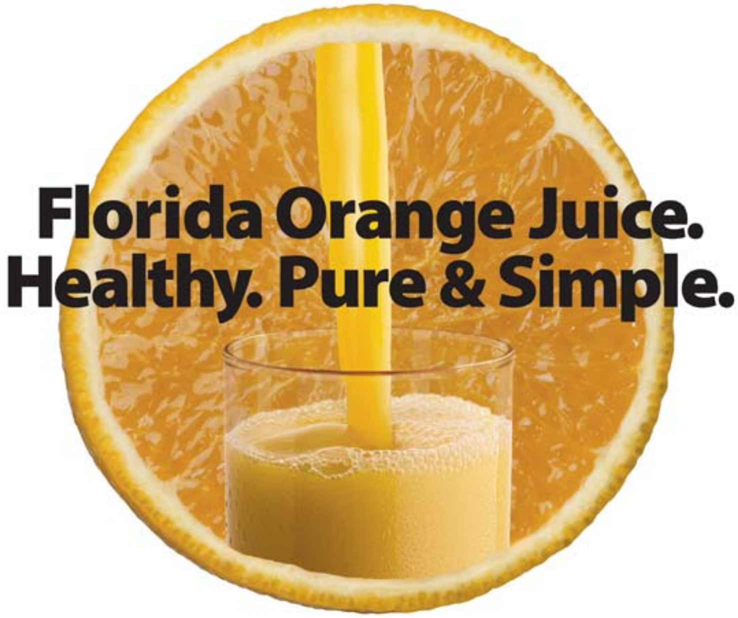

Florida Citrus Production Trends 2007-08 Through 2016-17

Economic and Market Research Department
Florida Department of Citrus

December, 2006

CIR 2006-1

MISSION: "Grow the Market for the Florida Citrus Industry" to enhance the economic well-being of the Florida citrus grower, citrus industry, and the State of Florida.

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Prepared by:

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Florida Citrus Production Trends 2007-08 Through 2016-17*

Introduction

This report provides production projections for Florida round oranges, grapefruit and specialty citrus for the 2007-08 through 2016-17 seasons. The projections are based on the same methodology used in a recent study of future prospects of the Florida citrus industry by Spreen et al.[1] Production in upcoming years will depend on a number of variables difficult to predict, and, as in the Spreen et al study, various assumptions are made with respect to these variables. Key assumptions are made on acre- and tree-loss rates, planting rates and yields per acre and tree. Citrus diseases such as canker and greening are expected to be important influencing factors, but uncertainty exists on the course that these diseases may take and their impact levels. Uncertainty also exists with respect to the future economic environment. The estimates in this study are thus intended to be viewed in this context. The farther out into the future the greater the uncertainty.

The production projections are based on the Florida Agricultural Statistics Service (FASS) biennial commercial citrus inventory for 2006. The biennial inventory reports numbers of trees and acres by age of tree for different varieties of citrus. These data are combined with FASS yield data on

*By Mark G. Brown, research economist, Florida Department of Citrus, Gainesville, Florida.

[1] The study was entitled "An Economic Assessment of the Future Prospects for the Florida Citrus Industry," March 16, 2006, by Thomas H. Spreen, Robert E. Barber, Jr., Mark G. Brown, Alan W. Hodges, Jordan C. Malugen, W. David Mulkey, Ronald P. Muraro, Robert P. Norberg, Mohammad Rahmani, Fritz M. Roka, and Robert E. Rouse. Web site: http://www.fred.ifas.ufl.edu/files/economic_assess_flciturus_indus.pdf. Florida orange production estimates are made in context of a world orange-juice model. A similar model was used to estimate Florida grapefruit production.

boxes of fruit per tree by age to estimate yields per acre, and future production is estimated by applying these estimated yields to projected acreage, by age.[2]

It should also be noted that the production projections are estimates of potential production, as opposed to utilized production reported by FASS. Potential production is the fruit that could be utilized assuming favorable citrus prices, while utilized production is the amount of fruit actually entering certified fresh and processing channels, as well as noncertified channels. Some fruit has been abandoned rather than utilized in the past when grower prices were below harvest and post-harvest costs.[3]

Overview of the 2006 Commercial Citrus Inventory

The *2006 Commercial Citrus Inventory* shows that Florida's total citrus acreage decreased by 17.0% over the last two years from 748.6 thousand acres in 2004 to 621.4 thousand acres in 2006 (Table 1). Similarly, the number of citrus trees decreased by 16.4% from 97.9 million in 2004 to 81.9 million in 2006. Since 1996, the number of citrus acres and trees have declined by 27.6% and 23.5%, respectively. The decline in acreage is similar to the decline in the mid-1980s resulting from freezes, while the decline in the tree population is the largest on record since 1966 when the first citrus tree inventory was conducted. The 2006 acreage level is the smallest on record. The large declines in the past two years are due to the destruction of trees under the past citrus canker eradication program, as

[2] This method has been referred to as the acre method in past reports. Another method to project production is the tree method which applies average boxes of fruit per tree to projected trees, by age. The acre method was selected over the tree method based on the expectation that observed yields per acre will more accurately reflect future yields than observed yields per tree. Increasing tree densities may negatively impact tree yields in upcoming years, making estimation of these yields and tree-based production projections problematic. Yields per acre are assumed to more fully reflect the impact of increasing tree densities. High tree densities have occurred in some of the younger age categories, and the observed acre yields for these age categories reflect the change in this factor. Older-age-category acre yields are assumed to be constrained by limited space and availability of sunshine, water and nutrients in the soil; and historical yields are assumed to reflect these yields.

[3] FASS reported abandonment of 3 million, 6 million, 6 million and 2 million boxes of grapefruit in 1995-96, 1996-97, 1997-98 and 2000-01, respectively.

well as losses due to other diseases, losses to hurricanes, and conversion of citrus land to non-agricultural uses.

With acreage declining more than the tree population, the trend toward denser planting levels has continued with the average trees per acre at 131.8 in 2006. Acreage and tree inventory data for individual varieties of citrus—round oranges, grapefruit and specialty citrus—are shown in Tables 2, 3 and 4, respectively. Major declines in acreage and trees have occurred across all varieties.

The FASS commercial citrus inventory indicates that the population of bearing and nonbearing round-orange trees decreased by 14.6% from 83.0 million in 2004 to 70.9 million in 2006. As indicated in Table 5, the orange tree population has become relatively mature compared to the decade following the 1980s freezes when planting levels were high. The orange tree population may continue to mature for the next several years, before possibly becoming younger on average to the extent new plantings occur in the future.

The total number of bearing and nonbearing grapefruit trees decreased 28.5% from 9.8 million in 2004 to 7.0 million in 2006. The grapefruit tree population has decreased by 53.9% since its high point of 15.1 million in 1996, reflecting losses resulting from the citrus canker eradication program, other diseases such as tristeza, hurricanes, urban development pressures in the Indian River area and past low returns grapefruit growers had experienced. The 2006 grapefruit acreage and tree population are the smallest on record. The 2006 grapefruit tree population is also relatively mature compared to the post-freeze period (Table 6). The age distribution for grapefruit trees by variety and by Indian River versus Interior regions is shown in Table 7.

The 2006 inventory indicates that the number of specialty citrus (Temples, tangelos and tangerines) acres and trees decreased by 22.2% and 22.5%, respectively, from 2004 to 2006. The 2006 specialty acreage is the smallest on record and the tree population is the smallest since the freezes in the 1980s. Like oranges and grapefruit, the specialty tree population has matured with 85.2% of the trees being greater than eight years old in 2006 (Table 8).

Methodology

The production estimates discussed in this report are based on projecting the acreage in 25 tree-age categories for the upcoming ten seasons, by variety. Projections are reported for oranges, grapefruit, and specialty citrus.[4] The Florida production projections for oranges and grapefruit were based on projections for four regions to take into account variation across regions in potential acreage loss and planting rates, as well as yields. The four regions used in modeling production were the South, West, Indian River, and the North & Central.[5] These regions are the same as those for which FASS reports yields per tree.

The orange production projections are made in context of a world supply and demand model described in the study by Spreen et al. The grapefruit production projections are based on a similar model also discussed by Spreen et al. Key supply assumptions made in applying these models in the present analysis are discussed in the next three sections. The demands underlying the models are largely held constant, with the focus of the present study on production. In most of the scenarios, it is assumed that the demands for orange juice (OJ) in the U.S. and rest-of-the-world (RW) grow (prices constant) by 1% and 2%, respectively; and the demands for grapefruit juice (GJ) and fresh grapefruit

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[4] These projections are based on separate estimates for early and midseason oranges, late oranges, white seedless grapefruit including a small amount of seedy grapefruit, red and pink seedless grapefruit, Temples, tangelos and tangerines.

[5] The regions included the following counties—South: Charlotte, Collier, Glades, Hendry, Lee and Okeechobee; West: DeSoto, Hardee, Hillsborough, Manatee, and Sarasota; Indian River: Indian River, St. Lucie, Martin, Palm Beach, Brevard, Volusia, and Flagler (parts of some counties are not included, as defined by FASS); North & Central: all other counties.

in the U.S. and export markets are unchanged over time. A reduced demand assumption is also considered. See the Spreen et al study for a more complete discussion of the orange and grapefruit models and other assumptions.

Planting Assumptions

The projections are dependent on assumed future acreage-planting rates. Average planting levels by variety, based on the 2000, 2002, 2004 and 2006 commercial citrus inventories, are shown in Table 9. Major declines in planting levels occurred in the past two years with the destruction of nursery trees exposed to citrus canker. Until the Florida citrus nursery tree industry recovers, planting levels will be low. In this study, we assume the supply of nursery trees will be limited in the next several years. For the 2006-07 and 2007-08 seasons, planting levels are assumed to be one-tenth the average level based on the 2004 tree census. In 2008-09, the planting level is held at 75% of the desired level based on price . Thereafter, planting levels are dependent on price as described in the Spreen et al study, assuming the nursery tree industry has recovered sufficiently. A further restrictive planting assumption related to citrus greening is also considered. These planting assumptions are made in projecting orange and grapefruit production; for specialty citrus, similar planting assumptions for 2006-07 through 2008-09 are made; thereafter, specialty citrus planting levels are set at the replacement level (for the replacement planting assumption, acreage planting levels are assumed to equal corresponding losses).

The impact of Brazil orange production on world orange-juice supply and prices, and, in turn, Florida orange tree planting levels and production was also considered. An important factor in determining Brazil's orange-juice supply is their orange planting rate. Based on historical data, the Brazil orange planting rate is positively related to the price of orange juice and negatively related to the price of sugar cane. Citrus and sugar cane compete for agricultural land in some areas of Brazil, and demand for sugar cane to produce ethanol has been growing. Thus, an increase in demand for sugar cane tends to increase its price, favoring the use of land for sugar cane production as opposed to orange production. Since the Spreen et al study, sugar prices have moderated, and in the present study recent sugar prices (about 25% below the price assumed in the Spreen et al report) are assumed for projecting future Brazil plantings levels.

Tree/Acre-Loss Assumptions

Acreage- and tree-loss rates jumped with the citrus canker eradication program (Table 10). Although this program ended in January 2006, this disease will continue to impact losses as well as yields. Before the heavy losses due to canker, loss rates were increasing as a result of the citrus tristeza virus and other factors. Losses to tristeza are expected to continue, but perhaps at a lower level to the extent trees on sour orange rootstock, which are susceptible to this disease, have been removed. In the upcoming years, a major factor assumed to impact loss rates is the incidence of greening. Future loss rates are the sum of an average (base) loss rate plus assumed increases due to greening, canker, tristeza and development. The average loss rate is based on losses occurring in the mid-1990s, prior to the occurrence of relatively large tristeza losses. This loss rate tends to increase with tree age, and this relationship is assumed to continue over the projection period, i.e., the orange and grapefruit projections are based on loss rates which increase with tree age.

Greening is assumed to impact acre losses under several scenarios, following the Spreen et al study. The incidence of greening is assumed to be the same as in the latter report. Greening is spread by an insect, the Asian psyllid. Currently, this insect is present in limited areas of the State. In this study, we assume that the psyllid will spread across the State to all citrus-growing regions. Although the psyllid may spread to an area, not all trees may become infected or be in the same symptom-reflecting state. The tree- and acre-loss rates, however, are expected to increase. It is assumed that an effective greening management program including suppressing the citrus psyllid will be developed. Such a management program, however, has not been implemented yet. Without an effective program greening has the potential to devastate the Florida citrus industry.

A low-greening scenario assumes that loss rates for acreage susceptible to this disease (areas where the citrus psyllid is present) are above the average or base by 50% for young trees, 37.5% for middle age trees and 25% for old trees (e.g., if the base loss rate for a young (old) tree were 1% (5%) without greening, then with greening, the loss rate would go to 1% times 1.5 or 1.5% (5% times 1.25 or 6.25%). A second greening scenario assumes the loss rate increases are double those in the low-greening scenario; additionally, scenarios in which 1% and 2% are added to the base loss rate across all tree ages are considered to allow for the possibility of further losses to greening as well as to development. Canker is also assumed to increase loss rates by 10% above the base. Loss rates were also adjusted for tristeza over the next five years; thereafter, losses due to this disease are assumed to be reflected in the base rate. For oranges (grapefruit), tristeza is assumed to add 1% (3%) to the base loss rate in the 2006-07 season; in the following four years the increment declines to zero.

Greening is also assumed to impact the tree-loss rate in Brazil. As for Florida, two scenarios are considered. The first assumes that greening increases the Brazil tree-loss rate by 50% from 5.0% to 7.5%, phased in over the next five years. The second scenarios assumes that the loss rate increases by 25% from 5.0% to 6.3%.

For Florida oranges and grapefruit, the assumed loss rates vary by region. For the specialty citrus production projections, which were made at the State level, the loss rates were assumed to be flat at 6% across tree age.

Yield Assumptions: Projection Methodologies Based on Trees Versus Acres

Production estimates were made for each of the four regions defined above, and State estimates were obtained by summing the region estimates. For each region, the production estimates were made by multiplying the projected number of acres in each specific age category by the yield or number of boxes per acre for that age category and summing the results across age categories. Non-hurricane yields used in making these estimates were based on yields over the period from 1993-94 through 2003-04 (Table 11), and hurricane-impacted yields were based on yields over the last two seasons, 2004-05 and 2005-06 (FASS). Yields in the latter two seasons were significantly below normal levels as a result of the hurricanes that struck Florida's citrus growing regions. To account for the possibility of hurricanes impacting yields in the future, weighted averages of the yields in the two hurricane seasons and those over 1993-94 through 2003-04 yields were used. The weighted averages were constructed as nine-tenths (.9) times the 1993-94 through 2003-04 averages plus one-tenth (.1) times the averages for the past two hurricane seasons. That is, we assume the probability that a hurricane impacts Florida citrus production is one out of ten. The FASS reports tree yields, as opposed to acre yields. The acre yields used in this report were obtained by multiplying the tree yields (boxes per tree) by the tree densities (trees per acre), by age.

The average yields described above were applied to acreage that was not affected by citrus canker. For acreage with citrus canker, three yield scenarios were considered—(1) the average yields were reduced by 5.0% for early and midseason oranges, 2.5% for Valencia oranges, and 10.0% for grapefruit; (2) the yield reductions were doubled—10.0% for early and midseason oranges, 5.0% for Valencia oranges, and 20.0% for grapefruit; and (3) the yield reductions were tripled—15.0% for early and midseason oranges, 7.5% for Valencia oranges, and 30.0% for grapefruit. The incidence of citrus canker was assumed to be the same as in the Spreen et al report. The assumed occurrence of canker varies over time and by region: in the South and West, the incidence increases from 25% in 2006-07 to100% in 2009-10; in the Indian River, the incidence is assumed to be 100% over the projection period; in the North and Central, the incidence increases from 15% in 2006-07 to100% in 2011-12. The incidence of canker in a region does not mean all trees in the region are in the same symptom-reflecting stage or have canker, but that canker is present and tree-loss rates can be expected to increase on average.

In this study, yields per acre were assumed to more fully reflect the impact of increasing tree densities than yields per tree. The estimated acre yields for the younger age categories capture, to an extent, the impact of increasing tree densities, as these age categories have experienced increasing densities over the years underlying the estimates. Older-age-category acre yields are assumed to be constrained by the limited space in which trees must compete for sunshine, water and nutrients in the soil. Historical acre yields for the older age categories are assumed to reflect the yield potential for these age categories in upcoming years.

It should also be noted that abandonment of grapefruit in 1995-96, 1996-97, 1997-98 and 2000-01 negatively impacted grapefruit boxes of fruit per tree reported by FASS for those seasons. For each age category, FASS boxes of fruit per tree were calculated as that age category's utilized production divided by the number of trees in that age category, including trees that yielded abandoned fruit. Hence, estimates of grapefruit production based on mean FASS yields for the past decade may understate potential production. To correct for this problem, reported grapefruit yields for the four seasons when abandonment occurred were adjusted upward by multiplying the reported yields times the ratio of potential production (utilized production plus reported abandonment by FASS) to utilized production. Separate adjustments were made for white and colored seedless grapefruit yields.

Round-Orange Production Estimates

Twelve scenarios were considered in projecting orange production. These scenarios are based on (1) the probability of a hurricane impacting the citrus regions of the State (0%, 100% and 10%), (2) the assumed impact of canker on yields (low and high), (3) the assumed level of greening (low and high); (4) losses to other factors (historical average and two increased rates), (5) planting rates, and (6) assumed demand growths. Two scenarios, considered more likely here, are discussed next, followed by a brief summary of the remaining ten scenarios (details are provided in the Appendix). Determining the probability of how a future event such as greening will unfold is problematic, and one may view a particular scenario in the Appendix to be more likely than the two scenarios focused on in this paper, depending on the subjective view of the probabilities of future events.

The two scenarios we focus on are shown in Table 12. The first scenario shows orange production assuming (1) the probability of a hurricane(s) impacting the citrus growing regions of the State is 10% (weighted average of the yields for the non-hurricane period from 1993-94 through 2003-04 and the yields for the hurricane period from 2004-05 and 2005-06 as previously noted), (2) canker yield reductions of 10% for early and midseason oranges and 5% for Valencia oranges, (3) historical average acre-loss rates, (4) low incremental greening loss rates, (5) price-dependent planting equations except for the 2006-07 through 2008-09 seasons as previously discussed, and (6) annual growth rates in U.S. and RW demands for OJ of 1% and 2%, respectively. Based on these assumptions, orange production declines from 187 million boxes in 2007-08 to 172 million boxes in 2014-15, before increasing to 174 million boxes in 2016-17.

The assumptions for the second scenario are the same as those for the first scenario except the incremental greening loss rates by tree age are doubled and one percentage point (1%) is added to the base loss rate across all tree ages. The results for this scenario suggest that orange production in the upcoming ten years may decline from 183 to 152 million boxes over the projection period.

Acre-loss and planting rates, Florida FOB prices for bulk frozen concentrated orange juice (FCOJ) and processed orange on-tree prices are also shown in Table 12. The planting rates tend to exceed the loss rates indicating a relatively strong persistence in orange production—the model suggests a relatively strong price environment will stimulate planting levels, more than offsetting losses. The relatively high planting rates suggest production may actually increase beyond the ten-year projection period (for example, the production levels for scenarios one and two are estimated at 185 and 160 million boxes, respectively in 2021-22). If planting levels do not positively respond to prices as indicated by these results, orange production may decline due to this factor alone; for example, if planting levels are one-half the replacement levels instead of being dependent on price, orange production in scenario one (scenario two) declines from 187 (183) million boxes in 2007-08 to 153 (132) million boxes in 2016-17 and 139 (116) million boxes in 2021-22.

The FOB price ranges from $1.66 per pound solids (PS) to $2.26 per PS across the two scenarios, while the processed on-tree price ranges from $6.47 per box to $10.38 per box. For each scenario, prices tend to increase over time as production declines. Although this report focuses on production, we note that the prices are strongly related to demand expansion (baseline assumption: 1% and 2% annual demand growth in the U.S. and the RW, respectively). Without demand expansion, projected prices are lower and tend to decline over time—for example, for scenario one (scenario two) with zero demand growth in both the U.S. and the RW, the FOB price declines from $1.52 per PS to $1.30 per PS ($1.55 per PS to $1.64 per PS) over the ten-year projection period; the lower prices slow the orange planting rate and projected production for scenario one (two) is at 169 (147) million boxes in 2016-17. Also, it should be noted that the model projects that Brazil (São Paulo) orange production increases from 361 to 364 million boxes in 2007-08 to 399 to 431 million boxes in 2016-17, depending on scenario.

Alternative Orange Scenarios (Appendix)

The Appendix provides ten additional scenarios. The first two scenarios (1A and 2A) are planting variations of the scenarios in Table 12. The remaining eight scenarios, which are summarized together, are based on various assumptions.

The two scenarios in Table A-1 are the same as those in Table 12, except planting levels are restricted to zero from 2006-07 through 2011-12; thereafter planting levels are determined by price. The psyllid that spreads greening is attracted to new growth shoots and until greening suppression methods are better understood, one strategy may be not to plant and risk attracting these insects. For scenario 1A (2A), without plantings over these years, orange production declines from 187 (183) to 148 (127) million boxes over the ten year projection period.

The remaining eight scenarios are summarized together in Tables A-2. The first scenario (3A) in this table shows orange production assuming that the probability of a hurricane(s) impacting the citrus growing regions of the State is zero. The yields per acre for this assumption are the averages over the 1993-94 through 2003-04 seasons. This scenario is also based on low canker yield reductions, historical average acre-loss rates, low incremental greening loss rates, price dependent planting equations except for the 2006-07 through 2008-09 seasons as previously discussed, and annual growth rates in U.S. and RW demands for OJ of 1% and 2%, respectively. Based on these assumptions, orange production declines moderately from 196 million boxes in 2007-08 to 185 million boxes in 2013-14 through 2015-16, before increasing to 187 million boxes in 2016-17.

The second scenario (4A) is the same as the first except yields per acre are set at the averages for the 2004-05 and 2005-06 hurricane seasons. This scenario is thus associated with a hurricane probability of 100%, but since other factors besides the hurricanes also impacted yields in these two seasons, the results do not strictly measure the impact of a hurricane(s). Nevertheless, comparisons of scenarios 3A and 4A indicate that orange production could decline by about 50 to 60 million boxes if events like those in the past two seasons were to repeat themselves.

Scenario 5A shows orange production projections assuming a 10% chance of a hurricane, other assumptions the same. These results suggest that orange production in the upcoming ten years may be in the 190 to 180 million box range. It should be noted that the 95% confidence interval, based on yield variation over the1993-94 through 2003-04 period, is about +/- 20% of the projected production estimates for this scenario. That is, it would not be surprising to see orange production over 200 million boxes or under 150 million boxes in any given year based on yield variability alone to the extent the other assumptions of this scenario were to hold.

Scenario 6A is the same as scenario 5A except the assumed canker yield reduction is tripled (the hurricane probability is set at 10%, the low greening assumption is maintained, the base loss rate is set at the historical average, acres planted are based on price except for 2006-07 through 2008-09, and demand assumptions are maintained). For this scenario, production declines from 184 million boxes in 2007-08 to 165 million boxes in 2013-14 through 2015-16, before increasing slightly to 166 million boxes in 2016-17.

Scenario 7A is the same as scenario 6A except the incremental greening loss rates are doubled. For this scenario, production declines from 184 to 160 million boxes over the ten-year projection period.

For scenario 7A, the incremental greening loss for young trees is 100% above the base rate but since the base rate is relatively low for young trees, based on the historical average, the overall loss rate on these trees assuming a high level of greening is still relatively low. Thus, in scenarios 8A and 9A, the base loss rate is increased by 1% and 2%, respectively, to represent the possibility of additional higher greening loss rates, as well as further losses to other diseases such as canker and development. For scenario 8A (9A), orange production declines to 145 (132) million boxes at the end of the projection period.

Scenario 10A is the same as scenario 7A (10% hurricane probability, high canker yield reductions, high greening losses, average losses due to other factors, price dependent planting rates), except the OJ demand growth rates in the U.S. and RW are reduced by one-half to 0% and 1%, respectively. This scenario results in lower prices and, in turn, lower planting levels, resulting in orange production declining from184 to 157 million boxes over the projection period. The decline in production in scenario 10A, compared to that in scenario 7A, is relatively modest, since planting levels are restricted for the next several years and new plantings thereafter contribute a relatively small amount to total production over the ten-year projection period.

Acre-loss and planting rates for the eight scenarios in Table A-2 are shown in Table A-3, while corresponding Florida FOB prices for bulk FCOJ and processed orange on-tree prices are shown in Table A-4. Brazil (São Paulo) orange production increases from 361 to 364 million boxes in 2007-08 to 386 to 455 million boxes in 2016-17, depending on scenario.

Grapefruit Production Estimates

Twelve scenarios for grapefruit production were also considered. The assumptions for these scenarios are similar to those for the corresponding orange-production scenarios, except for the assumed canker yield reductions (10% to 30% yield reductions for grapefruit) and the assumed growth rates in demand (zero to negative growth in demands for fresh grapefruit and GJ). The two scenarios considered more likely are shown in Table 13. The results for the remaining ten grapefruit scenarios are provided in the Appendix Tables A-5 through A-9. Again, as noted above in discussing the orange results, given the uncertainty of future events, a particular scenario in the Appendix could be viewed more likely depending on one's view of the probabilities of future events. The first scenario in Table 13 assumes (1) the probability of a hurricane(s) impacting the citrus growing regions of the State is 10%, (2) canker yield reductions of 20%, (3) historical average acre-loss rates, (4) low incremental greening loss rates, (5) price-dependent planting equations except for the 2006-07 through 2008-09 seasons as discussed above, and (6) zero growth in U.S. and export demands for fresh grapefruit and GJ. For these assumptions, grapefruit production is projected to declining from 22 to 16 million boxes over the ten-year projection period.

The second scenario in Table 13 is based on the same assumptions as the first scenario except that the greening loss rates are doubled and one percentage point is added to the base loss rate (assumptions summarized in the table footnotes). For this scenario, grapefruit production is projected to decline from 21 to 14 million boxes over the projection period.

The declines in production across scenarios result from relatively high acre-loss rates compared to planting rates during the first half of the projection period. Fresh grapefruit prices tend to be relatively strong, increasing as production declines over time. GJ prices are initially moderate, also increasing as production declines over time. On-tree prices follow a similar pattern. The increasing prices stimulate tree plantings as reflected in the projected planting rates in the second half of the projection period. This planting trend suggests that grapefruit production beyond the ten-year projection period will stabilize or perhaps increase slightly.

Alternative Grapefruit Scenarios (Appendix)

Following the orange scenarios, the first two grapefruit scenarios in the Appendix are planting variations of the scenarios in Table 13. The remaining eight scenarios (summarized together) are based on additional assumption variations.

The two scenarios in Table A-5 (1A and 2A) are the same as those in Table 13, except planting levels are restricted to zero from 2006-07 through 2011-12; thereafter planting levels are determined by price. For scenario 1A (2A), without plantings over these years, grapefruit production declines from 22 (21) to16 (14) million boxes over the ten year projection period. The production levels for these scenarios are similar to those in Table13, since planting levels underlying the results in Table 13 are already relatively low. At the end of the projection period, the planting-restricted grapefruit production estimate is about 1 million boxes less than the unrestricted estimate for both scenarios.

The remaining eight grapefruit scenarios are summarized together in Tables A-6. The first grapefruit scenario (3A) in this table shows grapefruit production declining from 25 to 18 million boxes over the ten-year projection period, assuming no hurricane(s) impacts the citrus growing regions of the State (see the table for other assumptions). Scenario 4A, assuming a 100% hurricane probability, shows grapefruit production in the 12 to 13 million box range; and scenario 5A, assuming a 10% probability of a hurricane(s), shows grapefruit production declining from 24 to 18 million boxes. The 95% confidence interval for the scenario 5A, based on yield variation over the1993-94 through 2003-04 period, is about +/- 14% of the projected production estimates. The remaining scenarios (high canker yield reductions combined with various other assumptions) show production declining from the 19 to 20 million box range in 2007-08 to the 12 to 14 million box range in 2016-17, depending on planting and loss rates.

The same loss, planting and price patterns previously noted in discussing Table13 generally hold for the grapefruit scenarios in the Appendix. Relatively high acre-loss rates compared to planting rates during the first half of the projection period underlie the projected production declines (Table A-7).

Fresh grapefruit prices tend to be relatively strong, increasing as production declines across scenarios and over time (Table A-8). GJ prices are initially relatively low or moderate depending on the crop size, increasing as production declines over time. On-tree prices follow a similar pattern (Table A-9).

Specialty Citrus Production Estimates

Specialty citrus production was projected using estimated equations which relate historical production to acres, by age. Potential specialty citrus production is estimated to decline from 6.9 million boxes in 2007-08 to 5.4 million boxes in 2016-17, assuming a 6% acre-loss rate and replacement planting levels (Table 14). Tangerine, Temple and tangelo production levels are estimated to decline over the next ten years from 4.6 to 3.7 million boxes, .8 to .5 million boxes, and 1.5 to 1.2 million boxes, respectively. If loss rates increase (decrease) by 1%, total specialty production is estimated to decrease (increase) by roughly 1% to 9%, depending on year.

Concluding Comments

Florida citrus production in the upcoming decade will be dependent on a number of factors difficult to predict. Acre-loss rates will depend on diseases such as citrus canker and greening, as well as development of citrus acreage for other uses. Planting rates will depend on future citrus prices and costs, and, hence, future supply and demand, as well as the recovery of the citrus nursery industry, which was severely impacted by the past citrus canker eradication program. Yields per acre will be impacted by citrus canker. Hurricanes and growing conditions could also have significant impacts. It is particularly unclear how greening may impact future production. In this report, it is assumed that an effective greening management program will be developed to control this disease. Such a management program, however, has not been implemented yet, and without one greening has the potential to devastate the Florida citrus industry. A number of scenarios regarding these issues have been considered in this study. The likelihood of the various assumptions and the resulting crop estimates become less clear further into the future.

The scenarios considered generally suggest orange production may moderately decline in the upcoming ten years as a result of above average acre-loss rates driven by diseases as well as development, yield reductions due to canker and restrictions on planting activity in the next several years as the Florida citrus nursery industry recovers. In general, the results suggest that orange production may range from roughly 190 to 180 million boxes in the initial upcoming years and then decline to the 170 to 150 million box range at the end of the projection period, depending on acre-loss rates. Somewhat steeper declines in orange production, however, may occur based on several scenarios considered. Grapefruit production is estimated to initially be in the 22 to 20 million box range before declining to the 16 to 14 million box range at the end of the projection period, again depending on acre-loss rates. Again, the analysis suggests steeper grapefruit production declines are possible. Specialty citrus production is estimated to range from 5 to 7 million boxes.

The projected production declines tend to result in increased prices which in turn stimulate planting levels, supporting production levels further into the future. Planting levels in the analysis are based on relationships between past citrus planting levels and prices. To the extent these relationships continue to hold in the future, the results of this study suggest a relatively strong persistence in citrus planting activity, production, and the Florida citrus industry, despite relatively high loss rates.

TABLES

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Table 1. Florida citrus acreage and tree numbers by commercial inventory.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	858.1	--	66.4	--	77.4
1968	931.2	8.5	74.4	12.0	79.9
1970	941.5	1.1	76.7	3.1	81.5
1972	878.0	-6.7	72.1	-6.0	82.1
1974	864.1	-1.6	71.3	-1.1	82.5
1976	852.4	-1.4	70.5	-1.1	82.7
1978	831.2	-2.5	69.1	-2.0	83.1
1980	845.3	1.7	70.7	2.3	83.6
1982	847.9	8.5	71.6	1.3	84.4
1984	761.4	-10.2	66.0	-7.8	86.7
1986	624.5	-18.0	57.5	-12.9	92.1
1988	697.9	11.8	69.3	20.5	99.3
1990	732.8	5.0	78.9	13.9	107.7
1992	791.3	8.0	92.0	16.6	116.3
1994	853.7	7.9	103.7	12.7	121.5
1996	857.7	.5	107.1	3.2	124.9
1998	845.3	-1.4	107.1	NC	126.7
2000	832.3	-1.5	106.7	-.4	128.2
2002	797.3	-4.2	103.2	-3.3	129.4
2004	748.6	-6.1	97.9	-5.1	130.8
2006	621.4	-17.0	81.9	-16.4	131.8

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 2. Florida round-orange acreage and tree numbers by commercial inventory.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	695.8	--	53.8	--	77.3
1968	713.4	2.5	56.6	5.2	79.3
1970	715.8	.3	57.8	2.1	80.7
1972	659.4	-7.9	53.7	-7.0	81.4
1974	642.4	-2.6	52.5	-2.3	81.7
1976	628.6	-2.1	51.6	-1.8	82.1
1978	616.0	-2.0	50.8	-1.5	82.5
1980	627.2	1.8	52.0	2.2	82.9
1982	636.9	1.5	53.5	2.9	84.0
1984	574.0	-9.9	49.9	-6.8	86.9
1986	466.3	-18.8	43.5	-12.9	93.3
1988	536.7	15.1	54.5	25.5	101.5
1990	564.8	5.2	62.6	14.9	110.8
1992	608.6	7.8	72.8	16.3	119.6
1994	653.4	7.4	81.6	12.1	124.9
1996	656.6	.5	84.2	3.1	128.2
1998	658.4	.3	85.4	1.5	129.8
2000	665.5	1.1	87.2	2.1	131.0
2002	648.8	-2.5	85.8	-1.7	132.2
2004	622.8	-4.0	83.0	-3.2	132.2
2006	529.2	-15.0	70.9	-14.6	133.9

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 3. Florida grapefruit acreage and tree numbers by commercial inventory.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- thousand -	- % -	- million -	- % -	- trees/acre -
1966	103.2	--	7.10	--	68.8
1968	119.9	16.2	8.50	19.7	70.9
1970	124.1	3.5	8.92	4.9	71.9
1972	124.1	NC	9.01	.9	72.6
1974	130.3	5.0	9.65	7.0	74.1
1976	137.9	5.8	10.40	7.8	75.4
1978	136.3	-1.2	10.41	1.3	76.4
1980	139.9	2.6	10.77	3.4	77.0
1982	139.9	NC	10.83	.6	77.4
1984	134.7	-3.7	10.58	-2.3	78.5
1986	117.8	-12.5	9.62	-9.1	81.7
1988	119.6	1.5	10.08	4.7	84.3
1990	125.3	4.8	11.19	11.0	89.3
1992	135.2	7.9	13.12	17.2	97.0
1994	146.9	8.7	15.00	14.3	102.1
1996	144.4	-1.7	15.12	.8	104.7
1998	132.8	-8.0	14.08	-6.9	106.0
1999	121.3	-8.7	12.96	-7.9	106.9
2000	118.1	-2.6	12.67	-2.3	107.2
2002	105.5	-10.7	11.33	-10.6	107.4
2004	89.0	-15.6	9.75	-14.0	109.5
2006	63.4	-28.8	6.97	-28.5	109.9

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 4. Florida specialty citrus[a] acreage and tree numbers by commercial inventory.

Year of Inventory	Number of Acres	Percent Change from Previous Acre Inventory	Number of Trees	Percent Change from Previous Tree Inventory	Tree Density
	- acres -	- % -	- million -	- % -	- trees/acre -
1970	82,767	--	7.6	--	91.48
1972	77,042	-6.9	7.1	-5.8	92.60
1974	74,446	-3.4	7.0	-2.1	93.84
1976	67,485	-9.4	6.2	-10.9	92.24
1978	62,723	-7.1	5.8	-7.1	92.23
1980	60,360	-3.8	5.6	-3.9	92.07
1982	55,163	-8.6	5.1	-8.8	91.88
1984	34,619	-37.2	3.2	-37.7	91.17
1986	30,155	-12.9	2.9	-7.7	96.60
1988	30,284	.4	3.0	4.1	100.09
1990	33,347	10.1	3.7	21.1	110.04
1992	37,507	12.5	4.6	24.0	121.36
1994	45,768	22.0	5.9	30.4	129.69
1996	50,950	11.3	7.0	17.1	136.40
1998	48,556	-4.7	6.7	-3.1	138.70
2000	45,355	-6.6	6.3	-6.4	139.00
2002	39,844	-12.2	5.6	-11.0	140.80
2004	33,547	-15.8	4.8	-15.0	142.14
2006	26,098	-22.2	3.7	-22.5	141.59

[a]Temples, tangelos and tangerines; fallglo tangerines not included prior to 1996.

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 5. Age distribution of Florida round-orange trees by year of inventory.

Year of Inventory	Tree Age ≤2	3-5	6-8	9-13	14-23	≥24	Total Trees	Bearing Trees
	- - - - - - - - - - - - - - - %					- - - - - - - - - - - - - - - - - -	- - - - thousand	- - - -
1970	9.1	20.6	17.6	14.8	13.4	24.4	57,801.5	49,404.2
1972	5.5	11.1	20.2	22.0	14.1	27.0	53,731.1	49,786.5
1974	4.0	5.9	16.9	27.8	16.9	28.4	52,521.7	49,466.9
1976	4.0	4.8	7.5	29.7	24.1	29.8	51,595.3	48,373.8
1978	5.2	4.5	4.7	23.4	31.5	30.6	50,843.2	47,454.5
1980	7.2	4.7	3.8	13.0	39.1	32.2	51,977.8	47,366.3
1982	12.0	5.1	3.7	7.2	40.2	31.8	53,504.7	46,078.5
1984	17.5	7.1	4.5	5.8	35.2	29.9	49,884.7	39,777.7
1986	20.0	12.4	6.1	7.1	28.7	25.7	43,461.4	32,708.0
1988	30.7	13.9	7.8	5.7	17.7	24.1	54,536.6	35,537.3
1990	35.1	14.3	10.7	6.7	10.0	23.3	62,613.4	40,666.0
1992	31.9	23.4	9.9	8.4	6.7	19.7	72,826.3	49,577.1
1994	24.4	24.6	16.7	11.0	6.5	16.9	81,614.4	61,707.7
1996	10.5	26.9	24.0	14.7	8.2	15.7	84,155.4	75,286.6
1998	8.0	15.5	26.7	23.0	11.5	15.3	85,430.6	78,586.5
2000	9.7	7.2	21.4	33.7	13.6	14.4	87,200.1	78,721.0
2002	9.5	8.6	9.3	37.0	22.5	13.1	85,751.1	77,595.9
2004	9.1	9.4	8.1	29.0	32.4	12.0	82,987.5	75,391.7
2006	6.9	9.4	10.1	17.1	44.9	11.5	70,849.4	65,954.4

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 6. Age distribution of Florida grapefruit trees by year of inventory.

Year of Inventory	Tree Age						Total Trees	Bearing Trees
	≤2	3-5	6-8	9-13	14-23	≥24		
	- - - - - - - - - - - - - - - - - - - % - - - - - - - - - - - - - - - - - - -						- - - - - thousand - - - - -	
1970	15.1	21.7	4.2	3.9	14.1	41.1	8,925.4	6,746.5
1972	6.9	21.9	14.0	5.5	10.6	41.1	9,012.7	8,032.1
1974	11.5	8.2	25.1	7.6	8.1	39.4	9,647.2	8,362.6
1976	13.9	7.9	13.3	20.8	6.8	37.2	10,398.1	8,598.9
1978	8.5	13.8	6.8	28.9	7.1	34.9	10,412.5	8,969.7
1980	8.9	10.5	10.7	21.6	15.8	32.5	10,768.7	9,586.2
1982	7.5	7.4	12.8	12.6	29.1	30.6	10,833.2	9,753.9
1984	11.4	6.7	7.5	15.7	32.1	26.7	10,582.9	9,192.8
1986	9.7	7.8	7.9	17.0	35.7	22.0	9,624.0	8,367.7
1988	11.0	9.7	6.5	13.8	38.3	20.7	10,081.2	8,654.7
1990	21.8	6.2	8.0	9.1	31.4	23.5	11,193.2	8,748.5
1992	27.2	14.0	5.5	8.6	19.1	25.6	13,119.2	9,556.9
1994	23.3	21.3	7.6	8.3	16.0	23.5	15,004.0	11,514.1
1996	9.8	25.3	17.8	8.2	15.3	23.6	15,116.9	13,632.8
1998	4.3	16.7	24.6	13.8	14.8	25.8	14,079.1	13,469.6
2000	3.7	6.2	22.7	27.2	13.6	26.7	12,668.6	12,204.1
2002	4.1	4.7	9.7	38.3	16.7	26.5	11,329.2	10,869.7
2004	8.0	4.0	4.9	32.1	27.0	24.1	9,748.3	8,967.9
2006	6.1	5.9	3.8	18.5	41.8	23.8	6,971.4	6,543.2

SOURCE: Florida Agricultural Statistics Service, *Commercial Citrus Inventory*, various issues.

Table 7. Age distribution of Florida grapefruit trees by marketing district and variety, 2006 inventory.

District/Variety	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	% [a]						- thousand -
Indian River							
White Seedless[b]	3.3	5.5	5.4	19.0	33.0	33.8	1,688
Red & Pink Seedless	9.1	6.1	2.6	15.1	42.6	24.4	3,362
TOTAL	**7.2**	**5.9**	**3.6**	**16.4**	**39.4**	**27.5**	**5,051**
Interior							
White Seedless[b]	1.6	4.5	3.1	17.0	43.3	30.5	591
Red & Pink Seedless	4.2	6.4	5.0	27.0	50.5	6.8	1,330
TOTAL	**3.4**	**5.8**	**4.4**	**23.9**	**48.3**	**14.1**	**1,921**

[a]Percentages may not total 100 due to rounding.

[b]Includes seedy grapefruit.

SOURCE: Florida Agricultural Statistics Service, *2006 Commercial Citrus Inventory*.

Table 8. Age distribution of Florida specialty citrus trees by variety, 2006 inventory.

Variety	Tree Age						Total Trees
	≤2	3-5	6-8	9-13	14-23	≥24	
	- % - - - - - - - - - - - - - - - - - - -						- thousand -
Temples	1.5	4.6	4.5	9.3	27.1	52.8	293.3
Tangelos	3.7	5.4	4.9	21.3	48.2	16.4	806.9
Tangerines	2.3	5.0	8.1	35.6	43.7	5.2	2,595.1
TOTAL	**2.6**	**5.0**	**7.2**	**30.4**	**43.4**	**11.5**	**3,695.3**

SOURCE: Florida Agricultural Statistics Service, *2006 Commercial Citrus Inventory*.

Table 9. Average annual citrus plantings by variety.[a]

Variety[c]	Annual Plantings[b]							
	1000 Trees				Acres			
	2000	2002	2004	2006	2000	2002	2004	2006
ORANGES								
Early & Midseason	1,044	1,195	1,250	896	7,846	9,029	9,655	6,803
Late	1,771	1,518	1,272	762	13,194	11,578	9,612	5,954
Total	2,815	2,713	2,522	1,632	21,040	20,607	19,267	12,757
GRAPEFRUIT								
Indian River								
White Seedless[d]	56	53	85	19	525	496	769	161
Red & Pink Seedless	52	68	144	102	464	579	1,217	862
Interior								
White Seedless[d]	8	7	7	4	86	78	71	31
Red & Pink Seedless	39	26	24	18	276	231	186	160
Total	155	154	260	143	1,351	1,384	2,243	1,214
SPECIALTY								
Temples	16	6	8	2	111	45	62	14
Tangelos	17	10	32	10	136	79	259	78
Tangerines	84	55	39	20	565	372	279	150
Total	110	71	79	32	757	496	600	241

[a] Based on 2000, 2002, 2004 and 2006 *Commercial Citrus Inventories*.

[b] Calculated as non-bearing trees or acres divided by 3 (years set for 2000: 1997, 1998 and 1999; years set for 2002: 1999, 2000 and 2001; years set for 2004: 2001, 2002 and 2003; years set for 2006: 2003, 2004 and 2005).

[c] Orange trees and acres listed as "unidentified" by the FASS were allocated between orange varieties in the same proportions as the identified proportions in calculating the averages. Grapefruit trees and acres listed as "unidentified" by the FASS were allocated between grapefruit varieties in the same proportions as the identified proportions in calculating the averages.

[d] Includes seedy.

Table 10. Historical citrus tree- and acreage-loss rates by variety.[a]

Variety	Annual Loss Rate[b]											
	Trees						Acres					
	94-96	96-98	98-00	00-02	02-04	04-06	94-96	96-98	98-00	00-02	02-04	04-06
	- - - - - - - - - - - -						% - - - - - - - - - - - -					
ORANGES [c]												
Early & Midseason	1.2	1.9	2.3	3.8	4.3	9.3	2.2	2.3	2.7	4.2	4.8	9.7
Late	1.2	1.9	2.3	3.8	4.3	9.3	2.2	2.3	2.7	4.2	4.8	9.7
GRAPEFRUIT[d]												
Indian River												
White Seedless[e]	1.5	3.0	4.8	5.8	9.5	17.2	2.4	3.5	5.5	6.1	10.2	17.4
Red & Pink Seedless	1.5	3.0	4.8	5.8	9.5	17.2	2.4	3.5	5.5	6.1	10.2	17.4
Interior												
White Seedless[e]	2.3	7.4	9.3	9.4	10.8	16.6	2.8	7.9	9.6	8.8	11.7	16.2
Red & Pink Seedless	2.3	7.4	9.3	9.4	10.8	16.6	2.8	7.9	9.6	8.8	11.7	16.2
SPECIALTY[f]												
Temples	3.2	4.9	4.8	10.8	16.8	16.0	3.9	5.7	5.3	12.2	15.4	15.9
Tangelos	4.3	5.2	5.6	8.3	8.2	16.2	4.7	5.6	5.6	9.2	10.3	15.3
Tangerines	2.1	4.1	5.6	6.6	9.6	10.8	3.0	4.5	5.5	6.7	9.8	10.6

[a]Losses due to all factors.

[b]Based on 1994, 1996, 1998, 2000, 2002, 2004 and 2006 *Commercial Citrus Inventories*.

[c]One loss rate for round oranges (early and midseason and late oranges) was estimated due to the unidentified (by variety) young round-orange trees.

[d]One loss rate for seedless grapefruit was estimated due to the unidentified (by variety) young grapefruit trees.

[e]Includes seedy for the 1998 to 2006 period.

[f]Loss rates based on bearing trees or acres due to unidentified nonbearing specialty citrus.

Table 11. Average orange and grapefruit yields by age for 1993-94 through 2003-04 seasons.

Variety/District	Tree Age				
	3-5	6-8	9-13	14-23	24+
	- - - - - - - - - estimated 1-3/5 bushel boxes per acre[a] - - - - - - - - - - -				
ORANGES					
Early & Midseason					
Southern	163	344	470	487	489
West	155	323	465	543	553
Indian River	99	216	275	314	305
Central	159	331	473	602	617
Valencia					
Southern	143	273	331	364	450
West	203	324	382	389	437
Indian River	100	186	265	270	259
Central	131	259	346	480	570
GRAPEFRUIT					
White Seedless					
Southern	248	469	450	535	552
West	454	528	492	519	572
Indian River	181	358	420	475	478
Central	267	406	545	764	976
Red & Pink Seedless					
Southern	358	513	571	571	530
West	260	399	482	382	650
Indian River	181	338	427	460	447
Central	186	383	593	687	742

[a]Estimated as average trees per acre, based on data reported by FASS in various *Commercial Citrus Inventories*, times average boxes per tree, based on data reported by FASS in various *Citrus Summaries*. (Boxes per tree by age were obtained by linear interpolation of FASS yields for broad-age categories.) Yields estimated for 22 ages—ages 3 through 23 and 24 plus; age category yields in table are based on 2004 acre distribution.

Table 12. Florida orange production projections, actual for 1999-00 through 2005-06, FASS estimate for 2006-07, and FDOC estimates for 2007-08 through 2016-17.

Season	Florida Production	Bearing Acreage	Acre Loss Rate	Acre Planting Rate	Florida Bulk FCOJ Price	Processed On-Tree Price
	million boxes	1,000 acres	- - - - - - % - - - - - -		- $/ps -	- $/box -
SCENARIO 1[a]						
99-00…03-04 Avg.	226	589.3	-4.0	3.2	.99	3.21
2004-05	150	541.8	-9.0	2.4	.99	3.31
2005-06	148	491.0	-10.0	2.4	1.52	5.44
2006–07	140	489.9	-3.5	NA	2.10	7.77
2007-08	187	481.6	-3.4	.4	1.66	6.47
2008-09	185	474.7	-3.3	4.6	1.68	6.61
2009-10	181	460.3	-3.3	5.9	1.74	6.99
2010-11	178	445.2	-3.3	5.9	1.78	7.26
2011-12	175	448.7	-3.6	5.9	1.82	7.51
2012-13	174	457.3	-3.7	6.0	1.84	7.64
2013-14	173	466.0	-3.8	6.0	1.85	7.72
2014-15	172	475.2	-3.7	5.9	1.85	7.73
2015-16	173	485.3	-3.6	5.8	1.85	7.69
2016-17	174	495.9	-3.6	5.7	1.83	7.61
SCENARIO 2[b]						
99-00…03-04 Avg.	226	589.3	-4.0	3.2	.99	3.21
2004-05	150	541.8	-9.0	2.4	.99	3.31
2005-06	148	491.0	-10.0	2.4	1.52	5.44
2006–07	140	489.9	-3.5	NA	2.10	7.77
2007-08	183	471.6	-4.4	.4	1.70	6.74
2008-09	179	460.1	-4.3	4.9	1.76	7.11
2009-10	174	441.3	-4.3	6.4	1.86	7.77
2010-11	169	421.8	-4.4	6.7	1.96	8.40
2011-12	163	420.0	-4.9	6.9	2.06	9.04
2012-13	159	423.1	-5.3	7.3	2.14	9.56
2013-14	156	426.9	-5.3	7.5	2.20	9.98
2014-15	154	432.6	-5.2	7.7	2.24	10.25
2015-16	152	440.4	-5.1	7.7	2.26	10.38
2016-17	152	450.2	-5.0	7.7	2.26	10.38

[a]Assumes the probability of a hurricane impacting yields is 10%; canker yield reductions are 10% for early and midseason oranges and 5% for Valencia oranges; greening loss rates are 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; planting levels in 2006-07 through 2007-08 are 10% of the 2003-04 level, plantings in 2008-09 are 75% of price dependent level; thereafter plantings are at the price dependent level; growth in U.S. and rest of the world demands for OJ are 1% and 2% per year, respectively.

[b]Same as Scenario 1 except greening loss rates are 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; and an additional 1% loss is added to the base acre-loss rate.

Table 13. Florida grapefruit production projections, actual for 1999-00 through 2005-06, FASS estimate for 2006-07, and FDOC estimates for 2007-08 through 2016-17.

Season	Florida Production	Bearing Acres	Acre Loss Rate	Acre Planting Rate	Florida Fresh FOB Price	Florida Bulk FCGJ Price (White)	Fresh/ Processed On-Tree Price
	million boxes	1,000 acres	- - - - - %	- - - - -	- $/box -	- $/ps -	- $/box -
SCENARIO 1[a]							
99-00…03-04 Avg.	45	100.2	-5.6	1.7	15.96	1.12	2.76
2004-05	13	71.0	-14.9	1.9	30.10	NA	13.47
2005-06	19	59.8	-19.2	1.9	24.80	NA	9.02
2006-07	26	57.7	-5.9	NA	16.56	NA	2.58
2007-08	22	56.2	-4.5	.4	24.49	1.07	5.58
2008-09	21	54.9	-3.6	.7	25.26	1.05	5.85
2009-10	20	53.2	-3.4	1.2	26.17	1.09	6.33
2010-11	20	51.6	-3.4	1.6	26.94	1.16	6.85
2011-12	19	50.0	-3.7	2.1	27.92	1.27	7.56
2012-13	19	48.6	-3.9	2.9	28.82	1.41	8.31
2013-14	18	47.3	-4.0	3.8	29.84	1.58	9.20
2014-15	17	46.4	-3.9	4.8	30.85	1.76	10.14
2015-16	17	45.9	-3.8	6.0	31.70	1.96	11.01
2016-17	16	45.9	-3.6	7.1	32.45	2.14	11.82
SCENARIO 2[b]							
99-00…03-04 Avg.	45	100.2	-5.6	1.7	15.96	1.12	2.76
2004-05	13	71.0	-14.9	1.9	30.10	NA	13.47
2005-06	19	59.8	-19.2	1.9	24.80	NA	9.02
2006-07	26	57.7	-5.9	NA	16.56	NA	2.58
2007-08	21	55.0	-5.5	.4	25.08	1.11	5.92
2008-09	21	53.2	-4.6	.8	26.17	1.13	6.41
2009-10	20	51.0	-4.4	1.6	27.44	1.21	7.15
2010-11	19	48.8	-4.5	2.3	28.62	1.33	7.98
2011-12	18	46.7	-5.0	3.2	30.13	1.51	9.10
2012-13	17	44.8	-5.5	4.5	31.67	1.74	10.36
2013-14	16	43.2	-5.6	6.0	33.37	2.02	11.83
2014-15	15	42.1	-5.4	7.8	35.01	2.33	13.37
2015-16	15	41.6	-5.1	9.6	36.38	2.63	14.76
2016-17	14	42.0	-4.8	11.2	37.45	2.90	15.92

[a]Assumes the probability of a hurricane impacting yields is 10%; canker yield reductions are 20%; greening loss rates are 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; planting levels in 2006-07 through 2007-08 are 10% of the 2003-04 level; plantings in 2008-09 are 75% of price dependent level; thereafter plantings are at the price dependent level; growth in U.S. and export demands for fresh grapefruit and GJ are zero.

[b]Same as Scenario 1 except greening loss rates are 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; and an additional 1% loss is added to the base acre-loss rate.

Table 14. Estimated specialty citrus production by variety.[a]

Season	Temples	Tangelos	Tangerines	TOTAL
	- million boxes	- -		
2007-08	.8	1.5	4.6	6.9
2008-09	.7	1.5	4.4	6.6
2009-10	.7	1.4	4.3	6.4
2010-11	.7	1.4	4.1	6.2
2011-12	.6	1.3	4.0	5.9
2012-13	.6	1.3	3.9	5.8
2013-14	.6	1.3	3.9	5.8
2014-15	.6	1.2	3.8	5.6
2015-16	.5	1.2	3.7	5.4
2016-17	.5	1.2	3.7	5.4

[a] Assumes the acre-loss rate for each variety is 6% per year and replacement planting levels (acre plantings are assumed to be equal to acre losses).

APPENDIX

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Table A-1. Florida orange production projections assuming restricted planting levels, actual for 1999-00 through 2005-06, FASS estimate for 2006-07, and FDOC estimates for 2007-08 through 2016-17.

Season	Florida Production	Bearing Acreage	Acre Loss Rate	Acre Planting Rate	Florida Bulk FCOJ Price	Processed On-Tree Price
	million boxes	1,000 acres	- - - - - - %	- - - - - -	- $/ps -	- $/box -
SCENARIO 1A[a]						
99-00…03-04 Avg.	226	589.3	-4.0	3.2	.99	3.21
2004-05	150	541.8	-9.0	2.4	.99	3.31
2005-06	148	491.0	-10.0	2.4	1.52	5.44
2006–07	140	489.9	-3.5	NA	2.10	7.77
2007-08	187	481.6	-3.4	.0	1.66	6.47
2008-09	185	474.7	-3.4	.0	1.68	6.61
2009-10	181	458.4	-3.4	.0	1.74	7.00
2010-11	178	441.5	-3.7	.0	1.78	7.28
2011-12	173	423.2	-4.1	.0	1.83	7.61
2012-13	168	403.9	-4.6	7.7	1.88	7.91
2013-14	162	384.4	-4.5	7.7	1.93	8.23
2014-15	155	365.4	-4.3	7.7	1.98	8.54
2015-16	151	377.3	-4.1	7.7	2.01	8.74
2016-17	148	390.6	-4.0	7.6	2.02	8.81
SCENARIO 2A[b]						
99-00…03-04 Avg.	226	589.3	-4.0	3.2	.99	3.21
2004-05	150	541.8	-9.0	2.4	.99	3.31
2005-06	148	491.0	-10.0	2.4	1.52	5.44
2006–07	140	489.9	-3.5	NA	2.10	7.77
2007-08	183	471.6	-4.4	.0	1.70	6.74
2008-09	179	460.1	-4.4	.0	1.76	7.11
2009-10	174	439.5	-4.5	.0	1.86	7.78
2010-11	168	418.2	-4.8	.0	1.96	8.42
2011-12	161	394.9	-5.6	.0	2.07	9.16
2012-13	154	370.0	-6.3	9.6	2.19	9.89
2013-14	145	345.3	-6.2	10.0	2.30	10.64
2014-15	137	321.5	-6.0	10.3	2.41	11.34
2015-16	130	332.8	-5.6	10.5	2.49	11.82
2016-17	127	346.9	-5.3	10.4	2.52	12.00

[a]Assumes the probability of a hurricane impacting yields is 10%; canker yield reductions are 10% for early and midseason oranges and 5% for Valencia oranges; greening loss rates are 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; planting levels in 2006-07 through 2011-12 are zero; thereafter plantings are at the price dependent level; growth in U.S. and rest of the world demands for OJ are 1% and 2% per year, respectively.

[b]Same as Scenario 1A except greening loss rates are 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; and an additional 1% loss is added to the base acre-loss rate.

Table A-2. Florida orange production projections for alternative assumptions.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season	**- - - - - - - - - - - - - - - - - - - million boxes - - - - - - - - - - - - - - - - - - -**							
2007-08	196	139	190	184	184	180	176	184
2008-09	195	137	189	180	180	174	169	180
2009-10	193	134	187	175	175	168	161	175
2010-11	191	131	185	172	171	163	154	171
2011-12	188	129	182	168	167	157	147	166
2012-13	186	130	181	166	164	153	142	164
2013-14	185	131	180	165	162	149	138	161
2014-15	185	133	180	165	160	147	135	159
2015-16	185	135	180	165	160	146	133	158
2016-17	187	139	182	166	160	145	132	157

[a] Low: Yield reductions of 5% for early and midseason oranges and 2.5% for Valencia oranges.
[b] High: Yield reductions of 15% for early and midseason oranges and 7.5% for Valencia oranges.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Growth in U.S. and rest of the world demands for OJ set at 1% and 2% per year, respectively.
[g] Growth in U.S. and rest of the world demands for OJ set at 0% and 1% per year, respectively.

Table A-3. Florida orange acre-loss and planting-rate projections.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season	**- - - - - - Acre-Loss Rate: % - - - - - -**							
2007-08	-3.4	-3.4	-3.4	-3.4	-3.4	-4.4	-5.4	-3.4
2008-09	-3.3	-3.3	-3.3	-3.3	-3.3	-4.3	-5.3	-3.3
2009-10	-3.3	-3.2	-3.3	-3.3	-3.3	-4.3	-5.3	-3.3
2010-11	-3.3	-3.3	-3.3	-3.3	-3.5	-4.5	-5.4	-3.5
2011-12	-3.6	-3.4	-3.5	-3.6	-3.9	-4.9	-5.9	-4.0
2012-13	-3.7	-3.6	-3.7	-3.8	-4.3	-5.3	-6.2	-4.4
2013-14	-3.8	-3.5	-3.8	-3.8	-4.4	-5.3	-6.3	-4.5
2014-15	-3.7	-3.5	-3.7	-3.7	-4.4	-5.2	-6.1	-4.5
2015-16	-3.7	-3.4	-3.6	-3.7	-4.2	-5.1	-6.0	-4.4
2016-17	-3.6	-3.3	-3.6	-3.6	-4.1	-5.0	-5.8	-4.3
	- - - - Acre-Planting Rate (Price Dependent[h]): % - - - -							
2007-08	.4	.4	.4	.4	.4	.4	.4	.4
2008-09	4.6	5.6	4.7	4.5	4.5	4.8	5.0	4.3
2009-10	5.9	7.7	6.0	5.8	5.9	6.3	6.7	5.4
2010-11	5.8	7.7	6.0	5.8	6.0	6.5	7.1	5.4
2011-12	5.9	7.6	6.0	5.8	6.2	6.8	7.5	5.5
2012-13	5.9	7.4	6.0	5.9	6.5	7.2	8.0	5.6
2013-14	5.9	7.1	6.0	5.9	6.7	7.5	8.3	5.6
2014-15	5.9	6.8	6.0	5.8	6.7	7.6	8.5	5.7
2015-16	5.8	6.4	5.9	5.7	6.8	7.6	8.6	5.6
2016-17	5.7	6.0	5.8	5.6	6.7	7.6	8.5	5.6

[a] Low: Yield reductions of 5% for early and midseason oranges and 2.5% for Valencia oranges.
[b] High: Yield reductions of 15% for early and midseason oranges and 7.5% for Valencia oranges.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Growth in U.S. and rest of the world demands for OJ set at 1% and 2% per year, respectively.
[g] Growth in U.S. and rest of the world demands for OJ set at 0% and 1% per year, respectively.
[h] Restricted through 2008-09, assuming limited availability of nursery trees.

Table A-4. Florida bulk FCOJ FOB price and processed on-tree price projections.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season				**FOB Price: $/ps**				
2007-08	1.60	2.00	1.64	1.68	1.69	1.72	1.74	1.61
2008-09	1.61	2.06	1.65	1.71	1.75	1.79	1.83	1.62
2009-10	1.66	2.13	1.70	1.78	1.85	1.91	1.96	1.67
2010-11	1.69	2.18	1.73	1.83	1.94	2.01	2.08	1.71
2011-12	1.73	2.20	1.77	1.87	2.03	2.12	2.21	1.75
2012-13	1.75	2.18	1.79	1.89	2.09	2.20	2.30	1.78
2013-14	1.77	2.13	1.80	1.90	2.15	2.26	2.37	1.79
2014-15	1.78	2.07	1.81	1.90	2.18	2.30	2.41	1.80
2015-16	1.78	2.00	1.80	1.89	2.20	2.31	2.43	1.79
2016-17	1.78	1.93	1.80	1.87	2.19	2.31	2.41	1.78
				On-Tree Price: $/box				
2007-08	6.13	8.68	6.34	6.59	6.71	6.87	7.03	6.15
2008-09	6.18	9.04	6.42	6.81	7.06	7.31	7.57	6.23
2009-10	6.47	9.49	6.72	7.27	7.71	8.07	8.44	6.57
2010-11	6.70	9.82	6.96	7.58	8.28	8.75	9.23	6.82
2011-12	6.93	9.96	7.19	7.85	8.85	9.43	10.01	7.09
2012-13	7.08	9.81	7.32	7.98	9.28	9.94	10.61	7.23
2013-14	7.20	9.51	7.41	8.04	9.63	10.35	11.07	7.33
2014-15	7.26	9.12	7.44	8.03	9.85	10.60	11.35	7.36
2015-16	7.28	8.67	7.43	7.96	9.95	10.70	11.43	7.33
2016-17	7.26	8.22	7.37	7.85	9.93	10.65	11.33	7.24

[a] Low: Yield reductions of 5% for early and midseason oranges and 2.5% for Valencia oranges.
[b] High: Yield reductions of 15% for early and midseason oranges and 7.5% for Valencia oranges.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Growth in U.S. and rest of the world demands for OJ set at 1% and 2% per year, respectively.
[g] Growth in U.S. and rest of the world demands for OJ set at 0% and 1% per year, respectively.

Table A-5. Florida grapefruit production projections assuming restricted planting levels, actual for 1999-00 through 2005-06, FASS estimate for 2006-07, and FDOC estimates for 2007-08 through 2016-17.

Season	Florida Production	Bearing Acres	Acre Loss Rate	Acre Planting Rate	Florida Fresh FOB Price	Florida Bulk FCGJ Price (White)	Fresh/ Processed On-Tree Price
	million boxes	1,000 acres	- - - - - % - - - - -		- $/box -	- $/ps -	- $/box -
SCENARIO 1A[a]							
99-00…03-04 Avg.	45	100.2	-5.6	1.7	15.96	1.12	2.76
2004-05	13	71.0	-14.9	1.9	30.10	NA	13.47
2005-06	19	59.8	-19.2	1.9	24.80	NA	9.02
2006-07	26	57.7	-5.9	NA	16.56	NA	2.58
2007-08	22	56.2	-4.5	.0	24.49	1.07	5.58
2008-09	21	54.9	-3.6	.0	25.26	1.05	5.85
2009-10	20	53.0	-3.4	.0	26.19	1.09	6.34
2010-11	20	51.1	-3.5	.0	27.01	1.17	6.89
2011-12	19	49.2	-3.9	.0	28.10	1.29	7.66
2012-13	18	47.1	-4.2	3.2	29.19	1.44	8.53
2013-14	18	45.1	-4.2	4.3	30.53	1.63	9.63
2014-15	17	43.1	-4.1	5.6	32.02	1.87	10.90
2015-16	16	42.7	-3.9	7.2	33.28	2.13	12.12
2016-17	16	42.8	-3.7	8.7	34.31	2.37	13.21
SCENARIO 2A[b]							
99-00…03-04 Avg.	45	100.2	-5.6	1.7	15.96	1.12	2.76
2004-05	13	71.0	-14.9	1.9	30.10	NA	13.47
2005-06	19	59.8	-19.2	1.9	24.80	NA	9.02
2006-07	26	57.7	-5.9	NA	16.56	NA	2.58
2007-08	21	55.0	-5.5	.0	25.08	1.11	5.92
2008-09	21	53.2	-4.6	.0	26.17	1.13	6.41
2009-10	20	50.8	-4.5	.0	27.47	1.21	7.16
2010-11	19	48.4	-4.6	.0	28.70	1.34	8.03
2011-12	18	45.9	-5.3	.0	30.33	1.53	9.22
2012-13	17	43.2	-5.8	5.1	32.13	1.78	10.64
2013-14	16	40.6	-5.9	7.0	34.30	2.10	12.43
2014-15	15	38.1	-5.7	9.3	36.72	2.49	14.50
2015-16	14	37.8	-5.3	11.8	38.78	2.90	16.46
2016-17	14	38.3	-4.9	13.8	40.29	3.27	18.08

[a]Assumes the probability of a hurricane impacting yields is 10%; canker yield reductions are 20%; greening loss rates are 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; planting levels in 2006-07 through 2011-12 are zero; thereafter plantings are at the price dependent level; growth in U.S. and export demands for fresh grapefruit and GJ are zero.

[b]Same as Scenario 1A except greening loss rates are 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees and 12+ year old trees, respectively; and an additional 1% loss is added to the base acre-loss rate.

Table A-6. Florida grapefruit production projections for alternative assumptions.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season	- - - - - - - - - - - -	- - - -	- - - -	**million boxes**	- - - -	- - - -	- - - -	- - - -
2007-08	25	13	24	20	20	19	19	20
2008-09	24	13	23	19	19	18	18	19
2009-10	24	13	23	18	18	17	17	18
2010-11	23	13	22	17	17	17	16	17
2011-12	23	12	22	17	17	16	15	17
2012-13	22	12	21	16	16	15	14	16
2013-14	21	12	20	16	15	14	13	15
2014-15	20	12	19	15	15	14	13	15
2015-16	19	12	18	15	15	13	12	14
2016-17	18	12	18	15	14	13	12	14

[a] Low: Yield reduction of 10%.
[b] High: Yield reduction of 30%.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Annual growth in U.S. and export demands for fresh grapefruit and GJ set at 0%.
[g] Annual growth in U.S. and export demands for fresh grapefruit set at -1%; growth in U.S. (export) demand for GJ set at -3% (0%).

Table A-7. Florida grapefruit acre-loss and planting-rate projections.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season				**Acre-Loss Rate: %**				
2007-08	-4.5	-4.5	-4.5	-4.5	-4.5	-5.5	-6.5	-4.5
2008-09	-3.6	-3.6	-3.6	-3.6	-3.6	-4.6	-5.6	-3.6
2009-10	-3.4	-3.4	-3.4	-3.4	-3.4	-4.4	-5.4	-3.4
2010-11	-3.5	-3.3	-3.4	-3.4	-3.5	-4.5	-5.5	-3.5
2011-12	-3.8	-3.5	-3.8	-3.6	-4.0	-5.0	-5.9	-4.1
2012-13	-4.1	-3.6	-4.1	-3.8	-4.4	-5.3	-6.2	-4.5
2013-14	-4.3	-3.4	-4.2	-3.8	-4.5	-5.3	-6.2	-4.7
2014-15	-4.3	-3.2	-4.2	-3.6	-4.3	-5.1	-5.9	-4.6
2015-16	-4.3	-3.0	-4.2	-3.5	-4.1	-4.8	-5.5	-4.4
2016-17	-4.2	-2.7	-4.0	-3.2	-3.8	-4.5	-5.2	-4.2
				Acre-Planting Rate (Price Dependent[h]): %				
2007-08	.4	.4	.4	.4	.4	.4	.4	.4
2008-09	.4	1.3	.5	.9	.9	1.0	1.2	.7
2009-10	.3	3.4	.5	1.9	1.9	2.3	2.7	1.4
2010-11	.2	5.3	.5	2.8	2.8	3.5	4.3	1.9
2011-12	.1	7.2	.6	3.8	3.9	5.0	6.3	2.5
2012-13	.1	8.9	.8	5.0	5.1	6.7	8.5	3.3
2013-14	.4	10.2	1.3	6.2	6.5	8.5	10.9	4.1
2014-15	.9	11.0	2.0	7.3	7.8	10.2	12.9	5.0
2015-16	1.8	11.3	3.0	8.3	9.0	11.6	14.4	5.9
2016-17	3.1	11.1	4.4	9.0	9.8	12.5	15.2	6.7

[a] Low: Yield reduction of 10%.
[b] High: Yield reduction of 30%.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Annual growth in U.S. and export demands for fresh grapefruit and GJ set at 0%.
[g] Annual growth in U.S. and export demands for fresh grapefruit set at -1%; growth in U.S. (export) demand for GJ set at -3% (0%).
[h] Restricted through 2008-09, assuming limited availability of nursery trees.

Table A-8. Florida fresh and processed grapefruit FOB price projections.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season	------------------ **Fresh FOB Price: $/box** ------------------							
2007-08	20.99	41.29	22.10	27.41	27.41	28.08	28.77	26.89
2008-09	21.44	41.63	22.56	28.63	28.64	29.67	30.76	27.78
2009-10	21.96	42.47	23.10	30.11	30.12	31.58	33.11	28.91
2010-11	22.50	43.46	23.67	31.18	31.25	33.13	35.15	29.65
2011-12	23.23	44.74	24.43	32.50	32.71	35.07	37.63	30.72
2012-13	24.05	45.85	25.27	33.47	33.95	36.78	39.87	31.59
2013-14	25.08	46.68	26.29	34.49	35.28	38.55	42.14	32.59
2014-15	26.23	46.88	27.40	35.36	36.47	40.09	44.06	33.54
2015-16	27.43	46.18	28.50	35.88	37.29	41.09	45.21	34.28
2016-17	28.78	44.82	29.68	36.10	37.77	41.52	45.50	34.86
	------------------ **FCGJ FOB Price: $/ps** ------------------							
2007-08	.82	1.76	.91	1.23	1.23	1.26	1.30	1.09
2008-09	.69	2.47	.81	1.33	1.33	1.41	1.49	1.12
2009-10	.64	3.14	.78	1.49	1.49	1.62	1.76	1.18
2010-11	.63	3.64	.79	1.67	1.68	1.87	2.08	1.25
2011-12	.65	4.00	.82	1.89	1.91	2.18	2.48	1.34
2012-13	.70	4.28	.89	2.11	2.15	2.51	2.90	1.43
2013-14	.78	4.47	1.00	2.33	2.42	2.86	3.33	1.53
2014-15	.89	4.55	1.14	2.54	2.67	3.18	3.72	1.63
2015-16	1.05	4.51	1.32	2.70	2.89	3.44	4.01	1.72
2016-17	1.24	4.34	1.53	2.80	3.05	3.60	4.15	1.79

[a] Low: Yield reduction of 10%.
[b] High: Yield reduction of 30%.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Annual growth in U.S. and export demands for fresh grapefruit and GJ set at 0%.
[g] Annual growth in U.S. and export demands for fresh grapefruit set at -1%; growth in U.S. (export) demand for GJ set at -3% (0%).

Table A-9. Florida fresh and processed grapefruit on-tree price projections.

Scenario	3A	4A	5A	6A	7A	8A	9A	10A
Hurricane Probability	0%	100%	10%	10%	10%	10%	10%	10%
Canker Impact	Low[a]	Low[a]	Low[a]	High[b]	High[b]	High[b]	High[b]	High[b]
Greening Impact	Low[c]	Low[c]	Low[c]	Low[c]	High[d]	High[d]	High[d]	High[d]
Base Acre-Loss Rate	Average[e]	Average[e]	Average[e]	Average[e]	Average[e]	Avg[e]+1%	Avg[e] +2%	Average[e]
Demand Growth	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Base[f]	Reduced[g]
Season	- - - - - - - -	- - - - - - - -	- - - - **Fresh FOB Price: $/box**	- - - - - - - -				
2007-08	3.47	14.74	4.19	7.19	7.19	7.55	7.92	6.59
2008-09	3.31	16.81	4.10	7.97	7.97	8.59	9.24	7.05
2009-10	3.39	18.95	4.24	9.00	9.01	9.94	10.92	7.67
2010-11	3.59	20.72	4.50	9.95	9.99	11.28	12.65	8.18
2011-12	3.95	22.26	4.92	11.09	11.22	12.92	14.76	8.87
2012-13	4.42	23.47	5.46	12.09	12.41	14.52	16.83	9.49
2013-14	5.07	24.32	6.19	13.13	13.69	16.21	18.94	10.21
2014-15	5.87	24.62	7.05	14.06	14.89	17.73	20.80	10.90
2015-16	6.79	24.20	7.99	14.71	15.82	18.84	22.04	11.46
2016-17	7.88	23.17	9.06	15.08	16.44	19.44	22.53	11.90

[a] Low: Yield reduction of 10%.
[b] High: Yield reduction of 30%.
[c] Low: Loss rates 50%, 37.5% and 25% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[d] High: Loss rates 100%, 75% and 50% above base rates for 1-3 year old trees, 4-11 year old trees, and 12+ year old trees, respectively.
[e] Dependent on age.
[f] Annual growth in U.S. and export demands for fresh grapefruit and GJ set at 0%.
[g] Annual growth in U.S. and export demands for fresh grapefruit set at -1%; growth in U.S. (export) demand for GJ set at -3% (0%).