for all contingencies from a temporary or short- term disruption to a total communications failure.
- Plan for everyday functions to fail including voice and data.
- Consider the business impact of inoperable communications.
- Prioritize facility communications. Determine order of restoration.
- Talk to communications vendors about emergency response capabilities. Establish procedures for restoring services.
- Determine needs for backup communications for each business function.

4. Create Reporting Templates:

- Tracking/reporting of progress and actions.
- Shift changes.
- Footprint of the storm, how it moved, what worked, and what could have been done better.

5. Resources

- Know what resources are available and your responsibilities.
- Inventory your trees and other assets.
- Develop a process to track the costs to maintain your assets.
- Develop a process to ensure resources are available during an event including: food, housing, laundry, gas for vehicles, power, etc.

6. Storms: (see Chapter on Vulnerability Assessment)

- Understand storms that impact your area. Talk with the emergency management department or other departments that can provide additional information about storm events. Make the information relevant to your needs.
- Understand how emergency management departments function and/or could help in a storm event.

7. Train:

- Train to respond quickly to a storm (See chapter on training).

8. Reestablish normalcy

- Establish a process for reestablishing normalcy/ replanting trees lost.

9. Review:

- Look for redundancies.
- Develop format for after-action reports.

> See the BIG PICTURE. When you are a specialist you tend to have a narrow focus.
> The more you understand how things work, the better you are at understanding what your role is and how your department works within the city, and how the city interfaces with other cities and the state.
> –Alan Haywood, City Arborist, Issaquah, WA

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Safety

Storms produce turmoil and a significant number of hazardous conditions which expose workers and the public to safety issues. The urban forest is an asset which can become a liability unless properly managed.

Work safe. It is the first thing and last thing you do. This is your primary objective.
– Jim Orr, Asplundh, PA

Recommendations:

- Understand, apply, and comply with all applicable safety regulations and practices.
- Develop an effective safety program that addresses safety issues prior to, during, and after a storm event.
- Ensure the safety plan is in place well in advance of storm season.

Safety Plan Components:

1. Identify a Safety Officer:

- Ensure compliance of contractors to the applicable OSHA Regulations, ANSI Standards and BMPs.
- Select and train the safety team.
- Work in cooperation with your local utility arborist (or municipal arborist) .
- Creating public safety announcements about:
  - Threats from downed conductors.
  - Non-local crews who are travelling in convoys.
  - Blind spots created by heavy equipment.
  - Traffic issues involving traffic lights, work zones, downed limbs and trees.
- Develop avenues for communication – web, television, radio and text alerts.
- Develop an alternate communications plans that works when large power outages shut down electronic networks.

Before starting work at each location, the crew leader should conduct a job briefing to make sure that each member of the team knows what to do and what hazards to avoid. Photo courtesy of Asplundh.

2. Create procedures for managing safety of external personnel:

- Create a checklist to identify tool and equipment requirements for basic emergency response.
- Identify required skills when requesting support.
- Identify requirements unique to the event you have so crews arrive properly prepared and equipped.
- Pre-inspect crews & equipment prior to performing work, explain and set expectations of work practices required to ensure safety.
  - Ensure adequate (internal) field supervision to verify that your requirements and expectations are being adhered to.
  - Create a checklist to facilitate accuracy and expediency (see Crew Transfer Sheet & Tree Crew Pre-Inspection Documents).
- Continue to monitor crews throughout event for compliance to regulations/standards and safe work practices.
  - Document high performance crews for recall to subsequent/post restoration efforts.
  - Dismiss crews for non-compliance.

3. Managing personnel:

- Identify personnel who are responsible to edit & maintain external workforce records.
- Create spreadsheet to detail incoming resources (see Crew Transfer Sheet).
- Train personnel to verify & maintain information.

4. Hazard area:

- Develop & implement a pre-job hazard brief with mandatory sign-in requirements. (Sample document Pre-Job Hazards Survey)
- Establish full authority of crew chief to call a work-stop if they determine conditions are unsafe to proceed.

5. Procedures for decontamination:

- Develop contacts/contracts with hazardous material release mitigation resources for emergency response.
- Develop public communication involving the release.
  - Determine threshold as to when to notify.
  - Identify spokesperson (Safety Officer?).
  - Develop a short, concise statement to be modified per the severity of the incident.
- Create requirements for hazardous material release mitigation kit for each crew.
  - i.e. A "Spill Kit" consisting of a sealed 5 gallon bucket containing 1 set rubber gloves, 2 large plastic trash bags, (4) 2'x2' absorbing mats with the rest of the space filled with absorbent granules.

Forms

- Pre Job Hazard Survey
- Western Division Storm Package
- Crew Transfer Sheet Master (download zipped Excel file)

This safety section was reviewed and updated by James P. Maloney, Lead Supervisor Distribution Forestry, Nathan Wright and Timothy Bodkin of National Grid; and John Sullivan, Director, Safety and Training, Lewis Tree Service, Inc. Forms were generously provided by both organizations.

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Communication

A communication failure can be a disaster in itself, cutting off vital activities. (FEMA 2010)

The best tools and resources mean nothing without leadership and communications.

It's human nature to love triumph-over-tragedy stories. We know that the more devastating the event, the more media coverage it gets. The public sees a community that is broken, a near future that is challenging.

Well thought out media coverage sends a message of hope. The media coverage offers opportunities for a community or a state to provide the type of information that is needed to resolve a problem.

Recommendations:

- Establish relationships with the media long before an event occurs. Arborists will benefit from learning how to interface with the media.
- Reduce chaos from storm events by reporting information about the storm event.
- Bring together and brief all concerned staff.
- Plan with other departments – especially public information.
- Establish a set of checklists and communication tools to quickly share relevant information, discuss options and strategies, assign responsibilities, and prepare for the storm event.
- Communicate with the emergency management department to ensure trees are included in their processes.

Communication Strategies:

1. Internal communications

- Take care of the family first.
  - Make plans for communicating with employees' families in an emergency.
  - Define how to communicate should families be separated or injured.
  - Arrange for an out-of-town contact for family members to call.
  - Designate a place to meet family members if they cannot get home.
- 1.2 Communicate with crews. Know where your crews are.
  - Establish procedures for warning personnel of an emergency.
  - Place emergency contact information near each telephone, on employee bulletin boards and in other prominent locations.
  - Maintain an updated list of addresses and telephone and cell phone numbers of key emergency response personnel (from within and outside the facility).
- Notification
  - Establish procedures to report an emergency.
  - Inform employees of procedures.
  - Develop check-in and check-out procedures.
  - Write down crew names, trucks assigned, and where they are sent.
  - Use GPS trackers on trucks.
  - At the end of a shift use the list to ensure everyone checks back in.

2. External Communications

Power lines brought down by broken trees pose a serious electrical hazard to the public and workers, as well as a blocking transportation for emergency vehicles. Photo courtesy of Asplundh.

- Communicate with the Public.
- Ensure the use of multi-lingual communications and communication tools for persons with disabilities.
- Provide specific instructions. You will be 50% more efficient by offering clear instructions.
- Describe how and when the public will be notified.
- Utilize social media such as Facebook and Twitter.
- Advise the community of areas to avoid after a storm event.
- Describe the likely types of problems that will be created as a result of the downed power lines, blocked roads, etc.

3. Build Positive Media Relations

Oregon Department of Forestry, recommends:

- When providing information to the media use the "Front Page" test. Think about how your words would look on the front page of a newspaper or sound in an isolated quote or "sound bite".
- Never repeat a negative question.
- Make sure statements are concise.
- Be prompt and meet deadlines.
- Stay on message. Determine three key points to emphasize.
- Be pleasant, firm and patient.

4. The purpose of the message is to explain and persuade

Risk Communication Strategies, Media Survival Group recommends:

- Be first – if information is yours.
- Be right – even if incremental.
- Be credible – tell the truth.
- Express empathy.
- Promote action – offer things to do.
- Understand your audience.

After the storm people want to know:

- What types of assistance will be offered?
- What are the hazards?
- What programs are in place to respond to fallen trees/limbs, etc.?
- What does a homeowner do with vegetative debris?
- What will be picked up by the city or municipality?
- When will vegetative debris be picked up?
- Who should they call?

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Contracts

A storm agreement or contract focuses on exactly what needs to
be in place and from whom. The contract must be scalable and
should align with the existing emergency response system.

Fully equipped crews, including contracted and mutual aid crews
assigned to storm emergency response, must be prepared to do
any job they are given.

The single most important thing to do is
to have a storm agreement in place, or at
least ready to be in place, as part of the
planning process. Don't look for help
after the fact.
– *Jim Orr, Asplundh, PA*
— *Walter Dodge, Lewis Tree Service, PA*

Recommendations:

- Understand that contracts made prior to events tend to be
  optimistic, the reality is often very different.
- Plan for the worst case scenario.
- Pre-qualify contractors to ensure they have the experience and training needed.
- Develop relationships with contractors, arborists, and others to support the program.
- For cities with no contracts in place identify contractors or utilities that might provide support and help, or consider
  a mutual aid agreement with a utility.

Contract Components:

The following components are considered essential to a contract.
Take your time in developing the list of requirements. Leave
nothing to interpretation.

Pre-planning is imperative and pre-event
contracts are legally imperative to qualify
municipalities for the fullest funding
when a disaster is declared.
– *Daniel Rohe, Rohe's DPS, Inc.*

Consider including:

1. Purpose, timing and length of the contract.

2. The chain of command and specifically who is in charge.

3. Pre-qualification requirements such as orientation, training, or meeting of local key players.

4. Types of emergency response and/or recovery services that may be needed.

5. Emergency response language and definitions.

6. The scope of the contract to ensure the most efficient use of resources.

7. Description of the arborist services and staffing needs. For example:

- Minimum number of crews needed.
- Defining what a crew is – leave nothing to interpretation.
- When the services may be needed and the duration, starting and ending times, for example available for
  emergency calls 24 hours a day.
- Contract tree crew personnel should come prepared for extended stays.
- Materials, tools and equipment to accomplish the safe execution of all work.
- The number and type of equipment and resources needed. For example:
    - For aerial lifts – the truck number and date of dielectric testing.
    - The amount and types of tools and personal protection equipment needed (PPE).
- A competent field supervisor and customer contact person(s) acceptable to the organization. Provide the contact
  information and contact method.
- The pay classification of each contracted crew along with union certification level.
- Current OSHA safety and other training, including annual refreshers.
- Current tree rescue and climbing certification.
- Dates crew members completed first aid and CPR training.

8. Contractor contact information – phone, cell, beeper, etc.

9. Ensure the contractor holds a state license and has:

- Appropriate equipment operation license.
- Appropriate storm training, certifications and qualifications.

10. Insurance and indemnification.

- Indemnification: Contractor shall be held solely liable and indemnify the organization fully for any and all claims and legal expenses for damages to trees resulting from violations, failure or damages arising out of the Contractor's negligence. Consult your insurance company for more information.
- Statement as to when the Contractor is not liable for work.

11. Reporting. For example:

- Time sheets and invoicing.
- Federal accident or other reports if required.

12. Predetermined meeting times to start the day and to debrief – for example – 6 am and 6 pm.

13. How to deal with vegetative debris.

14. Citations of OSHA and ANSI standards.

15. Internal and external communication protocols.

16. When the contractors and partners are to be included in trainings and drills.

After a widespread weather emergency like a hurricane, the competition for lodging and food can be a serious issue for tree and line workers, especially in rural areas where there aren't normally very many restaurants and motels. Utilities often contract for temporary 'tent cities' to provide a central location for housing, food, water and fuel. Photo courtesy of Asplundh.

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Incident Command System

Incident Command System (ICS) is used to manage natural disasters such as wildfires, floods, hurricanes, earthquakes, and other events. In an urban forestry context, its most common usage will be a storm event such as rain, hurricane, wind or snow that results in a large scale disruption of services and may do extensive damage to both green and gray infrastructure.

ICS provides a functional structure for actively managing any type of incident faced by responders. If that incident involves damage to a city's green infrastructure, it's essential that urban foresters are part of the response team.

> If you manage or are responsible for trees in the urban forest you must have at seat at the ICS table during planning, exercise, and response; not just as a tertiary component.

ICS is a time-tested systematic process of planning, logistics, operations, finance, and command functions. If an Incident Management Team (IMT) is established with an ICS structure, the IMT will be responsible for a wide range of functions in carrying out an incident response. These might include public safety, managing evacuees, debris removal, and other types of activities that would get a community back to a normal level of function.

Urban foresters should have a basic understanding of ICS structure and IMT functions in case a team is deployed in response to an event. Additionally, some parts of the US are creating Urban Forest Strike Teams (www.UFST.org) that operate as a stand-alone function in an ICS framework and narrowly but specifically focus on tree risk assessments and debris management.

Recommendations:

- **Urban forestry must be part of the larger incident command structure** – The ICS and the use of IMTs are 'scalable' –- the size of the team and the structure of the response is dependent upon the size of the incident. At the municipal level, ICS is most often applied in an Emergency Operations Center (EOC). If an EOC is established in your city, representatives of various city and county functions will all be involved, and it is vital that urban forestry have a defined role. Typically, urban forestry might be a one branch of an Operations function – but within that division, urban forest response functions like risk assessment and debris removal might be assigned to different work groups.
- **Integrating urban forestry with ICS must be planned in advance -** If you manage or are responsible for trees in the urban forest you must have a seat at the ICS table during planning, exercise, and response, not just as a tertiary component. This role doesn't get established during an incident – it must be cultivated in the ICS planning process prior to an event. Urban foresters should participate in "table-top" exercises and mock-disaster response exercises in order to know and become known to other responders.
- **Urban foresters need to learn the ICS system —** There are a range of ICS courses offered by the various public safety agencies at the local, state, and national level that can help urban foresters learn the basics of how ICS functions. It is recommended that all urban foresters have some working knowledge of ICS before being assigned to an incident.
- **An urban forestry function needs to be integrated into the first responder ICS -** The city or municipality must understand the importance of ICS training for the urban forest. Incident response involving hazardous tree removal or urban forestry issues can help or hinder ICS operations. Use of this guide can control risk factors and injuries for the ICS team.
- **Pre-Identify your urban forestry stakeholders and resources** – Urban foresters should develop a viable emergency response plan that contains the information needed to manage their portion of an event. This should include both operational and communication strategies.

Considerations:

1. The guide is designed to provide the infrastructure for a storm response with the understanding that the local ICS team will be in place and functioning.

2. Ensure appropriate resources are available – housing, food, fuel, etc. Work with the ICS logistics function to manage these needs.

3. Outside contractors must have adequate training to work within the ICS system.

4. See the planning section of this document for additional recommendations on how to plan for a natural disaster. Integrate those tasks into the ICS.

Additional Resources:

1. **ICS AND Mutual Aid Agreements (MAA)** – There is an interface for MAAs and ICS. ICS has provisions for mutual aid at a regional, state, and county level. Again, advanced planning is required.

2. **EMAC, the Emergency Management Assistance Compact** – The US Forest Service is developing EMAC resource packages for Certified Arborists trained for disaster deployment to help cities accomplish risk assessment and FEMA debris identification. Visit www.emacweb.org for additional information.

3. **NIMS -the National Incident Management System, has been developed to support ICS implementation across agencies** – For resources and ICS training check this link ICS training.

References:

FEMA Emergency Management Institute National Incident Management System Retrieved on July 8, 2012 from http://training.fema.gov/IS/Nims.asp

This ICS section was reviewed and updated by Paul Ries, Urban and Community Forestry Program Manager, Oregon Department of Forestry.

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Inventory

Tree inventories are used to review the current state of your urban forest. A tree inventory is the gathering of information on the health and diversity of the urban forest. Tree inventories are a good management tool.

You cannot manage the urban forest effectively unless you know what you have, and where the trees are. What kind of trees, how many street trees, what condition are they in? These are all questions you need to know. Additionally, tree populations are constantly changing, and the older the inventory the less accurate the inventory will be.

Experts recommend that you know what you have and what you are responsible for. Inventory everything you manage and/or own. Develop a process to track the costs to maintain your assets.

i-Tree Streets is one tool that you could use to analyze a street tree inventory. It is an easy-to-use, computer-based program that allows any community to conduct and analyze a street tree inventory. Baseline data can be used to effectively manage the resource, develop policy and set priorities. Using a sample or an existing inventory of street trees, this software allows managers to evaluate current benefits, costs, and management needs. http://itreetools.com/streets/index.php.

Know your trees. Know the scope of what you are dealing with.
– Jim Orr, Asplundh, PA

When communities are handing out thousands of dollars they don't want you guessing at the number of trees. Do an inventory.
– Gordon White, Okotoks, Alberta, Canada

For Storm Preparedness

If a disaster happens to the urban forest and you have an inventory, you will know the trees you have, where they are, the species type and their value.

Know where the trees are in relation to critical areas or locations such as hospitals, major roads, emergency shelters, responder (fire/police/ emergency operations) buildings, city service centers, and locate debris storage yard.

The Super Derechos of June 30, 2012 toppled trees from Indiana to New Jersey, causing massive damage to private and public property. Photo courtesy of Asplundh.

Reference:

Eckert, K. Arbor Global, HI. (2012 November 26). Storm response interview.

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Mutual Aid Agreement

Mutual Aid Agreements (MAAs) are arranged prior to incidents and allow jurisdictions to work together to increase resources. These agreements are critical to the successful management of large scale incidents.

Having a MAA with neighboring cities is not adequate or sufficient. Agreements with cities from outside the region need to be in place to be effective. Make sure you go far enough out to get the resources you need.

A mutual aid agreement is only effective when it is written as a contract.

Urban forestry needs to be included in the mutual aid agreements that are made by the municipality. Additionally urban foresters need to be at the table when municipalities and cities are negotiating MAAs.

Recommendations:

- Meet with arborists and contractors in nearby communities to understand each other's storm response and help needed.
- Commitments from contractors during an event may be stretched and at risk. Consider more resources identified even if they seem redundant at the time.
- Understand that commitments from outside contractors or resource are going to be optimistic. During emergency incidents it may be difficult to respond to needed issues. Plan for the worst case scenario and plan how it will be addressed.
- Develop a community of professionals to be there when needed.

You're flirting with disaster every week you don't have an agreement signed.
– *Chris Johnson, IA*

Many organizations work together to respond to a storm. Photo courtesy of National Grid

MAA Components/ Purpose of agreements:

- Defines type of assistance required, when needed, and the scope of work.
- Identifies chain of command for activating agreement.
- Defines communication procedures.
- Defines types of training needed and/or the type(s) of training in which participation is expected.
- Defines certifications and qualifications required.
- Defines necessary types of equipment.
- Defines the type of insurance needed and indemnification requirements.

Check the Contracts section for additional components you may wish to consider in the MAA.

References:

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Dockter, D., City of Palo Alto, CA. (2012, May 3) Expert meeting.

Remember, the closer to the coast the better the agreements should be.
– *Daniel Rohe, Rohe DPS, Inc. NY*

Eckert, K., Arbor Global, HI. (2012, May 3) Expert meeting.

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Training

Training ensures competent personnel who can safely and cost effectively prepare for, reduce risk and damage, and respond to tree related problems resulting from natural disaster events.

Identify the full scope of training needed for urban forestry storm response before, during, and after an event.

A training program prepares staff to respond appropriately to the different components of an incident; and is essential to providing safe, effective, and efficient incident response. The need for readiness should not be underestimated. Train to always be ready for the worst case scenario.

> Part of the key to training is to practice every chance you get. If you deal with that well it sets the stage for the big response.
> – *Andrew Stenbeck, WA DNR, WA*

Recommendations:

1. Establish leadership roles and clear authority.

2. Establish, define, and enforce minimum levels of knowledge and skill proficiency that is demonstrated and documented.

3. Training must be hands on.

4. Training should include multi-agency coordination, discipline and agency specific incident management courses.

5. Define the qualifications needed.

- Who needs to be trained and what level of experience and knowledge is needed.
- Consider how the less skilled employee can do triage and utilize the higher skilled individuals appropriately.

6. Training should be scheduled well in advance of a storm season.

7. Define the types of training and certifications that are needed, for example:

- Safe work practices.
- Applicable OSHA regulations.
- ANSI standards.
- Incident Command Systems.
- CPR.
- Tree risk assessments.
- Electrical hazard awareness.
- Tree pruning and felling practices during emergency conditions.
- Communications.
- Storm recognition and mitigation.
- Storm restoration practices.

8. Conduct periodic drills.

- Invite stakeholders and key individuals.
- Bring experts in to assist with training and practice if needed.

9. Practice to determine how to mobilize and distribute response teams. Who will be mobilized, how many will be mobilized, where to mobilize and when.

10. Tree Management Teams.

- Train for proper pruning and removal to minimize exposure to storm damage.

> The utility industry has a high level of response because they plan and practice it, even in years with no significant ice, hurricane, or other storms. They are always practicing or role playing.
> – *Jim Orr, Asplundh, PA*

11. After the fact.

- Post storm tree assessments.
- Urban Forest Strike Team.
  - Arborists can provide disaster planning assistance to communities, risk assessment, and FEMA debris identification following storms.
  - Risk assessment helps communities identify trees that are an unacceptable risk, and trees suitable for retention and management during disaster recovery. [1]

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[1] http://www.ufst.org/

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Vegetative Debris

Emergency conditions can generate exceptionally large volumes of debris containing trees, toxic materials and other waste.

A logistical vegetative debris plan should be developed to include:

- Short term collection points.
- Procurement and mobilization of debris processing equipment.
- Transportation of vegetative debris.
- Separation of recyclable materials from contamination (where possible).
- Identification of a final disposal site.

> "When the disaster is over the debris is still there. It's an issue the community needs to deal with."
> – *Jim Orr, Asplundh, PA*

Recommendations:

- The plan should include a detailed strategy for debris collection, temporary storage and staging areas, recycling, disposal, hazardous waste identification and handling and administration.
- Have a written policy in place indicating who is responsible for debris.
- Pre-select sites to speed the implementation of the debris management plan.

Superstorm Sandy left behind unprecedented amounts of vegetation. Photo courtesy of National Grid.

- Plan and estimate for maximum debris capacity.
- Shorter term logistics need to be arranged and long term disposal of different debris types needs to be considered. Consider logs versus branches.
- Prepare a communication strategy ahead of time to advise the community when, where, and how vegetative debris will be picked up.
- Consider how to dispose of biological waste when disposing of pests such as Emerald Ash Borer. Quarantines need to be respected.
- Review the plan at least once a year and revise as needed.

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Vulnerability Analysis

A vulnerability analysis is a systematic process of identifying and quantifying the areas of vulnerability within a system that could be used to better understand and plan for storm events.

A vulnerability analysis can assess:

- Specific risks affecting the urban forest.
- Human error-driven risks your organization is exposed to (for example lack of training, drills, certifications and experience).
- Risks unique to the business (for example loss of key person(s), injury, nonperformance).
- Past storm events.
- Risks based on geographic location.
- System failures (for example computer, telecommunications, emergency notification system failure).

Climate change is exposing human health and the built environment to increasing risks. Likely impacts include an expansion of the ranges of insects and other animals that carry disease.
In coastal areas sea-level rise and storm surges threaten infrastructure. In other parts of the country floods, droughts, and other weather and climate extremes pose increasing threats.
– US Global Research Program (2010)

A vulnerability analysis provides a process to:

- Understand storms that pose a risk triggering activation of a plan.
- Identify and map high risk areas that are likely to be impacted by storm events.
- Develop information dissemination methods, protocols (verbal, electronic, etc.) and procedures.
- Manage trees before a storm to reduce the likelihood of injury and damage.

To know more about conducting a vulnerability analysis click here.

Don't believe us—here's what the experts say:

"It should not come as a surprise that we are in a new *era of catastrophes.*" The concentration of more people and assets in hazardous areas are eradicating marginal improvements in resilience and hazard mitigation while at the same time new vulnerabilities and new hazards are emerging.

Climate change will alter—or perhaps already has—the magnitude and frequency of hydrological (water related) and meteorological disasters, those caused by extreme weather resulting in rain, flooding, wind, etc. This could cause disasters to become more severe and frequent and may introduce new hazards in areas unfamiliar with them.

With climate scientists warning of more extreme floods and droughts in the decades to come, the human and economic losses are bound to increase.

More people now live in harm's way-along coastlines, on floodplains, and in deltas. But the hidden factor in many natural disasters is the loss or degradation of ecological infrastructure.

Healthy rivers, floodplains, wetlands and forested watersheds provide services of enormous value to society just as roads, bridges and treatment plants do. They help mitigate floods and droughts, buffer storms, transport sediment, filter pollutants, purify drinking water, and deliver nutrients to coastal zones.

References

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Gall, M., Borden, K., Emrich, C., Cutter, S. (**2011**) *The unsustainable trend of natural hazards in the United States.* Journal of Sustainability ISSN 2071-1050. Retrieved on July 12, 2012 from www.mdpi.com/journal/sustainability.

Seven steps to Conducting a Vulnerability Analysis

Vulnerability Analysis Chart

Tyoe of Emergency	Probability	Human Impact	Property Impact	Business Impact	Internal Resource	External Resource	Total
	High Low 5 <-------> 1	High Impact 5 <---------> 1		Low Impact	Weak Resources 5 <------	Strong Resources ------>1	

Source of information Accounting-financial-tax.com (2010)

Step 1: List the potential emergencies

In the first column of the chart, list all the potential risks (storms or otherwise) that could affect your organization and/or the urban forest. Be sure to consider risks that could occur within your community. You should include your risk control committee, if you have one, in the process to help ensure all possible risks are brought to light.

As you consider the different risks think in terms of the potential areas of risk:

1. Human error

What are the potential employee error-driven risks your organization is exposed to?

- Are your employees trained to respond to storms?
- Are your employees trained to work safely?
- Do they know what to do in an emergency?
- Do your employees have annual drills?
- Are your employees certified arborists
- Do your employees have experience in storm response?
- Other

2. What kinds of risk does your organization face that are uniquely business risks?

- Loss of key person
- Worker injury and death
- Lack of training and/or the right type of training
- Nonperformance

3. What types of risks have your community, your facility, and other facilities faced in the past?

- Fires
- Severe weather
- Earthquakes
- Ice Storms
- Wind Storms
- Hurricanes
- Tornadoes
- Power outages
- Tsunami
- Storm surge
- Other

4. What can happen as a result of your geographic location?

- Proximity to flood plains, seismic faults, and dams
- Proximity to the coast
- Proximity to areas with known weather events
- Other

5. What could happen if you experience a process or system failure?

Consider the potential risks as a result of:

- Telecommunications failure
- Computer system failure
- Power failure
- Emergency notification system failure
- Other

Step 2: Estimate the probability of the Risks

In the probability column of the chart rate the likelihood of the occurrence of each risk by using a 1 to 5—with one as the lowest probability and 5 as the highest.   Rely on your own experience and that of others in your organization.

Step 3: Assess the potential human impact

What is the possibility of death or injury? Use the same rating of 1 to 5.

Step 4: Assess the potential property impact

Consider the potential for urban forestry losses and damage. Use the same rating of 1 to 5. Consider the potential risks in terms of:

- Loss of benefits of urban forest (environmental for example)
- Loss of green infrastructure
- Cost to estimate damage to urban forest
- Cost to prune
- Cost to remove trees
- Cost to replace trees
- Other

Step 5: Assess the potential business impact

Consider the potential loss due to the potential risks. Use the same rating of 1 to 5.

- Business interruption
- Employees who can't report to work
- Interruption of critical services
- Interruption of contractual services
- Other

Step 6: Assess Internal and External Resources

Assess your organization's resources and your ability to respond to situations. Use the same rating of 1 to 5. Consider each potential risk from beginning to end and evaluate each resource that you need to respond. For each risk, ask these questions:

- Do we have the needed resources and capabilities to respond?
- Will our external resources be able to respond to us in adverse times as quickly as we may need them, or will they have priority areas to serve?

If the answers are yes, move on to the next assessment. If they answers are NO, identify what you can do to correct the problem. For example you may need to:

- Develop additional risk management procedures
- Conduct additional training
- Acquire additional equipment
- Establish contracts or mutual aid agreements
- Establish agreements with specialized contractors

Step 7: Add the Columns

Total the score you've rated for each potential risk. The lower your score, the better. Risks with a high score should be given a high priority in your organization and addressed immediately.

How to Resolve your Risks

There are four basic strategies when selecting your risk management tools:

Shift the risk. This is one way of dealing with risk is to shift it to someone else. For example when you draft contracts with subcontractors that require them to carry liability insurance, you shift the risk to your subcontractors and their insurance companies.

Avoid the risk. Identify and correct hazardous situation, where possible. For example acquire a backup communications strategy, establish agreements and contracts, etc.

Reduce the risk. For example train the employees to respond to storms, train in incident command system, conduct annual drills, ensure equipment is prepped before a storm season, and provide training to reduce injuries that result in lost productivity or unnecessary accidents, etc.

Assume the risk. Will your organization need to bear the financial burden of a risk? This course of action should be taken only after a careful assessment of the risk, along with a detailed cost/benefit study.

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Resources

Develop Standard Operating Procedures (SOPs)

What you should create:

- Checklists – check all available checklists and templates
- Organizational chart
- Call-down rosters
- Resource listings – review all listings that may be helpful
- Maps useful to your effort
- How to obtain and use equipment, supplies and vehicles
- How to obtain mutual aid
- How to report information to organizational work centers and EOC
- How to communicate with staff members who are operating from more than one location.
- FEMA (2010 November) Developing and Maintaining Emergency Operations Plans CPG 101 Version 2.0
- Guidance for Preparing Standard Operating Procedures (SOPs) (2007)

Documents

- **Planning**
  - Producing Emergency Plans
  - Tree Emergency Plan Worksheet
- **Safety**
  - Pre Job Hazard Survey
  - Western Division Storm Package
  - Crew Transfer Sheet Master (download zipped Excel file)
- **Communications**
  - Building Positive Media Relations (Oregon Department of Forestry Staff, November 2009)
  - Media Survival Tips
- **Debris**
  - Debris- sample plan
  - Planning for Disaster Debris
  - Public Assistance Debris Management Guide FEMA 325
- **Incident Command**
  - Incident Command System Resource Center Training
- **General Information**
  - Developing an Urban Forest Management Plan for Hurricane-Prone Communities, Escobedo, F., et al
  - How Resilient is Your Coastal Community
  - International Society of Arboriculture
  - I-Tree Tools
    - I-Tree Tools
    - I-Tree Storm
  - Making the Urban Forest Safer by Neil Letson
  - Massachusetts Tree Wardens & Foresters Association
  - National Infrastructure Protection Plan
  - Storms Over the Urban Forest
  - Strike Team
  - Trees and Ice Storms
  - Winter Storm
- **The Survey**
  - Survey questions used for the EOP

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Introduction

According to the National Urban and Community Forestry Advisory Council report to the Secretary of Agriculture on Catastrophic Storms and the Urban Forests, a storm's impact on the urban forest is a national problem and its consequences affect our urban forests and our communities. [1]

Preparedness saves more lives than responders.
– *Amanda Ripley, The Unthinkable.*

It should not come as a surprise that we are in a new era of catastrophes.[2] There is a concentration of more people and assets in hazardous areas while at the same time new vulnerabilities and new hazards are emerging.[3] In fact 91% of Americans live in places at a moderate-to-high risk of earthquakes, volcanoes, tornadoes, wildfires, hurricanes, flooding, or high-wind damage according to an estimate calculated for TIME by the Hazards and Vulnerability Research Institute at the University of South Carolina.

Slightly more than 50% of the population lives in coastal areas and lessons learned from Katrina in the Gulf have not deterred construction and both the Gulf and Florida continue to boom. This dense coastal construction is the main reason storms are causing more and more damage every year. — Amanda Ripley, "Why we don't Prepare for Disaster", TIME, in partnership with CNN, August 20, 2006.

In 2009 the Friends of Hawaii's Urban Forest was awarded a Forest Service National Urban and Community Forest Advisory Council (NUCFAC) Grant to develop this *Urban Forestry Emergency Operations Planning Guide for Storm Response*.

The project was driven by a growing awareness of the devastation that happens to the urban forest after a natural disaster such as a hurricane, ice storm or wind event.

The question posed:

"**How can the urban forestry industry be equipped to respond to natural disasters?**"

The solution:

"**Develop an urban forestry emergency operations planning guide for storm response.**"

Methodology

This project includes four phases which are described in this report:

- **Phase one – Survey**

- **Phase two – Interviews**

- **Phase three – A meeting of experts**

- **Phase four – Compilation of data**

[1] Forest Service, National Urban and Community Forestry Advisory Council, (February, 2008) Report to the Secretary of Agriculture on Catastrophic Storms and the Urban Forest.

[2] Kunreuther, H.C.; Michel-Kerjan, E.O. *At War with the Weather: Managing Large-Scale Risks in a New Era of Catastrophes*; The MIT Press: Cambridge, MA, USA, 2009; p. 416.

[3] Gall, M., Borden, K., Emrich, C., Cutter, S., (2011, November 14), The unsustainable trend of natural hazards losses in the United States. Sustainability, www.mdpi.com/journal/sustainability. Retrieved on July 26, 2012.

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Survey

A survey was developed to gain an understanding of the essential practices, training and experiences of urban forestry storm responders. The survey data formed the basis for creating the guide and subsequent planning materials and helped the team answer the questions:

- **What are the features of an "***Urban Forestry Emergency Operations Planning Guide***" that would be of value to the industry?**

- **How would the guide help the industry prepare for a storm?**

Questions were asked about preparedness, types of certifications, experiences in storm response, plans in place, training and drills, contracts and mutual aid agreements, incident command in the urban forest, safety protocols and communication strategies.

The survey development phase took six months and involved industry experts to ensure that questions would consistently provide data about the readiness of the industry to respond to storms.
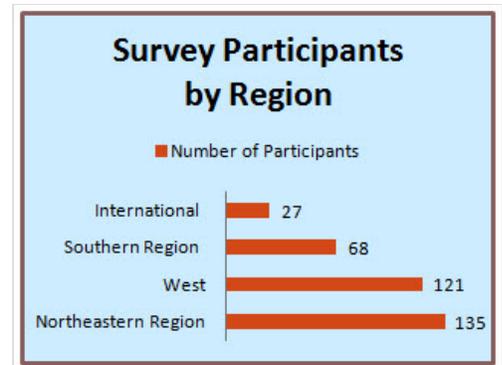
517 surveys were started and 367 surveys were completed. The chart to the right identifies participants by region.

Click this link to view the survey questions.

Several survey questions are explained below.

Survey Participants

The majority of participants had multiple certifications, management skills and 10+ years of experience. The table below identifies the professional experience by number of years.

**Survey Participants
by Region**

■ Number of Participants

International	27
Southern Region	68
West	121
Northeastern Region	135

Which, if any, of the following certifications do you hold?

The comment area included additional job classifications such as damage assessment, crew leader, team scout, incident commander, certified forester, restoration team member, lineman, lodging coordinator, researcher, emergency operations center manager, communications coordinator, public information officer, strike team, and zone manager and tree safety.
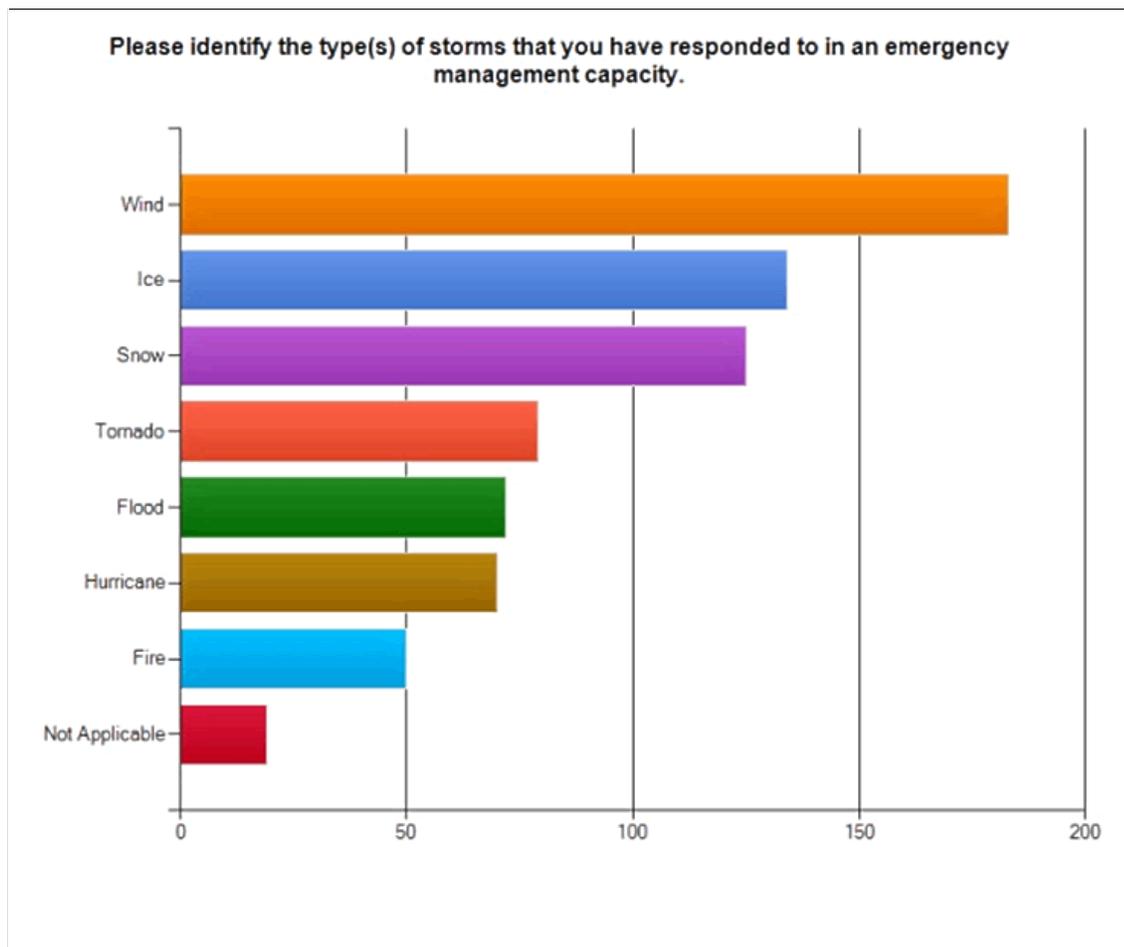
By industry, the majority of responders represented city government, public and local in scope, electric utilities, and private industry.

Storms

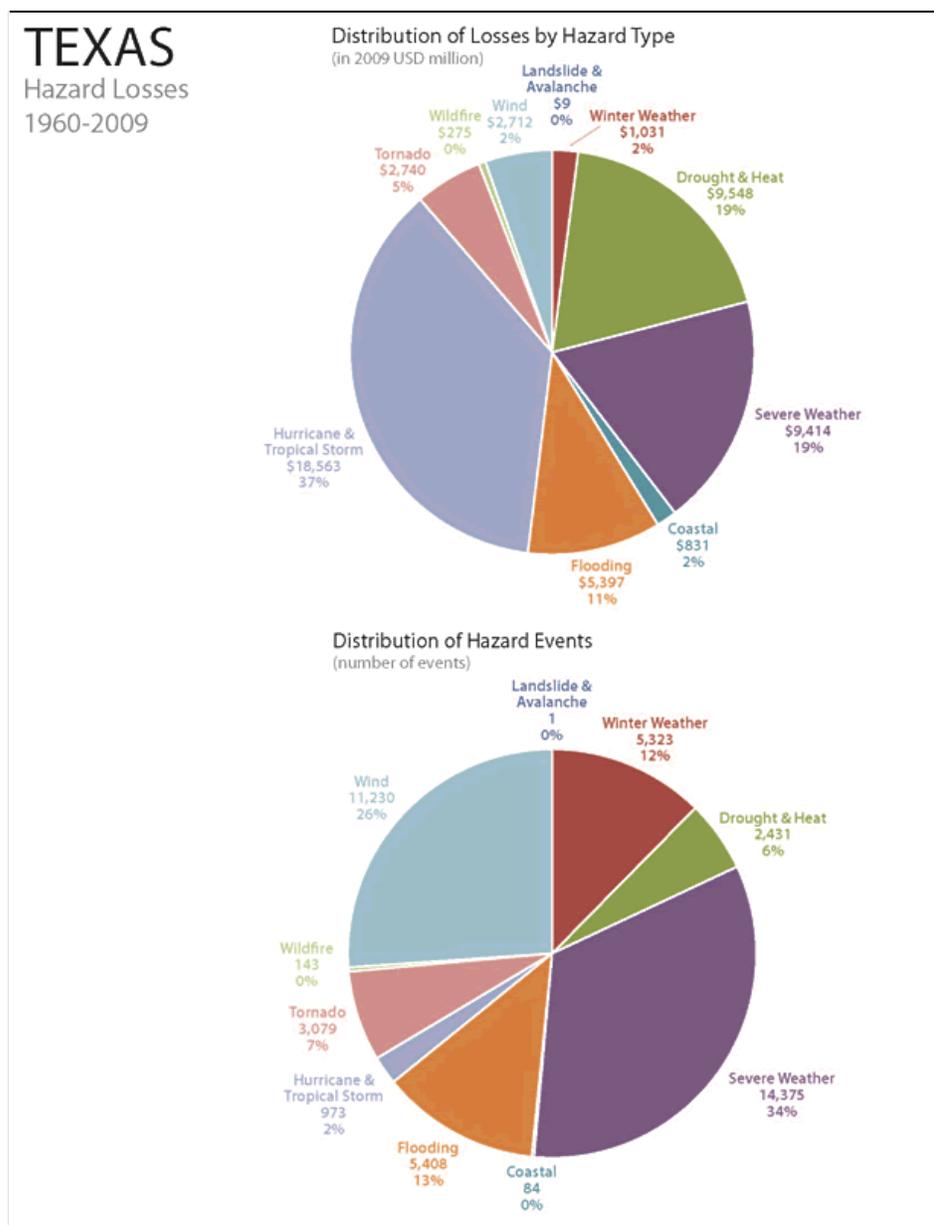Wind events were responded to far more frequently than any other type of storm.

Reported responses per event in days ranged from 1.6 to 43.71 days, with the longest response taking 790 days.

> Be aware that infrequent storms may carry a heavy price tag. You never know when a seemingly small storm may escalate into a financial doomsday.

Please identify the type(s) of storms that you have responded to in an emergency management capacity.

As a side note regarding storms

In a 2011 article called, "*The Unsustainable Trend of Natural Hazard Losses in the United States,*" Melanie Gall charted the monetary losses from natural hazards from 1960 to 2009 as being in the billions. Hurricanes were the costliest followed by flooding and coastal hazards, severe weather, geological, heat and drought, winter weather, wildfire, and landslides and avalanches.

See a sample chart below for an example of hazard losses by number of events as compared to the dollar cost. [4]

TEXAS
Hazard Losses
1960-2009

Distribution of Losses by Hazard Type
(in 2009 USD million)

- Landslide & Avalanche $9 0%
- Wind $2,712 2%
- Winter Weather $1,031 2%
- Wildfire $275 0%
- Tornado $2,740 5%
- Drought & Heat $9,548 19%
- Severe Weather $9,414 19%
- Hurricane & Tropical Storm $18,563 37%
- Coastal $831 2%
- Flooding $5,397 11%

Distribution of Hazard Events
(number of events)

- Landslide & Avalanche 1 0%
- Winter Weather 5,323 12%
- Wind 11,230 26%
- Drought & Heat 2,431 6%
- Wildfire 143 0%
- Tornado 3,079 7%
- Severe Weather 14,375 34%
- Hurricane & Tropical Storm 973 2%
- Flooding 5,408 13%
- Coastal 84 0%

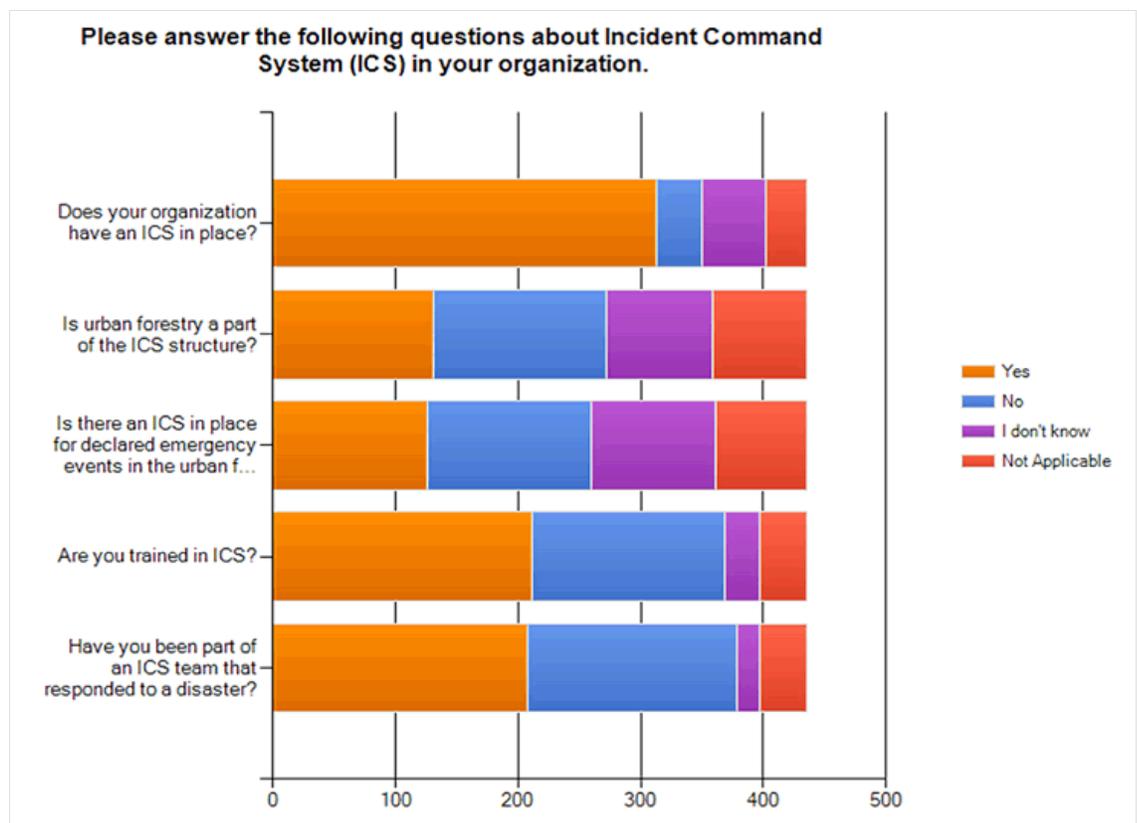# Reported Current State of Preparedness

Responders reported moderate to very good preparation for nine of the 16 options listed below. Those areas with less preparation include:

- **Community profile and hazard analysis.**
- **Inventory of trees in a community.**
- **Post-storm urban forest restoration planning.**
- **Debris management plans.**
- **A tool to estimate debris.**
- **Debris removal contracts.**
- **Debris disposal options.**

No.	Option	Very Good - Good Preparation	Less Preparation - No Preparation
1	Pre-disaster planning	X	
2.	Community profile and hazard analysis		X
3.	Key leadership and staff position descriptions	X	
4.	Process for collecting information about storms	X	
5.	Process for reporting and sharing information	X	
6.	Administrative, financial and logistics roles	X	
7.	Training activities and exercises	X	
8.	Current inventory of trees in the community		X
9.	Post storm urban forest restoration plan		X
10.	Debris management plan		X
11.	Tool to estimate the amount of vegetative debris		X
12.	Debris removal contracts in place		X
13.	Debris disposal options identified		X
14.	Safety protocols in place	X	
15.	Mutual aid agreements in place	X	
16.	Incident command system for storm response in place	X	

Incident Command System (ICS)

Five questions were asked about the presence of ICS in an organization.

Findings: While ICS is in place within an organization, the reported results indicate that urban forestry is not part of the ICS structure and is not in place for a declared emergency in the urban forest. The training in ICS and participation on a team responses were nearly equal yes and no's.

Partnerships

The survey indicated that electric utility companies, municipal government, and private and state organizations are the most important partnerships when planning, responding to and recovering from a storm.

In the comment section additional partners identified were: state emergency services, tree contractors, tree crews, National Guard, and contracted weather forecasters.
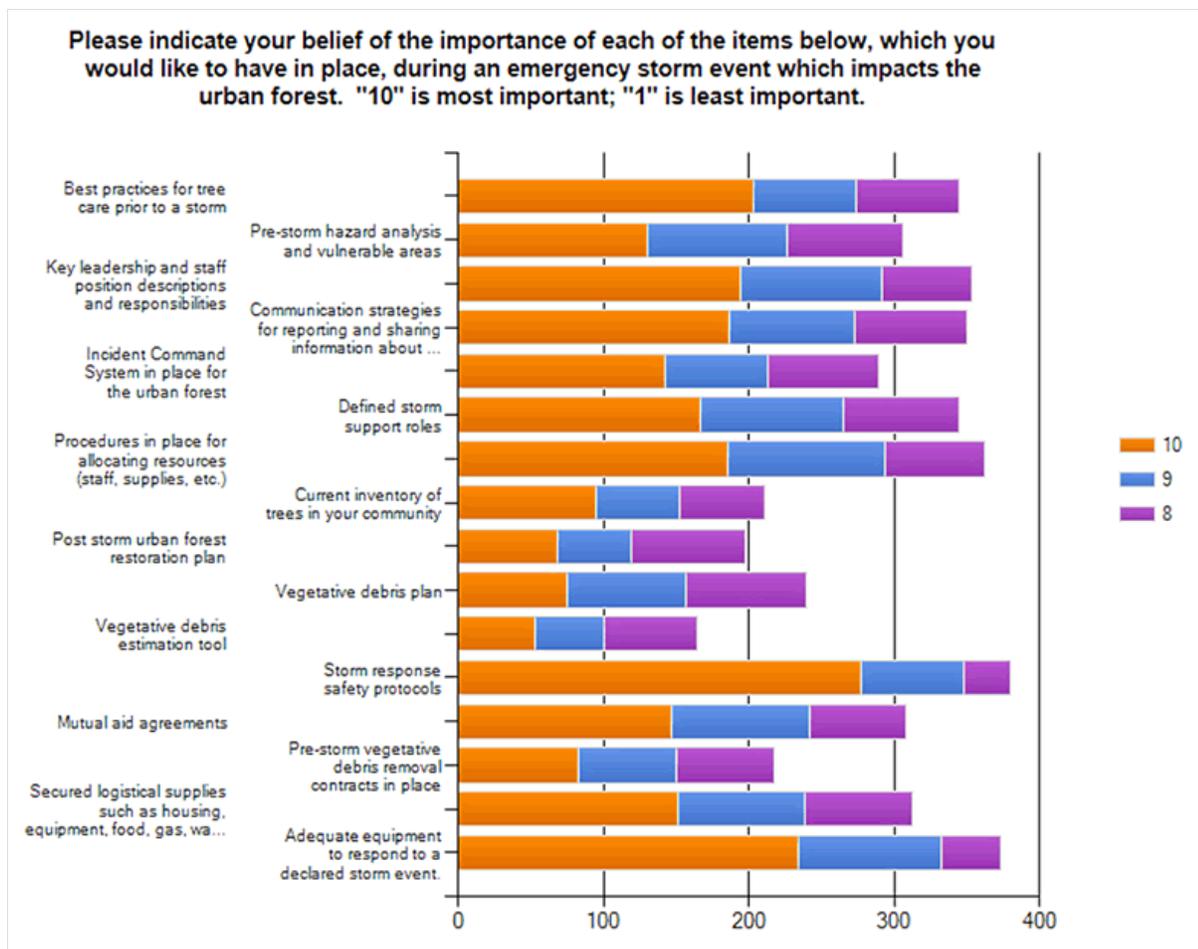
What needs to be in place?

Respondents were asked to rank the importance of 16 items that could be in place during an emergency storm in the urban forest.

The six highest priorities identified in terms of importance are:

1. **Safety protocols.**
2. **Adequate equipment to respond to a declared storm event.**
3. **Procedures for allocating resources (staff, supplies, etc.).**
4. **Key leadership and staff position descriptions and responsibilities.**
5. **Communication strategies for responding and sharing information.**
6. **Best practices for tree care prior to a storm.**

The responses are charted below.

Based on the reported response storm response in the urban forest is a concern. While the data suggests a favorable picture of storm preparedness interviews painted a slightly different picture. A summary of the interview methodology, and conclusion follows.

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[4] http://webra.cas.sc.edu/hvri/products/sheldus80_img/charts/total/PDF/Texas.pdf

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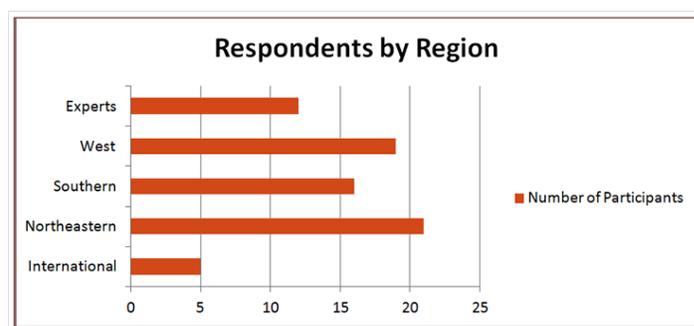
The Interviews

Methodology:

A survey question asked if the team could follow up with an interview. Two hundred survey respondents agreed. Individual emails were sent to schedule one-hour interviews. A team of two conducted the interviews, took notes, recorded the interviews and sent a link for photos and documents.

Between May 1 and August 15, 2011 seventy interviews were completed. The responders came from a variety of industries including municipal, utility, and private organizations, and small and large cities.

The interviews provided an opportunity to understand the issues. What topic areas were of most concern? What did the industry want in a document? What were their recommendations for others in the industry? Where should efforts be focused?

Of particular concern was the growing number of municipalities and cities without forestry departments or certified arborists. Many communities do not have up-to-date inventories, contracts or mutual aid agreements in place, and urban forestry is not part of ICS. The most interesting observation was the fate of small communities. As one contractor stated, "They are at the bottom of the barrel in terms of response."

Respondents by Region — bar chart showing Number of Participants: Experts, West, Southern, Northeastern, International.

Broad recommendations from the interviews:

- **Trees are the common resource among everyone and can impact your life.**

- **See the big picture.**

- **Work, plan and think safety.**

- **Know what to expect when a big storm hits.**

- **Focus on exactly what you need to have in place and from whom.**

- **The more you train and plan for disasters the less you bleed in battle.**

- **Utilize the expertise of the industry, and don't reinvent the wheel.**

- **Know how to inform the public about the storm in the urban forest.**

- **Understand your trees. Know the scope of what you are dealing with.**

- **Work more effectively and efficiently in changing unpredictable circumstances.**

Conclusion:

Urban forestry emergency managers need to be at the table when decisions are being made about the management, selection, planting and storm preparedness for trees in their community.

Without the interviews a complete picture of storm readiness would not have been understood. Discussions were essential to the creation of the guide.

Analyzing the comments and recommendations, identifying topics in terms of relative importance and the number of times topics were discussed or recommended provided the basis for the selection of the guide components.

The guide components include:

- **Planning**

- **Safety**

- **Communications**

- **Contracts**

- **Hazards and vulnerabilities**

- **Incident Command System**

- **Inventory**

- **Mutual aid agreements**

- **Trainings and drills**

- **Vegetative debris**

Urban forestry emergency managers need to be at the table when decisions are being made about the management, selection, planting and storm preparedness for trees in their community.

Our industry experts suggested the guide can be the basis and foundation for an Urban Forestry Storm Response BMP.

The wealth of information and quotes extrapolated from the interviews provided data that is used throughout the guide.

Urban Forestry Emergency Operations Planning Guide

Section 2: The EOP Process

- Introduction
- The Survey
- The Interviews
- Experts Meeting
- Conclusion
- Special Thanks

Meeting of Experts

A team of industry experts met on May 3, 2012 following the Western Chapter of ISA conference to review the document.

The goals of the meeting were to ensure the guide was sufficient, scalable, and user friendly; gaps were addressed; and next steps were identified.

Participants

- Colleen Carroll, NatureTalks, HI
- Stephen Cieslewicz, CN Utility Consulting, CA
- Dave Dockter, City of Palo Alto, CA
- Kevin Eckert, Arbor Global, Smart Trees Pacific, HI
- Bill Heriford, Davey Tree Surgery Company, CA
- Sandy Macias, USDA Forest Service, Pacific Southwest Region, CA
- Gordon Mann, Mann Made Resources, CA
- Mark Mead, City of Seattle, WA
- Jack McCabe, Davey Resource Group, CA
- Teresa Trueman-Madriaga, Smart Trees Pacific, HI
- Alan Yue, Facilitator, Premier Network System, CA

Recommendations

The experts made specific recommendations for the guide. Their recommendations included:

1. Urban forestry emergency managers need to be at the table when decisions are being made about the management, selection, planting and storm preparedness for trees in their community.
2. An appropriate effective safety program must be developed to properly address safety issues during and immediately following a storm event.
3. Planning will help an organization mitigate, respond to, and recover from a natural disaster in a timely and cost effective manner.
4. A strong communications plan must be developed to communicate within and outside the department, company and/or municipality.
5. Contracts ensure adequate support with sufficient personnel, proper equipment, and adequate qualifications to address storm conditions.
6. Mutual Aid Agreements (MAAs)allow for the procurement of resources when needed. Urban forestry should be included in the mutual aid agreements that are made by the municipality. Additionally urban foresters need to be at the table when municipalities/cities negotiate MAAs.
7. If you manage or are responsible for trees in the urban forest you must have a seat at the ICS table during planning, exercise, and response; not just after the fact.
8. Have an inventory of trees in your community. Know what you have and for what you are responsible. To effectively manage and address tree related damage you have to know the tree's composition, location, and condition.

9. Training ensures competent personnel who can safely and cost effectively prepare for, reduce risk and damage, and respond to tree related problems resulting from natural disaster events.
10. Natural disasters can generate exceptionally large volumes of debris containing trees, toxic materials and other waste. All urban forestry managers must be prepared to cost effectively manage vegetative debris.
11. Have an understanding of predicted weather events and patterns and consider more recent extreme weather events and how they can impact your community. This will help organizations prepare for and respond to a storm event.

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**URBAN FORESTRY
EMERGENCY OPERATIONS PLANNING GUIDE
FOR STORM RESPONSE –THE PROCESS**

Conclusion

The results of this study illustrated a need for an urban forestry emergency operations planning guide for storm response. No organization or municipality has the luxury of working and responding to storms independently. Collaboration is the key.

This project is unique due to its participation of experts who provided:

- **Support for the development and launch of the survey.**
- **Informative discussions about storm readiness through interviews.**
- **Expert review of the document based on a working knowledge of storm response.**

Our team hopes that the reader finds this guide useful in planning and preparing your community's response to storms. We believe that a well thought out and tested storm preparedness protocol is essential in this era of increasing storms across the urban forest.

Next Steps

1. Develop an urban forestry storm response BMP for utilities and municipalities.

- Initiate joint discussions between professional associations (for example, ISA, UAA and SMA) to facilitate mutual collaborations.
- Work with a team of experts to develop the BMP.
- Develop an urban forestry ICS.

2. Communicate and promote the BMP.

3. Implement the BMP.

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Special Thanks

This guide is possible because of the time, talent and support of a number of people who believe in the value of telling the story of storm response in the urban forest. Their involvement ensures key concepts and elements are included in the guide so others can learn from their experiences.

Lessons learned from the storm preparedness survey, the interviews, and the meeting of experts resulted in the "Urban Forestry Emergency Operations Planning Guide" for storm response.

Interviews May 1 – August 15, 2011

Northeastern

- Keith Cline, *Washington, DC*
- Nancy Stremple, *Washington, DC*
- Kurt Elsesser, *Illinois*
- Carlos Garcia, *Illinois*
- Chris Johnson, *Iowa*
- Thomas Hoerth, *Maine*
- Walter Dodge, *Massachusetts*
- Anne-Marie Moran, *Massachusetts*
- Paul Sellers, *Massachusetts*
- Nick Kuhn, *Missouri*
- Ray Wallace, *Missouri*
- Glenn Gentzke, *New York*
- James Maloney, *New York*
- Daniel Rohe, *New York*
- David Bienemann, *Ohio*
- Brad Bonham, *Ohio*
- David Gamstetter, *Ohio*
- Sue Mottl, *Ohio*
- Thomas Munn, *Ohio*
- Charles Owen, *Ohio*
- Jim Orr, *Pennsylvania*
- Brian Satterlee, *Rhode Island*
- Bertram Stewart, *Vermont*

Western

- Michael Neal, *Arizona*
- Ken Vonderscher, *Arizona*
- Terry Dougan, *Arkansas*
- Larry Abernathy, *California*
- Sam Gonzales, *California*
- George Gonzalez, *California*
- Gordon Mann, *California*
- Jack McCabe, *California*
- Suzanne Remien, *California*
- Peter Severynen, *California*
- Robert Tate, *California*
- Tony Wolcott, *California*
- Kevin Eckert, *Hawai`i*
- Steve Nimz, *Hawai`i*
- Tom Wells, *Colorado*
- Barbara Priest, *Oregon*
- Cynthia Orlando, *Oregon*
- Paul Ries, *Oregon*
- Dave Van Bossuyt, *Oregon*
- Alan Haywood, *Washington*
- Duane Northrup, *Washington*
- Andrew Stenbeck, *Washington*

Southern

- Dudley Hartel, Georgia
- Eric Kuehler, Georgia
- Rob Allen, Kentucky
- Peter Barber, Kentucky
- Sarah Gracey, Kentucky
- Jenny Gulick,Kentucky
- Ray Wallace, Missouri
- Louis Ehinger, South Carolina
- Alan Moore, North Carolina
- Eric Muecke, North Carolina
- Tom Rapp, South Carolina
- Gene Hyde, Tennessee
- Melinda Adams, Texas
- Jim Carse, Texas
- Keith Martin, Texas
- Frank Fentress, Virginia
- Blake Shores, Virginia

International

- John Ho, *Hong Kong*
- Frederick Janes, *NSW, Australia*
- Derek Lynn, *Victoria, Australia*
- Alberto de Sousa, *Brazil*
- Gordon White, *Alberta, Canada*

Meeting of Experts May 3, 2012

- Colleen Carroll, *NatureTalks, HI*
- Stephen Cieslewicz, *CN Utility Consulting, CA*
- Dave Dockter, *City of Palo Alto, CA*
- Kevin Eckert, *Arbor Global, HI*
- Bill Heriford, *Davey Tree Surgery Company, CA*
- Sandy Macias, *USDA Forest Service, Pacific Southwest Region, CA*
- Gordon Mann, *Mann Made Resources, CA*
- Jack McCabe, *Davey Resource Group, CA*
- Mark Mead, *City of Seattle, WA*
- Teresa Trueman-Madriaga, *Smart Trees Pacific, HI*
- Alan Yue, *Premier Network System, CA*

Review of Document August – December 2012

- Colleen Carroll, *NatureTalks, HI*
- Kevin Eckert, *Arbor Global, HI*
- Dudley Hartel, *USDA Forest Service, GA*
- James Maloney, *National Grid, NY*
- Cynthia Orlando, *Oregon Department of Forestry, OR*
- Paul Ries, *Oregon Department of Forestry, OR*
- Mary Steiner, *Consulting Service, HI*
- John Sullivan, *Lewis Tree Company, NY*