

ALMOND INDUSTRY MAPS

Almonds.com/Maps

Almond Board of California (ABC) has invested in a comprehensive mapping analysis to improve the precision, accuracy and transparency of information about the almond community. Understanding the impacts and opportunities of almond production is fundamental to responsible resource management, regulatory compliance and planning for the sustainable future of California agriculture.

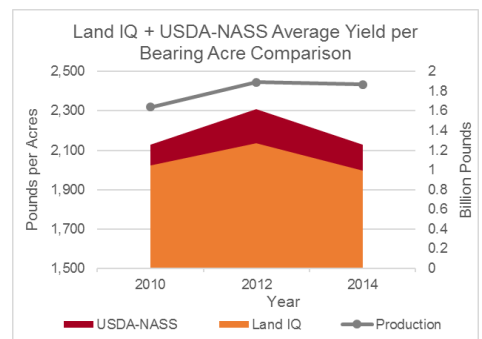
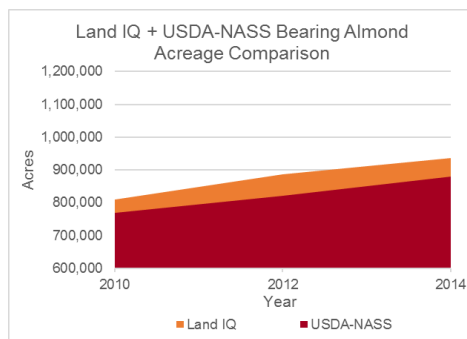
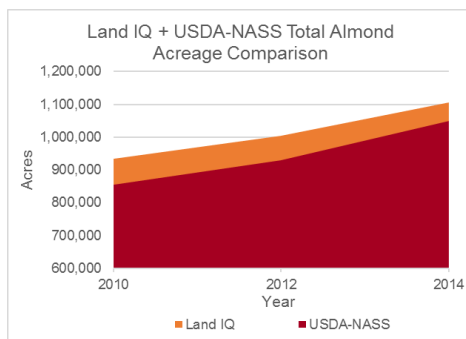
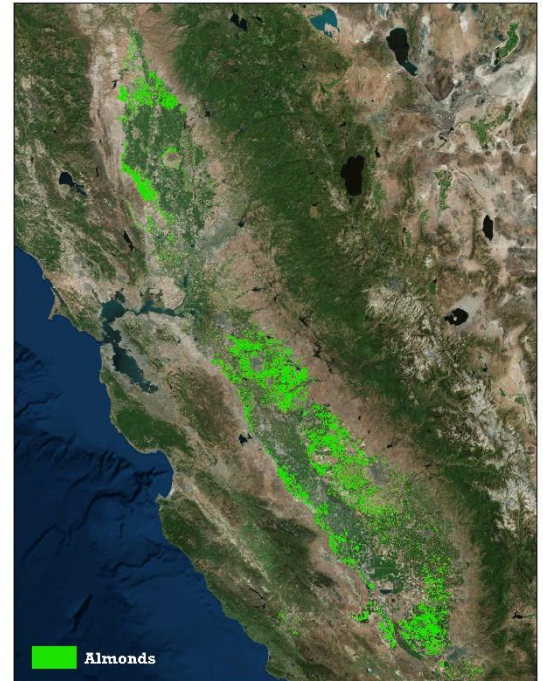
The maps, developed in partnership with Land IQ, a Sacramento-based agricultural and environmental scientific research and consulting firm, constitute a comprehensive, living map of California Almonds that draws upon multiple sources of information and extensive validation to create a highly accurate, orchard-by-orchard view of the industry. They can be accessed online at Almonds.com/Maps.

Improved Precision & Accuracy

Because Land IQ's approach does not rely on surveys or extrapolation, the result is a map accounting for every almond orchard in the state at an accuracy of 96 percent or greater, more accurate than other methods.

In general, Land IQ data consistently indicates that California Almond acreage is between 5-9 percent higher than the annual NASS Almond Acreage reports, as seen in a comparative analysis of 2010, 2012 and 2014. However, this does not mean that the industry can expect a larger crop than is currently projected by the United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). Rather, the historical difference indicates that the NASS production per acre (yield) statistic has consistently been an overestimate due to historic underestimation of industry acreage.

Given that the difference in reporting is steady, this finding does not have any implications on production, but rather shows that official estimates have consistently underestimated acreage. Reasons for differences in acreage between the two sources are largely due to differences in methodology.¹



Source: Land IQ. California Statewide Almond Mapping - 2014. Feb. 2016. Based on data from USDA National Agricultural Imagery Program (NAIP) and USGS Landsat. USDA-NASS. 2015 California Almond Acreage Report. Apr. 2016.

Applications

Land IQ's findings will be evaluated and used by NASS to fine-tune the official almond acreage surveys and other forecasts and reports, and serve as a complementary almond industry resource.

¹ Land IQ draws on multiple lines of evidence including agronomic and remote sensing knowledge, unique field boundaries, robust on-the-ground verification, publicly available imagery and other spatial and non-spatial resources. NASS relies on grower surveys, nursery surveys, the USDA Census of Agriculture, California county agricultural commissioner reports, monthly industry position reports and extrapolation based on the summation of available knowledge of the industry.

The NASS subjective and objective crop forecasts, almond acreage reports and others are the official USDA estimates and will continue to be the official statistics for the industry. ABC, NASS and Land IQ have begun conversations about how to work together in the future to ensure improved accuracy across industry reports and forecasts, leveraging the strengths of the different methodologies.¹

To date, findings from Land IQ have allowed the almond industry to drive innovation, further scientific research and educate stakeholders about almond-related opportunities. For example, through the mapping project, analysis of almond acreage indicates that 60 percent of almond orchards grow on soil moderately good or better for groundwater recharge, an important initiative the almond community is tackling to increase overall water availability for farmers and all of California.

Current Mapping Data

Crop Acreage

Based on the mapping assessment of California Almond orchards, Land IQ found that in 2014, there were 1,106,454 acres of almonds. In the same year, the USDA's National Agricultural Statistics Service (NASS) estimated acreage of 1,050,000.^{2,3} With regard to 2014 bearing almond acreage, Land IQ found that there were 936,263 acres while USDA-NASS indicated 880,000 acres.^{2,3}

Orchard Age

Since almond trees are typically commercially productive for 25 years, knowing orchard ages across the state can help address questions about production fluctuations, biomass accumulation, pest control needs and crop changes.

By looking back at 30+ years of satellite imagery, Land IQ's almond acreage mapping can pinpoint the year each orchard was planted across the state and thus estimate orchard age. Based on that analysis, we know that in 2014 15% of California's almond orchards were 1-3 years old, 35% were between 4 and 10, 34% 11 to 20, 7% were 21 to 25 and 8% were over 25 years old.⁴

Groundwater Recharge

A piece of the Almond Board's larger research program is investigating using almond orchards to recharge California's groundwater. Land IQ almond mapping indicates that nearly 675,000 acres of almond orchards grow on soil that is moderately good or better for groundwater recharge. This includes: 4,119 acres of almonds which are categorized as 'very good' in their groundwater recharge potential; 271,509 acres as 'good'; and 396,790 acres as 'moderately good'.⁵

Future Research

While the original assessment of almond acreage through Land IQ was performed based off of 2014 publicly available imagery, it will be updated regularly to assess change and keep the map up-to-date. Currently, 2010, 2012 and 2014 are mapped while work is being done to complete 2016 mapping. The spatial imagery that Land IQ's mapping relies upon is only available every two years.

Similar to the information procured through the current maps about groundwater recharge suitability, future applications have the potential to provide fundamental information that is critical for accurately and objectively answering questions that could not have been answered before.

To access this new, interactive web map, visit Almonds.com/Maps.

Questions about how to use the maps?

Contact Land IQ's technical support staff at 916.265.6358 or technical.support@landiq.com.

² Land IQ. California Statewide Almond Mapping - 2014. Feb. 2016. Based on data from USDA National Agricultural Imagery Program (NAIP) and USGS Landsat.

³ USDA. National Agricultural Statistics Service, Pacific Regional Field Office. 2014 California Almond Acreage Report. May 2015.

⁴ Land IQ. Orchard Age Analysis. Feb. 2016. Planting date +/- 1-2 years with approximately 95% accuracy. Based on data from USDA National Agricultural Imagery Program (NAIP) and USGS Landsat.

⁵ Land IQ. Groundwater Recharge Suitability Analysis. Nov. 2015. Based on data from UC Davis Soil Agricultural Groundwater Banking Index, California DWR Groundwater Levels, USGS Central Valley Hydrologic Model Well Logs, USGS Corcoran Clay Extent, DWR Irrigation District Coverage, USGS Hydrology and Points of Diversion.