Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
California

Stakeholders Cooperate to Reduce Diazinon in Runoff from Dormant Season Spray

Waterbodies Improved

Widespread use of the organophosphate (OP) pesticides diazinon and chlorpyrifos in California's Central Valley resulted in aquatic toxicity in the Sacramento and Feather rivers and their tributaries, Sacramento Slough and Sutter Bypass. As a result, in 1994 the Central Valley Regional Water Quality Control Board (CV-RWQCB) added a 16-mile segment of the Sacramento River, a 42-mile segment of the Feather River, the 1.7-mile-long Sacramento Slough, and the 19-mile-long Sutter Bypass to the CWA section 303(d) list of impaired waters. In 2001, the Sacramento River Watershed Program (SRWP) developed and implemented a water quality management strategy for the two rivers, which included installing on-site best management practices (BMPs). Diazinon concentrations decreased, prompting CV-RWQCB to remove Sacramento Slough and Sutter Bypass from the CWA section 303(d) list in 2006. The state has recommended the removal of the Sacramento River and Feather River segments (58 river miles total) from the 2010 CWA section 303(d) list for diazinon impairments.

Problem

The Sacramento River is California's longest river, flowing from Mt. Shasta to the confluence with the San Joaquin River at the Sacramento-San Joaquin Delta. The Feather River is the primary tributary to the Sacramento River (Figure 1). The Sutter Bypass is a floodwater bypass that diverts excess water from the Sacramento River between two large levees. It also provides for local drainage for the Sutter/Butte Creek Basin. The Sacramento Slough (Figure 2) serves as an outlet for the Sutter Bypass to flow into the Sacramento River.

Orchard managers used diazinon for decades to control wood-boring pests in the stone fruit and nut orchards in the Sacramento/Feather River watershed. Diazinon is highly toxic to aquatic life, and 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.

Samples collected from the Sacramento and Feather rivers and their tributaries by the U.S. Geological Survey (USGS) in 1992 showed that diazinon levels exceeded the California Department of Fish and Game's Hazard Assessment Criteria of 0.16 µg/L 1-hour average (acute), 0.10 µg/L 4-day average (chronic).

A 1993 study linked diazinon use on orchards during the dormant season (December through February) with elevated ambient concentrations of diazinon and aquatic toxicity in the Sacramento

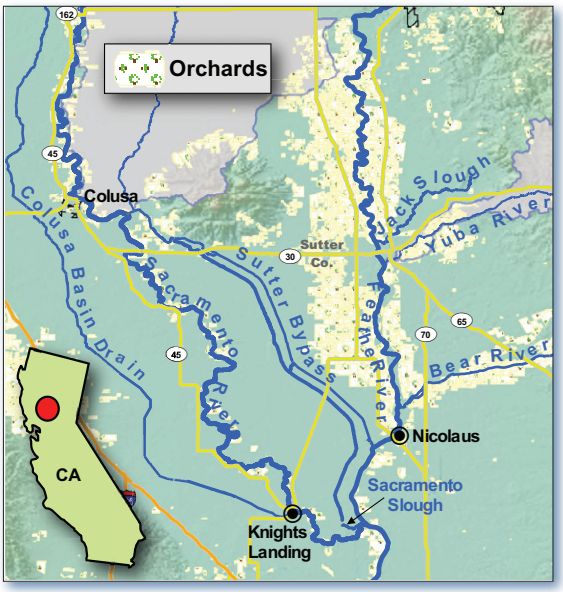

Figure 1. Map showing locations of Sacramento and Feather rivers and their tributaries, Sutter Bypass and Sacramento Slough.

Figure 2. Sacramento Slough at low-flow conditions.

and San Joaquin rivers. As a result of the USGS sampling results, in 1994 the CV-RWQCB added a 16-mile segment of Sacramento River, from Knights Landing to the Delta; a 42-mile segment of Feather River from Lake Oroville to Sacramento River; and the tributaries Sacramento Slough (1.7 miles) and Sutter Bypass (19 miles) to the CWA section 303(d) list due to aquatic toxicity caused by diazinon. Over the next decade, state and federal resources supported an extensive stakeholder process to develop a total maximum daily load (TMDL) for diazinon in the Sacramento River and Feather River watersheds.

Project Highlights

In 2001 the SRWP 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 the OP pesticide issue and presented an implementation plan designed to reduce diazinon in runoff during the dormant season. An Agricultural Implementation Group composed of commodity boards, pesticide registrants, and farm organizations worked to implement the Strategy and install various structural and management BMPs. For example, landowners replaced flood irrigation in orchards with piped sprinkler systems, installed filter strips, planted cover crops, and transitioned to pest management practices that limit diazinon use.

The Central Valley Water Board's 2003 adoption and subsequent implementation of the diazinon TMDL water quality objectives and allocated reductions was instrumental to the success of this project. The development of the TMDL played a key role in motivating the agricultural community to implement BMPs.

In 2003 CV-RWQCB began using its authority to regulate diazinon as a waste discharge from irrigated lands. Also in 2003 the U.S. Environmental Protection Agency (EPA) and pesticide manufacturers developed local label restrictions for agricultural uses of diazinon, including dormant-season applications. 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, non-agricultural outdoor use (lawns and gardens), and certain agricultural uses. In 2006 the California Department of Pesticide Regulation adopted diazinon dormant spray regulations for agricultural applications. The regulations prohibit the application of diazinon within 48 hours of a forecasted storm or when soils at the application site are saturated.

Results

Implementing the diazinon TMDL and SRWP Strategy to reduce diazinon runoff reduced diazinon levels in all four waterbody segments. For example, of 88 samples collected between 1996 and 2001 from the Sutter Bypass and 109 samples collected between 2000 and 2005 from the Sacramento Slough, none exceeded the water quality objective of 0.16 μg/L 1-hour average. As a result, the CV-RWQCB removed Sacramento Slough and Sutter Bypass from the 2006 CWA section 303(d) list for diazinon impairments. Samples collected on the Sacramento River (193 samples between 2005 and 2007) and the Feather River (15 samples in 2004) also did not exceed the water quality objective for diazinon. Based on these data, CV-RWQCB proposes to remove the 16-mile segment of the Sacramento River and the 42-mile segment of the Feather River from the 2010 CWA section 303(d) list for diazinon impairments.

Polluted runoff from both agricultural and urban areas continues to affect the water quality of the Sacramento and Feather rivers. The SWRCB and CV-RWQCB provide funding and technical assistance to support collaborative efforts to address continued aquatic toxicity problems.

Partners and Funding

Since 1991, EPA has awarded $7.6 million in special appropriation funds to develop the SRWP. Another $2.72 million in CWA section 319 grants supported several projects addressing diazinon in the Sacramento and Feather River watersheds since 1997, including a $219,000 grant awarded in 1997 to support ongoing SRWP planning and outreach/education efforts, a $350,000 grant awarded in 2001 to the California Dried Plum Board for implementing the SRWP Strategy, and a $990,000 grant awarded in 2005 to the Community Alliance with Family Farmers for educating growers in Sutter and Yuba counties and demonstrating mitigation measures for dormant season spray application.

Other funding sources included a CALFED (a state and federal consortium) Watershed Program grant for $310,000 in 2002 and a $932,680 state-bond-funded grant to the Coalition for Urban/Rural Environmental Stewardship in 2002 for projects that provided education, outreach and technical assistance to orchard growers and Agricultural Commissioners. In 2008 the Sutter County Resource Conservation District received a USDA Water Enhancement Program grant for $905,000 to implement BMPs to reduce diazinon levels in runoff to the Feather River.

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