

# 2016-17 California Navel Orange Objective Measurement Report



California Department of Food and Agriculture

## Cooperating with the USDA, National Agricultural Statistics Service

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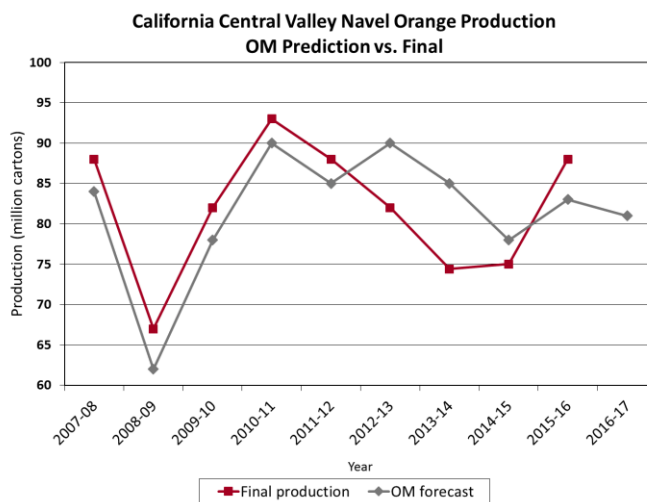
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### NAVEL ORANGE PRODUCTION FORECAST

The initial 2016-17 Navel orange forecast is 84.0 million cartons. Of the total Navel orange forecast, 81.0 million cartons are estimated to be in the Central Valley. This forecast is based on the results of the 2016-17 Navel Orange Objective Measurement (O.M.) Survey, which was conducted from July 9 to September 1, 2016. Estimated fruit set per tree, fruit diameter, trees per acre, bearing acreage, and oranges per box were used in the statistical models estimating production.

The varieties forecast in this report include conventional, organic, and specialty Navel oranges (including Cara Cara and Blood orange varieties).

Survey data indicated a fruit set per tree of 384, above the five-year average of 334. The average September 1 diameter was 2.213 inches, below the five-year average of 2.251 inches.



### CALIFORNIA NAVAL ORANGE AVERAGE SET PER TREE BY COUNTY

Year	Fresno	Tulare	Kern	Central Valley <sup>1</sup>
2007-08	380	384	429	390
2008-09	179	183	262	202
2009-10	247	285	337	294
2010-11	318	417	484	418
2011-12	301	281	413	318
2012-13	349	309	435	344
2013-14	303	253	261	265
2014-15	311	308	396	333
2015-16	449	387	460	412
2016-17	296	380	472	384

<sup>1</sup> Includes Madera, Fresno, Tulare, Kings, and Kern counties.

### SURVEY SAMPLE

A sample of 577 Navel orange groves was randomly selected proportional to county and variety bearing acreage, and 537 of the groves were utilized in this survey. Once a grove was randomly chosen and grower permission was granted, two trees were randomly selected. The Navel orange sample included organic, Cara Cara, and Blood orange groves.

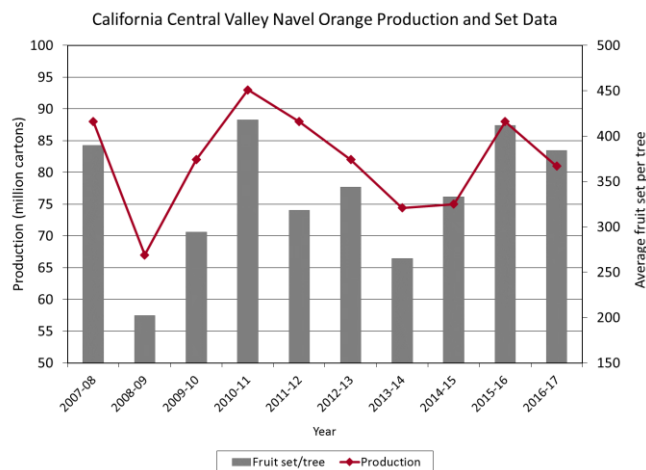
For each randomly selected tree, its trunk was measured along with all connected branches. A random number table was then used to select a branch, and then all connected branches from the randomly-selected branch were measured.

This process was repeated until a branch was reached with no significant limbs beyond it. This randomly-selected branch, called the terminal branch, was then closely inspected to count all fruit connected to it, as well as all of the fruit along the path from the trunk to the terminal branch. Since each selected path has a probability of selection associated with it, a probability-based method was then applied to estimate a fruit count for the entire tree.

In the last week of the survey period, fruit diameter measurements were made on the right quadrant of four trees surrounding the two trees of every third grove. These measurements were used to estimate an average fruit diameter per tree. Of the 537 utilized groves, 10 were in Madera County, 94 were in Fresno County, 315 were in Tulare County, and 118 were in Kern County.

### SURVEY HISTORY

A Navel Orange Objective Measurement Survey has been conducted in the Central Valley every year since the 1984-85 crop year, except for the 1991-92 season due to a lack of funding. The data from the first two years were used for research purposes in developing crop-estimating models.



**CALIFORNIA CENTRAL VALLEY NAVEL ORANGE DATA**

Crop year <sup>1</sup>	Number of sampled groves	Final utilized production (Cartons) <sup>2</sup>	Forecast utilized production (Cartons) <sup>2</sup>	Bearing acres	Average trees per acre	Average set per tree	Average September 1 diameter <sup>3</sup> (Inches)
1997-98	531	81,000,000	80,000,000	116,500	121	407	2.481
1998-99	498	37,000,000	61,000,000	118,000	121	380	2.184
1999-00	478	76,000,000	75,000,000	119,000	122	458	2.224
2000-01	478	68,000,000	65,000,000	122,000	122	347	2.311
2001-02	527	62,000,000	60,000,000	122,000	122	264	2.483
2002-03	510	82,000,000	77,500,000	129,000	122	466	2.200
2003-04	498	77,000,000	76,000,000	129,000	124	358	2.410
2004-05	526	86,000,000	90,000,000	131,000	125	392	2.495
2005-06	569	92,000,000	82,000,000	133,000	127	461	2.230
2006-07	539	67,000,000	64,000,000	135,000	129	294	2.268
2007-08	543	88,000,000	84,000,000	135,000	130	390	2.245
2008-09	527	67,000,000	62,000,000	135,000	131	202	2.276
2009-10	533	82,000,000	78,000,000	134,500	132	294	2.336
2010-11	519	93,000,000	90,000,000	133,500	133	418	2.143
2011-12	535	88,000,000	85,000,000	132,000	133	318	2.270
2012-13	539	82,000,000	90,000,000	127,000	134	344	2.195
2013-14	542	74,400,000	85,000,000	125,000	134	265	2.338
2014-15	534	75,000,000	78,000,000	124,000	134	333	2.205
2015-16	520	88,000,000	83,000,000	120,000	135	412	2.248
2016-17 <sup>4</sup>	537		81,000,000	120,000	135	384	2.213

<sup>1</sup> Data for 1998-99, and 2006-07 (freeze years) were not used in forecasting the 2014-15 crop.

<sup>2</sup> Prior to the 2010-11 season, cartons had a standard equivalent weight of 37.5 lbs. Beginning in the 2010-11 season, cartons have a standard equivalent weight of 40 lbs.

<sup>3</sup> Size data before the 2006-07 season are from the orange industry. Size data beginning 2007-08 are from the USDA-NASS, Pacific Regional Office objective measurement survey.

<sup>4</sup> USDA, NASS, Pacific Regional Office preliminary forecast for 2016-17.

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