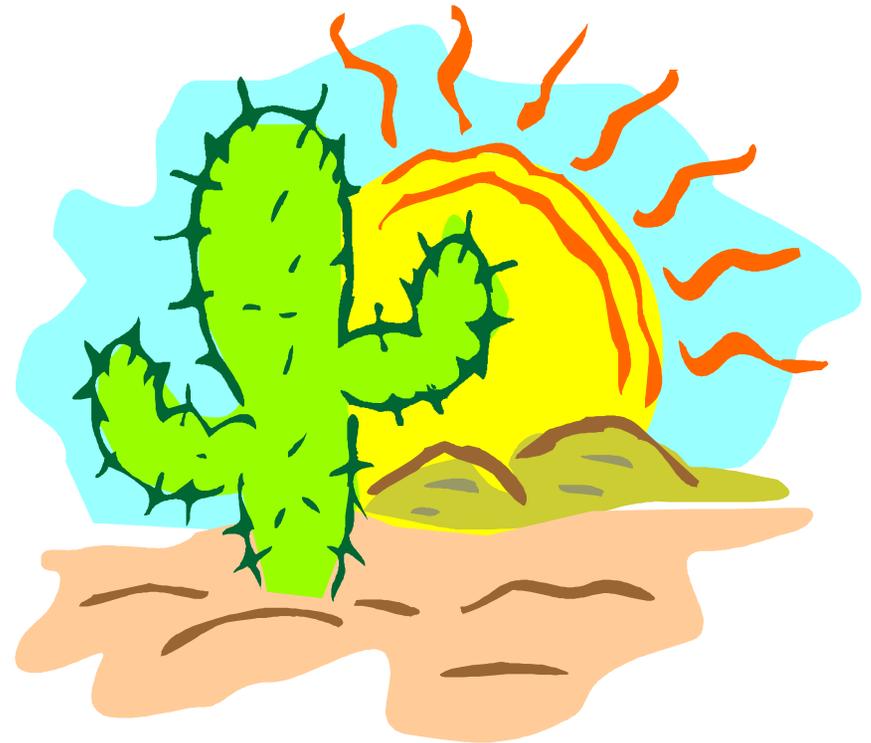


# Desert Awareness



Keep this booklet with you when traveling the desert,  
it could help to save your life.

PUBLISHED BY

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Revised November, 1998

## NOTES

## DESERT SURVIVAL

Always inform someone of where you are going, your route, and when you expect to return. **Stick to your plan.**

Carry at least one gallon of water per person per day, a first aid kit, and personal survival kit.

Be sure your vehicle has a sound battery, good hoses, a spare tire, necessary tools, and sufficient gasoline and oil.

Keep an eye on the sky. Flash floods may occur any time "thunderheads" are in sight, even though it may not be raining where you are.

Be alert to three conditions which can pose an immediate threat to your life - HYPERTHERMIA, DEHYDRATION and HYPOTHERMIA.

Test the footing before driving through washes and sandy areas. A one minute check may save hours of hard work or a punctured oil pan.

Stay near your vehicle if it breaks down. Raise the hood and trunk lid to denote "help needed." Leave a disabled vehicle only if you are **positive** of the route to get help. Leave a note for rescuers with the time you left and the direction taken.

When not moving, use available shade or erect some shade from tarps, blankets, or seat covers to reduce the direct rays of the sun.

Do not sit or lie directly on the ground. In sunlight, the ground usually is 30 degrees hotter than the air.

Rest at least ten minutes each hour if walking. A normally inactive person should rest 30 minutes each hour. Find shade, sit down, prop up feet.

If you have water, drink it. DO NOT RATION IT.

If water is limited, avoid stressful activities. DO NOT talk, eat, smoke, take salt or drink alcohol.

Keep clothing on, as it keeps your body temperature down and reduces the dehydration rate. Cover your head. Improvise a head covering if a hat is not handy.

A roadway is a sign of civilization. IF YOU FIND A ROAD, STAY ON IT.

To avoid poisonous creatures, put your hands and feet only where your eyes can see.

Arizona is nicknamed the "Grand Canyon State" after its unique geologic wonder. But Arizona is more than canyon country. It has plateaus, mesas, high and low deserts, grasslands, mountain chains covered with winter snows, jagged desert peaks, and flowing through all this diversity, ribbons of perennial ravine habitat. Two thirds of the state can be classified as desert - the Colorado Plateau in the north, the Mohave in the west, and the Sonoran in the south.

**A WORD OF CAUTION:** The desert is beautiful and deadly. Danger is always present, especially once you leave well-traveled roads. Not only strangers but also Sunday sightseers have found this to be true. Many native-born Arizonans have been careless and suffered the consequences. The information in this manual may save your life. The way to stay out of trouble is to think in terms of trouble.

Maricopa County Department of Emergency Management produces this Desert Survival Manual to help residents feel at ease in our desert out-of-doors environment and to increase chances of survival should circumstances demand it.

Travel in the desert can be an interesting and enjoyable experience or it can be a fatal or near fatal nightmare. This manual cannot detail survival rules for every situation; however, it can reinforce basic common sense rules for the not so familiar travelers in this hostile environment.

The driest months in the deserts are May and June, followed by October and November. The best hiking months are October through May. The months of June through September are too hot for hiking except in the higher mountains. With temperatures that reach 120° in the sun and dry parched air inducing continual thirst, the summer deserts are best left to the reptiles.

In addition to hot air temperatures and low humidity, the deserts are characterized by even hotter ground temperatures, high evaporation rates, lack of surface water, sparse vegetation and wide temperature ranges from day to night. Gigantic thunderheads, often moving at great speeds, may in a matter of minutes drop a half inch of rain on a locality, causing flash floods and instant erosion of the desert landscape.

**BEFORE GOING INTO THE DESERT, ALWAYS INFORM A RELATIVE OR NEIGHBOR EXACTLY WHERE YOU ARE GOING AND WHEN YOU WILL RETURN.**

**Pathfinding** Always have some idea of where you are. When planning on entering unfamiliar country, obtain a map beforehand, study the terrain features, the road structure, the direction to the nearest habitation, location of water, etc. Upon arrival at your destination, look for landmarks and orient yourself with the prominent ones. Fix directions well in your mind. Always remember the sun rises in the east and sets in the west; by standing with your right hand to the morning sun or your left hand to the evening sun, you will face north. As you move through the country, check your back trails often,

Africanized honey bees, sometimes referred to as "killer bees", look exactly like domestic or common European honey bees but differ in temperament. Africanized honey bees defend their colonies more vigorously and in greater numbers and may respond with minimal or no provocation; however, their venom is no more harmful than that of domestic honey bees. If you see a lot of bees flying in and out of a small opening, there is probably a nest inside. The best strategy is to leave them alone and do not try to rob their hive, provoke or disturb them. Bothering a nest is the best way to get stung. If attacked, run away as fast as you can. Keep going until they stop following or you can get inside a house, car or other shelter. If far from shelter, try to run through tall brush. This will confuse and slow them while you make your way out of the area. Do not flail or attempt to swat the bees. Bees target your head and eyes; therefore, try to cover your head as much as possible without slowing your progress. If someone else is stung by honey bees, help them out of the area as quickly as possible. Protect yourself and the other person from stings with a sleeping bag, clothes or blankets and run away from the bees.

**Prevention and Treatment:** In places where venomous species are expected, carefully inspect all clothing and bedding before use, especially items that have been on or near the ground during the night. Dampness seems to attract these creatures. During summer evenings, scorpions travel over the desert floor and up the branches of trees and bushes looking for food. Bedding on the ground will provide them a hiding place toward morning. If bitten (stung), apply a ligature and ice. DO NOT cut and suck. Remove the ligature after five minutes. Get a doctor, especially if the victim is a child, is elderly, has a bad heart, or has been bitten several times on the main part of the body.

- MOVE the victim to a medical facility without delay.
  - Do Not use ice, cold packs or sprays.
  - Do Not make incisions and apply suction except in unusual circumstances.
  - Do Not use a tight tourniquet.
  - Do Not give alcohol or any drugs.
  - Do Not wait to see if symptoms develop.

**Gila Monster:** Our only poisonous lizard; due to the small numbers, it is protected by law. Seldom over 20 inches long, with a beaded black and coral colored skin. They move sluggishly but can swap ends and snap rapidly. The bite is poisonous. The poison seems to be an anticoagulant and the wounds bleed freely, accompanied by swelling. If bitten, grab the Gila Monster behind the head and yank it off. The teeth are not set in sockets and come out readily. The bite causes a wide variety of symptoms: pain, swelling, discoloration, dizziness, excessive perspiration, tissue hemorrhage, and hypotension. It should be noted that there has not been a recorded death from the bite of a Gila Monster in Arizona in over 130 years. The treatment for its bite is the same as the treatment for a poisonous snake bite.

**Poisonous Insects and Spiders:** The potentially lethal species are the rock or bark scorpion, the black widow spider, brown recluse spider and honey bees:

- **Rock or Bark Scorpion** - Small very slim, light straw colored. The stinger, in the tip of the tail, injects a minute amount of powerful venom. Dangerous to all ages but most dangerous to small children, the elderly and those with high blood pressure, heart or respiratory ailments. There will be pain at the site, numbness, restlessness, fever, fast pulse, and breathing difficulty. Sting can be fatal.
- **Black Widow Spider** - Shiny black with red hourglass marking on the abdomen. Found in the dark corners of sheds and outbuildings, under logs, and in rock piles. Will bite if provoked. Bite can be dangerous to all ages, but is seldom fatal. Pain spreads throughout the body, accompanied by headache, dizziness and nausea. Extremities become cramped, the abdomen becomes rigid, pupils dilate, and spasms may occur after several hours.
- **Brown Recluse Spider** - Light brown colored, about 1/4 inch in length, active at night. Easily identified by the violin-shaped marking on the head and back. Rare in the desert. The bite causes severe tissue destruction which may take weeks to heal. Bite can be fatal.
- **Honey Bees** - Honey bee stingers are barbed at the tip and remain in the victim. The venom sacs are torn from the bee's body and remain attached to the stinger. Do not try to pull out stingers as pinching them injects additional venom. Scrape stingers out with a knife or other thin edge. There are more deaths annually from honey bee stings than from all other poisonous creatures combined.

making mental pictures of the land behind you - this is what you will be looking at when you return to your starting point. Stay on established trails. If possible, mark your route. A slow, careful trip out will assure a rapid and safe return.

If you think you are lost, **Do Not Panic**. Sit down, survey the area and take stock of the situation. Try to remember how long it has been since you knew where you were. Decide on a course of action. It may be best to stay where you are and let your companions or rescuers find you. This is especially true if there is water and fuel nearby, or in winter, if there is some means of shelter. **Once you decide to remain, do not move.**

If, after thinking the situation over, you feel you can retrace your course, do so. Mark your spot or leave a note before moving on. Look for your tracks; you may be able to back-track and find the way to familiar ground. Do not try to take shortcuts as this may tend to further confuse you. If possible, climb a tree or find a high point and make a mental sketch of the area before moving.



### **REMEMBER, MOVE WITH A PURPOSE, NEVER START OUT AND WANDER AIMLESSLY.**

**Walking** There are special rules and techniques for walking in the desert. By walking slowly and resting 10 minutes per hour, a person in good physical condition can cover 12-18 miles per day -- less after becoming fatigued or suffering from lack of sufficient food or water. In the hot desert, it is best to travel in early morning or late evening, spending mid-day in whatever shade is available. When walking, pick the easiest and safest way. Go around obstacles, not over them. Instead of going up or down steep slopes, zig-zag to prevent undue exertion. Go around gullies and canyons instead of through them. When walking with companions, adjust the rate to the slowest member. Keep together, but allow about 10 feet between each member.

At rest stops (**if possible**) sit down in the shade and prop your feet up, remove your shoes and change socks, or straighten out the ones you are wearing. If the ground is too hot to sit on, no shade is available, and you cannot raise your feet, **Do Not** remove your shoes as you may not be able to get them back onto swollen feet.

**Automobile Driving** Cross country driving or driving on little-used roads is hazardous, but it can be done successfully if a few simple precautions are taken. Be sure your vehicle is in sound condition, has a full tank of gas, a full radiator and a well-charged battery. It is also a good idea to check belts for signs of wear. Move slowly and do not attempt to negotiate washes without first checking the footing and the clearances, as high centers may rupture the oil pan. Overhangs may cause the driving wheels to become suspended above the ground. Do not spin wheels in an attempt to gain motion, but apply power very slowly to prevent wheels from digging in. When driving in sand,

traction can be increased by partially deflating tires. Start, stop and turn gradually; sudden motions cause wheels to dig in. There are certain tool and equipment requirements if you intend to drive off the main roads. (See recommended survival items)



**Signals** The best signals are fire -- a smokey fire for daytime and a bright fire for the night. Other signals may be used, but fire is by far the most effective.

The signal mirror is an excellent device for attracting attention, particularly of aircraft. On a clear day, ground signals may be seen for 10 miles; signals to aircraft can be seen at even greater distances.

If the decision is to stay in place and wait for rescue, it would be a good idea to establish some type of ground-to-air signal, such as a large "X", "SOS", or the word "HELP". Use any available material to make this display (rocks, brush, clothing, magazine pages or even newspaper). It can even be scratched into the ground. The important thing is to change the terrain to attract attention to your location.

Signals made by sound are the least effective. **Three** of whatever sounds you can make denotes "distress." A "thunder" whistle is recommended as an easy way to make a lot of noise. If you have a firearm, shoot once, wait 10 seconds and fire twice about 5 seconds apart. The first sound will attract attention and the second and third will give direction.



**Equipment:** The method of travel will dictate the equipment to carry. When traveling by auto, think about carrying "pioneer" gear such as shovels, picks, heavy rope, etc. You must also consider items to be carried by an individual on foot, whether engaged in recreational activity or a survival problem such as walking out from a disabled vehicle. A person walking should consider carrying their gear in a small pack or rucksack over the shoulder. Weight carried in this manner is less tiring than if carried in pockets or hung on the belt. It also affords a safer method of carrying items such as a belt knife, hatchet, etc., which could cause injuries in the event of a fall.

Survival kits are outlined in almost all writings on survival and can be purchased in many varieties. The best survival kits are those put together by individuals for their own personal needs. The following items are listed, in the order of importance. Learn to use and practice with each item **BEFORE** you need it for survival.

- **Rattlesnakes** - These are easily identified by the sandy color, the broad arrow-shaped head, blunt tipped-up nose, and rattles on the tail. Look for them mostly where food, water, and protection are available -- around abandoned structures, irrigation ditches, waterholes, brush and rock piles. They do not always give warning by rattling, nor do they always strike if someone is close. Usually they are not aggressive and will not "chase" people. If bitten, the strike results in immediate pain accompanied by swelling. The venom primarily causes local and internal tissue destruction and nerve damage. If traveling in areas where rattlers may be found, wear protective footwear and watch where you put your hands and feet. The general rule of thumb is if you hear one, stop and try to locate it, move slowly away from the sound and leave it alone. Most strikes are on individuals attempting to catch, kill or play with the snake.

- **Arizona Coral Snake** - A small snake, rarely over 20 inches long, with a small blunt, black head and tapering tail. A very attractive snake with wide red and black bands, separated by narrower yellow or white bands. All bands completely encircle the snake. There are many look alikes to this species; the key to identification is the "red band" which will not touch the "black band". They are sometimes seen in the day during the spring months (March, April and May) and are nocturnal during the summer. They live under objects, in burrows, and are shy and timid. Corals must chew rather than strike to introduce venom, but due to the very small mouth are unable to bite any but the smallest extremities. Arizona coral snakes will attack only under severe provocation. The venom affects the nervous system, causing failure of the heart and respiratory muscles.

**Treatment of Poisonous Snakebite** The following procedures are recommended by the Arizona Poison Control System:

- Do no harm. When treating a snake bite, this is the cardinal rule. Many people believe the bite of snakes and Gila Monsters are more life threatening than they really are, and attempts at first aid have sometimes proven to be harmful and dangerous.
- Calm and reassure the victim.
- Decrease movement of the limb that has been bitten and elevate it.
- Apply a **light** constricting band above the bite location (be able to insert two fingers under band). Do not release the band unless it becomes too tight from swelling.
- If possible, without risking another bite, capture the snake and bring in with the victim.

## FOOD

**Edible Plants** A visit to the Phoenix Botanical Gardens in Papago Park or a similar arboretum will afford much interesting information regarding desert plants. Most experts agree the main edibles are in the fruits of the cacti and legumes. All cactus fruits are safe to eat. The legumes are the bean bearing plants. The identification of all poisonous plants in Arizona (there are more than 700 in the United States and Canada) is beyond the scope of this small booklet. The reader is encouraged to study the matter further based upon the degree of interest. There is no pattern of geography, habitat, relationship, seasonal appearance or plant part that can be used successfully to separate poisonous plants from harmless ones. The best advice is to leave the plants alone and rely upon an emergency survival food pack. You must have water to survive, but you can go without food for some days without harmful effect. In fact, if water is not available, do not eat, as food will only increase your need for water.

**However, in a survival situation where use of strange plants for food is necessary, follow these rules: AVOID plants with milky sap. AVOID all red beans. If possible, boil plants which are questionable. Test a cooked plant by holding a small quantity in the mouth for a few moments. If the taste is disagreeable (very bitter, nauseating, burning), do not eat it.**

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## POISONOUS CREATURES

There is probably more said with less truth about poisonous creatures than any other subject. These animals and insects are for the most part shy or, due to their nature, not often seen. Therefore, any person who has the fortune or misfortune to become acquainted with them becomes an expert, and in due course, the stories told become distorted. Like gossip, the final tale seldom resembles the original fact. Learn the facts about these creatures and you will see they are not to be feared, only respected. Visit the museums which have displays of the creatures dead or alive -- avoid the roadside zoos with their sensational imports if you are looking for facts.

**Snakes** There are many types of snakes in the southwest, the rattlesnake and coral snake being the most famous. However, they are not the only poisonous snakes found in the state. Arizona also has what are classified as rear-fanged snakes. These include the mildly venomous lyre, tropical vine, night, ringnecked, western hog-nosed and black-headed snakes. **These snakes have low-toxicity levels and are not dangerous to man.** In Arizona, the greatest surface activity for some of the common desert inhabiting species is in March, April and May, and continues on until October or later according to species and weather. Snakes hibernate during the colder months, but it is not unusual to see some species all months of the year. During the spring and fall months, they may be found out in the daytime, but during the summer months they will generally be found out during the night, since they cannot stand excessive heat.

## RECOMMENDED SURVIVAL ITEMS

PERSONAL		
ESSENTIAL	DESIRABLE	USEFUL
Metal signal mirror Whistle Pocket knife Flint and steel Small candle Cigarette paper book Small pencil Small magnet compass Waterproof matches Dental floss (100 yd) 1 qt canteen with water	Band-aids Bright colored balloons Iodine tablets Canteen cup Waterproof match case Map of area Duct Tape Bandanna	1 sq yd nylon or chiffon, brightly colored 4 Quarters Hard Candy Heavy Duty Aluminum Foil Small fish hook Salt Tweezers Razor blade Heavy plastic bags for use as canteens Poncho or sheets of plastic Needle with large eye Cobbler's linen thread (1 Yd) Light picture cord (snare wire) Comb Snake bite kit Bar of soap (small) Woodman's saw Knife sharpening device Survival guide
VEHICLE		
ESSENTIAL	DESIRABLE	USEFUL
Roll of electrical tape First aid kit Flashlight Shovel Spare tire Jack (preferably one that may be rigged) Tool kit Water - 1 gal per person per day and 5 gallons per vehicle	Emergency fuel Extra matches Flares - at least 6 Strips of carpet Extra fan belt 12' Jumper cables Tire chains Tire pump Tube type tires	Car repair manual Block and tackle 50' of 5/8 inch rope Axe or good hatchet Food - dehydrated (requires water) Cooking pots Roll of 18" aluminum foil for cooking Tarpaulin for shade Blankets Poncho or sheets of plastic Walking shoes Hat and long sleeve shirts Cobbler's linen thread (1 Yd) 1/4" nylon cord (50-100')

## HEALTH

Much thought must be given to protecting your health and well being, and to the prevention of fatigue and injury. Medical assistance will be some time and distance away, and conditions are usually different and distinct from your everyday living. The desert is usually a healthy environment due to dryness, the lack of human and animal wastes, and the sterilizing effect of the hot sun. Therefore, your immediate bodily needs will be your first consideration.

While in the desert, if walking or active, rest at least 10 minutes each hour. Drink plenty of water, especially early in the morning while the temperature is still low. Wear sun glasses to protect your eyes from glare. Even though the glare does not seem to bother you, it will impair your distance vision and retard adaptation to night conditions. If no sunglasses are available, make an eyeshade by slitting a piece of paper, cardboard or cloth. Applying charcoal or soot around the eyes can be beneficial. Use Chapstick or grease on lips and nostrils. Do not "lick" lips if they are dry, as this will hasten splitting. In survival situations, everything you do, each motion made, and each step taken must be preceded by the thought: **Am I safe in doing this?**

**Carrying Water in the Desert:** When planning to travel in the desert, give your water supply extra thought. Carry enough water to meet personal requirements. Carry water in gallon or half gallon plastic containers; they are strong and lightweight. Rationing water at high temperatures is actually inviting disaster because small amounts will not prevent dehydration. In the hot desert, a person needs about a gallon of water a day. Loss of efficiency and collapse always follows dehydration. It is the water in your body that maintains your life, not the water in your canteen.

**Ration Sweat - Not Water:** Keep clothing on, including your shirt and hat. Clothing helps by slowing the evaporation rate and prolonging the cooling effect. It also keeps out the hot desert air and reflects the heat of the sun. Stay in the shade during the day. Sit on something 12 or more inches off the ground, if possible. **DO NOT SIT ON THE GROUND** as it can be 30 degrees hotter than a foot above the ground. If travel is necessary, travel slowly and steadily. Keep your mouth shut and breath through the nose to reduce water loss and drying of mucous membranes. Avoid conversation for the same reasons. Alcohol in any form is to be avoided as it will accelerate dehydration. Food intake should be kept to a minimum if sufficient water is not available. In situations where there is a limited water supply, it is often recommended to throw food away.

**Finding Water in the Desert:** If you are near water, it is best to remain there and prepare signals for rescuers. If no water is immediately available, look for it, following these leads:

- Watch for desert trails -- following them may lead to water or civilization, particularly if several such trails join and point toward a specific location.

## HEAT DISORDERS THEIR SYMPTOMS AND FIRST AID

HEAT DISORDER	SYMPTOMS	FIRST AID
SUNBURN	Redness and pain. With severe cases - swelling of skin, blisters, fever and headaches.	Ointments for mild cases; if blisters appear, do not break. If breaking occurs, apply dry sterile dressing. Serious and extensive cases should be seen by a physician.
HEAT CRAMPS	Painful spasms usually in muscles of legs and abdomen, possibly heavy sweating.	Firm pressure on cramping muscles, or gentle massage to relieve spasm. Give sips of salt water (1 tsp per glass) every 15 minutes for one hour.
HEAT EXHAUSTION	Heavy sweating, weakness, dizziness, skin cold, pale and clammy. Pulse steady, temperature normal, possible fainting and vomiting.	Get out of sun, lie victim down, loosen clothing, apply cool wet cloths and fan the victim, or move to an air conditioned room. Give sips of salt water (1 tsp per glass) every 15 minutes for 1 hour.  IF VICTIM VOMITS – NO FLUIDS, GET MEDICAL ATTENTION.
HEAT STROKE (OR SUN STROKE)	High body temperature (106° F or higher), hot, red, dry skin, rapid and strong pulse, possible unconsciousness.	Heat Stroke is a severe medical emergency. Summon a physician or get the patient to a hospital immediately. Delay can be fatal. Move victim into cooler environment, reduce body temperature with iced bath or sponging. Use fans and air conditioners. If temperature rises again, repeat process.  DO NOT GIVE FLUIDS.

**NECK PROTECTION** If the hat does not provide protection to the back of the neck, attach a piece of cloth onto the back of it. A large bandanna is not only great for protection but also has many other handy applications.

**LONG SLEEVED SHIRT** Long sleeves provide protection from the sun and also help to protect from scratches insect bites. Cotton is probably the most suitable type of fabric.

**LONG-LEGGED PANTS** Shorts and cutoffs are generally unsatisfactory for prolonged periods in the desert. Long-legged pants help the body maintain normal temperatures.

**BOOTS** Boots should be durable, fit well, provide support, provide insulation from the hot desert ground and provide traction.

- **DO NOT SMOKE**

Smoking will hasten dehydration and reduce endurance.

- **DRINK PLENTY OF WATER OR OTHER NON-ALCOHOLIC FLUIDS. DO NOT RATION!!**

Drink more fluids than the amount dictated by thirst. Drink at regular intervals rather than when you feel thirst. When your body becomes dehydrated, your brain's ability to recognize trouble may be impaired. If there is a limited amount of water, DO NOT RATION IT; attempt to conserve the liquids in your body instead.

- **NEVER START A DESERT TRIP ON IMPULSE**

DO NOT start a trip to the desert on the spur of the moment with few supplies, little or no water and no real idea of when you will return. Always be well organized and plan the entire trip.

- **DO NOT TAKE SALT TABLETS**

- **DO NOT DRINK ALCOHOLIC BEVERAGES**

Alcohol hastens dehydration.

- **DO NOT GET TOO MUCH SUN**

Flocks of birds will circle over waterholes. Listen for their chirping in the morning and evening, and you may be able to locate their watering spot. Quail often congregate near water. Doves flock toward watering spots morning and evening. Also look for indications of animals, as they tend to feed near water.

Look for plants which grow only where there is water: cottonwoods, sycamores, willows, hackberry, salt cedar, cattails and arrow weed. You may have to dig to find this water. Also keep on the lookout for windmills and water tanks built by ranchers. If cactus fruits are ripe, eat a lot of them to help prevent dehydration.

**Methods of Purifying Water:** Dirty water should be filtered through several layers of cloth or allowed to settle. This does not purify the water, even though it may look clean. Purification to kill germs must be done by one of the methods listed in the table on the following page.

**Water from Streams, Springs or Lakes:** During the past few years, increasing numbers of campers, backpackers, anglers and hunters have been stricken with waterborne diseases because they drank water straight from streams, springs or lakes. Even though the water appears to be sparkling clean and pure, it may contain microorganisms which cause disease.

Two organisms found in many waters are *Giardia lamblia* and *Cryptosporidium parvum*. Since these parasites have been found in many wild and domestic animals, they can be present even in remote areas, regardless of whether there are humans around.

These organisms are transferred between animals and humans by means of excreted fecal material. If the infected animal or human defecates in or near a stream or the feces are introduced as a result of untreated sewage or rainwater runoff, the organisms are then spread through the water.

Drinking water containing these parasites can cause *Giardiasis* or *Cryptosporidiosis*. Both are severe gastrointestinal disorders which may result in diarrhea, headache, abdominal cramps, nausea, vomiting and a low grade fever. People with degraded immune systems (due to AIDS, chemotherapy, or an organ or bone marrow transplant) should be aware that a *Cryptosporidium* infection can be life-threatening.

The best means of preventing infection from *Giardia* or *Crypto sporidium* is to not drink naturally occurring water, regardless of how pure it looks. This means that, when hiking or camping, you should either carry all your own water or disinfect the water before drinking it.

Boiling is the safest of available water disinfection methods. It kills *Giardia*, *Crypto sporidium*, bacteria and viruses. Research has shown that, at sea

level, boiling water for one minute effectively eliminates these hazards, although vigorous boiling for 2-5 minutes is generally recommended for *Crypto sporidium*. At higher elevations, water boils at lower temperatures and longer boiling times should be observed (e.g., 15 minutes at 10,000 feet).

These organisms can also be removed by filtration. To be effective for *Crypto sporidium*, however, the filter must be capable of removing particles of one micrometer or less in diameter.

Chemical disinfection, generally with the use of chlorine or iodine, is another method of preventing infection from *Giardia* and most other microorganisms. *Crypto sporidium* parasites, however, are highly resistant to most chemical disinfectants and can only be neutralized by boiling or filtration.

The table below lists the various disinfectants available and the recommended dosage per quart of water. The use of saturated iodine (made by dissolving iodine crystals in water) is not recommended because it does not kill all of the *Giardia* organisms in cold water. None of the below-listed disinfectants are considered to be effective against *Crypto sporidium*.

WATER DISINFECTION METHODS		
Disinfectant	Quantity per Quart of Water	Waiting Time Before Drinking
Chlorine Tablets	5 Tablets	30 Minutes *
Household Bleach	2 Drops **	30 Minutes
Iodine Tablets	2 Tablets	20 Minutes *
2% Tincture of Iodine	10 Drops	20 Minutes
Saturated Iodine	Not Recommended	

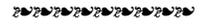
\* When using tablets, the waiting time begins after the tablets are dissolved  
 \*\* Use 4 drops if water is cloudy or turbid

## DEHYDRATION

Body temperature in a healthy person can be raised to the danger point by absorbing heat or by generating it. Heat can be absorbed from the ground by reflection or direct contact. Any kind of work or exercise increases body heat. **An increase in body temperature of 6 to 8 degrees above normal (98.6) for any extended period causes death.** The body gets rid of excess heat and attempts to keep the temperature normal by sweating, but by sweating the body loses water and dehydration results. This water must be replaced. Drink cool or warm water as fast as you want, but cold water may cause distress and cramps.

**Symptoms:** In the desert it is essential that the initial symptoms of dehydration be **known** and recognized. Learn these symptoms: Thirst and discomfort, slow motion, no appetite, and later nausea, drowsiness, and high temperature. If dehydration is from 6 to 10 per cent, symptoms will be: dizziness, headaches, dry mouth, difficulty in breathing, tingling in arms and legs, bluish color, indistinct speech and finally, inability to walk.

**Prevention:** Satisfying thirst is not an indication of the amount of water needed. If you drink only enough to satisfy your thirst, you can still dehydrate. Drink plenty of water, especially at meal times and during the cooler early morning hours. A pebble or small coin in the mouth will help to alleviate the sensation of thirst, but it is not a substitute for water and will not aid in keeping your body temperature normal.



## HEAT WAVE SAFETY RULES

- AVOID STRESSFUL ACTIVITIES DURING THE HOT SEASON**  
 In In the southwest desert, the hot season usually extends from April to October; however, hot weather may occur at unexpected times of the year. Avoid going out during the hot weather. Wait until fall, winter or spring for extensive outings on foot. Keep in mind that problems related to heat, sun and lack of water may occur in temperatures below 90°F.
- LIMIT ACTIVITIES TO COOLER TIMES OF THE DAY**  
 Reduce activity during the heat. Strenuous activities should be reduced, eliminated, or rescheduled to the coolest time of the day. Individuals at risk should stay in the coolest available place, not necessarily indoors.
- KEEP PACE SLOW AND CARRY LIGHT LOADS**  
 While walking or horseback riding in the desert, maintain an even, comfortable pace. Rest often and never force yourself. Never carry more gear than you can use. Keep in mind, **the more weight**, the greater the stress and heat production. This will increase the likelihood of problems.
- WEAR SUITABLE CLOTHING**  
 While shorts and sleeveless shirts may appear comfortable, they are not suitable for desert wear. The most important function of clothing should be to protect the skin from direct exposure to the sun. Lightweight, light-colored clothing is recommended because it reflects heat and sunlight better than darker material. The following items are recommended:  
 HAT            Hats should have a wide brim that goes all the way around, protecting the eyes in front and the neck in back.