

A major pollutant goes unregulated

By Lloyd G. Carter

Nearly three decades ago federal scientists discovered the cause of a massive die-off of fish and birds at the Kesterson National Wildlife Refuge in Merced County, 10 miles north of Los Banos. Selenium, a trace element scattered through the soils of the Western San Joaquin Valley, had been dissolved by irrigation in the Westlands Water District and then funnelled in drainage water from the fields to evaporation ponds at Kesterson through a cement-lined drainage ditch called the San Luis Drain. As the selenium moved up the Kesterson food chain it became more lethal until it caused the deaths of thousands of migratory birds and near total reproductive failure in some avian species.

In February of 1985 the State Water Resources Control Board declared the Kesterson evaporation ponds a public nuisance threat and gave the U.S. Bureau of Reclamation, which operates the big federal irrigation project delivering Northern California to the Western San Joaquin Valley, three years to stop the pollution or close the Kesterson facility. The next month the Reclamation agency closed Kesterson and Westlands growers have been without drainage since then, causing nearly 100,000 acres of land to salt up and go out of production, a process known as salinization, which is occurring to this day throughout the world where irrigated agriculture is practiced.

Shockingly, nearly 30 years since scientific confirmation selenium was killing migratory birds protected by international treaty, the United States Environmental Protection Agency (EPA) has not established wildlife protection criteria for selenium dumping in aquatic environments. Selenium is a strange element which is a micro-nutrient in animals and humans but also highly toxic in amounts slightly higher than that needed for nutritional necessity. A dramatic example is an overdose of selenium given to 21 polo horses from Venezuela which were to compete in the U.S. Open polo tournament in April of 2009. They all died within hours of taking the selenium, which was given to the horses purportedly to help them recover from exhaustion.

Selenium continues to be very popular on the vitamin and supplement market, being touted as a cure for everything from cancer to dandruff. Its dangers, particularly to fish and wildlife, are rarely mentioned.

Yet selenium continues to negatively impact fish and birds not only in the irrigated agriculture of the western San Joaquin Valley but in other parts of the United States where coal mining or phosphate fertilizer mining occurs.

In mid-June, a federal judge in Charleston, West Virginia, acting in a suit filed by environmentalists, including the Sierra Club, ruled that the Patriot Coal Company continues to dump selenium-laden mining wastes into the watershed of Mud River in Appalachia, killing off the fishery. District Judge Robert C. Chambers criticized Patriot Coal's Hobet Mining subsidiary and the West Virginia Department of Environmental Protection for failure to set a deadline for complying with state selenium limits at the company's Hobet 21 mountaintop-removal mining complex. The judge ordered a hearing for August to consider issuing an injunction.

"Hobet's track record of non-compliance and the WVDEP's history of acquiescing to deadline extensions and other modifications to ease permit requirements suggest compliance is not likely without intervention on the part of this court," Chambers wrote in a 55-page opinion.

More than two years ago, nationally recognized selenium expert A. Dennis Lemly said fish in the Mud River are suffering grotesque deformities evocative of selenium poisoning, including fish with two eyes on one side of the head and others with curved spines, eerily reminiscent of the deformities in Kesterson bird embryos. In a report to the federal court which is looking into the selenium poisoning at the Hobet mine, Lemly predicted that continued selenium dumping in the Mud River by coal mining would put the river's ecosystem "on the brink of a major toxic event . . . If waterborne selenium concentrations are not reduced, reproductive toxicity will spiral out of control and fish populations will collapse."

And yet in January of this year, the U.S. EPA actually approved expansion of the Hobet mining operation, apparently oblivious to the spreading selenium problem.

In southern Idaho, both wildlife and livestock have died from selenium poisoning as a result of phosphate for fertilizer mining by several mining companies, including the J.R. Simplot Company. According to the Greater Yellowstone Coalition (www.greateryellowstone.org), research by the Simplot company itself on the effects of selenium released from one phosphate mine revealed that trout populations were being devastated in the Sage Creek watershed and downstream in Crow Creek. The report showed that selenium was causing declines of 20 percent and higher in creek trout populations

The Idaho Department of Environmental Quality reported that the entire Blackfoot River and more than 90 miles of its tributaries — nearly 40 percent of the perennial stream miles in the Upper Blackfoot River watershed, along with their fish populations — are showing evidence of being poisoned by selenium. In August of 2009 at least 18 head of cattle died from eating selenium-contaminated forage at the Simplot owned Lanes Creek Mine, virtually at the headwaters of the Blackfoot River. These fatalities only added to the tally of hundreds of head of livestock already killed by selenium contamination.

U.S. EPA has stood by for decades, unwilling to set a wildlife safety standard for water anywhere in the United States.

A little history is illuminating. Section 101 (a) (2) of the 1972 Clean Water Act stated that... "[It] is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife . . . be achieved by July 1, 1983[']"

Ironically, 1983 was the year that federal scientists, including the EPA, indisputably knew that selenium in elevated amounts was highly dangerous for critters living in aquatic environments. That 1983 deadline came and went with no selenium standard in place.

EPA's last Federal Register proposed revision of national selenium criteria (December 17, 2004) explicitly stated: "Therefore, this draft selenium recommendation *is not designed to protect birds or terrestrial wildlife.*" (Emphasis added.)

How much selenium can fish, birds and mammals in an aquatic environment handle? According to research in the early 1990s at an EPA laboratory in Corvallis, Oregon, one part per

billion is about the safety threshold for fish and mammals. That's about one drop in an Olympic-sized swimming pool. That report, by researchers Jeffrey A. Peterson and Alan V. Nebeker, was published in 1992 in the peer-reviewed Archives of Environmental Contamination and Toxicology, Vol. 23, pages 154-162. Apparently, top officials at the EPA during the Clinton years, the Bush II years, and the first part of the Obama Administration, aware that cleaning up selenium contamination caused by irrigated agriculture on high selenium soils, coal mining, and phosphate mining, would cost those industries money, decided to shelve the Peterson/Nebeker report and as a result EPA IS STILL WORKING ON ESTABLISHING A NATIONAL SELENIUM CRITERIA FOR WILDLIFE THREE DECADES AFTER THE KESTERSON DISASTER.

EPA has the responsibility and the authority to protect wildlife from selenium not only under the Clean Water Act but also under Executive Order 13186, signed on January 10, 2001, by President Clinton 10 days before he left office. That order is titled "Responsibilities of Federal Agencies to Protect Migratory Birds" and one part of it states "each [federal] agency shall . . . prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable . . ." It must be remembered that the Migratory Bird Treaty Act was the law cited by the Reagan Administration in shutting down the evaporation ponds at Kesterson in 1985. That was the last time any presidential administration has used the treaty to protect birds from poisoning by agricultural waste water in California.

And the same story applies here in the San Joaquin Valley. The February, 1985 Kesterson cleanup order also included language that the Central Valley Regional Water Board begin addressing the problem of unregulated discharges of agricultural waste water from federal irrigation districts north of Westlands. Those districts from Merced County north to the Delta receive their irrigation supplies from the Delta-Mendota Canal, which was completed in 1951, long before anyone uncovered the dangers of selenium in waterways (although rangeland selenium toxicity for livestock was known in the Dakotas and other states nearly a century ago). Thus, those Delta-Mendota Canal irrigation districts have been dumping their untreated agricultural waste water into the lower San Joaquin River for nearly 60 years. For the first 25 years after the Kesterson cleanup order, those districts operated under a waiver issued by the Central Valley Regional Water Board and continued to dump their toxics in the lower river. This year, the Regional Board granted those drainers yet ANOTHER 10-YEAR EXEMPTION! How is it a polluting industry killing off a river gets 35 years to continue business as usual?

The Regional Board's exemption is being appealed to the State Water Board but given the state board's lax enforcement policies it seems likely it will merely rubber stamp the Regional Board's exemption.

Those federal irrigation districts north of Westlands surround the 50,000-acre Grasslands Water District, which is duck hunting district and wintering ground for tens of thousands of migratory birds on the Pacific Flyway. Thus, the districts are known as the "Grasslands drainers" and funnel their selenium-tainted wastewaters through Grasslands canals and sloughs into the lower San Joaquin River in an effort to reduce selenium loading into the river. The Grassland Bypass Project also includes the use of subsurface drainage to irrigate salt-tolerant crops in areas called "re-use areas" to reduce the volume of drainwater entering the river. Approximately 4,000 acres (three times the size of the Kesterson killing ponds) of land has been planted with salt-tolerant crops and

irrigated with the high selenium drainwater. Re-use areas are also a crucial part of the proposed in-valley management plan for Westlands' drainage, but on a much larger scale.

Monitoring of selenium levels in the Grasslands' re-use area is required because these lands integrate with the landscape and provide habitat for wildlife. Critics claim the trade-off here is a cleaner river for a more polluted terrestrial landscape. Over 42 studies of birds have been found to use the 4,000-acre drainage re-use area. Selenium concentrations of up to 90 micrograms per gram dry weight in two bird species – avocets and stilts – were recorded in 2006 in the Grasslands re-use area, a value representing an astounding degree of contamination which rivals the lethal selenium levels documented at Kesterson.

The re-use area monitoring is a grim reminder of the enormous volume of selenium that exists within the soils of the Western San Joaquin Valley (eroded from the shale of the Coast Range mountains), both in Grasslands and the 600,000-acre Westlands district. The disturbing selenium levels in the re-use area are a reminder that the drainage problem for western valley agriculture remains unresolved and that the selenium genie is now out of the bottle. Experts say regulators need to shift the focus back to regulating selenium in the valley, in addition to regulating selenium discharges to the San Joaquin River, the Delta and San Francisco Bay (which is also impacted by selenium discharges from oil refineries). However, the Regional Water Board, rather than doing its job, has decided to give the drainers/polluters another free pass for the next decade.

There is one bright spot in this gloomy picture. New EPA Region Nine Administrator Jared Blumenfeld seems interested in addressing the selenium problem in California. On June 14, Rep. Grace Napolitano, a Southern California congressperson who chairs the House Subcommittee on Water and Power, and fellow California Rep. John Garamendi, wrote Blumenfeld and Bureau of Reclamation Regional Director Don Glaser to complain about the 10-year waiver granted by the Regional Water Board and urged that only a one-year waiver be issued.

Their letter noted, "Many Californians remember the horrific photographs of deformed ducks from Kesterson Reservoir, a scene that forced the Bureau of Reclamation to abandon their historic practice of dumping contaminated water and thinking it would just go away. Thirty years have passed since the first impacts of the agricultural drainage water first began to be seen. Thirty years when we should have been developing solutions rather than continuing to ask for waivers to continue to put Californians and their environment at risk."

It should be noted, however, that Rep. Napolitano has never held a field hearing in the San Joaquin Valley to draw attention to the dangers of drainage water.

In any event, it is no longer a question of proving selenium's dangers to aquatic ecosystems, wildlife and fish. The evidence is clear. It's only a matter of political courage in the EPA regionally and nationally and more members of Congress demanding action. The U.S. Geological Survey is working with the U.S. Fish and Wildlife Service to draft selenium standards for San Francisco Bay. Three decades late, but at least it's a start. As things now stand, no one can state with certainty what the selenium loading of the lower San Joaquin River is doing to South Delta wildlife and fish.

However, the EPA needs to establish nationwide aquatic environment criteria for selenium, despite the complaints from mining companies and agribusiness that it will cost them money to be responsible for their own pollution. And the EPA needs to do it sometime this century, while there are still some fish in America's rivers. Thirty years of stall-and-delay is enough.

To learn more about selenium, go to the U.S. Geological Survey's Selenium Library at <http://wwwrcamnl.wr.usgs.gov/Selenium/library.htm>.