Introduction to Storm Preparedness and Response and Minimizing Risk and Damage

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Storms Over the Urban Forest: Storm Mitigation, Planning, Response and Recovery Focusing on Urban Trees

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Storm Response … A Three Act Play

Act I:  The Problem … Storms and Trees

Act II:  Storm Preparedness and Response

Act III: Minimizing Risk and Damage

http://www.uwsp.edu/cnr/faculty/hauer/index.htm
or Google Hauer UWSP

Safety
Cleanup
Repair
Overtime

Act One:
Weather, Storms and the Urban Forest

Outcomes
Acute or
Chronic

Short-term or
Residual

• Types
  – Flooods
  – Moisture Stress/Drought
  – Ice Storms
  – Tornadoes
  – Lightening
  – Hurricanes
  – Nor'easter
  – Straight-line Winds
  – Forest Fires

• When and how often?
March 29, 1999 St. Peter, MN Storm

The Urban Forest is

Dynamic and Devastation is Part of This

Recovery from St. Peter Tornado

People want to Help

Sometimes Help can Overwhelm

Storm Damage Preparedness

Now is not the time to start planning!

Now is the time for recovery and returning order
Ideally in Advance of Storms: An Integrated Approach

What we Know From Tree Risk Management:
1) Divide the community into tree risk zones
2) Tree failure is often predictable and preventable

The Disaster Cycle
1) Mitigation: activities to reduce the effects of disasters
2) Preparedness: plan a response prior to disaster
3) Response: activities during a disaster to minimize hazards in effective, efficient, and equitable ways
4) Recovery: returning to normal following a disaster

Disaster Cycle: Mitigation
- Tree Selection and Placement
- Tree Establishment
- Tree Maintenance
- Regular Tree Risk Assessment

Disaster Cycle: Preparedness
- **Staff Liaison/POC**: knows ICS; trained to assess tree damage
- **Tree Emergency Response Plan**: guide before and after storm (prevention, clean-up, regulations, salvage/repair, replanting, mobilization agreements for people and equipment)
- **Plan Coordination**: assign responsibility, avoid conflicts
- **Update Plan**: periodic evaluation (annually), contracts, contacts, and changes
- **Provide Training**: what to do, who does it, when to do it

Disaster Cycle: Response
- **Locate** and Consult Emergency Plans, Debris Removal Plan, and Contact Lists
- **Identify** Live Electric Wires (in, on, or under trees)
- **Implement** Response Phase Triage
  - Response I – Debris clearance
  - Response II – Debris removal and disposal
Disaster Cycle: Response:  
**Phase I – Debris clearance**

- Clear priority traffic lanes and culverts
- Push debris to the side
- Clear at least one lane ASAP
- Clear major walkways

**Survey of Immediate Threats**

- **Highest Priority Action**
  - Removal (e.g., uprooted, split in half, undermined)
  - Pruning (e.g., >= 2” hanging, broken, or cracked)

- **Targets Near Trees**
  - Buildings, sidewalks, roads
  - Electric wires, other important structure

- **Hire Professionals**
  - Standards (ANSI A300)
  - Verify before you pay

Disaster Cycle: Response:  
**Phase II Debris removal and disposal**

- Establish routes and methods for clearing tree debris. (hopefully set up before the disaster; if not, try adopting routes used for trash pickup or snow removal)
- Use staging areas if needed (malls, playgrounds, etc.), then clear those after things calm down.
- Debris removal typically most difficult tree disaster problem for communities and individuals.
- In general, removal of debris from public property is eligible for FEMA assistance when a Federal Disaster has been declared and when it constitutes an immediate threat to life, public safety, or improved property.

Disaster Cycle: Response:  
**Communication**

- **Basic Point:** communication is critical with disasters.
  - actively manage information
  - things can quickly get out of hand

- **Set up:** clear communication channels among emergency agencies and personnel.

- **Establish and publicize:** a phone number and staff person for public contact.

- **Media:** Work with the media early and often.

- **Deliver:** important messages to the community

Disaster Cycle: Recovery

- **Tree by Tree Assessment for Hazards**
- **Prioritize Repair** (tree data, location, other)
- **Update Tree Inventory**

- **Continue to Keep Records for Assistance**
  - Dates, personnel, job, equipment, location, and hours.
  - Consult FEMA forms and requirements ([http://www.fema.gov](http://www.fema.gov))

- **Reforest when the time is right**
What are the Safety Issues

Why is Safety Important?
Opps

Act III

Mitigation: Minimizing Risk and Damage

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Trees and Targets

What are the Signs of Potential Failure?

A Lesson in Physics and Safety
Storm Damage Prevention critical to public safety, similar in importance to other essential public services such as:

- Traffic light maintenance
- Roadway construction & repair
- Sewage disposal
- Clean drinking water

History Suggests … Storms Will Occur Damage to Property and Public Safety are Often Very High

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

Most common pre-existing defects:

- Decay
- Weak branch unions
- Codominant leaders
- Stem girdling roots

Minnesota Case Study (Gary Johnson, U of Minnesota)

Prioritizing “Levels of Risk”

- Some need “immediate” attention
- Some placed on the “back burner”
- Some regarded as “acceptable,” e.g.,

Pot Holes
Uneven Sidewalks
Bridges

Levels of Risk Can be Assessed

Defect Categories
- Decay
- Cracks
- Root Problems
- Weak Branch Unions
- Cankers
- Poor Tree Architecture
- Dead Trees, top branches

Systematic Approach

- Observe
- Monitor
- Evaluate
- Prioritize
- Take Action
Monitor for Indicators: Decay

Monitor for Indicators: Poor Branch Attachments

Monitor for Indicators:
Site condition changes, such as root loss

Monitor for Indicators: Exposure to Wind

Treatment Options:

• Move the Target
• Treat the Tree
• Convert to Wildlife Tree
• Close the Site
• Remove the Tree

Treatment Options: Move the Target
Treatment Options: Treat the Tree

Modern Advancements in Arboriculture

Treatment Options:

- **Close the site**: often not practical in urban settings
- **Remove the tree**: often an emotional decision

Basal Pruning Gone Bad

Treatment Options:

- **Remove the tree**: 99% of the job is removal

Basal Pruning a Hazardous Situation …

- **Convert to a “Wildlife Tree”**: … remember to reduce the tree risk
Design and Planning:

- Minimize Utility Conflicts

Design and Planning:

- Provide adequate space

Design and Planning: Site Selection

Minimize Construction Damage

Design and Planning:

Damaging Factors with Street and Sidewalk Repair

- Grade Change (Fill and Removal)
- Soil Compaction
- pH alteration
- Root Severing
- Trunk and Branch Wounding
- Hydrology Changes

Street Reconstruction on Tree Survival

Table 3. Percentage survival of trees subjected to construction or no construction (control) since 1989 and after implementation of construction damage minimization program.

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<tbody>
<tr>
<td>Construction</td>
<td>168</td>
<td>136</td>
<td>81.0</td>
<td>77.3</td>
</tr>
<tr>
<td>Control</td>
<td>502</td>
<td>407</td>
<td>81.1</td>
<td>81.4</td>
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Figure 1. Condition rating of street trees subjected to construction damage during street, curb, and sidewalk repair and undamaged control trees. (Bars are Std. Error of Mean)

Mike Eskew, Chairman and CEO, UPS

“What you do is noble.
You make business better.
You make communities better.
You bring order to chaos.”

The End!