



# **Economic Contributions of the Florida Citrus Industry in 2014-15 and for Reduced Production**

## **Report to the Florida Department of Citrus**

Alan W. Hodges, Ph.D., Extension Scientist, and Thomas H. Spreen, Ph.D., Professor Emeritus  
University of Florida-IFAS, Food and Resource Economics Department, Gainesville, Florida

June 9, 2015

**Acknowledgements.** Assistance in the preparation of this report was provided by Marisa Zansler, Director of Economic and Market Research for Florida Department of Citrus, and Robert Norberg, citrus industry consultant and former FDOC Deputy Executive Director.

# Summary

## Methodology

The economic impacts of the Florida citrus industry were evaluated for FY 2014-15 and for a hypothetical scenario of reduced citrus production in comparison with previous estimates for FY 2007-08 and FY 2012-13. Information on citrus fruit production, packed fresh fruit shipments, and processed citrus juices and by-product volumes and prices were taken from reports by the USDA-National Agricultural Statistics Services (NASS), Florida Agricultural Statistics Service (FASS), Florida Department of Citrus (FDOC) Economic and Market Research Department, the Florida Citrus Processors Association, and other industry sources. The regional economic contributions of the Florida citrus industry were evaluated using the *IMPLAN* regional economic modeling system and associated databases (IMPLAN Group, LLC), to estimate the economic multipliers that capture the additional economic activity generated by re-spending of income in the local economy arising from the sale of Florida citrus products. Four industry sectors in *IMPLAN* were used to analyze the Florida citrus industry: fruit farming (sector #4), frozen foods (#53), canned fruit and vegetables (#54), and wholesale trade (#319). The output value of each major type of product was specified as an impact event in the appropriate industry sector: fresh market citrus fruit in the fruit farming sector, packed fresh citrus fruit in the wholesale trade sector, frozen citrus juices (FCOJ) in the frozen foods sector, and chilled or shelf-stable single strength NFC citrus juices in the canned (bottled) food sector. In addition to orange and grapefruit juices, the Florida citrus processing industry produces byproducts of citrus pulp, meal, molasses, and essential oils, and values of these by-products were assigned to the two processing sectors based on relationships previously determined for FY 2012-13, and in proportion to their primary product values. Also, the export and local consumption values of citrus juice and byproducts were treated separately; only the direct impacts were considered for local consumption, since these values do not represent a change in overall regional economic activity. Refer to the recent sponsored project report for a complete description of the data sources and analytical methodology<sup>1</sup>. Prices for citrus fruit and processed juices under the 80 million box orange crop scenario were estimated using the World Orange Juice model<sup>2</sup>.

## Citrus Fruit Production

The total volume of citrus fruit production in Florida in FY 2014-15 was projected at 112.3 million boxes, based on the latest available forecast by USDA-NASS (Table 1). The grower value of Florida citrus fruit,

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<sup>1</sup> Hodges, A.W., M. Rahmani, T.J Stevens and T.H. Spreen. Economic Impacts of the Florida Citrus Industry in 2012-13. Sponsored project report to the Florida Department of Citrus. University of Florida, Food and Resource Economics Department, Gainesville, FL. Dec. 19, 2014, 39 pages, available at: [http://www.fred.ifas.ufl.edu/economic-impact-analysis/pdf/Economic\\_Impacts\\_Florida\\_Citrus\\_Industry\\_2012-13.pdf](http://www.fred.ifas.ufl.edu/economic-impact-analysis/pdf/Economic_Impacts_Florida_Citrus_Industry_2012-13.pdf)

<sup>2</sup> Spreen, Thomas H., Charlene Brewster, and Mark G. Brown. The Free Trade Area of the Americas and the world processed orange market. *Journal of Agricultural and Applied Economics* 35(2003): 107-26.

based on delivered prices, was \$1.533 billion, of which fruit for processing was valued at \$1.327 billion and fresh fruit was valued at \$206 million (Table 1). The value of fresh fruit shipped from packinghouses is estimated at \$332 million. The packinghouse wholesale margin on fresh packed fruit is \$125 million, representing the difference between what is paid by packinghouses (delivered prices) and the value of shipped fruit (F.O.B. prices).

The “reduced production” scenario assumes an annual crop of 80 million boxes of oranges, and 94.22 million boxes of all Florida citrus fruit, including grapefruit and specialty citrus fruit. This scenario is believed to be representative of near term situation, given recent declining harvest levels. Under this scenario, the total grower value would be \$1.259 billion and the fresh fruit packinghouse margin would be \$101 million (Table 1).

**Table 1.** Florida citrus fruit production volume and value for FY 2014-15 (projected) and reduced production scenario

| Citrus Type                            | Volume<br>Fresh        | Volume<br>Processed   | Total                 | Grower<br>value<br>fresh<br>fruit | Grower<br>value<br>processed<br>fruit | Total<br>Grower<br>value  | FOB<br>value<br>fresh<br>packed<br>fruit | Packinghouse<br>Operating<br>Margin |
|--|------------------------|-----------------------|-----------------------|-----------------------------------|---------------------------------------|---------------------------|--|-------------------------------------|
|  | ----- 1000 boxes ----- |                       |                       | ----- \$1000 -----                |                                       |                           |  |                                     |
| <u>Fiscal Year 2014-15 (projected)</u> |                        |                       |                       |                                   |                                       |                           |  |                                     |
| Oranges                                | 4,000                  | 92,400                | 96,400                | \$61,507                          | \$1,277,269                           | \$1,338,776               | \$103,747                                | \$42,240                            |
| Grapefruit                             | 5,742                  | 7,158                 | 12,900                | \$93,833                          | \$36,481                              | \$130,314                 | \$154,239                                | \$60,406                            |
| Specialty                              | 1,738                  | 1,280                 | 3,018                 | \$50,978                          | \$12,933                              | \$63,911                  | \$73,635                                 | \$22,657                            |
| <b>Total</b>                           | <b><u>11,480</u></b>   | <b><u>100,838</u></b> | <b><u>112,318</u></b> | <b><u>\$206,318</u></b>           | <b><u>\$1,326,683</u></b>             | <b><u>\$1,533,001</u></b> | <b><u>\$331,621</u></b>                  | <b><u>\$125,303</u></b>             |
| <u>Reduced Production Scenario</u>     |                        |                       |                       |                                   |                                       |                           |  |                                     |
| Oranges                                | 3,000                  | 77,000                | 80,000                | \$61,320                          | \$1,022,310                           | \$1,083,630               | \$93,000                                 | \$31,680                            |
| Grapefruit                             | 4,690                  | 6,745                 | 11,435                | \$81,506                          | \$35,483                              | \$116,989                 | \$130,844                                | \$49,339                            |
| Specialty                              | 1,566                  | 1,216                 | 2,782                 | \$46,134                          | \$12,491                              | \$58,626                  | \$66,555                                 | \$20,421                            |
| <b>Total</b>                           | <b><u>9,256</u></b>    | <b><u>84,961</u></b>  | <b><u>94,217</u></b>  | <b><u>\$188,960</u></b>           | <b><u>\$1,070,284</u></b>             | <b><u>\$1,259,244</u></b> | <b><u>\$290,399</u></b>                  | <b><u>\$101,439</u></b>             |

Source: USDA-NASS estimates, April 2015; FDOC Outlook, March 2015.

### Citrus Juice Processing

Florida citrus juice processing volumes and values for the current year and hypothetical scenario are presented in Table 2. Based on Florida citrus processor statistics as of week 32 of the 2014-15 production year (May 22, 2015), it is estimated that a total of 829 million SSE gallons of citrus juice will be produced, including 785 million gallons of orange juice and 44 million gallons of grapefruit juice, comprised of 422 million gallons as NFC (canned) product, 283 million gallons as frozen bulk product, 84 million gallons frozen packaged product, and 39 million gallons NFC bulk product. Processor gross values were estimated using an average wholesale price for bulk juice sales, and average retail values for packaged products, less an assumed 40 percent retail markup, based on information from Florida citrus processor statistics (FDOC). The total FOB processor value of citrus juice in FY 2014-15 is \$2.636 billion. In-state sales of packaged frozen and canned

citrus juices represented 14.53 percent and 8.09 percent of total production, respectively, based on Nielson retail scanner data from 2012-13 (FDOC), while all bulk juice was assumed to be shipped out-of-state to packaging firms. The total value of packaged and bulk citrus juice shipped from Florida to other states and foreign countries was estimated at \$2.337 billion, or 89 percent of total citrus juice sales.

**Table 2.** Florida citrus processor volume and value for FY 2014-15 and the reduced production scenario

| Type, Form                        | Forecast 2014/15 |                   |         |                    |                       | Reduced Production Scenario |                   |         |                    |                       |
|-----------------------------------|------------------|-------------------|---------|--------------------|-----------------------|-----------------------------|-------------------|---------|--------------------|-----------------------|
|                                   | Million SS Gal   | Unit Retail Value | Mark-up | FOB Value/gal (\$) | Gross FOB Value (M\$) | Million SS Gal              | Unit Retail Value | Mark-up | FOB Value/gal (\$) | Gross FOB Value (M\$) |
| <u>Orange Juice</u>               |                  |                   |         |                    |                       |                             |                   |         |                    |                       |
| Frozen-bulk                       | 258.6            | \$1.30            | 0%      | \$1.30             | \$336                 | 232.5                       | \$1.37            | 0%      | \$1.37             | \$319                 |
| Frozen-packaged                   | 83.8             | \$5.00            | 40%     | \$3.00             | \$251                 | 75.4                        | \$5.25            | 40%     | \$3.15             | \$237                 |
|                                   | <u>342.4</u>     |                   |         |                    | <u>\$588</u>          | <u>307.9</u>                |                   |         |                    | <u>\$556</u>          |
| NFC (canned)-bulk                 | 35.3             | \$2.50            | 0%      | \$2.50             | \$88                  | 31.8                        | \$2.63            | 0%      | \$2.63             | \$84                  |
| NFC (canned)-packaged             | 407.1            | \$7.57            | 40%     | \$4.54             | \$1,849               | 366.1                       | \$7.95            | 40%     | \$4.77             | \$1,746               |
|                                   | <u>442.4</u>     |                   |         |                    | <u>\$1,937</u>        | <u>397.8</u>                |                   |         |                    | <u>\$1,830</u>        |
| Total OJ                          | <u>784.8</u>     |                   |         |                    | <u>\$2,525</u>        | <u>706.5</u>                |                   |         |                    | <u>\$2,386</u>        |
| <u>Grapefruit Juice</u>           |                  |                   |         |                    |                       |                             |                   |         |                    |                       |
| Frozen-bulk                       | 24.8             | \$1.40            | 0%      | \$1.40             | \$35                  | 23.5                        | \$1.44            | 0%      | \$1.44             | \$34                  |
| Frozen-packaged                   | 0.2              | \$5.42            | 40%     | \$3.25             | \$1                   | 0.2                         | \$5.56            | 40%     | \$3.34             | \$1                   |
|                                   | <u>25.0</u>      |                   |         |                    | <u>\$35</u>           | <u>23.7</u>                 |                   |         |                    | <u>\$34</u>           |
| NFC (canned)-bulk                 | 4.0              | \$1.75            | 0%      | \$1.75             | \$7                   | 3.7                         | \$1.79            | 0%      | \$1.79             | \$7                   |
| NFC (canned)-packaged             | 15.1             | \$7.63            | 40%     | \$4.58             | \$69                  | 14.3                        | \$7.82            | 40%     | \$4.70             | \$67                  |
|                                   | <u>19.0</u>      |                   |         |                    | <u>\$76</u>           | <u>18.0</u>                 |                   |         |                    | <u>\$74</u>           |
| Total GJ                          | <u>43.9</u>      |                   |         |                    | <u>\$111</u>          | <u>41.7</u>                 |                   |         |                    | <u>\$108</u>          |
| Total Orange and Grapefruit Juice | <u>828.8</u>     |                   |         |                    | <u>\$2,636</u>        | <u>747.4</u>                |                   |         |                    | <u>\$2,494</u>        |

Source: FDOC, Economic and Market Research Department, May 2015.

FPS Report #32, 2014/15 Season, extrapolated to project full season; movement converted from PS to SSG.

For the reduced production scenario, total orange and grapefruit juice production volume was estimated at 747 million SS gallons, and processor value was estimated at \$2.494 billion, or 5.4 percent lower than for FY 2014-15 (Table 2). This value reflected average FOB prices 5.0% to 5.4% higher for orange juice, and 2.3% to 2.9% higher for grapefruit juice, compared to FY 2014-15 values, based on simulation results from the World Orange Juice model.

Processed citrus by-products were collectively valued at \$109 million for FY 2014-15 and \$91 million for the reduced production scenario.

## Economic Impacts

Total economic impact estimates for the Florida citrus industry in FY 2014-15 and for the reduced production scenario are summarized in Table 3. For FY 2014-15, the total output or revenue impact of the industry is projected at \$9.882 billion, including \$3.900 billion from citrus fruit production, \$5.685 billion from citrus juice and byproducts manufacturing, and \$296 million from fresh citrus marketing margins. Employment impacts of the citrus industry in the 2014-15 season are projected at 56,446 fulltime and part-time jobs, while value added contributions to Gross Domestic Product (GDP) are estimated at \$4.999 billion, and labor income impacts (employee wages, salaries, benefits, business owner income) are estimated at \$3.055 billion. Note that these estimates include the indirect multiplier effects of supply chain purchases and induced multiplier effects of consumer spending by employee households and governments for the export (out-of-state) share of industry sales that represent new final demand to the Florida economy, but direct effects only for in-state sales.

**Table 3.** Projected economic contributions of the Florida citrus industry in FY 2014-15 and for the 80 million box orange crop scenario

| Industry Activity   | Impact Type (Multiplier Effect) | FY 2014-15 (Projected) |                     |                    |                        | Reduced Production Scenario |                     |                    |                        |
|---|---------------------------------|------------------------|---------------------|--------------------|------------------------|-----------------------------|---------------------|--------------------|------------------------|
|   |                                 | Employment (Jobs)      | Labor Income (Mn\$) | Value Added (Mn\$) | Industry Output (Mn\$) | Employment (Jobs)           | Labor Income (Mn\$) | Value Added (Mn\$) | Industry Output (Mn\$) |
| Fruit Production  | Direct                          | 8,305                  | \$530.2             | \$819.8            | \$1,533.0              | 6,822                       | \$435.5             | \$673.4            | \$1,259.2              |
|   | Indirect                        | 5,804                  | \$192.3             | \$232.1            | \$398.0                | 4,767                       | \$158.0             | \$190.6            | \$326.9                |
|   | Induced                         | 15,012                 | \$749.2             | \$1,261.7          | \$1,969.2              | 12,331                      | \$615.4             | \$1,036.4          | \$1,617.6              |
|   | Total                           | 29,121                 | \$1,471.7           | \$2,313.6          | \$3,900.2              | 23,920                      | \$1,208.9           | \$1,900.5          | \$3,203.8              |
| Citrus Juice Manufacturing (exports, local sales, by-products)      | Direct                          | 5,251                  | \$391.9             | \$701.6            | \$2,745.2              | 3,613                       | \$275.5             | \$523.7            | \$2,070.6              |
|   | Indirect                        | 4,720                  | \$300.1             | \$489.3            | \$924.3                | 3,462                       | \$219.2             | \$358.3            | \$689.6                |
|   | Induced                         | 15,458                 | \$775.7             | \$1,296.9          | \$2,015.3              | 11,135                      | \$559.0             | \$934.4            | \$1,452.5              |
|   | Total                           | 25,429                 | \$1,467.7           | \$2,487.8          | \$5,684.9              | 18,211                      | \$1,053.6           | \$1,816.4          | \$4,212.6              |
| Fresh Fruit Packinghouse Operating Margin (exports and local sales) | Direct                          | 569                    | \$47.3              | \$86.7             | \$125.3                | 461                         | \$38.3              | \$70.2             | \$101.4                |
|   | Indirect                        | 189                    | \$10.4              | \$16.1             | \$25.6                 | 153                         | \$8.4               | \$13.0             | \$20.7                 |
|   | Induced                         | 1,138                  | \$57.5              | \$94.7             | \$145.5                | 921                         | \$46.6              | \$76.7             | \$117.8                |
|   | Total                           | 1,896                  | \$115.3             | \$197.4            | \$296.4                | 1,535                       | \$93.3              | \$159.8            | \$240.0                |
| Total All Applicable Activities                                     |                                 | 56,446                 | \$3,054.7           | \$4,998.9          | \$9,881.6              | 43,667                      | \$2,355.9           | \$3,876.8          | \$7,656.3              |

Total impact for all activities includes only direct effects of in-state juice sales and processor by-product sales; all other activities are assumed to be new final demand. Values in millions 2015 dollars. Employment represents fulltime and part-time jobs.

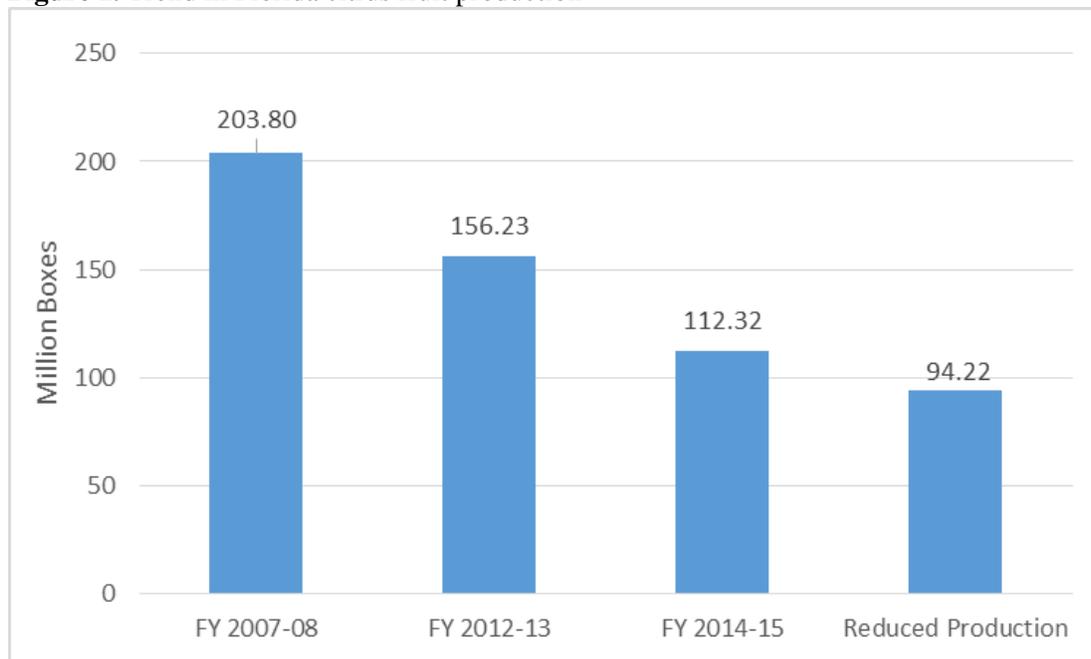
Source: Implan software and Florida data, 2012 customized model; FDOC processor statistics and production estimates.

For the reduced production scenario, the total output or revenue impact of the industry is projected at \$7.656 billion, including \$3.204 billion from citrus fruit production, \$4.213 billion from citrus juice and byproducts manufacturing, and \$240 million from fresh citrus marketing margins. Under this scenario, the employment impact is 43,667 jobs, value added impact is \$3.877 billion, and labor income impact is \$2.356 billion.

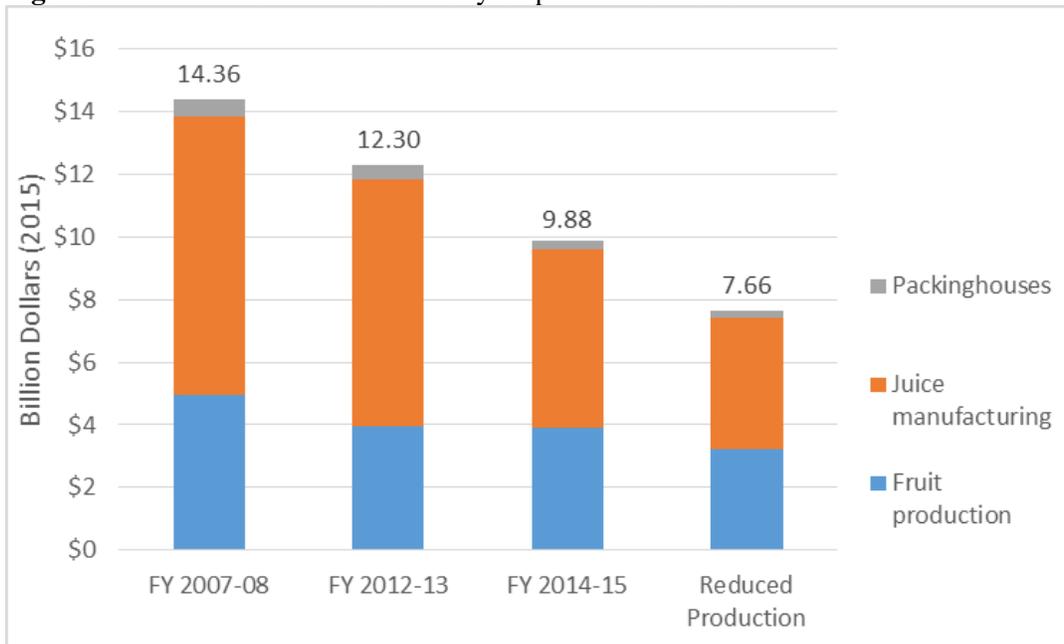
**Trends in Production and Economic Contributions**

Charts showing the trend in Florida citrus industry fruit production and economic contributions in FY 2007-08, 2012-13, 2014-15 and the reduced production scenario are presented in the figures below. In comparison to FY 2007-08, which represents the baseline condition prior to widespread infestation of citrus greening (HLB) disease in Florida, total citrus fruit production declined by 23% in FY 2012-13, 45% in 2014-15, and 54% under the reduced production scenario (Figure 1). Estimated output impacts declined by 14%, 31% and 47%, respectively, in constant 2015 dollar terms (Figure 2). Employment impacts declined by 18%, 30% and 46%, respectively (Figure 3). Value added impacts declined by 16%, 31% and 47%, respectively (Figure 4).

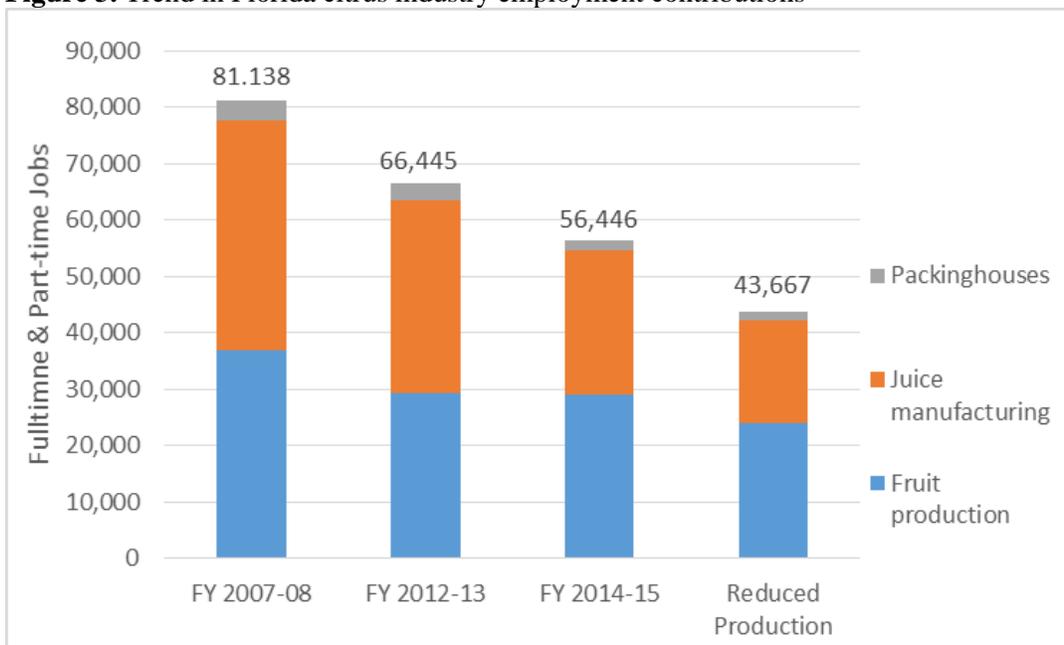
**Figure 1.** Trend in Florida citrus fruit production



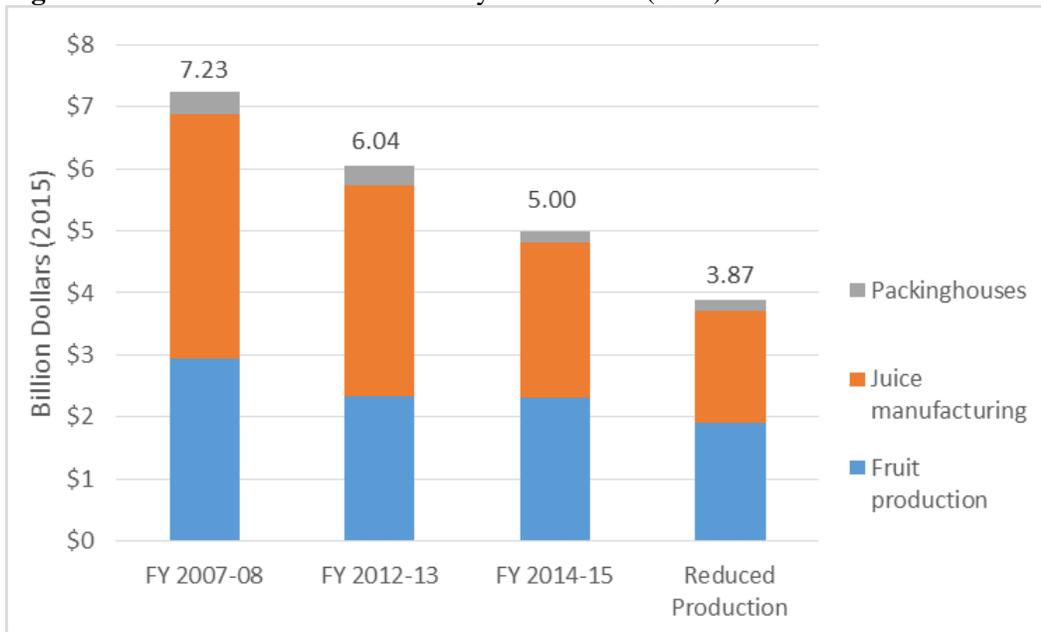
**Figure 2.** Trend in Florida citrus industry output contributions



**Figure 3.** Trend in Florida citrus industry employment contributions



**Figure 4.** Trend in Florida citrus industry value added (GDP) contributions



### Conclusions

This analysis showed that the economic contributions of the Florida citrus industry have declined dramatically over the past eight years due to reduced production caused by the endemic infestation of citrus greening (HLB) disease in the state. The “reduced production” scenario modeled is believed to represent the industry situation in the near future, with a production volume around 94 million boxes. The decline in economic contributions in percentage terms has been less than that for actual citrus fruit production volume because of the offsetting effect of price increases for citrus products at the grower, processor and retail market levels. However, because prices have already risen to historically high levels, there is some evidence that additional price increases may be moderated in response to possible further production volume decreases in the future. These findings support the need for additional research and development efforts to combat citrus greening disease, and mitigate its damaging economic consequences.

