



*Ground Team
Member*



*Home Study Course
Part I*

Ground Team Home Study Course

The Civil Air Patrol (CAP) represents itself to the community as doing Search and Rescue, (SAR) under the Mission of “Emergency Services.” The community therefore has the perception of the Civil Air Patrol being prepared and equipped to be able to perform the vital mission of searching out, finding and assisting those in need.

Each member accepting the task of being a ground team member (GTM) in the Civil Air Patrol, doing Search and Rescue and ancillary duties has an individual responsibility to be able to fulfill the mission if called upon to do so. The Ground Team Member must be mentally and physically prepared, equipped and trained to be able to do the tasks that may be required in a SAR, Drug Reduction (DR) or Homeland Security (HS) mission, and to be able to assist those in distress or in need.

This Ground Team Member home study course is not a comprehensive course in Ground Team Operations but gives the student a basic knowledge of CAP Ground Team tasks and some guidelines for Ground Team Members. It is a starting point, the place to begin training to build on basic skills. Proficiency will come by further training and by doing. Ground team member trainees should contact a ground team leader for explanations, training opportunities and guidance.

Qualifications for Ground Team Members. The specific requirements for becoming a ground team member are found in CAPR 60-3, paragraph 2-3 O and CAPR 60-4 Vol II

Section I

Physical & Mental Conditioning

Objectives: Upon successful completion of section I of this course, the student will be able to:

1. Define the need for physical fitness in the ground team member and some methods to help obtain physical fitness.
2. Define reasons for mental conditioning and preparation.
3. Define Critical Stress Management and Critical Stress Management.

Physical Conditioning:

For optimal proficiency and safety, being in good physical condition is paramount to the ground team member. Agility, strength and endurance are required. For example; lower body strength may help prevent injuries such as an ankle fracture.

For an adequate level of fitness an aerobic workout of at least 80% of your maximum heart rate, 4 times a week for 30 minutes is recommended. Your maximum heart rate

calculation is figured by subtracting your age from 220. For example, $220 - 35$ (your age) $= 185 \times 0.8$ (80%) $= 148$. You should exercise sufficiently to raise your pulse to 148 for maximum benefits. You should always consult your private physician prior to starting any exercise program.

Proper foot care and footwear is essential. Foot care should be consistent and meticulous. Many a mission has been compromised because of the lack of attention to proper foot hygiene. For example, toe nails should be cut or filed short and straight across. Feet must be kept clean and dry, with clean dry socks. (See the footwear discussion in the clothing section of this course).

Although the body's need for water cannot be lessened by physical conditioning or acclimatization, electrolytes lost and the efficiency of the sweating apparatus can be optimized if the body is physically fit. Fitness will help the body work more efficiently. Physical conditioning and acclimatization is as important with desert travel as it is with mountain travel.

Mental Conditioning:

Mental keenness and the will to survive are most important in Search and Rescue activities, especially in extreme circumstances. Being physically fit and maintaining a balanced diet goes a long way in helping a ground team member remain mentally healthy. Being involved in good causes, such as helping others also assists greatly in mental fitness.

In stressful situations such as seeing persons severely injured or killed in an aircraft accident, or in disasters, can adversely affect one's personal psyche. Critical Stress Debriefings are important and can often help to lessen the psychological impact of a traumatic event. No one in emergency services is immune to critical incident stress. CAPR 60-5 prescribes the policies and standards that govern implementation of Critical Incident Stress Management (CISM). It is important to seek help in such events.

Section II

Ground Team Equipment

Objectives: Upon successful completion of section II of this course, the student will be able to:

- List the minimum required equipment list for the individual ground team member. 24 Hour Pack, 72 Hour Pack.
- Recite reasons for the required equipment.
- List some sources for obtaining the minimum equipment.

- Recite the need and method of Replenish, Repair, Repack, and rest after a sortie (the “4 R’s”).

The 24 Hour pack or SAR Ready Pack is what you carry while searching. It is part of your uniform and must present a professional appearance. The 24 hour pack has your personal survival equipment, and must be with you at all times in the field. While it’s called a pack, it includes equipment or items that you may carry in pockets, or wear. A complete list of the recommended equipment items for ground teams is available at http://www.nesa.cap.gov/curriculum_material/GSAR/G&UDFTG.pdf. A brief discussion of some of the items follows:

Uniforms and clothing

Clothing serves two purposes – to protect you from the elements (hot, cold, or wet) and (when wearing a uniform) to identify you as a part of an organization or group. Because the climate and conditions a ground team may be deployed in can’t be controlled, ground teams must be prepared for any likely conditions, for both your own safety and to provide for any survivors. It is always more important to have the correct clothing for protection from the environment than it is to wear a CAP uniform, but several CAP uniforms can be worn. The team leader always has the final say in what clothing is acceptable, both in terms of protection and in presenting a uniform appearance.

Generally, ground team uniforms are the Air Force style camouflage pattern BDU or CAP Blue Utility Uniform. Depending on the mission, the golf shirt uniform with gray trousers may be acceptable, especially for urban or suburban mission assignments. Casual, civilian style clothing (especially jeans) is not acceptable, both because of the sloppy appearance they provide and because of the lack of protection they offer. If camouflage pattern BDU’s are worn, they should be worn with an orange reflective vest. Clothing should protect from the elements. Generally, clothing should be thought of as a system, all working together to provide the needed protection. It’s better to have several layers of clothes that can be added to or removed depending on the conditions than just a few layers of clothes that don’t offer as many options.

Clothing should fit correctly. Clothing that is too tight will constrict your circulation and make you colder, especially on your extremities (hands and feet). Outerwear especially should be sized to fit over the clothing you wear under it, with enough room that you can wear additional clothes like a sweater or vest if conditions warrant.

Footwear:

Footwear should be appropriate for the mission being performed, and should be correctly fitted for the socks that you will wear. Adding more socks when cold isn’t a good idea, since cutting off the circulation in your feet will just cause more trouble. For off-road work, combat boots with soles in good condition are adequate for most purposes, but keep in mind that the soles wear down and get slippery.

You can wear civilian hiking boots on ground team missions if you want. The boots should be of dark earth toned colors. Gaiters can also be worn, they and the hiking boots are both considered safety equipment.

What socks to wear is a personal preference – except cotton socks should NOT be worn. Cotton doesn't wick moisture away from your feet, and when they get damp from perspiration they become abrasive, resulting in blisters. Wool or synthetics are good choices. Some people wear more than one pair of socks with their boots, for instance a light pair of liner socks with a heavy or medium pair of outer socks, try several options and see what works best for you. Be sure the boots you wear are sized to fit OVER the socks you wear.

You should always have with you:

- Correct uniform with cap. The cap can be a typical squadron baseball cap; if a hard hat is required the team leader will tell you. The preferred uniform for ground SAR activities is the ground team uniform.
- Personal identification, including CAP membership card, 101 (ES card) and 101T (trainee) cards, Radio Operator Permit (ROP) card, drivers license if available, first aid cards, etc.
- Watch or time telling device like a pager. Watches are preferable.
- Note pad and pencil. Notepads with water resistant paper are available. The pencil (at least one) should be wooden, so it can be sharpened if necessary with the pocket knife.
- Vest, reflective, orange. These are needed when you're on a road or off-road, unless you're wearing high-visibility outer clothing.
- Signal Mirror, with lanyard (can use a mirror in a compass, see land navigation section)
- Whistle (plastic is recommended) with lanyard
- Pocket or utility-type knife, (multi-tool such as a "Leatherman" or Swiss army knife type)

You should NOT wear any exposed knives or other weapons at any time.

24 Hour / SAR Ready Pack

You can use several different types of packs for the 24 hour pack. Military surplus load bearing equipment (LBE) is often used, but should be considered less than ideal. LBE may present the wrong image to the public, can be heavy, and expensive. Keep in mind that CAP members are on Search and Rescue teams, not a military fire team, and we don't really need ammunition pouches or entrenching tools (shovels).

The 24 hour pack should be large enough to carry all of your gear with a little extra room for your share of the team equipment. Sizes of about 1800 cubic inches (check the manufacturers specs) are about the minimum for the job, but a little larger is bigger than

smaller. Book bags and school day packs are usually not large enough to carry all the required items, and are usually not durable enough for the mission. The pack should have padded shoulder straps, and at least a waist strap for stability – some packs will have “suspension systems” and a wide padded waist band to help transfer the weight of the pack from your shoulders to your hips.

A recent invention, the Camelback® pack, is a good option. Camelbacks are water bladders that are worn on the back, with a drinking tube over worn over the shoulder with a mouth valve. The addition of a pack allows you to carry your required equipment, and the camelback itself counts as one of the required water containers.

Another option is an equipment vest. These should be orange and reflective, and have numerous pockets to hold equipment although finding one that can hold all your equipment is difficult. Military aircrew survival vests are not large enough to hold everything, by the way.

Ensure your equipment is properly packed. And secure. Do not have a lot of “stuff” hanging from your pack. Poorly secured equipment can snag on branches, fall off and roll down the hill, and can cause the team member to be thrown off balance when hiking. Always pack your pack in the same manner. If you always put equipment in the same place in your pack, you will know if the equipment is there. You will not have to look through the whole pack to look for missing equipment. Equipment will be easier to find in a hurry or in the dark.

Keep your equipment clean and serviceable. Replace batteries, medicines and food as needed. Watch expiration dates.

Personal Survival and First Aid Kit

You should pack your personal survival and first aid kit in a plastic zip lock bag. The kit should contain (at a minimum) the following items:

- Rubber exam gloves (at least 2 pairs, store in a plastic bag)
- CPR mask
- Hand sanitizer (small bottle)
- Acetaminophen or aspirin tablets (4 or more)
- Antacid and anti-diarrheal tablets (such as pepto-bismol tablets)
- Antiseptic cleansing pads (2)
- Antiseptic Ointment (small tube)
- Band-Aids, various sizes, (6 or more)
- Candle, long burning
- Cotton Swabs, non sterile (Q-tips® or similar)
- Duct tape, 5-10 ft, wrap around a water bottle, pencil or dowel
- Leaf bag, large

- Matches, in a water proof container. Strike-anywhere type matches are best, others require the striker from the package be included in the waterproof container. Not all matches use the same striker.
- Moleskin (small piece, about 3x4 inches), or a Spenco® blister kit
- 1 - Plastic bag, Ziploc, qt. size, for kit
- Quarters, for phone call (at least 2)
- Roller Bandage, gauze type.
- Safety pins, large, 2
- Splinter forceps, tweezers
- Toilette, clean (wet wipes)
- Personal Medications. Carry any personal medications you need with you. If you have a medical condition that might become an issue let the team leader know (discretely if you wish), so if your condition becomes a factor they can deal with it immediately.

SAR equipment should be packed in plastic bags if it can be damaged by water. The items to carry include:

- Ziploc bags, 4, various sizes (can be used to carry and store the various items listed).
- Bandanna or handkerchief.
- Compass, orienteering style (see the land navigation section).
- Flagging tape, small roll. You can roll up a 15-20 foot piece from a larger roll. Any color is acceptable.
- Flashlight or headlamp, with batteries, bulb and spare bulb. Try to have all your electrical devices (flashlights, GPS units, radios, etc) use the same size batteries so you can mix and match if necessary.
- Spare flashlight with extra batteries and bulb.
- Leather work gloves to protect your hands from brush, ropes, etc.
- Goggles, protective – for high wind conditions or working around helicopters.
- Insect repellent, small bottle.
- Lip Balm, with sunscreen (Chapstick® or similar).
- Measuring device, 18 in minimum (a small cloth measuring tape is ideal, you can also mark a walking or tracking stick to measure with.
- Metal cup or pot - a military canteen cup is ideal, especially if it has the little stove base.
- Nylon twine or small rope, 50 ft. like parachute cord.
- Rainwear, durable, suitable for the conditions that might be encountered. Rain can happen at almost any time in West Virginia. Rain is a killer, and you should be prepared for it. Ponchos are usually not a good choice since they don't protect your bottom half, will snag on almost anything, and will build perspiration up on the inside.
- Scissors, multipurpose (EMT shears).
- Shelter material, 8 x 10. A plastic rip stop tarp is ideal. This can be used as an emergency shelter.

- Socks, extra pairs (depending on what you wear). Store in a plastic bag. They can also be used as emergency mittens for victims.
- Sunscreen lotion, small bottle, at least SPF 15.
- Tissue Paper (toilet paper). Small roll, remove the cardboard core, store in a plastic bag.
- Water Containers, 2, at least liter size. You must have at least two separate containers, in case one gets lost or damaged. Canteens can be used; a standard water bottle is fine too. In very cold weather (if the water might freeze) use a wide-mouth bottle.
- Webbing, 20 ft length of 1-in climbing type webbing, for emergency harnesses or utility uses.
- Wire, 5-10 ft, woven steel (picture hanging wire) for emergency repairs.
- The total weight of all this equipment, including the pack, personal survival and first aid kit, water, etc should be less than about 20 pounds.

Additional Equipment

Occasionally a ground team mission may require members to RON (remain overnight) at a staging base, search base or in the field. While the 24 hour pack should have sufficient items for your personal survival, additional equipment will assist you in remaining comfortable, rested and effective. Typical operations don't anticipate ground teams remaining in the field away from their vehicle, so the 72-hour pack can be either a pack or a duffle bag of some sort.

The 72 Hour pack is designed to help you live in the field for more than one day. It includes your sleeping bag, tent and other long term care items. Experience will help you determine what is needed. Often times, more equipment is taken than is usually needed, experience will help you determine what you need. Learn to pack light and use multi use equipment and materials. Watch the weight of your equipment. Remember, you have to be able to move ALL your equipment yourself, at one time – possible for some distance!

72 Hour Pack

- 72 Hour Pack, Frame Pack with hip belt. This can be an external or internal pack, or a duffle bag of some sort. It should be water resistant, and have a waterproof cover (even a large plastic trash bag, if nothing else) to keep your equipment dry. Many people want to use surplus military "ALICE" packs, if you choose this pack you MUST have a frame to go with it. Using an Alice pack without frame has resulted in permanent nerve damage to a substantial number of individuals.
- Tent, (optional, can share with another ground team member). You can also use a tarp or tube tent if needed.
- Food for 5 meals. Make sure if water is needed it is available. Food should require minimal cooking, be durable, and have a long shelf life.

- Plastic bowl, fork, spoon and other eating gear. Be sure to wash it well when done.
- 2 leaf bags, large, for emergency shelter, waterproofing, etc.
- Spare clothes, shirt and pants, in plastic bag.
- Underwear and socks, store in plastic bags.
- Sleeping bag and sleeping pad. Your sleeping bag should be made of synthetic materials, adequate for the conditions, and stored in a waterproof stuff sack. You should have a closed-cell foam sleeping pad to insulate you from the cold ground.
- Toilet Kit, including toothbrush and paste, shave kit, deodorant, soap, towel, etc).

Optional Items:

- Handheld FM Transceiver, speaker microphone, spare antenna, rechargeable and AA battery packs, cigarette lighter charging cord.
- GPS (handheld) and spare batteries.
- Water purification method (Iodine tablets or crystals, or filter).
- Eye protection (goggles, sun glasses).
- Gaiters

Other Ground Team Equipment will be required on a team basis. Make sure you leave room in your pack for this team equipment.

Reasons for the required equipment

Do not expect your team leader or your team buddy to bring your dinner, your sleeping bag, money, or toilet paper. They are not your Mother! There is no sense of duplication in group equipment. Sharing group equipment is economical, can save space and weight. Not everyone needs to bring a Responder First Aid Kit. Work with your Ground team leader. Follow his or her direction. Carrying excess equipment isn't necessary and just weighs you down. When purchasing equipment buy quality. Cheap may not hold up. The K-Mart oblong shaped Coleman type sleeping bag may not cut it in cold weather or when weight is a factor. (Coleman does make some good products). You do not need to start out buying everything. Some equipment can be rented from the local Backpacking store. You can then check it out and see if it works for you. Sometimes part of the rental fee will apply to the purchase if you decide to buy the equipment. Check with your suppliers. Sometimes you can buy near new equipment from other CAP ground team members. Maybe they have hung up their hiking boots and hiking staff, or upgraded their equipment. Equipment, clothing, fabrics and the like are changing rapidly. Some equipment that looks good may not be adequate. Buy equipment that has multi use, buy equipment that is durable, lightweight, and easily packed. Remember, often, military equipment has been designed for a special purpose and may not be the best for ground team needs. Remember we are not hiding from the enemy. Be informed. Talk with experienced people. They are available and helpful. CAP ground team leaders, backpacking magazines, and in backpacking stores such as REI, Sports Chalet and "On line" such as Campmor. Ask!

If you are in the City you can sometimes buy what you need if you forget something. When you are in the Back Country you may be out of luck.

The 4 R's

Replenish, Repair, Repack, and Rest!

When you get the page or the phone call is not the time to Replenish, Repair, and Repack. It should be done as soon as you can. In a disaster, such things as fuel for the vehicle may not be available. Supplies and equipment may not be available. Clothing and equipment needs to be repaired so it will be available for another or unexpected incident or disaster. When packing your Pack, First Aid Equipment, or Survival Equipment, always put equipment in the same location. That way, when you check your equipment, if it is not there, you know you do not have it. It's not in a different place. You can also find things you need faster in the dark.

REPLENISH

After a sortie, ensure you have all required equipment. Replenish items that you have used especially water, food and personal medications. Make sure your canteen is full of water. Check flashlight batteries and bulbs.

REPAIR

Inspect all equipment, and repair what you can. Make the repairs at once, before you need the equipment again. After the mission, clean uniforms and other equipment. Air out tents, ground clothes, and your sleeping bag.

REPACK

After you have completed the above steps, repack your gear. Don't be caught with your equipment all over your house. Be ready to go on the next mission.

REST

After you have prepared your gear get your rest. Be ready for the next one. Get your rest as soon as you can. You will be more alert, more safe and ready for an unexpected emergency.

Section III

First Aid, CPR, Preventing Disease Transmission

Objectives: It is beyond the scope of this home study course to present a comprehensive course in First Aid, CPR, and preventing disease transmission. The objective of this section is to make the student aware of resources for obtaining the skills required. Other sections in this course will touch on some of the subjects. It is your responsibility to stay current in your first aid training. You should keep your first aid qualification card with your 101 card to show that you're current.

Each Ground Team Member should learn the following skills.

First Aid

Ground team members are required to have at least Basic First Aid or an equivalent. CAP accepts a first aid course with at least 9 hours of instructional content, not counting CPR training as the standard for this requirement. First aid courses are available from the American Red Cross, National Safety Council, Medic First Aid and other organizations.

Cardio Pulmonary Resuscitation (CPR)

CPR training is not required for CAP ground team personnel, but is highly recommended for all members.

Blood borne pathogen (BBP) protection

Universal Precautions is the concept that all blood and certain body fluids are to be treated as if contaminated with Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), or other bloodborne pathogens. An acceptable alternative to Universal Precautions is Body Substance Isolation, treating all body fluids as hazardous.

Materials requiring universal precautions include:

- Blood
- Semen
- Vaginal secretions
- Cerebrospinal fluid
- Synovial fluid (cerebro-spinal fluid)
- Pleural fluid
- Any body fluid with visible blood or any unidentifiable body fluid
- Saliva from dental procedures (since it may be contaminated with blood).

The following materials don't require universal precautions unless there is visible blood:

- Feces
- Nasal secretions
- Sputum
- Sweat
- Tears
- Urine
- Vomitus

Personal protective equipment like gloves and a mask must be used whenever you might be exposed to blood or other potentially infectious materials. Rubber gloves and surgical masks create a basic barrier between the provider and the survivor, and protect both from transmitting potentially harmful diseases.

There are some basic rules to follow in exercising Universal Precautions.

- a) When conducting a hands-on assessment of a patient, always wear rubber gloves, and if the potential exists for airborne transmission or being splashed with blood or other pathogenic fluids, at least wear a surgical mask and goggles or face shield.
- b) Change gloves between patients. This avoids the transmission of pathogens between patients.
- c) Use well-fitting, disposable, latex or vinyl gloves for any task involving exposure to blood and other body fluids. Make sure extra pairs are available.
- d) Before putting on gloves, make sure they have no holes, cracks or tears.
- e) Change gloves if they become torn or dirty.
- f) Remove gloves by grasping the cuffs and pulling them off inside out. When putting them on, leave a little cuff so you can take them off without touching your own skin.
- g) Use work gloves over latex gloves when working around broken glass or sharp surfaces – for instance when removing a person from an auto wreck or crashed aircraft.
- h) Dispose of latex gloves in identifiable medical-waste containers, or send with the victims – don't dispose of in a regular trash container!
- i) Wash hands following removal of gloves. Handwashing is the best overall protective measure against most communicable diseases. Wash your hands and other skin surfaces thoroughly with soap and running water immediately after contact with blood or other body fluids. When running water is not available, waterless hand-wash substitutes should be used until a more thorough handwashing can be accomplished.

Section IV

Natural Hazards

Objectives: Upon completion of Section IV of this course the student will be able to:

- The student will be able to explain the four categories of Natural Hazards.
- The student will be able to explain methods to avoid or to minimize Natural Hazards exposures.
- Terrain
- Plants
- Living Creatures: Animals, Reptiles, Arthropods, Insects, and Zoonoses.
- Environmental

Natural Hazards:

There are four categories of Natural Hazards. They are terrain, plants, animals including insects and animal borne diseases, and environmental.

Terrain:

- a) Cliffs and steep terrain. These can often be identified on maps by closely spaced contour lines. Choose routes around these features. Look for improvements to help climb or descend these areas safely. If you must search the area, search parallel to the slope, rather than climbing or descending it.
- b) Drainage and flood areas. These are sometimes marked on maps. Avoid moving through these areas. If the search requires you to move through these areas, ensure team is properly dressed. Exercise extreme caution. Pay attention to weather and the weather in surrounding areas. Pay special attention to potential up stream areas or possible water fall areas. Do not camp in sandy areas or close to streams that could rise quickly. Do not camp in gorge areas that you cannot get to high ground in the event of flash flooding.

Never cross a stream with water that rises over your knees – the water will be too powerful and will almost certainly knock you down. Loosen your pack straps so you can ditch it if needed, cross facing upstream. Use a hiking stick or a branch to feel for pot holes and rocks before you step on them.

- c) Rough Terrain, such as boulder fields. You may have to search through these areas. Slow your rate of movement to allow all team members to exercise proper cautions. Be alert to slippery and loose boulders. Don't hop from rock to rock.

Plants:

Search teams can come in contact with irritant plants that can affect ground team members adversely. Search Team members should avoid eating berries or wild plants. Berries and plants can be used for survival purposes if the team member has been thoroughly trained in the identification and preparation of these berries or plants. Remember that not all parts of edible plants can be eaten. Also some plants are edible at certain times of the year only.

Irritant plants can cause an irritating rash (contact dermatitis) that can take one to three days to develop. In the late fall or early spring it is sometimes difficult to recognize these plants or vines. Be especially cautious if firewood is gathered. These plants and vines can be very detrimental and can cause severe respiratory problems if the smoke is inhaled. Also these vines may look like great "Hot Dog" roasting sticks. The result can be disastrous. There are three main irritant plants that contain the irritant resin urushiol. This irritant resin is found in poison oak, poison ivy, and poison sumac. Approximately fifty percent of the adult population is allergic to poison oak, poison ivy and poison sumac. These plants do not survive well above 4000 feet but are found in every state in the continental United States. They do not grow in Alaska or Hawaii. Generally Poison Ivy grows east of the Rockies, Poison Oak grows west of the Rockies, and Poison Sumac grows best in the southeastern United States. It is important to know what the plant looks like. Once contaminated the oil an average person has one to four hours to wash it off to prevent dermatitis.

Treatment:

When dermatitis caused by contact with an urushiol irritant is mild to moderate. Washing the area as soon as possible with cool water and a mild soap is indicated. Cool soaks with bicarbonate of soda or vinegar in water can be helpful. Calamine lotion can be helpful. It is comforting and can help form a crust and promote healing. It will take seven to ten days to heal spontaneously. Antihistamines, aspirin, or non-steroidal anti-inflammatory drugs are without effect. Do not scratch. Topical applications of soothing aluminum acetate (1:20) soaks, calamine lotion or tepid baths, with 1 cup Aveeno oatmeal or 2 cups linnet starch per tub, relieves itching and allows healing. Medical intervention may be indicated.

Living Creatures: Animals, Reptiles, Arthropods, Insects and Zoonoses:

Wild animals.. Remember the Wilderness and Deserts are their homes. For the most part wild animals will want to leave you alone. Animal attack injuries are usually preventable. When humans understand typical behavior for a species, proper precautions can be taken in the vicinity of a potential dangerous animal. An estimated 200 Americans are killed by animals each year; 131 of these die in traffic accidents involving deer. Bees kill approximately 43 persons, dogs 14, and rattlesnakes 10. Wild animals such as bears and cougars kill fewer people than do goats, rats, jellyfish and captive elephants. The incident of serious injury by a wild animal is less than the chance of being struck by lightning.

However, this does not mean precautions do not need to be taken.

Animals rarely attack people without provocation. Exceptions are large carnivores, which may be relatively unafraid of humans, and creatures clinically infected with rabies. The animal's perception of provocation may differ from that of the human. Patterns of behavior and attack differ by species. A major principle of animal behavior is that physical attack is often the animal's last resort. Animals generally give ample warning of their intentions. Humans can often avoid attack and injury by successfully interpreting visual, auditory, and olfactory warning signs. If a human slowly and carefully backs off without making sudden or threatening gestures, usually no harm will be done. The ideal reaction may depend on the species. For example, mountain lions have been turned from a full charge by an angry human who acted aggressively or fought back. Given a choice of victims, such a predator prefers the fleeing, panicky victim. Non predatory species, such as deer, are extremely susceptible to human intimidation, whereas a canine can be provoked to attack by a direct stare, which is regarded as a challenge.

Big cats typically attack from behind, biting the neck and head of their prey. The North American cougar (mountain lion or puma) is a cleaver, basically shy cat. Throughout the United States, cougars took sixteenth place as an animal related cause of death in recent years. Like many potential dangerous wild animals, the cougar can often be scared off by the human's aggressive behavior, even after the attack has begun. Be aware of your surroundings at all times. Noise while traveling will often keep animals away.

Bears: Grizzly (Brown) Bears and Black Bears:

Bears are Carnivores. Although some bear species practice specialized feeding in response to their habitat, all bears are also omnivores and retain the ability to feed on a variety of food types including vegetation, insects, and meats. Their range extends from sea level to 6100m (20,000 feet.).

Grizzly (Brown) Bears, These bears are larger than other bears, with adults weighing 325 to 850 pounds. The physical strength is tremendous and although they look cumbersome and slow they can run up to 40 mph over irregular terrain. They have a keen sense of hearing and even a keener sense of smell. Their eyesight has been described as poor, although the latest research shows that bears can see as well as humans and are especially adept at detecting movement. Evidence suggests grizzly bears have good night vision.

Attacks by Grizzly bears are relatively rare and sporadic. The vast majority of bears now avoid confrontation if given the opportunity. A close encounter with a female bear with cubs is considered more dangerous, since she is considered to be more aggressive in defense of her young. Also, females with cubs are more likely to be active during daylight hours when humans are active. Males are active primarily in predawn hours and after dusk. Most people attacked by grizzly bears are injured but not killed; the intent of the bear is to remove the perceived threat, not to prey on the individual.

Black Bears are most numerous. They are generally smaller than the grizzly bear 140 to 300 lbs. They also can run up to 40 mph over irregular terrain.

Safety in bear country involves four levels of interaction:

- Avoiding an encounter.
- Reducing the chance of being attacked after an encounter.
- Reducing the severity of injuries received if attacked.
- Reducing the chances of becoming prey to a bear.

Avoiding an Encounter:

Make noise so the bear knows a person is present, such as casual conversation. While traveling along a noisy stream or a windy ridge, the voice or noise may need to be amplified. Remain alert in bear country. Be aware that the terrain and environment may hamper a bear's ability to detect a human by sight, smell or sound. Likewise, the terrain may also hamper your ability to see or hear a bear before it discovers you. An "upwind bear" is more likely to be surprised by you, as is one in heavy forestation or near loud running water, in the rain or fog. Avoid ripened berry patches, streams with spawning fish, and elk caving grounds.

Always use good judgment to avoid a potentially dangerous situation, such as fresh bear sign, tracks, droppings, tree scratching, or carcass, consider that a bear is in the vicinity and take an alternate route.

- Avoid provoking an attack in a close encounter.
- Allow the bear to know you are human and not prey. Step away from visual obstructions. Allow the bear to identify you as a human. Talk in a calm voice.
- Do not make sudden movements or yell out, particularly with a grizzly bear. The bear may view this as an aggressive action.
- Do not stare directly at the bear. Look to the side or stand sideways to the bear.
- Do not consider climbing a tree or running away. It is difficult to locate a tree and climb to a safe height.
- If an encounter has taken place the best defense is to be non-aggressive and allow the bear to identify you as a human.

Reduce Severity and Extent of Injuries. If attacked by a bear, a victim can take several important steps to minimize injury. The action taken immediately before, during, and after the attack will influence the type and severity of the injuries. Humans are rarely killed during an attack precipitated by a surprise close encounter, even though bears can do so easily and quickly. Grizzly bears are head oriented, and they usually direct their aggression toward the head and neck.

- Protect the vital body parts if attacked.
- Do not run, try to climb a tree, fight or scream.

- Drop to the ground and protect the head and neck by interlocking the hands behind the head (ear level) and flexing the head forward, either in the fetal position or flat on the ground face down. Use elbows to cover the face if the bear turns you over.
- Do not hold out a forearm or hand to ward off the attack.
- Never try to look at the bear during an attack because it could expose you to serious facial injuries.
- After the attack, stay down until you are sure the bear has completely left the area. This is extremely important. Victims who have gotten up before the bear has left after the first attack generally received more severe injuries during the second attack.
- When you believe the bear has left the area, peek around while moving as little as possible, try to determine which way the bear went, evaluate options and then leave the area.

Black Bears:

If the attack is by a Black Bear, a different set of guidelines should be followed. Black bear aggression should be countered with aggression, such as shouting, yelling, throwing rocks or sticks, or whatever means are available. The victim should never lie down in a protective, submissive position because black bears are more likely to prey on humans they encounter at close range than Grizzly Bears.

Prevent Predatory Behavior:

The most important means of reducing the chance of being preyed on by a bear is to avoid anything that may attract a bear to your campsite while the occupants are sleeping, as follows:

- Avoid camping along bear travel corridors or at seasonal feeding sites.
- Avoid campsites littered with human refuse.
- Use proper food storage to render human food unavailable to bears. Food storage containers are available in camping stores, and often Standard government-issued bear resistant food containers are available in public camp grounds.
- Reduce food odors by cooking and eating at a site away from sleeping area.
- Do not sleep in clothes worn when cooking and eating.
- Do not leave garbage of food buried or poured into the ground at the campsite.

Reptiles. It is beyond the scope of this on-line training to give information on the many reptiles that could be encountered. It is recommended that you study these reptiles that may be encounter.

Pit Vipers. Rattlesnakes: The Pit Viper gets its name from the two pits, one on each side of the head underneath the eyes. These pits have heat sensors to locate their prey. Pit Vipers can also feel slight vibrations in the ground even a hundred yards away. Their fangs are folded until the snake strikes, and then the fangs swing forward and pivot down.

The fangs are hollow and are attached to the venom glands. The venom is into the prey with the force of a hypodermic. The rattles can recognize rattlesnakes on the rattlesnake's tail. The rattlesnakes usually vibrate their tail before striking, but not always.

Most Pit Viper venom is hemotoxic. Local affects are, swelling, strong pain, and necrosis at the bite site. Systemic effects are hemorrhaging, internal organ breakdown and destroying of the blood cells. Local effects are pain, swelling and necrosis. Systemic effects are respiratory collapse.

Recognition: It is difficult to distinguish the Mojave Rattlesnake from the Western Diamondback Rattlesnake. The Mojave Rattlesnake possesses venom that ranks among the most lethal of any North American snake. Even when severe envenomation occurs there may be minimal local tissue destruction due to the venom being primarily neurotoxin. Because of the minimal local tissue destruction, underestimation of the severity of envenomation may occur. Subsequent treatment with antivenin may be delayed and/or inadequate.

The amount of venom delivered by a rattlesnake is highly variable. Between 15 and 50% of Pit Viper bite may be "dry" bites resulting in no envenomation and consequently no tissue effects.

Mortality from Pit Viper bites in the United States is extremely rare. Of the nearly 70,000 reported to the American Association of Poison Control Centers between 1983 and 1998, only 10 deaths were associated with rattlesnake bites. In some of the cases death was most likely due to complication factors. 2 of these fatalities were likely due to anaphylaxis to the antivenin serum. One fatal case involved a bite to the face.

Suggested emergency treatment:

- Don't panic!
- Get away from the snake as soon as possible. Remember snakes can bite more than one.
- Identification of the type of snake could be difficult.
- Keep the victim calm.
- Remove rings, watches, bracelets or anything that could become tight, cutting off circulation from swelling.
- Wash the bite area as soon as possible. Thoroughly!
- Apply a loose splint. Be careful as swelling will probably increase.
- Have the victim transported to the hospital as soon as possible.
- Limit fluid intake as the body will pump the fluid to the bite site increasing swelling and pain.
- Keep the bite below the heart level.
- Support with Rescue Breathing or CPR if needed.
- Use a Sawyer extraction device if available, but don't delay seeking medical treatment. Don't use a Cutter (suction cup) type device, don't try "cut and suck" treatments, don't ice or cool the wound.

Insects:

Mosquitoes are responsible for more insect bites than other blood-sucking organism. Mosquitoes rely on visual, thermal, and olfactory stimuli to help them locate a blood meal. For mosquitoes that feed during the daytime, host movement and dark-colored clothing may initiate orientation towards an individual. Carbon dioxide and lactic acid serves as long- range attractants, luring mosquitoes at distances up to 118 feet. At close range, skin warmth and moisture serve as attractants. Floral fragrances found in perfumes, lotions, soaps, and hair-care products can also lure mosquitoes. Mosquitoes also require standing water, which may be found in tree holes, woodland pools, marshes, or puddles. To minimize the chance of being bitten by mosquitoes, campsites should ideally be situated as far away from these sites as possible.

Personal protection: Personal protection against insect bites may be achieved in three ways: avoiding infested habitats, using protective clothing and / or shelters, and applying insect repellents.

Habitat Avoidance: Campgrounds should be situated in areas that are high, dry and open, as free from vegetation as possible. Avoid unnecessary use of lights, which attract multiple insects.

Physical Protection: The use of physical barriers can be very effective in preventing insect bites, by blocking insect's access to the skin. Long-sleeved shirts, socks, long pants, and a hat will protect all but the face, neck, and hands. Tucking pants into socks or boots makes it more difficult for, mosquitoes, ticks, and other insects to gain access to the skin. Light color clothing, Closely-woven fabrics is the best. Head nets, hooded jackets, long pants, and mittens should be considered. Lightweight insect nets and mesh shelters are available for protection. Shelters may be enhanced by lightly spraying them with pyrethrum-based insecticides. Clothing can also be lightly sprayed with pyrethrum.

Repellents: Applying an insect repellent may be the most effective and easiest way to prevent arthropod bites. The ideal agent would repel multiple species of biting arthropods, remain effective for at least 8 hours, cause no irritation to the skin, and possess no systemic toxicity. It should be resistant to abrasion and wash-off and be greaseless and odorless.

Finding the ultimate insect repellent can be allusive. What works for one person or insect may not work for another. Chemical DEET remains the standard. It is broad spectrum and is effective against many species of crawling, and flying insects. DEET may be applied directly to the skin, clothing, mesh nets, or shelters. Care should be taken at avoid contact with plastics, and glass frames, rayon, spandex, leather or painted and varnished surfaces. DEET does not damage natural fibers, such as wool and cotton. DEET with 10% to 35% provides adequate protection. Higher concentrations will provide longer-lasting protection. The American Academy of Pediatrics currently recommends that DEET-containing repellents used on children contain no more than 10% DEET. The

reported repellent effects of Skin So Soft Bath Oils have been found not to be effective. It was found that Skin So Soft was 10 times less effective as DEET, with a protection time of less than 0.51 hours.

Ticks & Tick-Borne Diseases:

Ticks are noted for their nuisance potential, but they are also vectors that carry and spread a large variety of infectious agents. Ticks belong to the same class as spiders and scorpions, Arachnoids. Lyme disease accounts for 90% of all reported vector-borne illness in the United States. The principal vectors of Lyme disease are ticks. Most ticks are opportunists feeding on a variety of hosts including humans. Spring and late summer is the most susceptible time to have ticks use humans as a host. The nymph stage of the tick (usually in the spring) is the most difficult stage of the ticks' life cycle to detect the tick. At this age of the cycle the tick is small and often overlooked in the inspection of the body.

Prevention: Prevention is directed toward preventing tick bites. Avoid areas supporting reservoir species. The use of protective clothing, light colored clothing make it easier to see the ticks when they get on the host. Spray clothing with repellents such as pyrethrum, and apply repellents that contain DEET. Close inspection of all body parts at least two times a day when traveling in tick infested areas. Check brush in the area for signs of ticks. Look underneath leaves and branches. If you are traveling with horses or dogs, check these animals over also. Adult ticks are usually on the body one to two hours before attaching.

Proper removal of the tick is important, since infection can be acquired by careless handling of infected ticks. The tick should be grasped as close to the skin as possible with a pair of tweezers, or tick pliers. The tick should be pulled out with steady pressure, taking care not to crush or squeeze the body since the exposed fluid may contain infective agents. The bite site should then be washed and disinfected.

Symptoms of Lyme disease:

Symptoms can vary. Swelling margins (bull's eye type rash) are the most characteristic manifestation of Lyme disease. Swelling usually happens 7 to 10 days after inoculation from the tick bite. The most common sites include the head, neck, abdomen, arm pit, groin, and chest. Other signs include flu like symptoms and low- grade fever (104 deg. F). It is important that if any of these signs appear the suspected infected host be examined by a medical professional at once. Lyme disease is usually very treatable if diagnosed early. If you develop flu-like symptoms after being in the field, notify your physician that you might have been exposed to Lyme disease.

Spiders:

Only a few dozen spiders are considered harmful to humans. Most spiders have an insufficient quantity of venom, the toxin does not affect humans or the fangs cannot penetrate human skin.

The best protection from spider bites is prevention. Be aware of your surroundings. Make sure you watch where you put your hands, feet and your rear end (when you defecate or urinate). Shake out the boots when you put them on in the morning. Don't roll the bedding out to early before retiring. Check out the bedding before climbing in. Do not use lights anymore than needed; the light will attract varmints including spiders. If you get up in the night to go potty, watch where you step and sit.

Two main spiders of concern area are the Brown Recluse spider and the Black Widow spider.

Brown Recluse (Fiddle Spider). These spiders are 8 to 15 mm in adult body length, are light to dark brown, and have a dark violin shaped spot centered on the bottom, such that the fiddle extends backward across the cephalothorax.

The Brown Recluse is most active at night from spring through fall. They infest woodpiles, rats' nests, storage sheds, vacant buildings, under stones, logs and many more places. They are naturally nonaggressive toward humans. They are not prone to bite unless threatened or trapped against the skin.

Bites:

Local symptoms usually begin at the moment of bite, with a sharp stinging sensation, although the victim may be unaware of having been bitten. The stinging usually subsides over 6 to 8 hours and is replaced by aching and itching as the lesion loses blood supply and dies. Tissue damage may be extensive.

Treatment: Most mild envenomation responds to applications of cold compresses, elevation of the affected extremity, and immobilization. Make sure any immobilization is done loosely and check constantly because of possible swelling. Medical treatment needs to be sought at once.

Black Widow. The female Black Widow spiders are 8 to 10 mm is shiny black with a red hourglass marking on the ventral abdomen. They are worldwide. They inhabit barns, garages, outbuildings, gardens, vineyards, trash heaps, under stones logs and vegetation. They are most abundant in the summer.

Widow spiders tend to bite defensively when accidentally crushed. In the US most bites occur in rural and suburban areas. Bites usually occur on the hands, feet, and in areas with outdoor privies human envenomations are likely to involve the buttocks and genital area.

Bites:

The widow spiders' venom usually lacks locally active toxins capable of provoking inflammation. The venom contains several toxic components, including a potent neurotoxin, which induces widespread, sustained muscle spasm. Long term outcome is usually excellent, although victims may suffer significant hypertension, nervous system dysfunction and severe abdominal pain. In some cases within 30 to 60 minutes involuntary spasm and rigidity affect the large muscle groups of the abdomen, limbs, and lower back. Associated signs can include weakness, vomiting, thready pulse, fever, and diaphoresis.

Treatment:

The worst pain usually occurs during the first 8 to 12 hours after the bite. Symptoms may remain for several days. Hospitalization should be considered, especially in patients with hypertension, children, and pregnant women. Discharge is usually possible in 1 to 3 days, when hypertension and muscle spasm has subsided.

Antivenom is available in the United States. In general, antivenom should be used in cases involving respiratory arrest, seizures, uncontrolled hypertension, or pregnancy. In less severe cases its use must be weighed against risks of acute hypersensitivity and delayed serum sickness. Death from anaphylaxis has been reported in the United States.

Care of the local site includes routine cleansing, intermittent applications of ice, and tetanus prophylaxis. Keep the victim calm, immobilize, and obtain professional medical attention.

Zoonoses (Animal-borne illnesses) include Rabies and the Hantavirus:**Rabies:**

Rabies is one of the most feared diseases. Rabies is almost always transmitted by the bite of an infected animal. In the United States, the main reservoir and vectors of the transmission of rabies is wildlife. Extensive vaccination of domestic dogs and cats and the elimination of unrestrained and stray animals are the primary reason for the decline in the human infection rate. In the United States, studies have clearly demonstrated that bats are now the major source of human rabies. Since 1980, of 25 cases of humans contracting rabies 22 were identified by being caused by bats. The possibility of aerosol transmission also has been considered because in 1970's, two spelunkers which did not report any contact with bats died of rabies after exploring a cave near Uvalde Texas.

Preventing rabies transmission by bats:

Education is the best method of preventing the transmission of rabies from bats. Dwellings should be bat-proofed and contact with bats should be avoided. Any person who has contact with a bat, regardless of whether a bite is thought to be inflicted, should

receive post-exposure prophylactic therapy unless the bat can be caught and tested for rabies. Any person who awakes from sleep and finds a bat in their room should receive post-exposure prophylaxis.

Symptoms:

The incubation period can be as little as 9 days to more than 1 year. Some cases suggest a longer incubation period of over 5 years. The initial symptoms of rabies are usually non specific and can include malaise, fatigue, anxiety, agitation, irritability, insomnia, depression, fever, headache, nausea, vomiting, sore throat, abdominal pain, anorexia. Humans are likely to suffer furious rabies with its violent outburst. Furious rabies is characterized by, increasing agitation, hyperactivity, seizures, thrashing around, hallucinations, and hydrophobia, and impending death. The mortality from rabies is virtually 100%. Other Vectors of rabies are raccoons, skunks, coyotes, and gray fox. In the United States domestic animals appears under control at this time.

Post-exposure Rabies Therapy:

Post-exposure therapy should be given promptly but is not a medical emergency. Post exposure treatment for humans consists of reducing the viral infection by cleansing the wound as thoroughly as possible. Following a severe bite rabies exposure, such as a bite about the head or neck, or multiple bites, a major reduction in the number of virus organisms introduced may be essential to allow time for immunization. The best results is obtained by thoroughly cleaning the wound with a soap solution and then washing it with a veridical agent such as povidone-iodine solution (Betadine), or a 1% solution of benzalkonium chloride (Zephiran). Seek medical attention as soon as possible. It is possible to receive rabies inoculations prior to exposure, talk to your physician.

Hantavirus Pulmonary Syndrome (HPS).

Hantavirus (HPS) is a rodent borne virus disease characterized by severe respiratory illness. And a fatality rate of 43%. The deer mouse is the predominant carrier of HPS. Other small mammals may become infected, such as the western chipmunks. The hantaviruses do not cause apparent illness in the reservoir hosts, but the animals shed virus in saliva, urine, and feces. Human infection probably occurs when infective saliva, or excreta are inhaled as aerosols, or when the excreta are directly inoculated through the skin or ingested.

Symptoms of HPS:

Fever, muscle pain, and variable respiratory symptoms including, cough, and shortness of breath. Acute respiratory distress follows. Other early phase symptoms include headache, chills, abdominal pain, nausea, and vomiting. Rapid deterioration occurs which may culminate in death.

Prevention of HPS: Recommendations from CDC include:

- Eliminate rodent nests.
- Keep cooking, eating, and food storage areas clean.
- Cover human food and animal food.
- Contain and elevate garbage.
- Seal holes and cracks in dwellings to prevent entrance of rodents.
- Clear brush and trash from around homes and outbuildings.

Control rodent population, control fleas with insecticides. Safely clean up rodent infested areas. Avoid rodents when outdoors. Do not disturb rodent droppings or camp or sleep near burrows or areas where trash is present. Avoid feeding or handling rodents, even if they appear friendly.

Treatment:

Treatment is supportive. Any person with a severe, sudden respiratory illness should be suspected to have been infected with hantavirus.

Environmental Hazards:

Lightning:

Lightning is a constant occurrence. There are 2,000 thunderstorms active at any one time. Worldwide, there are 100 cloud to ground lightning strikes every second. Lightning is a complex phenomenon, occurring due to charge stratification in cumulonimbus clouds. It requires an unstable air mass (usually where hot and cold air fronts meet), with rapid vertical movement of water droplets or ice crystals. Multiple layers of charges may exist within the cloud mass. When charge differentials exceed the insulating capacity of air, ionized pathways form – lightning. The current built up in the cloud overcomes the air's insulating capability, and "grounds out". While seldom seen, lightning consists of two separate bolts – one going down and one up (the return stroke).

Lightning bolts are 6 to 8 cm in diameter and carry between 10-million and 100 million volts at 20,000 to 50,000 amps of direct current. Compare this to your normal household electrical outlet of 120 volts and perhaps 20 amperes of current. Lightning is also quick, the bolt lasts 0.01 - 1.0 milliseconds. Quick as lightning, "greased" or not, is very, very quick. Lightning bolts can strike up to 10 km in front of or behind a thunderstorm cell.

Thunder travels at the speed of sound, this allows a quick way to estimate how far away the lightning is (thunder is the noise created by the lightning bolt discharging). The speed of sound at sea level travels approximately 5 seconds per mile, so count the seconds from the flash, divide by 5, and that is how many miles away the flash occurred.

Lightning Bolt vs. Human Body:

Skin is a good resistor, especially with very short duration current. Lightning usually does not enter the body, but flashes over the exterior. Some charge may leak into the body via eyes, ears, mouth. Burns from lightning are usually superficial, unless caused by heating of objects close to the skin (belt buckles, dog tags, bracelets, etc.). Clothing may be blasted from the body. There is no residual charge in the body after a lightning strike; you can administer necessary first aid without concern – except from another lightning strike.

Injuries Associated With Lightning Strike:

Minor injuries include confusion, temporary blindness/deafness, amnesia, numbness, and rupture of the tympanic membrane. Victims usually recover without serious follow-on conditions.

Moderate injuries include being combative, disoriented, motor paralysis, autonomic dysfunction, vascular spasm, loss of consciousness/coma. Victims usually recover however can have significant follow-on conditions.

Severe injuries include cardiopulmonary, direct damage to the brain, blunt trauma to the brain or internal organs. Prognosis is usually poor.

Cardiopulmonary arrest can be a primary event, with cardiac re-start within a few seconds. Respiratory paralysis may lead to secondary hypoxic cardiac arrest. CPR and ACLS are indicated if the victim is to survive the event.

Neurological injuries can vary, ranging from direct electrical injury to the brain stem (almost invariably fatal), difficulty in short-term/long term memory transfer. Blood pressure instability is common, and may last for several days.

Burns:

Usually superficial (deep burns are an indication of electrical passage through the body and carry a grave prognosis). Burns can also occur from metal objects close to the skin (belt buckles, dog tags etc.). Feathering burns are not true burns but appear as usually transient pink or brownish markings. Sometimes the most outer skin over the areas will slough off in a few days.

Other injuries:

Cataracts can develop rapidly, within days or weeks, or they can show up years later. Dilated pupils occur frequently, and are an unreliable sign of death in a lightning victim.

Lightning strike prevention. How not to get hit.

- Don't be the tallest object in the area! Stay off ridgelines and mountaintops!
- Don't be next to the tallest object in the area.
- Remember that the cell "10 clicks over that away" can reach out and touch you.
- If in the mountains, shelter in a grove of trees - staying low in a region of rolling hills is also an option.
- Shelter in a metal vehicle (not convertibles) is relatively safe. The metal body will diffuse the current around the occupants. Don't touch the metal sides of the vehicle.
- Occupants of tents should stay away as far as possible from metal tent poles and wet clothing. If in the open, squat down with both feet close together, cover the ears with the hands. Have minimal contact with the ground. Stay out of the water in thunderstorm conditions.
- The 30-30 rule: The rule states that when the time is 30 seconds or shorter between seeing the lightning and hearing the thunder, the persons are in danger and should seek shelter. Outdoor activities should not resume until 30 minutes after the last lightning is seen or the last thunderhead (the second 30 of the 30-30 rule).

Initial treatment of lightning strikes:

Be aware of scene safety. Lightning does strike twice in the same place. Be as careful as you can in administering treatment. Perform the ABC's, rapid CPR may prevent further damage. Try to get advanced treatment as soon as possible. Treat the victim as though they have a back injury – they may well. Treat any other injuries that you find, burns, breaks, etc. Get advanced medical treatment as soon as possible.

Wildland Fires:

The ground team member needs to be aware of his/her surroundings when they are in the wilderness, they could face an unexpected wildland fire. Knowledge of wildland fire behavior can help keep the ground team member out of harms way and may save their life if caught in an unexpected fire. Attention to simple principals, indicators, and rules should enable the wildland user to anticipate and avoid fire threats.

It's far easier to avoid starting wildland fires than it is to extinguish them. Ground team members shouldn't need to be told not to toss lit matches or cigarettes around; however one serious threat is from driving a vehicle off-road into high, dry grass. Be careful where the driver parks the vehicle, and keep an eye on it until the engine and exhaust system cools down.

If a fire does start, the first step is to call or send for help. If possible, try extinguishing the fire with water or dirt – a dry chemical fire extinguisher doesn't work well on burning grass or wood. Toss dirt onto the fire, apply water to the base of the flames, but don't risk becoming trapped by the flames.

Fire-related injuries and fatalities are a direct consequence of heat, flames, smoke, critical gas levels, or indirect injuries. Intense fires that produce very high temperatures generally last for only a short period of time. Temperatures near the ground are lower because radiant heat is offset somewhat by inflow of fresh air and the fact that gases of combination rise and are carried away by convection. Close to the ground, within a few meters of flames reaching up to 36 feet, air temperatures may be less than 59 deg. F above ambient temperature. The breathing of heated air can be tolerated for 30 minutes at 199deg. F and for 3 minutes at 482 deg. F. Death or severe pulmonary injuries occur when these limits are exceeded.

Entrapment Procedures:

Do not panic. Most people are afraid when trapped by fire, so accept this fear as natural, so that clear thinking and intelligent decisions are possible. If fear overwhelms you, judgment is seriously impaired and survival is a matter of chance. Do not run blindly or needlessly. Unless a clear path of escape is indicated, do not run. Move downhill and away from the flank of the fire at a 45 degree angle when possible. Conserve your strength.

Enter the burned area - particularly in grass, low shrubs, or other low fuels, do not delay if escape means passing through the flame front into the burned area. Getting into the burned area removes you from most of the fuel and flames. Move aggressively and parallel to the advancing fire front. Choose a place on the fire's edge where flames are less than 3 feet deep and can be seen through clearly, and where the fuel supply behind the fire has mostly been consumed. Cover exposed skin and take several breaths, then move through the flame front as quickly as possible. If necessary, drop to the ground under the smoke for improved visibility and to obtain fresh air.

Control your breathing. Avoid inhaling dense smoke. Keep your face near the ground, where there is usually less smoke. Hold a dampened handkerchief over the nose. If there is a possibility of breathing superheated air, place a dry, not moist cloth over the mouth. The lungs can withstand dry heat better than moist heat.

Protect against radiation heat. Many victims of forest fires actually die before the flames reach them. Radiated heat quickly causes heat stroke, a state of complete exhaustion. Find shielding to reduce heat radiation quickly in an area that will not burn, such as a shallow trench. Crevices, large rocks, running streams, large ponds, vehicles, buildings, or the shore water of a lake can also be used for refuge. Do not seek refuge in an elevated water tank – the supports can burn, or the radiant heat can boil the water! Avoid wells and caves because oxygen may be used up quickly in these restricted places; consider them as a last resort. To protect against radiation, cover the head and other exposed skin with light colored, non-synthetic clothing or dirt. Lie prone. In a critical situation, lie face-down in an area that will not burn. Your chance of survival if the fire overtakes you is greater in this position than standing upright or kneeling.

SECTION V

FIELD SANITATION AND HYGIENE:

OBJECTIVES: On the completion of section V of this training the ground team member will be able to:

Explain care of the feet.

Explain how to avoid unpurified water.

Dispose of waste properly.

Explain proper personal hygiene.

Foot Care:

The proper care of feet can make the difference in weather or not the ground team member has a good experience or a miserable one. Proper care of the feet can also help to make sure the mission can be completed. It is also a safety factor. Extended operations require healthy feet!

Make sure your boots are correctly fitted and well broken in. Do not use the mission for breaking in new boots. Wear them around the house, take walks around the neighborhood. Many miles of walking may be needed to break in new boots. Fit boots with your pack on and the socks that you will be wearing. Try them out up and down hills or slopes – even in the store. Make sure your toes are not hitting the end of the boot when going down hill with a load. Your feet will generally lengthen, widen, and swell while during a hike from the load you carry and the pounding that occurs. If you feel any slight compression or abrasion of your feet, stop and apply tape or moleskin to the area. Don't wait until you have blisters.

Make sure boots are laced snugly but not too tight. If slipping of the heel occurs, try differential lacing. Heel lift inside the boot can lead to irritation of the Achilles tendon causing tendonitis and blisters. Differential lacing is a method of lacing the boot to help keep the heels down in the boot. To use differential lacing, the boots are laced up to and including the fifth eyelets and then the heel is kicked back in the boot. The laces are then tied at this point, or two sets of laces can be used for each boot, with the first set of laces tied at the fifth lacing eyelets. A second set of laces is then laced from the sixth eyelets to the top. The laces are then tied at the top.

Boots that get wet will often curl up at the toe putting pressure on the toes and the balls of the feet. Do not dry the boots fast as over a fire, especially nylon boots. Even leather boots don't do well with temperatures that your skin wouldn't find comfortable, leather was a cow's skin, after all. Waterproof your boots with suitable, manufacturers recommended products, and clean your boots of dried mud when done with the mission. If boots become very wet, stuff with newspapers and dry in a warm (not hot) place – perhaps changing the newspapers several times. Make sure your socks are clean, fitted, and free of holes and knotty darns that might rub your foot raw. Always bring plenty of

socks. Change socks often. A thin liner sock (Coolmax®), and a thick outer sock of wool or wool and synthetic mixes are often found to be superior.

Water:

Avoid unpurified water. Only drink and fill canteens from a known pure water source. If you must purify water, get your team leaders permission. Make sure you follow the instructions for purifying water. Remember, if the water is cold it will take longer for the chemicals to work. Heat is a good method to purify but it takes time and fuel. Ground teams can almost always carry enough water in the support vehicles that drinking native water isn't needed.

Assuming water is not contaminated with chemicals from mines or mineral deposits, it must be disinfected; that is killing any disease-causing organisms that might be in it. Water can be disinfected by boiling, by using some form of iodine, or by using a filter.

Boiling water always works to disinfect, but requires a lot of time and fuel. Some references claim that the water needs to be boiled for some length of time, bringing to a full rolling boil is adequate.

Iodine is the chemical disinfection of choice for water. Either iodine tablets such as the military water purification tablets or commercial Potable-Aqua® tablets can be used, but they must be fresh. Tablets should be gunmetal gray in color, if they look orange or "rusty" colored they are ineffective. Iodine crystals (Polar-Pure®) can also be used. For any chemical treatment, follow the directions for quantity, length of time to treat, etc.

Filters will not only disinfect the water, but also in many cases remove chemical contamination. Filters are expensive and somewhat fragile. If you choose a filter, make certain that it has the National Sanitary Foundation (NSF) seal of approval, and is capable of filtering microbes to 0.1 micron in size. Some filters combine iodine treatment with filtering.

Waste Disposal:

Waste disposal: If disposed of incorrectly, the waste can end up in someone's food or water. The waste can draw animals and disease carrying insects. The food is unsightly, smells and is a place to harbor disease reservoirs.

Human waste:

Whenever possible, use bathrooms / latrines. If none are available, then dig a cat hole (some areas require waste to be carried out) at least one foot deep. Make sure the hole is at least 100 yards down wind from any bivouac site. Make sure cat hole is not close to lakes or water sources. Cover the hole with dirt when finished.

Garbage:

Put garbage in designated trash cans only or carry it out. Seal it in plastic bags and pack it out.

Cooking Gear:

Do not wash cooking utensils in streams or lakes, or at campground water faucets. Use hot water and biodegradable cleaners such as Camp Suds®, Amway LOC®, or Shakley Basic-H®. Clean cooking gear as soon as possible and clean it well. Do not leave scraps of food on the ground.

Personal Hygiene:

Keep as clean as possible. Clean clothes help prevent infections, chaffing, and, if an injury does occur there is less bacteria on the body to infect wounds. Wash hands after using the latrine and before meals. Hand sanitizers are available if water is not abundant. Brush teeth at least once a day, and more often if possible.

SECTION VI

SETTING UP SHELTERS:

OBJECTIVES: On the completion of this section the student will be able to:
Explain different types of shelters.
Explain advantages & disadvantages of shelter types.
Give some examples of natural shelters, advantages & disadvantages.
Give examples of purchased or man made tents, advantages, disadvantages.
Describe areas where shelters should & should not be placed.

Man Made Shelters & Tents

As it is with most outdoor and back country equipment, shelters and tents are constantly improving. Seek out advice before you buy. Often you can rent your potential purchase before you buy. Many suppliers will apply part of your rental fee to the purchase price. Check it out.

Simple shelters:

A good part of the time, depending on where you live, work, and play, all you will need is a simple shelter. A poncho can be used as a shelter or a ground cloth for those that are hardy, and like to look up at the stars. Weather can change rapidly and things could get ugly. Know what is going on around you. Have options available to you. You can use your tarp as a lean-to shelter, if you buddy-up with another team member one of the tarps

can be used as a ground cloth. Tube tents are quite satisfactory for short stays and for those who do not want to spend a lot of money. Tube tents are a lightweight, inexpensive plastic tube. They are also slippery – it's easy to slide out of them during the night. You also need suitably located trees, fence posts, or something to tie them up. Tube tents are completely waterproof, so they will develop a lot of condensation over the night, and of course shouldn't be sealed.

Conventional tents can be free standing, breathable with a rain fly, with a screen net top and rain fly (for warm climates), three season (suitable for anything except severe winter weather), four season (usually suitable only for severe winter weather), some are available with a vestibule to store your gear in, with a hole in the floor to cook in (not a good idea), and with a number of other options. Get some serious advice before investing in a tent, from the sources already mentioned or from Recreational Equipment, Incorporated (REI) at <http://www.rei.com>. Tent Accessories can make the tent more comfortable and versatile. Some of the accessories available are repair kits, net shelves, etc. Most cloth tents will need to have the seams sealed before you use them, if yours does set it up and seal the seams at home. Sometimes your tent location selection may be limited, depending on, your equipment, the terrain, how much space you have, the surface area, and how much time you have to set up, as well as the wind. Choose your location wisely. Soft sand may look great, but, ask yourself, "what made this soft sand?" a stream, a waterfall in a storm? Look up, look down, and look all around. Big trees are great for shade and something to tie your tent to, but watch out for old trees with limbs that could break off and fall on you with a little wind. Dead foliage on the ground is soft and comfortable but could be a harbor for insects. In placing a tent, usually putting the entrance facing into the wind will sort of inflate the tent, making it quiet during the night, but if it's snowing try to place the entrance at right angles to the wind to keep it clear of snow. Practice putting up your tent at home in the wind, and become proficient at pitching your tent and setting up your equipment.

Natural Shelters:

There are many forms of Natural Shelters, those built by the intended inhabitant, and those that are there formed by nature. There are many restrictions today in building natural shelters (cutting trees, clearing camping areas and even in clearing rocks). Damage to the wilderness is frowned on and in many cases against the law. Know the rules, check with the controlling agency. A Lean-to can be made in an emergency. The use of fallen trees, caves, and rock outcroppings can also be used or used as a base for your shelter or cover in a storm or wind. If you must use natural materials or clear an area, make sure you put it back as close as you can to NATURAL.

Check out potential shelters, they may be inhabited by the original owner and they may protect it, or at least desire to share it on a cold night. Caves can be a great natural emergency shelter, their temperature usually remains quite constant (warm enough to survive) and they can be quite comfortable. Natural caves are usually quite safe with good air; it is usually the mineshafts that have bad air. Because we usually do not have canary's to sacrifice to make sure the air is good, a candle is a good indicator. If it

goes out, the air isn't good – but waiting that long may be too late. Depending on the geographic location, many caves have a good supply of water. Caves are to be used as a last resort in a wild fire, many deaths have been caused by seeking refuge in a cave and dying for the lack of oxygen as the cave fills with hot gases from the fire. If nothing else is available take a chance, use it.

Natural shelters in the snow:

Anyone that spends time in the wilderness, whether it is for recreation, or SAR, should practice the construction of several types of shelters. A lot of energy can be expended building a shelter, often only to have the shelter fall in on you. Take advantage of what has already been built, Caves, alcoves, and under overhangs. Shelters should be easy to construct rapidly and with simple tools. With a little work, already partial shelters can be improved to make a suitable shelter. Wind blocks can be made with rocks, logs, branches, and snow blocks. When overhangs and rock outcroppings are used for shelter, a fire can be built in such a way that heat is reflected onto the occupant. The fire should be built 5 to 6 feet from the back of the shelter with the reflector wall on the other side of the fire.

Snow trenches are usually simpler and quicker to construct than a snow cave and can save needed energy. Snow trenches can be dug on areas that are flat or an area with a slight incline. The snow depth needs to be 3 feet or deeper, or the snow can be piled. Dig a trench approximately 4 feet X 6 feet, one end can be roofed over using a poncho, tarp, or boughs, the other end with a fire built close to the entrance. The tarp can be held in place by piling snow around the edges. A narrow entrance helps contain heat and can be closed off with a small plastic sheet or a poncho. Make sure the smoke will draft up and away from the entrance and the trench. The entrance should be dug on the windward side of the fire. Other types of snow trenches can be dug, two people, and three people. Remember the larger it is the harder it is to warm up and keep warm.

If the snow shelter becomes too warm, the walls and floors will become wet and the roof will drip. The person inside the shelter should be able to see their breath at all times. The temperature inside the trench can be raised to 25 degrees F and 30 degrees F. with the use of a small candle, stove and body heat. Remember stoves and candles need to be vented.

Cone shaped depressions around the trunks of evergreen trees (“tree wells”) can be used for shelters. The coned area can be dug out and roofed over with a tarp. A fire built close to the well can reflect heat into the shelter. Ventilation must be adequate. Do not set the tree on fire!

Snow Caves:

Snow caves can be a piece of work. Choose a site that is not in an avalanche path. Choose a large snowdrift such as found on a leeward side of a small hill. Dig the entrance just large enough to crawl through. Dig out the interior just big enough for one to two persons and a stove. Dig the cave so there is a sleeping platform so the occupants will not be sleeping in a pool of water. If boughs are available, place them on the sleeping area floor. If a stove

is uses make sure there is a vent hole above the stove. The ventilation hole should be about the size of a ski pole basket. The temperature inside the snow cave should not be too warm or dripping will take place. The occupants should be able to see their breath inside the snow cave a temperature of 25 degrees F. and 30 degrees.

Snow Domes:

When you are on flat ground, or if the snow depth is shallow, the snow can be piled up and a snow dome cave can be made. Pile the snow 6 to 7 feet high; let it harden for a few hours, then dig an entrance low on one side. Dig out the interior making a dome shaped room large enough for sleeping. Leave a sleeping platform and cover it with boughs, sleeping pad or whatever insulation materials are available. Make a ventilation hole over the area for the stove. As you can see the snow dome is very time consuming and labor, energy intensive.