

# CENTRAL EVERGLADES PLANNING PROJECT



## Existing Conditions Performance

*Presented to*  
SFER Working  
Group Workshop

*by*  
CEPP Modeling  
Team

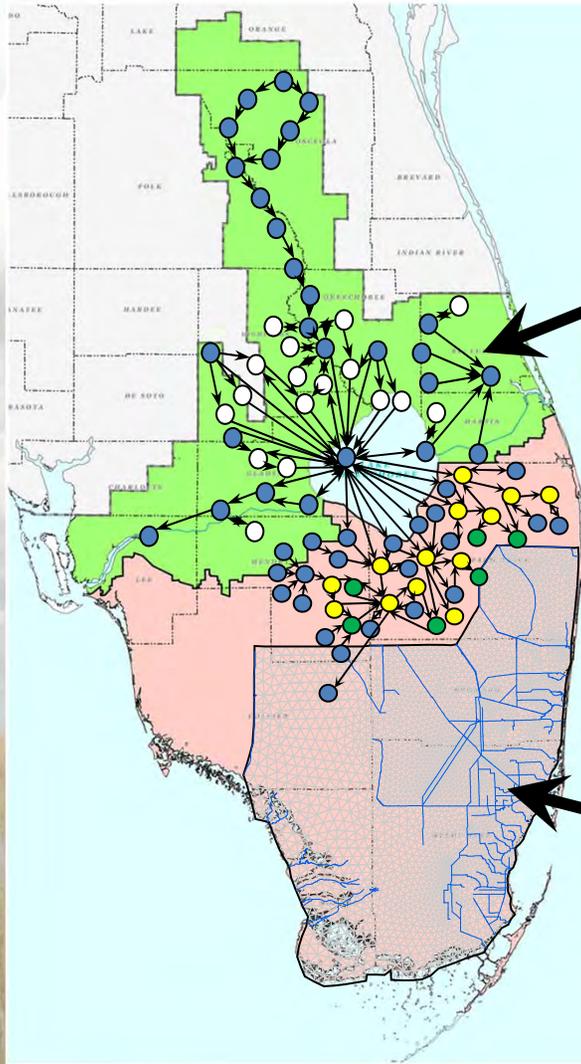
March 9, 2012

CENTRAL EVERGLADES

# Presentation Outline

- Provide Modeling Assumption Tables for Reference
  - Regional Simulation Model Basins (RSMBN)
    - 2010 / 2011 Existing Condition Baseline (ECB)
    - 2050 Future Without Project Baseline (FWO)
  - Regional Simulation Model Glades-LECSA (RSMGL)
    - 2010 / 2011 Existing Condition Baseline (ECB)
    - 2050 Future Without Project Baseline (FWO)
- System Hydrologic Review of Preliminary ECB
  - RSMBN
  - RSMGL

# Decoupled Regional Hydrologic Models



**RSMBN:**  
EAA Storage & Treatment

**Northern Everglades**

**Southern Everglades**

**RSMGL:**  
Decomartmentalization  
& Seepage Management

# RSMBN (Basins)

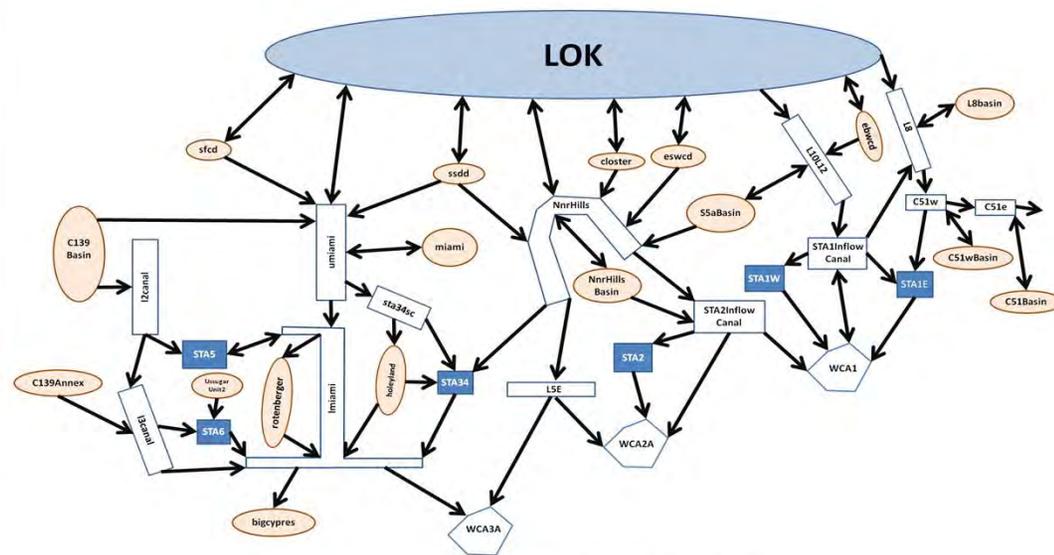
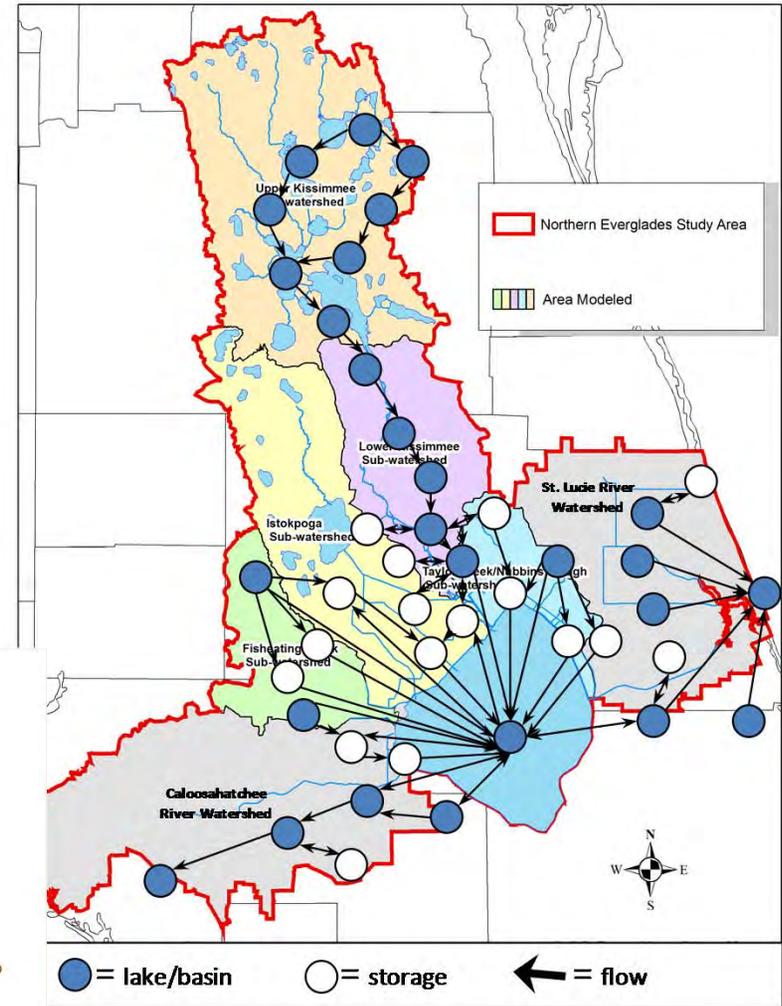
## Node Information:

total number of basins/lakes/canals represented: ~110

## Link Information:

total number of connections represented: ~155

Run Time:  
~ 10 minutes



**RSMBasin Schematic of the EAA**  
(Draft Nov. 2011)

## Domain Information:

EAA area represented: ~690 sq. miles

# RSMGL (Glades-LECSA)

## Mesh Information:

Number of cells: 5,794

Average size: ~ 1 s. mile

Domain size: 5,825 sq. miles

## Canal Information:

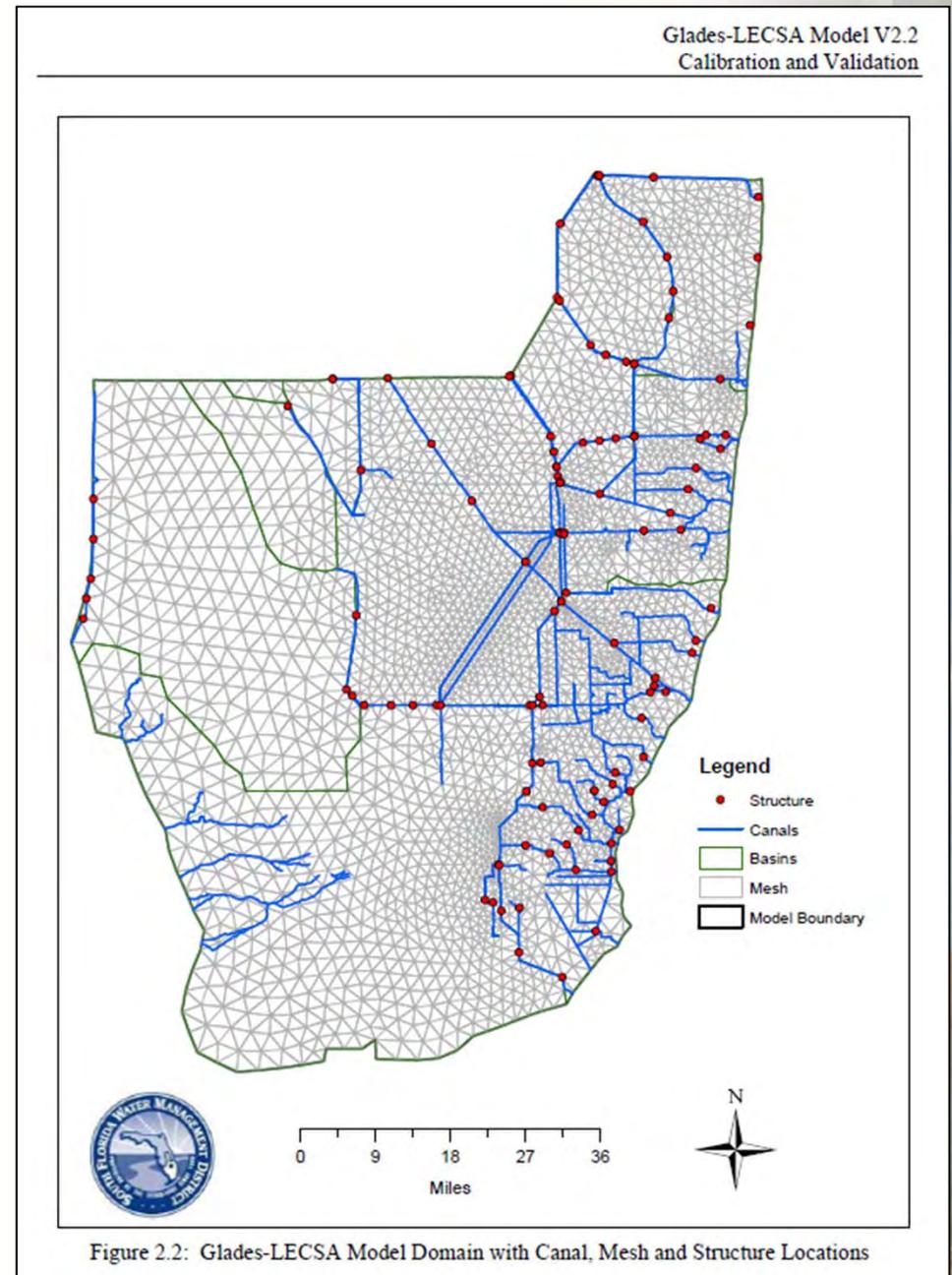
Number of segments: 979

Average length: ~ 1 mile

Total length: 1,043 miles

## Run Time:

~ 1 day

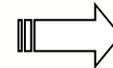
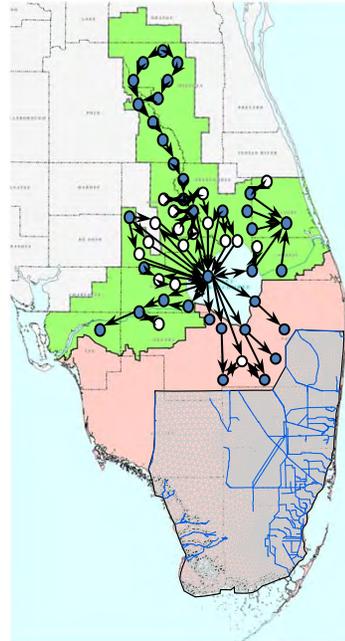
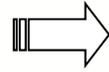


# Regional Hydrologic Modeling Approach

## Scenario

- Climatic Input
  - Rainfall
  - ET
- Boundary Conditions

Period of record:  
1965-2005



## Model Output

- Daily time series of water levels, flows
- Demands not met



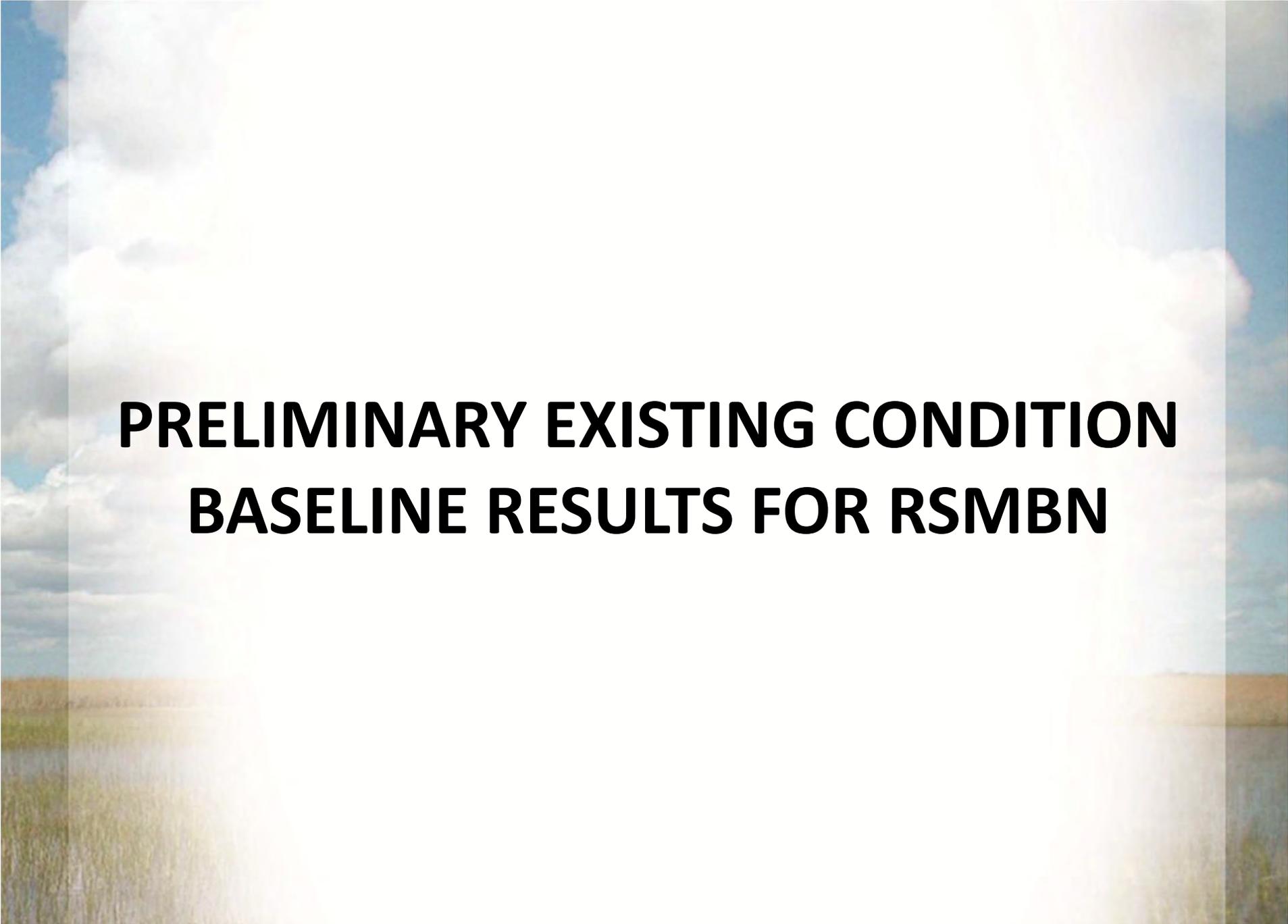
Evaluation  
(Environmental,  
Water Supply, etc...)

- Project Features
- Land Use/Land Cover
- Water Demands
- Operating Criteria

# Modeling Assumption Tables

## General Caveats:

- Products presented today are considered DRAFT and are subject to change.
- ECB and FWO Baselines will be refined over the next month with a target of delivering final versions to the CEPP team in April.



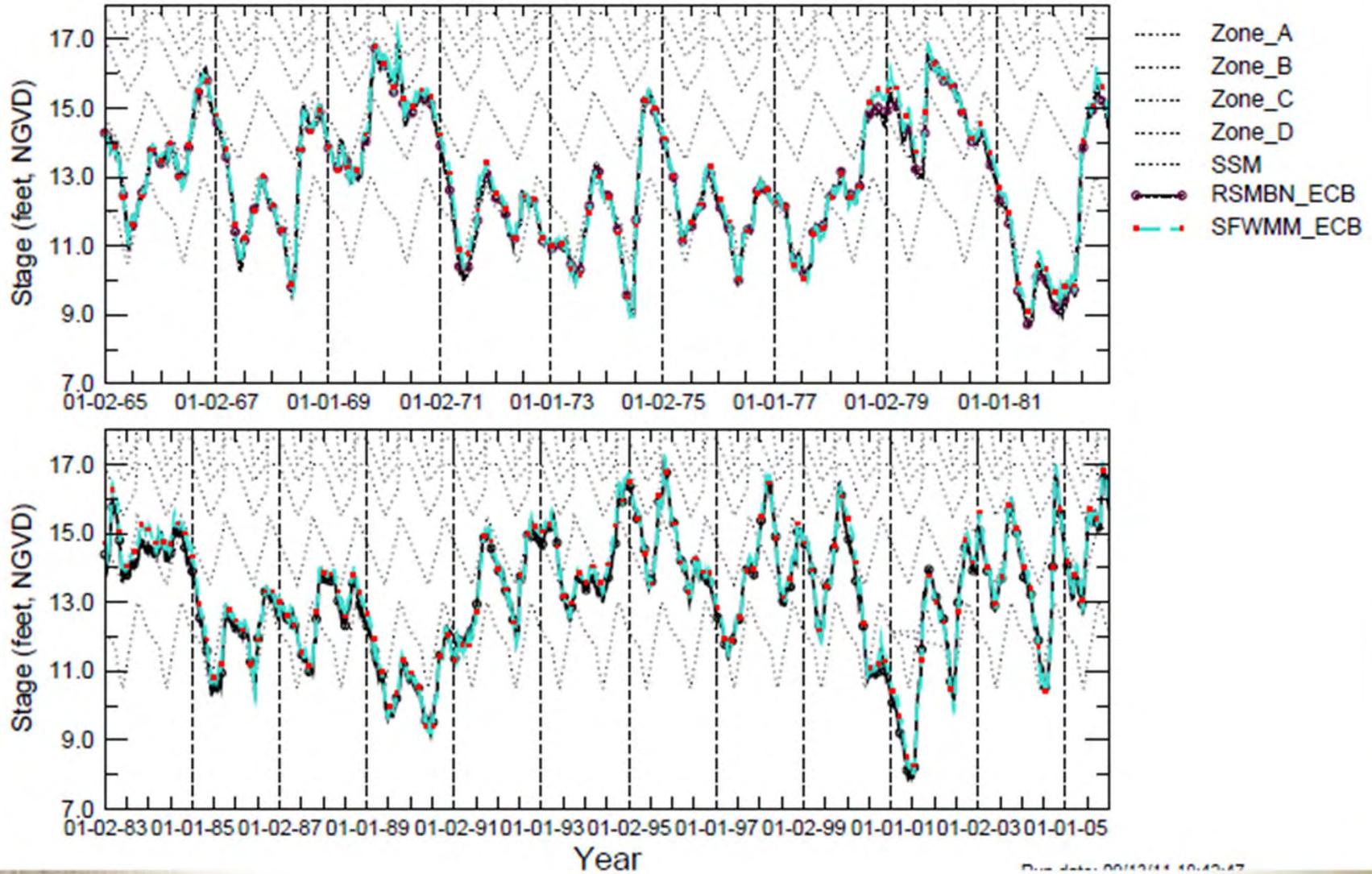
# **PRELIMINARY EXISTING CONDITION BASELINE RESULTS FOR RSMBN**

# RSMBN Results from Preliminary ECB Simulation

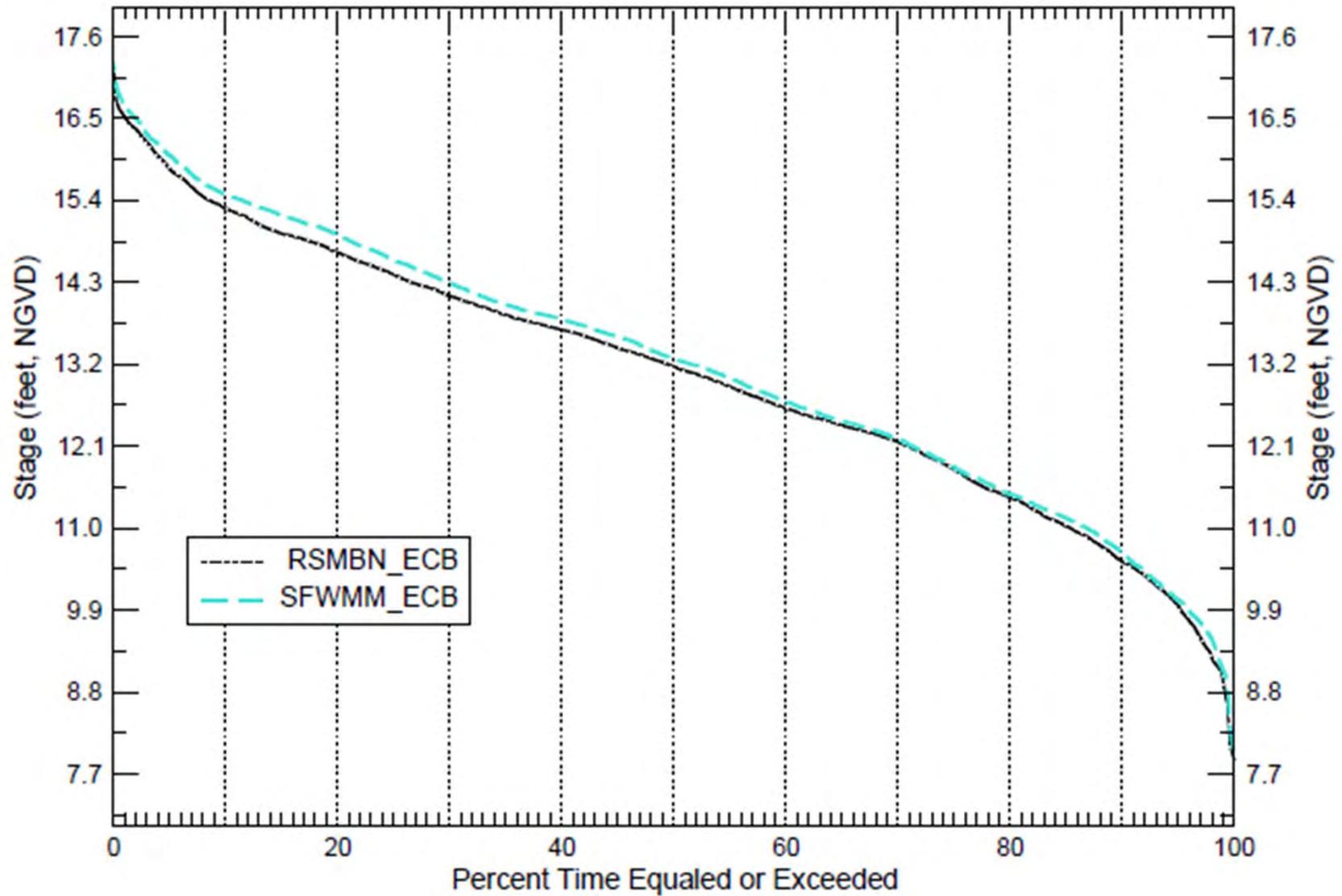
## General Observations:

- Simulated Lake Okeechobee stages in RSMBN are comparable to established South Florida Water Management Model (SFWMM or 2x2) simulation
- Simulated Redline flow = 1.47 Million AC-FT (excludes S-140 flows)
  - Generally consistent with previously established values
- Similar simulation of major EAA basins
- Improved simulation of STAs and 298 Districts

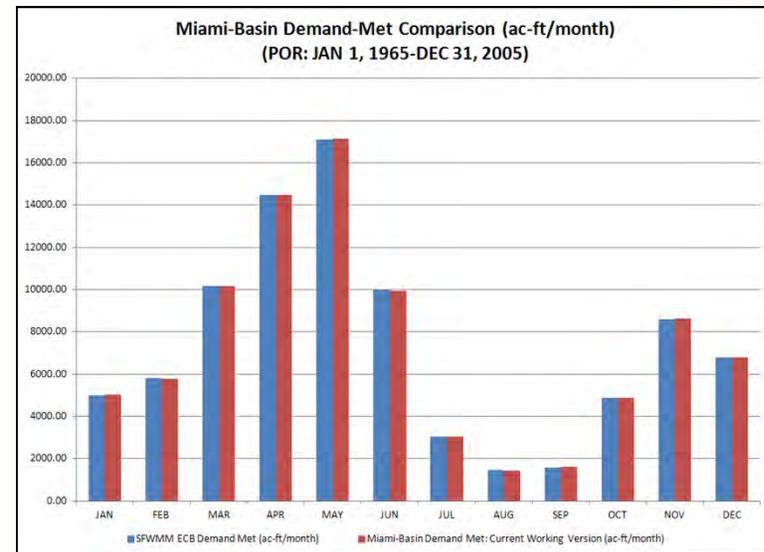
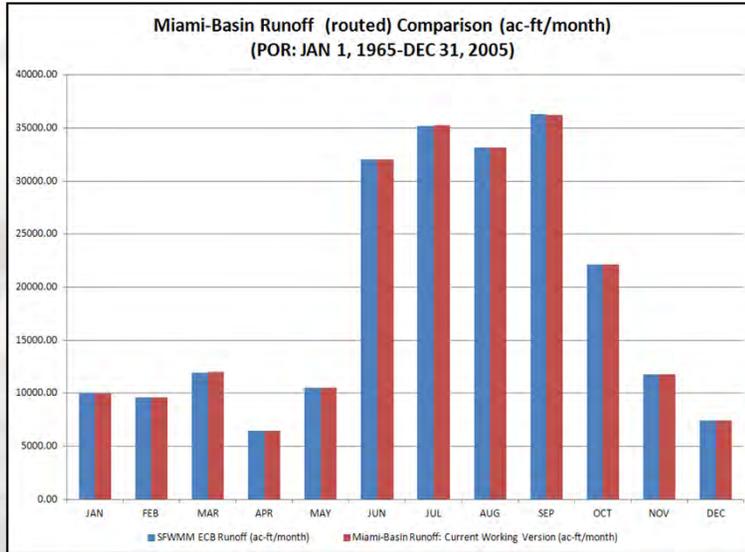
# Stage Hydrographs for Lake Okeechobee



## Stage Duration Curves for Lake Okeechobee



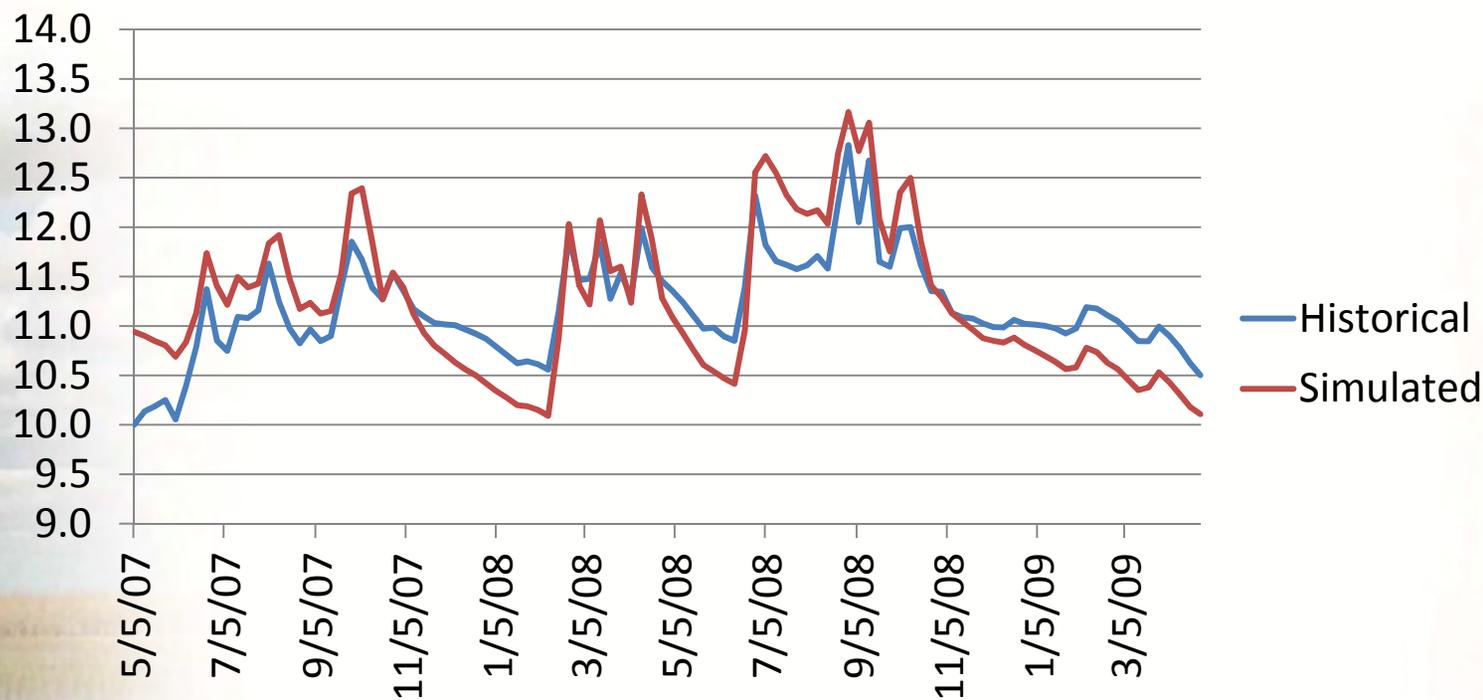
# Runoff and Demand Comparison of SFWMM and RSMBN Existing Conditions Baseline Simulations (Miami Basin)



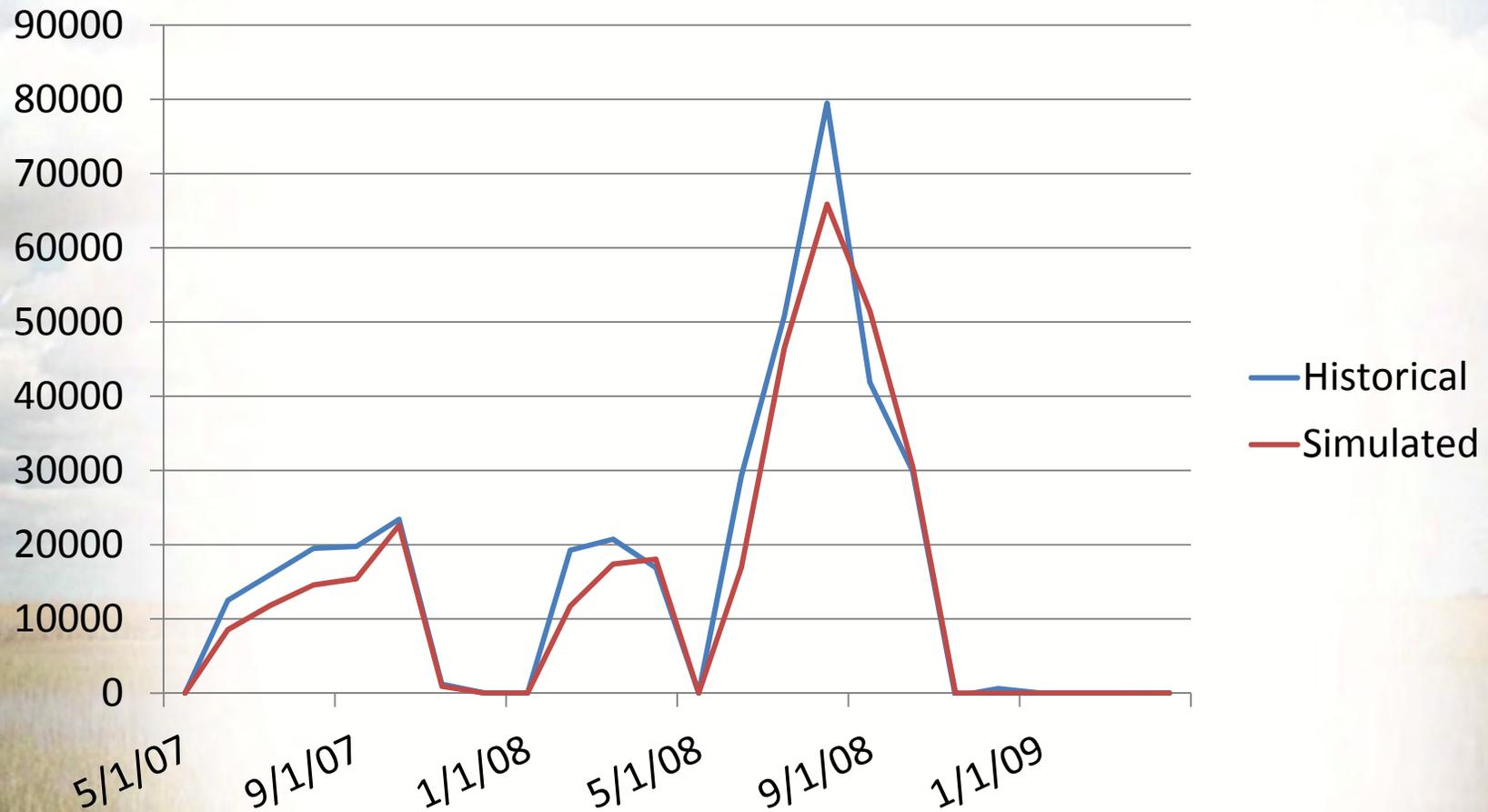
# Runoff and Demand Comparisons of SFWMM and RSMBN Existing Conditions Baseline Simulations (Major EAA Basins)

1965-2005 Annual Average Simulated EAA Runoff/Demand (kac-ft)						
	Runoff			Demand		
	SFWMM	RSMBN	%DIFF	SFWMM	RSMBN	%DIFF
MIAMI BASIN	226.5	226.6	0.01	88.8	88.9	0.04
NNR- HILLS BASIN	484.3	484.7	0.07	141.1	141.0	0.06
WPB BASIN	283.8	283.8	0.01	87.4	87.4	0.01

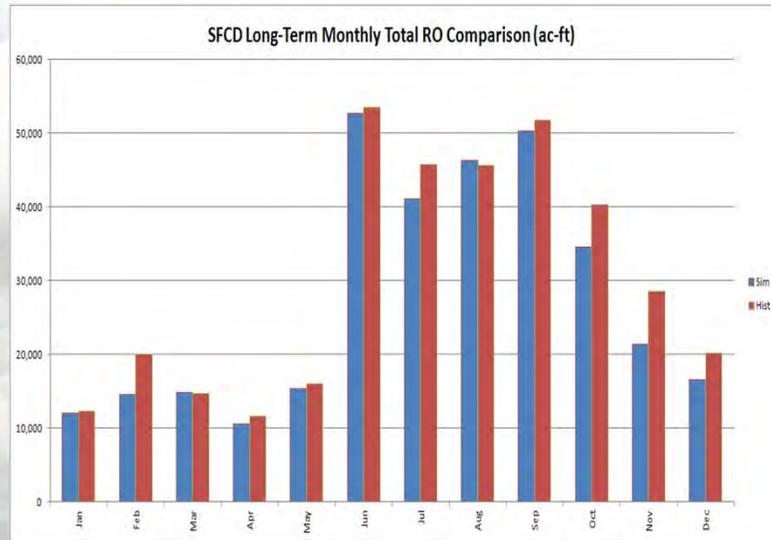
# Average Weekly Stage (ft NGVD) Comparison of Historical and RSMBN-Simulated Values for STA3/4



# Total Monthly Flow (cfs) Comparison of Historical and RSMBN-Simulated Values for STA3/4

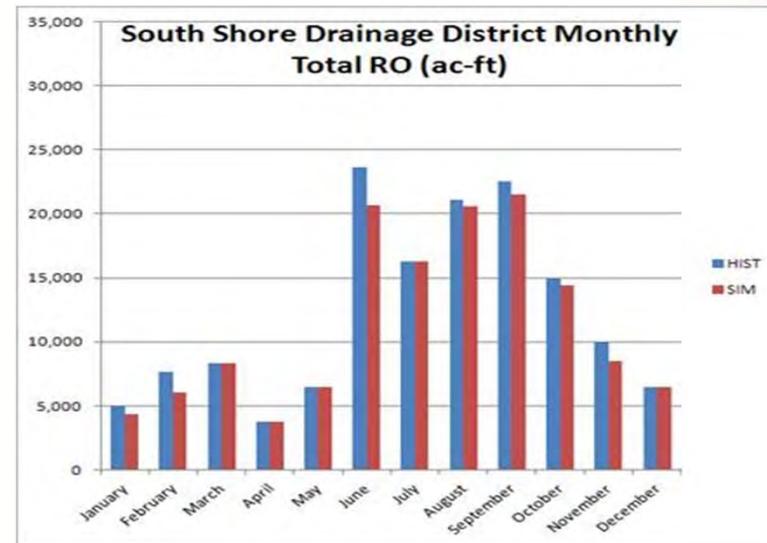


# Comparisons of Historical and RSMBN-Simulated Runoff for Selected 298 Districts (May 1994 – Dec. 2005)



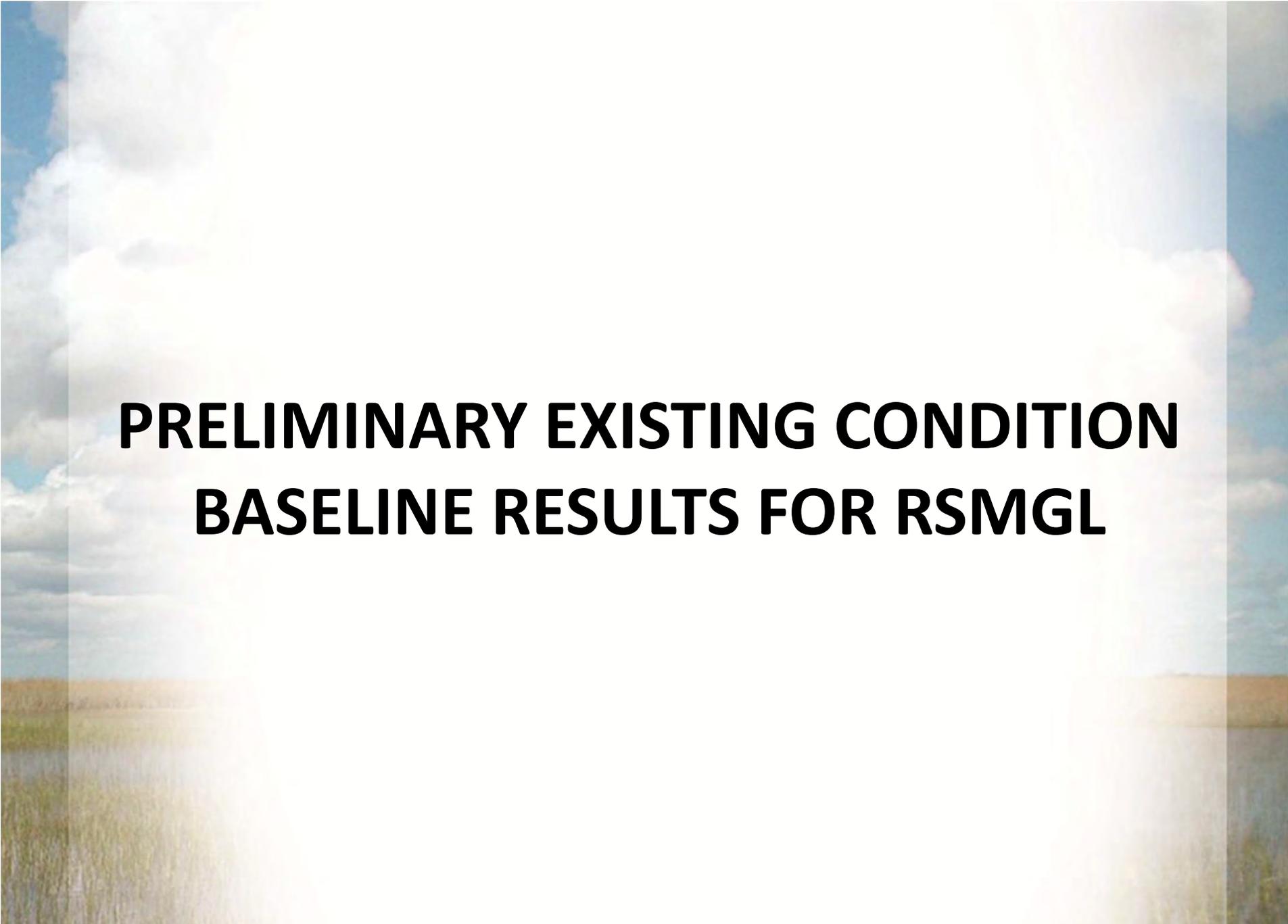
(South Florida Conservancy District)

(South Shore Drainage District)



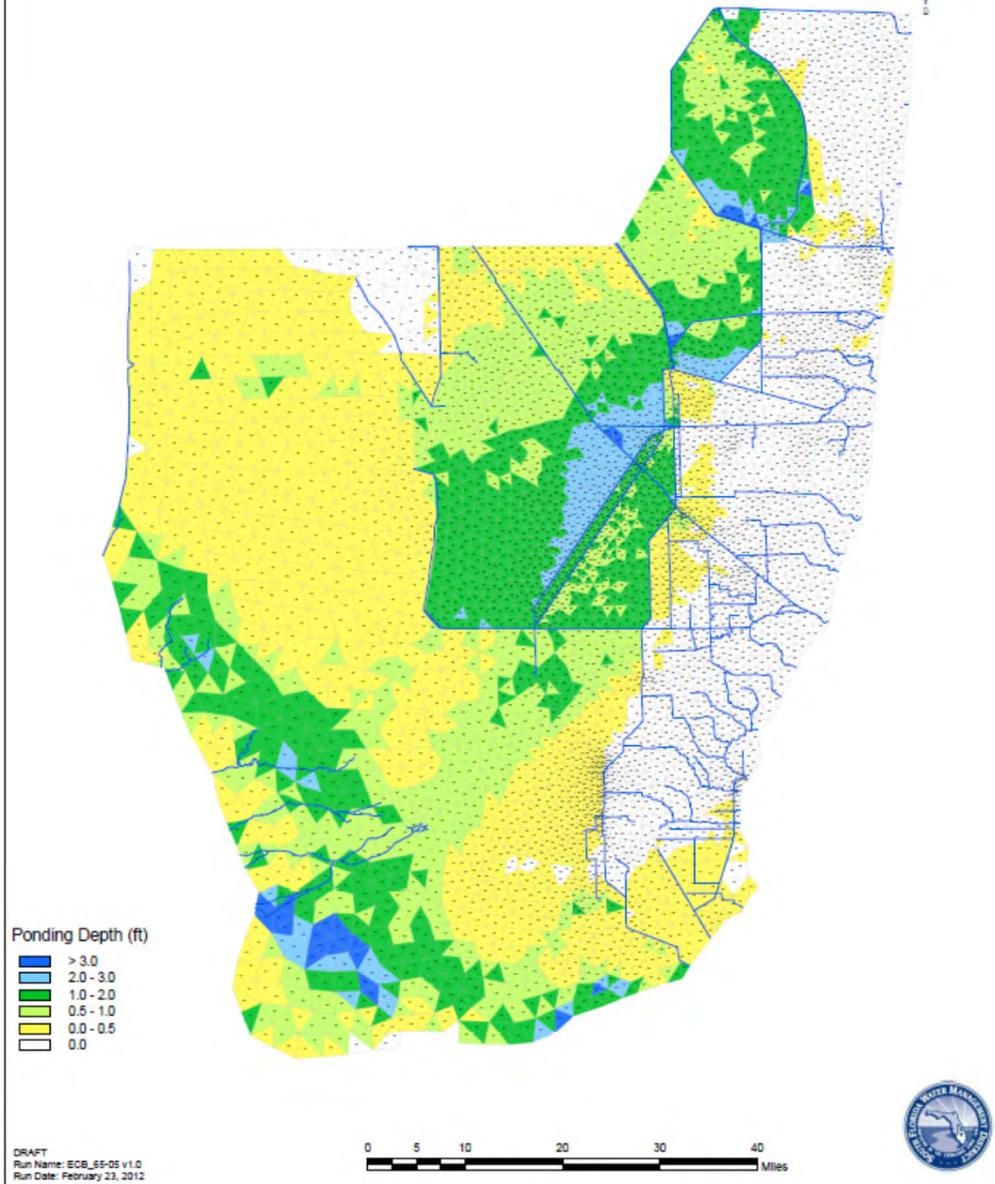
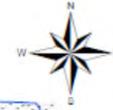
# Comparison of Historical and RSMBN-Simulated Runoff for All 298 Districts

<b>TOTAL RUNOFF FROM 298 DISTRICTS (May 1, 1994-Dec. 31, 2005)</b>		
	<b>WET SEASON (kac-ft)</b>	<b>DRY SEASON (kac-ft)</b>
<b>HISTORICAL</b>	<b>61.02</b>	<b>30.58</b>
<b>RSMBN</b>	<b>59.00</b>	<b>27.74</b>
<b>% DIFF</b>	<b>-3.31</b>	<b>-9.29</b>



# **PRELIMINARY EXISTING CONDITION BASELINE RESULTS FOR RSMGL**

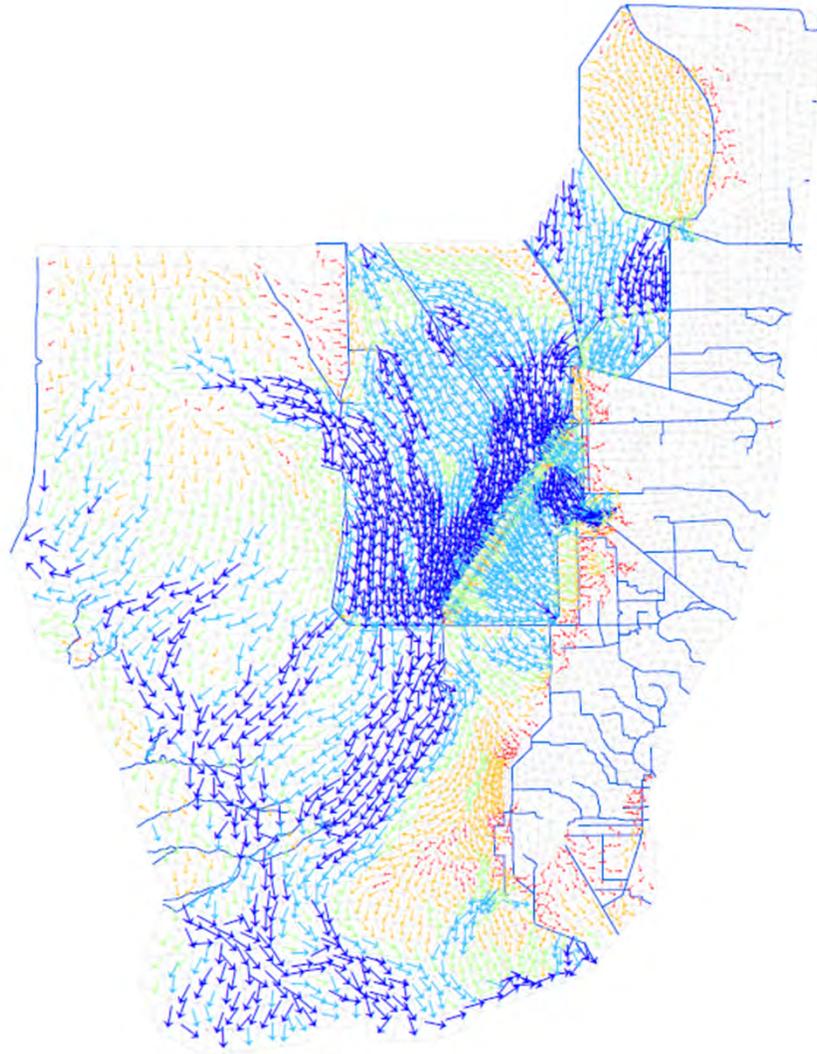
# Average Annual Ponding Depth 1965-2005



GETTING TO THE HEART OF THE EVERGLADES

CENTRAL EVERGLADES

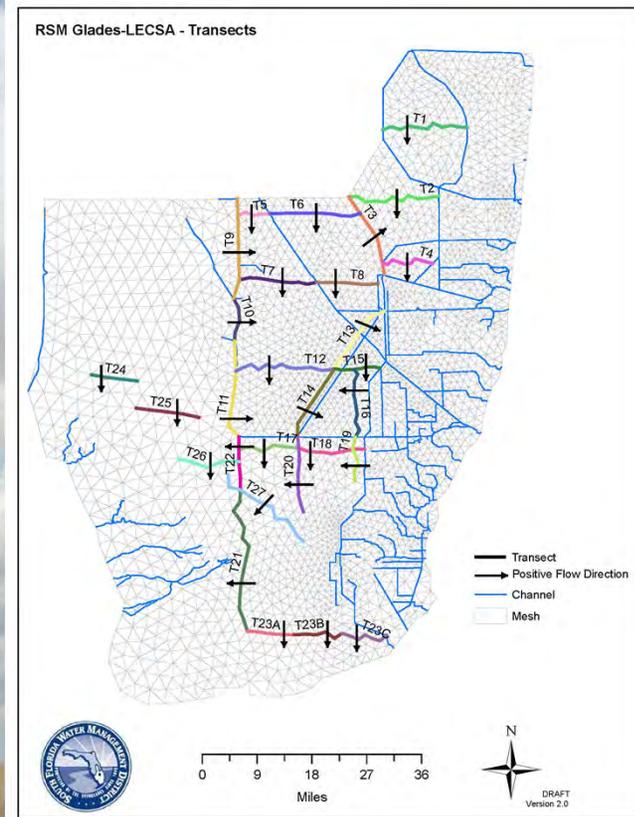
# Average Annual Overland Vector 1965-2005



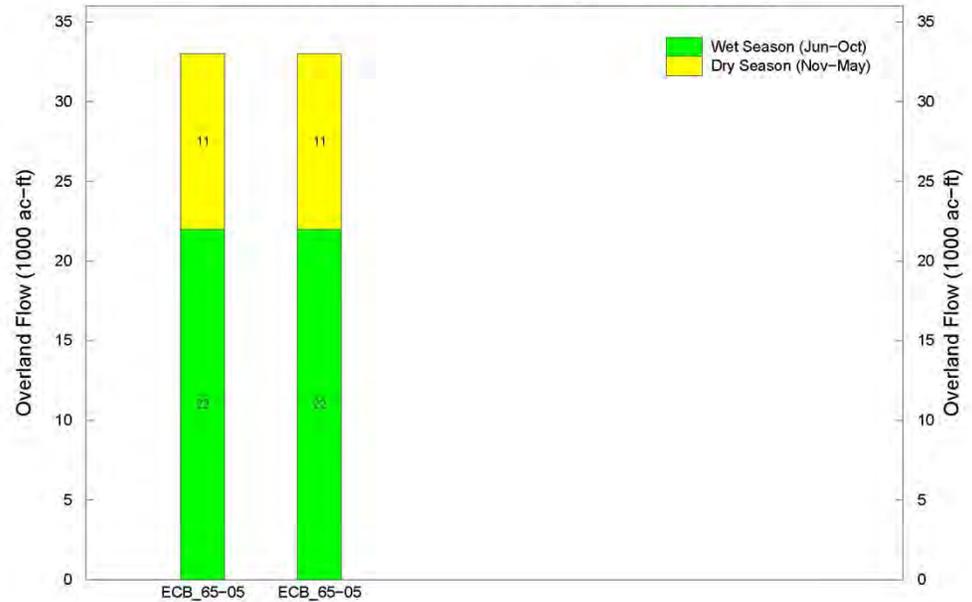
DRAFT  
Run Name: SCB\_65-05 v1.0  
Run Date: February 23, 2012



# Overland Transect Flows

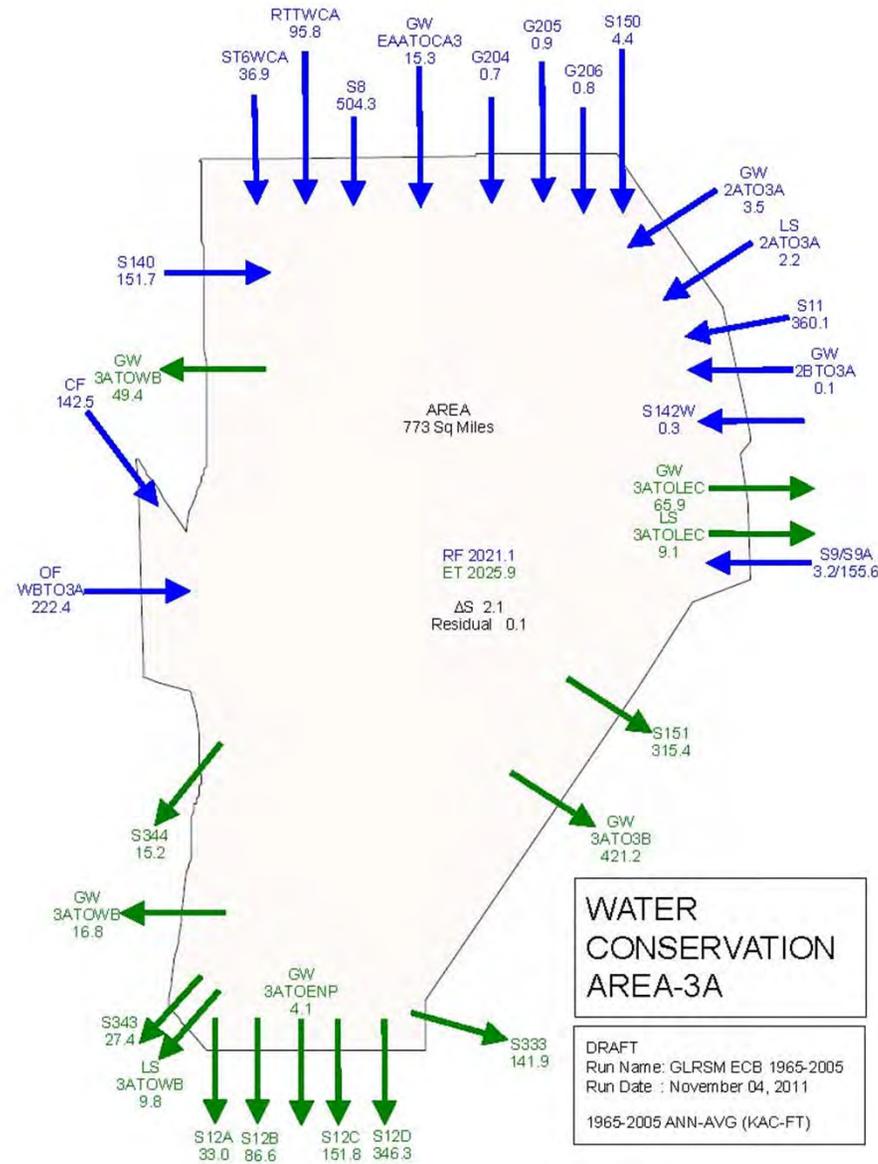


**Average Annual Overland Flow across Transect 6**  
 Southward flows in Northern WCA-3A (east of Miami Canal)



DRAFT  
 02/19/2012

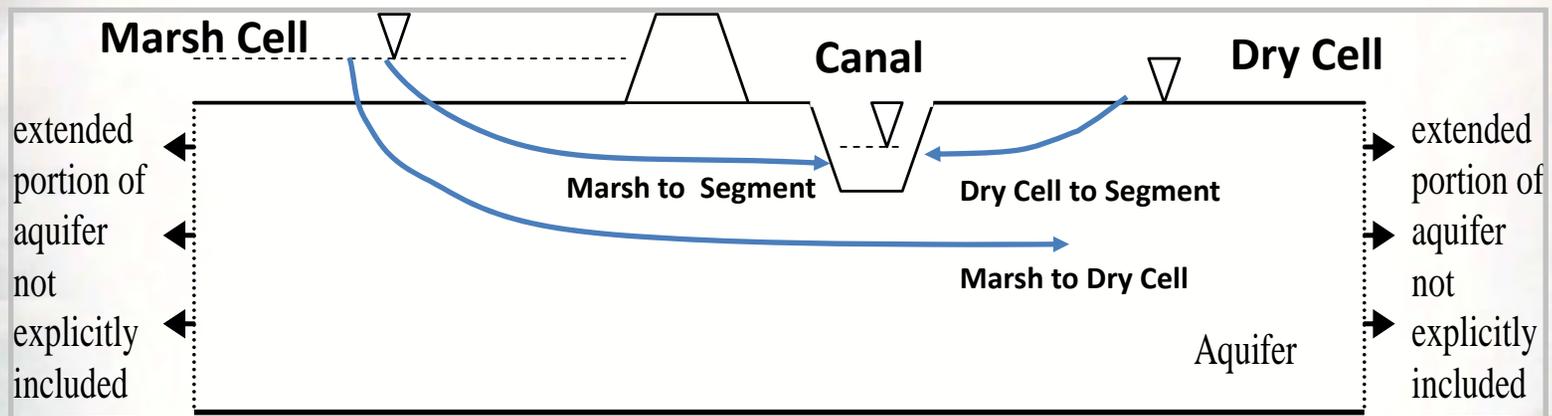
# Water Budgets



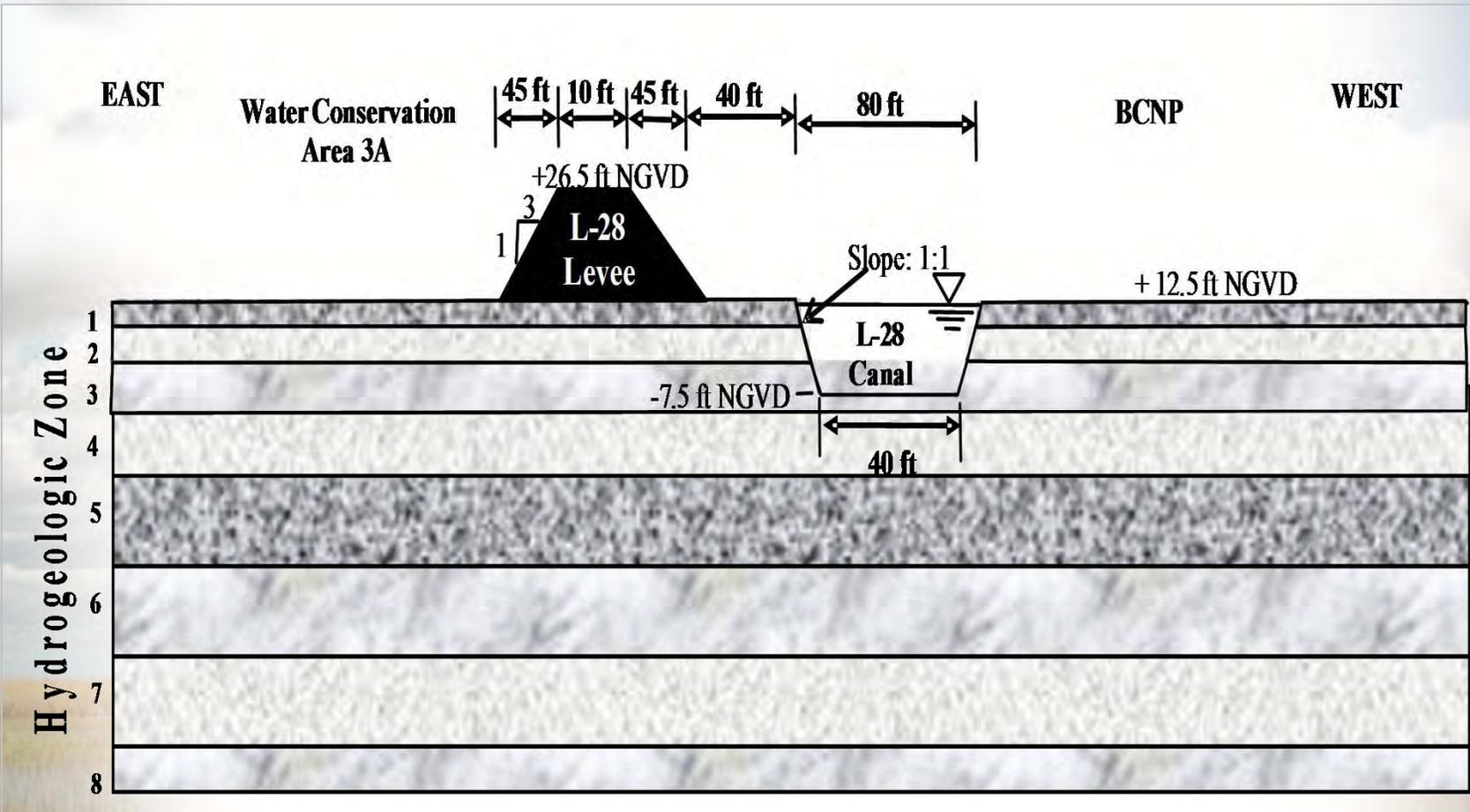
# L-31N Seepage

- Since initial RSMGL model calibration for DECOMP project, additional information in the vicinity of L-31N has become available.
- Effort to incorporate best available information in this area has resulted in model refinement.

## Levee Seepage modeled in RSMGL



# RSM-GL Seepage Coefficients computed from Analytic Element Model which uses the detailed local geology



## Seepage along L31N canal for the ECB run

<b>L31N_Seepage ECB RUN Average Flows (cfs)</b>	<b>DryCell_to _Segment</b>	<b>MarshCell_to _DryCell</b>	<b>MarshCell_to _Segment</b>	<b>MarshCell_to _DryCell (percent of seepage)</b>	<b>MarshCell_to _Segment (percent of seepage)</b>
<b>G211_North</b>	<b>-78.162</b>	<b>78.657</b>	<b>174.707</b>	<b>31.05%</b>	<b>68.95%</b>

- In previous RSMGL applications, over 90% of seepage went into canal.
- Refined values generally consistent with best available distribution of seepage within canal / aquifer cross section

# Ongoing Work

- Several additional model refinements ongoing including:
  - C-111 project features
  - 8.5 SMA Operations Plans
  - Adaptive Protocols for Lake Okeechobee
  - Etc...

# CEPP Hydrologic Modeling Team

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- Charles Sawyer
- Randy Vanzee
- Cary White



**QUESTIONS?**