FE636

Trends in Florida Citrus with Emphasis on Indian River, St. Lucie, Martin, and Palm Beach Counties[1]

Jackie K. White and P.J. van Blokland[2]

In 2004 and 2005, four severe hurricanes traveled through Florida's Treasure Coast (an area including Indian River, Martin, St. Lucie, and Palm Beach Counties), creating a significant impact on the area's citrus industry. This article examines how the hurricanes, as well as the influences of freezes, citrus diseases and pests, competition with Brazil, and a booming population growth are affecting the area's citrus industry. It also examines the efforts of governments, organizations, and individuals to respond quickly and efficiently to these threats to the area's agricultural lands.

History

Citrus trees were introduced to the Americas from the Orient in 1493 by Christopher Columbus, who planted seeds in Haiti. Juan deGrijalva then brought citrus to Central America in 1518 (USDA, 1992). Spanish explorers landed on the west coast of Florida in 1528 and 1539 and discarded the seeds of their cargo, rough-coated sour oranges, during their march across the state. Thousands of wild orange trees grew across the state as a result (Florida State Hotel Commission, 1930). One of the oldest cultivated groves may have been planted between 1809 and 1820 in Pinellas County. In the nineteenth century, production peaked at more than five million boxes until the “Great Freeze” in 1894-95 almost wiped out the entire industry, reducing production to only 147,000 boxes. It took 15 years for the industry to climb back to its previous level (USDA, 1992). Figure 1 shows the historic ebb and flow of the number of boxes sold by the industry since 1886.

Freezes

Until recently, citrus has been Florida's largest single agricultural commodity, but freezes during the 1980s crippled the industry again. These were followed by intensified efforts in replanting, resulting in increased production through the 1990s. The twentieth century record-high production was 304.5 million boxes in 1997-98. By the year 2000, Florida produced over 80% of the U.S. supply of citrus. Florida is the leading producer of grapefruit in the world and second to Brazil in production of oranges. The total economic impact of the industry, including direct, indirect, and induced impact in 2003-04 was $9.29 billion, a 5% decline since 1999-2000.

1. This is EDIS document FE636, a publication of the Food and Resource Economics Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. Published July 2006. Please visit the EDIS website at http://edis.ifas.ufl.edu.

2. J.K. White, Coordinator of Economic Analysis, and P.J. van Blokland, Professor, Food and Resource Economics Department, Indian River Research and Education Center, Ft. Pierce, FL, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

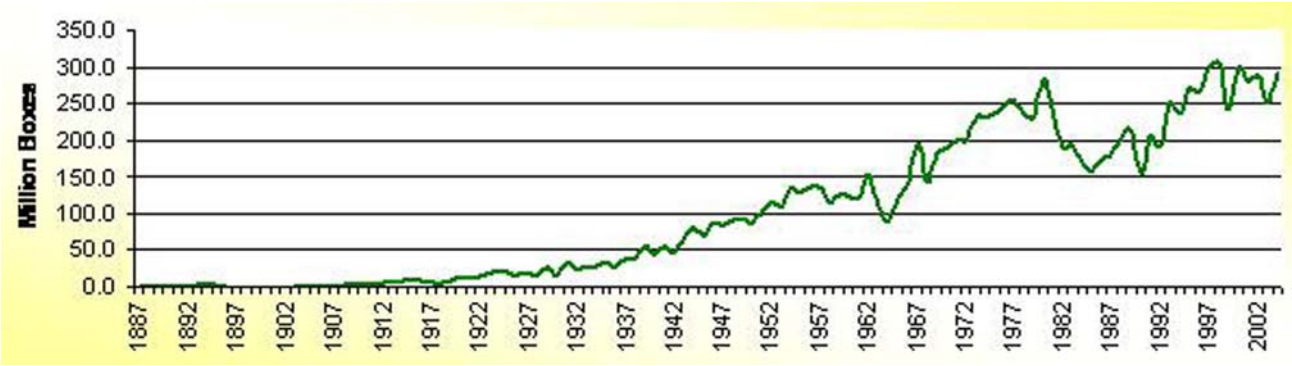


Figure 1. Historical growth of Florida citrus production in millions of boxes.

Ninety-seven percent of Florida's citrus juice products were shipped outside the state in 2003-04, up from 93% in 1999-2000. Jobs created by the citrus industry shrank from 89,700 to 76,366 in the same period (Hodges, Rahmani, and Mulkey, 2006).

Hurricanes

Hurricanes Charley, Frances, and Jeanne crossed citrus-producing counties in Florida in 2004, followed by Hurricane Wilma in 2005. Hurricanes Frances and Jeanne affected the Treasure Coast directly, making landfall three weeks apart in Martin County. Figure 2 shows the paths of recent citrus-damaging hurricanes across Florida (National Hurricane Center, no date [n.d.]).

A special census to measure the losses was conducted in mid-2005 in the four counties of Indian River, Martin, Palm Beach, and St. Lucie. (The normally scheduled Citrus Inventory will be taken in 2006.) Because of these hurricanes, Indian River and St. Lucie Counties only produced 36% of the state's grapefruit in 2004-05, compared to the normal 66%. Overall, the number of boxes of Florida citrus was down 42% from the 2003-04 season, bringing a 17% drop in value for the same period (USDA, 2005).

Canker, Tristeza, and Greening

Citrus Canker is caused by a bacterial pathogen and causes brown lesions on fruit, stems, and leaves, as shown in Figure 3. It also causes fruit and foliage to drop from the branches, leaving the tree severely compromised. Any harvestable fruit may be undesirable for fresh market, or unmarketable due to

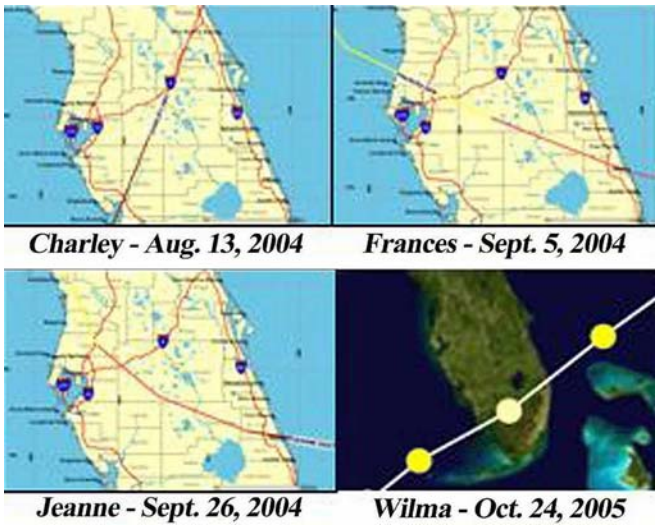


Figure 2. Paths of hurricanes in 2004 and 2005 which have affected citrus production. (Charley, Frances and Jeanne: National Hurricane Center, n.d.; Wilma: Wikipedia, n.d.).

quarantine restrictions (Gottwald, Graham, and Schubert, 2002).

Until January 2006, the USDA's citrus canker eradication program called for the burning of affected trees and all trees within a 1,900-foot radius of an infected tree. Afterwards, the cleared land had to be plowed and left to stand for two years before citrus trees could be planted in the location again. The program (which some feel was ill-conceived) resulted in seven million trees being burned on 80,000 acres (Rodgers, 2006).

After the 2004 hurricane season, the rate of tree removal and burning efforts were intensified in an effort to eradicate canker from commercial groves before the onset of the 2005 hurricane season. Before the plan could be completed, hurricane Wilma contributed to the spread of canker from south

Figure 3. Brown lesions caused by citrus canker on a grapefruit tree. (Photo printed with permission from Tim Gottwald, USDA.)

Florida up through central Florida, far beyond the ability to control it with the existing eradication plan. Estimates placed the spread of the disease at 183,000 acres. The existing eradication plan would have required the destruction of one-fourth of the commercial acreage in Florida, an amount that would have devastated the citrus industry (Conner, 2006).

The eradication program ended on January 10, 2006. The USDA has spent $436 million since 2000 to compensate growers for their losses and to help cover the cost of replanting trees (Rodgers, 2006). A new plan will eliminate the 1,900-foot burning rule for the purpose of eradication. It will, however, ensure that all citrus production and management practices comply with minimum standards to reduce diseases that threaten the industry without compromising the profitability of the industry (Conner, 2006).

Citrus tristeza virus (CTV) and citrus greening disease (CGD) are other diseases that are causing a high rate of grove decline. First reported in Florida in the 1950s, tristeza is spread by several species of aphids. The brown citrus aphid (*Toxoptera citricida*) is the most efficient vector and was introduced into Florida in the 1990s. Citrus tristeza normally causes trees to decline over a period of months or even years, but symptoms may also appear suddenly, causing a tree to die within weeks (Futch and Brlansky, 2005). Citrus greening disease causes small, misshapen, and bitter fruit as well as early fruit drop. This disease is transmitted by the Asian citrus psyllid, which was detected in Florida in 1998 (Knapp, et al., 2004). Threats from destructive invasive species, such as the brown citrus aphid and the Asian citrus psyllid, are becoming more difficult to control because of increased international travel and world-wide trade (Gottwald, Graham, and Schubert, 2002).

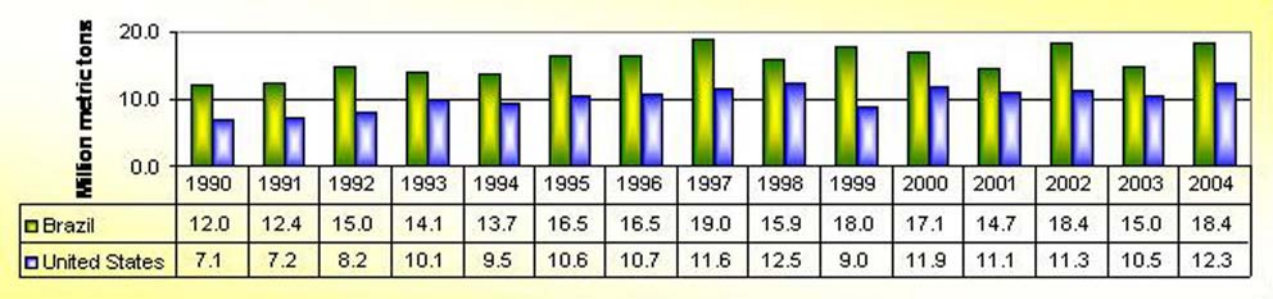
Competition from Brazil

Brazil is the largest citrus-producing country in the world. The Brazilian state of São Paulo has produced about 45% of the world's orange juice, while Florida has produced 40%. A comparison of Florida production with that of São Paulo is shown in Figure 4. São Paulo has twice the number of acres of planted orange trees and produces 60% more oranges than Florida. São Paulo can produce oranges at a cost of $259.69 per acre compared to Florida's per acre cost of $721.80. Brazil's main advantage is labor cost. Florida's 2000-01 total harvesting cost was $2.10 per box compared to São Paulo's cost of $0.53 per box. Florida has also recently been losing its migrant Mexican labor force to non-agriculture markets (Muraro and Spreen, 2003a).

Land Values

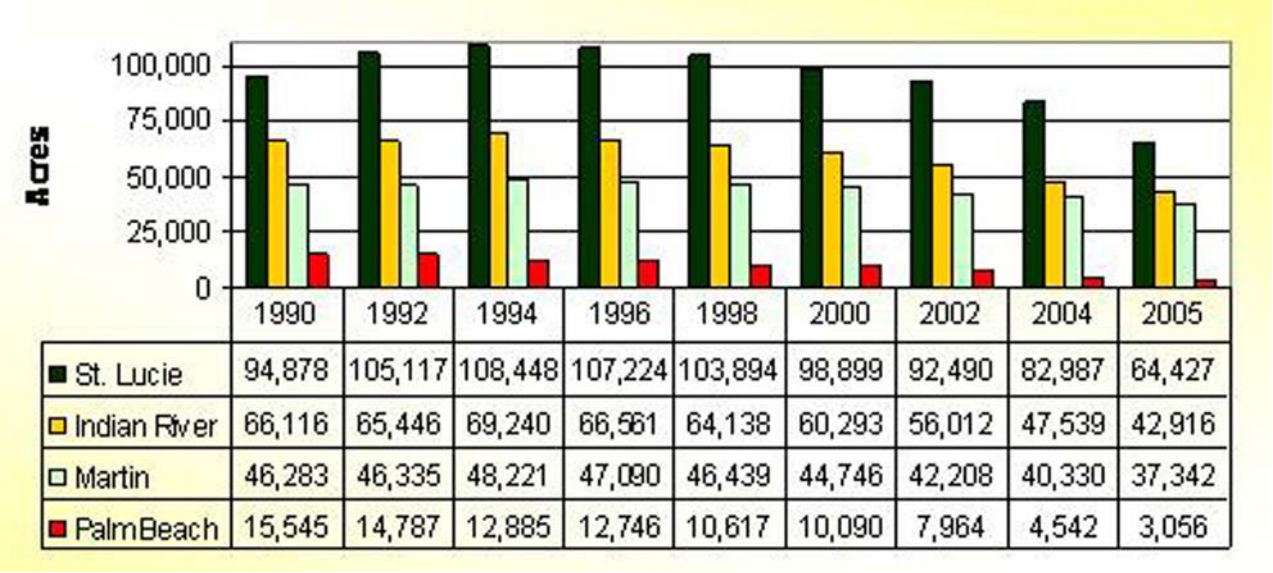
Population growth along the Treasure Coast has taken a heavy toll on citrus acreage for many years. As shown in Figure 5, citrus acreage in Palm Beach County decreased from 15,545 in 1990 to 3,056 in 1995, an 80% decrease. The reduction in Indian River County was 35% over the same period. St. Lucie County showed a 32% decline and Martin County showed a 19% decline in acreage since 1990 (USDA, 1990-2004). Population in Indian River, St. Lucie and Martin Counties is projected to climb from 430,000 to 720,000 by 2030. One hundred and fifty thousand new houses will be required to meet the demand (Committee for a Sustainable Treasure Coast, 2005).

The closer agricultural land is to a major metropolitan area, the more valuable it is. Land that is likely to be converted to residential or commercial use (transition land) within five miles of a major



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brazil	12.0	12.4	15.0	14.1	13.7	16.5	16.5	19.0	15.9	18.0	17.1	14.7	18.4	15.0	18.4
United States	7.1	7.2	8.2	10.1	9.5	10.6	10.7	11.6	12.5	9.0	11.9	11.1	11.3	10.5	12.3

Figure 4. Comparison of Brazilian and U.S. orange production from 1990 to 1994.



	1990	1992	1994	1996	1998	2000	2002	2004	2005
St. Lucie	94,878	105,117	108,448	107,224	103,894	98,899	92,490	82,987	64,427
Indian River	66,116	65,446	69,240	66,561	64,138	60,293	56,012	47,539	42,916
Martin	46,283	46,335	48,221	47,090	46,439	44,746	42,208	40,330	37,342
PalmBeach	15,545	14,787	12,885	12,746	10,617	10,090	7,964	4,542	3,056

Figure 5. Number of acres planted in citrus in the four-county area from 1990 to 2005.

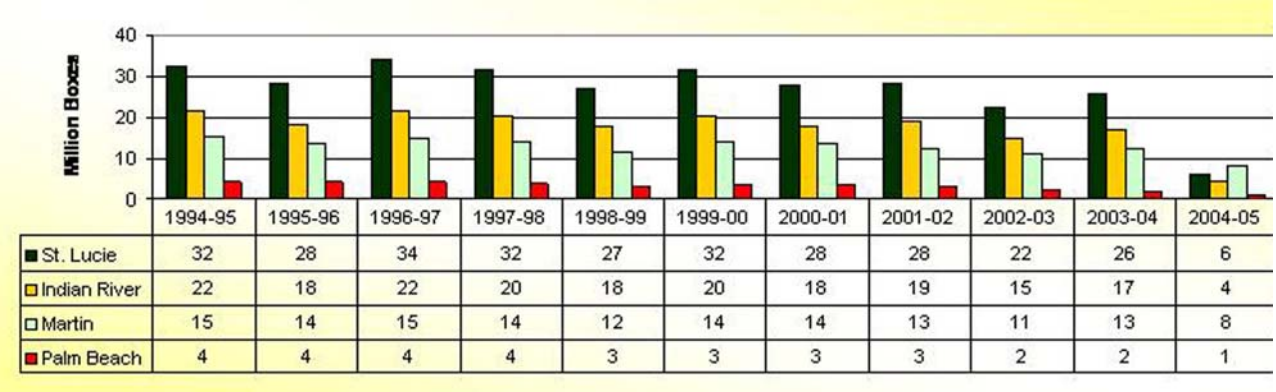
town in Palm Beach County is worth $137,500 per acre. In Indian River County the value is $46,481 per acre. This is an 86.1% increase since 2004. In St. Lucie and Martin Counties, which are classified non-metropolitan counties, the value of agricultural acreage within five miles of a major town increased from $6,778 to $17,143 per acre, a 152.9% increase since 2004 (Reynolds, 2006).

As acreage in the citrus industry is shrinking, opportunities for other industries are emerging. With the re-building requirements after the 2004 and 2005 hurricanes, citrus growers are already facing an exodus of migrant workers from harvesting to the booming construction industry. Re-building and new building projects provide an opportunity for growth in other agricultural industries such as the landscaping, sod, and nursery industries.

Current Economic Picture

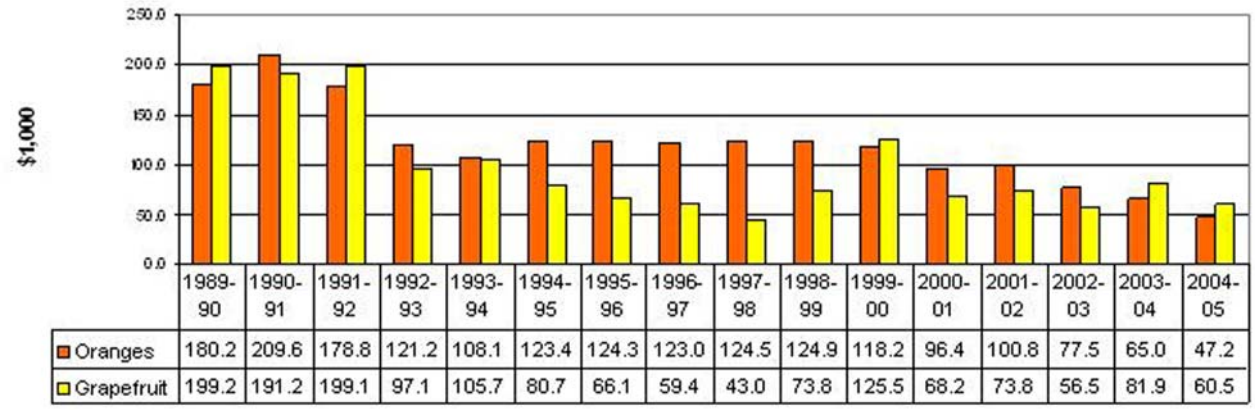
Citrus production along the Treasure Coast continues to decline due to environmental issues (e.g., canker, tristeza, greening, psyllids, and aphids) and urban development. These losses have followed a downward production trend since 1994 for Indian River, St. Lucie, and Martin Counties and since 1970 for Palm Beach County (Figure 6). Figure 7 shows the downward trend in total value of citrus in the four-county area from the 1989-90 season to the 2004-05 season.

Market prices, however, have responded predictably to the decline in production as the on-tree price per box of Florida oranges rose from $2.35 per box to $3.40 from the 2003-04 to the 2004-05 season. The on-tree price of Florida grapefruit rose from $2.91 to $13.65 for the same period. Figure 8 shows the rise in price in relation to the production of



	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
St. Lucie	32	28	34	32	27	32	28	28	22	26	6
Indian River	22	18	22	20	18	20	18	19	15	17	4
Martin	15	14	15	14	12	14	14	13	11	13	8
Palm Beach	4	4	4	4	3	3	3	3	2	2	1

Figure 6. Number of citrus boxes produced in the four-county area from 1995 to 2005 (in millions of boxes).



	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Oranges	180.2	209.6	178.8	121.2	108.1	123.4	124.3	123.0	124.5	124.9	118.2	96.4	100.8	77.5	65.0	47.2
Grapefruit	199.2	191.2	199.1	97.1	105.7	80.7	66.1	59.4	43.0	73.8	125.5	68.2	73.8	56.5	81.9	60.5

Figure 7. Value of citrus production in the four-county area from 1990 to 1995 (in thousands of dollars).

oranges and grapefruit in the four-county area over the past two seasons (USDA, 2005).

The Florida citrus forecast for the 2005-06 season was predicted to be 190 million boxes of all oranges and 24 million boxes of all grapefruit in the October forecast. However, due to the damage caused by Hurricane Wilma at the beginning of the season, this forecast was reduced by 20% to 153 million boxes of all oranges and 19.2 million boxes of grapefruit (USDA, 2006). Even so, the relatively small orange and grapefruit crops in 2005-06 have continued to support prices.

As growers work to replant trees, researchers are working to reduce the risks and enhance survival of these new trees in the current era of threats. Changes toward mechanical harvesting make this technology increasingly more practical and economical. Changes in crop design and varieties of trees are being researched. With careful management, residents and lawmakers in citrus-growing counties will recognize the broader value of this commodity. Preserving the groves contributes to water filtration and sustenance of wildlife as well as the beauty and heritage of our state.

The Future of Agricultural Land on the Treasure Coast

A number of committees, agencies, individuals, and special interest groups, both public and private, are dedicated to maintaining rural lands, wetlands, uplands, and waterways in the four-county area. The Rural Lands Subcommittee (RLS), whose leadership is shared by the Committee for a Sustainable Treasure Coast (CSTC) and the Indian River Citrus League, consists of members from agricultural producers, environmental groups, developers, regulatory agencies, and academic organizations, among others. The RLS is organized to monitor and guide the future use of agricultural lands on the

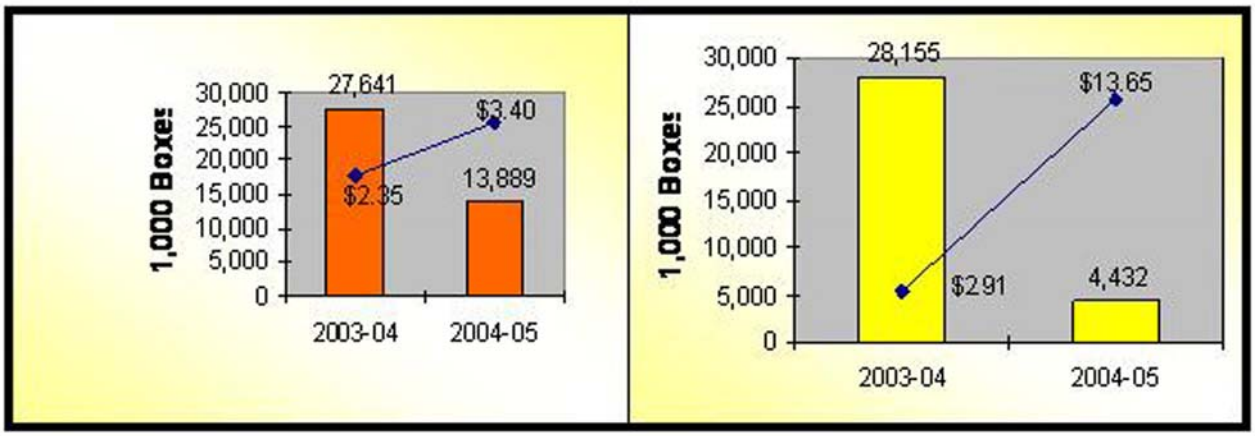


Figure 8. Production of oranges (left) and grapefruit (right) compared to on-tree price per box.

Treasure Coast. Sustainability of agriculture is a key element of the plan. Three focuses of the RLS are:

1. Examine the tools to promote the continued viability of agriculture.

2. Examine the kinds of agriculture that may be viable in the future.

3. Examine the relationships of future agriculture to future urbanization (CSTC, 2005a).

The CSTC is a panel of citizens from Martin, St. Lucie, and Indian River Counties. It was created on May 25, 2004, by Executive Order No. 04-61, signed by Governor Jeb Bush, "to study the challenges and opportunities facing their region and to recommend actions and tools that could be used to maintain a sustainable quality of life within the region." Three guiding principles directed toward retaining rural lands are spelled out in the committee's final report of September 30, 2005 (CSTC, 2005b):

- *Principle 1–A combination of tools and strategies work effectively to retain a functional, connected network of rural lands (open space, agriculture, and natural areas).* Rural landowners may be helped financially to retain their land by being compensated for having their land used to aid in wastewater/storm water disposal. Rural landowners may be compensated for using their lands for public recreational purposes.

- *Principle 2–Rural lands retention supports natural systems restoration.* Land can be preserved for protection of habitat and endangered species, and can be connected to make a system of greenways and corridors for wildlife movement. Retention of rural lands supports the mission of the Comprehensive Everglades Restoration Plan (CERP), the "largest environmental restoration project in the history of the world," and helps recapture the historical north-south flow of water through the area (Florida Department of Environmental Protection, 2006).

- *Principle 3–A sustainable agriculture sector contributes to the retention of rural lands and is a public purpose that justifies local, state, and federal support.* Retention of rural lands is a goal of state statutes, which would be served by increased funding for programs such as Florida Forever, the world's largest conservation land buying program, under the Florida Department of Environmental Protection's Division of State Lands (Florida Department of Environmental Protection, 2005). Establishment of local farmers' markets would serve to make citizens of the four-county area aware of local agriculture and enhance confidence in a safer food supply, one protected by Federal regulations and unhampered by international interruptions.

The establishment of committees such as these and the enactment of regulations and programs such as Florida Forever and CERP at the federal, state, and

local levels demonstrate a quick, if not pre-emptive, response to threats to rural lands and agriculture. This commitment is also apparent in the efforts of scientists in research institutions who are shifting their efforts to detection, prevention, and management practices to forestall future devastations such as the losses due to canker and hurricanes (Nordlie, 2006). This is exemplified by the development of a course to be offered in April 2006 to teach growers to construct and maintain living and artificial windbreaks in their groves to minimize the effects of hurricanes and reduce insect-vectored diseases as we prepare to face another severe hurricane season predicted for 2006 (The Ledger Online, 2006).

References

Committee for a Sustainable Treasure Coast (CSTC). 2005a. *About the Rural Lands Subcommittee.* Retrieved June 15, 2006 from http://sustainabletc.org/groups/rural/about.htm.

Committee for a Sustainable Treasure Coast (CSTC). 2005b. *Final Report of the Committee for a Sustainable Treasure Coast.* Executive Order No. 04-61, State of Florida, Tallahassee, FL (September 30). Retrieved 2/28/06 from http://sustainabletc.org/documents/CSTC_FINALREPORT_11-02-05Interim.pdf.

Conner, C. 2006. *Letter to Charles H. Bronson,* Commissioner of Agriculture, Florida Department of Agriculture and Consumer Services, Tallahassee, FL from the United States Department of Agriculture, Office of the Secretary, Washington, D.C. (January 10). Retrieved 2/28/06 from http://www.doacs.state.fl.us/pdf/Canker%20-%20Bronson.pdf.

Florida Department of Environmental Protection. *Florida Forever*. Florida Department of Environmental Protection, Tallahassee, FL. Retrieved May 16, 2006 from http://www.floridadep.org/lands/acquisition/FloridaForever/faq.htm.

Florida Department of Environmental Protection. 2006. *About DEP, Mission: More Protection, Less Process*. Florida Department of Environmental Protection, Tallahassee, FL. Retrieved February 10, 2006 from http://www.dep.state.fl.us/mainpage/about/about_dep.htm.

Florida State Hotel Commission. 1930. *Florida: Empire of the Sun.* Tallahassee, FL. Retrieved February 27, 2006 from http://fcit.usf.edu/florida/docs/h/hist01.htm.

Futch, S.H., and R.H. Brlansky. 2005. *Field Diagnosis of Citrus Tristeza Virus.* Electronic Data Information Source (EDIS) HS996. Journal Series No. T-00664. Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. Retrieved February 21, 2006 from http://edis.ifas.ufl.edu/HS242.

Gottwald, T.R., J.H. Graham, and T.S. Schubert. 2002. Citrus canker: The Pathogen and Its Impact. *Plant Health Progress* doi: 10.1094/PHP-2002-0812-01-RV (August/September) Retrieved February 21, 2006 from http://www.apsnet.org/online/feature/citruscanker/.

Hodges, A., E. Philippakos, D. Mulkey, T. Spreen, and R. Muraro. 2001. *Economic Impact of Florida's Citrus Industry, 1999-2000.* Economic Information Report EIR-01-2. Food and Resource Economics Department, University of Florida, Gainesville, FL (July). Retrieved February 21, 2006 from http://economicimpact.ifas.ufl.edu/publications/er01-2-citrus.pdf.

Hodges, A., M. Rahmani, and D. Mulkey. 2006. *The Economic Impacts of the Florida Citrus Industry in 2003-04*. Economic Information Report EIR-01-2. Food and Resource Economics Department, University of Florida, Gainesville, FL. Retrieved May 17, 2006 from http://www.fred.ifas.ufl.edu/economic_assess_flciturus_indus.pdf.

Knapp, J.L., S. Halbert, R. Lee, M. Hoy, R. Clark, and M. Kesinger. 2004. *The Asian Citrus Psyllid and Citrus Greening Disease.* Integrated Pest Management (IPM), University of Florida, Gainesville, FL (January 9). Retrieved February 21,

2006 from http://ipm.ifas.ufl.edu/agricultural/fruit/citrus/ASP-hoy.htm.

Muraro, R.P., and T.H. Spreen. 2003a. *Comparative Costs of Growing Citrus in Florida and São Paulo (Brazil) for the 2000-01 Season.* Electronic Data Information Source (EDIS) FE364. Food and Resource Economics Department, University of Florida, Gainesville, FL. Retrieved February 21, 2006 from http://edis.ifas.ufl.edu/FE364.

Muraro, R.P., and T.H. Spreen. 2003b. *Comparative Marketing Costs for FCOJ from Florida and São Paulo.* Electronic Data Information Source (EDIS) FE363. Food and Resource Economics Department, University of Florida, Gainesville, FL. Retrieved February 21, 2006 from http://edis.ifas.ufl.edu/FE363.

National Hurricane Center. (n.d.). *Hurricane History*. National Hurricane Center website. Retrieved February 17, 2006 from http://www.nhc.noaa.gov/HAW2/english/history.shtml. Images from http://hurricane.csc.noaa.gov/hurricanes/.

Nordlie, T. 2006. New Control Strategies for Canker in Development. *Florida Agriculture*. (March 3). Retrieved March 6, 2006 from http://floridafarmbureau.org/flag/News.aspx?Id=423.

Reynolds, J. 2006. *Strong Nonagricultural Demand Keeps Agricultural Land Values Increasing.* Electronic Data Information Source (EDIS) FE625. Food and Resource Economics Department, University of Florida, Gainesville, FL. Retrieved February 22, 2006 from http://edis.ifas.ufl.edu/FE625.

Rodgers, W. 2006. *Canker Program Gets Cash Infusion.* TBO.com News, *The Tampa Tribune* (February 10). Retrieved February 22, from http://www.tbo.com/news/money/MGB5GPNUHJE.html.

Tasker, G. 2006. *Citrus Growers Feel the Squeeze.* Herald.com, *The Miami Herald* (Feburary 17), Retrieved February 22, 2006 from http://www.miami.com/mld/miamiherald/business/13891582.htm.

Taylor, J.C. 1977. The Citrus Canker. *Update* 5(1, October). Historical Association of Southern Florida, Miami, FL. Retrieved February 21, 2006 from http://www.historical-museum.org/history/update/u051a.htm.

The Ledger Online. 2006. *Windbreaks Course Planned.* Theledger.com, *The Ledger Online* (March 3). Retrieved March 3, 2006 from http://www.theledger.com/apps/pbcs.dll/article?AID=/20060302/NEWS/603020393/1001/Business.

USDA. 1990-2004. *Commercial Citrus Inventories, 1990–2004.* Florida Field Office, National Agricultural Statistics Service, United States Department of Agriculture, Washington, D.C. Retrieved 2/27/06 from http://www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/index.asp.

USDA. 1992. *1990-91 Florida Citrus Summary*. Florida Field Office, National Agricultural Statistics Service, United States Department of Agriculture, Washington, D.C. (January). Retrieved 2/27/06 from http://www.nass.usda.gov/fl/hist_sums.htm#citrus.

USDA. 2005. *2004-05 Florida Citrus Summary*. Florida Field Office, National Agricultural Statistics Service, United States Department of Agriculture, Washington, D.C. (September 22). Retrieved 2/27/06 from http://www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/index.asp.

USDA. 2006. *Florida Citrus Forecasts,* October, 2005–February 2006. National Agricultural Statistics Service, United States Department of Agriculture, Washington, D.C. (February 9). Retrieved 2/27/06 from http://www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/cit/2005-06/cit1205.pdf.

United States Department of State. 2006. *Dumping Case on Orange Juice from Brazil Enters Final Phase*. Bureau of International Information Programs, United States Department of State, Washington, D.C. Retrieved on May 18, 2006 from http://usinfo.state.gov/wh/Archive/2006/Jan/12-152778.html.

Wikipedia. n.d. Image of Hurricane Wilma. Retrieved March 7, 2006 from http://en.wikipedia.org/wiki/Image:Wilma_2005_track.png.