

WHTAC – Parks, Recreation Sites & Trails

Table 1. Levels of Disturbance and Exposure (LODE)

Level of Disturbance & Exposure Risk	Example Types of Work Activities	Example Types of Visitor Exposure in Developed and Actively Used Areas
<p>Very Low Risk (No Pre-work WHT Assessment)</p>	<ul style="list-style-type: none"> • Forest surveys and reconnaissance, trail layout, foot travel (heads up work) • General light vehicle travel on roads (pickups, ATV/UTV, snow sleds) 	<ul style="list-style-type: none"> • Unmaintained hiking trails (e.g., Backcountry trails) and footpaths • Road travel by light vehicle (ATV/UTV), horseback and cycling
<p>1 – Low (Tree Hazard Table 3) <40km/hour Windspeed</p>	<ul style="list-style-type: none"> • Maintenance of developed areas: repairing, replacing, installing infrastructure with hand tools; cleaning, painting, firewood bucking, landscaping, brushing/pruning, lawn mowing • Brushing & Weeding (e.g., removing invasive plants, trimming overgrown areas) • Trail construction with hand tools • Use of light-duty machinery (e.g., weed whips, brush saws, lawnmowers) • Road travel with heavy vehicles (>5500 kg GVWR) on a constructed and maintained road • Fire control with hand tools and/or water hoses 	<ul style="list-style-type: none"> • Maintained trails (front-country) & trails with designated lookouts and viewpoints • Hiking trails with interpretive signs • Motorized trail use (ATV/UTV, snowmobile) • Rest stops alongside hiking trails • Wheelchair trails & high-use trails (e.g., large tour bus groups)
<p>2 – Moderate (Tree Hazard Table 4) <40km/hour Windspeed</p>	<ul style="list-style-type: none"> • Road travel with heavy vehicles (>5500kg GVWR) on a trail or overgrown road • Maintenance or construction activities without heavy equipment (e.g., small machines such as “bobcats”) • Tree pruning (stems >20 cm dbh) • Juvenile spacing or slashing (stems <15 cm dbh) • Tree bucking (e.g., bucking windfalls, felled trees) 	<ul style="list-style-type: none"> • Parking lots (paved or compacted roads) • Day use picnic sites • Public beach/swimming areas • Roadside viewpoints, rest stops • Portable/temporary toilet facilities • Portable/seasonal kiosks • RV sani-stations
<p>3 – High (Tree Hazard Table 4a) 40 - 65 km/hour Windspeed</p>	<ul style="list-style-type: none"> • Maintenance or construction activities with heavy equipment (including rubber tire backhoe where digging could affect tree root systems/stability) • Use of light and intermediate lift helicopters where workers are exposed to rotor wash • Tree falling (does not include hazard tree removal) and log removal (any tree >15 cm dbh) 	<ul style="list-style-type: none"> • Campgrounds and permanent amenities • Developed Playgrounds (e.g., swings, slides, etc) • Permanent buildings/facilities and engineered bridges
<p>4 – Very High (Tree Hazard Table 5) >65km/hour Windspeed</p>	<ul style="list-style-type: none"> • Land clearing operations in structurally damaged stands (e.g., wildfire burns, extensive windthrow) • Use of medium and heavy lift helicopters where workers are exposed to rotor wash (e.g., slinging bridges and materials, landing sites) 	

- * A wildlife hazard tree (WHT) assessment is only valid for the lowest LODE at which the assessment has been done.
- ** VLR activities are based upon the expectation that workers have been trained and mentored how to be situationally aware of the hazards expected in their workplace under a variety of forest and weather conditions.
- *** If trees CANNOT be safely felled and yarded away from adjacent standing timber (i.e., there is a chance that felled or yarded timber will strike adjacent standing “leave timber”), then default to LODE 4.
- **** Does not include dangerous tree falling for tree hazard mitigation. Falling of dangerous trees does not require reassessment to LODE 3; the falling process must be in accordance with the BC Faller Training Standard and adherence to safe falling practices.

Table 1A. Influence of Wind Speed on Level of Disturbance (worker safety)

Wind Speed (km/h)	Description	Level of Disturbance Equivalency
0 – 20	light breeze (dust and loose paper raised; small branches move)	1 – 2
20 – 40	fresh breeze (small trees sway; tops of large trees sway)	
40 – 65	strong breeze (small branches fly in the air; whole tree in motion; resistance felt when walking against wind)	3
65+	gale (branches broken off trees; walking impeded)	4

Table 1B. Helicopter Types

Helicopter Category	Passenger Capacity	Lift Capacity
Type 1 (Heavy)	15+	Exceeds 2720 kg (6000 lbs)
Type 2 (Medium)	9 – 14	1135 – 2720 kg (2500 – 6000 lbs)
Type 3 (Intermediate)	5 – 8	680 – 1134 kg (1500 – 2500 lbs)
Type 4 (Light)	1 – 4	Not exceeding 680 kg (1500 lbs)

The following listing provides examples of common aircraft by helicopter type, and is a useful guide when determining the appropriate level of disturbance for the type of aircraft being used.

Light Category: Jet Ranger (Bell 206), Hughes 500, Hiller 12, EC 120, R22 & R44

Intermediate Category: Long Ranger, A-Star (AS350), Bell 407, EC 130

Medium Category: K-Max, Bell 204, 212, 205

Heavy Category: Bell 214, Kamov, Sikorsky 61 & 64, BV 107 & 234

What is a Hazardous Tree?

A tree (live or dead) with structural defects that could fail (whole or part) and cause injury to people, or damage to facilities or property.

What is a Dangerous Tree? defined in the *Occupational Health and Safety Regulation* s. 26.1

A dangerous tree means a tree (live or dead, regardless of size) that is a hazard to a worker (including public and facilities) due to:

- a) its location or lean,
- b) its physical damage,
- c) overhead hazards,
- d) deterioration of limbs, stem or root system, or
- e) any combination of the conditions in paragraphs a) to d) above.

Steps Required to Determine Tree Danger Rating:

1. **Determine the level of ground disturbance and visitor exposure** (refer to Tables 1, 1A, 1B)
2. **Conduct a site assessment overview** (refer to Table 2)
3. **Conduct tree assessments** (refer to Tables 3, 4, 4A and 5)
4. **Make the appropriate safety recommendation** (Safe or Dangerous)
5. **Provide documentation and communicate safety procedure**

Summary of Assessment Requirements

All work activities EXCEPT those defined as “very low risk” require a pre-work inspection by a qualified person to determine if there are any trees that might endanger workers. A summary of activity level assessment requirements is shown below.

- **Very Low Risk (VLR) Activities** – No pre-work site inspection or WHT assessment is required.
- **Level 1 Disturbance Activities** – A pre-work inspection by a qualified person is required. If trees with significant tree hazards (see Table 3) are observed, the appropriate safety procedures must be taken before work activities begin. A certified WHT assessor is required for structurally damaged stands or high stem density (>500sph) stands of suspect hazard trees.
- **Level 2, 3 or 4 Disturbance Activities** – A pre-work inspection by a qualified person is required. If “suspect” hazard trees (see Table 4, 4A, 5) are identified by a qualified person, then further assessment by a certified WHT assessor is required and the appropriate safety procedures must be taken BEFORE work activities begin.

Common Tree Species Name and Codes					
Tree Species	Code Symbol	Tree Species	Code Symbol	Tree Species	Code Symbol
Douglas -fir	Fd	Sitka spruce	Ss	Western redcedar	Cw
Western larch	Lw	Spruce hybrid	Sx	Yellow cedar	Yc
Lodgepole pine	Pl	Black spruce	Sb	Black cottonwood	Act
Yellow pine (Ponderosa pine)	Py	Subalpine fir	Bl	Trembling aspen	At
Western white pine	Pw	Amabilis fir	Ba	Paper birch	Ep
White spruce	Sw	Grand fir	Bg	Red alder	Dr
Engelmann spruce	Se	Western hemlock	Hw	Bigleaf maple	Mb

Table 2. Site Assessment Overview (for all tree species)

Site/Stand Factors	Hazard Indicators / Influences
Stand history and condition	<ul style="list-style-type: none"> evidence and patterns of past tree failure, history of tree mitigation disturbance history (natural or human-caused, including wildfire damage, year of site construction) general tree species age, condition and density evidence and type of wildlife tree use, presence of culturally significant trees or trees of special recreation attraction evidence of root and/or stem diseases
Common rain, snow and ice conditions	<ul style="list-style-type: none"> high snow or ice loading high rain fall periods
Flooding	<ul style="list-style-type: none"> high water table evidence of water damaged/decayed roots area prone to flooding
Windthrow potential	<ul style="list-style-type: none"> topography and prevailing wind directions evidence of significant windthrow area of high or recent exposure stems with height/diameter ratio >100 or small live crown (<20% tree height) (i.e., very tall, slender stems) saturated soils fine textured soils shallow soils and restricted rooting depth
Crown condition (i.e., common root disease indicators)	<ul style="list-style-type: none"> stress cone crop thinning foliage and/or chlorosis rounded crown
Resinosis	<ul style="list-style-type: none"> higher than normal stem or basal pitch flow (e.g., from butt rot, mechanical stem damage, root disease)
Tree lean	<ul style="list-style-type: none"> trees recently leaning due to windstorm, root damage, shifting root mat or other causes
Additional site-specific factors	<ul style="list-style-type: none"> based on local knowledge (e.g., soil or slope instability)

Table 3. Hazardous Tree Assessment Process for Level 1 Disturbance & Exposure – Significant Hazard Indicators

D = Dangerous Hazard	<p>D if tree has one or more of the following significant tree hazard indicators that are at risk of imminent failure*:</p> <ul style="list-style-type: none"> Insecurely lodged trees or insecure hang-ups: <ol style="list-style-type: none"> Insecurely lodged trees (a tipped tree that is likely to shake free of the support trees and fall to the ground); or Dislodged but hung-up limbs or tops (consider size and height above ground) at risk of shifting free during light winds or other tree motion Highly unstable tree: Examples: <ol style="list-style-type: none"> >50% tree cross-sectional area damaged or decayed; or Spongy snags with heart rot conks along the majority of the length of the stem (e.g., class 5 – 6 conifers or class 4 deciduous) or soft snags (e.g., class 7 – 8 conifers or class 5 deciduous); or >50% lateral roots damaged or with advanced decay Recent lean toward work area AND decayed root system (>50% of roots have advanced decay) or damaged and lifting anchoring soil layer (consider soil conditions and anchoring)
S = Safe	all other trees

* Imminent failure: there is a high likelihood of failure during the operational period while workers are exposed, or expected to fail within recurring WHT assessment intervals.

Guide to Tree Significance Value

Tree Significance Value	Characteristics
HIGH	<ul style="list-style-type: none"> • A tree with rare or uncommon habitat characteristics for the site. (e.g., large brooms, cavities, loose bark, dead tops, broken tops, perch site) • A culturally modified tree (CMT) • A tree protected by policy or special management practices (e.g. Special Tree, monumental trees, veteran trees, etc.) • Tree with active or recent wildlife use (feeding, nesting, denning, perching, roosting, etc.) • Tree structure suitable for wildlife use (suitable for large stick nest, hunting perch sites, bear den, fisher den, etc.) • Largest tree for site (height and/or diameter) or rare tree species • Habitat characteristics suited for locally important wildlife tree user species
MEDIUM	<ul style="list-style-type: none"> • Large, stable trees that will likely develop into a wildlife tree (e.g., recent split, broken top, death from insects) • A wildlife tree that has deteriorated and has diminishing viability for continued use
LOW	<ul style="list-style-type: none"> • Trees not covered by high or medium categories • Trees which are highly unstable and unlikely to remain standing beyond an operational period (e.g., advanced root disease, leaners, soft wood decay class)

Wildlife Tree Uses: The following codes can be used to document types of recent uses observed:
CN–Cavity Nest **ON**–Open nest **F**–Feeding **M**–Mark tree **D**–Denning **P**–Perching **R**–Roosting

Safety Procedures for “suspect” hazard trees that have been assessed

S = Safe	<p>tree safe to work around, retain tree — no removal or modification necessary:</p> <ul style="list-style-type: none"> • record tree as Safe (numbered tag, paint dot or numbered flagging if required) • monitor tree • recommend treatment with low-risk defects while tree is safe to mitigate
D = Dangerous	<p>manage tree:</p> <ul style="list-style-type: none"> • record tree as Dangerous (affix tag, paint or flagging if required) • fall tree • remove dangerous part(s) of tree • install flagged no-work zone (Hazard Area) • inform workers of location of no-work zones and trees marked as Dangerous • modify target or facility (prevent exposure)
Alternate Safety Procedures for Aspen	<ul style="list-style-type: none"> • If a stand of LIVE trembling aspen trees has visible <i>Phellinus tremulae</i> conks (heart rot fungi), but without structural defects, apply the alternate safe work procedures • Conduct a site assessment overview to determine the general health of the live aspen in the stand • Review failed stems (presumed to have been live trees) to determine the presence and number of conks • Document the conk distribution of each failed tree to develop a risk table for this stand; aspen in better condition will be regarded as SAFE • If there are no failed aspen with conks, then all LIVE aspen with these conks will be regarded as SAFE for all LODEs • These steps only apply to LIVE aspen with <i>Phellinus tremulae</i>. If an aspen tree has other structural damage, then assess the tree according to the applicable LODE hazard tables and manage accordingly

Table 4. Hazardous Tree Criteria for LODE 2 Activities

NOTE: Any tree defects as described in the boxes below will be rated as DANGEROUS for level 2 disturbance. Trees with lesser defects can be rated SAFE for level 2 – take care to not brush trees and to fall and yard away if possible.

Defect Category	Species Group	
	Douglas-fir, larch, pines, spruces	Western redcedar, yellow cedar
Defective top (DT)	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident; OR • Class 4 and 5 trees: Defective Top (e.g., secondary top) >30% of tree height 	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident
Defective limbs (DL)	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness * Hung-up limbs 	<ul style="list-style-type: none"> • Limbs >15 cm diameter with structural weakness * Hung-up limbs
Witches' broom (WB)	Brooms >1 m diameter on dead branches with evidence of decay, cracking or failure (dead branches and brooms may be on the ground)	n/a
Split trunk (ST) (includes frost, lightning, wind- and impact-induced cracks)	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood	Crack or split >2 cm wide extending >50% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood
Stem damage (SD) (includes scarring, fire damage, machine damage, and animal damage or butt rot)	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured	>50% of tree cross-sectional area damaged, burned, scarred, decayed or fractured
Thick sloughing bark or sloughing sapwood (SB) (bark applicable to Douglas-fir, larch and yellow [ponderosa] pine)	Class 6 – 8 trees: Large pieces of bark or sapwood separated and sloughing from bole of tree*	<ul style="list-style-type: none"> • Bark n/a • Long slabs of sloughing sapwood hanging from bole of tree
Butt and stem cankers (CA)	>50% of butt or stem circumference as a perennial canker face	n/a
Fungal fruiting bodies (CM) ** (conks and mushrooms)	<ul style="list-style-type: none"> • Any heartrot fungus present Exception: For veteran and dominant live trees, if <i>Porodaedalea pini</i> conks present BUT NO other visible defects/damage to stem that allow oxygen exchange (e.g., broken top, scarring, nest cavity, etc.) = SAFE • Sap-rotting fungi present on any tree <30 cm dbh where saprot depth is >5 cm 	n/a
Tree lean (TL) (for class 1 – 3 trees)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Tree lean (TL) (for class 4 – 8 trees)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Root inspection (RI)	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >50% of lateral roots	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >50% of lateral roots
Detailed Tree Assessments	STEM TEST: Average sound stemwood shell thickness <30% of tree radius (i.e., AST < RST), or >50% circumference as an open wound and AST <30% of tree radius ROOT TEST: More than half of the roots are >50% decayed or rotten	

NOTE: Structural weakness includes visual evidence of decay, cracking, breakage, embedded bark or cracking at forks or multiple stem unions, presence of conks, stem scars with decay, swollen stems from mistletoe (goiter) or woodpecker cavities.

* In Douglas-fir, larch and yellow [ponderosa] pine, treat sloughing sapwood according to the bark failure potential criteria.

** If identity of wood decay fungus cannot be determined (e.g., saprot or heartrot), then default to Dangerous rating. Where *Porodaedalea pini* is present, if the stem has structural damage such as a broken top or scarring which allow oxygen exchange or other stress indicators (e.g., resinosis, damaged roots), **OR** if there are conks distributed along the bole length, then default to Dangerous rating.

Table 4. Hazardous Tree Criteria for LODE 2 Activities (concluded)

NOTE: Any tree defects as described in the boxes below will be rated as **DANGEROUS** for level 2 disturbance. Trees with lesser defects can be rated **SAFE** for level 2 – take care to not brush trees and to fall and yard away if possible.

Defect Category	Species Group	
	Hemlock, true firs	Broad-leaved deciduous
Defective top (DT)	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident; OR • Class 4 and 5 trees: Defective Top (e.g., secondary top) >20% of tree height 	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size) as a fork, co-dominant or multiple stem where structural weakness is evident; OR • Where a dead top is >20% of the tree height
Defective limbs (DL)	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness • Hung-up limbs 	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness • Hung-up limbs
Witches' broom (WB)	Brooms >1 m diameter on dead branches with evidence of decay, cracking or failure (dead branches and brooms may be on the ground)	n/a
Split trunk (ST) (includes frost, lightning, wind- and impact-induced cracks)	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood
Stem damage (SD) (includes scarring, fire damage, machine damage, and animal damage or butt rot)	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured
Thick sloughing bark or sloughing sapwood (SB) (bark applicable to cottonwood >50 cm dbh)	n/a	Class 5 trees: Large pieces of bark separated and sloughing from bole of tree
Butt and stem cankers (CA)	n/a	>50% of butt or stem circumference as a canker face on a dead tree
Fungal fruiting bodies (CM) ** (conks and mushrooms)	<ul style="list-style-type: none"> • Any heartrot fungus present • Sap-rotting fungi present on any tree <30 cm dbh where saprot depth is >5 cm 	<ul style="list-style-type: none"> • Any heartrot fungus present Exception: <i>Phellinus tremulae</i> on live trembling aspen; apply alternate safe work procedures; • Sap-rotting fungi present on any trees <30 cm dbh where saprot depth is >5 cm
Tree lean (TL) (for class 1 – 3 trees)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Tree lean (TL) (for class 4 – 8 trees)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Root inspection (RI)	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >50% of lateral roots	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >50% of lateral roots
Detailed Tree Assessments	STEM TEST: Average sound stemwood shell thickness <30% of tree radius (i.e., AST < RST), or >50% circumference as an open wound and AST <30% of tree radius ROOT TEST: More than half of the roots are >50% decayed or rotten	

NOTE: Structural weakness includes visual evidence of decay, cracking, breakage, embedded bark or cracking at forks or multiple stem unions, presence of conks, stem scabs with decay, swollen stems from mistletoe (goiter) or woodpecker cavities.

** If identity of wood decay fungus cannot be determined (e.g., saprot or heartrot), then default to Dangerous rating.

Table 4a. Hazardous Tree Criteria for LODE 3 Activities

NOTE: Any tree defects as described in the boxes below will be rated as DANGEROUS for level 3 disturbance. Trees with lesser defects can be rated SAFE for level 3 – take care to not brush trees and to fall and yard away if possible.

Defect Category	Species Group	
	Douglas-fir, larch, pines, spruces	Western redcedar, yellow cedar
Defective top (DT)	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident; OR • Class 4 and 5 trees: Defective Top (e.g., secondary top) >30% of tree height 	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident
Defective limbs (DL)	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness • Hung-up limbs 	<ul style="list-style-type: none"> • Limbs >15 cm diameter with structural weakness • Hung-up limbs
Witches' broom (WB)	Brooms >1 m diameter on live or dead branches AND with evidence of decay, cracking or failure	n/a
Split trunk (ST) (includes frost, lightning, wind- and impact-induced cracks)	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood	<ul style="list-style-type: none"> • Class 2 and 3 trees: Crack or split >2 cm wide extending >50% of tree diameter into stem AND evidence of decay in surrounding stemwood • Class 4 – 8 trees: Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of decay in surrounding stemwood
Stem damage (SD) (includes scarring, fire damage, machine damage, and animal damage or butt rot)	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured	<ul style="list-style-type: none"> • Class 2 and 3 trees: >50% of tree cross-sectional area damaged, burned, scarred, damaged or fractured • Class 4 – 8 trees: >25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured
Thick sloughing bark or sloughing sapwood (SB) (bark applicable to Douglas-fir, larch and yellow [ponderosa] pine)	Large pieces of bark or sapwood separated and sloughing from bole of tree	<ul style="list-style-type: none"> • Bark n/a • Long slabs of sloughing sapwood hanging from bole of tree
Butt and stem cankers (CA)	>50% of butt or stem circumference as a perennial canker face	n/a
Fungal fruiting bodies (CM) ** (conks and mushrooms)	<ul style="list-style-type: none"> • Any heartrot fungus present Exception: For veteran and dominant trees, if <i>Porodaedalea pini</i> conks present BUT NO other visible defects/damage to stem that allow oxygen exchange (e.g., broken top, scarring, nest cavity, etc.) = SAFE • Sap-rotting fungi present on any tree <30 cm dbh where saprot depth is >3 cm 	n/a
Tree lean (TL) (for class 1 – 3 trees)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	<ul style="list-style-type: none"> • Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope) • For candelabra-branched trees, where candelabras are predominantly on lean side of tree – lean >10% toward target/work area and tree has rooting problems
Tree lean (TL) (for class 4 – 8 trees)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Root inspection (RI)	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >25% of lateral roots	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >25% of lateral roots
Detailed Tree Assessments	STEM TEST: Average sound stemwood shell thickness <30% of tree radius (i.e., AST < RST), or >50% circumference as an open wound and AST <30% of tree radius ROOT TEST: More than half of the roots are >50% decayed or rotten	

NOTE: . all Footnotes can be found on Page 9 (on reverse)

Table 4a. Hazardous Tree Criteria for LODE 3 Activities (concluded)

NOTE: Any tree defects as described in the boxes below will be rated as DANGEROUS for level 3 disturbance. Trees with lesser defects can be rated SAFE for level 3 – take care to not brush trees and to fall and yard away if possible.

Defect Category	Species Group	
	Hemlock, true firs	Broad-leaved deciduous
Defective top (DT)	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size; e.g., secondary top) where structural weakness is evident; OR • Class 4 and 5 trees: Defective Top (e.g., secondary top) >20% of tree height 	<ul style="list-style-type: none"> • Class 2 to 5 trees: Defective Top (any size as a fork, co-dominant or multiple stem where structural weakness is evident; OR • Where a dead top is >20% of the tree height
Defective limbs (DL)	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness • Cracked, decayed, broken or hung-up limbs 	<ul style="list-style-type: none"> • Limbs >10 cm diameter with structural weakness • Cracked, decayed, broken or hung-up limbs
Witches' broom (WB)	Brooms >1 m diameter on live or dead branches AND evidence of decay, cracking or failure	n/a
Split trunk (ST) (includes frost, lightning, wind- and impact-induced cracks)	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood	Crack or split >2 cm wide extending >25% of tree diameter into stem AND evidence of advanced decay in surrounding stemwood
Stem damage (SD) (includes scarring, fire damage, machine damage, and animal damage or butt rot)	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured	>25% of tree cross-sectional area damaged, burned, scarred, decayed or fractured
Thick sloughing bark or sloughing sapwood (SB) (bark applicable to cottonwood >50 cm dbh)	n/a	Large pieces of bark separated and sloughing from bole of tree
Butt and stem cankers (CA)	n/a	<ul style="list-style-type: none"> • >20% of butt or stem circumference as a perennial canker face* • >50% of butt or stem circumference as a canker face on a dead tree
Fungal fruiting bodies (CM)** (conks and mushrooms)	<ul style="list-style-type: none"> • Any heartrot fungus present • Sap-rotting fungi present on any tree <60 cm dbh where saprot depth is >6 cm 	<ul style="list-style-type: none"> • Any heartrot fungus present • Exception: <i>Phellinus tremulae</i> on live trembling aspen; apply alternate safe work procedures; • Sap-rotting fungi present on any trees <60 cm dbh where saprot depth is >6 cm
Tree lean (TL) (for class 1 – 3 trees)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >15% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Tree lean (TL) (for class 4 – 8 trees)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)	Lean >10% toward target/work area AND tree has rooting problems (e.g., damaged roots; shallow, compacted or wet soils; cracked or lifting root mat; steep slope)
Root inspection (RI)	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >25% of lateral roots	Occurrence of any of the following: root pull; lifting root mat; visible decay or damage to roots affects >25% of lateral roots
Detailed Tree Assessments	STEM TEST: Average sound stemwood shell thickness <30% of tree radius (i.e., AST < RST), or >50% circumference as an open wound and AST <30% of tree radius ROOT TEST: More than half of the roots are >50% decayed or rotten	

NOTE: Structural weakness includes visual evidence of decay, cracking, breakage, embedded bark or cracking at forks or multiple stem unions, presence of conks, stem scars with decay, swollen stems from mistletoe (goiter) or woodpecker cavities.

* Perennial cankers are generally circular to lens-shaped cankers that can persist for years, and slowly expand at about the same rate as the radial growth of the affected live tree. They gradually take on a sunken appearance as tissues under the dead cambium do not grow along with the surrounding wood. They are sometimes called "exploding cankers".

** If identity of wood decay fungus cannot be determined (e.g., saprot or heartrot), then default to Dangerous rating. Where *Porodaedalea pini* is present on Douglas-fir, larch, pines and spruces, if the stem has structural damage such as a broken top or scarring that allow oxygen exchange or other stress indicators (e.g., resinosis, damaged roots), OR if there are conks distributed along the bole length, then default to Dangerous rating.

Table 5. Danger Tree Assessment Process for LODE 4 Activities

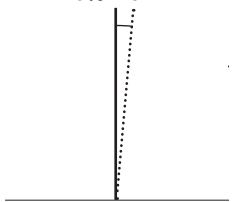
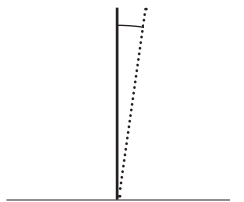
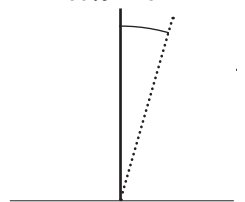
When conducting Level 4 disturbance assessments, only the following four types of trees are rated safe. All other trees will be rated Dangerous for Level 4 activities

Level 4 disturbance	
S = Safe	S if tree is of the following: <ul style="list-style-type: none"> • class 1 tree (all species) • class 2 trees with NO structural defects (all species) (usually wind- or snow-snapped green trees, very light fire scorching) • class 2 cedars with LOW failure potential defects (refer to table below) • class 3 conifers with NO structural defects (tree recently killed by insects, climate or light intensity fire — these will have no structural damage or decay)
D = Dangerous	all other trees (fall tree; create a no-work zone; or remove hazardous parts)

Structural Weakness includes visual evidence of decay, cracking, breakage, embedded (included) bark or cracking at forks or multiple stem unions, presence of conks, stem scars with decay, swollen stems from mistletoe (goiter), or woodpecker cavities

Class 2 Cedar Trees are SAFE for LODE 4 if they fit the Following Criteria

Defect Category	Western Redcedar, Yellow-cedar Low Failure Potential
Defective top (DT)	Defective Top (e.g. secondary top, spike) <30% of tree height with no evidence of decay, cracking, failure or other structural weakness
Defective limbs (DL)	Limbs (no size limit) with no evidence of decay, cracking or failure
Split trunk (ST) (includes frost, lightning and wind-induced cracks; does not include dry checking)	Crack or split >2 cm wide extending <50% of tree diameter into stem; no evidence of decay in surrounding stemwood
Stem damage (SD) (includes scarring, fire damage, machine damage, animal damage or butt rot)	<50% of tree cross-sectional area damaged, scarred or fractured with no evidence of decay in remaining stemwood
Tree lean (TL)	Lean <30% (16°) toward target/work area and tree has no rooting problems
Tree lean (TL) — candelabra branched trees (where candelabras are predominantly on lean side of tree)	Lean <10% (5°) toward target/work area and tree has no rooting problems
Root inspection (RI)	No visible problems: no root pull or lifting root mat. Any visible structural damage to roots only affects <25% of lateral roots (remaining roots undamaged)
Average stemwood shell thickness (for Detailed Tree Assessment if required)	Total sound stemwood shell thickness >30% of tree radius




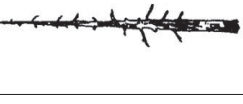
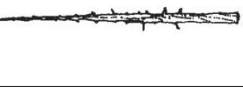
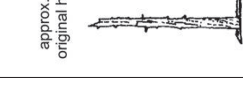
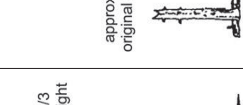





Tree Lean Comparisons		
<p>10% = 5°</p> 	<p>15% = 8°</p> 	<p>30% = 16°</p> 

* Sweep is where a LIVE tree is curved because of competition for sunlight, snow pack or steep slope conditions (live tree sweep is NOT lean).

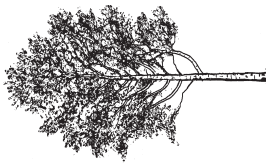
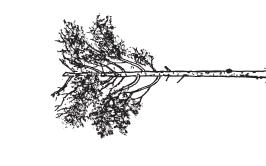
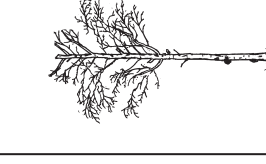
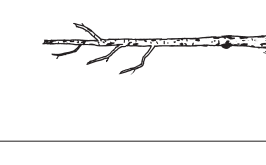
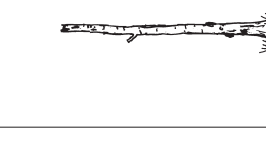

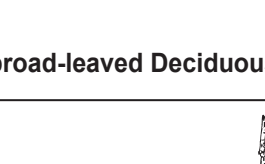
** Tree lean is documented as -% if towards target, and +% if away from target.

Special Considerations	
Conks	Extend the dangerous decay level 3m below the location of the lowest conk.
Cavity nests	Extend the dangerous level of decay 1m below the lowest cavity hole.
No Work Zones (NWZ)	Must be flagged on the ground; generally, 1.5 times the length of the longest dangerous defect, adjusted (larger or smaller) based upon site specific conditions such as slope or size of surrounding trees.
Reassessment	<p>Reassessment is needed:</p> <ul style="list-style-type: none"> • if an intervening winter or site altering event occurs (e.g., extensive windthrow, fire, flood, ice storm, landslide, etc) since the assessment was completed, OR • the LODE has changed from the original assessment.
Mechanically cut stubs	If stub wildlife trees are mechanically created from Class 1 – 3 stems, these DO NOT require a WHT assessment for any forest activity.
Documentation	<p>When documenting the assessment, enter:</p> <ul style="list-style-type: none"> • “–” for defects/hazards that don’t exist, • “S” for the defect seen and it is safe, • “D” for the defect seen and it is dangerous, • “?” for a defect seen but a detailed assessment was performed. <p>• Remember to state limitations, field marking procedures and recommendations for re-inspection timing.</p>
Structurally damaged stand	<ul style="list-style-type: none"> • Stands which have been severely and extensively damaged (e.g., wildfire, windthrow, advanced root disease) are complex and require an assessment by a Certified Wildlife Hazard Tree Assessor, even if performing LODE 1 activities, before work commences. • If there are >500 stems per hectare, then an application to WorkSafeBC will be required to develop a Points of Control safe work strategy in accordance with OHS Regulation 26.11(3) before work commences.

Decay Class Comparison for Conifers and broad-leaved Deciduous

LIVE TREES		DEAD TREES							DEAD FALLEN			
		Hard			Spongy				Soft			
Decay class	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5	CLASS 6	CLASS 7	CLASS 8	CLASS 9	CLASS 8	CLASS 7	CLASS 6
							 approx. 2/3 original height	 approx. 1/2 original height	 approx. 1/3 original height			

S O F T W O O D

LIVE TREES		DEAD TREES				DEAD FALLEN	
		CLASS 3 (Hard)	CLASS 4 (Spongy)	CLASS 5 (Soft)	CLASS 6	CLASS 5 (Soft)	CLASS 6
Decay class	CLASS 1	CLASS 2	CLASS 3 (Hard)	CLASS 4 (Spongy)	CLASS 5 (Soft)	CLASS 5 (Soft)	CLASS 6
							

H A R D W O O D

