

Procedure for: Certification to Operate a Chainsaw for the Department of Forests, Parks, and Recreation

Subject Title: Chainsaw Use

Date: January 1, 2021

PURPOSE: The Department of Forests, Parks, and Recreation (FPR) staff use chainsaws in the performance of their duties. The purpose of this procedure is to describe who in the department may operate a chainsaw and under what conditions. The goal is to certify (as and FPR Qualified Sawyer) staff every other year to operate a chainsaw, through proper training, skills assessment, and providing reliable PPE for safe operations.

SCOPE: To operate a chainsaw as part of an employee's duties, any FPR employee, full-time or seasonal, must be initially certified as an FPR Qualified Sawyer and then bi-annually recertified in a refresher. Certification and re-certification will be administered by FPR Sawyer Certifiers. This procedure does not extend to volunteers.

RECORDS, METRICS, and EVALUATION: To be certified as an FPR Qualified Sawyer, sawyers must know and use techniques and equipment that meet or exceed industry standards. Evaluation criteria will include use of open face felling technique, hazard recognition, understanding of reactive forces, bore cutting, adherence to safety rules, ability to read lean and tensions in trees, and ability to sharpen and maintain saws.

Requirements to be an FPR Qualified Sawyer

For initial sawyer certification:

- Documentation of completion of Game of Logging (GOL) levels 1-3; Wildland Fire Chainsaw (S-212) – this includes the annual Missoula Technology and Development Center training offered by the Green Mountain National Forest; or an equivalent as determined by the FPR Sawyer Certifiers and approved by their respective Division Director. If documentation is not available, a prospective sawyer can “test out” by demonstrating knowledge in a quiz (Appendix A) given by an FPR Sawyer Certifier. A score of at least 80% is the passing grade for this quiz.
- Demonstrate competence through a Field Evaluation (Appendix B) administered by an FPR Sawyer Certifier

For re-certification:

- Participation in a refresher training/evaluation by an FPR Sawyer Certifier every other year.
 - FPR Sawyer Certifier will evaluate sawyers in various activities designed to verify the sawyer's level of knowledge and skill.

Requirements to be an FPR Sawyer Certifier

- With a recommendation from FPR's Sawyer Certifiers and supervisor and management approval, an individual can be designated by the Director of their respective Division to be a Sawyer Certifier.
- Demonstrable skills and significant work experience with chainsaws.
- Documentation of completion of Game of Logging (GOL) levels 1-4.
- Teaching and communication skills.
- Demonstrable High level of commitment to safety.

ROLES and RESPONSIBILITIES:

FPR Qualified Sawyers will:

- Use all safety equipment and PPE (Appendix E).
- Apply appropriate cutting and safety techniques – including completion of a Chainsaw Safety Checklist (Appendix C).
- Maintain all equipment needed to operate a chainsaw, as identified in Appendix E.
- Turn down an assignment or seek qualified assistance when confronted with a complex situation that exceeds their competence and/or comfort level.
- Have a current First-Aid and CPR certification.
- Under no circumstances, operate a chainsaw for planned “project work” without another staff member present. This includes hazard tree removal, wildlife habitat improvement, trail work, and any other activity in which saw operation is an *expected* component of the project.

Work with at least one other person – this person does not need to be an FPR Qualified Sawyer, but they must have current First-Aid and CPR. The helper cannot run the saw if they are not certified. The helper must have and use a hard hat; eye and ear protection; leather work boots; and high visibility shirt, vest, or jacket. During felling, the helper should keep a distance of at least 2 ½ times the height of the tree being felled until the sawyer indicates it is safe to approach. Hand signals or audible contact, such as but not limited to, whistles or horns, shall be utilized whenever noise, distance, restricted visibility, or other factors prevent clear understanding of normal voice communications.

- Only operate a chainsaw alone, if presented with an unexpected circumstance such as a tree impeding the passage of a vehicle. In such an unexpected and low risk situation, Qualified Sawyers will notify their supervisor that an unusual situation exists requiring solo saw operation, the location, and the expected completion time. Then, the Qualified Sawyer will notify the contact that the task is complete. If the work can be safely and effectively performed with an alternate cutting method, the Qualified Sawyer will utilize that method. The chainsaw shall be considered a last resort.
 - *In the rare case of limited, appropriate solo operation under unexpected circumstance, the following checklist will be completed:*
 - *Acknowledge that I am alone, ask self is this the only reasonable way to address the issue/tree?*
 - *Would an ax or handsaw be feasible and less dangerous?*
 - *Confirm you are physically and mentally in good condition to operate a saw and address the situation.*
 - *Site conditions have been considered and a safety assessment completed. Mitigation steps have been identified.*
 - *Tree conditions/species characteristics have been considered. Mitigation steps have been identified.*
 - *Saw is sharp and in good repair.*
 - *Full PPE utilized.*
 - *First-Aid Kits must be worn or carried.*

FPR Sawyer Certifiers will:

- Meet the requirements of an FPR Qualified Sawyer, as defined above.
- Maintain their skill level and proficiencies.
- Stay current with industry standards (defined below) and developing techniques/technology.
- Use an evaluation/score sheet to assess and document a staff member's skill level.
- Work parallel to the National Wildfire Coordinating Group/USFS saw program to assure that FPR's terminology and procedures for saw operation and evaluating sawyers are comparable.
- Maintain records of FPR staff that are in the Qualified Sawyer program. Track each person's evaluation scores and strengths/weaknesses and the complexity of their test trees. Provide instruction and opportunity to improve.
- Model a safe attitude and lead a pre-work safety meeting, using the Chainsaw Safety Checklist and Job Hazard Analysis (JHA) before each - certifying or refresher course.

FPR will, as necessary to meet the mission and goals of the Department or Division:

- Provide all required equipment in safe, working order with all job required safety gear, including but not limited to purpose made cut resistant pants or chaps, hard hat, eye/ear protection, gloves, cut resistant boots and first-aid equipment (Appendix E).
- Provide time and opportunity for sawyers to certify and re-certify.
- Provide district/regional sawyer evaluation sites. The Forestry District Coordinator or designee will assist with planning/scheduling. Sawyer evaluation might be an opportunity to cut hazard trees in the district/region.
- Provide opportunity for staff that are not initially certifiable to receive requisite training and experience if it aligns with job duties.

TOOLS, SPECIAL EQUIPMENT, TRAINING

- A typical saw kit should include appropriate files and guides, "srench," extra chain, axe, wedges, First-aid kit, container for gas and bar/chain oil. Each chainsaw crew should have a means of communication to use in the event of an emergency - phone, radio, SPOT device.

SAFETY REQUIREMENTS:

- All FPR Qualified Sawyers and FPR Sawyer Certifiers will have current First-Aid and CPR training.
- A pre-work safety meeting, using the Chainsaw Safety Checklist (Appendix C) will be conducted before each chainsaw project is started.
- A Job Hazard Analysis (JHA – Appendix D) will be used in certification and refresher courses as a tool to teach and refresh sawyers about hazard recognition and mitigation.
- Complex or remote projects may need a JHA and/or crew members with higher first aid skills; this determination to be made by the authority having jurisdiction.

DEFINITIONS:

ANSI – American National Standards Institute. A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

FPR Sawyer Qualified – an employee that has documented completion of accepted training and demonstrated to an FPR certifier, competence in chainsaw use.

FPR Sawyer Certifier – a highly skilled and experienced sawyer, designated by the Director of their respective Division to approve staff people to become FPR Sawyer Qualified.

GOL – Game of Logging

Industry standards – commonly accepted practices for safety and performance as defined by OSHA, NWCG, VTOSHA, ANSI, etc.

JHA - job hazard analysis – an analysis of hazards likely to be encountered on a project and mitigations measures to be taken. JHA should be conducted before each project is started. Appendix D

PPE - personal protective equipment - To include purpose built cut resistant pants, hard hat, eye and ear protection, gloves and boots. (Appendix E)

NWCG – National Wildfire Coordinating Group

OSHA – Occupational Safety and Health Administration. An agency of the United States Department of Labor.

S-212 – an ational Wildfire Coordinating Group (NWCG) chainsaw course used in the wildland fire community.

VTOSHA – Vermont Occupational Safety and Health Administration – part of Department of Labor

APPENDICES

- A. Chainsaw Knowledge Quiz: (Quiz to “test-out” of requirement for documentation of completion of an approved chainsaw course.)
- B. State of VT Chainsaw Operator Evaluation Form
- C. Chainsaw Safety Checklist
- D. Job Hazard Analysis; Chainsaw Use
- E. Personal Protective Equipment and Saw Safety Features

APPENDIX A.

Chainsaw Knowledge Quiz

80% required for passing grade

(5 pts) Describe minimum PPE - looking for at least: **chaps or cut resistant pants, hard hat, eye and ear protection, gloves and cut resistant boots.**

(4 pts) Name at least 4 safety features on a saw: **throttle interlock, chain catch, chain brake, muffler and spark arrester, broad hand protector for right hand**

(4 pts) Name, locate and describe the three reactive forces and the part of the bar is used to initiate a bore cut.

- **Push at the top of the bar pushes the saw away from the wood.**
- **Pull on the bottom of the bar pulls saw towards the wood.**
- **Kick back at the top quadrant of the tip causes the tip to kick back toward user.**
- **Start a bore cut with the bottom quadrant of the tip.**

(6 pts) List at least 6 pieces of information needed to make a cutting plan that is safe and efficient.

- **Acquire a target.**
- **Identify hazards.**
- **Know an escape route.**
- **Tree size and hinge dimensions.**
- **Determine side, front and back lean.**
- **Identify tree species and wood characteristics.**
- **Determine sequence of cuts and wedge placement.**

(2 pts) Describe the minimum opening and the benefits of an open face notch.

- **At least 70 degrees.**
- **Allows tree to be nearly to the ground before the notch closes, which is good for safety (tree more likely to stay attached to stump) and accuracy.**

(3 pts) Describe the function and typical dimensions of the hinge.

The hinge directs the fall of the tree. In low complexity trees with little lean, the tree should fall approximately perpendicular to the hinge. A rule of thumb for hinge dimensions is the thickness of the hinge should be 10% of DBH and its length, 80%.

(2 pts) Define “by-pass” and the danger it presents.

By-pass occurs when the two upper and lower cuts for the notch do not meet exactly. If one of the cuts is too deep, it compromises/weakens the hinge and the ability to direct the fall of the tree.

(4 pts) Name at least 4 important concepts for safe and efficient limbing.

- **Read the tensions in the wood. Finish cuts in the tension wood.**
- **Watch where the tip of the bar goes to avoid kick back.**
- **Keep close to your work, don't reach.**

- Rest the weight of the saw on the wood when possible.
- Move feet when the bar is on the other side of the stem.
- Keep the thumb of your left hand wrapped around the handle bar. Use the thumb of your right hand on the throttle when appropriate to keep good body position.
- Use chain brake when moving significant distance or letting go of the rear handle. Don't use your left hand to move brush.

(4 pts) What is a barber chair and how can it be avoided?

A barber chair often occurs on forward leaning trees. Barber chair is the result of a tree splitting as it falls; the rear portion of the stem rotating around a fulcrum of uncut wood in the stem. The rear portion of the stem can hit the sawyer and is very dangerous. This condition can be avoided by using a controlled release technique. After notching, establishing the back of the hinge with a bore cut before the rest of the holding wood is cut. With the hinge properly dimensioned the tree, when released will bend the hinge and not split the trunk. A strap or trigger is left to keep the tree from falling until the hinge is set and the sawyer is ready to fell the tree.

(3 pts) Describe a generally good path for the escape route.

Usually a good escape route is back and to a 45-degree angle to the intended direction of fall and a minimum of 12 feet from the stump. Use other solid trees as protective barriers, if possible. Avoid going downhill from the falling tree. Clear brush and trip hazards *prior* to any cuts on the tree.

(3 pts) What is a spring pole and how can it be handled?

A small tree bent over and pinned to the ground, usually by a tree that has been felled. Spring poles are often dangerous because they are under pressure. To safely release the pressure using a chainsaw, first find the spot on the spring pole of maximum compression. Imagine the intersection of a horizontal line touching the top of the bowed over spring pole and a vertical line coming from the base of the spring pole. From this point, project a line at a 45-degree angle down to the inside of the spring pole stem. This is the spot to slowly cut. To avoid being pinched in the compression wood, shave or take shallow adjoining kerfs. Work slowly and check the spring pole; allow it to bend and release pressure. Eventually they will usually crack/snap. A tall spring pole that arches over shoulder height can be cut by clearing footing under the arch, standing in the arch and cutting the top of the spring pole.

State of Vermont Chainsaw Operator Evaluation Form

Name: _____
 Date: _____
 Training Location: _____
 Phone: _____
 Email: _____

Safety Equipment

___ Hard Hat:
 ___ Safety Shield:
 ___ Ear Protection:
 ___ Chaps:
 ___ Boots:
 ___ Gloves:
 ___ General saw control/comfort:
 ___ Saw Condition:
 Other comments: _____

Safe Operation

___ Starting Procedure:
 ___ Chain Brake Use:
 ___ Thumb Placement:
 ___ Boring technique:
 ___ General bar use:
 ___ Limbing:
 ___ Spring Pole:

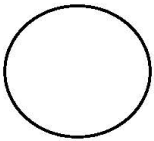
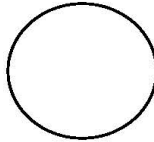
Felling Technique

___ Hazard assessment: _____
 ___ Notch direction: _____
 ___ Bore Cut: _____
 ___ Wedge use: _____
 ___ Escape route: _____

___ Felling Plan: _____
 ___ Notch accuracy: _____
 ___ Hinge accuracy: _____
 ___ Release: _____

Stump Analysis

Species: _____
 DBH: _____
 Condition: _____
 Height: _____
 Lean: _____
 Target Accuracy: _____
 Other: _____



Stump Analysis

Species: _____
 DBH: _____
 Condition: _____
 Height: _____
 Lean: _____
 Target Accuracy: _____
 Other: _____

Comments: Attitude, Technical Skills, Verbal Skills, Strengths, Weaknesses etc.

Recommended as FPR Sawyer

Instructor Signature: _____ Date: _____

Sawyer Signature: _____ Date: _____

Supervisor Signature: _____ Date: _____

April 2020

APPENDIX C.

Chainsaw Safety Check List

Leader:

Site/Project:

Workers:

Date:

Purpose for cutting/ authority having jurisdiction’s Job Hazard Analysis (JHA) special instructions:

SAW AND PPE for each member of crew:

- Saw sharp, inspected and in good repair, with maintenance, sharpening tools, and extra chain.
- Full PPE – appropriate for the job, inspected and in good repair.

CREW

- Workers are certified.
- Workers are physically & mentally in good condition for this assignment.
- Workers are briefed/aware of JHA intent.
- Workers are aware that they can decline to cut a tree that exceeds their skill/confidence level.
- All workers participated in a pre-work safety meeting; identified special hazards & mitigations.

MEDICAL/EVACUATION PLAN

- Have first-aid kit(s) on their person or in close proximity to work area.
- Medical/evacuation plan filled in (see back).
- Verified that phone/radio/SPOT device works from site.

SITE/STAND

- Site conditions and how they affect safety and work procedures have been considered. Mitigations identified.
- Tree conditions/ species characteristics have been considered. Mitigations identified.

WEATHER

- Weather conditions that present a hazard have been considered. Mitigations identified.

SIGNATURES OF CREW:

Date:

Emergency Medical or Evacuation Plan (page 2 of Chainsaw Safety Checklist)

To be filled in before work begins

Phone number for hospital: 911 or _____

FPR supervisor: _____ phone: _____

Alternate: _____ phone: _____

911 address of the worksite: _____ If no cell service or radio contact, the nearest landline is located at: _____

Directions to site from hospital/EMS station or well-known landmark:

Directions to hospital from site:

Designated role	Primary	secondary
First aid provider		
Point of contact		
Transport lead		

In the event of an emergency – be ready with:

Number of patients.	Patient 1	Patient 2
Sex, and approx. age & weight		
Nature of injury or illness		
Severity – is patient conscious, alert, breathing, how much blood loss		
Transport plan – use ambulance - give the directions supplied above or drive to hospital – inform hospital you’re coming		
Additional resources needed: manpower, AED, oxygen, stretcher, trauma supplies, etc.		

APPENDIX D.

State of Vermont Forests, Parks & Recreation	1. WORK PROJECT/ACTIVITY	2. LOCATION	3. UNIT
	Chain Saw Use		
JOB HAZARD ANALYSIS (JHA)	4. NAME OF ANALYST	5. JOB TITLE	6. DATE PREPARED
	Chainsaw Working Group		3/30/2020
7. TASKS/PROCEDURES			
8. HAZARDS			
9. ABATEMENT ACTIONS Engineering Controls * Substitution * Administrative Controls * PPE - Proper PPE must be worn at all times.			
Training Requirements	Personal injury	<ul style="list-style-type: none"> • Successful completion of S-212 course or Game of Logging levels 1-3 saw training course. • Saw refresher in accordance with FPR chain saw procedure. • Certified in basic First-Aid and CPR. • Do not exceed your level of training. 	
Training Certification		<ul style="list-style-type: none"> • Chainsaw operators shall be properly certified prior to operation. • Chainsaw operators may only exceed their level of training if they are under the supervision of a qualified Certifier. • For the purposes of training, additional individuals besides the saw operator may be allowed within a 2 ½ times tree height radius if under supervision of a qualified instructor. 	
Personal Protective Equipment	Cuts, eye injuries, hearing loss, burns	<ul style="list-style-type: none"> • Appropriate gloves (cut resistant for sharpening), hardhat, hearing protection, long sleeve shirt, chaps (recommended to overlap top of boots 2”), Chain Saw Protective Boots-8” high with skid resistant soles, and eye protection. • High visibility vest, shirt, or jacket, with appropriate reflective material for the light and visibility conditions. • First-aid kit on their person or in close proximity to the work zone. • Communications (2-way radio, cell phone or SPOT device) 	

Equipment	Injury, damage to equipment or adjacent resources	<ul style="list-style-type: none"> • Ensure chainsaw is in proper working order. • Ensure chain is properly sharpened. • Ensure falling axe of appropriate size and weight. • Ensure proper size and amount wedges.
Pre-work Briefing/Tailgate Safety Session	None	<ul style="list-style-type: none"> • Brief employees on work assignment and objectives. • Ensure required PPE for the assigned tasks is being utilized. • Review applicable safety procedures, consider possible hazards, discuss mitigations. Use and all members sign, the Chainsaw Safety Checklist. • Brief employees on the plan that would be executed in the event of a serious employee illness/injury that would require medical evacuation. • Additional job briefings shall be held if significant changes, which might affect the safety of the employees, occur during the course of the work
Transporting Saws	Fire, damage to equipment, and personal injury	<ul style="list-style-type: none"> • Saw should be transported either purged of all fuel, or completely full. • Bars should be covered during transportation. • Saws should be secured in compartments away from people in a manner that will minimize shifting to prevent damage to saw and apparatus.
Walking with Chain Saw	Cuts, falls, sprains and strains	<ul style="list-style-type: none"> • Engage chain brake when taking more than a few steps or shut off chain if walking more than 50 feet. • While carrying chain saw on shoulder ensure that chain and dogs are covered.
Size Up	Head injury, cuts, falling, and slipping	<ul style="list-style-type: none"> • Size up the tree considering the tree species, height, diameter, lean, soundness, current and previous fire damage, split or broken top, widow makers, and other hazard tree indicators. • Bore tree if necessary to determine soundness. • Walk anticipated lay of tree and check for hazards. • Clear work area of hazards and obstructions. • Determine and clear primary and secondary escape routes. • Ensure that area 2 ½ times the height of the tree to be felled is clear of personnel. • Be alert for environmental conditions that could increase risk. (strong/gusty winds, steep slopes, etc.). • Ensure adequate traffic control measures are taken on roads and trails. • If the identified tree cannot be safely removed and presents a hazard, the area will be flagged off at a safe distance and an alternate mitigation used.

Starting procedure	Loss of control, cuts	<p><i>The methods to safely start and operate a saw can vary with the model and size. The following basic precautions generally apply regardless of the saw model:</i></p> <ul style="list-style-type: none"> • Maintain a secure grip on the saw at all times. • Start the saw on the ground or ensure saw is firmly supported. • Do not "drop start" a chain saw.
Felling Process	Head injury, eye injury, cuts, amputation, crushing injuries, and death	<ul style="list-style-type: none"> • No employee shall approach a faller closer than 2 ½ tree lengths of trees being felled until the faller has acknowledged that it is safe to do so, unless it is demonstrated that their presence is necessary to manually fell a particular tree. • Follow proper felling procedure as outlined in S-212 or Game of Logging levels 1-3 chainsaw course. • Initiate undercut at a level that ensures adequate footing and balance throughout cutting sequence. • Prior to starting the back cut, the area should be surveyed to ensure that nobody has entered the area. A warning should be sounded as to the intentions of your actions. (i.e. "tree coming down, sidehill"). • At the first sign of the tree committing to the undercut proceed to safety zone. • No felling operations will be conducted at night or during times the top of tree being felled is obscured.
Working in a group using a chainsaw.	Struck by trees, limbs, head injury, crushing injury, death	<ul style="list-style-type: none"> • Direct work so that activities of one will not create a hazard for another. • Have workers and felling crews on the same contour rather than some working above and below others on steep slopes.
Limbing	Cuts, injury from limbs whipping back, crushing injuries	<ul style="list-style-type: none"> • Beware of other logs, branches, or rocks immediately behind the area where you are bucking, brushing, or limbing for possible kickback potential or rocking of the chain. • Watch for limbs under tension, and be aware of kick back and bar pinch. • Be cautious when limbing on the downhill sides of trees. Limbs may be holding tree in place, be aware that the log may roll after a limb is cut. • Know where the tip of your bar is at all times.
Bucking	Cuts, injury from, limbs whipping back, crushing injuries	<ul style="list-style-type: none"> • Beware of other logs, branches, or rocks in work area. • Avoid bucking on the downhill side. • Ensure log is stable. • Check area for overhead hazards.

Saw Team operations	Cuts, struck by trees limbs, head injury, crushing injury, death	<ul style="list-style-type: none"> • No worker shall approach a faller closer than 2 ½ tree lengths of trees being felled until the faller has acknowledged that it is safe to do so, unless it is demonstrated that their presence is necessary to manually fell a particular tree. • Do not allow workers assisting saywers to “reach in” to grab brush. • Ensure helper is clear of hazards when conducting limbing and bucking operations. • Saywer and helper communicate with each other when pulling brush and working close together.
Traffic Control	Injury to public, damage to vehicles.	<ul style="list-style-type: none"> • Block roads or trails and/or ensure guards are in place when felling trees that are along the travel routes. • Establish radio communications between guards and the sawyer when needed.
Fueling Chainsaws ref (22.48)	Burns, possible fire	<ul style="list-style-type: none"> • Allow chainsaw to cool for at least 5-minutes before refueling. • Fill the tank on bare ground or other noncombustable surface. • Immediately clean up spilled fuel / use a funnel. • Refuel out doors and at least 20 feet from an open flame or other sources of ignition. • Start the saw at least 10 feet from the fueling area.
10. LINE OFFICER SIGNATURE	11. TITLE	12. DATE
Previous edition is obsolete	(over)	

Potential Hazard Tree Indicators

NOTE: Trees with the indicators below are not all highly hazardous but should be carefully examined to assess the danger.

Indicators – Entire Tree

- Snags – standing dead tree or part of dead tree
- Moderate to severe lean (especially recent)

Crown Indicators

- Loss of needles & leaves
- Discoloration/dieback
- Thinning crown
- Stressed cone crop

Limb Indicators

- Dead/cracked/broken branches
- Fallen limbs on ground
- Rot or conks

- Cavities and cankers
- Mistletoe branches

Bole, Stem, Butt Indicators

- Dead/broken tops
- Forked/multiple tops
- Bole swelling
- Cracks or splits
- Cavities and cankers
- Rot or conks
- Wounds/damage – mechanical or fire
- Loose bark

Root & Tree Base Indicators

- Sprung roots – mounded soil or exposed roots
- Compaction & erosion
- Damage from previous fire(s)
- Wind-throw
- Basil resin flow
- Rot or conks
- Cracks or splits

Other Indicators

- Smoke or fire is visible in tree
- Area experiencing insect and/or disease infestations

Assessment Techniques – Potential Hazard Trees

NOTE: Potential hazard trees should be carefully inspected from top to bottom, including soil next to base of the tree. The assessment must include all sides (360°) of tree. Binoculars can aid in evaluating indicators higher in the tree. Much of hazard tree assessment is subjective and dependent on the skill level and experience of the inspector.

- Look for indicators of hazard and assess the degree of severity. Consider severity versus probability.
- Try to determine if decay or rot is associated with the hazard indicators, which makes failure more likely.
- Thump, bore, and dig as needed to assess conditions not immediately visible.
- Striking bole with a solid object (such as flat end of axe) will aid in hearing the hollow sound of a tree with advanced decay. Boring a tree will also reveal how sound the wood is.
- Digging around the roots may reveal if they are green & sound or are they dead, rotten, burned off or otherwise damaged.
- Evaluate wind (especially wind speed and variability in wind direction)
- What other safety hazards exist (uncontrolled fire, steep slopes, obscured visibility, aviation operations, power lines, etc.)?

Risk Mitigation Measures – Identified Hazard Trees

- Utilize LCES (Lookouts, Communications, Escape Routes & Safety Zones) whenever working in the vicinity of hazard trees.
- Eliminate identified hazard trees (consider all techniques such as saw, burn, blast, cable, heavy equipment).
- Use traffic control when felling trees in the vicinity of roads, trails, firelines, etc.
- Ensure that felling operations do not endanger nearby workers. Avoid working down slope of felling activities.
- If unable to eliminate an identified hazard tree, it should be flagged and avoided.
- Identified hazard trees that can't be eliminated must be communicated to all other employees working in the area.
- Reassess situation as conditions change.

APPENDIX E.

Personal Protective Equipment and Saw Safety Features: Maintain PPE in a clean and fully functional condition.

1. PPE Requirements - OSHA 1910.266(d)(1)

- **Chainsaw Chaps:** The employer shall provide, at no cost to the employee, and assure that each employee who operates a chain saw wears ballistic nylon leg protection or other leg protection the employer provides equivalent protection. The leg protection shall cover the full length of the thigh to the top of the boot on each leg to protect against contact with a moving chain saw. Leg protective garments must meet or exceed the cut resistance performance standards outlined in *Standard Leg Protection for Chain Saw Users (92-A-12)* published by American Pulpwood Association, as measured by the ASTM F1897-98 standard test method.
- **Hardhat with Face Shield:** The employer shall provide, at no cost to the employee, and assure that each employee who works in an area where there is potential for head injury from falling or flying objects wears head protection meeting the requirements of Subpart I of 29 CFR Part 1910. The employer shall provide, at no cost to the employee, and assure that each employee who works in an area where there is a potential for injury due to falling or flying objects, wears eye and face protection meeting the requirements of Subpart I of 29 CFR Part 1910. Logger-type mesh screens are acceptable eye and face protection for chain saw users.
- **Hearing Protection:** Hearing protection sufficient to reduce noise exposure to 85 decibels or less
- **Chainsaw Safety Boots:** The employer shall assure that each employee shall wear foot protection, such as heavy-duty logging boots, that are waterproof or water repellent, cover and provide support to the ankle, and provide cut resistance to chain saws. Calk-soled boots or other slip-resistant type boots may be worn provided that foot protection otherwise required by this paragraph is met. Foot protective devices must meet or exceed the cut resistance performance standards outlined in *Standard Foot Protection for Chain Saw Users (94-A-3)* as published by American Pulpwood Association, as measured by the ASTM F1458 standard test method. Employees shall wear leather wildland firefighter boots for chainsaw use while on fire duty.
- **First-Aid Kit:** Kits should be of size and scope to deal with deep cutting, and include the following components.
 - 1 Combat Application Tourniquet
 - 1 QuikClot Advanced Clotting Gauze 3" x 4' Z-Fold
 - 1 Mini Compression Bandage
 - 1 CPR Face Shield
 - 1 Whistle
 - 1 Pair Nitrile Gloves
 - 1 Re-sealable 4-mil clear zip bag
- **Gloves**
- **Hi-vis vest, shirt, or jacket** – with reflective material for low light conditions

2. Safety Features Required on Saws. Should be maintained in working order and inspected before use.

- Working chain brake
- Chain catch
- Spark arrester
- Throttle lock
- Hand guards

- Anti-vibration system
- All nuts/bolts/parts are tightened properly