



# Optimization of the Reclaimed Water System Golf Course Supplemental Irrigation Supply

*Environmental Science Forum*  
*October 5, 2006*

*Presented by*  
**Dave Slonena**  
Pinellas County Utilities

# Purpose of the Project

- To develop a supplemental irrigation supply when reclaimed water is interrupted to the golf course. The recovered reclaimed water will be used to meet the residential irrigation demands that would otherwise use potable water.
- The project will fulfill Utilities' 1997 Effluent Agreement with East Lake Woodlands

# State and Regional Water Resource Management Policies

- Foundation of this Project
  - ▶ Utilize local sources first before importing water from other regions or communities.
  - ▶ Use the lowest quality water available that meets the needs of the water use, i.e., where possible, don't use high quality potable water for non-potable needs.
  - ▶ Maximize the use of reclaimed water for non-potable needs, primarily irrigation.

# Background

- August 2001 – North County Reclaimed Water Master Plan Completed
  - ▶ Prioritized Reclaimed Water Zones to maximize potable water offset
  - ▶ Calculated Reclaimed Water (RCW) Demand from these areas
  - ▶ Identified strategies and sources of supply to meet future reclaimed water demands.

# Strategies & Supply

- Potential Strategies and Sources of Supply
  - ▶ Seasonal /Interruptible RCW supply to golf courses
  - ▶ Demand Management Strategies
  - ▶ Regional RCW interconnect with Oldsmar and Clearwater
  - ▶ Lake Tarpon Aquifer Storage Recovery (ASR)
  - ▶ Lake Tarpon Augmentation Supply

# Effluent Agreement

- 1997 Effluent Agreement identified investigating the existing irrigation wells as a potential supply.
  - ▶ Onsite irrigation wells were investigated in October 2001
  - ▶ Water quality was too salty in two of the four wells
  - ▶ Existing wells were inadequate to meet the combined residential and golf course irrigation demands
  - ▶ Location of the existing wells in relationship to the storage ponds required additional piping
  - ▶ Potential for saltwater intrusion if additional quantities were to be pumped from the wells



# Supply Options

- Meet with SWFWMD staff on several occasions to discuss potential supply options.
  - ▶ October 2002 discussed overall need and benefits for developing a supplemental supply for the golf course
- Identified following supply options:
  - ▶ Floridan aquifer wells at the golf course
  - ▶ Shallow horizontal wells at the golf course
  - ▶ Reactivation of the East Lake Road Wellfield
  - ▶ Lake Tarpon

# Shallow Horizontal Wells

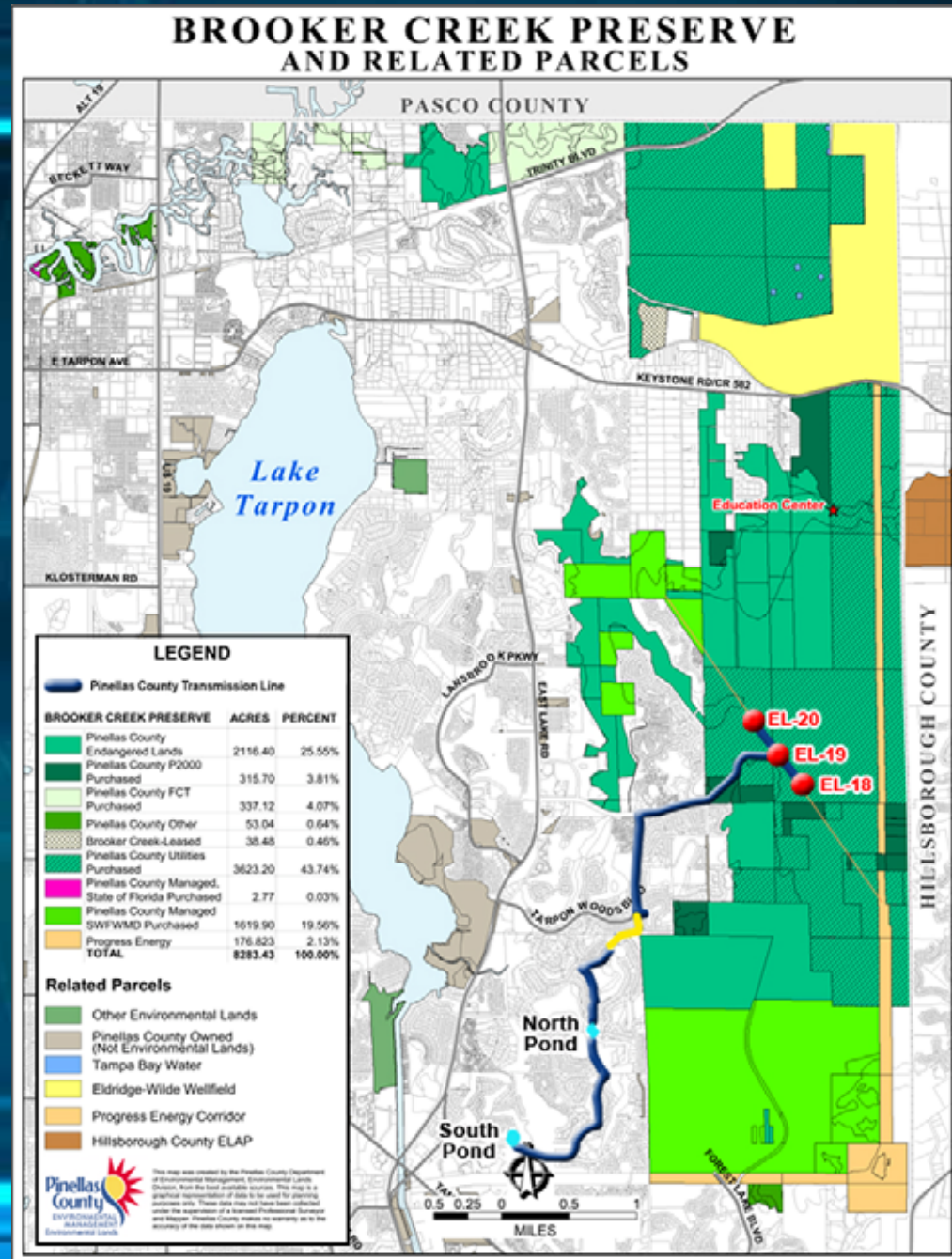
- SWFWMD staff suggested investigating shallow horizontal wells.
  - ▶ Performed onsite borings to determine suitability of horizontal wells in February 2004
  - ▶ Soils were not conducive for golf course irrigation supply development



# Consensus to Reactivate

- Discussed reclaimed water program and water supply options with SWFWMD staff in August 2004 and October 2004.
- Consensus was to reactivate East Lake Road Wells to meet the irrigation supply needs for the following reasons:
  - ▶ Potential saltwater intrusion with wells at the golf course
  - ▶ Reliability of Lake Tarpon as a source during the dry season

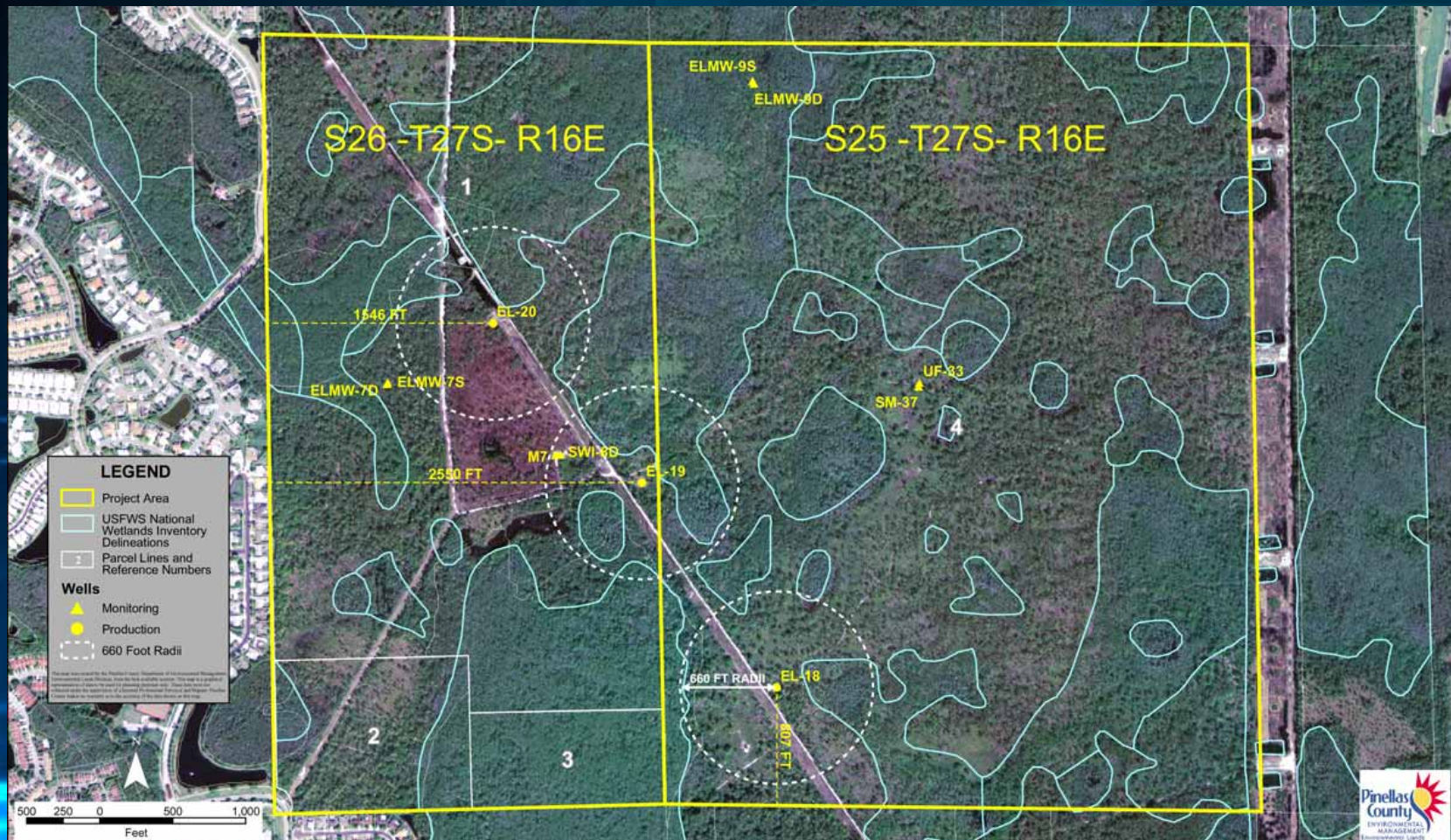
# Project Location Map *with Transmission Line*





# Project Location

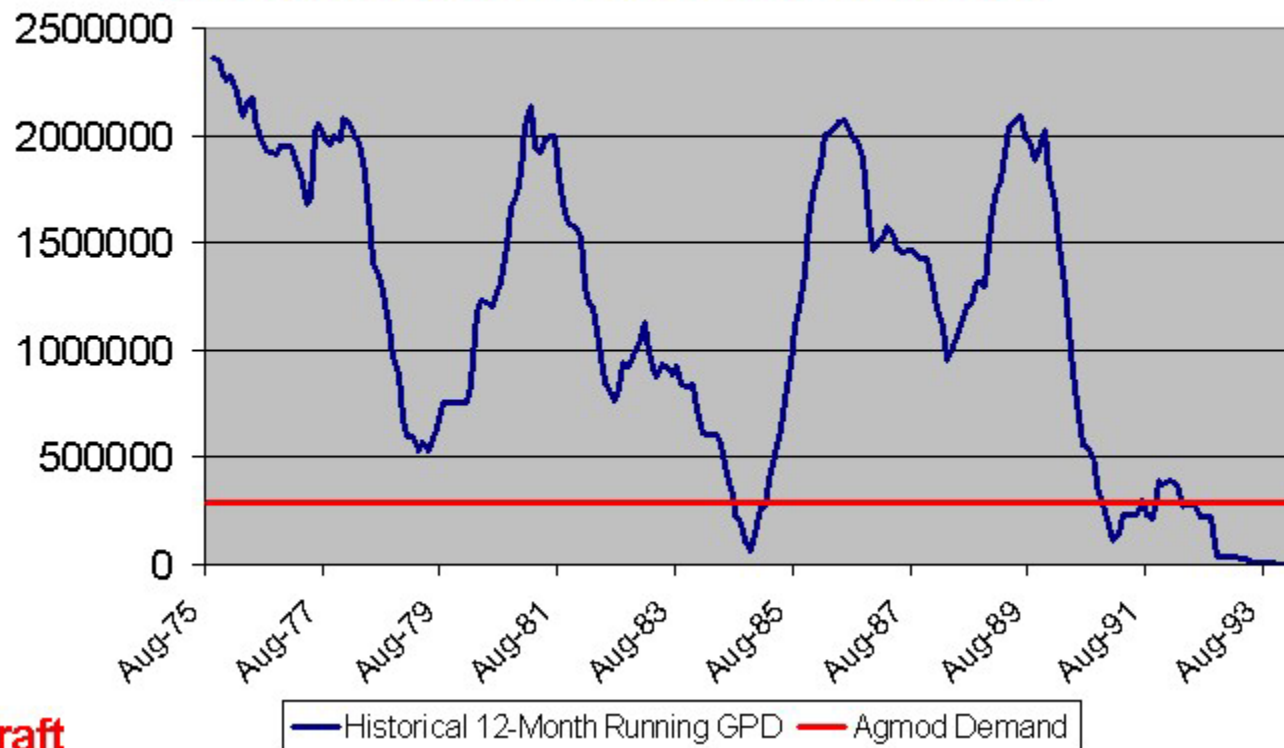
*with Aerial Photo*



# Historical Pumpage

## Adjusted East Lake Wellfield Annual Average

This chart is for simulation purposes to compare Agmod demand versus historical quantities. This chart does not imply that the application does or does not meet rule criteria at this time.



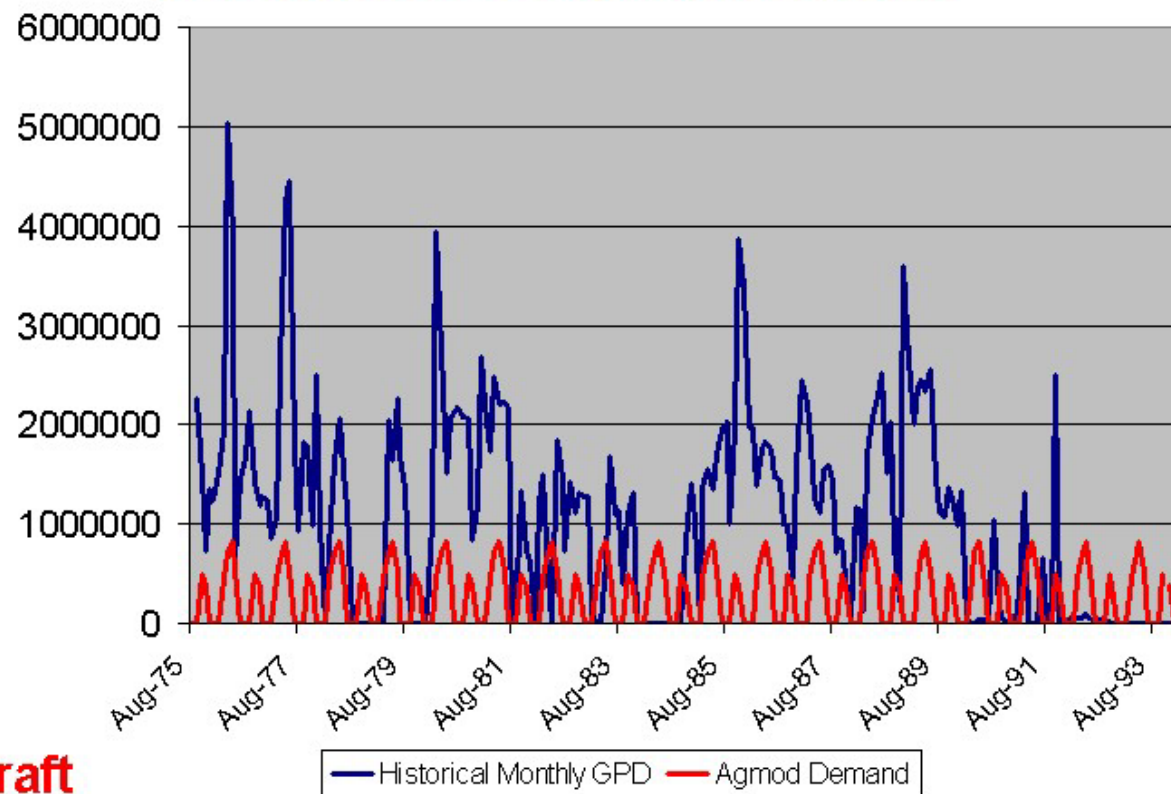
**Draft**



# Historical Pumpage

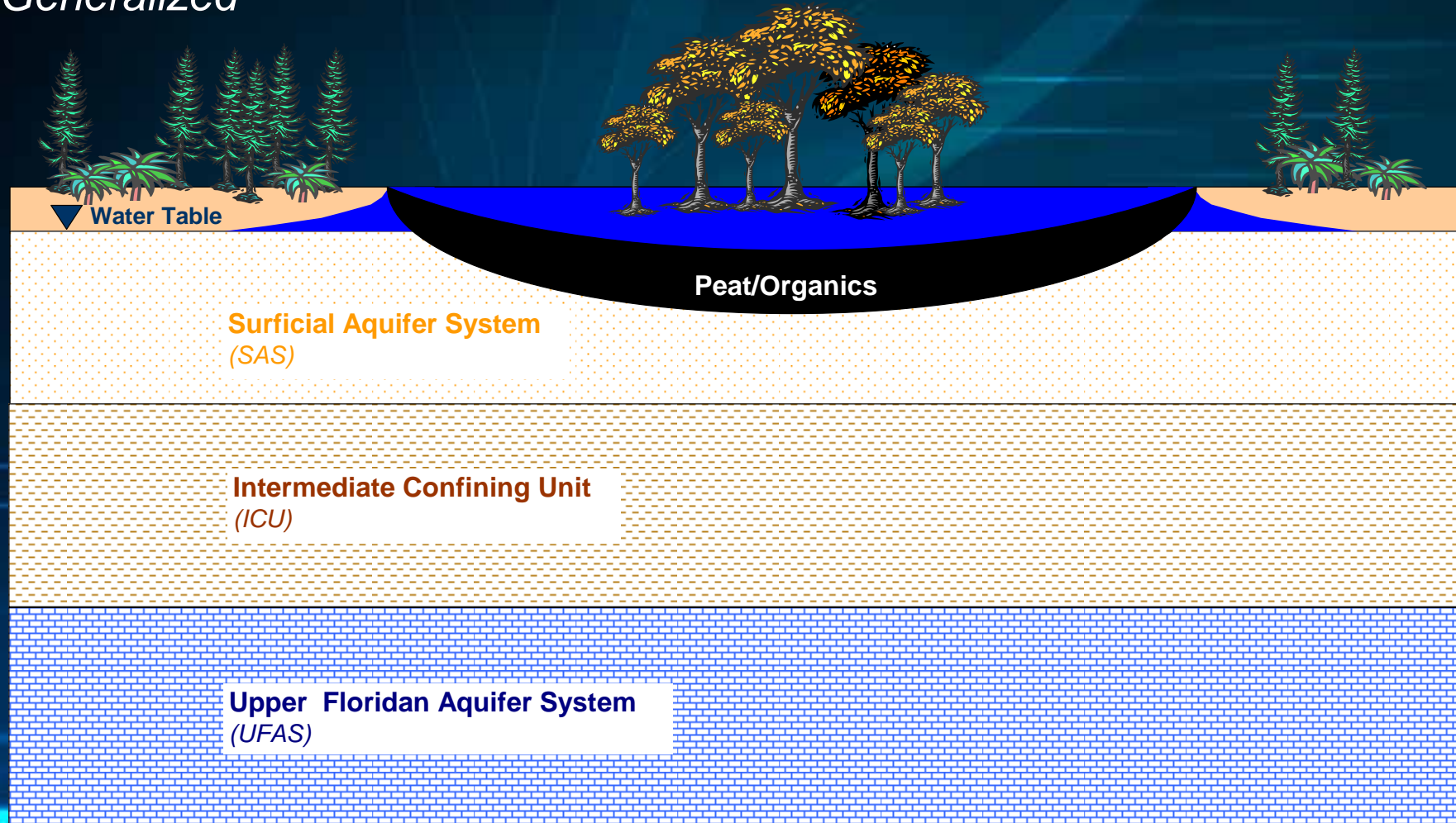
## Adjusted East Lake Wellfield Monthly Average

This chart is for simulation purposes to compare Agmod demand versus historical quantities. This chart does not imply that the application does or does not meet rule criteria at this time.



# Hydrogeologic System

*Generalized*





## QUESTION:

- What is the natural water level change in the surficial aquifer?
  - a) 0.3 feet
  - b) 0.5 feet
  - c) 1.0 feet
  - d) 1.5 feet
  - e) 2.0 feet
  - f) 2.5+ feet

# ANSWER:

- Ranges from **1.5 feet** to **5 feet**

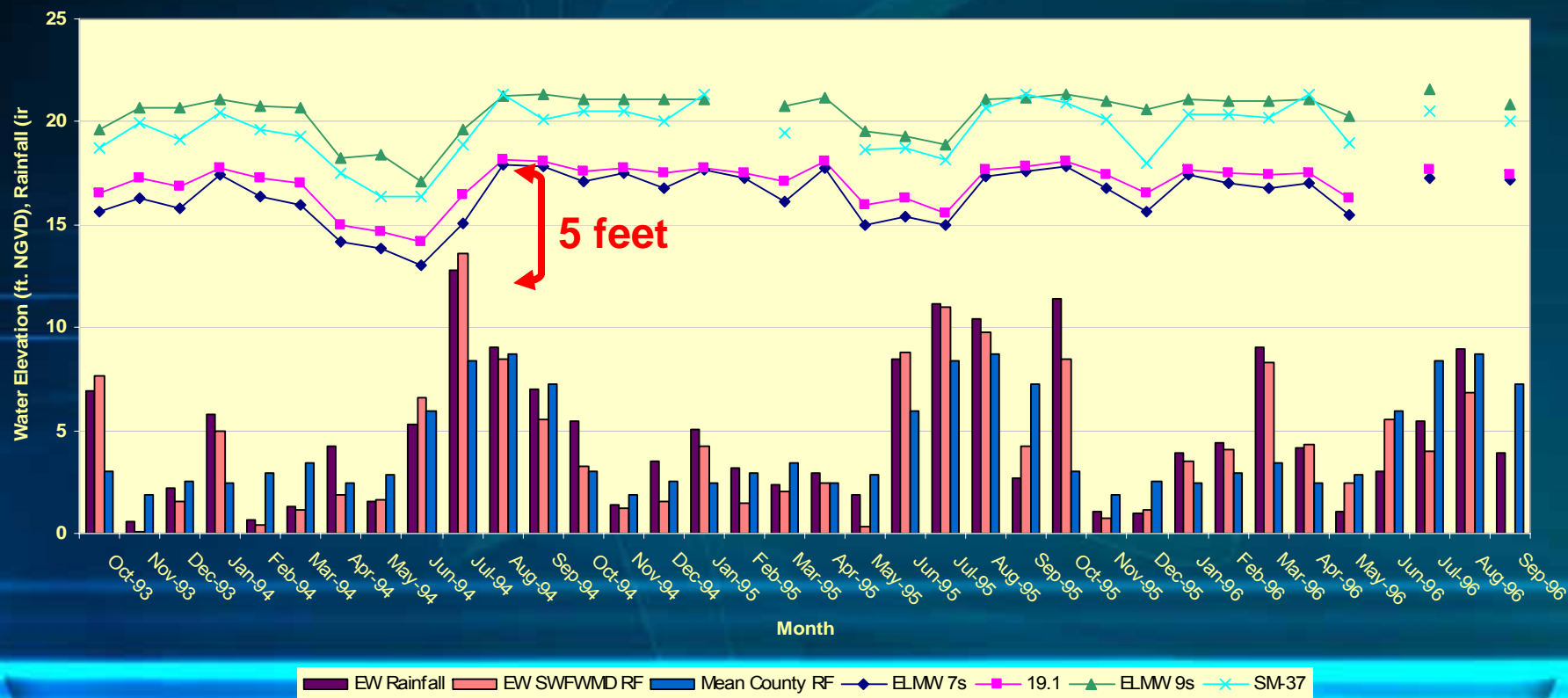


# Surficial Aquifer Water Levels

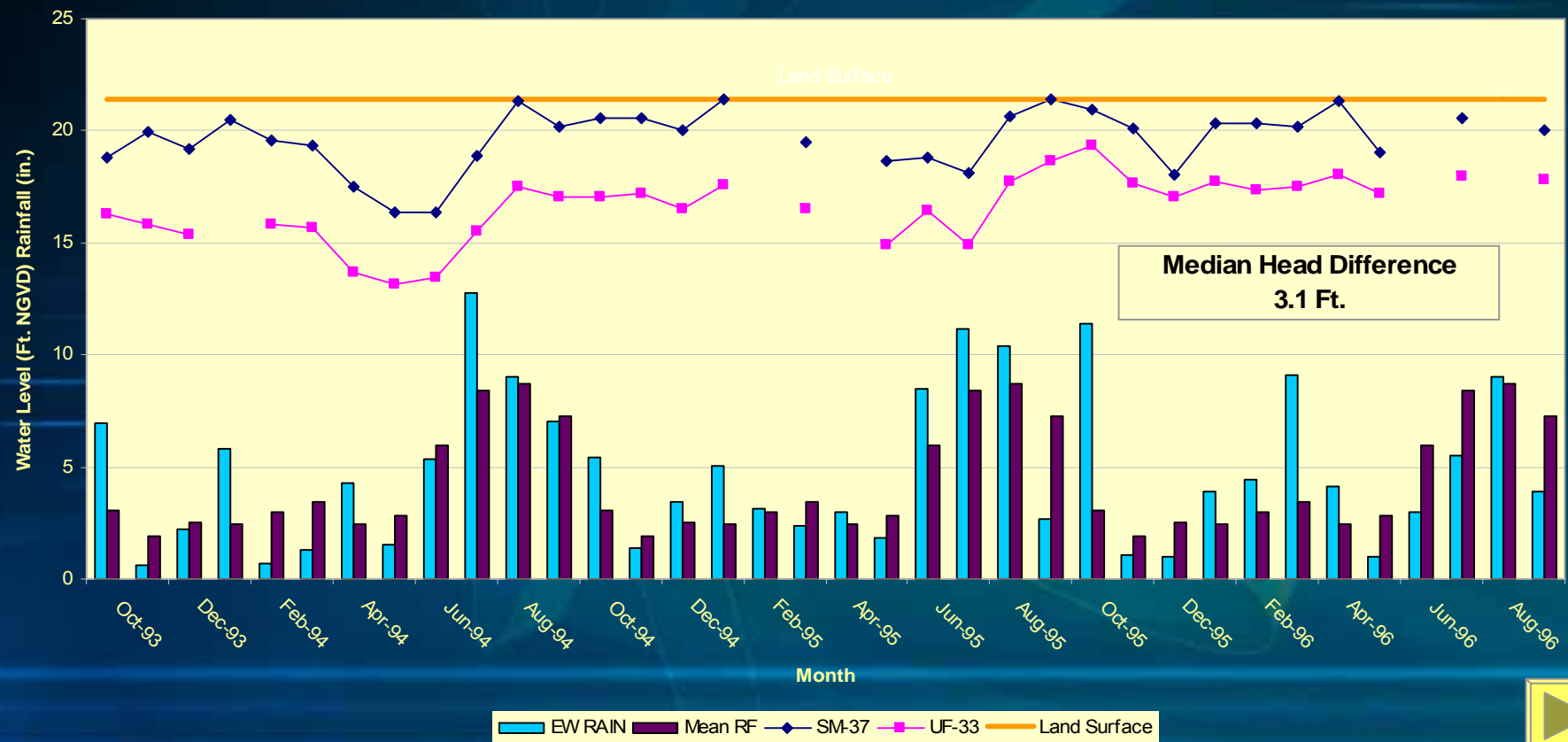
## Average Water Level Change

WY 94-96 = 3.2 feet

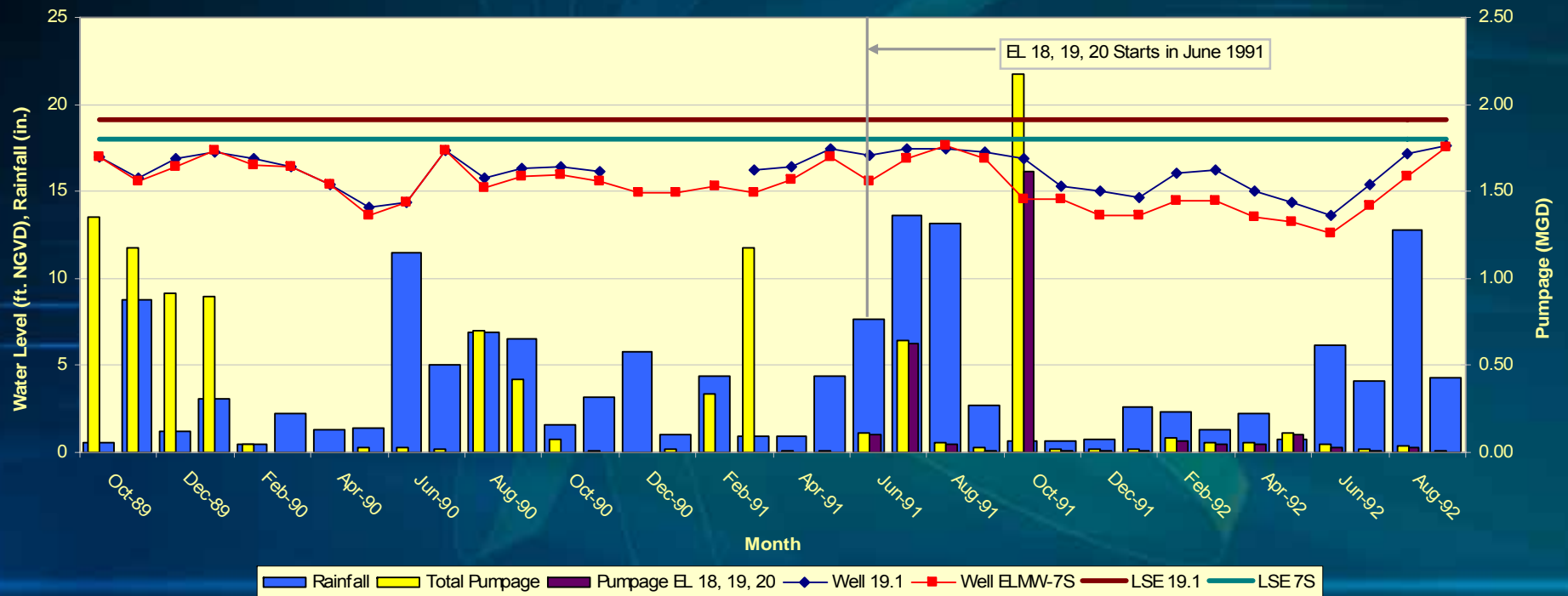
WY 95-96 = 2.4 feet



# SAS Water Levels to UFAS Water Levels *SM-37 & UF-33*



# EL Production & SAS Water Levels



# TBW Master Water Plan Map

## Master Water Plan

The Plan includes an aggressive conservation program with the goal of reducing regional demand by 10 mgd in 2000 and 17 mgd in 2005.

### Board-Approved Projects Projected Capacities - MGD

#### Stage C Projects (Construction)

|  |       |
|--|-------|
| Brandon Urban Dispersed Wells  | 6     |
| North Central Intertie   | 25    |
| Seawater Desalination  | 60-66 |
| Enhanced Surface Water Systems (including Tampa Bypass Canal, Hillsborough River High Water, Alafia River, South Central Intertie, Tampa Bay Regional Reservoir, Regional Water Treatment Plant) |       |
| Brandon / South Central Connection   |       |
| Loop 72 Phase A  |       |

#### Stage B Projects (Design, Permitting, Prop. Acquisition)

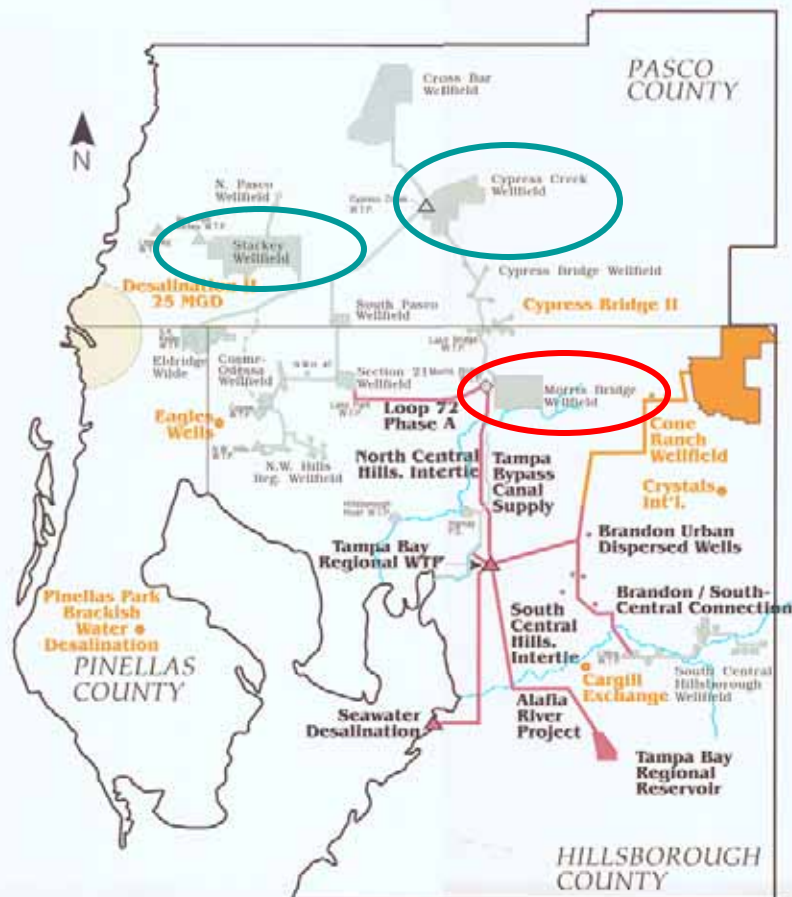
|                                      |          |
|--------------------------------------|----------|
| Cone Ranch & Dispersed Wells         | 10*      |
| Pinellas Brackish Water Desalination | 5-6*     |
| Cypress Bridge II                    | 4(max)*  |
| Seawater Desalination II             | 25*      |
| Cargill Reclaimed Exchange           | 1*       |
| Eagles Wells                         | 0.2-0.5* |
| Crystals International Water Supply  | 3.5-4*   |

\* Estimate of capacity. Permit applications will be based on optimized capacity within the limits of sound environmental practice.

#### LEGEND

-  Existing Facilities
-  New Water Supplies
-  New Pipelines / Interties
-  New Water Treatment Plant
-  Potential New Sources

**TAMPA BAY WATER**  
Supplying Water To The Region

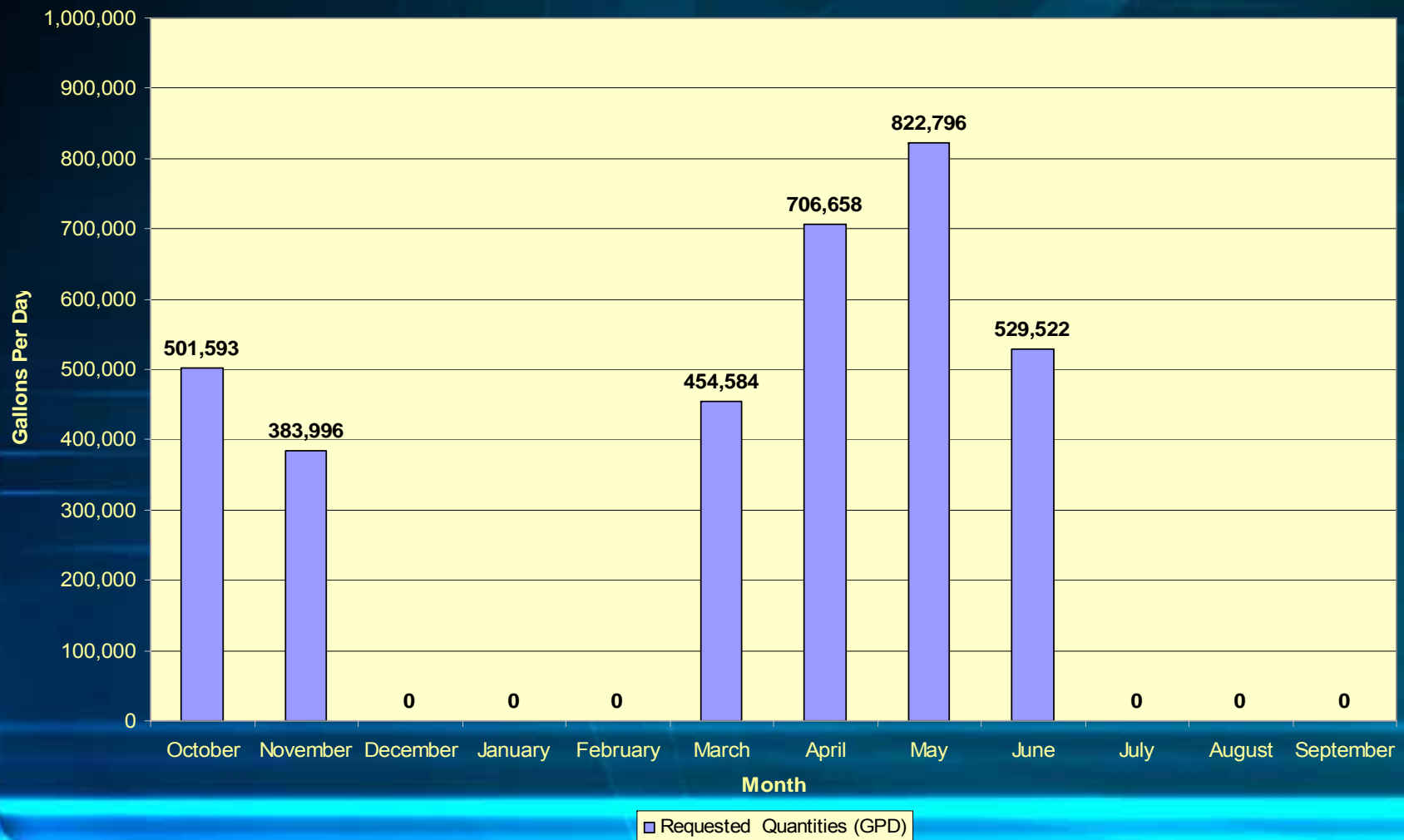


MWPP-01-200 CDR  
ATG-06/07/2001



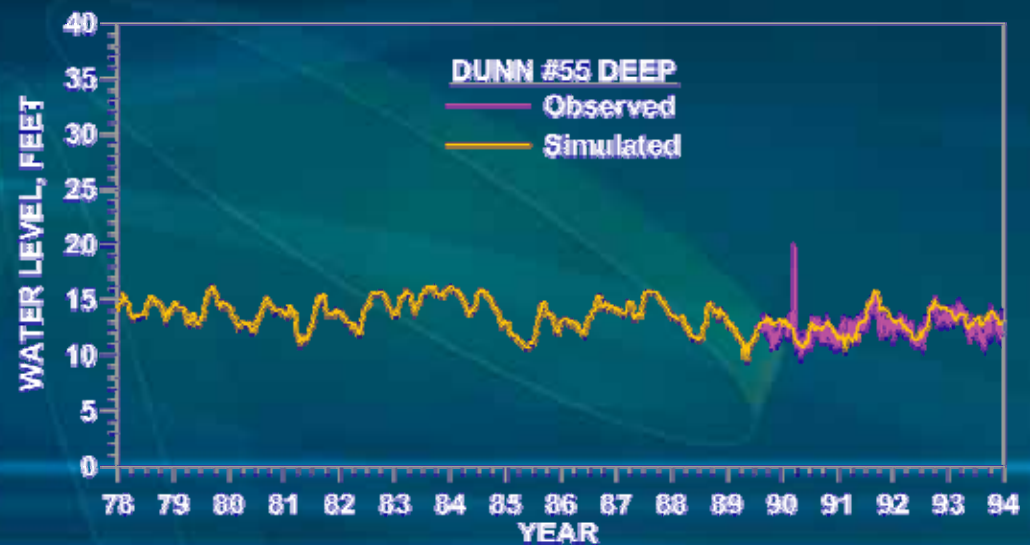
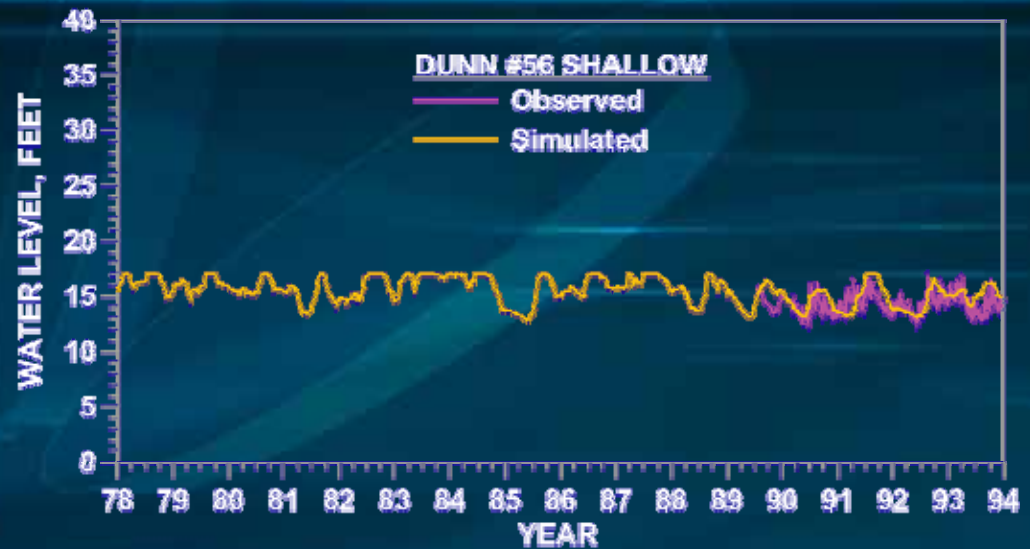
# Requested Quantities

Average Annual: 284,000 GPD



# Model Calibration

## Graphs



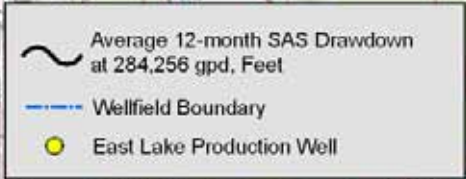
# Model Drawdown

*UFAS Drawdown  
12 month Average*



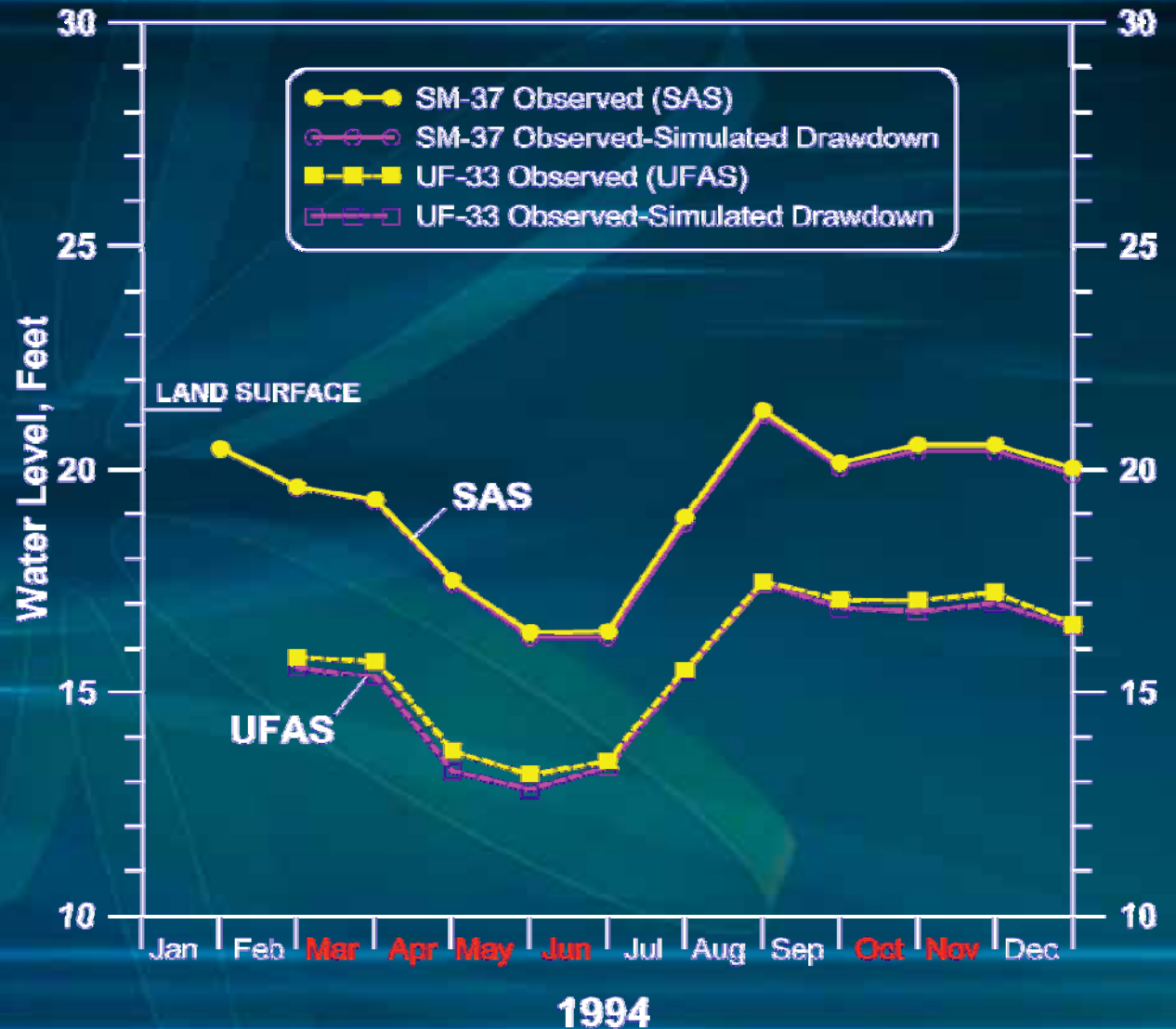


## SAS Drawdown 12 month Average



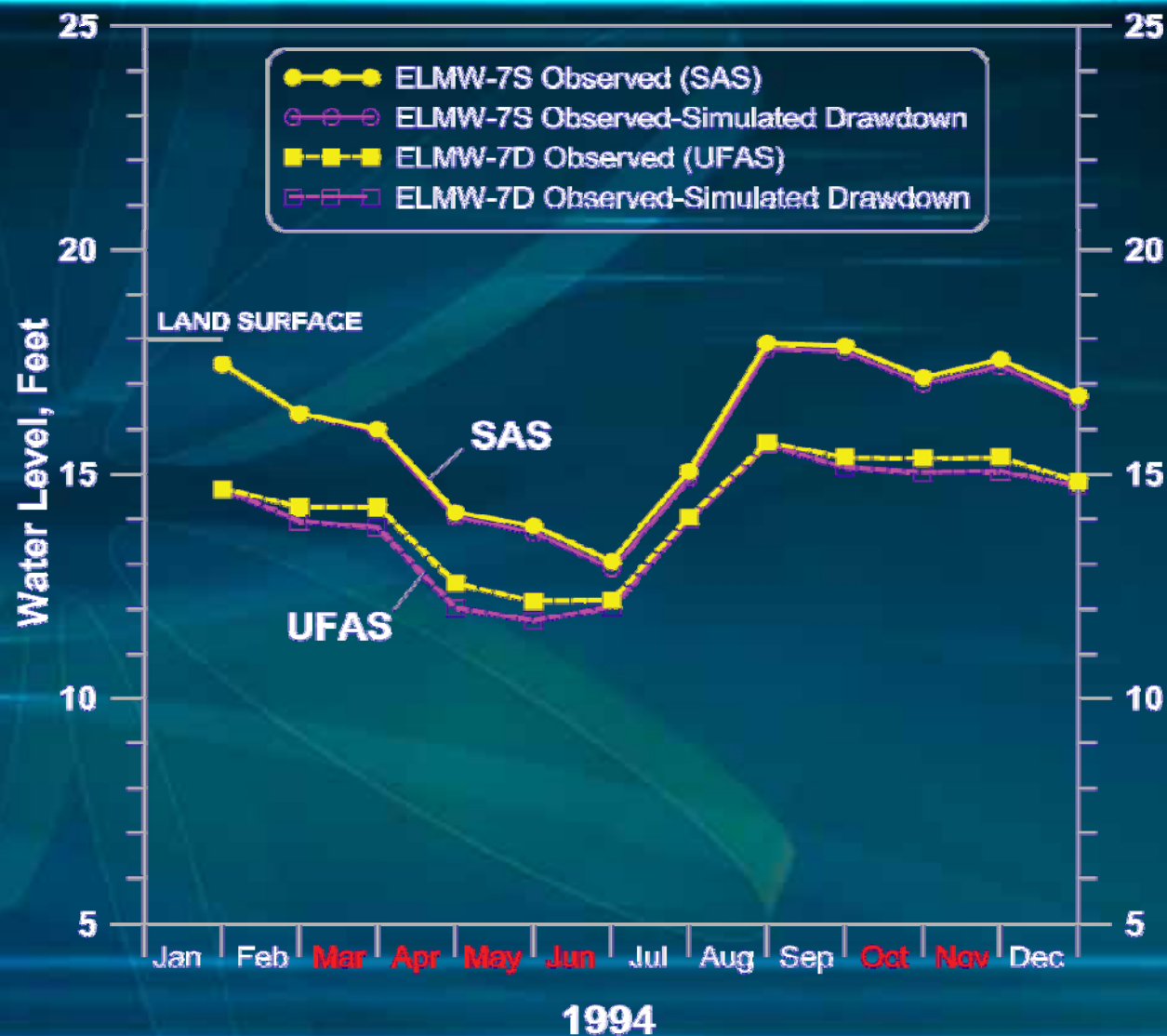
# Transient Model Drawdown

SAS Max. DD = 0.13 feet  
UFAS Max. DD = 0.48 feet



# Transient Model Drawdown

SAS Max. DD = 0.16 feet  
UFAS Max. DD = 0.62 feet





# Wetland Assessment

- Wetland assessment will be conducted for 5 wetlands within the vicinity of the production wells.
  - ▶ Identify percent cover
  - ▶ Wetlands plants
  - ▶ Species composition
  - ▶ Water levels
  - ▶ Normal pool
  - ▶ Seasonal high water

# EMP

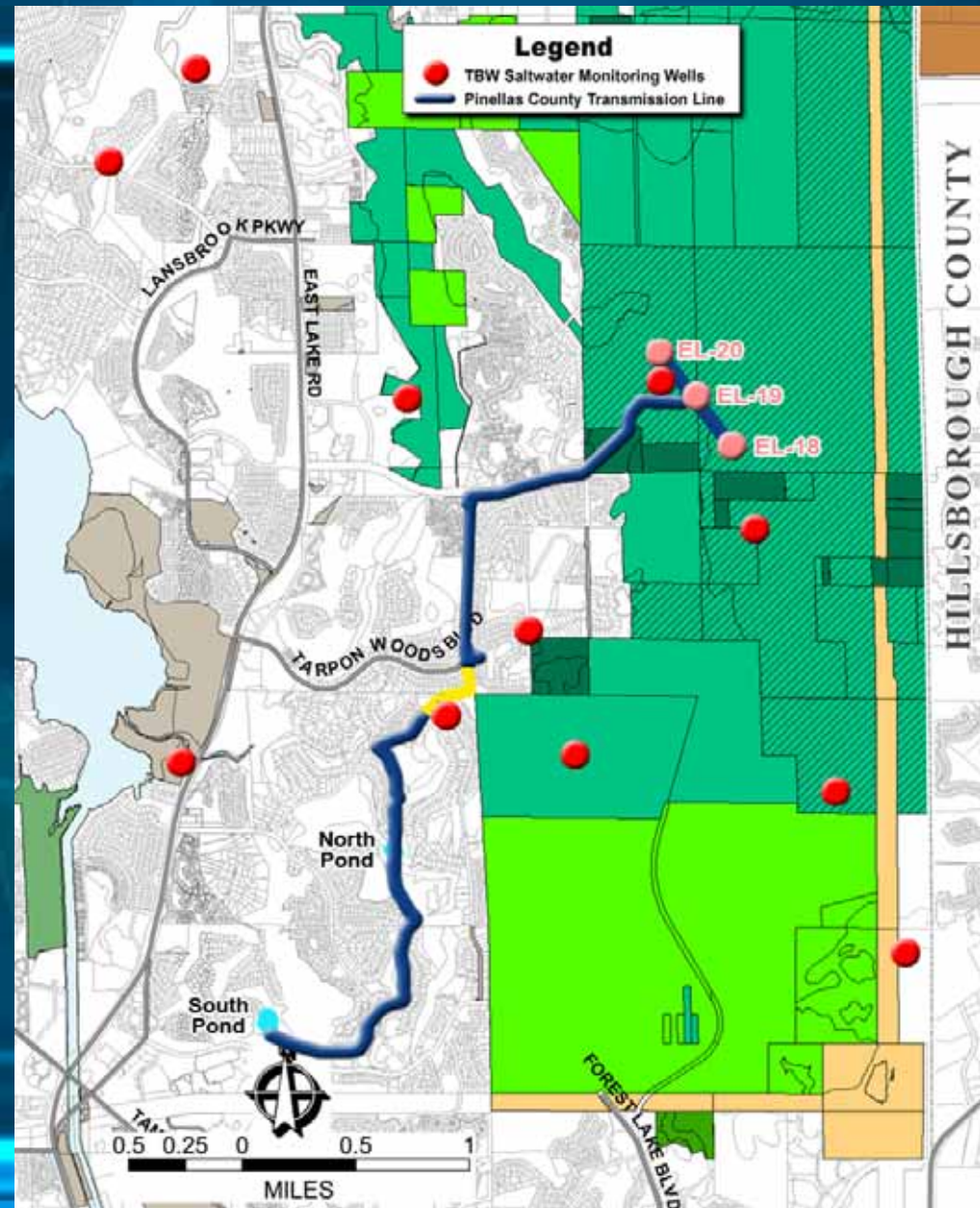
- An Environmental Monitoring Plan (EMP) will be developed and submitted for approval to SWFWMD to monitor the potential impacts to the wetlands.
  - ▶ Three wetlands will be monitored
  - ▶ Water levels collected twice a month
  - ▶ Annual wetland assessment using SWFWMD approved WAP

# Saltwater Intrusion

- Propose to sample production wells monthly
- Coordinate with Tampa Bay Water's saltwater monitoring program

# TBW Saltwater Intrusion Monitoring Wells

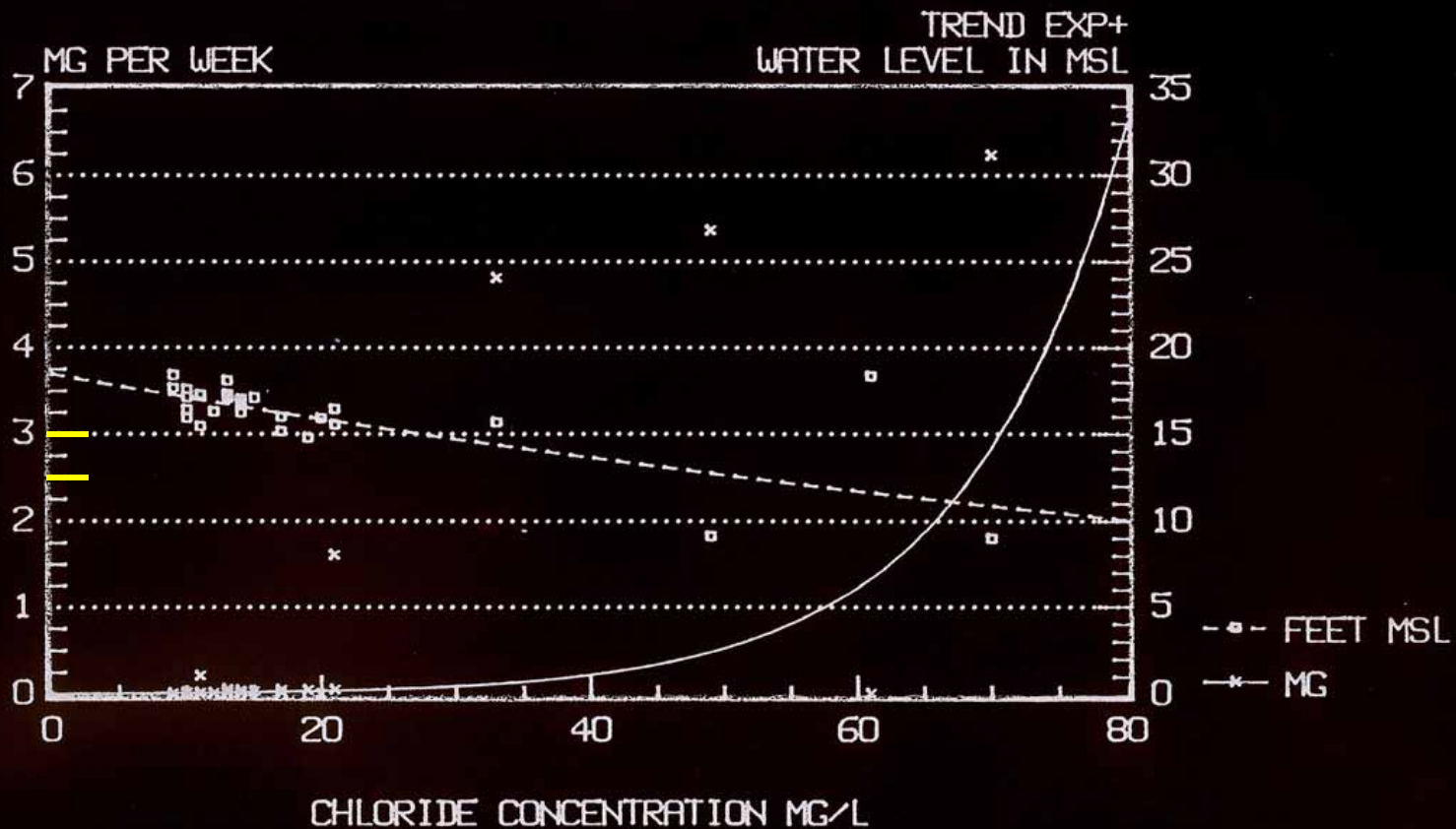
*Location Map*





# ELPW-20

CHLORIDE VS WATER LEVEL CORRELATION  
CHLORIDE VS PUMPAGE CORRELATION  
EAST LAKE ROAD WELLFIELD ELPW-20  
1991-1992  
 $y = \exp(2.9163276 - 0.00755 * x)$   $r = -0.691$



# Permitting Status & Update

- Response to SWFWMD due November 6, 2006.
- Utilities will request a 60-day time extension to respond to SWFWMD's questions in order for the ESF to discuss and comment on.
- SWFWMD will have 30 days from Utilities' response to deem application complete or request additional information.
- If application is deemed complete, SWFWMD is required to take action on the permit application within 90 days.



# Summary

- Based on the modeling, groundwater withdrawals will not cause unacceptable adverse impacts to wetlands or uplands.
- An EMP will be in place to detect any adverse impacts.
- The existing saltwater monitoring program and monthly monitoring from the wells will detect any water quality changes.

# Conclusions

- Seasonal use of the wells will help optimize the reclaimed water system and offset potable use.
- The withdrawal of water will be done in an environmentally sensitive manner.
- The net benefit to the region will be a reduction of potable water use, and reduced environmental stress in wilderness and management areas in other counties.



Thank You!