

Retiring Poisoned Lands in the Western San Joaquin Valley A C-WIN Policy Brief

*It is the policy
of the California Water Impact Network to:*

- **Retire poisoned lands from irrigation so that pollution from naturally high levels of contaminants such as salt, selenium, boron, mercury, arsenic and molybdenum is ended.**
- **End wasteful and unreasonable uses of water as mandated under the California Constitution.**
- **Slow or stop the spread of contamination to drinking water supplies, aquifers and aquatic food webs (including those with anadromous fish) where it now occurs, thereby protecting human and public health.**
- **Redirect as much as 4 million acre-feet of fresh water freed from retired lands to other beneficial uses within the Central Valley watershed, including fish and wildlife refuges, Delta ecosystem restoration and instream flows, and drought-period municipal uses.**
- **Require that solutions for retiring the poisoned lands from irrigation result in either no net change or an actual net decrease in energy consumption associated with use of those lands.**

The Toxic Spring of 1983

In the spring of 1983, federal wildlife biologists found that a majority of birds nesting at [Kesterson National Wildlife Refuge](#) had deformed embryos and chicks. Nearly two-thirds of Refuge birds had missing eyes and feet, protruding brains, and twisted beaks, legs and wings. The number of breeding birds able to reproduce collapsed. These birds had been poisoned and the reservoir at Kesterson became synonymous with “toxic disaster,” a western Love Canal

The culprit for these disfiguring effects on wildlife is [selenium](#). This element occurs naturally in estuaries, marshes, and in our food supply (such as in nuts). The western San Joaquin Valley and its Coast Range foothills have naturally high levels of selenium in the rocks and soils. Fish, birds, and mammals—including humans—obtain the small but required amount of selenium from eating a normal diet. But at just slightly higher levels, selenium becomes actively poisonous, causing embryonic defects and reproductive problems in vertebrate animals.

Selenium also occurs naturally in soils and mineral deposits like coal and oil. Wastes from agriculture, industry, mining, and gas and oil refineries can increase selenium contamination in estuaries and bays. When bottom-dwelling organisms like clams, snails, and worms graze, they accumulate selenium in their tissues. Once eaten, selenium quickly builds up in the tissues of their predators, the fish, birds, and even humans higher up in aquatic food webs.

The disaster at Kesterson National Wildlife Refuge was the earliest and most vivid example of the western San Joaquin Valley’s toxic legacy. It was caused by the west side growers’ success in obtaining and applying a large supply of irrigation water from the Delta Mendota Canal and the California Aqueduct to lands naturally contaminated with salts, selenium, and high levels of other toxic elements. West side growers are well known for their ongoing water supply complaints pitting “farmers against fish,” but the California public is much less aware of the toxic pollution that their use of water causes. At stake is not only the health of the San Joaquin Valley’s water ways and aquifers but the sustainability of west side agricultural production, at risk not only from selenium poisoning but from immense salt build-ups.

Today, selenium levels are increasing in Suisun Bay, Mud Slough, and the San Joaquin River, and [threaten many species](#), including salmon, white sturgeon, green sturgeon and migratory birds. The solution is to stop the irrigation of poisoned lands in the western and southern San Joaquin Valley. This C-WIN Policy Brief makes the case for doing that. As stated by the Pacific Institute, “... permanently retiring 1.3 million acres of drainage-impaired lands in the San Joaquin Valley would save 3.9 million acre-feet of water per year, while also reducing cleanup costs and minimizing the social and environmental impacts associated with polluted surface and groundwater.”

Selenium and Salt: The Valley’s Drainage Problems

Millions of years ago, the lands of the western San Joaquin Valley and Coast Range were an ancient seabed. As the shallow seas and wetlands of that epoch dried up and folded into



*Deformed duck embryos poisoned by selenium contamination.
Courtesy of US Fish & Wildlife Service.*

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mountains, elements such as selenium, boron, molybdenum, mercury, arsenic, and various other salts and minerals concentrated in the mud, soils and rocks that formed.

Today, many San Joaquin Valley growers irrigating orchards, vineyards and field crops along Interstate 5 face a vicious cycle of irrigation and pollution that threatens the productivity of their lands and the ecological and economic health of the San Joaquin River and the Delta estuary downstream.

To continue cultivating in these areas, growers must apply extra water just to leach salts from the root zone in order to keep the land producing. As their crops take up irrigation water, they filter out salts. The salts instead build up in the soil. The leaching also mobilizes selenium, boron, mercury, molybdenum, arsenic, and other toxins in the soils. This toxic brew of irrigation drainage percolates down to a shallow impermeable layer called "Corcoran Clay." The water pools on top of the Corcoran Clay. The more irrigation water is applied, the higher the toxic brew in the groundwater rises. The brew threatens to drown whole crops and turn the fields into lifeless salt-encrusted wastelands.

The Valley growers' water supply problems and their drainage problems are linked: the more surface water they use the more their drainage problems compound, and the more pollution drains into the west side creeks and sloughs of the San Joaquin Valley that drain ultimately to the Delta, completing the vicious cycle of pollution.

This poisoned drainage percolates downhill toward open waterways like ditches, wetlands, the San Joaquin River, and its tributaries. [Left alone, the land would permanently salinize](#) just from the salts in the groundwater. Some lands of the San Joaquin Valley already resemble a snowy desert, incapable of growing crops. Winds whip up the salt grains as airborne dust pollution. Such dust aggravates respiratory difficulties of many San Joaquin Valley residents.

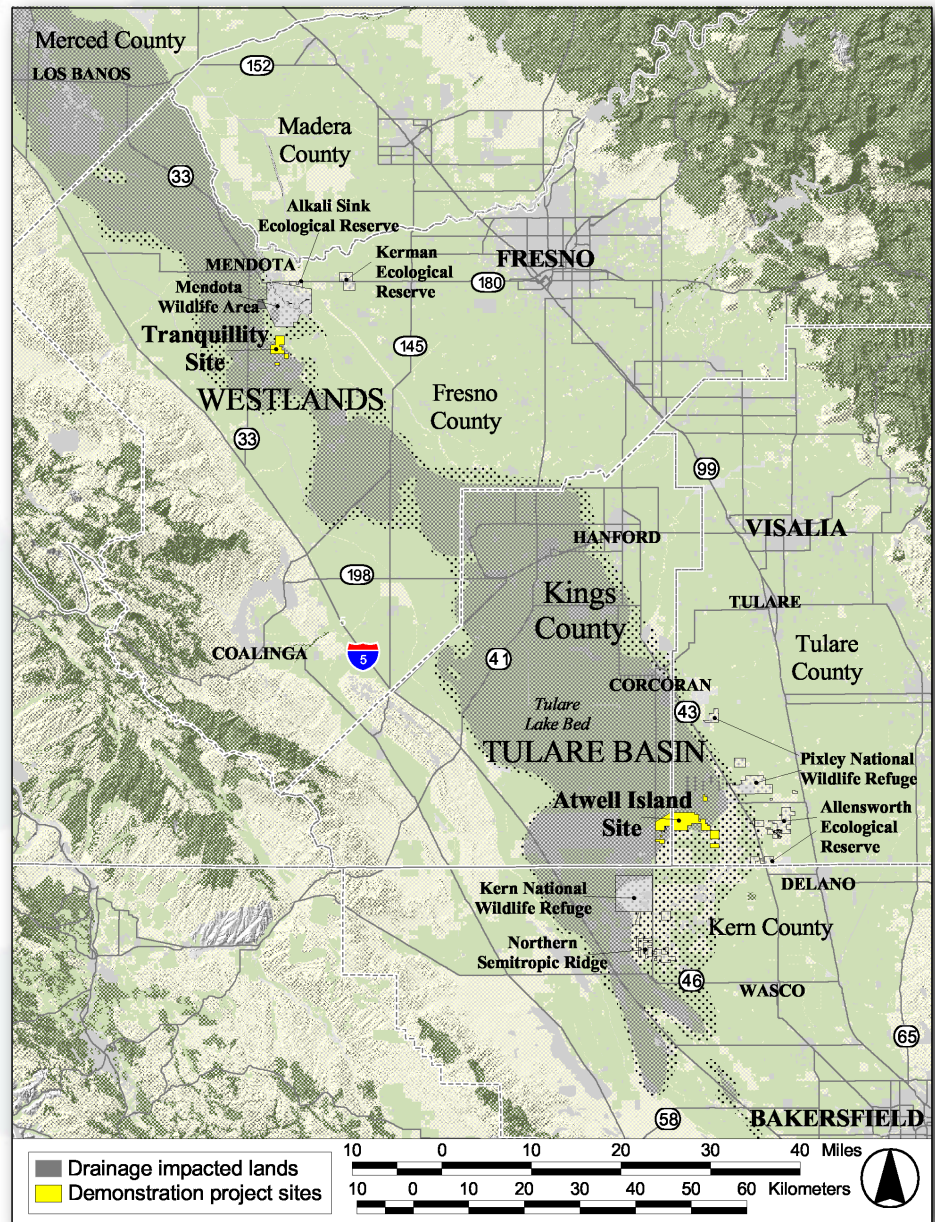
In other areas of the San Joaquin Valley where the Corcoran Clay is absent or perforated with wells, polluted irrigation drainage percolates into deeper aquifers used for drinking water for many Valley residents. Several communities in the Valley have to import bottled drinking water to meet their basic needs.

Pouring Water on the Drainage Problem

The west side's saline soils have been known since at least 1931, and the toxic problems since the 1950s. When Congress approved the San Luis Authorization Act in 1960 to provide irrigation water to the Westlands Water District and adjacent smaller water districts, it required that the Bureau of Reclamation provide drainage service specifically for the San Luis Unit. The main water supply for western San Joaquin Valley growers is the Trinity River division of the federal Central Valley Project, a major north coast river with an historically bountiful salmon fishery 400 miles to the

north. Trinity supplies are tunneled into the Sacramento River and exported by Project pumps in the south Delta through the Delta Mendota Canal, and have been since the mid-1960s.

The Bureau and the State of California planned to build a "master drain" to the Bay-Delta estuary near Antioch. But by the mid-1960s, however, California withdrew its support for extending a drain to the Delta. Congress stopped construction some years later after 93 miles were completed when the cities of Antioch and Pittsburg raised strong water quality and pollution concerns.



Location of drainage problem lands in the San Joaquin Valley from Los Banos to Bakersfield. Courtesy of Land Retirement Demonstration Project, California State University at Stanislaus.

When stopped in the mid-1970s, the San Luis Drain ended at Kesterson Reservoir near Los Banos. As events unfolded, it would be the end of Kesterson and its wildlife refuge.

After discovery of the selenium pollution, the ponds at Kesterson were drained, sealed, and buried in 1986. But

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subsidized water deliveries from state and federal water projects continue the toxic legacy of irrigation drainage in these poisoned San Joaquin lands. Since 1985, the federal [Central Valley Project \(CVP\) and the State Water Project \(SWP\)](#) have delivered nearly 4 million acre-feet of water in most years to growers irrigating approximately 1.3 million acres of toxic soils with shallow groundwater containing selenium and salts on the west side of the San Joaquin Valley and the Tulare Lake Basin from Gustine to Bakersfield.

Delta water contains sea salt from the estuary's tidal flows from San Francisco Bay. Delta export pumping adds 4,000 tons of salt daily (the equivalent of 40 railroad cars) to the already-saline soils of the western San Joaquin Valley. Only 1,700 tons of salts leave the basin daily in polluted drainage runoff to the San Joaquin River despite heavy investment by irrigators in expensive, unproven, and energy-intensive treatment technology such as the [Grasslands Bypass Project's](#) reverse osmosis facility.

Despite the gruesome and widespread effects of selenium pollution, state water quality regulation in this part of California has been lax. While much of the San Luis Drain was closed after the Kesterson disaster, growers in the Grasslands area near Los Banos (and who operate the [Grasslands Bypass Project](#)) soon after obtained permission from the Bureau to use 27 miles of the Drain to collect and dump the salt and selenium, and other toxins directly into Mud Slough, which ultimately drains to the San Joaquin River and Bay-Delta Estuary. The bypass project began operating in 1995.

Over opposition from a coalition of environmental groups led by C-WIN in 2010, the [Central Valley Regional Water Quality Control Board](#) recently renewed the Grasslands drainers' waiver to continue violating water quality standards for another 9 years and 3 months to the end of 2019. By then, the Board will have coddled the drainers for nearly 25 years! While there have been significant reductions in the discharge of pollution from the Grasslands Bypass Project, C-WIN analysis shows the reductions are a direct result of significant land retirement—the removal of land from irrigated cultivation—and reductions in water deliveries during drought periods, not the actions of the Grasslands drainers such as reusing drainage water and concentrating toxic brines.

Land Retirement is Cost Effective

C-WIN contends these lands should be permanently retired from irrigation. This would immediately reduce importation of salts and movement of toxins polluting San Joaquin Valley water ways and aquifers on the west side.

The Bureau of Reclamation's [Environmental Impact Statement on San Luis Drainage](#) found that land retirement is the most cost effective solution to resolve problems associated with irrigation of these toxic soils. The Bureau's [Land Retirement Demonstration Project](#) has shown significant and immediate success in lowering contaminated groundwater levels and selenium exposure from land retirement. The [U.S. Geological Survey](#) found that "*Land retirement is a key strategy to reduce drainage because it can effectively reduce drainage to zero if all drainage-impaired lands are retired.*"

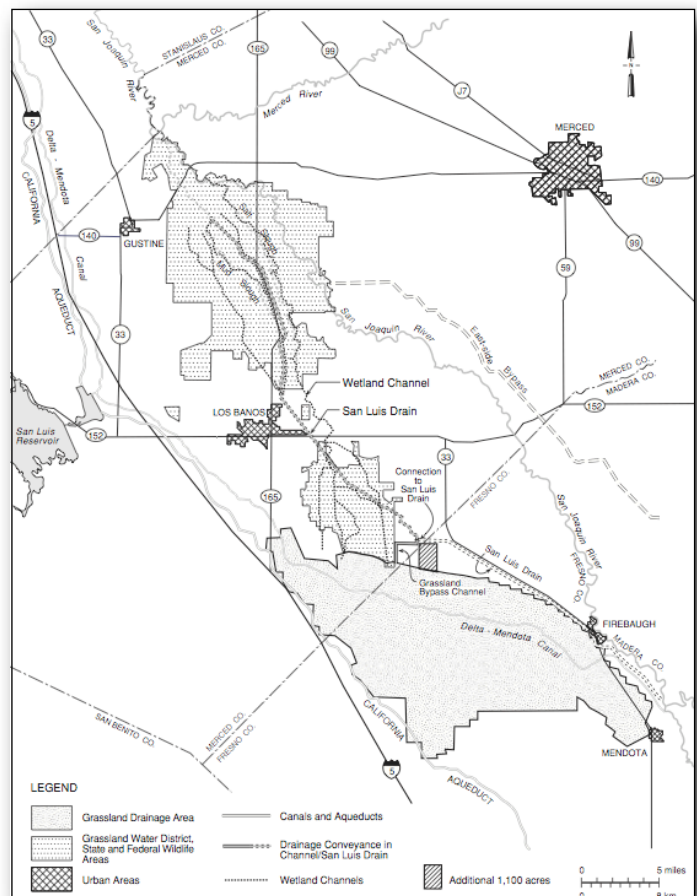
The west side of the San Joaquin Valley sees rainfall of between 5 and 10 inches a year. [Ceasing water deliveries to these toxic lands](#) need not preclude agriculture. The lands could return to dry farming (where growers rely on rainfall for their crops, as occurred in this area prior to the arrival of surface water supplies in the 1960s and 1970s). The lands may also be used for other purposes compatible with adjacent land uses such as solar "farms." Solar farms would provide much needed sustainable electricity to

complement the hydropower generation from the east side's dams on the San Joaquin River and its tributaries.

Land retirement already occurs here. Since the 1990s, Westlands Water District (the largest water district in California's Central Valley) has purchased outright about 100,000 acres of drainage problem lands within its limits. However, the land retirement alternative appears to be stalled out now in order to justify continued subsidized water deliveries.

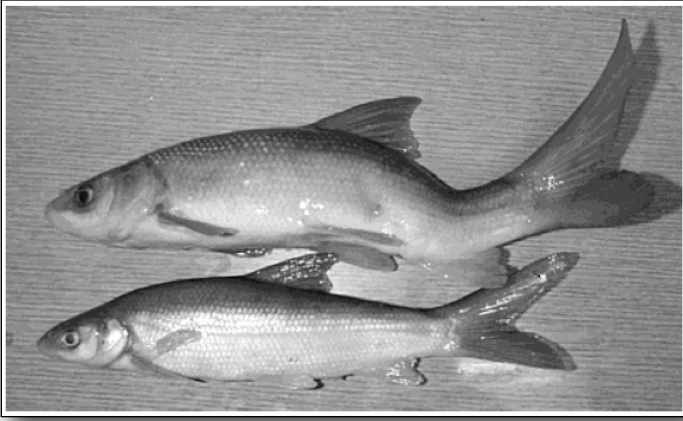
Water for Restoration, Not for Profit

Westlands irrigators hope to lock up over one million acre-feet of water annually (most of it from the Trinity River) in long-term water contracts, even though District land in production decreases. Irrigating their lands was Westlands' original reason to be. But with the long-term sustainability of these lands under irrigation in serious doubt, Westlands Water District wants to hang on to the water from its Central Valley Project contract with the Bureau. Federal water contractors like Westlands are allowed under the federal Central Valley Project Improvement Act of 1992 to sell water to cities. When District land is salted up and no longer suitable for agriculture, Westlands and other similarly positioned water districts hope to become "water ranchers." They hope to sell their contract water supplies to cities at huge profits, even though their water supplies are heavily subsidized by US taxpayers with interest free, decades-long government loans to promote agriculture. Many Westlands growers reap significant US Department of Agriculture crop subsidies as well.



Grasslands Bypass Project facilities between Gustine and Mendota in the western San Joaquin Valley. Courtesy of US Bureau of Reclamation and San Luis Delta Mendota Water Authority.

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Sacramento splittail with spinal deformity called lordosis (top) caused by selenium contamination, compared to normal splittail specimen. Courtesy of US Geological Survey and California Department of Water Resources.

Such blatant profiteering from public water supplies must be stopped. C-WIN contends that when salinized and toxic land gets retired the water contracts serving it should be proportionally retired as well based on past usage of water. If it took 3 acre-feet to irrigate an acre of land, then 3 acre-feet from the water service

contract should also be retired. Water service contracts supported irrigation development in trust for the California public, but such contracts do not confer an ownership interest in the water itself.

What should be done with that retired water supply? C-WIN strongly recommends that the retired water be returned to the environment, made available for urban water supplies and sustainable agriculture in other parts of California. Water quality will improve, the Delta and the Trinity River will enjoy decreased exports and increased ecological and economic health. Cities and agricultural regions should experience improved water supply reliability. Done right, American taxpayers should see reduced waste of their tax dollars on annual water, crop and energy subsidies to owners of toxic lands.

As the best of few good options for the Valley's future, land retirement is not without cost. The land must be monitored and managed to ensure that salinity and selenium discharges are minimized or eliminated. But only [land retirement](#) relies on proven technology while achieving the most cost effective solution. Allowing other appropriate uses on the land can enable the area to recover economically and environmentally over the medium to long term.



SOLUTIONS: RETIRING POISONED LANDS FROM IRRIGATION AND CREATING NEW JOBS

- **Retire Poisoned Lands:** Retire from irrigation all agricultural lands that contain selenium, boron, arsenic, molybdenum and mercury that is mobilized by the flushing of salts from the soil.
- **Prohibit crop and water subsidies** to agricultural lands that contribute to selenium, boron, arsenic, molybdenum and mercury pollution of surface and ground water.
- **Encourage Alternate Uses for Poisoned Lands**, such as dryland farming or solar farms on lands whose natural contaminant loads contribute to pollution of surface and ground water. This would create many new jobs.
- **Retrain Displaced Farm Workers Affected by Land Retirement:** Provide job training and economic incentives for farm workers displaced from the reduction in irrigated acreage of toxic lands.

TO LEARN MORE:

- Visit C-WIN's Selenium Press Room at www.c-win.org/selenium-press-room.html
- Visit C-WIN's Poisoned Lands, Polluted Waters web section at www.c-win.org/poisoned-lands-polluted-water.html.

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