

Environmental toxins in San Francisco Bay could increase with Delta water plan

Mike Taugher, Bay Area Newspaper Group, 9-16-11

A naturally occurring poison responsible for one of the nation's worst wildlife disasters a quarter-century ago is a looming problem in San Francisco Bay -- one that could worsen if aqueducts are built around the Delta, new research suggests.

The aqueducts could channel more selenium at higher concentrations into the bay, a possibility that has been largely overlooked in lengthy debates about Delta water, a top scientist said.

"It's clearly a serious problem and it could get worse," said Sam Luoma, a former lead scientist for the state's bay-Delta water and environment programs who sits on a national panel reviewing Delta water plans. "I don't know why it hasn't gotten traction."

Highly concentrated selenium from farm runoff killed or injured thousands of birds in the 1980s at the Kesterson National Wildlife Refuge near Interstate 5 west of Merced.

After photographs of dead and deformed birds appeared in newspapers and on television screens across the country, the wildlife refuge was declared a toxic dump and closed in 1987.

Today, selenium from the Bay Area's oil refineries and the San Joaquin Valley's farms is diluted enough in the bay and Delta that it might not be a severe problem, except that it is concentrating in the flesh of invasive clams that infest the waterways' northern reaches, especially parts of San Pablo Bay, the Carquinez Strait and Suisun Bay.

That's a problem for anything that eats the overbite clams, including ducks and sturgeon, one of the region's most popular sport fish.

Sturgeon already have selenium levels near those associated with reproductive problems, and sturgeon populations have not flourished as one might expect given the number of clams available to eat, Luoma said. Still, it is difficult to decipher if the problem already is affecting fish, because weak or deformed fish usually are eaten before they can be documented.

"If it gets worse, it will affect sturgeon," Luoma said.

It is unclear whether ducks or other birds have been affected. The sprawling wetlands on the shores of the San Pablo and Suisun bays are important bird habitats, with the Suisun Marsh containing 10 percent of California's remaining wetlands in the West Coast's largest brackish water marsh.

Recent studies by Luoma and others are building the case that despite dramatic reductions in selenium pollution from farms and refineries, the northern bay remains especially sensitive to it, due largely to the unwelcome overbite clam.

"What it does show you is that we shouldn't be adding any more selenium into the system," said Eugenia McNaughton, manager of the quality assurance section at the U.S. Environmental Protection Agency's San

Francisco office who has worked on selenium issues for years. "We need to get those numbers lower than they are right now."

The developing information is another thorny challenge for plans to reconfigure Delta water deliveries. Big water agencies from the Bay Area to Southern California want to improve the reliability of their Delta water supplies by building tunnels or canals around the Delta.

That could worsen San Francisco Bay's selenium problem because much of the selenium-tainted water that currently comes down the San Joaquin River -- the Delta's single largest source of selenium -- is taken up by pumps that recirculate San Joaquin water back to farms and cities.

If new intakes on the Sacramento River replace, or partially replace, the Delta pumps, more selenium from the San Joaquin River could flow into the bay, and less Sacramento River water would be available to dilute pollution and push selenium through the estuary.

"We're trading clean Sacramento River water and in return we're getting low-quality San Joaquin River water," Luoma said.

No one knows how much more selenium would flow into the bay if Sacramento River water is diverted upstream of the Delta.

State water officials are considering the issue in an ongoing study, said Karla Nemeth, a spokeswoman for Bay Delta Conservation Plan.

"It is a subject of analysis in the environmental review documents," Nemeth wrote in an email this week.

The full study she was referring to has not been publicly released, but government scientists who reviewed it last year were highly critical. Their objections led to numerous revisions that are continuing nearly a year after the study was supposed to be completed.

A summary of an earlier draft acknowledges the water diversion could increase selenium toxicity for Sacramento splittail, a large minnow that eats clams.

Selenium is a naturally occurring element found in crude oil and the ancient marine sediments of California's Coast Range.

Selenium is one byproduct of crude oil that refineries discharge in wastewater. Irrigation leaches selenium out of the soil and brings it to the surface, where it gets into farm drainage water.

A small amount of selenium is essential for people but too much is dangerous. The Delta selenium level is low enough that experts say drinking the water is safe for people. The only human threat would be to those who eat a lot of contaminated sturgeon or ducks.

But for wildlife, selenium can be a bigger problem and it can quickly take a huge ecological toll.

In 1983, highly concentrated selenium at Kesterson in the food web caused nearly two-thirds of the embryos and hatchlings of ducks and other water birds to die or hatch with deformities that year.

In the bay, the threat remains even though refinery and selenium discharges from some parts of the San Joaquin

Valley have been slashed.

Refineries spent tens of millions of dollars to cut selenium releases, said Tupper Hull, spokesman for the Western States Petroleum Association. They appear to have dropped by about two-thirds since the late 1990s, state regulators say.

"I think there's an acknowledgment that the refineries have done what's feasible to do," Hull said, adding they are not necessarily done.

"This is an ongoing effort," he said.

As the refineries reduced their discharges, the concentration of selenium in the estuary's clams declined until 2009, when it began rising again, said Robin Stewart, a researcher at the U.S. Geological Survey in Menlo Park.

It is unclear exactly why that happened, though it is possible the recent drought caused less water to flow through the bay, which in turn could have given clams more time to ingest selenium.

Farmers in the northern San Joaquin Valley, meanwhile, say they have reduced selenium discharges by 87 percent since the 1990s, though progress toward a goal to eventually eliminate the discharges has been slower than planned.