

Greater Everglades Ecosystem Restoration Meeting July 28th – August 1st, 2008

Effects of Sea-Level Rise on Saltwater Intrusion in Northern Broward County, Florida

Michael Zygnerski
Christian Langevin

United States Geological Survey
Fort Lauderdale, Florida USA

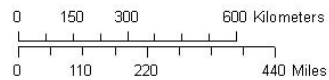
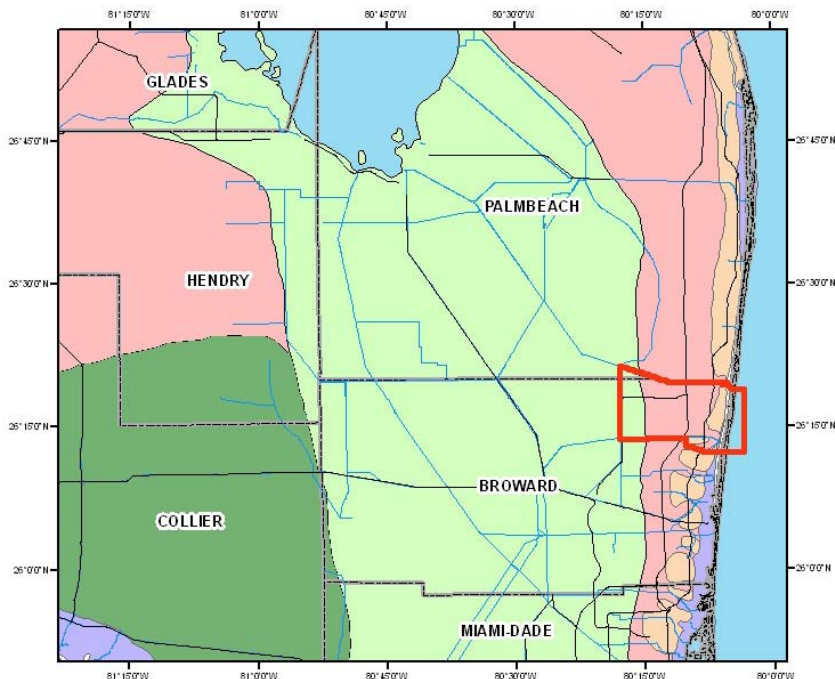


Pompano Project

Objectives

1. Simulate Historical Saltwater Intrusion
 2. Quantify Effects of Stresses
 3. Provide Useful Tool For Future Water Management
- Anthropogenic Stresses:
 - Everglades drainage
 - Agricultural/Urban development
 - Well field pumping
 - Canal water level management
 - Natural Stresses:
 - Sea level rise
 - Rainfall variations

Study Area/History

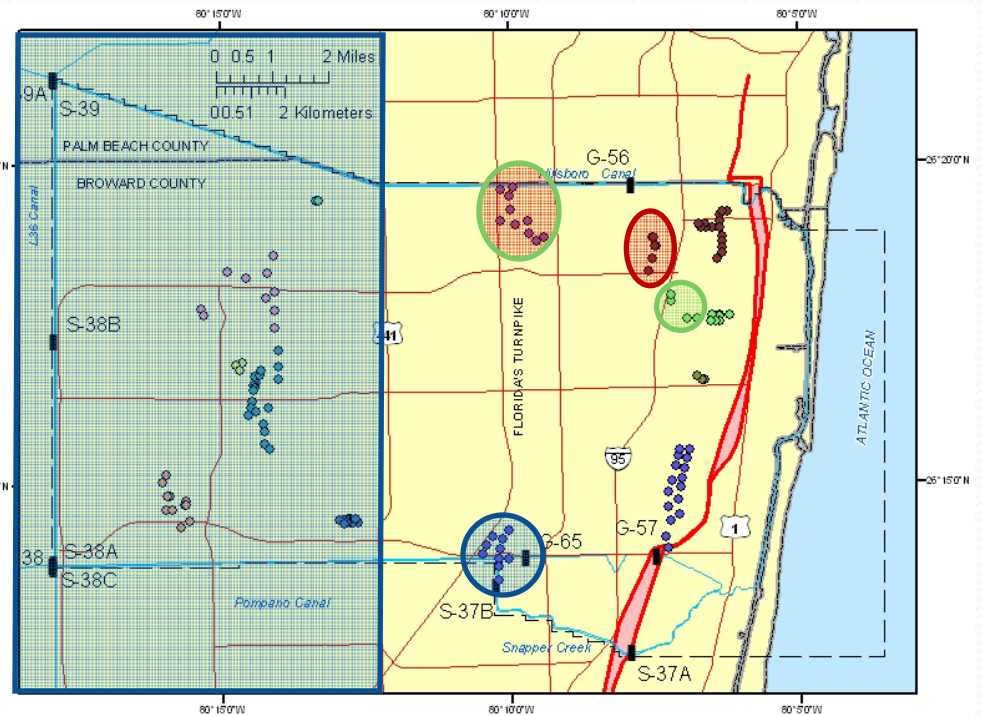


Explanation

- Study Boundary
- Major Highways
- Major Canals
- County Boundaries

Physiographic Features

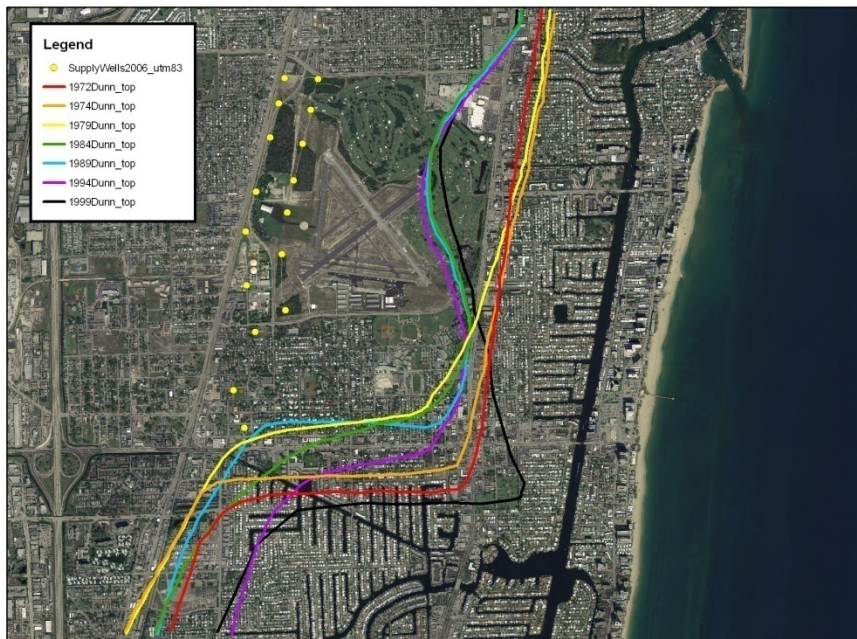
- ATLANTIC COASTAL RIDGE
- BIG CYPRESS SWAMP
- COASTAL MARSH & MANGROVE
- EVERGLADES
- LAKE OKEECHOBEE
- SANDY FLATWOODS



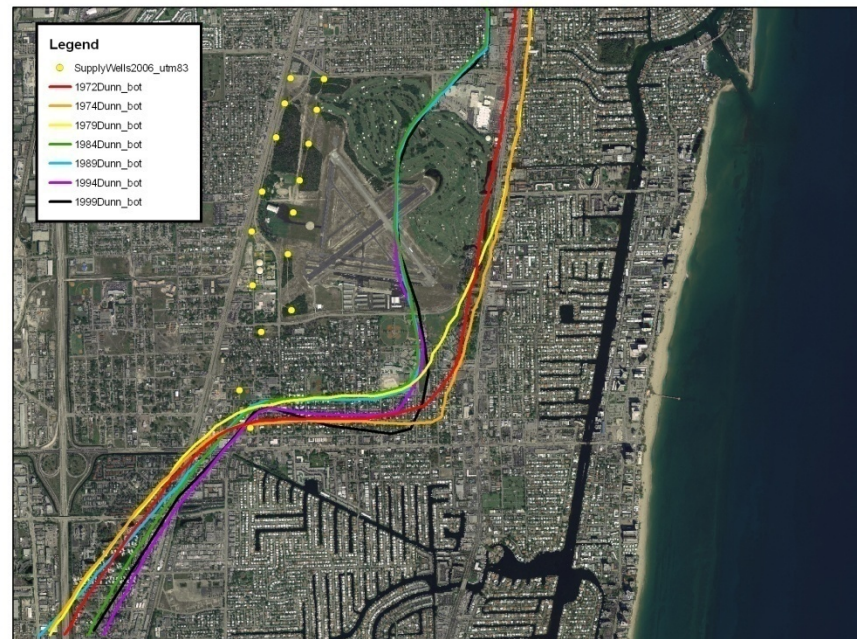
EXPLANATION

● BCNR	● MARG	■ CONTROL STRUCTURE
● BC2A	● NSID	 Active Model Boundary
● CSID	● PARK	— MAJOR HIGHWAY
● CRSP	● POMP	— MAJOR CANAL
● DEER	● ROUC	 Approx. Position of Saltwater Interface (1994)
		 COUNTY BOUNDARY

Historical Movement Of 250 mg/L Chloride Isosurface

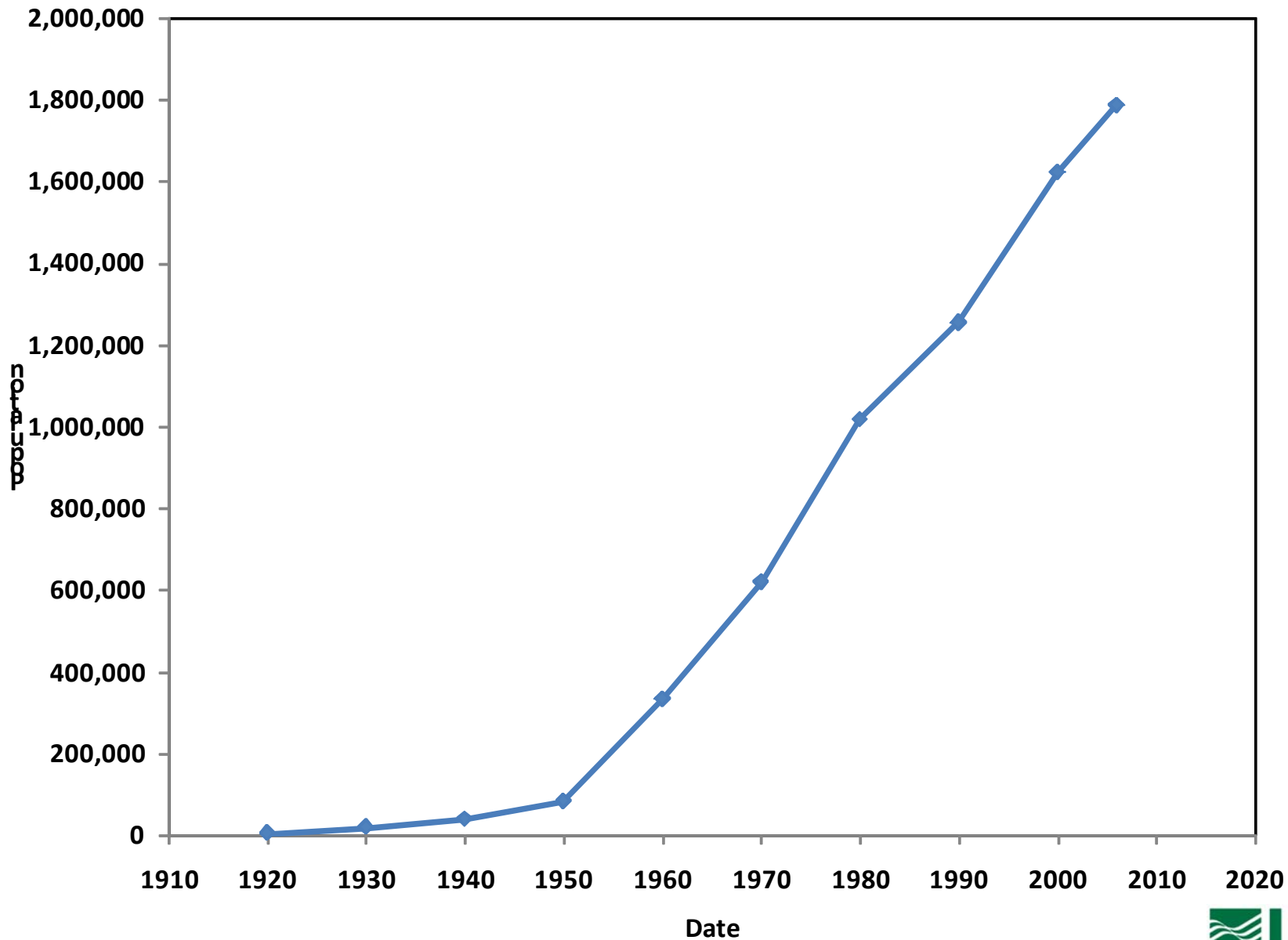


Top of Production Zone



Base of Production Zone

Land Use & Population Growth



Land Use & Population Growth



Broward County Historical Commission

SFWMD

Water Management

NBCRS Operations - Target Water Levels and Location of Control Structures

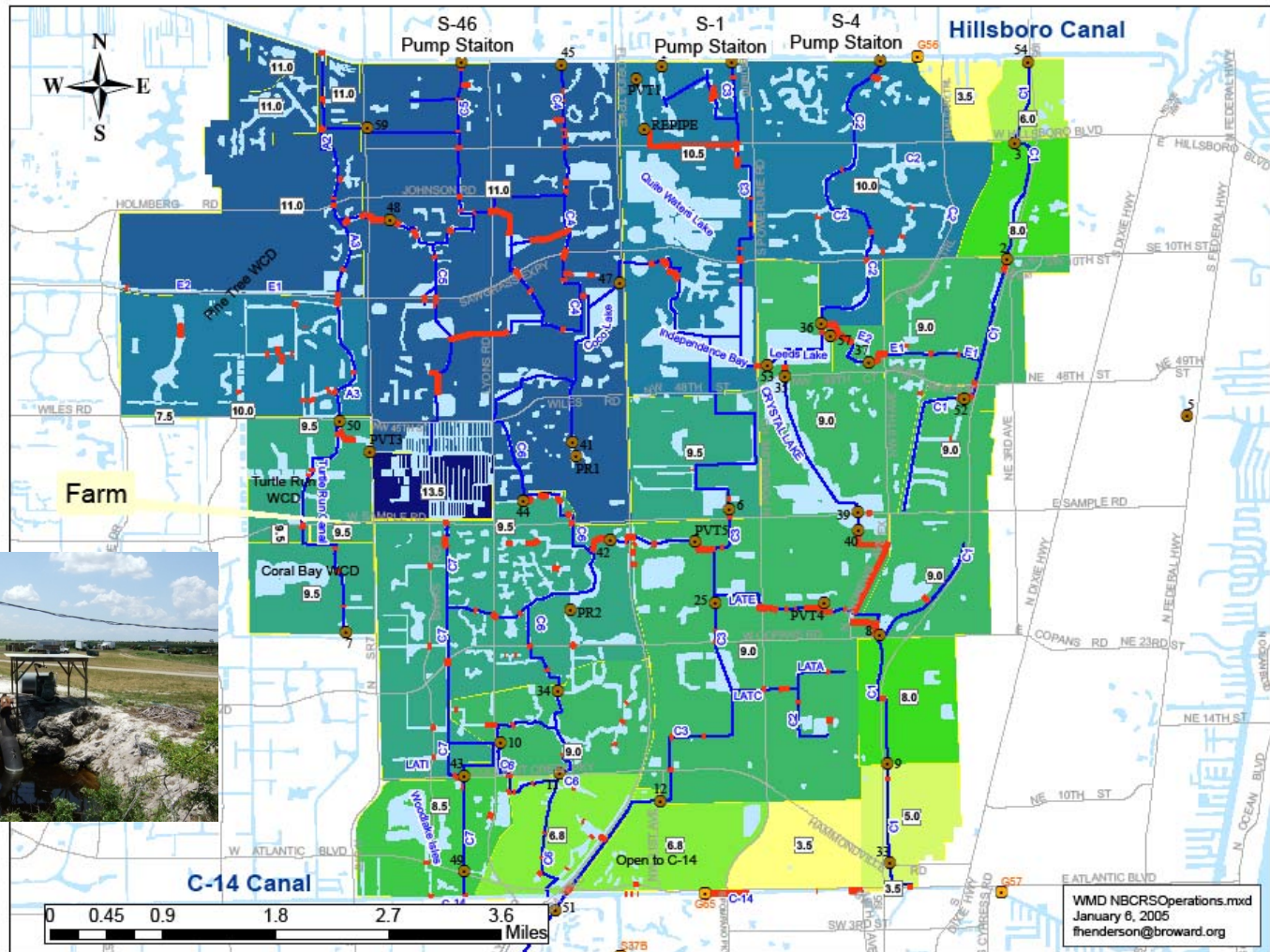
Legend

- Broward County Control Structure
- SFWMD Control Structure
- Culvert
- Major Roads
- Flow Path
- Surface Water
- NBCRS Boundary

Target Water Levels (FT)

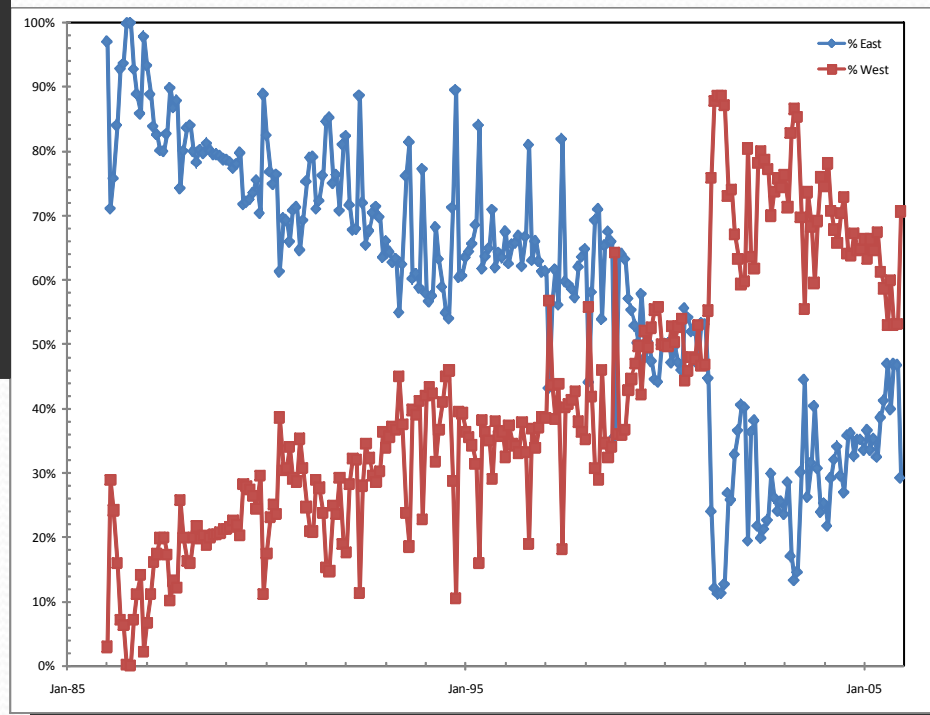
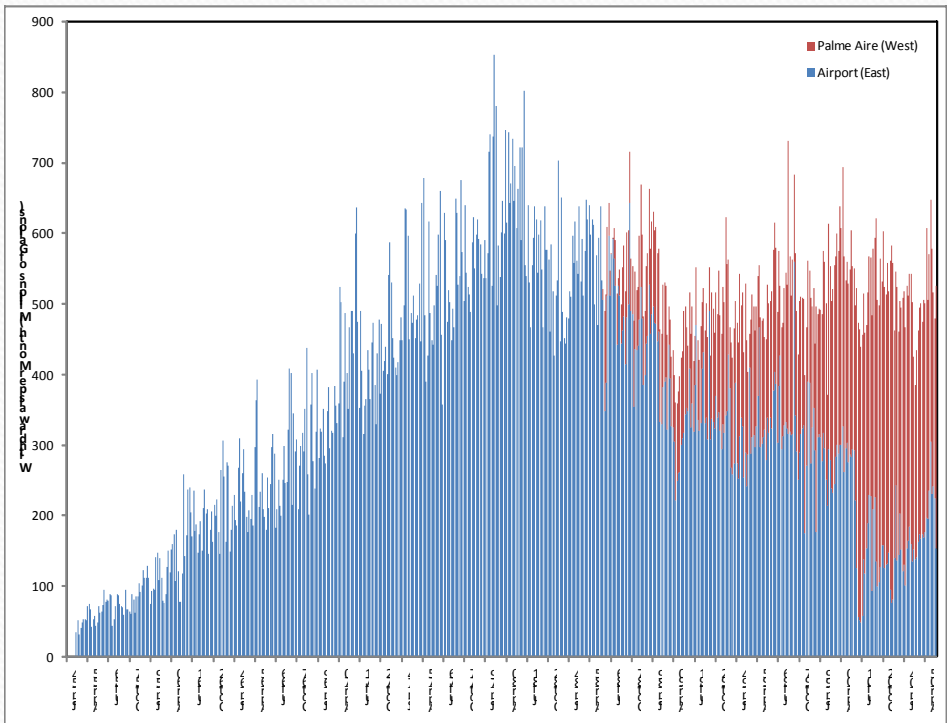
OPT_LEV

- 3.5
- 5.0
- 6.0
- 6.8
- 7.5
- 8.0
- 8.5
- 9.0
- 9.5
- 10.0
- 10.5
- 11.0
- 12.0
- 13.0
- 13.5

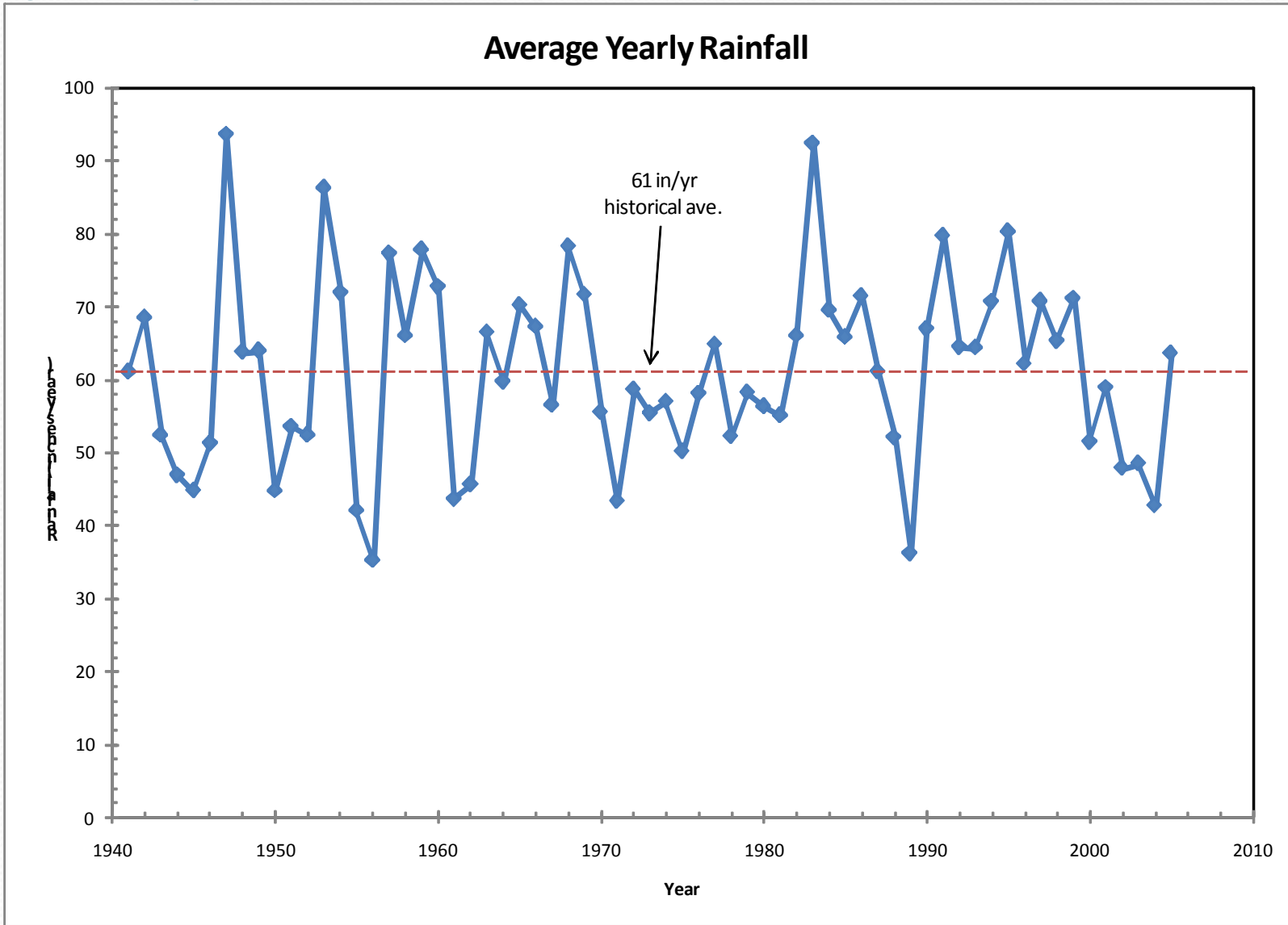


WMD NBCRSOperations.mxd
 January 6, 2005
 fhenderson@broward.org

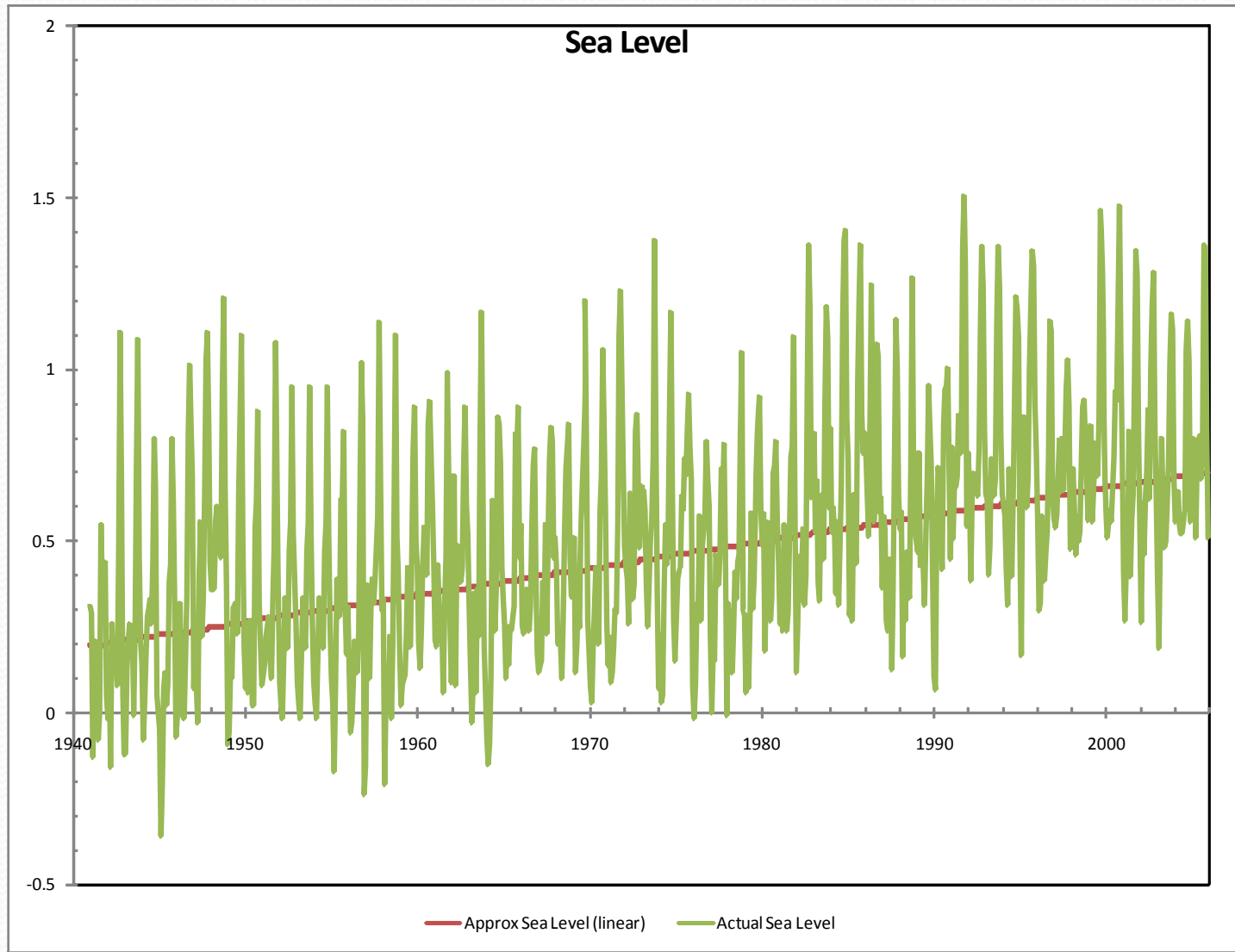
Withdrawals



Rainfall

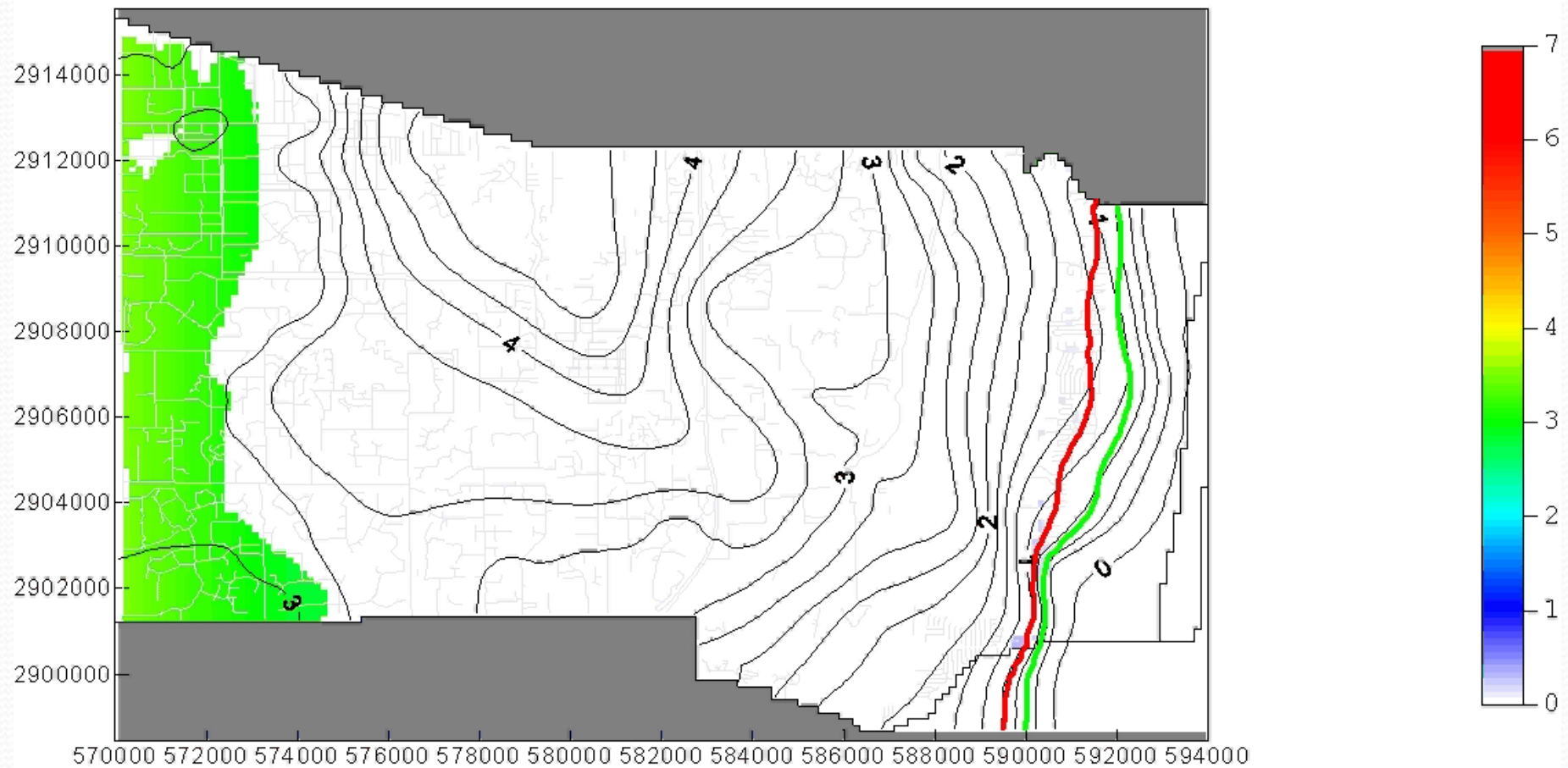


Sea Level Rise



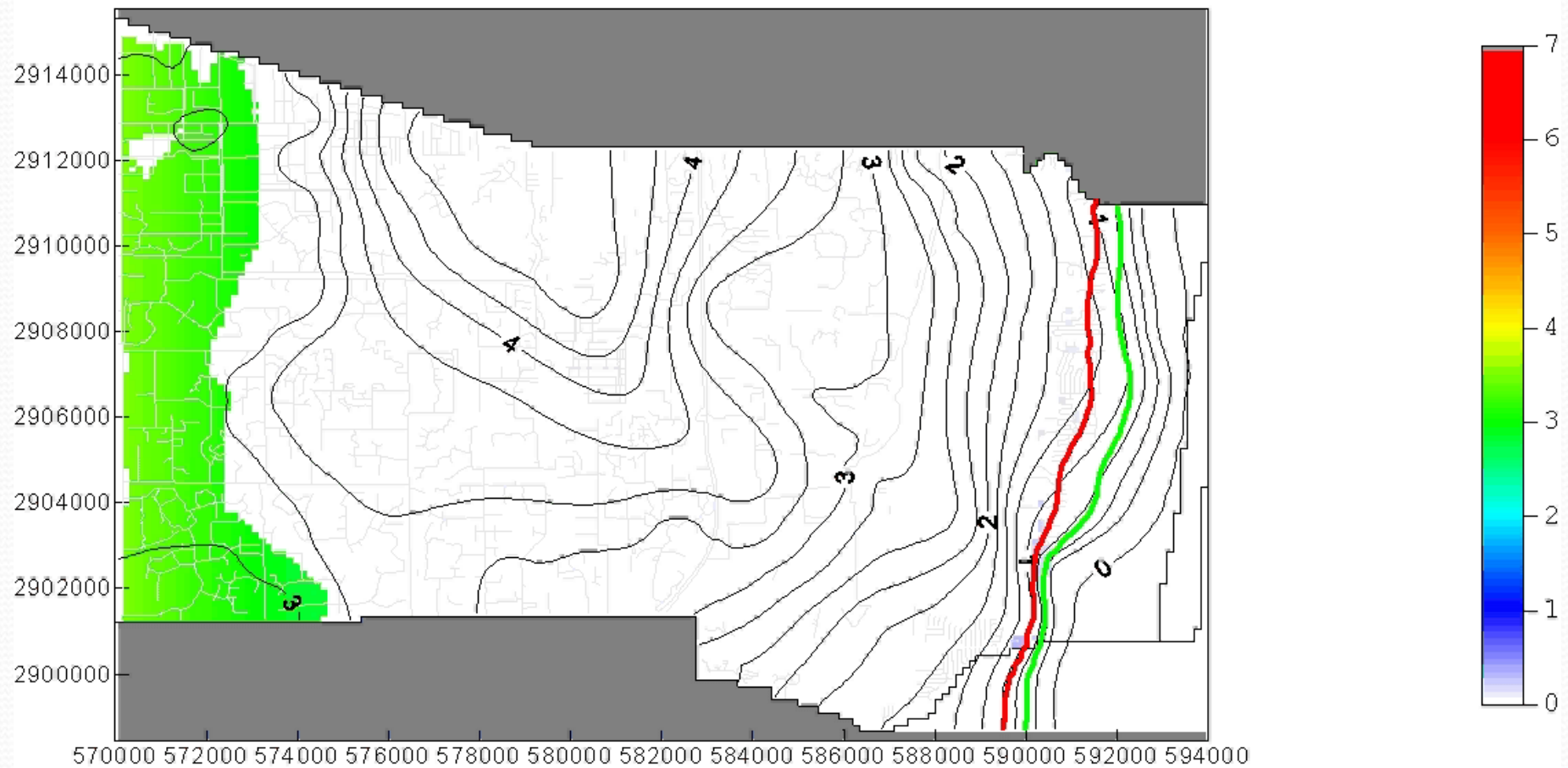
Results: Plan View

Stress Period 1---Jan 1900 - Dec 1906

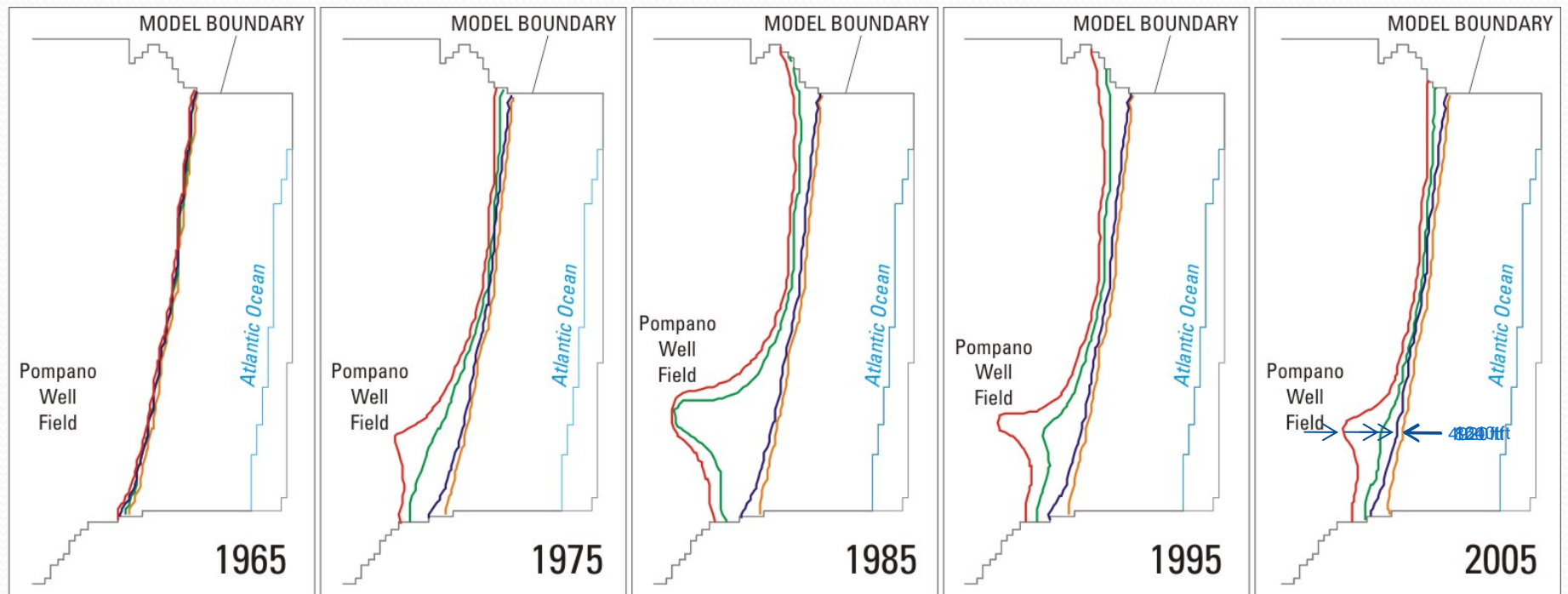


Results: Plan View

Stress Period 1---Jan 1900 - Dec 1906



Results & Conclusions



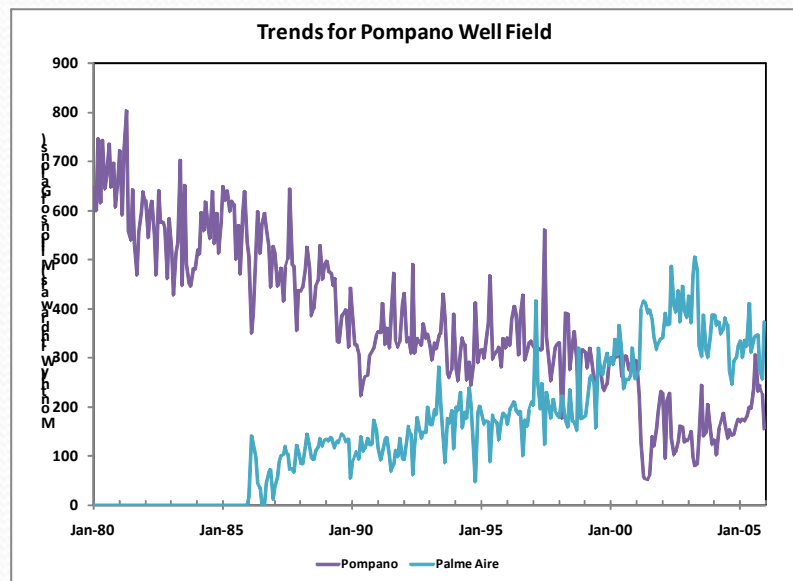
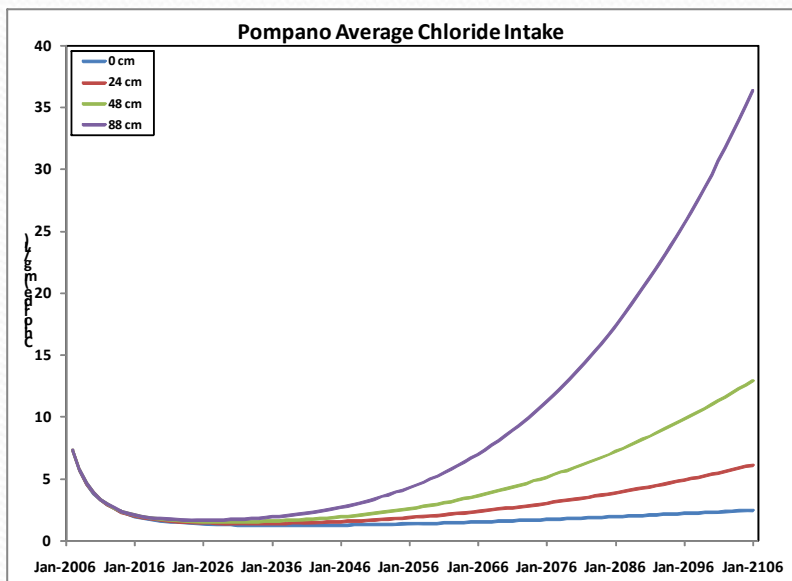
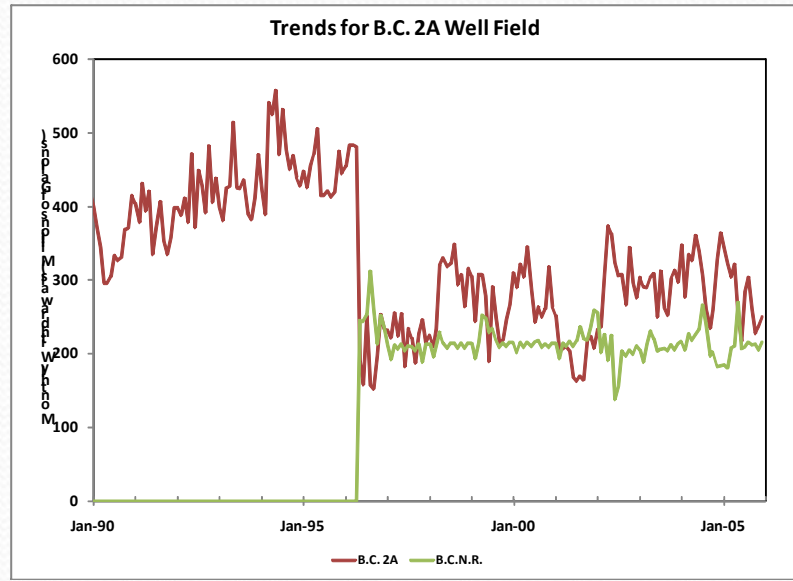
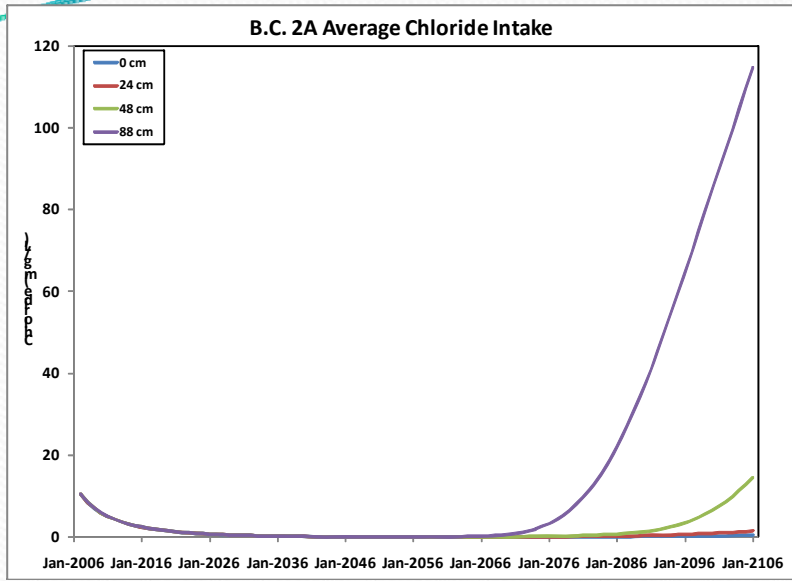
EXPLANATION

- Base historical
- No sea level
- No withdrawals
- No sea level rise and no withdrawals

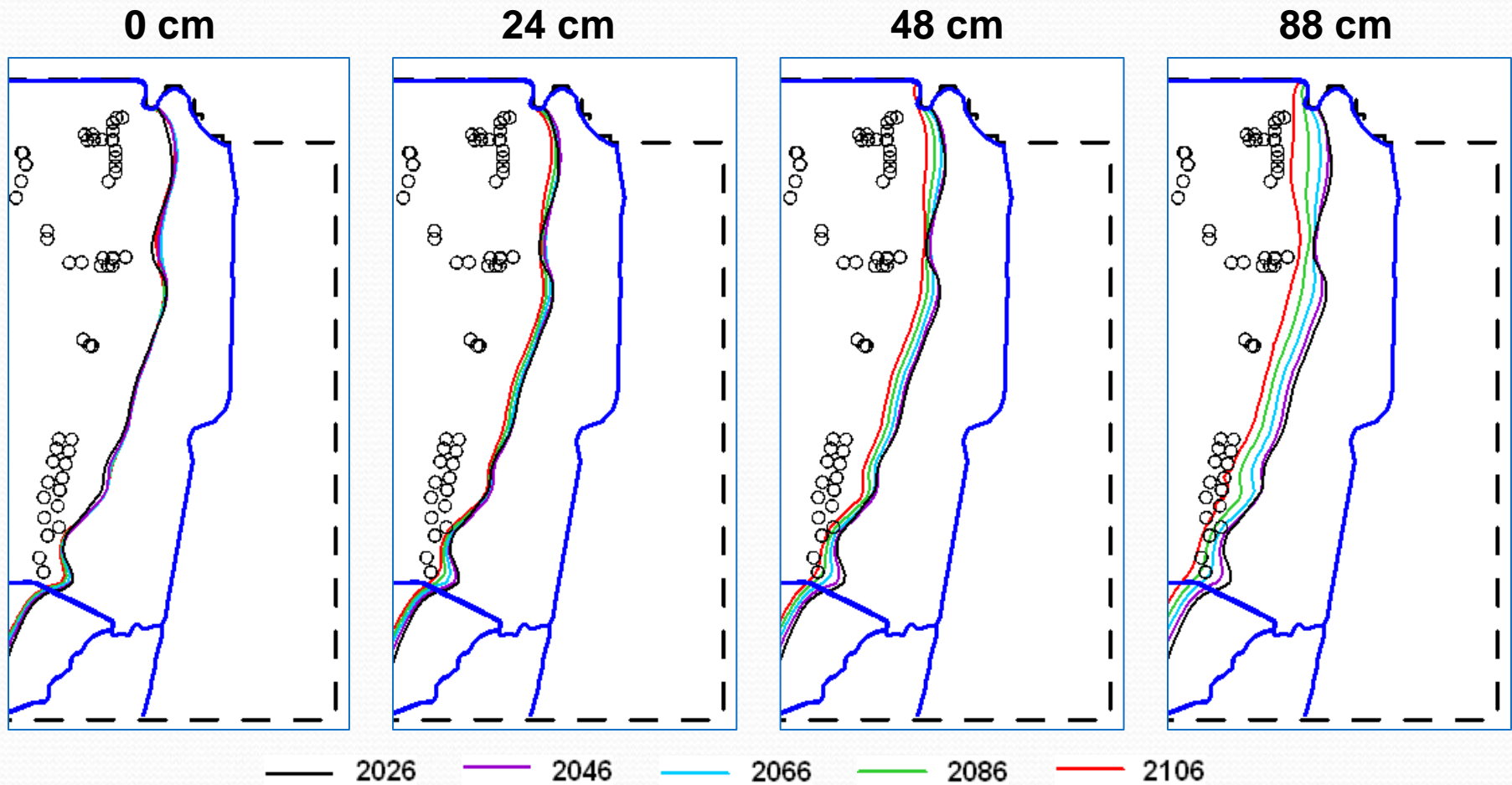
Prediction Scenario Assumptions

- 4 Projections for Sea Level Rise Used
 - 0, 24, 48, & 88 cm
- Time Period
 - 100 yrs (2006-2106)
 - 10 yr Stress Periods
 - Yearly Time Steps
- Increased Incrementally Each Stress Period
 - Tidal Canals
 - Ocean and Intracoastal Waterway
- Well Fields
 - Yearly Ave for 2005
- Recharge
 - Yearly Ave for Period of Record (61 in/yr)
- ET
 - Historic Yearly Ave

Average Chloride Increases



Movement of 250 mg/L Salt Front with Varying Sea Level Rise Estimates



Key Points

- Shift of withdrawals to inland well fields is an effective strategy for preventing saltwater intrusion
- Historical Rate of Sea Level Rise Will Cause Landward Movement of Saltwater Front
- Non Linear Relationship of Multiple Stresses Important to Consider

Questions??

Acknowledgements

- Broward County
 - Darrel Dunn
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For further information contact:

Michael Zygnerski

mzygners@usgs.gov