Arguments Against Purchasing Land in the Everglades Agricultural Area (EAA) for a South Reservoir, and Rebuttals to Arguments

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[1] An earlier draft version of this paper was dated February 10, 2017 and carried a heading stating that revision was likely.

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Table of Contents

"The issue is not if we will have additional southern storage, it is when and where."

— Senator Joe Negron (March 2, 2017)

Executive Summary

Some jobs associated with the sugar industry would be lost following state acquisition of 60,000 acres of sugarcane lands for the South Reservoir in the EAA (1,545 jobs, including 323 directly employed in sugarcane field and factory work), but the losses would be more than offset by 22,680 reservoir construction jobs and, after completion, 404 permanent reservoir operations and maintenance as well as recreation and tourism jobs. The amount of land proposed for the reservoir is about 15% of all lands currently producing sugarcane, and it is unlikely that this would impact industry operations by more than that percentage. The South Reservoir in the EAA is necessary to complete the suite of projects designed to restore fresh, clean water to the Everglades, and to reduce the harmful discharges to estuaries east and west of Lake Okeechobee. Marine industries in four counties (Lee, Martin, Palm Beach, and St. Lucie) were adversely affected by harmful algal blooms resulting from discharges in 2016; in 2014 these industries had a $4 billion impact and provided 37,000 jobs and $1.7 billion in employee earnings, a greater economic impact than the entire Florida sugar industry that in 2011 had a $2.5 billion value added impact and provided 10,300 jobs and $403 million in employee earnings. After careful study, senior faculty at the University of Florida reported that to reduce discharges and expedite flow of water south to the Everglades, "enormous increases in storage are needed north and south of the Lake" and "will require additional land [in the EAA]." The Florida Legacy Act of 2016 requires state agencies to give precedence in a timely manner to Everglades restoration projects that reduce discharges from the Lake to the St. Lucie or Caloosahatchee estuaries. If the South Reservoir were in place and managed dynamically, in three out of every four years over the past three-and-a-half decades there would have been no need for any discharges; in years with heavy rainfall, such as 2016 and 2013, the South Reservoir would have reduced discharges by 48.5% and 62%, respectively. The South Reservoir is one of the Everglades restoration projects approved the federal-state partnership (CERP, the Comprehensive Everglades Restoration Plan), it is necessary for Everglades restoration, and it is the most effective way to reduce harmful discharges that plague coastal communities. In addition the South Reservoir could provide water supplies and recharge the freshwater aquifer that six million people in the greater Miami depend on by protecting it from saltwater intrusion. Averaged over the past 35 years, the daily discharges from Lake Okeechobee would provide almost half of the average daily water needs in Miami-Dade, Broward and Palm Beach Counties, but instead this water is being wasted to tide. The funding for the South Reservoir land acquisition is there, the science is sound, and the current legislative proposals are simply asking that planning for this necessary project be undertaken now rather than waiting until 2021.

Introduction

Florida sugar industry spokespersons and others have questioned whether a reservoir should be constructed south of Lake Okeechobee (Lake O), in part because some private lands must be purchased. They have used a variety of arguments against a proposal offered in August 2016 by Senator Joe Negron of Stuart—and reaffirmed by him as President of the Senate in two memos to his Senate colleagues (see Negron 2017a, 2017b)—for the State of Florida to purchase 60,000 acres of land in the Everglades Agricultural Area (EAA) south of Lake O on which to store water that would help reduce harmful discharges of excess water from Lake O to the estuaries east and west of the Lake and wasted to tide rather than sent south as happened historically. The South Reservoir concept was formally proposed to the Legislature on January 26, 2017. Although referred to as the EAA Reservoir in many government documents, including legislative proposals, herein it is called the South Reservoir in the EAA. This document identifies and rebuts arguments against the reservoir.

A short **Background** section is provided, then **Eight Arguments** in the words of those speaking out against the South Reservoir proposal are listed and accompanied by **Rebuttals**. Following that is a **Postscript: Seven Questions Legislators Will Want Answers To**, with replies based on analysis herein. Throughout, **Source References** are indicated by Author (date) or (Author date) and listed at the end. The eight arguments are:

1) loss of jobs in 'Glades communities;
2) the state already has acquired too much sugarcane acreage, loss of more will create ghost towns;
3) state acquisition of private land reduces ad valorem property tax revenues for local governments;
4) the South Reservoir proposal lacks a science-based plan;
5) the proposed South Reservoir would be inadequate to reduce Lake O discharges;
6) water storage efforts should now be focused north of Lake O, not south;
7) the proposed South Reservoir is a new and distracting idea that should be set aside for now and considered in the future; and
8) instead of a South Reservoir the state should fund completion of the Lake Okeechobee dike.

These arguments present one side of an issue, and rebuttals to them offer other sides. The author has formal graduate-level education in economics, and has experience using information generated by economic impact input-output models of inter-industry relationships for policy analysis purposes. Information derived from these widely used models estimates job and revenue impacts. Some of the information supporting rebuttal comments herein is derived from published studies of various Florida industries using these models, but herein the focus is only on job impacts. Two new study reports focusing on economic impacts were released in late February 2017. Data from them are not used herein for reasons explained in **Appendix A**.

The many issues associated with the proposal for a South Reservoir have energized camps of dueling experts. More than 200 Everglades scientists petitioned the South Florida Water Management District

(SFWMD) in support of a South Reservoir (see Wickstrom 2015) and 60 water policy experts signed a letter to the governor in favor of other Everglades restoration projects instead of a South Reservoir (see Dean 2017). (The SFWMD is responsible for water resource management and is governed by a board appointed by Governor Rick Scott.) A water resource Ph.D. engineer employed by the Everglades Foundation has done work using the SFWMD reservoir operations model to demonstrate the benefits of a South Reservoir compared to a North Reservoir (Van Lent 2017, Van Lent and Paudel 2016); that work has been challenged by a Ph.D. engineer employed by the SFWMD (Owosina 2017). Until quite recently there was a lack of information about job impacts from a South Reservoir. Now economists from different camps have weighed in, offering analysis in support of the South Reservoir proposal (Maloney et al. 2017, hired by the Everglades Foundation) and against it (Villamil 2017, for the James Madison Institute) (see **Appendix A** for discussion). People who have not already made up their mind whether to support the South Reservoir proposal are left guessing about what might be best (see Rangel 2017, Staletovich 2017). In the end that boils down to how one might measure best. To arrive at what might be best for Florida, one needs to consider the environmental/ ecological, economic, and public health dimensions of the questions about the South Reservoir. All are addressed herein.

In the end, those who favor the South Reservoir have interests in the ecological and economic health of the Everglades and the estuaries in the east, west, and southern coasts of the Florida Peninsula. Those speaking out against the South Reservoir either care about maintaining a sugar industry south of Lake O in its current configuration, or think that the price tag for the South Reservoir is too high, given the many competing uses for public funds. This paper is designed to help people sort through the conflicting information and make an informed decision about the South Reservoir. For those with open minds, the reality of the situation was recently expressed by Senator Negron (2017b):

"The issue is not if we will have additional southern storage, it is when and where."

Background

Historically excess Lake O water flowed south to the Everglades and Florida Bay, and some of it recharged the Biscayne Aquifer that 6 million people in the greater Miami area depend on (i.e., Miami-Dade, Broward, and Palm Beach Counties). These discharges have created a public health problem as well as economic and ecological damage. Blooms of algae fed by excessive nutrients drained from Lake O have plagued coastal communities by turning toxic and closing beaches, reducing home values, and diminishing recreation and tourism activities and the jobs and income such activities provide.

In 2014 the Florida Senate commissioned a study by the University of Florida's Water Institute (UFWI) to identify options for reducing the Lake O discharges. Study findings were published in March 2015 and based on them, on August 8, 2016 Sen. Negron proposed constructing a 60,000 acre reservoir in the Everglades Agricultural Area (EAA) south of Lake O with a capacity to store 120 billion gallons (360 million acre-feet) of water. Consistent with the UFWI study findings, Sen. Negron recognized that it would be necessary for the state to acquire enough land for the South Reservoir. Without that there would not be a federal cost-share to construct the South Reservoir.

On January 26, 2017, after his appropriations subcommittee had listened to four hours of hearings on the South Reservoir land acquisition and construction proposal, Sen. Rob Bradley filed Senate Bill 10, a water resource bill that if passed would authorize and fund up to $1.2 billion for state acquisition of land on which to build one or two reservoirs in the EAA that would hold 360 million acre-feet of water. Construction funds for the Southern Reservoir, which is one among the suite of projects in the Comprehensive Everglades Restoration Plan (CERP), would be the responsibility of the federal government as part of the 50-50 cost-share bargain struck between the state and federal government in the Water Resource Development Act of 2000 that authorized CERP.

Also on January 26, 2017, Sen. Negron delivered a memo to his Senate colleagues explaining the South Reservoir proposal and asking for their help:

> These algal blooms have occurred before and will occur again unless high volume discharges from Lake Okeechobee are stopped and pollution in the Lake Okeechobee basin is abated. … Despite the sincere efforts of our state and federal government to plan and fund long-term solutions to address rising water levels and pollution in Lake Okeechobee, year after year as the Lake levels rise, the solution is to flood my community [i.e., Stuart] and many others across our state with billions of gallons of polluted water. … I have a personal mission to work with the agricultural community, to work with Florida's best scientists, and to work with every member of the Legislature, to protect our estuaries, to protect our lagoons, and to put the harmful discharges from Lake Okeechobee that destroy our environment and harm our economy into the past pages of history instead of the daily front pages of newspapers (Negron 2017a).

Chief among the opponents of Sen. Negron's proposal, now embodied in SB 10 and HB 761, is the sugar industry that owns and farms most of the EAA. On February 6, 2017, the fourteen largest landowners and sugarcane farmers in the EAA signed a letter to legislators stating that "We are not willing sellers of our property to the government" (EAA landowners 2017, as emphasized in original document).

Eight Arguments and Rebuttals

1) Loss of jobs in 'Glades communities

● July 16, 2016: "Taking another 60,000 acres of productive and sustainable farmland out of the EAA will without a doubt close down our sugar mill and put us out of business," said Barbara Miedema, vice president of Sugar Cane Growers Cooperative of Florida. "Sen. Negron's plan means losing a thousand or more jobs in the 'Glades communities, not to mention the impact to businesses in the community that provide services to us." (Stapleton 2016)

● August 24, 2016: "Sugar giant Florida Crystals and the Sugar Cane Growers Cooperative of Florida own most of the land Negron wants to buy. In a joint news statement, they said selling active farmland 'means losing (1,000) or more jobs in the 'Glades communities, not to mention the impact to businesses.' They said they will review details of the proposal. Negron said he's open to looking at other properties. Residents of communities south of the lake protested outside Negron's Palm City office, saying his plan will result in job losses." (Rangel 2016)

● January 25, 2017: Representing people who live and work in western Palm Beach County in a landscape dominated by sugarcane fields, Tammy Jackson-Moore (2017) commented to the Florida Senate Appropriations Subcommittee on the Environment and Natural Resources that the proposal for the state to acquire more farmland for Everglades restoration will close yet another sugar mill that employs 600 people and be detrimental to the economy of the 'Glades area.

● February 2017: "…displacing 60K acres of productive agricultural land would have important and negative economic impacts on the State, and significantly so in Palm Beach and Hendry Counties." (Villamil undated, page 5).

Rebuttal: To rebut this argument the following points are addressed: (a) analysis of employment impacts from EAA land acquisition, (b) language in the Everglades Forever Act of 1994, (c) Florida agency programs to assist people who are unemployed, (d) sugarcane agriculture expansion outside the EAA, and (e) adverse employment effects outside the EAA resulting from Lake O discharges.

(a) Although two reports estimating job impacts were released during the last week of February 2017 (Maloney 2017, Villamil 2017) neither of them provided source references for their findings on job losses, and only one of them demonstrated benefits from jobs created to construct the South Reservoir. Because it could not be verified, data from those two studies are not used here. Summary points from analysis of the employment impacts of the South Reservoir proposal (**Table 1**) are:

- For every job lost in Florida's sugarcane industry sector (1,545 jobs), there would be almost 15 jobs created as a result of reservoir construction, but these 22,680 jobs are ***temporary*** and spread out over several years, i.e., the time it takes to complete all construction phases.
- For every direct field and factory job lost in the sugarcane industry (323 jobs), there would be 1.25 ***permanent*** jobs (404 jobs) created from reservoir operations and maintenance plus new recreation and tourism opportunities.

Table 1. Employment Impacts Associated with Proposed South Reservoir in the EAA

Economic Sector	Employment Impacts			
	Direct	Indirect	Induced	Total
Sugarcane industry	(323)	(740)	(482)	(1,545)
Reservoir construction	9,450	5,670	7,560	22,680
Reservoir operations & maintenance	189	113	151	453
Recreation & tourism	215	108	107	430
Total net impact on jobs	9,531	5,151	7,336	22,018

Note: Economic sector data sources are identified and employment impact categories are defined and described in **Appendix A**.

(b) Following the precedent of Everglades Forever Act (EFA) of 1994 that authorized the Stormwater Treatment Areas (STAs), state legislation can include hiring provisions to ensure preference is given to jobs displaced by the South Reservoir project in the EAA (Goforth 2017a). Language from the EFA states that:

- The Legislature further recognizes that the EAA and adjacent areas provide a base for an agricultural industry, which in turn provides important products, jobs, and income regionally and nationally.
- It is the intent of the Legislature to preserve natural values in the Everglades while also maintaining the quality of life for all residents of South Florida, including those in agriculture, and to minimize the impact on South Florida jobs, including agricultural, tourism, and natural resource-related jobs, all of which contribute to a robust regional economy.
- The District shall give preferential consideration to the hiring of agricultural workers displaced as a result of the Everglades Construction Project, consistent with their qualifications and abilities, for the construction and operation of these STAs.

(c) The State of Florida operates a Reemployment Assistance Program to help displaced workers find new employment and job training opportunities (see Florida Department of Economic Opportunity 2017). Each county operates their program independently.

(d) Sugarcane production has already expanded outside the EAA. Martin County: In 2000, it was reported that there were an estimated 13,000 to 17,000 acres of sugarcane growing in Martin County, much of it on lands formerly grazed by cattle (McCue 2000). In Martin County, more than 10,000 acres of former citrus groves have been converted into sugarcane production, creating local sources of air pollution, water pollution and increased truck traffic on Martin County roads, particularly State Road 76 (Kanner Highway), as cane is transported to mills in the EAA (Goforth 2017a). According to the Florida Department of Agriculture there were 11,400 acres of sugarcane harvested in Martin County in 2013, which increased from 9,700 acres in 2012, 5,400 acres in 2011, and 8,000 acres in 2010. Glades County: 24,100 acres harvested in 2013, up from 22,000 acres harvested in 2010. Hendry County: 66,000 acres harvested in 2013, up from 49,000 acres harvested in 2010 (Florida Dept. of Agriculture (2013, 2014).

(e) Outside the EAA jobs are lost, businesses are closed, and public health issues plague coastal communities because of polluted Lake O discharges to the estuaries on both the east and west coasts (Goforth 2017a). Due to heavy rainfall and anticipated Lake O discharges, in February 2016 Governor Rick Scott issued an executive order declaring a “State of Emergency” in Martin and St. Lucie Counties. Due to algal blooms from the continued onslaught of the discharges, in June 2016 Governor Rick Scott issued an executive order declaring a “State of Emergency” in four counties (Lee, Martin, Palm Beach, and St. Lucie) and included a directive to the South Florida Water Management District to “Work with state and community partners to explore every opportunity to increase water flowing south from Lake Okeechobee.” (Scott 2016). Many

people feel that the best thing the state could do to increase flows south of the Lake is to complete the South Reservoir in the EAA that was started in 2006 and stopped in 2008.

(f) The economic impact of the marine industries in the four counties that were adversely affected by algal blooms in 2016—and declared to be in a "State of Emergency" by Governor Rick Scott—is substantially greater than the entire sugar industry in the state. In 2014 the total output of the marine industries in these four counties was $4 billion, and it provided 37,000 jobs and $1.7 billion in employee earnings (**Table 2**). By comparison, in 2011 the entire sugar industry in the state produced $2.5 billion in value added, and 10,300 jobs provided $402 million in employee earnings (LMC Int'l 2011).

Table 2. Economic Contribution of Marine Industries* in Four Counties Affected by Hazardous Algal Blooms in 2016

	Total Output**	Total Job Impact**	Labor Income
Lee County	$1,273 million	9,014	$486 million
Martin County	$324 million	3,290	$230 million
Palm Beach County	$1,884 million	18,220	$682 million
St. Lucie County	$549 million	6,390	$366 million
Total	$4.030 billion	36,914	$1.764 billion

***Marine industries include construction of marine-related infrastructure and facilities; living resources represented by fishing, aquaculture, seafood processing, and seafood markets; offshore minerals, consisting of limestone, sand, and gravel mining, as well as oil and gas exploration and production; ship and boat building, including repair; tourism and recreation, including accommodations and services associated with recreation in coastal areas, such as marinas, boat dealers, amusement and recreational facilities, hotels, restaurants, and sporting goods retailers, and; transportation, including marine passenger and cargo transportation services, and, search and navigation equipment (Hodges et al. 2015).

Total output and job impact includes direct, indirect, and induced effects as determined by economic impact input-output models used in the county source references below. A short explanation of input-output modeling and job impact categories is provided in **Appendix A.

County source data from economic impact input-output study reports: Martin & St. Lucie Counties – ECFRPC & TCRPC 2016; Lee County – Hodges et al. 2015; Palm Beach County – Thomas J. Murray & Associates 2015.

2) The state has already acquired too much sugarcane land, and the loss of more land will create ghost towns

● July 16, 2016: Barbara Miedema, vice president of public affairs and communications at the Sugar Cane Growers Cooperative of Florida, told the *Palm Beach Post* that the region already has lost more than 100,000 acres of farmland to Everglades restoration. The cooperative, whose members are small growers of sugar cane and vegetables, can't afford to lose more land. "It will turn our area into ghost towns," Miedema said (Stapleton 2016).

Rebuttal: Two issues addressed are (a) acreage lost, and (b) creation of ghost towns:

(a) How much productive sugarcane acreage has been lost? The best estimate, based on land actually in sugarcane production, is 40,000 acres, determined as follows. At maximum, the amount of productive sugarcane lands lost since 1980 is 49,000 farmed acres, and using 5-year running total averages, it would be 40,000 acres. (In addition to planted sugarcane, farmed acreage includes about 20,000 acres for seed production.) The largest amount of Florida land in sugarcane production was 465,000 acres during the 2001/02 growing season. In the highest 5-year period (1998/89–2002/03) the annual average was 456,000 acres. In the past five years (2012/13–2016/17) sugarcane has been farmed on an annual average of 416,000 acres (USDA ERS 2017). Taking the difference between the most recent 5-year period and the highest year, the actual loss cannot be more than 49,000 acres of productive sugarcane lands, and the 5-year annual average difference would be lower than that, at 40,000 acres.

In summary, less than 10 percent of the sugar industry's land base has gone out of production. No doubt most of that loss is from land purchased to improve water quality that is polluted by land use activities surrounding Lake Okeechobee, including sugarcane farming in the EAA.

(b) Ghost towns? If the state purchased 60,000 acres of EAA sugarcane land it would be a loss of approximately 15 percent of the land in sugarcane production and, as determined in the source reference for 1(a) above, a corresponding loss of 15 percent of the sugarcane field and factory jobs and inter-related jobs in other economic sectors. But because the lost jobs will be more than replaced by other employment opportunities, as described in 1(a) above, it is difficult to see how or why a community in the EAA would disappear as a result of the land purchase.

3) Land acquisition will reduce ad valorem property tax revenues for local government

● February 10, 2017: Senator Joe Negron's plan for the state to buy another 60,000 acres south of Lake Okeechobee for more water storage continues to draw opposition from area officials who say the state already owns plenty of land, and they don't want more property taken off their tax rolls. (Elsken 2017)

Because public agencies do not pay local property taxes on land they own, acquiring land for water storage will result in a reduction of property tax revenues for the relevant county. If the county has fewer than 150,000 residents, then it is eligible for payments in lieu of property taxes by the South

Florida Water Management District for a period of 10 years, based on the average of taxes paid in the 3 years prior to the acquisition of the land (Florida State Statute 373.59, subparagraph 10B).

Lands that would be acquired for a South Reservoir in the EAA most likely would be in Palm Beach County, so this statute would not apply. The county appraiser has stated that the loss of 60,000 acres of agricultural land would reduce property taxes by $13.1 million per year.

Rebuttal: In 2013 Palm Beach County received $2.7 billion in ad valorem property tax revenue. This was about 2 percent higher than in 2012. The loss of $13.1 million in property tax revenues for 60,000 acres acquired for a South Reservoir in Palm Beach County would be a reduction of less than one-half of one percent (0.485 percent) of the county's ad valorem property tax revenues.

In an area where Everglades restoration projects are implemented, property values would increase due to improved water quality (see discussion and analysis in McCormick et al. 2010, p. 40-47). Throughout the 16 counties where Everglades restoration projects are to be implemented, water quality improvements would translate into an increase of 1.655 percent in property value, which is a total increase of more than $16 billion in real estate property values. Because the location of a South Reservoir is yet to be determined, any increase in real estate value is highly speculative, but that such an increase would occur is not only intuitive but also supported by economic theory.

Similarly, when water quality is diminished, property values decline. Studies conducted for the Florida Realtors (2015) concluded that a 1-foot increase in the clarity of water in the Caloosahatchee estuary would result in an increase of $541 million in home values in Lee County and an additional $9.2 million in property taxes for the county (Gillis 2015). Similarly, home values in Martin County would increase by $428 million in Martin County, with unknown property tax implications. To the extent that a South Reservoir would reduce the Lake Okeechobee discharges and increase water clarity, homes in Martin and Lee Counties would increase in value. Conversely, reduced water clarity as a result of discharges would reduce real estate values. Indeed, following massive algae blooms in 2013 that resulted from Lake Okeechobee discharges into the St. Lucie estuary and Indian River Lagoon, the Florida Realtors (2015) study estimated that the value of homes in Martin County was reduced by $488 million.

For every dollar of property tax revenue that would have been lost in Palm Beach County in 2013 due to state acquisition of land for a South Reservoir, home values in Martin County decreased $37 dollars due to water quality impairment associated with Lake Okeechobee discharges.

4) The storage proposal lacks a science-based plan

● July 16, 2016: "Everyone is looking for solutions for the system," Florida Crystals said in a statement. "Our companies strongly support science-based plans that will provide measurable benefits to Lake Okeechobee and the coastal estuaries. Unfortunately, Sen. Negron's land buy does neither." (Stapleton 2016).

● February 6, 2017: "It's up to all of us to do our part to finish restoring the Everglades and fixing Lake Okeechobee. Plans to buy land with little to no benefit to environmental restoration only serve as a

distraction. By staying focused on the science, we can ensure reaching the goal we started more than two decades ago can become a reality." (EAA landowners 2017).

● March 5, 2017: U.S. Sugar Corp. took a full-page ad in the *Stuart News* in part to characterize Mark Perry, executive director of the Florida Oceanographic Society, as one who "ignores facts to parrot fake science."

● March 6, 2017: 57 EAA farmers signed a letter to Sen. Negron stating that "The science on which your plan is based is fraudulent; the environmental special interests who supplied you with the data used in your plan cooked the books to reach conclusions unsupported by the actual science. This is not our conclusion; it is the public judgment of the South Florida Water Management District, whose data and predictive models your environmentalist advisors have intentionally manipulated and distorted."

Rebuttal: The science-based plan is the University of Florida Water Institute study report conducted for the Florida State Senate (see Graham et. al 2015). It evaluated all existing plans and concluded that even if all planned projects were completed, water storage and treatment capability around Lake O would not be sufficient to provide relief by reducing discharges to the St. Lucie and Caloosahatchee estuaries east and west of the lake and moving more water south to Everglades National Park and Florida Bay.

The UF Water Institute study report stated that "The solution [for providing] relief to the estuaries and the ability to move more water south of Lake Okeechobee is enormous increases in storage and treatment of water both north and south of the lake." The report called for a total of 1.6 million acre-feet of new storage, identifying needs east and west of the lake (≈ 200,000 and 400,000 acre-feet, respectively) as well as north and south (≈ 1,000,000 acre-feet total north and south). The report also stated that "[the solution] will require additional land between the lake and the EPA" (Graham et al. 2015). The EPA is the Everglades Protective Area south of the EAA that includes Water Conservation Areas that treat polluted water and Everglades National Park. In other words additional water storage on land in the EAA is necessary to meet the objectives of reducing Lake O discharges to the estuaries east and west, and moving water south to the Everglades.

5) The storage proposal is inadequate to reduce Lake O discharges

● July 16, 2016: Judy Sanchez, a spokesperson for U.S. Sugar Corp., criticized the environmentalists' approach. "If activists had their way, billions of dollars would be diverted from existing approved and engineered projects … and instead be used to buy surplus land that would not yield enough storage capacity to handle more than 'a drop in the bucket' of Lake Okeechobee discharges." (Stapleton 2016).

● February 6, 2017: A letter to the legislature signed by 14 EAA landowners, including U.S. Sugar Corp. and Florida Crystals Corp., stated that "We are not willing sellers of our land to the government"; one of the given reasons was that "Water reservoirs south of Lake Okeechobee simply cannot store enough water to stop the dlscharges from lake Okeechobee when our region is inundated from heavy rains." (EAA landowners 2017).

● March 5, 2017: U.S. Sugar Corp. took a full-page ad in the *Stuart News* so that Judy Sanchez could reassert the claim that the South Reservoir would be a "drop in the bucket" and "NOT the solution to stopping coastal discharges" (as emphasized in the ad). Her conclusion is that "Floridians cannot afford to borrow billions we don't have, to buy land we don't need, for a project that won't work."

● March 6, 2017: 57 EAA farmers signed a letter to Sen. Negron accusing him of conducting "… a war on your part against farmers south of Lake Okeechobee … because it is clear that your agenda as Senate President has been hijacked by out-of-state special interests who seek to do harm to the people in Florida who live on the land and help put food on our tables." They also state that the "… plan would have minimal effect. Only a fraction of the discharges into the coastal estuaries would be prevented ..." (EAA farmers 2017).

Facts: In 2016 discharges east and west of Lake O totaled 737.3 billion gallons, or 2.263 million acre-feet. El Niño weather events in 2016 triggered unusually excessive rainfall. In 2013, another year of excessive rainfall , discharges totaled 582.3 billion gallons, or 1.787 million acre feet (Goforth 2017b). The Lake O discharges in these two years were 3.0 and 2.4 times the annual average over the past 36 years (1980-2016) of 244 billion gallons per year (Goforth 2017a) or 749 million acre-feet per year. In summer the nutrients in Lake O feed harmful algal blooms that not only make people sick, but can kill animals that ingest it (see **Box 1**).

Box 1. Health Threats Posed By Florida's Harmful Algal Blooms

Common in most of Florida's aquatic environments, many blue-green algae species (a.k.a. cyano-bacteria) are capable of producing harmful toxins (cyanotoxins). Cyanobacteria can cause unsightly blooms; cause taste and odor problems in public water supplies and can kill domestic animals, pets, and fish and wildlife that drink or are exposed to untreated contaminated water or toxic biota.

Florida's freshwater systems have three main types of cyanotoxins: hepatotoxins (affecting the liver), neurotoxins (affecting the nervous system), or dermatotoxins (causing topical skin irritations). Recreational exposure by direct contact with a cyanobacteria bloom from activities such as jet-skiing, boating, and swimming have been reported to cause hay fever-like symptoms (itchy eyes, sore throat, congestion) and dermal reactions (skin rashes, blistering) at high concentrations. Ingesting contaminated water can cause gastrointestinal distress (diarrhea, abdominal pains, nausea, vomiting). Health problems may occur in animals if they are chronically exposed to fresh water with cyanotoxins. Livestock and domestic animals can be poisoned by drinking contaminated water, and fish and bird deaths have been reported in Florida water bodies with persistent cyanobacteria blooms. It is important to remember these toxins have no known antidotes and cannot be removed by boiling (FFWCC 2017).

Research on links between cyanotoxins and human health raises concerns. Vegetables irrigated with water containing cyanotoxins are a concern and the Florida Health Department is not monitoring Lake Okeechobee water for cyanotoxins (Widder 2017). BMAA , a neurotoxin produced by almost all species of cyanobacteria, has been found in Florida shellfish. Field research has linked BMAA in food sources to high rates of ALS (Lou Gehrig's Disease) (Holtcamp 2012) and laboratory experiments link BMAA in food sources with Alzheimer's Disease (Cox et al. 2016, Pacenti 2016, Waycamp 2016).

Rebuttal: If all 1.6 million acre-feet of additional storage around the lake that were called for in the UFWI report (Graham et al. 2015) were in place, then storing the average annual discharge over the past 36 years of 749,000 acre-feet or 244 billion gallons (Goforth 2017a) would not be a problem.

But what about discharges in years that are well above the 36-year average, such as 2013 and 2016? According to a journalistic report by Tyler Treadway (2017), "[P]roponents of the Negron proposal stress that the project would provide 'dynamic' rather than 'static' storage: The reservoir would not just hold water, it would continuously send water south toward the Everglades. Over the course of a year, the reservoir would 'turn over' three to four times, sending 360 billion to 480 billion gallons of water to the Everglades, said Mark Perry, executive director of the Florida Oceanographic Society in Stuart. That gets a lot closer to the 2016 discharge total and in the range of the Lake O discharges during the 'Lost Summer' of 2013." (Treadway 2017)

As noted in the **Facts** section above, discharges during 2016 and 2013 were 737.3 billion gallons and 572.3 billion gallons, respectively (Goforth 2017b). Yes, there would need to be some discharges east and west during years with extraordinarily high rainfall. How much? Assuming dynamic storage of 360 billion gallons per year, the discharges would have been reduced by almost half in 2016 and almost two-thirds in 2013. Even though discharges would still be necessary, the South Reservoir would provide beneficial effects by withholding huge amounts of polluted water.

The issue of discharges is not just about the volume of water released from Lake O, but pollutants in the water that feed harmful algal blooms and modify salinity as well as dump sediment in estuaries, with adverse effects on humans and aquatic ecosystems. How harmful are the algal blooms? (See **Box 1**.) Harmful enough that in 2016, as had happened in 2013, local governments closed beaches. In June 2016 Governor Rick Scott declared a "State of Emergency" in four counties.

Had the proposed reservoir been in place in 2016, at least 120 billion gallons of Lake O water would have been kept out of the estuaries, preventing an estimated 1.4 million pounds of nitrogen, 110,000 pounds of phosphorus, and 12 million pounds of sediment from contaminating these critical coastal environments. With enhanced operation of Lake O and completion of other CERP projects, the benefits would have been even greater (Goforth 2017a).

6) Storage efforts should focus north of Lake O rather than south

● July 16, 2016: James Moran, a South Florida Water Management District board member, suggested that instead of continuing to focus on storage south of Lake Okeechobee , the district should consider water storage and treatment options north of the Lake. This was among the recommendations made in the UFWI study report (Graham et al. 2015, as described above) that was commissioned because of algal blooms in 2013. Water north of the lake contains nutrients from dairy and cattle ranching along with stormwater runoff from lands south of Orlando. Storing and cleaning that water before it gets into the lake and then flushed into the estuaries make sense, Moran said. "If you want to clean up the lake, you've got to clean up the water going into the lake," Moran said. "Then you won't have algae blooms in the future." (Stapleton 2016).

● February 3, 2017: Matt Morrison, policy bureau chief for the South Florida Water Management District, was reported to have said that "Storage north of the lake would be more 'flexible' than a reservoir to the south. Stored water could be moved to Lake O when drought dries out the western marshes, to the Caloosahatchee when saltwater is moving up from the Gulf of Mexico, and to the Everglades and Florida Bay when they need freshwater." (Treadway 2017).

Rebuttal: The Florida Legacy Act of 2016 requires the Florida Department of Environmental Protection and the South Florida Water Management District to "give preference to those Everglades restoration projects that reduce harmful discharges of water from Lake Okeechobee to the St. Lucie or Caloosahatchee estuaries in a timely manner." As stated in the UF Water Institute study report: "The solution [for providing] relief to the estuaries and the ability to move more water south of Lake O is enormous increases in storage and treatment of water both north and south of the lake." Furthermore, the solution "will require additional land between the lake and the EPA [Everglades Protection Area immediately south of the EAA]" (Graham et al. 2015)—i.e., land in the EAA is required to accomplish the objectives of providing relief to the estuaries and moving water south to the Everglades.

On the flexibility issue, Mark Perry, executive director of the Florida Oceanographic Society, said Mr. Morrison is correct, "but once the northern reservoir and wells that the district is considering as an option fill up, the only place to send excess water is to Lake O; and once the lake fills up, the only place to send the water is to the estuaries." (Treadway 2017).

According to Florida Audubon (2016), "A draft Project Implementation Report (PIR) completed for the EAA Reservoir project in February 2006 [see USACOE & SFWMD 2006] showed it was cheaper per acre to store water in the EAA than north of Lake Okeechobee or by using Aquifer Storage and Recovery (ASR). Storage south of Lake Okeechobee in the EAA was shown to cost less than half per acre than storing water north of Lake Okeechobee." More recently, Tom Van Lent, Ph.D., a hydrologist/engineer employed by the Everglades Foundation, used the South Florida Water Management District's reservoir operations model to demonstrate that the South Reservoir is more effective in reducing harmful discharges to the estuaries than the contemplated storage reservoir north of the Lake, with approximately 50 percent reduction in discharges for the South Reservoir compared to approximately 6 percent reduction in discharges for a northern reservoir (Van Lent 2017, Van Lent and Paudel 2016). Although opponents to the South Reservoir contest Dr. Van Lent's methods and findings, (see, e.g., Owisino 2017) there has been no dispute regarding statements that providing additional water to the Everglades can only be accomplished by constructing additional storage south of the Lake (Goforth 2017a).

7) The storage proposal is a new and/or distracting idea

● August 4, 2016: Dan O'Keefe, Chairman of the South Florida Water Management District's Governing Board, said that the US Army Corps of Engineers suggestion to accelerate the planning study to build the Southern Reservoir, scheduled to begin in 2021, "is a distraction ... and could prove harmful to ongoing restoration efforts." The Integrated Delivery Schedule, which sets out the timing for the myriad projects to fix the Everglades, is there for a reason, said O'Keefe. Several projects must be studied before an EAA

reservoir is considered. The schedule provides budget certainty and predictability, he added (Stecker 2016).

● August 5, 2016: Barbara Miedema, vice president of public affairs and communications for the Sugar Cane Growers Cooperative of Florida, said, “The Corps wants to leapfrog the entire well-thought-out process in search of a shiny coin,” she said, adding, “This is nothing more than a chorus of environmental groups that want to buy land in the EAA.” (Stecker 2016)

● January 2017: Ted Astolfi, interim CEO of the Economic Council of Martin County, in a video posted to the council’s Facebook page, articulated the group’s opposition to the Negron Plan: "I don't want us to get distracted by the new or latest idea,” Astolfi said, citing the council's support of the Comprehensive Everglades Restoration Plan and the Central Everglades Planning Project. “When it comes down to it, I have to be against (Negron's plan) because it distracts us from CERP ... it distracts us and delays us in implementing a 53-year project that we're just 17 years into.” (Smart 2017)

● February 20, 2017: Associated Industries of Florida released a statement supporting the restoration schedule that calls for starting on water storage south of the lake in 2021 rather than this year as Negron proposes through SB 10. Last week, the Florida Chamber of Commerce president Mark Wilson issued a similar statement (Ritchie 2017).

Rebuttal: The South Florida Water Management District’s involvement is critical. Nonfederal partners are required to put up half of the cost share for Everglades projects, which can reach into the billions of dollars (Stecker 2016). This recognition is built into the Negron Plan, which would have the state as the nonfederal partner acquire the land on which to build the Southern Reservoir so that federal dollars could be used to construct it.

Regarding Mr. O’Keefe’s above point that the talk of a South Reservoir in the EAA is distracting was echoed by Mr. Astolfi. However, Julie Hill-Gabriel, director of Everglades policy for the National Audubon Society, said the laws around restoration allow for flexibility in the planning process. “The district letter failed to recognize that that Integrated Delivery Schedule is always a living document,” she said (Stecker 2016).

Sen. Joe Negron (2017b) wrote that “If the Florida Legislature approves and funds additional water storage south of Lake Okeechobee, the Army Corps of Engineers will reevaluate the order of priority in the 2016 Integrated Delivery Schedule (IDS). Florida is a partner in Everglades restoration and its decisions influence and impact federal participation in the 50-50 matching program. An example of this reality is the Corps’ recent initiation of the Lake Okeechobee Watershed one year earlier than planned after adverse discharge events “(Negron 2017b).

Mr. Astolfi’s contention, above, that the Southern Reservoir is a new idea is simply wrong (see **Box 2**). Although in the above quotation she referred to the Southern Reservoir as a “shiny coin,” Barbara Miedema pointed out that the idea of building a storage reservoir south of the EAA is not

Box 2. Chronology of the South Reservoir: The Unfinished 60-year-old Project

1923: first reported discharges from Lake Okeechobee (Lake O) to the St. Lucie Estuary

1930: Martin County Commission sends first of many requests to State requesting a stop to the discharges

1955: US Army Corps of Engineers evaluates new outlet and flow-way south of Lake O

1980s-early 1990s: concept of regional EAA reservoir storage formalized

1996: Governor's Commission for Sustainable South Florida: A Conceptual Plan for the C&SF Project Restudy — stakeholders unanimously agreed to storage reservoirs in the EAA

1999: C&SF Restudy — identified EAA storage reservoirs as Component G

- 120 billion gallons on 60,000 acres
- land to be acquired from willing sellers prior to planning and design completion

2000: EAA storage reservoir authorized by Congress as one of initial set of CERP projects

- A-1 Reservoir: 62 billion gallons, 12 feet deep on 17,000 acres
- A-2 Reservoir: 55 billion gallons, 12 feet deep on 16,000 acres

2006: A-1 Reservoir began; cost estimate $913 million; anticipated completion 2009-2011

2008: Construction of A-1 Reservoir stopped after expenditure of more than $500 million

2012: A-1 footprint converted to a shallow water surge basin to provide additional water quality treatment for predominately EAA runoff, and secondarily, Lake O releases (Restoration Strategies)

2013: Central Everglades Project (CEP):

- A-1 Reservoir was removed from CERP (loss of 62 billion gallons of storage)
- A-2 Reservoir was reduced from 55 billion gallons to 18 billion gallons (loss of 37 billion gallons)

2016: Sen. Negron proposed acquisition of up to 60,000 acres and construction of EAA Storage Reservoir to hold 120 billion gallons

2017: SB 10 and HB 761 filed in Florida Legislature

- acquisition of up to 60,000 acres
- expenditure of $1.2 billion from Land Acquisition Trust Fund

Source: Goforth 2017a

a new concept and would do little to alleviate the algae problems of coastal Florida. The Southern Reservoir was studied by a state commission on sustainability in the late 1990s, then again after two major hurricanes a year later, she said (Stecker 2016).

Mr. Astolfi in a televised interview recognized that every aspect of Martin County's $639 million dollar marine economy's impact is closely tied to the environment, and that the Lake O discharges and algal blooms have had a "severe impact on business … those that are directly on the water are significantly impacted." (Brezinski 2016).

8) The storage proposal should be replaced by state efforts to reconstruct the Lake O dike

● February 22, 2017: State Sen. David Simmons, a Republican from Altamonte Springs, has proposed SB 816 as an alternative to the Negron Plan. The bill would require the South Florida Water Management District to take over management of Lake O discharges with the goal of raising the Lake by two feet in order to reduce discharges, and get the work done by 2020, using state funds if necessary (Ritchie 2017).

Rebuttal: The US Army Corps of Engineers is working to strengthen the dike around Lake Okeechobee to reduce the risk of flooding. The federal government has spent more than half of the $1.6 billion cost of dike repairs and is scheduled to complete work in 2025 (Ritchie 2017).

According to Sen. Joe Negron (2017b), "Once the Herbert Hoover Dike rehabilitation is complete in 2024, the Army Corps of Engineers is not committed to storing one more gallon of water in Lake Okeechobee. The LORS [Lake O Release Schedule] must go through a multi-year review process, with the Corps predicting only negligible modifications to the release schedule. The Corps wants to avoid expected negative impacts it believes would result if the Lake is managed at higher levels than the present. … If Florida advances funds to complete the rehabilitation of the Herbert Hoover Dike around Lake Okeechobee, the federal government will not repay the money to Florida. We will have simply spent hundreds of millions of dollars of General Revenue funds on what is unquestionably a federal responsibility." (Negron 2017b)

Postscript: Seven Questions Legislators Will Want Answers To

In the end, as Smith (2017) put it, legislators likely will want the answers to seven questions to decide whether to support the acquisition of land for the construction of the Southern Reservoir. Those questions follow, as they were posed by Smith (2017), with replies based on the preceding analysis.

Q1) Will a 60,000-acre reservoir south of Lake Okeechobee cancel the need for lake discharges and end the threat of algal blooms in the St. Lucie and Caloosahatchee estuaries?

A1) That's two separate questions. First, given historical discharge records dating back 36 years, in 3 of every 4 years there would be no need for any discharges if the reservoir was managed dynamically and 360 billion gallons coursed through it in a year. In those years with high rainfall, like 2016 and 2013, the Southern Reservoir would reduce the discharges by 48.5% and 62%, respectively. Second. During the warm summer months there is always a potential for algal blooms in the estuaries, but the algae and nutrients from Lake O discharges that come every summer guarantee an algal bloom and exacerbate the problem. Toxic algal blooms in the estuaries are less likely to occur when there are no discharges, and with reduced discharges the likelihood of toxic algal blooms is also reduced.

Q2) Can the southern reservoir already in the CEPP plan, together with land the state already owns, be adapted to store the same amount of water?

A2) Serious consideration should be given to locating additional water storage and treatment capacity south of Lake O that would minimize the need for the state to buy more land; i.e., the state should consider if existing state lands south of Lake O can be used to meet the goal of an additional 120 billion gallons of storage. As Gary Goforth, P.E., Ph.D., testified, the desired goal of CERP is to create a reservoir in the EAA capable of storing 360 million acre-feet, which is equivalent to 120 billion gallons. The amount of acreage needed to accomplish that goals is somewhere between 35,000–50,000 acres, depending on how high the reservoir walls are built (Goforth 2017 c). The state owns more land than that in the southern portion of the EAA; approximately 13,000 acres of that land is leased to two sugarcane growers, and the leases will be terminated in 2019. These lands were part of a 50,000 acre acquisition of sugarcane land called the Talisman tract in order to build an EAA reservoir. The leased lands are what is called the A-2 lands and a deep reservoir could be built there. On an adjacent parcel of 16,000 acres, the state began construction of the A-1 Reservoir in 2006, and halted construction in 2008 after $500,000 had been spent. The A-1 structures were converted to a shallow flow equalization basin to help clean polluted water from sugarcane lands before that water can be sent south. In addition, the state owns two wildlife management areas in the southern part of the EAA that could be either repurposed or, more likely, as mentioned in the UFWI report, managed to store more water (Graham et al. 2015, pages 103-106). But, as the UFWI report said, it would still be necessary for the state to acquire additional acreage in the EAA for water storage purposes.

Q3) How much time will it take to complete and permit a new reservoir?

A3) This is two questions. First, regrading permitting, Sen. Negron wrote, “Under both the Comprehensive Everglades Restoration Plan (CERP) and the Central Everglades Planning Project (CEPP), redirecting damaging Lake Okeechobee discharges southward to improve the flow, timing, and distribution of water through the Everglades has already been authorized. ” (Negron 2017b). Second, regarding construction, because the South Florida Water Management District was reported to have said that the 10,000 acres C-43 Reservoir would take 10 years to complete (Gillis 2016), it seems likely that the larger South Reservoir might take at least 10 years to complete.

Q4) How much delay will the process of land purchase and construction cause in completing projects just waiting for funding?

A5) All Everglades restoration projects are important, but some are more important than others and should be given priority. The Florida Legacy Act of 2016 mandates that state agencies give preference to projects that reduce discharges to the St. Lucie and Caloosahatchee Estuaries. In that context concern about the delay of other projects to undertake a higher priority project is irrelevant.

Q5) How will a 60,000-acre reservoir affect the local economy—will it alter a way of life in the Glades, cost jobs, lose money from the county tax rolls and necessitate a tax hike?

A5) It will cost some existing jobs but replace them with others (see item 1 above). It will not necessitate a tax hike (see item 3 above). It will alter a way of life in the Glades by providing new job opportunities for some of Florida's poorest communities.

Q6) Will this water really help Florida Bay and during very wet periods, what are the dangers to wildlife?

A6) According to Florida Audubon (2017), "CEPP, bridging Tamiami Trail and the C-111 projects are all critical to improving the health of Florida Bay. But these projects need an upstream source of freshwater to achieve their maximum benefits."

Q7) New reservoir or staying the course? Which gives Floridians the best bang for their buck?

A7) Staying the course means dumping hundreds of billions of gallons of polluted water into the St. Lucie and Caloosahatchee estuaries, creating environmental, economic and public health issues, and wasting water to tide when it is needed to maintain desirable ecological conditions in Everglades National Park (ENP), a designated World Heritage Site that is being adversely affected by lack of water, and to the south of it, Florida Bay, which suffers from hypersalinity due to lack of fresh water. Staying the course means waiting for other Everglades restoration projects that will help the problem situation, but not as much as scientists (e.g., Graham et al. 2015) believe additional storage around Lake Okeechobee would help. Only the South Reservoir will provide additional water for ENP and Florida Bay. A North Reservoir is necessary, but it will not be as effective in reducing discharges as the South Reservoir (Van Lent and Paudel 2016), and it would not help ENP and Florida Bay at all.

Which gives Floridians the best bang for their buck? That depends how one might measure bang. … Environmental, economic and public health issues need to be considered. "Staying the course" postpones searching for ways to deal with these problems. Will staying the course improve environmental conditions as much as the South Reservoir? No. Will staying the course improve the adverse economic consequences that people living near the St. Lucie and Caloosahatchee Estuaries suffer due to discharges and algal blooms? No, but it will protect jobs in the sugar industry and the communities where sugar workers live, but at the expense of marine industries in four counties and home values in two counties that taken together dwarf the adverse impacts from losing additional sugarcane lands. Will the public health issues associated with algal blooms be improved by staying the course? No. If one disagrees with these three findings, it can only be because one is willing to wait until 2021 to revisit these issues, because, as Sen. Negron (2017b) put it,

"The issue is not if we will have additional southern storage, it is when and where."

Appendix A. Comparing Employment Impacts in Table 1 with the "JMI" and "Clemson" Studies

Two reports estimating employment impacts from the proposed South Reservoir in the EAA were released during the last week of February 2017. The first of them was published by the James Madison Institute, self-described on their website as a "free-market think tank." JMI makes "policy recommendations rooted in the principles found in the U.S. Constitution and such timeless ideals as limited government, economic freedom, federalism and individual liberty coupled with individual responsibility." The author of the study is consulting economist Antonio J. Villamil, so the report is cited herein as Villamil (2017) and more widely known as the "JMI" study. A few days later the Everglades Foundation released the report it commissioned from Michael T. Maloney, an economics professor emeritus from Clemson University, which is cited herein as Maloney (2017) but more widely known as the "Clemson" study. Although press releases for both these reports featured discussion of job impacts, the studies arrived at very different results, and both of them in ways that cannot be verified because the data sources for job losses were not identified.

Neither of these two new studies documented where the fundamental building block of their analysis—employment data on Florida's sugar industry—came from, so their work cannot be verified. Because of that, findings of these two study reports studies are not used herein. In those studies source data for job loss impacts are either not identified ("JMI" study) or are not accessible ("Clemson" study). The "JMI" study report overstates job loss; the "Clemson" study report understates it. The "JMI" study ignores jobs created by constructing the South Reservoir, the "Clemson" study overstates them.

The results in **Table 1**, presented on page 6 and reproduced below, were developed independently. Sources of employment data and definitions and descriptions of direct, indirect, and induced impacts are provided below. Following that are comparisons of this study's independent results with those in the "Clemson" study (Maloney et al. 2017) and "JMI" study (Villamil (2017), which are presented by working through each line in the table.

Table 1. Employment Impacts Associated with Proposed South Reservoir in the EAA

Economic Sector*	Employment Impacts**			
	Direct	Indirect	Induced	Total
Sugarcane industry	(323)	(740)	(482)	(1,545)
Reservoir construction	9,450	5,670	7,560	22,680
Reservoir operations & maintenance	189	113	151	453
Recreation & tourism	215	108	107	430
Total net impact on jobs	9,531	5,151	7,336	22,018

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*Economic sector source data are primarily from economic impact studies using constructed input-output models based on inter-industry economic relationships (Sugarcane industry – LMC Int'l 2011, for the American Sugar Alliance; Reservoir construction – Mulkey et al. 2005, C-43 Reservoir economic

(*continued at the bottom of page 21*)

● **Sugar industry job loss.** The 60,000 acres of land called for in current legislation for the South Reservoir represents 15% of the 416,000 acres of Florida land in sugarcane production averaged over the past five years According to a study conducted for the American Sugar Alliance, with full participation by all of Florida's major sugar producers, in the 2009/10 growing season there were 2,152 people in Florida employed in sugarcane field work (1,130 jobs) and sugarcane factory work (1,022 jobs) (LMC Int'l 2011, Table 3.6). Income earned in these jobs "ripples" through the economy, creating indirect (4,927 jobs) and induced (3,213 jobs) effects in other industries. The acquisition of 60,000 acres of sugarcane farmlands for a reservoir would reduce the average of 416,000 acres farmed in recent years (USDA ERS 2017) by approximately 15 percent. Reducing the total number of sugarcane industry jobs in Florida (10,292) by the same percentage, there would be a loss of 323 direct, 740 indirect, and 482 induced jobs, for a total of 1,545 jobs lost.

The "JMI" study concluded that there would be 4,148 jobs lost as a result of the state acquiring sugarcane lands. Of these, 1,915 are identified as direct jobs, If the Villamil (2017) was referring to direct jobs in the sugar industry, as one would expect from an economic impact study of the sugar industry, then the results are overstated. The "JMI" study results would have 89% of the 2,125 direct jobs in the industry disappearing. Does it make sense that a loss of 15% of production capacity would result in a loss of 89% of the industry's jobs? Not to this analyst.

The "Clemson" study report did not include any information in it about job loss, so in essence it is a one-sided report. But in an interview with the *Miami Herald* the author said 90 farm jobs would be lost (Staletovich 2017). That is too low an estimate, even of the author was talking only about direct field jobs, which would be more like 169 jobs using the above-described data and methods.

(*continued from page 20*) impact analysis by the University of Florida, with supplementary data from McCormick et al. 2010 and Tehrani & Cruz 2017, both prepared for the Everglades Foundation; Reservoir operations & maintenance – Mulkey et al. 2005, as described above; Recreation & tourism – USACOE & SFWMD 2006, environmental impact statement for the CERP EAA Reservoir project; Parrish et al. 2013, economic impact of Florida's tourism industry).

******Effects from economic activity in the sugar sector "ripple" through the economy, creating a multiplier effect on jobs and income in other sectors. Herein only jobs are reported. The model calculates direct impacts (employment and spending), indirect impacts (secondary effects of spending via jobs and incomes generated in sectors from which goods and services are purchased to support the sugar industry) and induced impacts (expenditures of wages by direct and indirect employees). For example, a sugar field or factory worker draws wage income (direct impact), owns housing or rents it (indirect impact), operates a company vehicle (indirect impact), and spends money dining out, generating jobs and income for restaurant workers (induced impacts).

● **Reservoir construction job gains.** The total of 22,680 construction jobs reported in **Table1** above is based on a construction engineering and cost estimate of $1.89 billion for the South Reservoir developed by consulting engineers for the Everglades Foundation (Tehrani and Cruz 2017). A ratio of job expenditures per million dollars of construction expenditures was applied. Both McCormick et al. (2010) and Maloney et al. (2017) stated that the ratio of jobs per million dollars of construction expenditure is used by the US Army Corps of Engineers, and both authors used 20 jobs per million dollars, a ratio that McCormick et al. (2010) accredited to a Corps study that is not currently available on the internet. The Corps estimate was adjusted downward for two reasons: to account for monetary inflation, which the "Clemson" study did not do; and to resolve a discrepancy in reservoir construction job estimates between the Corps and University of Florida estimates for the same project, the C-43 Reservoir.

Then "JMI" study focused only on costs and job losses. It did not include even a mention of benefits from reservoir construction or any other potential benefits from the reservoir project. By design it is a one-sided report.

In the "Clemson" study, Maloney et al. (2017) used the 20 jobs per million dollars ratio determined by the Corps in 2010 and applied it 2017 cost estimates of $1.89 billion (Tehrani and Cruz 2017) to estimate construction jobs. The result was 16,000 direct jobs and an additional 23,000 jobs from indirect and induced effects, for a total job impact of 39,000. It is almost inconceivable that a Ph.D. economist would not adjust for inflation, but here it happened. If a million dollars bought 20 construction jobs in 2010, as in the Corps study, would a million dollars today buy 20 construction jobs? No, because of inflation, or the time value of money. According to changes in the CPI (Consumer Price Index, a widely used measure for expressing the change in the value of money) the value of a dollar today is 10% less than it was in 2010. The author should have made an adjustment for that, which would have reduced the jobs per million dollars of construction activity ratio to 18, and the total job impact from 39,000 to 35,100.

The "Clemson" study also may have overstated estimates of construction jobs by not double checking on Corps construction estimates. In the McCormick et al. (2010) study, construction job estimates made by the Corps were given for a number of CERP projects, including the C-43 Reservoir in Hendry County. University of Florida economists (Mulkey et al. 2005) did an impact study of that reservoir for the contractor doing the job for the South Florida Water Management District. The contractor furnished job estimates that were about one-third less than Corps estimates. The UF estimated 6,350 construction jobs, the Corps estimated 9,446 construction jobs for the same C-43 Reservoir project (see McCormick et al. 2010, Table 8-7, page 125). In **Table 1** the ratio for estimating jobs per million dollars of expenditure is adjusted downward accordingly, from 18 after adjusting for inflation to 12. As a result there would be 5 direct jobs, 4 indirect jobs, and 3 induced jobs for every million dollars of construction activity. These rations were then applied to a total of $1.89 billion of construction expenditures to produce the results in **Table 1**.

In the end, direct reservoir construction activity, whether it be 9,450 jobs in **Table 1** or 16,000 jobs in the "Clemson" report, dwarfs the direct, indirect, and induced job losses totaling 1,545 from land-use change from sugarcane production to water storage in **Table 1**.The job gains from construction would also be substantially more than the "JMI" study claim of 4,148 jobs lost. By including indirect and induced impacts from reservoir construction, the total job gains would be either 22,680 (**Table 1**) or

39,000 ("Clemson" study) and vastly exceeds the jobs lost in the sugar industry, even if it is as high as the "JMI" study concludes.

● **Reservoir operations and maintenance job gains.** In the University of Florida economic impact study of the C-43 Reservoir project, the authors were given an estimate from the reservoir construction firm that operations and maintenance (O&M) would be about 2 percent of construction costs (Mulkey et al. 2005). This analysis assumes that jobs are proportionate to expenditures, and calculates O&M jobs to be 2 percent of construction jobs.

● **Recreation and tourism job gains.** Impact analysis by public agencies estimated a total of 36,500 visitor days per year to a proposed EAA reservoir (USACOE & SFWMD 2006, p. 6-14). According to an economic impact analysis of Florida's tourism industry, each 85 visitors to Florida results in one direct job in recreation & tourism industries, and the indirect and induced job impacts taken together would create one more job (data from Parrish et al. 2013). Using these data and assuming that half of the recreation visits to the EAA reservoir would be from outside the county or multi-county region being analyzed, there would be 215 direct, and another 215 indirect and induced jobs, for a total of 430 jobs, as reported in **Table 1**.

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(All URLs were accessed during the first three months of 2017.)

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