



BMAP Action Plan for North Indian River Lagoon & Banana River

Pine Island Conservation Area Stormwater Improvements

**Brevard County
Natural Resources Management Dept.
Watershed Management Program**

Pine Island Conservation Area

Stormwater Improvements

- Initiated as partnership between SJRWMD & EELs in purchasing Pine Island Conservation Area.
- Two main points of discharge for North Merritt Island:
 - Indian River Lagoon (north)
 - Banana River (south)
- 6,000-acres of previously untreated stormwater runoff is now diverted into two expanded wet detention basins; Previously isolated borrow pits

Pine Island Conservation Area Stormwater Improvements

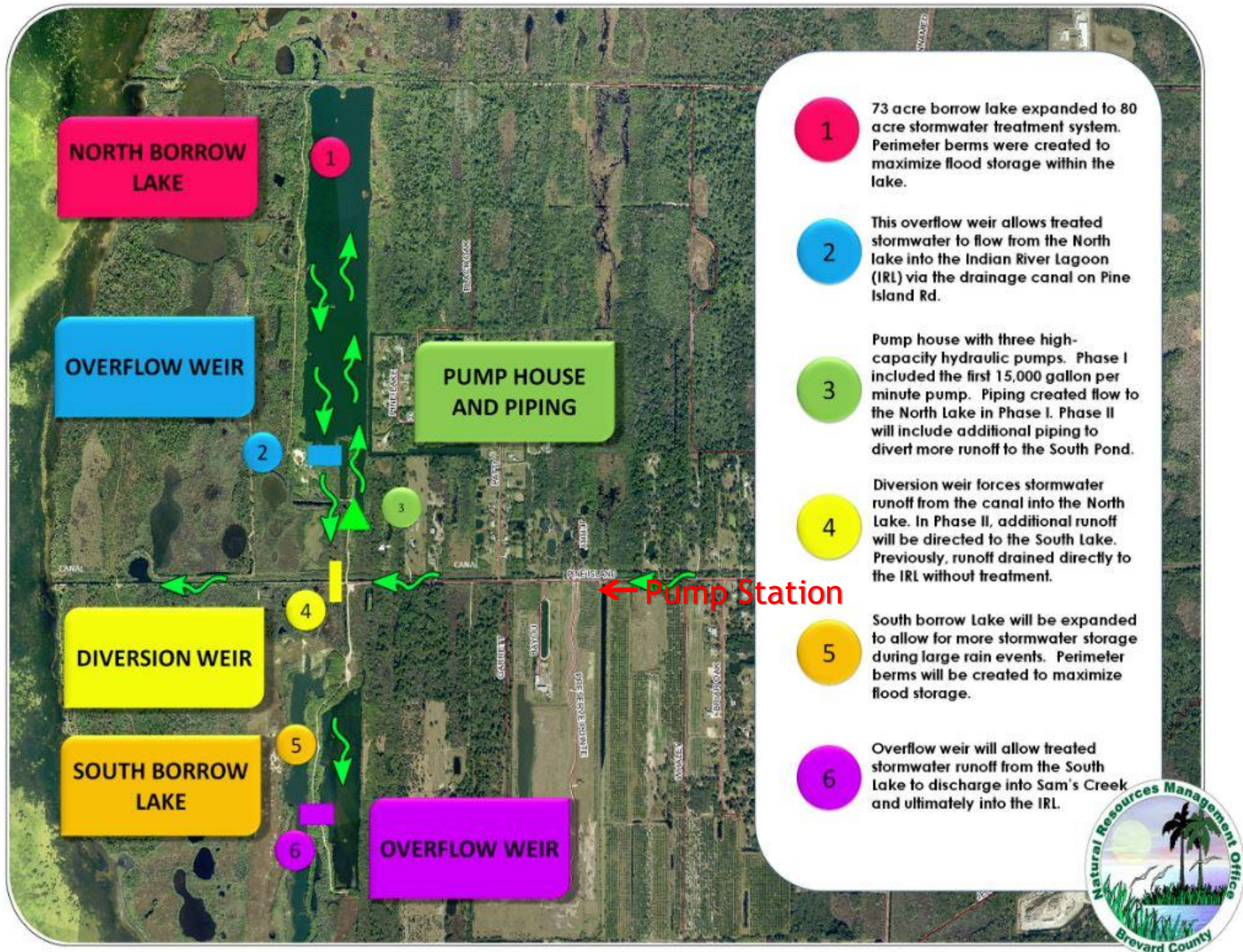
- **Phase 1: Construction began Aug. 2011;**
 - **Completed Sep. 2012.**
 - **Construction Costs: \$1.64 million;**
 - **TMDL & 319 Grant: \$800,000.**
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- **Phase 2: Construction began in Sep.2012**
 - **Completed Dec. 2014**
 - **Construction: \$1.62 million;**
 - **319 Grant: \$500,000.**

Phase I: Scope of Work

- **Diversion Weir - Gravity flow two 30-inch pipes for normal activity and smaller rain events**
- **Pump Station - 15,000 gpm hydraulic pump**
- **Control/Outfall Structure to North IRL**
- **Lake Expansion - 7+ acres of surface water**
- **Culverts - Tailwater control (flap-gates)**
- **Berms, Islands, Littoral Zones, & Swales**
- **Coquina Road, Canoe launch, & New bridge**
- **EELs - Salt Marsh Restoration Creation Area**

Phase II: Scope of Work

- Pump Station - Two Additional Hydraulic Pumps (15K & 32K GPM)
- Lake Expansion - Five (5) additional acres of surface water
- Culverts with tailwater control (flap-gates)
- Earthen Baffle in North Lake, Perimeter Berms in South Lake
- Outfall Connection to Sam's Creek
- Salt Marsh Preservation & Restoration Areas
 - (2+ Acres) along Sam's Creek
- Walking Trails



1

73 acre borrow lake expanded to 80 acre stormwater treatment system. Perimeter berms were created to maximize flood storage within the lake.

2

This overflow weir allows treated stormwater to flow from the North lake into the Indian River Lagoon (IRL) via the drainage canal on Pine Island Rd.

3

Pump house with three high-capacity hydraulic pumps. Phase I included the first 15,000 gallon per minute pump. Piping created flow to the North Lake in Phase I. Phase II will include additional piping to divert more runoff to the South Pond.

4

Diversion weir forces stormwater runoff from the canal into the North Lake. In Phase II, additional runoff will be directed to the South Lake. Previously, runoff drained directly to the IRL without treatment.

5

South borrow Lake will be expanded to allow for more stormwater storage during large rain events. Perimeter berms will be created to maximize flood storage.

6

Overflow weir will allow treated stormwater runoff from the South Lake to discharge into Sam's Creek and ultimately into the IRL.



Benefits

- **Water Quality Improvement Project**
 - Enhance the quality of the Indian River Lagoon, its flora, fauna, and the recreational community.
 - TMDL & BMAP Action Plan for North IRL & Banana River.
- **Flood Control Project**
 - Significantly decrease duration of flooding.
 - Pumps manually activated for rain events >6-in to lower water level in ditches.
- **Removal of non-native, aggressive plant species (aka Billion Peppers)**

Construction Challenges

- **Phase 1:**
- **Lack of Stockpiling Area for Excess Fill**
- **Coordination with KSC's Exploration Park, EELs, Road & Bridge, & our Contractor.**
- **Coquina Rock**
- **Oct. 9, 2011- "No Name Storm"- 9-in rain in 24-h**
- **Petroleum Contamination/Soils & Water Sampling/Treatment**

Construction Challenges

- Vultures
- Manatees

- Phase 2:
- Rain, Rain, & More Rain



Water Quality Results for Phase 1

Actual Pollutant Removal Efficiency:

2.2.1- Average Removal Efficiency for Nutrients

Pine Island Percent Removal					
Storm Event	Orthophosphate	Ammonia	TKN	Phosphorus	TSS
1	100	100	58	76	66
2	0	0	100	100	100
3	97	92	94	96	100
4	95	100	87	100	97
5	84	72	86	100	44
6	92	97	81	82	*
7	92	91	97	95	89
8	99	98	99	99	98
% Average Removal	82.38	81.25	87.75	93.50	84.86

*Data from this storm event indicates an addition of TSS.

Water Quality Results for Phase 1

Pollutant Removal Efficiency:

BMP Wet Detention	(lbs/year)		
Pollutant Loads	TSS	TP	TN
Pre-Project	77,465	2,394	9,350
Post- Project (Projected)	15,529	991	6,834
Post- Project (Expected)*	11,620	156	1,169
Load Reduction (Projected)	61,936	1,403	2,516
Load Reduction (Expected)*	65,845	2,238	8,181

* Based on average removal efficiency calculated from monitoring performance over 8 storm events







BMAP Action Plan for Banana River

Fortenberry Regional Stormwater Management System

**Brevard County
Natural Resources Management Dept.
Watershed Management Program**

Fortenberry Regional Stormwater Management System

- Water Quality Improvement & Flood Storage Project for 164 acres of prime commercial area between S.R. 520 & Cone Rd. and Plumosa Rd. & Sykes Creek Blvd. on Merritt Island.
- Originally slated & permitted as condominium development.
- Provides an opportunity to commercial properties located within watershed to purchase stormwater storage (aka credits) within the pond.

Fortenberry Regional Stormwater Management System

- Phase 1A: Construction began Oct. 2011;
- Completed April 2012.
- Phase 1B: Construction began Aug. 2012;
- Completed in Nov. 2012.
- Total Construction Costs for Ph. 1 = \$1.5 Million
- Phase 2: Construction began in Oct. 2013
- Completed June 2014
- Construction Costs: \$2.2 Million;
- FDEP TMDL Grant: \$350,000

Phase IA & IB: Scope of Work

- Excavation of first 11- acres of wet detention pond and both outfall weirs (Banana River Outfall)
- On-site and Off-site Mitigation for wetland and surface water impacts;
- On-site wetland creation and monitoring; Off-site wetland restoration through culvert installation within a mosquito impoundment containing B.P. & Melaleuca Trees.

Phase II: Scope of Work

- **Excavation of remaining 11.5 acres of wet detention within soils requiring construction waste & debris screening**
- **Walking Trail around perimeter of pond**
- **Phase III: Upstream Piping Improvements Courtesy of Public Works.**
- **Phase IV: Veteran's Memorial Park Expansion via Parks & Rec.**

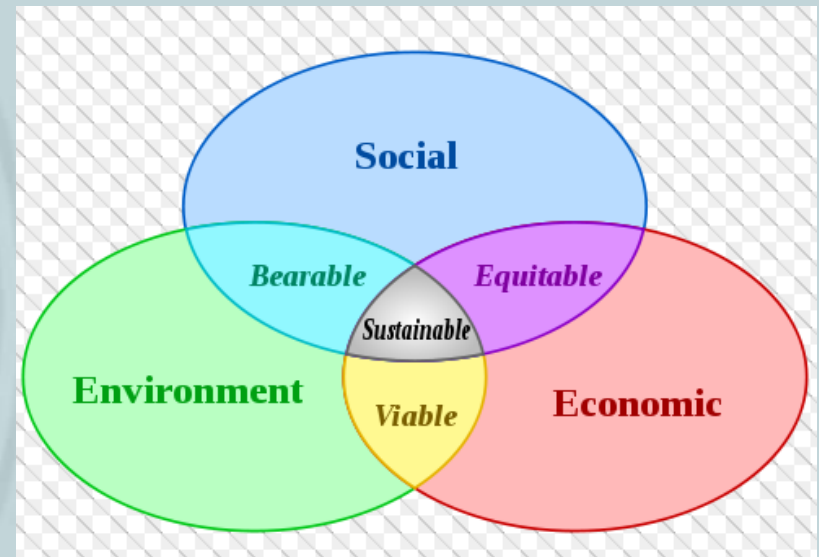


MASTER PLAN

SCALE: 1" = 200'

Benefits

- Water Quality Improvement for 164-acres of dense commercial area:
- Stormwater storage “credits” for “Sustainability”



Benefits

- Adjacent “Alum Pond” is now more efficient: ~100-acre reduction in drainage area
- Wetland Creation/Preservation
- Removal of non-native, aggressive plant species
- Veteran’s Memorial Park Expansion

Construction Challenges

➤ Phase 1:

- Displaced Veterans & Wanderers
- Debris removal
- Wetland plant restoration; Off-site mitigation
- Relatively smooth construction

➤ Phase 2:

- Soils & water sampling/testing
- Soils Screening: Bottles & Glass through the 3-inch screen.
- Dewatering
- Rain
- Contractor
- On a Positive Note: No Manatees!

1 Question from Engineers

DUH!

- Q: Why didn't you merge the alum pond with the new pond?





Public Outreach

- In Progress - BLUELIFEFL.ORG
 - Fertilizer (Pine Island) & Car Wash (Fortenberry) PSA Video at Local Movie Theatres, Links, Youtube, Social Media
 - Sticky Note Campaign in FL Today
- Public Presentations/Meetings
- Sign - Project Description

Questions?

