



## Almond Board of California Update

February 2016

Bob Curtis, Director Agricultural Affairs

Almond Board of California

# Almond Board of California

***The Almond Board of California administers a federal marketing order enacted by California Almond growers in 1950.***

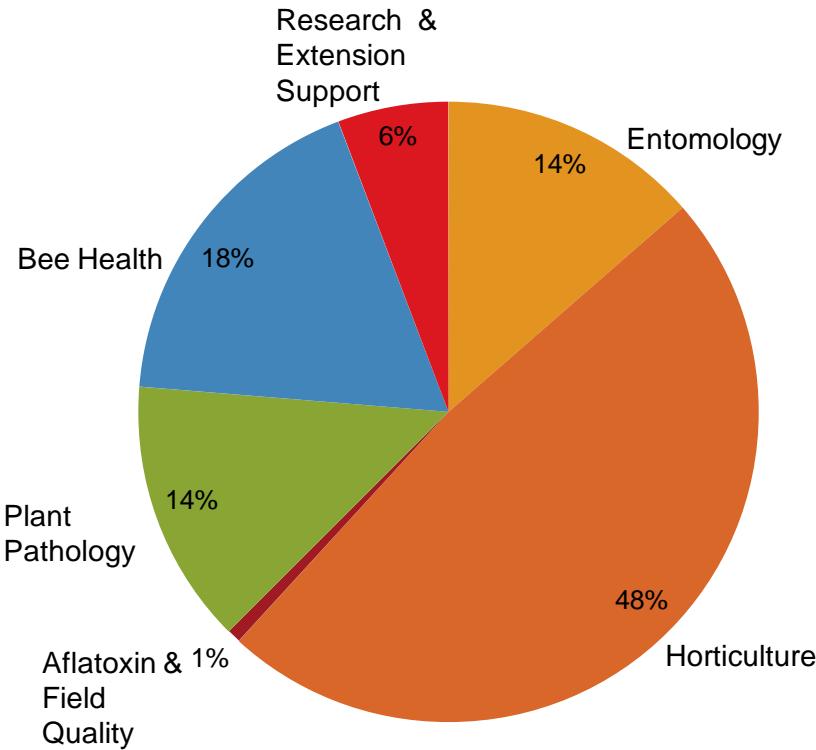
- Funded by a handler assessment of \$0.03/lb. which supports
- Assessment used to promote and research almonds. Research areas include...
  - Nutritional benefits
  - Growing practices
  - Environmental issues
  - Food safety
  - Consumers and markets
- As a marketing order under the auspices of the USDA, the Almond Board...
  - does not track pricing
  - cannot lobby or influence policy
- Collaborates with the Almond Huller and Processor Association (AHPA) who...
  - advocate on behalf of California Almonds
  - represent industry on policy and political issues



# Production Research Program

Crop Year 2015-16 \$1.784M budget

- 49 research projects
- Many projects co-funded Environmental and AQFS committees



# Agricultural Affairs Milestones + Priorities

## 43 Years of Success + Contributions

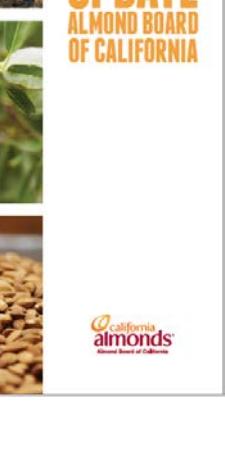
- Average yield doubled over last 20 years
- 33% decrease in water needed to grow a lb of almonds over last 20 years
- Advances in nitrogen use: increased production efficiency; environmental excellence; addressing nitrogen/nitrate regulations coming online
- Substantial decrease in kernel rejects to >1%; recognized for environmental stewardship
- Honey bee health research commitment largest, most sustained of any commodity organization
- History of irrigation + water research has helped growers best manage orchards through drought
- Meeting almond research & extension needs
- AIM builds on legacy of production + environmental research programs

HONEY BEE  
BEST MANAGEMENT PRACTICES  
FOR CALIFORNIA ALMONDS



**Almonds.com/  
ResearchDatabase**





**2015 RESEARCH UPDATE**  
**ALMOND BOARD OF CALIFORNIA**

# Almond Board Programs + Outreach

## Research + Innovation

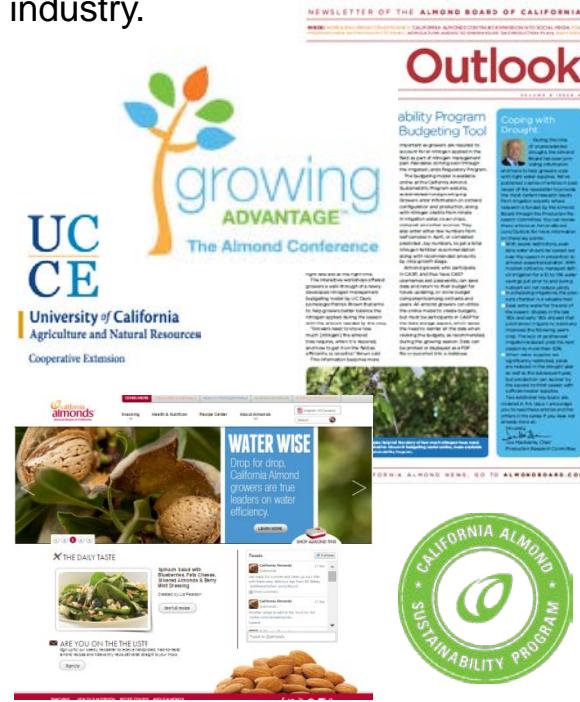
Over the past four decades, the California Almond community has invested tens of millions of dollars to research production and environmental issues ranging from water efficiency to bee health to food safety.

## Promoting Almonds

The Almond Board also funds nutrition, market, and consumer research to effectively understand and market almonds worldwide. ABC also conducts advertising and public relations to build awareness.

## Grower Outreach + Education

The Almond Board shares research findings and best practices with growers and the industry.



## Looking to the Future

Engaging and educating emerging leaders and young consumers, Almond Board programs encourage awareness and understanding.

### Almond Leadership Program

- Young industry leaders participate in year-long almond course
- One-on-one mentorships
- Special projects + presentations

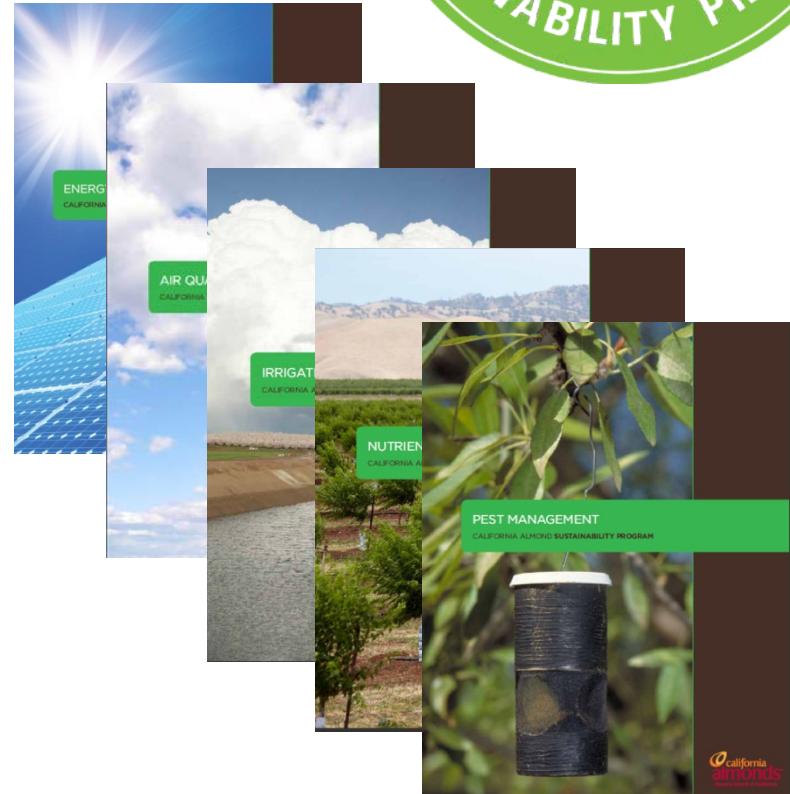
### Ag in the Classroom

- Educating elementary school students about agriculture and almonds

# California Almond Sustainability Program

***The California Almond Sustainability Program (CASP) formalizes grower sustainability practices and ensures continuous improvement through grower self-assessments.***

- CASP findings provide a baseline of industry-wide practices
- Modules available include:
  - Irrigation Management
  - Nutrient Management
  - Air Quality
  - Energy Efficiency
  - Pest Management
  - Financial Management
  - Ecosystem Management
  - Workplace and Communities



## Upcoming CASP Workshops

- **Almond Board Tools to Ease Irrigation and Nitrogen Budgeting and Compliance**
  - March 15 – Tulare
  - March 16 – Modesto
  - March 18 – Chico
- **Workshops being planned**
  - Pest Monitoring and Decision Making
  - Dust Management, Renewable Energy and Incentives

## Leadership and Commitment

***Just as California Almonds are leaders in agriculture, we are dedicated to innovation, efficiency, and being good neighbors to all Californians.***

- Committed to key issues including...
  - ***Honey Bee Health***
  - ***Water Use Efficiency***
  - ***Air Quality***
  - Water Quality
  - Food Safety
- Industry funded-research...
  - Informs solutions
  - Drives adoption of advanced best practices





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# FUTURE OF THE CALIFORNIA ALMOND INDUSTRY

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and the Almond Board of California

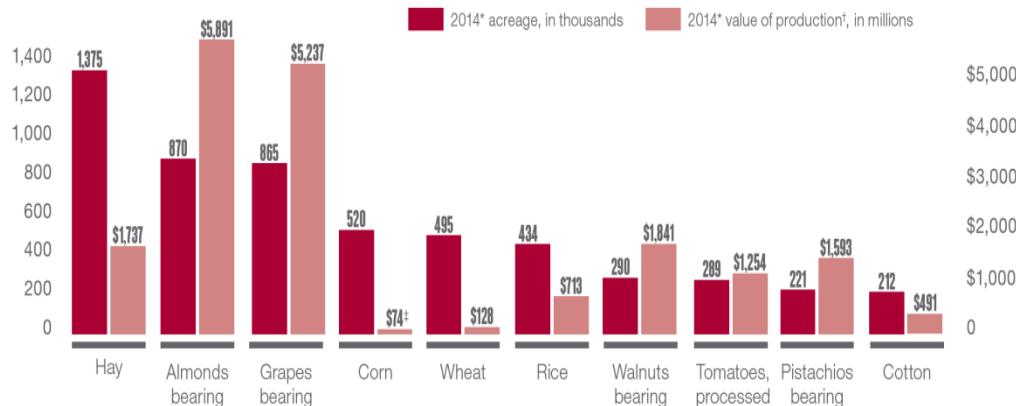


We are the leading crop in  
**CALIFORNIA**  
with an awesome future

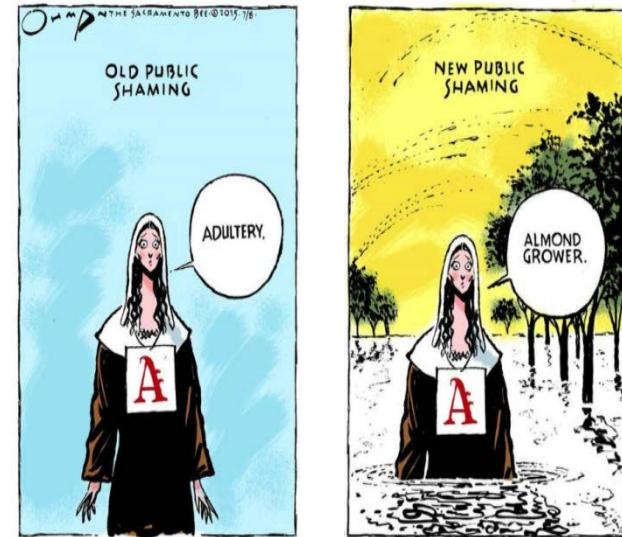
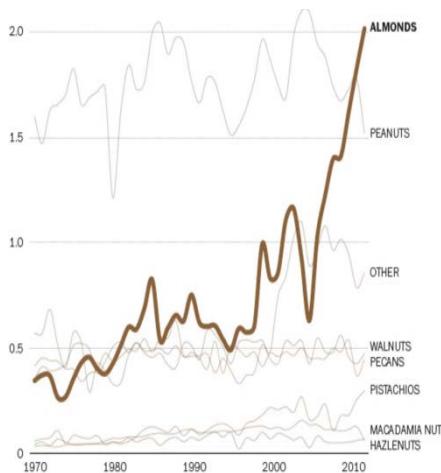


# With Success Comes Attention and Scrutiny

## TOP TEN CALIFORNIA CROP ACREAGE



Almonds surpass peanuts in popularity



The Modesto Bee

LETTERS TO THE EDITOR

OCTOBER 22, 2013

Martin Sullivan: Almond harvest too dusty



Regarding "Tolerate the dust because almonds are gold" by Dick Hagerty (Opinions, Sept. 18): Almonds are more like gold than Dick Hagerty seems to realize.

During the Gold Rush hydraulic miners had little consideration for the effects on other citizens or wildlife. They filled streams and rivers with silt and caused big problems for farmers and others downstream. It took years to bring the miners under control.

Currently, almond farmers completely externalize the cost of harvesting to everyone by filling the valley with dust, dirtying all surfaces and causing respiratory issues for most of us. If people want to be outdoors during almond harvest, currently they just have to accept the unpleasantness.

If the harvester's dirt stayed on their property or at least close by, it would be no big deal, but the dust fills the whole valley.

It is especially outrageous if they are making so much money that they don't modernize, since technology allows much cleaner harvesting.

The Modesto Bee

LETTERS TO THE EDITOR

AUGUST 27, 2015

Krista Smith: Where there's dust, making money's a must



Almonds are a dusty business we all know,

"That's OK," says the Almond Board, "Because it helps our economy to grow!"

When dust control during harvest is voluntary,

And dust control cuts profits, that's monetary,

With this status quo, I think we all know

That the dust will continue to grow!

KRISTA SMITH, OAKDALE

MORE LETTERS TO THE EDITOR

# 2014-15 in Headlines

August 2014

## The Dark Side of Almond Use

Best Of



A theatlantic.com

November 2014

## How almonds are sucking California dry

By David Willis, www.bbconline.net  
November 31st, 2014

View Original  
Email Print Share

BBC News, Los Angeles



California's worst drought for more than a century is causing huge problems for farmers, who need a trillion gallons of water per year for their almond orchards alone. But it also leaves homeowners facing difficult choices about what to do with their lawn.

I have a neighbour, Deborah, and ever since I've lived here, her front lawn has been luxuriant and green.

April 2015

## Almonds, the demons of drought? Frustrated growers tell another story

It's not clear exactly when almonds became the scapegoat for the California drought.

latimes.com

February 2014

## Editorial: State's growing, and thirsty, almond industry sowing seeds of discontent



B sacbee.com

June 2015

## The Water-Hogging Crops That Put Food on the Table for Low-Income Workers

By Padma Nagappan, www.takepart.com  
June 30th, 2015

View Original  
Email Print Share



A winter pruning session in an orchard near Modesto in the Central Valley, California. Almonds, a major component of farming in California, use up nearly 10 percent of the state's water reserves, according to some estimates.

Photo by Photo: Lucy Nicholson/Reuters  
California almonds and the farmers who grow them have received a lot of bad press in recent months as city dwellers facing mandatory water restrictions turn their ire on the thirsty crop.

July 2015



## Is California Sucking the Almond Industry Dry?

By Jade Beall  
Published July 09, 2015 | FOXBusiness

If you don't live in California, the serious drought—which is now in its fourth painstaking year—may not affect your everyday life. But you are probably eating their almonds. The state produces 80% of the world's almonds and the industry has been taking the brunt of the water shortage ever since.

"Blame game doesn't help. Yes, it takes about one gallon of water to produce one almond. And, it also takes 1.4 gallons of water to produce two olives. And, four glasses of milk needs about 143 gallons of water to produce. Should we stop making milk in California too? Where does it end?" says Dr. Harinder Grewal, Senior Agricultural Inspector for the Department of Agriculture at Stanislaus County, California.

California produces nearly half of all U.S. grown fruits, nuts, and vegetables, according to the California Department of Food and Agriculture. But the real money maker is almond production which contributes over 100,000 jobs and \$1 billion to the state's economy, according to the University of California Agricultural Issues Center.

April 8, 2015

## Seriously, Stop Demonizing Almonds

Best Of



G gizmodo.com

July 2015

## Evil Almonds? California's Drought Villain Is a Climate Change Hero



takepart.com

# Media + Public Perception on Almonds and Bee Health

## *What a difference a year makes!*

### 2015

2014



### Pollinator Stewardship Council

info@pollinatorstewardship.org

80,000+ beehives damaged or dead; Beekeepers Meet With EPA

■ April 3, 2014 ■ By Michele Colopy

The last two weeks the Pollinator Stewardship Council has received reports of bee kills at the end of the almond bloom. A meeting with EPA was held by Pollinator Stewardship

Mother Jones

POLITICS

ENVIRONMENT

CULTURE

PHOTO ESSAYS

## Are Your Delicious, Healthy Almonds Killing Bees?

—By Tom Philpott | Tue Apr. 29, 2014 5:00 AM EDT

# News.Mic



## No, Your Almond Milk Obsession Is Not Killing All the Bees

By Tove Danovich November 19, 2014

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# Capital Press

The West's Ag Website

Home » Ag Sectors » Orchards, Nuts & Vines

## Hives appear OK after quick, robust almond bloom

Tim Hearden Published:  
Capital Press February 24, 2015 2:29PM

Western  
**FARM PRESS**  
TIMELY RELIABLE INFORMATION  
FOR WESTERN AGRICULTURE

### FARM PRESS BLOG

## Save the almonds if you want to protect honey bees

by Todd Fitchette In Farm Press Blog

Apr 28, 2015

- Almond blossoms are said to be a complete food source for honey bees

# THE SACRAMENTO BEE

EDITORIALS MARCH 21, 2015

## Bees need allies beyond Big Almond

### HIGHLIGHTS

California's booming almond industry is one of the few bright spots for the struggling bee populations. But everyone needs to pitch in for bee colonies to survive.

California  
almonds  
Almond Board of California

**LEADERSHIP:  
WE MUST USE OUR TALENT AND TREASURE  
FOR THE BETTERMENT OF OUR INDUSTRY  
AND CALIFORNIA AGRICULTURE**





THROUGH TRANSPARENT  
COMMUNICATION AND ACTION,  
WE MUST PARTNER WITH OUR  
CUSTOMERS AND CONSUMERS IN  
IMPROVING AGRICULTURAL  
SUSTAINABILITY

For the betterment of ourselves, our communities, and our planet

# Almond Ambassadors

- Almond Board provides training, tools, presentations, key messages, and coaching for all program participants
- Almond Ambassador programs
  - Good Neighbor Media Spokesperson
    - Traditional media engagement via broadcast, print, radio interviews based on spokesperson location + area of expertise
  - Digital Truth Team
    - Response to online misinformation through social media channels and commenting on online articles
  - Speakers Bureau
    - Pairs industry members with civic organizations to better connect local communities with facts and context about California Almonds



Want to do more to ensure that almonds remain a Crop of Choice for California? Become an Almond Ambassador!

As an industry member who lives and works every day growing and processing almonds or an allied industry member who supports these activities, you are the best person to share the story of almonds.

Consumers increasingly expect and demand transparency when it comes to food production, outreach, transportation, and social media. As that ongoing conversation through community members of all types receive training, tools, presentations, key messages and coaching to ensure the almond industry is united in their message and speaking with one voice.

Good Neighbor Media Spokesperson

Are you comfortable speaking in front of a camera? Or, would you like to learn?

Good Neighbor Media Spokespeople give interviews over the phone, in studios, or in the orchard on important production and environmental topics. Media requests are matched with grower location, operation type and areas of expertise.

Speakers Bureau

Research shows that communication with local communities about agriculture and specifically almond growing helps bridge the rural-urban divide and strengthen the positive image of California Almonds.

The Speakers Bureau connects almond industry members with speaking opportunities including community and other organizations like Kiwanis, Lions Club, and Rotary.

Digital Truth Team

Almond Board's Digital Truth Team is composed of industry members who share accurate information about almond growing and processing practices, correct nutrition information within social media channels like Twitter and Facebook, and post comments to traditional news stories. To make things even easier, Almond Board regularly shares material with participants that can be used on social media. Occasionally, the Digital Truth Team is asked to help moderate a discussion, counter a misinformed opinion, or add color to current news events.

Do you want to learn more or get involved? Please contact Carissa Sauer at [csauer@almondboard.com](mailto:csauer@almondboard.com) or [Mark Lawler](mailto:Mark.Lawler@marklawler@yahoo.com) at [marklawler@yahoo.com](mailto:marklawler@yahoo.com).

1110 N Market St., Ste. 100 • Modesto, CA 95354 USA • T: +1.209.549.8352 • F: +1.209.549.8267

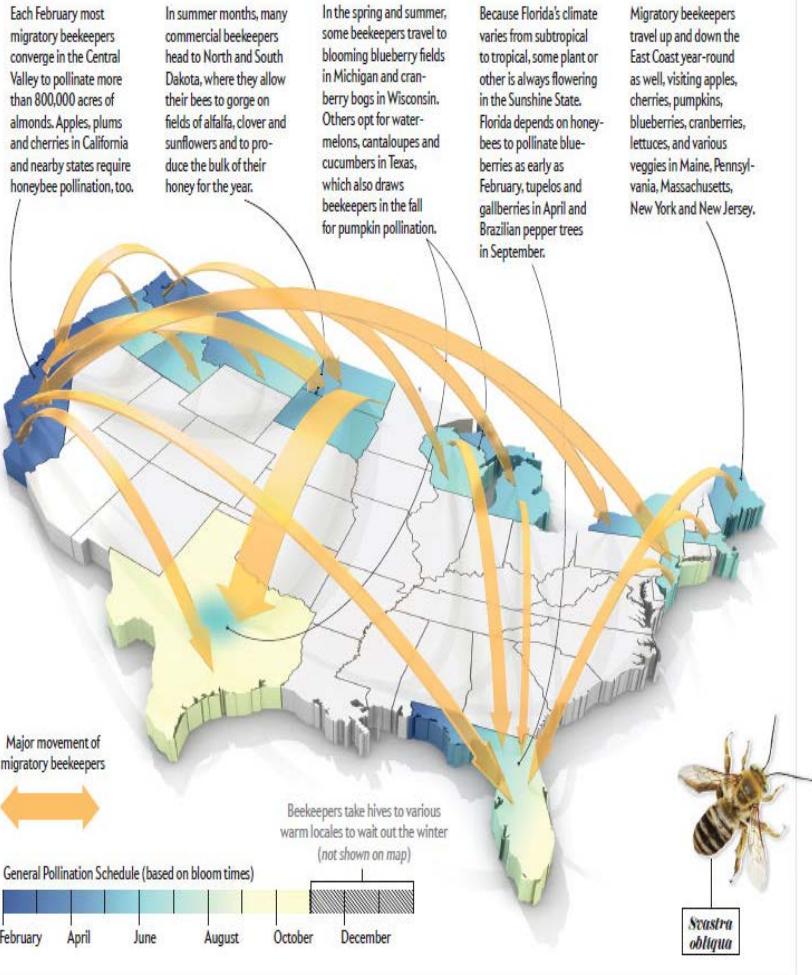
[Learn More](#)

For more information, see flyer at ABC resources table or contact Carissa Sauer, Manager Industry Communications ([csauer@almondboard.com](mailto:csauer@almondboard.com) or 209.343.3284)



## Honey Bee Best Management Practices for California Almonds

# Why should all pollination stakeholders care?



Source: *Scientific American*, September 2013

## ***The Pollination Partnership -- 2/3rds of Commercial Honey Bee Hives in the U.S. Pollinate California Almonds***

- Almonds need honey bees and honey bees benefit from almonds
- Bees are a valuable resource and almond production input
- The time bees spend in almonds impacts hive health throughout the year until they return the next season

# Honey Bee BMP Resources

## *"Honey Bee Best Management Practices for California Almonds"* Comprehensive Guide



## General/Decision Maker Quick Guide



### HONEY BEE BEST MANAGEMENT PRACTICES QUICK GUIDE FOR ALMONDS

All parties involved in honey bee pollination of California Almonds and/or applying pesticides should follow these precautions to ensure both honey bee hive health and the best possible pollination of the almond crop:

1. Communication should occur between all pollination stakeholders about pest control decisions. These stakeholders, as illustrated in the "Honey Bee BMP Communication Chain for California Almonds" on the reverse, can include beekeeper, bee broker, county agricultural commissioner, grower (owner/lessor), farm manager, pest control advisor (PCA) and pesticide applicator.
2. Agreements should include a pesticide plan that outlines which pest control materials may be used. Grower and beekeeper should agree on which products may be applied if a treatment is deemed necessary. If deemed necessary, growers should give beekeepers 48-hour notice before treatment.
3. If applying pesticides, contact your local county agricultural commissioner as specified in "Honey Bee BMP Communication Chain for California Almonds" on the reverse to give advance notification to beekeepers with nearby managed hives.
4. Avoid applying insecticides during almond bloom until more is known, particularly about their impact on bee brood (young developing bees in the hive). If treatment is necessary, only apply fungicides and avoid tank-mixing insecticides with fungicides.
5. Any fungicide application deemed necessary during bloom should occur in the late afternoon or evening, when bees and pollen are not present. This timing avoids contaminating pollen with spray materials.
6. Provide clean water for the bees to drink. This will ensure that they spend more time pollinating the crop than searching for water. Either cover or remove water sources before a pest control treatment, or empty and refill water after treatment is made. Check water levels throughout bloom and refresh as necessary.
7. Do not directly spray hives with any pesticide spray application. Ensure that the spraying driver turns off nozzles when near hives. Spray applications that come in contact with bee hives could adversely affect bee health and the pollination of the crop.
8. Do not hit flying bees with any spray application materials. Bees that come into contact with agricultural sprays will not be able to fly because of the weight of spray droplets on their wings.
9. Report suspected pesticide-related bee incidents to the county agricultural commissioner's office. Bee health concerns cannot be addressed without the data from these incidents. See "Honey Bee BMP Communication Chain for California Almonds" on the reverse for reporting details.
10. Beekeeper and grower should agree on hive removal timing. The University of California recommends bee removal when 90% of the flowers on the latest blooming variety are at petal fall. Past this point, no pollination is taking place, and bees that forage outside the orchard (up to 4 miles) seeking alternate food sources and water will have a higher risk of coming in contact with insecticide-treated crops.

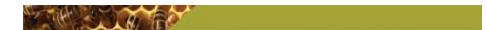
Carla, Bob, Gabriele Ludwig and Danielle Ventresca, eds. 2014. Honey bee best management practices for California almonds. Almond Board of California.



A digital version of this publication is available at [Almonds.com/BeeBMPs](http://Almonds.com/BeeBMPs)  
Also available:  
*Honey Bee Best Management Practices for California Almonds*  
*Honey Bee Best Management Practices Quick Guide for Almonds*

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## Applicator/Driver Quick Guide



### APPLICATOR/DRIVER HONEY BEE BEST MANAGEMENT PRACTICES QUICK GUIDE FOR ALMONDS

Pesticide applicators should follow these precautions to ensure both honey bee hive health and the best possible pollination of the California Almond crop:

1. **Read labels carefully and follow directions.** Do not use pesticides at bloom with label cautions that read "highly toxic to bees," "toxic to bees," "residual times" or "extended residual toxicity."
2. **Before applying pesticides at any time of year, contact the county agricultural commissioner to notify beekeepers with nearby managed hives.** This is mandatory for pesticide products with "toxic to bees" label statements and recommended for all other applications, particularly during almond bloom.
3. Water should either be covered or removed before a pest control treatment is made, or emptied and refilled after the treatment is made. Providing clean water for bees to drink will ensure that they spend more time pollinating the crop than searching for water.
4. Do not directly spray hives with any pesticide spray application. Spraying driver should turn off nozzles when near hives for all materials applied. Spray applications that come in contact with bee hives could adversely affect bee health and the pollination of the crop.
5. **Do not hit flying bees with spray applications.** Bees that come in contact with agricultural sprays will not be able to fly because of the weight of spray droplets on their wings.
6. **Report suspected pesticide-related bee incidents** to the grower, beekeeper and county agricultural commissioner. Bee health concerns cannot be addressed without the data from these incidents.

When a pesticide to be applied bears "toxic to bees" statements on its label, beekeepers with hives within 1 mile of the application must be notified (if they have requested notification) by the applicator at least 48 hours before the planned application.

A digital version of this publication is available at [Almonds.com/BeeBMPs](http://Almonds.com/BeeBMPs)

Also available:  
*Honey Bee Best Management Practices for California Almonds*  
*Honey Bee Best Management Practices Quick Guide for Almonds*

Carla, Bob, Gabriele Ludwig and Danielle Ventresca, eds. 2014. Honey bee best management practices for California almonds. Almond Board of California.



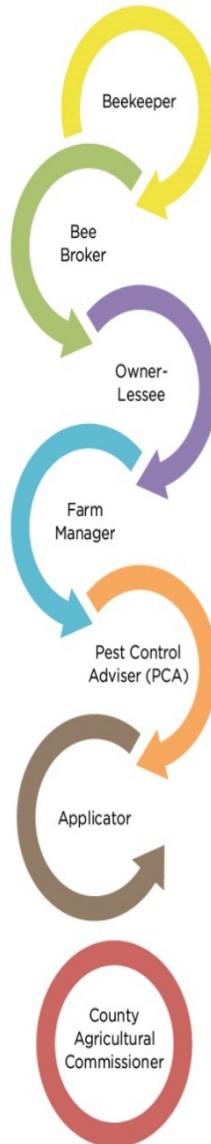
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Available downstairs at ABC Booth or online at [Almonds.com/BeeBMPs](http://Almonds.com/BeeBMPs)

## HONEY BEE BMP COMMUNICATION CHAIN



- Engage in agreements with growers.
- Register hives with county agricultural commissioner by Jan. 1 each year or upon arrival in California.
- Request optional notification from county agricultural commissioner each year upon registration and with any hive movement.
- Immediately report any suspected pesticide-related bee incidents to owner-lessee/county agricultural commissioner at almond bloom and throughout the year.

- Communicate details and specifications of pesticide application agreement to the PCA and applicator.
- Follow the *Honey Bee Best Management Practices Quick Guide for Almonds* and, if applying pesticides, follow the *Applicator/Driver Honey Bee Best Management Practices Quick Guide for Almonds*.
- If applying pesticides, contact local county agricultural commissioner to notify beekeepers with nearby managed hives before making applications any time of year. This is mandatory for “toxic to bees” label statements\* and recommended for other applications, particularly during almond bloom.
- Immediately report suspected pesticide-related bee incidents to beekeeper/county agricultural commissioner at almond bloom and throughout the year.

- Follow the *Applicator/Driver Honey Bee Best Management Practices Quick Guide for Almonds* and relay messages to the spray-rig driver.
- Before applying pesticides, contact local county agricultural commissioner to notify beekeepers with nearby managed hives before making applications any time of year. This is mandatory for “toxic to bees” label statements\* and recommended for other applications, particularly during bloom.
- Immediately report suspected pesticide-related bee incidents to farm manager/owner-lessee/beekeeper/county agricultural commissioner.

- Engage in agreements with beekeepers/bee brokers.
- Communicate details and specifications of agreements to stakeholders down the chain (farm manager, PCA, applicator).
- Follow the *Honey Bee Best Management Practices Quick Guide for Almonds* and, if applying pesticides, follow the *Applicator/Driver Honey Bee Best Management Practices Quick Guide for Almonds*.
- If applying pesticides, contact local county agricultural commissioner to notify beekeepers with nearby managed hives before making applications any time of year. This is mandatory for “toxic to bees” label statements\* and recommended for other applications, particularly during almond bloom.
- Immediately report any suspected pesticide-related bee incidents to beekeeper/county agricultural commissioner at almond bloom and throughout the year.

- Communicate details and specifications of pesticide application agreement to applicator.
- Follow the *Honey Bee Best Management Practices Quick Guide for Almonds*.
- Immediately report suspected pesticide-related bee incidents to grower/beekeeper/county agricultural commissioner at almond bloom and throughout the year.

- Collect and map locations of managed bees throughout the county based on information provided by registered beekeepers.
- Provide pesticide applicators the contact information for beekeepers with hives within a 1-mile radius of the application location.
- Investigate reports of suspected pesticide-related bee incidents.

## **Key BMP:** Communication should occur between all pollination stakeholders about pest control decisions

- Agreements/contracts should include a pesticide plan that outlines which pest control materials may be used.
- If treatment is deemed necessary, growers/PCAs/applicators should contact their beekeepers as well as contact County AG Commissioners so that beekeepers with near by managed hives are notified 48 hours in advance.
- As well, beekeepers should register their hives with County Agricultural Commissioner offices and request notifications for pesticide applications.
- Report suspected pesticide related incidences to County AG Commissioners. Bee health concerns cannot be addressed without data from potential incidents.



## Key BMP: Avoid applying insecticides during bloom

- Avoid applying insecticides at bloom until more is known, particularly about their impact on bee brood (immature bees) and avoid tank mixing insecticides with fungicides.
  - Bee losses have occurred as a result of tank mixing insecticides with bloom time fungicides.
  - The term ‘insecticide’ includes insect growth regulators, also known as IGRs.
  - Currently most bee label warnings are only based on acute adult toxicity.
  - The exception is B.t. (*Bacillus thuringiensis*) can be applied safely because it is documented to be safe for both adult and immature bees
- There are alternative IPM insecticide timings.
  - See <http://www.ipm.ucdavis.edu/> > Agricultural Pests > Almonds

*Impact on immature bees*



Newly emerged, wingless bees pulled from the combs by other bees, and empty cells of brood that failed in their attempts to emerge as adults.

## **Key BMP: Honey Bees and Fungicides**

**Any fungicide application deemed necessary during bloom should occur in the late afternoon and evening when bees and pollen are not present**

- This avoids exposing pollen to spray materials
- But, don't spray so late that fungicides do not have time to dry before bees begin foraging
- Spraying while bees are foraging can degrade floral scent chemicals that the bees "home in on"
- Bees that come in contact with ag sprays cannot fly until spray dries



## **Key BMP: Agree on Hive Removal Timing**

### **Beekeeper and grower should agree on hive removal timing.**

The University of California recommends bee removal when 90% of the flowers on the latest blooming variety are at petal fall. Past this point, no pollination is taking place, and bees that forage outside the orchard seeking alternate food sources and water will have a higher risk of coming in contact with insecticide-treated crops.

Losses can result from exposure to chemicals applied in other crops planted in the vicinity of almonds, particularly after almond bloom

- Bees will forage 4+ miles when pollen and water scarce

## ***Overall Objective:***

Ensure that almonds continue to be a good and safe place for bees



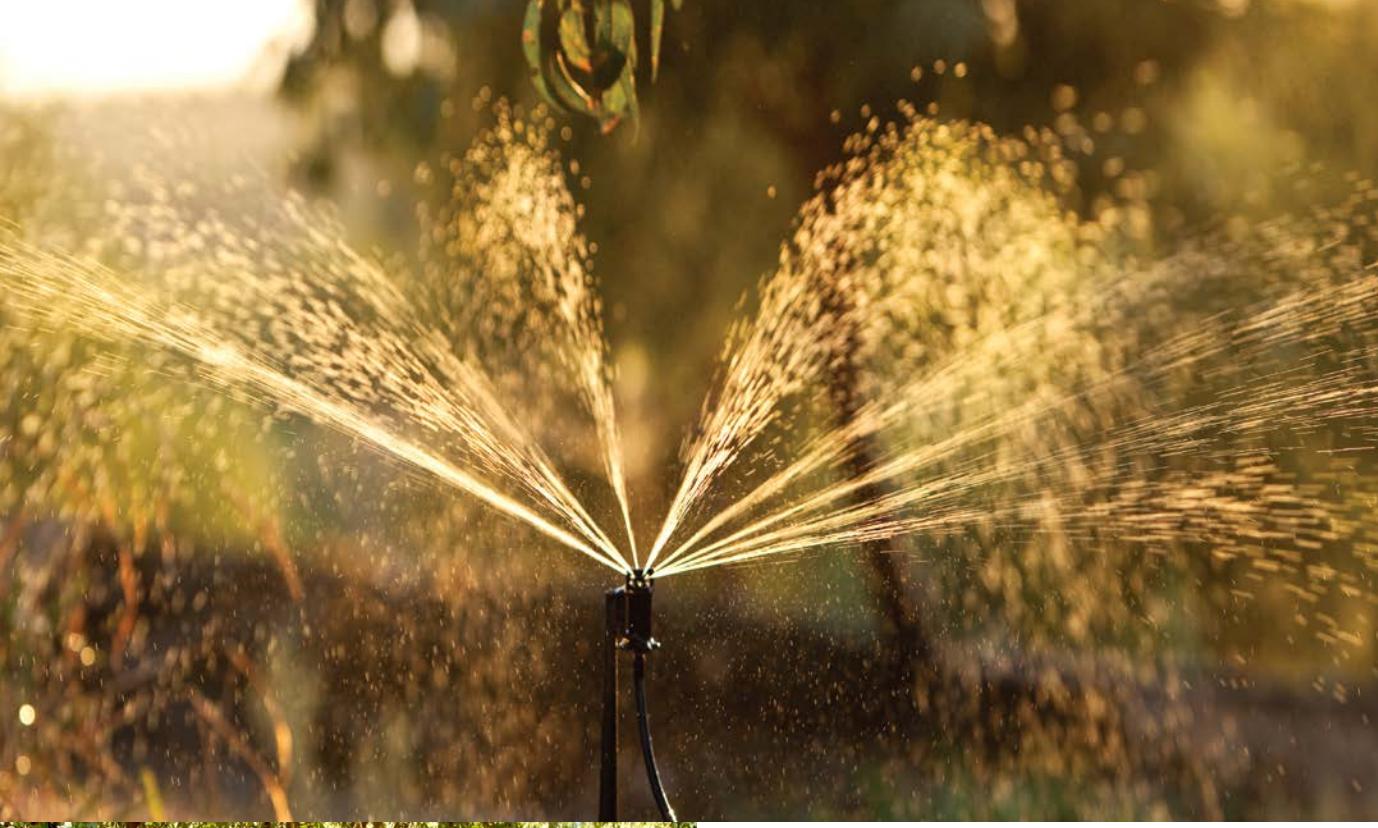
# *Accelerated Innovation Management (AIM)*

WATER  
MANAGEMENT +  
EFFICIENCY

SUSTAINABLE  
WATER  
RESOURCES

22ND CENTURY  
AGRONOMICS

AIR  
QUALITY



**AIM:  
WATER  
MANAGEMENT  
AND  
EFFICIENCY**

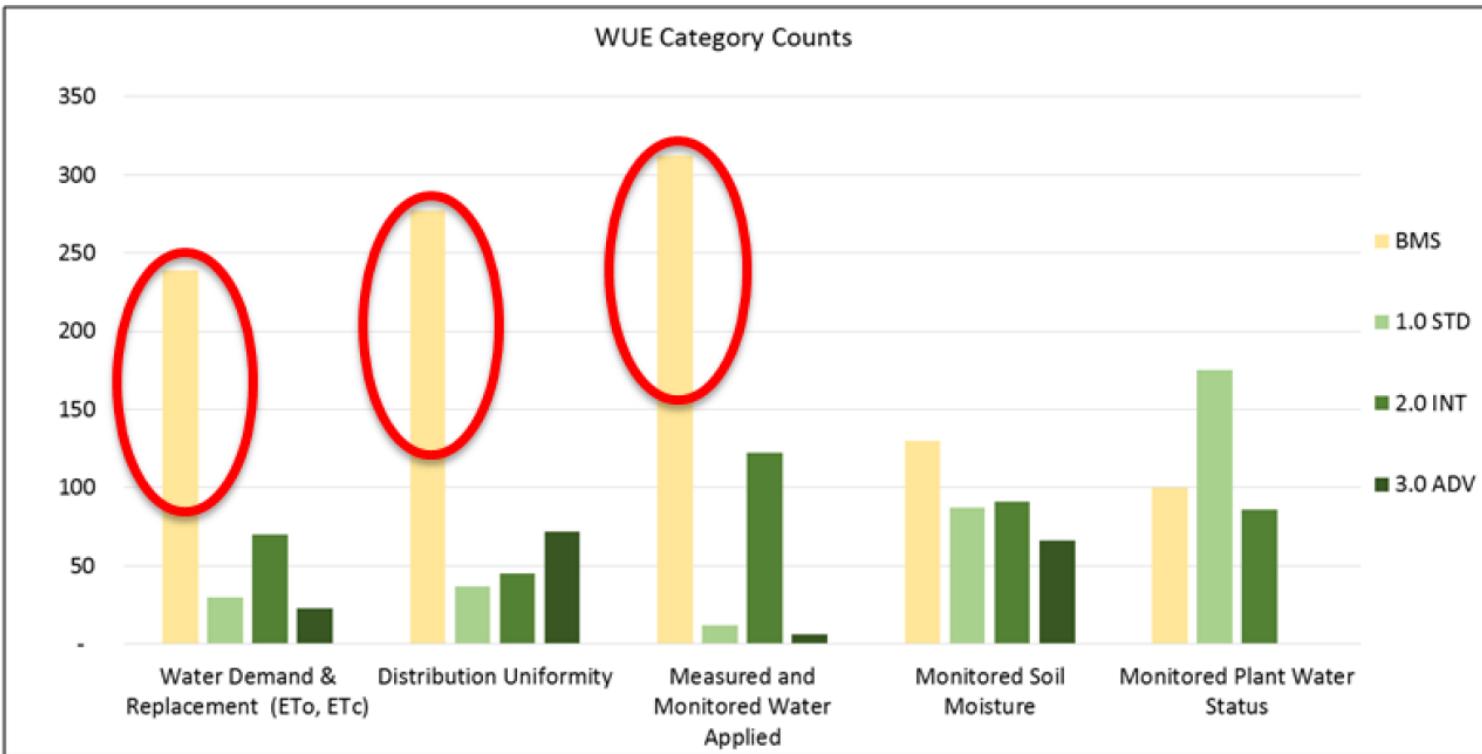


**33%**



# Overview of SureHarvest CASP data mining part 1

Figure 6. WUE categories identified as high priority in terms of researching potential programs relevant to almond growers that incentivize the adoption of WUE innovations



# Water Management and Efficiency

## *Almond Irrigation Improvement Continuum*

- Water Management and Efficiency
  - One of four key components of the Accelerated Innovation Management (AIM) program adopted by Almond Board of California's (ABC) Board of Directors.
  - California experts noted there were a range of tools growers could be implementing without wholly new technologies.
  - Focuses on accelerating almond grower transition and adoption of research based, commercially available, and increasingly water efficient irrigation management and scheduling tools.
  - An Almond Irrigation Improvement Continuum has been developed to describe the steps of this transition.



# Almond Irrigation Improvement Continuum



Measurement	1.0 Minimum	2.0 Intermediate	3.0 Advanced
Irrigation System Performance	Evaluate irrigation system for pressure variation and average application rate at least once every 3 years. Correct any diagnosed system performance problems.	Assess distribution uniformity and average application rate by measuring water volume at least every 3 years. Correct any diagnosed system performance problems.	Assess distribution uniformity and average application rate by measuring water volume at least every 2 years. Correct any diagnosed system performance problems.
Applied water	Use application rate and duration of irrigation to determine water applied.	Use water meters to determine flow rate and water applied.	Use water meters to determine applied water and compare to crop water use (ETc, evapotranspiration) to determine irrigation efficiency.
Orchard Water Requirements	Estimate orchard water requirements using “normal year” regional ETc to estimate irrigation demand on a monthly time step.	Estimate orchard water requirements using “normal year” regional ETc – adjusting for current weather and cover crop use on a bi-weekly time step.	Estimate orchard water requirements using “normal year” regional ETc to plan irrigations then use real time ETc data to correct the schedule on a weekly time step.
Soil Moisture	Evaluate soil moisture based upon feel and appearance by augering to at least 3-5 feet. Monitor on a monthly time step.	Use manually operated soil moisture sensors to at least 3-5 feet and monitor on a bi-weekly time step. Use information to ensure calculated water is not over/under irrigating trees.	Use automated moisture sensors that store data over time. Review weekly to ensure calculated water is not over/under irrigating trees.
Plant Water Status	Evaluate orchard water status using visual plant cues just prior to irrigation or on a bi-weekly time step.	Use pressure chamber to measure midday stem water potential just prior to irrigation on a monthly time step. Ensure calculated water applications are not over/under irrigating trees.	Use pressure chamber to measure midday stem water potential prior to irrigation on a weekly time step. Ensure calculated water applications are not over/under irrigating trees. Use it to assess when to start irrigating.
Management			

# Air Quality

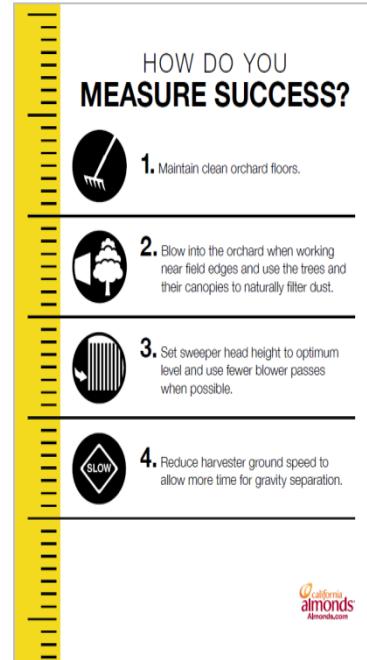
## *Addressing Harvest Dust*



# Harvest Dust Tool Kit

## 4 Key Strategies:

- 1) Maintain clean orchard floors.
- 2) Blow into the orchard when working near field edges and use the trees and their canopies to naturally filter dust.
- 3) Set sweeper head height to optimum level and use fewer blower passes when possible.
- 4) Reduce harvester ground speed to allow more time for gravity separation.



Available downstairs  
at Almond Board booth  
and upon request.

# In Development: Harvest Dust Educational Video

## *Sept. 2015 harvest dust filming*

- Video + still photography
  - Field level
  - Drone footage
- Shoot list developed based on quick guide recommendations
  - Pre-harvest
  - Sweeping
  - Pickup
- Where possible, practices were shot per recommendation and “incorrectly” to demonstrate the visual and real life difference in dust created



# NRCS Low Dust Harvest Equipment Incentive Program

- Stems from ABC Environmental Committee-funded research and subsequent Texas A&M study, coordinated effort by NRCS, ABC, AHPA, harvest equipment manufacturers
- NRCS has approved for its 2016 EQIP funding cycle, \$10.52/A for up to three years for the use of almond harvesters that have been demonstrated in peer-reviewed research to reduce dust emissions by 30% or more.
  - Information about specific models eligible for program can be obtained at local NRCS office
  - Applications accepted year-round
- Promotion to industry
  - NRCS press release
  - AHPA newsletter article
  - ABC California Almonds Outlook article
  - Various ag media



## More Information or Copies of Materials?

- See Jenny and Rebecca at the ABC resources table
- Bob Curtis  
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