

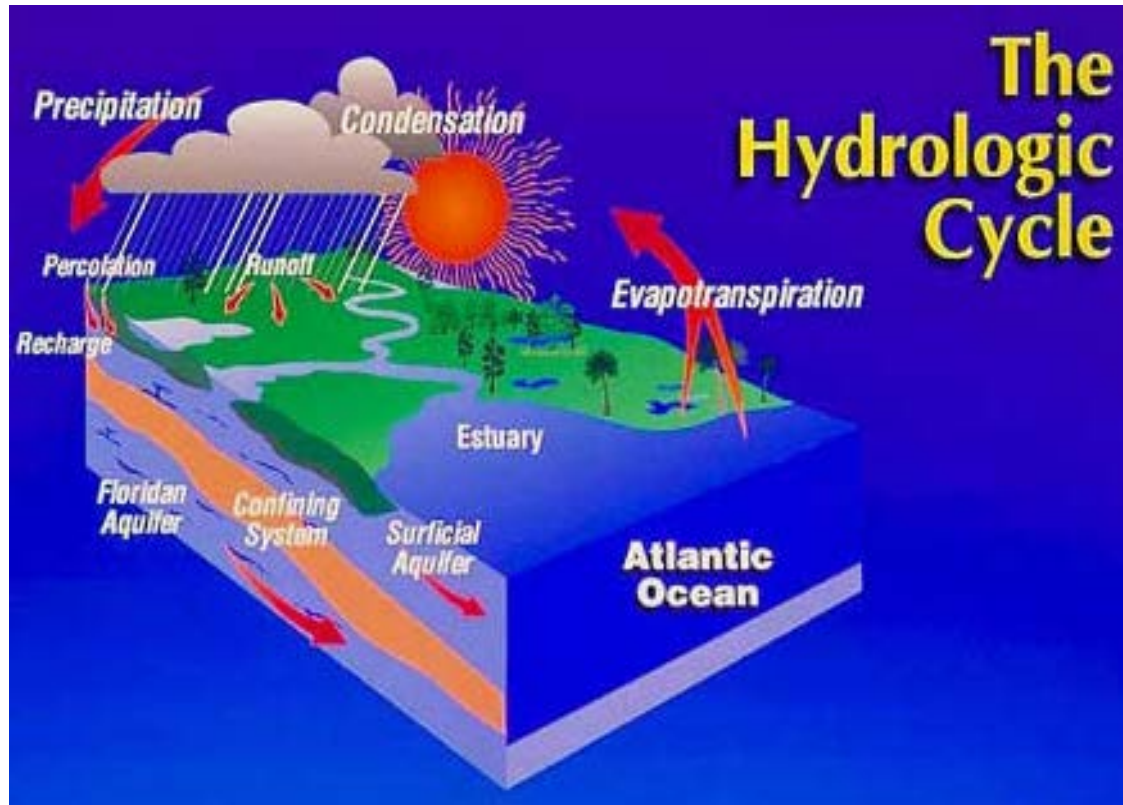
SOUTHEAST FLORIDA: RESILIENT REDESIGN
Miami Center for Architecture & Design
August 10-13, 2014

Water Management : The Hydrology of South Florida

*Tommy B. Strowd, Director
Operations & Maintenance
Lake Worth Drainage District*

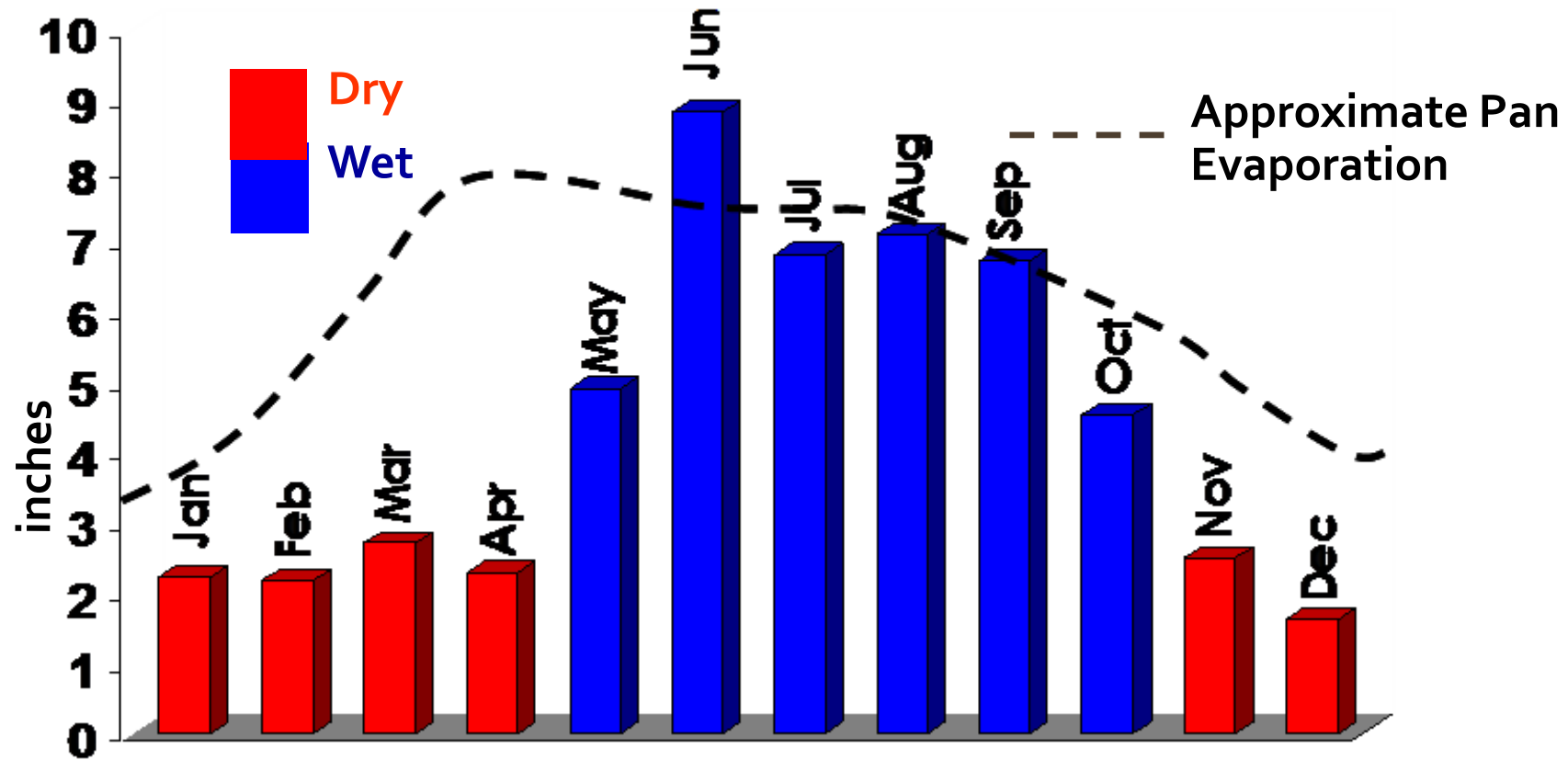


Hydrologic Recipe...



- Precipitation
- Evaporation
 - Transpiration
- Geology
 - Recharge / Percolation
 - Groundwater Aquifers
 - Rainfall Runoff
- Topography

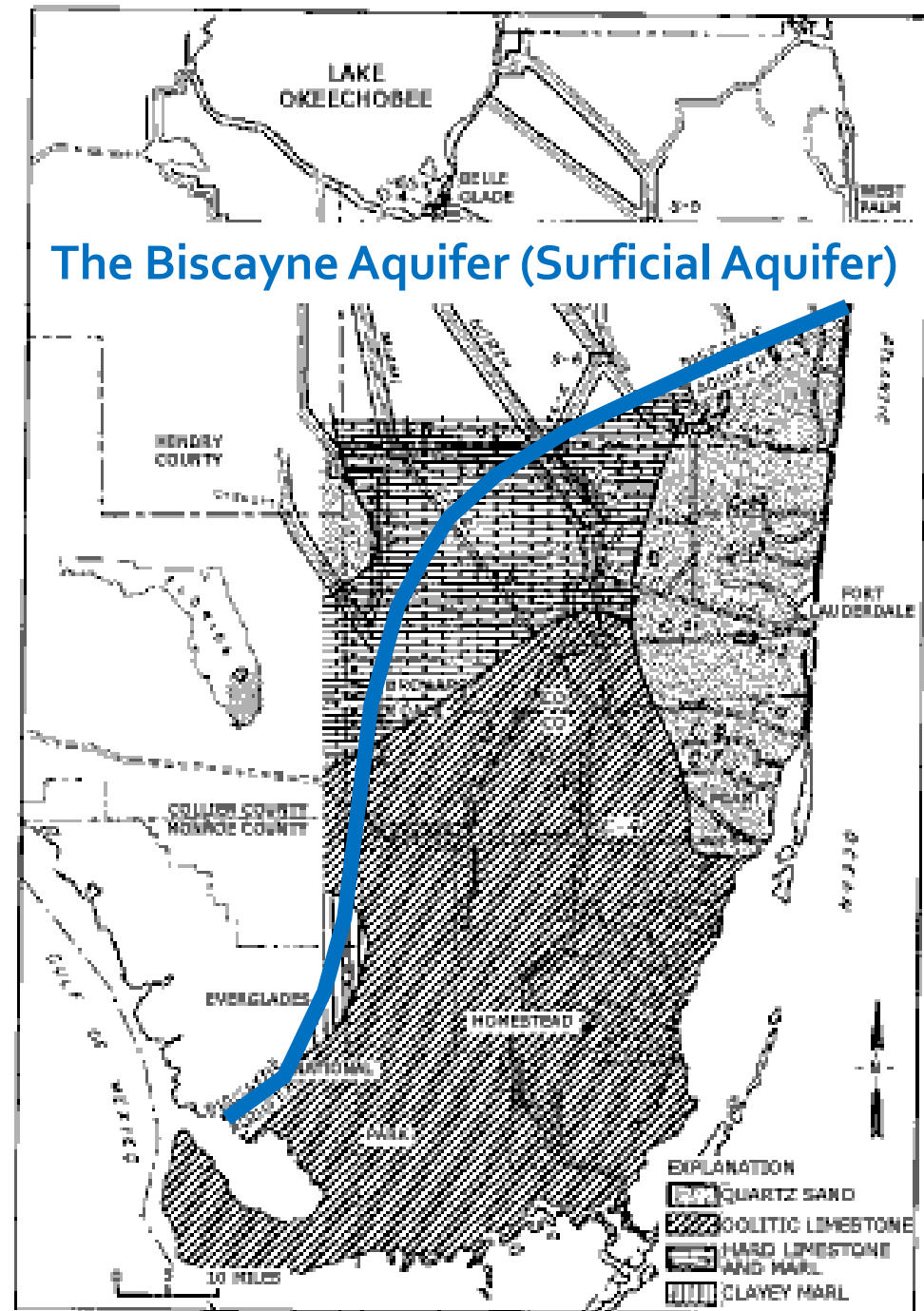
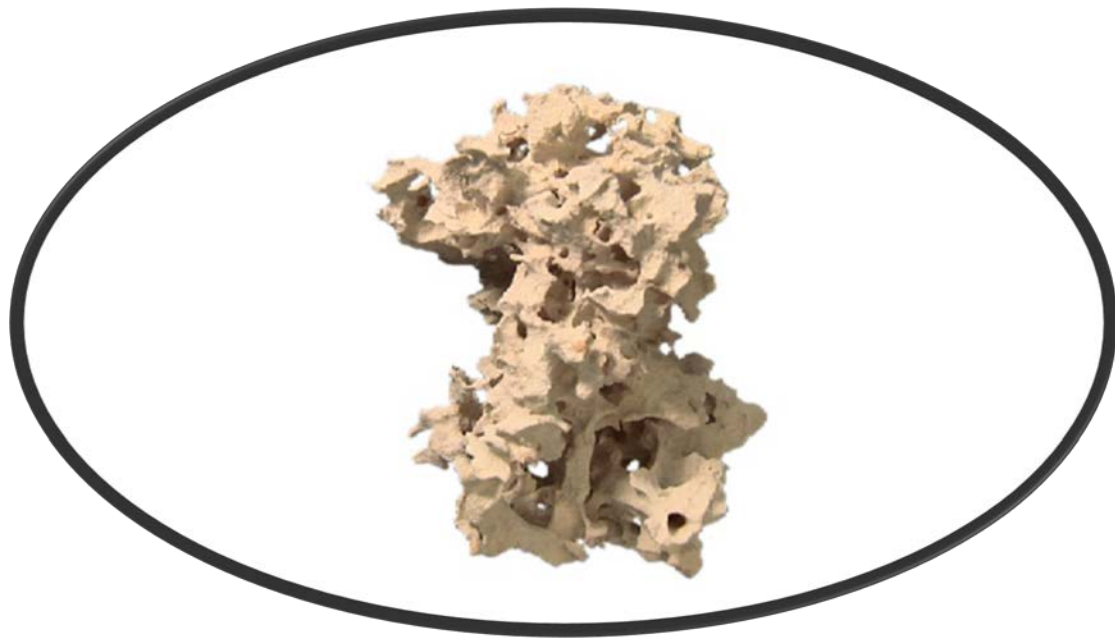
Seasonal Rainfall Variation in South Florida



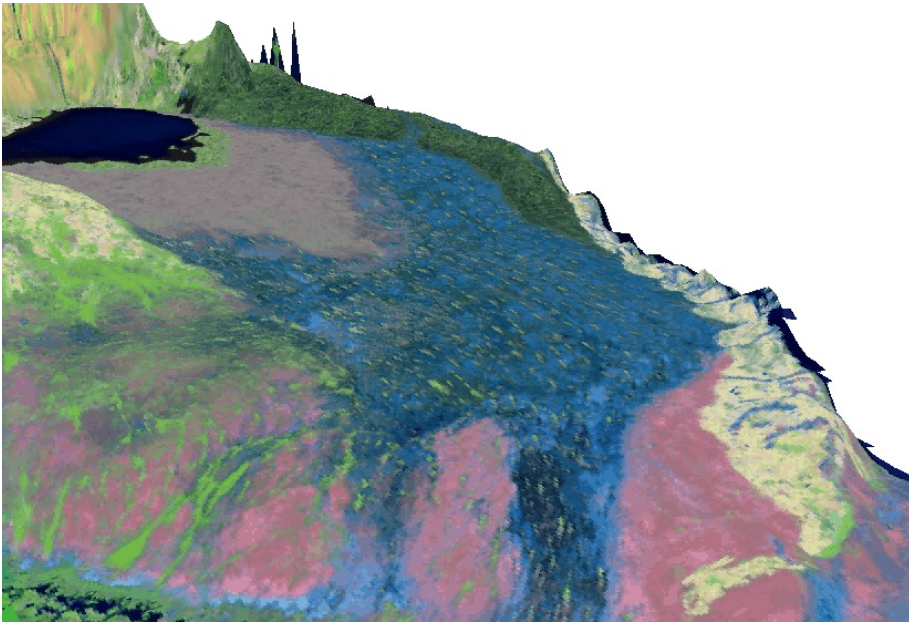
Average Monthly Rainfall 1965-1995

Annual Rainfall averages 52" and varies historically from less than 40" to over 78"

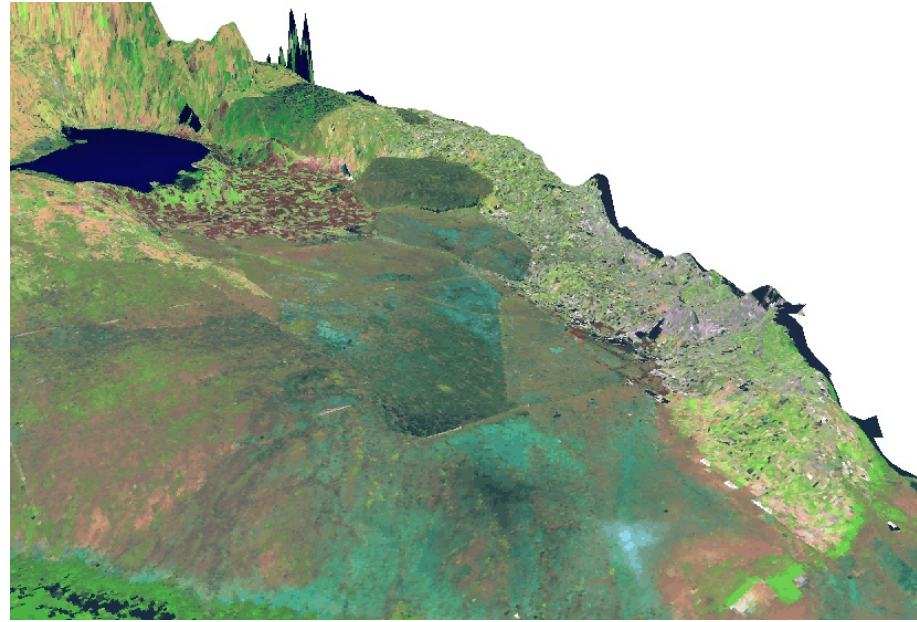
South Florida Geology



Changes in Topography

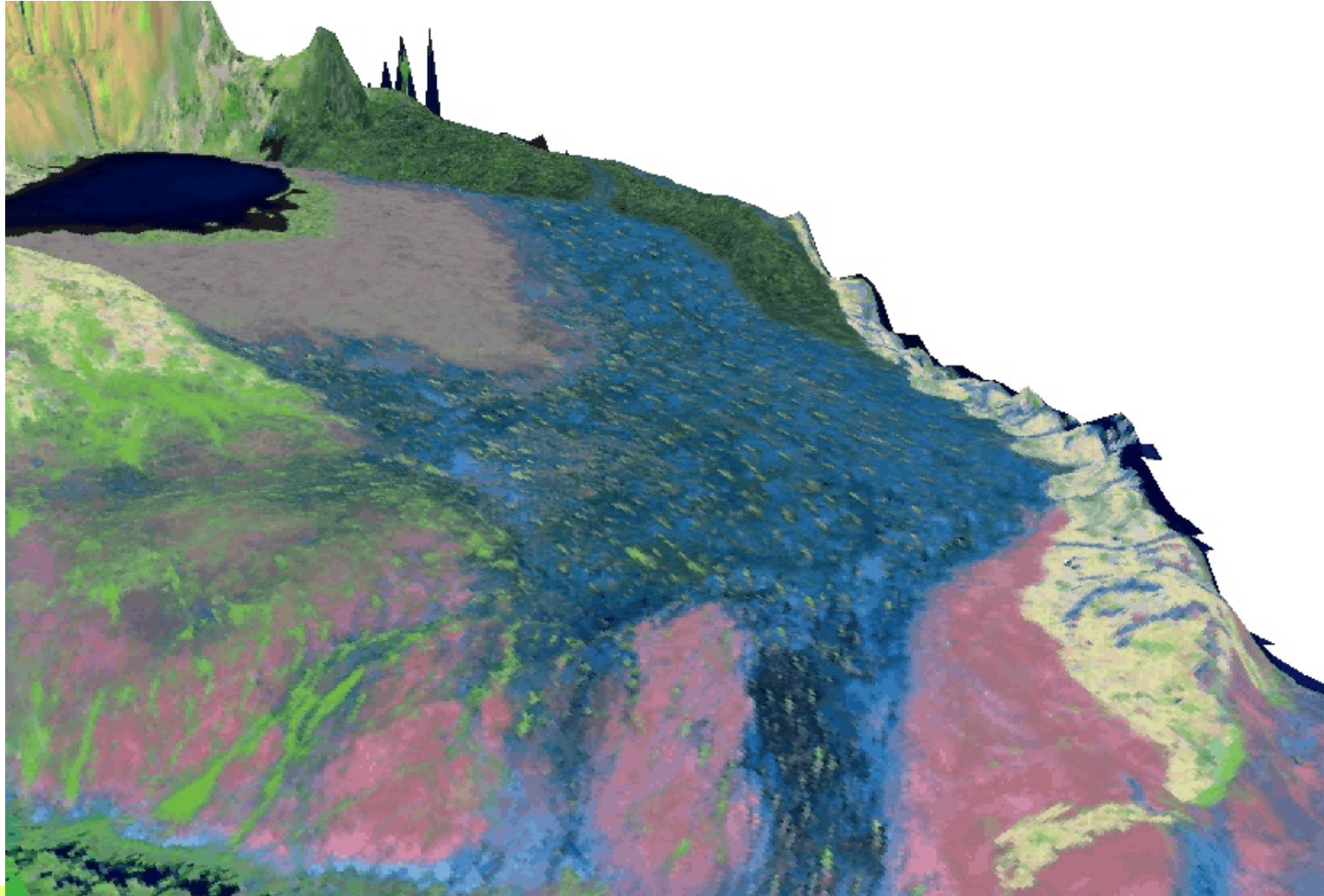


Pre-Drainage Topography

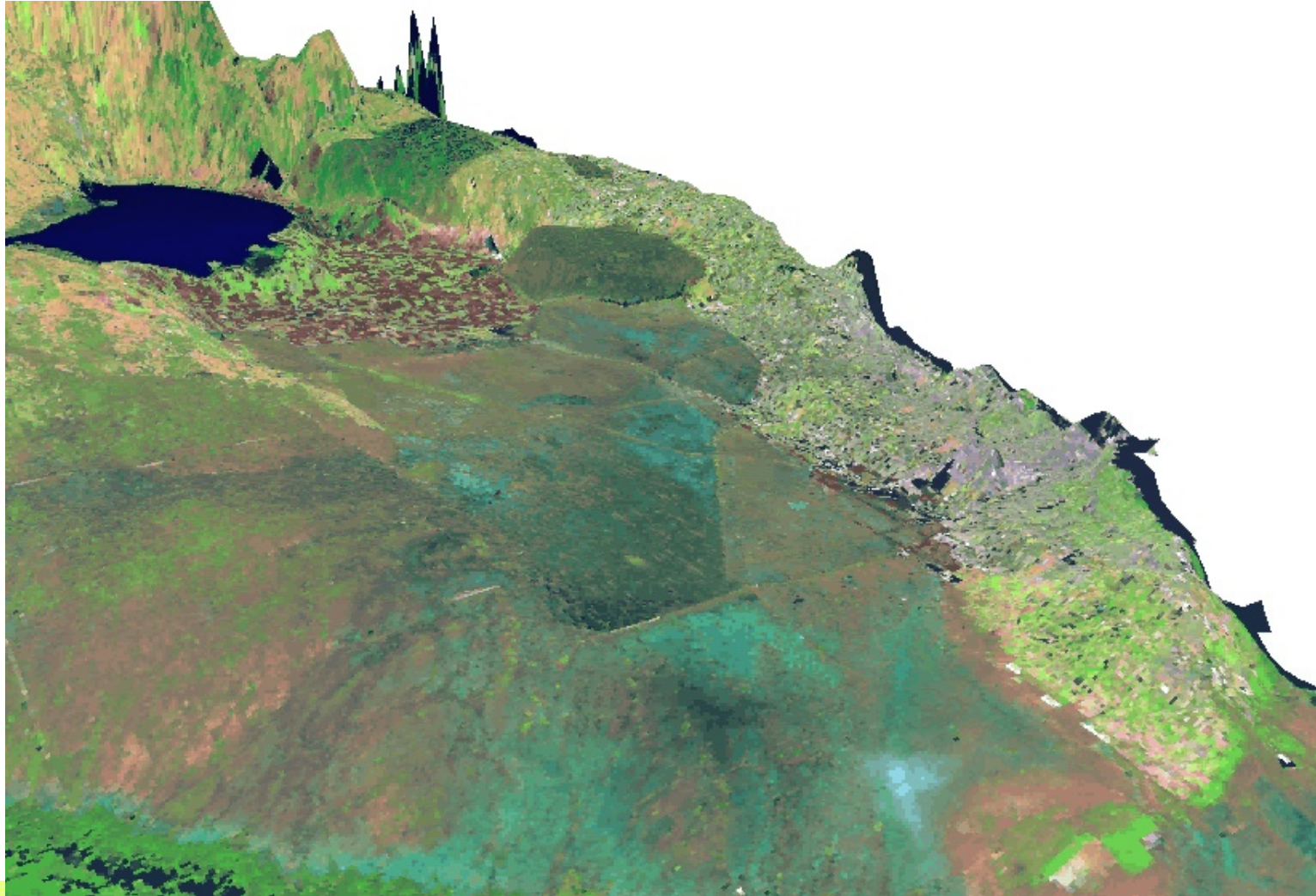


Post-Drainage Topography

Pre-Drainage Topography



Post-Drainage Topography

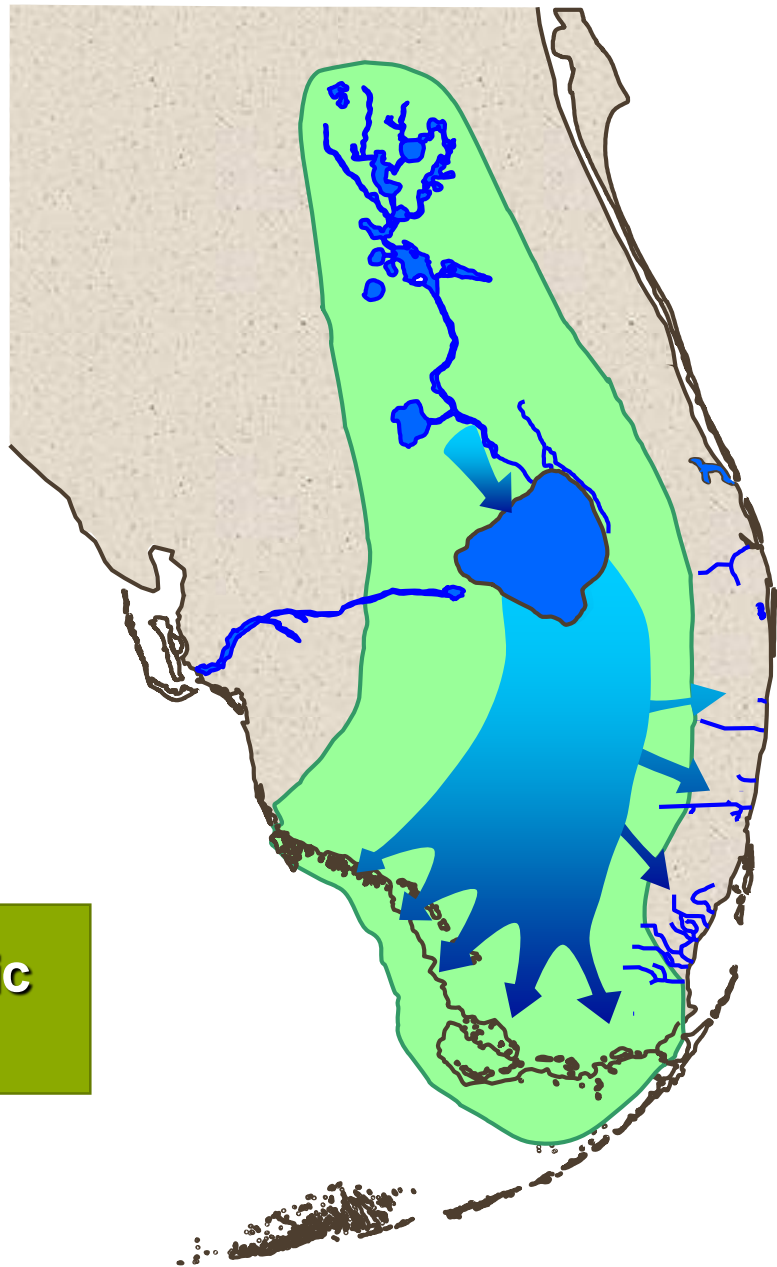


Central and Southern Florida Project for Flood Control and Other Purposes

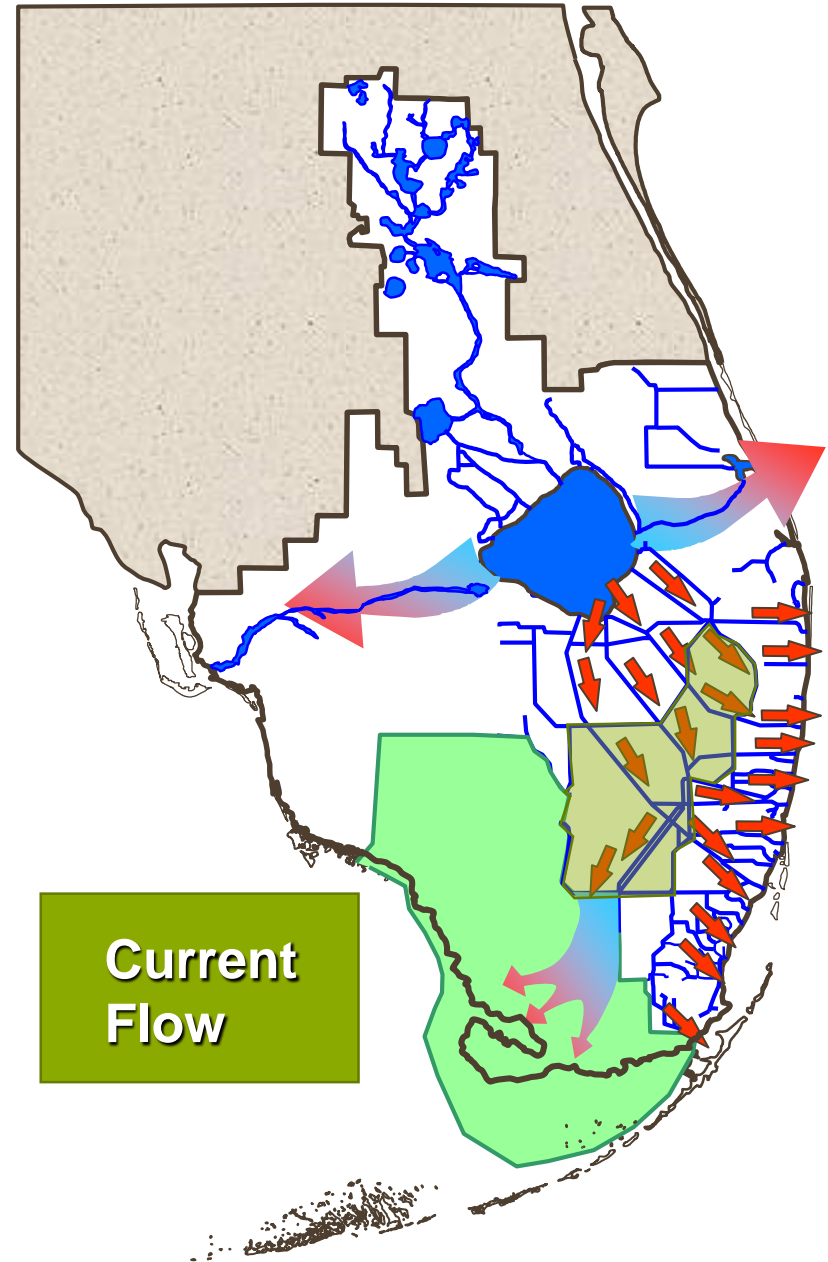


- Designed for multiple purposes
 - Flood Control
 - Water Supply
 - Navigation
 - Prevention of Saltwater Intrusion
 - Protection of Fish & Wildlife
- Constructed by the U.S. Army Corps of Engineers between 1949 and 1970
- Operated and maintained by the South Florida Water Management District
- Recent improvements include regional stormwater treatment projects to improve water quality entering the Everglades



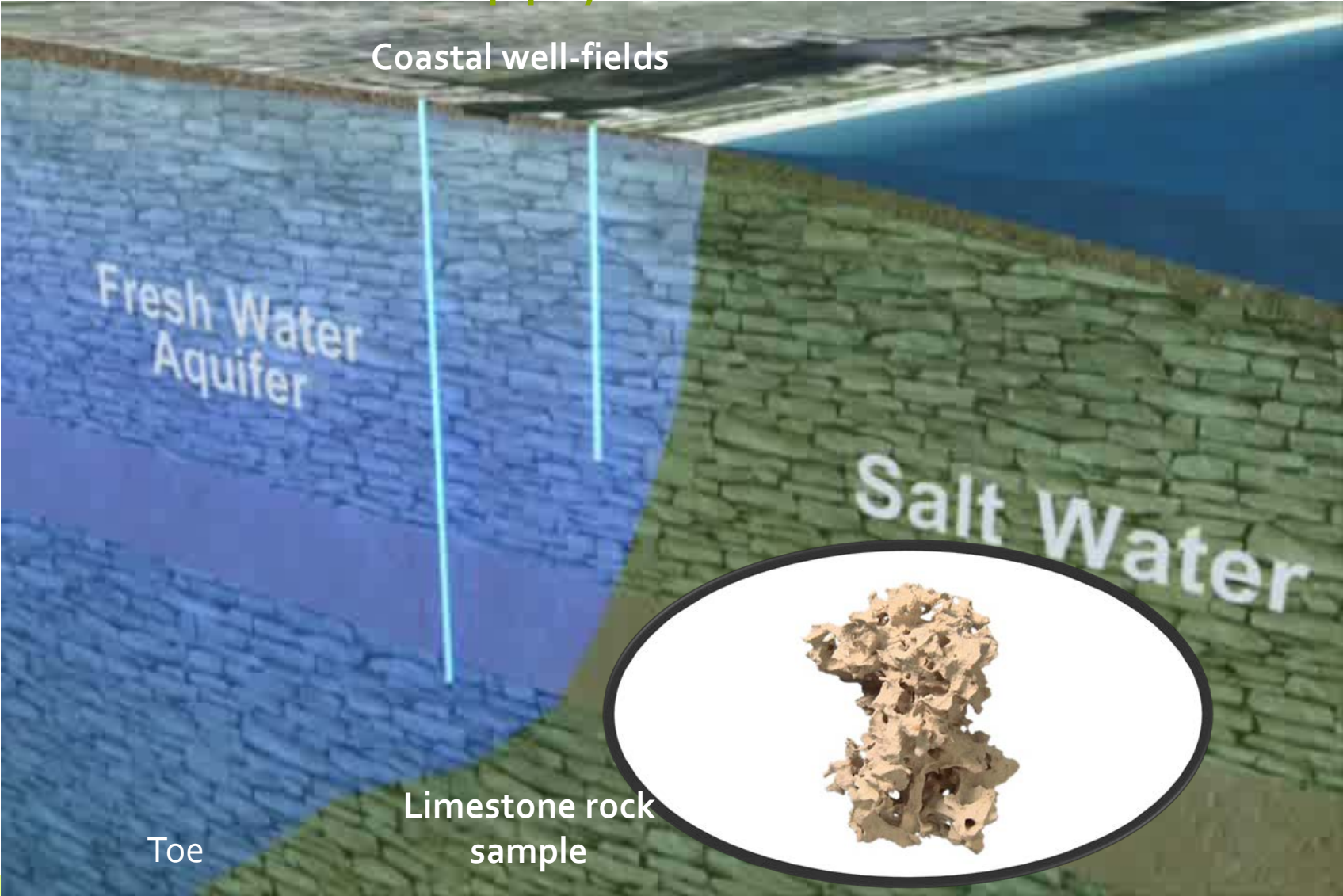


**Historic
Flow**

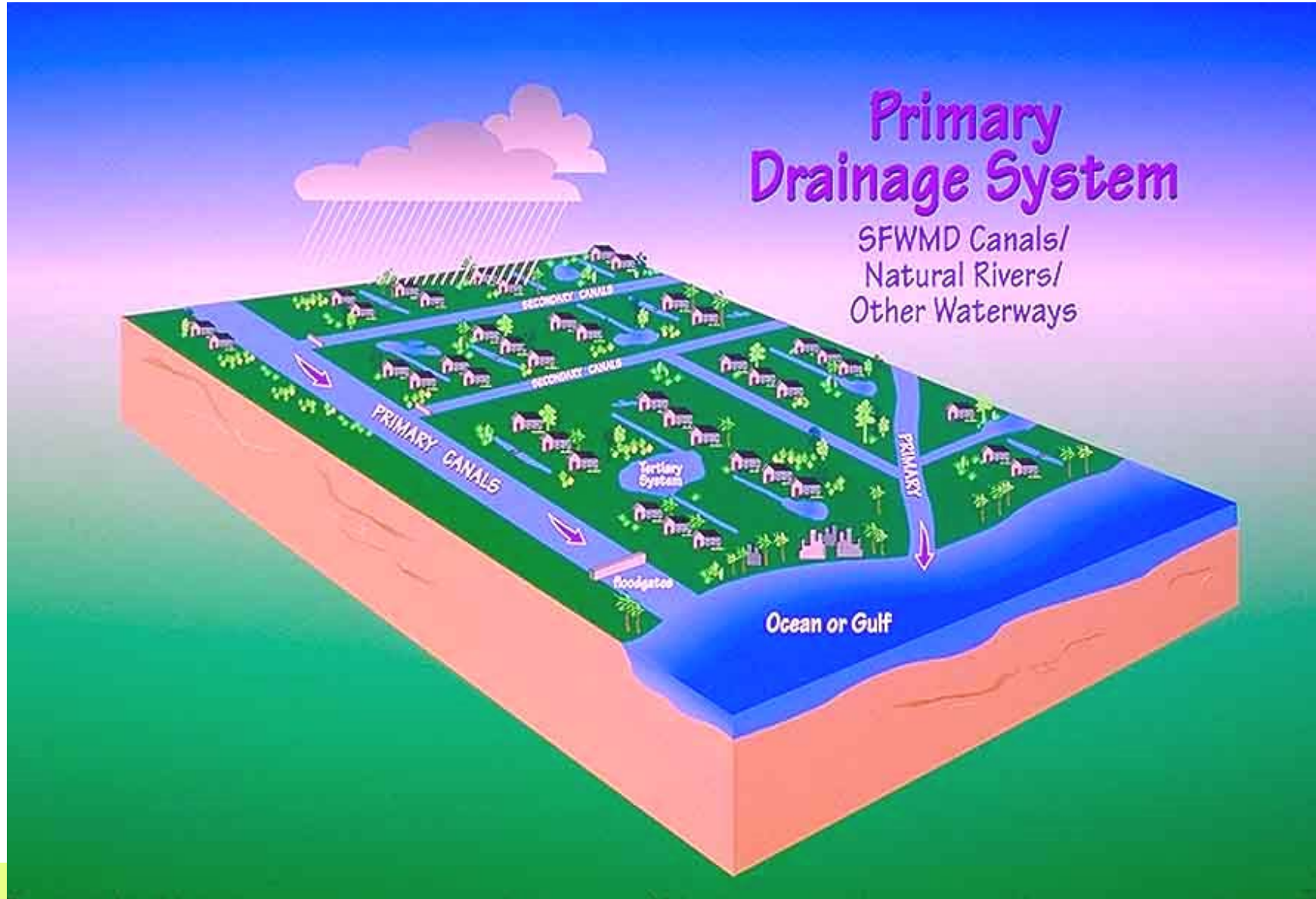


**Current
Flow**

Water Supply: Saltwater Intrusion



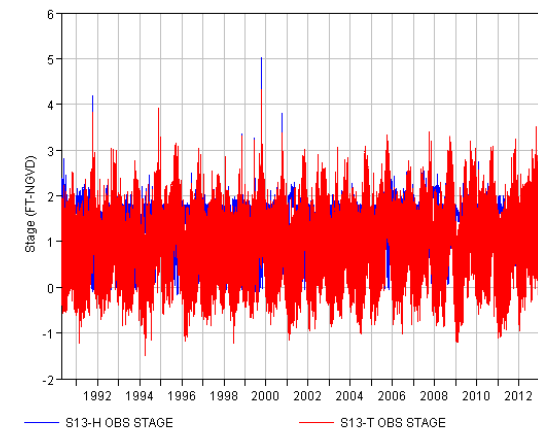
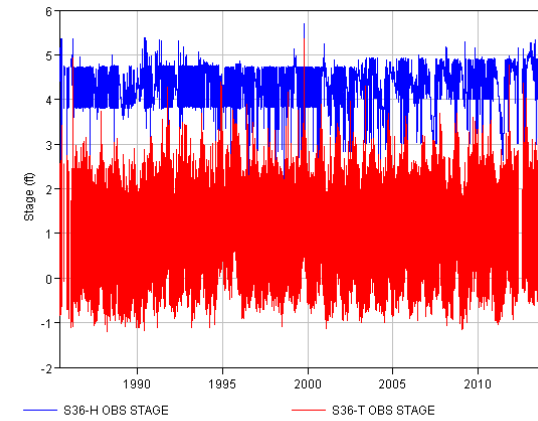
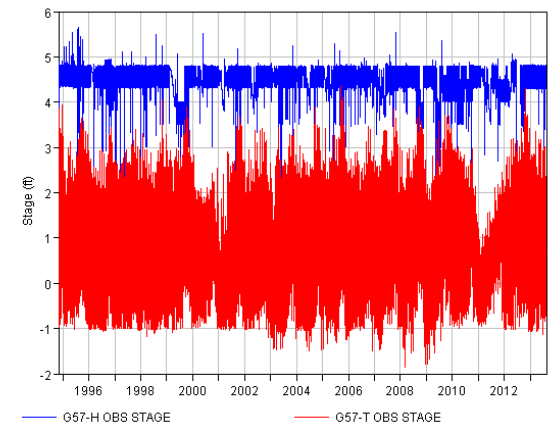
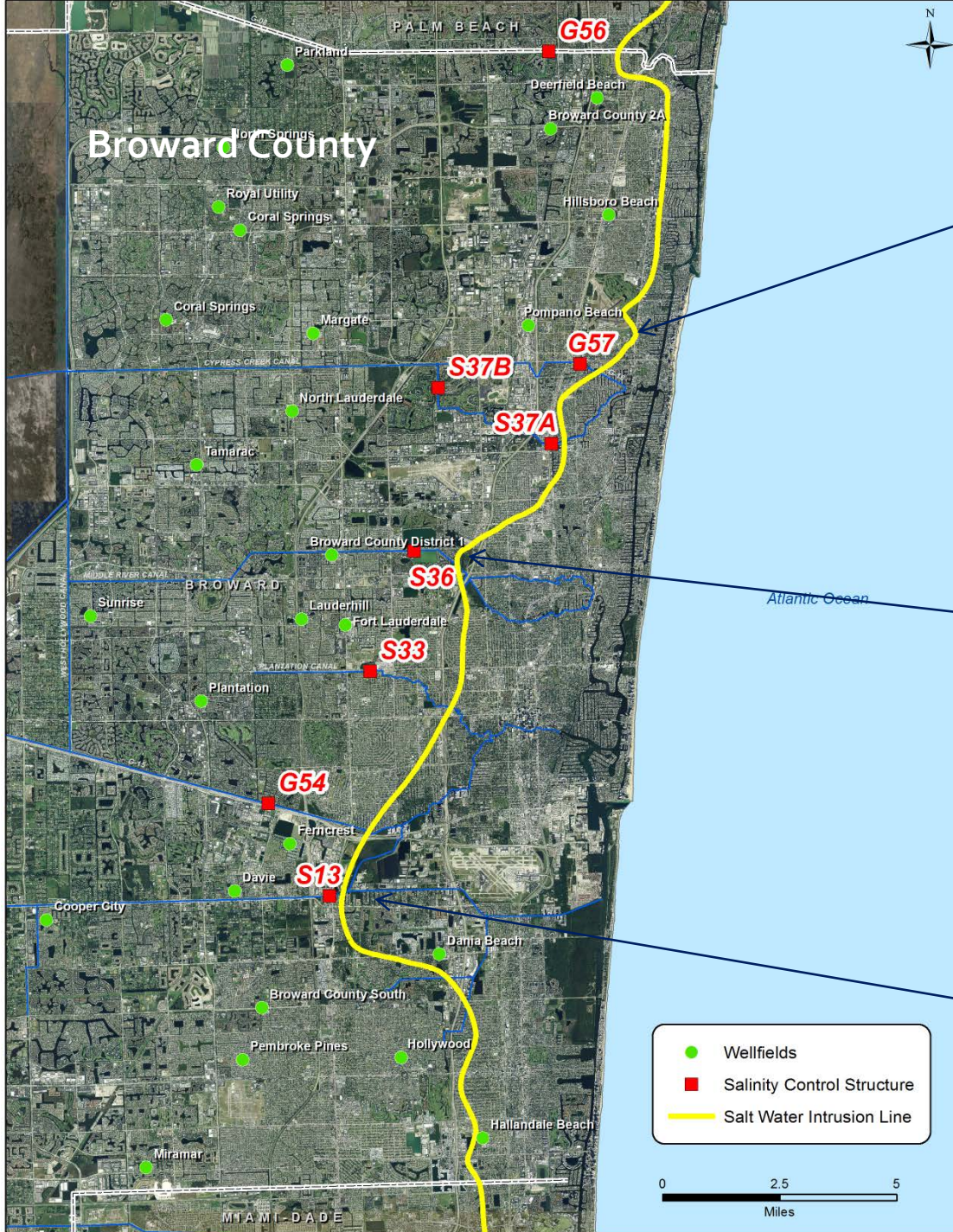
Local & Regional Drainage Responsibilities



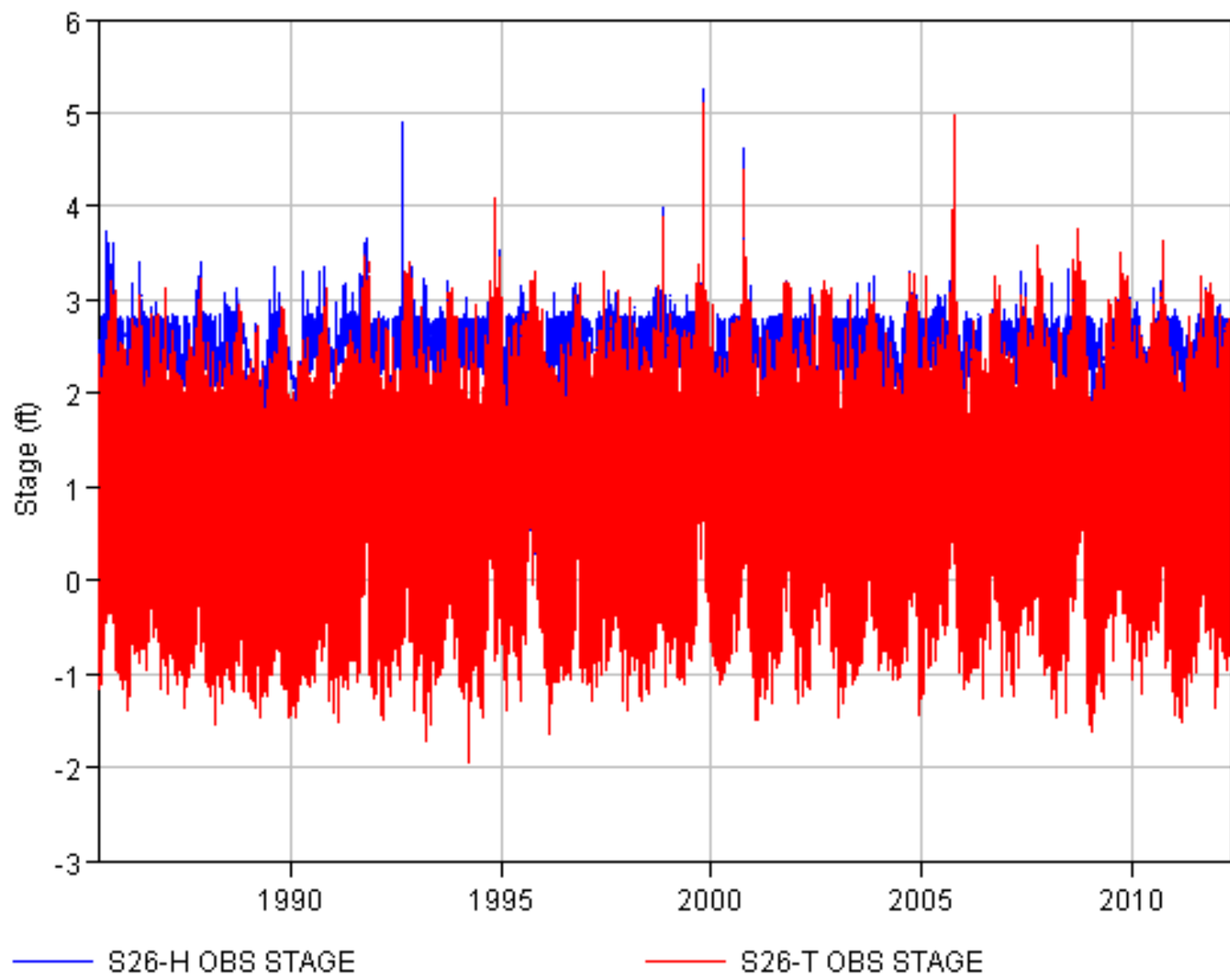


Gated Spillway Basics





Atlantic Ocean



Adaptation Example: Forward Pumping at S-26 Structure (not so 'green'!)



Adaptation to Rising Seas

Example: Forward Pumping at S-26 Structure





Miami River and
Miami Canal in 1912



Miami International Airport

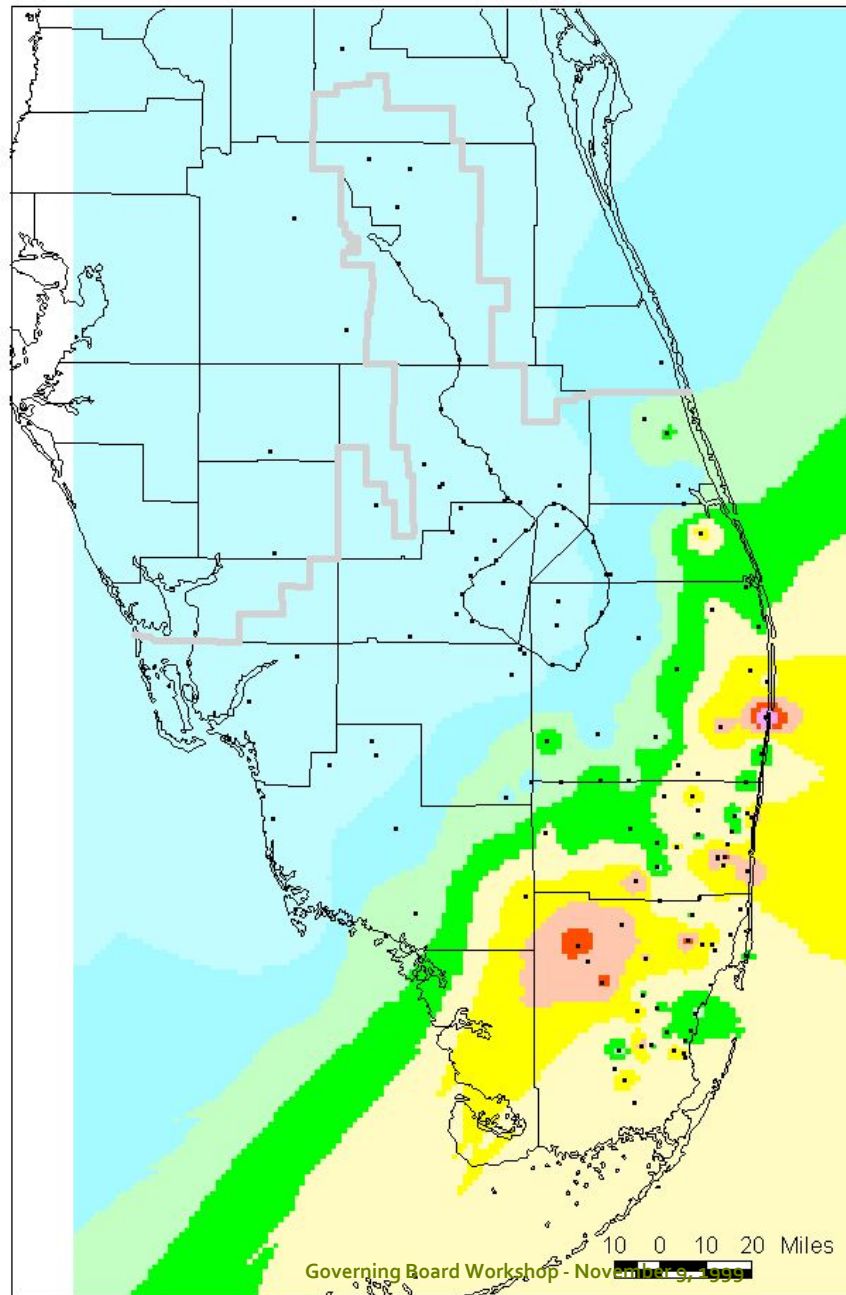


Contemporary
photo of the same
area



RAINFALL DISTRIBUTION - HURRICANE IRENE

October 14 - 16, 1999











- SFWMD Boundary
- County Lines
- Rain Gauges
- Lake Okeechobee
- Surface from Rain Gauges
 - < 2
 - 2-4
 - 4-8
 - 6-8
 - 8-10
 - 10-12
 - 12-14
 - 14-16
 - 16 +

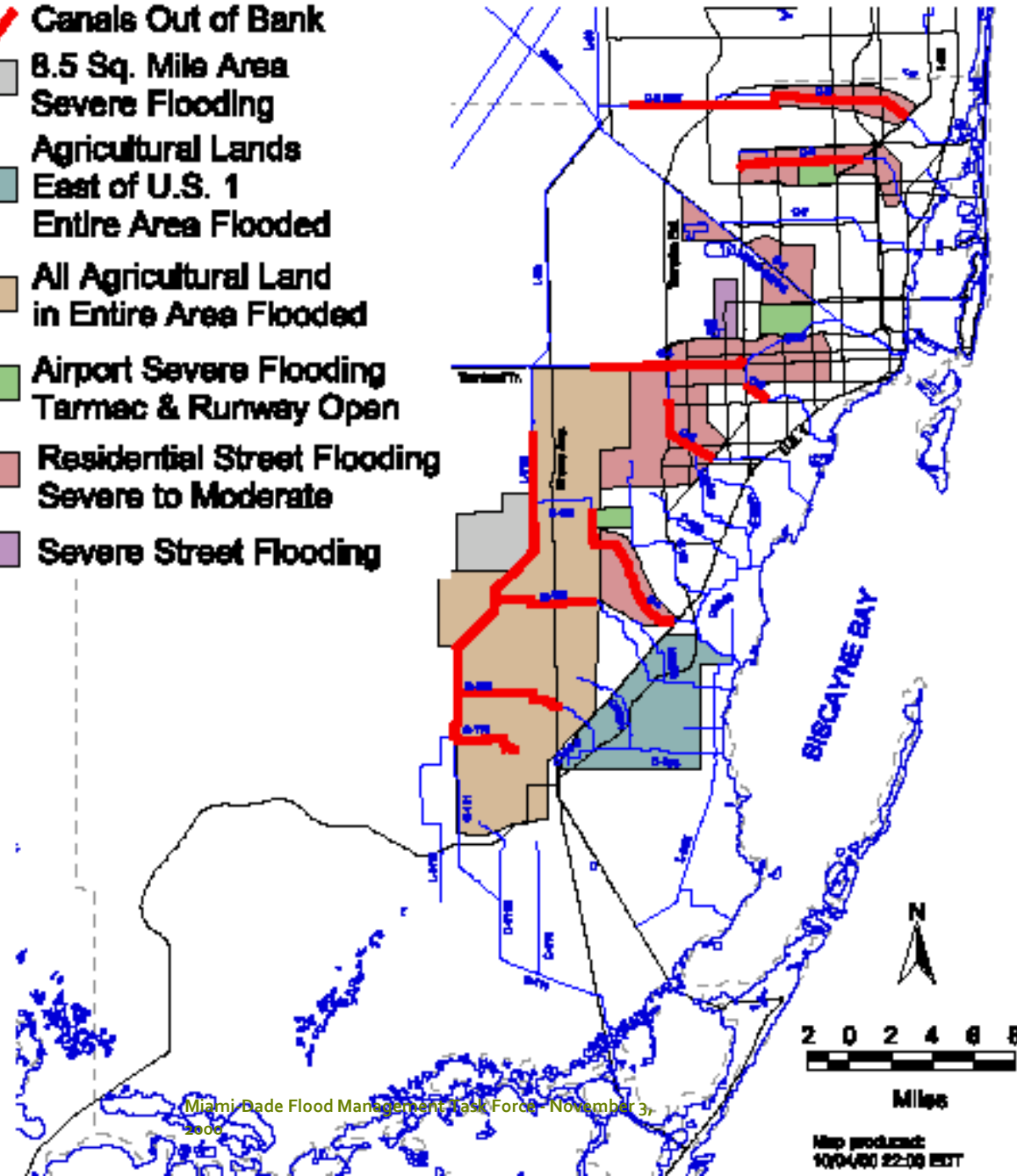


**WATER
RESOURCE
OPERATIONS**

Governing Board Workshop - November 9, 1999

Miami-Dade County Flood Areas

-  Canals Out of Bank
-  8.5 Sq. Mile Area Severe Flooding
-  Agricultural Lands East of U.S. 1
-  Entire Area Flooded
-  All Agricultural Land in Entire Area Flooded
-  Airport Severe Flooding Tarmac & Runway Open
-  Residential Street Flooding Severe to Moderate
-  Severe Street Flooding



















Isaac's Impacts

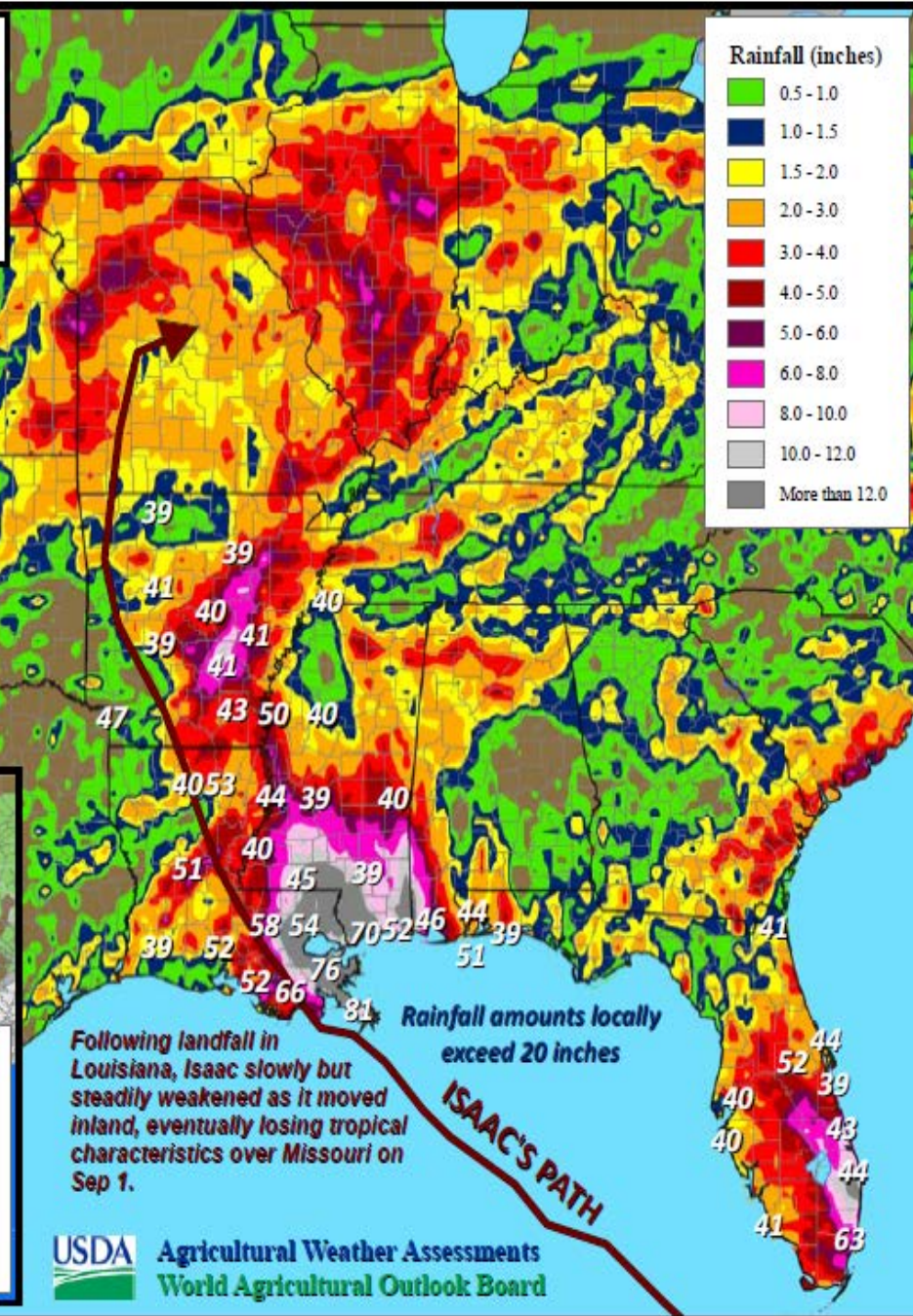
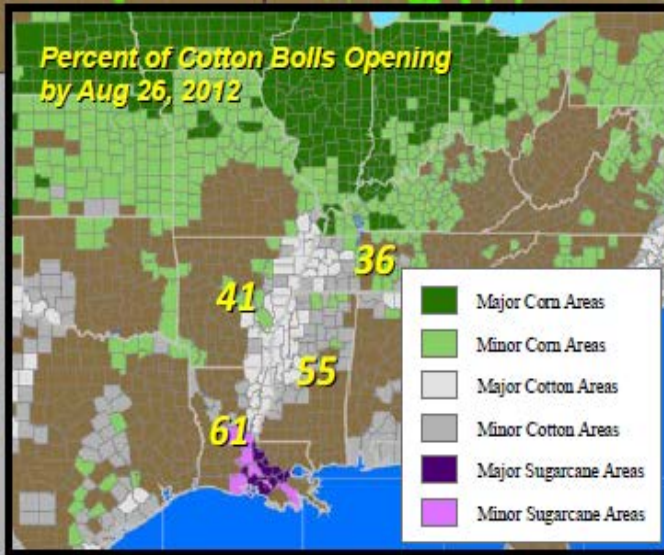
Locally heavy rains & strong winds from the Gulf Coast region to the Corn Belt

8 AM EDT Aug 25, 2012 - 8 AM EDT Sep 3, 2012

White numbers approximate peak wind speeds at select surface locations based on hourly observations. Stronger winds may have occurred at these sites.

Data Sources:

- Rainfall and wind data obtained from the National Weather Service
- Agricultural areas are delineated using NASS county-level crop data



USDA Agricultural Weather Assessments
World Agricultural Outlook Board

SOUTHEAST FLORIDA

REGIONAL COMPACT

**CLIMATE
CHANGE**



Thank You...

