



Audit of Dispersed Water Management Program

Project #14-07

Prepared by
Office of the Inspector General

J. Timothy Beirnes, CPA, Inspector General
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SOUTH FLORIDA WATER MANAGEMENT DISTRICT

November 13, 2014

Governing Board Members

Re: Audit Dispersed Water
Management Program
Project No. 14-07

This audit was performed pursuant to the Inspector General's authority set forth in Chapter 20.055, F.S. Our objectives primarily focused on assessing the effectiveness of the District's Dispersed Water Management Program and also includes comparison of the program's cost to other storage alternatives. Jankie Bhagudas and I prepared this report.

Sincerely,

A handwritten signature in blue ink, reading "J. Timothy Beirnes".

J. Timothy Beirnes, CPA
Inspector General

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BACKGROUND

Overview

In accordance with the Office of Inspector General's Fiscal Year 2014 Audit Plan, we conducted an Audit of the Dispersed Water Management (DWM) Program.

The DWM Program is one of the ways the District and its partners are addressing the legislative intent of the Northern Everglades and Estuaries Protection Plan (NEEPP),¹ which encourages and supports the development of partnerships to facilitate or further the restoration of surface water resources in the Lake Okeechobee Watershed (LOW), St. Lucie Watershed and Caloosahatchee River Watershed. DWM projects provide shallow water storage, retention, and detention through the use of existing infrastructure and simple structures that require minimal construction (for example, weirs, berms and culverts). Water is retained on-site and removed through natural means of evaporation, transpiration, or seepage. The following are examples of the simple infrastructures needed to retain water.

DWM Simple Structure - Culverts



¹The Lake Okeechobee Protection Act (LOPA) [Section 373.4595, Florida Statutes (F.S.)], passed in 2000, established a restoration and protection program for the lake. In 2007, the Florida legislature amended the LOPA in Section 373.4595, F.S., which is now known as the Northern Everglades and Estuaries Protection Program (NEEPP). The NEEPP promotes a comprehensive, interconnected watershed approach to protect Lake Okeechobee and the Caloosahatchee and St. Lucie rivers (SFWMD et al., 2008).

DWM Simple Structure: Culvert with a Riser (Weir)



Some benefits of DWM projects include the following environmental and economic benefits:

- Reducing the volume of water flowing into Lake Okeechobee and reducing damaging discharges and nutrients to the St. Lucie and Caloosahatchee Estuaries.
- Improving water quality and rehydration of drained systems.
- Contributing to the achievement of the Lake Okeechobee Total Maximum Daily Load (TMDL) for total phosphorous (TP), and meeting other water quality criteria.
- Providing habitat enhancement for various species.

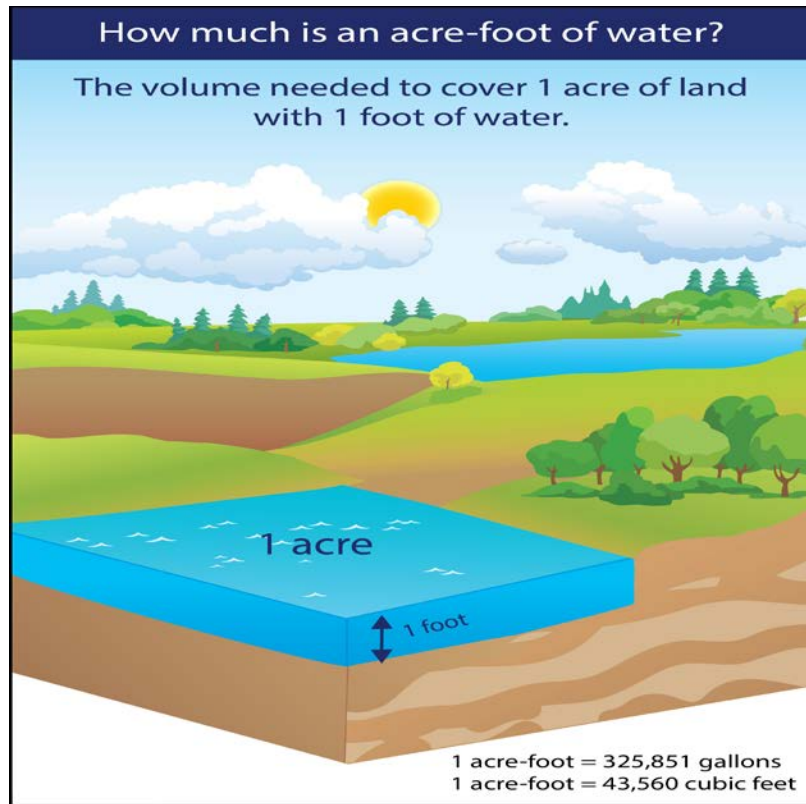
It is important to note that DWM projects are viewed as complements to regional projects; such as aquifer storage and recovery projects, deep injection wells, storage reservoirs, and other state initiatives, which are critical to storage needs.

Since 2005, the District, other agencies, environmental organizations, ranchers, researchers, and other stakeholders, have been working together to increase, identify, and implement mechanisms to retain or store excess water on private and public lands.

Site Before and After Simple Infrastructure Installation to Retain Water



Water retention is measured in acre-feet and is illustrated in the following picture.



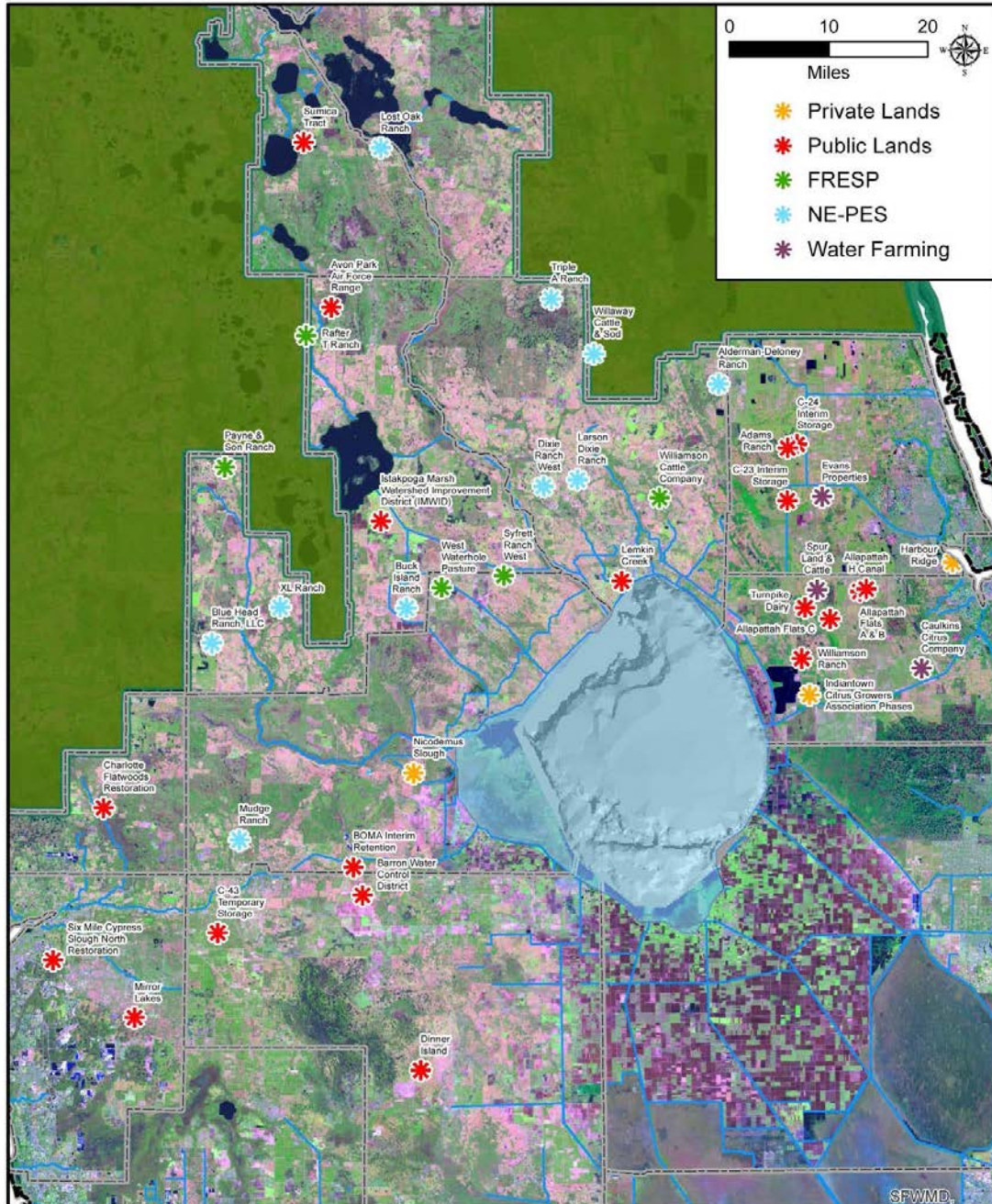
Types of DWM Projects

The five main categories of projects under the District's DWM Program are as shown in the following table.

DWM Project Categories
Florida Ranchlands and Environmental Services Projects (FRESP)
Private Lands
Public Lands
Northern Everglades Payment for Environmental Services (NE-PES)
Water Farming Payment for Environmental Services Pilot Projects

Project locations are shown in the following map and summarized in the following sections.

Locations of District and non-District DWM Projects that were Operational, Under Construction or Under Negotiation, as of December 2013



Source: 2014 South Florida Environmental Report

Florida Ranchlands and Environmental Services Project (FRESP)

FRESP was a five-year pilot of eight projects to develop and field test a Payment for Environmental Services (PES) program. FRESP partners included the following:

- South Florida Water Management District (District)
- Eight ranchers
- World Wildlife Fund
- Florida Cattlemen's Association
- Florida Department of Agriculture and Consumer Services (FDACS)
- Florida Department of Environmental Protection (FDEP)
- University of Florida Institute of Food and Agricultural Services (UF/IFAS)
- US Department of Agriculture Natural Resources Conservation Service (USDA-NRCS)
- MacArthur Agro-Ecology Research Center

Seven of the eight pilot projects were located in the Lake Okeechobee Watershed and one in the St. Lucie Watershed. These pilot projects consist of working ranches retaining excess stormwater runoff or providing water quality improvement for contracted payments. The pilot projects were implemented from 2005 through 2007 and remain in operation, but are phasing into other programs. Using data collected from these pilot projects, FRESP showed that expanding the number of projects on ranchlands in the Northern Everglades can complement existing and planned regional water storage and treatment projects. The success of FRESP resulted in the Northern Everglades – Payment for Environmental Services (NE-PES) Program and other DWM projects. As of June 2014, two of the FRESP projects' agreements have been extended: three are now operating under NE-PES projects, two have been converted to permanent easements under NRCS' Wetland Reserve Program (WRP), and one is no longer operating.

The following illustrates water retention on Rafter T. Ranch, located in Highlands County, one of the original FRESP still in operation. Based on DWM Program documents, this project can retain 1,145 acre-feet of water annually (about 373 million gallons).

Water Retention on Rafter T. Ranch in Highlands County



Public Lands

Some of the projects on public lands are on District owned pre-construction project lands that are being used on an interim basis until needed for the intended projects (for example, Caloosahatchee River (C-43) West Basin Storage Reservoir). In addition, some projects on public lands are cost shared with other local governments, water control districts, state agencies, and federal agencies, to cost share portions of planning, design, permitting, and construction costs. For example, some project costs are funded by U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS).

Private Lands

Some of the projects on private lands are cooperative agreements with land owners. In addition, the Nicodemus Slough project is on private lands and is the largest DWM project to date; it is estimated to retain 34,000 acre-feet of water annually over an eight-year period and cost over \$28.6 million to design, construct, operate, and maintain.

Northern Everglades Payment for Environmental Services (NE-PES)

Under these agreements cattle ranchers are paid for water and nutrient retention on their lands to reduce flows and nutrient loads to Lake Okeechobee and the St. Lucie and Caloosahatchee Estuaries. In January 2011, the District solicited proposals from cattle ranch owners in the Northern Everglades Watershed to submit proposals for DWM projects, which were reviewed and ranked by a selection committee that included staff from the Florida Department of Environmental Protection, before approval by the Governing Board and contract negotiations. A total of eight projects were awarded. In December 2012, a second solicitation was issued which resulted in 19 proposals. As of June 2014, only two contracts have been awarded due to funding constraints. Negotiations with the remaining respondents have been on hold due to funding constraints. It should be noted that during the 2014 Florida legislative session, \$13 million was appropriated for the DWM Program (included in the Fiscal Year 2015 revenue and planned obligations in the table on page 32). A total of \$10 million is anticipated to be used for new NE-PES projects. Specifically, the District plans to negotiate with the remaining respondents of the second NE-PES solicitation in ranked order. The District will seek clarification from Florida Department of Environmental Protection regarding the allowable uses of the remaining \$3 million.

The following picture illustrates water retention on the Dixie Ranch located in Okeechobee County. Based on the contract agreement, this NE-PES project can retain 856 acre-feet of water annually (about 279 million gallons).

Water Retention on Dixie Ranch in Okeechobee County



Water Farming Payment for Environmental Services Pilot Projects

As of June 2014, three pilot agreements for storing excess water on privately owned fallow citrus agricultural lands have been executed that will provide useful information on the concept of retaining storm water on citrus properties. The pilot agreements have three year terms and are located in the St. Lucie Watershed. The District received a grant of over \$1.5 million from FDEP to cover certain eligible costs. This award is being matched by a District contribution of \$1.5 million for a total commitment of \$3 million.

The following illustrates water retention on the Caulkins Citrus Company property, located along the St. Lucie Canal in Martin County.

Water Retention Pumps on Caulkins Citrus Company's Lands



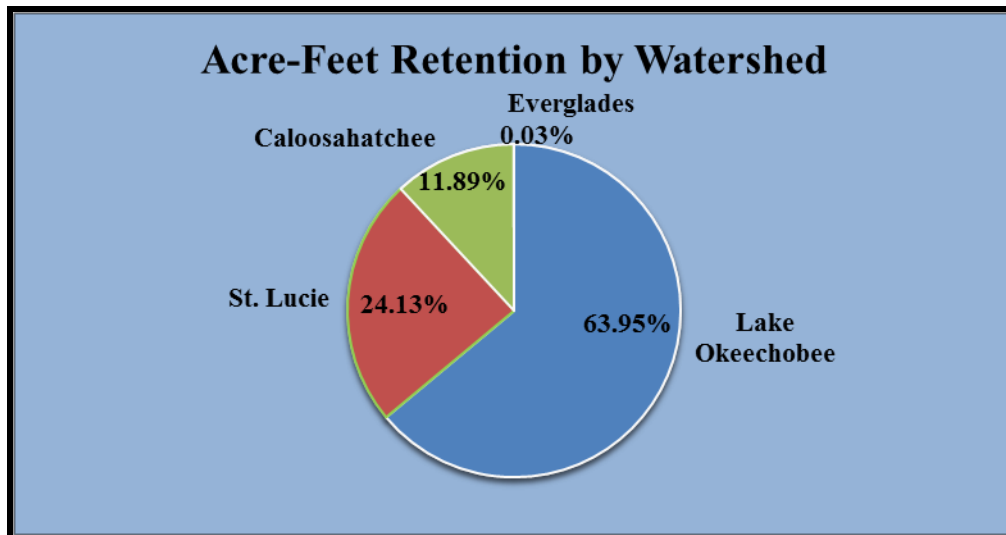
Based on the contract agreement, Caulkins Citrus Company will pump water onto 450 acres of its property that can retain 6,780 acre-feet of water (about 2.2 billion gallons) that would otherwise flow along the canal from Lake Okeechobee and surrounding basins into the St. Lucie River and Estuary.

DWM Program's Project Annual Retention

Various types of DWM projects that are either under construction or operational can retain approximately 95,000 acre-feet of water annually. It should be noted that projects totaling 48,728 acre-feet of retention are operational and projects totaling 45,957 acre-feet of retention are under construction. The project types are summarized in the following table and will be discussed in greater details in subsequent sections.

Dispersed Water Management Project Type	Acre-Feet Operational	Acre-Feet Under-Const.	Total Average Acre-Feet of Annual Retention
FRESP	6,145		6,145
NE-PES	4,777	3,859	8,636
Water Farming Pilot Projects	6,780	4,505	11,285
Private Lands – Eight-Year Contract with a Private Entity		34,000	34,000
Agreements with Private Entities – One-time Contribution of District Funds	4,217		4,217
Public Lands – Agreements with Public Entities	16,311	2,350	18,661
District-Owned Pre-Project Lands – Interim Storage	3,759		3,759
District-Owned Lands – Easements Funded NRCS Wetland Reserve Program	5,657	1,243	6,900
Prior FRESP Projects on Private Lands – Easements Funded by NRCS Wetland Reserve Program	1,082		1,082
Total – Acre-Feet	48,728	45,957	94,685

Further, DWM projects located in the Lake Okeechobee Watershed account for about 64% of retention amount of all DWM projects under construction and operational. The following table illustrates retention amounts by the different watersheds.



Overview of NE-PES and Water Farming Pilot Projects

The following provides a brief explanation of NE-PES and water farming projects agreement execution process.

- District issues solicitations for proposals. Proposals are reviewed, evaluated and ranked. Governing Board approves negotiations with respondents.
- Water retention model is used to estimate the annual acre-feet of water retention at proposed site.
- District staff determines the present value of the cost of the projects based on construction costs, operations and maintenance costs, and annual service payments. These costs are used to determine the cost per acre-foot of retention.
- District negotiates proposed costs with ranked respondents. District reimburses contracted service providers for construction costs and makes recurring fixed annual service payments.

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- Construction costs: Include surveys, design permitting, monitoring equipment, installation and construction of simple structures, and other construction activities.
 - Annual service payments: A fixed amount, which includes operations and maintenance costs.
- District purchases water monitoring equipment, which is installed at specific locations at each site by a District contractor. This equipment reverts back to the District at the end of the agreements.
- Each site is inspected monthly by a District contractor to document compliance with contract requirements. The contractor completes a monthly monitoring report, which includes weir elevations, water level data, and daily rainfall amounts, and forwards the report to the service provider. The service provider then forwards the report to the District. In addition, to receive annual payment, service providers are required to submit an annual certification stating that the project is operating as designed.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objectives primarily focused on assessing the effectiveness of the District's Dispersed Water Management Program and comparing its cost efficiency to other storage alternatives.

To accomplish our objective, we obtained an understanding of the DWM Program by interviewing District staff responsible for administering the program and reviewing various documents pertaining to the program. We compared the features of DWM projects to the regional projects (storage reservoirs) and provided the estimated costs of two regional water storage reservoirs. We assessed the impact of the DWM projects on reducing water flow to Lake Okeechobee and the St. Lucie and Caloosahatchee River Estuaries. Based on funds budgeted to the program and other anticipated revenue, we assessed how long contractual payment obligations and planned expenses will be funded. We also compared the cost of retention on public and private lands, then determined whether all available District or other publicly owned lands have been assessed to determine whether there are feasible sites that could be used cost effectively for water retention.

In addition, we obtained an understanding of the model used to determine water retention capacities and determined whether the model could be improved to better estimate retention capacities. Further, we determined whether DWM agreements are adequately monitored by District staff, whether construction cost estimates are reviewed by cost estimators for reasonableness, and whether payments to service providers are being made in accordance with the agreements.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

AUDIT RESULTS

Executive Summary

DWM projects are an innovative way to address water storage needs and provide environmental and economic benefits. Our audit identified some improvements that can be made to strengthen the DWM Program and improve the program's cost efficiency.

DWM projects complement planned regional projects and are viewed as short-term strategies to reduce excess water and improve water quality flowing to Lake Okeechobee and the St. Lucie River and Caloosahatchee River Estuaries. As of June 2014, operational DWM projects provide 48,728 acre-feet of retention and projects under construction will provide another 45,957 acre-feet, for a total of approximately 95,000 acre-feet of retention. These projects will provide about 6% to 9% of the Lake Okeechobee, St Lucie, and Caloosahatchee watersheds' projected storage needs (refer to table on page 18).

Regional and DWM projects have some similarities; however, the projects have major differences. Both types of projects reduce nutrient load and provide groundwater recharge. The most significant difference between regional and DWM projects is that regional projects are permanent and DWM projects are temporary. Another notable major difference is that regional projects capture and store water that is later released during dry periods to provide essential flows, which results in improved salinity and ecological health. In comparison, water retained on DWM project sites does not drain off-site as surface flow and is not available to improve salinity during dry periods. In addition, regional projects have high initial capital costs whereas DWM projects have low initial costs, but have recurring service payments.

Our assessment of the DWM Program's revenue and planned expenditures disclosed that additional funds will be needed to meet commitments and planned expenditures. Specifically, for the period Fiscal Year 2018 to Fiscal Year 2024, the DWM Program will need approximately \$17.3 million additional to meet its planned expenditures, as of June 3, 2014.

Audit procedures included calculating the cost of various methods of water storage. These are shown in the following table.

Annual Storage Cost Per Acre-Foot						
Storage Method		Initial Capital	Recurring Payments & Operations	Total	Financial Cost	Ecological Benefit
DWM	Public Lands	\$ 4.05	\$ 3.97	\$ 8.02	Lowest – But Limited Opportunities	Generally Lower than Reservoir
	Private Lands	\$ 22.65	\$ 80.45	\$ 103.10	Lower than Reservoir	
Reservoirs		\$ 147.32	\$ 20.53	\$ 167.84	Higher than DWM	Generally Higher than DWM

In many cases DWM projects may not provide the same ecological benefits as reservoirs. Storage reservoir costs are provided in the above table for the purpose of providing a comparative perspective regarding DWM storage cost per acre-foot of annual storage. Our analysis also reveals that the cost of DWM projects on public lands is significantly lower than private lands, although the ecological benefits are comparable. This cost difference is due to the following conditions.

- Recurring payments are not required on public lands; however, some projects may require on-going operation costs; such as operating pumps.
- The initial capital cost can be amortized over the infrastructures' useful life (typically 50 years) instead of the agreement term (typically 10 years).

It should be noted that although the cost of DWM projects on public lands is significantly lower, storage will be limited to the amount of such opportunities available on public lands that can be implemented with reasonable initial construction cost.

Some operational and planned DWM projects are on District lands as well as publically owned lands. Additionally, some District-owned pre-project land parcels are currently being used as interim storage and others sites are in the planning phases. Based on our analysis of the cost of current and planned DWM projects we concluded that, in most instances, using available District or other publicly owned lands, which meet the

required criteria for DWM projects, is a more cost effective strategy, primarily because annual service payments are not required. The weighted average annual cost to store water on publically owned land is about \$8 per acre-foot compared to \$103 for privately owned land. District staff has not performed a recent comprehensive analysis of all District-owned pre-project lands and other publicly owned lands to determine whether there are other feasible sites that would be suitable for interim water retention. Such analysis should also consider land that is currently leased to determine whether savings from storing water on these lands would exceed the current lease revenues. For example, the average grazing lease generates \$9 per acre in annual revenue, whereas the average cost of private land DWM projects is \$103 per acre-foot of retention. These leases can typically be terminated with a six month notice.

Annual NE-PES contract payments are fixed dollar amounts that were negotiated, based on the volume of water retained on-site, which were estimated using the Potential Water Retention Model (PWRM) developed specifically for NE-PES projects. The PWRM calculates the average annual water retention over a 10-year period of rainfall record that includes low and high rainfall days, weeks and months. However, the model could be refined to better estimate water retention levels or another model could be used to better estimate retention levels. In addition, DWM Program staff needs to increase efforts to ensure that all required contract compliance documentation is submitted by service providers and maintained by the District. Contract compliance documentation was not readily available and the data was not centralized.

DWM projects usually have some construction related costs before they can become operational. Staff involved in the contract negotiations reviewed proposed costs for reasonableness. We recommend that DWM staff consult with Engineering and Construction Bureau's staff, with construction cost estimating expertise, to review proposed construction costs.

Our audit also disclosed that the District is paying a contracted party about \$23,512 per year in administrative fees for essentially making payments to a FRESP service provider and forwarding invoices to the District for reimbursement. The initial

contract agreement was entered in 2006 and current DWM Program staff acknowledged that invoices should be sent directly to the District for payment.

Comparison of Dispersed Water Management and Regional Projects

DWM projects complement planned regional projects and are viewed as short-term strategies to reduce excess water and improve water quality flowing to Lake Okeechobee and the St. Lucie River and Caloosahatchee River Estuaries. Regional projects include above-ground reservoirs, aquifer storage and recovery projects, and deep injection wells. Modeling efforts indicate that additional storage is needed in the Everglades system and most analyses seem to indicate that at least a million additional acre-feet of storage is needed throughout the system. Water storage needs are shown in the following table.

Watershed	Estimated Storage Needs (Acre-Feet)	
	Early Planning - Pre-River of Grass (Note 1)	2009 River of Grass Planning (Note 2)
St. Lucie	200,000	200,000
Caloosahatchee	400,000	400,000
Lake Okeechobee (Notes 1 & 2)	1,100,000	512,500
Total Storage Needs	1,700,000	1,112,500
DWM Storage - Operational Projects	48,728	
DWM Storage - Operational + Projects Under Construction	94,897	
% of Need Provided by Operational DWM Projects	2.9%	4.4%
% of Need Provided by Operational & Planned DWM Projects	5.6%	8.5%

Notes

1 – Based on the Lake Okeechobee Watershed Construction Project – Phase II Technical Plan, about 900,000 to 1.3 million acre-feet of water storage is needed north of Lake Okeechobee. The storage amount in the table is the midpoint of estimated storage acre-feet needed. However, according to Office of Everglades Policy and Coordination Division staff, the magnitude of storage needed in the Lake Okeechobee Watershed varies depending on assumptions regarding delivery and storage volumes south of Lake

Okeechobee. Specifically, staff explained that these storage amounts were early planning estimates, prior to the 2009 River of Grass initiative, which assumed water would only be stored north of the Lake. Storage south of the Lake in the Everglades Agricultural Area (EAA) was not considered. However, River of Grass modeling and planning efforts in 2009 considered storing water south in the EAA that resulted in revised estimated needs of 450,000 to 575,000 acre-feet storage north of the Lake.

- 2 – River of Grass planning and modeling efforts in 2009 by District staff indicted that lower volumes of storage would be needed north of Lake Okeechobee, if water is sent south of the Lake to the Everglades Agricultural Area. Specifically, staff estimated that about 450,000 to 575,000 acre-feet of water storage would be needed north of the Lake and 250,000 to 525,000 acre-feet of water storage would be needed south of the Lake. Sending water south of the Lake was not considered in previous planning analyses. Further, this option reduces harmful discharges to the estuaries and would benefit Everglades National Park and Florida Bay. It is important to note that more detailed planning efforts are underway to determine the project features and locations that will provide optimal storage north of the Lake. Staff estimates that these efforts will take about two years to complete. This analysis would include the following: determining the optimal criteria and limitation of storage possibilities and determining which sub-watersheds would provide optimal storage. However, after this assessment is completed and a mix of projects has been identified there are no estimated timelines for the implementation of the project features north of the Lake to attain the estimated 450,000 to 575,000 acre-feet of water storage needed. Further, sending water south of the Lake is also in the planning and evaluation phase. The initial planning phase of the Central Everglades Planning Project (CEPP) is in the process of being considered for Congressional authorization; however, at this time the approval timeline is unknown. It should be noted that CEPP includes a very small portion of the projects needed south of the Lake to achieve the estimated 250,000 to 525,000 acre-feet of water storage. *(The storage amount in the table is the midpoint of estimated storage acre-feet needed north of the Lake.)*

DWM projects range from 30 acre-feet to 34,000 acre-feet of retention. As of June 2014, DWM projects that are operational and under construction provide approximately 95,000 acre-feet of retention, thus providing approximately 6% to 9% of estimated total storage needs.

Regional and DWM projects have some similarities; however, the projects have major differences. Notable similarities and differences are listed in the following tables.

Similarities Between Regional and DWM Projects
Nutrient load reductions
Habitat improvement
Groundwater recharge

Differences Between Regional and DWM Projects	
Regional Projects	DWM Projects
Projects are considered permanent.	Projects are considered temporary.
Water is captured and stored and later released during dry periods to provide essential flows, which results in improved salinity and ecological health. Some projects also have recreational benefits.	Water is retained on-site; generally does not drain off-site as surface flow. Water is not available to improve salinity during dry periods.
Project life is generally long term (50 years – the typical useful life of the infrastructure).	Project life is generally short term (10 years or less).
Complex planning, design, permit, and construction required. The process can take years before a project is implemented.	Simple structure construction typically using existing infrastructure and minor permit modifications or exemptions. Projects become operational in a short period of time.
Large initial capital cost.	Low initial capital cost.
Land purchase and management is required.	No land purchase costs.
No recurring service payments; however, there are annual operations and maintenance costs.	Recurring annual service payments to private landowners.
Lands acquired are removed from tax rolls.	Lands are kept on tax rolls.

The most significant difference between regional and DWM projects is that regional projects are permanent and DWM projects are temporary. Another major notable difference is that regional projects have high initial capital costs whereas DWM projects have low initial capital costs, but have recurring annual service payments. Also, DWM projects typically do not provide water treatment features (i.e., storm water treatment areas), whereas many regional projects have associated treatment features.

It should be noted that the estimated costs of five regional projects, which included four stormwater treatment areas (STAs) and two storage reservoirs, were compiled in a report, *Compilation of Benefits and Costs and Reservoir Projects in the*

South Florida Water Management District,² prepared by Hazen and Sawyer in July 2011 for the FRESP partners. The report included different cost scenarios and benefits for each project. As part of our audit, we determined the annualized cost and cost per acre-foot of retention for the Caloosahatchee River (C-43) West Basin Storage Reservoir and the C-44 Reservoir, which were included in the report. We used updated costs provided by the Operations, Engineering and Construction Division. The following provides a summary of the two storage projects and the estimated costs under certain assumptions.

Caloosahatchee River (C-43) West Basin Storage Reservoir

This project will capture and store approximately 170,000 acre-feet of stormwater runoff from the C-43 basin and reduce excess freshwater flow to the Caloosahatchee Estuary. It will also capture and store regulatory releases from Lake Okeechobee, which will reduce discharges to the estuary during wet periods and provide essential flows during dry periods to improve salinity balance. It should be noted that in 2012 and 2013, a portion of the project site was used for emergency shallow storage to help reduce freshwater impacts to the Caloosahatchee Estuary.

² The report analyzed four stormwater treatment areas and two reservoirs. District staff provided information such as project features, benefits, and costs to the consultant.

Based on the 2008 estimated construction and operational costs, we determined that the annualized cost for the C-43 Reservoir in 2014 dollars over a 50-year project life is \$138 per acre-foot of retention. The following table shows the estimated project costs and the methodology for calculating the annual cost per acre-foot.

C-43 West Basin Storage Reservoir – 170,000 Acre-Feet Storage Capacity	
Cost Type	2014 Cost
Capital Cost	
Land Cost (<i>Note 1</i>)	\$84,650,000
Construction Cost (<i>Note 2</i>)	429,513,750
Non-Construction Cost (<i>Note 3</i>) (e.g., engineering design and construction management)	29,047,784
Total Capital Cost	\$543,211,534
Cost of Capital (<i>Note 4</i>)	3.66%
Annual Cost of Capital	\$19,881,542
Annual Operating Cost	
Annual O&M Cost (<i>Note 5</i>)	2,700,641
Annual Project Monitoring and Data Collection (<i>Note 5</i>)	894,823
Total Annual Operating Cost	\$3,595,464
Total Annualized Cost	\$23,477,006
Storage Capacity – Acre-Feet	170,000
Annual Cost Per Acre-Foot	\$138

Notes

- 1* – Cost is the original purchase price of the land. Land cost was not updated because of unstable land prices in south Florida during the last few years. Further, project agreements for these projects with the U.S. Army Corps of Engineers provide for in-kind credit at actual purchase price for this project.
- 2* – Costs are based on the project's *Final Design Report – Appendix C – Opinion of Probable Costs*, which was prepared by a consultant in January 2008. In addition, the Operations, Engineering and Construction Division added a 10% escalation to the 2008 estimated costs to adjust the cost to 2014 dollars. Cost does not include STA components.
- 3* – The Operations, Engineering and Construction Division provided this cost. It includes \$19,047,784 of actual design costs, which was expended during 2004 through 2007, and \$10 million for projected engineering during construction and construction management services.
- 4* – The cost of capital was determined using average 30 Year Treasury Bond rate for the last five years.

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- 5 – Cost was obtained from a report, *Compilation of Benefits and Costs and Reservoir Projects in the South Florida Water Management District*, prepared by Hazen and Sawyer in July 2011 for the FRESP partners. The report analyzed four stormwater treatment areas and two reservoirs. District staff provided information such as project features, benefits, and costs to the consultant. Cost was adjusted to 2014 dollars using the Gross Domestic Product Price Index (GDP Price Index).

C-44 Reservoir

This project feature will capture, store, and treat flood runoff from the C-44 basin prior to discharge to the St. Lucie Estuary, and reduce damaging freshwater discharges. It includes construction of a 3,400-acre reservoir that will store up to 50,600 acre-feet of water and a 6,300-acre stormwater treatment area in Martin County. Operation of the reservoir will require the construction of a reservoir, intake canal, and pump station. The U.S. Army Corps of Engineers (USACE) will construct the reservoir and the intake canal while the District will complete the pump station. Based on the estimated construction and operational costs, we determined that the annualized cost of the C-44 Reservoir in 2014 dollars over a 50-year project life is \$268 per acre-foot of retention. The following table shows the estimated project costs and the methodology for calculating the annual cost per acre-foot.

St. Lucie Canal (C-44) Reservoir 50,600 Acre-Feet Storage Capacity	
Cost Type	2014 Cost
Capital Cost	
Land Cost (Note 1)	\$65,525,601
Construction Cost (Note 2)	233,496,367
Non-Construction Cost (Note 3) (e.g., engineering design and construction management)	45,335,020
Initial Monitoring (Note 4)	346,832
Total Capital Cost	\$344,703,820
Cost of Capital (Note 5)	3.66%
Annual Cost of Capital	\$12,616,160
Annual Operating Cost	
Annual O&M Cost (Note 6)	932,594
Total Annual Operating Cost	\$932,594
Total Annualized Cost	\$13,548,754
Storage Capacity – Acre-Feet	50,600
Annual Cost Per Acre-Foot	\$268

Notes

- 1 – The Operations, Engineering and Construction Division provided this cost, which is valued at the original purchase price. Cost of land allocated to the reservoir was not updated because of unstable land prices in south Florida during the last few years. Further, project agreements for these projects with the U.S. Army Corps of Engineers provide for in-kind credit at actual purchase price for this project.
- 2 – Costs are based on the C-44 Reservoir / STA Project's Opinion of Probable Construction Cost (OPCC) & Schedule, which was prepared by a consultant in 2008, and other District cost data. In addition, the Operations, Engineering and Construction Division added a 10% escalation to the 2008 estimated costs to adjust the cost to 2014 dollars. Cost does not include STA components.
- 3 – Costs are comprised of design and construction services costs that were obtained from District and U.S. Army Corps of Engineers.
- 4 – Cost was obtained from a report, *Compilation of Benefits and Costs and Reservoir Projects in the South Florida Water Management District*, prepared by Hazen and Sawyer in July 2011 for the FRESP partners. The report analyzed four stormwater treatment areas and two reservoirs. District staff provided information such as project features, benefits, and costs to the consultant.
- 5 – Cost of capital determined using average 30 Year Treasury Bond rate for the last five years.
- 6 – The Operations, Engineering and Construction Division provided this cost, which are based on District estimates.

The following table shows the estimated weighted average storage costs for reservoirs.

Reservoir	Annual Acre-Foot Storage Capacity	Annualized Cost		
		Capital	Operating	Total
C-43 West Basin Storage Reservoir	170,000	\$19,881,542	\$3,595,464	\$23,477,006
St. Lucie Canal - C-44 Reservoir	50,600	\$12,616,160	\$932,594	\$13,548,754
Total	220,600	\$32,497,702	\$4,528,058	\$36,960,014
Weighted Average Cost per Acre-Foot		\$147	\$21	\$168

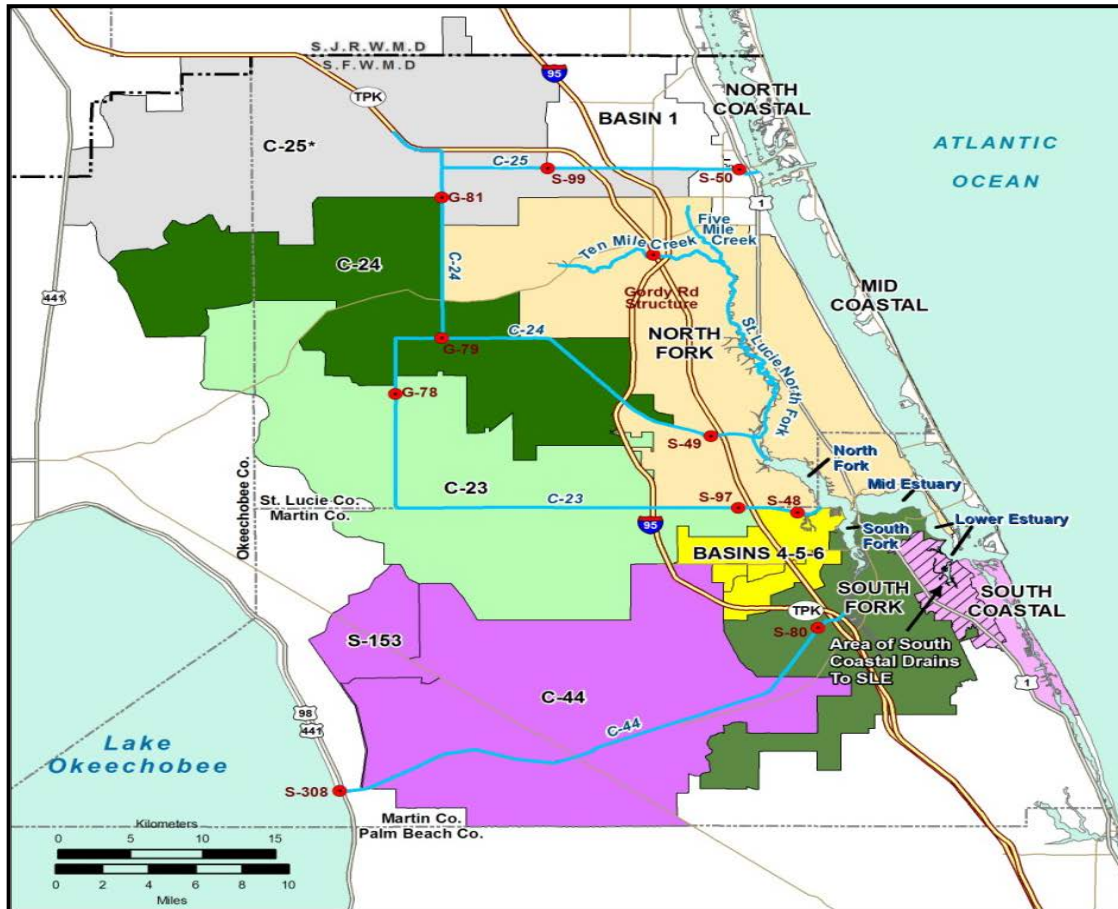
Impact of DWM Projects' within Lake Okeechobee, St. Lucie River and Caloosahatchee River Watersheds

The DWM Program's objective is to reduce the volume of water and nutrient loads discharging to Lake Okeechobee, and the St. Lucie River and Caloosahatchee River Estuaries. Major inflows to these water bodies are as follows:

- Lake Okeechobee: Kissimmee River, Fisheating Creek, and Taylor Creek. Most DWM projects are located north of Lake Okeechobee.
- St. Lucie River Estuary: Tidal basin³, C-44, C-23 and C-24 canals, 10 Mile Creek, and Lake Okeechobee discharges.
- Caloosahatchee River Estuary: Tidal basin, C-43 canal, and Lake Okeechobee discharges.

³ Discharges to the tidal basins are not controlled by the District. Tidal basins are water bodies that are tidally influenced.

The following map illustrates the flow from Lake Okeechobee and the St. Lucie River Watershed to the St. Lucie River Estuary.



Source: South Florida Environmental Report, 2012

project's impact on the Lake and the estuaries that were in operation during 2013 are summarized in the following table.

Operational DWM Projects During 2013			
Basin	Estimate Flow to Estuaries	DWM Projects Average Annual Retention	%
	Acre-Feet		
St. Lucie Watershed			
C-44 Canal (St. Lucie Canal)	261,000	3,937	1.51%
C-23 & C-24 Canals, & 10 Mile Creek	318,001	7,252	2.28%
Total – St. Lucie	579,001	11,189	1.93%
Caloosahatchee Watershed			
C-43 Canal	1,364,001	11,640	0.85%
Total – Caloosahatchee	1,364,001	11,640	0.85%
Total	1,943,002	22,829	1.17%

According to DWM Program staff, there are no plans to scientifically determine the impact of current operational DWM projects on flow reduction in the three watersheds to the estuaries. Instead, the District is now performing a comprehensive assessment of storage needs north of the Lake at a sub-watershed level, which according to staff would be more beneficial than measuring flows to the Lake and the St. Lucie and Caloosahatchee Estuaries. This type of assessment has never been performed for north of the Lake and is estimated to take about two years to complete. It will focus on determining the best mix of projects (for example, DWM, reservoirs, deep injection wells, aquifer storage and recovery, and flow equalization basin projects) on a sub-watershed level. This analysis will include determining which sub-watershed would be most suitable for DWM projects, determining the optimal criteria and limitation of storage possibilities, and determining which sub-watersheds would provide optimal storage. In summary, emphasis will be on location and a mix of suitable projects.

Some planned preliminary tasks are included in the following table.

Assessment of Storage Needs North of Lake Okeechobee	
Planned Tasks	Tasks Objectives
Develop a modeling work plan	Determine the most appropriate, effective, and efficient modeling tools.
Perform a suitability analysis	Determine optimal criteria and limitations of storage technologies (for example, DWM, reservoirs, and deep well injection projects).
Reassess overall storage needs north of the Lake	Determine total storage volume needed to minimize undesirable discharges to the estuaries and maintain the Lake within ecologically desirable ranges as projects are implemented.
Develop sub-watershed storage goals	Determine what combination of storage in each sub-watershed will best achieve the overall storage needs.
Identify the best mix of projects within each sub-watershed	Determine the anticipated benefits of the projects. This task will also determine the effectiveness of DWM projects on a sub-watershed level.
Perform a cost-effectiveness analysis	Determine the cost of preferred storage and range of cost per acre-foot of storage for the projects and what projects should be implemented first.

According to DWM Program staff, the suitability analysis will identify in which sub-watersheds DWM projects should be prioritized to provide optimal storage in a cost effective and efficient manner. Further, it will identify the mix of project features in a sub-watershed that would result in maximum flow reduction to the Lake. District staff acknowledged that the current DWM projects were implemented with no emphasis on project location and suitability. Instead, project implementation was primarily focused on water retention and detention north of the Lake. The results of the assessment will identify sub-watershed areas where DWM projects will be more effective.

Recommendations

- 1. Ensure the storage needs assessment for north of Lake Okeechobee (LO) is completed in a timely manner.**

Management Response: The Storage Needs North of the Lake project is a comprehensive, long term effort to reassess total storage needed north and south of LO to maintain the lake within the established stage envelope and minimize damaging discharges to the estuaries; identify the best combination of storage by sub-watershed to meet the total storage goal; perform a water storage technology suitability analysis specific to north of LO; and determine the best tools to accomplish storage needs. Storage features being considered are deep and shallow storage, Aquifer Storage and Recovery and Dispersed Water Management (DWM). Completion of this effort will require the commitment of resources from multiple resource areas across the District as well as external contractor support.

Responsible Divisions: Office of Everglades Policy and Coordination - Northern Everglades Unit; Office of Everglades Policy and Coordination - Dispersed Water Management Unit; Operations, Engineering and Construction Division -Engineering and Construction Bureau; Hydrology and Hydraulics Bureau - Modeling Section; Applied Sciences Bureau - Lake and River Ecosystems Section; Applied Sciences Bureau - Coastal Ecosystems Section; Water Resources Division - Water Supply Bureau.

Estimated Completion: Fiscal Year 2017, 1st Quarter

- 2. If the suitability analysis for north of Lake Okeechobee concludes that certain operational DWM projects in specific sub-watersheds are not in the preferred mix of projects to meet storage goal then consider terminating the contracts.**

Management Response: One component of the suitability analysis for the Storage Needs North of the Lake Project is to identify the primary criteria needed to successfully implement DWM projects and limitations of DWM, which will in turn be used to locate areas north of LO where DWM would be most feasible and necessary. Development of suitability criteria will consider key cost and feasibility drivers such as hydrology, engineering constraints, topography, soils, and land use. The purpose of the knowledge gained with this analysis is to assist with prioritizing

areas of focus for future DWM expansion. The suitability analysis will not provide information at the individual project level; it will provide information at the sub-watershed level. The DWM program will use the results from this effort along with the actual project data to evaluate existing contracts.

Responsible Divisions: Office of Everglades Policy and Coordination - Northern Everglades Unit; Office of Everglades Policy and Coordination - Dispersed Water Management Unit; Operations, Engineering and Construction Division -Engineering and Construction Bureau; Hydrology and Hydraulics Bureau - Modeling Section.

Estimated Completion: Fiscal Year 2015, 4th Quarter

3. Consider performing the same storage needs assessment for the St. Lucie and the Caloosahatchee River Watersheds.

Management Response: Upon completion of the suitability analysis for the Storage Needs North of the Lake Project and evaluation of the results of this effort, consideration will be given to conducting an analysis of the Caloosahatchee and St. Lucie River sub-watersheds to determine the most appropriate locations for DWM projects. The completion date below is based on a decision to move forward with the suitability analysis for these watersheds.

Responsible Divisions: Office of Everglades Policy and Coordination - Northern Everglades Unit; Office of Everglades Policy and Coordination - Dispersed Water Management Unit; Operations, Engineering and Construction Division -Engineering and Construction Bureau; Hydrology and Hydraulics Bureau - Modeling Section.

Estimated Completion: Fiscal Year 2016, 4th Quarter

Insufficient Funds to Cover DWM Program Commitments and Planned Expenditures

Based on our review of the DWM Program's revenue and planned expenditures, as of June 3, 2014, we concluded that there will be insufficient funds designated to meet all future commitments and planned expenditures. Specifically, for the period Fiscal Year 2018 to Fiscal Year 2024, the DWM Program will need approximately \$17.4 million additional to meet its planned expenditures. Planned expenditures primarily include DWM projects, contractual payments, and other planned costs. These costs include payments to a contractor to monitor executed DWM contracts, certain operations and maintenance expenses, capital equipment, and temporary storage. Based on our analysis and information provided by the Budget Bureau, as of June 3, 2014, the DWM Program's funding and commitments and planned expenditures for Fiscal Year 2014 to Fiscal Year 2024 are illustrated in the following table.

DWM Program's Revenue and Planned Expenditures, as of June 3, 2014					
Fiscal Year	Spend Down Funding and Other Revenue (Note 1)	Notes	Commitments and Planned Expenditures	Annual Surplus (Shortage)	Cumulative Revenue Less Expenditures
2014	\$11,882,777		\$11,792,401	\$90,376	\$90,376
2015	22,590,553	2	22,590,551	2	90,378
2016	4,727,013		4,727,013	0	90,378
2017	4,103,777		4,103,778	(1)	90,377
2018	4,079,963		4,171,116	(91,153)	(776)
2019	-		4,290,474	(4,290,474)	(4,291,250)
2020	-		4,361,973	(4,361,973)	(8,653,223)
2021	-		4,165,495	(4,165,495)	(12,818,718)
2022	-		3,144,220	(3,144,220)	(15,962,938)
2023	-		705,579	(705,579)	(16,668,517)
2024	-		688,700	(688,700)	(17,357,217)
	\$47,384,083		\$64,741,300	(\$17,357,217)	

Notes

1 - In Fiscal Year 2012, a total of \$34.3 million in spend down funds was allocated to the DWM Program. Additional revenue includes reimbursement grants from FDEP and NRCS, State appropriations, prior year disencumbrances, and funds from Save Our Everglades Trust Fund, Lake Okeechobee Trust Fund, and Water Management Land Trust Fund.
(Notes continued on next page)

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- 2 - The 2014 Florida legislative session appropriated \$13 million to the DWM Program (included in the Fiscal Year 2015 revenue and obligation amounts). A total of \$10 million is anticipated to be used for new NE-PES projects. Specifically, the District plans to negotiate with the remaining respondents of the second NE-PES solicitation in ranked order. The District will seek clarification from Florida Department of Environmental Protection on the use of the remaining \$3 million.

It should be noted that based on the DWM Program's contract agreements, funding for executed contracts are subjected to funding allocations each fiscal year and Governing Board approval. Further, the District can terminate a DWM agreement at any time for convenience upon 30 calendar days notice to the contractor. Funding unavailability is a good and sufficient cause for the District to terminate a contract. Nevertheless, if the DWM Program is to continue, additional sources of funding will be needed for contractual commitments during Fiscal Year 2018 through Fiscal Year 2024.

Recommendations

- 4. Continue working with the Florida Department of Environmental Protection as part of the District's budget cycle, to identify funding mechanisms for the DWM Program, to address the budget shortfall from Fiscal Year 2018 to Fiscal Year 2024.**

Management Response: Agreed. Staff will work with FDEP to address future funding shortfalls in the DWM program for Fiscal Years 2018 to 2024.

Responsible Divisions: Administrative Services Division – Budget Bureau; Office of Everglades Policy and Coordination – Dispersed Water Management Unit.

Estimated Completion: Fiscal Year 2017, 1st Quarter

- 5. Increase efforts to cost share the expenses of DWM projects by obtaining grants and partnering with public and private entities and other stakeholders.**

Management Response: The DWM program has and will continue to seek grant opportunities to fund projects. For example, the Water Farming Pilot Project Program

is funded through a Section 319 grant that was finalized in April 2014 for \$3,087,401 with the District contributing \$1,581,000 in cash or in-kind work. In addition, the DWM program is actively working with a local government entity to provide technical support for the local government to develop a DWM project on its lands. In addition, cost share opportunities with private entities and local governments will be pursued where possible as these projects result in overall lower costs to the District on a project by project basis.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Ongoing

Available District and Public Lands Should be Assessed for Use as DWM Project Sites

The following table shows the annual cost per acre-foot to store water on private lands compared to public lands. (Refer to Appendix 1 for the detailed analysis.)

Annual Storage Cost Per Acre-Foot			
DWM Agreement Type	Initial Capital	Recurring Payments & Operations	Total
Public Lands	\$ 4.05	\$ 3.97	\$ 8.02
Private Lands	\$ 22.65	\$ 80.45	\$ 103.10

The cost of public lands is significantly less than private lands due primarily to the following conditions.

- Recurring service payments are not required on public lands; however, some projects may require on-going operational costs; such as operating pumps.
- The initial capital cost can be amortized over the infrastructures' useful life (typically 50 years) instead of the agreement term (typically 10 years).

Based on our analysis of the cost of current DWM projects, using available District or other publicly owned lands that meet the required criteria for DWM projects, is a cost effective strategy for increasing water storage capacity because annual service payments are not required. Further, entering into cooperative agreements with private entities and obtaining grants to fund construction costs and/or service payments are other cost effective alternatives. Our audit and discussions with DWM staff, disclosed that some District-owned pre-project land parcels are currently being used as interim storage and others sites are in the planning phases. However, District staff has not performed a recent comprehensive analysis of all District-owned pre-project land and other publicly owned lands to determine whether there are other feasible sites that would be suitable for interim water retention.

The following tables list the different types of active and planned DWM projects, costs, and contract status.

Project Name	Status	Average Annual Retention in Acre-Feet	Planning, Design, Eng. & Const. Costs	Annual Payments/ Operational District Costs	Total Cost (Annual Payments + Const. Costs)	Cost/ Ac-Ft <i>Note 1</i>	Contract Yr. - as of FY 2014 / Interim Use Yrs.
Florida Ranchlands and Environmental Services Projects (FRESP)							
West Waterhole Pasture (<i>Note 2</i>)	Oper	5,000	\$ 50,000	\$ 493,750	\$2,661,414	\$ 74	8 of 8
Rafter T Ranch		1,145	431,524	92,490	986,464	124	7 of 9
Total FRESPs Still Operating		6,145	\$481,524	\$586,240	\$3,647,878		
Northern Everglades-Payment for Environmental Services (NE-PES)							
Alderman-Deloney Ranch (<i>Prior FRESP</i>)	Oper	147	\$ 3,272	\$ 25,000	\$ 253,272	\$ 173	3 of 10
Buck Island Ranch (<i>Prior FRESP</i>)		1,573	1,928	173,600	1,737,928	111	3 of 10
XL Ranch (<i>Prior FRESP</i>)		887	52,415	130,150	1,353,915	154	3 of 10
Dixie West		315	7,228	51,500	522,228	166	2 of 10
Dixie Ranch		856	17,015	146,500	1,482,015	173	2 of 10
Lost Oak Ranch		374	61,030	55,000	611,030	166	1 of 10
Willaway Cattle & Sod		229	325,494	1,879	344,279	175	1 of 10
Mudge Ranch	Oper	396	17,200	47,500	492,200	125	1 of 11
Triple A Ranch		397	322,186	28,500	607,186	167	1 of 10
Blue Head Ranch		3,462	193,750	361,200	3,805,750	111	1 of 11
Total NE-PES Projects		8,636	\$1,001,518	\$1,020,829	\$11,209,803		
Water Farming Pilot Projects (<i>Note 3</i>)							
Caulkins Citrus	Oper	6,780	\$ 301,976	\$480,830	\$1,263,636	\$ 76	1 of 3
Evans Properties (Alt. E-1)	Const	3,635	317,780	537,169	1,392,117	153	1 of 3
Spur Land & Cattle /Bull Hammock Ranch		870	136,000	54,720	245,440	81	1 of 3
Total Water Farming Pilot Projects		11,285	\$755,756	\$1,072,719	\$2,901,193		
Private Lands – District Contract with Private Landowner to Design, Construct, Operate, and Maintain							
Nicodemus Slough	Const	34,000	\$5,820,066	\$2,853,320	\$28,646,622	\$ 108	1 of 8
Total Private Lands		34,000	\$5,820,066	\$2,853,320	\$28,646,622		
Cooperative Agreements with Private Entities (District Assisted with only Construction Costs)							
Harbour Ridge HOA (Residential Community - Contributed \$93,007)	Oper	667	\$ 89,000	<i>None</i>	\$ 89,000	\$5.19	On-going
Indiantown Citrus Growers Association - Phases 1 & 2		3,550	267,853	<i>None</i>	267,853	2.93	On-going
Total Cost Share Agreements w/ Private Entities		4,217	\$356,853	<i>None</i>	\$356,853		

(See Notes on page 38)

Project Name	Status	Average Annual Retention in Acre-Feet	Planning, Design, Eng., & Const. Costs	Annual Payment / Operational District Costs	Total Cost (Annual Payments + Const. Costs)	Cost/ Ac-Ft <i>Note 1</i>	Contract Yr. - as of FY 2014 / Interim Use Yrs.
Agreements with Public Entities for Projects on Publicly Owned Lands							
Barron Water Control District – 50/50 cost-share. (<i>Note 4</i>)	Oper	5,000	\$ 200,000	<i>None</i>	\$ 200,000	\$1.55	On-going
Avon Park Air Force Range		10,000	254,242	<i>None</i>	254,242	0.99	
East County Water Control District Mirror Lakes/Halfway Pond Phase I		1,000	340,000	<i>None</i>	340,000	13.21	
Sumica Tract		281	35,350	<i>None</i>	35,350	4.89	
Six Mile Cypress Slough North (<i>Note 4</i>)	Const	1,400	300,000	<i>None</i>	300,000	8.33	
Dinner Island Ranch	Oper	30	18,480	<i>None</i>	18,480	24.41	
Total Publicly Owned Lands – Cooperative Agreements		17,711	\$1,148,072	<i>None</i>	\$1,148,072		
District-Owned Lands Acquired for Future Projects - Interim Storage							
BOMA Property (<i>Note 5</i>)	Oper	1,389	\$ 312,941	\$ 105,833	\$1,582,941	\$99.54	12
C-43 West Basin Storage Reservoir	Oper	2,070	293,189	55,000	623,189	53.35	6
C-23 (Section D - PC55) (<i>Note 6</i>)	Oper	110	9,061	<i>None</i>	9,061	9.66	10
Adams Ranch Cattle & Citrus Operations (C-23/ C-24) (<i>Note 6</i>)	Oper	190	<i>None</i>	<i>None</i>	<i>None</i>		11
Total District Lands - Interim Storage		3,759	\$ 615,191	\$ 160,833	\$2,215,191		
Projects on Private Lands: Prior FRESF Agreement Converted to Permanent Easements under NRCS’ Wetland Reserve Program - District has no Current Funding Obligations							
Payne and Son Ranch	Oper	932					
Williamson Cattle Company		150					
Projects on District Lands: Easement Agreements Primarily Funded with NRCS’ Wetland Reserve Program Grants (Except District Funds of \$16,864 for Allapattah H Canal and \$374,165 for Allapattah Phase 1)							
Williamson Ranch/Turnpike Dairy	Oper	547	<i>None</i>	<i>None</i>	\$ 343,385	\$24.40	On-going
Allapattah H Canal		1,610	\$ 16,864	<i>None</i>	16,864	0.41	
Allapattah Parcels A&B – Ph. I		3,500	374,165	<i>None</i>	1,496,660	16.62	
Allapattah Parcels A&B – Ph. II	Const	1,243	<i>None</i>	<i>None</i>	3,000,000	93.80	On-going
Agreements with Public Entity for Project with Features Including DWM on Publicly Owned Lands							
Istokpoga Marsh Watershed Improvement District (<i>Note 7</i>)	Const	950	\$12,423,146	<i>None</i>	\$ 12,423,146		On-going
Planned Use of District and Other Publicly Owned Lands for DWM Projects							
Allapattah Parcel C – <i>District Land and Funds</i>							
C-23 and C-24 Interim – <i>District Land and Funds</i>							
Lemkin Creek – <i>District Lands and Funds</i>							
East County Water Control District (ECWCD) Mirror Lakes / Halfway Pond Phases II & III - <i>Total of 2,500 acre-feet of storage. Land is owned by ECWCD.</i>							

(See Notes on page 38)

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- Note 1:** An acre-foot is the volume needed to cover an acre of land with a foot of water. An acre-foot can retain 325,851 gallons of water. For NE-PES and water-farming projects, the cost per acre-foot of retention was determined by calculating the net present value of payments over a 10-year project life assuming a 3% discount rate. The DWM Program also discounted the annual acre-feet of retention by 3% annually. For certain projects on public lands, we used a 50-year project life. For projects on pre-project District lands (interim storage sites), the project life was based on the estimated number of years until construction commencement. For Nicodemus Slough, we used the eight-year storage term specified in the contract. Further, in instances where project size was increased, the retention amounts were averaged.
- Note 2:** Only project that removes phosphorus from on-site and regional water. Water from the C-40 Canal is pumped into the marsh and nutrients are filtered out before discharge back by gravity to the C-40 Canal. In 2013, a total of 5.5 billion gallons of water were pumped into the marsh. About 6.4 metric tons of total phosphorous (87% of total inflow) and 16.12 metric tons of total nitrogen (30% of total inflow) was retained in the marsh.
- Note 3:** The Florida Department of Environmental Protection awarded the District \$1.5 million in grant funds for the water farming pilot study. The District will match the contribution for a total commitment of \$3 million.
- Note 4:** Projects were 50/50 cost-share. Amounts represent the District's contribution.
- Note 5:** This District property is located along the Caloosahatchee River and consists of approximately 1,892 acres of land of which 847 acres were leased back to BOMA, LC (seller) at approximately \$17,000 annually for citrus production. Portions of the property not leased to BOMA are fallow but have the infrastructure necessary to retain water that will reduce stormwater discharges to the Caloosahatchee River Estuary. In June 2014, the District extended an existing agreement for four years for the lessee to operate and maintain three above ground impoundments on the property. The estimated retention amount is 1,500 acre feet of storage. Average annual retention reflects the storage for two years at 836 acre-feet per year and storage for 10 years at 1,500 acre-feet per year (16,672 acre-feet /12 years = 1,389 annual average acre-feet). Other costs were also averaged.
- Note 6:** Projects require minimal or no construction costs. No annual costs are being incurred.
- Note 7:** This is an Alternative Water Storage/Disposal and Stormwater Reuse Project. This project is designed as a stormwater recycling system that will capture and store excess stormwater during wet periods reducing flows and nutrient loads to Lake Okeechobee and then return the stored water to the canal system providing a supplemental source of surface water to augment farm irrigation during dry periods. The project includes the phased design and construction of 1,200 acres of above-ground impoundments that will reduce Istokpoga Marsh Watershed Improvement District's average annual discharge volume of stormwater by approximately 60% and may remove as much as 70% of the total phosphorus currently discharged to the Harney Pond Canal and subsequently to Lake Okeechobee. The District's contribution is \$8,423,146 and the Florida Department of Environmental Protection will fund an additional \$4 million.

As shown in the preceding table, annual payments to the ten ranch landowners of the NE-PES projects range from \$1,879 to \$361,200 or about \$1 million annually to retain 8,636 acre-feet of water annually. Further, over the 10-year term of these agreements, which are funded by District ad valorem and state appropriations, the District will spend approximately \$11.2 million in construction and annual service payments. In addition, the District will incur cost for a contractor to oversee and manage sample collections, monitoring, coordination, equipment installation, maintenance, data management and other contractual reporting requirements for the NE-PES and Water Farming Pilot Projects. The monitoring contract amount is \$120,000 annually and \$1.2 million over a ten-year period.

The cost to retain water on District and other publicly owned lands usually requires initial construction costs and any operations and maintenance costs. In most instances, these costs include cost to construct temporary ditches, culverts, berms, and other minimal earthwork. The District owns a significant amount of lands in the Northern Everglades that have been acquired for the Comprehensive Everglades Restoration Plan (CERP) and other restoration projects. While implementation for most of these projects are being planned and authorized, the District has been using some parcels in the interim to retain water and reduce water flow to Lake Okeechobee and the estuaries at very low costs when compared to the cost of the NE-PES projects and other DWM projects on private lands.

It is important to note that the annual operating costs for interim storage on pre-project lands depends on the amount of water pumped onto the site; however, annual payments to service providers are required regardless of the amount of water actually retained. Some examples of the cost effectiveness of using District or publicly owned lands and entering into cooperative agreements with public and private entities are summarized in the preceding table and described in the following sections:

Avon Park Air Force Range

This project is on publicly-owned lands in Highlands County and retains approximately 10,000 acre-feet of water annually. The total project cost was \$254,242. Based on a 50-year project life, the estimated cost of storage is approximately \$1 per acre-foot annually.

Six Mile Cypress Slough North Project

The District entered into a cost-share agreement with Lee County by providing \$300,000 of \$600,000 toward the construction of the Six Mile Cypress Slough North Project, which will retain about 1,400 acre-feet of water annually. Lee County is responsible for maintaining this project, which will improve water quality and reduce discharges to the Caloosahatchee River and flooding to the Orange River Basin. The District's one-time \$300,000 contribution will result in water retention benefits as long as the project remains operational. Based on a 50-year project life, the estimated cost of storage is approximately \$8 per acre-foot annually.

Water Retention Analysis of Publicly-Owned Lands

In 2011, the District contracted with Hesperides Group⁵ to identify publicly-owned parcels that could be used to retain stormwater with minimal alteration. The Hesperides Group evaluated 19 District-owned parcels and two publicly-owned parcels. Twelve out of the 21 parcels were considered for potential interim retention analysis and nine parcels were removed from consideration for various reasons; such as, high construction costs, lease considerations, and permitted for other use. Based on our discussions with DWM Program staff, they have not analyzed all of the recommended parcels. We noted that the District is storing water on some of the sites analyzed by Hesperides Group (for example; Allapattah, BOMA, and C23/C24 Complex). Further, it should be noted that in 2007 and 2008 the District also consulted with two other contractors to assess potential sites for water retention/detention in the Northern and

⁵ The Hesperides Group submitted a report, *Dispersed Water Management Interim Water Retention Site Summary Report*, dated April 11, 2011.

Southern Lake Okeechobee Watersheds.⁶ According to DWM Program staff, these reports were not fully utilized by the DWM Program but were used by staff in other District areas.

Using District-owned pre-project land parcels, lands with permanent easements, and other publicly owned lands to retain water to reduce the impact of stormwater discharges is the most cost effective method of storage. DWM staff is increasing efforts to use District and publicly owned lands. Specifically, prior to commencing our audit, staff had not performed a comprehensive analysis of all District-owned pre-project land parcels and other publicly owned lands to determine whether other feasible sites are suitable for interim water retention. However, during our audit, staff stated that they will assess public lands to determine suitability as DWM retention sites.

Assess District-Owned Lands Under Lease For Water Storage Feasibility

In 2012, our Office conducted an *Audit of Land Lease Compliance* (Audit #12-16) in which we noted that the District leases land to 54 lessees for cattle grazing. Specifically, the District leases 72,393 acres that generates \$672,000 in annual revenue or about \$9 per acre. Further, the District can terminate most lease agreements at any time for convenience by providing at least six months written notice. The revenue generated from the cattle grazing leases is small compared to payments to private ranch owners for DWM projects, which averages \$103 per acre-foot. Leased lands should be included as part of an assessment to determine whether savings from storing water on these lands would exceed the current lease revenue.

⁶ Rudd Jones, P.E. & Associates, P.A. assessed 67 sites in the Northern Lake Okeechobee Watershed and MacVicar, Federico & Lamb, Inc. assessed 108 sites located in the Southern Lake Okeechobee Watershed.

Recommendations

6. **Perform an updated comprehensive analysis of all District-owned pre-project land parcels and other publicly owned lands to determine whether there are feasible sites that can be used for interim water retention.**

Management Response: The District conducted its latest focused evaluation of District owned parcels to determine where storage could occur by undertaking minimal capital improvements in 2011. Based on this evaluation, the District selected sites where storage could be brought on-line quickly for the initial storage of water on public lands. The District is in the process of conducting an assessment of all District owned pre-project land parcels, including District lands leased for cattle grazing, to determine whether there are sites that can be used for interim water retention which will include an analysis of the engineering and construction efforts and costs associated with these sites to determine their feasibility for water storage. The District will initially focus its efforts on evaluating lands in the C-23 and C-24 sub-watersheds of the St. Lucie Watershed based on availability of lands due to expiring lease terms.

Responsible Divisions: Operations, Engineering and Construction Division - Engineering and Construction Bureau; Office of Everglades Policy and Coordination - Dispersed Water Management Unit; Field Operations and Land Management Division.

Estimated Completion: C-23 and C-24 sub-watersheds of the St. Lucie Watershed: Fiscal Year 2015, 2nd Quarter.

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- 7. Include District lands leased for cattle grazing as part of the comprehensive analysis of all District-owned pre-project land parcels and other publicly owned lands to determine whether there are feasible sites that can be used for interim water retention.**

Management Response: See response to Recommendation #6.

Responsible Divisions: See response to Recommendation #6.

Estimated Completion: See response to Recommendation #6.

Revise Model for Estimating Water Retention Amounts for NE-PES Projects

Annual NE-PES contract payments are fixed dollar amounts that were negotiated based on the volume of water retained on-site and other factors. Retention amounts for current NE-PES projects were estimated using the Potential Water Retention Model (PWRM)⁷ developed specifically for NE-PES projects. The PWRM calculates the average annual water retention over a 10-year period of rainfall record that includes low and high rainfall days, weeks and months. However, based on our discussion with DWM Program staff, we concluded that the model could be refined to better estimate water retention levels or another model could be used to better estimate retention levels. Specifically, the PWRM model is a single basin model and does not account for inflows; however, many of the projects have cascading basins, which results in inflows during storm events. Further, DWM Program staff stated that several stakeholders expressed concerns that the model is difficult to run and the average annual retention amounts may be understated.

⁷ It should be noted that all current NE-PES projects are water retention projects. However, a formula, Potential Phosphorous Removal Formula (PPRF), was available to measure nutrient removal for any proposed nutrient removal project.

In addition, water levels and rainfall data for each of the NE-PES projects is required to be collected by the DWM Program on a monthly basis, which can be used to more accurately estimate retention capacities. Currently, this data has been collected but not utilized. DWM Program staff acknowledged that the data will be used as part of the revised model analysis. Although, this task may be time consuming, it will result in more accurate measurements of the NE-PES projects' benefits. After completion, DWM Program staff can be trained to run the model and regularly analyze project data.

Recommendations

- 8. Consider revising the water retention model used to estimate water retention capacities for the NE-PES projects by taking into account cascading basins, actual data, and stakeholder concerns.**

Management Response: The District has created a project to analyze if the Potential Water Retention Model (PWRM), developed specifically for the NE-PES projects, will be used to evaluate future private projects on ranchlands or whether another methodology is more appropriate. In addition, this effort will look at the appropriate model to use to evaluate other DWM projects, such as water farming and storage on public lands. If the PWRM tool is chosen for future use, the model will be refined as appropriate.

Responsible Divisions: Hydrology and Hydraulics Bureau - Modeling Section; Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Fiscal Year 2015, 3rd Quarter

- 9. Train staff to use the model so that water retention capacities can be closely monitored.**

Management Response: Staff training will take place on the selected model developed in response to Recommendation #8 above.

Responsible Divisions: Hydrology and Hydraulics Bureau - Modeling Section;
Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Fiscal Year 2015, 4th Quarter

Improve Project Monitoring Efforts

Our audit procedures included determining whether landowners were complying with DWM contract requirements. We concluded that the DWM Program staff needs to improve efforts to ensure that all required contract compliance documentation are submitted by contractors and maintained by the District. Compliance documentation we requested were not readily available and the data was not centralized. This information documents whether a project is operating as designed and retaining water and/or nutrients. Specifically, based on the NE-PES contracts, in order to receive annual payments, landowners are required to submit certain records. Such records include monthly riser board elevation levels at outfall structures, changes to the board elevations, rainfall data, water levels, and site conditions. Landowners are also required to submit an annual certification stating that maintenance activities were performed and that the project is operating as designed. It should be noted that the District contracted with a data collection and management entity to conduct and provide monitoring support to the landowners. The monitoring contractor's responsibilities include monthly data collection and analysis, monitoring equipment maintenance, and report submissions to the landowners. The landowners then submit the monthly information to the District. Without the monthly weir elevation levels, daily water levels, and daily rainfall amounts, DWM Program staff cannot determine whether contractors are complying with contract requirements. During our audit, staff ensured all compliance documents were submitted and created a database to track the information.

Initially, the DWM Program was not centralized and staff familiar with the DWM Program separated from the District. Further, there was delay before current DWM Program staff visited NE-PES project sites to meet with the landowners and familiarize

themselves with the projects. During our audit, current staff have either visited or made plans to visit all project sites. Further, DWM Program staff acknowledged that several improvements have been made to the DWM Program operations, but more are needed.

In addition, our review of construction payment costs disclosed that documentation substantiating services provided should be improved; for example, we noted that a contractor submitted total inspection hours on a monthly basis without any explanations of the inspection details. Contractors should be required to submit detailed documentation describing the work performed. Construction site inspections should include description of work inspected, equipment observed in use at the site, and specific dates and times inspections were performed.

Recommendations

10. Ensure that contractors are submitting all contractually required data and that DWM Program staff are reviewing the data in a timely manner.

Management Response: DWM Program management and staff have discussed in detail the contract reporting requirements and the deliverable dates for each of the contract types within the DWM program. A master tracking spreadsheet which contains the due dates and required data submission for all DWM contract deliverables has been created and is actively being used by management to track due dates for contract deliverables and to track staff review to ensure that the deliverables conform to contract requirements. Most importantly, the DWM program has created a centralized database for the storage of DWM program information. The program has developed a Standard Operating Procedure for use of this database by DWM staff. This database includes centralized critical program information, including project specific information such as the executed contract, certification documents, all required reports and project data, invoices, inspection results and permits. It also includes programmatic information such as overall program costs and budgetary data. The database continues to be populated by DWM program staff. The database will be continually updated as new information is generated.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Master Spreadsheet completed Fiscal Year 2015, 1st Quarter. Database completed Fiscal Year 2015, 1st Quarter. Database will be updated as new information is generated on a regularly scheduled basis.

11. Require DWM Program staff to perform and document periodic site visits to all DWM project sites and document such visits.

Management Response: The DWM program staff has conducted regular site visits to both public and private lands projects since the inception of the program in 2006; however, project managers did not have standard methods of performing or documenting these site visits. Recently, the program has developed a Standard Operating Procedure for site visits documenting the inspection dates, project schedule, compliance checks, and site pictures, follow up items and next scheduled inspection. Management met with the program staff to discuss the use of this Standard Operating Procedure to conduct wet and dry season inspections of operational projects. Inspections of projects that are in the construction phase or are in a pilot project program will occur on a weekly basis to ensure construction deadlines are being met and to oversee pilot project implementation.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Complete

12. Require DWM staff to ensure that construction costs are adequately substantiated before payments are made.

Management Response: A Standard Operating Procedure for Invoicing has been developed so that each project manager is aware of the requirements for submission

of materials from the contractors necessary to support the efficient processing of invoices. This SOP requires coordination with budget staff to ensure that the invoicing packages submitted by the contractor contain all required information to meet District payment requirements as well as documentation required for the District to seek reimbursement for costs under applicable grant agreements.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Complete

Request Agricultural Engineer to Review Proposed Construction Costs

DWM projects usually have some construction related costs, which are primarily agricultural, before they can become operational. Our audit disclosed that construction costs for the current FRESP, NE-PES, and Water Farming projects totaled over \$2 million and ranged from about \$1,928 to \$431,524. Although proposed project costs were negotiated by staff, we found that DWM staff did not consult with Engineering and Construction Bureau's staff, with construction cost estimating expertise, to review proposed construction costs. Instead, staff involved in the contract negotiations reviewed proposed costs for reasonableness. Staff with construction cost estimating experience would be better suited to determine cost reasonableness. In the future, DWM staff should consult with Engineering and Construction Bureau's agricultural engineer, as necessary, to review the reasonableness of proposed construction costs prior to contract negotiations.

Recommendation

- 13. Consult with the Engineering and Construction Bureau’s agricultural engineer to determine the reasonableness of proposed construction cost prior to contract negotiations, as necessary.**

Management Response: The DWM program has an established relationship with an Agricultural Engineer in the Engineering and Construction Bureau which has focused on project implementation on District and other publically owned lands. Staff will expand this relationship to include consultation as necessary for construction costs proposed by Respondents to future Requests for Proposals that the District issues involving construction costs on private lands. The team for the ongoing contract negotiations for the Northern Everglades Payment for Environmental Services Program second solicitation included two Agricultural Engineers who reviewed proposed costs for reasonableness prior to contract negotiations.

Responsible Division: Operations, Engineering and Construction Division - Engineering and Construction Bureau; Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Complete

Amend Contract to Increase District Responsibilities and Reduce Unnecessary Costs

In April 2006, the District, Highlands Soil and Water Conservation District (HSWCD), and Lykes Bros. Inc., entered into a three-year lease and pilot project agreement for Lykes Bros. Inc., property (known as “West Waterhole”) to support the West Waterhole Pasture Pilot Project (contract #OT061107/3600001161), a FRESP agreement. Based on this agreement, HSWCD was required to pay Lykes Bros. Inc., for the planning, design, permitting, construction and equipment, and operation and maintenance of the project. In July 2005, the District and other collaborative partners

awarded a contract to HSWCD (contract #OT050889 in the amount \$350,000 for a pilot phase project to implement water management alternatives to store and treat runoff on private lands. In sum, HSWCD received the \$350,000 from the District to pay Lykes Bros. Inc., upon completion of the contract deliverables.

The contract agreement between the District, HSWCD, and Lykes Bros Inc., has been amended six times, primarily to extend the contract term, increase funding, and include a 5% fee to HSWCD for administering the contract. Contract Amendment 6 is for two years and extends the contract term to September 2014. Based on the amendment, payments are based on not-to-exceed amounts. Specifically, Lykes Bros. Inc., is paid a fixed participation fee of \$375,000 yearly (\$93,750 quarterly) and up to \$95,239 yearly for actual operations and maintenance costs, which primarily include fuel costs, parts, and other costs such as labor, repairs, and a 17% general and administration fee of the total operation and maintenance costs. We noted that the contract does not specify a percentage of what costs are classified as general and administrative costs. Current Procurement Bureau staff stated they were not involved in the negotiations of the original contract. In addition, it should be noted that for the Caulkins Citrus Company Ltd., water farming pilot contract, the contractor will also be reimbursed for general and administrative costs; however, the types of costs classified as general and administrative costs are not listed in the contract.

Further, HSWCD receives 5% of the participation fees (\$18,750 yearly) and up to \$4,762 in operation and maintenance fees from the District. Currently, the payment process is as follows: Lykes Bros. Inc., submits invoices to HSWCD for payment, HSWCD makes the payments, and HSWCD then invoices the District for reimbursement of payment made to Lykes Bros. Inc., plus their 5% administration fee. Based on discussions with DWM staff, we concluded that the District is essentially paying HSWCD about \$23,512 per year for making payments to the contractor and forwarding invoices to the District for reimbursement. No other services are provided. DWM Program staff acknowledged that invoices could be sent directly to the District for payment. The DWM Program staff expects the contract term to be extended beyond the

September 2014 expiration date. As a result, management should consider addressing all the above issues when amending the contract agreement.

Recommendations

14. Consider amending contract #OT061107/3600001161 to increase District responsibilities and reduce unnecessary costs.

Management Response: The contract agreement between the District, Highlands Soil and Water Conservation District (HSWCD) and Lykes Brothers, Inc. (Lykes) was amended and restated on September 12, 2014 to remove HSWCD from the contract and have the District assume the administrative responsibilities as recommended. In addition, the revised contract now specifies the activities for which Lykes may apply the 17% general and administrative fee of total reimbursable operations and maintenance costs as recommended in the audit.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Complete

15. Ensure that all future DWM contracts specify allowable general and administrative costs.

Management Response: Future DWM contracts will specify allowable general and administrative costs where it is appropriate for a general and administrative fee to be paid by the District as part of the contract. For example, General and Administrative fees are not included as part of the Northern Everglades Payment for Environmental Services contracts because there is a fixed payment associated with Operations and Maintenance costs for these projects. For projects where Operations and Maintenance costs are variable and dependent, for example, on pumping rates, such

contracts will include the specific activities against which the general and administrative costs may be assessed.

Responsible Division: Office of Everglades Policy and Coordination - Dispersed Water Management Unit.

Estimated Completion: Complete

Office of the Inspector
Audit of Dispersed Water Management Program
Schedule of Dispersed Water Management Projects
APPENDIX 1

Project Name	Status	Avg Annual Retention in Acre- Feet	Planning, Design, Eng. & Const. Costs	Annual Payments by the District	Total Cost (Annual Payments + Const. Costs)	Cost / Ac Ft	Years of Storage	Contract Yr., as of FY 2014	Total Annual Acre Feet of Retention	Total Capital Cost	Cumulative Recurring Payments	Total Cost (Annual Payments + Const. Costs)
Florida Ranchlands and Environmental Services Projects (FRESP)												
West Waterhole Pasture	Oper	5,000	\$ 50,000	\$ 493,750	\$ 2,661,414	\$ 74	8	8 of 8	40,000	\$ 50,000	\$ 2,611,414	\$ 2,661,414
Rafter T Ranch	Oper	1,145	431,524	92,490	986,464	124	6	7 of 9	6,870	431,524	554,940	986,464
Total FRESP Projects Still Operating		6,145	\$ 481,524	\$ 586,240	\$ 3,647,878				46,870	\$ 481,524	\$ 3,166,354	\$ 3,647,878
Northern Everglades-Payment for Environmental Services (NE-PES)												
Alderman-Deloney Ranch (Prior FRESP)	Oper	147	\$ 3,272	\$ 25,000	\$ 253,272	\$ 173	10	3 of 10	1,470	\$ 3,272	\$ 250,000	\$ 253,272
Buck Island Ranch (Prior FRESP)	Oper	1,573	1,928	173,600	1,737,928	111	10	3 of 10	15,730	1,928	1,736,000	1,737,928
XL Ranch (Prior FRESP)	Oper	887	52,415	130,150	1,353,915	154	10	3 of 10	8,870	52,415	1,301,500	1,353,915
Dixie West	Oper	315	7,228	51,500	522,228	166	10	2 of 10	3,150	7,228	515,000	522,228
Dixie Ranch	Oper	856	17,015	146,500	1,482,015	173	10	2 of 10	8,560	17,015	1,465,000	1,482,015
Lost Oak Ranch	Oper	374	61,030	55,000	611,030	166	10	1 of 10	3,740	61,030	550,000	611,030
Willaway Cattle & Sod	Oper	229	325,494	1,879	344,279	175	10	1 of 10	2,290	325,494	18,785	344,279
Mudge Ranch	Oper	396	17,200	47,500	492,200	125	10	1 of 11	3,960	17,200	475,000	492,200
Triple A Ranch	Const	397	322,186	28,500	607,186	167	10	1 of 10	3,970	322,186	285,000	607,186
Blue Head Ranch	Const	3,462	193,750	361,200	3,805,750	111	10	1 of 11	34,620	193,750	3,612,000	3,805,750
Total NE-PES Projects		8,636	\$ 1,001,518	\$1,020,829	\$ 11,209,803				86,360	\$ 1,001,518	\$ 10,208,285	\$ 11,209,803
Water Farming Pilot Projects												
Caulkins Citrus	Oper	6,780	\$ 301,976	\$ 480,830	\$ 1,263,636	\$ 76	2	1 of 3	13,560	\$ 301,976	\$ 961,660	\$ 1,263,636
Evans Properties (Alt. E-1)	Const	3,635	317,780	537,169	1,392,117	153	2	1 of 3	7,270	317,780	1,074,337	1,392,117
Spur Land & Cattle /Bull Hammock Ranch	Const	870	136,000	54,720	245,440	81	2	1 of 3	1,740	136,000	109,440	245,440
Total Water Farming Pilot Projects		11,285	\$ 755,756	\$ 1,072,719	\$ 2,901,193				22,570	\$ 755,756	\$ 2,145,437	\$ 2,901,193
Private Lands – District Contract with Private Landowner to Design, Construct, Operate, and Maintain												
Nicodemus Slough	Const	34,000	\$ 5,820,066	\$ 2,853,320	\$ 28,646,622	\$ 108	8	1 of 8	272,000	\$ 5,820,066	\$ 22,826,556	\$ 28,646,622
Total Private Lands		34,000	\$ 5,820,066	\$ 2,853,320	\$ 28,646,622				272,000	\$ 5,820,066	\$ 22,826,556	\$ 28,646,622
Monitoring Costs												
Monitoring Contract				\$ 120,000	\$ 1,200,000		10		-	\$ -	\$ 1,200,000	\$ 1,200,000
Total Monitoring Costs				\$ 120,000	\$ 1,200,000				-	\$ -	\$ 1,200,000	\$ 1,200,000
Cost of Capital									-	\$ 1,630,739	\$ -	\$ 1,630,739
Present Value Factor									-		\$ (5,128,927)	\$ (5,128,927)
Total Contracts with Private Landowners		60,066	\$ 8,058,864	\$ 5,533,108	\$ 46,405,496				427,800	\$ 9,689,603	\$ 34,417,705	\$ 44,107,308
Private Lands							Weighted Average Cost Per Acre-Foot			\$ 22.65	\$ 80.45	\$ 103.10

Project Name	Status	Avg Annual Retention in Acre- Feet	Planning, Design, Eng. & Const. Costs	Annual Payments by the District	Total Cost (Annual Payments + Const. Costs)	Cost / Ac Ft	Useful Life- Years	Contract Yr., as of FY 2014		Total Capital Cost	Cumulative Recurring Payments	Total Cost (Annual Payments + Const. Costs)
Cooperative Agreements with Private Entities (District Assisted with only Construction Costs)												
Harbour Ridge HOA (Residential Community - Contributed \$93,007)	Oper	667	\$ 89,000	\$ -	\$ 89,000	\$ 5.19	50	On-going	33,350	\$ 89,000	\$ -	\$ 89,000
Indiantown Citrus Growers Association - Phases 1 & 2	Oper	3,550	267,853	-	267,853	2.93	50	On-going	177,500	267,853	-	267,853
Total Cost Share Agreements w/ Private Entities		4,217	\$ 356,853	\$ -	\$ 356,853				210,850	\$ 356,853	\$ -	\$ 356,853
Agreements with Public Entities for Projects on Publicly Owned Lands												
Barron Water Control District – 50/50 cost-share	Oper	5,000	\$ 200,000	\$ -	\$ 200,000	\$ 1.55	50	On-going	250,000	\$ 200,000	\$ -	\$ 200,000
Avon Park Air Force Range	Oper	10,000	254,242	-	254,242	0.99	50		500,000	254,242	-	254,242
East County Water Control District Mirror Lakes/Halfway Pond Phase I	Oper	1,000	340,000	-	340,000	13.21	50		50,000	340,000	-	340,000
Sumica Tract	Oper	281	35,350	-	35,350	4.89	50		14,050	35,350	-	35,350
Six Mile Cypress Slough North District–50/50 cost-share	Const	1,400	300,000	-	300,000	8.33	50	On-going	70,000	300,000	-	300,000
Dinner Island Ranch	Oper	30	18,840	-	18,840	24.41	50		1,500	18,840	-	18,840
Total Publicly Owned Lands - Cooperative Agreements		17,711	\$ 1,148,432	\$ -	\$ 1,148,432				885,550	\$ 1,148,432	\$ -	\$ 1,148,432
District-Owned Lands Acquired for Future Projects - Interim Storage												
BOMA Property	Oper	1,389	\$ 312,941	\$ 105,833	\$ 1,582,941	\$ 99.54	12	2 of 12	16,668	\$ 312,941	\$ 1,270,000	\$ 1,582,941
C-43 West Basin Storage Reservoir	Oper	2,070	293,189	55,000	623,189	53.35	6	6	12,420	293,189	330,000	623,189
C-23 (Section D - PC55)	Oper	110	9,061	-	9,061	9.66	10	10	1,100	9,061	-	9,061
Adams Ranch Cattle & Citrus Operations (C-23/C-24 Complex)	Oper	190	-	-	-	-	11	11	2,090	-	-	-
Total District Lands - Interim Storage		3,759	\$ 615,191	\$ 160,833	\$ 2,215,191				32,278	\$ 615,191	\$ 1,600,000	\$ 2,215,191
Projects on Private Lands: Prior FRESP Agreement Converted to Permanent Easements under NRCS' Wetland Reserve Program - District has no Current Funding Obligations												
Payne and Son Ranch	Oper	932	-	-	-	\$ -	50	On-going	46,600	\$ -	\$ -	\$ -
Williamson Cattle Company	Oper	150	-	-	-	-	50	On-going	7,500	-	-	-
Projects on District Lands: Easement Agreements Primarily Funded with NRCS' Wetland Reserve Program Grants (Except District Funds of \$16,864 for Allapattah H Canal and \$374,165 for Allapattah Phase 1)												
Williamson Ranch/Turnpike Dairy	Oper	547	\$ -	\$ -	\$ 343,385	\$ 24.40	50	On-going	27,350	\$ -	\$ 343,385	\$ 343,385
Allapattah H Canal	Oper	1,610	16,864	-	16,864	0.41	50	On-going	80,500	16,864	-	16,864
Allapattah Parcels A&B – Ph. I	Oper	3,500	374,165	-	1,496,660	16.62	50	On-going	175,000	374,165	1,122,495	1,496,660
Allapattah Parcels A&B – Ph. II	Const	1,243	-	-	3,000,000	93.80	50	On-going	62,150	-	3,000,000	3,000,000
Total Permanent Easements Agreements		7,982	\$ 391,029	\$ -	\$ 4,856,909				399,100	\$ 391,029	\$ 4,465,880	\$ 4,856,909
Cost of Capital										\$ 3,675,399	\$ -	\$ 3,675,399
Total Public Lands & Cost Share Agreements with Private Entities		21,470	\$ 1,763,623	\$ 160,833	\$ 3,363,623				1,527,778	\$ 6,186,904	\$ 6,065,880	\$ 12,252,784
Total Public Lands - Including District Project Lands, Interim Storage and Permanent Easements						Weighted Average Cost Per Acre-Foot				\$ 4.05	\$ 3.97	\$ 8.02