

# Wetlands clean water the natural way

NATALIE JACEWICZ 10:03 p.m. PST November 26, 2015



(Photo: The Salinas Californian)

The key to wresting thousands of pounds of pollutants from central coast rivers may be unassumingly simple: let them be wild.

But Mother Nature needs a hand. Scientists are treating Monterey County's sickened rivers like physicians tending to poisoned patients, using wetlands to pump out toxins so the rivers can function healthily.



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"You can't declare the Salinas River a sewer," said Steve Shimek, chief executive of the conservation nonprofit The Otter Project.

Shimek said many Salinas rivers need an intervention. A study by the Central Coast Regional Water Quality Control Board backs him up. Nitrogen from fertilizers runs off farm property and seeps into waterways. A 2011 report called nitrate "the most serious and widespread of all pollution problems in the Central Coast Region."

The report found that 30 percent of evaluated sites in California exceeded the safe level for drinking water, with nitrate over five times the safe amount. Many of the worst contaminated sites were in and around Salinas. Too much nitrate can send the human circulatory system haywire by interfering with the ability of blood to transport oxygen. Pregnant women and babies are most at risk.

Fred Watson, an associate professor of environmental science and policy at California State University Monterey Bay, has worked to curtail nitrate levels for years. And he's been using wetlands to do it.

Researchers have recently re-excavated the Molera wetlands to conduct new experiments in treating wastewater, and new treatment projects near Moss Landing have recently received funding as well.

The Molera wetlands look like a river that can't make up its mind. From above, the stream seems to wind back and forth near the Old Salinas River and the Tembladero Slough like a tightly woven Incan pattern. But there's method to the wetland's caprice. As water passes through, microbes suck up polluting nitrate. Watson called the system "very effective."

Like humans, many microbes breathe oxygen. Unlike humans, the microbes can suck the oxygen out of other oxygen-containing molecules, like nitrate. But microbes only do this when oxygen is scarce, and they need a carbon source to live and grow cell tissues.

"Wetlands have low oxygen deep down there in the muck and when plants die, they're a source of carbon," Watson explained.

The thriving microbes release the nitrate they breathe as nitrogen gas, ridding the water of pollutants. In other words, the microbes literally breathe life back into the river.

A wetland also protects wildlife habitat, according to Watson. The area offers sanctuary to migratory birds and animals like the ornate shrew — a mouse that looks as though it's paying Pinocchio's price for one too many lies. Downstream fish benefit from cleaner water, too.

But the low-tech technology presents challenges. Microbes do their best work in warm temperatures, and they remove nitrate less efficiently under cool conditions. And converting area to wetland means taking some valuable agricultural space out of commission.

Still, Watson said, "We can build these in a way that doesn't substantially affect the bottom line of growers."

For example, compact, winding water enables the wetlands to process more pollutant in less space. Other sources of carbon may perk up microbes and make them more efficient. One possibility? Adding sugar.

“If you give a kid some sugar, it very quickly motivates [his] energy,” said Watson. The same applies for microbes.

Arcata has put the wetlands treatment theory into practice on a large scale. Sydney Stewart, a naturalist interpreter for Arcata Marsh, explained that the city created wetlands as a step in wastewater treatment. The total wastewater treatment budget approved for 2014-2015 was just under \$2.8 million.

The wetlands treat the water, but they also create a popular habitat for birds and people.

“We have over five miles of trails,” said Stewart, who added that birders, dog-walkers and joggers frequent the wetland, some traveling from great distances. “People come from all over the world to come birding. It’s pretty great.”

She also said that engineers visit to learn from Arcata.

“I’m always constantly blown away by how many people have heard about us,” she said.

And more people may come. If work like Watson’s gains further traction, Salinas engineers may join the international crowd that comes to explore the wetlands and marvel at the work of an unseen microbial community beneath the surface.

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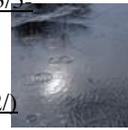
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