

BUILDING A WORLD OF DIFFERENCE

24 November 2015

SAWGRASS LAKE – DEMONSTRATION OF RAPID DEWATERING TECHNOLOGY

WEDA GULF COAST CHAPTER MEETING – NOVEMBER 18, 2015

LARRY ALMALEH



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PROJECT BACKGROUND



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- **Sawgrass Lake and 400-acre park**
 - One of the largest maple swamps on the Gulf Coast of Florida
 - Thousands of birds migrate through attracting birders and eco-tourists
- **Negative impact of neighboring skeet/trap gun club operations**
 - Extensive lead shot impacts to a 20-acre swamp/wetland and the adjoining 15-acre Sawgrass Lake
- **In 2001, the Florida Department of Environmental Protection (FDEP) and the Southwest Florida Water Mgmt District entered into an initial Consent Order Agreement**

REMEDIATION PLAN

The project was separated in 3 major phases as follows:

1. Excavation, dewatering and management of 100,000 CY of lead shot contaminated swamp / wetlands sediments.
2. Hydraulic dredging, dewatering and material management of 195,000 CY of organic-rich sand / sediments from the lake.
3. Wetlands construction in the former swamp areas and site restoration utilizing reclaimed soil



CHALLENGES

- **Lead Shot Separation From Lead Impacted Soils and Sediments.**
- **Dredging and Dewatering of Contaminated Lake Sediments**
- **Control And Monitoring of Remediation Process Water Discharges**
 - Leachate Carry-over from Contaminated Sediments
 - Polymers Additive Release
 - Ammonia Release from Organic Sediments

PROCESS DESCRIPTION



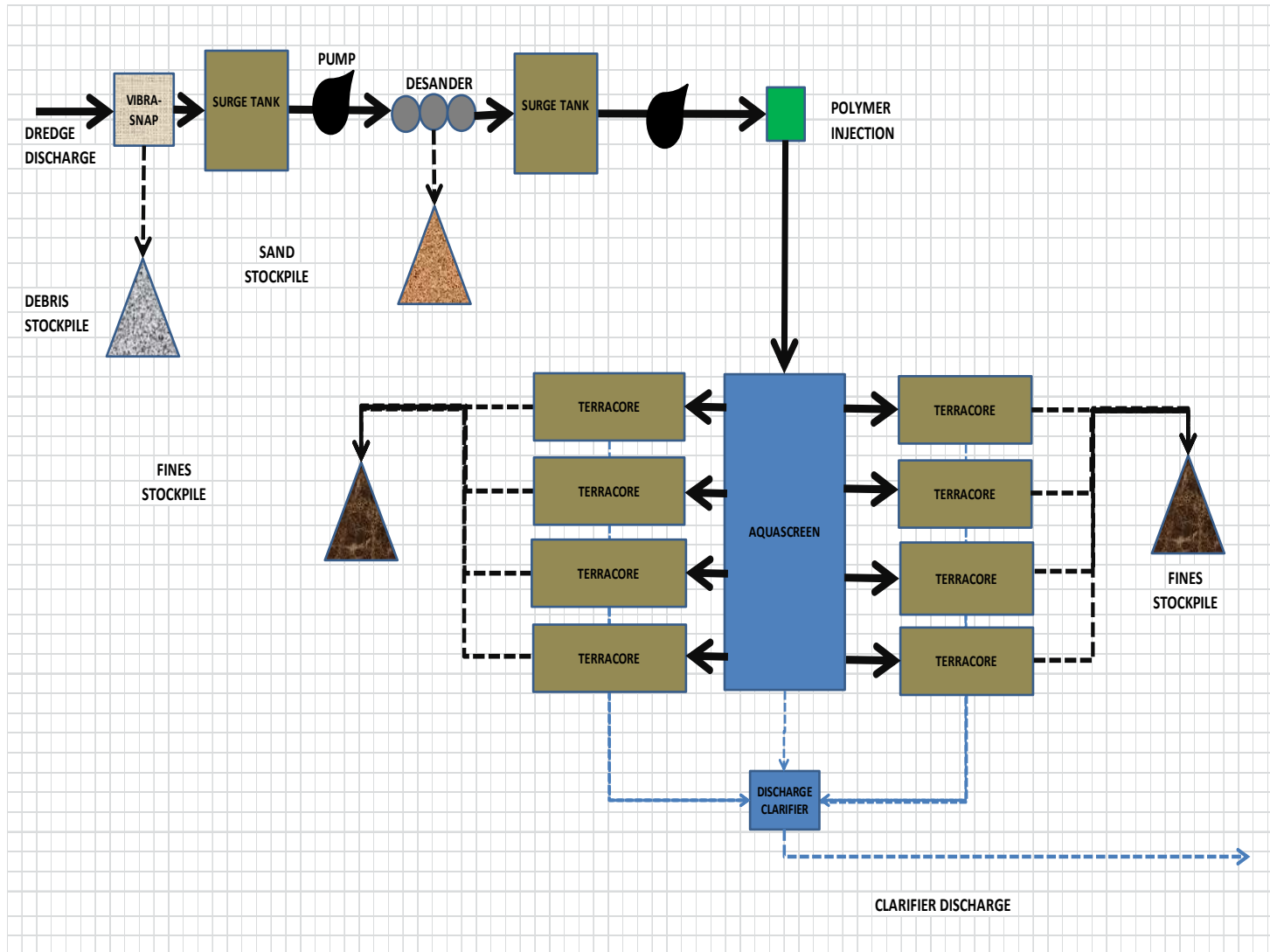
SOLUTION

The Genesis Rapid Dewatering System was selected to separate the soils and lead shot and to dewater the contaminated dredged lake sediments

The system advantages include:

- Ability to separate differing materials
 - Debris
 - Sand/gravels
 - Silts/clays
 - Organic material
- High quality water discharge
- Limited site development requirements
- Scalability

Process Description



EXCAVATION, DEWATERING AND MANAGEMENT OF 100,000 CY OF LEAD SHOT CONTAMINATED SWAMP/WETLANDS SEDIMENTS

- Grubbing and removal of surface vegetation.
- Excavation of contaminated sediments by backhoe.
- Mixing and re-suspending excavated soils.
- Separation of lead shot
- Dewatering of remaining fine grained sediments
- Stabilization and disposal of remaining sediments





**Lead Shot Recovery
From Hydro-cyclone**



Single Trailer System



DISPOSAL OF MATERIALS

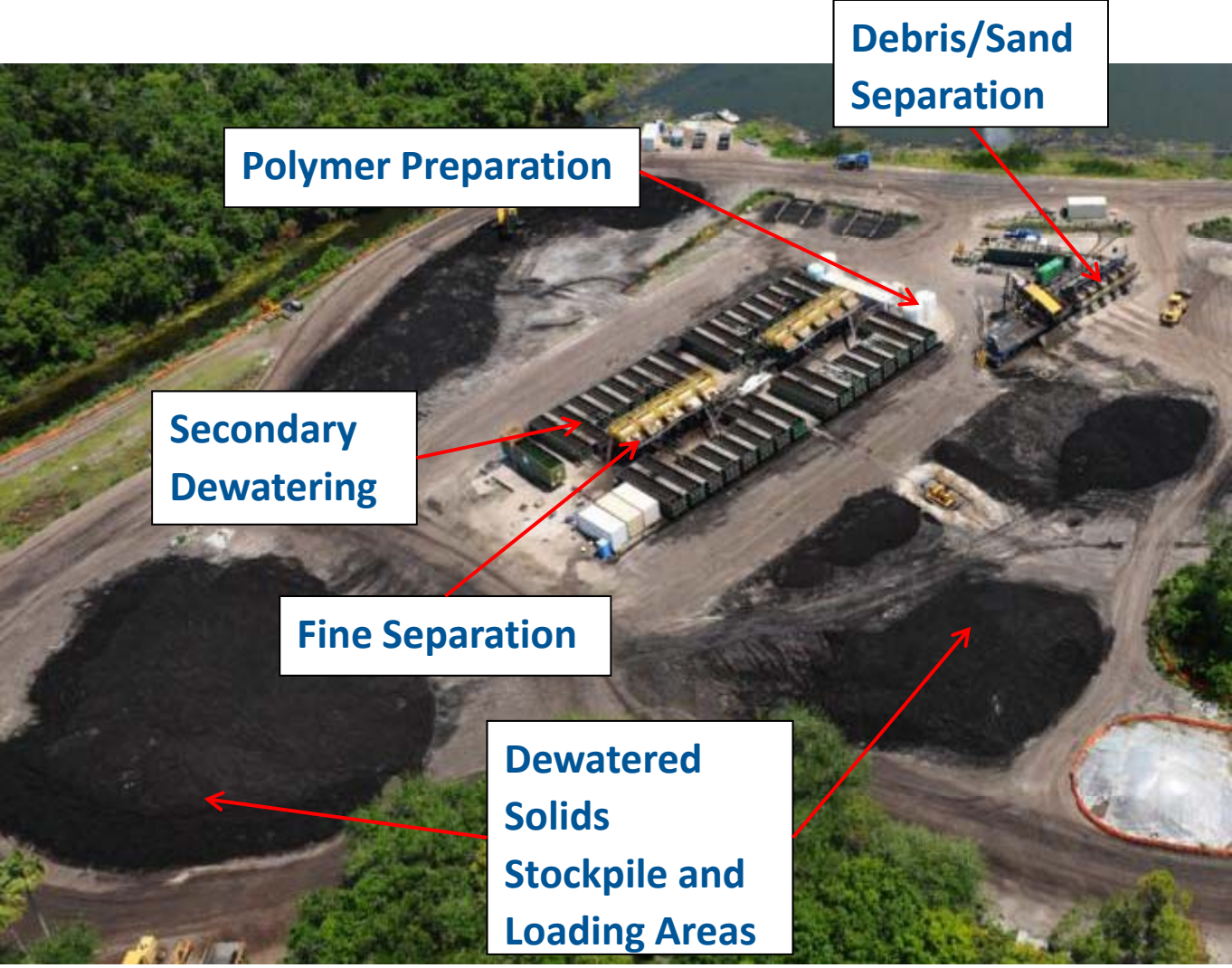
- Lead shot was reclaimed and sold
- Sand was tested and used as structural fill for separation berm between shooting club and lake.
- Large debris was treated with TerraBond to stabilize lead and disposed of in a Subtitle D MSW landfill
- Fine Material from Aquascreen and TerraCores treated with TerraBond and disposed of in a Subtitle D landfill

DEWATERING SOLUTION



HYDRAULIC DREDGING, DEWATERING AND MATERIAL MANAGEMENT OF 195,000 CY OF ORGANIC-RICH SAND/SEDIMENTS FROM THE LAKE

- Hydraulic dredging of lake, continuous pumping rate of 3,200 gpm.
- Separation of debris and sand materials.
- Polymer treatment of remaining fine grained sediments - AquaScreen™
- Primary dewatering of remaining fine grained sediments - AquaScreen™
- Secondary dewatering of fine grained sediments - TerraCore™
- Aeration of discharge water to remove ammonia
- Disposal of remaining sediments



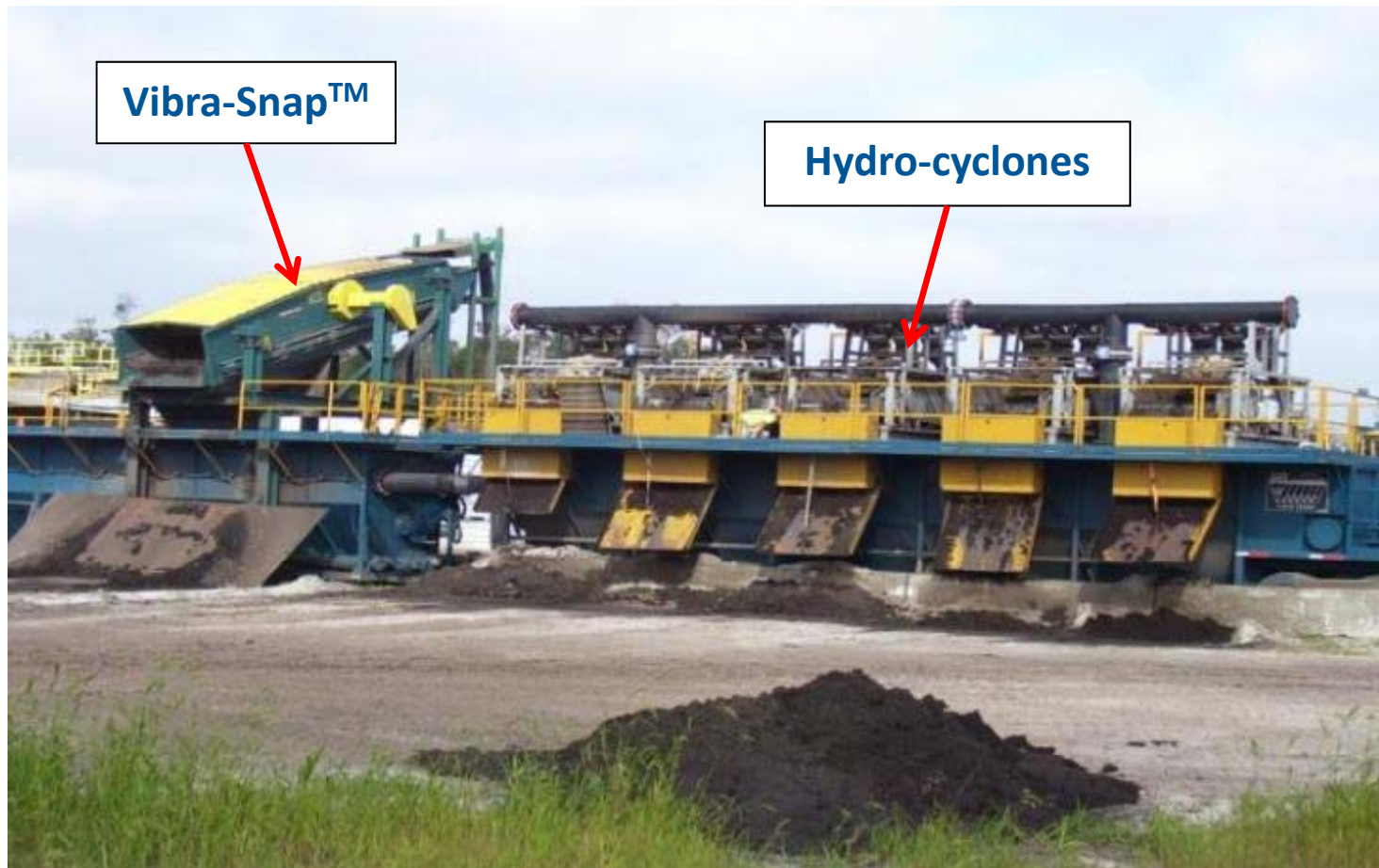
Process Description

The RDS process operates in the following sequence of solids separation and dewatering steps:

Initial separation of debris or large solids such as shells and gravels is performed using the Vibra-Snap vibrating screen

The dredge flow is directed to a surge tank below the Vibra-Snap screens and subsequently pumped to hydro-cyclones for sand separation

The de-sanded material flows to a second surge tank that moderates fluctuations in dredge discharge flow, material and solids density to allow for efficient polymer addition



Process Description Continued

Polymer is added as determined from the bench testing program through an automatic metering system.

The metering system controls the rate of polymer addition based on flow rate percent solids, and solids density. Multiple polymers can be added and controlled from this unit

The polymerized and flocculated fines are directed to the Genesis AquaScreen for initial dewatering. The flocculated fines are captured by the AquaScreen allowing the majority of the dredge water used to transport the solids to gravity drain through the screens

Polymerized and Flocculated Fines



Process Description Continued

The separated flocculated fine solids are directed to the Genesis TerraCore containers for final dewatering and densification.

The TerraCore containers are periodically emptied, usually on a daily basis, the solids stockpiled and loaded on trucks for final disposal.

Discharged water from the AquaScreen and the TerraCore containers is collected and treated if necessary and discharged to the original water body.

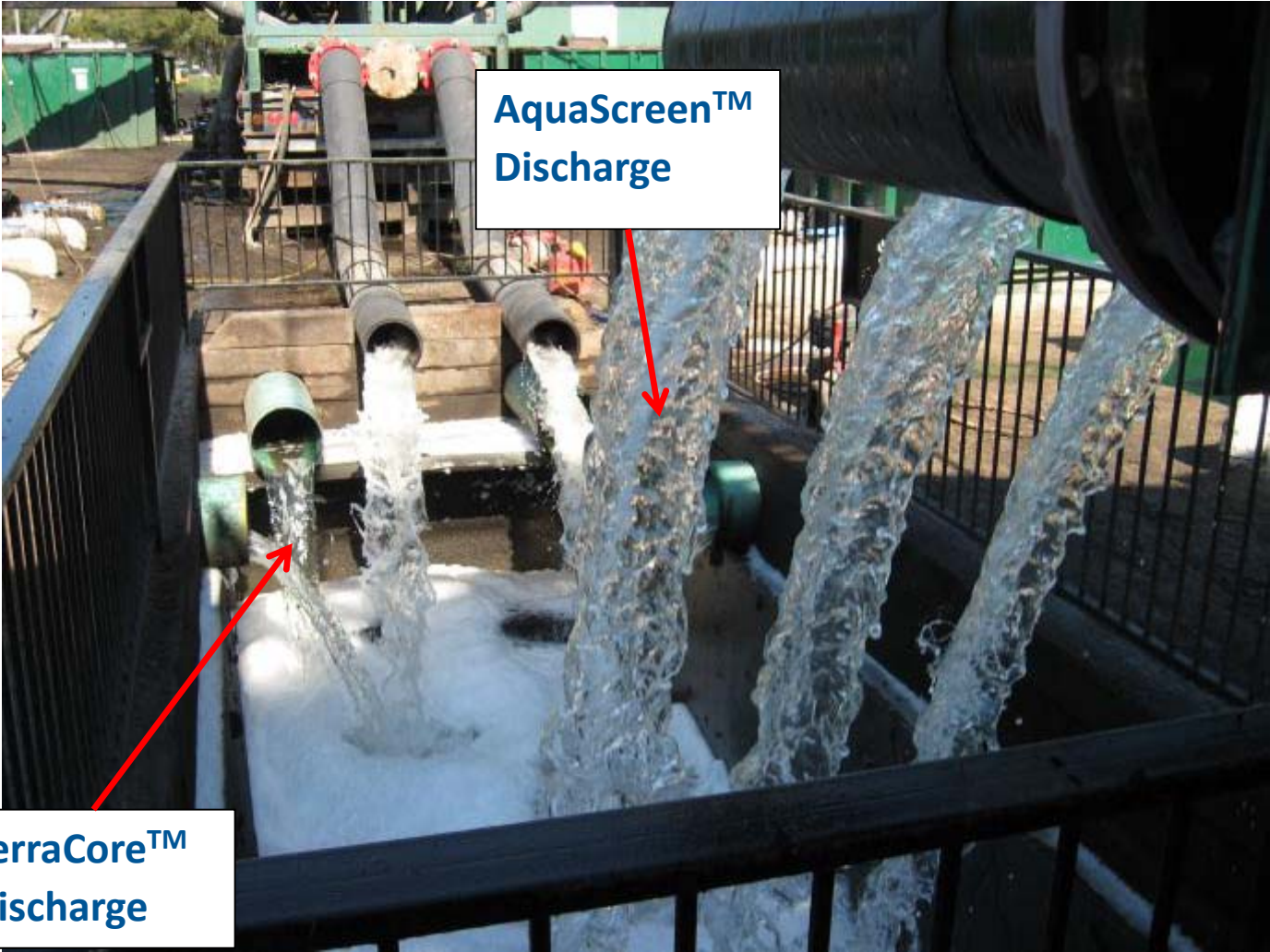


**Dewatered
Fines**



TerraCore™

AquaScreen™



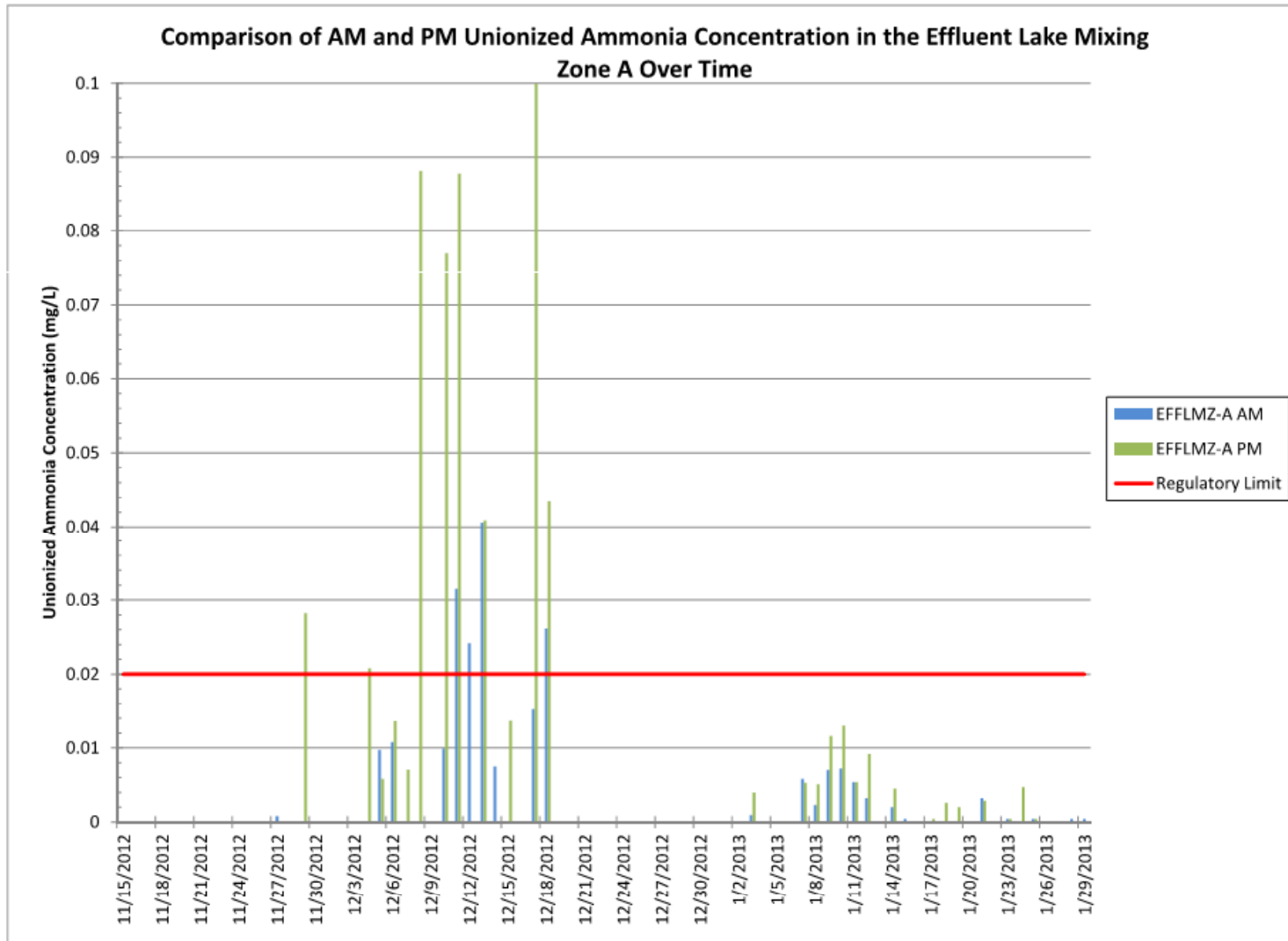
**AquaScreen™
Discharge**

**TerraCore™
Discharge**

WATER QUALITY

Constituent	Influent Dredge Material (ppb)	Effluent Water Quality (ppb)
Arsenic	160	3.3
Copper	790	2.3
Iron	290,000	170
Lead	9100	8.2
Nickel	250	2.3
Mercury	4.0	0.06
Total Nitrate	16.7	11.4
Phosphorus	4500	48
TDS	150,000 mg/l	15 mg/l

WATER QUALITY





Aeration Pond

WATER QUALITY

Table 1
 Lake Mixing Zone Class III Monitoring Results during Full Scale Lake Dredging Work
 Sawgrass Lake Restoration Project
 Contractor: Woodruff Sons, Inc.

Analytes	FDEP Class III Criteria for Surface Water Quality Classifications	August Geometric Mean of Lake Water (1), (2)	Units	Discharge Criteria (1)	Sample Identifications				
					EFFLMZ-44-B	EFFLMZ-45-C	EFFLMZ-46-A	EFFLMZ-47-B	EFFLMZ-48-C
Sample Collection Date					9/5/2013	9/19/2013	10/17/2013	11/4/2013	12/3/2013
Monitoring Location: 150 Feet Downstream from Effluent Discharge Pipe									
Lead	0.54-18.58**	52	ug/L	≤52	1.3 I	1.2 I	1.6	1.7	0.86 I
Ammonia (un-ionized)	≤0.02	0.01	mg/L	≤0.02	0.0032	0.0042	0.0046	0.02	0.000085 U
HEM (Oil and Grease)	5	2.1	mg/L	≤5	0.65 U	18	0.65 U	0.65 U	0.7 U
Turbidity	≤29 above background	27	NTU	≤56	2.6	3.0	4.4	4.0	0.7
Specific Conductance	1275	495	umhos/cm	≤1275	520	440	590	730	520
Total Cyanide	≤0.0052	0.0022	mg/L	≤0.0052	0.00125 U	0.00125 U	0.00125 U	0.00125 U	0.00125 U
pH*	acceptable from 6-8.5	7.6	SU	6-8.5	7.78	8.08	8.18	8.25	7.93
Temperature*	NA	NA	Degrees Celsius	NA	31.8	28.8	27.0	22.6	19.1
Dissolved Oxygen	>5	8.4	mg/L	>5	6.0	9.0	9.0	9.0	8.0

Surface Water Quality Classifications: Florida Administrative Code, 62-302.530

(1) Discharge criteria will be the higher value of the Class III criteria and the geometric mean of the lake water.

(2) Non detects were reported at 1/2 the MDL if the MDL was less than the Class III Surface Water Quality Standards, or if the MDL was higher than the surface water quality standard 1/2 the standard was reported as recommended in FDEP Rule No. 62-4.246(8).

* Values reported from the information collected in the field.

**Calculated range of values based on hardness as CaCO3. Actual criteria applied is a function of the hardness from the same sample.

U - Not detected

I - Detected at a concentration between the detection limit and reporting limit. Concentration should be considered estimated.

Exceeds Discharge Criteria



LESSONS LEARNED

- **Continued Communication with Regulatory Agency**
 - Development of a Collaborative Relationship Smoothed Progress
 - Development of Discharge Monitoring Criteria Is Crucial
- **Unexpected Releases from Organic Sediments**
 - Ammonia Release Required Addition of Aeration Pond
 - Delayed Production Until Solution Implemented
- **Productivity Improvements**
 - TerraCore™ Batch System Restricted Productivity – Batch System Versus Continuous Production Remainder of System

CONTACTS

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