

HYDRATION, By Barbara Brown, CVHC Hike Leader

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How Much Water Is Enough?

How much water is enough for your upcoming desert hike? “It depends.” and “Take enough.” are better answers than they seem, but leave you scratching your head. Here are several more specific recommendations:

..2 gallons for an all day hike in the desert

..½ liter (L) per hour (3.5 L or almost a gallon for 7 hours)

..4-6 oz for every 30 minutes you are out (very roughly 2 L or ½ gallon for 7 hours)

These numbers add specificity but not necessarily clarity. That’s where the “It depends.” enters in.

Variables Affecting Hydration Needs

Factor-in these variables when deciding how much water to carry:

..temperature

..humidity

..cloud cover

..shade opportunities

..wind

..time of day

..elevation gain

..fitness level

..usual perspiration rate

..current or recent illness

..heat acclimation

..speed relative to your usual pace

..effectiveness of your clothing and layers for cooling

..availability of additional water

The suddenly warmer temperatures and much lower humidity upon arriving in the desert from a cold climate will often result in a hiker underestimating their fluid needs. And matching someone else’s pace that is slightly faster than your usual pace will also spike your fluid needs, especially in the warmer temperatures.

For some, their hydration needs actually decrease as their fitness level increases because their body becomes more efficient. The same is usually true for food: the more efficient you are in how you move, the less increase in caloric intake you will experience with exercise.

Everyone is different. On an all day hike with very fit, over 65 year old hikers, one legendary Club member routinely carries no more than a half liter of water. Another capable hiker will bring 1.5 L and yet another wouldn’t consider going out the door for an all day hike with less than 3 L. The fourth hiker considers 2 gallons, about 8 L, the proper amount. Typically, none of these hikers run out of water. They are all carrying the correct amount of water—for them.

The Analytical Approach to Answering the “How Much” Question

Each of the above mentioned hikers is confident in their fluid requirements because of their many years of experience with both day hiking and backpacking. You too can become skilled in predicting your water needs, particularly when hiking in the desert, by studying your consumption. You can accelerate your learning curve and hit the sweet spot in days or weeks by tracking your intake.

Begin by measuring your daily water consumption and keeping a log for a week. Put all of the water you consume in a water bottle or pitcher before pouring it into a glass and tally your consumption at the end of each day. Exclude alcoholic beverages or those with caffeine because of their diuretic effect—they actually have a negative effect on your hydration. The water content of your food may be significant, but simplify the process by only tracking your drinking water. Note both the day to day variability in volume and the average amount that you drink. That average amount is your base amount of water for hiking.

If you usually drink 2 L per day, that will be a good starting amount to take on your next half day hike when you are exerting more heavily than on most days. If it's going to be warmer than usual, add another half liter to your pack. Factor in the variables, adding significantly more water if it is suddenly gotten warmer.

Keep a log of the miles you hiked, the temperature, and how much water you drank. If you run out or are close to running out of water, keep adding to your base amount so you always finish with extra water. It won't be long until you are confident about the amount of water to carry on both half day and all day hikes in a range of conditions.

Carrying Your Water

The easiest answer to the question as to whether it's best to carry your water in a bottle or in a water bladder with a drink tube is to do both. Drink tubes are wonderful for drinking the moment you sense thirst and allow you to drink and maintain your pace when hiking with a group. But some people won't drink enough from a tube, and that's when a bottle comes in handy. When you stop, pull out your bottle and chug your water to catch-up if your intake is lagging behind your thirst.

Some bite valves on water tubes are overly stiff, making it hard to draw enough water without making your jaw sore. Experiment with different brands: the valves sold by Hydrapak tend to draw well. Keep your water bladder and its tubing hygienic by promptly rinsing and draining them after each use and then blowing air through them with an aquarium pump until they are dry.

Pre- & Post-Event Hydration

Make a habit of keeping a high level of hydration every day. Drink at least a cup of water upon arising in the morning before that cup of coffee-coffee that increases your fluid needs. At an absolute minimum, match each cup of coffee with a cup of water before heading out. Start drinking right away so you'll have time to correct your overnight dehydration and to urinate the excess. Strive for drinking a liter of water before beginning a hike, taking your last sips while getting out of your car.

Hydrate at the end of the hike, exceeding the quantities of alcoholic beverages consumed with that of water. Being well hydrated at the end of the day will get the next day off to a better start. A little lemon juice may make the water more palatable and increase your consumption.

How Are You Doing?

Monitor your thirst and urination after your hike, during the evening, and the next morning. If you notice that you are quite thirsty at anytime on your hike day or the next morning upon arising, you likely

didn't drink enough during the hike. Likewise, if your urinary frequency or volume drops, you need to drink more as soon as you notice that decrease and on the next hike.

If you observe that you are drinking and it seems to just go through you too fast, your salt intake could be too low for the volume of water you are consuming. It is possible to have 'water intoxication' or to be over-hydrated, which can be fatal. One way of assessing if you are over-hydrated is to check your weight before and after you hike: if your weight goes up, you may have too much water on board relative to your salt intake.

Electrolytes

A Word of Caution

Sodium and potassium are the 2 most important electrolytes for healthy people to attend to when exerting, especially in the heat. It is easy to add either or both to your diet or water to meet your increased needs. BUT, like with water, both too little and too much sodium or potassium can be dangerous.

Discuss your plans for increasing your electrolyte intake with your health care provider in advance of doing so, especially if you have heart issues, take medication for high blood pressure (hypertension), have kidney issues, or are on a salt restricted diet.

Sodium

Like with your hydration, maintain your electrolytes even on rest days. Generally, your body functions best when you keep the levels of most things steady rather than letting them get depleted and then replacing what was lost. Don't rely on salty snacks, like chips and nuts, at the end of a hike to meet your needs because it's too late and often too little to be of the most benefit. Some studies show that the risk of dying is greater from too little sodium (salt) than too much sodium, but that is controversial.

Be clear about the difference between salt and sodium. When speaking of salt relative to electrolytes, people are referring to sodium chloride (NaCl) or table salt. Salt is about 40% sodium and 60% chloride. Keep track of which one your doctor or a package label is referencing—salt or sodium—to avoid making mistakes.

Sodium is the only electrolyte that is critical to manage from one hour to the next. Potassium, especially in relationship with sodium, is important too but your levels of it don't change as quickly as your sodium levels. The other minerals in electrolyte drinks matter, but over a longer period of time, than does sodium.

Early symptoms of having too little sodium on board can include:

- ..excessive urination
- ..dizziness
- ..unexpected weariness or fatigue
- ..headache
- ..jitteriness, even at night

More severe symptoms of low sodium that indicate a medical emergency include: nausea, vomiting, confusion, and seizures.

A Sodium "Rescue" Drink

Add a few teaspoons of table salt to your emergency kit so you can use this easy way to simultaneously diagnose and treat yourself or someone else who is too low in sodium when on the trail. Start with 2 bottles of water, one being less than completely full. To that bottle, begin adding table salt, perhaps a quarter of a teaspoon at a time. Add the salt, shake the bottle well to dissolve the salt, then take a swig.

If you are short on sodium, the salted water will taste especially good. If you sense that more salt would be even better, add more salt, shake, and sample. Keep adding table salt until you want to spit the water out because it is too salty. At this point, add a bit of water from your other bottle to dilute it until it is again palatable. Drink liberally from this bottle of salted water until you feel satisfied and refreshed. You will likely need to continue drinking salted water for the remainder of the day to correct your deficit.

Avoid using a product with sugar in it when restoring your sodium level because the sweetness will skew your sense of palatability. Initially, you want to determine how much sodium is required to remedy your deficit based on the taste. Once you are back on track with your sodium intake, you can use sugar as well.

Using sugary hydration fluids is thought to help with the absorption of electrolytes but you'll need to balance that potential benefit against the down-sides of bathing your teeth and mouth with sugar, the excess calories, and the health risks with added sugar in your diet. Some desert athletes excel without ever using sugar when hydrating.

Chunky rock salt crystals are a quick and easy way to test if you are getting low on sodium—just pop a few in our mouth. If the salt tastes unusually good, your sodium level is likely getting too low. The same is true with salty snacks: if even the thought of them sounds particularly good or a bite is especially tasty, you are likely running low on salt. And do notice if those salted nuts in your bag taste like you bought unsalted, it's probably time to hit the salt more aggressively. Rock salt crystals and salty snacks are easy ways to assess if you are salt short but adding the salt to your water is a more effective way to completely correct your salt deficit.

Potassium

Potassium is often included in electrolyte drinks and indeed, it is important. Electrolyte replacement powders and beverages are fine to use but a cheaper way to ensure you consume enough potassium is to use one of the grocery store, sodium-substitute products (sold next to the regular salt). Table salt products that are 50-50 sodium and potassium are a good choice to routinely add to your trail water. Begin experimenting with the 50-50 salt mix by adding $\frac{1}{4}$ to $\frac{1}{2}$ teaspoon to a liter of water and check for palatability and sense of wellbeing throughout the day.

Maintaining proper blood levels of both sodium and potassium are critically important to good health. The palatability test on the trail is the best way to monitor your sodium intake but that challenge is useless with potassium. For potassium, you must rely on blood serum levels measured by a lab.

Take a look at your old lab results, if you have them handy, to see if your potassium levels run low, high, or just right. If you have kidney issues or take anti-hypertensives, consult with your health care provider before increasing your potassium intake.

Your doctor can order potassium levels for you or you can obtain them yourself using an online resource like www.walkinlab.com. You'll want to request a serum potassium. Unfortunately, blood analysis of sodium isn't useful in healthy people and you must rely on your own judgment to evaluate the adequacy

of your sodium intake on a day-to-day basis. Be cautious when supplementing your potassium intake and consider checking your levels 2-3 times per year or more until you understand your needs.

Running Out of Water

Running out of water in the desert is dangerous, even with the often relatively mild temperatures of winter. To prevent a problem:

- ..turn around when you've consumed half of your water
- ..swallow your pride and ask companions or strangers if they have water to spare
- ..slow your pace
- ..rest in the shade
- ..put on that hat that is inside your pack & untuck your shirt tails to help keep cool
- ..keep drinking to maintain your hydration for the longest amount of time rather than ration your water
- ..stop eating food before your water runs out because you need additional water to digest the food

Trail Ambassador

Consider creating a culture of collaboration around you when on the trail by having extra water available. As often as you can, stow an extra, sealed, half liter bottle in the bottom of your pack. Whether it is you, members of your group, or strangers on the trail, a dehydrated hiker is a problem for everyone around them.

Probably every hiker has run out of water on the trail, whether because of underestimating their needs, failure of a water purifier, or having a water container leak. It happens to the best of us. Hikers tend to be a stoic crowd and may not ask for water when they are out. Keeping an eye on others and being quick to offer your spare half liter of water could interrupt a catastrophe. Being known as one who often has extra water may encourage an embarrassed, water-short, trail mate to speak-up about their shortfall, to the benefit of everyone.

Summary

Monitor your water intake on non-hiking days to estimate the minimum amount of water you need on a hike and then, based on your trail experience and the variables of the day, add more than that amount to your pack. If you are finishing all of your water on hikes, then you need to routinely take more water to stay well hydrated and to cover yourself for the unexpected.

In addition to monitoring your water intake, carry salty snacks or salt crystals to nibble on while on the trail to judge the sufficiency of your sodium intake. If you are getting low on sodium, stop and add salt to your water bottle until it is at the upper limit of palatability. It may take drinking salted water for hours, or even a day or two, to correct your sodium deficit if you are very sodium depleted.