# Section 319
# NONPOINT SOURCE PROGRAM SUCCESS STORY

California

## Stakeholders Cooperate to Reduce Diazinon in the San Joaquin River

### Waterbodies Improved

Widespread use of the pesticide diazinon resulted in elevated concentrations in the San Joaquin River (SJR) that were toxic to aquatic invertebrates and exceeded water quality standards. Consequently, the SJR was placed on California's Clean Water Act (CWA) section 303(d) list of impaired waters for diazinon in 1992. Watershed stakeholders implemented agricultural best management practices (BMPs) in orchards to lessen the use of organophosphate pesticides, including diazinon. Regulatory developments also reduced diazinon use. SJR diazinon concentrations decreased, prompting California to remove two reaches of the SJR from the state's list of impaired waters for diazinon in 2010.

## Problem

The SJR watershed in California's Central Valley is bounded by the Sierra Nevada Mountains on the east, the Coast Range on the west, the Sacramento–San Joaquin Delta to the north, and the Tulare Lake Basin to the south. The 350-mile-long SJR flows through an irrigated agricultural region.

In the early 1990s, monitoring by the U.S. Geological Survey, the Central Valley Regional Water Quality Control Board (CV-RWQCB) and the California Department of Pesticide Regulation (DPR) detected diazinon in the SJR at levels that were toxic to aquatic life and exceeded water quality standards. As a result, California added numerous SJR segments, including the 3-mile Stanislaus River to Delta reach and the 14-mile Bear Creek to Mud Slough reach (Figure 1), to the 1992 CWA section 303(d) list of impaired waters for not supporting beneficial uses for warm and cold freshwater habitat.

One of the main sources of diazinon in the SJR was identified as the pesticides used on orchards during the dormant season (December through February) to protect crops from overwintering pests. Runoff from these areas following winter storms contributed diazinon to nearby waterbodies.

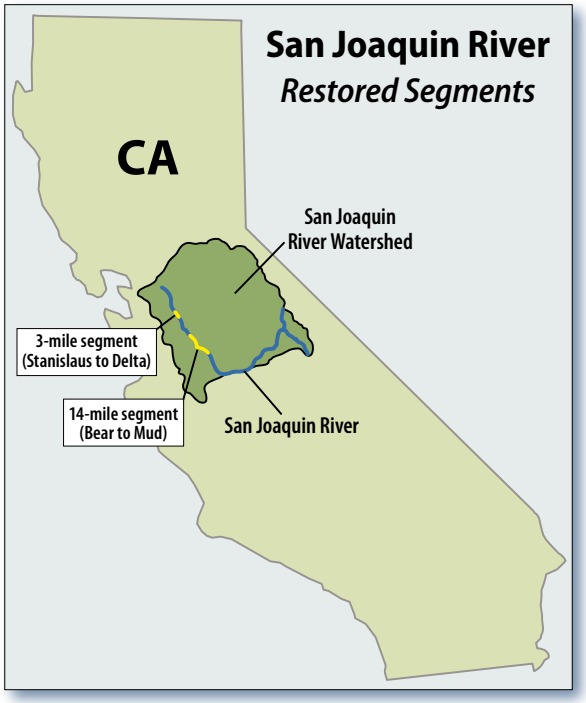


Figure 1. Reducing pesticide use improved two impaired segments in the SJR (noted in yellow).

## Project Highlights

A collaborative effort that included both voluntary and regulatory approaches motivated the agricultural community in the SJR watershed to reduce diazinon use. Beginning in the 1990s, a number of grants and research projects by the University of California (UC) and others supported the development of diazinon management practices and encouraged participation by local growers.

In 1994 watershed partners initiated the Biologically Integrated Orchard System (BIOS) project, a community-based pollution prevention program that uses biological methods to replace chemical farming practices. Participating growers adopted whole-system management approaches to reduce the use of diazinon and other pesticides, while also adopting practices to increase production and improve crop quality. For example, BIOS uses biological controls, cover crops, and maintenance of natural areas and hedgerows to provide habitat for beneficial insects to control pests.

Karina Corbett Photography

Figure 2. A navel orangeworm trap helps control pests in an almond tree.

Karina Corbett Photography

Figure 3. Field scout Luis Gallegos uses a sweep net to look for pests.

Beginning in 2002, the CV-RWQCB began to regulate discharges from agricultural lands through its Irrigated Lands Regulatory Program (ILRP). The ILRP allows growers to attain regulatory compliance through coalition groups. In the San Joaquin Valley, the Westside San Joaquin River Watershed Coalition and East San Joaquin Water Quality Coalition organized to educate growers about water quality problems and management practices, monitored water quality, and served as intermediaries between regulators and growers. The work of the coalitions was critical in motivating growers to implement practices to reduce diazinon discharges.

In 2003 the CV-RWQCB adopted a diazinon total maximum daily load (TMDL). The TMDL, along with the reductions required through the ILRP, played a key role in motivating the agricultural community to implement BMPs. In 2003 the U.S. Environmental Protection Agency (EPA) developed a special label for products containing diazinon, which noted that users must implement practices to reduce diazinon runoff. In 2004 EPA canceled all nonagricultural uses of diazinon; in 2006 the California DPR adopted dormant spray regulations that require that users implement protective practices when applying dormant orchard sprays.

The diazinon-reduction practices used in CWA section 319(h) projects in the Central Valley also helped to solve other pesticide problems in the area. For example, in 2009 the Sustainable Cotton Project, a farm-based program dedicated to sustainable farming practices and integrated pest management (IPM), helped orchard growers near the SJR to adopt biologically based techniques, including using pest traps (Figure 2) and scouting for pests and beneficial insects (Figure 3).

## Results

Implementing the diazinon TMDL, ILRP requirements, DPR regulations, diazinon label changes and BIOS project reduced diazinon runoff in the SJR. By 2010 data showed that diazinon levels in two reaches of the SJR (totaling 17 stream miles) once again met water quality standards. As a result, California removed both reaches—the 3-mile Stanislaus River to Delta reach and the 14-mile Bear Creek to Mud Slough reach—from the state's 2010 list of impaired waters for diazinon. Additional reaches will likely be removed from the impaired waters list when more data become available.

Polluted runoff from both agricultural and urban areas continues to affect the water quality of the SJR. The State Water Quality Control Board, CV-RWQCB and DPR continue to work on these problems through the ILRP, as well as by developing pesticide regulations and providing funding and technical assistance to support collaborative efforts to address toxicity problems.

## Partners and Funding

Partners include the UC IPM program, particularly Dr. Frank Zalom, and members and staff of the BIOS project of the Community Alliance with Family Farmers. BIOS received funding from EPA Region 9, UC Sustainable Agriculture Research and Education, the U.S. Department of Agriculture's (USDA) Sustainable Agriculture Research and Education Program, the USDA Environmental Quality Incentives Program and the Kellogg Foundation. Other cooperating entities include the East Merced Resource Conservation District and the USDA Natural Resources Conservation Service.

The BIOS project strengthened partnerships by working directly with farmers and promoting information sharing among farmers, pest control advisors, researchers and extension personnel, as well as the ILRP, Coalition for Urban/Rural Environmental Stewardship, Westland Water District, UC Cooperative Extension, DPR, California Dried Plum Board, Almond Board of California and local resource conservation districts.

In 1994 $181,200 in CWA section 319(h) funding was allotted to the BIOS program. In 2009 the Sustainable Cotton Project received an $834,046 CWA section 319(h) grant for which project partners invested more than $585,000 in matching funds. CWA section 319(h) grant funds also supported CV RWQCB project implementation staff costs.

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