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Introduction

In a kayak expedition, the risk of getting lost at sea is minimal. It is rare when we paddle farther than 20 nautical miles from shore.Storms blowing out to sea followed by strong offshore winds might happen but this isn’t something kayakers usually need to worry about. On the other hand sailors and people navigating on larger vessels (cruise ships or fishing boats) might find themselves in this situation one day. Although my focus with CASKE 2000 is on survival on land (islands and jungle environments). It is interesting to look at the experience of many castaways and adventurers and learn from their mistakes and discoveries. In a castaway situation, drowning is the main cause of death followed by hypothermia. People who survive the first few days will have to follow the same rules as for land survival. The priority should be to shelter themselves from the elements (exposure), find water, and then for longer period of time find food. Carrying signaling devices might also significantly increase the chance to be rescued.

The subject I find most interesting on the ocean is water. It is amazing to be on the largest mass of water on earth and have nothing to drink. At least this is what most castaways and sailors used to think until a French man, Dr. Bombard, revealed his findings. Man can drink sea water! It is believed that indigenous people were the pioneers in ocean navigation and survival at sea. They too might have drunk sea-water. Two famous expeditions tried to prove that the Incas and Huancavilcas could have migrated on balsa rafts from South America to the south Pacific islands. Their experience also forced them to drink sea-water over
extended period of time. The Kon-Tiki raft was an exact replica of the Incas crafts. Led by Thor Heyerdahl and his crew of four, the Kon-Tiki traveled 4,300 miles from Peru to Ranoia Reef (South Pacific) in 101 days. A later expedition called La Balsa, followed the route of the Kon-Tiki with a similar raft. In 1972, they left from Ecuador and covered 8,600 miles to reach Australia. If prepared, man can survive at sea, even in a castaway situation.

**What to do, when and how?**

Sailors, fishermen, and all people navigating the sea (or even flying over oceans) could one day find themselves in a castaway situation. The only kayaker I know personally who has experienced this situation is Ed Gillet, during his 1985 solo-unassisted crossing from California to Hawaii. For most other people, this situation will happen after abandoning a sinking ship or in rare instances a crashed airplane.

**Abandoning the ship**

Inflating rafts have proved to be much more efficient in survival situations than dinghies. The well-prepared sailors will have all they need to survive in their raft and signal their position. A list of recommended equipment is as follows.

- **Appropriate Clothing** (most important in cold water), flotation device, water (or reverse osmosis pump), first aid kit, signaling and communication device, and food (and/or fishing/hunting equipment), a knife, seasick pills, sun screen (or oil or grease). A sea anchor might also be useful during storms (and to catch plankton).

Many books describe lists of equipment to bring aboard. We will focus here on the survival situation which means surviving with the minimum.

During the ship wreck, if you have the choice to only grab a handful of things, my choice would be the following. Of course all this would depend on the wreckage location, temperature of water, climate and distance from land (supposing that those are known).

The two first threats for people abandoning a ship is drowning and hypothermia. Those are the two leading cause of death among all sailing accidents.

**Fire and Explosion**

In the rare event of a plane crash, (or if two large boats were to crash), there is a possibility for your craft to catch on fire and for the fuel to spread on the surface of the ocean. In this case you should quickly paddle or swim into the headwind (against the wind). If you are swimming, swim underwater. Try to surface where the fuel or fire is the thinnest. To surface and take your breath, extend one hand out first and sweep the surface (quickly not to get burnt) to clear an area from the burning fuel. Dive back as quickly as possible.

If there is a danger of underwater explosion grab on anything floating and pull yourself out of the water, if you can’t you might reduce the risk of injury by swimming on your back.

**Avoiding Drowning**

Inflatable rafts have proven to be the most seaworthy crafts to survive storms and heavy seas. Life jackets (PFD) are mandatory equipment on all vessels and represent the best personal flotation device. If you are not wearing one and can’t possibly grab one or a rescue buoy at the time your ship goes under, you should try to grab on anything else that might help you keep afloat. On a dive boat, a wetsuit would be a great piece of equipment to grab (including a diving BC, fins, masks and snorkels). On other boats, look for anything else that will support your weight and be easy to hold on to (plastic containers used for fuel or

[Survival at Sea](http://www.caske2000.org/survival/surivesea.htm)
food storage, pieces of the boat, etc).

The first objective is to swim (or paddle) as far as possible away from the ship before it goes under. Ships can suck people under as they sink. Once the ship has sunk, if you are able to swim or paddle back to the wreckage area, you might be able to find many useful things floating around.

**After the wreckage**

**Use Clothing:** A life jacket will save a lot of energy, but if you don’t have any and can’t hold on to any buoyant thing, you might be able to use some of your clothing to help you stay afloat with a minimum of energy. Air might naturally be caught in your shirt (you might even blow in it to add some). If you have pants on, tying knots on both legs will let you capture air inside and use it as a float. To do so hold the waistband open and swing it open in the air to fill it up and place the inflated pant-legs deep in the water holding on to the waist. The legs full of air will float you. It might take a few tries and you might have to repeat this technique every few minutes (as the air escapes through the fabric), but it might save you some energy. Note: It might be useful to keep on shoes (to avoid injuries later. But boots might fill up with water and add weight).

Save Your Energy: If you are in the water and have nothing to help you (equipment, clothing) keep afloat. It is important to save your energy. Unless you can swim to shore (within a reasonable distance and the current isn’t against you) you should avoid swimming and save your energy as much as possible. The density of the human body is much lower than the density of salt water (and for women density is lower than men). This means that it is easy to stay afloat. However, fear often causes people to drown as exhaustion and frenzied breathing leads to swallowing water. A few sips can cause you to drown. It is important to relax. The easiest way to save energy is to float on your back. You can become more buoyant by taking deep breaths. Some people might have difficulties with this technique (i.e. diving legs). If so, lay on your stomach with your face in the water and spread your arms apart. When you need to breathe, push your arms through the water and raise your head just long enough to breathe. This is the easiest way to float (all snorkelers have experienced it. Of course it is much easier with a mask and snorkel as you don’t need to raise your head to breathe). If the sea is too rough these two techniques might not work. Use the second technique (float on your stomach), but let your legs dive in. You will almost be in an upright position (more stable in the waves). Keeping your head underwater until you need to breathe will save you a lot of energy (you don’t need to fight to keep your head out of the water). Relaxing and controlling your breathing is the key.

Cramp: If you get a cramp (likely in cold water with added fear). Relax and use one of the techniques above. Try to press your cramped muscle using your thumb or the palm of your hand. If a second person can help, apply pressure first, then stretch the muscle. (Divers and snorkelers are used to cramps because of the extra stress caused by fins).

Note: Many people drown near the beach because of rip currents or high breaking surfs. Read the section Reaching Shore.

**Avoiding Hypothermia**

In cold water it is more important to grab clothing material to protect oneself from the elements than food. Kayakers are highly exposed to hypothermia as well. In the book “Deep Trouble” (recommended reading), Matt Broze describes many situation in which kayakers have lost their lives because of hypothermia. All people on the ocean should be appropriately dressed for the elements in which they navigate. The most experienced sailors sometimes forget the basic rules. In 1998, the world famous French sailor Eric Tabary died because he wasn’t wearing the proper clothing and floatation devices.

The best clothing to fight cold water are drysuits (if worn from the beginning) and neoprene wetsuits (even worn after entering the water). If you can get to a raft, all the warm clothing (wool and polypropylene) and windproof and waterproof clothing you can take with you is great. (dry bags work very well, in addition to keeping your spare clothing dry, they can be used as flotation devices. In tropical water, the wetsuit is my first choice because in addition to retaining your body heat in the water, it also increases your buoyancy enough to keep you afloat without any effort. In cold water, a wetsuit will protect you for a short period of time but it won’t be enough to preserve your body heat over a long period of time if you remain in the water.
For more information read the section on "Protecting yourself from the Elements – Hypothermia"

**Sharks, a threat or not?**

In history, sailors have always feared sharks. Are you really at risk of shark attack if your boat sinks? Studies have shown that very few species of sharks can be dangerous to human and very few accidents and fatalities are reported every year. Sharks aren’t the vicious, dangerous animals represented in movies such as Jaws. However Jack Cousteau said that the White Oceanic shark was the most dangerous to human and had caused the most fatalities. It is now believed that white oceanic sharks (the most common pelagic shark found far from shore) is very curious and attracted by unusual noises (such as a sinking ship). During world war II hundreds of marine sailors were killed by sharks after their ship sunk. But it is believed that in addition to all the noise (blasting and sinking) made by ships, helicopters flying low over the water to drop rafts to sailors were the main cause of shark attraction. So it seems like for the castaways, the highest risk of shark encounter happen when the ship sinks. The survival raft or dingy isn’t believed to attract sharks. To know more about sharks (dangerous species, feeding habits, attack patterns and real danger) I invite you to read our special page on sharks written by marine biologist Wade Smith.

**Leaving the wreckage site, or staying in place until rescued?**

Should you try to sail, paddle, swim toward a known coast, or should you stay put until the rescuers find you. This is often a difficult decision and it depends on the situation.

**What are your chances to be rescued?**

Were you able to send a distress signal? Did rescuers get it (did they answer you)? Where you able to send your exact location (did you know it at the time of wreckage)? Do you have any signaling and communication devices? (it is nearly impossible to find a raft in the ocean without knowing its location if no signaling (or communication) devices are onboard. Bad weather can also make searches impossible.

In open ocean if you were able to send a distress message from your boat and have low range communication and signaling equipment on your raft. Waiting for the rescue party might be the best solution.

If you don’t expect any rescue team to look for you and you can see the coast (especially if the wind or current push you in that direction), you might want to try to make a sail or paddle to reach it.

If you are in the water (swimming with a life jacket or holding onto a floating object). Unless you are sure that you can swim to shore (the current is not against you), it might be better to save your energy and stay in place. Each situation will call for a different action. It is important to think about everything before deciding to leave the wreckage site. For example, even if you had not sent any distress signals, it might be better to stay where you are if you were sailing in an area where other ships (shipping lane) or airplanes are likely to come to than to sail away to a very far island you might have seen on a map.

**Where to Go**

You decided to move, but you are in the middle of the ocean (no coastline on sight). Where should you go?

If you have a map. (or happen to know where you are and what is around you), deciding where to go is the biggest decision. It is possible to sail a raft, but it might be impossible to fight a current or wind to reach the closest island (even if it’s only 50 miles away), but castaways have been able to drift for thousand of miles and reach land. Sailing in the opposite direction of a known close-by island might be a difficult decision to make, but it might save your life. Choose your destination based on current and wind. Avoid small islands, your chance to reach them is nearly null. It is better to aim toward a more distant but larger land mass).
You survived the wreckage, you were able to stay afloat and stay warm to prevent hypothermia (or even better climb in your raft and stay dry). Now you have to be ready to survive at sea for an unknown period of time. Like on land, the basic survival rules apply. You must first protect yourself from the elements, then find water, and food. In addition preparing yourself to signal for help might increase your chances to be found by potential rescuers of passing ships and crafts.

Protecting yourself from the elements

After drowning, the highest danger comes from exposure (cold, wind, heat, sun, salt).

The resistance to the elements is also weakened by fear, stress, and the energy spent during the wreckage.

Hypothermia

Hypothermia is the main cause of death resulting from exposure to the elements. The body heat loss is 25 times greater in the water than in the air. Even in tropical water, a man immersed (without protection) for an extended period of time will die from hypothermia. (In the 80s a dive boat sunk in the warm water of the Sea of Cortez. The only people who survived were the ones who were able to grab their wetsuits. Survivors still suffered from hypothermia). In cold water, dying from hypothermia might be a matter of minutes.

In the heat of the moment

If you can, grab as much clothing as possible. Polypropylene will protect you even wet. Rain gear will protect you in the raft.

In the water

Try to get off the water as soon as possible. If you can’t, save your energy. Avoid all movements that will increase your blood circulation as it will also increase your body heat loss (it is wrong to believe that moving quickly in very cold water will help you to warm up. It only exhausts you). The original pain you feel in the extremities will quickly disappear, frostbite in the water doesn’t happen before hypothermia, so save your energy (On land in cold climates and mountains, frostbites can often happen before or even without hypothermia).

In a survival raft

Protect your self from the wind. Windchill can very quickly increase the risk of hypothermia. Use clothing, a sail or tarp made from any fabric available. Stay as dry as possible. Avoid drinking alcohol, coffee and smoking tobacco (those have a vasoconstrictor effect). Once on the raft, exercise might warm up cold extremities (and overall body). Covering yourself with grease or fat might help you preserve your body heat, especially if you need to dive back in the water. (people swimming across the Channel spray themselves with grease). For more information read our section on Land Survival.

Important note about rescuing people suffering from hypothermia

During rescue operations, people have lost their lives after surviving the initial hypothermia. It is essential to know (both for rescuers and victims) that the internal temperature can drop 4 to 5 degrees (Centigrade) at the time of rescue. This temperature drop might last 20 minutes.

When people suffer from hypothermia, the extremities are sacrificed to preserve the internal organs. The blood circulation then stops in the extremities where the blood becomes much colder. When rescued, the peripheral circulation (from the extremities) is re-activated. The previously stagnant cold blood goes back to the vital organs and provokes this last dramatic temperature drop which is often fatal. So it is essential to take this phenomena into account while warming up a victim of hypothermia.
Warming up technique

The best way to safely warm up victims is to immerse them in a hot bath (45-50 degrees) for a period of 10 minutes (the contact with warm water might be very painful to the extremities (if the victim is conscious), but it is very important to keep the victim submerged in the bath.

This technique was successfully used on victims who seemed to have died (very stiff body, and no apparent pulse).

If bath tubs aren't available, but hot water is. A shower (with enough water pressure) or hose spraying water at 60 degrees could be used instead.

If hot water isn't available in large quantity (if it needs to be boiled), hot pads can be made.

Hot pads aren't as efficient as hot baths but they represent the next best alternative.

Hot pads should be used as follows:

The most important pad (the first one) should be placed under the neck. If other pads are available, they should be placed under the armpits and between the legs (groin area).

Making Hot Pads

There are some special rubber containers made for this use. They were used in the past to warm up beds during winter nights in Europe. To make a pad, you can use any thin, flexible waterproof containers that will not melt (the MSR Dromadery water bags we use during our expedition would be great), skin gourds, inflatable life jackets, scuba diving BCs, drysuits, car tubes, or even condoms could be used to make those pads. Water can be heated (stove, fire, microwave, etc.) and placed in those pads.

If hot water isn't available, use chemical warming pads (sold in sports stores). To make hot pads without any hot water, you could heat rocks (fire) and wrap them in clothing. If on a sand beach and no rocks are available, you might need to make a fire in a pit (the size of the victim). When the fire is made place the victim next to it while preparing a second fire. As soon as the fire has produced some red coils, cover it with sand and place the victim in the hot pit. Make sure there is enough sand not to cause burns. Cover the victim with hot sand from the second pit and you can add red coals from the second fire on top of the sand. While the fire is still lit, you can wet some cloth and put them very close to the flames. They won’t catch on fire but will get hot quickly. You can use those as pads while waiting for your fire to produce red coals.

(Note that in hospitals, hypothermia patients are treated with combination of bath and IVs (intravenous fluids) to slowly warm up the full blood system).

Sun exposure

The main problem is dehydration which is reinforced by skin burns. On a raft freshwater is probably your most valuable thing. A way to reduce your necessary consumption is to reduce your body fluid loss. To do so you have to reduce exercise and sun exposure. Make a sun shade with any type of fabric available. Sails and tarps work best. If possible set them to shade the maximum surface on the raft while preserving the maximum airflow. When you get too hot, swimming (always tie yourself to the raft) or splashing your body will cool you off. Wearing wet clothing will also keep you cooler than bare skin (it will also protect you from burns).

Sunstroke

To avoid sunstroke cover your head and neck (with wet clothing) and minimize your movements during the day.

Skin

The salt water takes away the skin's natural moisture and sunburns accelerate dehydration. The skin can quickly dry and chap, crack and swell. Protect your skin with light clothing. Water might help you cool off,
but the constant rubbing with salt might irritate your skin even more (don’t apply anymore salt to broken skin areas). Also make sure you let your clothing dry before night. Even in the tropics, nights can be cold. If you don’t have any sun protective ointments, any type of grease or fat might also help protect your skin. (Fat can be found in sea birds and other various animals).

**Eyes**

On the ocean the sun is reflected by the sea and can cause partial or permanent blindness. Sunglasses (100% UV protection, polarized glasses are best) are a must for all watersport activities. If you don’t have any sunglasses, you should improvise some. Indigenous people from the Arctic circle used leather bands in which they cut two narrow slit for the eyes. Those narrow slits minimize the contact with sun rays. You could use any type of fabric to make such eye protection.

If your eyes are swollen or burning you can apply wet bandage with light pressure. It is better to use freshwater if you can spare it. Don’t apply the bandage for too long.

**Salt exposure**

Extended salt exposure will irritate the skin and might burn, produce rashes, sores and boils. If you can, rinse with fresh (rain) water, and keep the affected area dry. Avoid any additional contact with salt (seawater). In the case of infected pus filled sores, do not break it as they might spread infections.

**Long immersion**

Castaways who have parts of their bodies immersed for a long period of time might suffer from swelling and tenderness at the tip of their fingers and toe. It is painful and is best treated with sunscreen oil (coconut oil). Other types of rashes and boils might also result. The most affected areas are ones most frequently in contact with water: hands, elbows, buttocks. These can spread over other body parts. Healing takes a long time and requires a period of time without any additional salt exposure. Protect all affected areas from further contact with sea water.

**Water**

Prevent dehydration (body fluid loss due to perspiration) and motion sickness (also leading to dehydration. (sleep or rest as much as possible).

Protect yourself from the sun (see section on “Exposure – Sun”)

Protect yourself against motion sickness. (use pills before getting sick; try applying pressure on your wrist (accu-pressure point); look at the horizon; often change your head’s position; avoid eating when you are sick or susceptible to be). In the first storm on a raft, even experienced sailors get motion sickness. There isn’t much to do to avoid it, but it usually goes away after 3 days (or earlier if the sea conditions improve). The danger is vomiting leading to dehydration and exhaustion.

**H20 Consumption: Healthy VS. Necessary to survive**

The minimum amount of water considered necessary to stay in good shape is 1.3/4 pts (1 litre) per day. It is possible to survive with 2 to 5 oz (55 to 220 centiliters) per day.

When you will be surviving at sea for an unknown duration of time, it is necessary to ration the water to the minimum needed to survive.

On the first day, your body still contains much water, so you don’t need to drink. It is recommended to decrease your water ration progressively. The first 2 to 4 days you should drink 14oz (400cc). After you should reduce to 2 to 8 oz daily. This will of course vary with the conditions. (no protection from the sun in a tropical area will require more water than in the shade in temperate climate.

During such rationing, symptoms such as discomfort, absence of saliva, cracking of lips and weakness are normal. If delirium starts, the victim needs more water. (This rationing might not be healthy for a period of over a week, but unless you find alternative source of water you might have to follow it to survive).
Make good use of your fresh water

When drinking moisten the lips tongue and throat (gurgle lightly) before swallowing.

Use Lightly salted water (first rain) to wash wounds, and rinse face

Food and Water Needs

Digestion requires a lot of water. So if you are low in water and rationing yourself (adrift in an area without much rain), you should avoid eating. It is possible to survive much longer without food than without water.

Proteins requires much more water than carbohydrates. So if you need to eat, you should first eat your carbohydrate food (sugar and starches). The main food you will gather from the ocean (fish, sea turtles and seaweed) are rich in proteins and should be avoided if you don’t have enough water. Do not eat any dehydrated (dried) food if short on water (all dried food also requires much water to be digested). Over a long period, you should eat so as not to suffer from additional weakness and health problems due to starvation. Fish and other marine animals contain a little amount of water, but only when they are eaten immediately (fresh and preferably raw – (sashimi)).

Reverse osmosis hand pump

Some of these water desalination pumps are manually operated and can allow you to filter from 1 to 3.5 liters per hour. They are one of the most valuable pieces of equipment you could possibly store in a survival raft. We used one in our Baja leg and in spite of the time it takes to pump, we were happy to use it for island hopping in the sea of Cortez (see photo).

Drinking sea water

Everybody who has accidentally swallowed a bit of sea water knows that drinking a glass of it isn’t possible. Drinking sea water is dangerous and will result kidney failure. This is what everybody thought until Dr. Bombard proved that people could survive on sea water (we are talking about staying alive, not healthy). Many experts still disagree with Bombard’s theory, but the fact that he has survived 63 days on drifting raft without any other food and water than what the ocean could provide him gives a lot of credit to his research on sea survival. Bombard doesn’t disregard the danger of drinking sea water. During his testing periods he got sick when he tried to drink more than 32oz of sea water per day for more than five days. After numerous tests and various castaway experimentation (drifting at sea for weeks), he came to the conclusion that people could safely drink sea water in quantities not exceeding 32oz per day. Safely here doesn’t imply healthy, it is rather the maximum amount of sea water a man could drink without experiencing major health complication or life threatening conditions. Of course all his tests were limited on himself (although many other people like the crew of La Balsa expedition and the Incas themselves were known to regularly drink sea water). If you must drink sea water, follow Dr. Bombard’s advice.

DRINK MAXIMUM 32oz PER DAY and start as soon as possible (don’t wait to be dehydrated). Of course adding fresh water would improve your physical condition.

Collecting rain water

Depending on your location, it might rain daily or very sporadically. In the tropics, one short rain storm could dump much water. Often the unprepared castaways have not been able to take advantage of those strong sporadic rain storms (if it rains daily you don’t need to be too concerned). Many have died of dehydration in areas of heavy rains. Don’t wait for the rain to be prepared.

How to collect rain water

Over time much salt will crystallize over all the fabrics you could use to collect rain (especially sails and plastic tarps). When you expect rain make sure you wash your fabrics in the sea. (although the sea is salty, it will remove all the layers of salt crystals. The little salt left from rinsing in the sea will be minimal (otherwise, the rain water you will collect will be very salty). You should also keep all your equipment to
catch rainwater set up at night when you sleep (by the time you wake up and are ready to set up in the dark, you might have lost a chance to collect most of the water).

**What to use, how?**

Any large surface of fabrics such as canvas or plastic are great to catch rain water. If you have sails, make a giant bowl with them (make sure you rinse them before). In heavy sea make sure you protect your water collection plant from the waves. You don’t want the ocean to spoil your precious drinking water. If you don’t have any sails or not enough tarps, use anything from rain jackets and pants to garbage bags, wetsuits, life jackets, etc. Cans and bottles make great containers to store water but are not very efficient to collect it. You might also collect water from the gutters of your dinghy. Pockets of rain water might also form in various places (which you can lap if difficult to transfer into a receptacle).

**How to store rain water**

Drink all you need from the rain, but if you have been on a rationed diet, drink very slowly as to not vomit (a normal reaction after forced drinking following dehydration).

Store as much rain water as possible. The first water collected might still contain a bit of salt (save it separately. You can use it to wash wounds and moisten lips and eyes. When you run out of containers, think of anything that can be made into a container (plan this beforehand). To not mention the obvious, fill up your diving BC, and everything that is inflatable. If you are on a raft. You can partially fill up the tubes of your raft. It won’t sink (rafts are extremely buoyant) but it will even stabilize it more in heavy seas (you can then pipe the water out when needed (for example with a snorkel or diving hose)). Even condoms (never leave home without them!) can be thoroughly rinsed and after fully inflated, they can contain and preserve much water.

**Using saline and foul water**

When the water is first collected it might contain too much salt to be drinkable, but it could still be used to clean wounds, humidify lips and rinse the skin (especially where rashes, dryness and soreness have developed).

Foul water collected on a raft is usually safe to drink but because of the taste it might cause vomiting. To avoid vomiting is can be absorbed rectally by means of a water retention enema!

Another beneficial use of water enema: After a long period of dehydration (and diet) the stomach shrinks and can’t hold much water. During a strong rain storm, if you don’t have much container to store water, you want to fill yourself up. You can absorb up to one pint rectally.

In case of severe dehydration the body will more quickly be hydrated with an enema. It is a method that has saved knowledgeable survivors. But careful not to use salt water (sea water is as dangerous absorbed rectally as it is orally).

**Finding fresh water in the ocean**

**Ice**

In polar regions, ice is easily collected from icebergs. The surface of the ocean might also freeze and provide ice. If the ice is old enough (a year old. It is usually blue-gray like on glaciers), it will have lost its salt concentration. You can melt it to drink, or just suck it. Be sure to taste it first to make sure it isn’t salty.

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You might also be able to collect ice on the surface of various equipment. It is frozen air humidity and can be used.

When very cold, you might also be able to freeze sea water in containers. The salt will freeze last and
concentrate in the middle. You can then break the side and separate it from the center to get low saline water.

Fish

In the tropics dehydration can happen quickly. During the dry season, rains might be very sporadic (but strong so be ready!). The tropical waters are usually rich in marine life which can be used not only as a source of food but water as well.

Fish (and other marine animals) contain liquid in their flesh, but remember that if you are very low in water, digesting proteins will require more than you might be able to spare (it means eating flesh or drinking blood).

Fish can also provide a source of water. You can drink the aqueous liquid found in the eyes and spine bones. Those are almost free of salt and a good source of drinking water (especially if you catch large fish or in large quantities).

To extract the liquid, cut the freshly caught fish in half. Break the vertebrae apart and suck them (no water in shark spines). Also suck the eyes.

You can also suck on barnacles and similar shellfish which are often found on hulls, ropes (or even whales). Taste first to make sure it isn’t too salty. If it taste too bitter you might want to discard it as well.

The Incas were believed to chew on fish to obtain water. Later, members of La Balsa expedition also survived by twisting pieces of fish in clothing to extract the moisture (after removing all the blood). They also suck on the waters from the eyes and bones. Dr. Bombard even made a machine to press fish and extract the precious fluid they contain.

Solar Stills and Condensation

Modern equipment has come a long way and some new survival raft come equipped with solar stills and chemical desalination tablets. If so, the solar stills should be set up as soon as possible (don’t wait to be low in water, it is slow process).

To make your own solar still, read our Survival Page on beach surviving.

Condensation

In some dry places (little to no rain), nights might bring much condensation (a good example is Baja in Mexico). You can collect the drops of condensation with a canvas or plastic tarp (or sail) set as a bowl (to cover the maximum surface area, make sure the water collected gets funneled the proper way to be stored. (don’t forget to rinse the fabrics. See collecting rain water).

Food

Saving energy

The more active you are the more energy you use, the more food (and water) you need. Relax as much as possible and try to lay down to save as much energy as possible.

Food and Water. Should you really eat?

Before eating any food, be aware that digestion (especially of proteins and dried food) requires much water. If you are very short on water don’t eat. If you have food but no water, wait until you can collect enough water (rain or other means) to eat. You can survive much longer without food than without water. If you really need to eat (after a long period, don’t let yourself starve), you should choose the carbohydrates first (sugar and starches often contained in survival rations). Proteins (fish, turtles, birds and algae) although probably your main source of food, should be eaten last is you are low on fresh water.

Does the sea contain enough food to remain healthy?
Sailors in the past believed that the sea could not provide them enough vitamins. To avoid suffering from scurvy, they stored fruits and vegetables. Onions have always been a favorite among sailors. They contain the more vitamins than any other vegetables and if kept in a dry area, they can be kept for a long period of time.

Dr. Bombard proved his theory. The sea can provide enough food (including the right vitamins) to men for a long period of time. Fish flesh contains proteins and vitamin A (and D). Often livers from fish also contain other vitamins like B1 and B2 (be careful that some fish contains poison in their liver, others contain a very high concentration of vitamin A which can also be toxic). Vitamin C and sugar can be found in plankton.

Surviving castaways have often use much ingenuity to catch food. Most of what you find around you can be converted and use to catch, attract or find food.

**Fish**

Fish are plentiful in most oceans and they might be the easiest to catch if you have a minimum of material to make some basic equipment. Don’t worry about eating raw fish. In many countries raw fish is considered a delicacy. The most famous are Japan (sushi and sashimi) and Latin American countries (ceviche). (Note: cooking will kill potential parasites, but healthy fish are safe to be eaten raw).

**Fishing lines, nets, spears, etc.**

There are many known fishing methods used all around the world. Lines can be made from any types of ropes or strings (found from various clothing, fabrics, and other equipment), hooks can be made from metal, plastic, bones, etc.

**Fishing at night**

Often night time provides the best fishing. This is why many fishermen work at night. Spearfishing (freediving) at night is also much easier than during day time. Many fish are attracted by light. Use any possible source of light (electrical or fire) to attract fish. If not available you might even be able to reflect the light from the moon (full moon) to attract your preys.

Some fish (especially small sharks because their skin is rough) can even be caught by hand once attracted close to your raft (bait or light). For more information on fishing techniques, read our website on Survival

**Flying fish**

Sailors are familiar with those, they often find them lying on the deck of their boat in the morning.

Flying fish are found in schools. If you cross their path, you might be able to catch many at once. They are attracted by bright light. Use anything to that order (see fishing at night). Use white canvas or tarp (even during the day). The fish will fly over your raft and hit the tarp you set. They will fall stoned in your raft.

**A note about poisonous fish**

The castaways are usually far enough from shore that they don’t need to worry much about poisonous fish. Most fish found in open ocean are edible. Poisonous fish are usually found in coastal areas, particularly reefs. Even some poisonous fish might be edible if you carefully discard the liver and other internal organs in which the poison or toxins are usually contained. (often the flesh contains no or much less toxins). When in doubt only eat fish you know. If you can’t be selective, only eat flesh that has not been in contact with organs. Eat only a small quantity first, wait a few hours checking for symptoms before eating more. For more information read our homepage on “Dangerous Sea Life”.

Organs you don’t eat can be used. Some contain oil you can squeeze and rub on dry skin. Most can be use to bait other fish.

Note: cooking will not decrease the amount of poison or toxins in the fish.
Note: don’t forget that fish in the tropics can spoil very quickly (unless dried properly), discard any fish with you might believe unsafe. You don’t want to risk fish poisoning or even vomiting (loss of energy and water).

**Drying fish (or meat)**

If you catch more fish than you can eat (or than you should eat if you’re short on water), you should start drying it right away. In the tropics, fish can spoil very quickly.

Fish fillets are usually dried by being hanged in the sun. A quicker process (but which might not retain as much water) is to cut very thin slices of fish and spread them on any dry fabrics (canvas and plastics) exposed to the sun. (Meat (turtle) can be dried in the same way, but meat with high content of fat might spoil before being dried). Remember that dried food will require more water to digest.

**Birds**

Castaways rarely think about eating birds, but all sea birds are edible (some might be very chewy though). Their meat can be eaten cooked, raw, or dried.

Birds might land on your raft to rest or circle you hoping for food. They can be caught by hand, knocked with an oar, speared, caught with a net, snared, or even hook like a fish (using various baits or lure in the water or thrown in the air).

If you can’t cook the bird, skin it and eat it raw. In cold weather you can use the feather to make some insulation under your cloth (down sleeping bags!). Feathers could even be used as fishing bait. You can use the fat to lubricate the skin. In the arctic regions, people chew on fat (seals and sea lions). In very cold situation you might want to chew on the fat of birds (and sea turtles). Bones contain marrow. If you can’t chew on the bone, break it and extract the marrow with something long and thin. The best way to kill a bird by hand is to hold both wings in one hand (from the origin of insertion) and with the other hand grab the neck and quickly pull it down (and up if it doesn’t work on first try). The neck will break.

**Sea Turtles**

Sea turtle meat is very nutritious and still many indigenous people feed on them in Central America. Their eggs are also very good (found buried on the beach, or inside female turtles).

When killed the turtle should be bled as soon as possible to preserve its meat. (Not bled, the meat will spoil faster and won’t be as easy to dry). With the exception of the heart, organs might be best discarded. To remove the meat from the turtle, you will need a knife (improvised with metal or plastic if necessary (Tin cans make good blades). Start by cutting the head off to bleed the turtle. Then insert your blade in the crack between the top and lower shell from the head. Move your blade in a sawing motion to cut all around. If you can’t open the shell, cut all legs and dig your hands inside to grab the meat. Don’t forget the eggs if it’s a female. Don’t forget that the bones contain marrow. In cold climate the fat can also be chewed on. Otherwise it can be use for skin lubrication (or to bait fish or birds).

**Plankton**

Plankton is very nutritious and is a also essential to prevent scurvy for long time castaways. It isn’t found in every waters, but as whales (whale sharks and manta rays) feed on large quantities of plankton, all areas hosting those marine animals will be rich in plankton. Plankton will often be found on the surface at night (during the day it might only be found deeper). Any type of net with very small holes dragged behind a raft will work well. Mosquito nets, cotton fabrics from a tent will also work great. Any type of clothing trailed in the water will also work. Sea anchors are ready made natural plankton nets.

Don’t let the smell throw you off, plankton doesn’t smell good but it doesn’t taste bad.

**Seaweed**

Seaweed (or algae) of various types are found on most oceans. They are used in many Japanese dishes. In
addition to being very tasty, they are rich in proteins, carbohydrates, vitamins and minerals. Most seaweeds are edible, however some green or blue algae found in freshwater pools can be highly poisonous. Most type of seaweeds are found in coastal areas either drifting or still attached to rocks. (Don’t collect dried seaweed washed out on beaches). A few types of seaweed can also be found far offshore. In the Sargasso sea and North Atlantic, the sargassum species are commonly found floating on the surface. You can drag a net (see plankton) or any type of homemade hook or rake to collect seaweed. There are many types of seaweed, but the ones usually found offshore are tough and might be hard to eat raw. You can dry them in the sun (or with fire), then chew on them (if you have a lot of rainwater, you might want to rinse them too). Some thick seaweed will require boiling to remove some natural glue (used a lot in the paper industry).

Don’t forget that seaweed requires a lot of fresh water to be digested. Do not eat seaweed unless you have sufficient drinking water. For more information about seaweed, see our Survival Homepage.

Sea Cucumbers

They might be the least appealing form of food found in the ocean, but they are edible and even prized by Chinese and Japanese. They cover the bottom of most sandy oceans and are the easiest animals to catch in shallow water. Some species secrete a mucous from their skins that can be irritating (especially avoid contact with sensitive skin areas and eyes). They must be well gutted and cleaned (the skin must be cleaned numerous times to remove the sticky mucous) before being eaten. Depending on where they are prepared, they can be smoked, cooked, or marinated raw. For more information about sea cucumbers see our Survival Homepage.

Signaling devices

The most useful is an EPIRB. The smallest and easiest to carry are a signaling mirror and a whistle. Those three represent my first choice because of their efficiency (whistles and mirrors are so small you can always keep them attached to your life jacket and they nearly never fail even over a long period of time). The EPIRB is an emitter that emits international distress signals messages and indicates your position. Other useful signaling devices are flares, water dye, strobe lights, red and reflective fabrics, VHF radios (and GPS to give an exact position to rescuers), etc.

All signaling devices are important, but the best equipped people aren’t always the better prepared. In a survival situation it is essential to think and act according to the situation. Dr. Bombard proved that castaways could survive 63 days drifting at sea with nothing. When asked, Vital Arsal, the captain of La Balsa said that survival depends on the total cooperation of all men. If Ed Gillet had lost faith and stopped paddling when he ran out of food after 60 days in a kayak, he would have never reached Hawaii. Survival is about fighting and believing in life.

Reaching shore

Some castaways are found at sea, others reach nearby or distant coasts. If you are in a situation where you intentionally or accidentally reach a coastline, you might need to be careful with your landing. All sailors know that the greatest danger isn’t on open ocean, but near rocky or coral-lined shores. (you might find many stories of bad kayak landings in our journals. The book "we survived yesterday" is also full of tales of dangerous landings). If possible avoid shores with high cliffs. Lookout for breaking surf and coral reefs. Choose sandy beaches over rocks and coral. If you are on the windward side of the island, try to paddle around it (to the leeward side) to find a more protected place (or look for a small bay that will shelter you from waves). A flat sloping beach might be a better choice than a steep beach (on which big surf could break violently). If you can wait, don’t land at night. If you can’t choose your landing and will arrive in a coral or rocky area, wear protecting clothing if available (shoes, life jacket, wetsuit, etc). Waves arrive in sets (often of 7), make sure you time your landing to deal with the smallest waves. If pushed toward rocks, swim feet first. If high swell threatens to break on you, don’t surf it, dive into it (going in the opposite direction) and once it passes over you resume swimming toward the beach. If you are in a raft or canoe, the main surf landing technique would be very similar to kayaking. Paddle hard toward the beach between the waves and back paddle as hard as you can when the next breaking wave is catching you (avoid surfing, you might capsize). If you have a sea anchor, let it drag behind you. It will keep your craft oriented in the waves and will prevent you from surfing (and maybe capsizing). Don’t jump in the water, stay in your raft (or dinghy) until you touch the beach. If you seem to be drifting away from shore, you most likely are in a rip current (or possibly in an outflowing river estuary). Don’t fight it. Those are usually not very wide, paddle
or swim parallel to shore until you come out of the rip current.

Once on the beach if no human signs are evident, you are now in a coastal survival situation (much more favorable than a sea survival situation). Note: It is easier to look for landmarks when you are still on the water than after you've landed on the beach. Please refer to our Survival Home Page for information on coastal survival.

**Note:** If you are wearing a life jacket, it might be easier to swim on your back. It is easier to cover distance with a partially deflated jacket.

### Indications to the proximity of land

- Drifting vegetation or wood might indicate proximity of land.
- Birds often fly to sea in the morning and return toward the land at night (some birds can fly far out to sea).
- Birds usually indicates proximity of land.
- Wind generally blows toward land during the day and toward sea at night.
- Shallow water is clear (in tropics). It might indicate proximity of land.
- Silt or murky water probably comes from a river and indicates proximity of land (the amazon produces murky ocean for hundreds of miles).
- In the tropics coral reefs or lagoons often reflect themselves in the clouds (greenish color).
- Cumulus clouds are usually formed over land.
- Clouds often gather themselves over corals islands and reefs.
- A change of pattern in the swell might indicate a change of tide around an island.

If the swell is decreasing but the wind remains constant, it indicates an island windward (which is protecting the sea).

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Read our page on [Dangerous Sea Life](http://www.caske2000.org/survival/surivesea.htm)

Return to: [SURVIVAL](http://www.caske2000.org/survival/surivesea.htm)