

(S-V86-A)

Water Survival Training, Parachuting

FUNDAMENTALS OF WATER SURVIVAL

This handout is intended as a guide for note taking during Academic lectures and as a thorough guide to operational training lectures when note taking is difficult. It can also be kept for a quick reference to sustain your knowledge, as often as needed, between refresher courses. We also hope this will serve as a basis for further research to enhance your knowledge of open water survival.



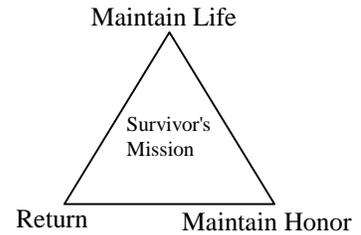
PRE-MISSION PREPARATION IS THE KEY TO SUCCESS

Initially and most important, is the realization that IT CAN HAPPEN TO YOU. You must not allow yourself to be lulled into the false sense of security believing that it always happens to the other person. "Look beside you, to that person YOU are the other person." Once you have accepted this possibility, your next step is to take actions to ensure you can cope with the hostile environment".

1. ENVIRONMENTAL ASPECTS OF WATER SURVIVAL.

What is an environment? According to Webster it is "The circumstances or conditions surrounding one." The intent of this lesson is to familiarize you with the environment you are about to encounter.

a. Survivor's Mission – An ejection sequence, bailout, or crash landing ends an aircrew mission and begins the survivor's mission. The survivor's new mission becomes: return to friendly control without giving aid or comfort to the enemy, return early and in good physical and mental condition. Survivors can best accomplish their new mission by remembering the survivor triangle.



1. ENVIRONMENTAL CONDITIONS	Climate Terrain Life forms
2. INDUCED CONDITIONS	Nuclear Biological Chemical
3. SURVIVORS CONDITION	Physical Psychological Material Obligatory
4. DURATION	Short term Moderate term Long term
5. SOCIOPOLITICAL CONDITIONS	Friendly Hostile Unknown

b. Five Basic Conditions Affecting Survival – Five basic conditions will affect every survival situation: environmental, induced, the survivor, duration, and sociopolitical. These conditions may vary in importance or degree of influence from one situation to another and from individual to individual. The aircrew member may succumb to their effects or take advantage of them. These conditions exist in each survival episode and have great bearing on the survivor's every need, decision, and action.

(1) Environmental – During an open ocean survival episode, the environment throws two curve balls at the survivor.

(a) Climate – May materialize in the form of extreme cold or heat. Due to lack of resources you must rely on man-made materials found in your survival kits.

(b) Life Forms – The survivor is no longer at the top of

the food chain but somewhere in the middle.

(2) Induced – Most survivors in a raft would not consider themselves targets of a nuclear attack. Fallout, however, may be a problem and canopies or spray shields are the only available protection. Biological and chemical warfare are not usually suitable for open-ocean. If employed, the main protection available will once again be raft components and clothing as the chemical defense ensemble filter will be contaminated seawater.



(3) Survivor's Condition.

(a) Physical – As an aircrew member presses forward to survive, his/her condition plays an important role in how the situation unfolds. Good physical condition will help the survivor reach his/her raft, retrieve needed items floating nearby, and rescue other injured survivors. However, poor condition can hamper these efforts and leave the survivor exhausted after only seconds of physical exertion.

(b) Psychological – Are you ready for deployment today? A current will and power of attorney can relieve immense pressure during a survival situation. No matter what happens, the survivor's family must be given the tools to continue if the need presents itself. Psychological attitude plays a big role in survival at sea, pre-mission actions taken to ready one's family will decrease despair.

(c) Material – The survivor's total assets consist of items found in the survival vest, and the survivor's pockets. Survivors will need to call on all of their ingenuity to improvise needed items.

(4) Duration – Air superiority, rescue asset capabilities, distance from nearest forces, and the and the survivor's ability to locate and operate signaling devices are all factors that may affect the duration of the survival episode. Duration may also depend on the survivor's perception of time. Survivors in good health may consider short term a matter of hours to 3 or 4 days. Someone with a catastrophic injury, however, may consider an hour long-term.



(5) Sociopolitical – Attitudes of indigenous people can affect the downed aircrew if their paths cross. Survivors can expect one of three attitudes: friendly, hostile, or unknown. Consider egressing into British waters, a survivor would expect the locals to be friendly. Now consider this: after striking a target inside Baghdad you are forced to eject on the outskirts of town, a survivor could almost definitely consider the locals to be hostile. But, let's suppose you are able to pilot the aircraft south into the U.S. patrolled no-fly zone and eject there. Are these locals going to be friendly toward the survivor or not? The attitude in this instance could be unknown.

As you can see the ocean places a different emphasis on the 5 basic conditions affecting survival because of the environment itself.

2. ENVIRONMENTAL IMPACT ON SURVIVORS.

a. Open Ocean – 70% of the earth is covered by water. This makes it likely that in future conflicts aircrews will have to fly over water either traveling to the theatre of operation or ingressing or egressing targets. Example: On 12 Sep 96, several F-117A Stealth aircraft departed Holloman AFB en-route to Kuwait, during their flight they traveled many miles over open ocean.



b. Winds – Winds can both help and hinder survivors. Prevailing winds, those that constantly blow in the same direction, can aid in travel. They can also act like an air conditioner on hot days by reducing body heat 25 times faster. There are 6 major wind belts, 3 in the Northern Hemisphere and 3 in the Southern. Trade Winds are near the equator, the Polar easterly winds are near the Poles and located between are the prevailing westerlies. These different belts can aid the survivor in traveling to shipping lanes or toward shore. Survivors who have studied the prevailing winds in their operational areas will be in the best position to use winds effectively.

c. Storms – There are many types of storms on the open ocean that affect the downed crewmember. A survivor can experience anything from a little shower to blizzards. Types of storms a survivor may encounter include:



(1) Waterspout – A spiral of water much like a tornado over land.

(2) Tornado – Occur over water with rotational speeds in excess of 390 miles per hour.

(3) Typhoons and Hurricanes – These storms range in severity from a category I with 75 mph winds to a category V with 230+ mph winds. These storms vary in intensity from mild to gale force winds and are seasonal. Aircrew should research weather possibilities in their operational area so they are prepared.



d. Temperatures – Temperatures can reach severe extremes in the open ocean because the ocean spans such a vast portion of the earth. Survivors should expect, depending on their operational area, water temperatures from the extremes of heat in excess of 75° F to extreme cold temperatures as cold as 29° F or colder. Also be aware of the intense sun in both extremes. This is not the time to work on your tan. Unprotected exposure to sun can deplete the body of much needed water and sunburn is not something survivors need to deal with on top of existing problems. Most sunburns occur in somewhat cooler environments due to lack of intense heat which normally serves as warning of the sun's strength.

e. Limited Natural Resources – Food, water, and materials to meet other needs are extremely limited. We will cover specifics later.

3. THE OCEAN'S IMPACT ON SURVIVORS' BASIC NEEDS.

The three fundamental goals of a survivor mentioned earlier (Maintain Life, Maintain Honor, and Return) can be further broken down into eight basic needs. For the sake of nontactical conversation, we will reduce to six basic needs: personal protection, sustenance, medical, travel, signaling, and evasion. For this discussion we will omit resistance and escape.

(1) Personal Protection – On the ocean there is little or no natural protection. Available protection is generally provided by the equipment the survivor entered the situation with.



(2) Sustenance – Food is normally available in the ocean. Drinking water may be limited by the resources in the survival kit and by nature. One caution we expound on later: NEVER DRINK SEAWATER. The second leading cause of death of survivors at sea according to the pamphlet, Airman Against the Sea, was consumption of seawater.

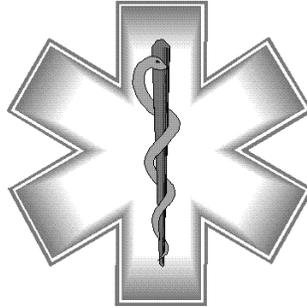
(3) Medical – By looking at the size of a survival medical kit, a survivor will soon realize that medical supplies are limited and will have to be used to their fullest potential. Also, harsh climates may intensify ejection or bailout injuries and the ocean environment can cause additional problems.



(4) Travel – Travel depends on a survivor's ability to adjust raft components, their knowledge of the winds and currents in the area, and the wind and currents at the time.

(5) Signaling – Look at the size of an emergency raft, then look at the amount of ocean and it is easy to realize that a survivor must use signaling devices to their fullest capability. Other factors limit signaling effectiveness: cold, wet conditions, poor visibility, and poor concealment for Combat Search And Rescue (CSAR) forces. We will elaborate on these factors in subject-specific chapters.

(6) Evasion – The ocean offers very little natural concealment and weather conditions can either help or hinder evasion efforts. These will be covered in depth in the combat section of this handout.



4. OPEN WATER SURVIVAL MEDICINE

Foremost among the many things that can compromise a survivor's ability to return are medical problems encountered during ejection, bailout, landing, or being dragged by the parachute. The most common injuries are fractures, sprains, dislocations, burns, and lacerations. A review of past conflicts and peacetime survival episodes shows that military members can administer first aid to others, but have an inability to administer self-aid. If not treated minor injuries can become life threatening in a survival situation. Caution: these practices are for true survival situations only and are not advisable for roadside assistance.

a. Impact of a Survival Situation on the Treatment of Injuries.

- (1) Lone Survivor – No matter what type of aircraft, a survivor may be alone and have to treat injuries, regardless of severity, without help.
- (2) Lack of Resources – Limited resources may require a survivor to reuse or even improvise some items.
- (3) Limited Recovery Capability – It may be difficult for recovery forces to come immediately to your location due to lack of air superiority, distance, or capabilities.
- (4) Life or Limb Decisions – A survivor may have to make the decision to sacrifice a limb in order to survive. A tougher decision could be to make that determination for someone else, who cannot make the choice due to unconsciousness or other circumstances.



b. Shock. Any condition in which the body fails to provide sufficient circulation. Survivors should expect and treat for shock with all injuries. Shock may also be present if no other injuries exist, simply because of the circumstances surrounding the survivor.

- (1) Sign/Symptom Definition – For future reference a sign is an indication of a patient's condition that can be observed by another person, i.e., things that can be seen, heard, smelled, or felt by another person. A symptom can be felt or reported by

the patient but cannot be observed by another person.

(2) Signs/Symptoms.



(a) Restlessness and Anxiety – These are part of an altered mental status brought on by lack of oxygen to the brain.

(b) Paleness – Due to blood being sent to the vital organs from the extremities.

(c) Weak Rapid Pulse – Pulse rate will increase to circulate more blood.

(d) Shallow, Labored, Rapid, or Irregular Respiration – As progression into shock continues these occur.

(e) Thirst – Survivor may get cottonmouth.

(f) Later Cyanosis – Bluish color, most easily seen around the lips and fingernail beds.

(3) Treatment.



(a) Secure and Maintain an Airway – Without oxygen the patient cannot survive, therefore this is the first critical step to securing the patient.

(b) Control Bleeding – Once again, critical step to reduce shock and more importantly, to keep the survivor alive. Without blood the patient cannot survive.

(c) Elevate Lower Extremities – Used to get blood back to the brain. A common saying is "If the face is pale raise the tail, if the face is red raise the head." Use good sense,

if the survivor has massive head injuries or a severe bleeder of the head avoid or limit lower extremity elevation.

(d) Splint Fractures – This will help reduce some pain and anxiety.

(e) Maintain Normal Body Temperature – Insulate from above and below to reduce heat loss or shade to keep patient cool.

(f) Avoid Rough and Excess Handling – This will help avoid any further injury and/or causing more pain than is necessary to the patient.

(g) Keep Victim Supine – This will allow for more even and easy blood flow. One may want to consider placing the patient in the recovery position (on the side), to prevent vomiting debris from going back into the airway.

c. Breathing Injuries. Breathing injuries are serious and must be taken care of immediately.

(1) Signs and Symptoms.



(a) Obvious Trauma – Usually associated with injury to the face, neck, and/or chest area, which could interfere with breathing or have blocked the airway.

(b) Inability to Speak – The survivor may be wheezing or gasping for air or just trying to move their mouth in an attempt to clear the airway and signal for help.

(c) Grasping at Throat – This is an internationally recognized sign that the victim is choking or unable to breathe for some reason.

(d) Chest is Still – Checking for the gentle rise and fall of the chest in a raft is difficult, however, if the attendant will place one hand on the injured persons chest and one on their back in a "C" clamp fashion, the movement of the chest can be detected.

(e) Cyanosis – Check the inside of the lips and fingernail beds for a bluish color indicating lack of oxygen.

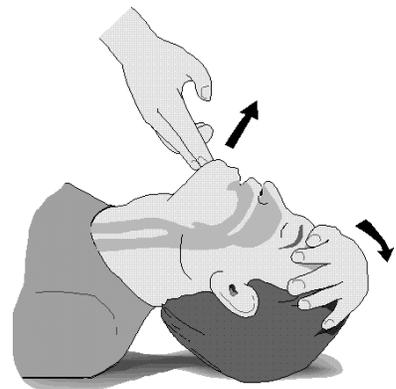
(2) Treatment.

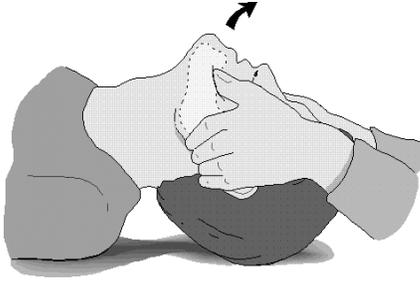
(A) **Establish an Airway** – Many times the tongue falls into the throat and creates a blockage. There are a couple of ways to establish an airway.

1 If no spinal injury is suspected, head tilt chin lift:

(a) Grasp the chin with the fingertips of one hand and place the palm of the other hand on the forehead.

(b) Lift with the fingers and press with the palm simultaneously. There may be vomit, mucous, or blood in the airway, which will need to be removed.





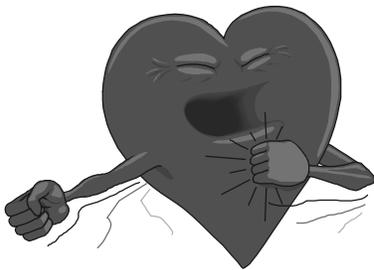
2 Use the jaw thrust method to align the airway:

(a) Encompass the head using the forearms and place your hands on the lower jaw.

(b) Using the index fingers press the jaw forward trying not to move the head or neck. Keeping the head perfectly still may be difficult in the raft and while boarding the raft. Take every precaution to not cause any more damage to spinal column which could result in the victim being paralyzed.

(B) Remove Obstructions – If anything is visible use one or two fingers to sweep the mouth. Enter the mouth between the cheeks and teeth then sweep across and out quickly making sure not to press anything further into the airway. If possible, lay the injured person on their side and sweep.

(C) Begin Rescue Breathing – If still in the water, ensure Life Preserver Unit (LPU) is inflated, then position the head and begin rescue breathing. Squeeze the nose with one hand and place your mouth on the injured survivor; blow 1 breath every 5 seconds (approx. 12 breaths per min). It is very important to ensure a good seal on the mouth, otherwise seawater may be forced into the victims lungs. Rescue breathing can be a laborious task, if it becomes too difficult to swim and breathe for you and the injured person, it may become necessary to save yourself. Another option that could be considered is to hyperventilate the injured survivor (give several consecutive breaths), then get to the raft or rescue line and either begin regular rescue breathing or once again hyperventilate the survivor.



(D) Bleeding – The human body contains a limited amount of blood, in a survival setting there is no replacement for this life essential fluid.

(1) Types of bleeding.

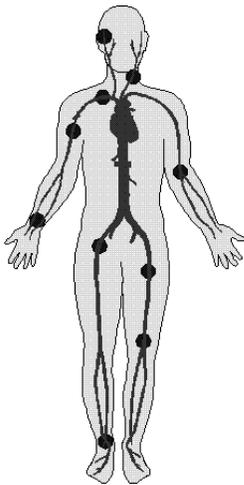
(a) Capillary – Oozing, usually somewhat bright red blood. Usually not considered life threatening, however, if not treated to prevent infection the infection could become life threatening.

(b) Venous – Dark red blood not normally spurting but it could have a heavy flow if large veins are severed.

(c) Arterial – Bright red blood usually spurting with each heartbeat. This is the most serious type of bleeding because large amounts of blood can be lost very quickly.

(2) Treatment. The following methods should be used in the order that they appear.

(a) Direct Pressure – This is an instinctive reaction that needs little explanation. Place pressure on the wound to stop the flow of blood. A good tip for the survivor is to use a sterile bandage on the wound as soon as possible. This will leave the clotted blood in place once pressure is removed when the bleeding ceases, reducing the chance of further bleeding.



1 Elevation – With direct pressure applied, elevate the injury above the heart. This will help slow the flow of blood to the area.

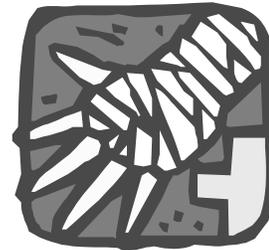
2 Digital Pressure Points – Any place a major artery passes close to the surface of the skin and lies over a bone. There are two major pressure points on each side of the body, the femoral for lower limbs and the brachial for upper extremities.

3 Constriction Band – Used in conjunction with above methods. It should be at least 2-3 inches wide, so it will not injure the limb more and tight enough to slow the blood flow but not completely stop off. A constriction band is usually placed 2 inches above the wound so it can be used for a tourniquet, if that drastic measure becomes necessary.

4 Tourniquet – Tourniquets should be used only as a last resort. Even in the most severe amputations tourniquets are not required. If a tourniquet is applied limb tissue will begin to die and rot.

5 Clean Wounds – Wounds should be cleaned to prevent infection, however try not to remove the dressing next to the wound because it could remove clots or regenerated tissue causing more problems.

6 Bandage – The bandage over the dressing may be made of improvised material such as parachute, clothing, or extra material from the raft. Your imagination is the limit area, but be sure it is clean. The bandage should be changed or cleaned daily if feasible.



e. Fractures, Sprains, and Dislocations.

(1) These three are usually lumped together in a survival situation because without an x-ray it is difficult to distinguish between them unless bone ends are exposed or evident.

(2) Signs and Symptoms.

(a) Deformity – Parts may be twisted in directions not normally possible. Example: You have a knee where you did not before the accident.

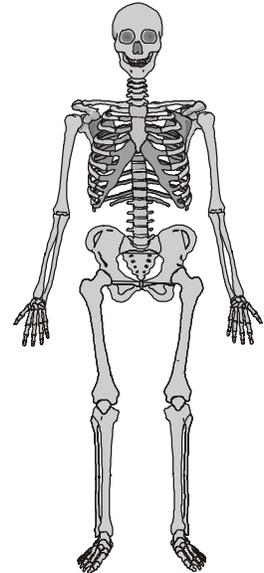
(b) Tenderness – An area very painful to the touch, very often found while conducting a survey for injuries.

(c) Inability to Use – Usually noticed when a body part does not function normally.

(d) Swelling – Swelling is usually noticed around the area of injury.

(e) Exposed Fragments – Bone ends passing through the skin is an obvious sign of a broken bone. The fragments may not be completely exposed but only pressing against the skin.

(f) Crepitus – A grating noise, when movement of the affected area occurs, that sounds much like using a fist to crush a bowl of breakfast cereal.



(3) Treatment – An open fracture can be very dangerous because the sharp bone ends can slice an artery if the limb is not immobilized promptly. This may be very difficult in a raft but every precaution should be taken to limit movement of the injury and limb.

(a) Control Bleeding – Use the methods discussed earlier.

(b) Immobilize – Immobilize the joint above and below the suspected break (e.g., if the shin is suspected immobilize the ankle and knee). In the same manner, if a joint is the problem immobilize the bone above and below.

(c) Check Circulation – Check to ensure that the actions taken did not pinch an artery and restrict circulation. Always check an area distal to the injury (e.g., if the forearm is suspected, check the wrist for a pulse or squeeze the finger tips, they should turn white when squeezed and immediately become pink again if circulation has not been impeded).

(d) Protect from Further Injury – Limit use of injured area and immobilize.

f. Eyes.



(1) Wear eye protection to prevent injury.

(2) Treatment of Eye Irritations. Crash or ditching sight may be contaminated with many substances that can cause eye irritations such as hydraulic fluid, fuels, or any number of substances depending on the cargo. It is also possible to come in contact with caustic liquids during or prior to ejection.

(a) Flush Thoroughly – Tilt the head so the injured eye is below the good eye and begin flushing from the nose across the eye. Fresh water is preferable, however, seawater may be used as a last resort. If using seawater, splash a clear area in the water prior to rinsing.



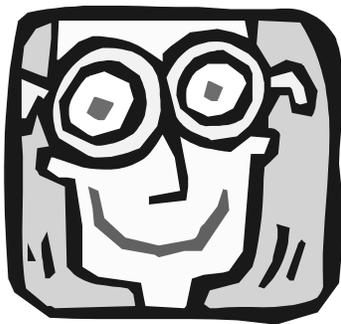
(b) Apply Ophthalmic Ointment – This is found in the survival medical kit and can be identified by feel because of its cone-shaped cap.

(c) Bandage Both Eyes – Cover the uninjured eye to ensure eyestrain does not become a problem. Eyestrain can cause headaches, nausea, and general ill feeling.

(d) Treat for Shock – Eye injuries can be quite stressful for some.

(3) Treatment for Traumatic Eye Injuries – Traumatic eye injuries can occur if proper eye protection is not used and usually occurs during ditching or ejection.

(a) Foreign Objects – If an object has penetrated the eye or eye sockets DO NOT attempt to remove it.



(b) Bandage Both Eyes - The best course of action is to use some type of material, such as parachute or extra clothing, to make a donut bandage to ensure the object does not move. It is possible to use a Styrofoam cup or some other similar object over the donut bandage. This will help reduce the risk of bumping the object. Whatever the means, the object must not be protruding when bandaging is completed. The other eye should also be bandaged to avoid sympathetic eye movement. If it is imperative

to see, a vertical slit may be cut in the bandage of the good eye so it will not attempt to look at movement to the side.

g. Burns.

(1) Burns are frequently encountered in aircraft accidents and can also come from the sun in the open ocean environment.

(2) Signs and Symptoms – Burns can range from minor to serious, but all can deplete the body of a considerable amount of fluids.



(a) First-Degree Burn – Superficial Burn – Red skin, often painful to the touch, a sunburn for instance.

(b) Second-Degree Burn – Partial-Thickness Burn – Characterized by red blisters along with the red skin.

(c) Third-Degree Burn – Full-Thickness Burn – Charred flesh may have material fused into the skin. This type is surrounded by first- and second-degree burns.

(3) Treatment – The treatments are basically the same for all types of burns.

(a) Immerse – Use water to cool the area.

(b) Blisters – Leave blisters intact to keep out infection.

(c) Blot/Pat dry – Rubbing can irritate and even remove skin or flesh.

(d) Charred Clothing – DO NOT remove charred clothing or burned flesh from the area, because it has been sterilized and it is important not to open the wound to infection.

(e) Loose Dressing – Apply a loose, dry, clean, padded dressing and change as necessary.

(f) Increase Water Intake – The body will need a lot of water to help replace water lost to burns.

h. Hypothermia.



(1) A condition in which the internal or core body temperature falls below 95 degrees Fahrenheit.

(2) Conditions Leading to Hypothermia.

(a) Cool Temperatures – Even in 90 degree water after a prolonged period the body can become hypothermic.

(b) Moisture – Moisture as it evaporates from the body causes cooling. Water logged clothing does not retain it's insulating qualities.

(c) Wind – The wind can cool the body 25 times faster than normal.



(2) Signs and Symptoms.

(a) Shivering – Shivering occurs in the early stages of hypothermia and is the body's way of generating heat.



(b) Slow Reactions – As symptoms progress, the body's reactions slow down.

(c) Mental Confusion – Due to lack of oxygen to the brain, you may begin to enter a state of "euphoria". These later stages of hypothermia are very dangerous because the decision making process is clouded.

(3) Treatment.

(a) Insulate – Insulate to prevent further heat loss. Common problems include covering only the top and not the bottom and not protecting from the wind.

(b) Rewarm – Use any means available to bring the body temperature up. Have the survivor move around and get them dry clothing if available.



(c) Skin Contact – Skin to skin contact may be required if the case is severe. Use blankets, clothing, raft canopies, and/or many layers of parachute over clothing to help insulate. If the intended rescuer is not completely warm, this may reduce their body temp and draw them to hypothermia so be cautious.



(d) Warm Fluids – The only warm fluids available may be from placing a water bag between the layers of another survivor's clothing to warm the water.

(e) Carbohydrates – If water is available, some carbohydrates may be administered to give the body calories to burn for heat. Hard candies from your personal survival kit or issued kit are excellent for quick calories.

(4) Prevention.

(a) Prevention is the Key! – If possible it would be wise for the survivor to place a clip on a pack or helmet bag commonly carried in the aircraft, so that prior to bailout they can clip it to the parachute harness. If Gore-Tex material, extra clothing, small poncho, or Gore-Tex bivy sack is available prevention of hypothermia is easier. Stay Fit! It is easier to overcome adverse conditions if the body is finely tuned.

(b) Proper Clothing – Dress to egress. Dress for the temperatures of the climate of the operational area and be sure to consider COLDER seasonal and evening temperatures. Use anti-exposure suits when required.

(c) Use Equipment – Get out of the water and into a raft as soon as possible. The water will conduct heat away from the body. Use the Heat Escape Lessening Posture (HELP) if no raft is available. Use raft components to provide protection and insulation from the environment.

i. Frostbite.



(1) Frostbite is partial or complete freezing of the skin or deeper tissue.

(2) Conditions which Lead to Frostbite.

(a) High Altitude Ejection.

(b) Inadequate Insulation – Lack of insulation from the cold.

(c) Restricted Circulation – Tight fitting flight suits can be a problem because they DO NOT allow dead air space.

(d) Contact Frostbite – Contact by skin with an extremely cold object.

(3) Signs and Symptoms.

(a) Feeling – Tingling, stinging, or numbness of the affected area.

(b) Color – Skin is red, then waxy, with white or yellow-white tinged areas.

(c) Two Types of Frostbite.

1 Superficial – Skin is hard and brittle and underlying tissue becomes nonresilient.

2 Deep – Skin is hard and brittle, underlying tissue is firm, and movement is near impossible.

(4) Treatment.

(a) Superficial – Rewarm with body heat. DO NOT rub or massage because frozen particles can damage adjoining flesh. DO NOT allow to refreeze, this will cause more damage.

(b) Deep – Leave frozen and protect from further freezing.

(5) Prevention.

(a) Cover – Cover all exposed tissue.

(b) Clothing – Use the COLDER principle.

(c) Buddy System – Inform each other of exposed areas before they begin to show signs of frostbite.



j. Immersion injuries.

(1) Immersion injuries occur due to prolonged or consecutive exposure to water.

(2) Signs and Symptoms.

(a) Skin becomes wrinkled, pale, and cold to the touch.

(b) Swelling and reddening of the skin occurs.

(c) Itching and/or burning sensation.

(3) Treatment.

(a) Remove wet clothing.

(b) Pat Dry – DO NOT rub or massage, this promotes sloughing of the skin.

(c) Gradually Rewarm – Although not likely in a raft, sudden rewarming, such as from fires, will dry out tissue and cause more problems.

(d) Protect the area from further exposure.

(4) Prevention.

(a) Keep skin warm and dry.

(b) Stimulate circulation with physical activity or massage prior to injury.

k. Saltwater Sores.

(1) Sores caused by constant pressure and chaffing on an area of the body, which is or has been immersed in saltwater.

(2) Signs and Symptoms.

(a) Skin begins to blanch.

(b) Skin becomes numb and later turns tender.

(c) A combination of white and red skin colors around the injured area.

(d) Blisters with pus may develop. To help prevent infection, DO NOT break the blisters.

(3) Treatment.

(a) Use fresh water, if available, to rinse the area.

(b) Air or pat dry. DO NOT rub.

(c) Use antibiotic ointment from survival kit to help prevent infection.

(4) Prevention.

(a) Change body position frequently.

(b) Keep raft as dry as possible.

(c) Stimulate circulation as discussed in earlier prevention areas.

l. Heat Cramps.



(1) Painful muscle spasms, usually of the leg muscles, that occur after vigorous exercise.

(2) Signs and Symptoms.

Painful muscle spasms.

(3) Treatment.

(a) Rest.

(b) Increase water intake.

(c) Protect from the environment.

(4) Prevention.

(a) Avoid strenuous exercise in warm weather.

(b) Maintain body fluid levels.

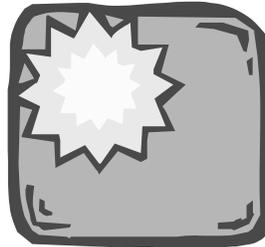
m. Heat Exhaustion.

(1) Heat exhaustion occurs when the body loses water and electrolytes through very heavy sweating.

(2) Signs and Symptoms.

(a) The same as shock.

(b) Skin is cool and clammy.



(3) Treatment.

(a) Protect the survivor from the hot environment by using raft components.

(b) Loosen tight clothing to allow circulation of air.

(c) Increase water intake.

(4) Prevention.

(a) Proper use of clothing and equipment can prevent heat injuries.

(b) Maintain proper body fluids.

(c) Be hydrated prior to mission.

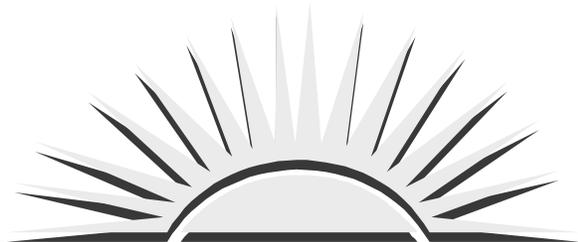
n. Heat Stroke.

(1) Normal mechanisms for ridding the body of heat are overwhelmed.

(2) Signs and Symptoms.

(a) Skin is hot, dry, and flushed.

(b) There is a lack of sweating because



the mechanism for cooling the body has shut down.

(c) The survivor will become unconscious and die if not treated immediately.

(3) Treatment.

(a) The body must be immediately cooled by any means available.

(b) The sudden cooling may send the survivor into shock, so be prepared to treat it as well.

(4) Prevention – Prevention of all heat disorders.

(a) Ration sweat not water. Especially in situations with limited amounts of water, it is imperative to limit activity and rest in the heat of the day. Activities should be conducted in the coolest parts of the day. Drink water.

(b) When water supply is low, reduce food consumption.

(c) Foods high in carbohydrates should be substituted for high protein foods. Carbohydrates require less water to process.

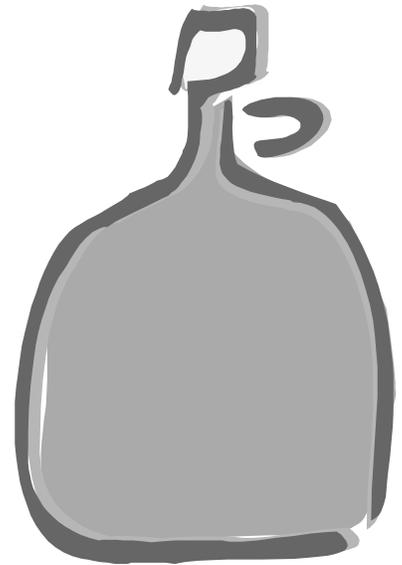
o. Common Illnesses.

(1) Types.

(a) Constipation – Normally does not require a great deal of concern. **DO NOT** take laxatives because they could cause diarrhea and dehydration.

(b) Diarrhea/Dysentery – The difference between the two is the presence of blood and/or mucus with dysentery. With either of these it is important to restrict food intake and increase water consumption. The number one cause of most illness and infection in a survival situation is unclean hands, therefore, it is important to practice good hygiene.

(c) Seasickness – Seasickness is nothing more than motion sickness. To help combat seasickness a survivor should keep an active mind, concentrate on necessities, and look at stationary objects such as clouds or land. You should also find the area of least movement such as the center in a 20-man life raft. If you If you can't help vomiting, do so in a container to prevent attracting hazardous marine life.



(d) Dehydration – Lack of sufficient water intake and excessive loss of body fluid are the primary causes of dehydration. The body loses fluid in many ways, such as vomit, bleeding, urination, defecation, sweating, and respiration.

(2) Signs and Symptoms.

- (a) Headache.
- (b) Irritability.
- (c) General ill feeling.
- (d) Dark yellow urine.
- (e) Minimal and infrequent urination.

(3) Treatment.

Drink water.

(4) Prevention.

- (a) Ration sweat, not water.
- (b) Reduce food intake, if water supply is low or limited.

p. Sanitation and Hygiene while in a Raft.



(1) Rinse clothing with fresh water, if available. Use saltwater only as a last resort to remove filth.

(2) Keep rafts clean of caustic or unsanitary materials, i.e., fuel, blood, vomit, urine, etc.

(3) Inspect and change or clean bandages, as necessary.

(4) Gently massage extremities to maintain good circulation.

(5) Use discretion where vomiting, urination, and defecation take place.

(6) Treat all minor cuts and scrapes to prevent infection.

5. PSYCHOLOGICAL FACTORS ON THE OPEN OCEAN.

a. Psychological Factors.

(1) Aircrew members in a survival situation must recognize that coping with psychological aspects of survival are at least as important as handling environmental factors. In virtually any survival episode, the survivor will be in an environment that can support life. However, the survivor's problem will be compounded because they never really expected to bailout or crash land.



(2) No matter how well prepared, aircrews probably will never completely convince themselves that "it can happen to them". Survivors must understand that psychological problems may occur and solutions to those problems must be found if the survival episode is to reach a successful conclusion. A starting point is to identify some causes of psychological stress.

(a) Fear – Fear of the unknown, unfamiliarity, or the feeling of not being in control of the situation has paralyzed some survivors.

(b) Pain – If a survivor focuses on nothing but the pain, they can neglect satisfying other basic needs.

(c) Temperature – The extremes of heat and cold can be uncomfortable.

(d) Thirst/Hunger – Constantly focusing on the negative aspects can cause preoccupation and hinder the collection of food and water.

(e) Boredom – When the basic needs have been met, some may not know what to do with the extra time. By rotating duties and changing routines you can combat boredom.

(f) Loneliness – Lack of interaction with others, missing family members and/or loved ones, or pets.

(g) Frustration – Lack of control of the environment (there is no thermostat in a raft). Goals may seem hard to reach.

b. Emotional Reactions to Survival Stresses.



(1) When a survivor knows what to expect ahead of time, it is much easier to combat them and their affects. Below are some reactions to stresses on the open ocean that could affect the survivor.

(a) Fear – Fear can cost or save a life. Usually fear makes every fiber of ones being aware and gives the apprehension of impending danger. But if let go too far, fear can turn to panic.

(b) Panic – An irrational reaction to fear. It is uncontrollable and results in irrational behavior and is commonly seen in emergencies.

(c) Resentment – An emotional state of displeasure or indignation toward some act, remark, or person that has been regarded as causing personal insult or injury.

(d) Anger – A strong feeling of displeasure and belligerence aroused by a real or supposed wrong.

(e) Hopelessness - Stems from negative feelings.

(2) Regardless of actions, a survivor may feel success is impossible, especially due to the long-term nature of the survival situation. Poon Lim survived for 133 days on the open ocean. Without the proper attitude he could have given in to hopelessness.

c. Methods to Combat Psychological Stress.

(1) Physical Conditioning and Training – Builds stamina to endure longer and the knowledge to do more with available resources.

(2) Understanding Source and Nature of Stress –Gives the root cause and thus allows for combating the problem. It will allow one to change what they can and have a positive attitude about the things they cannot change.

(3) Concentrating on Necessities – Consists of organization of self and equipment, so that when rescue arrives the survivor is ready for action. Prioritize basic needs and use problem solving techniques to help reduce some of the unneeded stresses.

(4) Set Realistic, Obtainable Goals – Strive to attain the easier goals first, this will build confidence and give courage to tackle tougher tasks.

(5) Learn to Tolerate Discomfort – Do any of the survival rafts appear as though they were designed for comfort? They were designed to keep survivors afloat until rescue arrives or landfall is made. Comfort is not a necessity, it is a nicety. If during the quest for survival, a survivor attains some degree of comfort, they should enjoy it.



(6) Rest Breaks – Take frequent rest breaks to conserve energy.

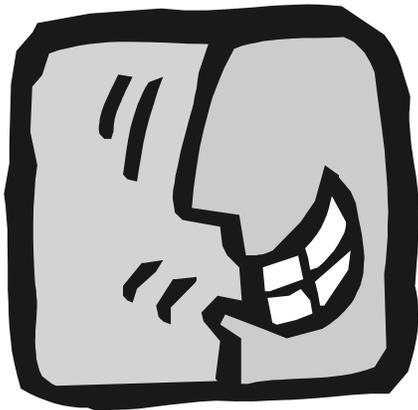
(7) Keep Mind Active – Think of things that there normally is not time for. Family, religion, and rescue are among some of the things other survivors have contemplated. In Vietnam, one survivor designed a home down to the last nail and constructed it when he returned.

d. Strengthen the Will to Survive.

Probably the greatest tool a survivor can have is not a knife, compass, or map, but a mind and body with a will to survive. There are documented cases of survivors traveling over 320 kilometers, with little to no food and negligible amounts of water, just to return to friendly control.

(a) Will to Survive – The will to survive is the desire to live despite seemingly insurmountable mental and/or physical obstacles.

(b) Positive Mental Attitude (PMA) - Keep a positive outlook and think of the driving factors to return: Family, spouse, children, revenge, and pride to name a few. Many things have driven survivors, what drives you? PMA is probably the key to the will to survive.



(c) Survivor's Mission – Never forget the survivor's mission. Maintain Life, Maintain Honor, and Return.

(d) Have Faith that You Will Be Found – Rescue units dedicate their lives to finding comrades and bringing them home.

(e) Others Have Done It – Others have survived long-term raft situations. Poon Lim, 133 days and William and Simone Butler, 66 days (a couple in their 50's).

(f) Understand Strengths and Bolster Weak Areas – Know personal strengths and weakness. Work on weakness until they are strengths.

(g) Combat Psychological Stress – Use the methods discussed earlier to combat psychological stresses.

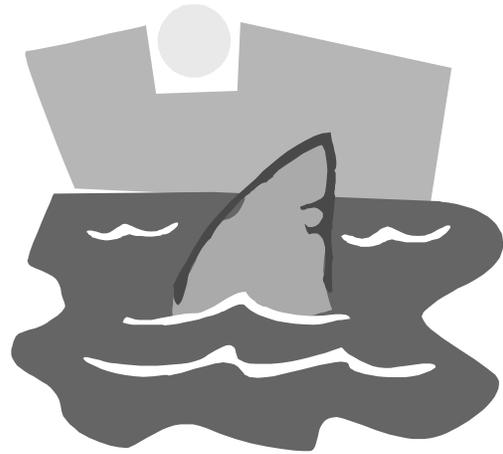
6. HAZARDOUS SEA LIFE.

a. Climate, oceans, and life forms are the three basic components of environmental conditions. These components can present special problems and advantages for the survivor. However, life forms probably present the greatest psychological fears of the unknown to the survivor. Especially when we think about the life forms that can prey upon us. Knowing and understanding these life forms will not only eliminate the fear of the unknown, but help prevent the likelihood of attracting one of these hazardous life forms. Military members learn the characteristics of certain weapons in order to defend against or defeat them. Hunters study their prey, in order to defeat them. Survivors should understand obstacles in order to overcome them.

b. Hazardous Marine Life that Bites.

(1) Sharks.

(a) Sharks can be found in all waters and have been seen in the fresh water lakes of Nicaragua, as well as hundreds of miles up the Mississippi river. Sharks vary in size. Some have been recorded at over 20 feet and over 4000 pounds. There are nearly 370 species of sharks in the world, of these only 27 have been attributed with attacks on man. Studies have proven that sharks that attack man usually do so because they mistake them for their normal food source.



(b) Simuli that Attracts Sharks.

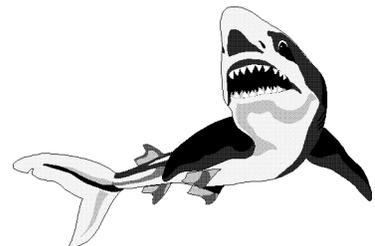
1 Prey – Small fish are attracted to the raft's shade and shadow.

2 Sounds – Sharks can actually feel the vibration of splashing. Erratic splashing emulates wounded prey. Steady strong strokes tend to discourage their interest, as it displays a healthy strong animal.

3 Smells – Sharks can smell remarkably well. Scientists believe the shark can detect one part of blood per billion parts seawater. Blood, body waste, and fish products attract their attention.

4 Sight – Contrary to popular belief sharks can see very well. In the past some people have tried to use a dark sea dye as a shark repellent, they assumed sharks could not see the person in the dye. However, scientists learned some sharks have the ability to magnify available light and can see the survivor even better against the dark background.

5 Method of Injury – Sharks come equipped with triangular teeth in rows of 5-6, so if one comes out another takes its



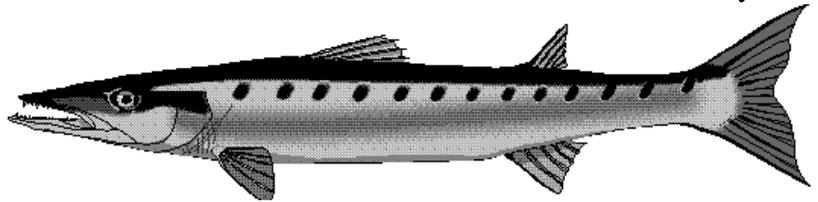
place. They also have very coarse skin that can injure the survivor or present stimuli into the water, if the survivor is not wearing the proper clothing (flight suit, gloves, and boots).

6 Prevention – Keep arms and legs inside raft and keep clothing on if the water contains stimuli.

7 Treatment – Control bleeding and clean to prevent infection.

(2) Barracuda.

The Barracuda is found in tropic and subtropical reef areas. They have been found as large as 100 pounds and 6 to 8 feet long. Barracudas are voracious carnivores and tend to be very territorial. Of the 20 some species some travel in schools and divers have been known to swim along in their schools unharmed. The danger presents itself when territory has been violated or a stimulus is present.



1 Sight – Shiny objects attract the barracuda. Shiny rank, dog tags, watches, and rings are a few of the things that could attract the barracuda.

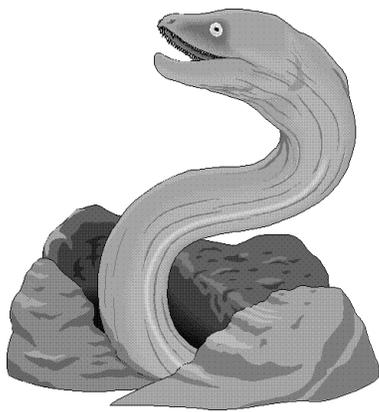
2 Smell – Similar to the shark the barracuda is attracted to vomit, blood, and food or bait.

3 Method of Injury – The barracuda has large K-9 type teeth that will tear flesh as it rushes through its target.

4 Prevention – Stay in the raft and cover or remove shiny objects, and contain stimuli.

5 Treatment – Control bleeding and prevent infection.

(3) Eels.



Eels may grow up to ten feet long and one foot in diameter. While normally docile, the eel is very protective of its home territory. They are found in temperate, tropic, and subtropical reefs. A survivor will normally come in contact with an eel while searching for food. It is wise to probe any hole with a pole prior to foraging.

1 Method of Injury – The eel can be considered the bulldog of the sea. Once it bites a survivor with its rear curved teeth it does not let go. The survivor may have to jam their fist in further and as the eel attempts to adjust the grip, jerk the

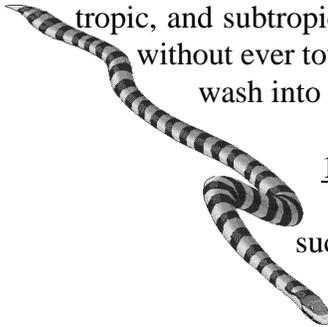
hand free. This will most likely cause some soft tissue injury, but it may be the easiest way to get free.

2 Prevention – Use a probe on any hole before searching.

3 Treatment – Control bleeding and clean to prevent infection.

(4) Sea Snakes.

The sea snake has a venomous bite that can be deadly. These creatures are found in temperate, tropic, and subtropical regions. A sea snake can live from birth to death in the water without ever touching land. They are normally contacted while fishing or they may wash into a raft.



1 Method of Injury – Sea snakes bite like normal snakes, however, their fangs are feeble compared to a rattlesnake's. For a sea snake to successfully penetrate the skin it usually needs a tender area, like the inner forearm, to chew on.

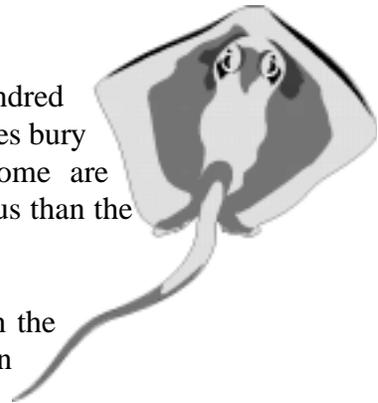
2 Prevention – Stay in the raft and use spray shield to cover the raft in rough seas. If the survivor catches a snake while fishing, they should cut the line.

3 Treatment – Use a constricting band to limit travel of poison. Limit activity and treat for shock. Wash the bite area to remove any poison that may be there.

c. Hazardous Marine Life that Punctures.

(1) Skates and Rays.

This marine life can range from very small to several hundred pounds, stretching 15 feet long and 7 feet wide. These creatures bury themselves on coastlines worldwide waiting for food. Some are venomous but the infection from the wound is more dangerous than the venom.

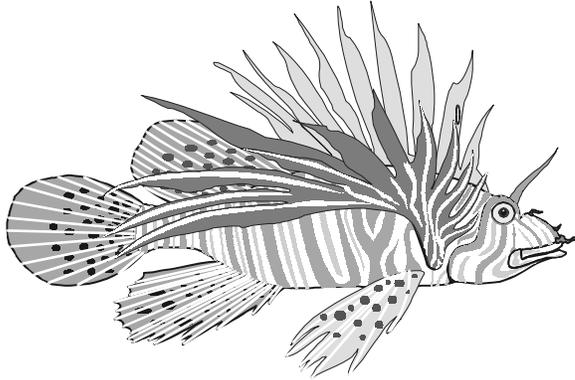


1 Method of Injury – The stingrays use a spike located on the underside of the tail as a spear. Large skates have spines on their backs that are painful if stepped on.

2 Prevention – The survivor should shuffle or drag their feet as they walk, this will alert both parties of the oncoming meeting and usually encourage the sea creature to leave. If caught while fishing, cut the line free.

3 Treatment – Wash the area and treat to prevent infection.

(2) Fish with Venomous Spines.



The examples used here are representative fish and intended to stress prevention principles. Fish with venomous spines are found worldwide. They may be caught while fishing or stepped on while searching for food on the coastline.

1 Method of Injury – Most fish have spines that are either on their back or they have ones that appear to be ornamental appendages. Some have spines like hypodermic needles

with venom sacks, such as the stone fish, which can be deadly.

2 Prevention – Wear proper footwear while searching for food on a coastline and cut fishing lines they have been caught on.

3 Treatment – Use cool water to act as a local antiseptic and use a heat soak to break down most fish poisons.

(3) Sea Urchin.

Sea urchins are found along coastlines in tidal pools, rock pools, and similar areas. Injuries occur from handling, falling, or stepping on them. Some have been found with needles up to one foot long that feel like ground up fiberglass in the wound if they are contacted.

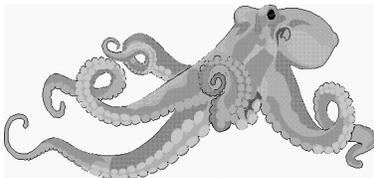
1 Method of Injury – Spines made of calcium carbonate.

2 Prevention – Wear boots and protective clothing.

3 Treatment – Wash the area and treat to prevent infection.

(4) Octopus.

A survivor will normally come in contact with octopi along coastlines while foraging for food. DO NOT handle or molest octopi, this is when most injuries occur.



1 Method of Injury – The octopus has a beak located on the bottom of the creature, in the center of its body. A bite may be hardly noticeable, but some have an anti-coagulant that will cause the victims blood to not clot at the wound.

2 Prevention – Don't handle an octopus. If caught while fishing, cut the line free.

3 Treatment – Immobilize the area, apply a pressure bandage, then wash the area to prevent infection.

(5) Blue Ring Octopus.

At this time the Blue Ring is the only known poisonous octopus. It normally only reaches about 8 inches in size, but is very deadly. The Blue Ring is found in the Indo-Pacific region and should be avoided.

1 Method of Injury – It uses a beak like other octopi, but has venom to attack and paralyze the breathing mechanism.

2 Prevention – Avoid and DO NOT handle.

3 Treatment – Apply a pressure bandage. Secure and maintain an airway.

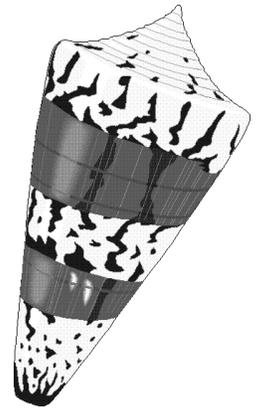
(6) Cone-Shaped Shell.

These shells are found along shores worldwide and should be avoided. Their toxin will paralyze the mechanism that controls breathing. These creatures are nocturnal hunters and the sting of some can cause death.

1 Method of Injury – The creature has 10 to 13 radular teeth that can be fired from the end of the cone.

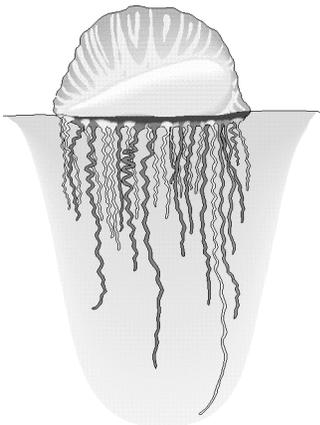
2 Prevention – DO NOT pick up or touch cone shaped shells.

3 Treatment – Wash the affected area and apply a pressure bandage. Secure and maintain an airway.



d. Hazardous Marine Life that Sting.

(1) Jellyfish.



Jellyfish are found worldwide and can be contacted if they wash into a raft or tentacles are brought in with a sea anchor or parachute. Their tentacles range from several feet to 150 feet long. While some jellyfish only irritate, others, like the Box Jelly, can kill an average adult. The Portuguese man-o-war, a hydroid, can also sting and may have tentacles as long as 98 feet.

1 Method of Injury – Stinging cells on the tentacles fire into the body.

2 Prevention – Close spray shield in rough seas and wear protective clothing.

3 Treatment – Remain calm and remove the tentacle by lifting it straight off the body. Alcohol, vinegar, meat tenderizer, and urine all will help relieve the pain. Secure and maintain an airway and treat for shock due to the intense pain.

(2) Coral.

Fire Coral may be a variety of colors. All have a very distinct fire like appearance with light tips. All coral will be found around coastlines while foraging for food. If contacted, fire coral will burn like its name.

1 Method of Injury – Survivor rubs against the coral.

2 Prevention – Observe closely and most importantly, wear protective clothing.

3 Treatment – Pour alcohol, vinegar, or urine on the area.

e. General Methods to Avoid Injury from Marine Life.

(1) While in a Raft.

(a) Stay there.

(b) Wear clothing.

(c) DO NOT procure large fish or dangle arms or legs outside the raft.

(d) Pull in the sea anchor to move away from discarded waist.

(e) In rough seas, the spray shield will keep unwanted visitors out.

(f) Keep shiny objects out of the water unless using them for bait.

(2) While Foraging for Food.

(a) Wear clothing and gloves.

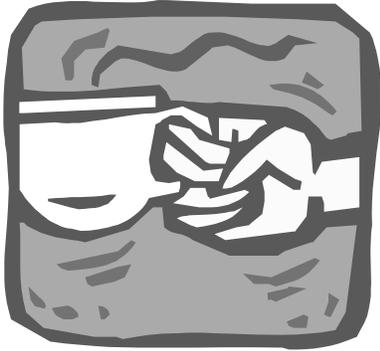
(b) Shuffle feet.

(c) Probe holes and crevices before searching them for food.

(d) DO NOT handle ornamental fish, cone shells, or carry bait and food around with you in the water.

- (e) Avoid large fish.

7. SUSTENANCE.



- a. "Water, water everywhere and not a drop to drink." Nearly every survival situation details the need survivors have had for water. In an ocean environment, fulfilling this need may not only be harder, but even more critical than if you were a survivor on land. The priority of finding water over that of procuring food must be emphasized. Water is required to maintain normal body functions. Without it, the body cannot function properly. An individual may be able to live for weeks without food, however, a person who has no water can be expected to die within days.

Knowing how to procure water, and for an extended survival situation, procure food will be vital for survival.

b. Water Sources on the Open Ocean.

(1) Survival Kits – An immediate source of water can be found in the survival kit if the survivor has no water on their person.

(a) FlexiPak – Each packet contains approximately 4 ounces of water. To test these simply squeeze and look for squirts. They can be purified if the seal is found to be broken. Aircrew may find some silver FlexiPak but the new tactically minded green packets are now being used.

(b) Desalter Kit – Each kit contains 8 bars. One bar added to 1 pint of seawater will make it consumable. In each kit a small bag is included which is used to combine the seawater with the chemical bars. The safest process is to add seawater, add the bar, and agitate the bag for 1 hour. After the hour has passed, allow the chemical to settle to the top of the bag so it does not clog the filter and spout located on the bottom of the bag. The chemical bar cannot be used more than once. For the exact number of kits in your survival kit, check with your Life Support shop.

(c) Desalination Pump – Several names are associated with this marvelous machine, reverse osmosis pump, MROD, and desalinator pump to name a few. One-man kits, if equipped with an MROD, will usually only fit a Survivor 06 that will produce 1 quart per hour. Larger kits may be equipped with the Survivor 35 model that pumps a whopping gallon per hour. Most of these pumps are designed to produce in excess of 10,000 gallons before the filters need to be changed. One caution is the biocide chemical that is used to keep bacteria from growing while the unit is in storage. Follow the directions, but most pumps require 2 minutes or 60 - 80 strokes of water to be cycled through the unit, before water coming out the fresh water tube can be consumed. Each day the units should be used for at least 10 minutes to keep bacteria from growing in them. The MROD can provide the most sustained water of all the issued water sources.

(2) Naturally Procured Water.

During a long-term episode, unless the survivor has a reverse osmosis pump, the majority of water is going to come from nature.

1 Collect Rain – Use any available container, but remember if it has been exposed to the salt water the salt spray must be rinsed or wiped off. Many containers can be used such as: helmets, spray shield, raft canopies, or any other container a survivor can procure.



2 Sea Ice – When looking for ice to use as water, find the bluish/blackish ice that shatters easily and has rounded corners, or the simplest way to be sure is to taste it. DO NOT eat sea ice, but instead melt it using body heat.

3 Sponge Dew – If this technique is used, remember to clean the salt spray from the raft. A survivor may also be able to collect condensation from the inside of the raft canopy.

(3) Commonly Misconceived Water Substitutes.

There is no such thing as a water substitute. These so-called substitutes can cause more harm than good.

1 Seawater – Seawater has trace elements, minerals, not to mention high concentrations of salt and Must Not be consumed.

2 Blood – Blood has fats, proteins, and many other things, which make it unacceptable as a water source.

3 Fish Juice – Fresh water can be found in some fish cells. However, it requires approximately 27 thousand pounds of pressure to remove this water.

4 Urine – Urine is body waste and not fresh water.

(4) Storing Water in a Life Raft.

(a) One of the big considerations to keep in mind is sealing the container the water is going

to be stored in. Without a sealed container fresh water can become contaminated with other substances the most common of which is seawater.

1 Issued water bag.

2 LPU bladders will contain nearly 3 gallons of water, but as with any sealed rubber container in the inventory the talc powder must be rinsed out before use.

3 G-Suit Bladder – Remember to rinse these.

4 Helmet – Not as desirable because helmets are hard to seal. Water from the helmet should be used among the first of the water consumed or used.

5 Bailing Bucket – Least desirable because these are not only hard to seal they are needed often. Any water collected in this should be used first.

(b) NO WATER – NO FOOD.

If a survivor has no water, they should not eat food because digestion requires water.

c. Food Sources on the Open Ocean.

(1) Available food sources on the ocean come from issued sources, which are transitional food until other food from natural sources can be procured. Remember to avoid coffee if your water is limited.

(2) Food Procurement Methods.

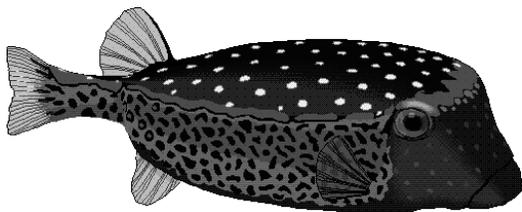
The open ocean provides an enormous selection of food for a survivor. Probably the hardest decision is what to procure and what method to use to procure it.

1 Fishing – A very thorough fishing kit is provided along with instructions for the fishing impaired.

2 Improvised Hooks – Many things can be used to procure sea life, among them are nets and fish hooks. Hooks can come in many forms and are only limited by the survivor's imagination. A fish bone could be notched in the middle then attached to a line with bait and used for a fish wedge. Even nails procured from passing debris or safety pins from a medical kit or personal survival kit could be used for fishing or hooking birds.

(3) Characteristics of Inedible Fish.

As you go through the list you may see some characteristics are shared with edible fish but you must remember that unless you can positively identify the fish as one that is edible the following characteristics should be avoided.

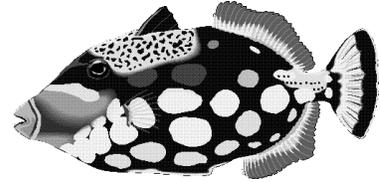


1 Does Not Look Like a Fish – If the fish does not look like a classic fish, then avoid it.

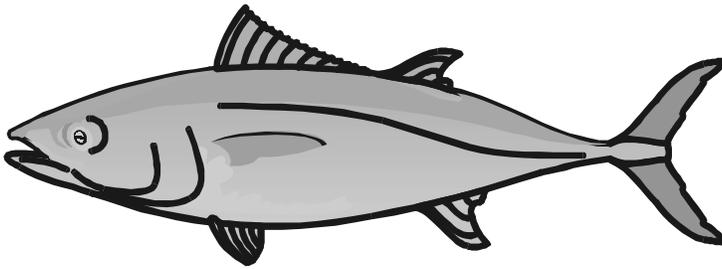
2 Box Like Body – Avoid fish with box like bodies, ones that puff up, or if they seem to have all head and no distinct body.

3 Skin – If the fish has skin, but not scales, avoid it. You may wonder why fish with skin should be avoided. Even though some species like catfish are edible, some very dangerous fish are in this category and unless the survivor is an expert or can positively identify the fish as edible it should be avoided.

4 Parrot-like Beak – Fish with a beak shaped mouth should be avoided, because they can eat the blue/green algae from reefs. Fish that have been feeding on reefs can get cigatera poisoning, which will make a survivor very sick.



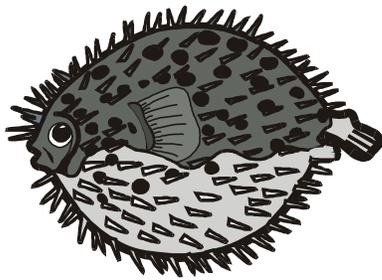
5 Unhealthy – Avoid fish that look or act unhealthy. They could make the survivor sick.



6 V-Shape – Everyone knows that tuna is an edible fish, but it is a bleeder fish. When commercial fisherman catch tuna, they place them on ice because they will spoil very quickly. A survivor does not have the luxury of ice and would not want to risk getting scromboid poisoning from the spoiled fish.

7 Over 3 Pounds – Fish larger than 3 pounds or 3 feet should be avoided because it soon becomes a fight over whether the raft belongs to the survivor or the fish.

(3) Marine Edibility Test.



Many of the fish a survivor could procure in the ocean are poisonous. Therefore a general principle called the marine edibility test has been developed to help the novice angler determine edible fish.

1 Choose a fish with no poisonous characteristics, one that LOOKS like a FISH.

2 Cut the fish into small strips.

3 Taste a small portion, check for bad taste, stinging, or burning (peppery taste) sensation. If none, swallow and wait 12 hours. During the test period watch for symptoms such as

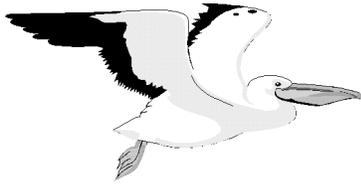
headache, nausea, and cramps.

4 After 12 hours, if none of the above symptoms are present, consume and/or preserve the fish.

5 DO NOT use if spoilage is suspected.

6 Discard internal organs.

(4) Marine Birds.



Birds may be a welcome change to the survivor who has eaten nothing but sushi since the accident.

1 Procurement – Use a baited hook or even a net to procure birds. Keep their talons and beak away from the raft and your body as they may fight fiercely and cause injury or puncture a raft.

2 Preparation – Skin instead of pluck to remove the strong oily taste. DO NOT eat the internal organs. Sun dry or eat the flesh raw.

(5) Seaweed.

Seaweed can also be a welcome change to the raw meat diet and it can also give some needed carbohydrates and vitamins.

1 Seaweed can be found floating on the surface.

2 Red, brown, and green leafy varieties are edible but be sure to eat only the leafy sections and avoid the methane bubbles.

3 Wash the weed and eat it raw.

4 Begin with small amounts and gradually increase intake to allow the body to transition to the new food.

d. Preserving Food on the Open Ocean.

(1) Dried foods have a much longer life than foods that are not preserved. The only ways to dry food in a life raft are to sun or air-dry them.

(2) Preservation Techniques.

- (a) Cut the food into thin strips to accelerate the drying time.
- (b) If the survivor improvises a line from one side or end of the raft to another the food could be hung on the line to dry.
- (c) If a line is not feasible, the survivor could also lay the food on a raft cell. If this technique is used, you must be aware of the changing sea state. If the seas begin to get rough, the food can get wet and prolong the drying time.

e. Food Storage in a Life Raft.

As you can imagine it may be difficult to keep food from becoming water logged, but Life Support Units pack many survival items in Ziploc bags which are very useful for the survivor to store dried food in. Other items the survivor could use include wrapping the food in some waterproof material, such as parts of an anti-exposure suit, an extra LPU bladder, or parts of a G-suit. The best storage method, however, is probably the seat kit inner bag.



8. COMBAT CONSIDERATIONS.

Aerial combat in the future, as in the past, will expose aircrews to possible ejection, bailout, or forced ditching into enemy controlled waters. Simply looking at some of the recent conflicts the United States has been involved in shows the vast amount of water that can separate the aircrew from some targets. Aircrews who encounter such traumatic circumstances must be prepared to survive and evade the enemy and return to friendly control. Aircrew members must be prepared to exert extreme mental and physical effort to successfully fulfill their mission: RETURN EARLY AND IN GOOD PHYSICAL AND MENTAL CONDITION WITHOUT GIVING AID OR COMFORT TO THE ENEMY.

a. Pre-Mission Responsibilities – These responsibilities DO NOT start when mission notification is received; they start today.

(1) Physical Condition.

A survivor's best physical condition is when he/she first enters the survival situation. The aircrew member who is physically fit will be able to handle difficult tasks and overcome physical and mental stresses easier than the poorly conditioned survivor.



(2) Medical Needs – After the Mayday call, it is too late to schedule an appointment for preventative medical care.

(a) Immunizations – It is important to ensure all shots are current to ensure the best protection possible from the start.

(b) Dental Care – Sitting in a raft is not the time to be bothered by that cavity you have been putting off for months.

(3) Psychological Factors

It is important for the survivor to be able to concentrate on surviving and not worry about how their spouse will sell the car or who will take care of the children if the survivor is a single parent.

(1) Will – Do you have a current will and if not, who decides who gets what if you DO NOT live in a community property state? The court.

(2) Power of Attorney – Regular powers of attorney will allow spouses or designated childcare representatives to take care of your affairs. Several types of power of attorneys exist. One that is beneficial in case of extended absence is a durable power of attorney. The durable power of attorney stays intact indefinitely, which is beneficial if you become a POW or are MIA.

(4) Personal Survival Kits – Personal Survival Kits are very beneficial and if thought is put into it, they can be very organized, hassle free, and small.

(a) Consolidated – All items are placed in one container that is easy to transfer from uniform to uniform. Problem: if one piece is lost, all is lost.

(b) Scatter – Items are placed in different pockets which will take more effort to transfer, however, if one piece is lost not all is lost.

(c) Contents – Multipurpose items such as, multipurpose pliers, space blanket, or non-lubricated condom can have multiple uses. For those in ejection seats, all food has been removed, so food may be a consideration to transition into open ocean foods. Power Bar-type food, high in carbohydrates, can easily be placed in pockets for survival food.

(5) Review DD Form 1833, ISOPREP.

Prior to any combat mission or biannually the ISOPREP should be reviewed to keep crew members familiar with the information contained on them. Remember to use information that is easily remembered, such as significant things in the member's life that are easily recalled under stressful situations. Numbers entered should not be consecutive, sequential, and no zeros. Each statement should contain four different pieces of information. They should not include religious, sexual, fictitious, or political information. DO NOT forget to completely fill out the form.

b. Current Events and Political Attitudes – Having a good understanding of an enemy, their country, capabilities, local people, and current events can be of great use to the survivor.

(1) SERE Contingency Guides. Prior to missions these documents can be reviewed at Intel.

(a) Sociopolitical Information – What are the attitudes toward Americans?

(b) Environmental/Geographical – They provide an idea of normal environmental conditions in order for the aircrew to mentally prepare as well as supplement their survival kit. Geographical information allows aircrew to psychologically prepare for terrain and become familiar with significant landmarks.

(c) Local People, Customs, Political Attitudes – Many countries have customs different than that of Americans and things Americans do may be taboo to them.

(d) Enemy Activity – Movement on local waters, to include military troops or fishing boats. A survivor who knows a country has and uses Automatic Direction Fixing (ADF) capabilities will be more careful when making radio calls.

(2) Safe Area Intelligence Description (SAID).

(a) Survival and Evasion Conditions – Foods, water, cover, insects, and animal life are among the helpful information in SAID Guides.



(b) Security Forces and Hazards – Size or type of force may be some information included, as well as hazards like mines or false floors in jungle areas.

(c) Recovery Areas and Sites – Possible site for recovery or pictures of areas could aid in identification.

(3) General Published Information – Sitting at a computer at home aircrew members can access many beneficial bits of information with out even inconveniencing them.

(a) Intel Summaries and Studies – Library of Congress on-line can provide detailed information about many areas. CNN, National Geographic, and the Discovery Channel are among a few areas of study.

(b) SERE Bulletins and Newsletters – Contain information pertaining strictly to survival, evasion, and escape.

(4) Combat Search and Rescue Special Instructions (CSAR SPINS) – These are found in the General section of the Air Tasking Order (ATO) and provide information specific to the current theatre of operations. They are developed by rescue.

(a) Authentication Procedures – What to do and when.

(b) Comm Times and Procedures – When and how to contact.

(c) Contact Procedures – What to do and when.

c. Impact of Current Intel on Decisions – Changing worldviews and ideas can change world opinion. Potential survivors must be up to date on current world events.

(1) Political Attitudes – Understanding the political attitudes of different groups can help a survivor make decisions based on knowledge and not guess work.

(a) Friendly Government – Is the government friendly toward the U.S. and are we helping them or working to help them regain control such as in Kuwait.

(b) Unfriendly Government – Is the government unfriendly toward the U.S. because we are supporting directly or indirectly rebels or freedom fighters that are opposing them.

(c) Splinter Groups – Are there groups somewhere in the middle acting for their own benefit or profit and what is their attitude toward the U.S.

(d) Local People Support Government – Does the local populous support their government and because of their allegiance would they call authorities if they saw Americans parachute in or evidence of an evader's presence?

(e) Local People DO NOT Support Government – Some locals may be indifferent or not in agreement with the policies of their government and because of these beliefs are willing to help Americans or not report the presence or evidence of an evader.



(2) Local Culture – The culture and social values of the indigenous people could sway certain decisions survivors make.

(a) Friendly to Strangers – Are the locals known to be friendly to strangers and help them or turn a blind eye.

(b) Unfriendly to Strangers – Do the locals normally feel threatened and use some type of violence against strangers or are they just reluctant to get involved.

(c) Unknown – In some areas there may not be enough experience with locals to determine or predict their actions

or there may be no recorded history in some areas.

(3) Religious Beliefs – Religion is a very sensitive area for many people and some cultures leave little room for tolerance of other religions. Knowledge of the religion and people's attitudes about religion will give survivors a basis from which to make decisions if the need should arise.

(4) Current Events – The world changes on a daily basis. Enemies become friends and friends become adversaries.

(a) Changing Attitudes – Has the American role in the war changed from humanitarian to one more direct or that of a police force. Our presence could be welcome at first, but as time goes on and we remain involved attitudes about the U.S. could change.

(b) Economic Status – Is America actively pushing for or suggesting an embargo? Has an embargo or sanction been imposed due to efforts supported by the U.S.? Actions such as these could change views of many people toward the United States.

(c) Intent – What is the reason we are involved? Is it for American interests, drug interdiction, or to support the people of the country? All these factors affect the survivor's decision making process because they also affect the people the survivor may come in contact with.

d. Camouflage on the Open Ocean.

BLISS Principle.

(a) B-Blend – Cover all portions of the raft that DO NOT blend with the surrounding environment. For multi-place rafts use the dark side of the raft canopy or signal paulin to blend. The ramps can be pulled in to hide them. LPUs may have to be covered with parachute or softened and hidden with available material. One-man rafts are already optimized for blending with the ocean.

(b) L-Low Silhouette – Partially deflate the raft, remove canopy poles so the raft will be difficult to spot from sea level.

(c) I-Irregular Shape – Break up the round or oval shape by deflating or using flotsam, seaweed, or available material such as clothing to make the raft difficult to spot from the air.

(d) S-Shine – Avoid allowing shiny objects such as watches, rings, dog tags, mirrors, or any unnatural objects from inadvertently flashing the horizon.

(e) S-Sound – Sound travels great distances over water, especially in moist air. It is important to limit unnatural sounds and talking to reduce the risk of discovery.

e. Water Combat Search and Rescue – The weakest link in any rescue attempt is the survivor. Survivors must relate their position to rescue if or when rescue asks.

Signals – Use of emergency signals is very important because they make the survivor stand out against the background. The different considerations of emergency signals are:

(a) Location – Know where the signal is located and be ready to use it at a moment's notice.

(b) Procedures – Knowing the procedures by memory will help the survivor use the device quickly.

(c) Preparation – Be prepared to use the signal when asked by rescue, but DO NOT break the seal as the device can become inoperable due to the damp air or saltwater spray.

(d) Safety – To ensure both the rescuers and the survivor return, use good sense when operating any pyrotechnic devices.

(e) Electronic – Transmit only as pre-briefed and at pre-briefed times. If the survivors see an aircraft or vessel they must be positive of its identification as friendly prior to attempting contact. It is wise to transmit in short bursts no longer than 3-5 seconds to avoid enemy getting a Direction Fix (DF). The survivor should also alert the aircraft of any enemy activity or vessels and steer them around the threat.



(f) Unconventional – There are many ways in which a survivor can be recovered and they should be prepared for any eventuality, such as a submarine or amphibious craft to mention only a couple.



9. POST-EGRESS AND PARACHUTING TECHNIQUES.

DON'T WAIT!** If your aircraft develops problems over water which may result in ejection or ditching, it is imperative that Dash-1 emergency procedures are begun as soon as possible to let someone know you are in trouble. Don't hesitate – begin transmitting an emergency signal and continue communications for as long as possible. When you determine it is no longer safe to stay with the aircraft – **GET OUT!

a. Methods of Donning Parachute Harness and Flotation.

(1) Self – Slip the parachute harness on just like you would your vest or jacket.

(2) Buddy – Just as if your butler was helping you with your jacket, one person holds the harness for another.

b. Procedures of Donning Parachute Harness and Flotation – Once the harness and LPU assembly are donned, adjust by fastening the chest strap and adjust seat sling to the break of the buttocks. After the harness and LPUs have been donned, fasten your leg straps and stow all excess webbing.

c. C-9 Canopy Components.

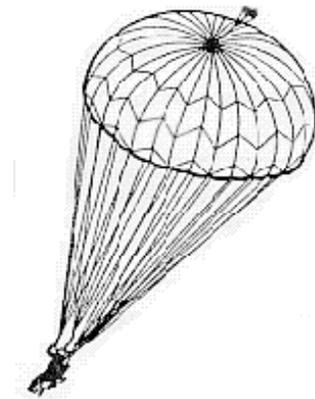
(1) Pilot Chute – Designed to pull the main chute out.

(2) Apex – The only designed hole in the center top of the C/9 canopy.

(3) Gores – The canopy is broken into 28 gores.

(4) Panels – Each gore is divided into panels for reinforcement.

(5) Radial Seams – A radial seam, which contains 550 cord,



divides each gore.

(6) Lower Lateral Band – This is the reinforced lower edge of the canopy.

(7) Suspension Line – The suspension line attaches the risers to canopy.

(8) Risers – Risers run between the suspension line and the releases.

(9) Releases – Connect the parachute to the harness, type of release depends on aircraft.

d. Operation of Parachute Releases – One key factor to remember is that each release has a two stage release system. The first is a safety, the second is the actuation.

(1) J-1 – J-1 style releases are found on heavy aircraft, trainers, and B-52. To operate releases: pull out and down on safety cover and tug sharply on cable loop with thumb.

(2) Koch – Koch style releases are found on some ejection aircraft such as F- 15, A-10, U-2, OV-10, etc. To operate releases: raise locking lever and pull down on actuating lever.

(3) Frost – Frost style releases are found on ejection seat aircraft such as F-16 and B-1 at this time. To operate releases: rotate safety latch fully, move slide fully toward latch, and squeeze safety latch toward slide latch.

(4) SEAWARS – (Seawater Activated Release System) SEAWARS may be found on Frost or Koch releases and is intended as a backup system for unconscious survivors or ones without the physical ability to release themselves. The SEAWARS device will release the canopy within two seconds of water contact, however, DO NOT wait for it to release you from the canopy. You should activate your releases manually.

(5) UWARS – This release system is found on all three types of releases. UWARS retracts the pins holding the releases to the chute immediately upon water contact.

e. Three Basic Styles of Parachute Containers.

(1) Back Style – This parachute container provides the wearer with movement and capability to perform their job while wearing the chute.

(2) Chest Style – Designed for aircraft with limited mobility areas. The chest chute can be removed then clipped onto the aircrew's torso harness quickly, in case of an emergency.

(3) Integrated Seat – Ejection seat, maintain ejection position until man-seat separation has occurred.

f. Inspection Points on a Parachute Container.

- (1) Snaps and keepers on harness straps.
- (2) Ripcord handle should be stowed.
- (3) Timer actuation knob stowed.
- (4) Canopy releases closed.
- (5) Emergency oxygen pressure should be set between 1800 and 2200 psi.
- (6) Back pad secured.
- (7) Zippers closed.
- (8) Risers straight and tacked to pack.
- (9) Pack closed with no canopy visible.
- (10) No stains on pack (i.e., oil, water, acid, etc.).

g. General Egress Procedures – Altitude awareness at time of egress may provide critical information to determine actions.

- (1) Dash-1 – Always follow Dash-1 procedures specific to your aircraft.
- (2) Manual Bail Out – Arm automatic actuating device. If the parachute timer is set for a delay of 4 or more seconds, pull prior to exit. If it is set for a delay of less than 4 seconds, pull after clearing aircraft.
- (3) After Clearing Aircraft – Assume military free fall position immediately.
- (4) Ejection – If separated from the seat, assume military free fall position. If free falling with seat, allow the seat to work automatically.



It is unsafe to deploy a parachute above 14,000 feet. You would experience a severe opening shock, lack of oxygen, and extreme cold. For this reason, if you egress from your aircraft above 14,000 feet, you must free fall to a safe altitude. If using an ejection seat, you may free fall with the seat or you may have immediate man-seat separation.

h. Free Fall Body Positions for Altitudes and Pack Styles.

(1) Above 14,000 Feet.

(a) Back Style.

- 1 Feet and knees together, slight bend at the waist.
- 2 Arms across chest; elbows in (DO NOT grab ripcord handle).
- 3 Chin on chest.
- 4 Maintain position until parachute deploys automatically, you drop below 14,000 ft, or you begin to spin and tumble uncontrollably.



(b) Chest Style.

- 1 Feet and knees together, slight bend at the waist.
- 2 Place both arms under pack tray; DO NOT grab ripcord.
- 3 Turn head right, looking over your shoulder.
- 4 Maintain position until parachute deploys automatically, you drop below 14,000 ft, or you begin to spin and tumble uncontrollably.



(c) Spread Eagle – Assume the spread eagle position if spinning or tumbling occurs.

- 1 Arch back, head up.
- 2 Extend arms horizontally, with elbows slightly bent; palms down and cupped.
- 3 Spread legs about 45 degrees and bend knees in a relaxed position.
- 4 Maintain position until parachute deploys automatically or you drop below 14,000 ft.



NOTE: DO NOT PULL RIPCORD ABOVE 14,000 FEET!

(2) Below 14,000 Feet.

(a) Back Style.

- 1 Feet and knees together, slight bend at the waist.
- 2 Arms across chest, elbows in.
- 3 Visually locate and place hand on ripcord handle.
- 4 Chin on chest.
- 5 Pull ripcord.

(b) Chest Style.

- 1 Feet and knees together, slight bend at the waist.
- 2 Left forearm under the pack, left hand grasping lower corner of tray.
- 3 Visually locate and place right hand on ripcord.
- 4 Turn head right, looking over your shoulder.
- 5 Pull ripcord.

(c) Integrated Seat.

Immediately upon seat-man separation, assume the military free fall body position to prevent arms, legs, and parachute entanglement. DO NOT attempt to assume a "spread eagle" position.

NOTE: Extreme Low Altitude – At **extremely low altitudes**, pull ripcord as soon as you clear the aircraft regardless of position or pack configuration.

i. Procedures to Correct Canopy Malfunctions.

(1) Twisted Risers or Lines – Grasp all four sets of risers with palms forward, thumbs down, and pull apart while bicycling legs until clear.

(2) Mae West and Partial Inversion – Locate smaller lobe, follow lines to riser, pull deep into chest, and release sharply.

(3) Uncorrectable Malfunctions.

- (a) Full inversion.
- (b) Broken lines (By T.O. DO NOT pull four line).
- (c) Burn holes (By T.O. DO NOT pull four line).
- (d) Blown panels (By T.O. DO NOT pull four line).

NOTE: PAD – Use the **PAD acronym to assess your situation in correcting malfunctions!** (**P**rogress, **A**ltitude, **D**amage) Determine how much altitude and time you have to correct the problem. Assess the damage and how fast you're falling compared to other crew members.

NOTE: With a Mae West, as a last resort, you may cut the offending line.

j. Post-Egress Checklist.

- (1) Check Canopy – Check to ensure no malfunctions have occurred. Correct malfunctions as necessary.
- (2) Lift Visor – Increase visibility.
- (3) Discard Mask – Once in the water, a mask becomes the worlds largest one way drinking straw.
- (4) Deploy Seat Kit – To deploy, grasp the handle at your right hip and pull.
- (5) Activate LPUs – To ensure flotation once you have entered the water.
- (6) Activate 4-Line Jettison Lanyards.
 - (a) Prior to 200 feet.
 - (b) DO NOT pull if you have an uncorrected malfunction or a damaged canopy.
- (7) Steer Into the Wind.
 - (a) Hold canopy into the wind until approximately 50 feet above water.
 - (b) Right turn, pull down on right rear lanyard or riser.
 - (c) Left turn, pull down on left rear lanyard or riser.

NOTE: Chest style and integrated seat parachutes, use red lanyards to steer. With these types of chutes you will not be able to get to your risers. **PREPARE TO LAND**

k. Preparing for Water Entry.

Water Entry Position (Be prepared for shallow water.)

- (a) Place hands on releases, keep thumbs under main lift web to remain secure.
- (b) Feet and knees together; slight bend in the knees.
- (c) Balls of the feet pointed toward the water.
- (d) Eyes on the horizon.
- (e) Release upon water contact.

l. Situations Requiring Modifications to the Checklist.

(1) Low-Level – Check canopy, activate LPUs and prepare for a water entry. If more time allotted continue remaining checklist.

(2) Low-Level with SEAWARS – Automatic canopy release and LPU inflation. Use mask removal techniques and prepare to land.

(3) Total Darkness – Activate your LPUs and prepare for water entry.

(4) Combat Edge.

- (a) Check canopy.
- (b) Visor (up and locked).
- (c) Remove oxygen mask (bayonet clips).
- (d) Grasp both the communication cord and the bladder supply hose and quickly pull away. You must exert at least 30 lbs of pressure.
- (e) Disconnect vest hose from the CRU-94P.
- (f) Remove CRU-94P from the torso harness mounting bracket and discard along with the oxygen mask and quick disconnect.

- (g) Stow the vest hose to keep it from causing injury or becoming entangled.
- (h) Continue with normal checklist.

(5) Wearing Chemical Defense Ensemble.

- (a) Check canopy, disconnect chin strap and both bayonet clips.
- (b) Remove helmet.
- (c) Remove hood and mask simultaneously.
- (d) Place helmet on and disconnect mask from filter pack and discard.
- (e) Continue checklist.

m. Procedures for Drag Recovery.

(1) Front Drag.

- (a) Hold head up and out of water.
- (b) Spread your legs to stabilize yourself.
- (c) Release as soon as possible.

(2) Back Drag.

- (a) Spread legs and bend knees to stabilize, digging your heels in the water.
- (b) Perform a hard sit up.
- (c) Place your chin on chest.
- (d) Release as soon as possible.

NOTE: If contact from releases is broken, slide your hands down your risers to relocate your releases.

n. Procedures for Parachute Disentanglement – If you parachute down in a low wind situation, it is possible the canopy could come down on top of you. If this occurs:

- (1) REMAIN CALM – Lift the parachute material to create an air pocket.

- (2) DO NOT THRASH – You will become entangled in the parachute cord.
- (3) KEEP FEET AND LEGS TOGETHER.
- (4) LOCATE RADIAL SEAM – They have 550 cord in them.
- (5) HAND OVER HAND – Use hand over hand movement to work yourself out from under the canopy.
- (6) REMOVE ALL LINES – Remove any lines from your body using your hands.
- (7) LAST RESORT – Cut lines only as a last resort.
- (8) SLOWLY SWIM – Slowly swim from your canopy and get into the life raft.

BOARD YOUR RAFT AND START SURVIVING!!!



10. AIRCREW FLOTATION AND HELICOPTER RECOVERY DEVICES.

If the Air Force provided no flotation could you tread water until rescued? There are many ways to tread water with very little energy expended such as tying legs and arms of a flight suit then capturing air inside the body of the suit and using it as a flotation device. The flight helmet can also be used to capture air and be used for flotation. Due to the reasons for ditching, or parachuting into the water, injuries or unconsciousness may be a problem, therefore the Air Force has invested heavily into flotation devices to keep your head above the water. Most aircrew members will also have several pounds of gear on such as the parachute harness and survival vest.

a. Flotation Devices.

(1) Heavies and Helos – 2/P and 10/P style Life Preserver Units (LPU) are found primarily on heavies and training aircraft. To don these LPUs simply slip them on like you would a vest and adjust so there is approximately a fist distance between the chest strap and the body. The LPU pouch should also be adjusted fist distance under your armpits. If the LPU rides too high under the arm, it will chafe and if too low it will flop annoyingly. This style LPU can be inflated manually by pulling the tabs or orally by unscrewing the knurled locking ring and pressing down on the rubber plunger while blowing.

(2) Ejection – 9/P style LPUs are found exclusively on ejection seat aircraft. The 9/P LPUs are attached to the harness and are donned with the harness. This LPU style is a self-righting unit to keep unconscious or badly injured survivors from floating face down in the water. The 9/P can be inflated manually and orally, just as the previous style. However, this unit has a third method of inflation, which is water activated to ensure the survivor has flotation if they are unconscious.

(3) Passenger – 5/P and Adult/child LPUs are found on larger aircraft that carry passengers. The 5/P LPUs are donned like a vest and the adult/child is simply placed over the head with the connecting straps routed under the arms or under the legs for a child. The 5/P and Adult/Child

LPU's can be inflated manually by pulling the tabs labeled (JERK FOR INFLATION) or orally. These LPU's usually have some extra gear provided since access to a life raft may be delayed or impossible. A survivor may find Sea Marker Dye, whistle, line, and seawater activated light to use until rescue arrives.

Wearing of life preservers increases the predicted survival time. Just getting into a raft will greatly increase life expectancy in a cold water environment. The following table shows predicted survival times for an average person in 50-degree water temperature:

<u>Survival Time</u>	<u>Projected</u>
<u>No Floatation</u>	
Drown proofing	1.5 hours
Treading water	2.0 hours
<u>With Flotation</u>	
Swimming	2.0 hours
Holding still	2.7 hours
HELP (fetal position)	4.0 hours



b. Heat Escape Lessening Posture (Help) Reduces the Flow of Cold Water over the Vital Organs.

(1) Single Survivor – A survivor should pull their knees into the chest and wrap arms underneath the knees to maintain as much heat as possible. It is possible to extend the life expectancy as much as 40% by performing the HELP. If wearing 2/P, 10/P style LPU's the bladders can be Velcroed together under the legs.

(2) Group – If in a group situation huddle together to preserve as much heat as possible.

c. Swimming Strokes – Swimming is easier with LPU's when a modified swimming stroke is incorporated.

(1) Backstroke – To travel long distances with the least expenditure of energy, the backstroke will serve the survivor well. To perform this stroke lay on your back, kick your feet, and reach above the shoulders with cupped hands then bring your hands to your sides as if doing jumping jacks. The main draw back is the difficulty seeing where you are going.

(2) Sidestroke – Sidestroke is best for pulling along an injured survivor or equipment. To perform this stroke lay on your side, grasp the object you are carrying with your top hand, kick your feet, and reach out with your opposite hand. Cup your hand and make a downward motion pulling your hand down to your side.

(3) Breaststroke – When the survivor needs to approach an object (i.e., raft, rescue devices, etc.)

breaststroke is best suited. To perform this stroke with 2/p, 10/p style LPUs, ensure the LPUs are Velcroed together in front of you, then push them under your body so they are at about stomach level. Roll forward onto your belly, reach your arms out in front of you with hands cupped, kick your feet and bring your hands back to your sides. For 9/p style LPUs the process is the same minus the Velcro.

d. Boarding 20-Man Raft

(1) Preboarding Considerations – Prior to boarding any type of raft, the survivor needs to perform the SLIP:

(a) **S – Separate** the 2/p or 10/p style LPUs and push them behind your body. Survivors with the 9/p style LPU, need to soften their LPU by letting air out of the oral inflation tube.

(b) **L – Lubricate** the boarding ramp/area to include the upper cell on the 20-man raft.

(c) **I – Inspect** yourself for any sharp objects that could cause damage to the raft (i.e., parachute releases, pens, pencils, etc.)

(d) **P – Penetrate** or proceed onto the raft. Grasp both lower boarding handles on the boarding ramp. At the same time, plane out your body like "superman" and kick your feet. Finally, in one swift motion swim straight onto the raft using the boarding handles for assistance. Once at the top of the boarding ramp, step over the top cell of the raft. Keep your chest as far away from the top cell as possible and enter the raft.

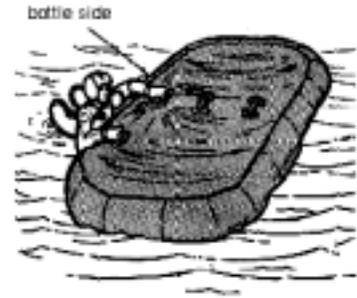
(2) Alternate Method – Alternate method is used when the CO₂ bottle valve has frozen and the raft is very soft or if a puncture has left the raft limp. If the bottle is the culprit splash water on the bottle valve to help it thaw. Meanwhile the others can enter by approaching the side of the boarding ramp. Grasp the boarding handle on the top cell, put your knee in the center of the ramp, then reach for the other handle on the top cell and climb in.



e. Boarding 7-Man Raft.

(1) Preboarding Considerations – Unlike the 20-man raft, the 7-man raft can come to you upside down. If this occurs, the survivor will need to right the raft.

(a) Righting the 7-man – To right this raft, approach from the bottle side, face raft into the wind, push down on the bottle and climb up the handles on bottom of raft. Once this is accomplished ensure accessory kit container is opposite the cylinder, this will provide counterbalance for when the survivor enters the raft.



(b) Righted – Once the 7-man has been righted, DO NOT LET GO of the raft. Move around the raft using the safety line. Once you're on the bottle side, use the **SLIP** principle and get in. To penetrate the raft, find the stirrup and the knotted rope. Place your right foot into the stirrup and grasp the knotted rope with both hands. Keep your weight centered directly over the right foot, then stand and pull yourself up using the knotted rope and "fall" into the raft. Keep your chest as high as possible off the upper cell of the raft.

(c) Group – If you are in a group, some can remain on the opposite side of the boarding ladder to act as counter weight for those getting in the raft.

f. Boarding One-Man Raft.

(1) Preboarding Considerations – The one-man raft can also come to you upside down.

(a) Righting the One-Man – Approach the raft from the bottle side. Push down on the bottle with one hand, at the same time reach across grasp the boarding handle on the opposite side, then pull.

(b) Once Righted – If the raft is not inflated, locate the lanyard attached to the CO₂ bottle head and pull to activate the bottle. If the raft does not inflate find the red or red/black stripped valve on the main cell and inflate. The valve will be under the spray shield. Once finished, flip the spray shield back inside of the raft and move to the small end. Use the SLIP principle and enter the raft.

(2) Boarding – Like the other rafts the one man has more than one way to enter.

(a) Knee In – Push down on the small end of the raft, place knee in and fall forward.

(b) Back In – For use if you have an injured arm. Hook one foot into small end of raft, un-clip seat kit on that side, grab hold of the small end of the raft with the good arm, and turn your back to the raft. Push the small end of the raft down and under hip, and kick and pull yourself into the raft.

(c) Swim In – In rough seas, you must grasp the small end of the raft, plane your body out like "superman", then kick and pull into the raft. Use the white handles on the side, not the spray shield, to pull yourself into the raft.

g. Survivor's Immediate Priorities within the Raft – Once inside of the raft, the survivor needs to take care of some immediate action needs. THE FIVE A's: In reality these tasks DO NOT have to be completed in any certain order. However, we have listed them in a logical order.

(1) **A – Assist** yourself, as well as others into the raft. The 20- and 7-man rafts have heaving lines available to the survivor. (Heaving line consists of approximately 50 feet of chord and a rubber doughnut).

(2) **A – Air** – For the 20-man raft, upon entering the raft go immediately to the center, turn 90 degrees to the right. This is where the equalizer tube is found, directly beneath the tube you will find the equalizer clamp. Clamp the tube, this will separate the upper and lower cells of the raft. Inside the 7-man raft opposite the bottle side are located two mattress valves. Look, listen, and feel for air seeping out. If any leakage is present adjust the valves, but DO NOT over tighten. Once in the one-man raft, if you need to top it off, find the red or red/black striped valve opposite the bottle side on the top of the main cell. The floor inflation valve is located beside your left hip and the spray shield inflation tube is located over the right shoulder. This valve is operated by unscrewing the top locking mechanism and blowing.

(3) **A – Anchor** – In all rafts, the survivor must deploy the sea anchor crest to trough (that is, if your raft is at the bottom of the wave you'd place your anchor at the top and vice versa) to help reduce drift and increase stability.

(a) 20-Man Raft – The anchor on this raft is located directly opposite the equalizer tube.

(b) 7-Man Raft – The anchor is located off the front of the raft (end closest to the inflatable seat.)

(c) 1 Man Raft – The anchor will be found off the large end of the raft, directly in front of your face, if on your stomach.

(4) **A – Accessory Kit** – All rafts, look to see if the accessory kit is floating, if not, it could be under the raft (i.e., 20-man, 7-man).

(a) 20-Man Raft – Move to the bottle, find the smooth side of the bottle. Between the smooth side of the bottle and the nearest boarding ramp is where the kit should be attached with a lanyard.

(b) 7-Man Raft – The accessory kit will be located on the oarlock opposite the bottle, attached by a lanyard.

(c) One-Man Raft – The kit will be attached to the bottle by a lanyard.

(5) **A – Analyze** – As with all survival situations you must analyze your situation.

h. Survivor's Responsibilities During Recovery Operations.

(1) Multi-Place Raft.

(a) Surface Vessel – Bring in all lines and lanyards, fully inflate the raft, wait in the raft for instructions. Ensure you disconnect from your raft before boarding.

(b) Helicopter Recovery – Clear all lines and lanyards, secure all items, remove sails and canopies, deploy sea anchor, partially deflate raft, and stay in raft. (May be required to enter water to mount device.)

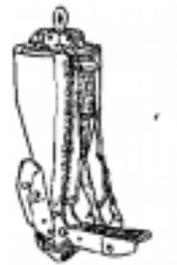
(2) One-Man Raft.

(a) Surface Vessel – Same as for multi-place raft.

(b) Helicopter Recovery – Secure all equipment to the raft, partially deflate, get out and replace your body weight with water, leave sea anchor in the water. Maintain handhold on the raft until you have the recovery device in the other hand.

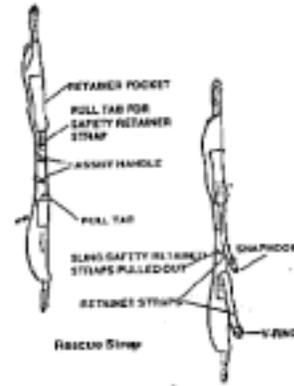
9. Recovery Procedures and Mounting Rescue Devices – Some procedures are common to all rescue devices, such as: let the device ground out before touching, maintain handhold on raft until device is secured, and the three main signals for pickup. Use one of these three to signal the helicopter: thumbs up, shake cable, or make a call on your survival radio as a last resort.

(1) Forest Penetrator – Mount the forest penetrator by preparing your LPUs (soften or separate), control the penetrator, place safety strap around body (9/P style must un-hook the quick ejector snap, then pass the webbing around their body and reattach the quick ejector snap back into the metal bar, ensuring that the lower bladders of the LPUs are tucked into the device), sit on one seat, hug the device, and signal the aircraft. As you are being lifted, drag your feet and legs to prevent oscillation. Remember not to cross your legs.



Penetrator: inflation collar

(2) Rescue Strop - The rescue strop is donned by preparing LPUs (soften or separate), grasp strop at free end, pass around body. Attach V-ring to hook (9/P style must ensure that lower portion of their bladders are tucked into the device), hold webbing with one hand, and signal for pickup. Once tension is felt cross arms in front, place head in center and allow legs to hang straight down to prevent oscillation.



(3) Navy Hook – The Navy hook is used by preparing LPUs (separate or soften), identify large hook and attach to D-ring on the chest strap of parachute harness with the hook facing the body, and signal the aircraft for pickup. Ensure that leg straps and chest strap are fastened.

(4) Coast Guard Basket – Mount the Coast Guard basket by climbing in, sit and center weight, place hands inside basket, and signal for pickup.

11. SURVIVAL LIVING.

Maintaining life, honor, and returning, regardless of the conditions, may make surviving difficult or unpleasant. The survivor may be constantly faced with hazardous and difficult situations. The cumulative effects of existing conditions cause the stresses, hardships, and hazards. On the open ocean the only materials a survivor may have to provide for needs are man-made materials contained in a survival kit.

a. Anti-Exposure Suits – Anti-exposure suits will increase life expectancy in cold water. The more insulation on the inside, the longer you can expect to survive. Depending on your mission, there are several types of anti-exposure suits a survivor could encounter. We will discuss the two most common.

(1) Quick Don – The Quick Don Anti-exposure suit is designed to be put on in 60 seconds or less. The suit is capable of doubling the life expectancy in various water temperatures. Accessories include a pair of mittens and an inflatable hood. To don this style, put your feet in first, next insert the right arm, the head, and finally the left arm. Once your body is in, don't forget to zip the suit down and make sure the zipper is seated.

(2) Constant Wear – The Constant Wear Anti-exposure suit is designed to be worn continuously during over-water flights, when the water is 60 degrees or below. Major commands may waiver this to 51 degrees. This suit is custom fit for each individual crewmember's physical make up. Usually Life Support personnel will assist in donning the Constant Wear Anti-exposure suit.

(3) Special Considerations – It is very important to care for these suits, since they provide your first line of personal protection. Things to consider: avoid tearing, keep the insides dry, and rinse off any caustic liquids as soon as possible. Maintaining suit integrity is critical, especially in colder environments.

b. One-Man Raft – The one-man raft has some unique features that the other rafts in the inventory do not.

(1) Shelter Features – The spray shield provides protection from the wind and waves, and has a Velcro closure with a hood. To inflate the spray shield, locate inflation valve over your right shoulder. It also has an inflatable floor that provides protection from the cold water. The floor inflation valve is located by your left hip.

(2) Other Features – The one-man raft accessories are attached by lanyard to the CO₂ bottle. The sea anchor is attached at the large end of the raft and ballast buckets to help stabilize the raft are located on the bottom. Inside are pockets and tie-down straps for stowing survival equipment for quick access. The main cell inflation valve is found opposite bottle side on top of the main cell.

c. 7-Man Raft.

(1) Shelter Features – To provide shelter from the wind and waves, in this raft, use the signal paulin for coverage and any useful material salvaged from aircraft (i.e., pallet covers, wall insulation, line, wire, extra clothing, etc.) Floor insulation can be provided by seat cushions, extra LPUs, or extra single place rafts from bail out kits.

(2) Other Features – Two heaving lines, with toss rings are located on the top of the main cell, one on each end. The raft has two separate cells, which are inflated by the CO₂ bottle and have separate inflation valves. It also has an inflatable seat, which must be manually inflated using the pump provided in the accessory kit, attached to the oarlock opposite the CO₂ bottle. Collapsible metal oars are provided in the accessory kit at no extra charge to the survivor. And finally to enter the raft, there is a boarding ladder and knotted rope.

d. 20-Man Raft – The 20-man raft is considered by some to be the Cadillac of rafts. It can never come to you wrong side up, because both sides are identical.

(1) Shelter Features – Protection from the wind and waves is provided by a canopy and poles, which can be found in the accessory kit. The canopy can be used for immediate protection without the poles. Avoid using the poles during rough seas and stormy weather; which could break and puncture the raft. Use the dark side out for colder weather or evasion and the pink side for protection from the sun and signaling.

(2) Other Features – The accessory kit is tied to the raft, between the round end of the CO₂ bottle and the boarding ramp. The upper boarding ramp can be used for an injured survivor. To prevent the entire raft from deflating, there is an equalizer tube and clamp located inside the raft near the bottle side, which when clamped will pneumatically isolate the two main cells. In the center of the raft, a floor support boot prevents everyone from being too closely acquainted during rough seas. A heaving line, with a toss ring, is located on the raft near the sea anchor. And remember, since the raft is a mirror image there is also another toss ring, line, and equalizer clamp located on the bottom side if extra materials are needed.

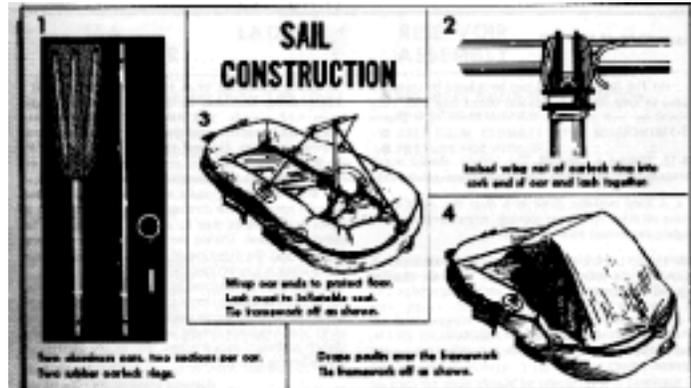
e. Travel – There are several reasons to travel.

(1) Noncombat – The common reasons to travel are to reach frequently traveled areas such as shipping lanes or to travel to land for obvious reasons.

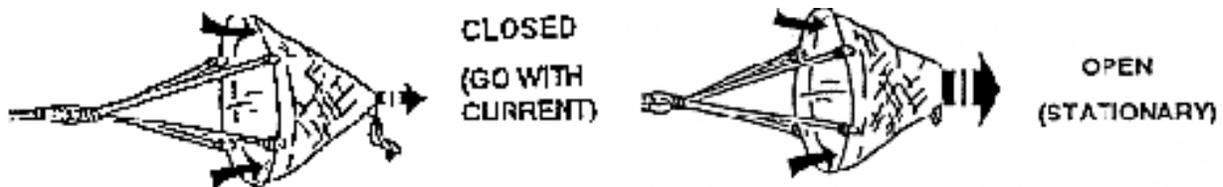
(2) Combat – As on land, you should travel to avoid the enemy by getting away from hot areas and traveling toward friendly areas.

(3) Travel Concepts – There are two basic concepts used for traveling.

(a) Wind – The general idea is to reduce drag in the water and create drag with the wind. To prepare the life raft for travel using the wind, fully inflate raft, pull sea anchor in, tie off ballast buckets, and erect a sail using the canopy in a 20-man, the signal paulin in a 7-man, or the spray shield in a one-man.



(b) Current – Using the current, means you must create as much drag in the water as possible and get a low profile to decrease wind drag. To prepare the life raft for travel with the current, partially deflate the raft, close the sea anchor, and open ballast buckets. Create as much drag as possible.



f. Landfall – In order to make landfall, we must first identify that we are approaching land. This may not be as easy as it sounds. At night, you must rely on senses other than sight.

(1) Indicators of Land.

(a) Fixed Cumulous Clouds.

(b) Color of Water – Deeper water is dark in color and shallow water is usually lighter in color.

(c) Odors – Common odors, such as smoke or smog for example.

(d) Sights – Lights, trees, or land itself are definite indicators.

(e) Birds – Birds usually fly away from land to feed in the morning and they return in the evenings.

(f) Debris – Increased debris in the water can indicate land nearby.

(2) Landfall Considerations – If possible, try to approach the lee side of land masses on a sloping shoreline. Avoid night landings, strong surf, reefs, and rocky cliff areas. Remember these are all considerations and may be violated in certain instances.

(3) Pre-Landing Preparation.

(a) Stay in the raft.

(b) Secure all gear so it doesn't get lost.

(c) Inflate LPUs for flotation.

(d) Have a plan of attack and a spot to meet on shore, in case the group gets separated.

(e) Ride the crest of the wave when possible.

(f) Fill the raft with water to make it more stable.

(g) Face the raft shoreward and stay in it until you reach land.

g. Care And Use – Maintaining good care and use of aircrew clothing is paramount on the open sea. Use these methods to protect clothing and boots:

(1) Clothing – Examine and repair when necessary, rinse with fresh water when feasible, and secure to the raft when not in use.

(2) Rafts and Flotation – Rinse off fuels or caustic liquids ASAP. Be cautious of sharp objects or equipment and lines that could rub holes. Never over inflate rafts in warm weather. As the air heats and expands it can cause seams to rupture. Also, keep the raft as dry as possible.

(3) Raft Repair Plugs – If the occasion arises to repair flotation, solar still and desalter kit tape may be used for small holes, however the repair plug will be needed for larger "accidents". To use the raft repair plug use the following steps.

(a) Place cord around wrist.

- (b) Dip plug in water.
 - (c) Insert rubberized side.
 - (d) Slide plate over bottom.
 - (e) Adjust plug to cover entire hole.
 - (f) Tighten wing nut.
 - (g) Test to ensure good seal(re-inflate). If it has no leaks, wrap the wire around the wing nut. Use two plugs if the hole is too large for one repair plug, but remember to use some tape to bridge the center of the hole.
- h. Accessory Kit Items – Procuring water will be of great importance on the open ocean. Accessory kits may provide you with many water procurement devices.

Immediate Water – For initial consumption you can find water in flex packs (4 oz.).

- (a) Water Procurement – Several options may be available depending on what your Life Support Unit provides. The options range from Desalter kits (eight bars = eight pints) to reverse osmosis pumps (Survivor 35 provides approx. 1 to 1½ gallons per hour, Survivor 06 approx. 1 to 1½ quarts per hour).
 - (b) Other Items – Other accessory kit components may include life protection items, such as canopy, poles, and issued food and water. Signaling items provided may be electronic devices such as radios, beacons, and a strobe light or pyrotechnic devices such as, marine smoke/illumination flares, and hand-launched flares. Keep these items protected from the saltwater and air by placing them in waterproof containers and securing when not in use.
- i. Improvising – If you fail to secure gear to raft or self, you may need to replace lost articles. During the course of your survival stay, you may identify a need for other items as well. If either of these situations occur you may need to improvise. Before improvising consider the five rules of improvising which can eliminate unneeded waste or unsafe items.
- (1) Determine need.
 - (2) Inventory all materials (man-made and natural).
 - (3) Consider all alternatives to meeting needs.
 - (4) Select best alternative, providing most efficient use of time, energy, and materials.
 - (5) Construct, but ensure the item is safe and durable to prevent injury or delays in future operations.

12. SIGNALING AND COMMUNICATION FOR RECOVERY.

Receipt of a distress call sets a highly trained and well-equipped organization into operation; however, prompt and safe recovery is by no means ensured. The success of the rescue effort depends on many factors. Most successful recoveries have resulted primarily because survivors were able to assist in their own recovery. Many rescue efforts have failed because survivors lacked the knowledge and ability necessary to assist. When needed, this knowledge and ability could have made the difference between life or death – freedom or captivity.

a. Common Characteristics of Transceivers and Beacons.

- (1) Limited Battery Life – Tested to a minimum of 6 hours.
- (2) Limited Range – A limited range of approximately 60 to 80 nautical miles.
- (3) Frequency – Operate on 243.0. The beacon will override the voice capabilities of the radio.
- (4) Cone of Silence – Each device has an area of reduced transmission both above and below the device. This "cone of silence" extends out the top and bottom of the radio at approximately 30 degrees (It extends out at approximately 45 degrees from the PRC 112).
- (5) Line of Sight.
 - (a) When communicating with these electronic devices, it is necessary to have a clear view or "line of sight" with the recovery force. Having a clear "line of sight" will ensure maximum transmission capability.
 - (b) During tactical situations you could use this to your advantage by reducing the probability of enemy intercept.

b. Beacons – Beacons begin to operate upon parachute deployment or man/seat separation. Beacons can be used in conjunction with the survival radio to conserve its battery life, but they will override voice communication if both activities are attempted simultaneously. The 33 C/M beacon we will use can be set in one of two modes (the mode switch is located on the bottom of the beacon)

- (1) Timed – If in the timed mode, the beacon will operate in 8-12 minute increments. On the bottom of the beacon is a selector switch, it can be set to timed or continuous modes. A jeweler's screwdriver or the tip of knife, are examples of devices used to switch modes. When the beacon is operating, a green Light Emitting Diode (LED) will be illuminated and if the timer has switched the device off the red LED reading OUT will be illuminated.

(2) Continuous – By using the continuous mode, the survivor can control the length of time the beacon transmits. The on/off switch is located at the top of the beacon.

(3) To Operate.

(a) Remove flexible antenna by pushing down then twisting counter clockwise.

(b) Extend the telescoping antenna by first unscrewing it and then pulling it out section by section to avoid breaking. To ensure the antenna is fully extended a black ring should be visible on the base of the extended antenna.

(c) Turn to "ON" position, then set to timed or continuous mode.

c. Transceivers – Depending on the mission, a survivor could see one of a couple different transceivers. The unit Life Support section should give spin-up training on the transceivers being used in your survival kits. For times sake, we will discuss the most commonly found transceiver in a survival kit, the PRC 90. Before you begin to operate your radio, ensure that beacon has been turned off.

(1) Fully Extend Antenna – Extend the antenna one section at a time to avoid breaking it.

(2) Turn On – Use the barrel knob on the side. When the arrow points to the 9 o'clock position, the transceiver is broadcasting 243.0 beacon, 6 o'clock position is voice 243.0, and 12 o'clock position is voice 282.8. (You must push in on arrow and rotate up to move to this position).

(3) Turn Volume Up – By T.O., the volume should be packed at the lowest audible tone position.

(4) Speaker and Microphone – If you hold the device like a telephone, the speaker will be at your ear and the microphone will be by your mouth.

(5) Spare Battery and Earphone – These are generally attached to the wrist lanyard.

d. SDU-5E Strobe Light – The strobe light is operated by turning the strobe on and selecting one of the two covers, the infrared cover and the direction fixing end. If used intermittently, the battery life is approximately eighteen hours, however if used continuously, only nine hours of approximate use is available. Should a survivor misplace or break the infrared (IR) cover, a suitable substitute could be a single layer of a Meal Ready to Eat (MRE) outer container. A single layer will be slightly more brilliant and two layers will be slightly less visible, but are much more acceptable than pure white light.

e. Care Of Electronic Devices.

(1) Keep Warm – Place them between layers of clothing, not directly on your skin.

(2) Keep Dry – Keep the devices out of the water as much as possible. Utilize waterproof containers as much as possible. Bags from the survival vest, which can be sealed, are one alternative.

(3) Use Battery Life Sparingly – Use the devices intermittently, as well as in conjunction with one another, to conserve battery life.

f. Issued Signals – Imagination is the only limitation to a survivor's arsenal of signals, but here are a few things that are designed to aid in recovery.

(1) Transceivers.

(2) Beacons.

(3) Strobe Lights.

(4) Signal Mirror.

(5) Sea Marker Dye.

(6) Whistle.

(7) Water Activated Lights.

(8) Raft and Canopy.

(9) Signal Paulin.

(10) Reflective Materials – Glasses, watches, dog tags, or solar blankets, along with many other things and can be used for signaling devices.

(11) Parachute – Use caution when you retrieve parachute from the water, as jellyfish tentacles could be entangled with the material.

g. Principles of Visual Signaling on Open Water - Incorporating principles with the use of your issued signals will help increase your chance of being seen.

(a) Size – The size of the signal should be as large as you can make it.

(b) Contrast – To be seen from the air, your signal should contrast with the surroundings.

(c) Movement – Movement will attract the eye more readily than a fixed signal. A scanner or other crew members cannot be looking exactly where you are, when they scan the waters, therefore your movement can help to catch their eye.

h. Making Radio Contact – Noncombat – To conserve battery life, use some type of communication plan incorporating the beacon, talk, and listen cycle.

(1) Beacon – Activate beacon for approximately 15 seconds (use Personal Locator Beacon (PLB) to conserve radio battery).

(2) Talk – Use voice by transmitting "Mayday, Mayday, Mayday", your call sign, last known location, and number of survivors.

(3) Listen – Listen for any type of return communication from rescue.

(4) Repeat – Repeat beacon, talk, and listen cycle for several minutes, listening for any response. If no contact is made, try again later.

i. Guiding Recovery to Survivor's Location – Many assets are in place to assist you in recovery, as was demonstrated during Desert Storm.

(1) COSPAS – Roughly translated Space Systems for the Search of Vessels in Distress (COSPAS) is a Russian asset dedicated to receiving distress beacons.

(2) SARSAT – Search And Rescue Satellite (SARSAT) is a National Oceanic and Atmospheric Administration weather satellite which, is also used to receive beacon distress signals. France, Canada, and America jointly own SARSAT.

(3) AMVER – Automated Mutual Assistance Vessel Rescue (AMVER) – Did you ever expect to be recovered by an oil tanker? Well, it is possible. If a vessel is part of the AMVER system and it is closer than any other asset, it can be diverted to your location as a recovery asset.

(4) ADF – Some aircraft will have Automatic Direction Finding (ADF) capability. If this is the case, you simply turn on beacon and let the ADF work for you, or press the push-to-talk button on the radio.

(5) Vectoring – You may have to vector an aircraft to your location.



(a) Initial Heading – Use the Lensatic compass by reading the red numbers (the ones from 0-360) closest to your body. Always use a three-digit number even if it is 0-0-5 or 3-3-0 to make it easier for the aircrew. If you have rescue visual, you may give left or right hand turns, but remember to tell them to "roll out" or "stop turn."

(b) Distance – When giving initial heading, also estimate the distance the aircraft has to travel to reach your location. If the aircraft is a fast mover, they may have to slow down to see you more clearly. No matter the airframe, it will give them an approximate area to scan.

- (c) Decreasing Range – Always try to let the crew know when they are approaching your position. If there has been a lull in the transmissions, let them know you are still alive and they are proceeding on course.
- (d) Mark the Aircraft – Mark their position, as the aircraft passes overhead, using clock positions and distance. A count down may be helpful if you DO NOT have a specific position marker, such as a signal mirror or smoke flare.
- j. Combat Considerations for Initial Contact – Vectoring procedures used when you are tactical are different than those used during peacetime.
- (1) Transmit Only as Pre-Briefed – Follow the pre-mission briefing or information contained in the CSAR SPINs.
- (2) Transmission – Keep transmissions as short as possible, preferably 3 to 5 seconds.
- (3) Authentication – Rescue will authenticate your identity using ISOPREP or SPIN information. Provide only necessary information and enemy activity in the area or information requested by rescue.

It is not easy to spot a survivor in a dark, one-man life raft in the middle of an ocean, especially when visibility is limited. Knowing how to operate the communications equipment (radio or beacon) and the emergency signaling equipment (pyrotechnics, mirror, and sea marker dye) will not only pinpoint your location but make you easier to spot during recovery. Knowing when to use them will prevent the enemy from finding you first. The role of survivors, in effecting their rescue, changes continuously as aircraft and rescue equipment become more sophisticated. The probability of a downed aircrew member applying long-term survival training concepts under noncombat conditions continues to decrease, while it increases under combat conditions.

- l. Sea Marker Dye – To prepare the sea marker dye, attach the pouch to the raft and pull tab to release. Dipping the dye in a "tea bag" motion will help to dispense the dye. Sea marker dye will produce the largest open water survival signal.
- (a) Duration – The green signal will last for approximately 20 - 30 minutes and can spread to 150 feet in diameter in calm seas. It will last approximately one hour. In rough seas, the dye will leave a long streak and can disperse as quickly as 20 minutes.
- (b) Range – Sea marker dye can be seen up to 10 miles at 22,000 feet AGL in calm weather. For aircraft operating closer to the ground, the signal has been seen for 5 miles at 1000 feet and 7 miles at 2000 feet.

l. Signal Mirror – Batteries are included! The signal mirror can be used in one of two methods.

(1) Primary – Instructions are on the back of your mirror. Flash your hand, then locate it through the sighting hole. Once you have found the reflection, you should see the aim indicator or "fireball". Wherever you aim the fireball is where the mirror flashes.



(2) Alternate – This method is performed by flashing the mirror onto the hand, move to horizon keeping the flash in the "V" of your fingers, and rotate to the rescue platform.

(3) Range – In optimum conditions, the mirror has 8 million candle power and can be seen at 50 miles, although it has been seen up to 100 miles at RED FLAG. During optimum conditions the moonlight can also be used.

m. Smoke and Illumination Flare.

(1) MK-13 – Before you can prepare this signal, you must first identify the day and night end.

(a) Night End – The night end is identified by the red cap, with 3 bumps and 9 bumps surrounding the rim of the canister. The flare also may have a washer attached to the lanyard and it will have printed on the side "for night use".

1 Range – Approximately 10 - 35 miles.

2 Burn Time – Approximately 18 seconds.

(b) Day End – The day end is identified by a smooth orange cap, smooth edge, no washer on the lanyard, and labeled "For Day Use".

1 Range – Approximately 12 miles.

2 Burn Time – Approximately 18 seconds.



(c) Prepping the Flare – Push down on the tab, then carefully roll the tab from side to side, keeping contact with the rim of the flare. Continue this until seal is broken completely around the rim of the flare.

(d) Firing – Hold the flare at a 45 degree angle from body, out and over the raft, clear of spilled fuels, on downwind side of raft, and pull tab straight out. (Take care not to look directly into the night end, as it can ruin your night vision and could hurt your eyes).

(2) MK-124.

(a) Night End – This is identified by ridges on flare, white firing pin, and marked "for night use".

1 Range – Approximately 10 - 35 miles.

2 Burn Time – Approximately 20 seconds.

(b) Day End – The day end is identified by smooth end, red firing pin, and marked "for day use".

1 Range – Approximately 12 miles.

2 Burn Time – Approximately 16 seconds.

(c) Prepping the Flare – Slide the firing pin out.

(d) Firing – Same as with the MK-13, only push down on the firing pin as opposed to pulling with the MK-13.

n. Personnel Distress Signal Kit – The gyro jet comes with a rocket launcher and a bandoleer of seven jets.

(1) Preparing – Remove the jet from bandoleer. Using your thumb and forefinger, twist it until it seats into the launcher.

(2) Firing – Simply aim the jet slightly into the wind, pull trigger fully downward, turn your head away, and allow your finger to slide off the trigger to ensure the trigger snaps upward. If jet does not launch, try to reseal it. If it does not fire, you may need to get another jet into the launcher and fire it before the rescue party is out of range.

(a) Range – Approximately 10 – 35 miles.

(b) Burn Time – They will launch 700 -1250 feet, with a 3 second delay and 9 second burn time.

13. SUGGESTED READING.

Commercial Publications

- (1) 117 Days Adrift, Maurice and Maralyn Bailey.
- (2) Adrift, Steven Callahan.
- (3) Albatross: The True Story of a Woman's Survival at Sea, Deborah Kiley and Meg Noonan.
- (4) Beyond Courage: Shipwrecked and Adrift, Robert Aros and rob Ternan.
- (5) Bombard Story, The, Alan Bombard.
- (6) Book of Sharks, The, Richard Ellis.
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- (8) Dangerous Marine Animals, Bruce W. Halstead.
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- (23) Sole Survivor (Poon Lim), Ruthanne Lum McCunn.
- (24) Sole Survivors of the Sea, James E. Wise.
- (25) Strange Last Voyage of Donald Crowhurst, The, Nicholas Tomlin.
- (26) Survival At Sea, C.H. Wright.
- (27) Survive the Savage Sea, Dougal Robertson.
- (28) Survivor, Michael Greenwald.
- (29) The Raft, Robert Trumbull

14. OPEN OCEAN PERSONAL SURVIVAL KIT ITEMS.

Suggested Items.

- (1) Raft Repair Kit (bicycle).
- (2) Fish kit (hooks/line).
- (3) Leatherman Tool.
- (4) First Aid Kit.
- (5) Sewing Kit.
- (6) Sharpening Stone.
- (7) ZipLoc Bags.
- (8) Garbage Bag.
- (9) Solar Blanket.
- (10) Sun Block.
- (11) Chapstick.
- (12) Cell Phone.
- (13) Hat.
- (14) Food (MRE/Power Bars).
- (15) Signal Mirror.

15. REFERENCES.

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DARRIN M. VALHA, Maj, USAF
Commander