Freedom Park Wetlands
Bought, Conserved, Planned for Multiple Uses

- Impaired watershed
- Gordon River Master Plan 2002
- 50-ac parcel ID’d
  - abandoned citrus grove
  - exotic plant infestation
  - recommended site to improve water quality
- County purchased in 2004
Wetlands Improve Water Quality Naturally

- **Surface Water**
  - Plant Uptake & Storage
  - Adsorption
  - Nitrification / Denitrification
  - Decomposition
  - Burial & Soil Storage
  - Volatilization

- **Detritus**
  - Volatile Organics, Selenium

- **Sediments**
  - Annual Growth Cycle
  - Sedimentation
  - Precipitation
  - Burial & Soil Storage
  - TSS, Adsorbed Contaminants

- **O₂**

**Environment Types**
- micro-aerobic
- anaerobic
Freedom Park
Stormwater Treatment, Restoration, Recreation
Treatment Wetlands and Native Diversity

- Treats runoff from 3,000-acres
- 200 MG/yr treated before Naples Bay
- TN reduced by 41% to 0.8 mg/L
- TP reduced by 84% to 33 ppb
- Metal reduced to background levels
- Rainfall driven hydroperiod
- 2011 FSA Excellence Award Winner
Public Use Exceed Expectations
(25,000 visitors per year)

LOCAL GEM

SPEAKING OF TRAVEL
Vicke Kelber

The joy of discovering someplace new doesn’t always have to involve a long car, train, ship, or plane ride. In the past, I’ve written a few columns on some of the wondrous places right in our own backyard including Shark Valley, Loop Road, and Bird Swamp Rookery.

Following all of the rain we had earlier this year, a friend and I set out to hike through Picayune Strand State Forest. As we feared, the ground was too saturated to walk on and another option we explored was also too wet. We then decided to head for Freedom Park, at the northeast corner of Goodlette-Frank Road and Golden Gate Parkway in Naples. Visiting a park barely a stone’s throw from Coastland Mall seemed strange, but what we discovered was a little gem.
The Concept

MASTER PLAN
Gordon River Water Quality Park
Naples, Florida
Collier County

Note: All median openings and access points are conceptual in nature and subject to change per Collier County.
Constructed and Natural Wetlands Combine Treatment and Restoration

Begin: Dec 2007
Duration: 18 months
Opening: Oct 2009
Construction: $10M

Pond: 4.7 ac
Treatment Wetlands: 6.7 ac
Restored Wetlands: 11.4 ac
Constructed WWAR: 2.9 %
Hydraulic Operation Centers on Treatment of Intercepted Wet Season Flow

Total nHRT = <18 d

To River
Dry Season Operation Allows for Pumped River Flow if Available

Total nHRT = >62 d

Pump from River through Wetlands

ONDJFMAMJJAS

Dry Season
Stormwater Lake Inlet and Pump Station Extends Treatment Beyond Storm Events

- **Submersed Intake**
- **Overflow Weir Elevation Diverts Flow to Pond**
- **Pump Station Sends Water to Inlet Cascade**

1,000 gpm
Lake Provides Stormwater Detention, Pretreatment, and Passive Recreation

Cascade inflow to lake provides aeration

Lake overlook and walkway
Native Vegetation Cover Matched to Habitat Hydroperiods

Deep Zones

Water Lily, Spatterdock, Submersed Aquatic Vegetation

Shallow Marshes

Fireflag, Pickerelweed, Spikerush, Duck potato, Sawgrass
Periphyton Treatment Area–Limestone Bed Added for Phosphorus Removal

Wetland C Outlet Zone
Monthly Flows Match Precipitation Seasonality
Observed Wetland Water Level Elevations

Water Level Elevation (ft NGVD)

FP Water Level Elevation (NGVD)  Marsh Bottom Elevation  Discharge Elevation
Some Challenges

Torpedo Grass Invasion

Chronically low water levels in marsh zones
Desired Wetland Water Level Elevations

Water Level Elevation (ft NGVD)

Marsh Bottom Elevation

Desired Water Level Elevation

FP Water Level Elevation (NGVD)
Deep Zones Help Sustain Marsh Ecology During Dry Season

Submersed Aquatic Vegetation

Floating Leaved Vegetation
TP: 84% Reduction to Background

Median TP<sub>IN</sub> and Median TP<sub>OUT</sub>

- Stormwater
- Wetland 'C' Outflow
TN: 41% Reduction to Background

[Graph showing the reduction in TN from stormwater and wetland 'C' outflow over time from April 2008 to September 2013. The graph includes data points for IN and OUT with median values indicated.]

- Median TN$_{IN}$
- Median TN$_{OUT}$

Data points show a reduction trend, with stormwater generally having higher values than wetland 'C' outflow.
Removal of Non-native Plants Restored Natural Hardwood Swamp Forest Habitat
Boardwalk for Wetland Access Makes Sharing the Trail with Nature Easy and Safe

Wide Boardwalks Allow 2 People Walking Side-by-side

Height Allows Critters to Roam and Water Levels to Vary

Bobcat

~25,000 visitors annually
This model really works…
Progress in Treatment Wetlands Design


1990 2000 2010

Annual South Florida Environmental Report

Treatment Wetlands Proven Concept for Watershed Improvement

Treatment Wetlands improve

- Nutrients
- Metals
- Pathogens
- Flooding
- Ecology

To protect

- Fisheries
- Aquatic habitats
- Public safety
- Tourism
- Property values
Questions and Further Discussion

Rafael Vázquez-Burney, PE
Senior Technologist
East Region Technology Lead—Natural Treatment Systems

D 813.281.7766
M 727.366.3301

rvazque1@ch2m.com

4350 West Cypress Street Suite 600
Tampa, FL 33607