JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Clearing logs or splitting wood with axe and hatchet
PERSONAL PROTECTIVE EQUIPMENT	Helmet, eye protection, gloves, pants, boots.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Tool Inspection	Struck by/cut by axe	Make sure the handle is clean and free of cracks or splits and the head is securely fastened to the handle.
		Make sure the bit is sharp and free of burrs.
		Sheath the tool when it is not in use to protect the blade.
Prepare Site	Struck by/cut by axe	Clear the work area of obstacles that could deflect the blade such as bushes or overhanging branches.
	Slips, Trips & Falls	Clear the work area of bark, limbs, or other items that could affect footing.
Axe Use	Injuries to bystanders	Notify other workers in work area before swinging. Maintain safe distance from other workers. Anticipate wood chips flying long distances (> 20') when using an axe.
	Foot and leg injuries	Be sure the swing follow through is not in line with legs or feet.
		If the tree or log to be chopped is not large enough to resist movement during chopping, secure it to another log, rock, or by other means.

		Position feet firmly with weight distributed evenly. Maintain a firm grip on the handle with both hands.
		Stop axe use if you become fatigued.
Limbing	Cuts, injuries from tree moving unexpectedly.	Stand with the tree trunk between you and the limb being cut.
		Remove limbs strategically so that the tree does not shift unexpectedly.
Clearing downed logs		Start notch wide enough so as you work into the thickness of the log, the angle of cut and chopping is not too steep. Making alternate left and right cuts to create a “V”.
		If the tree or log is above the ground, beware, it may give way unexpectedly when the holding wood releases.
Splitting wood	Leg and foot injuries	Never chop on the ground, always use a chopping block.
		Be sure the swing follow through is not in line with legs or feet.
		Bend knees deeply as you swing to prevent followthrough from striking feet or shins.
		If splitting small pieces of wood (for kindling, etc.), lightly start the hatchet blade into the piece of wood, remove holding hand from the wood, and swing the hatchet and wood piece into the splitting block.
Storage at Work Site	Trips and falls, cuts	When not in use, protect the blade with a sheath and place it in plain view a safe distance from the work area.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Brushsaw use
PERSONAL PROTECTIVE EQUIPMENT	Eye protection, leather boots, leather gloves, long sleeves, hearing protection, helmet with a faceshield, brushsaw harness, chaps. **Youth Members are not allowed to operate brushsaws.**

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
Brush Cutter Assembly	Improper Blade Placement	Use arrows on brushsaw and blade to make sure blade turns in correct direction.
		Double check blade is centered on brushsaw before use.
		Make sure blade is sharp.
Power Brush Cutting	Improper use of Circular or Triangular Blades	When using a circle blade for larger brush, ease into cut like a chainsaw.
		When using a triangle blade for smaller brush, use hips to swing into cut with a controlled motion.
	Rocks Kicking Out From Blade	Be aware of your surroundings, make sure others are clear of the area and/or properly equipped.
		Remove debris from area before brushing.

		Wear proper PPE.
	Injury to visitors or co-workers	Have co-workers keep themselves and visitor away from the area you are working.
		Be alert to your surroundings.
		Shield vehicles and glass when cutting nearby.
	Flying Sticks or Brush	Wear proper PPE.
		Make cuts with right side of blade instead of left so debris with fly away from body instead of towards body.
	Slips and Falls	Do not force the brush cutter through overly large material. Do not make wild swings, and keep control of the machine.
		Wear proper boots with ankle support.
		If you fall, push the blade into the ground to stop the spinning.
		Make sure you have secure footing, especially when moving across a side hill.

Job Hazard Analysis

Job to be performed	Carpentry	
Personal Protective Equipment	Helmet, eye pro, ear pro, gloves, respirators/dust masks. **Youth members are not allowed to operate power tools.**	
SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Moving about the worksite, using power tools	Electric shock or tripping from power cords	Keep a neat work site. Keep work areas clear of people. Discontinue use of power cords that are cut or frayed.
	Accidents caused by dull bits, blades, etc.	Ensure drill bits and saw blades are sharp and in good condition. Do not force cuts or drilled holes if you encounter resistance. Discard bits and blades if they are dull or damaged.
	Flying debris in eyes while cutting	Wear all PPE while using power tools.
	Cuts to hands, arms, legs	Maintain situational awareness, communicate with crewmates about movements and spacing, keep safe distance between workers.
	Hearing loss	Use ear protection when using or working near power tools, even for short periods of time. Warn others of loud noises and give them time to prepare.
Lifting heavy loads	Muscle strains, repetetive use injuries, especially to the back, wrists, and elbows	Use good form when lifting- use the legs, engage the pelvic floor, and keep joints aligned. Get help from a partner for heavy loads or when you are tired. Rotate tasks and stretch often to prevent repetetive use injuries.
Working on or near ladders	Falls, injuries from items falling from ladder.	Make sure the ladder is on stable ground and secure. You may want to use a spotter. Fall protection (harness, rope) is required when working above 6 feet.
		Do not rest tools on the ladder precariously. Avoid working under someone on a ladder. Always wear a helmet in an active work zone.
Using power sanders	Respiratory irritation and long term effects from dust inhalation.	Wear a dust mask anytime you use a power sander. Avoid working in enclosed areas with dust producing tools.

Sawing, sanding and machining of treated wood	Exposure to Chromated Copper Arsenate (CCA)	Avoid frequent or prolonged inhalation of sawdust from treated wood.
		Sawing, sanding and machining of treated wood should be performed out doors while wearing PPE.
		Because preservative or sawdust may accumulate on clothes, launder before reuse. Wash work clothes seperately from other household clothing.
		After handling treated wood and before eating, drinking, toileting, or using tobacco products, wash exposed areas of skin thoroughly.
	Improper disposal and cleanup of treated wood.	All sawdust and construction debris should be cleaned up and disposed of properly. Dispose of treated wood by ordinary trash collection.
		Do not burn in open fires, stoves, or residential boilers, because toxic chemicals may be produced as part of the smoke and ashes.
		Sweeping up of sawdust should be performed in PPE.
	Improper use of CCA treated wood	Do not use treated wood where the preservative may become a component of food or animal feed (mulch, counter tops, beehives, containers for storing animal feed, etc.)
		Only treated wood that is visibly clean and free of surface residue should be used for patios, decks, and walkways
		Do not use treated wood where it may come in direct or indirect contact with drinking water.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Crosscut saw use and maintenance
PERSONAL PROTECTIVE EQUIPMENT	Eye Protection, Leather Boots, Leather Gloves, and Helmet. Additional Youth PPE: Chaps

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Preparing For Work	Injuries or Property Damage Resulting From Lack of Communication or Knowledge About the Project	If at any point a job is deemed unsafe, workers should feel entitled to stop until the appropriate PPE or equipment is available, or the right conditions exist to make the job safe.
		Always wear the required PPE. PPE should be kept in good condition and replaced when worn out.
	Injuries Or Property Damage From Lack Of Preparation, Proper Tools, or Poorly Maintained Equipment	All tools should be inspected regularly to ensure their safe condition.
		Thoroughly inspect crosscut saws and field kits before leaving for the field.
		Only authorized personnel may operate crosscut saws, under the approval and direction of supervisors, crew leaders or on-site (project) supervisors.
		Confirm with your project partner ahead of time what A, B, and C fellers and buckers are allowed to do in regards to work complexity in their district.
Transporting Crosscut Saws	Injuries or Property Damage From Transporting Tools	Be extremely careful when carrying saws, keep the saw as flat as possible, and maintain control of the saw at all times.
		Sharp edges should be positioned in such a way to minimize exposure to self and others: use scabbards/sheaths, and point the teeth away from body.
		Tools need to be carried securely, but also readily separable in case of a slip or fall.

Project/Worksite Safety Considerations	Injuries or Property Damage From Lack of Communication	Good communication between crewmembers should reinforce individual awareness of potential hazards.
		Crewmembers need to stay aware of their surroundings, the location of other crewmembers and other trail users while operating crosscut saws.
		Always yell-out, “front-cut! Back-cut!” and, “falling!” when falling trees.
	Injuries or Property Damage From Improper Worksite Analysis	Always thoroughly size-up each and every tree, before any cuts are made. Never attempt to cut any tree that is unsafe, that you are uncomfortable with, or that is beyond your skill level.
		Never attempt to cut any tree when conditions aren’t right or too hazardous-e.g., high winds, deep snow, etc. Constantly assess and reassess as you go—things can change!
		Always have at least one escape route and safety zone planned prior to making any cuts.
		Always post guards or lookouts when clearing trails, preferably in the line of sight of the crosscut saw operator.
Cutting or falling using the crosscut saw	Injuries or Property Damage From Improper Crosscut Use	Look up, down and all around while cutting. Don’t get focused on one thing and neglect to watch for other hazards.
		Anticipate where the tree is being pinched, where it’s under tension (pulled apart) and where it’s under compression (pushed together/compressed).
		Consider using compound cuts to direct where log will roll after cutting.
		Watch the kerf—it is a good indicator of tension and compression—if the cut opens, it’s under tension: if it closes, it’s under compression.
		Use WD-40 to reduce friction built up by sap on the crosscut.
		Use wedges, especially on larger diameter material. Be extremely careful when setting and tapping wedges to not break or dislodge wedges.
		Anticipate ‘spring-back’ from ‘spring poles’: saplings or pinched branches. Use proper techniques to release compression and tension.

		Always work from the uphill side unless the situation dictates otherwise.
		Try to cut limbs on the opposite side of the tree in relation to where the operator is standing, as terrain, tension, and the situation allows.
		As a general rule, always release the tree from the stump first, then limb your way out to the top and buck your way back to the stump.
		Vary your body position and the types of activities performed to limit exposure to repetitive motion injuries.
	Injuries or Property Damage From Moving Cut Logs	Be especially careful rolling logs and rounds on loose or steep slopes. Make sure the log will roll to a safe location. Clear a path, and post guards to minimize potential for injuries.
		Use an adequate number of bodies when moving logs by hand. Consider using log tongs.
Crosscut Maintenance and Storage	Injuries or Property Damage From Improper Crosscut Maintenance and Storage	After use, apply WD-40 with steel wool to remove rust and sap buildup on crosscut. After cleaning, apply motor oil to lubricate saw and limit oxidization of exposed metal.
		Store crosscut on a flat surface or hanging up. Keep crosscut as dry as possible.
		Do not attempt to sharpen a crosscut saw. It can only be sharpened by a professional.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Driving
PERSONAL PROTECTIVE EQUIPMENT	First aid kit, vehicle tool box, fire extinguisher

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
MCC Driving Privileges	Accidents due to improper training	All Drivers who operate a MCC vehicle (or private vehicles used on official duty) shall hold a valid state driver's license with the proper endorsements for the size and class being driven.
		Certain past violations could result in denial of MCC driving privileges. Violations that occur during the season in a private vehicle on an employee's off time could also result in denial of MCC driving privileges.
		Defensive driving training is required for all MCC employees who drive an MCC vehicle on official duty.
Defensive Driving	Fatigue	Employees shall not operate while sick or suffering from excessive fatigue or emotional stress. No one should drive an MCC vehicle who is under the influence of a prescribed or over the counter medication which includes a warning not to operate equipment or that may cause drowsiness.
	Damage to Vehicle	Driving an MCC or partner vehicle under the influence of alcohol is prohibited. Violation of this rule will result in immediate termination.
	Damage to Others	Drivers are limited to no more than 10 consecutive hours of driving or 14 consecutive hours total on duty, even with multiple drivers.

		Phone use is prohibited while driving an MCC vehicle.
	Damage to Vehicle; personal injury; accidents caused by bad conditions such as weather, smoke, and dust; collisions with wildlife	Seat belts must be worn at all times. The vehicle operator shall ensure passengers also wear safety belts. Do not exceed the carrying capacity of a vehicle; there must be a functional seat belt for every passenger
		Drivers and passengers must know and obey all State and local traffic laws. Any tickets aquired on MCC time are the responsibility of the driver.
		MCC requires drivers to travel 5 MPH below the posted speed limit when the posted speed limit is above 55 MPH. Drivers shall not exceed 75 MPH.
		Driver should reduce rate of speed in hazardous conditions, such as bad weather and low visibility.
		Be alert to wildlife crossing roadway, particularly at dawn, dusk, and after nightfall.
		Headlights are to be on while vehicle is in motion, no matter what time of day.
		Vehicles must have a fire extinguisher and first aid kit at all times.
Backing	Damage to Vehicle, accidents, damage to others	Minimize the amount of time spent backing. Always back into parking spots rather than out of them, and plan ahead if it will be necessary to turn around.
		Use a spotter when backing at all times. Roll down the windows, turn off the radio and communicate effectively.
Vehicle Incidents	Damage to Vehicle/Injury	If accident occurs, turn to your MCC policy manual for procedure and contact MCC staff as soon as possible.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Fencing
PERSONAL PROTECTIVE EQUIPMENT	Helmet, eye protection, gloves, long sleeves, long pants, leather boots.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Transporting materials	Cuts from barbed wire, tetanus	Control wire to prevent backlash. Wear PPE and durable clothing. Have a current tetanus vaccine, and clean any cuts promptly.
	Muscle strains, injuries from lifting, trips and falls	Use proper ergonomics and spread the load between several people.
		Fencelines tend to be less travelled than trails. Pay close attention while walking and avoid loose material, slick patches, and gopher holes.
Building H Braces	Injuries to hands, back	Use proper ergonomics while digging post holes.
		Use caution when pounding spikes. Wear PPE and keep the area clear.
Installing T posts	Injuries from post pounder, hearing loss	Post pounders are heavy. Use proper ergonomics and employ caution when lifting the post pounder above shoulder height (it can hit you in the head if you lose balance).
		If holding a T post for someone else to pound, ensure that your hands are low enough to avoid injury.
		Wear hearing protection. Hearing loss is accumulative and permanent.
Stretching fence	Fence coming loose under tension, pinched hands	Make sure that the wire is secured in stretcher before adding tension. Stand clear of the area as much as possible in case the wire comes loose.
		Ensure that the wire is firmly secured to the H brace before removing the stretcher.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Griphoist and highline use
PERSONAL PROTECTIVE EQUIPMENT	Helmet, eye pro, leather gloves, leather boots.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Preparation to Use Griphoist and Highlines	Injuries or Property Damage Resulting From Lack of Communication or Knowledge About the Project	If at any point, a job is deemed unsafe, workers should feel entitled to stop until the appropriate PPE or equipment is available, or the right conditions exist to make the job safe.
		Communicate between crewmembers to reinforce individual awareness of real and potential hazards.
	Injuries From Lack of PPE	Always wear the required PPE. PPE should be kept in good condition and replaced when worn out
Setting Up System, Trouble Shooting, Testing	Injuries From Poor Planning and Project Management	Explore options, fill holes, and build temporary structures to maximize safety and efficiency in moving materials, especially on steep or loose slopes.
		Clear the route of hazards and debris before moving materials. Consider using chocks, skids or logs to ease moving materials.
	Injuries or Property Damage Resulting From Misused or Overloaded Equipment	Questions to ask when setting up and using a highline system:
		-Where is the most useful location for the system?
		-Are there any conflicts/safety issues with trails or the public.
		-Where is the direction of pull?
		-What type of anchors are there?
		-Are they sound? Are there more than one?

		-Are the anchors/spar trees in the same plane?
		-What's the angle between anchors? Between anchors and spar trees?
		-Are the anchors equalized and/or independent?
		-What will happen if an anchor fails?
		-Are spar trees of questionable size? Can they be anchored?
		-Will anchor straps damage trees? Adjust under slack and/or pad.
		-Will the loads clear high spots/natural obstacles?
		-Do loads need to be belayed?
		-How heavy are the loads?
		-How much tension is required to lift loads?
		-What is the heaviest load this system can safely handle?
		-What is the weakest link in the system?
		-Where is the greatest strain placed on the system?
		-What is the worst case senario? How can it be prevented/mitigated?
		-Is there anyway to retain safety and function, yet reduce the system to fewer components
Setting Up System, Trouble Shooting, Testing	Injuries Or Property Damage Resulting From Misused Or Overloaded Equipment.	Employees using griphoist and highline systems must be familiar with the safe working load limits and safety features of all components in the system.
		It is recommended that a load calculation be done before every new or major lift, to ensure loads are within safe working limits.
Using and Operating System	Injuries From Equipment	All tools should be inspected regularly to ensure their safe condition.

		Workers should never step, sit, straddle or stand on the cable; Never enter or occupy the ‘dead man zone’; and Never needlessly touch a cable under tension
		When moving materials or applying tension, workers need to remain aware of direct and potential hazards, and position themselves in such a way to minimize their exposure.
		All personnel in proximity to highline operations need to be wearing PPE.
		Crews need to understand the different safe working load (SWL) limits of straps and chains when oriented vertically (SWL =1X), as a basket (SWL = 2X), or girth-hitched (SWL = approx ¾ X).
Using Chain Baskets	Injuries From Equipment: Chains and Chain Baskets.	Employees working with chains and chain baskets need to be familiar with their safe working load limits and basic chaining techniques
		Inspect chains and baskets prior to use and/or periodically during use
		Slip hooks should be equipped with operational gates. Slip hooks should be taped if necessary.
Using Straps	Injuries From Equipment: Anchor Straps	Employees working with anchor straps need to be familiar with their safe working load limits and basic wrapping techniques.
		Inspect anchor straps prior to use and/or periodically during use.
		Note that there are anchor-only and drag-only straps in the cache.
		If anchor straps will damage trees, adjust under slack and pad.
		Slip hooks should be equipped with operational gates.
		Place anchor straps as low on tree as possible.
Using Shackles	Injuries From Equipment: Shackles And Misc.	Crews working with shackles and other system components need to be familiar with their safe working load limits and basic techniques.

		Inspect shackles prior to use and/or periodically during use.
		When in doubt, tape or cable-tie shackle pin to ensure it will not back out
		When belaying loads from a shackle, make sure the vibration or friction from the rope will not back the pin out
		Slip hooks should be equipped with operational gates.
Using Tripods	Injuries From Equipment: Modular Spar Towers	Crews working with towers and their components need to be familiar with their safe working load limits and basic set up and operation.
		Inspect towers and components prior to use and/or periodically during use
		Note that each tower is unique and each piece is labeled to indicate which parts go together.
		Direction of pull should strike through the center of each tower.
		Ensure each leg is securely planted. Be extra careful on exceptionally hard (slick rock) or soft ground, as legs can slip or become buried under tension.
		Make sure weight is evenly distributed between each leg.
		When in doubt, anchor tower and/or secure legs, perform test lift and/or slowly increase weight, check towers and system often.

Using Snatch Blocks	Injuries Or Property Damage Resulting From Misused Or Overloaded Equipment: Multi-Part-Pulls.	Employees working with blocks need to be familiar with their safe working loads, angle limits, and basic techniques.
		Note that there are two sizes of blocks;
		-small (silver) blocks for angles between 0 and 90 degrees,
		-large (orange) blocks for angles between 0 and 180 degrees.
		When in doubt, tape or cable-tie block locking mechanism to ensure it will not back out or loosen.
		Blocks should be equipped with operational gates.
		When using multi-part pulls, make sure the additional mechanical advantage does not exceed the safe working load limits of anchors, shackles, or other system components.
		Inspect blocks prior to use and/or periodically during use.
Operating System	Foot And Hand Injuries	Workers need to maintain constant awareness of their feet and hands in relation to objects being moved and avoid placing them under materials.
	Injuries From Materials—Cuts, Scrapes, Pinches, Etc.	Clear work area often to reduce the chance of tripping or falling
		Be prepared for sudden or unexpected shifting or settling of loads when tension is introduced, especially when using chains and chain baskets.
		Freshly cut stone is extremely sharp, and workers need to exercise caution while handling or moving this material.

	Injuries From Overhead Hazards	Hardhats are mandatory for all griphoist use
		Check for and anticipate any overhead hazards. Special attention to tree limbs and tops. Look up!! Shock loads especially can snap branches.
		The belayer must have clear visual or verbal communication with the load attendant to avoid shockloading the system on a high center hangup.
		A muenter hitch with a dynamic rope on a shackle is the standard belay
	Injuries Or Failures From Overloading System Or Components	Use attached Griphoist Cheat Sheet—Working Load Limits and Trails Rigging Standard Operating Procedures.

Griphoist Cheat Sheet—Working Load Limits:

TU-17 = 2,000lbs (19lbs)-pins shear at 3,000lbs
5/16" **wire rope** (4x26) = 10,000lbs (.185lbs/ft)
3" dia. (silver) **snatch block** = 4,000lbs (4lbs)
4 ¾" dia. (orange) **snatch block** = 3,000lbs (8lbs)
TU-28 = 4,000lbs (40lbs)-pins shear at 6,000lbs
Griphoist handle weighs 3lbs
7/16" **wire rope** (4x26) = 20,000lbs (.35lbs/ft)
4 ½" (silver) **snatch block** = 8,000lbs (12lbs)
6 7/8" (orange) **snatch block** = 5,000lbs (15lbs)
Tripods—recommended max load = 600lbs
½" screw-pin **shackle** = 4,000lbs (>2lbs)
5/8" screw-pin **shackle** = 6,500lbs (>2lbs)
¾" screw-pin **shackle** = 9,500lbs (2lbs)
7/8" screw-pin **shackle** = 13,000lbs (3lbs)
Chain saddle **grab link** = 7,300lbs
"Little Mule" wire grip = 5,000lbs (3lbs)
"Sauerman" cable clamp (3/8") = 4,000lbs (5lbs)
"Sauerman" cable clamp (1/2") = 7,000lbs (5lbs)
Chain baskets = 9,000lbs (~43lbs)
Grade 80 chain = 7,100lbs (1.5lbs/ft)
Webbing slings: (10' = 3lbs)

2" wide	**3"** wide
Vertical = 6,400lbs	Vertical = 8,600lbs
Choker = 5,000lbs	Choker = 6,500lbs
Basket = 12,800lbs	Basket = 17,200lbs

Trails Rigging Standard Operating Procedures:

- **Size Up**
  - What is the Objective?
  - What are the Hazards?
- **Estimate Weights**
  - Weight x Volume
- **System Design**
  - Calculations
  - Anchors
  - Components
  - Attachments
- **Inspection, Safety Plan, Test**

ROMO **Safety Factor**: ***All Rigging*** **= 5 : 1**
Volume: Circles = π r 2, Cylinders = π r 2 x L(ength)
Squares/Rectangles = Length x Width x Depth
Approx. Weights: Granite = 170lbs per Cubic foot
Weight per linear foot: Doug Fir: 24.7(gr), 17.7 (dry)
based on 8"-10" dia Spruce: 21.7 (gr), 16.4 (dry)
Pines: 19.6 (gr), 16.1 (dry)
Coefficient of Friction: Rock on Dirt = 8%
%Grade = Vertical Rise x 100 ÷ Horizontal Run.
To find # of Pads and Pad length: determine rise and run of section in inches. Divide the rise by step height to find # of steps. Divide run by # of steps—plus one to find pad length in inches.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Hand Tools (Trail Maintenance and Construction)
PERSONAL PROTECTIVE EQUIPMENT	Gloves, Hard Hat, Eye Protection

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
Tool Preparation (hand file, power disk	Cut Fingers/Arms	Have a stable work surface
		Do not use a grinder without proper instruction and always wear a face shield with eye protection
		Take your time, watch what you are doing
		Replace a tool handle if it is extremely dry, cracked, warped, or loose.
		Remove pitch from tools before going into the field
		Refer to pages 131-132 of *Trail Construction and Maintenance Notebook* for sharpening instructions or watch the video *An Axe to Grind*
General Use	Bodily Injury and Fatigue	Always carry tool at your side, on the downhill side, with sharp edge pointing down
		Keep proper spacing, 10 feet minimum between coworkers when swinging tools
		Do not swing tools towards body
		Maintain proper grip on tools
		In addition to required PPE, wear long pants and sturdy boots
		Notify coworkers when you are passing
		When working with a tool, position body securely and square to the target
		Use the right tool for the job; do not pry with a digging or chopping tool
Pulaski	Bodily Injury to Self and People Close By	Check for overhanging branches when chopping
		Keep good control over the tool and be aware of where the sharp ends are.
		Keep tool sharp and clean
		Use the axe end to chop large roots after dirt has been cleared by the adze end
Rock Bars	Personal Injury-Broken Fingers, Arms, Legs, Ribs. Strained Back.	Always ensure rock bar is in good working order with no visible cracks
		Maintain the factory bevel on the tip with a file or grindstone
		Always lay the bar down when not in use, NEVER lean it up against another object
		When operating the bar, use both hands

		If the bar begins to bend, release the tension
		If necessary, use a fulcrum for leverage. If a second bar is needed ensure there is good communication between the two operators
		Do not put your hands under a rock while the rock bar is in use
		Do not pry with the bar between your legs
		Carry rock bar at your side or on your shoulder, tip forward, with a good grip in the center to balance the weight. The person carrying the rock bar should hike at the back of the group
Pick Mattock	Bodily Injury	Use pointed tip for breaking hard objects and the adze on softer materials
		Stand comfortable with your feet about shoulder width apart and one foot slightly forward. Grasp the handle with your forward hand near the head, place the other hand near the handle end. Bend over at the waist with your back straight and work the tool with short deliberate downward strokes.
Shovel	Broken toes	When shifting or scooping materials bend at your knees and lift with your legs
	Strained Back	When shoveling, support your upper body by bracing forearm closest to your body against your thigh as you pivot the blade sideways.
	Bodily Injury	Carry the shovel with the head forward
		Grip the handle near the head and hold it awar from the body
		Keep the edge sharp
		Never use a shovel as a pry bar
Log Carrier	Strained Back	Lift with your legs
		Make sure both hooks on the carrier are secured to the long
		Use good communication between all people involved in the operation
Lopping Shears/Nippers	Bodily Injury and Fatigue	Be aware of falling limbs, especially when lopping overhead
Cleaning Waterbars	Bodily Injury	Bend at the knees, get as comfortable as possible
		Do not clean waterbars with the side of your foot
Lifting (i.e. rocks, logs)	Back Injury/Hernia	Lift with your legs
		Hold object close to body
		Ask for help if needed
		Use mechanical devices when objects are too large or heavy
		If possible, cut or break the object to make easier to move
Working on Switchbacks or hillsides	Personal Injury, Injury to Coworkers, Injury to the Public	Be aware when coworkers are directly below or above you
		Use flaggers if the trail below is not visible and an object being cut or move has potential to roll downhill

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Application of Herbicide by Hand Apparatus
PROTECTIVE EQUIPMENT	Long Pants, Long Sleeves, Wrap-Around Safety Glasses, Nitrile Gloves, Work Gloves, Chemical-Resistant Boots

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
Transport of Herbicides	Exposure to Herbicides	Before loading, ensure PPE, spill kit and cleaning supplies are available: Shovel, absorbent material (sand, kitty litter, etc.), rags or paper towels, contractor bags.
		Check to ensure herbicide containers and backpack sprayers are not damaged before loading.
		If needed, wipe down the exterior of backpack sprayers and herbicide containers with paper towels or rags to remove herbicide and blue dye prior to transport or use.
		Prior to loading, depressurize backpack spray wands by removing the sprayer lid and spraying the contents of the wand directly into the sprayer tank. Wipe nozzle tip clean, and cover with nitrile glove.
		Transport herbicides only in closed, lockable containers in the bed or box of a truck
		Carefully arrange and secure backpack sprayers to stabilize sprayer, to avoid damage to spray wand, and to prevent the cross contamination of other equipment.
		Leaking sprayers and herbicide containers can be consolidated with functioning containers.
		Transport herbicides only in closed, lockable containers in the bed or box of a truck
		For longer distance of travel do your best to empty backpack sprayers (plan ahead!). Equipment, including loaded backpack sprayers, may require placement in a contractor grade garbage bag.
		Drive safely, and slow down in rugged terrain.

2. Mixing & Handling Herbicides	Exposure to Herbicides	Read and follow all safety instructions for each herbicide, found on the chemical label and SDS
		Properly bandage or protect any open cuts or abrasions before handling herbicides.
		Required PPE for mixing includes impermeable (nitrile or similar) gloves and safety glasses.
		Clean as you go, wiping up all herbicide and indicator dye dribbles and spills as they occurr.
		Hold backpack sprayer upright while designated mixer measures and pours herbicides.
		Mix herbicides in a well-ventilated area
		Always check equipment and fittings for leaks and calibrate with water before using herbicides
		If present, use spill trays to prevent soil contamination.
		Triple-rinse and store all herbicide measuring and mixing equipment.
3. Application of Herbicides	Exposure to Herbicides; Spills and/or Contamination	Wear PPE while applying herbicides.
		Spills are common while putting on the backpack sprayer. Be mindful of sprayer tanks position at all times, and keep tank upright throughout application process. Use proper lifting technique- avoid bending over, ask for assistance, or place sprayer on tailgate or other raised surface to minimize spills.
		While spraying, ensure that you and other sprayers are upwind of spray nozzles.
		Immediately attend to any leaks or spills.
		Communicate presence of others to MCC personnel
		Post signage with herbicide warning if working in populated areas
		Wash herbicide off immediately if it contacts skin. Take supply of water to work site for washing purposes

		Thoroughly wash hands and remove gloves before eating, drinking, smoking, or using the bathroom.
Storage of Herbicides	Exposure to Herbicides; Spills and/or Contamination; Security of Herbicides	Thoroughly clean and rinse equipment before storing (usually at end of hitch)
		Utilize triple-rinse procedures to ensure thorough decontamination
		Wear PPE while cleaning equipment
		While at work site, keep herbicide containers in the shade to prevent volatilization and pressure buildup
		Designate an area where only herbicides are stored
		Lock herbicide storage areas (truck box, locker, shed, etc.)
		Ensure all containers are clearly labeled, especially those herbicides which have been mixed and transferred to a new container
Spill Procedures	Exposure to herbicides; Spills and/or Contamination	Provide First Aid as needed
		Utilize spill kit to contain the spill and absorb excess or pooling herbicide (spill kits may be self-made by using absorptive clay, pet litter, saw dust, etc.)
		If the spill starts to spread, or threatens nearby water sources, dig a dike around the area with a shovel;
		Double bag all contaminated soils and absorptive materials for proper disposal in a sanitary landfill
		Fill out Incident Report for spills over 1 Cup; Spills over 2 Gal. will result in a written warning and additional training with regional staff; Spills over 5 Gal must be reported to MT Dept. of Agriculture and will result in temporary suspension of participant's herbicide application

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Use of motorized watercraft
PERSONAL PROTECTIVE EQUIPMENT	United States Coast Guard approved, properly fitted Personal Floatation Device (PFD), first aid kit, map, spare paddle, compass, flashlight, bailing device and radio.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Launching and Loading a Boat	Damage to equipment	Insure that the drain plug is in place, remove tie down straps, tilt outboard motor up before launching, unplug trailer light system.
	Personal injury	Know the weight capacity of the boat, be sure that weight is properly distributed.
		Make sure safety lock is engaged when operating a trailer winch.
Watercraft Travel	Drowning	During periods of high winds avoid large open water areas, know personal and equipment limitations, don't be afraid to sit out high winds, insure fuel supply is adequate. Always wear your PFD.
	Capsizing	Know how the boat maneuvers, know boat stopping distance, don't make tight, high speed turns.
	Lightning/Storms	Stay off of water during electrical storms, wear proper clothing, know current and expected weather conditions.
	Rocks and Reefs	Have current maps showing safe travel routes and known hazards, travel slow in unfamiliar waters, be aware of fluctuating water levels, use GPS and depth finders.
	Floating debris	Utilize passengers to look out for floating debris
	Rapids	No running of rapids.
	Sunburn/Eye strain from the glare	Avoid prolonged exposure to bare skin, cover skin or use sunscreen, wear sun glasses and/or hat.

	Night travel	All regularly scheduled travel shall terminate at least 1 hour before sunset. Per state regulations, all boats will have approved lighting systems.
	Stranding	Be sure to secure watercraft at all landings, so that it does not float away.
	Hypothermia	Dress in layers and carry appropriate rain gear. Recognize signs of hypothermia.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Working with pack animals
PERSONAL PROTECTIVE EQUIPMENT	Sturdy boots, pants, gloves.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Preparation for packing	Kicked by animal or crushed toes/feet	Wear appropriate PPE for this situation- sturdy boots are always required when near stock. Warn animal of your presence and intentions. Don't hang out behind horses or mules. Avoid spooking animals.
	Helpers cause accident/incident	Make sure that you understand what the packer wants you to do. Often people new to stock use don't have good "horse sense".
Tying loads on animals	Injuries from lifting loads	Try to work in pairs. Try to lift pack saddles/loads with good technique even though these loads are heavy and awkward. If available, load near a side hill or other higher surface so lift is lower.
	If horse spooks or shifts, feet can get stepped on, helpers can get kicked	Make sure the horse sees the load you are placing on it. Keep contact with the animal when moving around it. Make sure you have space to move away from the animal if it spooks.
Following or encountering string on trail	Animals spooked by visitors or other event.	When you meet a packstring in the trail, move downhill, take off helmets and packs and talk softly with the packer as the string approaches. Wait until string is well past before stepping out onto the trail.
	Wrecks	Do not wade into a wreck as it unfolds. Wait until the scene stabilizes, then look to your packer for instructions. The most helpful thing may be to stay out of the way.
Situational awareness of environmental hazards	String spooks because of or is in close proximity to natural hazards such as falling trees, rock or ice fall.	Maintain a high level of situational awareness. Do not pass or work with strings in constricted, steep, or otherwise dangerous areas.
		Constantly assess exposure to potential hazards—are you near cliffs? What time if the year is it? How strong are the winds? Are you under dead trees?

		Minimize time spent in hazardous areas in the event of a wreck.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Rock Work
PERSONAL PROTECTIVE EQUIPMENT	Helmet, eye protection, gloves, leather boots, long pants.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Preparation For Rockwork	Injuries or Property Damage Resulting From Lack of Communication or Knowledge About the Project	If at any point, a job is deemed unsafe, workers should feel entitled to stop until the appropriate PPE or equipment is available, or the right conditions exist to make the job safe.
		Communicate between crewmembers to reinforce individual awareness of real and potential hazards.
		Crewmembers warn each other of presence of hikers with a friendly, “trail,” or, “traffic.”
	Injuries From Lack of PPE	Always wear the required PPE. PPE should be kept in good condition and replaced when worn out
Handle and Transport of Rocks	Injuries From Improper Body Mechanics	Use and promote proper techniques of stretching, lifting, bending, moving, rolling rocks, tool use and securing good footing.
		Switch hands often, and vary the types of activities performed to limit exposure to repetitive motion injuries.
	Miscommunication While Moving Rock	Discuss transportation methodology before attempting to move materials.
		Instructions should come from one predesignated person while working in teams of two or more.

	Excessive Strain and Lack Of Personnel	Use the appropriate number of workers to move materials. This decision may vary between individuals or determined by the on-site supervisor. If inadequate personnel are available, refrain from activities.
	Injuries From Tools or Equipment	Inspect tools regularly to ensure their safe condition.
		Use either rock bars or hand lifting techniques to minimize the potential for injuries to hands.
	Loss of Control of Material	Stay aware of your surroundings, the location of other crewmembers and other trail users while moving materials. Post lookouts or guards when loss of control is possible.
		Maintain constant awareness of your feet in relation to objects being moved and avoid placing them under materials.
		Position yourself to minimize your exposure when moving rock or applying leverage.
	Injuries From Rock Bars	Never straddle, sit or stand on rock bars. Do not cross rock bars. It takes only 15lbs of pressure to break your clavicle. Don't brace a loaded rock bar against your collar bone, shoulder, or knee.
		Be prepared for sudden or unexpected loss of bite or slippage—use chocks to increase purchase. Move stones gradually instead of in large pushes.
Lay Rock, Shape Rock, and Crush Rock	Injuries From Tools or Equipment	Use the right tool for the job to decrease the chances of injury to an employee, or damage to a tool through improper use.
		Use proper body mechanics and technique.
	Injuries Caused by Shaping and Splitting Rock	All personnel in close proximity to shaping or splitting operations need to be in full PPE.
		Freshly cut stone is extremely sharp, and workers need to exercise caution while handling or moving this material.
		Consider wearing hearing protection when shaping and splitting rock.

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	
PERSONAL PROTECTIVE EQUIPMENT	

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Task 1	Hazard 1	
	Hazard 2	
Task 2	Hazard 2	

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Towing a Trailer
PERSONAL PROTECTIVE EQUIPMENT	When loading tools: hard hat, gloves, eye protection.

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED SAFE JOB PROCEDURES
Backing up Vehicle to Trailer	Backing up too quickly	Reverse slowly with windows down and no radio
	Hitting someone or something	This job requires two people, use a backer!
Pulling Trailer to Hitch by Hand	Strained back	At least two people are required to move the trailer by hand
	Dropping Trailer, Bodily Injury	Move slowly and communicate with crew
		Keep proper balance
		Try to move the trailer by hand only when it is empty or with very little weight inside
Hooking up the Trailer	Pinches	Have two sets of eyes on everything being hooked up
	Hooking up trailer incorrectly	Before moving, make sure the lights work, the foot is up, and chains are crossed below the tongue when attached
Driving with a Trailer	Changing road conditions	Be aware of weather forecast before driving
	Fishtailing in high winds	Practice driving with a trailer before long-distance trips
	Flat tire	Check tire pressure and lug nuts before driving
	Contents of trailer being thrown around	Secure trailer contents
	Running over curbs or hitting other vehicles	Take wide turns and give more space than normal between yourself and other drivers.
		Drive responsibly, never exceeding 65 MPH!
		Avoid driving in high traffic areas & parking lots
Parking a Trailer	Hitting nearby vehicles, objects, or people	Use your backer and mirrors, minimize distractions, and drive slowly. Park in open areas away from other vehicles.
	Trailer rolls away when unhitched from vehicle	Remember to chock the tires of the trailer on the downhill side. Put the foot down.
	Trailer getting broken into	Make sure trailer is locked and you have keys

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Wildlife Surveys
PERSONAL PROTECTIVE EQUIPMENT	Have eye protection, hard hat, and gloves with you if needed in certain areas

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Hiking in Remote Areas or on Rough, Swampy, Uneven Terrain	Falls, strains, sprains, cuts, blisters, falling limbs, walking in brush	Always be aware of surroundings and use judgement on when to wear PPE if surroundings become hazardous
		Take the time to care for hot spots/blisters
Insect bites, bee stings, snake bites	Allergic reaction	Do not distrub insect nests
	Infection	Ensure that members who require EpiPens are carrying their own and each crew member should know their location
		Always carry FA Kit and know its location
Walking in Bear Country	Wildlife Encounters	Carry bear spray, make noise around creeks and in high brush
		Report unusual wildlife behavior to project partner, ranger, or other visitors
Observing Animals	Unexpected Wildlife Behavior	Keep a safe distance from Wildlife, leave yourself an out

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Backcountry Travel and Camping, General field work
PERSONAL PROTECTIVE EQUIPMENT	Situational- Helmets, eye pro, and gloves are required when dealing with bear hangs. Throw ropes and shoes with heel straps are required for stream crossings, closed toed shoes are required for kitchen activities. PPE should be worn in camp when using tools.

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Backcountry Travel	Poison Ivy Contact	Learn to identify poison ivy: Glossy mitten shaped leaves that grow in threes. Generally low and woody, in winter shows yellow white clusters of berries
		Avoid exposure when possible. Wear long sleeves, and do not burn poisonous plants.
		If exposed, wash exposed areas with Tecnu soap, following the directions carefully.
	Tick Bites	Wear long sleeves and pants. Avoid lying down in tall grass or brush, especially in the spring.
		Check body daily for ticks, including the hariline, armpits, back and groin. It takes 24 hours for ticks to fully attach and transmit disease.
		If you find a tick that has burrowed into your skin, remove it by the head making sure you leave no parts behind. You may choose to see a doctor and turn the tick in for testing.
		Watch for signs of illness, such as fever, headache, joint and muscle pain, severe fatigue, paralysis, or rash or spots on the skin. Seek medical attention promptly upon exhibiting symptoms.
	Bee hornet and wasp stings	Use common sense to avoid stinging insects. Watch for swarms and nests.

		If the victim develops hives, asthmatic breathing, tissue swelling, or a drop in blood pressure, seek medical help immediately. Give victim antihistamine, (Benadryl, chlo-amine tabs)
		Make any bee allergies known and carry an epi pen.
	Mosquito Bites	There are few cases of west nile virus in Montana, but the mosquitoes do carry it. Watch for signs of illness, such as high fever, disorientation, muscle weakness, or stiff neck. Seek medical attention promptly upon exhibiting symptoms.
		To avoid bites, wear long sleeves and pants, use a head net in buggy areas, sleep in a tent or closed bivvy, and use insect repellent containing DEET.
		To alleviate itching, use calamine lotion, hydrocortizone cream, or an ice pack. Keep bites clean to avoid infection.
	Hantavirus, Plague, and Rabies exposure	Avoid bat roosting sites and rodent nesting areas.
		Avoid any animal that appears to have lost its fear of humans or behaves abnormally.
		Rodent feces should be cleaned up with bleachy water. Use a respirator to avoid breathing dust. Do not take on projects such as cleaning out rodent infested sheds without a properly fitted respirator.
		If exposure is suspected , watch for signs of illness such as muscle spasms, difficulty swallowing, disorientation, paralysis, agitation, hallucinations, fever, nausea, headache, deep muscle aches, dry cough, and respiratory problems. Seek medical attention immediately upon exhibiting symptoms.
	Waterborne illness: giardia, cryptosporidium	All MCC employees must treat their water while in the field. Do not drink directly from streams or other water sources.
		Water must be filtered, boiled, treated with aquatabs, or as a last resort, chlorinated (1tsp bleach/5 gallons of water)

		Watch for signs of illness such as diarrhea, sulfurous burps and farts, and/or persistent cough (associated with cryptosporidium). Diarrhea in the backcountry can rapidly escalate into a life threatening condition, and both giardia and cryptosporidium are highly contagious. Administer electrolyte fluids and make moves to evacuate affected members.
	Bear Encounters	Do not hike alone in the backcountry. Avoid travel during dusk and dawn. Make plenty of noise to warn bears of your approach, especially near streams, or when entering tall brush, rounding corners, or cresting hills.
		Watch for bear sign such as scat, footprints, rub trees, and claw marks.
		Carry bear spray at all times.
		Practice bear safe camping. Store food and smellies properly in a bear hang, bear resistant container, or a locked vehicle. Never keep food or smellies in a tent.
		Keep a clean camp, and keep sleeping areas at least two hundred feet (80 good steps) from the cooking and food storage area. Do not burn food scraps or leave packs unattended during the work day.
		If a bear is encountered, talk in a low voice and try not to intimidate the bear. Know the difference between black and brown bears. (Hint: it isn't color)
		If charged, deploy bear spray and try to remain standing.
	Mountain Lion Encounters	Follow the same procedures as with bears, with the following exception: always act aggressive towards a mountain lion. Do not crouch, hide, or turn away. Raise your arms and try to look big, yell loudly, and fight back. Bear spray works against any mammal.
	Lightning Strikes	Do not use radios or other electrical devices during an electrical storm. Move away from metal tools and packframes.

		Take cover, but avoid the tallest objects. If no cover is available, get down on the ground in lightning position. Do not shelter in rock caves or under cliffs.
		Avoid ridge lines, hill tops, open spaces, rock outcrops, caves, and other likely lightning targets.
		If you see lightning nearby (30 seconds between flash and thunder boom, or within 6 miles), begin moving to safer terrain.
		If you are already in safer terrain, near your vehicle or an accessible building, and there is less than 15 seconds between the lightning flash and the sound of thunder (<3 miles), cease work and seek shelter. Stay there until storms have moved out of the area (>30 second interval between flash and boom, with intervals increasing), before returning to work.
	Hazard Trees and overhead hazards	Learn to identify hazard trees, such as those that are dead/dying, diseased or damaged. Make a habit of looking up to check for overhead hazards such as detached branches, broken tops, and hangups.
		Wear a hard hat when travelling through particularly dangerous terrain (beetle killed stands, burn areas, etc.)
		Do not camp or take breaks within 1.5 tree lengths of a hazard tree. Assess overhead hazards before setting up camp, beginning work, and taking breaks.
		If wind is strong or a thunderstorm (often accompanied by high wind) is approaching, wear a hard hat and consider working or taking shelter in an area with fewer overhead hazards.
	Heat Stress/Hypothermia	Wear proper clothing for the weather conditions. Be prepared for changing conditions.
		Take breaks in the shade or have a warming fire.
		Carry dry spare clothing.
Hiking	Getting lost	Carry and know how to use a map.

		Follow MCC institutional hiking policies. Maintain visual contact with the rest of the group, and regroup at trail junctions and stream crossings.
		If the crew splits up, establish a time and place to reunite.
		If lost, stay put on the trail and remain calm.
	Falls and foot injuries, stress and impact injuries.	Warm up and stretch before setting off. Walk carefully and use secure footing.
		Carry a load that is appropriate for your body and make adjustments as needed. Carry weight over your hips, and make sure your pack is packed and adjusted properly.
		Use boots with good traction and ankle support. Wear clean wool or synthetic socks. Take care of hot spots before blisters form, even if it means taking an extra break. Treat blisters promptly if they do form.
		Maintain appropriate distance between hikers, and make sure shoulder carried tools (rock bars, cross cuts) are carried in the back of the group.
		Avoid kicking loose rock or material onto coworkers below.
		Try to step over, rather than on, deadfall. It is often slippery or unstable.
		If travelling across a slope, carry tools on the downhill side.
	Fatigue and respiratory distress	Take breaks as needed, and practice good self care. Be realistic about your abilities, and do not compare yourself to others.
		Eat and drink througout the day to maintain electrolyte balance.
		If you have a respiratory condition, carry your inhaler, and avoid activities that will aggravate your condition. Hike at a comfortable pace, and improve your fitness gradually.
		Use extra care at the end of the day, when fatigue is most likely and the potential for accidents is highest.
Stream crossings	Drowning, ankle injuries	Scout the best location to cross a stream. Do not attempt to cross deep, fast water, particularly during spring runoff or flash floods.
		Position a person with a throw bag downstream of the crossing, so that they can rescue a fallen crosser.

		Unbuckle backpack waist belts so that they can be ditched in the event of a fall.
		Do not attempt to cross barefoot. Use a stream crossing shoe with a heel strap. Use great care in placing feet to avoid entrapment.
Camp area	Injury from hazards in camp	Assess camp area prior to setup. Check for overhead hazards, unstable slopes, animal sign, or other hazards.
		If hazards become too great in number, consider moving to another campsite and communicate new location to staff and/or project partner.
Setting up and using a bear hang	Injuries from load falling, overhead hazards, rope burns, debris in eyes	Set up a bear hang only in healthy trees with no overhead hazards. Choose branches that are sturdy enough to support the weight of your goods. When possible, use an easier method of storage such as a bear box, pannier, or vehicle.
		Do not walk under or spend time below the bear hang. Organize your camp so that you will not be tempted to do so.
		Wear gloves, eye pro, and hard hats when setting up, lowering, or raising the bear hang.
Encounters with the public	Injury to members of the public, personal injury, injury to our reputation	Keep gear and tools out of the immediate trail area and take breaks where people can comfortably pass. Keeping a clean, organized worksite makes you look professional and keeps everyone safe.
		Always be polite and professional when talking with visitors.
		Be visible to the public. When applicable wear a high visibility vest.
		Be aware of other seasonal traffic on forest roads: berry pickers, hunters, log trucks, park visitors, etc. Let others know of traffic conditions/hazards.
		If a member of the public becomes aggressive or physically threatening, leave the area immediately via foot or vehicle. Move a safe distance away and write down any pertinent information (including vehicle description, license number and identity if known, report it immediately).

Communications in the Backcountry	Dead spots where radio contact is not possible, radio failure, improper use	Be sure to ask project partner about radio coverage and dead spots in advance.
		Ensure radio is in working order and has extra batteries
		Be fully trained in the proper use of a radio. Have your project partner explain the channels and repeaters appropriate to the locations you will be working.
		Become familiar with geographic features(i.e. steep canyons) that might make it hard to transmit out.
		If an emergency occurs in an area where there is no radio communication, have a small team (2) climb to a high point and radio for assistance. If communication is still not possible, have two crew members go for help while the other members perform first aid.
		Youth members can use radios only with leader supervision

JOB HAZARD ANALYSIS

JOB TO BE PERFORMED	Chainsaw use
PERSONAL PROTECTIVE EQUIPMENT	First aid kit, hardhat, ear protection, eye protection, long sleeve shirt, chainsaw chaps (cover 2" of boots), boots (at least 8" tall). **Youth Members are not allowed to operate chainsaws.**

SEQUENCE OF BASIC JOB STEPS	**POTENTIAL HAZARDS**	**RECOMMENDED SAFE JOB PROCEDURES**
Training Requirements	Personal Injury	Successful completion of S-212 course or National Sawyer Certification Card training course.
		Certified in basic first aid and CPR
		Do not exceed your level of training. If you are a trainee you must have a qualified person supervising your activities.
		Chainsaw operators may only exceed the restrictions or limitations placed on them if they are under the supervision of a qualified individual who is certified at a higher level of saw operation.
Wildfire Activity	Property Damage, personal injury, injury to the public	During the fire season, check with USFS to determine fire hazard level. Stage 3 (chainsaws cannot be operated), Stage 2 (Sawyer is required to carry a shovel and a fire extinguisher at all times), or Stage 1 (spark arrester must be operational).
Check Equipment	Property Damage, personal injury	Ensure chainsaw is in proper working order.
		Ensure chain is properly sharpened.

		Ensure felling axe is of appropriate size and weight.
		Ensure bar is appropriate length for specific work.
		Ensure that fuel has been properly mixed and is not expired.
		Ensure proper size and number of wedges.
Transporting Chainsaws	Fire, property damage, personal injury	Saw should be transported and stored purged of all fuel.
		Bars should be covered during transportation.
		Saws should be secured in compartments away from people and in a manner that will minimize shifting to prevent damage to saw.
Walking with Chainsaws	Sprains/Strains, cuts, injuries due to slipping and falling	Make sure chain is stopped between cuts.
		Engage chain brake if walking more than 2 steps. Use more often if you are in steep terrain or brushy areas.
		While carrying chainsaw on shoulder, ensure that chain, dogs, and muffler are covered by a scabbard.
Size Up	Head Injury, crushing , injury of bystanders	Size up the tree considering: tree species, height, diameter, lean, soundness, current and previous fire damage, split or broken top, widow makers, and other hazard tree indicators.

		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	The methods to safely start and operate a chainsaw can vary with model and size.
		Maintain a secure grip on the saw, start the saw on the ground or securely between the legs, and never drop start a saw.
Felling Process	Head Injury, eye injury, cuts, loss of limbs, crushing injuries, death	No employee shall approach a faller closer than 2-1/2 tree lenghts of trees being felled, until the faller has acknowledged that it is safe to do so, unless it is demonstrated that a team of employees is necessary to manually fell a
		Follow proper felling procedure as outlined in S-212 or NSCC chainsaw course
		Shout "face cut" to alert public of your intentions, then initiate under cut at a level that ensures adequate footing and balance throughout the felling procedure.
		Prior to starting back cut, the saw should be stopped and the area surveyed to ensure that nobody has entered the area. A warning should be sounded as to the intentions of your actions.
		At the first sign of the tree committing to the undercut, proceed to your safety zone.
		No felling operations will be conducted at night or during times the top of the tree being felled is obscured.
Chainsawing while in Groups, Working with a swamper	Struck by Tree, head injury, crushing injury, death	Space employees so that activities of one will not create a hazard for another.
		There should be no more than 3 sawyers to 1 swamper. A 1:1 ratio is encouraged for beginner sawyers.

		Sawyer and swamper should utilize good communication to avoid injuring one another. Swampers should stay clear until the sawyer indicates that it is safe to approach, usually by employing the chain break and making eye contact.
		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 injury, loss of control.	Beware of other logs, branches, or rocks immediately behind the area where you limbing for possible kick back potential or rocking of the bar and chain.
		Always keep the power head of the saw at or below shoulder height.
		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 the limb is cut.
	Injuries resulting from kickback	Know where the tip of your bar is at all times. Avoid cutting with the kickback zone.
		Keep the face and limbs out of the cutting plane of the saw. Do not lean over the bar while cutting.
		Exercise caution when making boring or plunging cuts. These cuts, when done improperly, can cause the saw to kick.
Bucking	Cuts, crushing injuries, death	Be aware of other logs, branches, or rocks in the work area.
		Avoid bucking on the downhill side of a log.

		Ensure the log is stable, and check for overhead hazards.
Fueling Chainsaw	Burns, fire/wildfire, fuel geysering	Check fuel level before refueling. If a saw is running poorly (acting like it is out of gas) with more than 1/2 tank of gas, the tank may be pressurized, which can cause fuel geysering. Do not open the fuel cap. Allow the saw to cool completely.
		When refueling, open gas cap slowly to control the release of presssure and keep face away from opening. Fill the tank on bare ground or other non combustable surface.
		Immediately clean up spilled fuel and use a funnel when fueling.
		Refuel out doors and at least 20 feet from an open flame or other sources of ignition. Start the saw at least 10 feet away from fueling station.
Sharpening Chain	Cuts to hands and arms, eye injuries, injuries from environmental hazards	Assess the safety of any area you plan to use for sharpening, fueling, or taking breaks. Check for overhead hazards, people working nearby or uphill, vehicular traffic, etc.
		Wear sturdy gloves, eye protection, and a helmet if there is any chance of danger overhead or if you are near an active work site.