



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# California

## Reducing Pesticide Use Contributes to Restoration of San Diego Creek

### Waterbody Improved

Runoff from residential and agricultural activities contributed to high levels of pesticides (diazinon and chlorpyrifos) in California's San Diego Creek. As a result, the state added a 7.83-mile segment of the creek to its Clean Water Act (CWA) section 303(d) list of impaired waters in 1998. Project partners conducted education and outreach programs that led watershed stakeholders to implement best management practices (BMPs). As a result of these efforts, diazinon and chlorpyrifos levels have declined, prompting California to propose removing these two pesticides from the list of impairments on the 7.83-mile segment of San Diego Creek in 2014.

### Problem

San Diego Creek is in the Newport Bay watershed in central Orange County on the Southern California coast (Figure 1). The watershed is surrounded by the Santa Ana Mountains to the east and the San Joaquin Hills to the west. Monitoring data indicated that pesticides were present in a 7.83-mile segment of San Diego Creek (Reach 1) extending from Newport Bay upstream into Irvine, and likely contributed to the creek's failure to support its beneficial use of warm freshwater habitat. Consequently, in 1998 the segment was placed on the California CWA section 303(d) list as impaired for pesticides.

Diazinon and chlorpyrifos were first linked to water column toxicity in San Diego Creek during a state-sponsored investigation in 1999 and 2000. At the time, plant nurseries in the San Diego Creek watershed treated their nursery stock with pesticides to comply with a state-imposed quarantine targeting fire ants. High levels of diazinon and chlorpyrifos caused Reach 1 to violate water quality standards. The bioaccumulation of these compounds can adversely affect the health and reproductive success of aquatic organisms and their predators, and can pose a human health threat. The investigation identified runoff from nurseries as the primary source of the diazinon and chlorpyrifos in San Diego Creek.

In 2002 the U.S. Environmental Protection Agency (EPA) established total maximum daily loads (TMDLs) for San Diego Creek and Newport Bay by consent decree, which the Santa Ana Regional Water Quality Control Board adopted in 2003. These TMDLs established numeric targets for diazinon and chlorpyrifos and outlined a series of implementation actions to reduce pesticide loading.

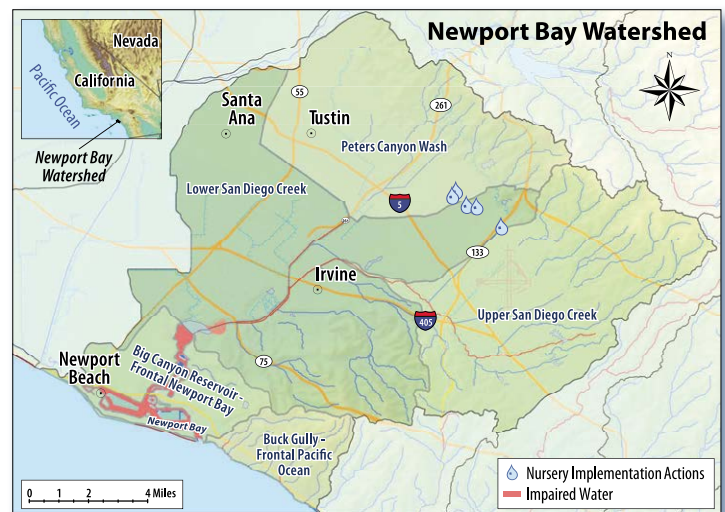


Figure 1. San Diego Creek is in Southern California's 154-square mile Newport Bay watershed.

### Project Highlights

Between 2006 and 2009, Orange County Coastkeeper (OCCK) collaborated with the University of California Cooperative Extension (UCCE) on the Orange County Nurseries Water Quality Improvement Project, which focused on reducing pesticides in runoff from plant nurseries and agricultural sites in the San Diego Creek watershed. The program (1) educated residential pesticide users and small nurseries about alternative ant control strategies, (2) improved irrigation and implemented erosion/sediment control procedures at nurseries to prevent potting mix (with incorporated pesticides) from reaching waterbodies; (3) encouraged municipalities to implement Integrated Pest

Management (IPM) strategies to reduce pesticide use through landscape design, plant selection and use of nontoxic alternatives for pest control; and (4) created a demonstration center to train landscape architects, master gardeners and municipal staff about IPM.

In 1990 the Regional Board issued Waste Discharge Requirements (WDRs) to large nurseries to address excessive nutrient discharges. In 2005 and 2006, these WDRs were revised to include the TMDL limits on diazinon and chlorpyrifos. As a result, the nurseries switched to alternative products and implemented BMPs to retain sediment (and associated bound pesticides) on-site and to reuse the sediment in their potting mix (see Figure 1 for nursery implementation action sites). Additionally, the 1996 Food Quality Protection Act directed EPA to begin using more stringent standards when registering pesticides—largely because of public health concerns. This led to the phase-out of diazinon and chlorpyrifos for most uses by 2005 (Figure 2).

## Results

Monitoring data collected between 1999 and 2011 show that water column toxicity caused by diazinon and chlorpyrifos has been reduced to levels that are no longer detrimental to the waterbody's beneficial uses. While San Diego Creek contained diazinon concentrations as great as 400 nanograms per liter (ng/L) in 2001, concentrations have steadily decreased and now meet both the TMDL chronic and acute load allocation (nonpoint source) limits of 45 and 72 ng/L, respectively. Similarly, chlorpyrifos levels were as high as 100 ng/L in 2002 but by 2003, levels had declined and have consistently met the TMDL load allocation chronic (12.6 ng/L) and acute (18 ng/L) limits since 2003 (except for exceedances in December 2008 due to a heavy storm event).

Sediment toxicity data show steady declines in pesticide concentrations, particularly between 2001 and 2005, when many agricultural and non-agricultural uses of pesticides were phased out. Additionally, the TMDL required Orange County's stormwater National Pollutant Discharge Elimination System co-permittees to implement a monitoring program for diazinon and chlorpyrifos, and for water column toxicity. These data show that water quality has improved.

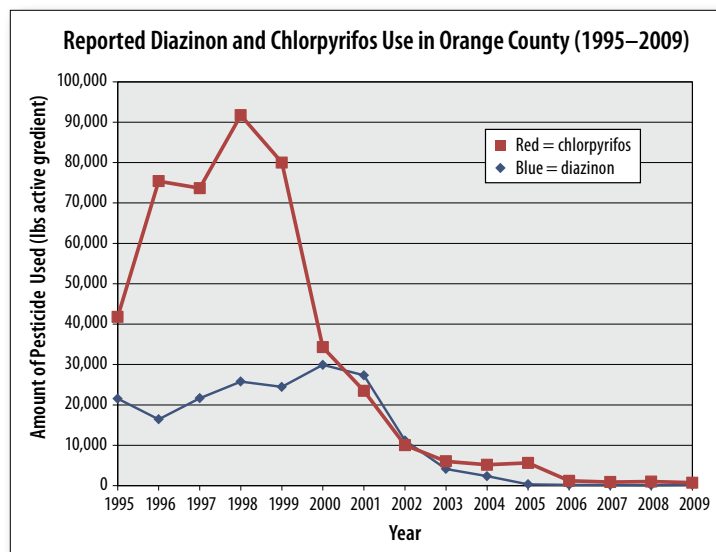


Figure 2. Pesticide reduction efforts led to significant decreases in diazinon and chlorpyrifos use.

On the basis of these data, the state will propose to remove Reach 1 of San Diego Creek from the state's 2014 list of impaired waters for both diazinon and chlorpyrifos. This segment remains listed as impaired for toxaphene (a banned insecticide), selenium, sedimentation/siltation, nutrients and fecal coliform. The upstream, Reach 2 segment of San Diego Creek remains listed as impaired for unknown toxicity, nutrients, sedimentation/siltation and indicator bacteria.

## Partners and Funding

Partners in the water quality restoration effort include the State Water Resources Control Board, Santa Ana Regional Water Quality Board, Southern California Edison, Orange County, OCCK, UCCE, large commercial nurseries, California Department of Pesticide Regulation and EPA. Two EPA CWA section 205(j) and 319(h) grants funded five years of diazinon, chlorpyrifos and toxicity data collection. To date, California has invested at least \$306,758 in CWA section 319(h) funds to help nurseries implement BMPs to reduce pollutant loads. Grants under the California state bond programs supported BMP implementation to reduce pesticides in the watershed. Water quality outreach to small nurseries was funded in part by a \$372,000 grant from the state's Agricultural Water Quality Grant Program.



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