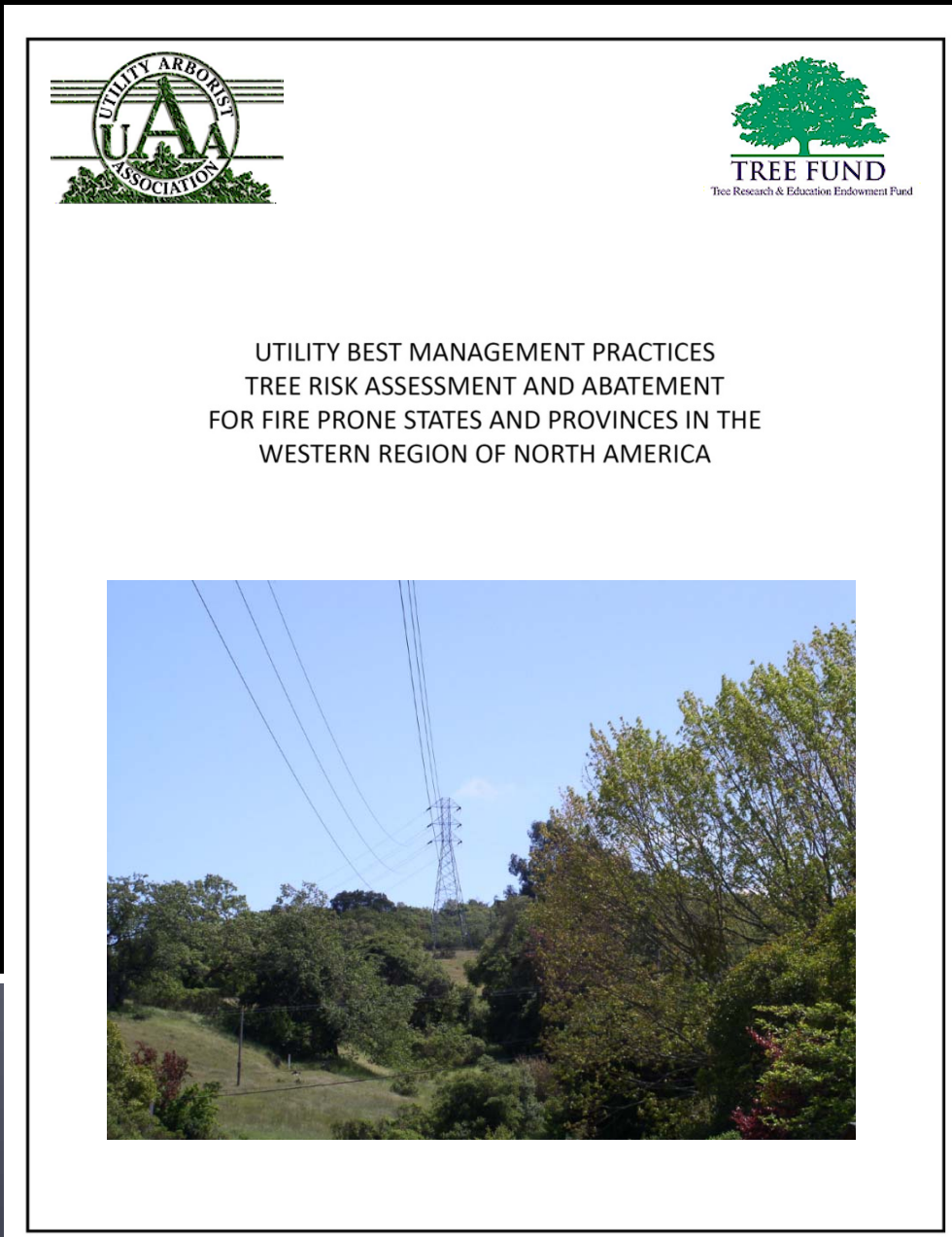
Utility Best Management Practices

The Tree Risk Assessment and Abatement BMP



Background

- Hazard trees represent a significant liability to the general public, cities, counties, utilities, and State and Federal agencies
- Unmanaged hazard trees can cause personal injuries and fatalities, damage to public and private property, power outages, and threats to the nation's critical infrastructure
- The Utility Arborist Association found that there was a need for industry accepted procedures to identify hazard trees during power line patrols

Objectives

- This BMP is intended to be an industry and stakeholder accepted protocol for identifying individual trees located within a large population of trees, which should be examined more closely to assess their potential risk
- The application of this BMP is intended for the fire-prone states and provinces in the western region of North America
- The long-term goal is to produce a national or international set of guidelines that could be adapted to meet local or regional conditions

Development Process

- At the direction of the UAA, a Hazard Tree Identification Protocol working group was assembled
- The group included representation from various stakeholder groups
- The working group convened two workshops and communicated regularly during the development of these BMPs
- Sub-committees were established to address various issues that were identified during the workshops and in subsequent communications
- A review committee was also established to evaluate and provide input on these BMPs

Stakeholders

- American Society of Consulting Arborists
- Arizona State Forestry Division
- Cal Fire
- California Board of Forestry
- California Fire Alliance
- California Public Utilities Commission
- Caltrans
- Edison Electric Institute
- Large Land Owners
- Municipal Forestry
- Nevada State Fire Marshal
- Oregon Office of the State Fire Marshal
- US Fish and Wildlife Services
- US Forest Service
- Utility Arborist Association
- Vendors
- Washington Office of the State Fire Marshal
- Western Utilities

Working Group

- Don Akau, San Diego Gas & Electric Co.
- Cleto Arceo, NV Energy
- Jim Clark, HortScience
- Lynn Cullen, Pacific Gas & Electric Co.
- Michael Daleo, San Diego Gas & Electric Co.
- Clark Douhan, Southern California Edison
- Larry Evans, Davey Tree Surgery Co.
- Alan Finocchio, Davey Tree Surgery Co.
- Mark Frizzell, Sacramento Municipal Utility District
- Bruce Hagen, Cal Fire
- Randy Miller, PacifiCorp
- Bob Novembri, Novembri Consulting, LLC
- Judy Perry, USDA Forest Service
- Jeff Spohn, Arizona Public Service
- David Wood, University of California
- Richard Zito, Western Environmental Consultants, Inc.

Oversight Committee

- Larry Abernathy, Davey Tree Surgery Co.
- Chip Brown, Allegheny Power
- Ken Finch, UAA Director
- Lynn Grayson, American Electric Power
- Nelsen Money, Pacific Gas & Electric Co.
- Mike Neal, Arizona Public Service Co.
- Ward Peterson, Davey Resource Group
- Daran Santi, Pacific Gas & Electric Co.
- Steve Tankersley, Pacific Gas & Electric Co.
- Bryan Taylor, Idaho Power

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Section 1: Patrols, Inspections, and Methods Used to Assess Tree Risk

Patrols, Inspections, and Methods Used to Assess Tree Risk

- Typically, each utility develops a maintenance plan that includes methods for patrolling and inspecting its electric facilities
- Methods can include patrolling from the ground, on foot or in a vehicle, or by using aircraft, whether fixed wing or helicopter, or by the use of Light Detection and Ranging (LIDAR) in combination with other methods
- Methods can vary significantly between utilities

Patrols, Inspections, and Methods Used to Assess Tree Risk

- **Patrol and Inspection Methods**
  - Patrol and inspection methods used to assess tree risk are utility and site specific
  - Each utility should have a plan in place that describes the methods used based on site specific requirements

Patrols, Inspections, and Methods Used to Assess Tree Risk

- **Line Patrol**
  - A Line Patrol is a periodic, ground-based visual assessment of trees, which can be observed from within or closely adjacent to an easement or right-of-way, in order to identify tree defects that could cause a tree, or parts of a tree, to fall directly into an Overhead High-voltage Conductor

Patrols, Inspections, and Methods Used to Assess Tree Risk

- **Detailed Line Patrol**
  - A Detailed Line Patrol is a periodic, ground-based visual assessment of trees within the strike zone, in order to identify tree defects that could cause a tree, or parts of a tree, to fall directly into an Overhead High-voltage Conductor

Patrols, Inspections, and Methods Used to Assess Tree Risk

- **Detailed Tree Inspection**
  - Close proximity, 360 degree visual inspection of an individual tree from the ground

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Section 2: Frequency of Patrols

Frequency of Patrols

- Patrol frequency varies among utilities based on individual needs, applicable laws and regulation, species, vegetation type, line voltage, and the presence of high fire risk areas

Frequency of Patrols

- **Overhead High-voltage Conductors**
  - A multi-component approach should be employed when determining the frequency of patrols for Overhead High-voltage Conductors
  - Each utility should determine their Line Patrol frequency and establish a separate Detailed Line Patrol schedule
    - For example, a Line Patrol could occur on an annual basis and a Detailed Line Patrol could occur every 3-5 years or as determined by the Line Patrol

Frequency of Patrols

- **Overhead Low-voltage Conductors**
  - Each utility should define a patrol and abatement strategy for Overhead Low-voltage Conductors (pole to pole, not pole to weatherhead), dependent on fire risk and regulatory requirements

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Section 3: Assessing Tree Risk

Assessing Tree Risk

- **Tree Defects**
  - The ability to assess tree risk and tree failure potential is a baseline requirement for any utility vegetation management program
  - Inspectors must have the ability to identify the likelihood of a tree's failure and be able to determine the appropriate abatement action

Assessing Tree Risk

- **Sites that Require Additional Consideration**
  - It may also be necessary to look at some sites in more detail due to environmental conditions, past management practices, or other human activity

Assessing Tree Risk

- **Tree Risk Assessment Procedure**
  - The inspector determines the presence, severity, and significance of a tree defect if one exists
  - The inspector considers the severity of the defect when prescribing an abatement action and prioritizes the work accordingly
  - Some utilities may require that an inspector's recommendation be reviewed by a supervisor or appropriate utility personnel

Assessing Tree Risk

- **Tree Risk Assessment Procedure**
  - The tree care contractor or utility personnel, when in the field, may make a follow-up determination of the recommended abatement action
  - It should be recognized that some recommendations for abatement treatments may be limited by legal constraints or by the property owner

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Section 4: Assessment and Abatement Plan

Assessment and Abatement Plan

- Trees that have been determined to be an unacceptable risk to high-voltage conductors during an assessment generally require some form of abatement action, whether pruning or removal
- A plan for assessment and abatement should be developed based on the varying conditions that can be encountered in the field

Assessment and Abatement Plan

- Each utility should have a plan and procedure in place for the assessment and abatement of hazard trees
- The assessment and abatement plan should address regulatory requirements, patrol schedule, severity of tree conditions, resource availability, environmental impacts, property owner and land manager concerns
- The plan should specify the party or parties responsible for prescribing and executing the abatement

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Section 5: Worker Qualifications

Worker Qualifications

- Workers that perform tree risk assessment patrols and inspections should receive adequate training, as defined by the utility, to satisfactorily perform the tasks needed to identify hazard trees and recommend abatement procedures
- At a minimum all workers performing tree risk assessments should be able to recognize tree-specific defects listed in Appendix 'A' and the site conditions listed in Appendix 'B', and understand what those conditions imply regarding abatement

Worker Qualifications

- Each utility should require that all personnel performing tree risk assessment patrols and inspections receive training specific to tree risk assessment
- It should be required that all tree risk assessment training be recorded and updated by the individual's employer

Worker Qualifications

- Each utility should define minimum qualifications necessary to perform tree risk assessment patrols and inspections
- Minimum qualification requirements should take into consideration the individual's knowledge of utility assets, arboriculture-related education and experience, industry certifications and in-house training

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Section 6: Documentation

Documentation

- Documentation and data collection related to vegetation management can vary significantly among utilities
- The process used to document hazard trees may include tagging, collecting GPS information, or the use of other means to document and track hazard trees such as in an inventory system

Documentation

- Each utility should have documentation procedures and data collection requirements for vegetation management
- The utility's existing requirements should be incorporated into their tree risk assessment and abatement plan

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Appendix ‘A’: Tree-specific Defects / Potential Triggers

Tree-specific Defects / Potential Triggers

Appendix ‘A’

Basal wound
Bleeding and/or resinosus
Bulges and/or swellings
Cankers, including bleeding & gall rust
Cavities
Codominant or multiple stems from base or higher on trunk
Conks indicating heart rot, root rot, sap rot or canker rot
Cracks including shear
Dead branches and/or top
Dieback of twigs and/or branches
Embedded wires or cables
Excessive lean or bow
Fire damage
Foliage – off-color, flagging or loss
Hazard beam

History of limb failure(s) on tree
Included bark
Insect activity such as frass from termites, bark beetles or carpenter ants
Large branches overhanging power line
Lightning damage
Live crown ratio below 30%
Mistletoe – dwarf or broad-leaf
Nesting holes – birds, mammals, insects
Past poor pruning practices
Roots injured, exposed, undermined or uplifted
Seam
Species failure patterns
Unnatural or structurally unsound canopy weight distribution
Weak, unsound branch attachments

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Appendix ‘B’: Site-specific Conditions / Potential Triggers

Site-specific Conditions / Potential Triggers

Appendix ‘B’

Areas known to be affected by introduced tree pathogens
Areas of recent clearing/new edge
Change in drainage
Change in grade
Construction – including trenching, paving or road construction
Cultural disturbance to landscape - natural or unnatural
Diseased center – dead tree in middle and dying trees around it
High stand density with single species composition
History of failure(s) at site
History of repeated outages on circuit
Fire damage
Raptor nests above lines
Recent thinning or logging
Soils prone to slides
Specific conditions like high winds
Storm damage
Wet sites

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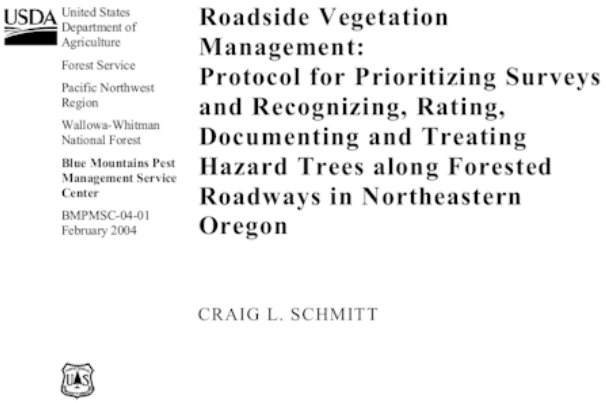
Appendix ‘C’: Training Resources

Training Resources

Appendix ‘C’



USDA United States Department of Agriculture
Forest Service
Pacific Northwest Region
Wallowa-Whitman National Forest
Blue Mountains Pest Management Service Center
BMPMSC-04-01
February 2004

Roadside Vegetation Management: Protocol for Prioritizing Surveys and Recognizing, Rating, Documenting and Treating Hazard Trees along Forested Roadways in Northeastern Oregon

CRAIG L. SCHMITT

A Field Guide to Insects & Diseases of California Oaks
A Handbook of Hazard Tree Evaluation for Utility Arborist
A New Tree Biology
A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas
ANSI A300 – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Pruning)
ANSI Z133 – Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush – Safety Requirements
California Tree Failure Report Program
Diseases & Insect Pests of Northern & Central Rock Mountain Conifers
Diseases of Pacific Coast Conifers
Evaluating Tree Defects, 2nd Edition
Field Guide for Danger Tree Identification & Response
Hazard Trees - Recognizing them before you climb
International Tree Failure Database
Manual of Pacific Coast Trees
Modern Arboriculture
Pests of the Native California Conifers
Power Line Fire Prevention Field Guide
Pruning Trees Near Electric Utility Lines
Recognizing Tree Hazards - A Photographic Guide for Homeowners
Roadside Vegetation Management: Protocol for Prioritizing Surveys & Recognizing, Rating, Documenting & Treating Hazard Trees along Forested Roadways in Northeastern Oregon
Ten Common Wood Decay Fungi on California Trees
Tree Hazards-Recognition & Reduction in Recreational Sites
Urban Tree Risk Management

Where Can I Get a Copy of the BMP?

- The Tree Risk Assessment and Abatement BMP will be available on the UAA website, exclusively for UAA Members!