

CONSIDERATIONS for PERSONAL SAR EQUIPMENT:

The purpose of this document is to make Search and Rescue personnel aware of the basic equipment that should be carried in the field. In the early 1980's the National Association for Search and Rescue began their education program, and they included a recommended equipment list. When ASTM took over the standard writing process, they also gathered information for an equipment list. This document considers the NASAR and ASTM [F-2209] lists. In some local jurisdictions, however, lists like this are created by well-meaning individuals with limited actual experience out in the bush. This document will address the actual needs of a searcher doing their assignment tasks and also considers the needs, if an emergency or unplanned experience occurs while on a mission. If a searcher has a special skill; for example, dog handler, tracker, rope rescue technician, or emergency medical technician, they may need to carry some additional equipment for their specialty. Maintaining body temperature, hydration, nourishment, and staying dry are paramount. Having the most efficient tools for necessary tasks and fixing broken equipment is next. Being able to take care of personal needs is also considered.

Originally, search and rescue activities were expected to last around 24 hours, but I want to extend that time for unforeseen emergencies and to consider the adventure racing community that may need to cover four days on average,

The author's background includes sixty years of search and rescue participation, with nine different groups, each with a unique focus, for a total of one hundred and fifty years of experience. It will be the reader's choice whether or not to carry all these items, but the author has tried to analyze this list of items, discuss their possible uses, and give some practical examples, with their projected costs and weights.

In the event of an unexpected emergency, what you thought was going to be 'too much', may be what you wish you had.

This document has been peer reviewed by experienced field members of assorted SAR units, MRA units, a medical advisor for cave rescue, and some other uniquely qualified individuals who actually have experience outdoors.

Clothing: Must be adequate for climate and local conditions.

(Discussion: Clothing choices should be layered with consideration for: wicking, thermal layers, and a wind or waterproof layer. Items can be added or removed as needed. Fabrics should be synthetic or wool blends. Avoid cotton unless you are using government aircraft or in a fire situation and then follow the S-130 requirements.

An outer wear, weather-resistant coat with a removable fleece liner is one practical example.

An additional consideration might include gaiters for wet grass or to keep leeches, ticks, or other rogue insects off your skin and snow or water out of

Considerations for SAR testing

your boots. Example: Highland Gaiters® from Mountain Warehouse®, cost \$22.00 – 6 oz.

A hat with a broad brim to block sun and repel rain should be considered.

Footwear choices may vary for conditions or terrain, but ankle support and a lug sole should be considered. Buy the right size and make sure they are broken in before prolonged use is attempted. Replace if worn out)

Pack: Adequate size for listed items with room to store appropriate outerwear; and have the ability to carry additional necessary mission and/or unit gear.

(Discussion: Smallest size required and riding in the most comfortable position. If your pack is too large or uncomfortable you will not carry it. When used in rugged terrain, carrying it low on the back is recommended by the wildland fire community as it reduces fatigue, and allows a searcher to have greater endurance. It should have an adjustable waistband as this will help stabilize the load)

(Example: Consider dividing equipment into two groups. Items for emergencies in one carrier and items required for a mission, readily available, in another carrier, possibly a load bearing vest type garment.

Three strategies are offered:

First strategy: For emergency equipment, a waist pack, one example is a Harper Pack, Original®, 521 cu. inches, cost \$108.00 - 15.6 oz.

For usable mission related items, a vest with pockets, one example, is a Cruiser Vest made by PacForest Supply® in Oregon – cost \$99.00 – 2 lb. 4 oz. with fifteen pockets. This vest has a large pocket on the back for storing outerwear or other team equipment. It comes in a variety of fabrics. Nylon is tougher than cotton or mesh, but you may sweat more. For a Mediterranean type of climate, the cotton duck material is probably a good choice. The author opted for the orange nylon version.

Second strategy: Wildland fire pack concept. Will have a load bearing waist unit for carrying water containers, a small pack, and/or a fire shelter pouch which could also be used for SAR emergency gear. An upper unit, which can be detached, for the rest of your equipment. Rides low on back for balance and could work with the above vest.

Examples: FSS Field Pack, total capacity 2100 cu. in. The waist belt, supported by removable padded shoulder straps, carries a butt pack, for emergency equipment, and two water pouches. [One for water vessel and the other for a bag containing high energy snack food] The removable 1000 cu. in. unit has a main section, two side pockets, and a pocket in top flap unit, cost \$147.00 – 4 lbs. from GSA or Coaxsher FS-1 Spotter Pack®, total

Considerations for SAR testing

capacity 1100 cu. in. with removable 700 cu. in. upper unit, includes 102 oz. water case, [Beware, have a contingency plan for when your bladder leaks], cost \$184.00 – 4.44 lbs. from Field Fire®. [The author opted for the GSA model].

Third strategy: Basic backpack for everything needed on a specific mission.

Example: Osprey Stratos®, 34 Liter, cost \$160.00 – 3 lbs. 2 oz. from REI.

Whichever your choice, you can modularize your equipment between the carry devices for varying situations. One way to do that is to put items in packing cubes available from REI®. They come in a variety of sizes and have one mesh side so you can see a list of contents. Another option is assorted light weight dry bags. A visible list of contents is recommended for each container. You can quickly take the exact items you might need for your deployment.)

If you need to carry a radio and a GPS you might consider a chest harness, which can be used with all the above pack strategies.

Example: PMI Stealth Radio Harness®, cost \$55.00 – 6.4 oz.

Recommended list of items for search and rescue personnel to have:

NOTE: A possible location where each item below might be carried is indicated by a [letter]: [V] denotes items available in a vest and [P] denotes items in a pack available for emergencies

Pad: Ensolite pad [closed cell], about 12 in. by 24 in. by ¼ in., cost: \$5.00 – 8 oz. [V]

(Discussion: Provides insulation and comfort if you have to sit on cold or hot rocks, keeps you off moisture, padding for knees during patient care, provides base for arm splinting, cook stove, etcetera. Thickness can vary from ¼ to ½ inch which may reflect in cost and weight.)

Shelter: 8' by 10', minimum size, of waterproof material with 25' of cord [however, in reality, probably cannot be configured to keep you dry in heavy rain]. [P]

(Discussion: Consider a tube tent that will keep you dry in any rain. Replace the string that comes with the tube tent with 25 feet of parachute '550' nylon cord.)

(Example: Coghlan's Tube tent®, 9' by 12' includes adequate string, cost \$6.00 – 18 oz.)

Duct tape: (Discussion: May be used to seal one end of the tube tent, temporarily patch torn clothing, or repair a de-laminated boot sole. Can also be used to seal wrists and ankles of Tyvek coveralls in poison oak areas. Used in

Considerations for SAR testing

medical situations to place messages on patients. Denote areas that have been searched. Choose bright colors as pink or yellow. Can be purchased in flat packages.) [P]

(Example: Danco Redi-Tape, Pocket Size®, flat-fold, 5 yd., cost \$ 3.50 - 3.5 oz.)

Rainwear: Waterproof suit [P]

(Discussion: May be worn for protection when working in a contaminated environment including poison oak, or as waterproof outer clothing.)

(Example: DuPont Tyvek® coveralls – cost \$5.00 – 4.25 oz.)

Poncho, wet weather, coated rip-stop nylon [V]

(Discussion: Used as a garment, ground cloth, sheet, blanket, or sleeping bag cover, Size 63" x 88". Beware that some commercial versions do not have brass grommets and snaps, and the nylon coating may tend to stick together when folded. If your version does seem to stick sprinkle corn starch on the surfaces before you fold them. Can be secured around the waist with your Purcell Prusik cord. [Discussed later] Poncho's seams can be rubbed with wax for more water proofing.)

(Example: Authentic USGI or NATO military surplus, often available from Sportsman's Guide® or Coleman's Military®, cost \$30.00 – 1 lb. 5 oz.)

There are those who are completely against ponchos and prefer a more streamlined profile moving through the brush.

(Optional example: FroggToggs Classic Suit® – cost \$ 48.00 – 1 lb. 5 oz. – [\$45.00 from Sportsman's Guide®].)

Boot socks, - cost \$4.00 – 3 oz. [P]

(Discussion: An extra pair, not cotton, preferably of a wool blend. If your feet have become wet and cold, dry socks are a great morale booster.)

Gloves, wool [P]

(Discussion: For warmth, but fingerless, so objects can be handled. Can be used as a liner for leather gloves)

(Example: USGI Fingerless gloves 100% wool, cost \$ 7.50 – 1 oz.)

Gloves, leather [V]

(Discussion: For work and protection from hot rocks to wood splinters.)

(Example: Wells-Lamont® brand at COSTCO®, cost \$ 7.00 – 5 oz.)

Considerations for SAR testing

Gloves medical or surgical, “Nitrile”, at least 3 pair, cost \$ 0.75 – 0.75 oz. [V]

(Discussion: Non-sterile gloves for handling medical, biological waste, or scent articles. Have the correct size.)

Bandana, cost \$ 3.00 - 1 oz. [V].

(Example: 26” by 26”, printed cotton is historically correct or a ‘wild rag’ 36” by 36”.)

(Discussion: Wiping brow, handling hot objects, and when wet can be used as mask to help filter particle matter from air at fires or in debris fields.)

(Another option in this era of airborne disease is wearing a neck gaiter or ‘Buff’ that could cover mouth and nose. They are made of synthetic material, so are not recommended for fire line activities, cost \$11.00 – 1 oz. at REI®, or USGI Neck Gaiter, 90% polypropylene and 10% Lycra®, cost \$10.00 – 2.5 oz.)

Goggles or safety glasses, cost \$ 10.00 to \$18.00 - 4 oz. [P]

(Discussion: For eye protection, can be flexible or rigid models, tinted or not.)

Dust masks, NIOSH N-95 rated, at least three, total cost \$ 3.00 - 1 oz. [P]

(Discussion: Consider wearing a lesser value mask, your ‘Buff’, or bandana over your N-95 mask to make it last longer. To avoid fogging glasses try placing a tissue inside mask to absorb moist air.)

Balaclava [head gear], wool or synthetic, [P]

(Discussion: Prevents body heat loss from head and can be worn as a helmet liner. Also, it can provide sun protection, and wool provides fire flash protection. If there is a potential to be around fire, a Nomex® style is recommended. Each layer of Nomex® in the balaclava adds about \$25.00. If you have a ponytail hairstyle a watch cap may be an alternative.)

(Example: USGI balaclava, 85% wool and 15% nylon, cost \$13.00 – 2 oz.)

Helmet, approved by ANSI, UIAA, NFPA, or OSHA, [V] or [P]

(Discussion: Needs a chin strap, an ability to attach a head lamp, the suspension should be attached by rivets, as most molded plastic fixtures holding the suspension will fail and cannot be repaired. Some prefer a wildland fire style with a brim all around for greater sun protection. The wildland fire versions are often set up with a heavier chin strap, goggle clips, and shroud mountings. For climbing style helmets there is available a nylon

Considerations for SAR testing

sun visor, Sunbrero® sold by CMC®, which fits over the helmet and provides sun protection.)

(Example: Edelrid Ultralight Climbing helmet®, cost \$ 60.00 -15 oz. or

Bullard full brim wildland helmet®, cost \$55.00 – 16 oz.)

Safety Vest: (Discussion: Should be ANSI/ISEA compliant and is required when working near traffic. Also makes you more visible in the wilderness to helicopters, searchers, and hunters.)

(Example: ALCO SAR high visibility, cost \$15.00 - 5.5 oz. [V]

Lighting: Headlamp, to be mountable on helmet [V]

(Discussion: Could have options of flood, spot, strobe, or red, and use AAA batteries or same batteries as flashlight)

(Example: Black Diamond Spot 325 Headlamp®, cost \$ 40.00 – 4 oz. and uses AAA batteries.)

Flashlight, cost \$10.00 to \$20.00 – 7 oz. [V]

(Discussion: Use AAA batteries or same batteries as headlamp.)

(Example: U.S. Municipal Surplus Elite-Tac LED Flashlight®, with five settings <3,000 lumens, cost \$20.00 – 6 oz. [3 AAA batteries], [Sportsman's Guide®]

Extra bulbs and batteries (6), cost \$ 5.00 - 5 oz. [P]

(Discussion: Most efficient to use the same size battery in both devices, consider having one light capable of dimming and an automatic flashing mode. In this modern age, having extra blubs may not be an issue as LED bulbs are often not replaceable. If you have to carry a GPS unit which requires AA batteries and a lot of them, then using an AA battery flashlight is now maybe a reasonable selection.)

Lighting considerations for the 21st Century:

(Discussion: Generally, head lamps have three AAA batteries, but this size is inappropriate for most flashlights which use larger battery sizes. With LED bulbs there seems to be a problem regulating the voltage of three batteries. With the advent of LED bulbs and lithium-ion batteries maybe it is time to consider a different approach to lighting sources and using rechargeable batteries.)

(Examples: [Author's option] Milwaukee Rechargeable Hard Hat Headlamp®, cost \$60.00 – 6.5 oz., with spot, flood [high, medium, and low].

Considerations for SAR testing

From 475 lumens lasting 2 hours to 25 lumens lasting 31 hours. Can be worn around neck to illuminate path but not blind others when you move your head. Battery seems to recharge in about one hour.

Milwaukee 700L Flashlight®, cost \$70.00 – 8.25 oz., with spot/flood [high or low], strobe. From 700 lumens lasting 4.5 hours to 100 lumens lasting 16 hours.

Milwaukee [extra] Rechargeable Battery®, \$20.00 – 2 oz., 4 volts and 2.1 amps.

One disadvantage with Milwaukee® products is they use their own proprietary battery. An advantage though is that the charging cable plugs into any active USB port, in a vehicle, or elsewhere.

With one extra charged battery in your pocket, you will have the potential of 25 lumens of light for 93 hours or eight nights.

Often sold in a package deal where an extra battery is included with either light from 'The Home Depot'® web site.)

Trekking pole, adjustable, [V]

(Discussion: For balance in rugged country, debris probing, brush moving, and as a tracking aide. Adjustable length. Some have a shock absorber built in for comfort. When using the wrist holding the stick should be slightly above the elbow. When used as a tracking aid, use rubber sheep castration rings, for markers and secure the wrist strap so it will not touch the ground. Investigation shows that traditional trekking poles have three sections and collapse to only 26 inches making it hard to carry. Leki® has a pole with four sections and collapses to 17 inches. Some pole models are carbon fiber and others are aluminum. Carbon fiber may shatter where aluminum will just bend and may be straightened. Replacement rubber tips are sold by REI® for \$16.00 a pair. Buy one foot of ½ in. rubber hose for \$1.00 and cut eight tips out of it.

(Examples: ALPS Mountaineering Excursion Trekking Pole®, 10 oz. collapses to 26 inches, cost \$25.00 [Sportsman's Guide].

LEKI MCT Vario TA®, aluminum, 8 ½ oz., collapses to 17 inches, cost \$80.00 [Enwild]

TREK-LOGY Trek-Z®, aluminum, 10 ½ oz., collapses to 16 inches, cost \$22.00 [Amazon]. [Author's choice one even though it is Chinese])

Compass, orienteering or sighting type, cost, \$25.00 to \$100.00 – 1.5 oz. [V]

(Discussion: Choice will be based on skill. In consultation with John Carnes, a college level navigation course instructor with extensive search

Considerations for SAR testing

and rescue experience, his realizations of searchers' actual needs for navigation skills are revealing and the author's experience agrees with his conclusions. He feels for most SAR folks the only times they will be sighting bearings and walking course lines will be during training or testing based on a skill that was considered important fifty or more years ago. Carnes classifies his students into three different groups. For most outdoor enthusiasts they only need to know basic cardinal directions to orient their map to the terrain and a simple base plate; [example: Silva Ranger®, \$27.00 – 1 oz. or even a 'zipper pull' compass]. The next training level involves sighting on features they see in the distance in order to triangulate their current location, and a base plate compass with a mirror will provide the accuracy for that; [example: Silva Ranger 2.0®, cost \$48.00 – 2 oz.] It is recommended you use these compasses in magnetic mode. The third group consists of a very small minority who require a high degree of accuracy which can only be provided with a more expensive 'look through the bezel' type sighting compass and it is probably not needed for SAR. [Example: Silva 54LU® was the best compass for SAR use but it is no longer manufactured. It was a simple base plate compass, but you could direct sight an azimuth through the bezel. [Contact the author about availability.] Available [hockey puck style] examples: Suunto KB-14®, cost \$120.00 – 8 oz.; Suunto KB-20 VISTA® \$90.00 – 1.7 oz.; and Plastimo Iris 50® [sold by Nautos USA®], cost \$81.00 – 8 oz. Using a direct sighting compass will require a separate six-inch plastic ruler/protractor combination for map plotting, and a separate mirror for signaling. John recommends investing in and learning to use a GPS for the 21st century – example: Garmin GPSMAP® model, the newest series you can afford.

Grid reader, cost \$2.50 [V]

(Discussion: Locating UTM coordinates on paper map with greater accuracy.)

Tally counter, cost, \$5.00 – 2.1 oz. [V]

(Discussion: For traditional orienteering, if you don't use a GPS, to keep track of distance traveled, or another option is a set of 'Ranger Pace-Counter Beads'®, used with your specific pacing parameters, cost \$6.00 – 1 oz.)

Multi-purpose tool, with pliers and knife blade, cost \$30.00 - \$ 60.00. [P]

(Examples: SOG®, (6 oz.) Leatherman® (5.25 oz.) or Gerber® (7.5 oz.)

(Discussion: Your budget may dictate how many tools your device will have but pliers for repairs, wire cutting, and handling hot objects is important. Also, a sharp blade of some kind and an awl are often needed.)

Considerations for SAR testing

Trash bag, contractor, 55-to-60-gallon size by 3 mil thickness, cost \$0.25 – 6 oz. [V]

(Discussion: Multiple uses. You can place a six-inch cut about six inches from one corner. Place bag over the head and the cut corner now forms a hood when you sit under it.)

Candle lantern, with 9-hour candle, cost \$25.00 – 6.4 oz. [P]

(Discussion: Placed between legs as you sit under a poncho, or the trash bag provides warmth. Candles, made by UCO® of beeswax will last about nine hours. Candle wax should burn, regular candles will just melt, and it will clog up the lantern and require constant cleaning. Beeswax is recommended for candles. A tea candle is not recommended as when it burns the wax becomes liquid in the cup and can spill, also the flame is open. Another consideration with an open flame is a Bee-Hive Beeswax Travel Tin Candle®, burns 12 hours, cost \$6.00 – 2 oz. The light from a candle lantern will help in keeping a positive mental attitude during an unscheduled survival event.

Carabiners, (Discussion: Need two, locking aluminum, minimum rating of 20 kN. or 4,400 lb. each. Their gates should be of the ‘key-lock’ design. Consider one carabiner to be of an auto-lock variety so when it is connected and released you will know the gate is locked. The other one should have a regular locking gate which provides more flexibility in use.)

(Example, Petzl AmD® model, \$10.00 to \$16.50 each – 2.5 oz. each or both are 5 oz.

Webbing, 2.5 cm. or 1 inch tubular, rated minimum of 18 kN. or 4,000 lb.

Two pieces are recommended:

5 to 10 m. (16.5 to 33 ft.) \$ 4.95 to \$9.90 – 7 to 14 oz. [V] or [P]

(Example: For a tied harness where midpoint of webbing tie starts on one’s hip.)

(Discussion: Length will depend on the somatology of the user and is used to craft a sit harness that will not fall down around ankles, ends should be cut at a 30-degree angle and the length marked on each end with a Sharpie®.)

6 m. (19.5 ft.) piece, cost \$ 5.70 - 8.5 oz. [V]

(Discussion: For many general uses on a mission, ends should be cut and marked as described above. This piece of webbing may also be used in

Considerations for SAR testing

conjunction with the above tied waist harness to make a full body harness. Other uses are victim harness, hose strap, stretcher carry strap, et cetera)

Prusik loops: a total of three... [P]

(Example: A set, both using 7 mm. cord and 105 cm. (41 in.) and 115 cm. (45 in.) in length, cost \$4.00 a pair – 2.5 oz. MBS 10.7 kN or (2405 lbf.)

(Discussion: The 105 cm. is the minimum length to tie a triple wrap Prusik hitch on 13 mm. or (½" rope), the 115 cm. length allows the Prusik hitch to sit below a micro-Prusik minding pulley for a hauling system. Both will work better on smaller ropes. Both can be used as a personal belay on the crew's rope, for a personal climbing system, or to change an MB [Münter] hitch belay from a conditional belay to a true belay. When using it for personal use, a two wrap Prusik is acceptable.)

(Example: A Purcell Prusik with 175 cm. (68 in.) of 6 mm. or 7 mm. cord, cost \$10.00 – 3 oz.)

(Discussion: Provide fall protection when working near an edge and can be used when creating a personal climbing system. Will also function as an adjustable belay when assisting a patient. When configured as a "Purcell Prusik", the Prusik loop should be tied with three wraps on the anchor side and two wraps on the other side, an asymmetrical Prusik - 3 over 2. Can also function as a waist belt when wearing a poncho to keep it from flapping.)

Measuring device: six feet, cost \$ 3.00 - 0.75 oz. [V]

(Example: Small, retracting sewing tape measure that can be locked in extended position, helpful for tracking documentation and photographing clues.)

Flagging tape: one roll [V]

(Example: Bio-degradable material in a bright color. PRESCO® 1" by 100' roll of pink, cost \$4.00 – 1 oz. Many uses.)

Whistle: (Discussion: Preferably with pea-less technology, as ball type can freeze in cold temperatures. Carry on a lanyard.)

(Example: Fox-40®, cost \$6.50 – 2.5 oz.) [V]

Mirror: (Discussion: Should be of glass, at least 2 inches by 3 inches, with a hole for a lanyard and a sighting window to aid in signaling. Your compass mirror may suffice but the mirror and personal skills must give you the ability to signal an aircraft.)

Considerations for SAR testing

(Example: Mark 3®, USGI, with case, cost \$26.00 – 6.5 oz.) [P]

Matches: [P] (Discussion: Strike anywhere, waterproof coated, in a watertight container. Carry an extra piece of striking material in the waterproof container. Matches have a shelf life, as they absorb moisture, as time passes.)

(Example: UCO® Survival matches at REI®, 20 pack, cost \$ 3.00 – 0.5 oz. or 10 pack, cost \$1.50 – 0.2 oz.)

(Example: A cheap cigarette lighter is also an option, as is a small plastic bag filled with cotton balls impregnated with Vaseline for a fire starter.) [P]

(Discussion: A BIC cigarette lighter can be carried safely in an EXOYAC® fire-SLEEVE Lighter case cost \$15.00

Watch: Only required if a wristwatch is not worn [V]

ZIP® ties: (Discussion: Used in building shelter, medical splints, and repairs.)

(Example: At least eight, 12 inches in length – 1 oz. [P]

ZIP® locked bags: (Discussion: Can be used to keep gear dry, collect water, contain contaminated items, protect collected evidence or irrigate wounds.)

(Example: Assorted sizes, cost \$0.25 – 1 oz.)

Braided wire: 6 ft., [P]

(Discussion: Picture hanging type wire for equipment repairs, cost \$2.50 - 3 oz.)

Notepad with two pencils: cost \$3.00 - 3 oz. [V]

(Discussion: Consider water resistant paper and at least two wooden pencils with working erasers.)

(Example: Write-in-Rain® notebook and classic wooden pencils.)

Sharpie®, with broad chisel point: cost \$.50 – 1 oz. [V]

Discussion: Making notations on flagging tape or comments for patient care on duct tape.)

EMT Shears: cost \$5.00 and up – 1.6 oz.

(Discussion: Stainless steel, 7 1/2", and American made for medical assessment needs and overnight camp set-up. Cheap ones are almost for one time use only)

(Example: 'MILTEX'® or 'RAPTOR'® brands.)

Chemical light stick: Four pack of 4" sticks, cost \$2.00 – 1 oz. each stick [P]

Considerations for SAR testing

(Discussion: One time use only and will last about 10 hours when activated, store carefully in your pack, so it won't activate prematurely. Sticks only have about a two-year shelf life.)

Water bottles: Two, with one liter or (one quart) capacity each, [V] and [P]

(Discussion: Consider at least one container cover that can attach to belt or outside of pack for one of the containers, so it can be accessed without opening pack. This container should have a small top opening to avoid spills when you drink while walking. An insert is available for large mouth bottles to facilitate non-splash drinking. An alternative could be a hydration bladder that might be part of your pack choice. If you use a bladder have a contingency plan for when the bladder leaks. Another option to a bladder is a Source Tactical Gear™ hydration line which will connect to several water bottle styles. Cost \$30.00 – 5 oz. – Amazon. Also consider carrying packets of liquid electrolyte to add to your water supply to reduce possible dehydration and for muscle health. Example: Liquid I.V.®, sold by COSTCO®, in a bag which contains thirty sticks of liquid. One stick of liquid can be added to one quart of water. Cost \$1.00 for an individual stick. Does impart an odd taste to water. Many powder electrolyte additives are ineffective as they are mostly fructose and sugar. An exception is Gatorade Zero®, assorted flavors, in .97 oz. packets of powder to be added to ≤500 cc (16 oz.) water. Excellent taste. Cost: \$ 0.69 each at Amazon®. Another important option is to also carry ten water purification tablets. Sometimes unknown sources of water can be compromised, and one does not want to run the risk of a waterborne illness. Example: AQUATABS® [NaDCC] ten tablets, cost \$3.00 at REI®. Each tablet will handle .75 liters of water and work in 30 minutes. If you use tap water, consider filling containers at the beginning of deployment to avoid possible contamination and do not store city water in your personal containers. After ninety minutes of moderate exercise on a warm day the body will have expelled moisture equal to one per cent of the body's total weight. This could be between 1 ½ to 2 pounds or 1 ½ to 2 pints of liquid. Recommended to consume a minimum of one pint of liquid each hour.)

(Examples:

Nalgene® bottle, cost \$6.75 – 3.5 oz. (works with Source Tactical Gear™)

Klean Kanteen®, stainless steel, cost \$30.00 - 9 oz.

Plastic bottle, GSA, cost \$ 2.00 – 2 oz.

Glaceau Smartwater® bottle, cost \$2.50 – 1.25 oz. [Comes with one liter of balanced pH water fortified with electrolytes. Re-useable with an excellent shape for packing.]

Considerations for SAR testing

Carrier for belt, \$ 10.00 - 3.5 oz.

2 liters or (quarts) of water, carried in your kit, 4 lbs.)

Metal cup (Discussion: Civilized way to drink, available to drink from other sources, can be used to heat water in, and provide water for a search dog.)

(Example: Sierra cup®, stainless steel, 12 oz. liquid, cost \$4.00 – 4 oz.)

Food: An active SAR worker will probably consume 3,600 calories every 24 hours. The California Department of Corrections provides inmates with 1,800 calories a day. You should carry a minimum of 1,800 calories during your first assignment, or however much food you can fit in a one-quart zip-lock bag, cost \$ variable – 12 to 16 oz.

(Discussion: Daily requirement of 0.7 grams of protein for every pound of body weight recommended by United States Military [150-pound person equals 105 grams of protein]. Try to have your food supply contain at least 100 grams of protein. Also consider the sugar and salt content of foods you choose to avoid hypernatremia issues.)

(Examples: Individual portions available at COSTCO. Assorted Kirkland® nut packages at 250 calories and 11 grams of protein. Nature Valley® bars at 190 calories and 10 grams of protein, Nature Valley Sweet and Salty Nut® bars at 160 calories and 3 grams of protein [author's choice], Kirkland® trail mix at 300 calories and 9 grams of protein, Pacific Gold® jerky or biltong at 90 calories and 12 grams of protein, and Kirkland Fruit-Snack® at 70 calories and 1 gram of protein per individual packages. Other energy bars that you like. Also consider dried apricots, 1.4 oz. at 110 calories and 1 gram of protein or dried apple slices, 1.4 oz. at 130 calories and 1 gram of protein. Also consider individual portions of any of the nut butters. Various packets of energy gel can be beneficial. An example is GU®, which costs \$1.37 for each 1 oz. packet (100 calories). Recommended consumption of one packet per hour with some water. Foodstuff needs to be rotated as nuts and bars become rancid in taste during storage.)

Cost \$20.00 and more – 6 oz. (in a one-quart zip-lock bag) [V] and [P]

Personal:

Photo Identification card from your unit, i.e. 'Alameda County SAR' (identifies who you are?)

Cash money, 1 - \$10.00, 2 - \$5.00, 10 - \$1.00, and assorted coins, (might pass a store)

Toilet paper, minimum of sixteen sheets per day (personal needs)

Considerations for SAR testing

Over The Counter drugs: (for personal use only) Many SAR events may span two days., but your kit should consider the needs at an adventure racer level, which commonly will last four days.

Each item listed below is carried in an individual zip-lock bag (1½"x 1½") available from Amazon® cost \$0.06 for two bags.

Pain medication – examples: Acetaminophen [TYLENOL®] 500 mg., Ibuprofen [MOTRIN®] 400 mg., or Naproxen Sodium [ALEVE®] 400+ mg. (longer lasting), Choose the one that does not interact with other medications you may take. (These medications are for pain management and must be taken with food at eight-hour intervals. Four doses recommended.)

Antacid medication – Calcium Carbonate Tabs (Four 'Pepto®' tablets recommended.)

Diarrhea medication – example: Imodium AD® (Three doses recommended.)

Allergic reactions - Diphenhydramine HCl 25 mg. – example: Benadryl®, Cleartin, Zyrtec®, or Allegra 24®. (Four doses recommended.)

Water purification tablets, (water in the field may not be the best and you cannot risk the consequences) – example: AQUATABS® [NaDCC], cost \$0.63 each, (Six doses recommended.)

Sunscreen, tube (if personally needed, SPF of 50 recommended)

Lip balm – Carmex® - (relief for lips in cold or hot conditions, a fire starter)

Insect repellent (avoid a miserable night) – discussion: DEET® has been around since the 1940's but, it will make your skin feel greasy and you may risk harming equipment made with plastic or synthetic fibers – example: NATRAPEL Wipes®, containing Picaridin, cost \$25.50 for twelve individually wrapped wipes, @\$2.12 each. Consider carrying two wipes in individual packaging.

First Aid kit with assorted Band-Aids®, a Tegaderm® waterproof dressing, antiseptic ointment, and personal medications (take care of yourself.) (Discussion: This kit is intended for your personal use. If your mission assignment is of a medical nature you will need to carry additional supplies for an expected patient. However, someone you find may have similar personal needs to your own. If they saw something you had and took it, without your permission, it might benefit them, also.)

(Example: Adventure Medical Kits – Day Tripper Lite®, cost \$15.00 - 5.5 oz. at REI® and the container is large enough to hold most of the items listed in this section.)

Considerations for SAR testing

Tweezers (tick, splinter, and stinger removal)

Tick Key® (removing ticks from yourself and your team's dog)

Syringe, 10cc. (for flushing out wounds)

Needle (for splinters and blisters, and can be stored in syringe)

Tourniquet, example: SWAT-T Tourniquet® - cost \$16.00 – 2.5 oz. – (for serious bleeding and other uses)

Ear plugs, (hearing protection for aircraft noise and for sleeping)

Also consider:

Spare eyeglasses (if you wear them)

Sunglasses (to reduce glare effects)

Binoculars (especially if searching open country or on a containment assignment) - example: 8 X 35 are a reasonable size.

Total weight: **24 lbs.** Total cost: **\$1050.00** average

Author's example: Total Vest weight – 14 lbs. and total Pack weight (with outer wear coat) - 10 lbs.