



United States Department of Agriculture  
National Agricultural Statistics Service

# 2012 California Almond Objective Measurement Report



**Cooperating with the California Department of Food and Agriculture**

California Field Office · P.O. Box 1258 · Sacramento, CA 95812 · (916) 498-5161 · (916) 498-5186 Fax · [www.nass.usda.gov/ca](http://www.nass.usda.gov/ca)

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## 2012 CALIFORNIA ALMOND FORECAST UP

California's 2012 almond production is forecast at a record 2.10 billion meat pounds, up 5 percent from May's subjective forecast, and 3 percent above last year's crop. The forecast is based on 780 thousand bearing acres. Production for the Nonpareil variety is forecast at 730 million meat pounds, 7 percent below last year's deliveries. The Nonpareil variety represents 35 percent of California's total almond production.

The 2012 California almond crop began with a warm and dry February that created favorable bloom conditions for almond trees. The 2012 bloom period was shorter than last year, but the excellent weather made up for the shorter overlap. Chilling hours were plentiful. An early March frost resulted in some spotty damage in the South San Joaquin Valley, and an early April hailstorm affected orchards in Merced County. Weather in the Sacramento Valley has been near ideal. A heavier than normal drop was reported in the San Joaquin Valley. Across the state, lower limb death was higher than 2011. Disease and insect pressure have been minimal.

The average nut set per tree is 7,048, down 4 percent from 2011. The Nonpareil average nut set of 6,571 is down 12 percent from last year's set. California varieties' average nut set, at 6,845, is up 5 percent from 2011. The average kernel weight for all varieties sampled was 1.48 grams, 1 percent below last year. The Nonpareil average kernel weight was 1.64, up 3 percent from last year. A total of 99.1 percent of all nuts sized were sound.

## SAMPLING PROCEDURES

To determine tree set, nuts are counted along a path within a randomly selected tree. Work begins at the trunk and progresses to the end of the terminal branch. Using a random number table, one branch is selected at each forking to continue the path. A branch's probability of

selection is directly proportional to its cross-sectional area. This methodology is used because of its statistical efficiency. The method also makes it possible to end up at any one of the tree's numerous terminal branches.

Since the selected path has a probability of selection associated with it, this probability is used to expand nut counts arriving at an estimated set for the entire tree.

Along intermediate stages (i.e., the bearing surface between forkings), every fifth nut is picked. All nuts on the terminal branch are picked. These nuts are used to determine size and weight measurements.

## FIELD SAMPLING ACTIVITIES

The survey began May 29 and sampling was completed by June 18. There were 1,746 trees sampled for the 2012 survey in 873 orchards. Additional orchards were not sampled for one of the following reasons:

- 1) Orchard had been sprayed.
- 2) Orchard had been recently irrigated and was wet.
- 3) Orchard had been pulled.
- 4) Grower would not grant permission or could not be contacted.

The Objective Measurement Survey is funded by the Almond Board of California.

## DATA RELIABILITY

The 80 percent confidence interval is from 1,918 million meat pounds to 2,282 million meat pounds. This means that the results of our sampling procedures will encompass the true mean 80 percent of the time.

**TABLE 1: COMPARISON OF NUT ESTIMATES AND ORCHARDS SAMPLED  
BY DISTRICT AND VARIETY, JUNE OBJECTIVE MEASUREMENT SURVEY COUNTS, 2006-2011**

| District and Variety                    | 2007          |                  | 2008          |                  | 2009          |                  | 2010          |                  | 2011          |                  | 2012          |                  |
|---|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|
|   | Nuts Per Tree | Orchards Sampled | Nuts Per Tree | Orchards Sampled | Nuts Per Tree | Orchards Sampled | Nuts Per Tree | Orchards Sampled | Nuts Per Tree | Orchards Sampled | Nuts Per Tree | Orchards Sampled |
| <b>ALL DISTRICTS</b><br>(All Varieties) | 7,413         | 865              | 7,452         | 816              | 5,589         | 852              | 5,956         | 816              | 7,353         | 857              | 7,048         | 873              |
| <b>BY DISTRICTS</b>                     |               |                  |               |                  |               |                  |               |                  |               |                  |               |                  |
| <u>District I</u>                       |               |                  |               |                  |               |                  |               |                  |               |                  |               |                  |
| Sacramento Valley                       | 7,758         | 135              | 8,157         | 112              | 6,737         | 120              | 6,783         | 122              | 7,561         | 111              | 7,100         | 110              |
| <u>District II</u>                      |               |                  |               |                  |               |                  |               |                  |               |                  |               |                  |
| San Joaquin Valley                      | 7,350         | 730              | 7,340         | 704              | 5,400         | 732              | 5,810         | 694              | 7,322         | 746              | 7,041         | 763              |
| <b>BY VARIETIES</b>                     |               |                  |               |                  |               |                  |               |                  |               |                  |               |                  |
| Butte                                   | 7,866         | 109              | 8,038         | 106              | 7,505         | 108              | 6,562         | 114              | 8,666         | 121              | 7,532         | 126              |
| California Types 1/                     | 7,633         | 285              | 7,458         | 273              | 5,302         | 284              | 6,023         | 263              | 6,535         | 283              | 6,845         | 286              |
| Carmel 2/                               | 7,159         | 161              | 7,259         | 149              | 5,129         | 141              | 5,442         | 134              | 6,256         | 132              | 6,583         | 125              |
| Monterey 2/                             | 6,344         | 63               | 5,903         | 69               | 4,618         | 80               | 6,090         | 76               | 5,925         | 96               | 6,222         | 105              |
| Nonpareil                               | 7,067         | 370              | 7,079         | 344              | 5,136         | 360              | 5,583         | 346              | 7,482         | 353              | 6,571         | 358              |
| Padre                                   | 8,000         | 59               | 9,195         | 57               | 6,791         | 63               | 6,476         | 65               | 8,521         | 72               | 9,398         | 74               |

1/ For survey purposes, the California classification includes the following varieties: Aldrich, Ballico, Carmel, Davey, Fritz, Harvey, Le Grand, Mono, Monterey, Norman, Price Cluster, Ruby, Tokoyo and Yosemite.

2/ Carmel and Monterey varieties are also included in California Types.

**TABLE 2: WEIGHT, SIZE AND GRADE OF AVERAGE ALMOND SAMPLE, 2007-2012**

| District and Variety         | Kernel Weight (Grams) | Kernel Size (Millimeters) |       |           | Grade (Percent of Nuts) 1/ |         |               |         |             |       |       |  |
|------------------------------|-----------------------|---------------------------|-------|-----------|----------------------------|---------|---------------|---------|-------------|-------|-------|--|
|                              |                       | Length                    | Width | Thickness | Edible Nuts                |         | Insect Damage | Shrivel | Natural Gum | Blank | Other |  |
|                              |                       |                           |       |           | Singles                    | Doubles |               |         |             |       |       |  |
| <b>ALL DISTRICTS</b>         |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.47                  | 21.81                     | 12.39 | 9.96      | 94.6                       | 3.9     | 2/            | 1.2     | 0.2         | 2/    | 0.2   |  |
| 2008                         | 1.43                  | 21.60                     | 12.30 | 9.66      | 96.2                       | 2.8     | 2/            | 0.6     | 0.1         | 0.2   | 0.1   |  |
| 2009                         | 1.58                  | 22.96                     | 13.10 | 9.93      | 97.1                       | 1.8     | 2/            | 0.7     | 0.2         | 0.1   | 0.1   |  |
| 2010                         | 1.72                  | 23.38                     | 13.20 | 10.30     | 94.7                       | 4.0     | 2/            | 1.0     | 2/          | 0.1   | 0.1   |  |
| 2011                         | 1.49                  | 21.84                     | 12.52 | 9.92      | 94.6                       | 4.1     | 2/            | 0.8     | 0.1         | 0.2   | 0.2   |  |
| 2012                         | 1.48                  | 21.40                     | 12.51 | 9.94      | 93.4                       | 5.7     | 2/            | 0.7     | 2/          | 0.1   | 2/    |  |
| <b>BY DISTRICT</b>           |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| <b>Sacramento Valley 3/</b>  |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.59                  | 22.97                     | 13.26 | 10.34     | 93.4                       | 4.5     | 2/            | 0.7     | 0.2         | 2/    | 1.2   |  |
| 2008                         | 1.43                  | 22.52                     | 12.80 | 9.69      | 95.1                       | 3.6     | 2/            | 0.8     | 0.1         | 2/    | 0.5   |  |
| 2009                         | 1.65                  | 22.90                     | 13.63 | 10.16     | 97.4                       | 1.2     | 2/            | 0.5     | 0.1         | 2/    | 0.8   |  |
| 2010                         | 1.75                  | 23.86                     | 13.44 | 10.23     | 93.7                       | 4.5     | 2/            | 1.1     | 2/          | 2/    | 0.7   |  |
| 2011                         | 1.60                  | 22.73                     | 13.33 | 10.02     | 92.1                       | 6.2     | 2/            | 0.6     | 2/          | 2/    | 1.1   |  |
| 2012                         | 1.54                  | 22.32                     | 13.22 | 10.07     | 94.1                       | 3.9     | 2/            | 1.3     | 2/          | 0.3   | 0.3   |  |
| <b>San Joaquin Valley 4/</b> |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.44                  | 21.58                     | 12.22 | 9.89      | 94.8                       | 3.8     | 2/            | 1.3     | 0.2         | 2/    | 2/    |  |
| 2008                         | 1.43                  | 21.41                     | 12.21 | 9.66      | 96.4                       | 2.6     | 2/            | 0.5     | 0.1         | 0.3   | 2/    |  |
| 2009                         | 1.57                  | 22.98                     | 13.00 | 9.89      | 97.0                       | 1.9     | 2/            | 0.7     | 0.2         | 0.1   | 2/    |  |
| 2010                         | 1.71                  | 23.28                     | 13.15 | 10.31     | 94.9                       | 3.9     | 2/            | 1.0     | 2/          | 0.2   | 2/    |  |
| 2011                         | 1.48                  | 21.70                     | 12.40 | 9.90      | 95.0                       | 3.8     | 2/            | 0.8     | 0.1         | 0.2   | 0.1   |  |
| 2012                         | 1.48                  | 21.26                     | 12.40 | 9.93      | 93.3                       | 6.0     | 2/            | 0.6     | 2/          | 0.1   | 2/    |  |
| <b>BY VARIETY</b>            |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| <b>Butte</b>                 |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.22                  | 19.18                     | 11.74 | 9.87      | 94.8                       | 4.2     | 2/            | 0.7     | 2/          | 2/    | 0.3   |  |
| 2008                         | 1.21                  | 18.72                     | 11.76 | 9.70      | 95.5                       | 3.6     | 2/            | 0.6     | 2/          | 0.3   | 2/    |  |
| 2009                         | 1.26                  | 19.86                     | 12.19 | 9.78      | 96.9                       | 2.3     | 2/            | 0.6     | 0.1         | 2/    | 0.1   |  |
| 2010                         | 1.43                  | 20.54                     | 12.39 | 10.15     | 94.2                       | 4.3     | 2/            | 1.1     | 2/          | 0.1   | 0.1   |  |
| 2011                         | 1.24                  | 19.33                     | 11.84 | 9.78      | 94.5                       | 4.5     | 2/            | 0.7     | 2/          | 0.1   | 0.2   |  |
| 2012                         | 1.20                  | 18.54                     | 11.77 | 9.83      | 92.5                       | 6.4     | 2/            | 0.9     | 0.1         | 0.1   | 2/    |  |
| <b>California Types 5/</b>   |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.44                  | 22.20                     | 11.85 | 9.88      | 93.3                       | 5.0     | 2/            | 1.2     | 0.2         | 2/    | 0.2   |  |
| 2008                         | 1.41                  | 22.14                     | 11.79 | 9.60      | 95.6                       | 3.5     | 2/            | 0.4     | 0.1         | 0.3   | 2/    |  |
| 2009                         | 1.62                  | 24.12                     | 12.77 | 9.85      | 96.7                       | 2.4     | 2/            | 0.6     | 0.2         | 0.1   | 0.1   |  |
| 2010                         | 1.71                  | 24.08                     | 12.73 | 10.34     | 93.2                       | 5.9     | 2/            | 0.7     | 0.1         | 2/    | 0.1   |  |
| 2011                         | 1.55                  | 22.94                     | 12.27 | 9.94      | 92.1                       | 6.8     | 2/            | 0.6     | 0.1         | 0.2   | 0.2   |  |
| 2012                         | 1.53                  | 22.45                     | 12.23 | 10.00     | 90.7                       | 8.7     | 2/            | 0.5     | 2/          | 2/    | 2/    |  |
| <b>Carmel 6/</b>             |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.47                  | 22.78                     | 11.74 | 9.86      | 93.5                       | 4.8     | 2/            | 1.4     | 0.2         | 2/    | 2/    |  |
| 2008                         | 1.43                  | 22.75                     | 11.79 | 9.63      | 96.1                       | 3.1     | 2/            | 0.6     | 2/          | 0.1   | 2/    |  |
| 2009                         | 1.64                  | 24.62                     | 12.62 | 9.79      | 97.1                       | 1.8     | 2/            | 0.7     | 0.1         | 0.1   | 2/    |  |
| 2010                         | 1.70                  | 24.56                     | 12.57 | 10.20     | 94.8                       | 4.2     | 2/            | 0.8     | 0.1         | 2/    | 0.1   |  |
| 2011                         | 1.50                  | 22.81                     | 12.08 | 9.79      | 94.6                       | 4.5     | 2/            | 0.7     | 2/          | 2/    | 2/    |  |
| 2012                         | 1.51                  | 22.41                     | 12.20 | 9.90      | 91.9                       | 7.5     | 2/            | 0.6     | 2/          | 2/    | 2/    |  |
| <b>Monterey 6/</b>           |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.61                  | 23.63                     | 12.44 | 9.99      | 92.5                       | 6.6     | 2/            | 0.5     | 0.3         | 2/    | 2/    |  |
| 2008                         | 1.62                  | 23.77                     | 12.32 | 9.78      | 92.9                       | 6.1     | 2/            | 0.4     | 2/          | 0.5   | 2/    |  |
| 2009                         | 1.82                  | 25.64                     | 13.48 | 9.98      | 95.4                       | 3.8     | 2/            | 0.5     | 0.3         | 2/    | 2/    |  |
| 2010                         | 1.89                  | 25.26                     | 13.23 | 10.66     | 88.9                       | 10.6    | 2/            | 0.5     | 2/          | 2/    | 2/    |  |
| 2011                         | 1.76                  | 24.65                     | 12.83 | 10.21     | 86.7                       | 12.3    | 2/            | 0.5     | 0.3         | 2/    | 0.1   |  |
| 2012                         | 1.71                  | 24.06                     | 12.76 | 10.25     | 86.8                       | 12.6    | 2/            | 0.4     | 0.1         | 0.1   | 2/    |  |
| <b>Nonpareil</b>             |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.61                  | 22.87                     | 13.17 | 10.06     | 95.3                       | 3.2     | 2/            | 1.1     | 0.1         | 2/    | 0.2   |  |
| 2008                         | 1.55                  | 22.68                     | 13.02 | 9.68      | 96.9                       | 2.1     | 2/            | 0.7     | 2/          | 0.1   | 0.1   |  |
| 2009                         | 1.74                  | 23.97                     | 13.93 | 10.03     | 97.5                       | 1.3     | 2/            | 0.7     | 0.2         | 0.1   | 0.2   |  |
| 2010                         | 1.89                  | 24.49                     | 14.02 | 10.29     | 95.8                       | 2.5     | 2/            | 1.3     | 2/          | 0.2   | 0.2   |  |
| 2011                         | 1.60                  | 22.75                     | 13.12 | 9.95      | 96.1                       | 2.4     | 2/            | 1.0     | 0.1         | 0.2   | 0.3   |  |
| 2012                         | 1.64                  | 22.55                     | 13.33 | 9.97      | 94.8                       | 4.0     | 2/            | 0.9     | 2/          | 0.2   | 0.1   |  |
| <b>Padre</b>                 |                       |                           |       |           |                            |         |               |         |             |       |       |  |
| 2007                         | 1.22                  | 19.03                     | 11.61 | 9.98      | 95.3                       | 2.2     | 2/            | 2.1     | 0.3         | 2/    | 0.1   |  |
| 2008                         | 1.23                  | 18.86                     | 11.64 | 9.84      | 97.3                       | 1.4     | 2/            | 0.8     | 0.2         | 0.2   | 2/    |  |
| 2009                         | 1.32                  | 20.09                     | 12.24 | 10.08     | 96.6                       | 1.6     | 2/            | 1.4     | 0.2         | 2/    | 0.2   |  |
| 2010                         | 1.49                  | 20.65                     | 12.73 | 10.55     | 96.3                       | 2.1     | 2/            | 1.2     | 2/          | 0.4   | 2/    |  |
| 2011                         | 1.25                  | 18.94                     | 11.85 | 9.90      | 97.3                       | 1.9     | 2/            | 0.7     | 2/          | 2/    | 2/    |  |
| 2012                         | 1.20                  | 18.15                     | 11.57 | 9.92      | 96.8                       | 2.3     | 2/            | 0.5     | 2/          | 0.3   | 2/    |  |

1/ Percentages may not add to 100 due to rounding.

2/ Not shown if less than 0.07 percent.

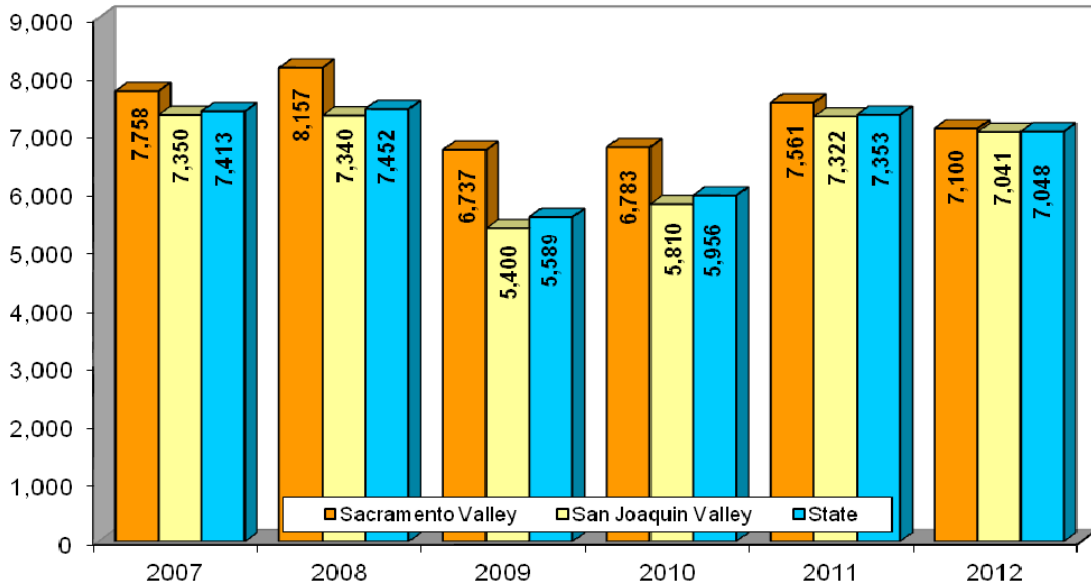
3/ Sacramento Valley includes these counties: Butte, Colusa, Glenn, Solano, Sutter, Tehama, Yolo and Yuba.

4/ San Joaquin Valley includes these counties: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare.

5/ For survey purposes, the California classification includes the following varieties: Aldrich, Ballico, Carmel, Davey, Fritz, Harvey, Le Grand, Mono, Monterey, Norman, Price Cluster, Ruby, Tokoyo and Yosemite.

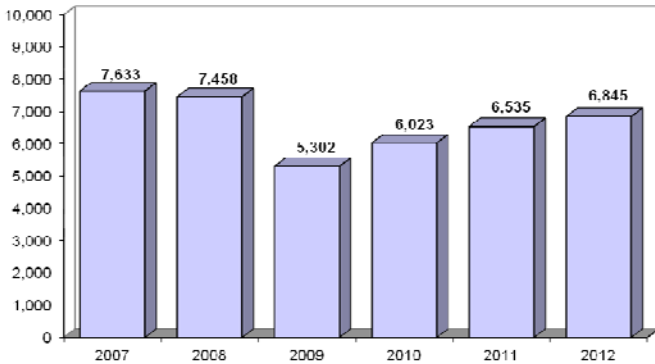
6/ Carmel and Monterey varieties are also included in California Types.

## CALIFORNIA ALMONDS Nuts per Tree, by District

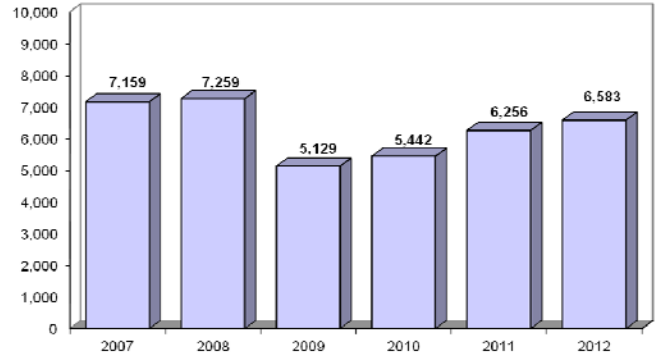


## ALMONDS BY VARIETY

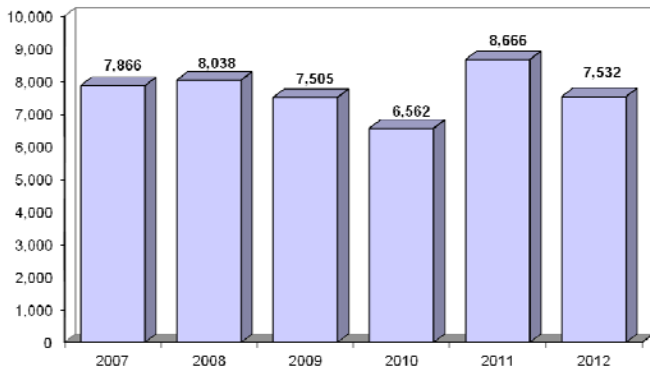
**CALIFORNIA TYPE**  
Nuts per Tree



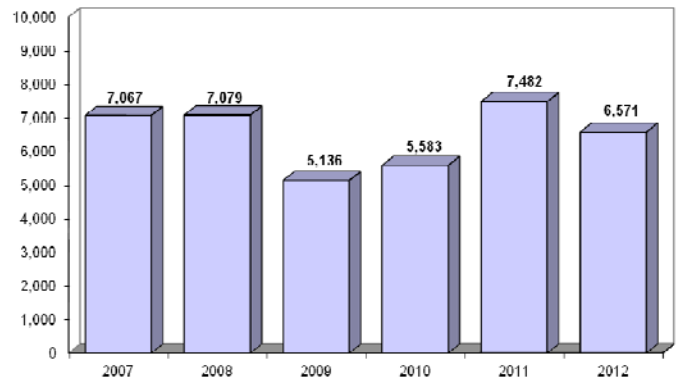
**CARMEL TYPE**  
Nuts per Tree



**BUTTE TYPE**  
Nuts per Tree



**NONPAREIL TYPE**  
Nuts per Tree



**TABLE 3: CALIFORNIA ALMOND ACREAGE, PRODUCTION AND TREES PER ACRE, 1982-2012**

| Year | Bearing Acres 1/ | Total Meat Production |              |               | Acreage<br>Trees Per Acre |
|------|------------------|-----------------------|--------------|---------------|---------------------------|
|      |                  | Metric Tons 2/        | Million Lbs. | Lbs. Per Acre |                           |
| 1982 | 339,000          | 157,000               | 347          | 1,020         | N/A                       |
| 1983 | 360,000          | 110,000               | 242          | 673           | N/A                       |
| 1984 | 381,000          | 268,000               | 590          | 1,550         | N/A                       |
| 1985 | 409,000          | 211,000               | 465          | 1,140         | N/A                       |
| 1986 | 416,000          | 113,000               | 250          | 601           | 84.5                      |
| 1987 | 417,000          | 299,000               | 660          | 1,580         | 84.0                      |
| 1988 | 419,000          | 268,000               | 590          | 1,410         | 86.3                      |
| 1989 | 411,000          | 222,000               | 490          | 1,190         | 87.3                      |
| 1990 | 411,000          | 299,000               | 660          | 1,610         | 88.4                      |
| 1991 | 405,000          | 222,000               | 490          | 1,210         | 89.6                      |
| 1992 | 401,000          | 249,000               | 548          | 1,370         | 90.5                      |
| 1993 | 413,000          | 222,000               | 490          | 1,190         | 92.0                      |
| 1994 | 433,000          | 333,000               | 735          | 1,700         | 92.6                      |
| 1995 | 418,000          | 168,000               | 370          | 885           | 93.7                      |
| 1996 | 428,000          | 231,000               | 510          | 1,190         | 94.4                      |
| 1997 | 442,000          | 344,000               | 759          | 1,720         | 95.5                      |
| 1998 | 460,000          | 236,000               | 520          | 1,130         | 96.3                      |
| 1999 | 485,000          | 378,000               | 833          | 1,720         | 97.3                      |
| 2000 | 510,000          | 319,000               | 703          | 1,380         | 99.0                      |
| 2001 | 530,000          | 376,000               | 830          | 1,570         | 101.0                     |
| 2002 | 545,000          | 494,000               | 1,090        | 2,000         | 101.0                     |
| 2003 | 550,000          | 472,000               | 1,040        | 1,890         | 103.0                     |
| 2004 | 570,000          | 456,000               | 1,005        | 1,760         | 103.0                     |
| 2005 | 590,000          | 415,000               | 915          | 1,550         | 104.0                     |
| 2006 | 610,000          | 508,000               | 1,120        | 1,840         | 105.0                     |
| 2007 | 640,000          | 630,000               | 1,390        | 2,170         | 105.0                     |
| 2008 | 680,000          | 739,000               | 1,630        | 2,400         | 107.0                     |
| 2009 | 720,000          | 640,000               | 1,410        | 1,960         | 108.0                     |
| 2010 | 740,000          | 744,000               | 1,640        | 2,220         | 108.0                     |
| 2011 | 760,000          | 921,000               | 2,030        | 2,670         | 111.0                     |
| 2012 | 780,000          | 953,000               | 2,100        | 2,690         | 112.0                     |

1/ Bearing acreage is defined as plantings four years and older.

2/ Rounded to nearest thousand, metric ton = 2,204.62 pounds.

VIC TOLOMEO, Director  
 SARAH HOFFMAN - KELLY KRUG, Deputy Directors  
 Doug Flohr - Aaron Cosgrove  
 Sarah DeVandry - Stephanie Holm - Robert Jeutong - Brian Kugel  
 Jodi Letterman - John McDonnell - Karen Olmstead - Lena Schwedler -  
 Geoffrey Sechter - Jennifer Travis - Jennifer Van Court  
 Estimates Group - (916) 498-5161

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