

## Water Purity in the High Sierra

BY Bob Rockwell

I have been investigating and documenting the issue of water quality in the Sierra Nevada since the mid-1980's, in particular the prevalence of *Giardia lamblia*, or *Giardia* (a parasite), and the likelihood of contracting giardiasis (an infestation of *Giardia*). The latest paper (*Giardia Lamblia and Giardiasis, with Particular Attention to the Sierra Nevada*, 21 January 2002) can be viewed at, for example,

<http://www.lomapieta.sierraclub.org/pcs/articles/giardia.asp> or  
<http://www.yosemite.org/naturenotes/Giardia.htm>. Some pertinent points from it:

Don't worry about getting giardiasis from Sierra water. While *Giardia* cysts have indeed been found in some places, they have not been found in the numbers required to contract the disease. Flawed case studies, careless reporting, and hearsay have all contributed to the widely held but false belief that *Giardia* is a real wilderness problem.

A valid claim that giardiasis was contracted from a specific water source requires affirmative answers to the following questions, at the minimum: (1) Was the presence of *Giardia* confirmed in the laboratory? (2) Was the person *Giardia*-free prior to drinking it? (3) Did the suspect water source contain *Giardia* cysts in sufficient numbers to cause the disease? In particular, question (3) cannot be answered without the help of rarely done sophisticated measurements.

There have been legitimate cases of giardiasis as a result of a visit to the Sierra, but water was not the culprit. The problem is that up to 5% of us are asymptomatic carriers of *Giardia*, coupled with our diminished attention to personal hygiene when in the backcountry. The camp cook who does not wash his hands after defecating can transfer millions of cysts to food or utensils, which can in turn be ingested by his companions. Unfortunately, hand washing, while strictly enforced in other settings to restrict the spread of germs, is rarely mentioned in wilderness education materials.

The US Forest Service has preached the dangers of contracting giardiasis from untreated Sierra water for years, but they recently admitted they don't know if there is any *Giardia* there at all! There are a couple of reasons why they probably won't change their story, though. First, they want to alert people, especially novices who may not be skilled in choosing water sources intelligently, that they may get sick from some water, in some places, some of the time-and *Giardia* is a handy organism to blame it on. Second, if a person believes they contracted giardiasis from Sierra water, they cannot accuse the Forest Service of not warning them.

Virtually all Sierra water is pure, probably purer than your tap water at home. I have spent much of my free time since 1952 in the Sierra, never treating the water and never suffering consequences. The same holds for literally hundreds of similarly active friends and acquaintances. Of course, you do have to "drink smart": Avoid a stream draining a meadow where cattle are grazing or one with billowing clouds of surface foam. Other rules are the following (see the paper for a more complete list, with explanations):

- Large, cold, fast-flowing streams are better than small, quiet, warm ones.
- Streams entering from the side are better than those paralleling the trail.
- Drink from a lake at the inlet (best) or outlet (next best).
- Water at higher elevations is better than lower.
- Springs are particularly trustworthy.

Why not just treat all water and be completely safe? Depending on the choice of treatment, the penalties are cost, trouble, weight and perhaps taste. You may feel it's worth it.

But drinking from a Sierra cup dipped into a pristine stream can be one of life's many pleasures. When any minuscule risk can be easily managed, it seems a shame to do otherwise.