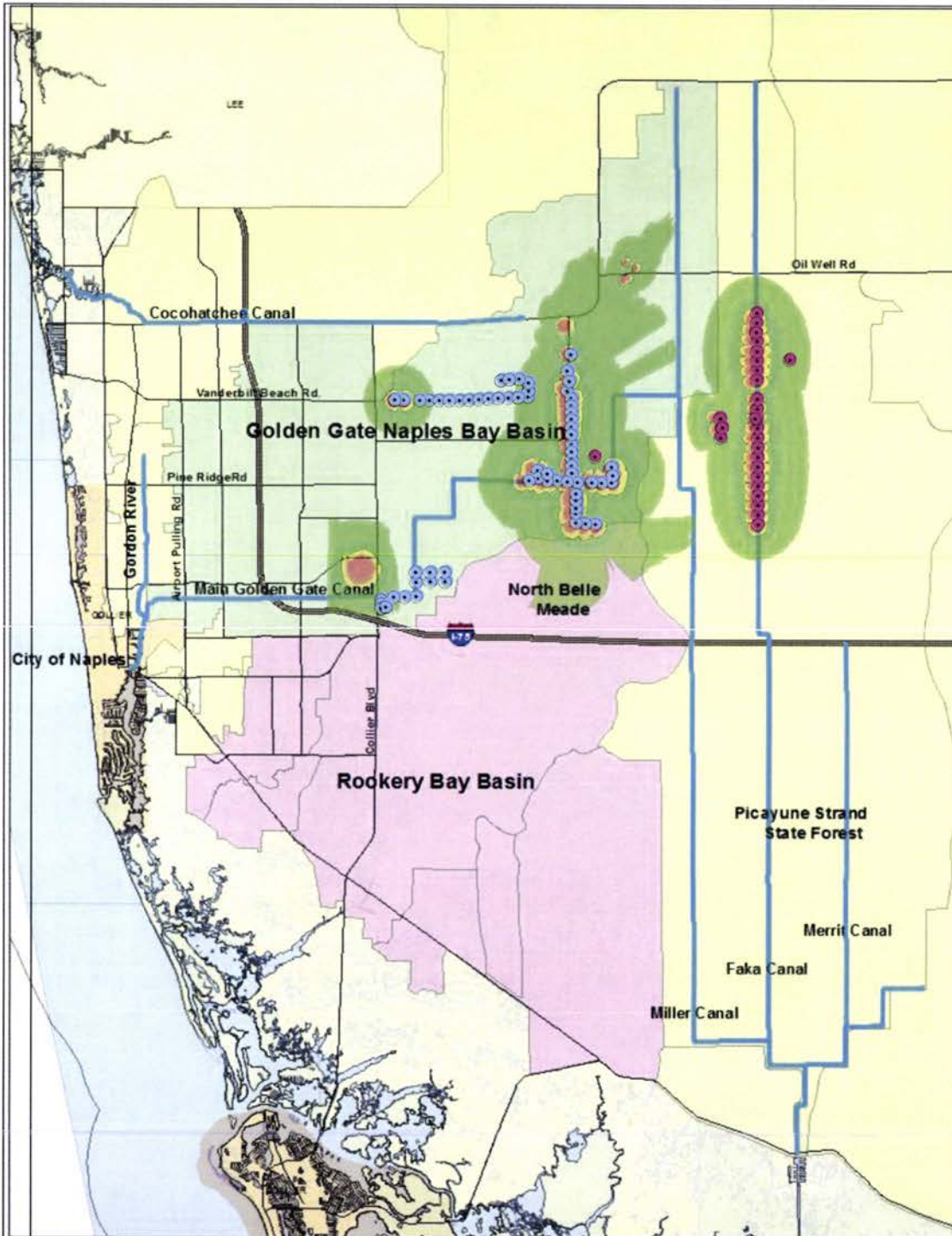




G.G.W.I.P.

Golden Gate Watershed
Improvement Program
Kick-off Workshop

Northern Golden Gate Estates Watershed



Wellfield Protection Zones

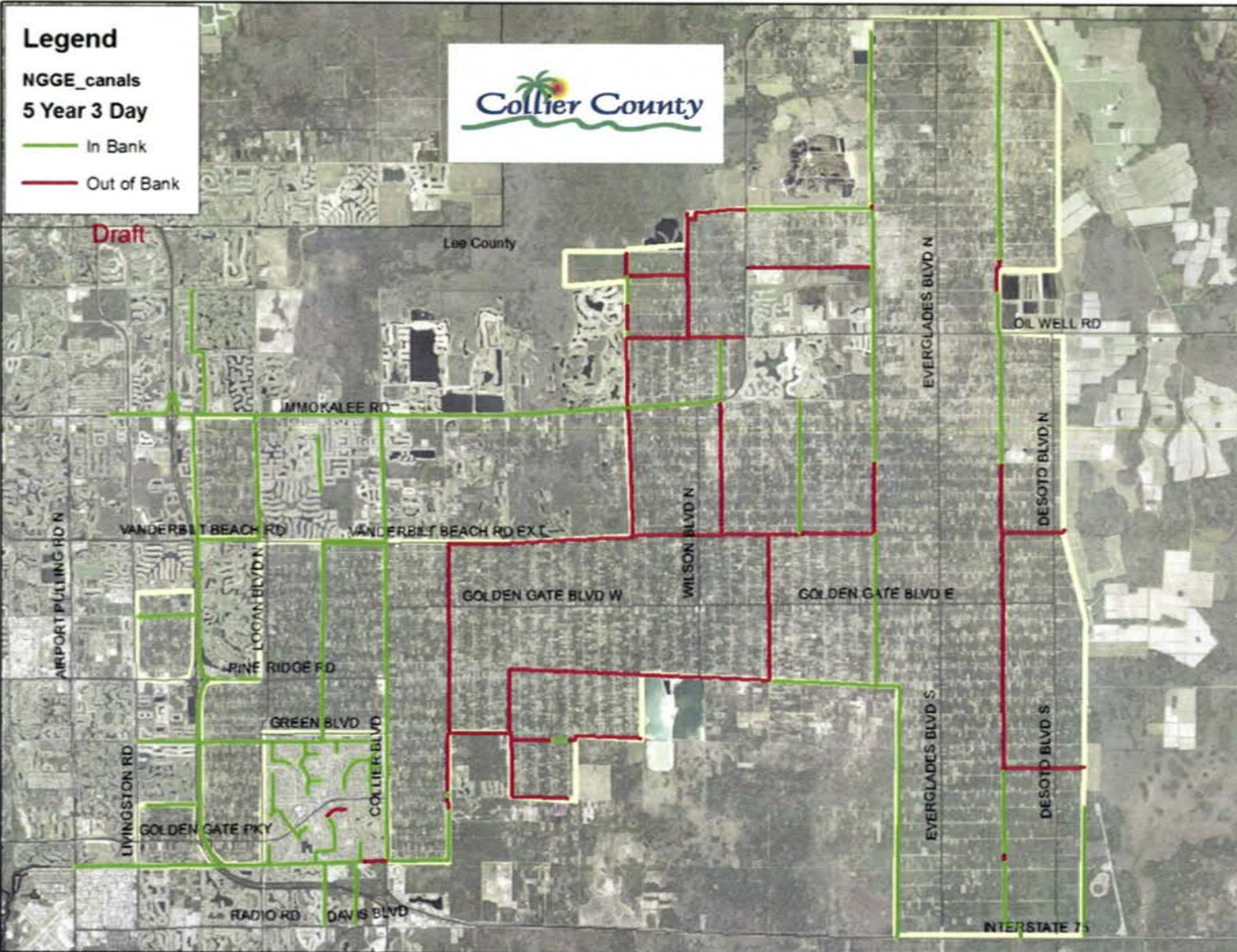
 ST/W-1	1yr
 ST/W-2	2yr
 ST/W-3	5yr
 ST/W-4	20yr

Wells

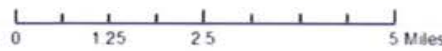
- City of Naples
- Collier County

Golden Gate Estates Canals for 5 Year 3 Day Storm Event

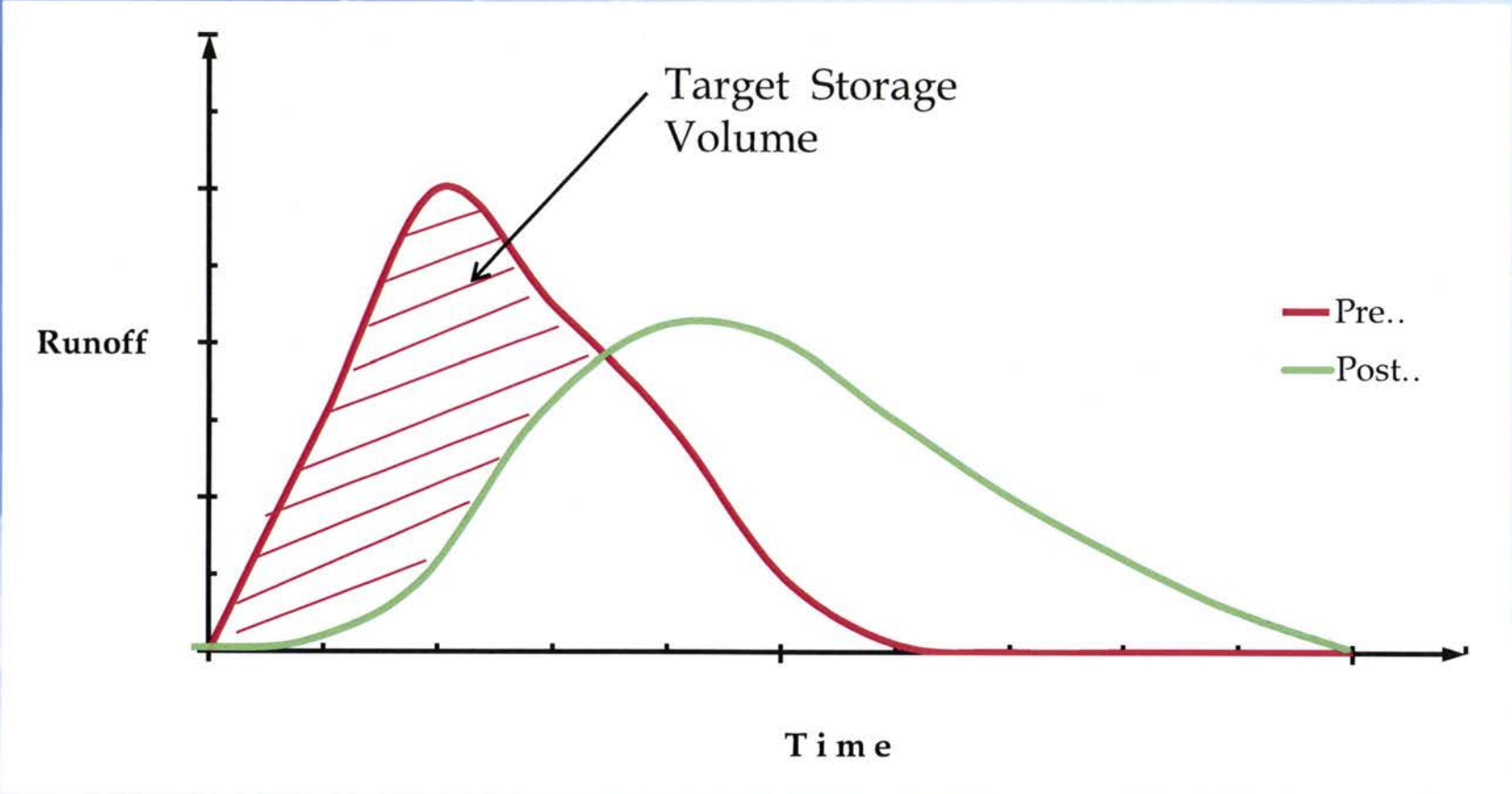
Atkins May 9, 2013



Data Source: Aerials - Collier County Property Appraiser
Created by GIS GMD PR / Stormwater Environmental
G:\GIS\MapDocs\NGGE_Canals.mxd
G:\Images\MapDocs\Aerials\12\NGGE_Canals.pg
Date: 07/12

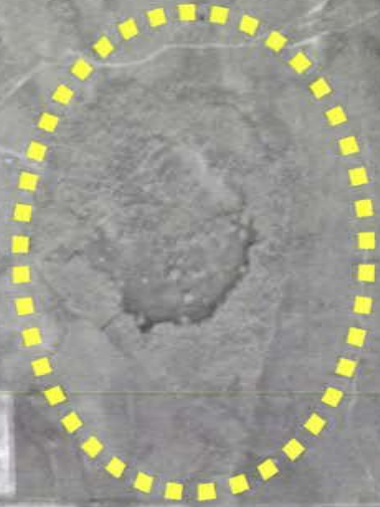


Need for Additional Watershed Storage



12-14-62

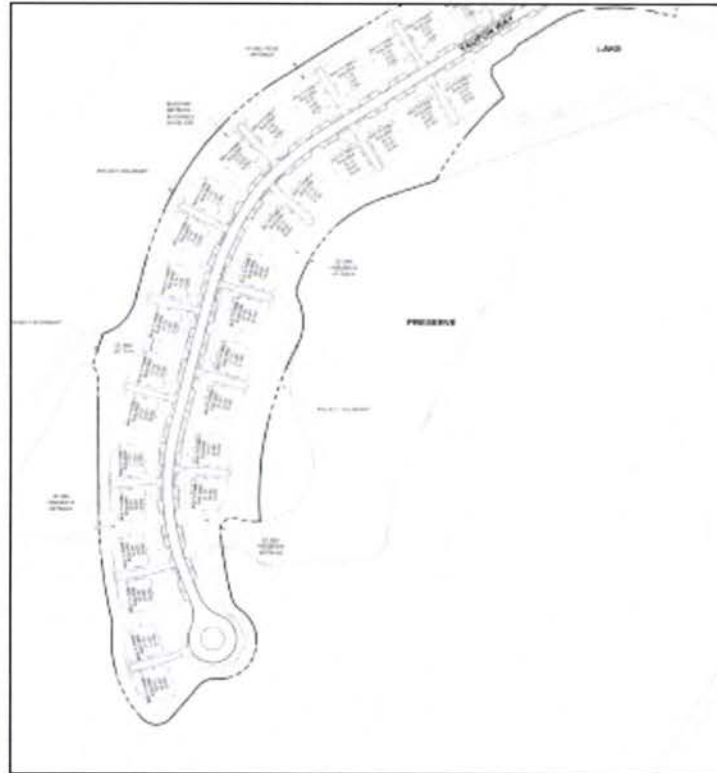
DSM-100-126

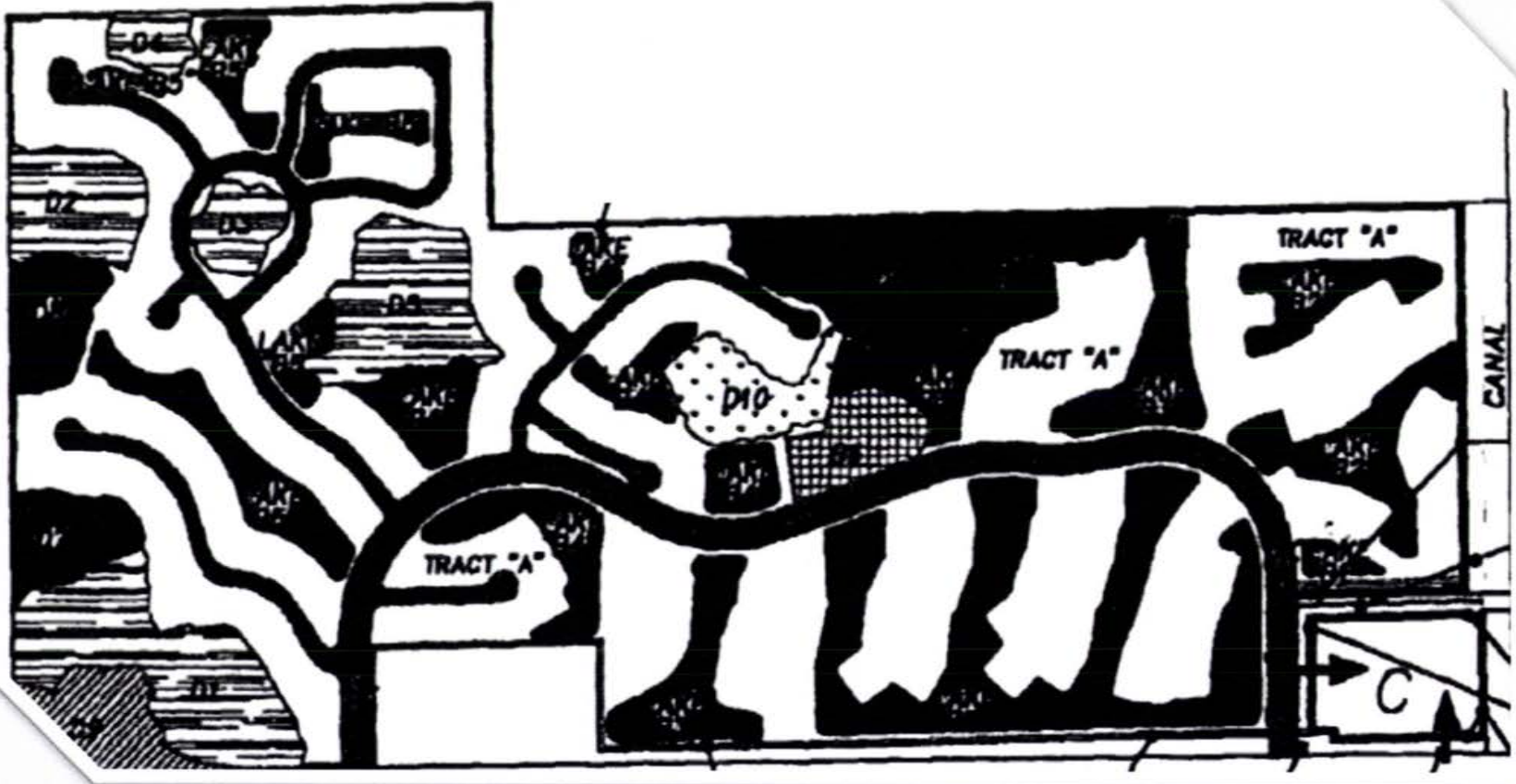


Winchester Head : Pre-Plat

Current Day Plats

- Current regulations protect the resource and the environment
- Current designs set aside conservation tracts and easements designed by a team of professionals





If We Could Do it Over

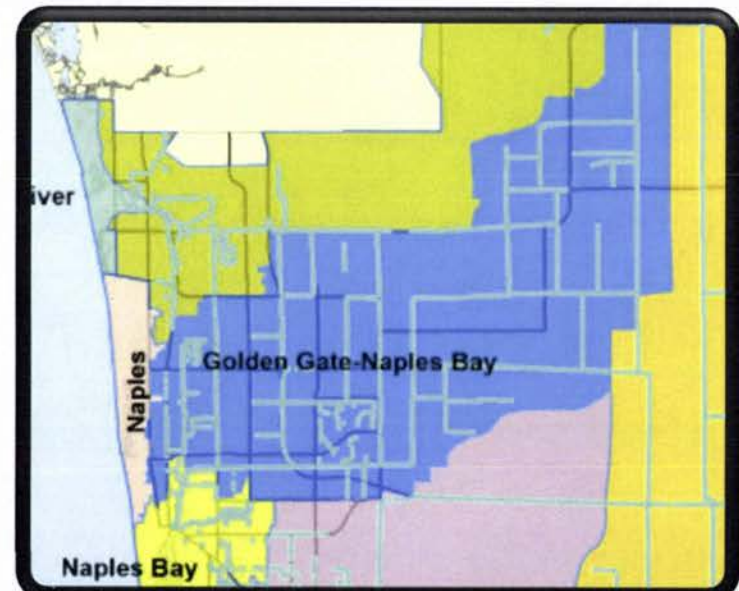
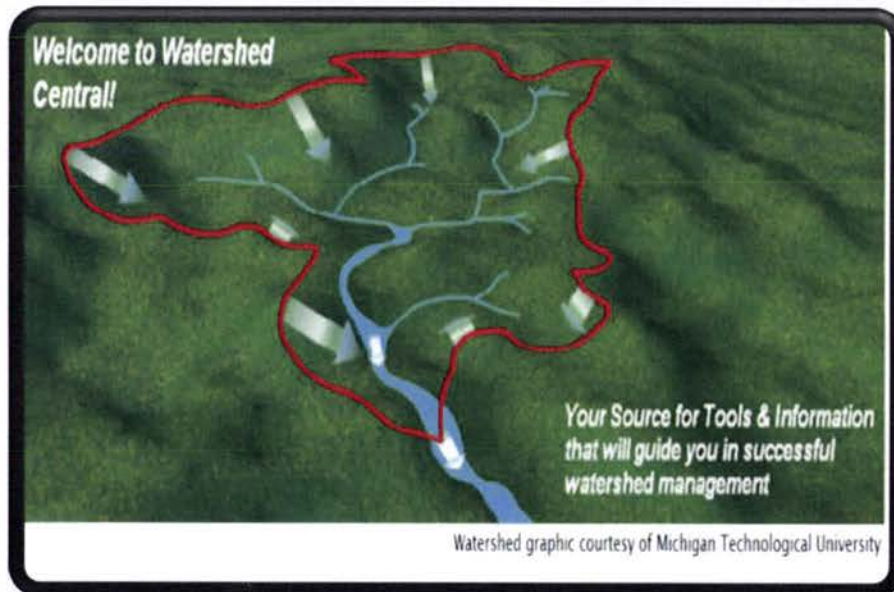


- If GGE was designed today it would be much different
 - Habitat preserved
 - Canals would be water features, cascading downstream
- Roads would have been designed around depressional areas instead of through

**We want to take advantage of
the environment rather than
ignoring it's importance!**

What is a Watershed?

A watershed is an area of land in which all of the water that enters it, drains into a common waterbody. Also known as a drainage basin, it can be thought of as a "funnel" that collects surface water and ground water and drains it into a single stream, lake, ocean, or other reservoir. Hills and ridges usually separate one watershed from the next. (FDEP)



Watershed Improvement Program

- **Assess Watershed Characteristics and Functions**
- **Identify Benefits from Improving the Watershed functions**
- **Specify possible non-structural and structural alternatives to improve watershed functions**
 - **WMP Initiatives #6, #8, #9**
 - **WMP Projects: NGGE Flowway, North Belle Meade Spreader Swale, Upper Golden Gate Estates Canal Weir Construction**
- **Commit to Projects and include in 5-year Budget**



Watershed
Management Plan
(WMP)

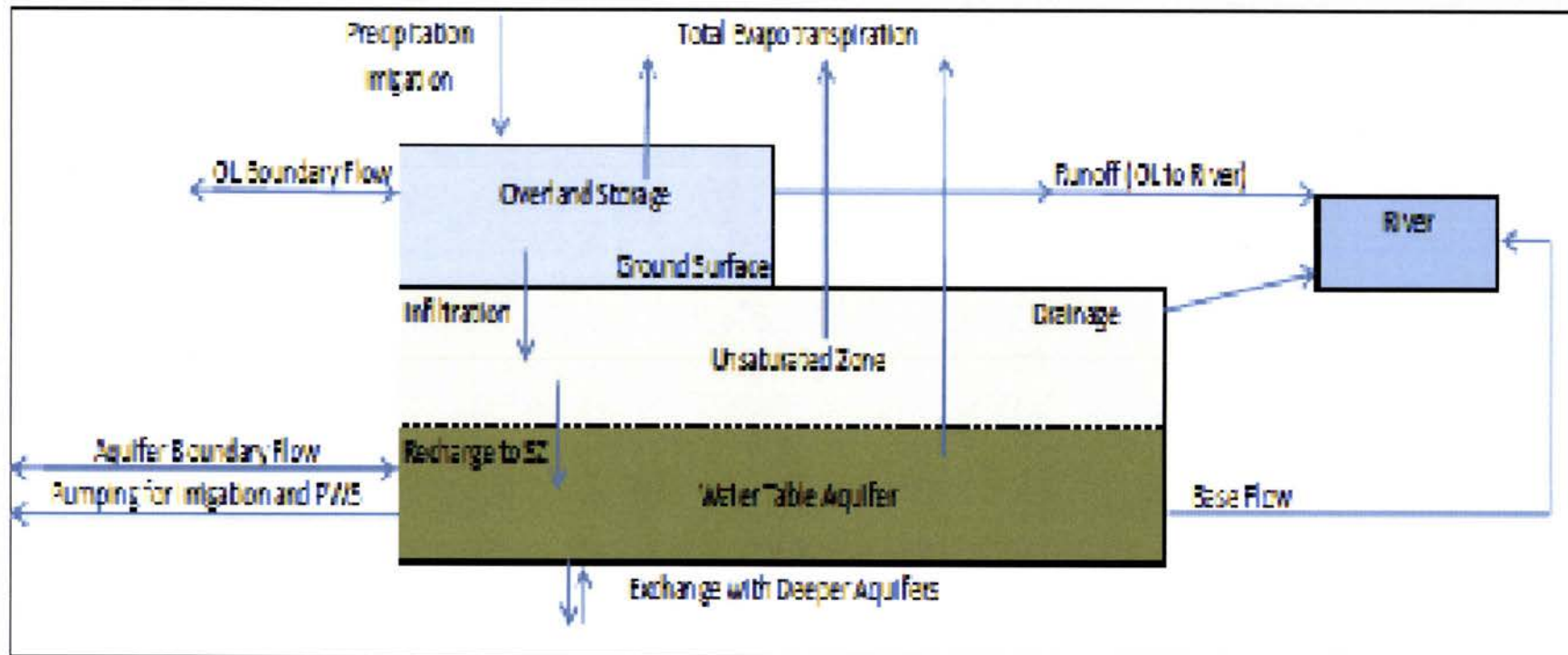
GGWIP

Watershed Management Plan (WMP)

Modeling the Water Budget

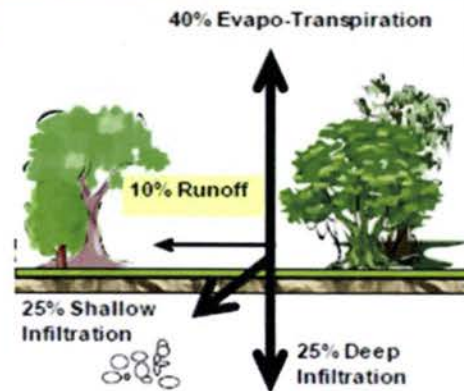
Schematic of MIKE SHE Model

Assess Watershed Characteristics and Functions:
Data Collection and Analysis



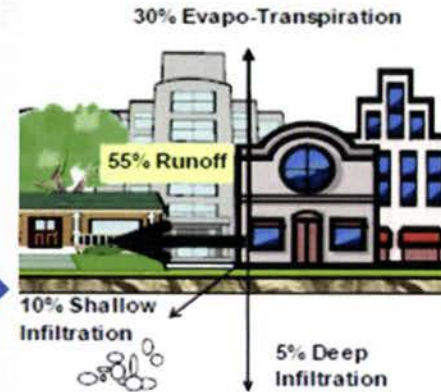
Model allows us to evaluate future projects

WMP: Impacts of Development

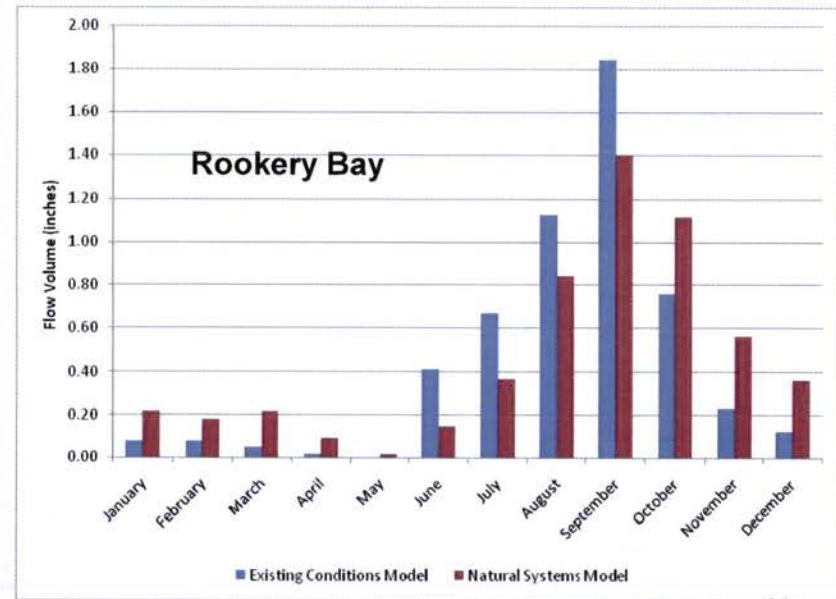
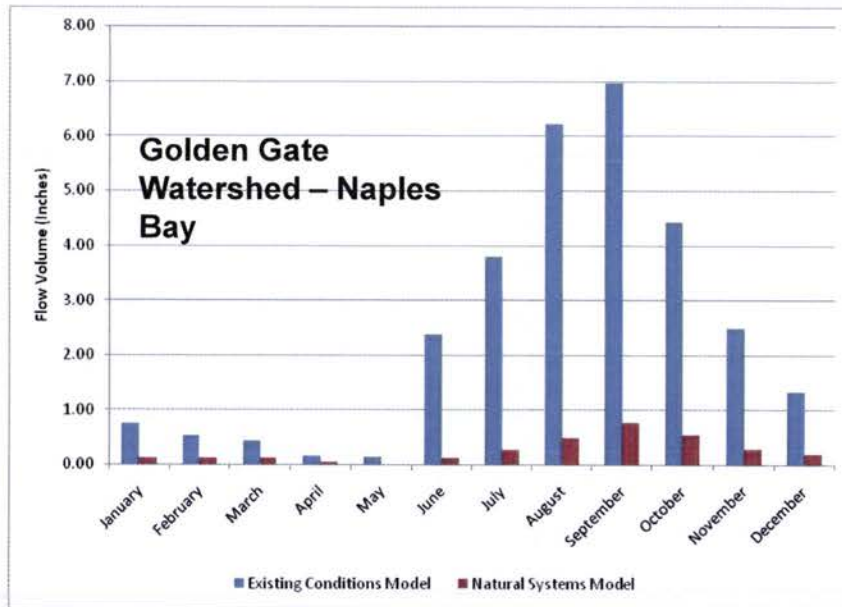


Natural Ground Cover

Watershed Development



75-100% Impervious Surface



Watershed Management Plan Estimates

Change in Watershed Area

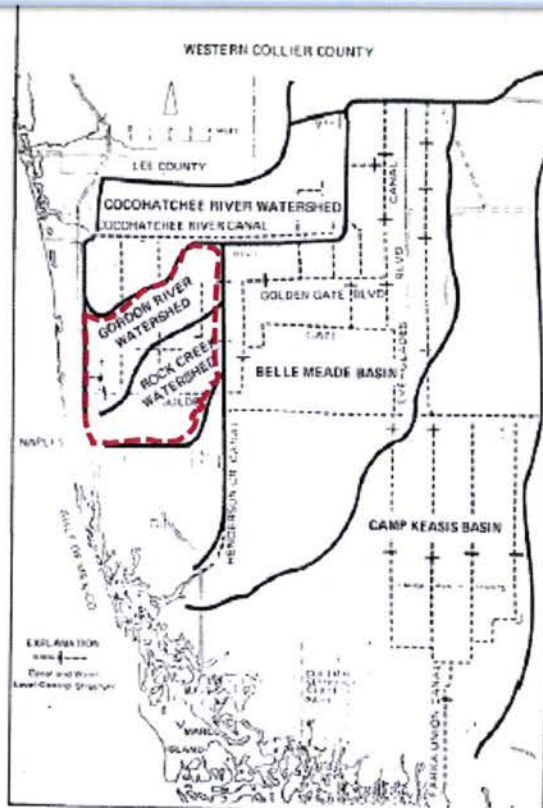


Figure 1-6
Pre-Canal Construction Basin Boundaries in Western Collier County
(From Figure 2.3 in BCE 1974)

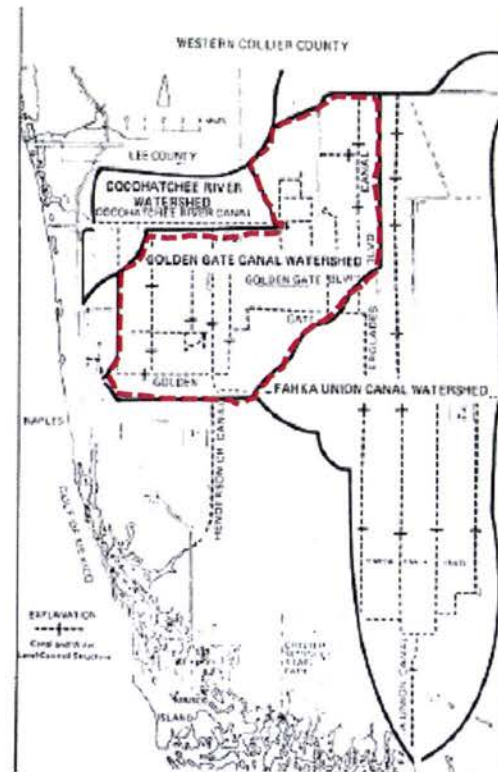


Figure 1-7
Post-Canal Construction Basin Boundaries in Western Collier County
(From Figure 2.2 in BCE 1974)

Golden Gate-Naples Bay Watershed Water Budget (WMP)

Assess Watershed Characteristics and Functions:
Data Collection and Analysis

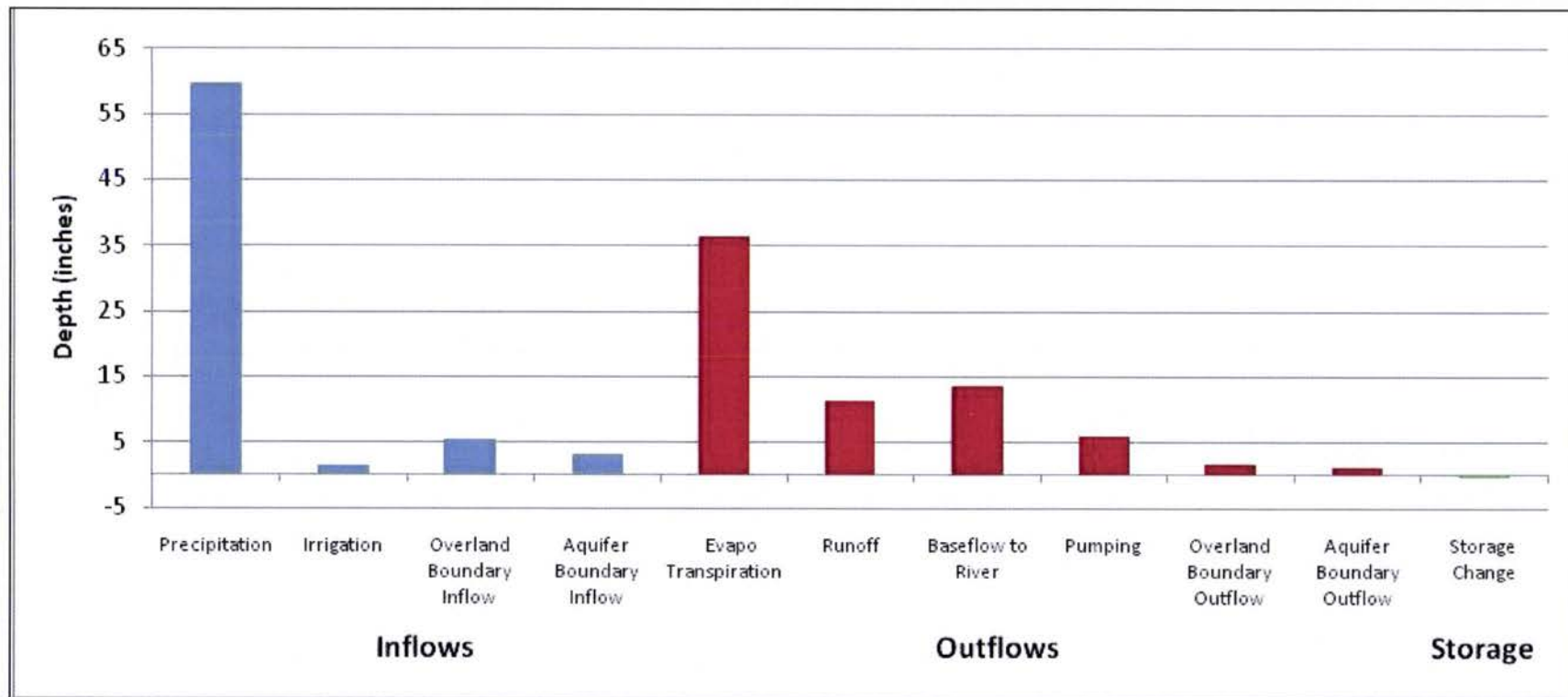


Figure 2-11. Average Water Year Budget–Golden Gate-Naples Bay Watershed

Watershed Characteristics/Functions

What happens to the Rainfall?

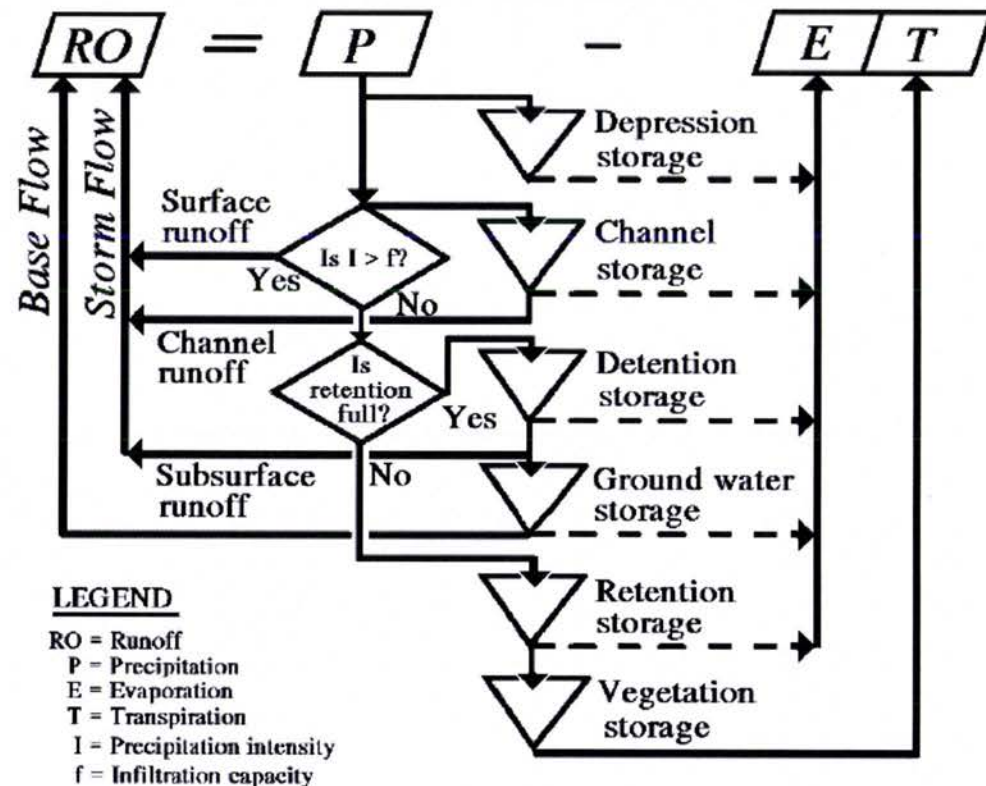
- **Hydrological Functions**

- Collection of Rainfall
- Storage of Rainfall
- Discharge of Runoff to Receiving Water Body

- **Ecological Functions**

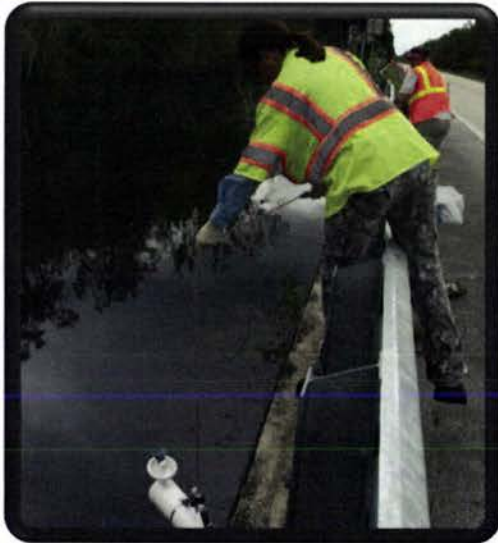
- Change of Chemical Characteristics of Water (Water Quality)
- Habitat characteristics (e.g., wetlands)

Watershed Budget



Watershed Functions (Peter E. Black)

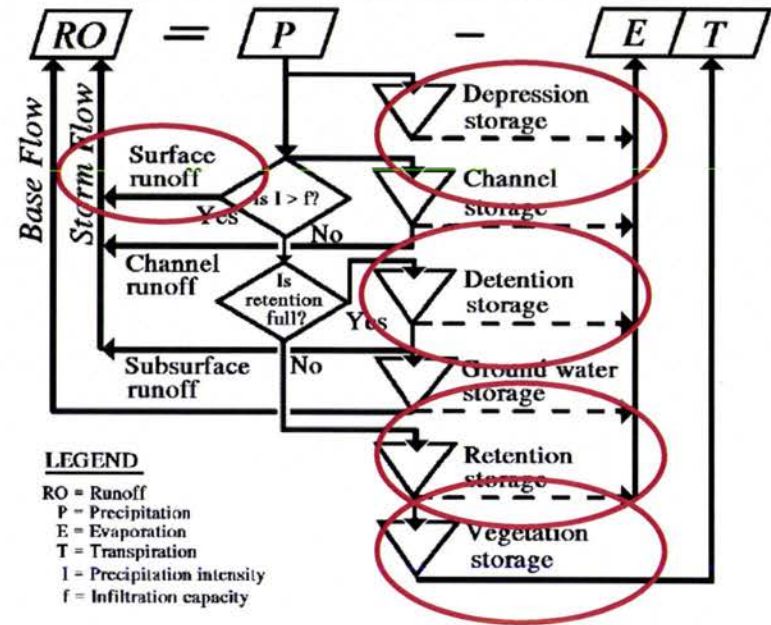
Water Quality Benefit



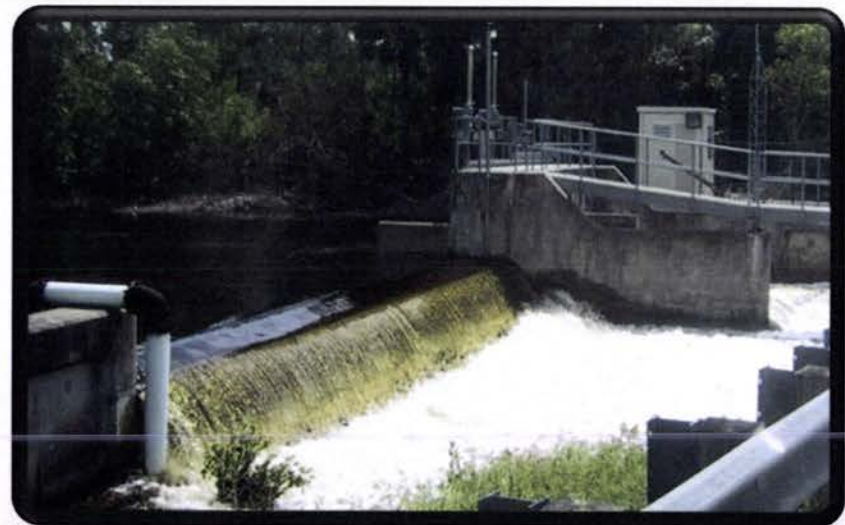
Physical,
Chemical and
Biological
Parameters



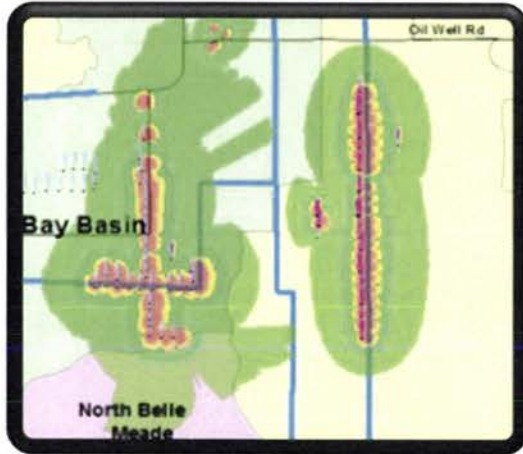
Water Budget/Functions



Excess Freshwater to Naples Bay



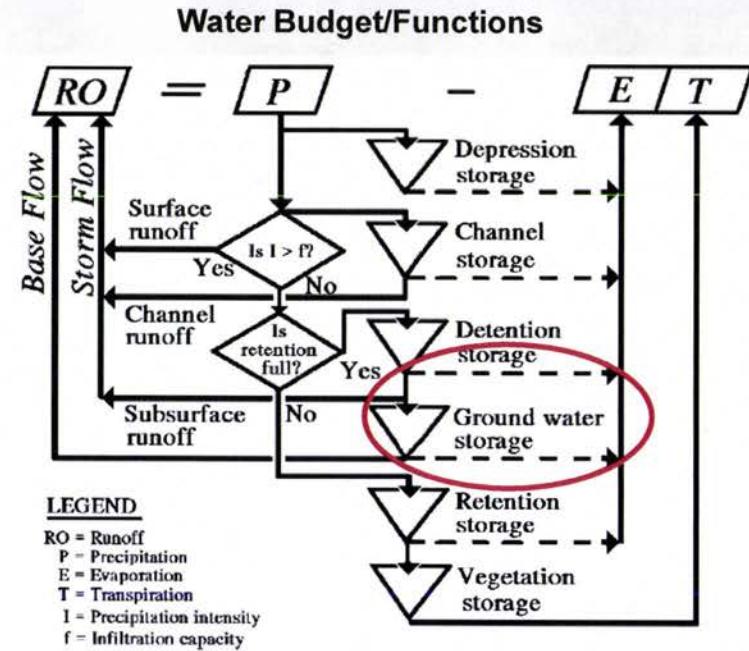
GW Recharge Benefit



City and County Wellfields



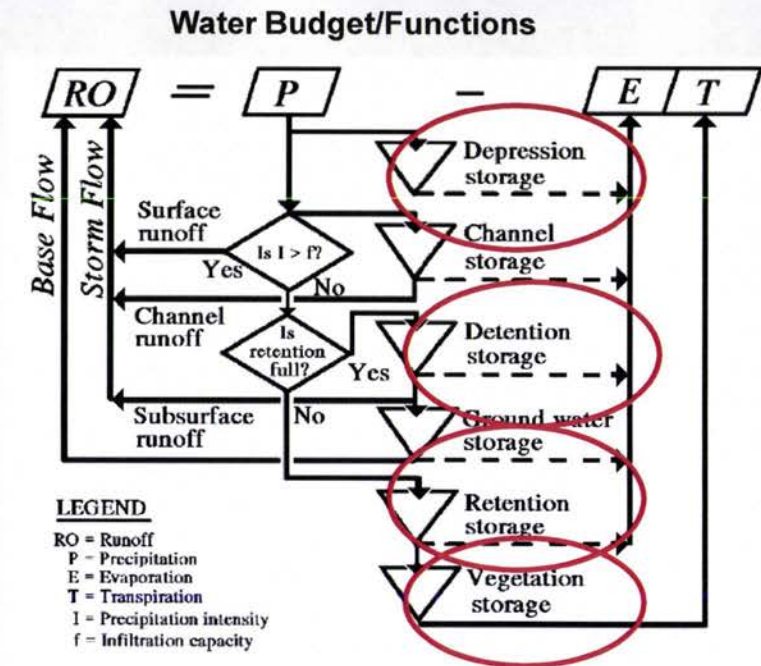
Private Wells



Increase GW levels to reduce threat of wildfires

Habitat Restoration Benefit

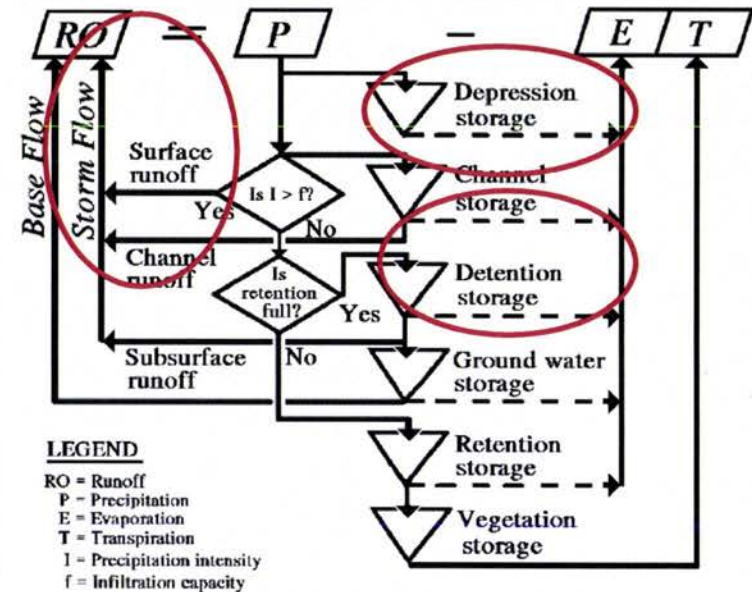
- Preservation and Restoration of Wetland Systems
- Increasing Wetland Habitats
- Recognize benefits to Upland Systems



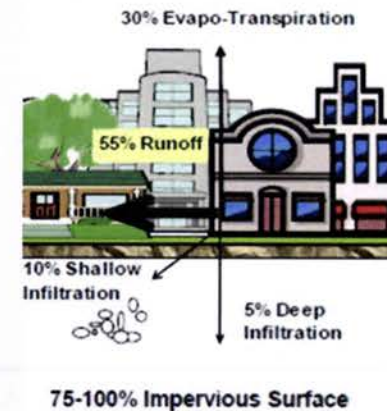
Flood Protection Benefit



Water Budget/Functions



Changes to Base Flood Elevation (BFE) due to future development



Initiative #6 Verification of No Floodplain Impact



Initiative 6: Verification of No Floodplain Impact

It is critical that future development discharges are controlled such that the extent of the regulatory floodplain is not increased at any point along potentially affected canal systems,

It is critical that future development discharges are controlled such that the extent of the regulatory floodplain is not increased at any point along potentially affected canal systems. This is because floodplain impacts would have implications associated with the National Flood Insurance Program.

It is recommended that the County implement the requirement that each development permit include a check of no impact upstream or downstream for the 100-year/72-hour design storm event.

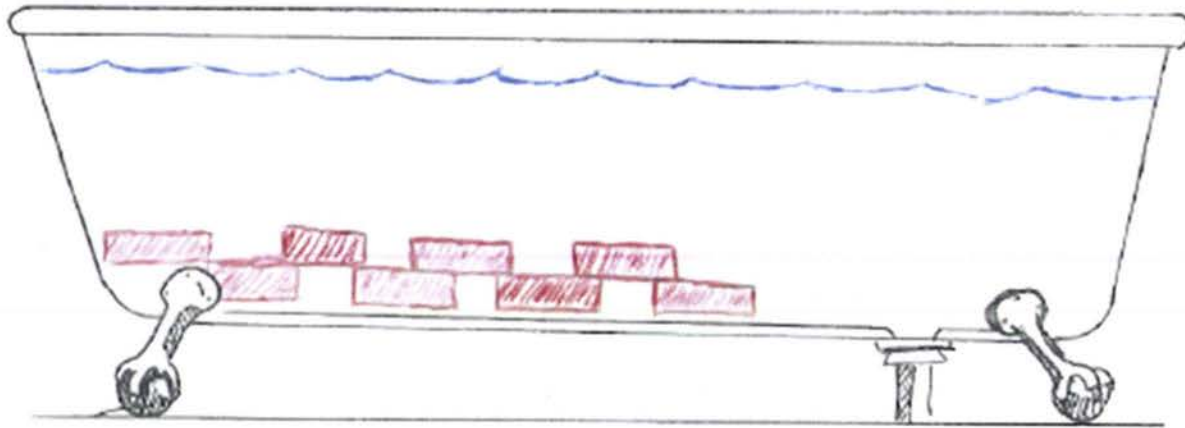
Tools that can be used for this purpose include a) the Tomasello computer model that was developed by the County for floodplain management purposes, or b) a version of the existing conditions model (ECM) but modified using a smaller grid size, i.e. 500 ft to better define local conditions.

It should be noted that the application of this recommendation would also require changing the LDC Section 3.07.02 from referencing "surrounding properties" to "any properties upstream or downstream" of a development. It is also important to adopt this initiative jointly with SFWMD.

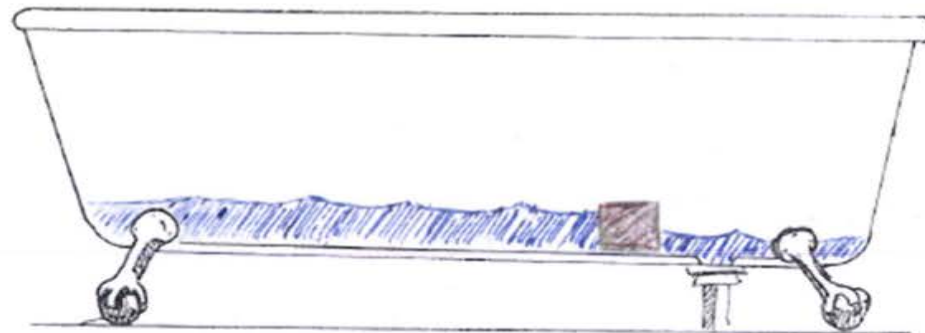
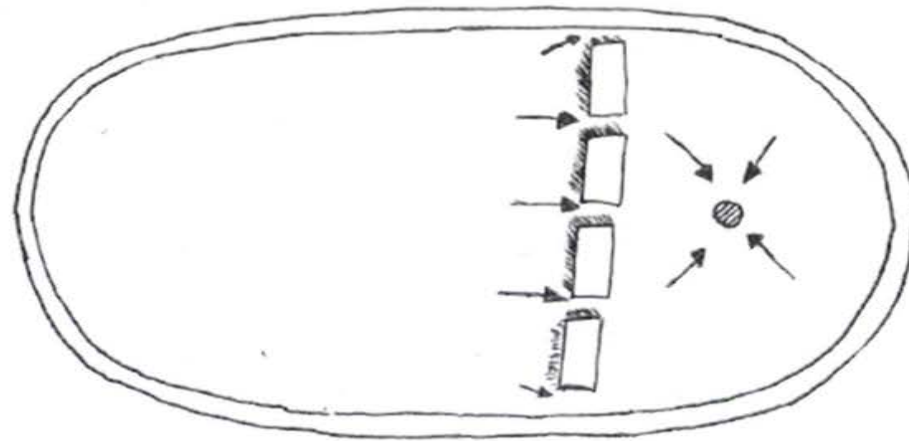
- The FEMA model then and now
- Infrastructure has its limitations
- GGE is a floodplain
- Minimize negative impacts maximize positive impacts to the watershed



Displacement is the Key



We Also Need to Avoid Building a Dam



What will we have done at build-out?



PROJECT AREA



Total # of lots = 23,735 within the project area

YES THAT WAS 23,735 LOTS!!



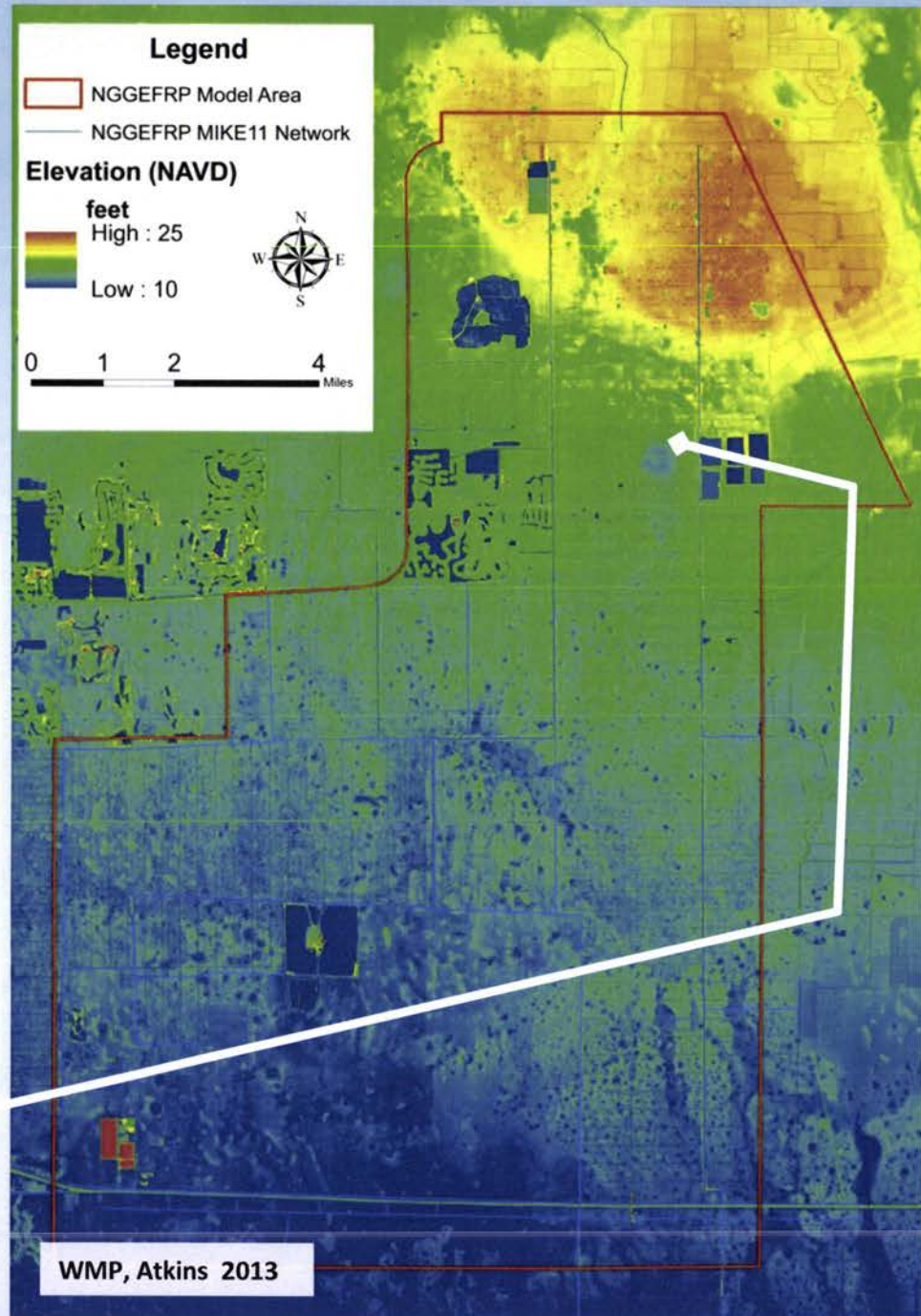
Why Golden Gate Estates?

- High potential for impact due to limited water management system
- Greatest potential for growth to full build-out

Future Implications

- Allowed amount of fill affects the predicted BFE (more fill = greater change to BFE)
- Considerations for watershed management plan
- Requirements for size/condition of buildable lots
- Transferable fill rights

NGGE Conceptual Planning

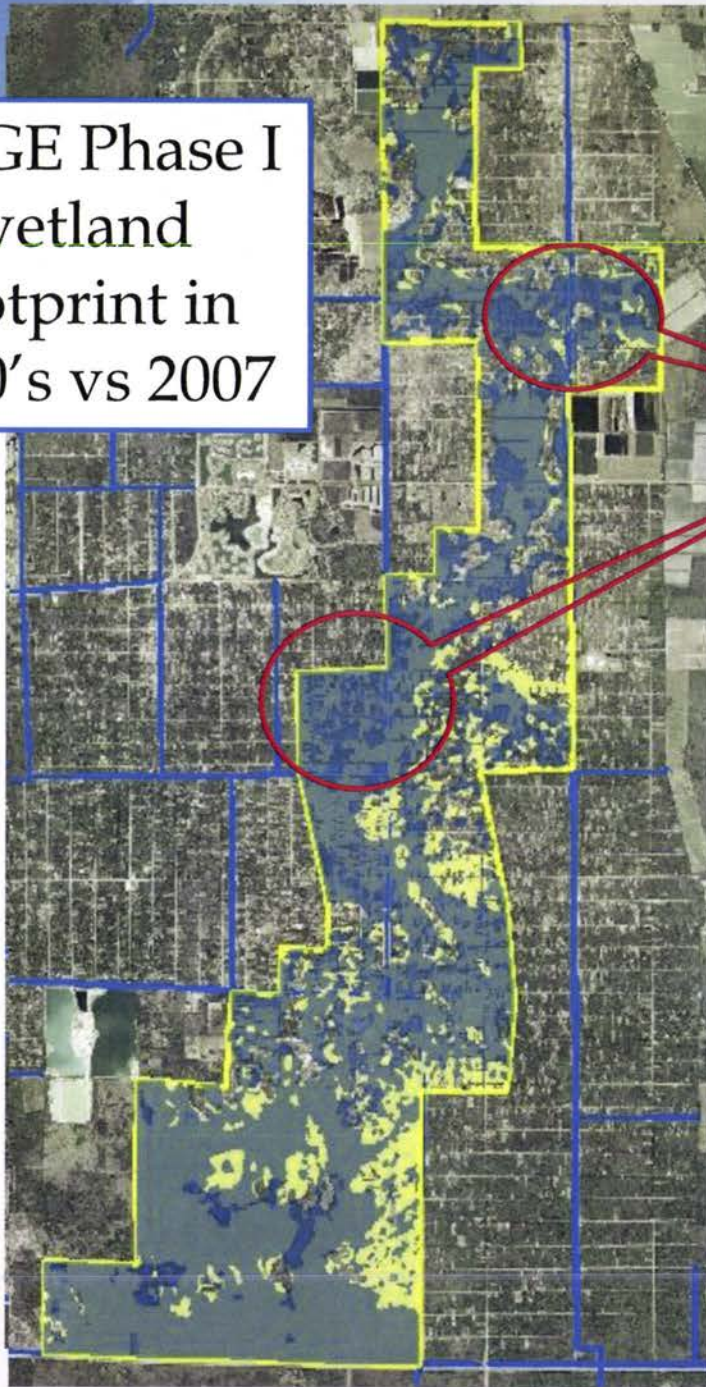


Recently Completed Efforts

Belle Meade Area Stormwater Management Master Plan	2006
Horsepen Strand Conservation Area Feasibility Study (Phase 1)	2008
Collier County Watershed Management Plan	2011
NGGE Flowway Restoration Study (Phase 2)	2013
Culvert Installation	2014




What's Next For NGGE ?

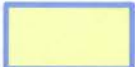

NGGE Phase I
wetland
footprint in
1940's vs 2007



PHASE I : HORSEPEN STRAND CONSERVATION AREA (HSCA)

Areas with
High loss

-  1940's wetland footprint
-  2007 wetland footprint
-  Lost wetlands

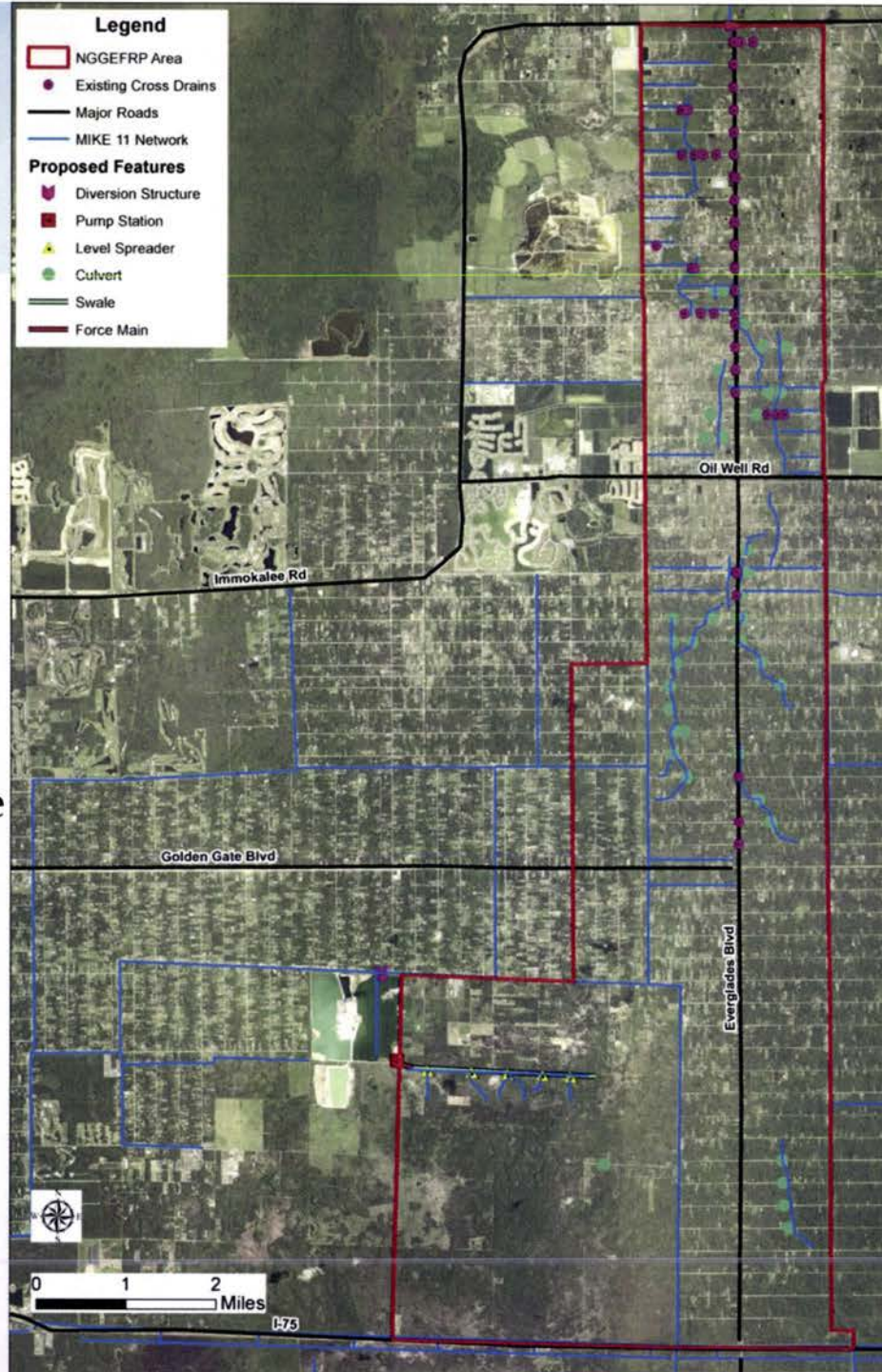
-  2007 wetland footprint
-  1940's wetland footprint

NGGE Problem Statement

- ❑ Construction of the Golden Gate Estates canal network and residential roads **fractured the connectivity of wetland systems** in the north Golden Gate Estates area.
- ❑ Roadside swales and ditches now divert stormwater runoff and overland **surface water flow directly into the canal system.**
- ❑ The result is a loss of wetland hydrology and an **increased volume of discharge to Naples Bay.**
- ❑ The effect includes **less recharge to the surficial aquifer system** which is the primary source of drinking water for Collier County and the City of Naples.

NGGE Culvert Installation 2014

- Blue circles are the new culvert locations (42)
- Red circles are previously existing culvert locations



- Based on Phase 2 of the Comprehensive NGGE studies funded by DEP and SFWMD

- New culvert installation funded by Collier County and SFWMD/BCB

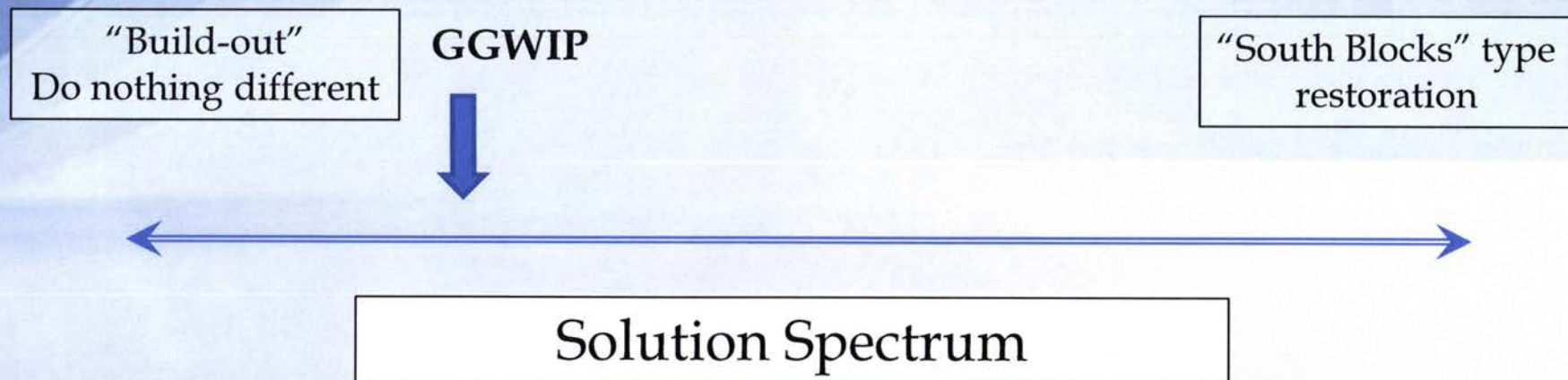
Conceptual Planning Goals

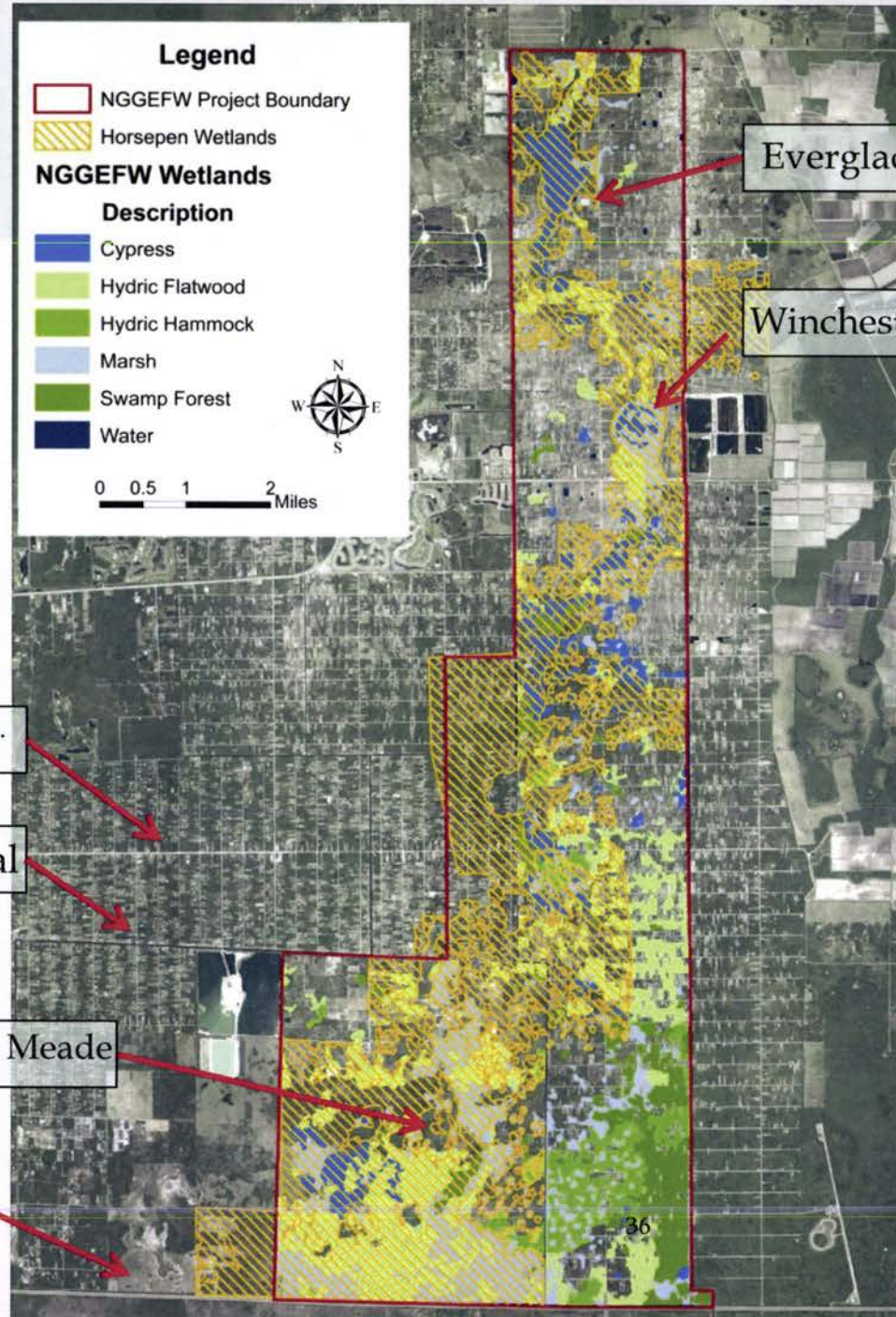
1. Identify **potential hydrologic adjustments** to the existing system utilizing the historic flowways located within the 34-square mile area.
2. Improve surface water conveyance **utilizing existing low-lying areas**.
3. **Enhance connectivity** of low-lying areas.
4. Optimize **utilization of remnant sloughs and wetland areas** such as Winchester Head, Horsepen Strand, and Winchester Strand, for better surface water management.

Conceptual Planning Goals

(cont.)

5. **Redirect surface water flows** to low lying areas reducing the burden placed on the canal system.
6. **Reduce flows to Naples Bay.**
7. **Enhance aquifer recharge** for public water supplies.





Everglades Blvd.

Winchester Head

Golden Gate Blvd.

GG Main Canal

North Belle Meade

I-75

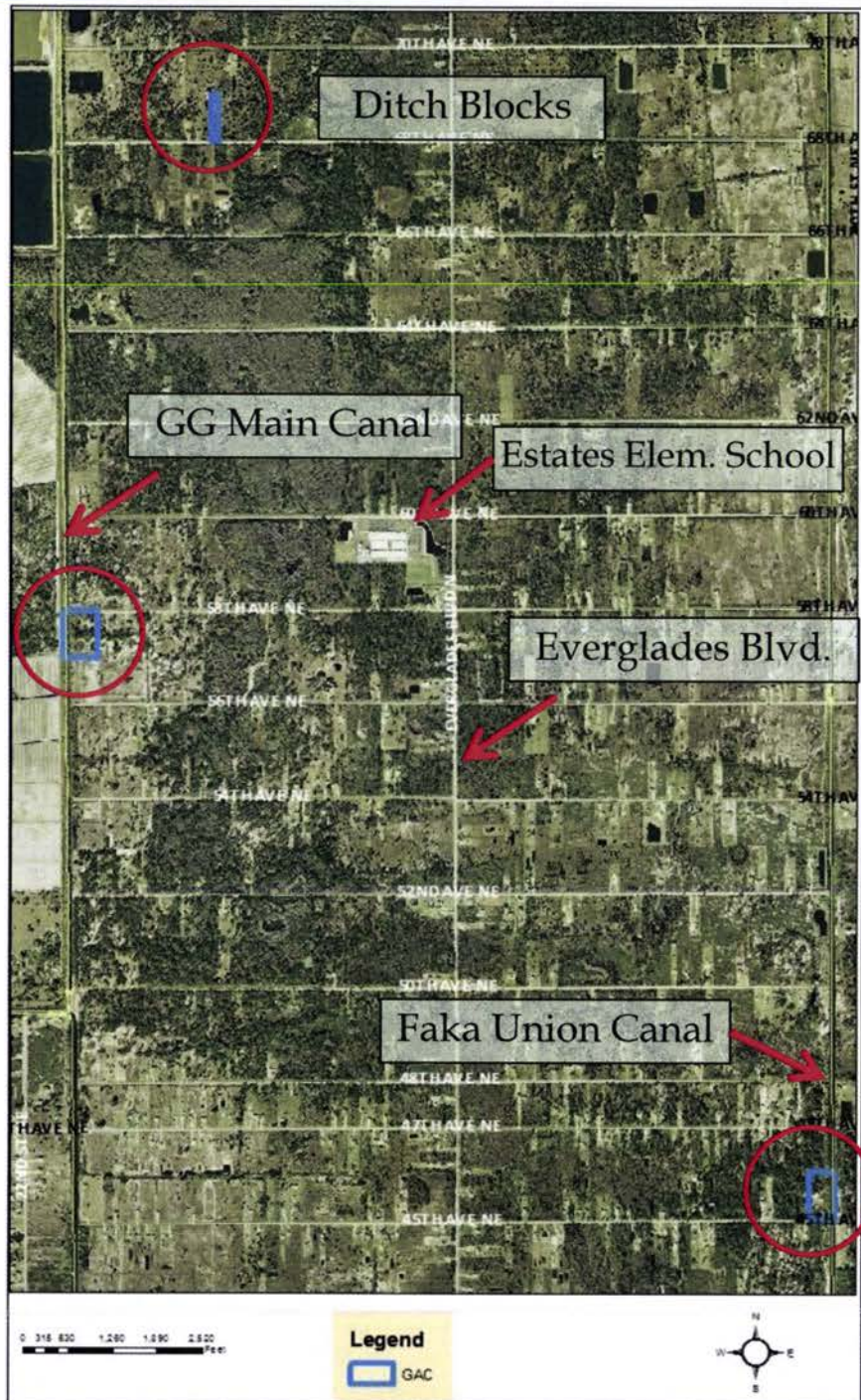
NGGE Wetland Systems

Possible Solutions

1. Redirect flows using **ditch/swale blocks and additional culverts** to provide connectivity within the wetland system re-establishing historical flow patterns.
2. Increasing small sections of **canal areas (scaloping)** to gain additional capacity.
3. Designate an area as a **mitigation area** and create incentive programs to obtain properties and to generate funds to implement the project

NGGE Properties of Interest

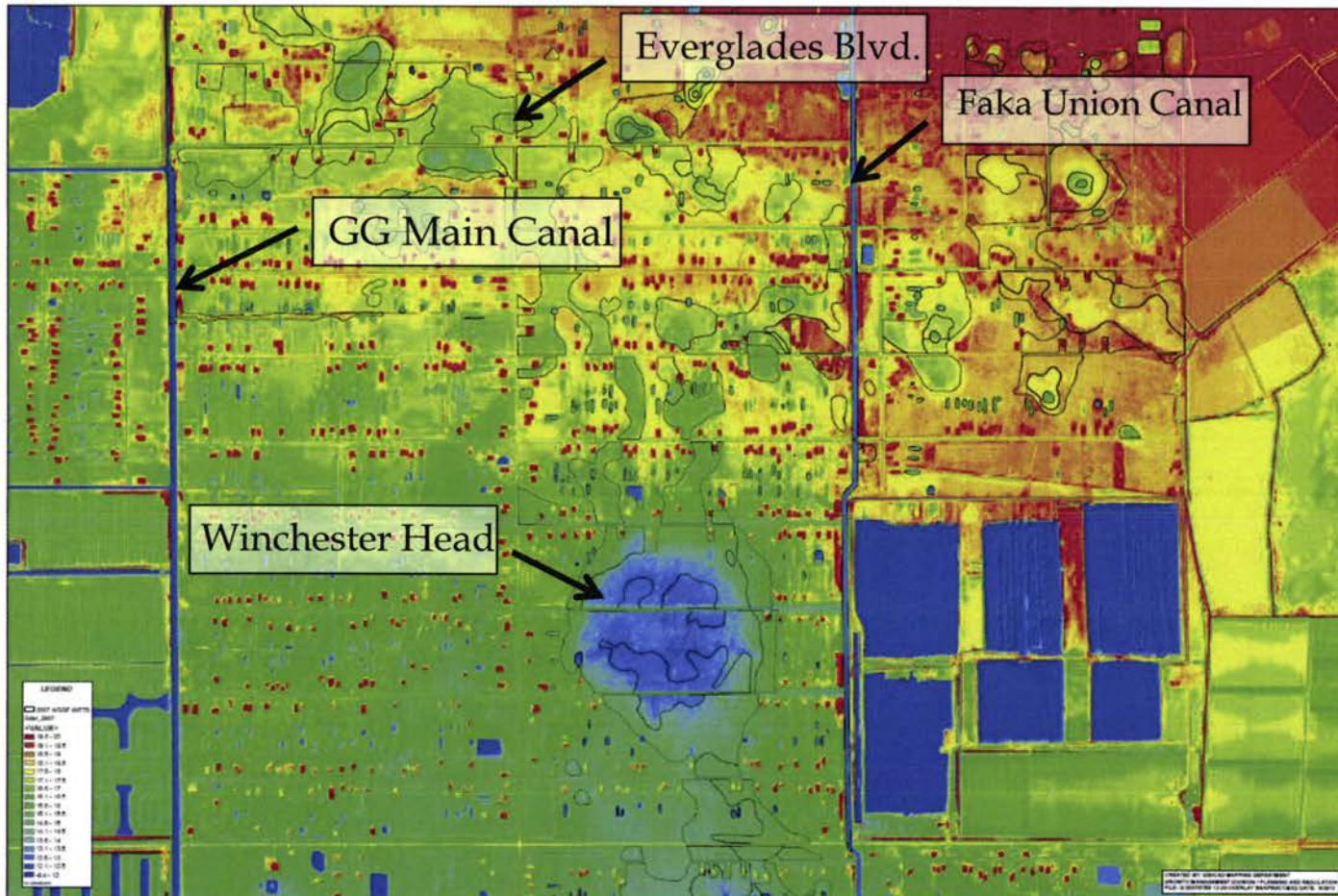
- ◉ Gulf American Corp Lots Now Owned by CC
- ◉ Strategic Locations in Wetlands or Adjacent to Canals
- ◉ Divert Roadside Flows
- ◉ Excavate/Enlarge Small Sections of Canal
- ◉ Recreation Component



Design Considerations

1. Evaluate the presence of **roadside berms** that restrict sheet flow.
2. Determine the maximum groundwater elevation that is allowed for **proper function of septic system** in the immediate vicinity.
3. Consider the **affects of increased sheetflow** on downstream properties.
4. Evaluate **flow rates and storage capacities** within the system and size culverts accordingly.

Let's get the water(shed) right!

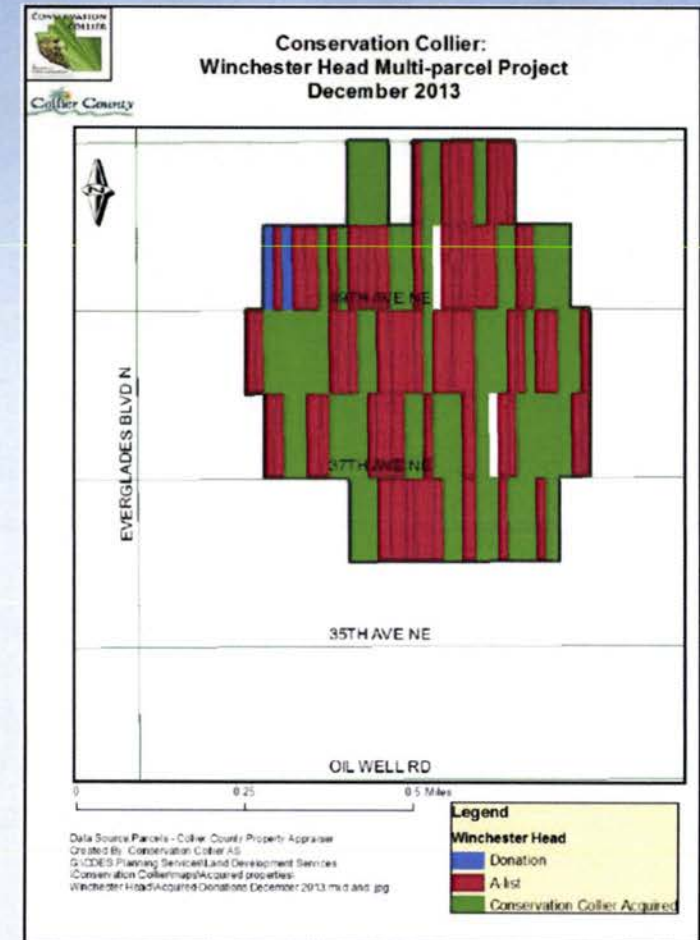


Project Benefits

- ❖ Improve wetland hydrology in the proposed flowway.
- ❖ Provide additional water quality treatment
- ❖ Increase groundwater recharge, well field and water supply sustainability

Project Concerns

- ❖ Elevated groundwater level may affect septic systems and or increase flood risk for residential properties near the vicinity.
- ❖ May require purchase of private property within the primary flowway



2006 Belle Meade SW Master Plan

- Reduce fresh water flow to Naples Bay Restoring Historic Flowways
- Preserving Environmentally Sensitive Areas
- Reducing Point Source Discharges into Estuaries

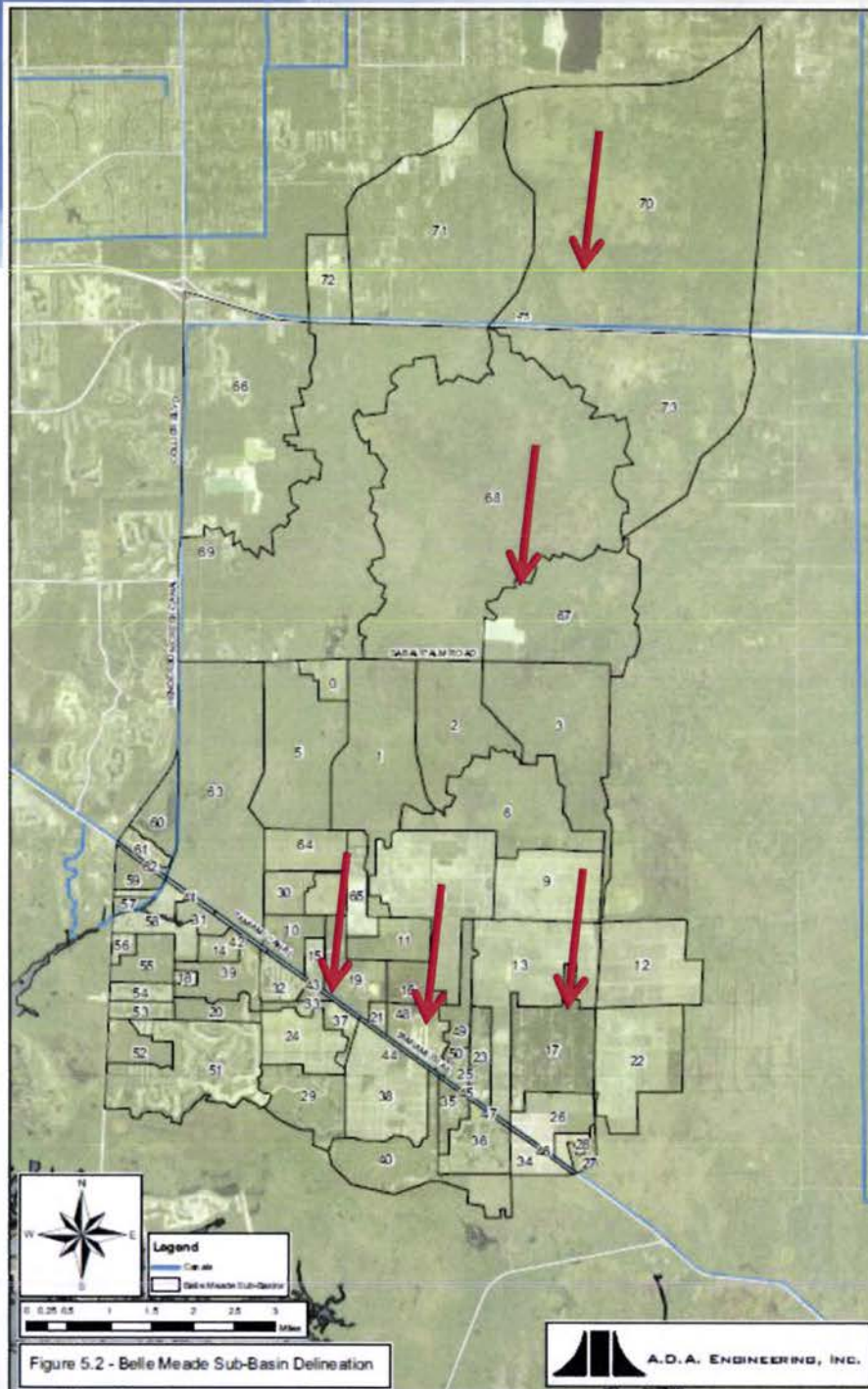
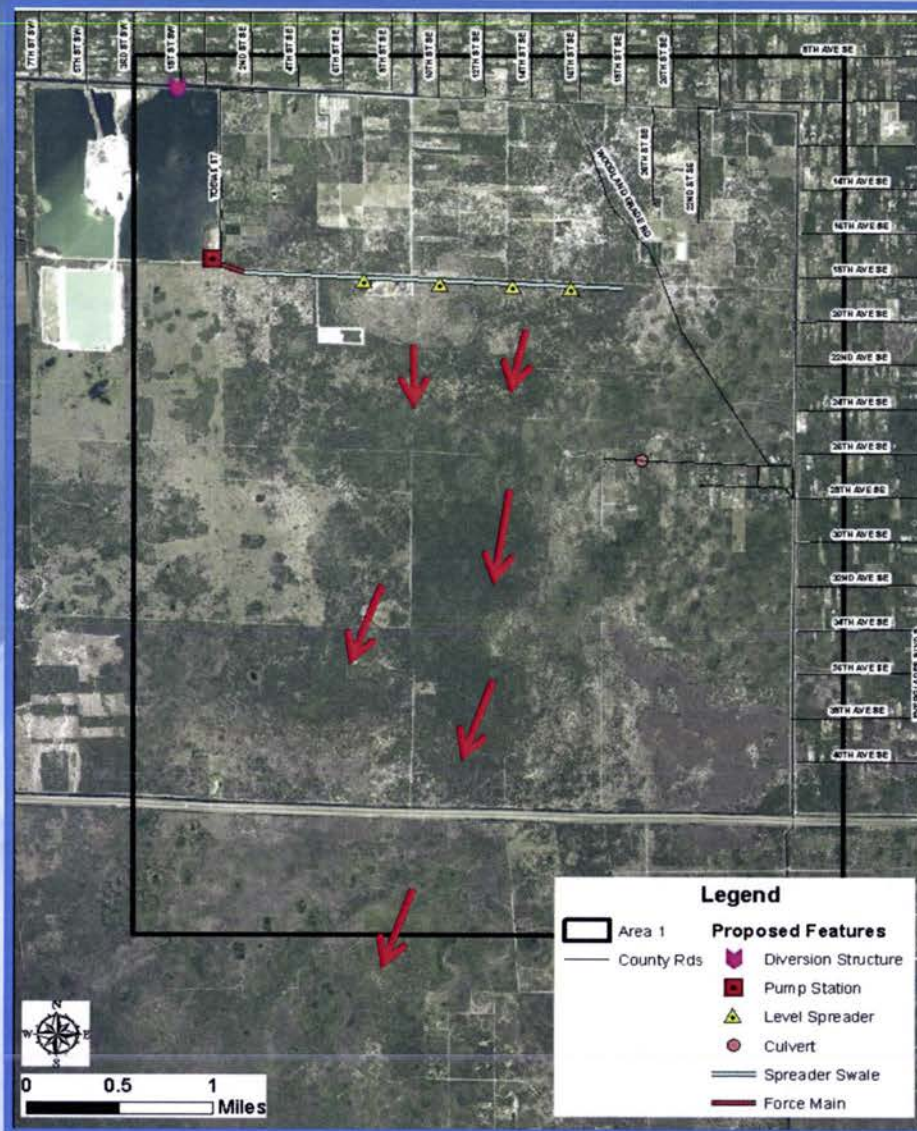


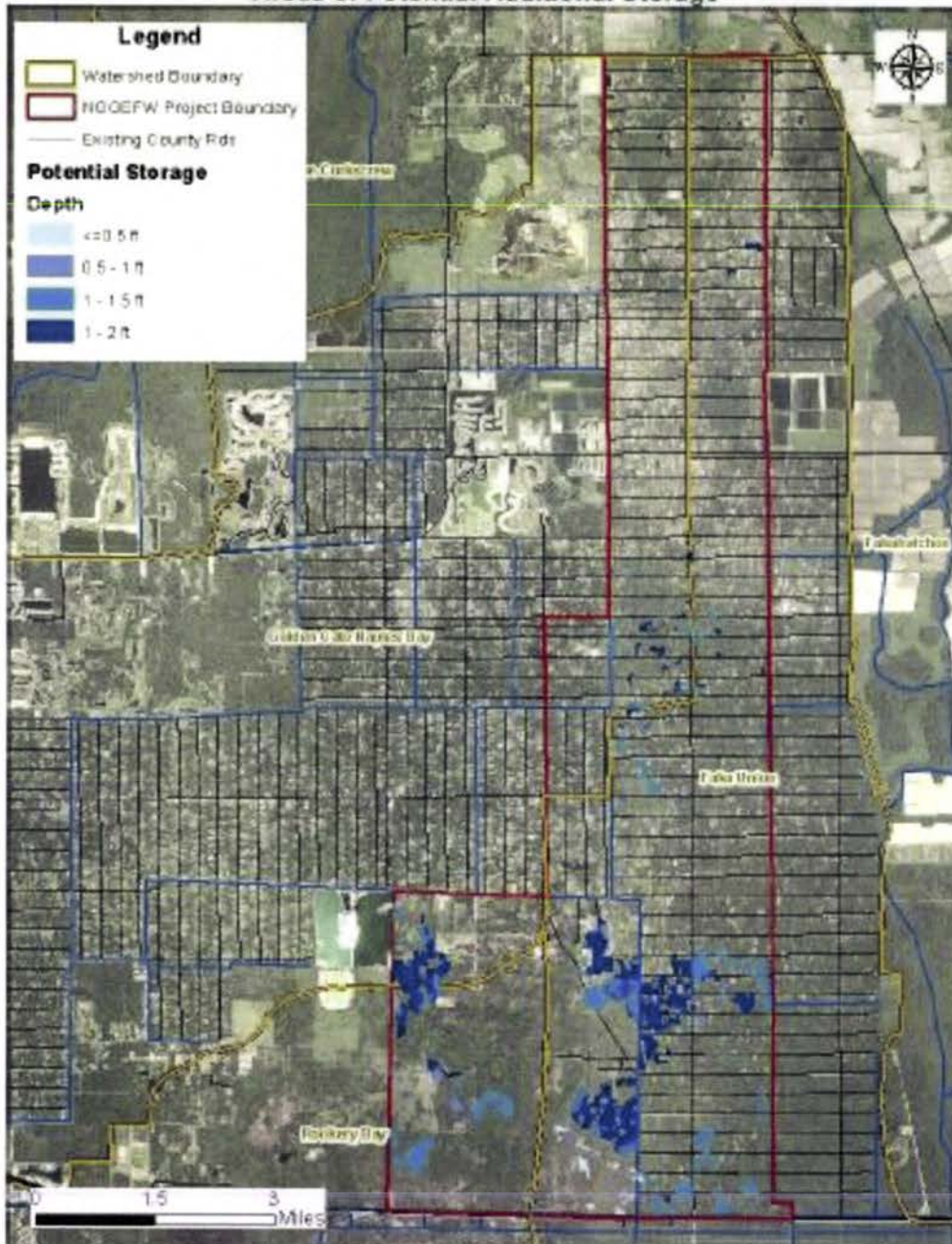
Figure 5.2 - Belle Meade Sub-Basin Delineation

Northern Belle Meade Rehydration



- ◉ WMP project # 1
- ◉ GG Canal Flow Diversion
- ◉ 3 Different Schematic Models
- ◉ Flow Rates of 100 to 800 Cubic Feet Per Second
- ◉ Reduce Fresh Water Flow to Naples Bay By Up To 10%

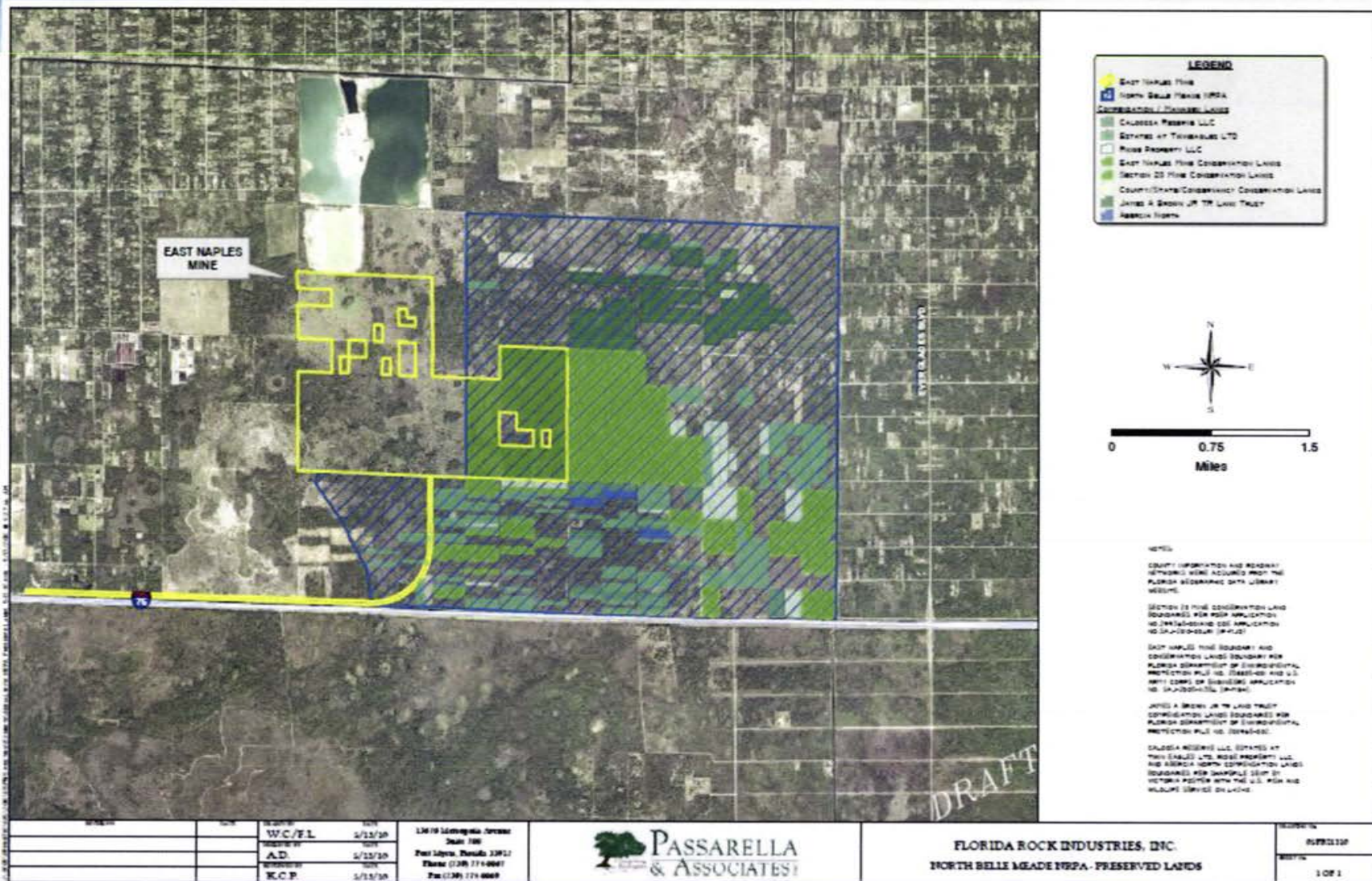
Figure 6. North Golden Gate Estates Flowway Restoration Project
Areas of Potential Additional Storage



Potential Storage

- NGGEFRP (WMP Project #2) Identified Areas For Additional Wet Season Water Storage
- 0.5 feet to 2.0 feet Canal Flow Diversion
- 1,800 acres

Conservation Lands in NBM



I-75 Canal Culverts and Spreader Swale

- WMP project # 4
- Interconnected Culverts Under I-75
- Flows Dependant On Upstream Improvements
- Picayune Strand State Forest



www.colliergov.net/watershedimprovements



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STORMWATER PLANNING

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STORMWATER MANAGEMENT MASTER PLANNING IN COLLIER COUNTY

A County-wide Stormwater Master Plan was prepared in 1998. The Master Plan reflected a broad watershed planning philosophy, as well as a scope of service for detailed individual basin studies with a multi-disciplinary objective of appropriate land use and natural resource management as well as traditional flood protection. The Master Plan study was used to develop the Drainage Sub-Element of the County's Growth Management Plan.

The Collier County Growth Management Plan ("Drainage Stormwater Management Sub-Element") was prepared to meet the requirements of Chapter 40, Florida Statutes and Chapter 62-6, Florida Administrative Code. The document prepares a plan through stated goals, objectives, and policies to guide and implement the County-wide Stormwater Management Plan that provides an acceptable level of service for stormwater control and environmental management objectives. Through the Growth Management Plan, both the government's leadership and the general public are able to stay informed and provide input in the process of setting or altering program goals. The goals, policies and objectives of the Growth Management Plan are carried out through the County's Land Development Code.

In 1996, the Big Cypress Basin Board initiated a follow-up master planning effort called the Big Cypress Basin Watershed Plan. This Watershed Plan is being developed in cooperation with the City of Naples and Collier County, at a much greater level of detail by incorporating detailed surveying, field data measurements, and computer modeling for preparing detailed basin and sub-basin stormwater management/natural resource studies. The Watershed Plan is responsive to Florida's evolved stormwater management philosophy incorporating the water resource needs of both human populations and the existing ecosystem.

A Watershed Management Plan was completed in 2011.

The North Golden Gate Cactus Flamingo Recreation Study was completed in 2015.

Golden Gate Watershed Improvement Program

Last Updated: September 24, 2014



15min BREAK



- Agency presentation
- Public comment
- Input

Next Steps

What's the future of Golden Gate Watershed ??

