



# NONPOINT SOURCE SUCCESS STORY

# California

## Regulatory Actions and Stakeholder Involvement Reduce Diazinon Levels in Butte Slough

### Waterbody Improved

Widespread use of the pesticide diazinon resulted in elevated concentrations that were toxic to aquatic invertebrates and exceeded water quality standards in Butte Slough. As a result, Butte Slough was placed on California's Clean Water Act (CWA) section 303(d) list of impaired waters for diazinon in 2002. The California Central Valley Regional Water Quality Control Board (Central Valley Water Board) initiated the Irrigated Lands Regulatory Program (ILRP) in 2002, and in 2003 the Central Valley Water Board adopted the diazinon total maximum daily load (TMDL) for the Sacramento River watershed. Outreach and education efforts were coordinated to promote ways to address the problem. Watershed stakeholders implemented best management practices (BMPs) to manage the use of diazinon and other pesticides. Diazinon concentrations decreased, resulting in the Central Valley Water Board's recommendation to remove Butte Slough from the impaired waters list for diazinon in 2016.

### Problem

The 9-mile-long Butte Slough flows between Butte Creek and the Sutter Bypass in Butte County in California's Central Valley (Figure 1). Butte Slough discharges to, and diverts flood water from, the Sacramento River, California's longest river. Butte Slough receives large volumes of agricultural runoff during winter storms and is dominated by agricultural return flows during the summer irrigation season.

The Butte Slough watershed contains extensive almond and stone fruit orchards. In 1994 diazinon levels were found to exceed water quality standards. For decades, growers used diazinon as a dormant spray in orchards during winter months to control wood-boring pests. Diazinon is highly toxic to aquatic life; exposure to even low concentrations of the pesticide (one part per billion or less) can cause genetic damage in fish and reduce their reproductive success.

### Project Highlights

A collaborative effort that included voluntary and regulatory approaches motivated the agricultural community to address the diazinon impairment. In 1996 the Sacramento River Watershed Program (SRWP), a nonprofit corporation, was developed from a grant from the U.S. Environmental Protection Agency (EPA) Region 9. The SRWP connected groups and individuals concerned about the health of the watershed. SRWP activities included research, monitoring and continual assessment of water quality, and outreach and education.

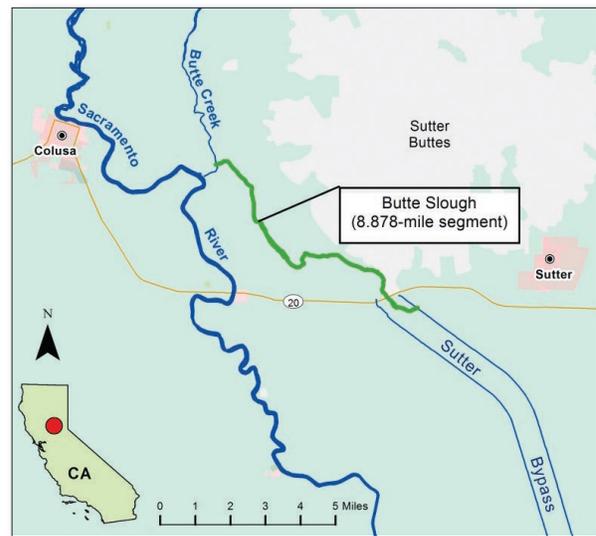


Figure 1. Butte Slough (shown in green) is in the Sacramento Valley of California.

In 2001 the SRWP Organophosphorus (OP) Pesticide Focus Group completed its Water Quality Management Strategy (Strategy) for diazinon in the Sacramento and Feather rivers. The Strategy summarized two years of research on OP pesticide concerns and presented an implementation plan to reduce diazinon runoff. An Agricultural Implementation Group composed of commodity boards, pesticide registrants and farm organizations worked to implement the Strategy. For example, growers replaced flood irrigation with sprinkler systems, installed filter strips, planted cover crops, and transitioned to pest



Figure 2. Micro-sprinklers and cover crop BMPs reduced diazinon in runoff.

management practices that limit diazinon use (Figure 2).

In 2002 the Central Valley Water Board's ILRP initiated efforts to regulate agricultural discharges. The ILRP allows growers to attain regulatory compliance through coalition groups. The Sacramento Valley Water Quality

Coalition organized to represent and educate growers about water quality problems and BMPs, monitor water quality, and meet ILRP requirements. In 2003 the Central Valley Water Board adopted a diazinon TMDL for the Sacramento and Feather rivers, which included requirements for dischargers in the Butte/Sutter Basin, and began to regulate diazinon as a waste discharge from irrigated lands.

The TMDL and ILRP requirements played a key role in motivating the agricultural community to implement BMPs. In 2003 EPA and pesticide manufacturers developed local label restrictions for agricultural uses of diazinon. Then, in 2004, the EPA Pesticide Program, under the Federal Insecticide, Fungicide, and Rodenticide Act, cancelled the registration and sale of diazinon pesticides for indoor use, nonagricultural outdoor use (lawns and gardens), and certain agricultural uses. In 2006 the California Department of Pesticide Regulation (DPR) adopted dormant spray regulations for agricultural applications. The regulations prohibit diazinon application within 48 hours of a forecast storm, or when soils are saturated.

## Results

Growers reduced diazinon runoff to Butte Slough by implementing BMPs to comply with the diazinon TMDL, ILRP requirements, DPR regulations, and pesticide label changes. Water quality samples collected since 2000 show that diazinon levels in Butte Slough meet water quality standards. None of the 61 water samples, including 19 samples collected in the dormant season, exceeded standards (Figure 3). This long-term data set provided the Central Valley Water Board with sufficient weight of evidence to propose removing Butte Slough from the 2016 impaired waters list for diazinon.

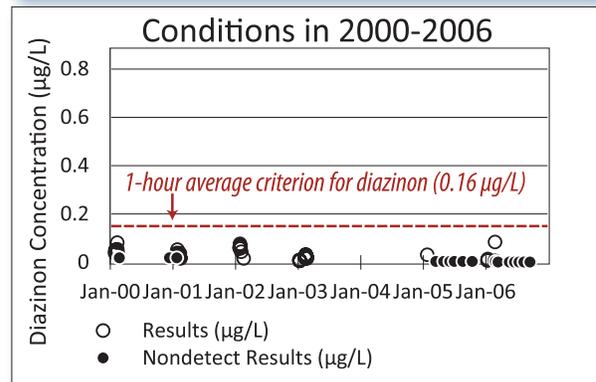
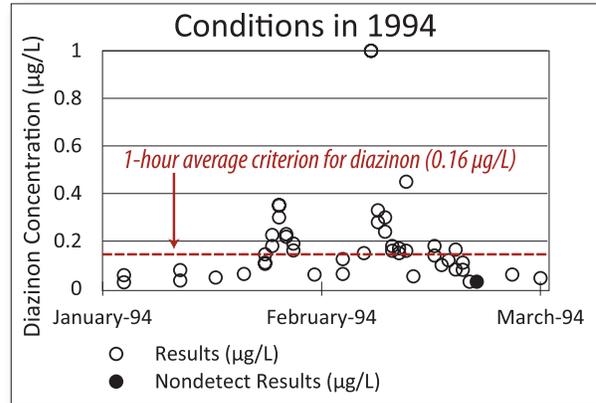


Figure 3. Samples show many exceedances in 1994 (before restoration), and none in 2000–2006 (after restoration).

## Partners and Funding

Since 1991, EPA has awarded \$7.6 million in special appropriation funds to develop the SRWP. CWA section 319 grants supported several projects that addressed diazinon in the Sacramento River watershed, including a \$219,000 grant awarded in 1997 to support ongoing SRWP planning and outreach/education efforts. A 2002 state bond-funded grant for \$932,680 was awarded to the Coalition for Urban/Rural Environmental Stewardship for projects that provided education, outreach and technical assistance to orchard growers and agricultural commissioners. CWA section 319 grants supported Central Valley Water Board staff time to address diazinon in the Sacramento River watershed; it also provided funding to continue SRWP planning and outreach/education efforts. The Central Valley Water Board's ILRP continues to work with Sacramento Valley Water Quality Coalition to improve surface waters that can be affected by pesticide runoff.



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## For additional information contact:

**Danny McClure**, Central Valley Regional Water Quality Control Board, Region 5  
916-464-4751 • [Danny.McClure@waterboards.ca.gov](mailto:Danny.McClure@waterboards.ca.gov)  
**Holly Grover**, Central Valley Regional Water Quality Control Board, Region 5  
916-464-4747 • [Holly.Grover@waterboards.ca.gov](mailto:Holly.Grover@waterboards.ca.gov)