

Dispersed Water Management Success Stories

Benefits for Lake Okeechobee, Estuaries, and The Everglades

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Water Impounded and Wetlands Restored – Typical Results Possible from Dispersed Water Management

The need for large amounts of new water storage capacity in south Florida was an overarching theme of the Comprehensive Everglades Restoration Project (CERP) in 1999. The Lake Okeechobee Watershed (LOW) component of CERP focused on large structural projects that included a deep 200,000 acre-foot capacity reservoir, and several smaller reservoirs and Stormwater Treatment Areas north of the Okeechobee. But for political, economic, social, and environmental reasons, the LOW project appears stalled interminably. And as the LOW stalled out, a 2007 re-evaluation of Okeechobee restoration needs estimated that much more storage, as much as 1 million additional acre-feet, is needed north of Okeechobee to attain reasonable system-wide performance.

To maintain forward progress on water storage goals, Audubon, with generous funding from the Darden Foundation, has been promoting innovative approaches to meeting water storage and quality needs in the Northern Everglades through an alternative approach often called, “Dispersed Water Management” (DWM). DWM has many forms designed to serve a variety of functions but the unifying characteristic of DWM projects is that they are often accomplished in cooperation with private landowners who own the vast majority of lands in Florida. Until recently, DWM projects have been smaller and more scattered as they evolved during a “pilot project” stage. Major large projects are now being completed, in the range of 30,000 acre feet or more, and are beginning to operate.

DWM is but one approach to attaining water management goals and has strengths and weaknesses relative to other approaches. Beneficial aspects to DWM that often exceed “engineered” approaches (reservoirs, Aquifer Storage and Recovery Wells) include:

- DWM on private lands keeps land on the tax rolls, still producing food and fiber
- Provides an additional revenue stream for landowners and an incentive to not develop their property more intensely
- Makes private landowners part of the solution rather than “part of the problem”
- Can be quickly implemented
- Avoids high construction costs for the levees required for deeper storage which may now be imposed by “post Katrina” Army Corps of Engineers Dam & Levee Safety Criteria.
- Can be placed virtually anywhere with space and appropriate topography (the speed and location advantages make DWM a very agile water management activity)
- Often creates wildlife habitat
- Retains and detains water
- Reduces nutrient movement
- Recharges groundwater

Early projects with private land owners

Conservation easements are a long established tool for working with private land owners. Typically, they conserved the most intact natural ecosystems and the associated wetlands often did not need restoration. The net gain in wetland function as viewed from a watershed perspective, often was negligible. Therefore, conservation easements were (and are) valuable for habitat conservation. Conservation easements can prevent additional runoff and drainage from new development activities. However, conservation easements alone have little impact on past actions affecting regional hydrology that cause water to rush downstream, and do not directly achieve CERP-type goals of increasing water storage.

The Florida Ranchlands Environmental Services Project (FRESP, 2005-2011) added a new dimension to working with private landowners by having the specific goal of increasing water storage and cleansing capacity. Rather than targeting the least impacted properties, FRESP looked for highly-drained and/or nutrient-enriched wetland basins that could be rehydrated to hold and potentially treat water. Some FRESP projects merely plugged ditches to hold back water, others used shallow reservoirs to achieve goals and some even flooded uplands with sheet-water.

FRESP was a pilot project conducted on only eight properties and has ended. But the results proved very promising: about 20% less water flowed from the properties after FRESP than before¹, one project over six years retained 57% of the water pumped through while reducing phosphorus and nitrogen outflows by 88% and 56%, respectively during 2014. FRESP developed techniques to estimate project

¹ Dr. Sanjay Shukla, University of Florida, personal communication. Analysis is ongoing.

benefits and how to monitor them were developed. Issues such as listed species and wetland considerations were at least partly resolved during FRESP to entice more landowner participation. Most importantly, the landowners have enjoyed the additional income stream from furnishing water management services and learned to operate the systems within other agricultural activities. Upon termination of the FRESP pilot project, two landowners requested and were granted extensions of the project, three landowners successfully enrolled in the SFWMD Payment for Environmental Services program, two enrolled in NRCS wetland reserve program (WRP), and one is contemplating future options. Having 7 of 8 landowners willing to continue in water management programs was perhaps the most promising result of all.

The SFWMD built on these results by initiating a Payment for Environmental Services program, to further develop DWM. The first solicitation in 2013 had 13 applicants and awarded 8 contracts. The second solicitation in 2014 had 19 applicants but due to limited funds and one very large proposal that consumed a large share of available funding, was only able to fund the top two projects. These projects are being monitored by an independent contractor to ensure compliance. But DWM attracted more attention than just the PES proposals.



Water Flows Into Impoundment Marsh at Rafter T Ranch DWM Project

Private landowners step forward with their own proposals

Private landowners have proposed the largest DWM projects to date. Lykes Brothers, Inc. submitted a proposal for a 16,000 acre tract named Nicodemus Slough that could hold 30,000+ acre-feet of water, almost four times the volume of the first 10 PES projects combined. With strong Audubon support, the project was funded and now is operational. Alico, Inc. subsequently submitted an even larger project on 35,192 acres, projected to store 91,944 acre-feet per year and that now has been funded. There has been controversy associated with the Alico project as the landowners lobbied aggressively for legislative funding, and its large cost eclipsed the possibility of awarding contracts to other landowners for numerous smaller projects.

Landowners in the Indian River Lagoon region offered projects called “Water Farming” that involve building shallow reservoirs on former citrus groves three of those projects have been funded and are in various stages of development. Being new, the projects have extra monitoring requirements for water quality and quantity to fully measure results. Interestingly, one project had an estimated annual capacity of 6,780 acre-feet on its 450 acres but was able to take 11,840 acre-feet in one year due to evaporation and groundwater recharge effects.

Another private landowner initiative is the Floating Aquatic Vegetative Tilling nutrient removal project (it grows aquatic plants and periodically plows the plant biomass underground to sequester nutrients) that is being built on 523 acres in the Caloosahatchee Watershed.



Pumps Recently Installed at a new Dispersed Water Management Project

DWM has captured the interests of private landowners and their proposals have expanded the scope, size and geographic range of DWM efforts.

Beyond private landowners: agencies are taking advantage of DWM opportunities

The utility and ease of implementation of DWM projects has spurred many agencies to utilize it on public lands. The incentive of improving water storage has helped gain funding for many conservation lands with previously drained wetlands. A few examples include the Avon Park Air Force Range who restored the Arbuckle Marsh (10,000 acre-feet of storage), the Sumica Tract (Kissimmee Valley, 281 acre-feet), Dinner Island (30 acre-feet), Allapattah Flats (many projects, 6000+ acre-feet), and many others.

Some agency lands planned for CERP and related projects that remain unbuilt have nonetheless been shallowly flooded during wet periods. These public lands include: the C-43 reservoir footprint, BOMA, C-20s RASTA footprints, Allapattah parcels (mentioned previously), and smaller ones. The Everglades Headwaters National Wildlife Refuge also has been promoted partially based on its potential to restore wetlands and increase storage. The NRCS Wetland Reserve Program has grown in scope, again partly due to awareness of regional water management benefits with the largest project in the nation in the Fisheating Creek Watershed covering some 34,000 acres, costing more than \$100 million and storing about 27,000 acre-feet of water while restoring and enhancing about 12,892 acres of wetlands. All these projects did not proceed based on DWM benefits alone, but that factor had a strong influence in getting them from an interesting concept to fully funded projects to attain the benefits.

Summary

Dispersed Water Management has emerged as an agile, popular approach to meeting water management goals. A recent audit by the SFWMD (2014) estimated about 94,685 acre-feet of capacity in DWM projects built or almost-built in south Florida, with two-thirds on private lands. This did not include the Alico Inc. project that would roughly double this number.

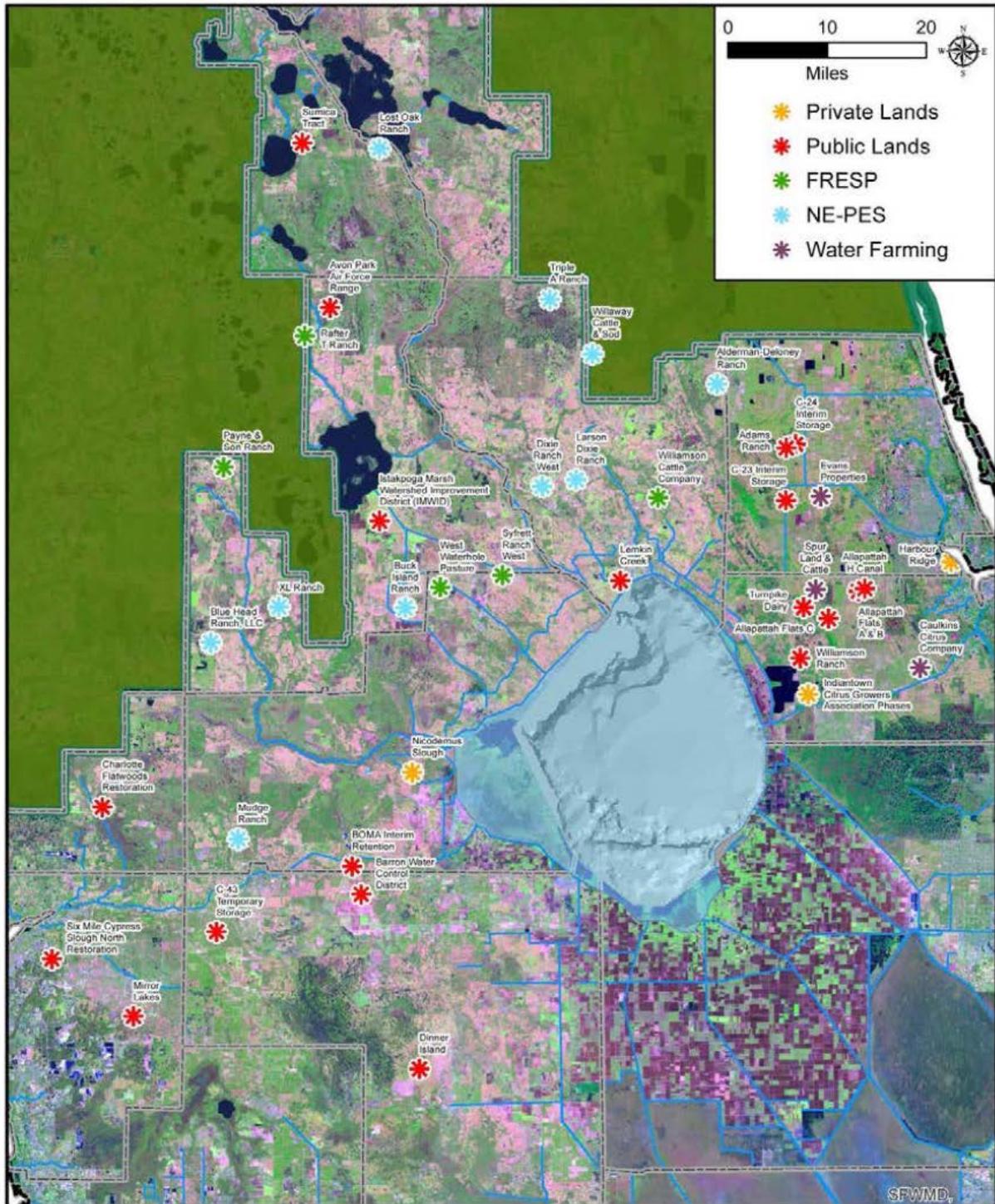
While these results are encouraging, they represent only a small fraction of the estimated 1.6 million acre-feet the UF Water Institute report concluded would be needed north, south, east, and west of Lake Okeechobee to attain reasonable water management control of the south Florida system.

Future steps will require a better understanding of how DWM functions at large scale. Detailed modeling is needed on the large-scale impacts that DWM projects have, how much they will cost, and how DWM fits in with other water management strategies (reservoirs, filter marshes, ASR wells, and so on). Issues of implementation, compliance, governance will need attention. For a more detailed look at the costs and benefits of Dispersed Water Management, see our report "Relative Costs and Benefits of Dispersed Water Management (DWM)". See here: <http://bit.ly/1FVOo2o>

Name	Timeline	Type	Acres	Volumes	
Conservation Easements	Pre-2000	Some wetland restoration	Unknown, isolated	Unknown	
Wetland restoration on government lands	Pre-2000	Wetland restoration	Unknown, isolated	unknown	
Florida Ranchlands Environmental Services Project (8 projects)	2005-2011	Storage in small impoundments, wetlands and uplands (experimental)		9,974 acre-feet	
PES Phase I	2013	Shallow storage	9,068	4,778	
PES Phase II	2014-15	Shallow reservoirs	5,713	3,858	
Lykes Nicodemus Slough	2014	Shallow storage	16,000	32,000	
Water Farming (3 projects)	2014-2015	Shallow reservoirs	1,373		
Alico	2014	Shallow storage	35,192	91,944/year	
Fisheating Creek Wetland Reserve Program	2012-2015	Wetland restoration	34,122 total (13,500 wetland)	27,000 (Audubon estimate)	

Figure 1. Growth of Dispersed Water Management projects and concepts over time. Note the increasing numbers, partnerships, volumes, and geographical distribution of projects.

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