

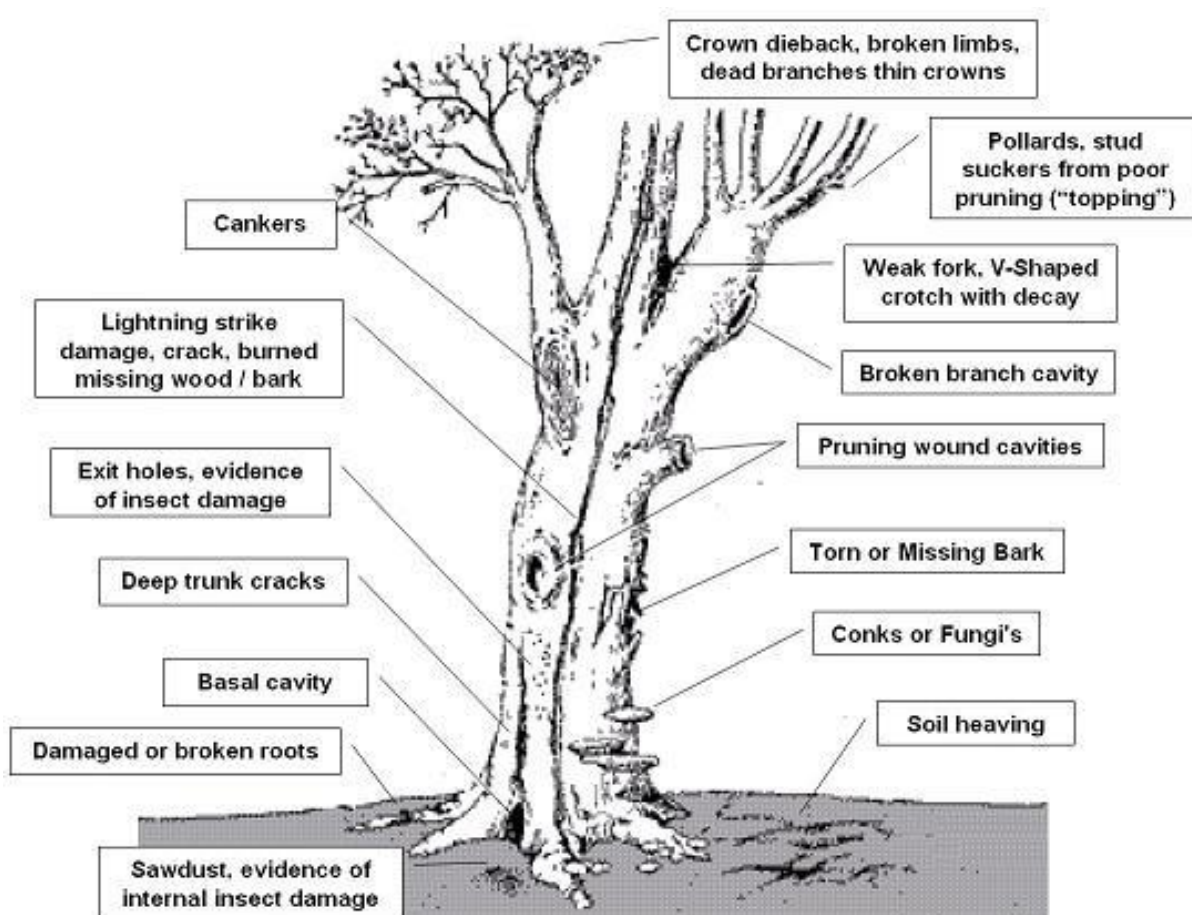
POST-FIRE HAZARD TREE AWARENESS

What makes a tree hazardous?

A tree is considered hazardous if it has defects or structural weaknesses that may cause failure resulting in property damage, personal injury or death. The post-burn environment surrounding a hazardous tree can be equally if not more dangerous than the tree itself!

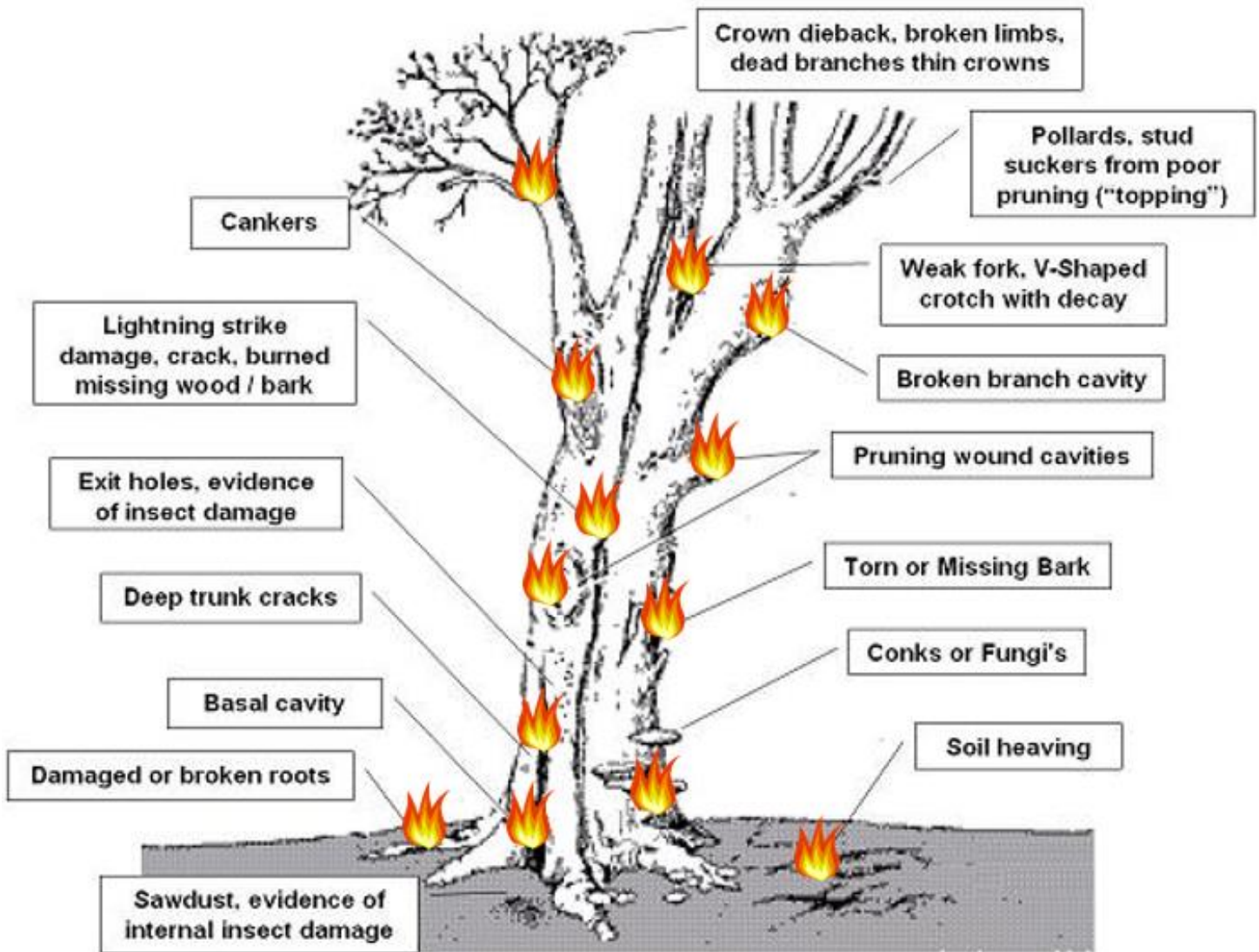
Common Pre-Fire Factors in Tree Failure

- Tree Species
- Tree Age
- Decay
- Wounds
- Cankers
- Seams
- Lean
- Branch Angle
- Branch Type
- Crown Vigor
- Crown Form/Shape
- Root Condition



Common Post-Fire Factors in Tree Failure

• Live or dead	• Loose overhead limbs ("widowmakers")
• Burned out roots	• Species, resinous vs. non-resinous
• Limb weight	• Broken or uprooted trees supported by other trees
• Hollowed boles	• Catfaces and other impacts to percentage of sound bole wood
• Leaning and/or root sprung	• Incineration of other indicators of weakness (conks, mushrooms, etc.)



- **Resinous vs. Non-Resinous Species**

Species Group	Resinous (decay resistant)
True-fir (<i>Abies</i> spp.)	No
Hemlock	No
Spruce	Partially
Douglas-fir	Yes
Larch	Yes
Pine	Yes
Cedar	Non-resinous but decay resistant
Hardwoods	Non-resinous but some are more decay resistant than others

- **Live vs. Dead**

Dead trees should be considered to have a high potential for failure. Live trees should not automatically be considered to have a low potential for failure if they have been damaged by fire or present other failure indicators

Post-Fire Hazard Tree Assessments

Based upon *probabilities* as well as some assumptions about the future

- Is the tree *likely* to fail/fall?
- When is tree *likely* to fail/fall?
- Is target *likely* to be present when tree fails/falls?

Inspection and Hazard Assessment

- Check to ensure entry into and exit from areas surrounding the tree are safe
- Start at tree bottom or top depending on height, damage, and initial observations of potential failure
- Use binoculars
- Check from all angles
- Look for targets
- Document results
- Considering using a hazard assessment for decision-making

Steps in developing a Tree Risk Rating

1. Identify the possible target
2. Identify the tree part(s) that could strike the target
3. Evaluate the likelihood for each part to fail
 - Improbable, possible, probably, imminent
4. Evaluate the likelihood of tree/part impacting target
 - Very low, low, medium, high
5. For each failure mode, identify the likelihood for tree failure impacting a specified target
 - Very unlikely, unlikely, somewhat likely, likely, very likely
6. For each failure mode, estimate the consequences of failure
 - Negligible, minor, significant, severe
7. For each failure mode, designate the risk
 - Low, moderate, high, extreme

Example of International Society of Arboricultural (ISA) Rating System

Table 1: Matrix used to estimate the likelihood of a tree failure impacting a specified target

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

Likelihood of Failure & Impact	Consequences			
	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat Likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Awareness

Ability to recognize hazard trees in the post-fire environment, understand their potential, and know who to call for further assistance!

References

- Field Guide for Hazard-tree Identification and Mitigation On Developed Sites in Oregon and Washington Forests. Portland, Oregon: U.S. Department of Agriculture, Forest Service, Forest Health Protection, Pacific Northwest Region : Oregon Department of Forestry : Washington State Department of Natural Resources, 2014. <https://permanent.fdlp.gov/gpo52152/stelprd3799993.pdf>
- A Guide to Identifying, Assessing, and Managing Hazard Trees in Developed Recreational Sites of the Northern Rocky Mountains and the Intermountain West : US Department of Agriculture, Forest Service, 2017. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd571021.pdf
- International Society of Arborists Tree Risk Assessment Manual, Second Edition, 2017. <https://www.isa-arbor.com/store/product/442/>