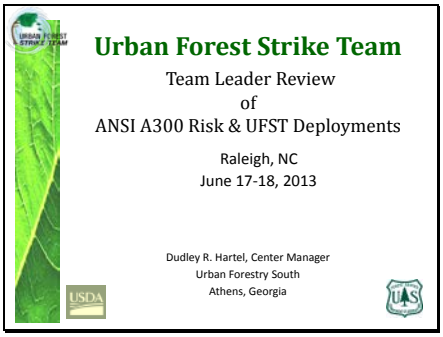
Slide 1



This is the *Tree Risk Assessment Specifications* presentation developed by the UFST Advisory Committee & the USDA Forest Service for the UFST Team Leader refresher workshop in Raleigh, NC; June 17-18, 2013.

The Urban Forest Strike Team program was developed by the Southern Group of State Foresters and has since been adopted and adapted for use throughout the eastern United States. [Note: The UFST logo is the SGSF's identifying mark for this program.]

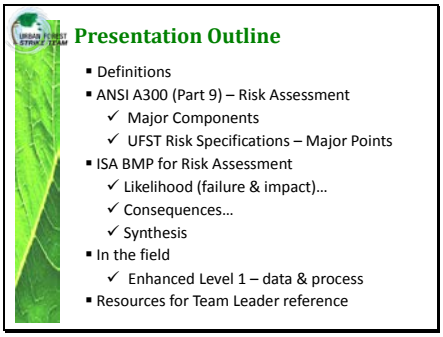
Urban Forestry South is the Southern Region's urban & community forestry Technology Transfer Center which supports U&CF programs through state agencies and municipalities. The Northeast Area State and Private Forestry works with the 20 States in the Northeast and Washington DC (Maine to Minnesota, to Missouri to Maryland) to support and promote urban forestry programs.

Urban Forestry South in Athens, Georgia (Dudley Hartel & Eric Kuehler), the USDA FS Office of the Durham (NH) Field Representative (John Parry), and the Midwest Center for Urban & Community Forestry in St. Paul, MN (Jill Johnson) provide the primary technical support for UFST development, implementation, and deployment.

The UFST Advisory Committee(s) provide(s) the guidance, direction, and oversight of the program on behalf of the Southern Group of State Foresters, Massachusetts Tree Wardens, and other participating federal agencies.

File: 2013 UFST Team Leader Workshop Refresher - ANSI A300 Risk (18May13 v1.3).pptx

Slide 2



The objective of this presentation is to introduce/review the ANSI A300 Part 9 and ISA BMP risk protocol and its relationship to the UFST assessments provided following significant disaster events.

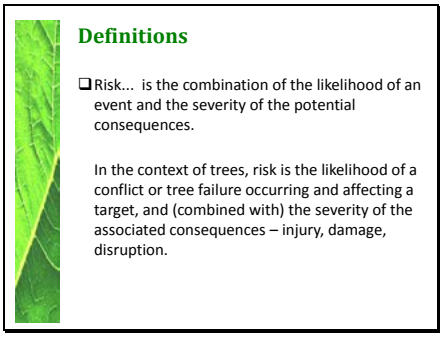
I will introduce/review the risk assessment protocol used by UFST that is based on the ANSI A300 Part 9 standard and ISA Tree Risk BMP…

- the ANSI A300 (Part 9) Risk Assessment standard and how it applies to UFST
- UFST specification components
- an overview of the ISA BMP for Risk Assessment
- when necessary we can discuss these in terms of Matheny & Clark
- how the risk specification & BMP protocol are executed in the field (UFST deployment)
- risk assessment resources

For this presentation we will use the following three (3) references (i.e. current arboricultural standards):

- ANSI A300 (Part 9)-2011 Tree Risk Assessment; a. Tree Structure Assessment, Tree Care Industry Association, Inc., Londonderry, NH
- Best Management Practices: Tree Risk Assessment (2011), Smiley, E.T., and N. Matheny, S. Lilly, International Society of Arboriculture, Champaign, IL
- Tree Risk Assessment - Manual (2013), Dunster, J. and E.T. Smiley, N. Matheny, and S. Lilly, International Society of Arboriculture, Champaign, IL (i.e. TRAQ)

Slide 3



Definitions adopted from current arboricultural standards are based on the ISO 31010 (see optional slide at end of presentation).

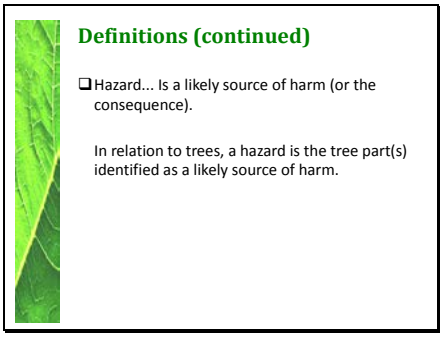
Risk (from ISA BMP: Tree Risk Assessment)…

- Probabilities (likelihood) involved
- An event
- Consequences (harm) with some level of severity (or concern)

Conflict… e.g. tree obstructs stop sign visibility at intersection, or tree limbs/branches touching power distribution lines.

Target… e.g. human, infrastructure, vehicle.

Slide 4

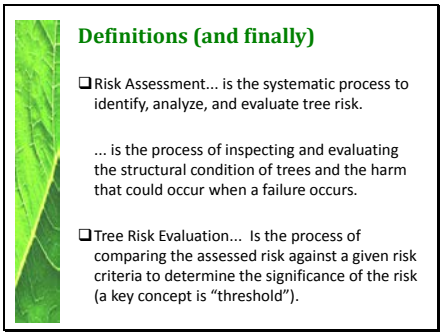


Hazard (from ISA BMP: Tree Risk Assessment)…

- What is the likely source (e.g. limb, branch, whole tree) of the assessed harm (i.e. consequence)

The defect is NOT the hazard, until assessed, assigned a risk rating, and determined to exceed the owner's threshold for acceptable risk.

Slide 5



Risk assessment is the step after an urban tree risk management program (framework) establishes a community's context for risk and its management. (see Pokorny 2003)

Assessment and evaluation (from ISA BMP: Tree Risk Assessment)…

- Systematic process
- Identify
- Analyze
- Evaluate

- There are standards (i.e. ANSI A300 Part 9) that should be followed when developing this assessment process

Evaluation (from ISA BMP: Tree Risk Assessment)…

- Comparing the assessed risk to your experience and/or expectations (i.e. risk threshold; how much harm is acceptable to you)

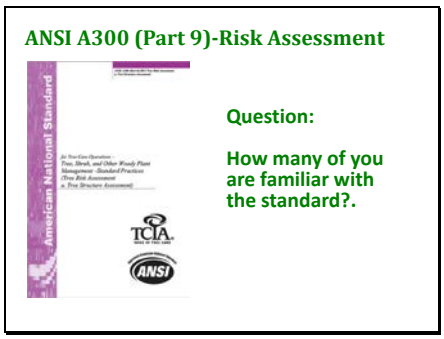
Slide 6

Review:

- Includes the attempt to standardized definitions and terminology
- Based on published arboricultural references (ISA)

Any questions or comments after this quick introduction to ANSI ?

Slide 7

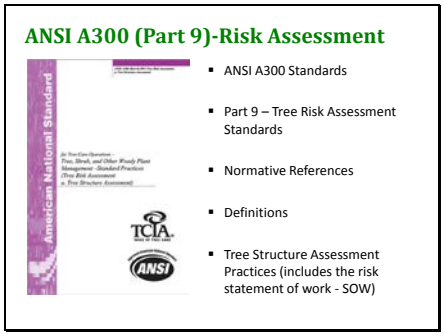


Now we will quickly review the major components of the ANSI A300 Part 9 published in 2011.

How many of you are familiar with this new standard?

- Aware of it?
- Read it?
- Studied it?
- Used it?

Slide 8



Published in 2011 by TCIA (see additional slides at end of presentation for TCIA's role in ANSI A300).

The "standard" reviews the ANSI system and introduces the tree risk standard (Part 9).

It covers safety, other standards that apply, and definitions.

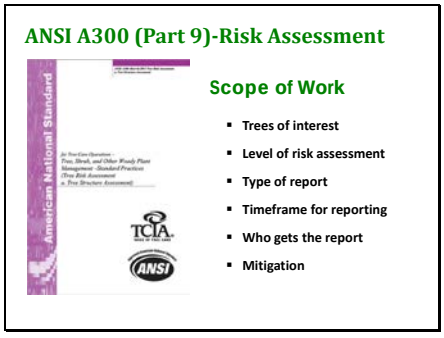
Requirement for written specifications: Section a. 1.2 "for developing written specifications" and Section 90.1 "standards for writing specifications".

The "Tree Structure Assessment Practices" – Section 93 includes the requirements for a statement of work (SOW) in addition to other general information related to objective, qualifications, and target identification.

It states that:

"The arborist should perform tree structure assessments on only those trees specifically identified in the scope of work."

Slide 9



Let's look first at the details of the scope of work…

The standard indicates should be included, at a minimum, in the Scope of Work portion of the written risk specification:

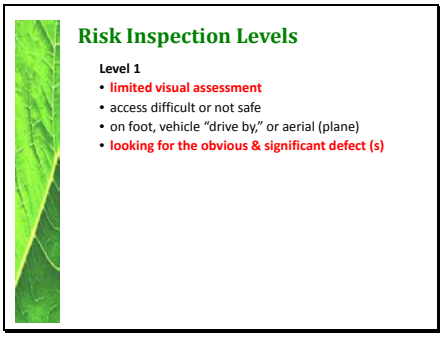
- Trees of interest – can be spatial (i.e. area), species specific, or other definable attribute
  - ✓ UFST: trees damaged by the storm event PLUS spatial boundaries
- Level of risk assessment - detail when Level 1,2, and 3 would be used
  - ✓ UFST: we use an enhanced Level 1 (i.e. more than is needed for Level 1,

but less than required for Level 2)
    - ✓ UFST: Level 2 requires assessment of multiple defects/targets and a more detailed assessment of targets
    - ✓ UFST: Team Leader and municipality develop target occupancy zones to define our spatial area of interest
- Type of report – written or verbal
    - ✓ UFST: the Team Leader will produce a written report (from UFST template) for the deployment
    - ✓ UFST: draft reports (at defined interval) may be produced if needed (i.e. if debris contractor is working very close behind UFST crews)
- Timeframe for reporting – this is the timeframe for the deployment and final report
    - ✓ UFST: final report is delivered at demobilization of the last team deployed for the storm event
- Who gets the report – the owner or owner's representative
    - ✓ UFST: this is determined during the Team Leader's
- Mitigation – what needs to be done, and when (i.e. action and priority)
    - ✓ UFST: we use standard FEMA debris criteria for removals and pruning; plus mitigation for non-FEMA risk
    - ✓ UFST: prioritization is based on the ISA risk rating (4 levels), and size of part (or other criteria collected and discussed with owner)

Go over these and then explain why they are important for UFSTs.

- Indicates our professional, standardized approach
- Documents the assessment process
- Clearly defines trees and physical area of the work to be done
- Makes it clear how information will be transmitted to the owner (i.e. municipality)
- Think of it as an extension of ICS into the community

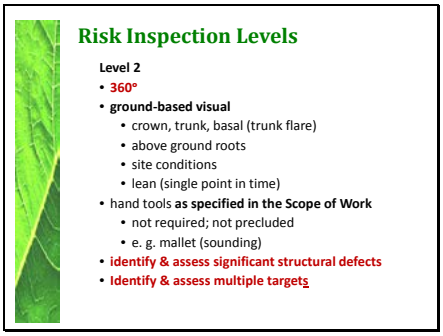
Slide 10



The standard defines three distinct levels of assessment that may be used by a qualified arborist.

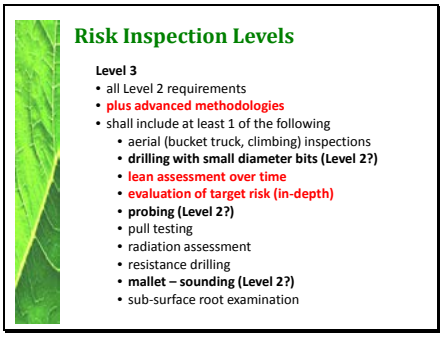
For UFST, we use Level 1; the significant defect(s) are typically but not necessarily storm related.

Slide 11



Level 2 (see (ISA TRAQ Manual pg 174-175) indicates multiple defect/target assessment and probably a more in-depth evaluation of targets.

Slide 12

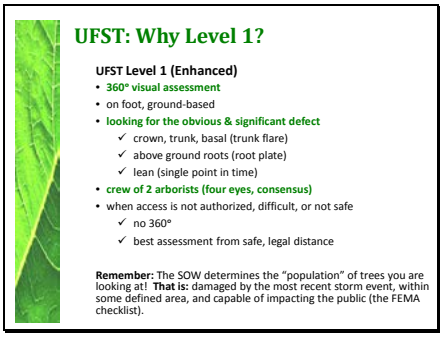


Level 3 requires the most advanced techniques (possibly multiple) and should result in assessments with highest confidence (i.e. lower chance of missing significant defects and their associated risk).

Sounding, probing, and drilling (i.e. small diameter bits) may also be common techniques for Level 2 for many arborists. Remember, Level 2 does not preclude use of any of these techniques.

Level 3 requires at least 1 of the "advanced methodologies".

Slide 13



The UFST "enhanced" Level 1 includes these significant features:

- 360 degree assessment unless restricted (for safety, legal access)
- a ground-based from foot assessment (NOT a drive-by unless #1 applies)
- quickly locating the obvious storm damage and most significant risk (even if pre-storm)
- considering all above-ground damage and visual defects
- we assess based on 2 arborists and their discussion

The Scope of Work (SOW) determines which streets we walk down (or parks we are in), and which trees we stop at (recent storm damage; i.e. the Federally/State/Local declared disaster event). State & local events would be UFST in-state deployments; and Federally declared events could be regional UFST deployments.

The Team Leader works with the municipality to develop the UFST specifications from a "template' for each deployment.

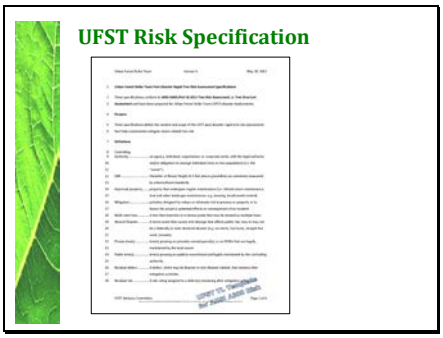
Slide 14

Review:

- Includes a quick review of the ANSI A300 Standard
- Illustrates the levels of risk assessment
- Role of UFST Team Leader

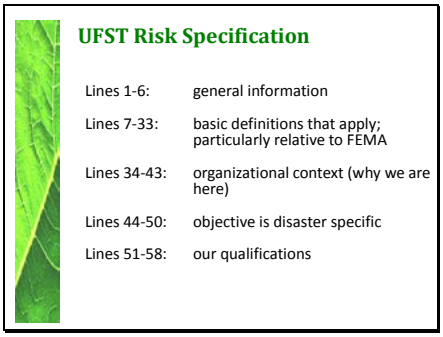
Any questions or comments from this quick introduction to the ANSI A300 levels?

Slide 15



Let's look at few sections of the current UFST ANSI Risk Specification…

Slide 16



Let's look at few sections of the current UFST ANSI Risk Specification…

Lines 1-6: general information

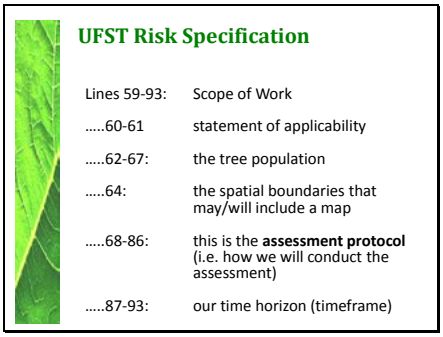
Lines 7-33: basic definitions that apply; particularly relative to FEMA

Lines 34-43: organizational context (why we are here)

Lines 44-50: objective is disaster specific

Lines 51-58: our qualifications

Slide 17

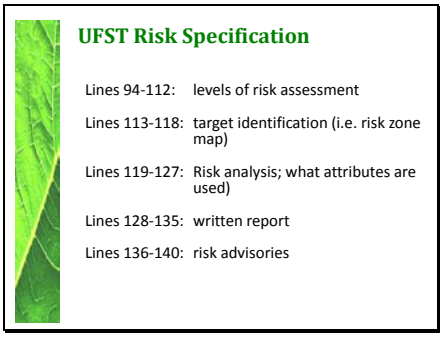


Let's look at few sections of the current UFST ANSI Risk Specification…

Lines 59-93: Scope of Work

- 62-67 indicates the population of trees to be assessed
- 64 the Team Leader may/will develop a map (with GIS support as needed) to delineate the area
- 68-86 our assessment protocol (i.e. the procedure)
- 87-93 our time horizon (i.e. how far into the future are we trying to prognosticate)

Slide 18



Let's look at few sections of the current UFST ANSI Risk Specification…

Lines 94-112: describe the level(s) of risk and the process used; only 1 for UFST (i.e. Level 1 (Enhanced)); a disclaimer (1st) related to the trype of assessment being proposed

Lines 113-118: target identification that results from the discussion between UFST Team Leader and the municipality; for some deployments this may result in the development of a risk zone map based on human occupancy

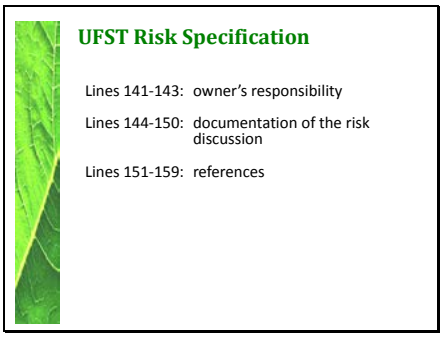
Lines 119-127: describes the attributes collected and used for the risk analysis

Lines 128-135: specifies the report characteristics that will be completed by the Team Leader (and team)

Lines 136-140: disclaimer 92nd) on the role mitigation

has on absolute risk; introduces the concept of residual defects (after mitigation) that should be assessed for residual risk (residual risk is not calculated in typical Level 1's since only a single defect/target is rated; Level 2's that look at all (i.e. multiple defect/target combinations would result in residual risk being immediately reported)

Slide 19



Let's look at few sections of the current UFST ANSI Risk Specification…

Lines 141-143: owner's determination (responsibility for mitigation, residual defects/risk, further assessments

Lines 144-150: document when and who discussed the risk specification that guides the UFST deployment

Lines 151-159: the current arboricultural standards and BMPs used to develop the specification

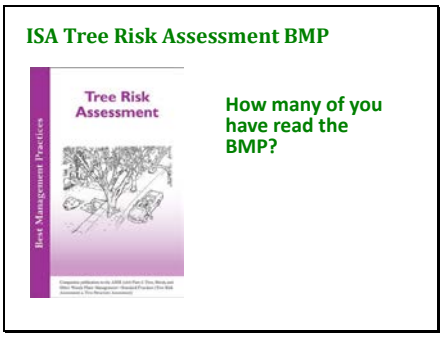
Slide 20

Review:

- Details of the UFST risk specification template

Any questions or comments from this discussion of the UFST Tree Risk Specification "template"?

Slide 21

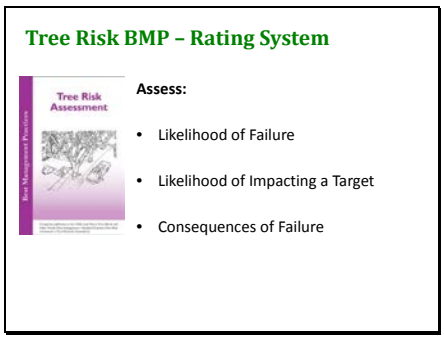


Question: How many of you have read the BMP?

How many have used the methods outlined in the BMP in the field for risk assessment?

(raise hands? Or answer question—very little, extensively, somewhere in between?)

Slide 22



From Tree Risk Assessment - Manual (2013) – ISA

This system uses an assessment of three factors:

- The likelihood of failure: tree part(s) or whole tree
- The likelihood of a impacting the target: when it fails how will it impact the target, and
- The consequences of the failure on the specific target (assuming that it will fail and impact; those are both covered above).

Examples:

- You may have a storm-damaged branch that is barely hanging on by a thread, and it's located directly over a target. This likelihood of failure is probable and likelihood of impacting the target is high. But the size of the branch is only 1" in diameter and 2 feet long, and the target is a rickety fence. The consequence is negligible because of the size of the part AND the value of the target (extreme example but gives you the idea). . The risk rating is LOW for this scenario.

- You have a tree with a vertical crack in the trunk and heartwood exposed just below a major junction of scaffold limbs; this tree crown is also located over a location with high levels of human occupancy. This may have likelihood of failure that is probable and likelihood of impacting the target (humans) of high. The consequence of this scenario is severe because of the value of the target AND mass of the tree that is expected to fail. The risk rating is HIGH for this scenario.

- You have a tree with a cracked limb (4" at break) that appears to still be securely attached; this limb is about 30' from a well used trail (to the side 90°) – frequent human occupancy. This may have likelihood of failure that is possible and likelihood of impacting the target (humans) of low. The consequence of this scenario is significant because of the value of the target (human). The risk rating is LOW for this scenario.

Note: underlined words in these scenarios are "keywords" for the ISA BMP and TRAQ.

Slide 23

Tree Risk BMP – Rating System
Likelihood of (Tree Part) Failure

What data will contribute to UFST knowledge of LOF?

- Defect – type & severity
- Site Characteristics - Construction
- Load on the tree part
  - ✓ Exposure
  - ✓ Cultural practices – i.e. bad pruning

From Best Management Practices: Tree Risk Assessment – ISA – T. Smiley, N. Matheny, S. Lilly – 2012
Likelihood of Tree Part Failure

Include major factors that contribute to this assessment …

Slide 24

Tree Risk BMP – Rating System
Likelihood of Impacting a Target

What data will contribute to UFST knowledge of LIT?

- Target zone – Shape & location
- Occupancy
  - ✓ Type of target e.g. stationary vs. moving
  - ✓ Rate e.g. rare to constant

From Best Management Practices: Tree Risk Assessment – ISA – T. Smiley, N. Matheny, S. Lilly – 2012
Likelihood of Tree Part to Fail

Include major factors that contribute to this assessment …

Slide 25

Tree Risk BMP – Rating System
Consequences of (Target) Impact

What data will contribute to UFST knowledge of COI?

- Value
  - ✓ Human
  - ✓ Economic
- Extent of injury
  - ✓ Size of part/tree
  - ✓ Distance falling
  - ✓ Fall characteristics

From Best Management Practices: Tree Risk Assessment – ISA – T. Smiley, N. Matheny, S. Lilly – 2012
Consequences of impacting the target

Include major factors that contribute to this assessment …

Slide 26

Tree Risk BMP – Rating System

Matrix I:

		Likelihood of Impacting Target (Person or Property)			
		Very Low	*Low*	*Medium*	*High*
Likelihood of Failure (Tree Part)	***Imminent***	*Unlikely*	*Somewhat likely*	*Likely*	*Very likely*
	Probable	*Unlikely*	*Unlikely*	*Somewhat likely*	*Likely*
	Possible	*Unlikely*	*Unlikely*	*Unlikely*	*Somewhat likely*
	Improbable	*Unlikely*	*Unlikely*	*Unlikely*	*Unlikely*

From Best Management Practices: Tree Risk Assessment – ISA – T. Smiley, N. Matheny, S. Lilly – 2012

This system uses two inter-related matrices to define "risk".

In the first matrix, failure potential (the rows: improbable to imminent) are intersected with probability of target impact (the columns: very low to high). This matrix rating is then transferred to Matrix II (the "Risk Matrix").

Slide 27

Tree Risk BMP – Rating System

Matrix II:

		Consequences (to Target)			
		Negligible	*Minor*	*Significant*	*Severe*
Likelihood of Failure & Impact	***Very likely***	*Low*	*Moderate*	*High*	*Extreme*
	Likely	*Low*	*Moderate*	*High*	*High*
	Somewhat Likely	*Low*	*Low*	*Moderate*	*Moderate*
	Unlikely	*Low*	*Low*	*Low*	*Low*

From *Best Management Practices: Tree Risk Assessment* – ISA – T. Smiley, N. Matheny, S. Lilly – 2012

Matrix I values are rows (combination of failure potential & impact onto a target) that are intersected with expected consequences to the target (the columns: negligible to severe).

The intersection represents the "assessed risk" based on the three components:

- likelihood of failure (i.e. failure potential)
- likelihood of impacting (affecting) a target
- consequences of that impact

and is used to develop mitigation recommendations.

Municipalities can use any of the subcomponents (e.g. Consequences) to prioritize large numbers of assessed trees that have the same risk rating (e.g. Moderate).

Slide 28

Tree Risk BMP – Rating System

Multiple Defects

Decide in the beginning which part you are going to assess…

Which one is the…most likely to fail?

Poses the greatest risk?

Residual Risk – Once mitigation is complete, are there other defects that contribute to risk?

Multiple defects and residual risk.

UFST Task Specialists assess the FEMA defect (or the defect most likely to result in failure within the time frame) and then indicate if any additional defects (storm related or not) may represent some significant risk **FOLLOWING** storm mitigation.

This is residual risk that is identified but NOT assessed with our Level 1 protocol.

Slide 29

Risk Assessment - Synthesis

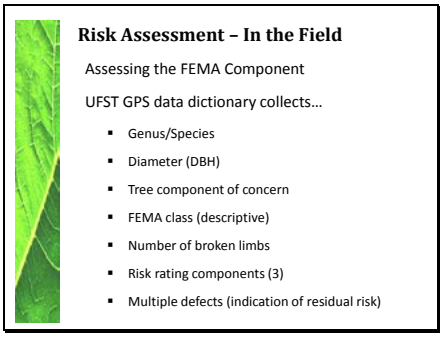
Data collected depends on level of assessment.

Your written tree risk specification will identify the level(s) and data being collected.

Data provides the support for the matrix selections.

The level (of assessment) will determine the type and detail of data observed and collected.

Slide 30



For disaster response, UFST assesses the FEMA defect (if a non-FEMA tree, then assess most likely to occur or as defined in the specification that the Team Leader has developed with the municipality).

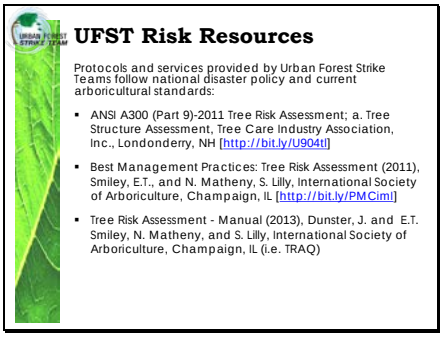
Slide 31

Review:

- The ISA BMP process for assessing risk for UFST

Any questions or comments from this discussion of the UFST Tree Risk Specification “template”?

Slide 32



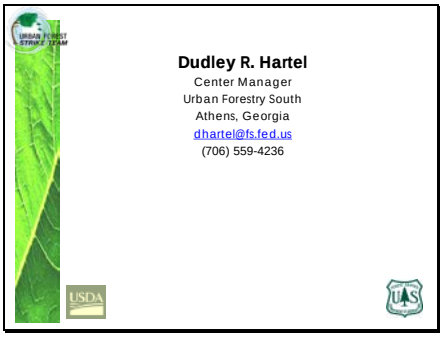
UFST standards and references for risk assessment:

- ISA’s new Tree Risk BMP (2011)
- ANSI A300 (Part 9) Tree Risk Assessment (2011)
- Tree Risk Assessment - Manual (2013)

- Currently considering the role that the ISA Tree Risk Qualification program may have within UFST.

- For a more comprehensive guide to urban tree risk management, see Pokorny (2003).

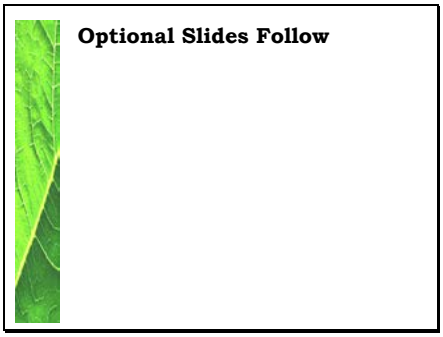
Slide 33



This presentation will be archived and available as a PDF at www.UFST.org.

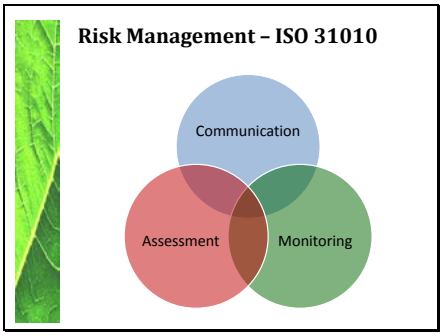
Search for “ANSI UFST Team Leader”

Slide 34



The slides that follow are optional and may be used as discussion and questions demand during the presentation.

Slide 35



Current arboricultural standards for risk assessment and management are based on ISO 31010 components:

- Communication and consultation
- Risk assessment
- Monitoring and review

For arboriculture these include:

- ANSI A300 (Part 9)-2011 Tree Risk Assessment; a. Tree Structure Assessment, Tree Care Industry Association, Inc., Londonderry, NH
- Best Management Practices: Tree Risk Assessment (2011), Smiley, E.T., and N. Matheny, S. Lilly, International Society of Arboriculture, Champaign, IL
- Tree Risk Assessment - Manual (2013), Dunster, J. and E.T. Smiley, N. Matheny, and S. Lilly, International Society of Arboriculture, Champaign, IL (i.e. TRAQ)

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ANSI (American National Standards Institute) accredits organizations to develop voluntary standards for their industry or profession.

TCIA is the accrediting organization for arboriculture and organizes the ASC (ANSI Standards Committee) A300 committee with representatives from a broad and diverse group of industrial and governmental organizations.

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Developed (green), new titles under development (blue), and currently being reviewed (red) from TCIA on 28May13.

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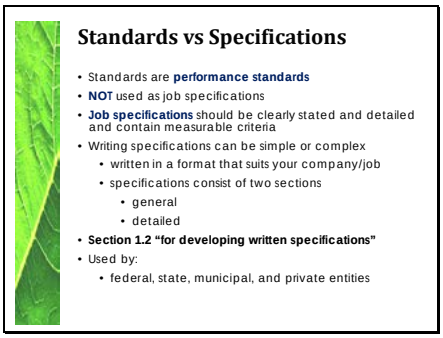

The "standard" clearly identifies the performance standards used to develop arboricultural specifications specific to your job or contract and appropriate for all levels of ownership and consulting.

You cannot say "Perform a tree risk assessment to the **ANSI A300 (Part 9)-2011 Tree Risk** standard."
But, "Perform a tree risk assessment that complies with the **ANSI A300 (Part 9)-2011 Tree Risk** standard." This statement then would require someone (owner or arborist) to write a risk specification based upon the standard.

See section 1.2 "for developing written specifications."

Developing and consistently using a risk specification the ANSI A300 Standard will:

reduce misunderstandings related to the scope of the risk evaluation for a tree owner

- clearly define the qualifications of the arborists
- clearly define the assessment techniques to be used
- provide better contract compliance
- reduce the chance for misinterpretation of results (i.e. the written reports)
- help arborists become more consistent with their risk assessments and with colleagues assessments over time