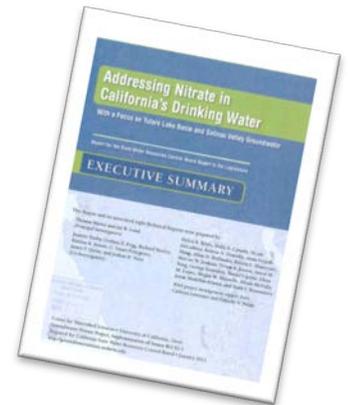


# Nitrates in Groundwater

Groundwater quality is essential to all California residents and nitrogen fertilizer use can cause nitrate contamination of groundwater. California Almond growers share concerns about protecting groundwater quality. Most almond growers are multi-generational family farmers, who live and raise their families where almonds are grown. Because of this, almond growers welcome the ongoing scientific research into the issue.

In 2012, University of California Davis (UCD) researchers released a study<sup>1</sup> commissioned by the State Water Resources Control Board (SWB) on nitrogen use in California agriculture and its impact on water quality. While the focus of the study was on the Tulare Lake Basin and the Salinas Valley, the findings impact all of California. Key findings of the report included:

- In both basins, some of the groundwater was contaminated with nitrate
- Largest regional sources of nitrate in groundwater are agriculture fertilizer and animal manure
- Impact to groundwater quality is long-term, meaning it takes a long time to accumulate and will take a long time to improve
- Nitrogen loading reductions are possible and will improve groundwater over time
- Direct remediation to remove nitrate from large groundwater basis is extremely costly
- Drinking water supply actions such as blending, treatment, and alternative water supplies are most cost effective
- Many small communities cannot afford safe drinking water treatment
- Most promising revenue source is a fee on nitrogen fertilizer use or on water use
- Inconsistency and inaccessibility of data prevent effective and continuous assessment



In response to this report, the SWB submitted several recommendations to the Legislature for developing a groundwater cleanup program. The recommendations were grouped into four main categories:

- Providing Safe Drinking Water
- Monitoring, Assessment and Notification
- Nitrogen Tracking and Reporting
- Protecting Groundwater

Several of the recommendations require both legislation and funding. In response to recommendations for safe drinking water, the legislature passed, and the governor signed, two bills providing emergency grant funding for small, disadvantaged communities. Also, the 2013-2014 Budget addresses the state's urgent drought needs, and includes funding for water quality improvement throughout the state. It also secures emergency drinking water supplies for disadvantaged communities with contaminated drinking water supplies, including needs exacerbated by the drought.

California voters will have the opportunity to vote for a water bond in November which includes \$1 billion set aside for groundwater protection and water quality.<sup>2</sup> The water bond, originally passed by the legislature in 2009, totals \$11.14 billion. The bond ultimately included on the November ballot may change as there are several new water bonds under consideration by the state legislature ranging from \$5 billion to \$9.5 billion; considerably less in cost, but most of the proposals contain funds for safe drinking water.

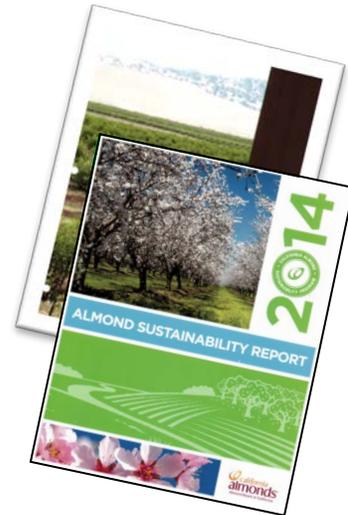
## Research Funding

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The Almond Board of California (ABC) has invested more than \$2 million in scientific research focused on improving nitrogen management. Since 1975, 71 projects have been funded.

Research funded by the ABC has produced new farming practices that have improved the efficiency of nitrogen management in California Almond orchards. Recent research improved leaf sampling techniques to allow for in-season rate adjustments. The almond industry's investment in production and environmental research is the basis of an industry-wide sustainability program which includes nutrient management among its grower self-assessment modules.

The California Almond Sustainability Program promotes a combination of the best type and amount of fertilizer that will maximize yield response and cause the least waste and the least negative environmental impact. California Almond growers are committed to water stewardship practices that will prevent adverse impacts to groundwater quality. The 2014 Almond Sustainability Report revealed that growers in 73% of assessed orchards combine the use of efficient irrigation practices with optimal nitrogen fertilizer rates to achieve the exact placement in root zones of precise amounts of fertilizers with minimal losses.



## Nitrogen Use Efficiency

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The California Almond industry consistently invests in developing and adopting environmentally responsible farming practices and technology which include improving nitrogen management. Because of this, nitrogen use efficiency in California Almond orchards has improved dramatically in the last 20 years.

Typical nitrogen use efficiency in various agriculture crops is 50% or less. Research conducted by the University of California has demonstrated nitrogen use efficiency in almonds at 75-80% using current growing practices, making almonds among the most efficient nitrogen using crop.

## Next Steps

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California Almond growers are supportive of and engaged in practical, research-based approaches to protecting groundwater quality and will continue to participate in ongoing discussions with local, state, and national authorities to provide results from the research conducted by the ABC. The California Almond industry will continue its commitment to environmentally responsible farming practices as well as funding research to protect and improve the advances made to date.

<sup>1</sup>**Addressing Nitrate in California's Drinking Water**, Thomas Harter and Jay R. Lund, Center for Watershed Sciences, University of California, Davis; January 2012.

<sup>2</sup>**2009 Comprehensive Water Package**, The California Department of Water Resources, November 2009.