



NONPOINT SOURCE SUCCESS STORY

California

Watershed Restoration Efforts Reduced Malathion Levels in Colusa Basin Drain

Waterbody Improved

Use of the pesticide malathion resulted in elevated concentrations that were toxic to aquatic invertebrates and exceeded water quality standards in Colusa Basin Drain. As a result, Colusa Basin Drain was placed on California's Clean Water Act (CWA) section 303(d) list of impaired waters for malathion in 1998. The California Central Valley Regional Water Quality Control Board (Central Valley Water Board) initiated the Irrigated Lands Regulatory Program in 2002. Outreach and education efforts were coordinated to promote ways to address the problem. Growers implemented best management practices (BMPs) to manage the use of malathion and other pesticides. Malathion concentrations have decreased, resulting in the Central Valley Water Board's recommendation to remove Colusa Basin Drain from the impaired waters list for malathion during the 2018 Integrated Report listing cycle.

Problem

The Colusa Basin watershed is in Northern California, mainly in Colusa County, with portions spanning to Glenn and Yolo counties. The watershed covers approximately 1,045,445 acres and drains into the Sacramento River at Knights Landing through the Colusa Basin Drain (Figure 1). The Lower Colusa Basin Drain drainage area is 36,624 acres and includes 31,472 irrigated acres (non-rice).

In the late 1990s, levels of the pesticide malathion in Colusa Basin Drain exceeded applicable quality standards. As a result, the segment was placed on California's 1998 CWA section 303(d) list of impaired waters for malathion. Levels of malathion continued to be high over the next 15 years. Exceedances of the aquatic life criterion (0.028 micrograms per liter [$\mu\text{g/L}$]) were observed in March 2010 and August 2011, with a subsequent exceedance in March 2013. The Sacramento Valley Water Quality Coalition developed a management plan in 2012 as a requirement for the Irrigated Lands Regulatory Program (ILRP); the plan identified BMPs needed to reduce the offsite movement of malathion to surface water.

In addition, an evaluation of potential sources contributing to the malathion detections was completed. Based on this evaluation, agriculture is likely a contributing source. The use of malathion pesticide

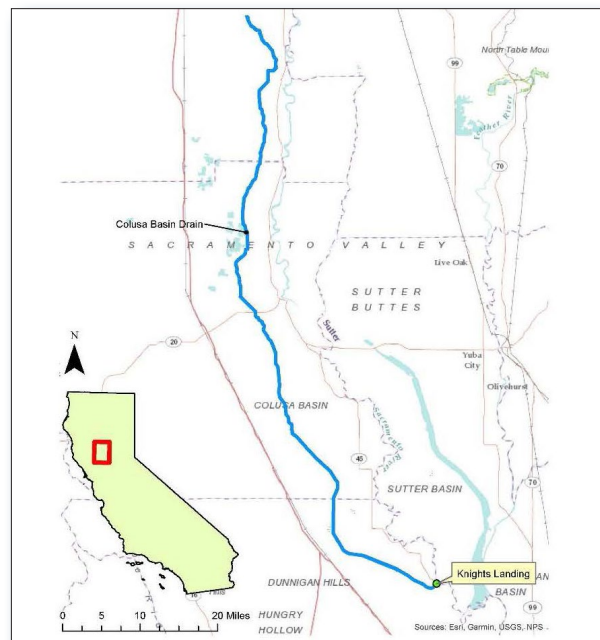


Figure 1. The Colusa Basin Drain is in Colusa, Glenn and Yolo counties, California.

on alfalfa is the primary use in the watershed, with primary pathways of transport in agricultural applications as stormwater runoff, irrigation tailwater runoff and drift from applications. Managing these pathways of transport has been the focus of outreach to control malathion exceedances.

Story Highlights

The Sacramento Valley Water Quality Coalition's Colusa Glenn Subwatershed Program and the county agricultural departments mailed exceedance notices to their growers that were using malathion. Workshops were held for growers to discuss implementation of BMPs and regulations associated with and alternatives to malathion use.

The subsequent absence of Malathion exceedances related to agricultural applications were attributed to changes in practices as a result of increased awareness of the growers and applicators, which resulted from outreach efforts of the Colusa Glenn Subwatershed Program and the local resource conservation districts, Farm Bureau offices and agricultural departments. Management practices that were implemented included improved pesticide application practices, irrigation practices (e.g., microirrigation systems, improved irrigation management practices), and practices intended to manage sediment and erosion (e.g., vegetative buffer strips). Three contracts for financial assistance with management practice implementation have been funded in Colusa County, supporting the implementation of 17 total practices across 674.5 acres.

Results

Outreach and education to growers in the area, along with improved irrigation systems and irrigation management, has been shown to prevent or reduce discharges of malathion from agricultural operations—and thus prevent or reduce the discharge of pesticides to surface waters. Specific efforts include reducing applications of malathion during conditions with high risk of drift or runoff, increasing the number of practices that minimize applications of malathion and alternative pesticides, and managing irrigation to eliminate tail water runoff.

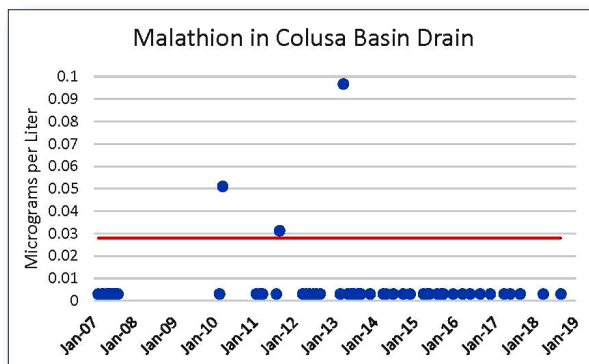


Figure 2. Malathion concentrations in the Colusa Basin Drain. Note that nondetectable samples were assigned the method detection limit of 0.003 µg/L.

Malathion in Colusa Basin Drain was delisted based on water quality results that were well below the 0.028 µg/L aquatic life criteria. Since March 2013, malathion concentrations have been below the aquatic life criteria (Figure 2). The Central Valley Water Board adopted the delisting of the Colusa Basin Drain for malathion, which was documented in the final staff report titled "Section 303(d) 2018 Impaired Waters List Updates for the Central Valley Region."

Partners and Funding

Implementing relevant practices occurred in 2016 through the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) financial assistance program and additional special funding with priorities to address water quality in Colusa and Yolo counties (Bay Delta Initiative for Water Quality Improvement in Lower Colusa Basin Drain Representative Area). The Colusa Glenn Subwatershed Program, in partnership with the Colusa office of the NRCS, received \$473,872 in EQIP funding during fiscal year 2015 to assist local growers in addressing water quality issues related to irrigation systems and irrigation management.



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For additional information contact:

Holly Grover
Central Valley Regional Water Quality Control Board
916-464-4747 • holly.grover@waterboards.ca.gov