Clean, Green & Wild:
Green Cleaning in the Wilderness

Art Ludwig

The trail wears on through the heat and dry. Rivulets of sweat trickle down the paths through the dust on my girlfriend's sides. My lips taste of salt.

After an interminable time putting one hot foot in front of the other, our glazed eyes register the distant shimmering of a cool mountain pool down in the valley.

Spring returns to our step.

"Race you!" I say.

We slide giddy down the slope to the water, already unsticking the packs from our backs... but something is amiss. A great head of foam churns at the bottom of the waterfall, shampoo suds march across the surface toward us. Embarrassed for our species, we trudge up the creek looking for the next pool.

Natural waters mirror our way of life. Managed wisely, all surface water would be drinkable from source to sea. In wilderness unvisited by humans, virtually all surface water is drinkable. In Switzerland most of the surface water is of drinking quality. In the US, almost none is.

Though our cities and farm areas would have to be completely redesigned to clean up their waters, keeping water clean in wilderness areas isn't too hard. The divine water management in the wilderness is good inspiration, and clean water flowing out of the wild gives cities and farm areas clean water to start with. With a little imagination, the understanding from the wild can be applied at home as well.

*My definition of **rich**: you can drink the water you swim in, every day.*

Water cycle primer

Most people know that water is purified when it evaporates from the ocean. Rainwater is exceedingly clean even in urban areas, at least until it touches something. Biological purification in topsoil, however, is relatively unknown and under-appreciated.

Downhill from all the insects, rotting leaves and deer poop on the surfaces of a wild valley, the main drain (in the absence of human meddling) is invariably a river of drinking quality water.

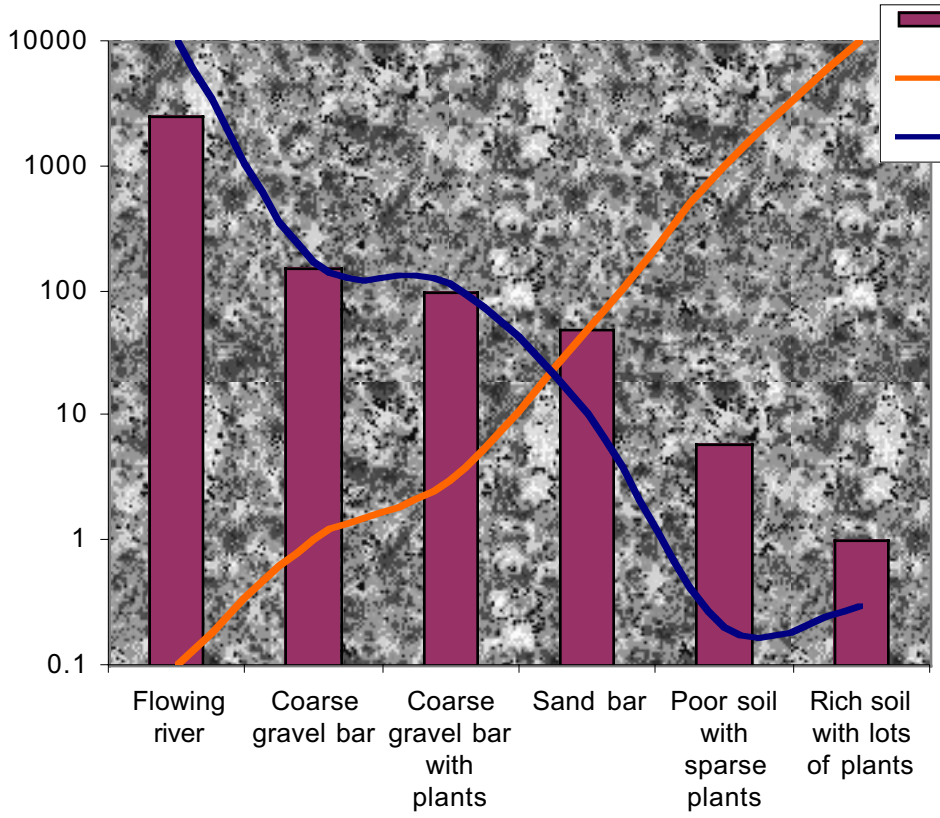
A nutrient-bacteria-earthworm soup permeates the surface of the earth. As this brew percolates through the topsoil, then subsoil, it becomes clear, clean groundwater; the stuff we see coming out of springs.

How?

In the process of biological purification , topsoil microorganisms biodegrade organic contaminants, (including deer poop and biocompatible cleaners) into plant nutrients. Plant roots suck the nutrients out of solution, leaving pure water.

This purified water infiltrates into the water table, which in turn seeps out through springs and into rivers. While topsoil has tremendous purifying powers, rivers have little. In the soil water might move an inch a day in a thin film through a maze of plant roots — the contact time and contact area are huge. In a river there are just a few roots on the sides to maintain the cleanliness of a large volume of fast moving water. This is just sufficient to remove the trace of nutrients from occasional fallen leaves, bird poop and what not, so long as the water is quite clean to begin with.

TABLE: THE ABILITY OF A WATERSHED TO PURIFY PATHOGENS AND NUTRIENTS DEPENDS MAINLY ON WHERE YOU ADD THEM



The most important factors for a watercourse's ability to process pollutants are location, location, location, as you can see at left.

Note the logarithmic scale; material which biodegrades harmlessly in one foot when applied to rich soil with lots of plants takes over a thousand feet to degrade if added to the river itself.

Purification is better with:

- *Slow soil flow
- *Lots of surface area for beneficial microbes
- *Higher temperatures
- *More plants and roots
- *Less runoff
- *More easily biodegradable materials
- *Higher dilution

The moral of the water cycle story

Organic wastes or wastewater applied in moderation to healthy topsoil will be entirely purified. The more life in the soil, the greater its purifying capacity. Wastes dumped in rivers can easily overload their capacity to purify themselves. Materials which do not biodegrade into plant nutrients cannot be purified by rivers *or* soil. These must be packed out, or not brought in in the first place.

That's the theory—what does it look like when you reduce these principles to practice? Well, it depends on who's practicing. Natural or "Earthy" might describe my style. Why go to the wilderness if not to be close to the earth?

Note: Some alpine ecosystems are too fragile to handle even responsibly disposed wastes very well. In crowded areas, even a large purifying capacity can be overloaded. In these cases, the most responsible thing may be to pack your wastes out, or better yet, go somewhere else.

One difference between a "natural" camping style and others is that the impact on the whole earth is considered, not just the impact on the wilderness. To cook with gas instead of wood, for example, does not seem as low impact if you consider the impact on the former wilderness the gas came from, and what it took to transform it from wilderness to gas in your bottle. Utilizing inspiration and materials from the wild (within it's carrying capacity, of course) forms a closer connection than behaving like self-contained visitors from another planet.

Washing Techniques

A version of "reduce, reuse, recycle" applies to eco-clean camping. No matter the purported green pedigree of the cleaner—even if wrung from sustainably harvested rain forest flowers—if you use less or none of it, the impact will be less. Even when I owned my eco cleaner manufacturing business, I usually carried no cleaners with me backpacking except for hand laundry soap for longer trips.

Dishes

The optimum material for washing dishes is clean sand. Used washwater containing bits of food can be dumped around the roots of plants at least a ten feet away from the river. An organic abrasive pad can be made with a handful of green leaves or grass between your hand and the sand — great for getting the burned bits out of the bottom of the pan. For cutting grease, use wood ashes (less messy to use if you can gather them without chunks of charcoal). A raw material for making old style lye soap, wood ashes contain plant nutrients (a lot of potassium and a little phosphate). Most plants will not mind a light, occasional application of ashes, and will appreciate the nutrients. One word of warning; ashes are so alkaline, that they will dry out or even burn your hands if you have a lot dishes to do (If this happens they can be moisturized with oil). In this case, or if there are no ashes, a biocompatible all-purpose cleaner can be used to cut grease. A disposal note: even the most organic, biodegradable soap is a potent fish toxin. Many indigenous people used naturally occurring soaps to stun fish. This is a way of fishing you can only afford when the ecosystem is overflowing with abundance, as all the baby fish are killed as well as the mature ones.

Clean river sand, and grass for a brillo pad, a perfect washing place.

Dumping the greywater with ashes and food bits at least ten feet from the water, where there are plants growing

Ashes cut grease

It's not that big of a deal if you get bits of sand, food, ashes, or leaves in the water, but *please rigorously avoid getting soap in the water.*

Note if water is short: In a dry camp more extreme water conservation measures are appropriate than in just about any environment short of the space shuttle.

Take the "Monk's greywater system," for example. Fill your bowl with drinking water right after eating, swirl around the edges with your finger, then drink it! This may sound disgusting, but its only the food you were just eating. This works with used toothbrush water, too.

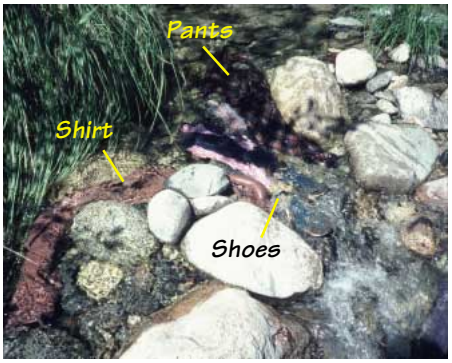
Alternatively, coarse dry sand or dried vegetation cleans non-greasy dishes surprisingly well without soap *or* water.

Hands, Body & Hair

Sand on skin is invigorating and effective, like a loofa sponge. The finer the sand, the less abrasive the effect. Take care not to scoop too deep from wet sandbars; sometimes there is an anaerobic layer below the clean sand on top. Clay can work on skin also. Rub down next to the water and then you can rinse right in it. Sand or clay will settle harmlessly back out even if they make the water cloudy for a bit (notes: rinsing is faster if you don't let the sand/clay dry. Some fine materials stick to skin and are hard to rinse; you might try rinsing on a small area before coating your whole body. Rinsing by swimming is the most fun and effective.)

Hair is trickier. Certain kinds of clay work well on hair. The nicest my hair has ever been was during a month when I washed it only with green clay from a river bank in the Swiss Alps. The effect varies widely; some clays just glop hair up and leave it dried out; you'll have to experiment. If you use shampoo, use a relatively simple and natural one, and use a minimal amount so you don't end up with mountains of suds.

To use shampoo or soap, get wet, then take a container of water from the river some distance away where there is rich soil and a healthy network of roots. Lather up and rinse off there. A complete hair and body wash with soap, and shampoo, plus rinse, can be done on as little as a quart of water, if water is really tight.



Clothes & Equipment

Clothes may be freshened by immersion overnight in a swift, clean river. Weigh them down well with clean rocks so they don't float away. Positive retention, e.g. with a rope through sleeve holes is another option. After a night in the river and air drying on a line, clothes will smell good again, but any stains probably won't have come out. When its time to get them really clean, use a little soap. A good clothes-washing setup is a large, smooth, clean rock fifteen or twenty feet from the water, with good soil and roots growing lustily around it. First, rinse all the clothes directly in the river (in the laundry trade this first rinse is called the "break" cycle). A lot of the dirt will just come right off (sweat and dirt are non-toxic for aquatic ecosystems in these quantities). Then haul the sopping wet clothes over to the laundry rock. Squirt a little cleaner on each stain, under the armpits, etc., then knead and rub the garment against itself and the rock until clean. Squeeze all the soapy water you can out of them. Pour some fresh water on the clothes, knead them, and squeeze again. If you don't have a very good vessel for hauling water, you can quickly im-

merse the squeezed clothes in the river to wet them, then take them back to the root spot to knead them and squeeze the soapy water out. For the final rinse, they can be swished around in the river itself.

The river at last, take two

"Race you," I say, as we unstick our packs from our backs. We slide giddy down the slope to the water, shedding clothes as we go.

Tsssssss! Tsssssssss! Our sun toasted bodies hit the water. We giggle and roll, pretending we're otters. On a sand bar near the waterfall we scoop up handfuls of sand. We rub our arms, legs, armpits, the spaces between our toes. Finer sand behind the ears and on the face. We rub each other's backs. We look like aborigines—we grin at each other. I spy a vein of blue clay by the waterfall and try it in my hair—it feels like the good kind. I massage in a whole handful, plus a little more for my beard. I pull my hair into crazy spikes and stalk Lynn, who darts giggling into the water, where she disappears into a cloud of floating sand like a fleeing octopus. Underwater, I can't see a thing. The sand and clay float away, along with the top layer of dead skin. My whole body tingles.

I catch Lynn behind the waterfall, where she is savoring mouthfuls of the cool water, which in this watershed flows clean and clear from source to sea.

About the Author

Art Ludwig is a writer and ecological system designer. He lives in a canyon behind Santa Barbara, California, where he bathes in the creek nearly every day, and in his solar heated bathing garden the other days.

In 1989 he founded "Oasis Biocompatible Cleaners," a manufacturer of cleaners which biodegrade entirely into plant food. He is currently is writing and consulting on various projects, often traveling with his wife and children.

Biocompatible and Biodegradable

"*Biodegradable*" means microorganisms can breaks something down; it doesn't say anything about into what. Almost all cleaners sold today are biodegradable.

"*Biocompatible*" means the break-down products are good for or won't harm the specific environment they end up in. Biocompatibility depends on the environment. Salt, for example, which is present in virtually all cleaners, is biocompatible with the ocean, but is toxic to plants and soil. No soap or detergent is biocompatible with streams or lakes until it has biodegraded.

"Eco" cleaners are designed to be minimally toxic and degrade rapidly if they do get in the water, but its far better to apply wastewater to the soil, in the wild or at home, so the washwater can be completely purified by the natural action of topsoil before it reaches any surface water.

Recommended Cleaners

Water *the universal solvent*
Sand *go for the top layer of clean sand. For dishes, even soil works in a pinch*
Clay *test different kinds to find one that works on your hair (less likely if your hair is dry)*
Grass *makes a brillo pad in combination with sand*
Ashes *cut grease*
Soaproot, Ceanothus, other local plant *source of widcrafted soap*
Limon, Orange peel *cuts grease, roofing tar, works good to get beach tar off your feet*
Dr. Bronner's *a good, simple soap*
Oasis All-purpose Cleaner *biodegrades into plant nutrients. Good for dishes & hand laundry.*
Lifetree products