Scientists on west side of Valley making more water from tainted farm drainage (video)

fresnobee.com /2014/08/02/4052342/scientists-on-west-side-of-valley.html

By Mark Grossi

FIREBAUGH — People in pickups cruise through the quiet flatlands around here almost oblivious to a $22 million roadside experiment that turns dirty water into a chance for survival for west San Joaquin Valley farming.

Inside a buzzing complex, Jeff Moore talks of membranes and clarifiers as he explains the process of scavenging salt, boron and the infamous natural trace element called selenium.

"Once the water gets squeezed out, this stuff ends up here," says Moore, the plant operations manager, pointing at a bin filled with what looks like mashed, clay-colored dirt.

This is a desalination plant -- a pilot project, started up this summer and doing what no similar plant has been able to do yet on the Valley's west side. It's filtering crop drainage water laden with enough contamination to sterilize the ground or foul a river.

Underwritten by the U.S. Bureau of Reclamation, the system could end a decades-old contamination problem, create a precious new stream of water and save a 97,000-acre piece of farming worth nearly $500 million a year.

But beyond the 97,000 acres, a breakthrough with this technology might be the next big advance for hundreds of thousands of west-side acres.

"Why wouldn't you want to reuse water this way?" asks Dennis Falaschi, general manager of the Panoche Drainage District, which is spearheading the project. "It has the potential to help a lot of people."

The project -- including two other cutting-edge experiments -- is a ray of hope in an otherwise dismal drought year. Many west-side districts are getting no river water from Northern California. Farmers are pumping record amounts of water from the ground.

Irrigation on the Valley's west side has become more efficient out of necessity. But efficiency is radical on the 97,000 acres in the Grasslands area, where farmers grow tomatoes, garlic and cotton. The less water going through the treatment process, the cheaper it is to run. The government estimates operation costs at $1.5 million a year.

Falaschi says the Grasslands-area farmers use stingy drip irrigation, capture any runoff below the roots of the plants and funnel it to 6,000 acres of once-barren land.

Their drainage water then irrigates salt-tolerant crops, such as pistachios and Jose tall wheatgrass, which is used as dairy feed.

"It creates something valuable with some of this water," says Chris Eacock, a Fresno-based representative of the Bureau of Reclamation.

After the drainage water is used on the 6,000 acres, a much smaller amount of highly concentrated drainage is again captured and sent to the desalination plant.

The plant forces the flow of bad water through a membrane to filter contaminants. The process is called reverse osmosis, and it cleans up 200 gallons per minute.

The cleaned-up water can be used in fields. The mashed lump of concentrated selenium sludge, classified as hazardous waste, must be taken to a special landfill, such as Kettleman Hills in Kings County.

The pilot project will run 18 months so officials can see how well it works.

The other two experiments include solar-powered distilling to condense drainage water and desalination through a reverse osmosis membrane that is closely monitored to extend its life. Both are considered promising.

There's a good reason why the government is going to all this trouble. Farm drainage throughout this area is loaded with salt and selenium, remnants of an ancient sea.

Selenium was the villain in a 1980s wildlife disaster at Kesterson Reservoir in Merced County. The Bureau of Reclamation had directed a different group of farmers -- in Westlands Water District -- to send their selenium-laced drainage from 40,000 acres to the reservoir.

At the time, nobody understood what high concentrations of selenium would do to wildlife. At Kesterson, shorebirds were left dead or deformed, and all kinds of wildlife was broadly destroyed.

Kesterson was hastily closed down, but the west-side drainage problem hasn't gone away. Like many places on the globe, there are areas where the tainted irrigation drainage won't drain away.

It's trapped on shallow layers of clay that prevent the water from draining lower into the underground. The tainted water builds up toward root zones of crops, eventually poisoning the land.

Westlands and other districts are entitled to drainage from the federal Central Valley Project, a federal court has ruled in a long-running lawsuit. This desalination experiment could help the Bureau of Reclamation answer that need.

"From what we've seen so far," Eacock says, "the reverse osmosis is significantly reducing the amount of selenium in the drainage. And there is room here to expand this system."

Landowners on the 97,000 acres in the experiment are highly motivated, too.

In the 1980s, these landowners sent their irrigation drainage through sensitive Grasslands wildlife refuges in Merced County into the San Joaquin River. The growers risked being shut down if they didn't come up with a way to clean up the drainage.

By the mid-1990s, the Grassland Bypass Project began to send the bad water to the river through the San Luis Drain, a canal that had once been used by the Westlands farmers. State authorities required a reduction of drainage contaminants each year after the bypass project began.

Over the last 15 years, the drainage has dropped from 34,000 acre-feet of tainted water per year to about 6,000 acre-feet, officials say.

"The salt reduction has been 87%," says Falaschi. "And we've eliminated 90% of the selenium."

Fishing groups filed suit to stop the project in 2011, saying fish and habitat are being affected downstream. Bill Jennings, executive director of the California Sportfishing Protection Alliance in Stockton, a plaintiff, said the Grasslands discharges are toxic to fish and should never have been allowed.

Those involved with the desalination project say soon the Grasslands growers may not be discharging drainage at all.

"That's the goal," Falaschi says. "Take it down to zero."

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