

USDA Forest Service

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# TREE RISK ASSESSMENT FOR MUNICIPALITIES



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# An Introduction to Tree Risk Assessment For Municipal Officials

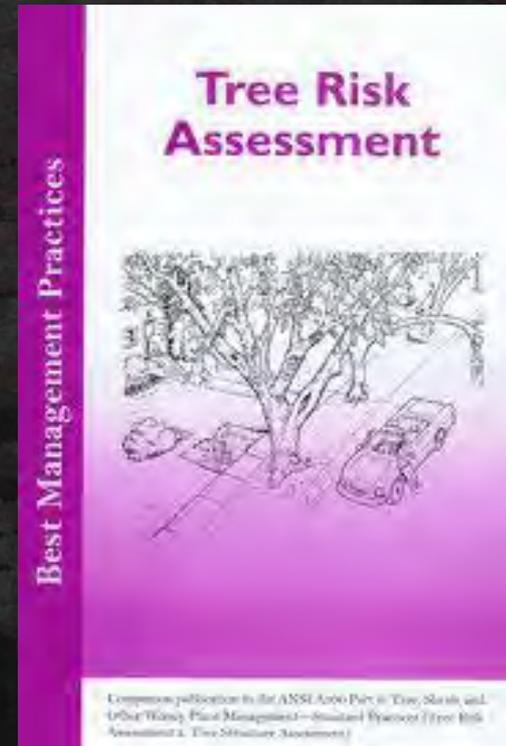
# Overview of this presentation

- **Tree Risk Assessment** – the systematic process to identify, analyze, and evaluate tree risk (the tree level)
- **Tree Risk Management** – the application of policies, procedures, and practices used to identify, evaluate, mitigate, monitor, and communicate tree risk at a broader scale (the urban forest level)
- *This presentation is supported in part by the USDA Forest Service*



# Transitioning from Hazard Tree Evaluation to Tree Risk Assessment

- Tree Risk Assessment: Best Management Practices Guide – a new publication from ISA - the International Society of Arboriculture
- We must evaluate both the hazardous condition that a tree represents, and the risk that it presents



# Facets of this issue...

Tree Risk  
Assessment

- Technical
- Biological
- Physical
- Managerial
- Political/Legal

Tree Risk  
Management

- Emotional
- Economic/  
Financial



# Tree Risk Assessment Terms

- **Hazard** – a likely source of harm
- **Risk** – the likelihood of an event and the possible consequences
- **Target** – people or property that could be injured or damaged
- **Tree Risk** – is evaluating by categorizing or quantifying both the **likelihood** of occurrence and the **severity** of the consequence

# People involved in tree risk assessment and management

## Tree Risk Manager

- Duty of care responsibility
- Defines tree risk policies
- Establishes budget
- Determines priority
- Decides the level of acceptable risk
- Chooses among mitigation options

## Tree Risk Assessor

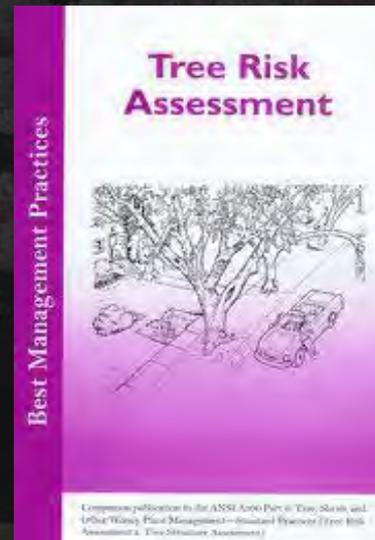
- Identifies tree and site conditions to inspect
- Evaluates and classifies the likelihood of failure
- Estimates the consequences of tree hitting a target
- Determines options for treatment or mitigation

# Quantitative Risk Assessment

- Risk = Probability X Consequences
- Since “hazardness” and “riskiness” are relative terms, we can NOT say if a tree is a hazard or a risk, but we can say that one tree is more hazardous or more of a risk than another
- Probability is hard to quantify for trees because they are natural structures, which is what makes this process difficult

# The New ISA BMP Method

- Matrix-based qualitative approach
- Understand the limitations of whatever method you use
- Recognize the uncertainty associated with our limited ability to predict natural processes, weather events, and target behavior



# Tree Risk Assessment Levels

- Limited – Visual assessment (inspection)
- Basic – Visual Tree Assessment (VTA)
- Advanced – Internal and/or below ground detection



# Limited Risk Assessment

- Walk-by or drive-by
- Identifies candidates for further assessment
- Records locations that meet certain criteria
- Useful for after storms or other events that introduce change into the urban forest



# Basic Risk Assessment

- VTA – Visual Tree Assessment
- Ground level – complete review of tree and site
- Hand tools – binoculars, mallet, probe, shovel
- Assess tree health and target
- Record observations of conditions and defects
- Determine if advanced assessment is necessary
- Recommend treatment or mitigation options

# Advanced Risk Assessment

- Provides detailed information about specific tree parts, defects, targets, or site conditions
- May involve aerial, internal, or below ground assessment
- May require specialized skill or equipment



# Assessing and evaluating potential targets

- People or property damaged or disrupted
- Target Zone
- Occupancy Rate



# The impact of wind and weather

- Most tree failures occur during wind or weather events when loads (force) exceed the capacity of trees to withstand the loading
- Tree failures in the absence of wind or weather events are usually associated with serious uncorrected structural defects or conditions



# Categorizing Tree Risk

## Likelihood of Failure

- Improbable
- Possible
- Probable
- Imminent

## Likelihood of Impacting a Target

- Very Low
- Low
- Medium
- High

## Consequences of Failure

- Negligible
- Minor
- Significant
- Severe

## Likelihood of Failure and Impact

- Very likely
- Likely
- Somewhat likely
- Unlikely

**Table 1: Matrix used to estimate the likelihood of a tree failure impacting a specified target (ISA Tree Risk Assessment, pg 34)**

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat Likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat Likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat Likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

**Table 2: Risk rating matrix showing the level of risk as the combination of likelihood of a tree falling and impacting a specified target, and the severity of associated consequences (ISA Tree Risk Assessment, pg 39)**

Likelihood of Failure and Impact	Consequences			
	Negligible	Minor	Significant	Severe
<b>Very Likely</b>	Low	Moderate	High	Extreme
<b>Likely</b>	Low	Moderate	High	High
<b>Somewhat Likely</b>	Low	Low	Moderate	Moderate
<b>Unlikely</b>	Low	Low	Low	Low

# Tree Risk Assessment and Management is about more than trees...

- It is about protecting people and property, about risk, liability, money, and safety
- Tree risk assessment helps us understand the biological and physical aspects of the tree and the site, combined with the realities of a target
- Tree risk management encompasses not only the biological and physical aspects of the tree, but the legal, political, and emotional aspects as well
- The questions cities must ask: how much risk is acceptable?

# Elements of Tree Risk Management Program

- Evaluation/Assessment
- Policy
- Plan
- Evaluation



# Tree Risk Evaluation/Assessment

- Inventory trees
- Identify priorities
- Establish procedures



# Tree Risk Policy

- Your city's tree policies need to be technically sound, financially feasible, written down, legally approved, and most of all....defensible
- How much risk can a city assume?
- Cost of prevention rarely exceeds the cost of repair



# Tree Risk Management Plan

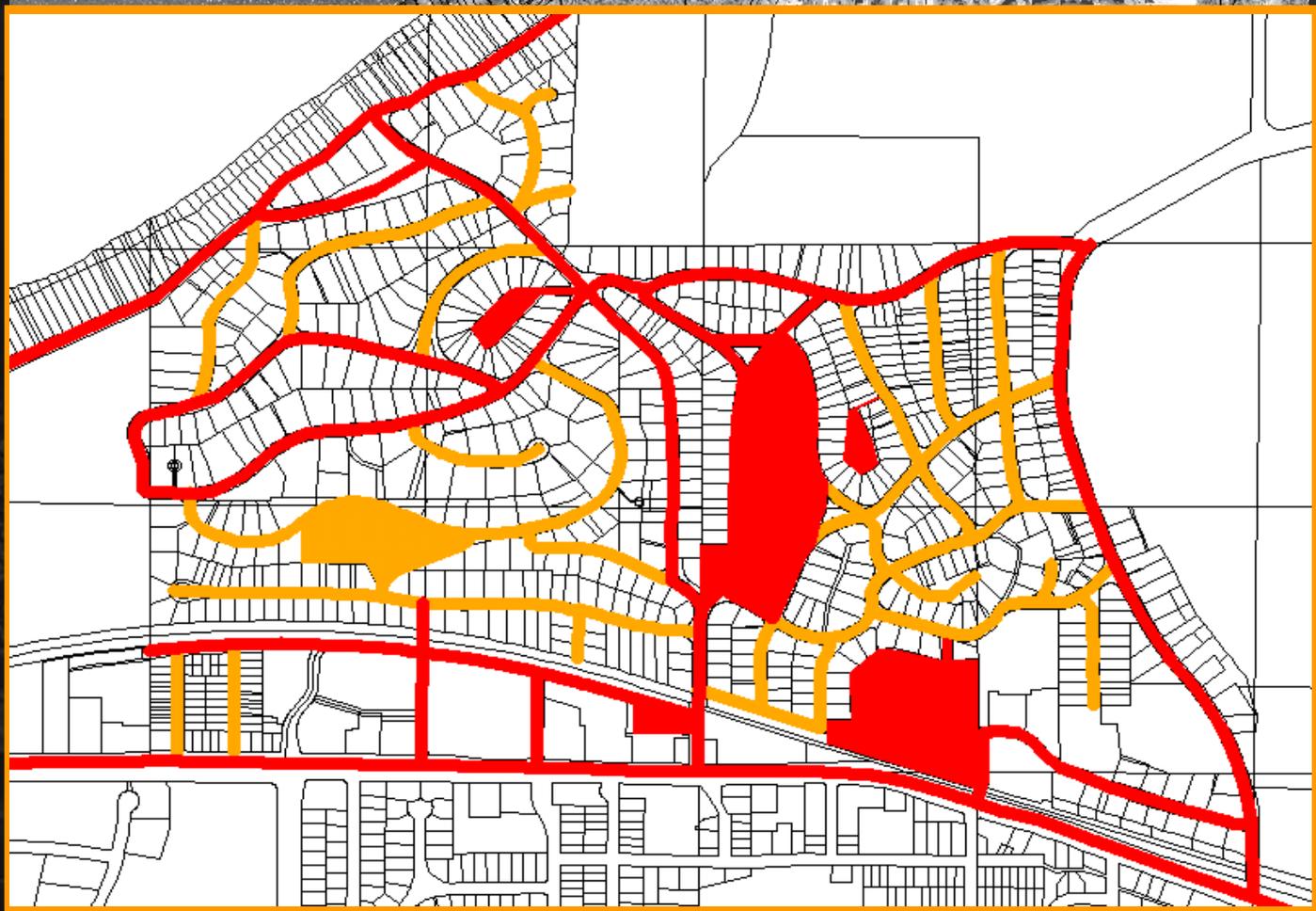
- Could be a part of your city's overall urban forestry plan
- Could be an element of a broader risk management plan
- Should be consistent with policies



# Elements of a Municipal Tree Risk Management Plan

- Tree Risk Policy Statement
- Resource Assessment
- Goals
- Action Plan/Outcomes
- Risk Zone Map
- Tree Failure Log
- Annual Risk Working Group Meeting
- Staff Training Log

# Tree Risk Management Plan Risk Zone Map



Map Credits: Village of Shorewood Hills, 2003, via Mark Duntemann

# Evaluation

- Plans collect dust rather quickly
- Your policies and plans should be regularly revisited and updated
- The processes are as important as the policies and plans



# Summary

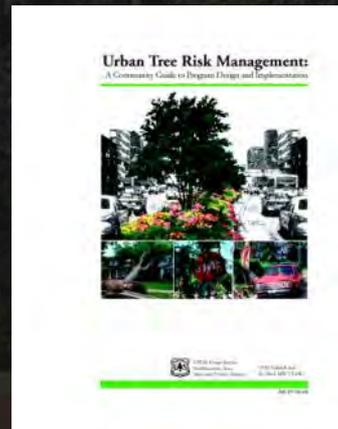
- You can't save every tree any more than you can cut every one down
- Your city can not afford to ignore risks
- Seek assistance from your state urban forestry program



# Further Reading

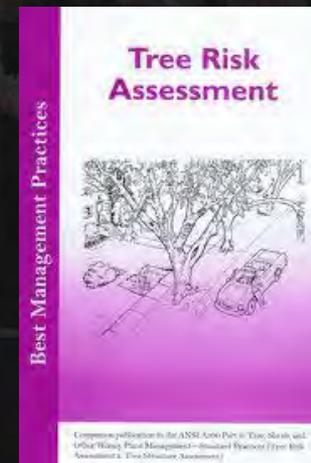
## Urban Tree Risk Management: A Community Guide to Program Design and Implementation

- Available online from the USDA Forest Service
- <http://www.na.fs.fed.us/spfo/pubs/uf/utmmm/>



## Tree Risk Assessment: Best Management Practices Guide

- Available from the ISA
- [www.isa-arbor.com](http://www.isa-arbor.com)
- \$15 - \$20



# A healthy urban forest is a safe one...

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