

# Lake Okeechobee Phosphorus Source Control Grant Application Release 2



# Candler Ranch Phosphorus Reduction using PhosPhilter

by Larry Madrid, P.E.



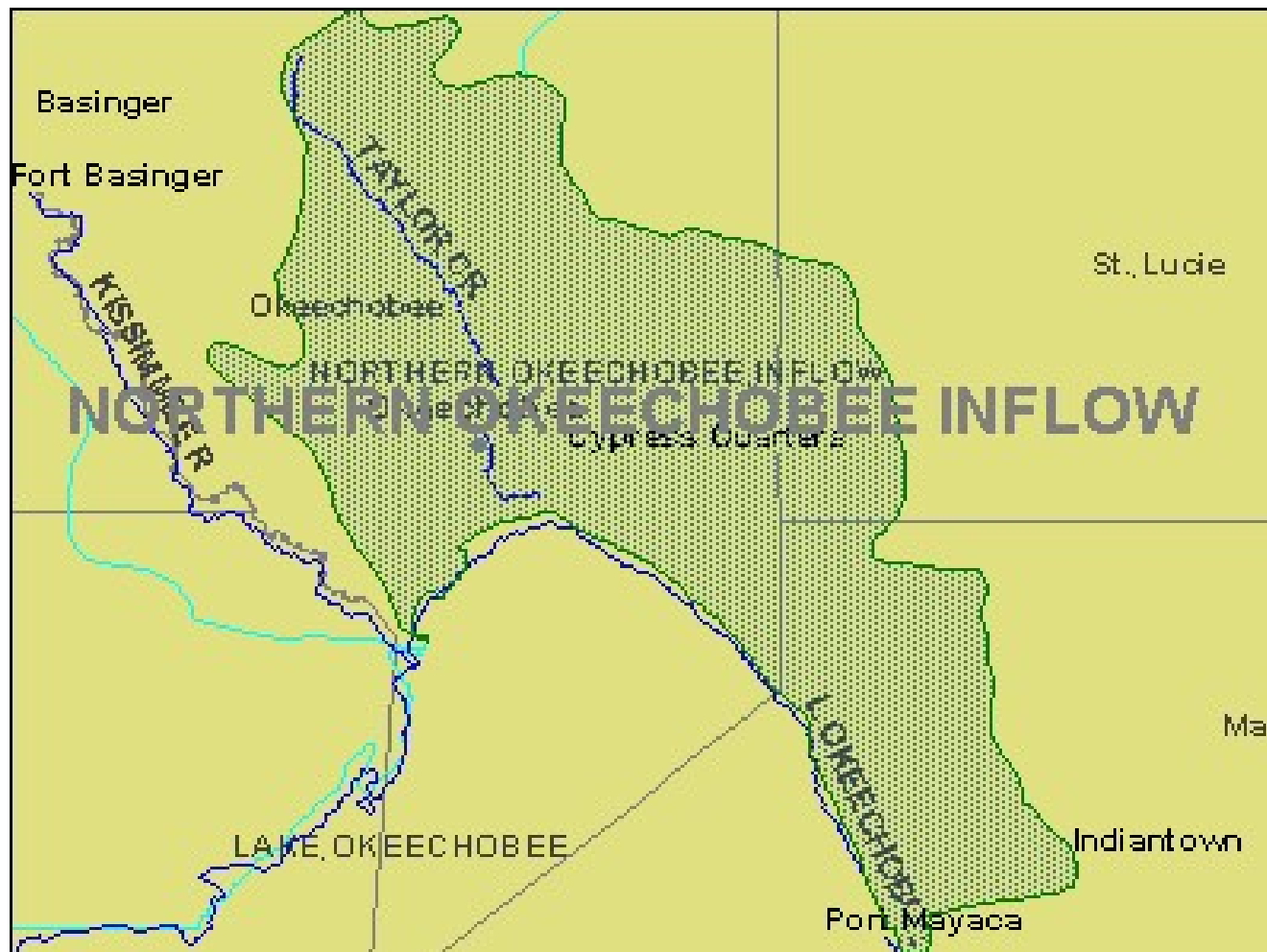
# Goals and Objectives

- SFWMD Program Goal - To reduce phosphorus runoff from the Candler site to less than 0.35 mg/l.
- MEG Goal - To develop an inexpensive, easy to implement BMP that can help to reduce P from agri-business and other non point sources.

# Program Specifics

- Interagency Selection Committee
- Funding from State Water Advisory Panel through FDEP
- Approval by SFWMD Governing Board
- Costs cover “implementation and monitoring”. Owner covers O&M
- Our Project Kickoff - January 2002.

Why? Ask the Feds at  
<http://www.epa.gov>



# What is a TMDL ?

- TMDL - Total Maximum Daily Load. Establishes the maximum amount of a pollutant that a waterbody can assimilate without causing exceedances of a water quality standard for critical and designated uses.

# Pollutant Loads

LOAD = mass of a pollutant entering the river

= Concentration x flow

(e.g., 2 lbs/gal x 1000 gal = 2000 lbs = 1 ton)

# How do we reduce phosphorus load to Lake Okeechobee ?

- Existing BMP's, such as less fertilizer, setbacks, fencing, reducing the number of active dairies.
- Emerging BMP's, such as Stormwater Treatment Areas (STA's) and upgrades to water treatment plants.
- New Technologies, such as the PhosPhilter System.



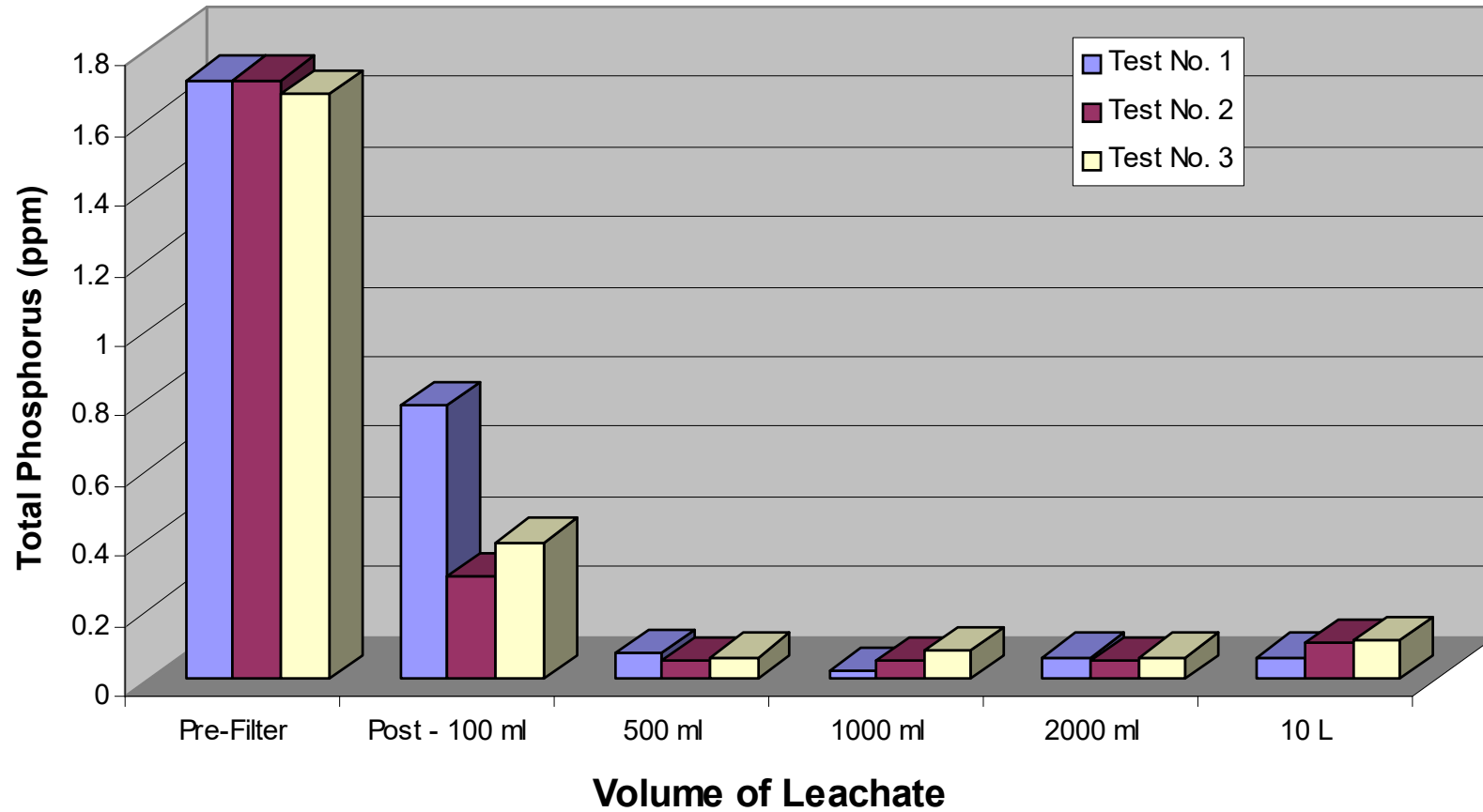
PhosPhilter is the application of iron humate (FeH) to reduce phosphorus in runoff



# What is it and how does it work?

- Patented Co-product of municipal water treatment using ferric sulfate
- 70% organic detritus, 30% iron
- Has a very high cation exchange capacity, and an affinity for phosphorus
- Current use as a fertilizer
- Research at UF indicated potential for P reduction
- Additional testing of high-P lake water by MEG

## Phos-Philter Analytical Results



# PhosPhilter™ Design Concepts

- Edge-of-farm technology
- Design as a flow-through system to encourage contact with the product
- Adjust permeability to achieve optimum flow conditions
- Easy to implement and easy to maintain
- Modular to accommodate various sizes and shapes of ditches/streams/sloughs/structures

# Gabion Basket Concept

## Gabion Specifications

### P.V.C. Coated

Mesh Opening ..... 3"x3" (7.5cm X 7.5cm)

Mesh Wire ..... 0.106" - US Gauge 12 (2.7 mm)

Spiral Binder ..... 0.106" - US Gauge 12 (2.7 mm)

Lacing Wire ..... 0.087" - US Gauge 13.5 (2.2 mm)

Zinc Coating ..... ASTM A90

P.V.C. Coating ..... Minimum Thickness 0.0150" Per Side

P.V.C. Coating ..... Nominal Thickness 0.0216" Per Side

Length ..... 6'

Width ..... 3'

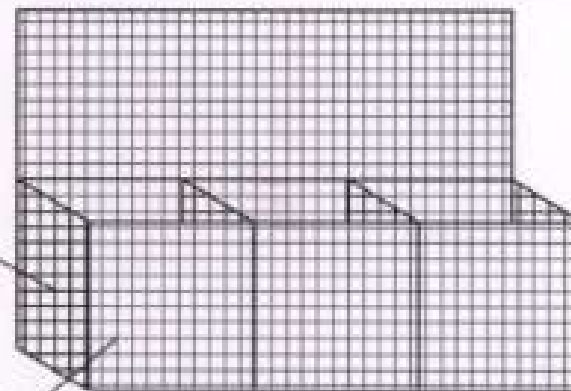
Height ..... 3'

No. of Cells ..... 2

Capacity Cu. Yds. ..... 2.0

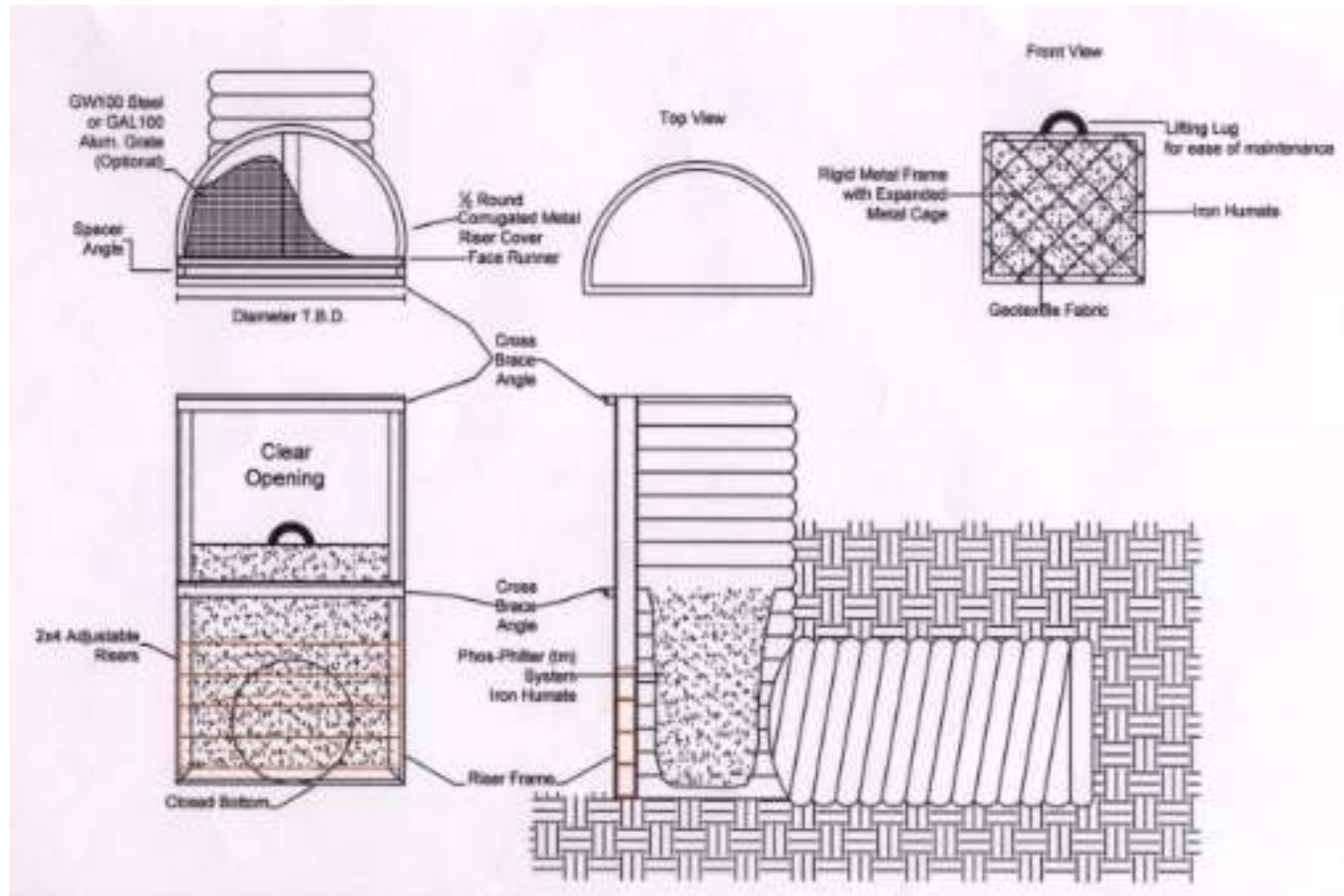
Line Baskets with  
AMOCO 4545 Geotextile  
Permittivity 150 gal/SF/min

Fill with Iron Humate



Gabion Basket 3 Cells (Typical)

# Drop Inlet Concept



# Candler Site

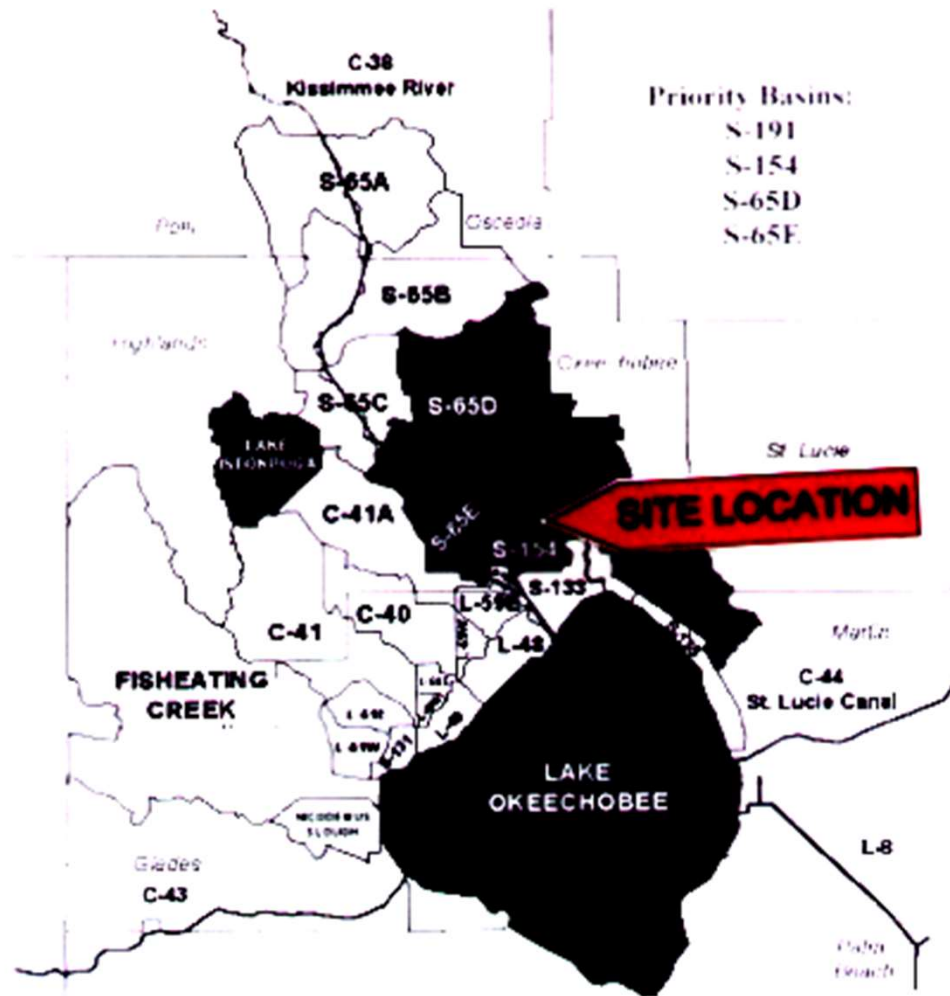


Figure 1. Lake Okeechobee Watershed Basins

# Aerial Map Candler Property





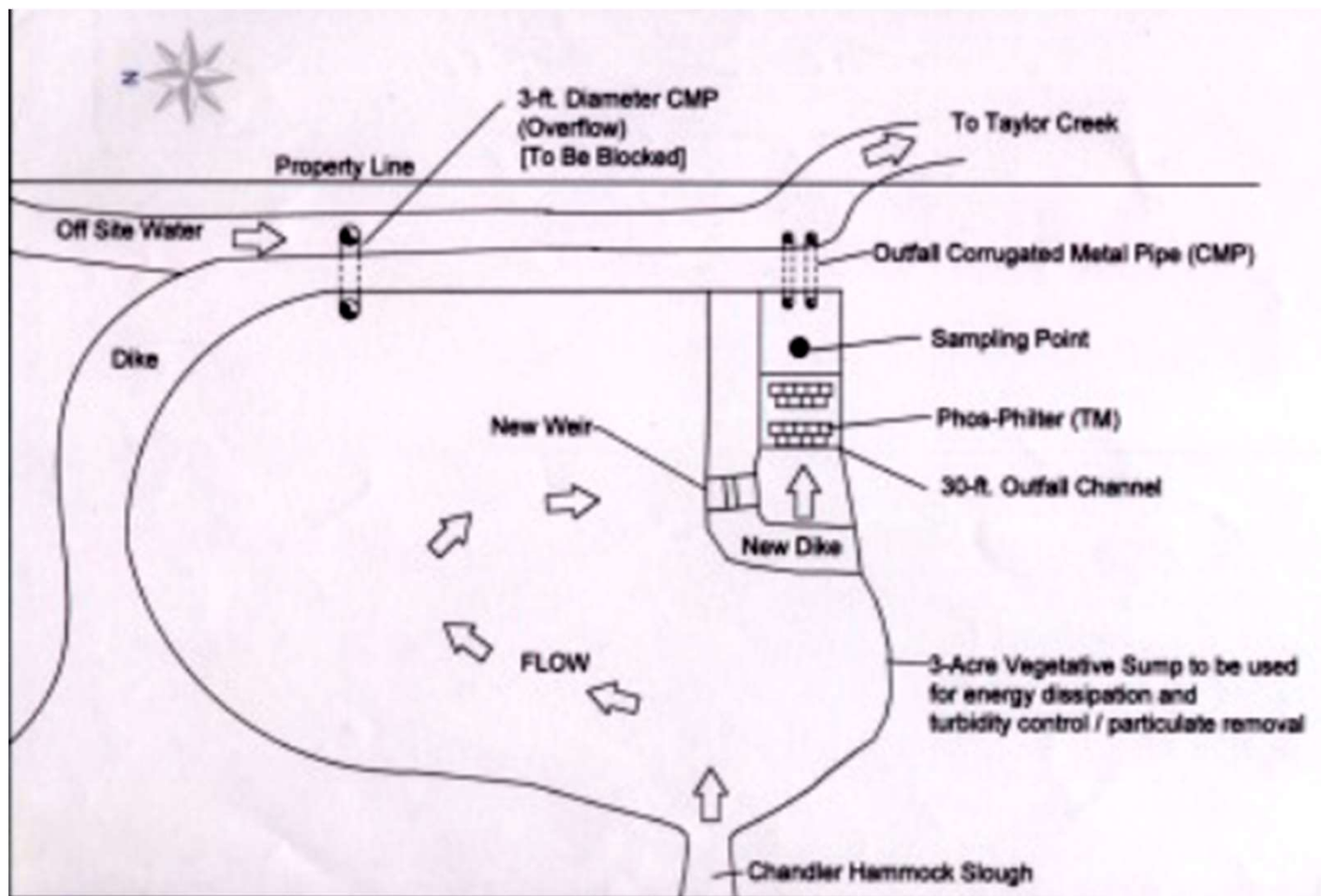
# Discharge (upstream)



# Discharge (downstream)



# PhosPhilter Deployment Plan



# Anticipated Results

- Reduced phosphorus concentrations to below 0.35 mg/l immediately. Remove 1200 - 1300 lbs/year loading.
- Required to change the PhosPhilter 1 - 3 yrs
- Cost estimate \$11.76/lb P removed (including monitoring costs)
- Acceptance by the SFWMD, other agencies, and agribusiness as an effective BMP
- Possible use as a polishing pond for STA's

Thanks ! Any Questions?

**PhosPhilter™**

