JOB HAZARD ANALYSIS	**1. JOB TITLE** Smoky Mountains Hiking Club AT Maintainers	**2. DATE:** 12/22/2023	**NEW** **X REVISD**
INSTRUCTIONS ON REVERSE SIDE	**3. TITLE OF WORKER(S):** ATMC	**4. NAME OF ORGANIZATION:** GRSM	**ANALYSIS BY:** Multiple Sources
5. LOCATION: Appalachian Trail within Great Smoky Mountains National Park	**6. DEPARTMENT:** Visitor and Resource Protection/Backcountry Operation	**10. SUPERVISOR:** Christine Hoyer	**REVIEWED BY:** SMHC
11: REQUIRED AND/OR RECOMMENDED **PERSONAL PROTECTIVE EQUIPMENT:** safety glasses, hard hat, leather gloves, Nitrile gloves, long pants, sturdy hiking boots			**APPROVED BY:** Christine Hoyer

7. SEQUENCE OF BASIC JOB STEPS	8. POTENTIAL HAZARDS	9. RECOMMENDED ACTION OR PROCEDURE
Preparing your body and mind for a backcountry project day	Risk of injury and illness due to being unconditioned, not acclimatized, mentally or physically unprepared.	-Staff are recommended to maintain a level of fitness, flexibility and mental toughness throughout the year to reduce the potential for injuries and illness due to the physical work and mental effort associated with backcountry travel and campsite maintenance.
Planning for a backcountry project day	Injury and illness associated with being unprepared for backcountry travel.	-Plan ahead and prepare for every hike – from what you are wearing to the gear you are carrying. Know the weather forecast and trail conditions. Have a planned itinerary and tell someone where you're going and when you are scheduled to return. Know what to do in case of an emergency.
Gearing up: Navigation	Getting lost and disoriented unexpectedly extending your time spent in the backcountry.	- Always carry a detailed topographic map of the area you are working, and place it in a protective case or plastic covering. Always carry a compass. Staff may also choose to carry other navigational tools such as an altimeter or global positioning system (GPS) receiver; other aids include route markers, route descriptions, and other types of maps or photos.
Gearing up: Sun Protection	Sunburn, dehydration, heat exhaustion, heat stroke.	Carry and use sunglasses, sunscreen for the lips and skin, and clothing for sun protection.
Gearing Up: Insulation	Cold weather injuries, frostbite, cold water immersion, and hypothermia.	-Have a layering system that allows you to be comfortable and dry in a myriad of weather conditions. Carry extra dry clothing in case you get wet. Basic backcountry clothing include synthetic socks, boots, underwear, pants, shirt, sweater or fleece jacket, hat, mittens or gloves, and raingear. The term "extra clothing" refers to additional layers that would be needed to survive the long, inactive hours of an unplanned bivouac. Carry an appropriately rated sleeping bag if you are planning to camp overnight.

Gearing Up: Illumination	Getting lost and disoriented unexpectedly extending your time spent in the backcountry.	-Carry a headlamp, flashlight and extra batteries. These items will be invaluable if caught out in the dark. Know when the sun rises and sets. Know how much daylight is left and plan your hike out accordingly.
Gearing Up: First Aid	Being unprepared to treat injury and illness in a backcountry setting.	-Carry and know how to use a first-aid kit, but do not let a first-aid kit give you a false sense of security. The best course of action is to take the steps

		necessary to avoid injury or sickness in the first place. At a minimum, a first-aid kit should include gauze pads in various sizes, roller gauze, small adhesive bandages, butterfly bandages, triangular bandages, medications, adhesive tape, tweezers, cleansers, latex gloves, and paper and pencil.
Gearing Up: Fire Kit	Being unprepared to deal with emergencies and cold weather injuries.	-Carry the means to start and sustain an emergency fire. Fire is a luxury in the backcountry however it can be a lifesaving tool in an emergency. Butane lighters, matches in a waterproof container, ferrocerium rod. All must be absolutely reliable. Fire starters are indispensable for igniting wet wood quickly to make an emergency campfire. Common fire starters include candles, chemical heat tabs, and canned heat. In harsh snowy conditions where dry firewood is nonexistent, it is advisable to carry a stove as an additional emergency heat and water source.
Gearing Up: Tools and repair kit	Being unprepared to repair essential safety gear in the backcountry.	-Carry appropriate backcountry tools. Knives are useful in first aid, food preparation, repairs, and every backcountry traveler needs to carry one. Other tools (pliers, screwdriver, awl, scissors) can be part of a knife or a pocket tool, or carried separately—perhaps even as part of a group kit. Other useful repair items are shoelaces, safety pins, needle and thread, wire, duct tape, nylon fabric repair tape, cable ties, plastic buckles, cordage, webbing, and parts for equipment such as tent, stove, crampons, snowshoes. Trekking poles can be a useful tool for hiking in mountainous terrain and stream crossings.
Gearing Up: Nutrition	Not enough nourishment and energy to complete the task or see you safely returned to the frontcountry.	-Carry extra food. For shorter trips, a one-day supply of extra food is a reasonable emergency stockpile in case foul weather, faulty navigation, injury, or other reasons delay your planned return. An overnight or long trek may require more. The food should require little or no cooking, be easily digestible, and store well for long periods. It should have high nutritional value and caloric density with minimal weight.

Gearing Up: Hydration	Dehydration, heat exhaustion, heat stroke. Water borne pathogens: salmonella, cholera, E.coli, protozoa, giardia and cryptosporidium	Carry extra water and have the skills and tools required for obtaining and purifying additional water. Always carry at least one water bottle or collapsible water sack. Daily water consumption varies greatly. Two quarts (liters) daily is a reasonable minimum; in hot weather, 6 quarts may not be enough. In dry environments, carry additional water. Plan for enough water to accommodate additional requirements due to heat, cold, exertion, or emergency.
Gear Up: Shelter	Exposure to injuries and illness caused by severe weather, lightning, extreme temperatures, wind, etc.	-Carry shelter from rain and wind, such as a tent, tarp, plastic tube tent or a jumbo plastic trash bag. Another possibility is a reflective emergency blanket. It can be used in administering first aid to an injured or hypothermic person, or can double as a means of emergency shelter. -When out on trail patrol, staff/volunteers should be continually aware of, and prepared for, dynamic and extreme weather.
Performing maintenance duties: bending, shoveling, digging, chopping, cutting, brushing, pushing, pulling, lifting, dragging, removing objects from campsite or trail.	Injuries from improper body mechanics, body positioning, etc. Muscle strains, pulls, and repetitive motion injuries.	-Each staff will be provided training on the safe and proper use of the most important, primary tool—their bodies.
		-Proper techniques of stretching, lifting, bending, moving, shoveling, grubbing, rolling rocks, securing good footing, etc, will be addressed in focusing on proper body mechanics. -It is recommended that prior to each maintenance run staff properly stretch and warm-up before, during and after physical activity. -switch hands often, and vary the types of activities performed to limit exposure to repetitive motion injuries.
Working in a rugged and dynamic environment.	Injuries and illness associated with not being aware of your surroundings and current conditions. Lower leg injuries, trips falls, arm, wrist and head injuries.	-Good awareness on trail for hikers as well as other staff/volunteers should reinforce individual awareness of potential hazards. -Staff/volunteers need to stay aware of their surroundings, the location of other staff/volunteers and other trail users while performing maintenance activities. -Tools and equipment, when not in use, should be kept in an orderly manner a safe distance away from the area of work and the public. -Tools should never be leaned against trees or rocks, always laid down flat, and in such a way to minimize exposure to sharp edges. -All protective covers, scabbards, and shields should be in place whenever such tools are not actively being used. -Clear work area often to reduce the chance of tripping or falling. -Staff/volunteers need to maintain constant awareness of their feet and hands in relation to swinging tools and objects being moved and

		avoid placing them under materials.
Using Hand Tools	Injuries from improper tool use or poor maintenance.	-The right tool for the job should always be used to decrease the chances of injury to an employee, or damage to a tool through improper use. -If proper body mechanics are used, then proper tool use should follow. -Staff/volunteers will be trained on the safe and proper use of tools used in trail maintenance. -It is the individual's responsibility to maintain awareness of this area immediately about them, especially when using any type of swinging or digging tool. -When carrying tools, keep the working end close to your body to avoid accidental injury to others. -Sharp edges should be positioned in such a way to minimize exposure to self and others. -Efforts should be made to avoid carrying tools above waist. -Tools need to be carried securely, but also readily separable in case of a slip or fall. -When loading tools on packs, all protective scabbards and covers should be in place. -Tools will be securely lashed to backpacks in such a way as to not pose an injury, tripping or safety hazard to the person carrying the tool(s), or anyone else on the trail.

		-All tools should be inspected regularly to ensure their safe condition. Any unsafe, defective, or ill-maintained tools should be fixed, red-flagged, tagged, or rotated out of service. -Wooden handles should be free of cracks or splinters and fit tightly, with no wiggle or play, in respective heads. -Handles should be replaced when they are loose, splintered, or cracked, and cannot be repaired.
Removing blowdowns with hand saw/cross cut	Head injuries, crushing injuries and other trauma associated with tree work.	-Always thoroughly size-up each and every tree, before any cuts are made. -Constantly assess and reassess as you go—things change! -Never attempt to cut any tree over 6 inches in diameter, which may be unsafe. -Never attempt a cut you are uncomfortable with, or that is beyond your skill level. -Remember to look up, down, and all around. -Don't focus in on one thing and neglect to watch for other hazards. -Be cautious when removing broken limbs from the trail corridor – plan ahead. -When limbing from a tree in the corridor be sure to cut it flush to the tree or ground – be mindful that if it is above your shoulder, as you release it gravity will bring it down on you if you do not control the limb. - Certification requirement: AT Sawyer certification required, two-person crew minimum - PPE/Safety Gear requirement: : Gloves, boots, hardhat, eye protection, (and/or face shield), first-aid kit
Hiking in mountainous terrain.	Blisters, foot injuries, lower leg injuries, trips, falls, arm, wrist, and head injuries.	-Always wear sturdy properly fitting footwear. -Avoid using brand new boots or boots in disrepair. -Avoid stepping on slick rocks and logs. Be especially wary of the locust logs in water bars. -Use hiking sticks or trekking poles for balance and support.
Using Bear Cable Storage Systems	Injuries from compromised food storage cables. Punctures, cuts, scrapes and other hand injuries.	-Be sure to wear leather gloves when inspecting broken, frayed cables.
Cleaning Fire Rings/Shelter Chimneys/Shelters	Hand Injuries. Cut Scrapes and punctures Breathing dust and ash.	-Wear leather gloves in order to be protected from sharp or pointed objects while sifting for trash in the fire rings. -have nitrile glove available in the case you find something especially disgusting. For example biohazard -Sift through ash slowly and look constantly for hazardous materials. -Wear a dust mask while sifting through campfire rings as to avoid breathing ash, dust and other hazardous or unhealthy materials.

Working in an environment shared with wildlife.	-Losing vital safety gear or food to wildlife. -Sustaining injuries due to negative wildlife encounter. -Pathogens and disease contracted from insect bites such as ticks and mosquitoes. -Injected venom from wildlife such as snakes and other stinging insects.	-Respect wildlife -Follow Leave No Trace principles -Follow all food and gear storage regulations. -Keep a safe distance from all wildlife -Know what to do in the case of a bear encounter -Be aware of where you place your feet and hands. -Use insect repellent such as Deet or Permethrin.
Working in an environment with hazardous plant species.	Poison Ivy, Poison Oak, Poison Sumac, Stinging Nettle	Be able to identify and avoid contact with hazardous plants.
Working in and around Trail Shelters	Hantavirus, Norovirus	-Do not eat out of the same food bag, share utensils, or drink from other hikers' water bottles. -Wash your hands with biodegradable soap (200 feet from water sources) before eating or preparing food and after toileting. -Be aware that alcohol-based sanitizer may be ineffective against norovirus. -Treat all water. Follow Leave No Trace guidelines for disposing of human waste. Spray any mouse droppings with a bleach and water solution and leave it to site for at least 10 minutes. Do not sweep or brush mouse droppings until after the bleach has a chance to kill the hantavirus.
Working in and around Privies	Hepatitis A and B	-Wash your hands with biodegradable soap (200 feet from water sources) after working in or around privy. -Be sure that all materials are fully composted before dispersion. -Participate in the Hepatitis vaccination program and blood borne pathogen training.

Trash/Garbage Removal	Exposure to Bloodborne pathogens, lacerations, punctures, muscle strains, sharps	- PPE required for high risk sites/materials: Non-permeable gloves, disinfectant, hand sanitizer, disposable or washable coveralls, eye protection. - If determined to be High-Risk, BBP Training and/or BBP training as provided through First Aid training is required. - If emptying trash receptacle, disinfect all trash receptacle touch surfaces before emptying. - When picking-up loose trash, utilize trash picker poles/rigs whenever possible and carefully place trash in trash bags/receptacles, taking care to avoid unnecessary bodily contact with trash bags/receptacles. - Place sealed/tied trash bags in the vehicle securely away from all passengers. - Carefully remove gloves and coveralls and dispose of them in a trash receptacle. Remove coveralls first, and then gloves. - Wash hands or use hand sanitizer that contains at least 60% alcohol as soon as possible. - Keep hands away from potentially dangerous tight spaces. - Wear PPE - Safety gloves. Inspect tools and objects prior to operating tools.
		- If working as a team, use good communication skills. - Always keep sharp edges working away from your body. - When picking-up loose trash, utilize trash picker poles/rigs whenever possible and carefully place trash in trash bags/receptacles, taking care to avoid unnecessary bodily contact with trash bags/receptacles. Always make sure you are comfortable with the load you are lifting. - Whenever possible use two people when loading any items (especially heavy/ odd sized items). - Do not twist and lift simultaneously. - Always move your feet while you move your body. Maintain a safe following distance between workers - typically 10 ft. - When encountering the public, move to the side of the trail and let them pass, taking care to keep tools and trash out of range of passing visitors.
Overhead and Uphill Forest Hazards	“Widow Makers” (dead limbs and other overhead), branches and blowdowns – if unstable or dead, “uphill and overhead” of workers	- Helmets required in some jurisdictions, and strongly recommended for all Trail maintenance workers - Before working, LOOK UP! - If dead limbs or leaner trees are evident, AVOID DANGER ZONE
Cutting Brush	Sharp tools, spring poles, loose footing, flying brush, poison ivy, bee stings, snakebites, ticks	- Eye protection - Have soap and water available - Note known allergies
Log work (peeling, rolling, setting)	Sharp tools, slippery logs, rolling logs, back or muscle strains	- Keep back straight, lift with legs or mechanical advantage - Work in unison; keep tools sharp

Sidehill Trail Construction, Waterbars	Back or muscle strain, carpal tunnel syndrome, sharp tools, slippery or unstable footing, steep slopes, working too close to or walking by other workers	- Keep wrists rigid when swinging tools - Place one foot in front of the other, and keep back straight when swinging or pulling digging tools - Keep proper spacing between workers
Rock Work	Rock shrapnel or dust, crushed extremities, slippery or unstable footing, back or muscle strain, rattlesnakes	- Keep back straight, lift with legs or mechanical advantage - Work in unison
Crush and Fill (site-made gravel)	Rock shrapnel, splinters or broken tool handles, carpal tunnel	- Keep wrists rigid when swinging sledgehammer - Keep proper spacing between workers
Sharpening (in the field)	Cuts from tools, flying metal filings	- Gloves, eye protection, file handle and knuckle guard
Carpentry	Sharp tools, splinters, flying nail chips or sawdust, smashed fingers or thumbs	- Measure twice, cut once
Working Alone or in Remote Areas		- Implement check-in/check-out procedures with friend or family member who knows how to contact park dispatch. - Carry hand sanitizer. - Be aware of usual hazards, such as thunder, heat, slippery footing, stinging insects, poison ivy, bears, etc. Maintain situational awareness and use Operational Leadership
Performing Volunteer Services during the COVID19 Pandemic	Exposure to COVID-19	- Stay up to date with and follow appropriate CDC guidelines. - Avoid touching hard surfaces including plastics, metals, woods, etc. - Assume all hard surfaces may be contaminated with COVID-19. - Practice physical distancing of 6 feet - Avoid touching your eyes, nose, mouth and/or footwear. - Wash hands often with soap and water. Alcohol-based hand sanitizer that contains 60% -95% alcohol can be used where soap & water are not readily available. - Clean & disinfect frequently touched objects and surfaces using EPA registered disinfectants or bleach solution - Practice Operational Leadership principles and assess your personal risk before conducting activities. Use SPE Risk Assessment & GAR to determine whether each specific work activity should take place. (See attached SPE/GAR Cards) - Do not share food, drinks, or PPE with others. - Accident/Injury/Illness: In cases of emergency, contact supervisor or call 911. Report all incidents/injuries to your volunteer supervisor.

General Tool and Equipment Use	Exposure to COVID-19	- Frequently wash hands often with soap and water and/or hand sanitizer. - Individuals are responsible for accounting for and maintaining their own tool/equipment set. - Clean and disinfect tools/equipment when work/task is complete, or at least daily when in constant use.
Remove / Contain / Dispose of PPE	Exposure to COVID-19	- Remove washable/reusable gowns and over clothing by disposing in a dedicated container or laundry basket. - Remove gloves by use of safety method: One glove removed and held by the opposite hand and turning the remaining glove inside out and disposed of in trash. - Remove and clean safety glasses and spray shields. - PPE trash may be disposed of in regular trash routes.

Follow Smoky Mountains Hiking Club – AT Maintainers Best Practices

- Avoid heavily congested areas when possible
- No carpooling except with household members
- No more than 4 volunteers in a work group
- Maintain social distancing space of at least 6 ft
- Must wear a mask for situations when a 6 ft distance cannot be maintained
- There will be no shelter or privy maintenance until further notice
- Do not share tools.
- Clean tools before and after use, especially if using club tools
- Wash hands and/or use hand sanitizer frequently, and always before eating
- Do not work if you are sick
- If you become ill after doing maintenance work, please contact club contact and Backcountry Management Specialist

Operational Risk Management Analysis (ORMA)		
Rate 1-10 → Any category rated > 5 should receive specific mitigation		
1. Supervision	*Presence of, qualified, accessibility & effectiveness. Clear chain of command?*	
2. Planning	*Information available & clear, adequate time to plan, SOP's, pre-plans, brief's, team input solicited?*	
3. Contingency Resources	*MOU's and planning in place. Shared communications plan?*	
4. Communication	*Radio communications, environment that values input, de-confliction?*	
5. Team Selection	*Level of training and experience. Cohesiveness & atmosphere that values input?*	
6. Team Fitness	*Physical & Mental state of the team? Consider rest, fatigue, morale, outside distractions?*	
7. Environment	*Threats, time of day, extreme temperatures, elevation, difficulty of terrain, remoteness?*	
8. Incident Complexity	*Exposure time, severity & probability of mishap, potential for taxing staffing levels?*	
Green (1-35)	Amber (36-60)	Red (61-80)

SEVERITY × PROBABILITY × EXPOSURE (SPE)		
SEVERITY	***PROBABILITY***	***EXPOSURE***
1. None or slight 2. Minimal 3. Significant 4. Major 5. Catastrophic	1. Impossible or remote in any conditions 2. Unlikely under normal conditions 3. About 50 / 50 4. Greater than 50% 5. Very likely to happen	1. None or below average 2. Average 3. Above average 4. Great
VALUES	***RISK LEVEL***	***ACTION***
80-100	Very High	Discontinue, Stop
60-79	High	Immediate Correction
40-59	Substantial	Correction Required
20-39	Possible	Attention Needed
1-19	Slight	Possibly Acceptable

Remember the key principles of Operational Risk Management:

- Accept no unnecessary risk and make decisions at appropriate level.
- Supervisors must ensure employees/volunteers know how much risk is acceptable/when to elevate decisions on risk to a higher level.
- Employees/volunteers are to make the final risk decisions at or below what is acceptable.
- Integrate risk management into planning as early as possible, and at every level

I have read this document and asked my Supervisor for clarification regarding any part that I did not understand.

SMHC ATMC Volunteer Signature and Date: