

# Regulatory Impact and Regulatory Flexibility Analyses

## The Potential Economic Impact of Expanded Importation of Hass Avocados from Mexico

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## **PREFATORY NOTE**

In response to its proposed rule on expanding the Mexican Hass avocado import program, APHIS received a comment suggesting that the Mexican Hass avocado shipping season be changed from November 1 through April 30 to October 15 through April 15. Because Mexican Hass avocados could still be in the marketplace in the United States until mid- to late May, under a program that ends on April 30, and given the warmer temperatures in early to mid-May in the States proposed for inclusion in the program and the increasing availability of fruit fly host material in those States at those times, APHIS has made the change requested by the commenter in its final rule. The regulatory impact analysis and regulatory flexibility analysis are based on a six-month shipping period, and the revised final rule still involves a six-month shipping period (but with slightly different dates). Because the volume of avocados coming in does not change, we do not believe that substantive revisions to the analyses that follow are necessary. Such changes would not materially affect the findings of our analyses.

## **SUMMARY OF REGULATORY IMPACT ANALYSIS**

This analysis considers economic impacts on U.S. Hass avocado producers and consumers/merchandisers that could result from allowing fresh Hass avocados from Michoacan, Mexico, to be imported into additional areas of the United States and over a longer period each year than is currently allowed. Hass avocado imports from approved orchards in Michoacan have been permitted entry since the 1997/98 season, for distribution during the months of November through February in what are termed the approved States: Connecticut, Delaware, the District of Columbia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, and Wisconsin. The additional approved States will be Colorado, Idaho, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. The period of import for all approved States will be extended by two months, from November through February to October 15 through April 15.

Impacts on U.S. producers and consumers/merchandisers will derive from the increased supply of Hass avocados from Mexico and concomitant price declines. Essentially all domestically produced Hass avocados are grown in California. U.S. producers and California producers are therefore used interchangeably in the analysis. The 1997 rule that first allowed for the importation of Mexican Hass avocados to 19 States and the District of Columbia resulted in a redistribution of California-grown Hass avocados from markets in the approved States during the months that imports are allowed from Mexico. This rule is expected to have a similar effect. Anecdotal experience suggests that benefits resulting from the existing rule have been largely realized at the

wholesale level, and discussion of consumer gains therefore includes explicit reference to merchandisers as well.

Two models are used to estimate impacts. The first is a nationwide model that does not distinguish between the approved and nonapproved States. The rationale underlying this model is that given sufficient time, a single price for avocados would obtain in the two regions. Although Mexico's supply is restricted to the approved States for specified months of the year, California and other foreign suppliers can move in and out of the two markets, and would do so in search of profits until prices in the approved and nonapproved States essentially equalize.

The second model explicitly recognizes the approved and nonapproved States as two regions. Estimated economic losses include direct market loss for California producers in approved States, and losses related to increased supply in nonapproved States, as the diversion of California Hass avocados from approved to nonapproved States depresses prices. Consumers/ merchandisers are expected to gain in both approved and nonapproved States from the lower prices. A theoretical limitation of the regional model, in contrast to the national model, is the assumed maintenance of a price differential between the approved and nonapproved States.

Both models use a partial equilibrium economic surplus framework to consider benefits and costs of the rule. Potential producer losses and consumer/merchandiser gains are quantified in terms of changes in producer and consumer surplus resulting from the increased imports expected from Mexico. To simplify the analysis, the demand curve is assumed to have a constant elasticity while U.S. supply is assumed to be fixed. The

supply curve is assumed to be vertical at least in the short run, that is, supply is perfectly inelastic and does not respond to changes in price.

In the national model, additional Hass avocado imports from Mexico totaling 16.87 million pounds are estimated to result in a 12 percent drop in the wholesale price, from \$1.34 per pound to \$1.18 per pound. Consumers/merchandisers would gain by \$27.65 million per year and California Hass avocado producers would lose by \$17.93 million per year, for a net benefit of \$9.72 million per year.

In the regional model, the same level of additional Mexican Hass avocado imports is assumed (16.87 million pounds), an amount equivalent to the maximum quantity assumed could be wholly diverted from approved to nonapproved States. Impacts are examined using three scenarios. In the first scenario, 70 percent of California Hass avocados affected by the rule that would otherwise be sold in the approved States are diverted to nonapproved States; in the second scenario, 85 percent are diverted; and in the third scenario, 100 percent are diverted. The 85 percent diversion scenario is considered representative of what is most likely to occur, given historic changes in quantities of California Hass avocados shipped to the existing approved States due to Mexican imports.

The first scenario of the regional model (70 percent diversion) would mean 6.07 million pounds of California Hass avocados remain in the approved States, and 11.81 million pounds are diverted to the nonapproved States. The additional supply of Mexican Hass avocados results in a price decline that benefits consumers/merchandisers in the approved States by about \$10.12 million per year. California producers whose Hass

avocados are sold in the approved States face a revenue loss of \$17.15 million per year. The net loss in the approved States is \$7.03 million per year.

In the nonapproved States, the 11.81 million pounds of California Hass avocados diverted from the approved States result in a price decline that causes a revenue loss of \$0.35 million per year for California producers. Consumers/merchandisers in the nonapproved States benefit by \$19.31 million per year, for a net benefit of \$18.96 million per year.

Net losses in the approved States (\$7.03 million per year) and net gains in the nonapproved States (\$18.96 million per year) yield an overall net gain of \$11.94 million per year in the first scenario.

The second scenario (85 percent diversion) yields producers losses and consumer/merchandiser gains comparable to the first one. Net losses in the approved States (\$13.93 million per year) and net benefits in the nonapproved States (\$22.79 million per year) combine for an overall net gain estimated at \$8.87 million per year.

In the third scenario (100 percent diversion), 16.87 million pounds of California Hass avocados are diverted to the nonapproved States. Net losses in the approved States (\$21.05 million per year) and net gains in the nonapproved States (\$26.54 million per year) yield a combined net benefit of \$5.50 million per year.

In sum, impacts of the rule for U.S. producers and consumers/merchandisers range from net benefits of \$11.94 million per year for the 70 percent diversion scenario and \$8.87 million per year for the 85 percent diversion scenario, to \$5.50 million per year for the 100 percent diversion scenario. The net benefit estimated using the national model, \$9.72 million per year, is contained within this range. The overall impact in all

cases is minor. In the event the price elasticity of demand is larger than that used in this analysis (-0.86), losses to California producers and merchandiser/consumer benefits will be less than those calculated, but the net impact remains positive. Another factor that could reduce losses to California producers would be activities to increase the demand for Hass avocados, that is, activities that would increase sales at any given price.

## SUMMARY OF REGULATORY FLEXIBILITY ANALYSIS

The Regulatory Flexibility Act requires that impacts on small entities be taken into consideration in rule making, to ensure that such businesses are not disproportionately burdened. There are about 6,000 producers and 100 handlers of Hass avocados in southwestern California that could be affected by this rule, as well as about 200 importers. APHIS has been unable to obtain information on the size distribution of affected avocado producers. For the purposes of our analysis, we assume that the size distribution of the 6,000 producers is the same as the size distribution of avocado farms reported in the 1997 Census of Agriculture; that is, 98 percent are small entities (\$750,000 or less in annual receipts). Most Hass avocado importers are reportedly also small entities (100 or fewer employees), while most Hass avocado handlers are large (more than \$5 million in annual receipts). Given the declines in revenue that are described in the three scenarios of the regional model, average annual losses for small-entity California Hass avocado producers could range between \$1,870 and \$2,593. This impact could prove significant if producers rely upon Hass avocado production as their principal source of income.

Two variations of the regional model are presented as examples of rule modifications that would mitigate adverse impacts on small-entity California Hass avocado producers. Alternative A would extend the four-month period of import by two months, March and April, but would not expand the region of approved States. Alternative B would maintain the current four-month period of import, but would expand the approved region by the same States as in the rule. For both alternatives, losses to California's Hass avocado producers would be less than have been calculated for the rule.



Under the 85 percent diversion scenario, California producer losses would be \$12.46 million per year and \$2.50 million per year for alternatives A and B, respectively, compared to an annual producer loss of \$20.55 million under the rule. However, consumer/merchandise gains would also be reduced in both cases. Net benefits are estimated to be \$6.52 million per year for alternative A and \$3.67 million per year for alternative B, compared to \$8.87 million per year for the rule.

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# Regulatory Impact and Regulatory Flexibility Analyses

## The Potential Economic Impact of Expanded Importation of Hass Avocados from Mexico

### 1. Introduction

This analysis examines the potential economic effects on U.S. Hass avocado producers and consumers/merchandisers that could result from allowing fresh Hass avocados from the State of Michoacan, in Mexico, to be imported into additional areas of United States and over a longer period than is currently allowed. Impacts upon prices and changes in producer and consumer/merchandiser welfare are examined. The second section provides background and the purpose for the analysis. The third section lays out the U.S. avocado industry structure, acreage and production, Hass avocado consumption, Hass avocado distribution, wholesale prices, and Hass avocado trade. Section 4 discusses the Mexican Hass avocado industry: production, world trade, exports to the U.S. that began in the 1997-1998<sup>1</sup> season, and expected additional exports as a result of the rule. Section 5 discusses the data and method of analysis, and presents expected impacts of expanded Mexican Hass avocado imports under various scenarios. Section 6 contains the regulatory flexibility analysis.

### 2. Background

Under the regulations in 7 CFR 319.56-2ff, fresh Hass avocados that are grown in approved orchards in approved municipalities in Michoacan, Mexico, may be imported

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<sup>1</sup>For some crops, fruit and tree nuts whose growing seasons do not follow the calendar year, including Hass avocado, NASS uses the convention 1997/1998, 1998/99, etc. The rule writer changed these to read 1997-1998, 1998-1999, etc.

into specified areas of the United States, subject to certain conditions. Currently, they may be distributed in Connecticut, Delaware, the District of Columbia, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, and Wisconsin. The regulations allow Mexican Hass avocados to be imported into these States only during the months of November, December, January, and February.

The Government of Mexico has requested that the Animal and Plant Health Inspection Service (APHIS) amend the regulations regarding the importation of Mexican Hass avocados to (1) increase the number of States into which the Hass avocados may be imported and (2) to extend the Hass avocado shipping season.

This rule will expand the distribution area for Hass avocados imported from Mexico to include the States of Colorado, Idaho, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. Distribution of Hass avocados from Michoacan, Mexico, would be limited to 31 northeastern and north central States, and the District of Columbia. Additionally, the rule will lengthen the shipping season during which Hass avocados may be imported into the United States to six months, October 15 through April 15. We do not believe that any of the pests of concern could become established if Hass avocados from Mexico entered into any of the 31 States or the District of Columbia during this time, due to the cold temperatures and lack of suitable host material.

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However, in each case the period represents a single growing season and not two years. Thus, to be consistent, the economic analysis follows this convention.

We would continue to require that the boxes in which the Hass avocados are shipped be marked with a statement indicating the limited distribution of the Hass avocados to specific States. The statement on boxes used to ship imported Hass avocados from Mexico would be changed to read: "Distribution is prohibited to AL, AZ, AR, CA, FL, GA, HI, LA, MS, NV, NM, NC, OK, OR, SC, TN, TX, WA, Puerto Rico, and all other U.S. Territories." (These States are referred to in this document as nonapproved States. All other States are referred to as approved States.)

This analysis considers the potential economic effects on domestic Hass avocado producers and consumers/merchandisers that could result from allowing fresh Hass avocados from Michoacan, Mexico, to be imported into this larger area of the United States. Essentially all domestically produced Hass avocados are grown in California. U.S. producers and California producers are therefore used interchangeably in the analysis. Anecdotal experience suggests that benefits resulting from the existing rule have been largely realized at the wholesale level, and discussion of consumer gains therefore includes explicit reference to merchandisers as well. Both national and regional models are used to examine impacts.

An alternative to this rule would be to make no changes in the regulations, that is, to continue to restrict the distribution of Mexican Hass avocados to 19 northeastern States and the District of Columbia and to the months of November through February. We have rejected that alternative because we believe that APHIS risk assessment documents show that expanded importation of Mexican Hass avocados as set forth in this rule would present a negligible risk of introducing plant pests into the United States.

Two other alternatives are examined in the regulatory flexibility analysis in section 6, as examples of modifications that would mitigate adverse impacts on small-entity California Hass avocado producers. The first would extend the four-month period of import by two months, from October 15 to 31, and March through April 15, but would not expand the region of approved States. The second would maintain the current four-month period of import, but would expand the approved region by the same States included in this rule. Impacts estimated under these two alternatives are compared to expected impacts under this rule.

### 3. U.S. Avocado Industry

This section provides a brief description of the Hass avocado industry in the United States and in California, in particular. It provides details on Hass avocado acreage and production, domestic shipments by region, and wholesale and FOB prices. Mexican and California Hass wholesale prices in the approved States are compared, and domestic Hass avocado consumption and Hass avocado trade are examined. Data presented in this section are used in the impact analysis.

#### 3.1 Acreage and Production

The United States produced 362.6 million pounds of fresh avocados in 1999-2000, valued at \$391.9 million.<sup>2</sup> Two States, Florida and California, accounted for about 99.8 percent of total avocado production in 1999-2000 (the latest data year). A very small quantity is produced in Hawaii and Texas. Florida produces mainly green varieties

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<sup>2</sup> This value is for all Hass avocados produced in U.S. Fruit and Tree Nuts 2000, Economic Research Service.

of avocados while California mainly grows Hass avocados.<sup>3</sup> Therefore, our analysis of the effect of this rule on U.S. Hass avocado producers focuses on the California Hass avocado industry. Of the approximately 321 million pounds of fresh avocados produced in California, nearly 90 percent were Hass avocados. Hass avocados are produced throughout the year, with 41 percent of production occurring in the first half of the growing season, between November and April, and 59 percent of production occurring in the second half of the growing season, between May and October.

### 3.2 Avocado Consumption

Total U.S. consumption of avocados over the last five years ranged between 393 million pounds and 470 million pounds, with an average consumption of 426 million pounds. Avocados are not a staple food in most U.S. households. However, fresh avocado per capita consumption is higher than that of limes, apricots, cherries, cranberries, kiwifruit, plums and prunes. Most Hass avocados are consumed in the southwest and western States, where they are purchased by about 78 percent of households. In the rest of the country, less than 30 percent of households purchase fresh Hass avocados. Overall per capita consumption of fresh avocados ranged between 1.37 and 1.76 pounds per person during the last five years, with an average of about 1.58 pounds. Per capita consumption of fresh avocado fruit is much higher in the Southwest and Pacific regions (4.29 pounds per capita) than in the rest of the country (0.51 pounds per capita).

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<sup>3</sup> All avocado varieties except Hass avocados are green in color when ripe. Hass avocados are green on the tree, but turn black when ripe. Hass avocados growing season starts November 1 and ends October 31. Because the growing season overlaps two calendar years a single growing is reported either as 1999/00 or 1999-2000. Here the 1999-2000 convention is used throughout the analysis whenever references are made to a growing season or shipment period. The rule would allow Mexican Hass avocado imports during the months November through April.

### 3.3 Avocado Trade

Avocado exports represent a small share of total domestic production. Four countries account for 90 percent of the U.S. fresh Hass avocado export market: the Netherlands (42.3 percent), the United Kingdom (17.3 percent), Canada (16 percent), and Japan (14 percent). The quantity exported and imported varies significantly from year to year. About 5.5 million pounds, valued at \$3.6 million, were exported in 2000, a drop of 60 percent from the previous year. In contrast, the United States imported about 173 million pounds of fresh avocados in 2000, valued at about \$107.9 million, an increase of 42.5 percent in terms of volume and 49 percent in terms of value, from the previous year.

Thus, the United States is a net importer of avocados. In the last six years alone there has been over a fourfold increase in import volumes, up from about 41 million pounds in calendar year 1995 to the 173 million pounds in 2000. The major suppliers are Chile (63.1 percent), Mexico (16.9 percent), the Dominican Republic (12.5 percent), and New Zealand (5.6 percent). These countries together supplied about 98 percent of U.S. fresh avocado imports in 2000. Imports from Chile, Mexico and New Zealand are mainly the Hass variety, while those from the Dominican Republic are green varieties.

Imports are widely distributed throughout the year, but are most pronounced during September through December. About 76.5 percent of imports are received during this four-month period, while only about 9 percent of domestic production occurs during these months. Thus, there is a close and inverse association between imports and U.S. production ( $r = -0.90$ ). There is also an inverse relationship between domestic shipments and imports ( $r = -0.66$ ), that is, most imports arrive during the months when domestic shipments are low. On the other hand, there is a strong and positive association between



domestic production and domestic shipments ( $r= 0.85$ ) indicating that most domestic shipments occur during the months of highest production.

### 3.4 California Avocado Industry

This subsection provides a description of Hass avocado acreage and production in California. Details of domestic shipments before and after Mexican Hass avocados began entering the approved States are analyzed. Wholesale prices in various markets are discussed, and California and Mexican Hass avocado wholesale prices are compared.

#### 3.4.1 California Avocado Acreage and Production

Most U.S. avocado production is concentrated in the southwestern part of California. Five counties (Riverside, San Diego, San Luis Obispo, Santa Barbara, and Ventura) contain 94 percent of the farms, account for 94 percent of the acres, and yield 93 percent of production. Table 1 shows numbers of California farms, categorized by acreage, and their production. According to the 1997 Census of Agriculture, there were 5,036 farms growing avocados in California that year, a decline of about 19 percent from 1992. The majority, over 98 percent, are small farms.<sup>4</sup> Large farms, less than 2 percent of the total, account for about 40 percent of acreage and more than one-third of sales.

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<sup>4</sup>See section 6.2 for a discussion of the impact on small entities.

Table 1: California Avocado Production, by Farm Size, 1997

Farms with	Number of Farms	Percent of Farms	Number of acres	Percent of Acres	Production in Pounds	Percent of Production
0.1 to 0.9 acres	579	11.50	274	0.39	634,676	0.21
1.0 to 4.9 acres	2,291	45.49	5,182	7.43	14,698,903	4.92
5 to 14.9 acres	1,224	24.30	10,057	14.41	41,043,490	13.75
15 to 24.9 acres	421	8.36	7,822	11.21	37,444,332	12.54
25 to 49.9 acres	298	5.92	10,259	14.70	50,530,849	16.93
50 to 99.9 acres	127	2.52	8,710	12.48	43,532,067	14.58
100 acres or more	96	1.91	27,481	39.38	110,646,247	37.04
Total	5,036	100.00	69,784	100.00	298,530,564	100.00

Source: USDA, NASS, Census of Agriculture 1997. Note that these data distinguish between bearing and nonbearing trees but not between bearing and nonbearing acreage. The latter comparison is shown in Table 2.

The number of bearing acres peaked at 76,307 acres in 1987-1988 and has been declining since. Table 2 below shows acreage and production between 1992-1993 and 1999-2000. Production was highest during the 1992-1993 season and thereafter has varied slightly year to year. (The eight-year average was 339 million pounds; the standard deviation, 90.3 million pounds; and the coefficient of variation, 0.27).

The prices shown in Table 2 represent weighted averages for all varieties of avocados. Producer prices reached a high of \$1.21 per pound during the 1998-1999 season, compared to an average producer price of about \$0.92 per pound between 1995-1996 and 1999-2000. When only the Hass variety is considered, average producer prices in 1998-1999 and 1999-2000 were \$1.29 per pound and \$1.12 per pound, respectively. For the first half of the 1999-2000 season (November through April), the Hass price was \$1.18 per pound.<sup>5</sup>

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<sup>5</sup> The California Avocado Commission, Report: Pounds & Dollars by Variety, Nov 98-Oct 99 and Nov 99-Oct 00.

Table 2: California Avocado Acreage, Production and Grower Price, 1992-1993 to 1999-2000

Year	Bearing acres	Nonbearing acres	Production (millions of pounds)	Percent change in production	Price per pound (cents)
1992-1993	68159	644	569.8	83.3	20.70
1993-1994	66865	505	271.0	-52.4	92.67
1994-1995	61254	987	304.2	12.2	74.73
1995-1996	61125	740	340.4	11.9	69.10
1996-1997	60674	488	329.1	-3.3	78.71
1997-1998	59895*	1478	304.9	-7.3	85.64
1998-1999	59385	1109	271.5	-11.0	121.09
1999-2000	58987	739	321.1	18.3	105.71

\* A discrepancy of about 10,000 acres exists between the 1997 Census of Agriculture data, shown in Table 1, and the industry statistics for 1997-1998, and may be because Table 1 presents calendar year data and Table 2 data by crop year, November through October.

Source: Industry Statistics 1971-1972 to 1999-2000, California Avocado Commission, 2001.

### 3.4.2 Hass Avocado Shipments

Table 3 shows the regional distribution of California Hass avocado shipments before and after importation of Mexican Hass avocados began. Shipments are categorized into six regions: Pacific, Southwest, West Central, East Central, Northeast, and Southeast. As the table indicates, from November 1986 to October 1994, shipments of California Hass avocados averaged about 245 million pounds per year. In comparison, there was a total of 296 million pounds of California Hass avocados shipped during the 1999-2000 season.

From November 1986 to October 1994, about 77 percent of all shipments were to the Pacific and Southwest regions. The Northeast and East Central, which are the regions that became eligible in 1997-1998 to receive Mexican Hass avocados, November through February, received about 14.1 percent, while 3.8 percent went to the Southeast. The West Central region received about 5.1 percent of the total.

California Hass avocado shipment patterns continue to show clear regional differences. Over two-thirds of Hass avocado shipments, based on 1999-2000 data, are to the Pacific (50.8 percent) and Southwest (20.1 percent) regions. The West Central (5.1 percent), East Central (7.8 percent) and Northeast (8.2 percent) regions together account for only 21.1 percent and the Southeast region accounts for another 7.9 percent. A recent industry survey revealed that over 75 percent of households in the Southwest and Pacific regions buy avocados, compared to less than 30 percent of households in the rest of the country.

With this rule, the area approved for Mexican Hass avocado imports will be expanded to include those States that comprise the West Central region, and the allowed shipping season will be extended to include March and April. In other words, Mexican Hass avocados would be available in the West Central, East Central, and the Northeast regions from November through April.

Table 3 shows the dramatic shift in California Hass avocado shipments to the East Central and Northeast regions after entry of Mexico Hass avocados during the November-February period. Before importation of Mexican Hass avocados was allowed, these two regions received an average of 7,761,778 pounds during these four months. In 1999-2000, the two regions received only 1,010,375 pounds of California Hass avocados during this period.

Table 3 offers other insights into impacts of the existing rule on California Hass avocado producers. Notwithstanding the significant decline in domestic shipments to the East Central and Northeast regions during the period of Mexican Hass avocado imports, California Hass avocado sales overall have expanded, not contracted, according to these

data. In particular, it is noted that year-round shipments during the 1999-2000 season to the East Central and Northeast regions increased over pre-Mexican import averages by 31 and 45 percent, respectively. California Hass avocado producers have apparently countered the reduction in shipments in these two regions during the November-February period by significantly expanding shipments during other months.

The last column of Table 3 lists shipments November through April. For the 1999-2000 season, the three regions of concern received a total of 17,880,300 pounds, which represented about 16 percent of total domestic shipments during this six-month period. The 17.88 million pounds includes 1.01 million pounds that were shipped to the East Central and Northeast regions during the November-February period of Mexican Hass avocado imports (the sum of the quantities for these two regions, in the next to the last column of Table 3). Because the rule makes no changes to existing requirements for shipments of Mexican Hass avocados to the East Central and Northeast regions during November to February, this 1.01 million pounds would not be affected by the rule.

Therefore, the amount assumed to be partially or wholly replaced by expected additional Mexican Hass avocado imports is 16.87 million pounds. Based on Mexico's avocado production approved for export to the United States and its global exports (see section 4), it is reasonable to assume that Mexico has the capability to export at least this additional amount to the United States. The model assumes that this same amount, 16.87 million pounds, would be Mexico's additional Hass avocado exports.

Table 3: Shipment of California Hass Avocados Before and After Importation of Mexican Hass Avocados Began (pounds)

Regions	Average November 1986 to October 1994 <sup>1</sup>			1999-2000 Season <sup>2</sup>		
	Total Shipment <sup>3</sup>	Shipment (Nov-Feb)	Shipment (Nov-Apr)	Total Shipment <sup>3</sup>	Shipment (Nov-Feb)	Shipment (Nov-April)
Pacific	128,851,875	22,788,019	51,736,850	150,306,026	24,960,500	58,680,650
Southwest	59,979,978	14,719,891	26,701,613	59,482,176	11,330,800	24,903,575
West Central	12,461,366	2,858,656	5,154,394	15,172,675	2,874,226	6,114,300
East Central	17,562,534	4,143,584	7,523,972	23,084,525	678,700	5,743,700
Northeast	16,859,097	3,618,194	6,665,941	24,380,950	331,675	6,022,300
Southeast	9,208,750	2,222,900	4,035,869	23,502,650	4,817,950	9,724,325
Total	244,923,600	50,351,244	101,818,639	295,929,002	44,963,851	111,188,850

Note: The Northeast and the East Central are the regions currently receiving Mexican Hass avocados. The West Central is the region that would be added under the rule to receive Mexican Hass avocados. The Northeast region includes CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT, and VA. The East Central region includes IL, IN, KY, MI, OH, WV, and WI. The West Central region includes CO, IA, KS, MN, MO, MT, NE, ND, SD, UT, and WY. The Pacific region includes AZ, CA, ID, NV, OR and WA. The Southwest region includes NM, OK and TX. The Southeast region includes AL, AR, FL, GA, LA, MS, NC, SC, and TN. <sup>1</sup> Average shipments for the eight seasons from November 1986 to October 1994. <sup>2</sup> Actual shipments during 1999-2000. <sup>3</sup> November through October.

Source: California Avocado Commission, Shipment to six regions: 1999-2000, Tom Bellamore, personal communication, April 2001.

APHIS recognizes that relying solely on one season, 1999-2000, to demonstrate the shift in California Hass avocado shipments that has occurred due to the importation of Mexican Hass avocados, affords less certainty than could be gained by considering a series of recent years.<sup>6</sup>

<sup>6</sup>One possible means of gaining greater confidence would be to “normalize” the regional portions using their November 1986 to October 1994 average shares of the total, and then apply these percentages to the 1999-2000 total. In essence, this would remove variability attributable to the 1999-2000 season. Each region’s share of the total would be based on its 1986-1994 average percentage. Normalization yields a potential maximum quantity diverted of about 8.4 million pounds for the November through February period. Extending the normalization to include the months of March and April yields an even smaller maximum quantity displaced: 5.2 million pounds. We calculate from the 1999-2000 set of shipments that up to 16.87 million pounds of California Hass avocados could be replaced by Mexican imports, after removing the 1.01 million pounds shipped to the Northeast and North Central regions, November-February. While use of the 1999-2000 season shipment data is not without fault, we believe it provides a valid basis for deriving California Hass avocado diversion quantities.

### 3.4.3 Hass Avocado Prices

Overall, wholesale Hass avocado prices are inversely related to seasonal supply patterns. They are lower during peak production months, between April and August, and higher during fall and winter months, September through January. Wholesale prices of Mexican Hass avocados in the U.S., provided by USDA, Agricultural Marketing Service, averaged \$1.34 per pound during the four-month period of import, November through February, for the four years, 1997-1998 through 2000-2001. California Hass avocado prices averaged \$1.79 over the same period. There is no statistically significant difference between California wholesale prices in different cities, but there is a statistically significant difference between Mexican and California wholesale prices.

In addition to the above wholesale prices, the avocado industry maintains records of FOB prices by market area. Table 4 compares California Hass avocado FOB prices per pound for the current import period and the extended period in 1999-2000. The average weighted FOB price for all regions was higher for the current import period (November through February) than for the six-month period (November through April). The latter weighted average FOB price, \$1.34 per pound, which happens to be the same as the four-year average wholesale price referred to above, is assumed in the impact analysis to be the equilibrium market price.

Table 4: FOB Price per Pound of California Hass Avocados  
by Market Area: 1999-2000

Region	CA Hass (Nov-Feb)	CA Hass (Nov-April)
Pacific	\$1.56	\$1.36
Southwest	\$1.45	\$1.25
West Central	\$1.64	\$1.42
East Central	\$1.73	\$1.30
Northeast	\$1.85	\$1.31
Southeast	\$1.64	\$1.44
Weighted average	\$1.55	\$1.34

Note: These are FOB shipping-point prices based on industry data for 1999-2000 season. The per pound prices are calculated by dividing lug prices by 25 pounds.

Source: California Avocado Commission, 1999/00 Avocado Average Lug Prices by Market Area, Tom Bellamore, personal communication, April 2001.

#### 4. Mexican Avocado Industry

This section provides an overview of the Mexican avocado industry. It provides details of acreage and production, wholesale prices, domestic consumption, Mexico's international trade, and its Hass avocado exports to the United States during the last four years.

##### 4.1 Avocado Acreage and Production

Mexico is by far the largest avocado producer in the world, accounting for over 40 percent of total world production. It produced an average of 1,738 million pounds over the last five years. The harvested area over the last five years averaged 210,859 acres, and the average yield over the last five years has been about 8,300 pound per acre.

Although the planted area continued to increase during the last five seasons, the harvested area and production have fluctuated. Occasional low temperatures during blooming season and drought during the growing season have largely accounted for these fluctuations.



Michoacan is Mexico's major avocado producing State, accounting for about 83.5 percent of acreage and about 82 percent of Mexican production. Hass avocados account for nearly 95 percent of total production in the State. The peak production period for Hass avocados in Michoacan is from October to April. Current U.S. export-approved acreage is only about 24,210 acres, or 14 percent of Michoacan's harvested acreage.

#### 4.2 Avocado Prices

Wholesale prices in Mexico City have increased from an average of \$0.14 per pound in 1995 (before export to the approved States began), to about \$0.27 per pound during the November through April period of the 1999-2000 season.

#### 4.3 Avocado Consumption

Mexico is the largest consumer of avocados in the world, and it will continue to export only a very small fraction of its avocado production. During the calendar year, 1999, Mexican domestic fresh avocado consumption was 1,784 million pounds, or about 18.3 pounds per capita, and has averaged 17 pounds over the last five years. This amount is more than eight times U.S. per capita consumption. Total fresh domestic consumption averaged 1,590 million pounds, while total exports averaged only 78 million pounds.

#### 4.4 Avocado Trade

Mexico's annual export of avocados over the last five years has averaged only about 5 percent of Mexico's domestic consumption. Export levels fluctuate greatly. Low temperatures during blooming season, drought during the growing period, adverse foreign exchange rates, and changing economic conditions in importing countries have all affected the volume of trade. Freezing temperatures and drought, in particular, affect

crop size and quality. Consequently, the share of avocado production that is of export quality varies year to year.

#### 4.5 Exports to the United States

The 2000-2001 shipping season marks the fourth year the United States has received Hass avocado imports from approved orchards in the State of Michoacan. Table 5 shows exports during the four seasons. Exports increased from about 13.3 million pounds during the first year of export, to about 25.9 million pounds in the 1999-2000 season, and then declined to 22.5 million pounds in 2000-2001 (a 14 percent decline).<sup>7</sup> The four-year average of annual exports to approved States is 20.8 million pounds.

Table 5: Mexican Hass Avocado Exports to the United States, November 1997 to February 2001

Season	1997-1998	1998-1999	1999-2000	2000-2001
Million pounds	13.3	21.5	25.9	22.5
Total Shipments	347	560	669	576
Percent Change	NA	61%	19%	-13.9%

Source: USDA/APHIS/PPQ, Jeff Grode, Trade Compliance Section, Personal Communication, March 2001. These data are very similar to numbers reported in FAS attaché reports.

#### 5. Economic Impact

This section describes the models used in the analysis, and then uses them to examine the potential economic effects on U.S. producers and consumers/merchandisers of expanded imports of Mexican Hass avocados. Existing Hass avocado imports from Mexico and from other countries are included in the analysis.

<sup>7</sup> USDA/FAS, Mexico Avocado Annual 2000, GAIN Report #MX0179, December 2000.

## 5.1 Data and Method of Analysis

This analysis is based on expected additional imports of Hass avocados from Mexico.<sup>8</sup> Two models are used to estimate impacts. The first is a nationwide model that does not distinguish between the approved and nonapproved States. The rationale underlying this model is that given sufficient time, a single price for avocados would obtain in the two regions. Although Mexico's supply is restricted to the approved States for specified months of the year, California suppliers can move in and out of the two markets, and would do so in search of profits until prices equalize.

The second model explicitly recognizes the two regions, approved and nonapproved States. Estimated economic losses include direct market loss for California producers in approved States, and losses related to increased supply in nonapproved States, as the diversion of California Hass avocados from approved to nonapproved States lowers prices. Consumers/merchandisers would be expected to gain in both approved and nonapproved States.

Two variations of the regional model are presented in section 6, in the regulatory flexibility analysis. One considers impacts if the region of approved States does not change and only the time period is extended by two months. The other alternative assumes the same region of approved States as in the rule, but leaves the allowed period of import, November-February, unchanged.

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<sup>8</sup> Producers and exporters in Mexico would not have the flexibility to make adjustments from domestic sales to exports, or from processing to fresh. Additional groves would be eligible to produce export-quality Hass avocados for the U.S. market only if they were approved to do so by APHIS. A nonapproved grove that normally produces fruit for the Mexican domestic fresh or processing market could not, in response to U.S. prices, be used to grow Hass avocados for shipment to the United States.

For both the national and regional models, a partial equilibrium economic surplus framework is used to consider benefits and costs of the rule. Potential producer losses and gains to consumers/merchandisers are quantified in terms of changes in producer and consumer surplus resulting from the increased imports expected from Mexico. To simplify the analysis, a demand curve of constant elasticity is assumed while U.S. supply is assumed to be fixed. The supply curve is assumed to be vertical at least in the short run, that is, supply is perfectly inelastic and does not respond to changes in price.

As stated in previous sections, Hass avocados are shipped from California throughout the year. California growers shipped about 17.88 million pounds of Hass avocados to the regions of concern (East Central, Northeast, and West Central) during the months of November through April of the 1999-2000 season, while the other regions received about 93.31 million pounds during this six-month period.<sup>9</sup> To arrive at the amount assumed to be partially or wholly diverted because of additional Mexican Hass avocado imports, we subtract from the 17.88 million pounds the quantity shipped by California's Hass avocado producers to the East Central and Northeast regions during November through February of the 1999-2000 season: 1.01 million pounds. As has been noted, we assume, based on historical shipments, that the 1.01 million pounds would be unaffected by the rule. The quantity assumed to be partially or wholly diverted, therefore, is 16.87 million pounds.

Mexico is capable of exporting at least this additional amount to the United States, and Mexican Hass avocado imports due to the rule are also assumed in the

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<sup>9</sup> It is emphasized that this amount is for the 1999-2000 season. Because of the cyclical nature of Hass avocado yields, amounts shipped vary from year to year. Hass avocado production is also affected by inclement weather.

analysis to be 16.87 million pounds. This import quantity is reasonable, given Mexico's four-year history of exports to the United States. The 1999-2000 weighted average FOB price of California Hass avocados for the affected months, \$1.34 per pound, is the base price used in the analysis (see Table 4).

Regarding imports from other countries, Chile and New Zealand supplied 94.2 million pounds during the 1999-2000 season. Both countries supply mainly the Hass variety, and about 33 percent, or 31.02 million pounds, are imported between November and April. Apportioning this total among the regions by the same distribution as the supply from California yields assumed totals of 4.71 million pounds and 26.31 million pounds in the approved and nonapproved States, respectively.

This analysis is appropriately based on the six-month period, November through April, during which the Mexican imports would be allowed by the rule. Revenue losses for California producers resulting from the loss of market share in the approved States are presented in this time frame. It is recognized, of course, that California producers earn revenue from May through October, as well. These receipts should be kept in mind when considering the rule's overall consequences. Of the approximately 296 million pounds shipped domestically by California Hass avocado producers in the 1999-2000 season, about 185 million pounds (more than 60 percent) was marketed in the May through October period. It is noted as well that shipments during the 1999-2000 season were more than 20 percent greater than average total shipments for the seasons between 1986 and 1994, that is, prior to Mexican Hass avocado imports (296 million pounds compared to 245 million pounds).

The analysis performed using the regional model has California producers losing market share in the approved States because of additional Mexican Hass avocado imports. Shipment data show that such losses have occurred in the four years that Mexico has been exporting avocados to the approved States. However, the decline in California Hass avocado production since Hass avocado imports from Mexico began has been much smaller than the concurrent increase in producer prices. Average annual California production for the three seasons preceding Mexican imports (1994-1995 to 1996-1997) was 325 million pounds; for the three subsequent seasons (1997-1998 to 1999-2000), average annual production was 299 million pounds. The average California producer price for the three seasons, 1994-1995 to 1996-1997, was \$ .74 per pound; for the three seasons, 1997-1998 to 1999-2000, the average price was \$1.04 per pound.

Thus, when the two periods are compared, California Hass avocado production fell by 8 percent, while prices received by California producers increased by over 40 percent. These data, especially the appreciable increase in producer prices, demonstrate that many factors beyond those included in the analysis affect the supply and demand for avocados. The models used are abstractions of reality that simplify the Hass avocado market to a few principal quantities, a base price, and generalized demand and supply elasticity assumptions. Results of the analysis inform as to possible impacts on U.S. entities of additional Mexican Hass avocado imports allowed by this rule, other influences held constant. They do not capture many of the agronomic and other factors that influence avocado production.

## 5.2 Potential Impacts

*National model.* This model considers additional Mexican Hass avocado imports from a nationwide perspective, and parameters and impacts are shown in Table 6.

Table 6: Changes in producer revenue and consumer/merchandiser benefit, due to 16.87 million pounds of Mexican Hass avocado imports, November through April  
(National Model)

California's supply (million pounds)	111.19
Current Mexican imports (million pounds)	20.79
Additional Mexican imports (million pounds)	16.87
Other imports (million pounds)	31.02
Base price (\$ per pound)	\$1.34
New price with additional imports (\$ per pound)	\$1.18
Percent change in price	-12.03
California revenue at base price (million \$)	\$148.99
California revenue at new price (million \$)	\$131.06
Change in California revenue (million \$)	-\$17.93
Change in consumer/merchandiser benefit (million \$)	\$27.65
Net U.S. benefit (million \$)	\$9.72

Without the additional Mexican imports, the November through April supply is 163 million pounds (California's supply, current imports from Mexico, and imports from other countries). Mexican imports that are assumed to enter under the rule would increase the total six-month supply by about 10 percent, to 179.87 million pounds. The increase in supply of Hass avocados, given no change in demand and an inelastic supply, will cause a price decline that benefits consumers/merchandisers but results in a loss for producers. From a base price of \$1.34 per pound, it is estimated that the Hass avocado wholesale price would fall by 12 percent, to \$1.18 per pound.

Consumers/merchandisers would gain by \$27.65 million per year and producers would lose by \$17.93 million per year, for a net benefit of \$9.72 million per year. This

model tacitly acknowledges the absence of price discrepancies between approved and nonapproved States.

*Regional model.* As in the national model, impacts for U.S. producers and consumers/merchandisers in the regional model result from expanded Hass avocado supplies and concomitant price declines. However, this model explicitly takes into account distinct impacts in the approved and nonapproved States, namely, through importation of Mexican Hass avocados into the former region and diversion of California Hass avocados into the latter region. A theoretical limitation of the regional model, in contrast to the national model, is the assumed maintenance of a price differential between the approved and nonapproved States. Baseline and scenario data on quantities of avocados supplied to the approved and nonapproved States are presented in Table 7.

Table 7. Quantities of avocados supplied to the approved and nonapproved States, November through April, by source (million pounds)

APPROVED STATES	Diversion Scenario			
	Baseline	70%	85%	100%
California original supply	17.88			
California supply after diversion /1	0	6.07	3.54	1.01
Mexico (existing supply)	20.79	20.79	20.79	20.79
Mexico (additional supply)	0	16.87	16.87	16.87
Other countries' supply	4.71	4.71	4.71	4.71
Total	43.38	48.44	45.91	43.38
Price per pound	\$1.34			
NONAPPROVED STATES				
	Baseline	70%	85%	100%
California original supply	93.31	93.31	93.49	93.31
California diversion supplied	0	11.81	14.34	16.87
Other countries' supply	26.31	26.31	26.31	26.31
Total	119.62	131.43	133.96	136.49
Price per pound	\$1.34			

/1 Includes 1.01 million pounds of California Hass avocados considered unaffected by the rule.



Three scenarios are set forth, each assuming a different quantity of California Hass avocados diverted from approved to nonapproved States. In the first scenario, 70 percent of California Hass avocados affected by the rule that would otherwise be sold in the approved States (11.81 million pounds out of 16.87 million pounds) are diverted to nonapproved States; in the second scenario, 85 percent (14.34 million pounds); and in the third scenario, 100 percent (16.87 million pounds).

We believe the second scenario (85 percent diversion) is representative of the response most likely to occur, given historic changes in quantities of California Hass avocados shipped to the existing approved States due to Mexican imports. The lower and higher diversion percentages provide insight into relative impacts if either of these market shifts was to occur, but such outcomes are considered less likely. As in the national model, impacts are estimated based on a price elasticity of demand of -0.86 and a fixed supply (zero price elasticity of supply).<sup>10</sup>

Currently, about 43.4 million pounds of Hass avocados are shipped to the approved States, November through April, of which nearly 17.9 million pounds are supplied by California producers, about 20.8 million pounds by Mexico, and about 4.7 million pounds by other countries (Table 7). Based on a price of \$1.34 per pound, the

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<sup>10</sup> Garoyan, Leon, "Proposed Rule for the Importation of Fresh Hass avocado Fruit Grown in Michoacan, Mexico: An Analysis of the Impact on California's Hass avocado Industry," Management Research Associates, August 22, 1995. (Prepared for the California Avocado Commission (CAC) and attached as Exhibit 30 to the CAC's October 13, 1995, comments on the proposed rule.). Garoyan estimates price flexibility of -0.987 using industry shipment data from November 1986 to July 1995. The reciprocal of this yields a price elasticity of demand of -1.0132. A quantity dependent demand function estimate using data from Appendix Table 1 of that report covering North East and East Central regions of the United States for the months of November through February between 1986 and 1994 also yields a price elasticity of -1.07. Carman and Green estimate an elasticity of demand of -0.86 (Carman and Green, 1993). In another study, Carman and Cook estimate an elasticity of demand of -0.65 and elasticity of supply of 0.206 (Carman and Cook, 1996). In another study Carman and Craft (1998) find demand elasticities of -0.65 (monthly data) and -0.75 (annual data). The elasticity of demand of -0.86 as reported by Carman and Green is used in the analysis.

revenue received by California producers in the approved States is nearly \$24 million per year. Approximately 119.6 million pounds of Hass avocados are sold in the nonapproved States, 78 percent supplied by California and the remaining 22 percent coming from other countries. Revenue earned by California producers in this market, at the same base price of \$1.34 per pound, is over \$125 million per year. Table 8 shows expected impacts for the three scenarios, and the base revenues are found in line 9 of that table.

Table 8. Changes in producer revenue and consumer benefit, assuming 70%, 85%, and 100% diversion of California avocados from the approved States to nonapproved States, due to 16.87 million pounds of additional Mexican avocado imports (million dollars per year)

		Approved States			Nonapproved States			Aggregate Total		
Scenario		70%	85%	100%	70%	85%	100%	70%	85%	100%
1	California supply (million pounds)									
2	originally in the two regions	17.88	17.88	17.88	93.31	93.31	93.31			
3	subject to diversion	16.87	16.87	16.87						
4	remaining in approved States /1	6.07	3.54	1.01						
5	diverted to non-approved States				11.81	14.34	16.87			
6	Base price (\$ per pound)	1.34	1.34	1.34	1.34	1.34	1.34			
7	Price with additional imports (\$/lb)	1.12	1.21	1.30	1.19	1.15	1.12			
8	Percent change in price	-16.27	-9.49	-2.71	-11.48	-13.94	-16.39			
9	California revenue at base price /2	23.96	23.96	23.96	125.04	125.04	125.04	148.99	148.99	148.99
10	California revenue at new price									
11	for nondiverted quantities /3	6.81	4.29	1.32	110.68	107.61	104.54	117.49	111.90	105.86
12	for diverted quantity /4	0.00	0.00	0.00	14.01	16.54	18.90	14.01	16.54	18.90
13	Total	6.81	4.29	1.32	124.69	124.15	123.44	131.50	128.44	124.76
14	Change in California revenue /5	-17.15	-19.67	-22.64	-0.35	-0.89	-1.60	-17.49	-20.55	-24.23
15	Change in consumer (merchandise) b	10.12	5.74	1.59	19.31	23.68	28.14	29.43	29.42	29.73
16	Net U.S. benefit /6	-7.03	-13.93	-21.05	18.96	22.79	26.54	11.94	8.87	5.50

/1 The amount remaining in the approved States after diversion includes the 1.01 million pounds not subject to diversion, that is, the amount supplied by California to the East Central and Northeast regions, November-February. For example, in the 70 percent diversion scenario, 5.06 million pounds is the amount subject to, but not diverted (16.87 million pounds x .30) to which is added 1.01 million pounds to arrive at the total of 6.07 million pounds of California supply remaining in the approved States.

/2 (line 2) x (line 6). All revenue amounts and changes are only for California avocado producers. Since essentially all Hass avocados produced in the United States are grown in California, they represent U.S. revenue.

/3 (line 4) x (line 7).

/4 (line 5) x (line 7).

/5 (line 13) - (line 9).

/6 (line 14) + (line 15).

The calculations that underlie Table 8 are explained here for the 70 percent diversion scenario. Its parameters and impacts are shown in the first columns under the three table headings: Approved States, Nonapproved States, and Aggregate Total. Of the 17.88 million pounds of California Hass avocados that are supplied to the approved States States (line 2 of the table), 1.01 million pounds would not be affected by this rule, since they are already being sold in the East Central and Northeast regions during November through February (that is, already in competition with Hass avocados imported from Mexico). Thus, 16.87 million pounds is the quantity considered subject to diversion (line 3), of which 30 percent, or 5.06 million pounds, is not diverted. Adding this amount to the 1.01 million pounds yields 6.07 million pounds (line 4), as the total California supply remaining in the approved States. The diverted amount is 11.81 million pounds (line 5). In the approved States, importation of an additional 16.87 million pounds of avocados from Mexico causes the base wholesale price of avocados (\$1.34 per pound, line 6) to decline by 16.27 percent (line 8), to \$1.12 per pound (line 7). In the nonapproved States, the increase in supply resulting from the diverted California production results in a wholesale price decline of 14.45 percent (line 8), to \$1.19 per pound (line 7).

California's base revenues in the two regions, \$23.96 million per year in the approved States and \$125.04 million per year in the nonapproved States (line 9), are based on the amounts of California Hass avocados originally shipped to them (line 2), multiplied by the base price (line 6). California's revenue in the approved States after diversion (\$6.81 million per year, line 13) is equal to the nondiverted quantity (line 4), multiplied by the new price (line 7). California's revenue in the nonapproved States after diversion (\$124.69 million per year, line 13) is the sum of the pre-diversion quantity (line 2) multiplied by the new price (line 7), plus the diverted quantity (line 5) multiplied by the new price. Subtracting California producers' revenues before

diversion (line 9) from their revenues after diversion (line 13) yields the change in their revenue: losses of \$17.15 million per year in the approved States and \$0.35 million per year in the nonapproved States (line 14).

Consumer/merchandise benefits following diversion are estimated to be \$10.12 million per year in the approved States and \$19.31 million per year in the nonapproved States (line 15). Adding California producers' losses and U.S. consumers/merchandise gains results in a net loss of \$7.03 million in the approved States and a net gain of \$18.96 million in the nonapproved States (line 16).

When both regions are considered together under the Aggregate Total heading, the loss to California producers is \$17.49 million per year (line 14), the gain by consumers/merchandise is \$29.43 million per year (line 15), and the net benefit is \$11.94 million per year (line 16).

The 85 percent and 100 percent diversion scenarios can be interpreted similarly. In the second scenario (85 percent diversion), 3.54 million pounds of California Hass avocados remain in the approved States, and 14.34 million pounds are diverted to the nonapproved States. The additional supply of Mexican Hass avocados in the approved States results in a price decline of about 9.49 percent, from \$1.34 per pound to about \$1.21 per pound. Consumers/merchandise benefit by \$5.74 million per year, while California producers whose Hass avocados are still sold in the approved States lose \$19.67 million per year in revenue. The net loss in the approved States is about \$13.93 million per year.

In the nonapproved States, the diversion of 14.34 million pounds of California Hass avocados from the approved States causes a price decline of over 18 percent, from \$1.34 per pound to about \$1.15 per pound. The combined loss for California producers already selling in the nonapproved States and those whose Hass avocados are diverted from the approved States is

\$0.89 million per year. Consumers/merchandisers in the nonapproved States benefit by \$23.68 million per year, for a net gain of \$22.79 million per year.

When net losses in the approved States (\$13.93 million per year) and net benefits in the nonapproved States (\$22.79 million per year) are combined, the impact is an overall gain of \$8.87 million per year.

In the third scenario (100 percent diversion), 16.87 million pounds of California Hass avocados are diverted to the nonapproved States. Consumers/merchandisers in the approved States gain by \$1.59 million per year, and California's producers lose by \$22.64 million per year, for a net loss of \$21.05 million per year. Consumers/merchandisers in the nonapproved States gain by \$28.14 million per year, and California's producers lose by \$1.60 million per year, for a net gain of \$26.54 million per year. With 100 percent diversion, net losses in the approved States (\$21.05 million per year) and net gains in the nonapproved States (\$26.54 million per year) yield a combined net benefit of \$5.50 million per year.

In sum, impacts from expanded Mexican Hass avocado imports for U.S. producers and consumers/merchandisers in the regional model range from net benefits of \$11.94 million per year for the 70 percent diversion scenario and \$8.87 million per year for the 85 percent diversion scenario, to \$5.50 million per year for the 100 percent diversion scenario. The overall impact in all cases is minor. In the event the price elasticity of demand is larger than that used in the analysis (-0.86), the losses to California producers will be less than estimated. Another factor that could reduce the losses to California producers would be marketing, promotional, or other activities to shift the demand curve to the right. These activities would increase sales at any given price.

## 6. Regulatory Flexibility Analysis

This section describes the potential impact upon small businesses. The types and approximate number of entities that will be affected by the rule are discussed, and losses that small-entity California Hass avocado producers may bear are estimated. Two alternatives to the rule that would mitigate revenue losses for small-entity California Hass avocado producers are considered.

### 6.1 The Number and Size of Operations

As a part of the rulemaking process, APHIS evaluates whether regulations are likely to have a significant economic impact on a substantial number of small entities.<sup>11</sup> Entities that would be directly affected by the rule are about 6,000 California Hass avocado producers, about 100 handlers, and about 200 importers.<sup>12</sup> The Small Business Administration has established guidelines for determining which types of firms are to be considered small under the Regulatory Flexibility Act. An avocado farm is considered small if it has annual receipts of \$750,000 or less.<sup>13</sup> Avocado handlers (firms engaged in postharvest activities) are considered small businesses if their annual receipts are \$5 million or less.<sup>14</sup> Firms that import avocados are small if they have 100 or fewer employees.<sup>15</sup> Most Hass avocado producers and importers can be considered small, while Hass avocado handlers are predominantly large entities.<sup>16</sup>

California Hass avocado producers and handlers can be expected to incur losses as estimated in section 5, due to the additional Hass avocados imported from Mexico. Importers of the additional Mexican Hass avocados will probably gain from the increased level of imports,

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<sup>11</sup> “Guide to the Regulatory Flexibility Act.” Small Business Administration, Office of Advocacy, Washington, DC, May 1996.

<sup>12</sup> California Avocado Commission, as provided to USDA, Agricultural Marketing Service.

<sup>13</sup> North American Industry Classification System (NAICS) code 111339, Other Non-citrus Fruit Farming.

<sup>14</sup> NAICS code 115114, Postharvest Crop Activities (except Cotton Ginning).

<sup>15</sup> NAICS code 442480, Fresh Fruit and Vegetable Wholesalers. The wholesale sector comprises two types of wholesalers: those that sell goods on their own account and those that arrange sales and purchases for others for a commission or fee. Importers are included in both cases.

<sup>16</sup> Agricultural Marketing Service.

although they will also face lower wholesale prices. Importers of avocado from other countries will also face the same decline in wholesale prices as domestic suppliers.

The Regulatory Flexibility Act requires that impacts on small entities be taken into consideration in rule making, to ensure that the entities are not disproportionately burdened. APHIS has been unable to obtain information on the size distribution of affected avocado producers. For the purposes of our analysis, we assume that the size distribution of the 6,000 producers is the same as the size distribution of avocado farms reported in the 1997 Census of Agriculture. Possible impacts are determined by relating the decline in revenue described in the three scenarios to average annual sales by small-entity producers.

California avocado farms are classified in the 1997 Census of Agriculture by acreage (see Table 1). The category for the largest farms, those with 100 or more acres, included only 96 out of a total of 5,036 farms in 1997 (less than 2 percent). Given a producer price of \$0.85 per pound,<sup>17</sup> average levels of production for the categories of farms shown in Table 1 indicate that only producers with 100 or more acres are not small entities, according to the criterion of \$750,000 or less in annual receipts.<sup>18</sup> Thus, over 98 percent of avocado farms in 1997 could be considered small. We assume the same large share of today's 6,000 avocado producers would qualify as small entities.

## 6.2 Distribution of Impacts

Table 9 shows the classification of the 6,000 avocado producers, and their production and sales, by whether they are small or large entities. The 2 percent of producers that qualify as large

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<sup>17</sup>To estimate the sales value of production reported in the 1997 Census of Agriculture, the 1997-1998 weighted grower price of \$0.85 per pound is used, as reported in Agricultural Statistics.

<sup>18</sup>Average annual sales of Hass avocado farms, based on 1997 Census of Agriculture data shown in

Farm Size (acres):	Average Annual Sales (dollars):
0.1 to 0.9	932
1.0 to 4.9	5,454
5 to 14.9	28,503
15 to 24.9	75,600
25 to 49.9	144,131
50 to 99.9	291,356
100 or more	979,680



entities account for more than one-third of all production. As shown in Table 9, it is estimated that the small producers have average sales of about \$27,000, while the large producers have average sales of nearly \$825,000.

Table 9: California Hass Avocado Producers, Production, Annual Sales and Average Sales, Classified as Small and Large Entities.

Item	Small Entity (\$750,000 or less)	Large Entity (more than \$750,000)
Number of Producers <sup>1</sup>	5,886	114
Total Production (pounds)	187,884,317	110,646,247
Average Production (pounds)	31,921	970,581
Total Sales (dollars)	\$159,701,670	\$94,049,310
Sales per Producer	\$27,132	\$824,994

Source: USDA/NASS, 1997 Census of Agriculture (for size standards); Agricultural Statistics 2000 (for price data).

<sup>1</sup>The number of small- and large-entity producers is a simple division of the 6,000 producers based on the 98%/2% split indicated by the 1997 Census of Agriculture data.

As indicated in Table 8, potential losses for California Hass avocado producers in the regional model range between \$17.49 million per year and \$24.23 million per year, depending on whether domestic Hass avocado producers react to the additional importation of Mexican Hass avocados by partially or fully diverting affected sales from approved States to nonapproved States. (In the national model, producer losses total \$17.93 million per year.) The potential distribution of impacts for small and large entities is shown in Table 10. As this table shows, small-entity producers bear losses of between \$11.01 million and \$15.26 million per year, depending whether there is partial or full diversion.

Table 10: Total and Average Loss by Small-Entity Producers as a Percentage of Average Revenue, Regional Model

	<u>Diversion Scenarios</u>		
	<u>70 Percent</u>	<u>85 percent</u>	<u>100 Percent</u>
Total Loss <sup>1</sup>	\$17.49 million	\$20.56 million	\$24.25 million
Loss by Small-Entity Producers <sup>2</sup>	\$11.01 million	\$12.94 million	\$15.26 million
Average Loss per Small Entity <sup>3</sup>	\$1,870	\$2,199	\$2,593
Small-Entity Loss as a Percent of Average Annual Receipts <sup>4</sup>	6.89%	8.10%	9.56%

Notes: <sup>1</sup> is from Table 8. <sup>2</sup> is calculated by multiplying total loss by the small-entity share of production. <sup>3</sup> is estimated by dividing the small-entity share by the number of small producers. <sup>4</sup> is calculated by dividing average loss per small producer by the average sales per small producer.

Average annual losses for small-entity California Hass avocado producers range between \$1,870 and \$2,593, representing between 6.89 and 9.56 percent of average annual receipts. This impact could prove significant if producers rely upon Hass avocado production as their principal source of income.

### 6.3 Impact Mitigation Alternatives

Two alternatives to the rule are considered that would mitigate impacts on California’s small-entity Hass avocado producers. Alternative A would extend the four-month period of import by two months, from October 15 through 31 and March through April 15, but would not expand the region of approved States. Alternative B would maintain the current four-month period of import, but would expand the approved region by the same approved States as in the rule. In essence, the two alternatives represent subsets of the rule.

Tables 11 and 12 show the results of an 85 percent diversion of California Hass avocados from approved to nonapproved States under alternatives A and B, respectively. They can be interpreted the same as Table 8. Only impacts for the 85 percent diversion scenario are estimated, since it is the scenario considered representative of what is most likely to occur. Estimating losses for the 70 percent and 100 percent diversion scenarios would provide little

additional substantive information in terms of assessing the alternatives. As seen in Table 10, the larger the percentage diversion, the larger are the estimated losses to small-entity California Hass avocado producers.

Table 11. Changes in producer revenue and consumer benefit, assuming 85% diversion of California avocados from the approved States to nonapproved States, due to 10.75 million pounds of additional Mexican avocado imports (million dollars per year)

	Alternative A	Approved States	Nonapproved States	Aggregate Total
	Scenario	85%	85%	85%
1	California supply (million pounds)			
2	originally in the two regions	11.76	99.42	
	subject to diversion	10.75		
3	remaining in approved States /1	2.62		
4	diverted to non-approved States		9.14	
5	Base price (\$ per pound)	1.34	1.34	
6	Price with additional imports (\$ per pound)	1.23	1.23	
7	Percent change in price	-8.50	-9.49	
8	California revenue at base price /2	15.76	133.22	148.98
9	California revenue at new price			
10	for nondiverted quantities /3	3.21	122.09	125.30
11	for diverted quantity /4	0.00	11.22	11.22
12	Total	3.21	133.31	136.52
13	Change in California revenue /5	-12.55	0.09	-12.46
14	Change in consumer (merchandiser) benefit	4.23	14.75	18.98
15	Net U.S. benefit /6	-8.32	14.84	6.52

/1 The amount remaining in the approved States after diversion includes the 1.01 million pounds not subject to diversion, that is, the amount supplied by California to the East Central and Northeast regions, November-February. For example, in this 85 percent diversion scenario, 1.61 million pounds is the amount subject to, but not diverted (10.75 million pounds x .15) to which is added 1.01 million pounds to arrive at the total of 2.62 million pounds of California supply remaining in the approved States.

/2 (line 2) x (line 6). All revenue amounts and changes are only for California avocado producers. Since essentially all Hass avocados produced in the United States are grown in California, they represent U.S. revenue.

/3 (line 4) x (line 7).

/4 (line 5) x (line 7).

/5 (line 13) - (line 9).

/6 (line 14) + (line 15).

Table 12. Changes in producer revenue and consumer benefit, assuming 85% diversion of California avocados from the approved States to nonapproved States, due to 2.87 million pounds of additional Mexican avocado imports (million dollars per year)

	Alternative B		Approved States	Nonapproved States	Aggregate Total
			85%	85%	85%
1	California supply (million pounds)				
2	originally in the two regions		3.88	41.08	
3	subject to diversion		2.87		
4	remaining in approved States /1		1.44		
5	diverted to non-approved States			2.44	
6	Base price (\$ per pound)		1.34	1.34	
7	Price with additional imports (\$ per pound)		1.26	1.29	
8	Percent change in price		-6.12	-4.09	
9	California revenue at base price /2		5.20	55.05	60.25
10	California revenue at new price				
11	for nondiverted quantities /3		1.81	52.80	54.61
12	for diverted quantity /4		0.00	3.14	3.14
13	Total		1.81	55.93	57.74
14	Change in California revenue /5		-3.39	0.88	-2.50
15	Change in consumer (merchandise) benefit		2.30	3.87	6.17
16	Net U.S. benefit /6		-1.09	4.75	3.67

/1 The amount remaining in the approved States after diversion includes the 1.01 million pounds not subject to diversion, that is, the amount supplied by California to the East Central and Northeast regions, November-February. For example, in this 85 percent diversion scenario, 0.43 million pounds is the amount subject to, but not diverted (2.87 million pounds x .15) to which is added 1.01 million pounds to arrive at the total of 1.44 million pounds of California supply remaining in the approved States.

/2 (line 2) x (line 6). All revenue amounts and changes are only for California avocado producers. Since essentially all Hass avocados produced in the United States are grown in California, they represent U.S. revenue.

/3 (line 4) x (line 7).

/4 (line 5) x (line 7).

/5 (line 13) - (line 9).

/6 (line 14) + (line 15).

In alternative A, the baseline supply of California avocados to the approved States is 11.76 million pounds. This figure is derived from avocado shipment data shown in the last two columns of Table 3 for the East Central and Northeast regions, that is, their total for the November-April period. The amount considered subject to diversion is 10.75 million pounds, found by removing from consideration the 1.01 million pounds already sold in competition with current Mexican Hass avocado imports during November through February. California's baseline supply to the nonapproved States in alternative A is 99.42 million pounds, the sum of the November-April shipments to the Pacific, Southwest, West Central, and Southeast regions. With an 85 percent diversion of California's supply to the approved States, 2.62 million pounds remain in the approved States (including the 1.01 million pounds), and 9.14 million pounds are shipped to the nonapproved States.

The baseline California supply for alternative B is also derived from Table 3. Expanding the area of approved States while keeping the period of import the same means the California supply is 3.88 million pounds (including the 1.01 million pounds). The amount considered subject to diversion would be California producers' shipments to the West Central region, November-February: 2.87 million pounds. California's baseline supply to the nonapproved States in alternative B is 41.08 million pounds, the sum of the November-February shipments to the Pacific, Southwest, and Southeast regions. With an 85 percent diversion of California's supply to the approved States, 1.44 million pounds remain in the approved States and 2.44 million pounds are shipped to the nonapproved States. In both alternatives, the additional quantity of avocados imported is assumed to

be the same as the maximum amount of California production that could be diverted, 10.75 million pounds in alternative A and 2.87 million pounds in alternative B.

As can be seen in Table 11 for alternative A, producer losses total \$12.46 million per year (\$12.55 million per year in the approved States and \$0.09 million per year in the nonapproved States). For alternative B, Table 12 shows that producer losses total \$2.50 million per year (a \$3.39 million per year loss in the approved States but a \$0.88 million gain in the nonapproved States—an anomaly resulting from the increase in supply, due to the diversion, more than compensating for the price decline). These losses can be compared to a total producer loss of \$20.55 million per year for the 85 percent diversion scenario of the rule.

Losses calculated under the two scenarios are smaller simply because the quantities of additional Hass avocados supplied from Mexico—and related diversions of California Hass avocados—are smaller. However, consumer/merchandise gains are also less under both alternatives. Net benefits are estimated to be \$6.52 million per year for alternative A and \$3.67 million per year for alternative B, compared to a net benefit of \$8.87 million per year for the rule.

## ADDENDUM

The magnitude of estimated impacts depends on the size of the elasticities. This addendum, written in response to one of the comments received on the preliminary Regulatory Impact Analysis, shows what the impacts would be if a price elasticity of demand of  $-1.2$  is assumed instead of  $-0.86$ . All other assumptions and variables of the models remain the same, including a price elasticity of supply of zero. Tables A1 and A2 show the changes that result due to this more elastic demand, for the national and regional models, respectively.

Table A1: Changes in producer revenue and consumer/merchandiser benefit, due to 16.87 million pounds of Mexican Hass avocado imports, November through April, assuming a price elasticity of demand of  $-1.2$ .

(National Model)

California's supply (million pounds)	111.19
Current Mexican imports (million pounds)	20.79
Additional Mexican imports (million pounds)	16.87
Other imports (million pounds)	31.02
Base price (\$ per pound)	\$1.34
New price with additional imports (\$ per pound)	\$1.22
Percent change in price	-8.62
California revenue at base price (million \$)	\$148.99
California revenue at new price (million \$)	\$136.14
Change in California revenue (million \$)	-\$12.85
Change in consumer/merchandiser benefit (million \$)	\$19.81
Net U.S. benefit (million \$)	\$6.96

In the national model, price would decline by 8.6 percent (compared to 12 percent when assuming a elasticity of demand of  $-0.86$ ), producer losses would be \$12.8 million (compared to \$17.9 million) and consumer/merchandiser gains would be \$19.8 million (compared to \$27.6 million), for an annual net benefit of \$7.0 million (compared to \$9.7 million). Both consumer/merchandiser benefits and producer losses would be smaller,



assuming a price elasticity of demand of  $-1.2$  rather than for  $-0.86$ , but the net impact remains positive.

The regional model yields a similar set of impacts. In the case of an 85-percent diversion of California avocados from approved States to nonapproved States, for example, price would decline by 6.8 percent in the approved States and by 10 percent in the nonapproved States (compared to declines of 9.5 percent and 18.1 percent, respectively, when assuming a elasticity of demand of  $-0.86$ ), aggregate producer losses would be \$14.7 million (compared to \$20.5 million) and aggregate consumer/merchandiser gains would be \$21.1 million (compared to \$29.4 million), for an annual net benefit of \$6.4 million (compared to \$8.9 million). As in the national model, consumer/ merchandiser benefits and producer losses would be smaller, assuming a price elasticity of demand of  $-1.2$  rather than for  $-0.86$ , but the net impact is still positive.

Table A2. Changes in producer revenue and consumer benefit, assuming 70%, 85%, and 100% diversion of California avocados from the approved States to nonapproved States, due to 16.87 million pounds of additional Mexican avocado imports (million dollars per year), assuming a price elasticity of demand of -1.2.

		Approved States			Nonapproved States			Aggregate Total		
Scenario		70%	85%	100%	70%	85%	100%	70%	85%	100%
1	California supply (million pounds)									
2	originally in the two regions	17.88	17.88	17.88	93.31	93.31	93.31			
3	subject to diversion	16.87	16.87	16.87						
4	remaining in approved States /1	6.07	3.54	1.01						
5	diverted to non-approved States				11.81	14.34	16.87			
6	Base price (\$ per pound)	1.34	1.34	1.34	1.34	1.34	1.34			
7	Price with additional imports (\$/lb)	1.18	1.25	1.31	1.23	1.21	1.18			
8	Percent change in price	-11.66	-6.80	-1.94	-8.23	-9.99	-11.75			
9	California revenue at base price /2	23.96	23.96	23.96	125.04	125.04	125.04	148.99	148.99	148.99
10	California revenue at new price									
11	for nondiverted quantities /3	7.19	4.42	1.33	114.75	112.54	110.34	121.94	116.96	111.67
12	for diverted quantity /4	0.00	0.00	0.00	14.52	17.30	19.95	14.52	17.30	19.95
13	Total	7.19	4.42	1.33	129.27	129.84	130.29	136.46	134.26	131.62
14	Change in California revenue /5	-16.77	-19.54	-22.63	4.23	4.80	5.25	-12.53	-14.73	-17.37
15	Change in consumer (merchandise) b	7.25	4.11	1.14	13.84	16.97	20.17	21.09	21.08	21.31
16	Net U.S. benefit /6	-9.52	-15.43	-21.49	18.07	21.77	25.42	8.56	6.35	3.94

/1 The amount remaining in the approved States after diversion includes the 1.01 million pounds not subject to diversion, that is, the amount supplied by California to the East Central and Northeast regions, November-February. For example, in the 70 percent diversion scenario, 5.06 million pounds is the amount subject to, but not diverted (16.87 million pounds x .30) to which is added 1.01 million pounds to arrive at the total of 6.07 million pounds of California supply remaining in the approved States.

/2 (line 2) x (line 6). All revenue amounts and changes are only for California avocado producers. Since essentially all Hass avocados produced in the United States are grown in California, they represent U.S. revenue.

/3 (line 4) x (line 7).

/4 (line 5) x (line 7).

/5 (line 13) - (line 9).

/6 (line 14) + (line 15).

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