

Dairy Impacts to Water Quality and Orange County Water District's Comprehensive Dairy Waste Management Strategy

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The Santa Ana River watershed has the highest density of dairy cows in the Nation, averaging 25-30 cows per acre. Currently, 270 dairies operate on 25,000 acres within the Chino Basin portion of the watershed, with over 336,000 animals. Although the number of dairies continues to decrease, the number of animals is increasing, and the resulting impact on water quality is enormous. In the Chino Basin, the nitrate-nitrogen levels and total dissolved solids in the ground water exceed State and Federal water-quality objectives. The accumulation of salts and nitrates released from manure stockpiles and runoff of dairy washwater degrades the quality of the Santa Ana River, which recharges the Orange County ground-water basin.

The Orange County Water District (OCWD) manages both the flows of the Santa Ana River and the ground-water basin it recharges, which supplies over 2 million residents with about 75% of their water. The impact of large-scale dairies on recharge water quality is a critical issue for OCWD in protecting Orange County's primary drinking water supply. Manure-laden discharges to surface water during storm events contain protozoan parasites such as *Cryptosporidium* and *Giardia*, and pose a potential threat to public health. Organic loading into surface waters significantly decreases dissolved oxygen levels and has resulted in massive fish kills in recharge basins, which erodes public confidence in the safety of water supplies. In addition, increased salts and nitrates in the water supply shifts costs to the public sector as the economic costs of salts and salt reduction measures are transferred to the water purveyors and consumers.

OCWD is proceeding with a comprehensive approach to reduce the impact of dairy wastes on the Orange County ground-water basin, which includes: 1) incentive program for manure management, 2) enforcement of existing laws and regulations, and 3) participation in research and source-water-protection programs:

- 1) OCWD developed the "Tipping Fee Reduction Demonstration Program" to remove salt from the watershed by encouraging co-composting and export of manure. OCWD provided \$175,000 in incentives to lower the tipping fee at a local co-composting facility to increase the deliveries of manure to 150,000 tons, a reduction of 11,550 tons of salt. The benefits of salt reduction by direct manure removal (\$15 per ton of salt) far exceed ground-water-desalting costs (\$318 per ton of salt).
- 2) OCWD works with regulators for monitoring and enforcement of dairy-waste-management regulations to ensure compliance with State and Federal law. OCWD is assisting the U.S. Attorney's Office and U.S. Environmental Protection Agency on a multi-agency Dairy Task Force to prosecute illegal discharge and disposal practices to prevent further deterioration of water quality.
- 3) OCWD is actively engaged in educational outreach with the dairy industry on source-water-protection efforts. OCWD also is pursuing collaborative research projects into the impact of dairy waste on water quality and public health. Research issues include: management of salts, nutrients, and pathogens released from manure; impacts of discharges containing hormones and antibiotics; and the fate and transport of pollutants to ground-water basins.

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