
ECONOMIC IMPACTS OF THE EUROPEAN GRAPEVINE MOTH (*LOBESIA BOTRANA*) IN CALIFORNIA

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SUMMARY

The European Grapevine Moth (EGVM) is a known pest of economic significance that originated in Europe and has spread to portions of Africa, the Middle East and Chile. EGVM was first detected in the United States in September 2009 in Napa County, California, and was confirmed to be present in October 2009. Anticipating a large number of the first generation adult moths to emerge in Napa County and the neighboring counties in the following spring, APHIS and CDFA, in partnership with the affected counties, industries, the University of California, and other stakeholders, began developing programs to protect EGVM host plants and to stop the artificial spread of EGVM. A State-wide systematic trapping program was in place in February 2010, which enabled APHIS and CDFA to assess the distribution and density of the EGVM infestation and to delineate the quarantined areas. The current quarantined areas total 2,089 square miles in portions of nine California counties, including California's leading agricultural county, Fresno, and the nation's top wine grape producing counties, Napa and Sonoma, together with Lake, Mendocino, Merced, San Joaquin, Santa Clara and Solano counties.¹

The EGVM regulated products, including grapes, olives, stone fruits, kiwifruits, pomegranates, and persimmons, were valued in 2008 at \$2.7 billion in the quarantined counties and at \$5.7 billion in California.

Grapes: Wine, raisin and table variety grapes

- Total market value of grapes in California in 2008 was about \$3.9 billion. The eight regulated counties accounted for 48 percent (\$1.9 billion) of that total.
- In 2007, 11,623 grape farms² existed in California. The eight regulated counties accounted for 61 percent (7,067 grape farms) of that total.

¹ The ninth county, Santa Clara, was added to the quarantine on September 28, 2010, after the detection of three EGVM on September 15 and 17, 2010, in the Gilroy area. This study includes only the eight counties that were under quarantine before Santa Clara County was added on September 28, 2010.

² "Farms" include vineyards and orchards in this analysis.

- With 90 percent of grape production in the United States, California is by far the largest grape-producing State. Furthermore, in 2009, grapes had the highest value of production among all fruit and nut products in the United States. In California, grape is the second-highest valued agricultural product next to milk and cream.
- In 2009, the United States was the third-largest producer of grapes in the world and the second-largest exporter of table grapes after Chile. Yet the United States is a net importer of grapes (imports minus exports), with imports valued at about \$1 billion. The principal sources are Chile (\$702 million) and Mexico (\$280 million), with most grape imports occurring during the off-season months of January through May. The United States exported \$586 million of fresh grapes to 86 countries in 2009. Canada is the largest importer of U.S. fresh grapes, accounting for 33 percent of U.S. grape exports in 2009.

Stone fruits and other regulated products

- Total market value of stone fruits produced in California, such as peaches, nectarines, plums, cherries, and apricots, was about \$1.6 billion in 2008, and the total share of the eight regulated counties was 49 percent (\$775 million). Total market value of other regulated products, such as olives, persimmons, pomegranates, and kiwifruits, in California was \$171 million in 2008, with a total share of 35 percent (\$60 million) among the eight regulated counties.
- In 2007, 10,312 farms in California produced stone fruits and other regulated products; the eight regulated counties accounted for 2,729 of those farms (27 percent). Among the eight counties, affected farms are heavily concentrated in Fresno County, i.e., 1,402 farms (51 percent of the eight counties).
- California dominated acreage planted in kiwifruits (97 percent), olives (96 percent), plums/prunes (94 percent), and pomegranates (100 percent) in the United States.
- The shares of stone fruits grown in Fresno County are notable; in 2007, it produced 45 percent of nectarines, 19 percent of peaches, and 13 percent of apricots in the United States. Fresno County also accounts for about 75-80 percent of U.S. raisin production.

Because of the high levels of production of regulated products in the eight regulated counties, the EGVM quarantine may present major economic impacts for California agriculture, and for U.S. consumption and export of these products. The economic impacts directly resulting from the grower- and government-led programs are discussed in the two sections that follow – costs of control measures and costs of compliance:

Economic impacts – Costs of control measures

- The largest cost components for suppressing and eradicating EGVM are chemical control measures, such as insecticides and mating disruptions using an EGVM pheromone, and the government-managed systematic trapping, detection, and monitoring programs to determine the presence and distribution of EGVM.
- Chemical control measures, which differ significantly by crop type or geographic condition and are primarily carried out voluntarily by growers, can be costly. In Napa County in 2010, for example, these costs are estimated to total \$7.7 million: \$5.1 million for grower-applied conventional insecticides; \$1.8 million for grower-applied organic insecticides; and \$800,000 for grower-applied mating disruption dispensers.
- The government-managed trapping and monitoring program is another costly program. Currently, about 40,000 traps are installed and monitored in 47 grape-producing counties in California. In addition, 18³ States besides California are participating under the grape commodity survey.
- Costs associated with other mechanical and cultural controls, such as flower and fruit removal and outreach programs, are also incurred at the community and grower levels.

Economic impacts – Costs for compliance

- Compliance requirements of the Federal Order (first issued on 6/22/10 and amended on 8/13/10, 9/15/10 and 9/30/10) are intended to prevent movement of EGVM outside of the quarantined areas. Compliance costs include the purchase of tarps

³ These additional States include WA, NY, MO, OR, OK, MI, PA, TX, MD, CO, ID, VA, NC, OH, GA, IN, WY and VT.

and screens required to haul the regulated products outside of the quarantined area under applicable conditions, expenses related to the disposal of green wastes, and expenditures for cleaning of machinery, equipment, and trucks.

- Under the Federal Order, fresh grape shipments for consumption must be treated (e.g., fumigation with methyl bromide) if vineyards are located within 200 meters of an EGVM detection. Because the majority of table grapes are produced in Fresno County and are shipped interstate and abroad, this provision will significantly affect the table grape growers in Fresno County. Because of logistics and quality issues, such as the limited number of existing fumigation facilities, the high, initial cost associated with constructing in-house facilities, and the shortened shelf life of fumigated grapes, treatment of fresh table grapes using methyl bromide is considered to be cost-prohibitive for exports. Beyond the Federal Order, potential new treatment requirements that could be imposed by importing countries as a result of the outbreak of EGVM in the United States could have significant impacts not only for fresh grapes but also for other regulated products.

In addition to the costs of control measures and regulatory compliance, EGVM could have a significant economic impact on international trade and interstate commerce.

Economic impacts – Costs for international trade and interstate commerce

- The EGVM outbreak is still developing, and it is difficult to assess comprehensively its impact on international trade and interstate commerce. However, industry and government representatives agree that, without the regulatory protocol, California growers could have lost the ability to export all EGVM regulated products. Stone fruits were the first products to experience the impacts of EGVM, as their April to September harvesting season preceded that of other regulated products. Canada halted stone fruit imports from the quarantined area for approximately 45 days starting in May, which resulted in an estimated 250,000 to 350,000 boxes of stone fruits being diverted domestically. Without the regulatory protocol to certify the safety of the products, the resulting loss of trade could have been significant, as high as 2.5 million boxes in Fresno County alone. On September 1, 2010, Mexico removed the temporary import suspension on the EGVM regulated products, which had been imposed on the regulated counties in

their entirety, and began allowing imports of table grapes from non-regulated areas and imports of stone fruits from all areas in these counties.

- Costs of complying with the State's regulatory quarantine are difficult to estimate at the time of this writing. Growers, harvesters, haulers, and receivers of grapes for crushing in the quarantine area are required to have compliance agreements to engage in these activities. In Napa County alone, over 800 compliance agreements have been issued. The main activities that result in increased costs to the regulated industries are the cleaning of equipment, the covering or screening of loads under applicable conditions, and the processing of green wastes to control all life stages of EGVM.

Costs and benefits of EGVM and Federal Order

- Direct costs to growers, such as costs associated with control measures and regulatory compliance, negatively impact growers and their industries. Most of these costs are likely to be absorbed by growers and not be passed on to the next level of the supply chain. Considering the dominant position of California and the eight regulated counties in the production of the regulated products, reduced production revenue could negatively impact the areas' already depressed economy further.
- The Federal Order and a systematic detection and control program are necessary for maintaining interstate and international commerce. Eradication of EGVM would free growers and governments from the control programs and activities related to regulatory compliance.
- Potential elimination of EGVM from California will require a continuation of the control programs and activities through fiscal year (FY) 2013, including systematic trapping and monitoring and regulatory compliance by all impacted entities, and assumes EGVM does not spread beyond the areas currently known to be infested. If eradication is not achieved, costly control measures will continue for the foreseeable future.
- The costs and benefits of controlling and eventually eliminating EGVM extend beyond the immediate economic impacts examined in this report. There are environmental costs (impacts to non-target organisms and ecosystems, potential impacts to air, soil, water quality, etc.) and social costs (potential health impacts to

workers and neighboring property owners, negative community perceptions, etc.) that also need to be considered when evaluating and comparing alternative courses of action.

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INTRODUCTION

The European Grapevine Moth (EGVM) was found in September 2009 in a commercial vineyard in Napa County, California. This was the first known find of EGVM in North America. In the fall of 2009, approximately 10 acres of wine grape vineyards in Napa County experienced complete product loss as a result of EGVM larvae burrowing into the fruit. While diapausing pupae were over-wintering, local, State, and Federal governments anticipated a large number of the first generation adult moths to emerge the following spring based on the trapping and visual pupal sampling data collected in the fall. Thanks to the concerted efforts of growers, industries, the international technical working group (TWG)⁴ and local, State, and Federal governments, a statewide trapping program to delineate the density and distribution of EGVM and EGVM control measures was ready in February 2010. In the spring of 2010 (February-May), over 97,000 adult EGVM in Napa County and 78 more EGVM in six other counties were captured under the statewide EGVM trapping and monitoring program.

On March 9, 2010, based on reports of EGVM finds under the statewide EGVM trapping program, the California Department of Food and Agriculture (CDFA) announced an initial interior quarantine of 162 square miles, which included portions of Napa, Solano and Sonoma counties. Subsequent finds of EGVM led CDFA to expand the quarantine, which currently encompasses 2,089 square miles in portions of nine California counties: Fresno, Lake, Mendocino, Merced, Napa, San Joaquin, Santa Clara, Solano and Sonoma.^{5,6}

On June 22, 2010, APHIS issued a Federal Order to regulate the interstate movement of the host products in order to prevent the spread of EGVM outside of California.⁷ Four

⁴ The International Technical Working Group (TWG), which consists of experts on EGVM from Italy, Chile, Germany, France, Spain and the United States, was formed at the request of APHIS in September 2009 to provide timely advice to counter the outbreak of EGVM in California.

⁵ CDFA EGVM quarantine map <http://pi.cdfa.ca.gov/pqm/manual/pdf/maps/3437EGVMMapOverview.pdf>

⁶ Three adult moths were found in Santa Clara County during the week of September 20, 2010. As a result, APHIS and CDFA expanded the quarantine area to include portions of Santa Clara County, effective September 28, 2010. This document does not include Santa Clara County in the analysis.

⁷ APHIS – Federal Domestic Quarantine Order; *Lobesia botrana* (European Grapevine Moth) DA-2010-25, June 22, 2010 http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/federalorder-6-22-10.pdf

provisions of the Federal Order, which lays out the quarantine restrictions, are summarized below, with additional information related to the economic significance of the quarantined products:⁸

- (1) Quarantine areas are based on a 5-mile radius (79 square miles or 50,400 acres) around each EGVM detected location.⁹
- (2) Regulated articles and their market values are listed in Table 1.¹⁰ Total market value for the regulated articles in the eight regulated counties is about \$2.7 billion, or 48 percent of the total values for the regulated articles in California.

Table 1. EGVM regulated products and their market values reported in 2008

| Regulated Product by Common Name | Scientific Name | EGVM Host Category | Market Value \2 - California Total (\$1,000) | Market Value \2 - Eight \3 Quarantined Counties in California (\$1,000) |
|----------------------------------|--------------------------|--------------------|--|---|
| Blackberry, Dewberry | <i>Rubus</i> spp | Secondary wild | 287 | - |
| Bladder Campion | <i>Silene vulgaris</i> | Secondary wild | - | - |
| Carnation | <i>Dianthus</i> spp. | Secondary | 1,933 | - |
| European barberry | <i>Berberis vulgaris</i> | Secondary | - | - |
| European privet | <i>Ligustrum vulgare</i> | Secondary wild | - | - |
| False baby's breath | <i>Galium mollugo</i> | Secondary | - | - |
| Gooseberries and Currants | <i>Ribes</i> spp. | Secondary | - | - |
| Grape | <i>Vitis</i> spp. | Primary | 3,913,732 | 1,868,,611 |
| Jujube | <i>Ziziphus jujube</i> | Secondary wild | - | - |

⁸ The Federal Order was revised three times: (1) on August 13, 2010, to include a portion of San Joaquin County in the regulated area, (2) on September 15, 2010, to exempt olive fruit and to allow options for safeguarding conveyances moving or holding grapes for crushing or processing as raisins, and (3) on September 30, 2010, to include a portion of Santa Clara County in the regulated area.

⁹ An EGVM detected location is a location in which (a) a total of two or more adult EGVM are trapped within 3 miles of each other and during the timeframe of one lifecycle or (b) DNA analysis confirms the presence of one or more immature EGVM.

¹⁰ The following are included in the list of regulated articles, in addition to the regulated articles set out in the table:

- Plant litter, compost, winery/processing or harvesting waste and all other green waste residues of any regulated plant, plant part or plant product from the planting, growth, pruning, production, harvesting, processing and conveyances of regulated plants, plant parts or plant products.
- All farm/vineyard equipment and conveyances used in the planting, growth, pruning, production, harvesting and processing of regulated plants, plant parts or plant products.
- All living, dead, cut, fallen or other materials or products used in the cultivation, planting, growth, production, harvesting and processing of regulated plants, plant parts or plant products.

| Regulated Product by Common Name | Scientific Name | EGVM Host Category | Market Value \2 - California Total (\$1,000) | Market Value \2 - Eight \3 Quarantined Counties in California (\$1,000) |
|---|-------------------------------|--------------------|--|---|
| Kiwifruit or Chinese gooseberry | <i>Actinidia chinensis</i> | Secondary | 32,791 | 1,730 |
| Old man's beard | <i>Clematis vitalba</i> | Secondary wild | - | - |
| Olive \4 | <i>Olea europaea</i> | Primary | 67,087 | 12,295 |
| Persimmon | <i>Diospyros kaki</i> | Secondary | 27,458 | 15,664 |
| Pomegranate | <i>Punica granatum</i> | Secondary | 41,419 | 30,003 |
| Red clover | <i>Trifolium pretense</i> | Secondary | - | - |
| Rosemary | <i>Rosmarinus officinalis</i> | Other primary /1 | - | - |
| Sea squill | <i>Urginea maritime</i> | Other primary /1 | - | - |
| Smooth sumac | <i>Rhus glabra</i> | Secondary wild | - | - |
| Spurge flax | <i>Daphne gnidium</i> | Primary wild | - | - |
| St. John's Wort | <i>Hypericum calycinum</i> | Secondary wild | - | - |
| Stone fruit (Apricots, Cherries, Nectarines, Peaches, Plumcots, Plums) \5 | <i>Prunus spp</i> | Secondary | 1,592,569 | 775.159 |
| Total | | | \$5,677,276 | \$2,703,461 |

Source: APHIS-CPHST, Host list for *Lobesia botrana* (European Grapevine Moth)

http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/Lobesia_botrana_host_list.pdf.

Source: USDA-NASS. California County Agricultural Commissioners' Data, 2008, October 15, 2009

http://www.nass.usda.gov/Statistics_by_State/California/Publications/AgComm/200810cactb00.pdf.

Note \1: These hosts were reported in Crete, Greece, but it is unclear whether they are primary or minor hosts.

Note \2: Market value is based on Free-On-Board (F.O.B.) packed price.

Note \3: The eight counties under quarantine include: Fresno, Lake, Mendocino, Merced, Napa, San Joaquin, Solano, and Sonoma. A portion of Santa Cruz County was added to the quarantined area on September 28, 2010; however, it is not included in this analysis.

Notes \4 and \5: Olive fruits and almonds in dried/split husks ready for harvest are exempt.

While all of the species listed above have been identified as hosts of EGVM, damage to grapes has had the greatest impact. Table 1 shows the economic significance of grapes. For example, market value of grapes in California in 2008 was about \$3.9 billion, and the eight regulated counties account for 48 percent (\$1.9 billion) of that total, which is the largest value among the EGVM regulated host products. Although they are considered to be secondary hosts to EGVM, the market value of stone fruits, which include peaches, nectarines, plums, plumcots, apricots and cherries, in California in 2008 was the second largest at \$1.6 billion. The eight quarantined counties accounted for 49 percent of this total at \$775 million. Because of the

economic significance of fresh grapes and fresh stone fruits in California and the United States, this document primarily focuses on these products.

(3) Exemption – Almonds in dried/split husks ready for harvest, all other seed or nuts extracted from fruits, non-commercial indoor decorative houseplants, and olive fruits are exempt from regulation.¹¹

(4) Conditions for interstate movement of regulated articles are summarized as follows:

Certificate and limited permit: Interstate movements of regulated articles from a quarantined area require a certificate or limited permit issued by an authorized inspector.

Compliance agreement: Any person engaged in producing, growing, harvesting, handling, packing, transporting or moving regulated articles interstate may enter into a compliance agreement.

Conditions to be eligible for interstate movement from the quarantined area: Key conditions are summarized as follows.

- Implementation of integrated pest management program
- Record keeping of regulated articles shipped interstate
- Disposal of plant litter, compost, harvesting waste and green waste by a commercial entity at a designated composting facility
- Use of screens or tarps to cover fruits when they are moved outside of the quarantined area under applicable conditions
- Cleaning of all equipment, machineries and conveyances leaving the infested area by either pressure washing or steam treatment
- For fresh table and juice grapes, a systems approach was implemented
 - A minimum of one trap per five acres
 - Post-harvest treatment (such as fumigation with methyl bromide) if vineyards are located within 200 meters of a EGVM detection

¹¹ California County Agricultural Commissioner's Data 2008 reports total market value of almonds as \$2.6 billion. Market value of almonds in the eight quarantined counties is \$870 million, which is about 33% of the State total.

- If outside of 200 meters, inspection to verify freedom from EGVM prior to interstate movement.

In addition to the costs associated with the aforementioned compliance requirements, affected entities, especially growers, expend additional resources in the form of money, labor, materials, and time to implement EGVM control measures, such as for insecticides, mating disruption, and cultural controls. Furthermore, local, State, and Federal governments require additional funding to provide timely inspections, surveillance and other necessary assistance programs.

Beyond the physical damage to the fruits, therefore, EGVM has created a series of negative economic impacts, such as increased insecticide costs for growers; trade interruptions and additional phytosanitary requirements imposed by receiving countries; quarantine restrictions and compliance costs incurred by growers and other post-harvest service providers; and ongoing expenses for governments to systematically trap and monitor the spread of EGVM statewide.

The spread of EGVM in affected counties is slowing. The EGVM eradication program will require continuing systematic trapping and monitoring programs; chemical, mechanical and cultural controls; and regulatory compliance by all impacted parties. Eradication of EGVM would free growers and governments from all of these activities.

This economic analysis provides an overview of at-risk products (both primary and secondary) and a discussion of the potential economic costs to control the infestation of EGVM in California. Emphasis is placed on eight California counties where the Federal Order is in effect.

EUROPEAN GRAPEVINE MOTH (*Lobesia botrana*)

Native to Southern Italy, EGVM is primarily a pest of grape, although other hosts have been reported in literature.¹² EGVM has proven to be a pest of economic importance.¹³ It was first described in Austria and is now found throughout Europe, North and West Africa, the Middle East, and eastern Russia.¹⁴ It was more recently introduced into Japan, and in 2008, it was first reported in Chile, South America.¹⁵ Annually, EGVM can have from two to four generations, depending on climatic conditions. Three generations are likely to occur in most of California. In each generation, EGVM goes through four life stages: egg, larva, pupa and adult moth. The EGVM larvae, not the adult moths, are responsible for the damage to grapes.¹⁶ Newly hatched larvae are highly mobile and immediately feed directly on grapes and grape flowers, causing the grapes to be unmarketable. First-generation larvae (May-June) feed on grape bud clusters or flowers. Second-generation larvae (July-August) feed on developing grapes. Third-generation larvae (August-September) are the most damaging – they feed on multiple ripening grapes and expose grapes to further damage from grey mold, a fungal infection caused by *Botrytis cinerea*. It causes the berries to turn brown and rot and can cause the loss of the entire grape cluster. A single EGVM generation can be completed within 30 to 32 days. EGVM overwinters as diapausing pupae. High temperatures (over 20°C) and relative humidity of 40-70% with little wind provide optimum conditions for moth activity. Flight typically occurs

¹² APHIS New Pest Advisory Group (NPAG) report, October 14, 2009.

¹³ Losses of up to one-third of the vintage have been reported in areas of the Soviet Union, Syria, and Yugoslavia. Losses in Israel sometimes reach 40 to 50 percent among table grapes and up to 80 percent or more for wine grapes. Further loss is due to the time and labor spent in cleaning the grape bunches. When infestations are heavy, the work days spent in cleaning the fruit account for 30 to 40 percent of the time of those involved in harvesting. Cooperative Agriculture Pest Survey (CAPS) 2007, Grape commodity based survey reference, http://caps.ceris.purdue.edu/webfm_send/374.

¹⁴ Africa: Algeria, Egypt, Eritrea, Kenya, Libya, and Morocco; Asia: Armenia, Azerbaijan, Georgia, Iran, Israel, Japan, Jordan, Kazakhstan, Lebanon, Syria, Tajikistan, Turkey, Turkmenistan, and Uzbekistan; Europe: Austria, Bulgaria, Cyprus, Czech Republic, Czechoslovakia, France, Germany, Greece, Hungary, Italy, Luxembourg, Macedonia, Malta, Moldova, Portugal, Romania, Russia, Serbia and Montenegro, Slovakia, Slovenia, Switzerland, Ukraine, and the United Kingdom (CABI, 2007). South America: Chile.

¹⁵ EGVM was first detected on April 18, 2008, in Chile, and the official control program began on April 23, 2008.

¹⁶ CDFA European Grapevine Moth http://www.cdfa.ca.gov/PHPPS/brochures/EGVM_Brochure_English_6-22-10_web.pdf

at night from dusk to dawn. Female moths are reported to fly distances of 80-100 meters in search of oviposition (egg-laying) sites; males can fly further in search for females.¹⁷ Because of its relatively short flight distance, EGVM spreads slowly through natural means; the rapid spread of EGVM into new areas requires human-assisted artificial transport.

On September 15, 2009, Napa County Agricultural Commissioner staff detected one adult EGVM in a commercial vineyard in Oakville, Napa County, California, which was subsequently confirmed as the first EGVM, on October 7, 2009, by APHIS. Although the damage was limited to a relatively small area in 2009, approximately 10 acres of vineyards in Napa County had 100 percent product loss due to EGVM. Currently, 2,091 square miles (1.3 million acres) in nine California Counties (Fresno, Lake, Mendocino, Merced, Napa, San Joaquin, Santa Clara, Solano and Sonoma) are quarantined to prevent the artificial spread of EGVM.¹⁸¹⁹

CDFA, impacted counties, and APHIS are working cooperatively to trap the adult moths in all grape-producing counties, i.e., 47 out of 58 counties in California, with pheromone-baited traps. The objectives of the trapping program are to swiftly survey the State to determine the distribution of EGVM, to monitor male flight activities, and to make informed treatment decisions in grape production areas. In addition, in coordination with their county agricultural commissioner's, CDFA, APHIS, and University of California researchers, grape growers in the affected areas have initiated intensive and coordinated programs to drastically reduce EGVM populations through the use of insecticides and mating disruption.²⁰

CDFA reported that a total of 100,894 adult EGVM were detected as of September 11, 2010, in nine counties (Table 2).²¹ Among the total EGVM detected, 100,772 were detected in

¹⁷ Smith, Rhonda, Lucia Varela, May 2010, UC Cooperative Extension Sonoma County <http://westernfarmpress.com/grapes/egvm-spreads-north-coast-vineyards>

¹⁸ Approximately one third of the total quarantined acreage falls under crop acreage.

¹⁹ As noted earlier, this economic analysis does not include Santa Clara County.

²⁰ Second report of the International Technical Working Group for EGVM in California, Final, May 14, 2010 http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/TWG%20report-5-14-2010.pdf

²¹ No EGVM was detected in Lake County; it is included in the regulated counties, as a section of Lake County interfaces with the quarantined radius of Napa County.

Napa County and the remainder (122) in the eight other regulated counties. Subsequent detections of second and third-flight adult moths were substantially lower in Napa and Sonoma Counties.

Table 2, Detections of EGVM adults – February-October, 2010

| County | Total: (Feb-Oct 2010) |
|---------------------------|-----------------------|
| Fresno | 11 |
| Mendocino | 36 |
| Merced | 4 |
| Monterey ^{\1} | 1 |
| Napa | 100,831 |
| San Joaquin | 2 |
| Santa Clara ^{\2} | 3 |
| Santa Cruz | 1 |
| Solano | 11 |
| Sonoma | 59 |
| Total | 100,959 |

Source: CDFA

Note \1: In Monterey County, one EGVM was found near Soledad on May 10, 2010 and was confirmed by USDA. 375 traps were placed in a 5 mile radius, all on vineyards. Traps were surveyed every day for 5 days, then once per week. No additional EGVM have been found to date (Monterey County Agricultural Advisory Committee report, May 27, 2010).

Note \2: Two more EGVM were found in Santa Clara County since September 11, 2010, as a result a portion of Santa Clara County was added to the regulated area on September 30, 2010.

REGULATED PRODUCTS, INDUSTRIES AND COUNTIES IN CALIFORNIA

Table 3 summarizes the market value of the regulated products in the eight regulated counties in 2008. The total market value is estimated to have been about \$2.7 billion, or a sizable 48 percent of the \$5.7 billion total value of the regulated products in California.

Table 3. Market values of the regulated products – California and eight regulated Counties, 2008 (\$ million)

| Regulated product by Common Name | EGVM Host Category | Market Value - California Total (\$ millions) | Market Value - Eight Regulated Counties (\$ millions) | Percent of Eight Regulated Counties in California |
|-------------------------------------|-----------------------|--|--|---|
| Grape: Wine | Primary | 2,348 | 1,404 | 60% |
| Grape: Raisins | Primary | 423 | 310 | 73% |
| Grape: Table | Primary | 1,120 | 154 | 14% |
| Grape: Total | Primary | 3,914 ^{\1} | 1,868 | 48% |
| Kiwifruits | Secondary | 33 | 2 | 5% |
| Olives | Primary | 67 | 12 | 18% |
| Persimmons | Secondary | 27 | 16 | 57% |
| Pomegranate | Secondary | 41 | 30 | 72% |
| Stone fruit: Apricots | Secondary | 46 | 17 | 37% |
| Stone fruit: Cherries | Secondary | 336 | 224 | 67% |
| Stone fruit: Nectarines | Secondary | 284 | 152 | 54% |
| Stone fruit: Peaches | Secondary | 502 | 234 | 47% |
| Stone fruit: Plumcots | Secondary | 1 | - | - |
| Stone fruit: Plums | Secondary | 220 | 122 | 55% |
| Stone fruit: Plums Dried | Secondary | 203 | 26 | 13% |
| Stone fruit: Total | Secondary | 1,593 | 775 | 49% |
| Total \2 | | 5,675 | 2,703 | 48% |

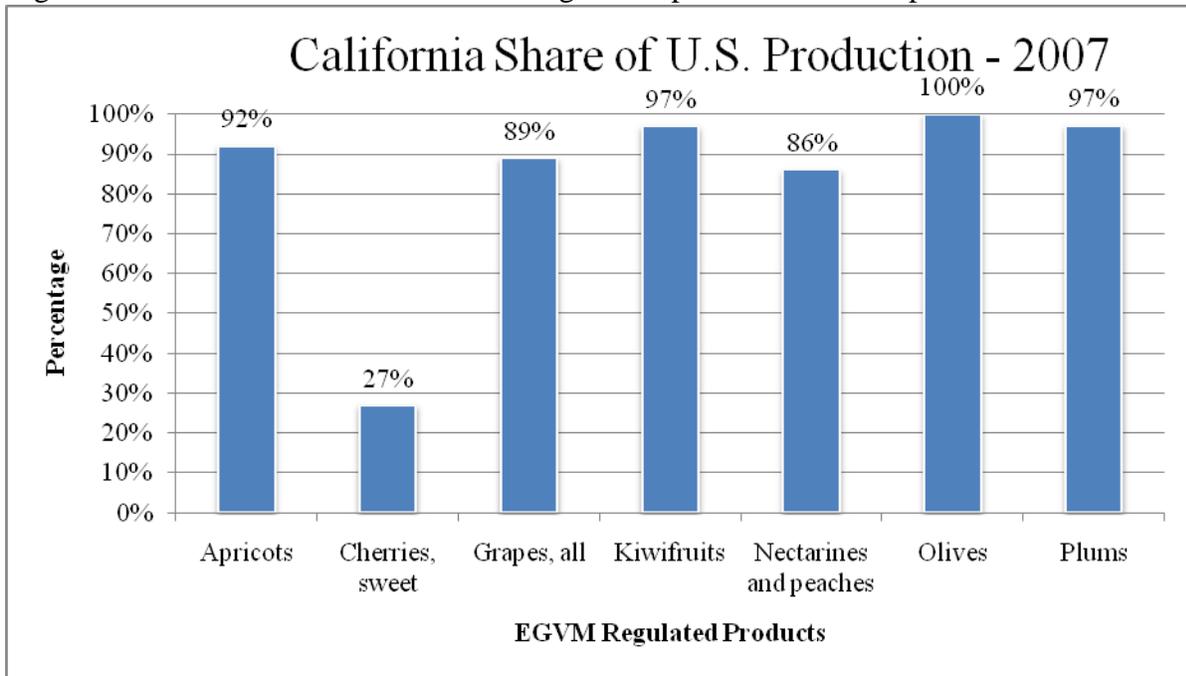
Source: USDA-NASS. California County Agricultural Commissioners' Data, 2008, October 15, 2009.

Note \1: California grape total includes \$23.5 million for un-specified grapes.

Note \2: Total does not include regulated products: blackberry and carnation.

Figure 1 further shows California's importance in producing EGVM-regulated products. In 2007, kiwifruits, olives and plums were almost exclusively produced in that State, while California's production of apricots, sweet cherries, grapes, nectarines and peaches accounted for around 90 percent of U.S. production.

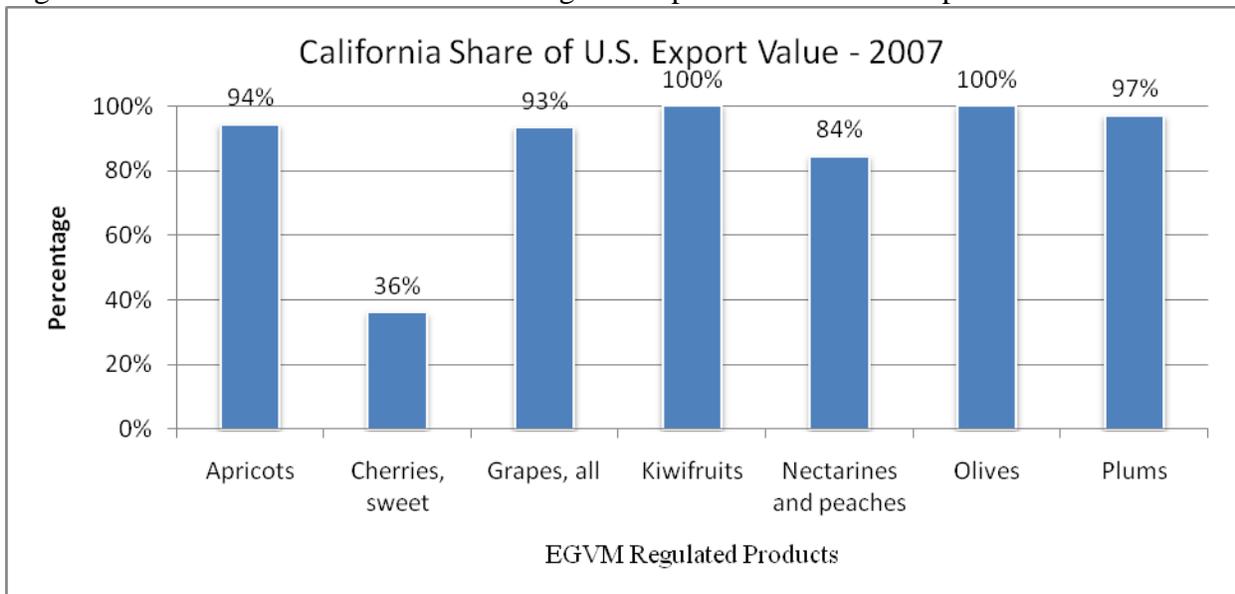
Figure 1. California share of EGVM regulated products in U.S. production - 2007



Source: California Agricultural Resource Directory 2008-2009.

Figure 2 shows the importance of California produced EGVM-regulated products in 2007, in terms of their export values. Except for sweet cherries, California is the predominant exporter of EGVM-regulated products.

Figure 2. California share of EGVM regulated products in U.S. export value - 2007



Source: California Agricultural Resource Directory 2008-2009

GRAPES

Grape Industry

Among fruits and nuts produced in the United States in 2009, grapes had the highest value of production at \$3.2 billion.²² Apples (\$2.2 billion), strawberries (\$2.1 billion), oranges (\$2.0 billion), and almonds (\$1.8 billion) followed grapes in product values.²³

Total grape bearing acreage in the United States was close to 1 million acres (940,700 acres) and total grape production was 7 million tons in 2009 (Table 4). Fourteen States engaged in the production of grapes in 2009. California is by far the largest producer of grapes; it accounted for 84 percent of total bearing acreage (786,000 acres) and nearly 90 percent of total grape production (6.3 million tons) in 2009. Among three grape utilization categories, wine, raisin and table grapes, wine grapes account for the greatest utilization of grapes produced in California at about 50 percent of total U.S. grape production. Raisins grown in California accounted for 29 percent of total U.S. grape production and table grapes accounted for 12 percent of total U.S. grape production. The State of Washington is in a distant second with 6.4 percent of bearing acreage (60,000 acres) and 5.5 percent of total U.S. grape production (0.4 million tons) in 2009.

Table 4. Grapes bearing acreage and total production by State, 2009

| State | Bearing Acreage | | Total Production | |
|-----------|----------------------------|---------|---------------------------|---------|
| | 2009 <i>1,000 acres</i> | % Share | 2009 <i>1,000 tons</i> | % Share |
| AZ | NA | - | NA | NA |
| AR | 0.6 | 0.1% | 2 | 0.0% |
| CA | | | | |
| all types | 786 | 83.6% | 6,311 | 89.3% |
| wine | 482 | 51.2% | 3,440 | 48.7% |
| table | 83 | 8.8% | 855 | 12.1% |
| raisin | 221 | 23.5% | 2,016 | 28.5% |
| GA | 1.4 | 0.1% | 5 | 0.1% |

²² Grape and other crop values shown in Table 1 are for 2008. The reported values of 2008 are higher than the reported values of 2009.

²³ Crop values based on marketing year average prices reported in NASS Crop Values 2009 Summary (February 2010) <http://usda.mannlib.cornell.edu/usda/current/CropValuSu/CropValuSu-02-19-2010.pdf>

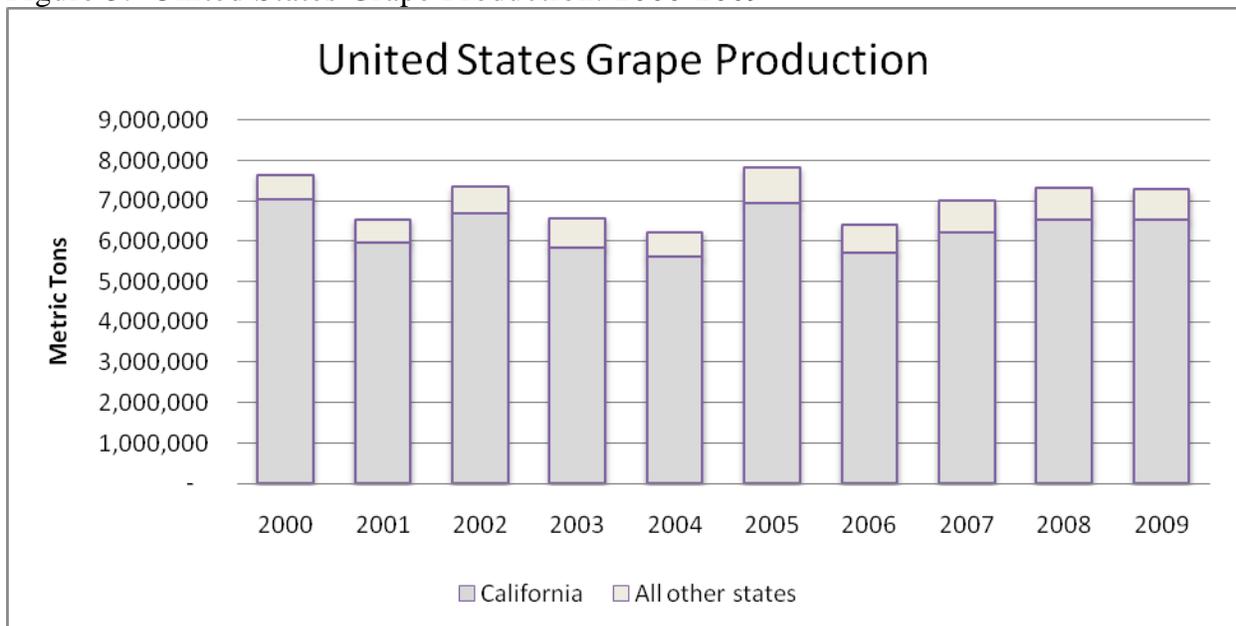
| State | Bearing Acreage | | Total Production | |
|------------|--------------------|---------|-------------------|---------|
| | 2009 | % Share | 2009 | % Share |
| | <i>1,000 acres</i> | | <i>1,000 tons</i> | |
| MI | 14.2 | 1.5% | 97 | 1.4% |
| MO | 1.6 | 0.2% | 4 | 0.1% |
| NY | 37.0 | 3.9% | 133 | 1.9% |
| NC | 1.8 | 0.2% | 5 | 0.1% |
| OH | 1.9 | 0.2% | 6 | 0.1% |
| OR | 16.5 | 1.8% | 37 | 0.5% |
| PA | 13.6 | 1.4% | 64 | 0.9% |
| TX | 3.3 | 0.4% | 6 | 0.1% |
| VA | 2.8 | 0.3% | 9 | 0.1% |
| WA | | | | - |
| all types | 60.0 | 6.4% | 390 | 5.5% |
| wine | 34.0 | 3.6% | 165 | 2.3% |
| juice | 26.0 | 2.8% | 225 | 3.2% |
| U.S. Total | 940.7 | 100% | 7,068 | 100% |

Source: USDA-NASS Noncitrus Fruits and Nuts 2009 Preliminary Summary, January 2010
http://usda.mannlib.cornell.edu/usda/current/NoncFruiNu/NoncFruiNu-01-22-2010_revision.pdf

Note \1: Arizona estimates discontinued in 2009

The ten-year trend of U.S. grape production has been relatively stable at around 7 million tons, especially during the last three years, with California dominating production (Figure 3).

Figure 3. United States Grape Production: 2000-2009



Source: USDA-National Agricultural Statistic Service (NASS)

In addition to domestic production, fresh grapes are imported, mainly from Chile and Mexico, to supplement the U.S. demand, especially during the U.S. off-season. Table 5 and Table 6 show the U.S. fresh grape import and export values for 2005 - 2009. The United States is the world's largest importer of fresh grapes. In 2009, it imported about \$1 billion fresh grapes from 26 countries, with 94 percent of imports supplied by Chile and Mexico. The United States exported \$586 million of fresh grapes to 86 countries in 2009 and was a net import of fresh grapes with over \$400 million of trade deficits. Canada imported 33 percent of U.S. fresh grape exports. Other than for Mexico and the United Kingdom, the other export markets are mainly Asian and Oceania countries.

Table 5. United States fresh grape import: calendar year 2005-2009 (\$ millions)

| Partner Country | | | | | | % Share |
|-----------------|------|------|------|------|-------|---------|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2009 |
| World total | 944 | 922 | 960 | 975 | 1,048 | 100% |
| Chile | 614 | 719 | 640 | 679 | 702 | 67% |
| Mexico | 301 | 153 | 262 | 225 | 286 | 27% |
| Others | 30 | 50 | 57 | 71 | 60 | 6% |

Source: Global Trade Atlas

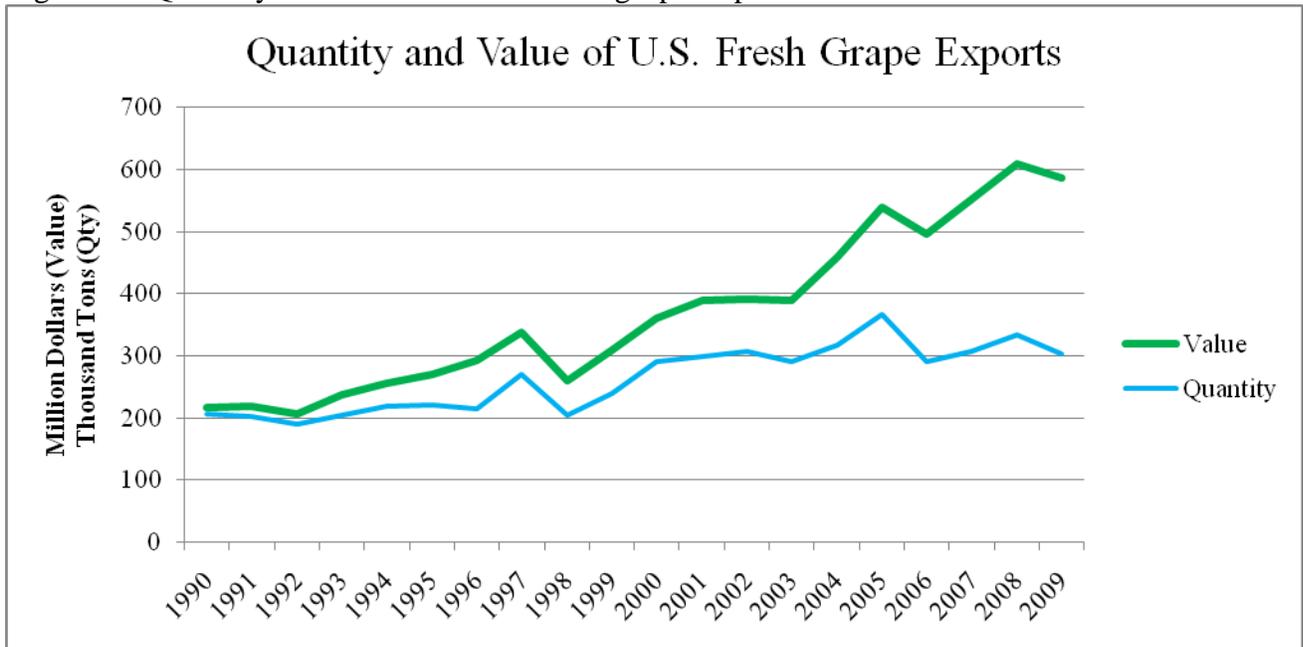
Table 6. United States fresh grape export – Top 12 countries: calendar year 2005-2009 (\$ millions)

| Partner Country | | | | | | % Share |
|-----------------|------|------|------|------|------|---------|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2009 |
| World total | 540 | 497 | 552 | 609 | 586 | 100% |
| Canada | 158 | 150 | 185 | 169 | 194 | 33% |
| Hong Kong | 44 | 43 | 45 | 59 | 63 | 11% |
| Australia | 16 | 16 | 34 | 47 | 48 | 8% |
| Philippines | 11 | 12 | 15 | 18 | 24 | 4% |
| Indonesia | 15 | 11 | 17 | 26 | 24 | 4% |
| Taiwan | 26 | 17 | 20 | 24 | 21 | 4% |
| Mexico | 51 | 49 | 51 | 60 | 19 | 3% |
| United Kingdom | 13 | 12 | 17 | 23 | 19 | 3% |
| Malaysia | 63 | 40 | 20 | 16 | 15 | 3% |
| New Zealand | 8 | 8 | 13 | 13 | 14 | 2% |
| Thailand | 10 | 10 | 12 | 15 | 13 | 2% |
| Vietnam | 5 | 5 | 7 | 9 | 12 | 2% |

Source: Global Trade Atlas

The United States is the world’s second-largest exporter of fresh table grapes, after Chile. As shown in Figure 4, the total quantity of U.S. fresh grape exports has increased gradually over the last 20 years, from nearly 206,000 metric tons (MT) in 1990 to just over 303,000 MT in 2009. In terms of quantity exported, the five largest markets for fresh grapes from the United States in 2009 were Canada, Hong Kong, Mexico, Indonesia, and Australia.²⁴ Some of the export markets that have shown significant growth in recent years include China, Taiwan, Australia, and Indonesia.

Figure 4. Quantity and value of U.S. fresh grape exports

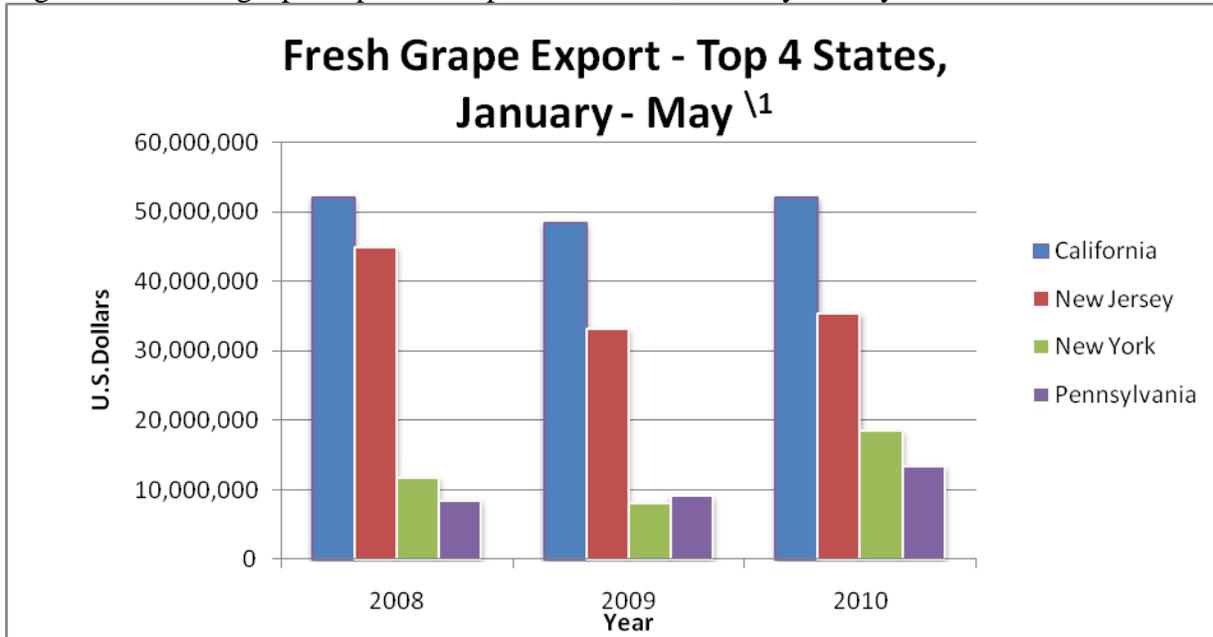


Source: Global Trade Atlas

Figure 5 shows the top four States in terms of fresh grape export values for January-May in 2008 – 2010. California leads the U.S. in fresh grape exports followed by New Jersey, New York and Pennsylvania. While California has remained at a steady export level of around \$50 million for each of the five-month periods, New Jersey’s exports have declined by about 20 percent. New York and Pennsylvania, on the other hand, have more than doubled their exports in the last two years.

²⁴ Mexico was historically the number two export market for the U.S. fresh table grapes. However, it dropped to number three in terms of quantity and number seven in terms of value due to a 30 percent devaluation of the peso against the U.S. dollar and retaliatory tariffs imposed on the U.S. table grapes.

Figure 5. Fresh grape export – Top Four States, January – May: 2008-2010



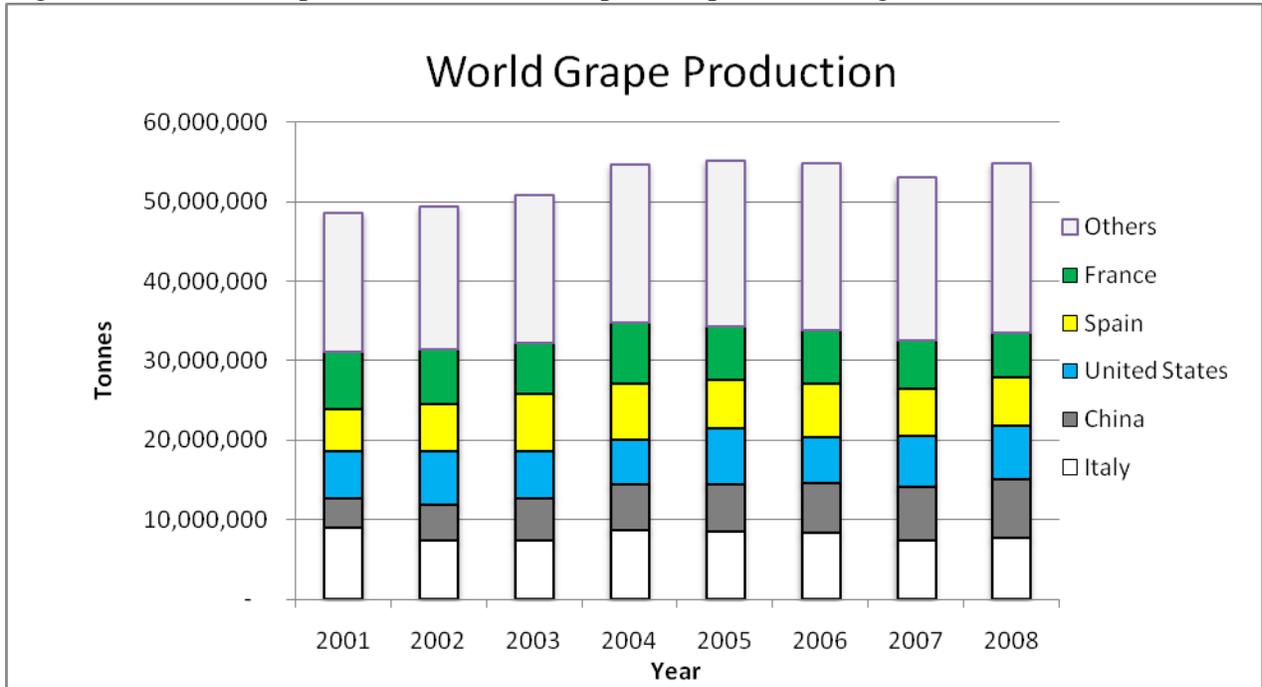
Source: Global Trade Atlas.

Note \1: In order to capture the 2010 data, January-May time period was used.

Figure 6 shows the world grape production for 2001-2008 with the top five grape-producing countries in order. The United States is the third largest producer of grapes in the world, after Italy and China. Among the top five grape producing countries, China has been showing a significant increase in grape production. It almost doubled the production of grapes in 8 years from 2001 to 2008, increasing its position from 5th (close to Turkey's 6th) to 2nd.²⁵ As shown in Figure 3, grape production is relatively stable in the United States at around 7 million tons.

²⁵ According to USDA-FAS, China is the world's largest producer of fresh table grapes, but only a small exporter. However, with improved quality and handling capacity, industry sources believe China's grapes will be much better position on the world market. USDA-FAS, World Market and Trade, Fresh Table Grapes, January 2008 http://www.fas.usda.gov/http/2008_Table%20Grapes.pdf

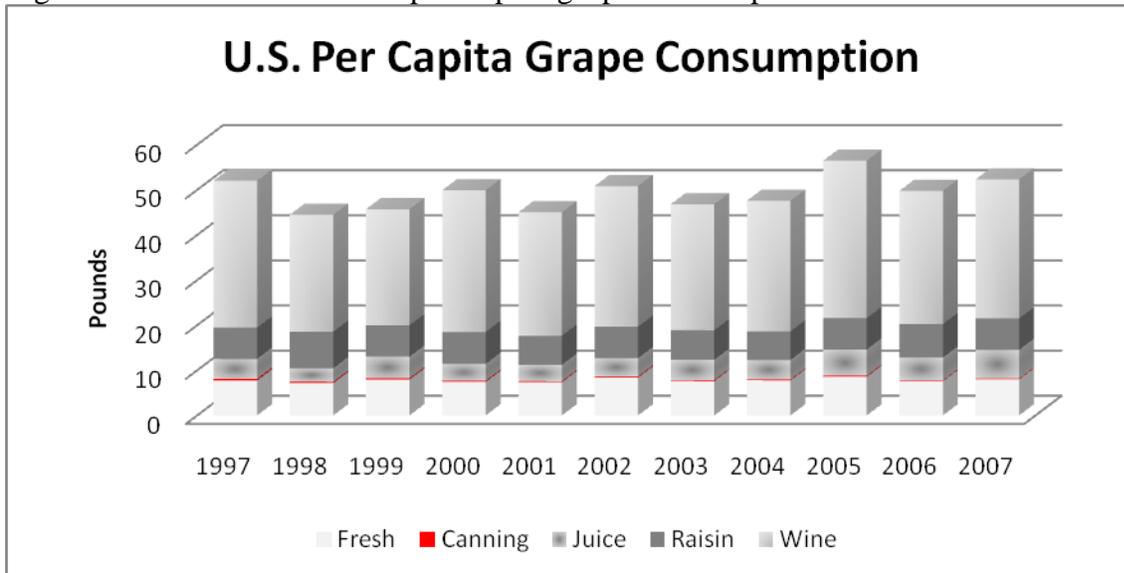
Figure 6. World Grape Production and Top-5 Grape Producing Countries, 2001-2008



Source: Food and Agriculture Organization (FAO) Statistics

Grapes are a popular fruit for fresh consumption, although fresh grape consumption is a relatively small share of total grape consumption (Figure 7).

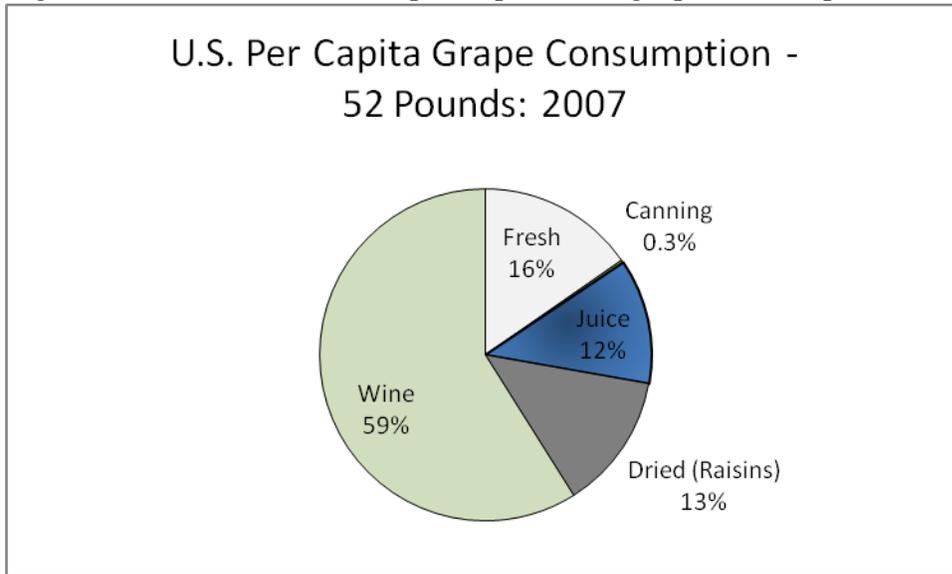
Figure 7. The United States per capita grape consumption: 1997-2007



Source: USDA-Economic Research Service (ERS) 2007 Fruit and Tree Nut Year Book
 Note: Canning, which is about 0.2 pound, is too small to appear in the graph.

In 2007, fresh grape consumption accounted for 16 percent of U.S. per capita grape consumption (Figure 8). Per capita fresh grape consumption in the United States has been relatively stable, ranging between 7.5 to 8.5 pounds in 1997-2007.

Figure 8. The United States per capita total grape consumption ¹: 1997-2007



Source: USDA-Economic Research Service (ERS) 2007 Fruit and Tree Nut Year Book.

Shipments of domestic fresh grapes typically run from May through December.²⁶ Fresh grapes are harvested mainly from May through December, with desert areas (Riverside County) accounting for much of the early season supply (May 25-July 20) and the San Joaquin Valley (Kern, Tulare, Fresno and Madera Counties) accounting for the later supply (July 5-December 15). The bulk of the domestic shipments occur from August through October.

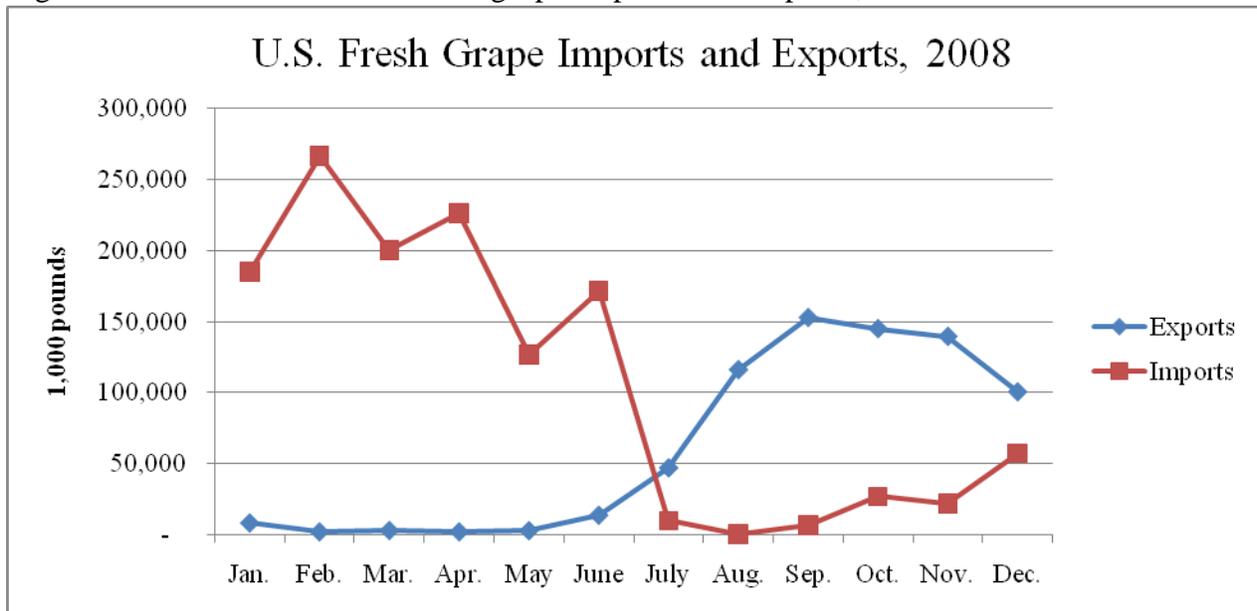
Generally, prices for table grapes are high at the start of the season in May when supplies are still limited, then fall as supplies increase towards the summer months. Typically, prices are lowest in August, when the U.S. domestic grape supply is at its peak, and prices begin to rise in November as supplies decrease.²⁷

²⁶ NASS 2006 Fruits and Tree Nuts: Blooming, Harvesting, and Marketing Dates <http://usda.mannlib.cornell.edu/usda/current/FrTrNuDates/FrTrNuDates-12-01-2006.pdf>.

²⁷ Agricultural Marketing Resource Center (AgMRC) Fresh grapes profile, May 2009.

During the U.S. off-season, fresh grapes are supplemented by imports, primarily from Chile, making fresh grapes available year-round (Figure 9). The average prices of fresh market grapes show a strong seasonal pattern during the marketing season.

Figure 9. The United States fresh grape imports and exports, 2008



Source: USDA-Economic Research Service (ERS), 2009 Fruit and Tree Nut Year Book.

California Grape Industry

Grapes ranked second after milk and cream among all agricultural commodities produced in California in terms of total value of production in 2008, at \$3.9 billion.²⁸ The major share of this value came from wine grapes, which made up 64 percent of the total, followed by raisin grapes at 23 percent, and table grapes at 13 percent. Processed uses accounted for 83 percent of the total utilized value, with fresh grapes making up the remaining 17 percent. Production in terms of value tends to be concentrated in the San Joaquin Valley and in the Central Coast wine-producing counties. In 2008, the top five counties in terms of production value were Fresno (18.5 percent of total), Kern (14.3 percent), Tulare (12.5 percent), Napa (10.2 percent), and Sonoma (9.7 percent). Most fresh-market grapes are grown in the San Joaquin Valley, in Fresno, Kern and Tulare counties, with some additional production further south in Riverside County.

²⁸ USDA-NASS Summary of California Agricultural Commissioners' Reports 2007-2008, October 15, 2009 http://www.nass.usda.gov/Statistics_by_State/California/Publications/AgComm/200810cavtb00.pdf

Total grape acreage (wine, raisin, and table) in California in 2009 was 843,000 acres, of which 63 percent were wine grapes, 26 percent were raisin grapes, and 11 percent were table grapes (Table 7). Grape acreage exists in 48 of California's 58 counties. Raisin acreage declined by 6 acres in 2009 compared to 2008, table grape acreage remained unchanged, and wine grape acreage reached an all-time high of 489,000 bearing acres.

Table 7. Estimated¹ grape acreage in California. 2007-2009

| | | 2007 | 2008 | 2009 | % of Total |
|--------|----------------------|--------------------|------|------|------------|
| Type | | <i>1,000 acres</i> | | | |
| Wine | Total | 523 | 526 | 531 | 63% |
| | Bearing ² | 480 | 482 | 489 | 58% |
| | Non-bearing | 43 | 44 | 42 | 5% |
| Raisin | Total | 233 | 225 | 219 | 26% |
| | Bearing | 227 | 221 | 216 | 26% |
| | Non-bearing | 6 | 4 | 3 | 0% |
| Table: | Total | 92 | 93 | 93 | 11% |
| | Bearing | 82 | 83 | 84 | 10% |
| | Non-bearing | 10 | 10 | 9 | 1% |
| All | Total | 848 | 844 | 843 | 100% |
| | Bearing | 789 | 786 | 789 | 94% |
| | Non-bearing | 59 | 58 | 54 | 6% |

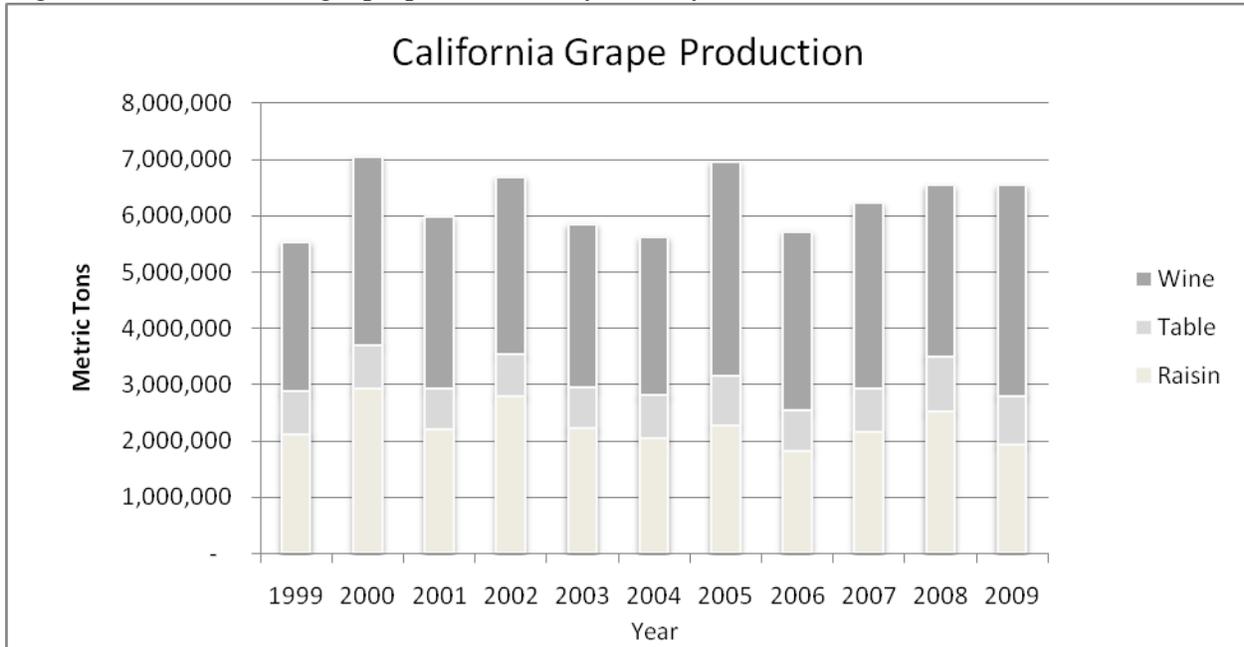
Source: USDA-NASS California Grape Acreage Report 2009 Summary, released March 30, 2010.

Note \1: Estimated grape acreages are derived from data voluntarily reported by grape growers and maintained in a USDA-NASS data base.

Note \2: Bearing and Non-bearing Acreage: All varieties are considered non-bearing for three years (i.e., acres planted in 2006 would not be bearing until 2009). The only exceptions are the Thompson Seedless variety and all table type grapes in Imperial and Riverside counties, which are of bearing age after one year.

In looking at the historic trend of the California grape production for 1999-2009, wine grapes accounted for 57 percent of total California grape production in 2009 (Figure 10). With the exception of 2008, wine grapes have consistently accounted for more than 50 percent of total grape production since 2003. While raisin production showed a high of 42 percent of total grape production in 2002, the share of raisins has been in decline since 2003. In 2009, its share declined to 29 percent. Among the three grape varieties, table grapes production has been most stable at around 13 percent.

Figure 10. California grape production by variety

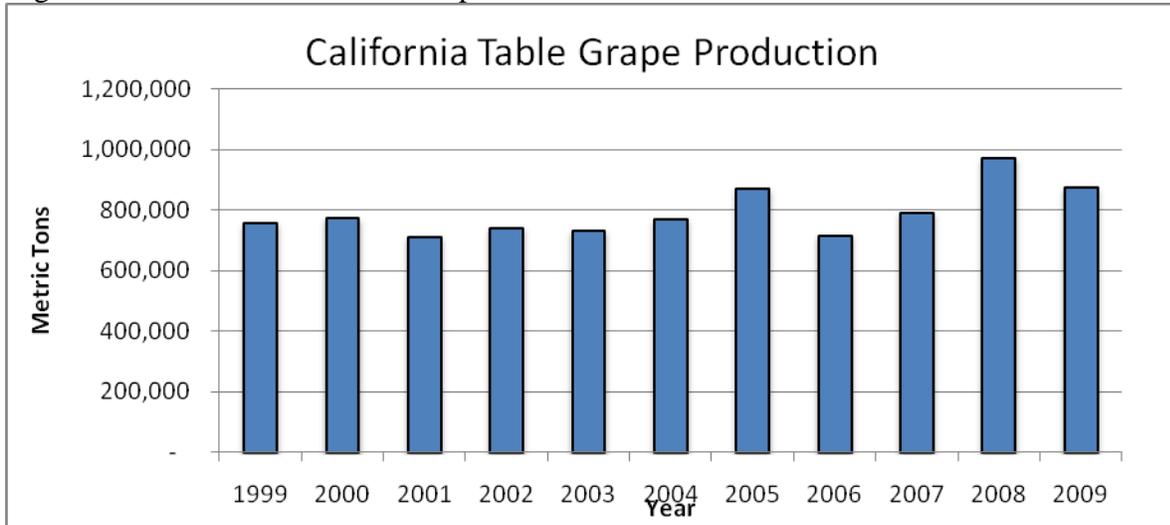


Source: USDA-NASS California Field Office

Among the three grape categories, Figure 11 focuses on the production of table grapes in California. U.S. consumers can choose from many different varieties of grapes sold in the fresh market, but based on the three major categories, table grape varieties comprise over 70 percent of all of the grapes produced in California for fresh use. Raisin grapes, consisting mostly of the Thompson seedless variety that accounts for almost 25 percent of white wine grapes, make up about 5 percent.²⁹

²⁹ USDA-ERS Fruit and Tree Nuts Outlook/FTS-326/March 28, 2007, Commodity Highlight: Fresh-Market Grapes.

Figure 11. California Table Grape Production: 1999-2009

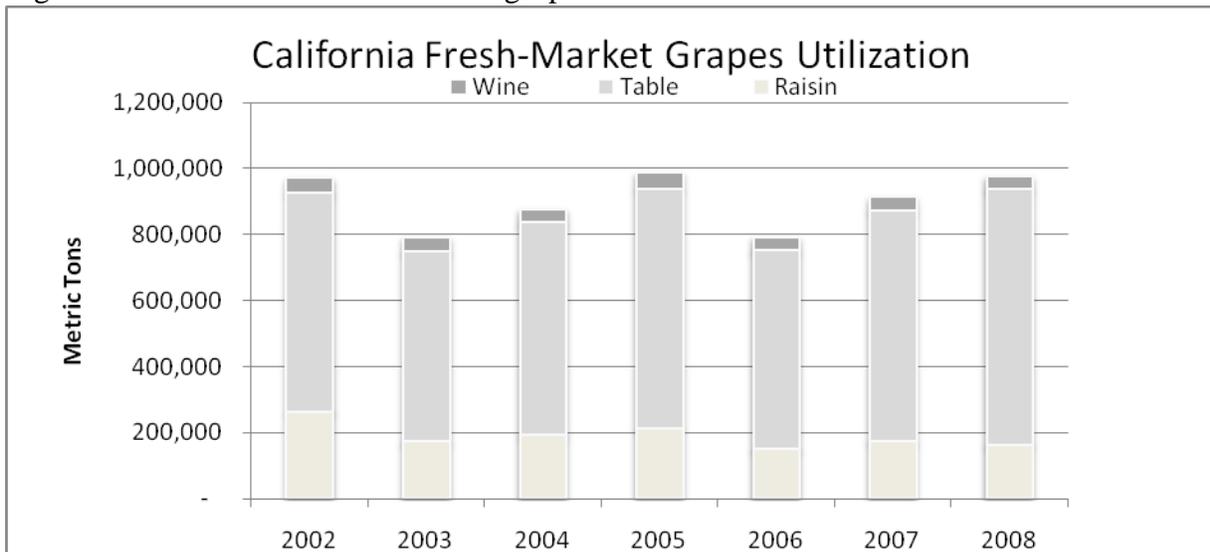


Source: USDA-NASS California Field Office.

Shipments of domestic fresh grapes typically run from May through December. In San Joaquin Valley, harvesting usually begins on July 5, is most active during September 1 – November 5, and ends December 15.

Figure 12 shows California’s fresh market grape utilization from 2002 – 2008. The percentage used for wine has remained relatively stable, ranging from only 4 percent to 6 percent. The percentage devoted to raisins has been in decline, its 19 percent share declined to 17 percent in 2008.

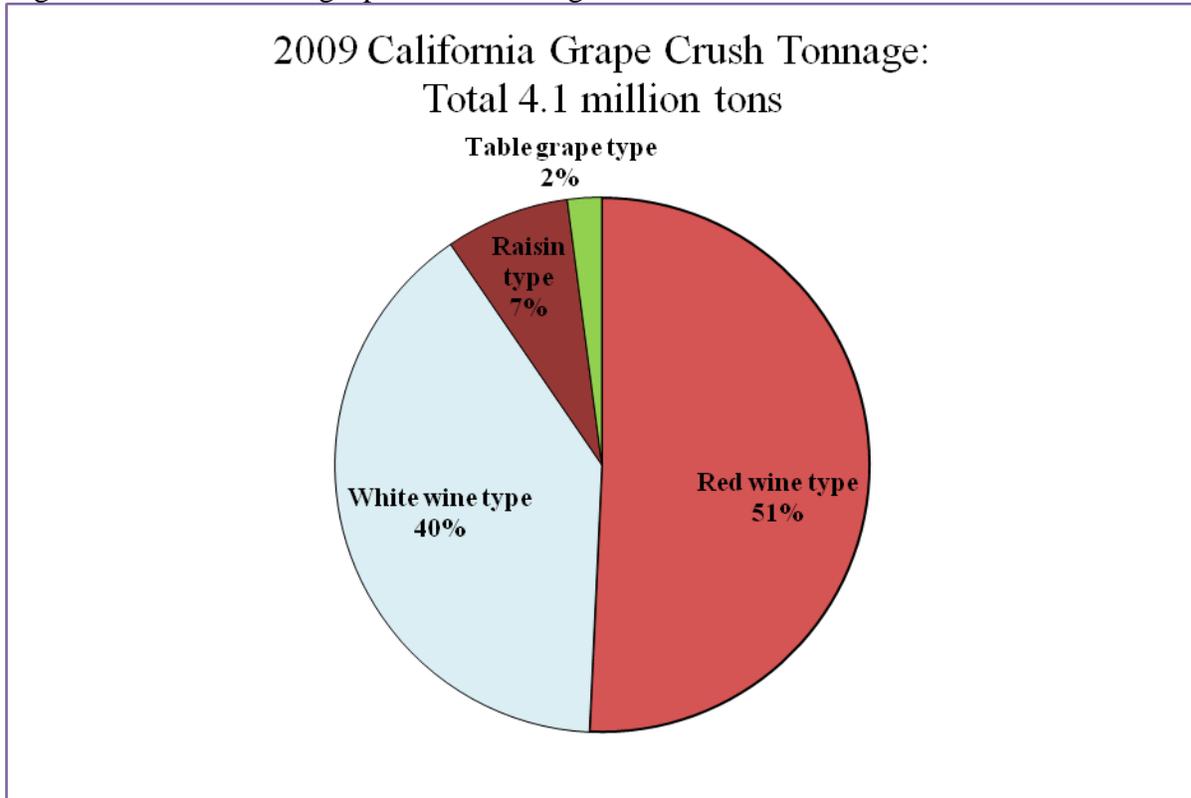
Figure 12. California fresh market grapes utilization



Source: USDA-NASS Noncitrus Fruits and Nuts Preliminary Summary

Figure 13 shows California's 2009 grape crush tonnage in terms of type. Wine grapes, both red and white, accounted for over 90 percent of the amount used in crush, while raisin and table grapes accounted for less than 10 percent.

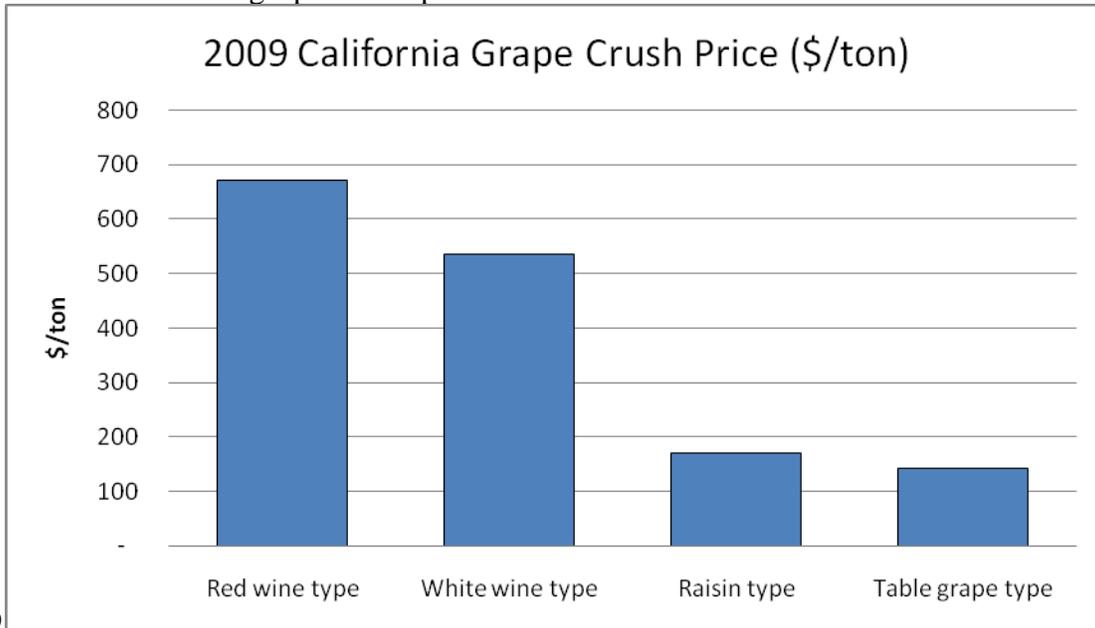
Figure 13. California grape crush tonnage: 2009



Source: CDFA Grape Crush Report, February 2010
http://www.nass.usda.gov/Statistics_by_State/California/Publications/Grape_Crush/Prelim/2009/200902gcbnarr.pdf

Figure 14 shows the price in dollars per ton of the four types of grapes used for crush. Wine grape crush prices, both red and white varieties, were well above the prices of both the raisin and table grape types.

Figure 14. California grape crush price:



2009

Source: CDFA Grape Crush Report - Preliminary 2009 Crop, February 10, 2010.

Eight EGVM Regulated Counties in California

Table 8 shows grape acreages of California counties in 2008 and 2009 and their percentage shares. It also highlights this data with respect to the eight regulated counties. Grape acreage is concentrated in the San Joaquin Valley and northern California. In 2008 and 2009, Fresno and San Joaquin counties accounted for 34 percent of California's grape acreage, and the eight regulated counties accounted for 53 percent of California's grape acreage.³⁰

Table 8. Grape acreage in California by County, 2008 - 2009

| Rank | County | 2008 Acres | Share | 2009 Acres | Share | Cumulative |
|------|-------------|---------------|-------|---------------|-------|------------|
| 1 | Fresno | 195,108 | 25% | 192,555 | 25% | 25% |
| 2 | Madera | 75,763 | 10% | 74,867 | 10% | 35% |
| 3 | Kern | 74,837 | 10% | 73,218 | 10% | 44% |
| 4 | San Joaquin | 70,695 | 9% | 71,605 | 9% | 54% |
| 5 | Sonoma | 57,375 | 7% | 57,152 | 7% | 61% |
| 6 | Tulare | 50,880 | 7% | 48,890 | 6% | 67% |

³⁰ The county acreage data compiled in the 2009 CDFA acreage report and the individual agricultural commissioner's crop reports do not differ significantly; only exception is San Joaquin County, the 2009 San Joaquin crop report shows 91,800 acres for grapes.

| Rank | County | 2008 Acres | Share | 2009 Acres | Share | Cumulative |
|------|-----------------------------------|---------------|-------|---------------|-------|------------|
| 7 | Napa | 45,230 | 6% | 45,402 | 6% | 73% |
| 8 | Monterey | 41,303 | 5% | 42,262 | 6% | 79% |
| 9 | San Luis Obispo | 29,628 | 4% | 30,565 | 4% | 83% |
| 10 | Sacramento | 19,192 | 2% | 19,645 | 3% | 85% |
| 11 | Santa Barbara | 17,074 | 2% | 17,566 | 2% | 88% |
| 12 | Mendocino | 16,847 | 2% | 17,156 | 2% | 90% |
| 13 | Merced | 12,234 | 2% | 12,073 | 2% | 92% |
| 16 | Lake | 8,372 | 1% | 8,212 | 1% | 95% |
| 18 | Solano | 3,501 | 0.5% | 3,497 | 0.5% | 97% |
| | Eight Regulated Counties Total | 409,364 | 53% | 407,654 | 53% | - |
| | California Total | 772,527 | 100% | 768,038 | 100% | 100% |

Source: CDFA, April 2010, California Grape Acreage Report 2009 Crop (April 2010)

Table 9 shows the eight regulated counties' grape growers, grape production and grape values by three types of grapes: wine, raisin and table grapes. Counties are listed in the order of production values. Fresno County is the largest grape producer in terms of both production tonnage and production value. Fresno County typically supplies 75 to 80 percent of raisins in the United States. Kern, Tulare and Fresno counties are the major producers of table grapes. Among the eight regulated counties, Fresno County is the lone supplier of table grapes. Napa and Sonoma Counties generated the highest values for wine grapes. For example, the Napa County 2009 agricultural crop report shows that black variety wine grapes had an average price of \$3,212.32 per ton, and white variety, \$2,117.77 per ton.³¹ On the other hand, the Fresno County 2009 agricultural crop report shows that wine variety had a unit price of \$268 per ton for crushed wine grapes and \$978 per ton for juice wine grapes.³²

³¹ Napa County 2009 Agricultural Crop Report <http://www.countyofnapa.org/AgCommissioner/CropReport/>

³² Fresno County 2009 Agricultural Crop Report <http://www.co.fresno.ca.us/Departments.aspx?id=114>

Table 9. Eight California EGVM regulated counties: grape production and values, 2009, 2008

| County | Grape Utilization | Number of Growers | Production Tonnage (1,000 tons) | Production Value (\$ millions) | Percent of Value in Eight County Total |
|-------------------------|-------------------|-------------------|---------------------------------|--------------------------------|--|
| Fresno \2009 \1 | Wine | 249 | 580 | 163 | 10% |
| | Raisin | 1,582 | 270 | 365 | 100% |
| | Table | 385 | 100 | 139 | 100% |
| | Total | 2,216 | 950 | 668 | 32% |
| Napa \2009 | Wine | 1,410 | 143 | 495 | 32% |
| | Table | - | - | - | - |
| | Total | 1,410 | 143 | 495 | 24% |
| Sonoma \2009 | Wine | 1,758 | 213 | 465 | 30% |
| | Table | - | - | - | - |
| | Total | 1,758 | 213 | 465 | 23% |
| San Joaquin \2009 | Wine | 820 | 679 | 285 | 18% |
| | Table, Crushed | | 1 | 0.3 | 0% |
| | Total | 820 | 680 | 285 | 14% |
| Mendocino \2008 | Wine | 394 | 46 | 62 | 4% |
| | Table | - | - | - | - |
| | Total | 394 | 46 | 62 | 3% |
| Merced \2009 | Wine | 57 | 129 | 42 | 3% |
| | Raisin | 3 | 1 | 1 | 0.3% |
| | Table | 2 | - | - | - |
| | Total | 60 | 130 | 43 | 2% |
| Lake \2009 | Wine | 164 | 28 | 34 | 2% |
| | Raisin | - | - | - | - |
| | Table | - | - | - | - |
| | Total | 164 | 28 | 34 | 2% |
| Solano \2009 | Wine | 102 | 18 | 12 | 1% |
| | Raisin | - | - | - | - |
| | Table | - | - | - | - |
| | Total | 102 | 18 | 12 | 1% |
| Eight Counties \2 | Wine | 4,954 | 1,836 | 1,558 | 100% |
| | Raisin | 1,585 | 271 | 366 | 100% |
| | Table | 387 | 101 | 139 | 100% |
| | Total | 6,926 | 2,208 | 2,063 | 100% |

Sources: California Agriculture Commissioners' Crop Reports, most recent reports for 2009 or 2008 for production tonnage and production value. USDA-NASS 2007 Census of Agriculture for number of growers.

Note \1: For Fresno County, raisin variety includes canned, crushed, dried, fresh, and juice grapes. Table variety includes crushed and fresh. Wine variety includes crushed and juice.

Note \2: Eight counties' total production value, \$2.063 billion, in 2009 is higher than the 2008 total, \$1.878 billion found in the 2008 California County Agricultural Commissioners' data.

Napa County and Surrounding Counties

Virtually all grape production in Napa County consists of wine grapes. Wine grape production was valued at \$495 million in 2009, accounting for 98.6 percent of the total gross value of all agricultural production (\$502 million) in the county.³³ Potentially affected acreage (both bearing and non-bearing) includes 32,947 acres of black wine grape varieties and 10,084 acres of white wine grape varieties for a total of 43,031 acres.

Wine grape production is also significant in several of the counties adjacent to Napa County. Napa and the surrounding counties of Sonoma, Yolo, Lake and Solano contain 27 percent of California's wine grape acreage. Of the surrounding counties, Sonoma has the largest value of wine grape production at \$465 million, followed by Lake at \$34 million and Solano at \$12 million.

Fresno County and Surrounding Counties

The San Joaquin Valley³⁴ is a very important region in terms of California's grape production, especially for raisins and fresh table grapes. Approximately 64 percent of California's grape acreage is located in the counties of the San Joaquin Valley. This includes almost all of the State's raisin (99 percent of total) and table grape (90 percent of total) acreages. Fresno County, which typically produces over 90 percent of California's raisin grapes and supplies about 75 to 80 percent of raisins in the United States, is called the "raisin capital of the world."

The total value of grape production in the San Joaquin Valley was \$2.4 billion in 2008. Fresh market production is important for many of the major grape-producing counties in the region. Tulare and Kern counties both produce the majority of their grapes for the fresh market. Prices for fresh grapes are higher than those for grapes used for processing, reflecting higher production costs, mainly attributed to more extensive manual labor.

³³ Napa County 2009 Agricultural Crop Report

³⁴ Fresno, Kern, Kings, Madera, Merced, San Luis Obispo, San Joaquin, Stanislaus, and Tulare counties are in the San Joaquin Valley.

In 2008, Kern, Tulare, and Fresno counties produced table grapes valued at \$439 million, \$397 million, and \$153 million, respectively, accounting for almost 90 percent (\$989 million) of total California table grape sales (\$1.1 billion).

Grape Farms in Regulated California Counties

Fourteen States engaged in production of grapes in 2009 in the United States, however, as explained in the previous sections, California is by far the largest producer of grapes, accounting for 84 percent of the total bearing acreage and nearly 90 percent of total grape production in 2009. Table 10 summarizes the characteristics of grape farmers in relation to small farms and disadvantaged farms. The vast majority of grape and other fruit farms (about 98 percent) are classified by the Small Business Administration (SBA) as small entities because they have annual receipts of not more than \$750,000 (North American Industry Classification System Code 111, Crop Production). USDA recognizes that small family businesses are essential to providing for the economic well-being of the United States, and to better understand this special segment of farmers, it has defined family farms with sales under \$250,000 to be “small family farms.”

The distribution of USDA-defined, small family grape farms, together with two additional classes of grape farms (i.e., ones for which the principal operator is a female and those for which at least one of the top-three operators belongs to an ethnically disadvantaged group)³⁵ are summarized in Table 10. Based on Census of Agriculture data, there were 25,892 grape farms in the United States in 2007. Forty-five percent of these farms (11,623) were in California. Among these 11,623 grape farms in California, 71 percent (8,234 farms) were considered to be small family farms with annual sales of less than \$250,000. This proportion of small family farms in California was lower than the national percentage of 81 percent. Female-operated grape farms represented a relatively small share of the total (11 and 13 percent of California and U.S. grape farms, respectively). Ones operated by members of ethnically

³⁵ Ethnically disadvantaged farms are defined as having at least one of the top-three operators who is of (1) Spanish, Hispanic, or Latino origin, (2) American Indian or Alaska native, (3) Asian, (4) Black or African American, or (5) native Hawaiian or other Pacific Islander. If a farm has more than one operator who belongs to a disadvantaged group, all ethnicity groupings applicable to those operators were counted in the Census of Agriculture. Numbers of farms having operators who belong to disadvantaged groups shown in Table 10 are net numbers of farms without duplication.

disadvantaged groups comprised 11 percent of grape farms in California, compared to a national percentage of 8 percent.

Table 10. Number and percentage of special-category small family grape farms in California and the United States, 2007

| Special Category Grape Farms | Number of Grape Farms in California | Farms in Each Category as a Percentage of All California Grape Farms | Number of Grape Farms in the United States | Farms in Each Category as a Percentage of All U.S. Grape Farms | Grape Farms in California as a Percentage of U.S. Grape Farms |
|---|-------------------------------------|--|--|--|---|
| All grape farms | 11,623 | 100% | 25,892 | 100% | 45% |
| Small family grape farms (Sales under \$250,000) | 8,234 | 71% | 20,932 | 81% | 39% |
| Female-operated family grape farms | 1,296 | 11% | 3,363 | 13% | 39% |
| At least one operator belonging to an ethnically disadvantaged group \1 | 1,228 | 11% | 2,073 | 8% | 59% |

Source: NASS 2007 Agricultural Census

Note \1: Ethnically disadvantaged farms are defined as having at least one of the top-three operators who is of (1) Spanish, Hispanic, or Latino origin, (2) American Indian or Alaska native, (3) Asian, (4) Black or African American, or (5) native Hawaiian or other Pacific Islander. If a farm has more than one operator who belongs to a disadvantaged group, all ethnicity groupings applicable to those operators were counted in the Census of Agriculture. Numbers of farms having operators who belong to disadvantaged groups shown in Table 10 are net numbers of farms without duplication.

Table 10 showed that, among the 11,623 grape farms in California, 8,234 farms are considered to be small based on the USDA small family farm standard of less than \$250,000 in annual sales. Table 11 summarizes the small grape farm data by county. A large number of small grape farms are found in Fresno County (20.2 percent of the total small grape farms in California) and Sonoma County (15.9 percent). Solano County shows the highest concentration of small grape farms (82 percent) and Merced County the lowest (38 percent), with the concentration in the eight counties about 70 percent.

Table 11. Number and percentage of small family grape farms in the EGVM-regulated counties, 2007

| County | Number of Small Family Grape Farms (Sales under \$250,000) | Percentage Share of Small Family Grape Farms in California (n=8,234) | Total Number of Grape Farms in County | Small Family Grape Farms as a Percentage of all Grape Farms in County |
|--------------------|--|--|---------------------------------------|---|
| Fresno | 1,661 | 20.2% | 2,359 | 70% |
| Lake | 125 | 1.5% | 164 | 76% |
| Mendocino | 305 | 3.7% | 394 | 77% |
| Merced | 23 | 0.3% | 60 | 38% |
| Napa | 949 | 11.5% | 1,410 | 67% |
| San Joaquin | 510 | 6.2% | 820 | 62% |
| Solano | 84 | 1.0% | 102 | 82% |
| Sonoma | 1,310 | 15.9% | 1,758 | 75% |
| Eight counties | 4,967 | 60% | 7,067 | 70% |
| All other counties | 3,267 | 40% | 4,556 | 72% |
| Total | 8,234 | 100% | 11,623 | 71% |

Source: NASS 2007 Agricultural Census.

STONE FRUITS AND OTHER REGULATED PRODUCTS

Stone Fruits

Although considered secondary hosts to EGVM, stone fruits are as equally impacted by the EGVM quarantine because the same restrictions apply. The production of stone fruits in California is sizable. In 2007, orchards of stone fruits covered 238,305 acres in 50 of California's 58 counties, accounting for over 62 percent of the U.S. stone fruit acreage.³⁶ Table 12 compares the production and market value of stone fruits in California and the United States in 2008. The major stone fruit in both California and in the United States was the peach. Almost 86 percent (almost 1 million tons) of peaches in the United States were produced in California in 2008. Plums, cherries, and nectarines are also important products and had sales values of \$502 million, \$423 million, \$336 million, and \$284 million in California.

³⁶ NASS 2007 Census of Agriculture, NASS Non-citrus fruits and nuts 2009 Summary (July 2010).

Table 12. U.S. and California stone fruits production and market values - 2008

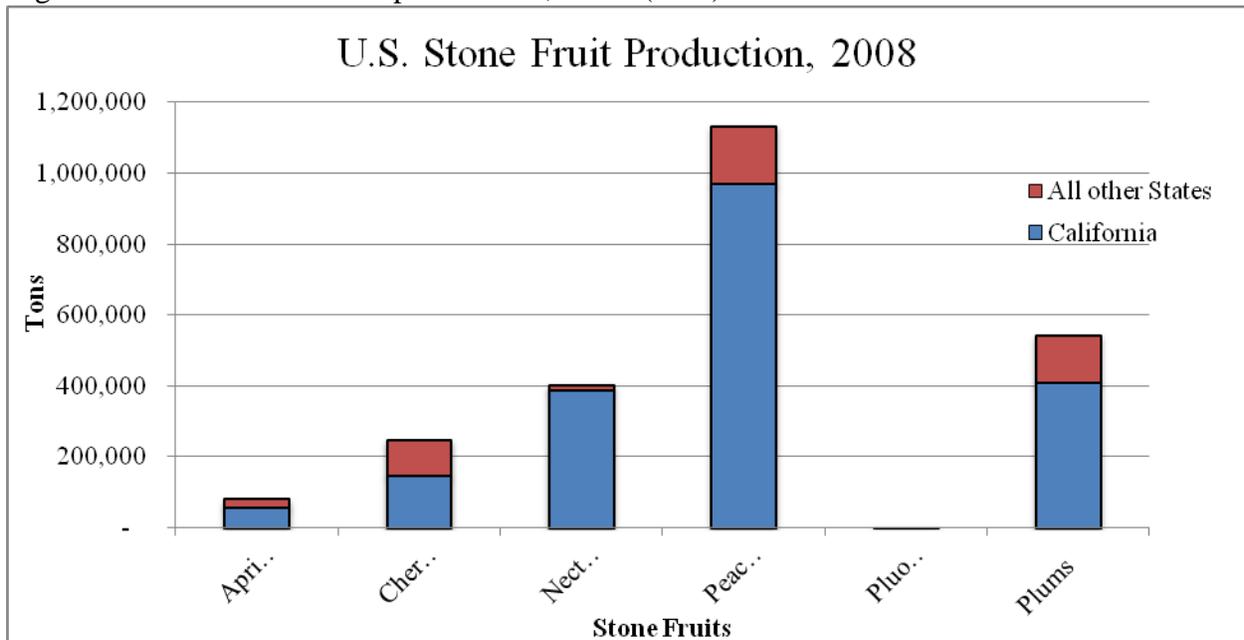
| Regulated Product | Production (tons) | | | Market Values (\$1,000) |
|--------------------|-------------------|------------|----------|-------------------------|
| | California | U.S. Total | % Calif. | California |
| Apricots | 58,529 | 81,600 | 72% | 45,855 |
| Cherries, Sweet \1 | 86,000 | 248,100 | 35% | 336,266 |
| Nectarines | 387,517 | 403,507 | 96% | 284,367 |
| Peaches | 970,809 | 1,135,300 | 86% | 501,969 |
| Pluot/Plumcots | 11 | 12 | 96% | 686 |
| Plums | 408,972 | 543,500 | 75% | 423,426 |
| Total | 1,911,838 | 2,412,019 | 79% | 1,592,569 |

Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009).
 NASS Noncitrus Fruits and Nuts 2009 Summary (July 2010).

Note \1: NASS data were applied to both California and U.S. production and market values for cherries.

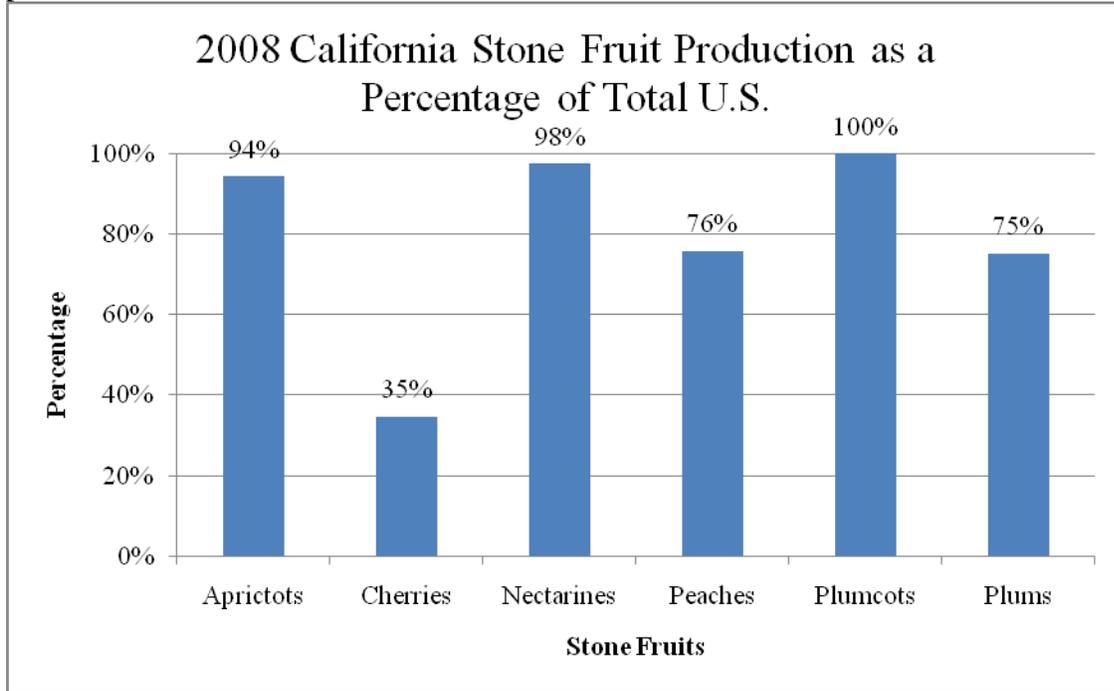
Figure 15 and Figure 16 show the significance of California in stone fruit production. Peaches, plums and nectarines are the three largest volume stone fruits in the United States, with California dominating the production of those fruits. In terms of percentages of production shares, cherries are the only stone fruits for which California did not produce more than 70 percent of the total U.S. crop in 2008.

Figure 15. U.S. stone fruit production, 2008 (tons)



Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009), NASS Noncitrus Fruits and Nuts 2009 Summary (July 2010).

Figure 16. California stone fruit production as a percentage of total U.S. stone fruit production - 2008



Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009).
 NASS Noncitrus Fruits and Nuts 2009 Summary (July 2010).

Note: The data are for 2008 and differ from Figure 1 which are based on the 2007 data and include kiwifruits.

Table 13 compares the market values of stone fruits produced in California to the combined market values produced in the eight EGVM-regulated counties. Forty-nine percent of California stone fruits (\$775 million of \$1.6 billion) were produced in the eight regulated counties in 2008. Peaches generated the highest market value in the eight counties (\$234 million), followed by nectarines (\$152 million) and plums (\$122 million). It is notable that over half (54 and 55 percent, respectively) of California nectarines and plums are produced in the eight counties, while California produced 96 percent and 75 percent of the total amount of nectarines and plums in the United States. In other words, these eight counties generated 51 percent of total nectarine, 37 of total peach and 22 percent of total plum market values in the United States in 2008.

Table 13. Stone fruits market values: California and eight regulated counties - 2008

| Regulated Product | EGVM Host Category | Market Value California Total (\$1,000) | Market Value Eight-Regulated Counties (\$1,000) | Percentage Share of Eight Regulated Counties |
|------------------------------|--------------------|---|---|--|
| Stone fruit: Apricots | Secondary | 45,855 | 17,023 | 37% |
| Stone fruit: Cherries | Secondary | 336,266 | 223,896 | 67% |
| Stone fruit: Nectarines | Secondary | 284,367 | 152,280 | 54% |
| Stone fruit: Peaches | Secondary | 501,969 | 234,319 | 47% |
| Stone fruit: Plumcots/Pluots | Secondary | 686 | NA ¹ | |
| Stone fruit: Plums | Secondary | 220,363 | 121,952 | 55% |
| Stone fruit: Plums Dried | Secondary | 203,063 | 25,688 | 13% |
| Stone fruit: Total | Secondary | 1,592,569 | 775,159 | 49% |

Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009).

Note \1: NA Withheld to avoid disclosing data for individual farms.

Among the eight regulated counties, Fresno County's uniquely important position in stone fruits production is observed in Table 14. For example, Fresno County is the only one of the eight regulated counties that produced nectarines, and it contributed 46 percent of California's total nectarine production. Since 96 percent of nectarines are produced in California, this means Fresno County produced 45 percent of the nectarines in the United States. The significance of Fresno County in stone fruits production is further summarized in Table 15. Merced County also contributed to the production of apricots and peaches, whereas the wine grape-producing counties of Lake, Mendocino, Napa, Solano and Sonoma counties produced few or no stone fruits in 2008.

Table 14. Stone fruits production: California and eight regulated counties– 2008 (tons)

| Regulated Product | Fresno | Lake | Mendo-cino | Merced | Napa | San Joaquin | Solano | Sonoma | Eight Counties Total | California Total |
|-------------------|---------|------|------------|--------|------|-------------|--------|--------|----------------------|------------------|
| Apricots | 10,800 | - | - | 5,958 | - | 7,800 | 18 | - | 24,576 | 58,529 |
| % of CA | 18% | 0% | 0% | 10% | 0% | 13% | 0% | 0% | 42% | 100% |
| Cherries, Sweet | 11,300 | - | - | - | - | 52,600 | 139 | - | 64,039 | 148,149 |
| % of CA | 8% | 0% | 0% | 0% | 0% | 36% | 0.1% | 0% | 43% | 100% |
| Nectarines | 180,000 | - | - | - | - | - | - | - | 180,000 | 387,517 |
| % of CA | 46% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 46% | 100% |
| Peaches | 220,100 | - | - | 91,535 | - | 56,900 | 239 | - | 368,774 | 970,809 |
| % of CA | 23% | 0% | 0% | 9% | 0% | 0% | 0% | 0% | 38% | 100% |
| Plums | 26,700 | - | - | 2,912 | - | - | 3,073 | - | 32,685 | 408,972 |
| % of CA | 7% | 0% | 0% | 1% | 0% | 0% | 1% | 0% | 8% | 100% |

Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009).

Note: Peaches include clingstone, freestone, and unspecified varieties. Plums include fresh and dried.

Table 15. Stone fruits production: the United States and Fresno County (tons)

| | U.S. | Fresno County | Fresno County's Share of U.S. |
|------------|-----------|---------------|-------------------------------|
| Apricots | 81,600 | 10,800 | 13% |
| Cherries | 248,100 | 11,300 | 5% |
| Nectarines | 403,507 | 180,000 | 45% |
| Peaches | 1,135,300 | 220,100 | 19% |
| Plums | 543,500 | 26,700 | 5% |

Source: California County Agricultural Commissioners' Data, 2008 (October 15, 2009).

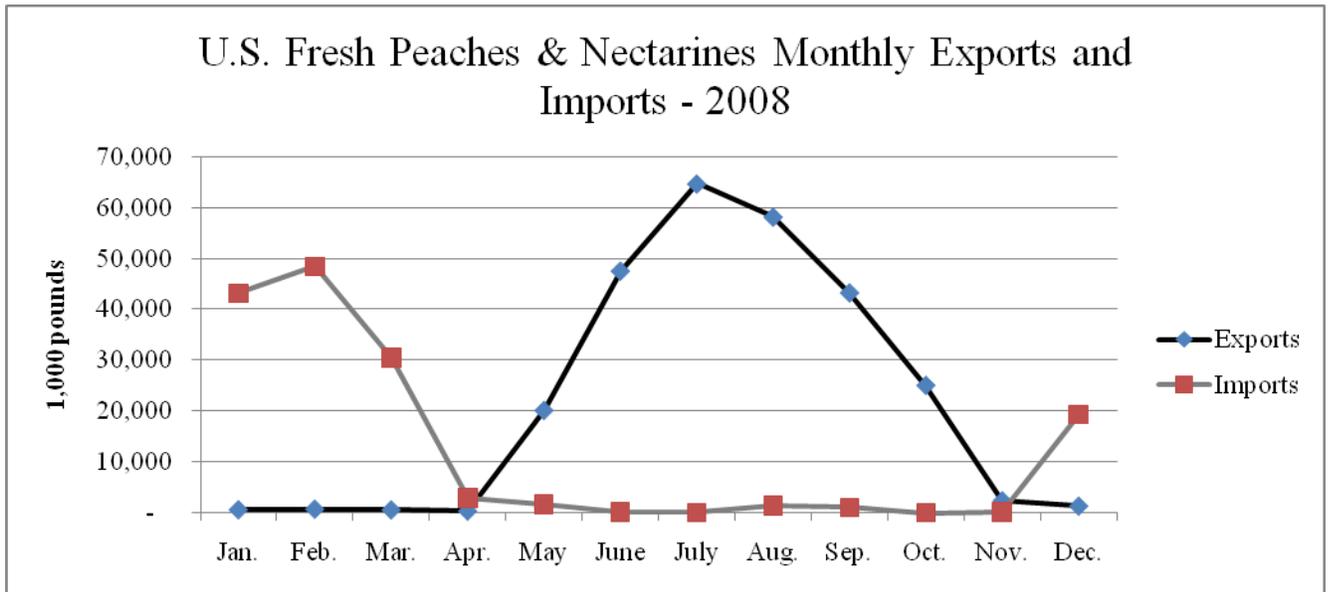
Note: Peaches include clingstone, freestone, and unspecified varieties. Plums include fresh and dried.

Shipments of California fresh freestone peaches and nectarines typically run from April through October. Harvesting usually begins on April 20-30, is most active during May 15 – September 10, and ends October 15.³⁷ During the U.S. off-season, fresh peaches and nectarines are supplemented by imports, primarily from Chile,³⁸ making fresh peaches available all year round (Figure 17).

³⁷ NASS Fruits and Tree Nuts: Blooming, Harvesting, and Marketing Dates (December 2006).

³⁸ The U.S. imports of fresh peaches from Chile accounted for 97 percent of total imports at \$54 million (49,091 tons) in 2009.

Figure 17. U.S. fresh peaches and nectarines monthly exports and imports - 2008



Source: USDA-Economic Research Service (ERS) 2009 Fruit and Tree Nut Year Book

Other Regulated Products

Table 16 and Table 17 summarize the market values and production of other regulated products: carnations, kiwifruit, olive, persimmon, and pomegranate. The total market value of these crops produced in California was \$171 million in 2008, and the total share of the eight regulated counties was 29 percent (\$50 million). Except olives, all other regulated products are secondary hosts for EGVM.

California produces the most olives in the United States. Total production of California was 76,317 tons in 2008, produced on 31,211 bearing acres. Virtually all of the production was used for processed items. Canned olives comprised the largest portion of processed production. Olives crushed for oil made up most of the remainder of processed production. The five leading olive-producing counties in terms of production value are Tulare (30 percent), San Joaquin (18 percent), Glenn (16 percent), Tehama (15 percent), and Madera (7 percent). The shares of the eight regulated counties are 18 percent of California in market value and 21 percent of California in production.

Carnations (cut miniature and unspecified) are produced in Monterey County; no production of carnations was reported in the eight regulated counties in 2008.

Kiwifruits are produced predominantly in California, mainly in the San Joaquin Valley and the Sacramento Valley. Fresno County, which produced 7 percent of kiwifruits (1,460 tons) in California, is the only kiwi producing county among the eight regulated counties. Kiwifruit harvesting usually begins on September 25, is most active during October 1 and October 30, and ends November 15.

Fresno County is also the only county to produce persimmons and pomegranates among the eight regulated counties. Pomegranates are produced predominantly in California; Fresno County produced 69 percent (20,300 tons) and Tulare County produced 27 percent (8,040 tons) of total California production in 2008. Some varieties are available as early as August, while the Wonderful variety, which accounts for the majority of the commercial harvest, is in season from October through January.³⁹ Approximately 75 percent of U.S. pomegranates are sold domestically while the remaining 25 percent is exported.

Persimmons (*Diospyros kaki* or better known as Japanese persimmon or Asian persimmon, as opposed to American persimmon) are harvested in mid to late fall. Tulare County produced the largest share of persimmons in California at 41 percent (4,910 tons) of State production in 2008. Fresno County followed with a production share of 27 percent (3,180 tons).

Table 16 Market values of other regulated products - California and eight regulated counties - 2008 (\$1,000)

| Regulated Product | EGVM Host Category | Market value California Total (\$1,000) | Market value Eight Quarantined Counties (\$1,000) | Percentage of Eight Regulated Counties |
|---------------------------------|--------------------|---|---|--|
| Carnation | Secondary | 1,933 | 0 | 0% |
| Kiwifruit or Chinese gooseberry | Secondary | 32,791 | 1,730 | 5% |
| Olive | Primary | 67,087 | 12,295 | 18% |
| Persimmon | Secondary | 27,458 | 15,664 | 57% |
| Pomegranate | Secondary | 41,419 | 30,003 | 72% |
| Total | | 170,688 | 59,692 | 35% |

Source: USDA-NASS. California County Agricultural Commissioners' Data, 2008, October 15, 2009

³⁹ Pomegranates Council <http://www.pomegranates.org/techinfo.html>

Table 17. Production of other regulated products - California and eight regulated counties – 2008 (tons)

| Regulated Product | Fresno | Lake | Mendo-cino | Merced | Napa | San Joaquin | Solano | Sonoma | Eight Counties Total | California Total |
|-------------------|--------|------|------------|--------|------|-------------|--------|--------|----------------------|------------------|
| Kiwifruit | 1,460 | - | - | - | - | - | - | - | 1,460 | 21,852 |
| % of CA | 7% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 7% | 100% |
| Olive | 1,710 | - | - | - | 544 | 13,900 | 144 | - | 16,298 | 76,317 |
| % of CA | 2% | 0% | 0% | 0% | 1% | 18% | 0% | 0% | 21% | 100% |
| Persimmon | 3,180 | - | - | - | - | - | - | - | 3,180 | 11,876 |
| % of CA | 27% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 27% | 100% |
| Pomegranate | 20,300 | - | - | - | - | - | - | - | 20,300 | 29,365 |
| % of CA | 69% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 69% | 100% |

Source: USDA-NASS. California County Agricultural Commissioners' Data, 2008, October 15, 2009

Stone Fruits and Other Regulated Product Growers in EGVM Regulated Counties

This section summarizes the number of farms and acreage of stone fruits and other regulated products other than grapes which are produced in the eight regulated counties: apricots, cherries, kiwifruits, nectarines, olives, peaches, persimmons, pluots/plumcots, plums/prunes and pomegranates.

In 2007, there were a total of 41,569 farms in the United States that engaged in the production of the aforementioned regulated products (Table 18). California accounted for 25 percent of those farms (10,312 farms). It is noteworthy that California farms for olives, pluots/plumcots and persimmons accounted for 98, 81 and 86 percent of total U.S. farms, respectively. Total U.S. acreage for these regulated products was 531,507 acres in 2007. California accounts for 59 percent of the total acreage for these products in the United States (313,789 acres), a significantly larger share than its share for farms (25 percent). Cherries and peaches are the only products for which California's acreages are below 50 percent of total U.S. acreages. California dominates national acreages for kiwifruits (97 percent), olives (96 percent), pluots/plumcots (95 percent), plums/prunes (94 percent) and pomegranates (100 percent).

Table 18. Other EGVM regulated products: number of farms and acreages in U.S. and California - 2007

| Regulated Product | Number of Farms | | | Acres | | | Average Acreage per California Farm |
|-------------------|-----------------|------------|-----------------|---------------|------------|-----------------|-------------------------------------|
| | United States | California | Percent of U.S. | United States | California | Percent of U.S. | |
| Apricots | 3,141 | 775 | 25% | 13,750 | 11,290 | 82% | 15 |
| Cherries, Sweet | 8,051 | 1,291 | 16% | 100,705 | 30,433 | 30% | 24 |
| Cherries, Tart | 3,028 | 38 | 1% | 49,561 | 19 | 0% | 1 |
| Kiwifruit | 430 | 265 | 62% | 4,509 | 4,375 | 97% | 17 |
| Nectarines | 2,269 | 743 | 33% | 31,846 | 28,431 | 89% | 38 |
| Olives | 1,696 | 1,660 | 98% | 39,540 | 38,142 | 96% | 23 |
| Peaches | 13,582 | 2,005 | 15% | 149,237 | 66,408 | 44% | 33 |
| Persimmons | 1,505 | 745 | 50% | 4,191 | 3,236 | 77% | 4 |
| Pluots & Plumcots | 308 | 249 | 81% | 4,332 | 4,137 | 95% | 17 |
| Plums and Prunes | 6,987 | 2,024 | 29% | 109,319 | 102,860 | 94% | 51 |
| Pomegranates | 599 | 517 | 86% | 24,517 | 24,458 | 100% | 47 |
| Total | 41,596 | 10,312 | 25% | 531,507 | 313,789 | 59% | 30 |

Source: USDA-NASS 2007 Census of Agriculture

Table 19 shows the total number of farms and acres for all regulated products, except grapes, in the eight regulated counties. In 2007, there were 2,729 farms in the eight regulated counties which engaged in the production of regulated products other than grapes, about one-third of grape farms (7,067 grapes farms shown in Table 11). Among the eight counties, the farms are most heavily concentrated in Fresno County, which had 1,402 farms (or 66 percent of the 2,123 farms in the eight counties). Areas devoted to the production of these products totaled 94,768 acres in the eight counties. Merced County had the highest average farm acreage (76 acres per farm), while the averages for Lake and Napa counties were 1 acre and 2 acres per farm, respectively.

Table 19. Number of farms and acreages for stone fruits and other EGVM regulated products except grapes in eight EGVM regulated counties: 2007

| County - Stone Fruits and Other Regulated Products Except Grapes | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|--|-----------------|--------------------------|---------|-----------------------|----------------------|
| Fresno | 1,402 | 14% | 58,367 | 19% | 42 |
| Lake | 49 | 0% | 47 | 0% | 1 |
| Mendocino | 88 | 1% | 327 | 0% | 4 |
| Merced | 119 | 1% | 9,010 | 3% | 76 |
| Napa | 91 | 1% | 226 | 0% | 2 |
| San Joaquin | 606 | 6% | 20,104 | 6% | 33 |
| Solano | 129 | 1% | 1,803 | 1% | 14 |
| Sonoma | 245 | 2% | 4,884 | 2% | 20 |
| Eight Counties Total | 2,729 | 27% | 94,768 | 30% | 35 |
| California Total | 10,312 | 100% | 313,789 | 100% | 31 |

Source: USDA-NASS 2007 Census of Agriculture

Number of farms and amount of acreage for three key products (nectarines, peaches and plums) are shown below (Table 20, Table 21, and Table 22).

Table 20. Number of nectarine farms and acreages in eight EGVM regulated counties: 2007

| County - Nectarines | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|---------------------|-----------------|--------------------------|----------------|-----------------------|----------------------|
| Fresno | 239 | 32% | 13,135 | 46% | 55 |
| Lake | 3 | 0% | D ¹ | | |
| Mendocino | 6 | 1% | D | | |
| Merced | 9 | 1% | 112 | 0% | 12 |
| Napa | 2 | 0% | D | | |
| San Joaquin | 15 | 2% | 80 | 0% | 5 |
| Solano | 6 | 1% | 7 | 0% | 1 |
| Sonoma | 3 | 0% | 1 | 0% | 0 |
| Eight Counties | 283 | 38% | 13,335 | 47% | 47 |
| California | 743 | 100% | 28,431 | 100% | 38 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

Table 21. Number of peach farms and acreages in eight EGVM regulated counties: 2007

| County - Peaches | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|------------------|-----------------|--------------------------|---------|-----------------------|----------------------|
| Fresno | 258 | 13% | 17,619 | 27% | 68 |
| Lake | 11 | 1% | 8 | 0% | 1 |
| Mendocino | 19 | 1% | 22 | 0% | 1 |
| Merced | 48 | 2% | 4,877 | 7% | 102 |
| Napa | 12 | 1% | 5 | 0% | 0 |
| San Joaquin | 60 | 24% | 2,686 | 4% | 45 |
| Solano | 30 | 1% | 88 | 0% | 3 |
| Sonoma | 36 | 2% | 23 | 0% | 1 |
| Eight Counties | 474 | 24% | 25,328 | 38% | 53 |
| California | 2,005 | 100% | 66,408 | 100% | 33 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data

Table 22. Number of plum and prune farms and acreages in eight EGVM regulated counties: 2007

| County – Plums and Prunes | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|---------------------------|-----------------|--------------------------|----------------|-----------------------|----------------------|
| Fresno | 408 | 20% | 16,058 | 16% | 39 |
| Lake | 2 | 0% | D ¹ | | |
| Mendocino | 11 | 1% | 7 | 0% | 1 |
| Merced | 21 | 1% | 1,912 | 2% | 91 |
| Napa | 10 | 0% | 8 | 0% | 1 |
| San Joaquin | 14 | 1% | 44 | 0% | 3 |
| Solano | 45 | 2% | 1,234 | 1% | 27 |
| Sonoma | 28 | 1% | 18 | 0% | 1 |
| Eight Counties | 539 | 27% | 19,281 | 19% | 36 |
| California | 2,024 | 100% | 102,860 | 100% | 51 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

Table 23 shows the significance of San Joaquin County in California’s sweet cherry production. In 2007, San Joaquin County accounted for 43 percent of sweet cherry farms in California and, its share of acreage for sweet cherry production accounted for 48 percent of total sweet cherry acreage in California.

Table 23. Number of sweet cherry farms and acreages in eight EGVM regulated counties: 2007

| County – Sweet Cherries | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|-------------------------|-----------------|--------------------------|----------------|-----------------------|----------------------|
| Fresno | 83 | 6% | 2,330 | 8% | 28 |
| Lake | - | 0% | - | 0% | |
| Mendocino | 16 | 1% | 6 | 0% | 0.4 |
| Merced | 5 | 0% | 260 | 1% | 52 |
| Napa | 1 | 0% | D ¹ | | |
| San Joaquin | 558 | 43% | 14,738 | 48% | 34 |
| Solano | 15 | 1% | 28 | 0% | 2 |
| Sonoma | 10 | 1% | D | | |
| Eight Counties | 558 | 43% | 17,362 | 57% | 31 |
| California | 1,291 | 100% | 30,433 | 100% | 24 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

The number of farms and acreages for other regulated products are included in the Appendix (apricots, kiwifruits, olives, persimmons, pluots/plumcots and pomegranates).

ECONOMIC IMPACTS

Economic impacts of EGVM including direct costs of control and compliance and negative impacts to agricultural businesses can be significant. In the eight regulated counties alone, the livelihood of about 10,000 farms that produce EGVM-regulated products valued at \$2.7 billion could be at stake. If EGVM were to spread to other areas of California, as it did when a portion of San Joaquin County was added to the list of quarantined areas in August, the impact could be felt by as many as 22,000 farms in California that produce EGVM-regulated products valued at a total of \$5.6 billion.⁴⁰

Since the confirmation of EGVM in Napa County in October 2009, concerted efforts to control the outbreak by growers, industries, researchers, and governments have yielded positive results. Government outreach efforts prompted growers to participate in EGVM control measures; additional government funding allowed for critical trappings and monitoring activities and provided the framework for an industry/government joint partnership; and timely feedback by the international technical working group and University of California researchers provided important guidance for development of effective control measures. The outcome is reflected in the EGVM detection reports. During June through September of 2010 (which included the EGVM second flight), detections of EGVM significantly declined, and several counties reported no detections at all. APHIS has requested additional funding, with the aim of eradicating EGVM by 2013. With EGVM eradication in sight, it is unlikely that product damage and yield loss will intensify in California or the infestation will spread in the United States.

This document focuses on three areas of economic impact:

- EGVM control measures
- EGVM regulatory compliance
- International trade and interstate commerce

We also discuss the benefits of EGVM eradication.

⁴⁰ See Table 1.

STAKEHOLDERS AND AFFECTED ENTITIES

The Federal Order directly affects farmers who grow the regulated products, as well as those who harvest, transport, and otherwise process or handle the products. These entities generally sign compliance agreements that indicate how products, vehicles, equipment, and related articles are to be treated during the quarantine.

Stakeholders and entities potentially affected by the outbreak of EGVM and by the EGVM Federal Order include the following:

- Growers of regulated products
- Postharvest service providers of regulated products, such as harvesters, haulers, packers, crushers, canners, bottlers, shippers, cold storages, and other processing facilities including wineries
- Transportation service providers of interstate and international movement of regulated products
- Service and material providers of EGVM control measures: traps, insecticides, mating disruption dispensers, fumigation, etc.
- Service and material providers of green waste treatment and cleaning of machinery and equipment
- Distributors, marketers, wholesalers, retailers, exporters, importers and other entities who are involved in commerce of regulated products inter-state and internationally
- Consumers of regulated products
- Entities which support growers (industry groups and U.C. extensions)
- Local, State, and Federal governments
- Taxpayers

ECONOMIC IMPACTS–COSTS FOR CONTROL MEASURES

Most of the significant direct costs associated with the EGVM outbreaks are costs for control measures, which are primarily incurred by growers and governments. Costs for key control measures are listed as follows:

- insecticide treatments,
- mating disruption dispensers,
- other mechanical/cultural controls,
- trapping/inspections/monitoring
- grower outreach/education

Insecticide and Mating Disruption Dispenser Treatments

The primary measures to control EGVM are the timely applications of insecticide and mating disruption dispensers that contain an EGVM pheromone.^{41,42} Without such control measures, product losses would be significant. The research literature reports losses of 80 percent in grapes due to EGVM (Whittle 1985, cited in NPAG 2009). Control measures can greatly minimize product loss and yield reduction.

Control measures such as insecticide and mating disruption treatments are voluntary; therefore, associated costs are primarily borne by growers. This section focuses on sample costs per acre in wine grape vineyards, recognizing that the extent of infestation and losses may vary significantly over time or geographically.

Based on acreage information provided by Fresno and Napa counties and the standardized application costs prepared by the University of California Cooperative Extension, grower control costs for Napa County and the 1000-square meter core quarantined area of Fresno County are estimated as follows:

⁴¹ APHIS was able to expedite the registration process to bring the mating disruption dispenser Isomate, which was not registered in California, in three months, to Napa County. It was a very speedy process considering the typical registration process takes one to one-and-a-half years. Currently, up to 10,000 dispensers are set up in Napa County.

⁴² For detail on the EGVM mating disruption dispenser, refer to the EPA fact sheet:
http://www.epa.gov/pesticides/biopesticides/ingredients/factsheets/factsheet_011471.htm

Napa County: In 2010, annual costs are estimated to total \$7.7 million: \$5.1 million for grower-applied conventional insecticides; \$1.8 million for grower-applied organic insecticide treatments; and \$800,000 for grower-applied mating disruption dispensers. Isomate, which can last up to an entire season, began being deployed in May and will be applied once each year.⁴³

Fresno County 1000-meter core quarantined area: Costs for 2010 are estimated to range between \$0.7 million and \$1.5 million, based on the assumptions that a 3,000 acre core quarantined area will be insecticide-treated for all 4 flights and no mating disruption dispensers are used (as indicated by Fresno County operators).

The type, timing and frequency of applications (including ovicides and larvicides that are used by traditional and organic growers) will impact the costs for growers (Table 24). Control costs for organic growers are expected to be much higher, because of the higher costs of organic insecticide (Table 25).

Napa County reports that 100 growers engage in the production of organic wine grapes on 2,751 acres. In Mendocino County, where the emphasis on organic agricultural options is on the rise, some vineyards may no longer be able to afford organic or biodynamic practices and certification because of the EGVM outbreak.

Table 24. Estimated insecticide application costs: Traditional grape growers

| Grapes – Traditional Category | Name | Cost/Acre (per application) | | Frequency/Year | | Annual Cost/Acre | |
|--|----------|-----------------------------|-------|----------------|------|------------------|--------|
| | | Low | High | Low | High | Low | High |
| Insecticide | Intrepid | 20.00 | 40.00 | 1 | 2 | 20.00 | 80.00 |
| Insecticide | Altacor | 31.00 | 70.00 | 1 | 2 | 31.00 | 140.00 |
| Other application costs (labor, equipment, fuel, etc.) | - | 7.50 | 12.00 | 2 | 4 | 15.00 | 48.00 |
| Total cost/acre - traditional grape growers | - | - | - | - | - | 66.00 | 268.00 |

Source: Lucia Varela, North Coast IPM Advisor, University of California, Santa Rosa, CA.

Note 1: Conventional growers will apply 4 sprays in the 1st year: Intrepid and Altacor for the 1st generation, Altacor for the 2nd generation, and Intrepid for the 3rd generation.

Note2: Includes all costs except that of the insecticide (e.g. labor, tractor, gas, etc.).

Note 3: Low frequency consists of an 8 ounce rate. High frequency consists of a 16 ounce rate.

⁴³ CDFA.

Table 25. Estimated insecticide application costs: Organic grapes

| Grapes - Organic | Name | Cost/Acre (per application) | | Frequency/Year | | Annual Cost/Acre | |
|--|---------|-----------------------------|-------|----------------|------|------------------|--------|
| | | Low | High | Low | High | Low | High |
| Insecticide | Dipel | 7.50 | 15.00 | 2 | 4 | 15.00 | 60.00 |
| Insecticide | Entrust | 47.00 | 94.00 | 2 | 3 | 94.00 | 282.00 |
| Other application costs (labor, equipment, fuel, etc.) | - | 7.50 | 12.00 | 4 | 7 | 30.00 | 84.00 |
| Total cost/acre - organic grape growers | - | - | - | - | - | 139.00 | 426.00 |

Source: Lucia Varela, North Coast IPM Advisor, University of California, Santa Rosa, CA.

Note 1: Organic growers will receive 7 sprays in the 1st year: 2 Dipel and 1 Entrust sprays for the 1st generation, Dipel and Entrust for the 2nd and 3rd generations.

Note 2: Insecticide application cost include all costs except insecticide (e.g. labor, tractor, gas, etc.).

Note 3: Low frequency consists of an 8 ounce rate. High frequency consists of a 16 ounce rate.

Table 26 shows application rates and unit costs for common insecticides used to estimate the costs to control EGVM for traditional and organic grapes.

Table 26. Application rates and control costs for common insecticides

| Insecticide | Type of Production | Application Rate | Cost |
|-------------|--------------------|---|-----------|
| Intrepid | Conventional | 0.06-0.12lb A.I./acre | 355.52/lb |
| Altacor | Conventional | 0.044-0.099 lbs A.I./acre | 161.28/lb |
| Dipel | Organic | 1-2 lbs/acre (0.16 - 0.32 oz A.I./gallon) | 19.99/lb |
| Entrust | Organic | 1.5 g/100 L | 579.47/lb |

Source: Manufacturers' catalogs, authorized distributors' prices.

Table 27 shows estimated mating disruption dispenser costs. The dispensers provide season-long mating disruption to control throughout three generations of EGVM depending on temperature.

Table 27. Estimated mating disruption dispenser costs: Traditional and organic wine grapes

| Wine Grapes | Name | Cost Per Acre (per application) | | Frequency Per Year | | Annual Cost Per Acre | | |
|---|--------------|---------------------------------|-------|--------------------|------|----------------------|--------|--------|
| | | Low | High | Low | High | No dispenser | Low | High |
| Mating disruption dispenser | EGVM-Isomate | 80.00 | 90.00 | 0 | 1 | - | 80.00 | 90.00 |
| Other application costs (labor and equipment) | Labor cost | 30.00 | 30.00 | 0 | 1 | - | 30.00 | 90.00 |
| Total cost | - | - | - | - | - | - | 110.00 | 120.00 |

Sources: Lucia Varela, North Coast IPM Advisor, University of California, Santa Rosa, CA.

Note 1: EGVM-Isomate includes 200 dispensers per acre.

Note 2: Assume 1.5 hour labor/acre at \$20/hour.

The need and ability to implement the control measures, either stand-alone insecticide treatments or a combination of insecticide and dispenser treatments, differ substantially by geographic area, product, grower’s acreage, and proximity of commercial or residential area. For example, in Napa County, where relatively high-value wine grapes are grown in a relatively compacted area of ridges and valleys, the ratio of treatment costs to total revenue can be lower than in other counties where grape acreages are larger or the values of grape production are lower (Table 28). On the other hand, in Fresno County, where values of wine grapes are relatively low but sizes of grape vineyards are relatively large, the ratio of treatment costs to total revenue may be higher.

Table 28. Average production value and acreage per grape grower based on 2009 or 2008 values and acreages and 2007 number of growers

| County | Grape Type | Grower Type | Number of Growers (2007) | Average Production Value per Grower | Average Acreage per Grower |
|--|-----------------|-------------|--------------------------|-------------------------------------|----------------------------|
| Napa (2009) | Wine | Traditional | 1,310 | 360,473 | 31 |
| | Wine | Organic | 100 | 227,993 | 28 |
| | Table | All | 0 | | |
| | County Total | | 1,410 | 351,077 | 31 |
| Fresno quarantined acreage (2009) | Wine | All | 249 | 655,622 | 164 |
| | Raisin | All | 1,582 | 230,982 | 88 |
| | Table | All | 385 | 360,974 | 30 |
| | County Total \1 | | 2,359 | 301,281 | 87 |
| Sonoma (2009) | Wine | All | 1,758 | 264,526 | 32 |
| | Table | All | 0 | | |
| | County Total | | 1,758 | 264,526 | 32 |
| San Joaquin (2009) | Wine | All | 820 | 347,538 | 112 |
| | Table | All | 0 | | |
| | County Total | | 820 | 264,526 | 112 |
| Solano (2009) | Wine | All | 102 | 119,427 | 39 |
| | Raisin | All | 0 | | |
| | Table | All | 0 | | |
| | County Total | | 102 | 119,427 | 40 |
| Mendocino (2008) | Wine | All | 394 | 157,480 | 116 |
| | Table | All | 0 | | |
| | County Total | | 394 | 157,480 | 116 |
| Merced (2009) | Wine | All | 57 | 739,391 | 200 |
| | Raisin | All | 3 | 495,110 | 200 |
| | Table | All | 2 | NI | 73 |
| | County Total | | 60 | 720,483 | 200 |
| Lake (2008) | Wine | All | 164 | 208,701 | 50 |
| | Raisin | All | 0 | | |
| | Table | All | 0 | | |
| | County Total | | 164 | 208,701 | 50 |
| Eight Regulated Counties Total | Wine | All | 4,954 | 314,635 | 61 |
| | Raisin | All | 1,585 | 231,456 | 89 |
| | Table | All | 387 | 359,456 | 30 |
| | All Grapes | All | 7,067 | 298,101 | 64 |

Sources: Agriculture Commissioners' Crop Reports, most recent reports for 2009 or 2008. USDA-NASS 2007 Census of Agriculture.

Note \1: For Fresno County, farm numbers were broken down based on the Fresno Agriculture Commissioner's data. To be consistent with other county data, NASS 2007 Census data was applied to its total number for grape growers.

NI= No information.

As explained previously, the need to implement chemical control measures vary substantially depending on geographic area, product, grower’s financial capability, and proximity of commercial or residential areas. Notwithstanding these sources of variability, Table 29 provides a generalized view of the range in the size of EGVM control costs relative to producers’ gross returns. The EGVM control costs per acre in Table 29 are based on the estimated annual costs of insecticide applications and mating disruption dispensers shown in Table 24 and Table 27 for traditional grape growers (from \$66 to \$388, with the high-end cost including \$268 for insecticides and \$120 for dispensers). Under the low annual cost assumption of \$66 per acre, the chemical control costs are estimated to be 1.4 percent of growers’ annual gross revenue. Under the high annual cost assumption of \$388 per acre, the chemical control costs increase to 8.3 percent of average growers’ returns. In counties where average grape grower sales are relatively low, such as Mendocino, Solano and Lake Counties, grower costs relative to control measures could be more significant.

Table 29. Estimated average annual costs of EGVM control measures for grape growers and a comparison of control costs and the average value of production

| | Per Grape Grower | | Estimated Annual Costs of Control Measures | | | |
|--|---------------------------------|-----------------|--|-------|---------|----------|
| | | | Per Acre | | Total | |
| | Average Annual Production Value | Average Acreage | Low | High | Low | High |
| Eight Regulated Counties | \$298,101 | 64 | \$66 | \$388 | \$4,224 | \$24,832 |
| Costs of Control Measures as a Percentage of the Value of Production | | | | | 1.4% | 8.3% |

Other Mechanical and Cultural Controls

In addition to the insecticide and mating disruption treatments, other mechanical and cultural controls have been introduced. For example, in Fresno, Merced and San Joaquin counties, the EGVM program utilized fruit and flower removal in the 400-meter detection zones and within the quarantine areas.⁴⁴ In Napa County, about 40,000 postcards were mailed to county residents during the week of July 26, 2010, targeting urban grape growers, homeowners with a small number of vines, and casual growers, to encourage them to either remove and

⁴⁴ EGVM weekly program report.

dispose of this year's fruits or treat their vines with an insecticide that controls EGVM.⁴⁵ In addition to the costs incurred by government bodies for these types of outreach programs, the costs community members incur by removing and disposing of noncommercial fruits are real but difficult to measure.

Trapping, Inspection, and Monitoring of EGVM and Other Government-Related Activities

To define the distribution and densities of EGVM infestations, state-wide trapping and monitoring programs are essential. Without systematic trapping and monitoring programs, the presence or absence of EGVM cannot be confirmed. If eradication is the ultimate goal, then a declaration of eradication needs to be based on the monitoring program in place.⁴⁶

Currently, CDFA is trapping in 47 out of 58 counties in California, concentrating on commercial vineyards in Napa and Fresno counties, and covering all grape production areas in California. CDFA and APHIS, based on TWG recommendations, jointly decide how many traps to set up depending on the risk factors; for example, in Sonoma County, over 4,000 traps have been set up.⁴⁷ At the onset of the outbreak of EGVM last fall in Napa County, collaborative efforts began with a team that consisted of the County Agriculture Commissioner's office, CDFA, and APHIS. The team placed detection traps at the recommended levels within a nine-square-mile core area around Oakville, Napa County. Traps were placed in another 40-square-mile area surrounding the core, while an additional 40-square-mile area was being trapped along lines that radiate outward from the core, like spokes on a wheel. Traps were inspected at least weekly.⁴⁸ Currently, the University of California Cooperative Extension is also monitoring the

⁴⁵ Napa County "Kick the moth out" campaign, July 26, 2010

<http://www.countyofnapa.org/Pages/Content.aspx?id=4294972740>.

⁴⁶ International Technical Working Group for EGVM, Second Report, May 14, 2010

http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/TWG%20report-5-14-2010.pdf.

⁴⁷ Sonoma County Agriculture Division Agriculture Commissioner. "In Sonoma County, a neighboring county to Napa County, in February 2010, the agriculture commissioner's office and CDFA began deploying up to four thousand traps throughout commercial vineyards in Sonoma County. Traps are being inspected every two weeks throughout the growing season until November." http://www.sonoma-county.org/agcomm/european_gv_moth.htm.

⁴⁸ Western Plant Diagnostic News Letter, October 2009,

<https://www.wpdn.org/common/newsletters/wpdn/WPDN%20Newsletter%202009-10.pdf>.

distribution of EGVM in selected areas of Napa County. The results of the monitoring show no detection of adult male EGVM for the week ending 8/20 despite the peak 3rd flight day.⁴⁹

CDFA continued to survey the entire grape growing areas, as well as other regulated product growing areas, in 47 counties with over 40,000 traps. In addition, 18 other grape-producing States are surveying for EGVM through cooperative agreements with APHIS. To enable these efforts in California, APHIS budgeted the following funding under various sources for FY2010:

\$7.6 million for CDFA as part of the cooperative agreement
\$500,000 for USDA costs in California

Total = \$8.1 million (USDA costs incurred in California in FY 2010)

The biggest cost is the statewide trapping, which is contracted out with the respective counties. The material cost of traps consists of traps and lures (pheromone) which need to be replaced every 4 weeks. Other costs include pre-harvest inspections and sampling.

The above costs also include activities related to regulatory compliance, which are discussed in the next section. APHIS has requested an emergency funding of about \$22 million in FY 2011 to continue the EGVM program with CDFA, California counties, industry groups, affected growers, and other grape-producing States. The goal is to eliminate EGVM from California as soon as possible with continued intensive monitoring and regulatory efforts, along with suppression treatments by affected growers and with funding needs extending into FY2012.

⁴⁹ University of California Cooperative Extension Napa County
<http://cenapa.ucdavis.edu/newsletterfiles/newsletter2084.htm>.

ECONOMIC IMPACTS–COSTS FOR COMPLIANCE

Provision IV of the Federal Order, issued on June 22, 2010 and amended on August 13, 2010, specifies the conditions for interstate movement of regulated articles. These conditions were outlined in the Introduction section of this analysis. To comply with the Federal Order and the State Interior Quarantine Order, the regulated counties have issued compliance agreements that facilitate activities such as harvesting, moving and receiving regulated products within and outside of quarantined areas. In addition, APHIS has issued two regulatory protocols for the interstate movement of fresh grapes and other regulated articles.⁵⁰ In this section, the regulatory requirements and associated costs are summarized.

Tarps and Screens

Under the Federal Order, all conveyances moving or holding grapes growing in EGVM quarantine areas must be filled, covered or enclosed in a manner to minimize spread of any life stage of EGVM. Cost for tarps and screens for a wine truck is estimated to be about \$260 per truck (wholesale, volume price).⁵¹ The lifespan of tarps is estimated to be around 10 trips per tarp.⁵² The total cost for tarps/screens for growers depends on the number of trips per truck and number of trucks. Costs may be higher in Fresno County than in the other affected counties, due to the greater volume of regulated products shipped interstate or exported. Raisins are exempted from the tarping requirement because most are dried in the field.

Disposal of Green Waste

Under the Federal Order, plant litter, compost, harvesting waste and green waste must be disposed of by a commercial disposal entity at a designated composting facility. It is not clear who (packing house, grower, harvester, etc.) would incur the costs to dispose of the quarantined green waste, which include containers, hauling and receiving fee. In Fresno County, stone fruits

⁵⁰ APHIS Regulatory protocols for fresh grape shipments (consumption only) and other than fresh grapes, July 7, 2010 http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/FreshGrapeShipments.pdf
http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/OtherThanFreshGrapeShipments.pdf.

⁵¹ Cost estimated by the Fresno County Agriculture Commissioners Office.

⁵² Estimate by the Napa County Agriculture Commissioner's Office.

growers have experienced difficulties since only one or two certified composters are available, and the alternative, landfills, are under a mandate to limit the amount of green waste by the State.

Cleaning of Containers, Equipment, Machines and Trucks

Under the Federal Order, equipment, machinery and conveyances leaving the regulated area must be cleaned by either pressure wash or steam treatment. Napa County is estimating a cost of about \$400,000 to growers for the year based on the estimated number of compliance agreements issued. Most small farms are not equipped with power sprayers or steam washers and these will be an additional cost for compliance. Rented equipment must also meet this requirement, making complying with this requirement more complex.

Inspections, Phytosanitary Export Certifications and Record Keeping

Under the 2010 inspection protocol, regulated fresh fruit produced in quarantined areas may only be moved if all boxes/containers or pallet tags are marked with a diamond stamp and each shipment is accompanied by a certificate. In addition, several trading partners began requesting a phytosanitary certificate if the imported regulated products came from inside the quarantined areas. (The impacts on trade will be discussed in the following section.)

Phytosanitary certification requirements may be imposed by other States and countries, to ensure that a shipment is free of pests. For certification of commercial shipments valued at \$1,250 or more, a fee of \$104 as well as additional fees is charged by APHIS and respective originating counties.⁵³

Methyl Bromide Fumigation

Under the Federal Order, fresh grapes must be treated (e.g., fumigated with methyl bromide) if vineyards are located within 200 meters of the EGVM detection. Because the majority of table grapes are produced in Fresno County and are shipped interstate and abroad, this provision most affects the table grape growers in Fresno County. Beyond the Federal Order,

⁵³ APHIS user fees increased from \$77 to \$104 on October 1, 2010, for commercial shipments having a value of \$1,250 or more. The fee is scheduled to increase further to \$106 on October 1, 2011.

additional fumigation requirements imposed by importing countries could have significant impacts not only for fresh grapes but for other regulated products as well.

The majority, if not all, of the industry participants agree that fumigation with methyl bromide is the least desirable treatment option for fresh grapes for consumption. The reasons voiced are:⁵⁴

- Limited availability of fumigators
- Product quality: Shortened shelf life and potential damage to the grapes
- Capital requirement: High initial investment cost to build a chamber on-site – expected to be over \$100,000
- Capacity constraint and potential product loss: A standard- sized chamber is not able to process fresh grapes adequately during peak season. One full fumigation cycle is expected to be about 8 hours; however, the majority of the grapes arrive from the fields in a small window of two hours, between 4:00 and 6:00 PM. The grapes waiting in queue for MB fumigation could be damaged by heat.
- Lead time for chamber permits: In addition to certification by APHIS, the normal permit process by State and county air quality boards is lengthy, especially in California where standards are stringent.

⁵⁴ Information provided by the California Grape and Tree Fruit League.

ECONOMIC IMPACTS - TRADE AND INTERSTATE COMMERCE

The EGVM outbreak and its consequences are still a developing situation; therefore, the data to measure the economic impacts are limited or preliminary. However, in this section, some monthly data as late as July 2010 are analyzed to identify any unique trends related to the regulated products in California. One consensus that has emerged among the industry and government participants on trade is that, without the regulatory protocols, California growers of the regulated products could have lost all their export markets. The news of the first discovery of EGVM in North America created a chilling effect on trade with Canada and Mexico, for example. There was about a 45-day period starting in May during which stone fruit exports to Canada were halted, resulting in an estimated 250,000 to 350,000 boxes of stone fruits being diverted domestically. Without the regulatory protocol to certify the safety and quality of the products, the resulting loss of trade could have been even more significant, reaching as high as 2.5 million boxes in Fresno County alone. On September 1, 2010, Mexico removed the temporary import suspension on the EGVM regulated products, which had been imposed on all of the EGVM regulated counties, and began allowing stone fruit imports from the regulated areas within these counties and table grape imports from the non-regulated areas in these counties. In sum, while phytosanitary requirements for EGVM in California were being negotiated between the United States, Canada and Mexico, shipments of at least 200,000 boxes of stone fruits to Mexico and an additional 200,000 boxes to Canada were lost in a compressed time period of 2 to 3 weeks.⁵⁵

Table 30 reiterates the importance of California in the production and export of the EGVM regulated products based on the 2007 California Agricultural Resource Directory. California's shares of stone fruit production are 85 to 100 percent of total domestic production and, except for cherries, its shares of stone fruit exports are equally substantial at around 83 to 100 percent. The total value of regulated products in the eight regulated counties was calculated to be 41 percent of total production in California. Because many factors impact the fresh fruit markets, it is not possible to isolate the impact of EGVM; however, it is worthwhile to observe and compare the fluctuation of the monthly stone fruit prices.

⁵⁵ Hoffman, Setsuko August 2010, Personal communications with California Grape and Tree Fruit League president, Barry Bedwell, and trade director, Marcy Martin.

Table 30. California shares of U.S. production and values and California shares of U.S. exports and values. 2007 (\$ millions)

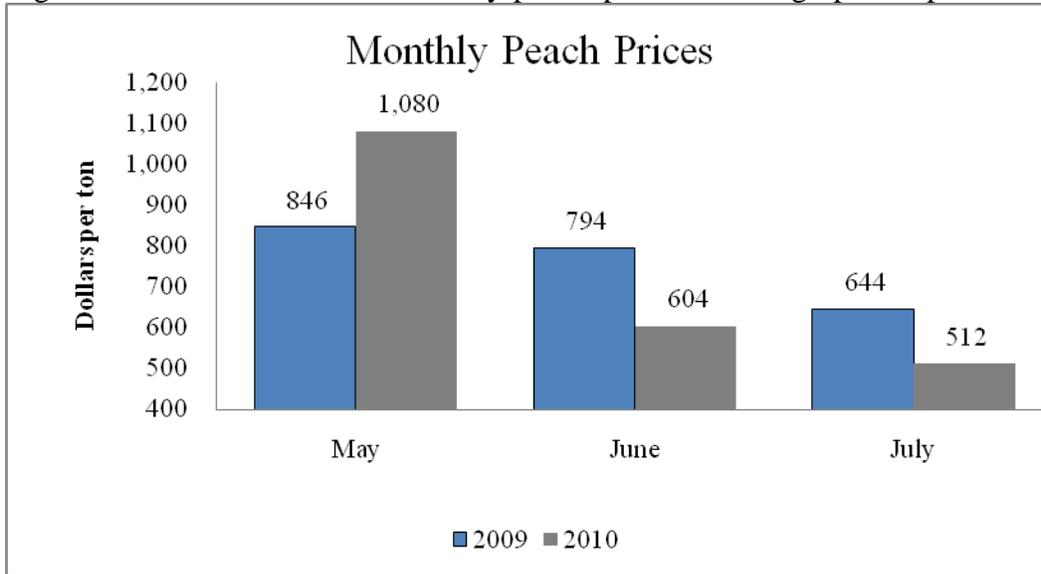
| Regulated Product | CA Share of U.S. Production | CA Total Value (\$ million) | CA Share of U.S. Export Value | CA Total Exports (\$ million) |
|------------------------|-----------------------------|-----------------------------|-------------------------------|-------------------------------|
| Apricots | 92% | 35 | 94% | 17 |
| Cherries, sweet | 85% | 155 | 21% | 270 |
| Grapes, all | 89% | 3,078 | 93% | 1,691 |
| Kiwifruits | 97% | 23 | 100% | 14 |
| Nectarines and peaches | 86% | 421 | 84% | 174 |
| Olives | 100% | 87 | 100% | 17 |
| Plums | 97% | 219 | 97% | 53 |
| Total | | 4,016 | | 2,236 |

Source: California Agricultural Resource Directory 2008-2009.

Stone fruits were the first products to experience the impacts of EGVM, as their harvesting season preceded other regulated products, such as table grapes. Because of colder than normal spring temperatures, peach shipments from California were delayed about two weeks. NASS reports that usual harvesting for California freestone peaches begins on April 20, becomes most active between May 15 – August 30 and ends on October 10. While California peach harvesting season was delayed about two weeks and did not start till May, South Carolina and Georgia, the second and third largest peach producing States in the United States, had a bumper crop year in 2010. As the harvesting season in South Carolina and Georgia begin on May 15, supply of peaches in May was higher than usual, which could negatively impact the prices.

NASS agricultural price reports indicate that the notable declining trend of this year's peach prices over the three-month period (Figure 18).

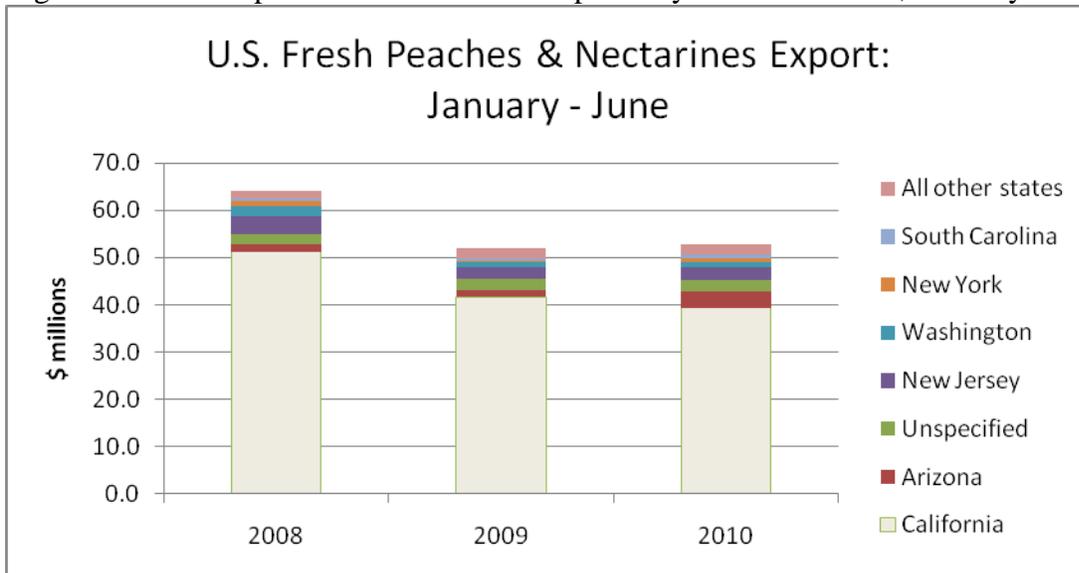
Figure 18. Fluctuations of monthly peach prices: Average prices per ton



Source: NASS Agricultural Prices, July 30, 2010 <http://usda.mannlib.cornell.edu/usda/current/AgriPric/AgriPric-07-30-2010.pdf>.

Although this year’s production volume of California freestone peaches is expected to be larger than last year, exports from California have declined according to the 2010 data for January – June. Despite the decline for California, total U.S. exports of peaches and nectarines increased slightly in 2010, to \$52 million (Figure 19).

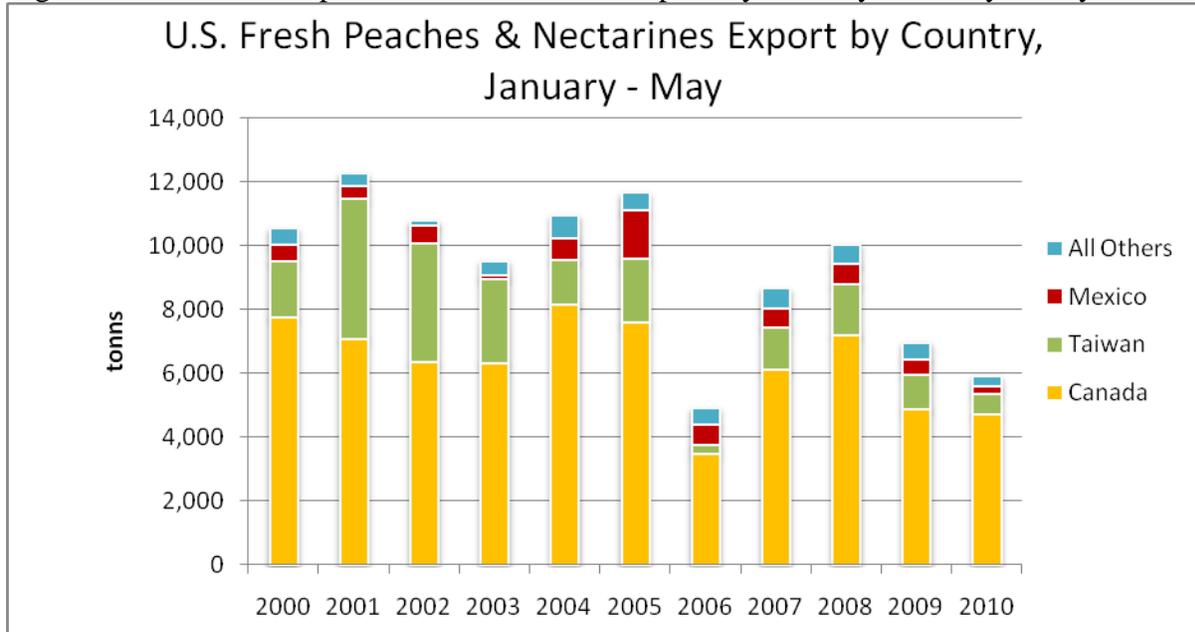
Figure 19. Fresh peach and nectarine exports by selected states, January ~ May



Source: Global Trade Atlas

Figure 20 compares U.S. fresh peach and nectarine exports for the 5-month period, January – May, by country for the years 2000 to 2010. Exports during this period in 2010 were the second-lowest after those of 2006. The data do not include the peak harvesting months of June and July; however, the declines in exports to Taiwan and Mexico are notable.⁵⁶

Figure 20. U.S. fresh peaches & nectarines export by country: January - May



Source: Global Trade Atlas

As previously stated, there was about a 45-day period starting in May during which stone fruit exports to Canada were halted, resulting in an estimated 250,000 to 350,000 boxes of stone fruits being diverted domestically. Two weeks delay in shipments of California peaches due to cold spring weather and the bumper crop year of South Carolina and Georgia peaches are the major factors in condensed period of increased supply which probably contributed to the sharp drop in price from May to June. Export of peaches could have relieved the pressure of peach inventory build-up; it did not materialize because of EGVM. It is beyond the scope of this

⁵⁶ Several factors related to declines in stone fruit exports to Mexico are described in the California Tree Nut Agreement Annual Report 2009 as follows: “Shipments to Mexico this past season declined for a number of reasons including a 30 percent devaluation of the Peso against the Dollar compared to summer 2008, higher pest pressures in the orchards and continued frustration with Mexico’s oversight of the protocol. While the tree fruit industry did not face increased tariffs this past season, like table grapes, due to the ongoing trucking dispute between the US and Mexican governments, there still remains ample room for Mexican quarantine authorities to erect non tariff trade barriers, particularly against California peaches, plums and nectarines.”

analysis to measure the impact of EGVM on the volatile peach prices; however, it is important to consider how the outbreak of exotic pests and subsequent regulatory actions could impact the volatile fresh fruit markets in the short term.

In addition, new phytosanitary requirements could be imposed by our trading partners. For example, if a new fumigation requirement with methyl bromide were to be imposed by our trading partners, such a requirement would reduce the desirability of exports not only because of the increased treatment costs but also resulting in a shortened shelf life of the regulated products.

COSTS AND BENEFITS OF EGVM AND THE FEDERAL ORDER

Costs of EGVM and Federal Order

The potential economic impacts of EGVM on farms, both direct and indirect, can be significant. Direct costs, such as control measures and regulatory compliance, and indirect costs, such as reduced sales volumes, negatively impact growers and their industries. In the eight regulated counties alone, if EGVM were to spread to other areas within the counties, the livelihood of as many as 10,000 operators who engage in the production of EGVM regulated products with a total market value of \$2.7 billion may be impacted. If EGVM were to spread to other counties of California, as has already happened in San Joaquin County, the livelihood of as many as 22,000 farmers in California that engage in the production of EGVM regulated products with a total market value of \$5.7 billion may be impacted.

The previous sections outlined various economic impacts related to costs for control measures and costs for compliance. Most of these costs are likely to be absorbed by growers, and will not be passed on to the next level of the supply chain in the form of grower price increases. The structural shifts of the fresh fruit industries towards market consolidation and integration make it difficult for the growers to pass on costs they bear because of EGVM.⁵⁷

⁵⁷ 2009 Annual Report of California Tree Fruit Agreement “The rapid consolidation among grocery retailers in the late 1990s led to more market power in the hands of retailers and less ability for tree fruit shippers to influence prices. According to the Produce Marketing Association, in 1999, the top ten chains accounted for 53 percent of grocery sales; in 2005, they accounted for 68 percent.”

Furthermore, California is the primary producer and the primary exporter of the regulated products in the United States; any negative economic impacts felt by these farms could also cause ripple effects in the Nation’s economy, such as declines in exports as a result of increased trade barriers or a decline in overall producer prices or availability of products in the domestic markets.

Given the current economic conditions in California, any additional costs incurred by the farms and the industries could negatively impact the speed of economic recovery. The latest monthly unemployment rates show consistently higher unemployment in California compared to the U.S. average (Table 31). Unemployment rates are significantly higher in Merced and Fresno counties than the average rates for California and the United States, while the unemployment rates of Napa County are fluctuating close to the national rates.

Table 31. Monthly local area unemployment rate - 2010

| Metropolitan Area | March | April | May | June | July | August \1 |
|------------------------|-------|-------|------|------|-------|-----------|
| Fresno | 18.7 | 16.9 | 15.9 | 16.0 | 16.1` | 15.4 |
| Merced | 22.1 | 19.8 | 17.9 | 18.1 | 18.7 | 17.4 |
| Napa | 10.8 | 9.9 | 9.0 | 9.3 | 9.4 | 9.4 |
| Stockton (San Joaquin) | 18.4 | 17.6 | 16.1 | 16.5 | 17.3 | 16.6 |
| California | 12.6 | 12.5 | 12.4 | 12.3 | 12.3 | 12.4 |
| United States | 9.7 | 9.9 | 9.7 | 9.5 | 9.5 | 9.6 |

Source: U.S. Bureau of Labor Statistics, Economy at a Glance <http://www.bls.gov/eag/eag.ca.htm>

Note \1: Preliminary data.

Benefits of the Federal Order and EGVM Eradication

The Federal Order and a systematic pest trapping, detection and control program are essential to protect the industries to ensure the pest-free status of regulated products from the quarantined area and to allow the continued interstate and international shipments of those regulated products. Benefits of the Federal Order are articulated in a CDFA Finding of Emergency issued on July 20, 2010:

“Additionally, the USDA cannot regulate less than the entire State unless the State has a quarantine regulation which is substantially the same as what the federal quarantine requirements are or will be. Now that the USDA has confirmation of EGVM in California, a federal order or quarantine regulation restrictions are imminent. Should

USDA quarantine all of California, it would have serious repercussions on our ability to export any EGVM host material to other states or countries. For instance, both Canada and Mexico are major trading partners with California. Canada has already prohibited the importation of grapes and olives, and placed restrictions on stonefruit, kiwi, persimmon, pomegranate and berries from EGVM areas in California. Mexico has prohibited the importation of any host material from EGVM counties. Therefore, it is necessary to amend this regulation as an emergency action.”

The movement restrictions and systematic pest trapping, detection and control program are necessary for maintaining interstate and international commerce. Eradication will free growers from the control programs and activities related to regulatory compliance. The EGVM International Technical Working Group (TWG) reported in its May 2010 report that the eradication of EGVM in California is feasible:⁵⁸

“ *Overall strategy:* ... Eradication, in fact, will be a realistic goal for the program if (1) the population is not (and does not become) substantially more widespread than it is known to be at present, (2) the grape industry remains behind the effort, and (3) control methods that are available at the present time remain available for use by the program.”

No EGVM has been found in five of the eight quarantined counties since June 2010. There were two EGVM trapped on Aug. 2 and 4 in San Joaquin County. Finds in Napa and Sonoma counties were substantially lower in August through October than in previous months.⁵⁹ If EGVM does not spread beyond the areas currently known to be infested, the program could potentially eliminate this pest from California by 2013. The eradication program will require continued systematic trapping and monitoring programs and regulatory compliance by all impacted entities. If eradication is not attainable, costly control measures will continue for the foreseeable future. The costs and benefits of controlling and eventually eliminating EGVM extend beyond the immediate economic impacts examined in this report. There are environmental costs (impacts to non-target organisms and ecosystems, potential impacts to air,

⁵⁸ http://www.aphis.usda.gov/plant_health/plant_pest_info/eg_moth/downloads/TWG%20report-5-14-2010.pdf

⁵⁹ CDFA

soil, water quality, etc.) and social costs (potential health impacts to workers and neighboring property owners, negative community perceptions, etc.) that also need to be considered when evaluating and comparing alternative courses of action.

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APPENDIX

Table A 1. Number of apricot farms and acreages in eight EGVM regulated counties:
2007

| County - Apricots | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|-------------------|-----------------|--------------------------|-----------------|-----------------------|----------------------|
| Fresno | 94 | 12% | 1,726 | 15% | 18 |
| Lake | 1 | 0% | D ^{\1} | | |
| Mendocino | 1 | 0% | D | | |
| Merced | 18 | 2% | 376 | 3% | 21 |
| Napa | - | 0% | - | 0% | |
| San Joaquin | 26 | 3% | 965 | 9% | 37 |
| Solano | 5 | 1% | 1 | 0% | 0 |
| Sonoma | 90 | 12% | 4,544 | 40% | 50 |
| Eight Counties | 235 | 30% | 7,612 | 67% | 32 |
| California | 775 | 100% | 11,290 | 100% | 15 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

Table A 2. Number of kiwifruit farms and acreages in eight EGVM regulated counties:
2007

| County - Kiwifruit | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|--------------------|-----------------|--------------------------|-----------------|-----------------------|----------------------|
| Fresno | 16 | 6% | 219 | 5% | 14 |
| Lake | 2 | 1% | D ^{\1} | | |
| Mendocino | 1 | 0% | D | | |
| Merced | - | 0% | - | 0% | |
| Napa | 1 | 0% | D | | |
| San Joaquin | 3 | 1% | D | | |
| Solano | 2 | 1% | D | | |
| Sonoma | 3 | 1% | Z | | |
| Eight Counties | 28 | 11% | 219 | 5% | 8 |
| California | 265 | 100% | 4,375 | 100% | 17 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data

Note: (D) Withheld to avoid disclosing data for individual farms, (Z) Less than half of the unit shown.

Table A 3. Number of olive farms and acreages in eight EGVM regulated counties: 2007

| County - Olives | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|-----------------|-----------------|--------------------------|---------|-----------------------|----------------------|
| Fresno | 35 | 2% | 1,065 | 3% | 30 |
| Lake | 28 | 2% | 39 | 0% | 1 |
| Mendocino | 28 | 2% | 291 | 1% | 10 |
| Merced | 4 | 0% | 15 | 0% | 4 |
| Napa | 58 | 3% | 212 | 1% | 4 |
| San Joaquin | 19 | 1 | 1,334 | 3% | 70 |
| Solano | 16 | 1% | 436 | 1% | 27 |
| Sonoma | 62 | 4% | 294 | 1% | 5 |
| Eight Counties | 250 | 15% | 3,686 | 10% | 15 |
| California | 1,660 | 100% | 38,142 | 100% | 23 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data

Table A 4. Number of persimmon farms and acreages in eight EGVM regulated counties: 2007

| County - Persimmons | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|---------------------|-----------------|--------------------------|----------------|-----------------------|----------------------|
| Fresno | 100 | 13% | 611 | 19% | 6 |
| Lake | 2 | 0% | D ¹ | | |
| Mendocino | 1 | 0% | D | | |
| Merced | 1 | 0% | D | | |
| Napa | 4 | 1% | 1 | 0% | 0 |
| San Joaquin | 23 | 3% | 214 | 7% | 9 |
| Solano | 9 | 1% | 9 | 0% | 1 |
| Sonoma | 6 | 1% | 2 | 0% | 0 |
| Eight Counties | 146 | 20% | 837 | 26% | 6 |
| California | 745 | 100% | 3,236 | 100% | 4 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

Table A 5. Number of pluot/plumcot farms and acreages in eight EGVM regulated counties: 2007

| County – Pluot/Plumcot | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|---------------------------|-----------------|-----------------------------|----------------|--------------------------|-------------------------|
| Fresno | 76 | 31% | 1,252 | 30% | 16 |
| Lake | - | 0% | - | 0% | |
| Mendocino | - | 0% | - | 0% | |
| Merced | 4 | 2% | D ¹ | | |
| Napa | 2 | 1% | D | | |
| San Joaquin | 9 | 4% | 21 | 1% | 2 |
| Solano | - | 0% | - | 0% | |
| Sonoma | 7 | 3% | 2 | 0% | 0 |
| Eight Counties | 98 | 39% | 1,275 | 31% | 13 |
| California | 249 | 100% | 4,137 | 100% | 17 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.

Table A 6. Number of pomegranate farms and acreages in eight EGVM regulated counties: 2007

| County – Pomegranate | Number of Farms | Percentage of California | Acreage | Percent of California | Average Farm Acreage |
|-------------------------|-----------------|-----------------------------|----------------|--------------------------|-------------------------|
| Fresno | 93 | 18% | 4,352 | 18% | 47 |
| Lake | - | 0% | - | 0% | |
| Mendocino | 5 | 1% | 1 | 0% | 0 |
| Merced | 9 | 2% | 1,458 | 6% | 162 |
| Napa | 1 | 0% | D ¹ | | |
| San Joaquin | 9 | 2% | 22 | 0% | 2 |
| Solano | 1 | 0% | D | | |
| Sonoma | - | 0% | - | 0% | |
| Eight Counties | 118 | 23% | 5,833 | 24% | 49 |
| California | 517 | 100% | 24,458 | 100% | 47 |

Source: USDA-NASS 2007 Census of Agriculture, California State and County Data.

Note \1: (D) Withheld to avoid disclosing data for individual farms.