

# The Chattanooga Times

...ly, without fear or favor"

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## Nature vs. engineers: How do we clean up that creek?

By Pam Sohn  
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With Chattanooga Creek appearing to be a fixture for some time to come on the national Superfund list, the new question of the day is how government will fix it.

The quandary revives an almost age-old battle: man vs. nature.

Should the cleanup rely on heavy machinery, concrete and engineering?

Or should it gamble on something new — applied Mother Nature.

Applied Mother Nature, something biologist John Todd calls "a living machine," is one method of cleanup that the Army Corps of Engineers is considering.

That method has lots of environmental appeal compared to the usual tried-and-true but not very esthetically pleasing techniques of the past: dredge it, bulldoze it, seal it in a barrel, burn it and bury it.

"I'm trying to be optimistic," says Todd's assistant, Stephen O'Neal, executive director of the Southeast Center for Restoration of Waters. "But at this point, even though the creek is in the hands of the EPA, it seems as though we're competing with a lot of other projects that the Army Corps of Engineers has dealt with. And they have a way of bulldozing entire watersheds and creating incinerator plants and that sort of thing."

Todd's solar aquatics approach seems a gamble to EPA because it involves an unprecedented procedure — using nature's own house-

keeping system to clean up our mess.

The parts of Todd's living machines are simple: bacteria, protozoa, algae, fish and plants. The logic behind it is that waste isn't waste: It's a food source for an engineered ecology. The ecology is developed to suit the food source.

For instance, to treat water polluted with raw sewage, bacteria would consume the sewage solids, protozoa would eat the bacteria, fish would eat the protozoa. Meanwhile, as the tainted water is routed through the "machine," sunlight, aeration and the very life cycles of the organisms and creatures act as a catalysts to break down the long molecular chains of harmful organic compounds that pollute. The effect is similar to the way hydrogen and oxygen molecules separate and return to the air when sunlight causes water to evaporate.

Because the creek's pollution is much worse than simple sewage, Todd created a system just for it and put it through a bench experiment with TVA oversight.

At least a portion of the creek cleanup process would require enclosure and air filtering, Todd says, to prevent toxic chemicals from escaping to the air as the very hazardous compounds in the mud break down.

Todd originally designed such an enclosed ecosystem to purify cholera-contaminated water in Third World countries, modeling the design after North African shallow lakes.

Photosynthesis in those lakes is so powerful, Todd says, that the pH levels would swing from neutral at night to very basic during the day, killing most toxic compounds and many human pathogens.

For the creek cleanup, air toxins released from the creek's tarry muck would flow through plastic tubes to an underground filter box filled with wet peat moss and bacteria. The design also calls for backup carbon air filters.

But Todd's method is new. Most EPA staffers are engineers who build and understand machines — not biology. So Todd and O'Neal believe the road ahead looks steep.

"It's a little frustrating that all this good work was done and a successful bench study was conducted and now it just sort of stalled in the networks," says O'Neal. "The creek itself is really just a beginning. There are waterways throughout the South that could benefit from this procedure. Incineration (something mentioned often by EPA as a solution) is a major expense to taxpayers. I don't even want to guess how much that's going to cost — to divert the creek and build a place where they can burn up the soil. Then they've got to deal with the ashes. They've got store those somewhere."

O'Neal says he believes Todd worked on the creek "just to bring these alternative methods to the fore. EPA at least owes Dr. Todd a portion of the creek to continue this work."