



Pacific Crest Trail Association



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Association**

Saw Safety Procedures





Safety Requirements

- **Personal Protective Equipment (PPE)**
- **Job Hazard Analysis (JHA)**
- **Trailhead Communication Plan (TCP)**
- **Emergency Action Plan (EAP)**
- **Communications Device**





Personal Protective Equipment (PPE)

Crosscut (All equipment must meet USFS standards)

Hard Hat	Full brim or cap style
Eye Protection	Safety glasses or shield when chopping or driving wedges (ANSI z87.1)
Hearing Protection	Not Required
Long-sleeve Shirt	Required
Gloves	Slip-resistant, appropriate for the weather Cut-resistant, when filing & handling saw conditions
Trousers	Loose fitting
Boots	Heavy-duty, cut resistant or leather, laced, with non-skid soles and adequate ankle support
First Aid	OSHA-compliant kit, one with each saw crew





Personal Protective Equipment (PPE)

Chain saw (All equipment must meet USFS standards)

Hard Hat	Full brim or cap style
Eye Protection	Safety glasses, goggles or shield (ANSI z87.1)
Hearing Protection	Plugs or muffs
Long-sleeve Shirt	Required at all times
Gloves	Slip-resistant, appropriate for the weather conditions Cut-resistant, when filing
Trousers	Loose fitting
Boots	Heavy-duty, cut resistant or leather, laced, with nonskid soles and 6 inch-high or adequate ankle support
First Aid	OSHA-compliant kit, one with each saw crew
Chaps	Meets USFS or ASTM specifications, 2" Overlap at hem





First Aid Kit (PPE)

- OSHA-compliant (1910.266 App A)
 - ▶ Two large gauze pads (at least 8 x 10 inches)
 - ▶ Two elastic wraps
- PCTA Volunteer Injury Packet
- Each saw crew must have a first-aid kit
- [OSHA Link \(online only\)](#)





Job Hazard Analysis (JHA) & Supporting Documents

- **Review JHA and highlight the main points**
 - ▶ Utilize the local/project-specific hazards section
 - ▶ Everyone **MUST** sign the JHA
- **Review Trailhead Communication Plan (TCP) & Emergency Action Plan (EAP)**
 - ▶ Review communication device(s) and protocol
- www.pcta.org/volunteer/crew-leader-center
[\(online only\)](#)





Sawyer Safety Procedures

- **Operational Safety**

- ▶ Apply OHLEC planning logic to improve safety

- **OHLEC**

- ▶ Objective
- ▶ Hazards/Obstacles
- ▶ Leans/Binds
- ▶ Escape Routes
- ▶ Cut Plan





Operational Safety

- Saw operations include, but are not limited to, bucking, brushing, limbing
- Sawyers have the obligation to say "NO" and walk away from any situation they determine to be an unacceptable risk
- Saw only if safe





OHLEC: Objective

- Develop an Objective for the cutting operation
- The Objective is a very iterative process during a bucking operation
- “Where do you want the cut piece when finished?”
 - ▶ Determine cut piece track for log segments
 - ▶ Determine sequence and direction of limb removal
 - ▶ Determine how brush will be removed and disposed





OHLEC: Hazards & Obstacles

Develop a plan to identify the Hazards & Obstacles in the cutting operation

- Overhead – Widow makers, dead trees, leaners, loose bark, snags
- Upslope & downslope
- Both sides of log
- Bearing points
- Pivots
- Root wads
- Spring poles
- Limbs & branches
- Rotten wood
- Foreign objects
- Bees & poisonous plants
- People & animals
- Buildings, property & equipment





OHLEC: Leans & Binds

- Determine the binds in the log to be bucked, and in the limbing and brushing
- Predict binds based on bearing points and lie of log
- Determine the binds in the spring poles
- Determine how the binds will change during the cutting operation
- Determine the reactionary forces when the log is cut





OHLEC: Escape Routes

- Determine the “good” and “bad” side of the cutting operations
- Identify the escape route and safety quadrants, and safe zones for crew
 - ▶ Determine the safe area to work and clear the escape route if needed
 - ▶ Determine the safe area for the saw crew
 - ▶ Determine safety quadrant for each sawyer when double bucking





OHLEC: Cut Plan

- **Develop the cut plan for the cutting operation**
 - ▶ Determine the cutting sequence
 - ▶ Determine the type of cuts required
 - ▶ Determine what types of supports or prep will be required to move cut pieces
 - ▶ Communicate plan to saw crew
 - ▶ Assign tasks to the saw crew and swampers





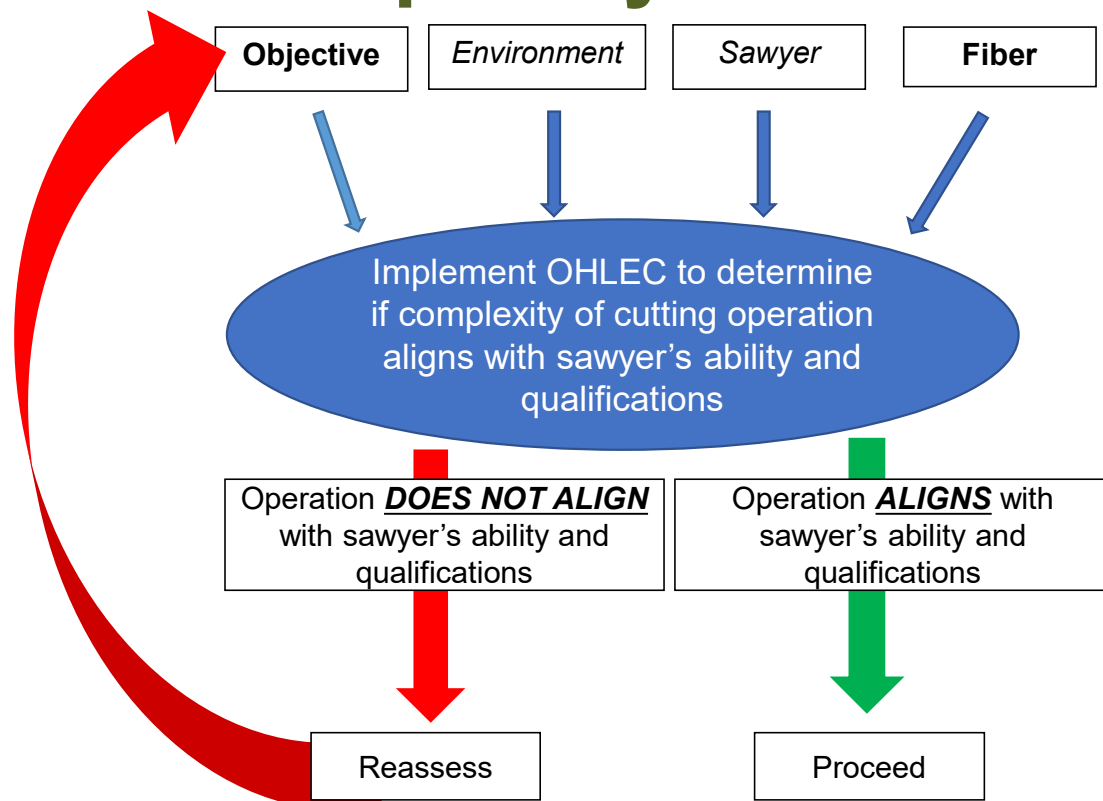
Operational Complexity

- **Objective**
 - ▶ *Static*
- **Environment**
 - ▶ *Dynamic*
- **Human Factor**
 - ▶ *Dynamic*
- **Wood Fiber**
 - ▶ *Static*





Operational Complexity

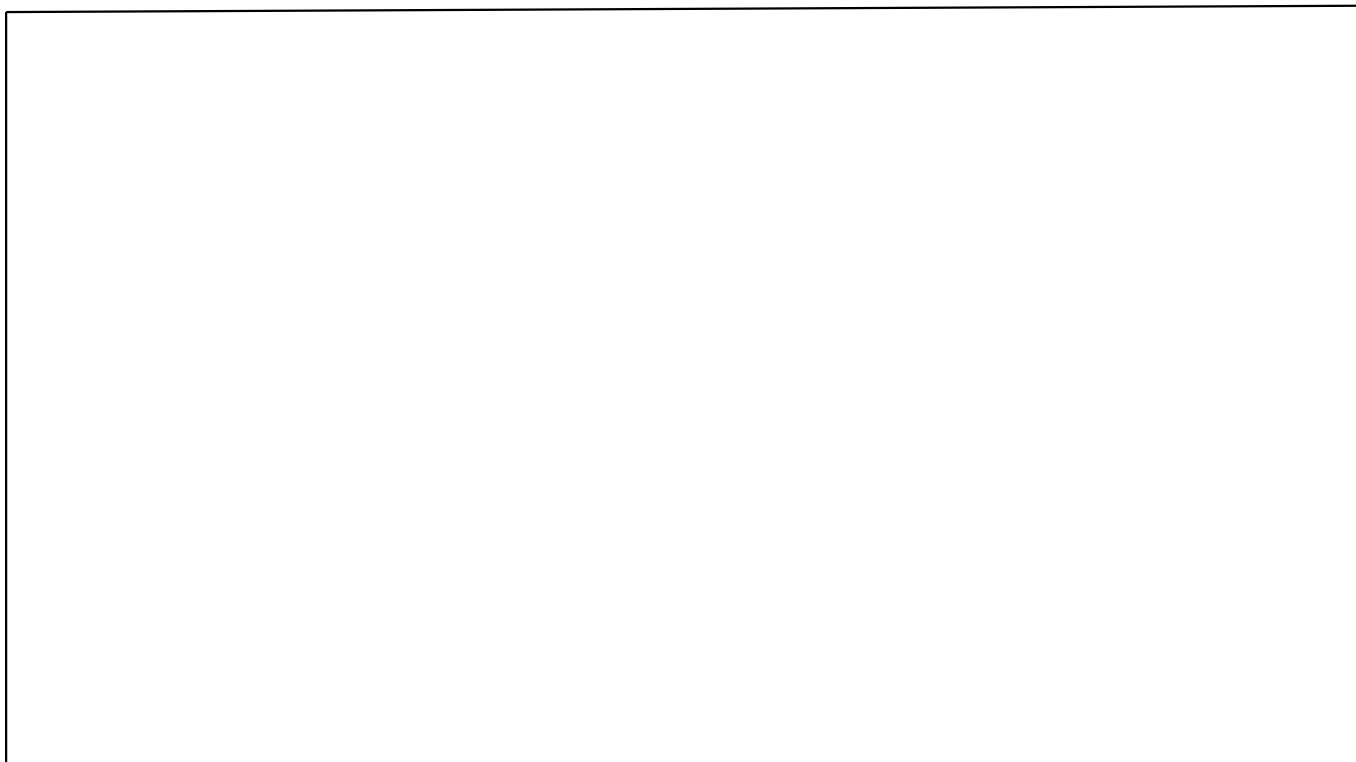


Reassess the Objective to change the sawyer and the environment variables to align with sawyer ability and qualification





Human Factors Video





Hazard Mitigation: Complexity

Chainsaw Field Guide		Risk
Objective <ul style="list-style-type: none">How do I get home safely?What needs to be done?What is your desired lay?What obstacles exist and are their values high?	Fall tree to any lay	Low
	Bucking or Limbing Only	Low
	Fall tree within 45 degrees of specific lay	Moderate
	Fall tree within 5 degrees of specific lay	High
	No safe lay	STOP Reevaluate
Hazards <ul style="list-style-type: none">Overhead hazardsOther Tree hazards in cutting areaEnvironmental HazardsCutting area hazardsWood Hazards – rot, cracks, live, dead, fire weakenedHuman factor HazardsHung/jack straw trees	Static Hazards	Low
	Dynamic Hazards	High
	No Escape from Hazards	STOP Reevaluate
	30% Fiber at Hinge	STOP Reevaluate
	Base won't support down if cut	STOP Reevaluate
Leans (Falling) <ul style="list-style-type: none">Side to SideHead or BackRisk of barber chair?	Side	Low
	3 feet	Low
	3 ft. - 5 ft.	Moderate
	> 5 ft.	High
	Head	Low
Binds (Bucking) <ul style="list-style-type: none">Top/BottomSide to sideEnd to endCombinations	< 3 ft.	Low
	3 ft.	Moderate
	Back	Moderate
	1-2" lift to overcome	Moderate
	> 2" lift to overcome	High
Escape paths	Angle	Low
	Diagonal both clear	Low
	Only 1 escape path	Moderate
	Distance from Tree	Moderate
	15ft	Low
Cutting Plan <ul style="list-style-type: none">Hinge design (80-10)UndercutBack cutSequence of cutsType of bucking cutSlope steepness	10ft-15ft	Moderate
	Cover < 10 ft	Moderate
	No escape path	STOP Reevaluate
	Undercut/Hinge	Low
	Single cut undercut	Low
	Sound Fiber	Low
	Compromised Fiber	Moderate
	Double cut undercut	Moderate
	Sequence of cuts	Low
	All from 1 side, escape to same side	Low
	Requires moving from side to side of tree	Moderate
	Backcut	Low
	Single backcut	Low
	Double cut backcut	Moderate
	Tree diameter > 2x bar length	High
	Cutting plan does not meet objective and needs to be changed	STOP Reevaluate
	Cutting plan does not meet sawyer ability and qualifications	STOP Reevaluate

Climber and Axe Field Guide		Risk
Objective <ul style="list-style-type: none">How do I get home safely?What needs to be done?What is your desired lay?What obstacles exist and are their values high?	Fall tree in any direction	Low
	Fall tree in specific lay	Moderate
	Buck small bole where piece can be easily lifted and moved	Low
	Buck large bole with pre-plan of how to move piece	Moderate
	No safe lay	STOP Reevaluate
Hazards <ul style="list-style-type: none">Overhead hazardsOther Tree hazards in cutting areaEnvironmental HazardsCutting area hazardsWood Hazards – rot, cracks, live, dead, fire weakenedHuman Factor HazardsLessons and Jack straws	0-2 Individual Hazards	Low
	3-5 Individual Hazards	Moderate
	> 5 Individual Hazards	High
	No Escape from Hazards	STOP Reevaluate
	30% Fiber at Hinge	STOP Reevaluate
Leans (Falling) <ul style="list-style-type: none">Side to SideHead or BackRisk of barber chair?	Base won't support down if cut	STOP Reevaluate
	Side	Low
	< 3 feet	Low
	3 ft. - 5 ft.	Moderate
	> 5 ft.	High
Binds (Bucking) <ul style="list-style-type: none">Top/BottomSide to sideEnd to endCombinations	Head	Low
	< 3 ft.	Low
	3ft-6ft	Moderate
	> 6 ft.	High
	Back	Moderate
Escape paths	< 1" lift to overcome	Moderate
	> 1" lift to overcome	High
	Back lean on tree < 12" DBH	High
	Binds	Low
	Known low release of energy	Low
Cutting Plan <ul style="list-style-type: none">Hinge design (80-10)UndercutBack cutType and sequence of cutsWedge PlanChopping	Release of energy know but may require a series of cuts	Moderate
	High release of energy expected or unknown	High
	Angle	Low
	45 degree both clear	Low
	Only 1 escape path	High
	Distance	Low
	15ft	Low
	10ft-15ft	Moderate
	No escape path	STOP Reevaluate
	Undercut/Hinge	Low
	Conventional undercut	Low
	Sound Fiber	Low
	Compromised fiber	Moderate
	Weak side vertical chopping	Moderate
	Undercut-other	High
	Backcut	Low
	Double sawyer	Low
	Single sawyer	Moderate
	Bucking	Low
	Double sawyer	Low
	Single sawyer - underbucking	Moderate
	Cutting height above shoulders	High
	Wedge Plan	Low
	Cutting plan does not meet objective	STOP Reevaluate
	Cutting plan needs to be changed	STOP Reevaluate

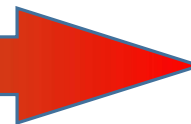


Hazard Mitigation: Complexity

Hazard Ranking Guideline

Log Diameter	16" and under	24" and under	Above 24"
Side Bind	Mild	Moderate	Severe
Top/Bottom/End Bind	Mild	Moderate	Severe
Slope	Level	10%	Above 10%
Single Log	On Ground	3' above Ground	Over 3' in the air
Stacked Logs	On Ground	Suspended	On Slope
Other hazards	None	Pivots, Root Wads, not affected by cutting sequence	Root Wads, Pivots, other hazards

Increasing Complexity





Pacific Crest Trail Association

Hazards: Blow Downs Video





Hazards: Spring Poles Video





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Hazards: Spring Poles Video





Situational Awareness

