

To Treat or Not to Treat the Water?

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The choice I have made this year is to drink unfiltered water. I find it quite liberating to leave my city-bred paranoia (and one more technological artifact) behind, and go ahead and indulge myself in one of nature's great treasures—clean, clear mountain snowmelt, or better yet, a spring flowing straight from the rock. Most of the people in the world will never in their lifetimes see water as pure as the water most of us are taught to filter religiously.

—unknown author

As for those who drink straight from the source without filtration or purification, I suspect you've never gotten gut-wrenching, high-fever, diarrhea-running sick, 30 miles from the trail head. One of those and you stop taking chances.

—unknown author

Gone are the days when you could throw yourself down on your belly, tired and thirsty, and slurp up water from a crystalline stream. It might be good—and it might be bad. And the only safe bet is to disinfect wilderness water before drinking.

—Buck Tilton, *Trekker's Handbook*, page 123

Central Issues Addressed in This Article

Should I assume all wilderness sources of water are contaminated and take the appropriate treatment steps or take a more situational approach? What are the pros and cons of taking a conservative and highly disciplined approach to water treatment in the wilderness versus taking a more relaxed, *laissez-faire* approach? What are the best sources of wilderness drinking water?

Introduction

Water contamination can be grouped into three types: biological, chemical and aesthetic. Chemical contamination is commonly found in the frontcountry and is ordinarily not a problem in the wilderness with the exception of being around mining sites. Aesthetic contamination is material suspended in the water that may not cause illness itself, but looks unattractive and can interfere with removal of the other two. The most common aesthetic water contaminations in the wilderness are algae, silt, glacial flour, or volcanic ash. Biological contamination is the primary focus of this article. Biological contaminants are generally grouped into three types: parasites (or protozoa), bacteria, and viruses. Parasites (or protozoa) are the primary concern in wilderness areas of North America.

With this background, what about the treatment of wilderness water, especially for parasites? Surprisingly, it is common to find wilderness travelers on both sides of this issue. There are many who seldom treat or filter their water, who claim to have gone for years without problems. There are some who religiously treat all of their water sources and still get sick. Having said this, most hikers these days seem to be routinely treating their water most of the time in the wilderness. This is also the position of most hiking and backpacking book authors. The most balanced treatment of this topic I have come across is from REI's online Expert Advice resource: [Is Water Treatment Necessary?](#) [Note: This topic is part of a larger article titled, "How to Choose a Water Treatment System."]

At first take, the central issue seems to be technological: are there effective, lightweight, easy to use and relatively inexpensive treatment methods available for hikers? The answer to this question is an obvious yes. For a detailed overview of nine different types of water treatment currently available for the wilderness, click on this link: [Treatment Options](#).

Upon closer analysis, this topic should be viewed as both a scientific and a philosophical issue. The scientific issue revolves around available studies regarding the types and levels of water contamination. When I say that this issue can be viewed philosophically (i.e., opposing positions with interesting arguments supporting a wide range of positions), I am sure some would disagree by saying that there is no real issue: if there is any doubt at all, treat. If this is your position, read no further. If your mind is not already made up and you are

interested in a serious philosophic debate, read on.

Assuming this is a serious issue (of whatever kind), what is the most defensible approach? Should I treat or not? Before debating these approaches, let's first clarify and define the positions. I start by offering working definitions for the two approaches. I then offer thumbnail sketches of a full range of philosophical positions.

Two Competing Approaches—Working Definitions

Here are behaviors common to the two competing approaches. The sum of these behaviors will provide a good working definition for each approach.

Conservative, Highly Disciplined Approach:

- Treat or disinfect all water sources by filtering, ultraviolet purification, chemically disabling harmful organisms or boiling.
- Be careful not to contaminate already treated water.
- Carry backup methods of treatment in case the primary method fails.
- Be careful where the water to be treated is drawn.

Relaxed, *Laissez-faire* Approach:

- Undertake a careful study of potential water resources in advance of a trip in order to draw primarily from pristine sources.
- Carry extra water between pristine sources, if necessary.
- Treat water drawn from sources close to trailheads, from sources close to domestic or wild herds of animals or from heavy concentrations of hikers.
- Trust that most wilderness sources are not contaminated when you get any distance away from trailheads.
- Carry emergency treatment methods in case the reality in the field turns out to be different from what was expected.

Philosophies of Water Treatment: A Continuum

Within the conservative and relaxed approaches defined above is a full range of options and attitudes on this subject. This is not a black/white, either/or issue. The following thumbnail sketches are intended to go from one end of a continuum to the other.

—Be suspicious of all water sources. Treat or disinfect all water, even that carried

to the trailhead (i.e., coming from known and dependable private or municipal water systems).

- Treat all wilderness water. Assume that all wilderness water is contaminated. Treat all water that does not come from a known and dependable private or municipal water supply.
- Use double or triple treatment methods on most wilderness sources of water. For example, first filter the water and then use an ultraviolet or chemical treatment process.
- When in any doubt, treat. Treat all but the most pristine sources in wilderness areas. For example, assume that only springs that are well above any sources of contamination are safe to drink.
- Take a situational treatment approach. Decide to treat or not only after consideration of all relevant factors (e.g., water temperatures, watershed source, visual examination of site, level of human and livestock usage, opinions of local area managers, current strength of personal immune system).
- Travel in wilderness areas that are known for high quality water. Carry enough treated water to get one into the wilderness beyond most sources of contamination. Then drink freely. Put negatively treat only water sources that are close to trailheads or close to obvious sources of pollution.
- Do not usually treat wilderness water. Use pristine sources when possible and condition your intestinal system to become immune to any wilderness contaminants when pristine sources are not available. Carry chemicals for treatment only in case of emergency when only obviously contaminated water is available.
- Avoid contaminated water. Use your knowledge and skill to select water from only pristine sources. Carefully plan your trip around such sources. Avoid all bad or questionable water sources. Do not treat the water from bad sources unless dying of thirst.

—If possible, totally avoid treated water to develop a high level of personal immunity. There is good reason to believe that most people suffer from gastrointestinal problems because their immunity has been compromised from drinking water that is *too clean*. For example, drinking chlorinated water could have this effect. While avoiding treated water, one should still be very selective with water sources. One should also expect to get some mild upsets until immunity has been fully developed.

—Other treatment philosophies?

Reader Participation: Philosophy of Water Treatment

Which approach in the previous section best captures your philosophy in the wilderness areas most frequented? *First*, sketch any options (positions, approaches, philosophies) on this issue that have been missed, especially those you favor. *Second*, circle up to three of your most favored positions. If you are conflicted, don't hesitate to circle positions that seem to contradict one another.

Arguments in Favor of Relaxed, *Laissez-faire* Approaches

Since the relaxed, *laissez-faire* approaches to water treatment are clearly in the minority, let's first look at arguments in favor of these approach to get a better understanding of the entire issue. I will develop this section as objectively as possible offering critical evaluations of each stated argument.

1. Failure of Common Methods: Failures of treatment methods are too common: clogged or broken filters, not following directions (e.g., not waiting long enough for chemicals to act), not boiling long enough, cross contamination of treated and untreated water, and levels of contamination overwhelming the treatment method. No one treatment system is perfect.

Critical Evaluation: Even though it is not possible to be safe 100% of the time, using two or more treatment methods together will get very close. In addition, the appropriate knowledge, skill and discipline can be developed to overcome most of these problems (e.g., bring two filters or an extra filter cartridge). Even if one can't be 100% safe, why not shoot for 90-95%?

2. Choose Low-Risk Areas for Wilderness Travel: Some have made choices to

live near and hike in high risk areas in terms of water pollution. But this is a personal choice. There are vast areas in the United States and Canada (especially out west) that are relatively free of contaminated water. In addition, it usually takes a willingness to hike ten miles or more from the trailheads to be relatively free of contamination. Making the choice to hike far enough into low-risk wilderness areas is an integral part of my relaxed attitude towards water treatment. If I had little choice but to hike in high-risk areas (e.g., if I had a serious physical handicap), I would likely take a more conservative approach.

Critical Evaluation: This line of reasoning is based on some fallacious black and white reasoning: that hiking areas are either high or low risk. In fact, most hiking areas in the United States are probably somewhere in between, especially those frequented by humans on a regular basis. Furthermore, many don't have the choices that are assumed by this line of argument.

3. Lack of Scientific Evidence of a Serious Problem: The science on this subject is very limited, especially in documenting contamination in wilderness areas that is sufficient to make one seriously ill. In fact, there is much anecdotal evidence to the contrary. Many spend their whole lives drinking wilderness water and do not get sick from it. In addition, there is evidence that serious gastrointestinal illnesses in the wilderness are usually caused by poor hygiene, either your own or that of others, rather than by drinking contaminated water. Most will treat water from questionable and compromised sources, but there is seldom a need to drink from these sources.

Critical Evaluation: If there is no scientific evidence to support a conservative approach, why do most agencies have warnings posted everywhere to treat the water? If there is no strong science on this issue, why not err on the conservative side of treating all water sources since treatment is so easy? Finally, there is the issue of generalization: should one generalize from those with unusually strong immune systems to the majority of us?

4. Paranoia from Techno-Culture: There is so much paranoia and concern in contemporary society about being totally safe and secure. If one is to take no risks, don't go outside. Like so many things today, our media-oriented culture

not only overstates the problem, but then wants us to spend our time and money on technological solutions. It is so much easier and safer to find pristine sources of water than to depend upon technology. Added to this are the warnings from state and federal land managers ("Treat Your Water!" "Beware of Giardia!") who are clearly listening to their legal eagles, people who profit from the litigiousness of contemporary society. One of the biggest reasons to get out in the wilderness is to get away from all this. It is important to get away both mentally and physically. As one of the quotes at the top of this article stated, a true *wilderness* experience is drinking directly and freely from pristine water sources without the use of technology and chemicals.

Critical Evaluation: While there is some truth to this analysis of contemporary culture, the more important truth is that it is easy to treat the water and worry about other issues (like coming back home alive and in one piece). Let's not make this into a big philosophical debate. This talk of paranoia is itself an overreaction to contemporary culture. Finally, regarding true wilderness experiences, there are many elements that make up such experiences. To pick on this one thing and ignore the other elements is not fair. I can easily treat my water and have a quality experience at the same time.

5. Develop Stronger Immune Systems: It is obvious that some hikers have developed strong immune systems that are not affected by wilderness contaminants. If some can develop strong immune systems, why not most? Granted, this argument will not apply to those who have to live day-to-day with compromised immune systems caused by disease or illness.

Critical Evaluation: One of the underlying issues here is whether or not a person's immune system can be developed to withstand the type of contamination that exists in the wilderness. All it takes is one serious gastrointestinal illness after returning from the wilderness to quickly make one into a conservative. One suggested approach is to totally avoid treated water in the frontcountry to strengthen one's immune system. Even if this approach is effective, it is not practical for most of us. Furthermore, most are not disciplined enough to develop immune systems strong enough to withstand all of the nasties that are out there (assuming it is possible in the

first place).

In Favor of Conservative, Disciplined Approaches to Treatment

1. Why take a chance? Wilderness water treatment methods are relatively fast, easy, effective and light in weight. They are usually moderate in cost. Why take a chance? I am basically a risk adverse type of person; I don't like to take unnecessary risks.

Critical Evaluation: Two criticisms. *First*, even though not unanimous, the few scientific studies on this topic have shown little or no risk drinking most wilderness water. There are many wilderness areas where there is no evidence of contamination in amounts sufficient enough to make one seriously ill. *Second*, if you believe there are serious risks, are you not taking risks with your chosen treatment method? Mechanical filters are subject to clogging, breakdown, freezing and improper use. UV purifiers take batteries, can malfunction and don't work well with water containing organic matter. Chemical treatments can take hours to work against protozoan cysts in colder water and maybe don't work at all against some forms of contamination. Boiling takes too long and can use a lot of fuel. All treatment methods are problematic.

Replies to the Above Criticisms: Scientific studies of this problem are very limited. Just because there has been no conclusive evidence to date demonstrating a serious problem doesn't mean the water is safe. Regarding treatment methods, each of the problems mentioned can be easily overcome. Also, it is good to carry backup methods of treatment.

2. Unpleasant Personal Experiences: I have experienced a severe case of diarrhea upon return from the wilderness that was diagnosed as Giardia (or Cryptosporidium). I never want to go through this again. I will always treat my wilderness water.

Critical Evaluation: But where were these nasties picked up? Most experts suggest two things: (1) that it is highly likely you picked them up from contaminated food or hands; (2) if you indeed picked them up from the water,

you were in an area frequented by humans, pack animals or domesticated animals. If the latter, then one is smart to treat the water. But why carry your approach to water treatment over to all water sources? If you are unfortunate enough to get a gastrointestinal illness in the wilderness (from whatever source), anti-diarrhea medicine is easy to carry in your first aid kit and easy to use.

Conclusions and Final Thoughts About Treatment

Simplified, my position is that there are three kinds of water sources: pristine and pure, potentially contaminated, and contaminated beyond treatment. Most of the time, pristine sources are available where I hike and I do not treat these sources. Plus, I totally avoid obviously contaminated sources. When the source is *potentially contaminated* (e.g., areas frequented by humans, pack animals, domesticated animals or wild animals), I treat. I take a fairly relaxed attitude towards water treatment because I have made life decisions that allow living near and hiking in several relatively uncontaminated wilderness areas. Generally, it is easy to carry enough purified water from home to get far enough into backcountry wilderness areas beyond most contaminated sources. By referring to *uncontaminated* areas, I mean that my research has led me to believe that any contaminants in these wilderness areas (especially protozoan cysts) are in such minute quantities that they are unlikely to cause serious problems. Part of this attitude is based on the belief that I have a fairly strong immune system to deal with potential contaminants. If my general health declines and I become more susceptible to illness, I would have to reconsider. Most important, I am willing to change my relaxed attitudes based upon new information.

Part of my more relaxed attitude towards water treatment is because I have developed a better understanding about what water sources to trust and not to trust. Click on this article for some tips in this regard: [Avoiding Poor Sources of Drinking Water](#). For example, most hikers assume if a water source is clear and cold and running briskly that it has a low probability of being contaminated. This common attitude is not defensible. I carefully plan my trips around my knowledge of potential water sources.

Having said all this, I occasionally take trips into areas that might have been compromised. I also take trips with those who feel strongly about water treatment and who insist on treating all of our drinking water. In both cases I

willingly participate in treating all of our group water containers. On these trips, we carry not only a primary, but also backup water treatment methods.

As a backup, I always carry chemical water treatments (usually chlorine dioxide) if I can't find dependable sources of water. However, in using chemicals one needs to be careful about the timing: use the chemicals before getting desperate. It is good to carry chemical water treatments for another reason: treated water is an effective hand and surface sanitizer as well as a potential source for cleaning wounds in the field.

Since it is likely that more people get sick in the wilderness from poor personal hygiene than from questionable sources of drinking water, I have become quite conservative about personal hygiene. I seldom share food with others for the same reason. I do what I can to encourage others to take their personal hygiene seriously in the wilderness.

Additional Issues for Reflection

1. What is the current state of scientific knowledge about the contamination of wilderness water sources?
2. Is pollution of water by livestock the most common source of sickness in hikers? What are the most prevalent contaminating organisms in wilderness water in the United States and Canada?
3. What about contamination from wild animals? More specifically, how much of a threat are large herbivores (deer, elk, bear, moose, horses) to wilderness water quality?
4. Are poor hygiene practices a much more prevalent cause of illness in the wilderness than drinking contaminated water?
5. How much of a role do individual immune systems play regarding who gets sick or not from wilderness water contamination?
6. Is there a scientific basis for believing that the surface of lake water is being purified by sun, especially at higher elevations?

7. What are the most likely sources of contaminated wilderness water? Areas frequented by humans? By pack animals? Wild animals? What is the relationship between the number of people traveling in a specific wilderness area and the risks of getting sick from the water?
8. What are the most effective and efficient wilderness water treatment technologies?
9. What is the best value in effective water treatment?
10. Are there water-borne contaminants in the wilderness that are not dealt with by common water treatment technologies? Are there potential contaminations not on the radar of managing agencies?
11. Who should I trust about wilderness water? Should I believe the managing agencies? Hiking book authors?
12. How accurate are water treatment technology manufacturers in their claims about the effectiveness of their devices? Can we trust the government or consumer watchdogs to protect consumers in this matter?