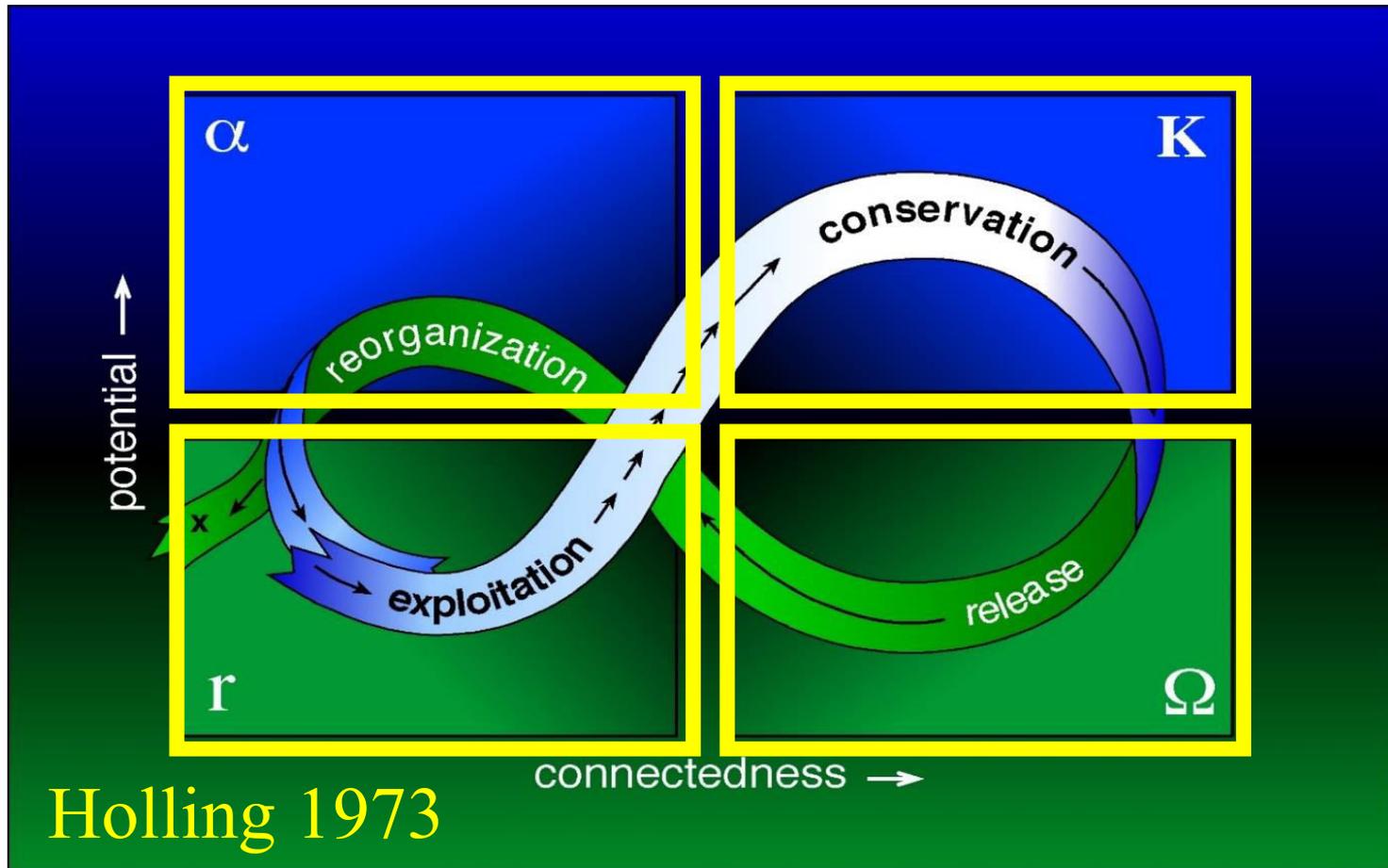




RECOVER Science Meeting March 2016

**GE - REVISION OF EXTREME
HIGH AND LOW WATER EVENTS
PERFORMANCE MEASURE (PM)**

ECOSYSTEM RESILIENCY



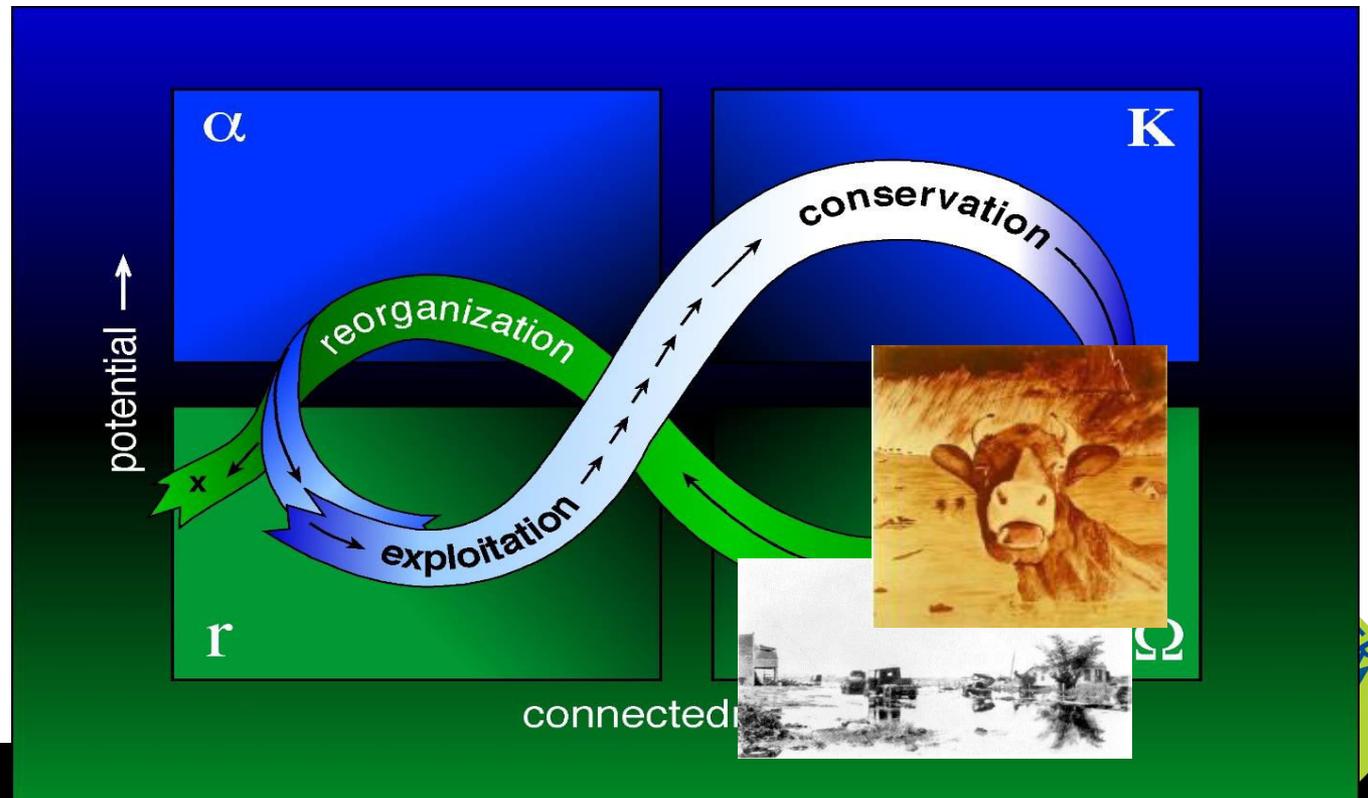
It is as if two separate objectives are functioning but in sequence. The first maximizes production and accumulation. The second maximizes invention and re-assortment. (Twilley 2014)

Increasing stability reduces the resilience of an ecosystem.

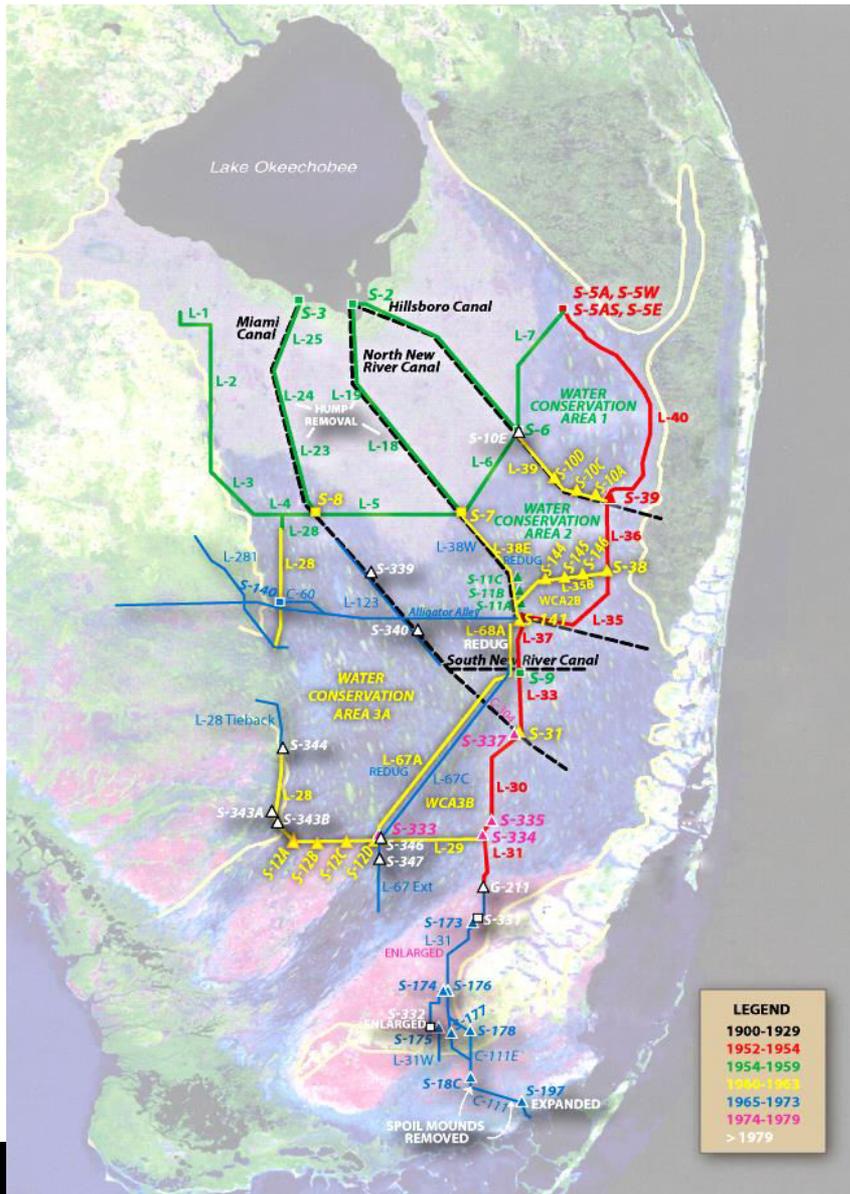


RELEASES (1927-1930) SET THE STAGE FOR REORGANIZATION

- Floods and hurricanes threatened public safety and economic development → Society decided to reorganize
- In FL -- Built infrastructure became a Federal and State partnership



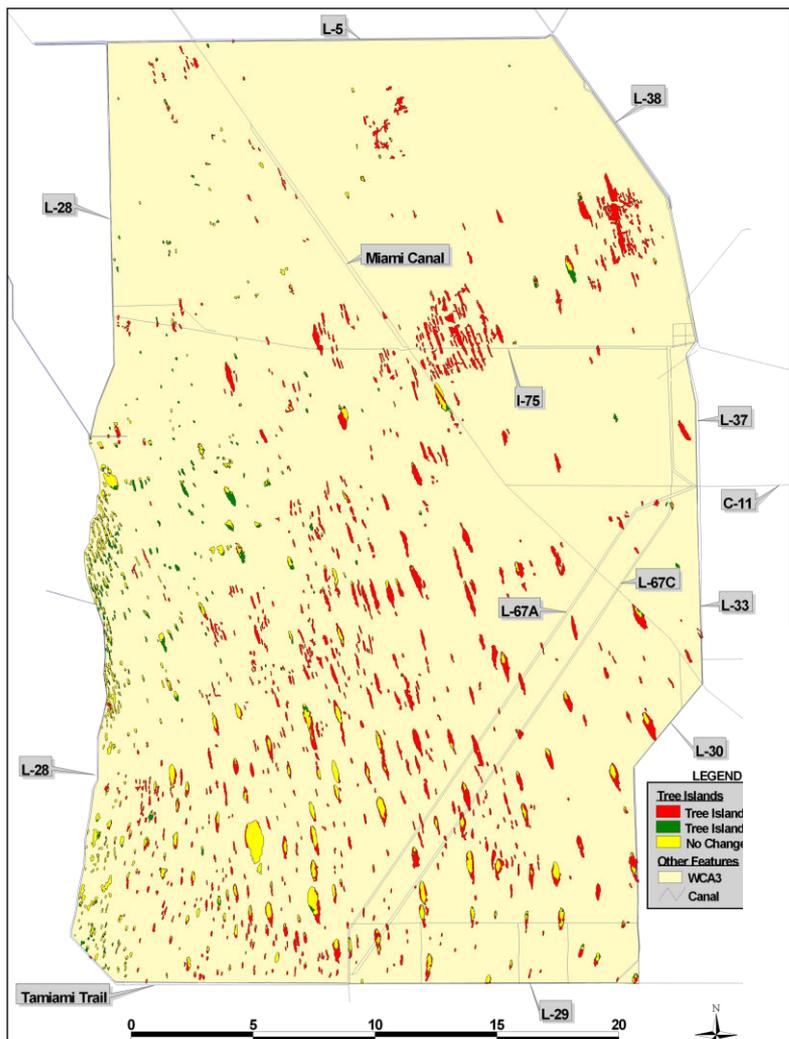
CHANGES DUE TO REORGANIZATION



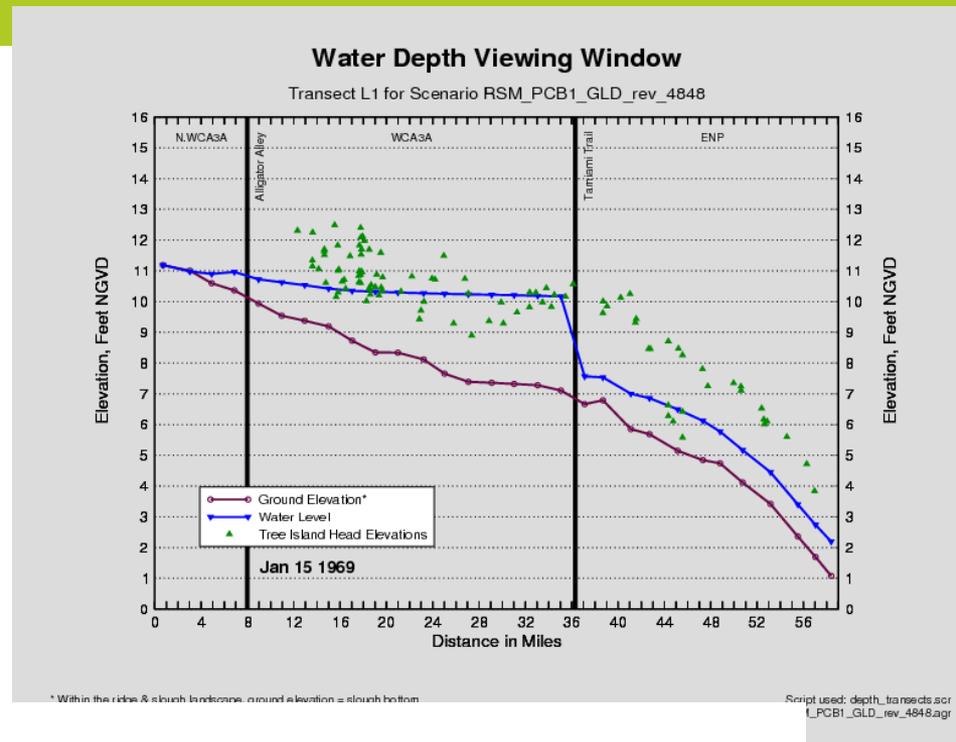
- After reorganization economic development expanded,
- Flood protection expanded,
- Water demand changed,
- Chemistry of water supplies changed,
- Urban policy dominated



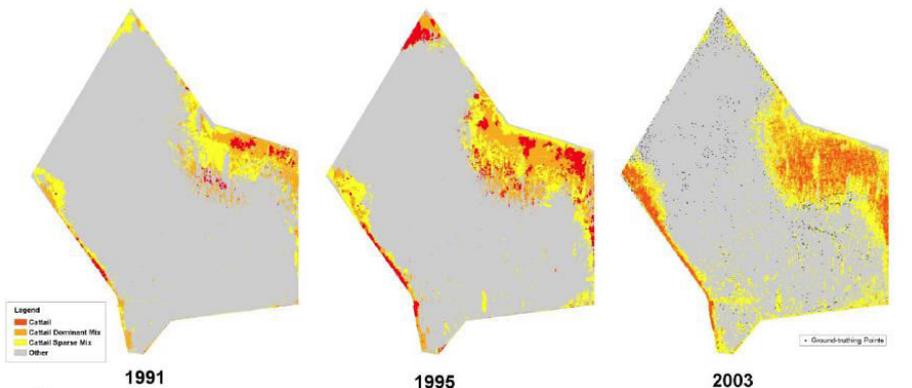
REORGANIZATION SET THE STAGE FOR EXPLOITATION



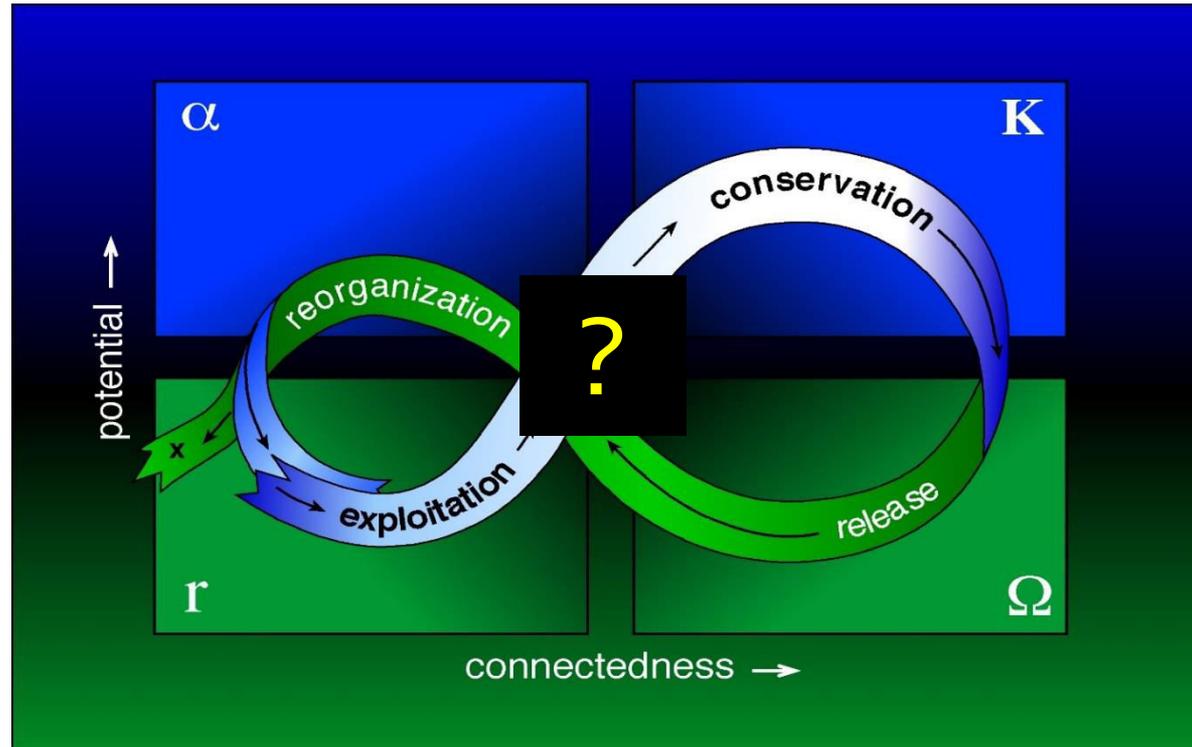
Loss of Tree Islands



Water Conservation Area 2A Cattail Trend Analysis 1991 - 2003



RESTORATION IS THE NEW CONSERVATION PHASE



Curtain (2015): "The very process of trying to maintain a system within a narrow range of limits may actually increase the likelihood of its collapse."

PM Background

- Performance Measure last revised in April 2009
- “Extreme Low Water Levels” Metric is based on the Soil Oxidation PM – Used in Decomp and in the Central Everglades Planning Project
- Historic Everglades driven by alternating long term pulses of high water levels followed by periods of moderate dry downs.
- Duration, amplitude, frequency of pulses and dry downs needs to be a PM
- Revision of Extreme High and Low Water Levels in the Greater Everglades PM on RECOVER workplan for FY 15 and FY 16



Since 2009...

- *Scientific Knowledge Gained (August 2011)*
- *Ecological Effects of Extreme Hydrological Events on the Greater Everglades (February 2012)*
- *RECOVER System Status Reports (2012, 2014)*
- *Decomp Physical Model*
- *Development of NSRSM*
- *Research by other investigators*
- *(e.g., USGS, others)*



Where we are now...

- RECOVER developed scope of work for performance measure revision in March 2015.
- Consensus was to change title of measure to “Landscape-Level Hydrologic Variability” to better capture inter- and intra-annual variability.
- RECOVER staff currently working with Hydroplan.



Where we are now...

- **Team Members:**
 - ***ENP:*** Agnes McLean, Jed Redwine
 - ***USACE:*** Melissa Nasuti, Andy LoSchiavo
 - ***SFWMD:*** Fred Sklar, Tom Dreschel
 - ***FWC:*** Tim Towles
 - ***FWS:*** Miles Meyer



Where we are now: HydroPlan*

Key Deliverables	Tentative Schedule
▪ Task 1: Kick-Off Meeting	▪ October 2015
▪ Task 2: Literature Synthesis	▪ March 2016
▪ Task 3: Metrics, Target, Evaluation Methodology	▪ May 2016
▪ Task 4: Public Meeting	▪ July 2016
▪ Task 5: Assessment Methodology	▪ August 2016
▪ Task 6: Draft PM	▪ September 2016
▪ Public Review/Final PM	▪ October 2016



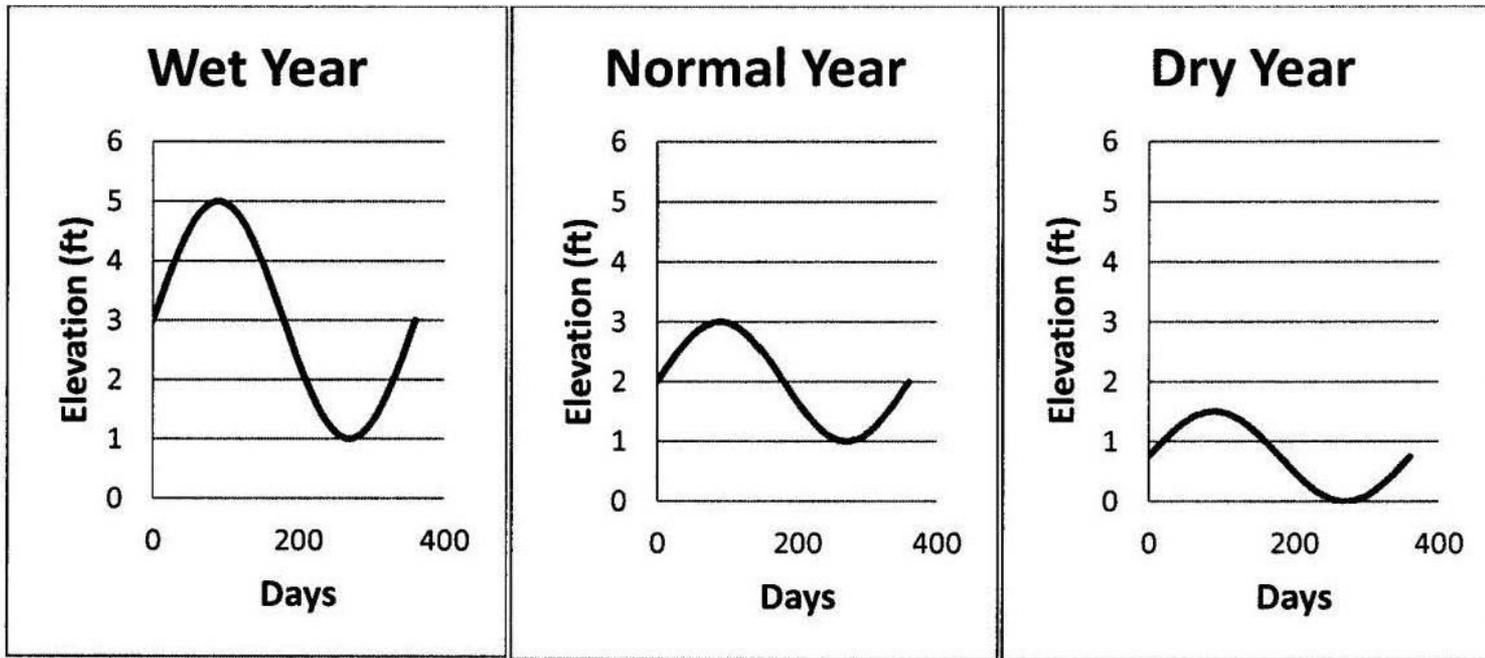
* Steve Davis, Lorraine Heisler and Lewis Hornung

Where we are now: Literature Review

- **McVoy et al. (2011):**
 - *Annual water depths typically fluctuated by 3 ft.*
 - *Min slough depth was 1 ft.*
- **Bedford et al. (2012):**
 - *Inter-Annual water depths fluctuated by as much as 5 ft.*
 - *Every 1-ft increment creates and supports another habitat*
- **FWC (2013):**
 - *Water depths fluctuations that exceed 2 ft. should not persist for more than 60 days.*



Where we are now: Literature Review



Annual Hydroperiod

Mean 3 ft
Range 4 ft

2 ft
2 ft

0.75 ft
1.5 ft

Interannual Hydroperiod

Mean
Range

2 ft
5 ft



- Bedford et al. (2012):

Where we are now: Literature Review

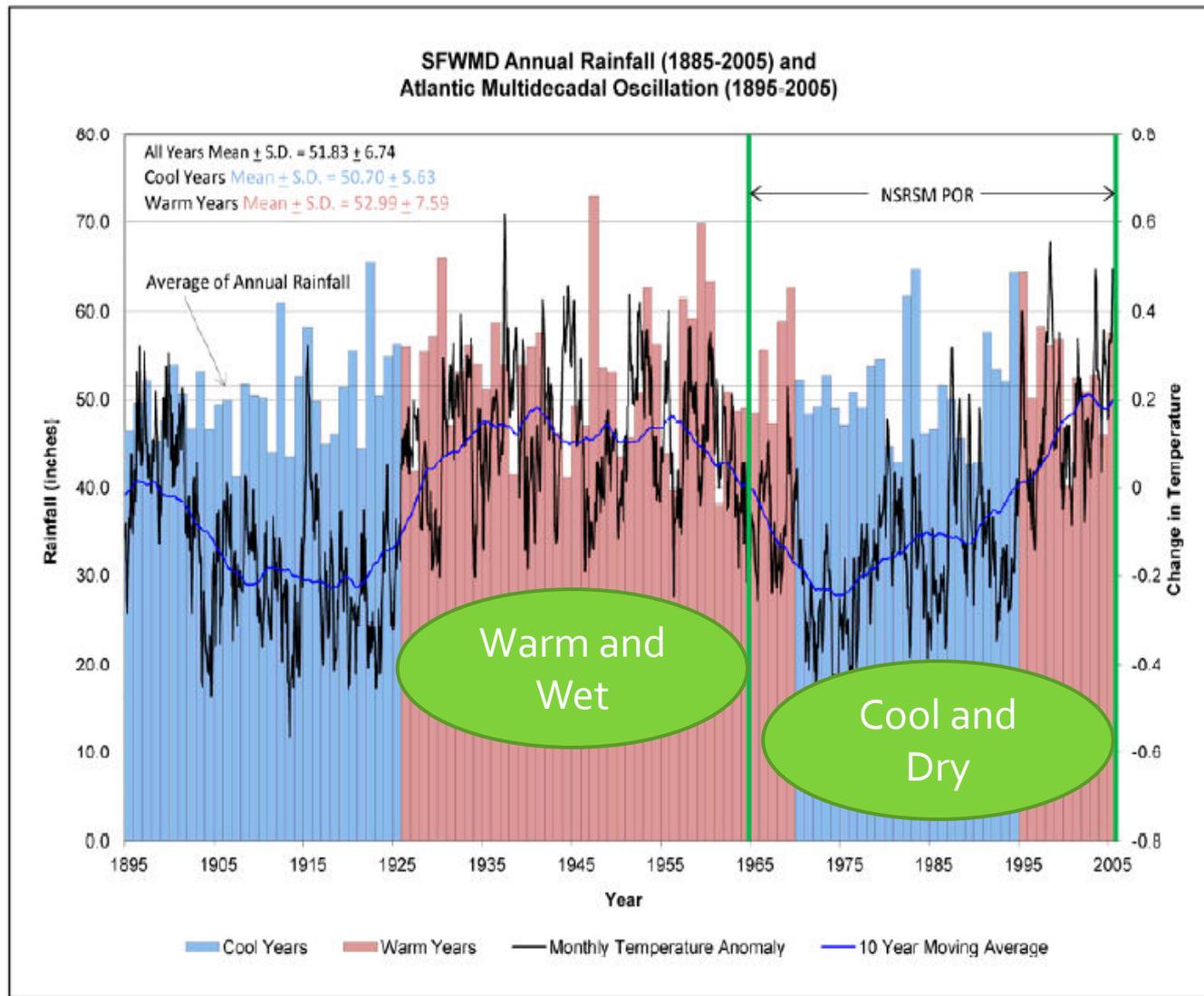
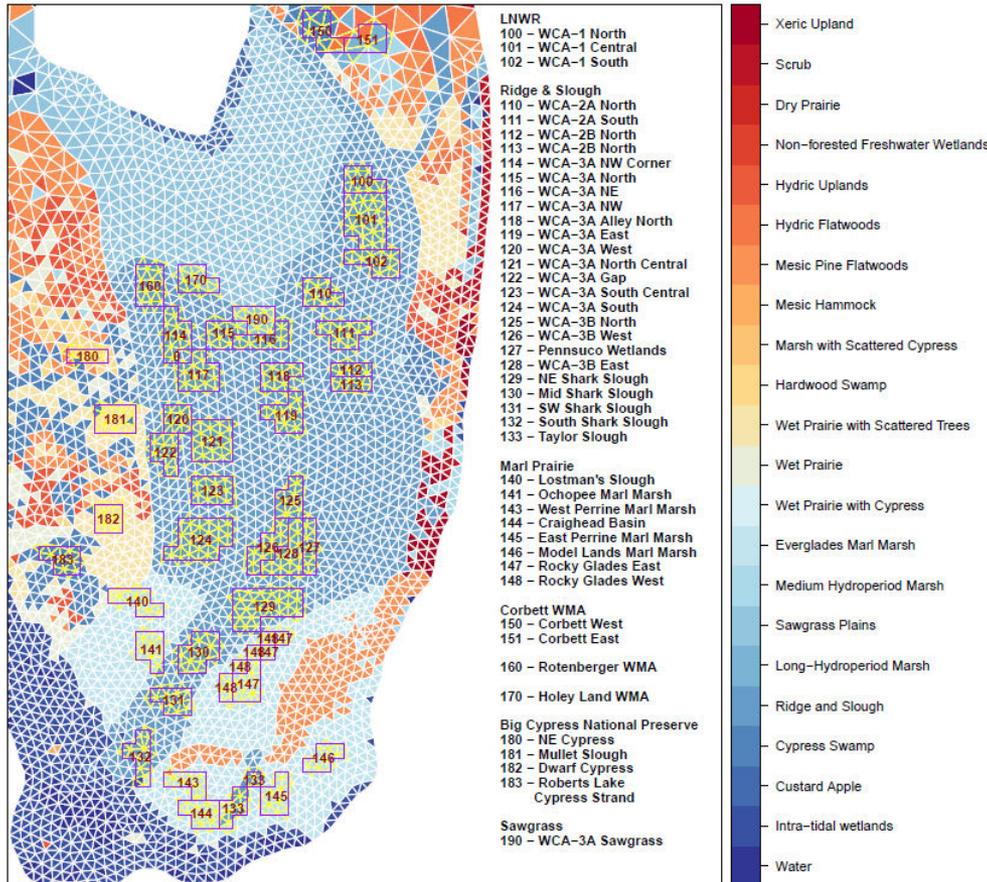


Figure 1. District rainfall (inches) and Atlantic Multi-decadal Oscillation (1895 -2005) with NSRSM period of record (1965-2005) (from Said and Brown 13).

Where we are now...

NSRSM Landscape Types and Indicator Regions



- NSRSM Indicator Regions will inform development of PM.
- Will use methodology similar to CEPP.
- Awaiting coding by Interagency Modeling Center.



Next Steps: Greater Everglades Team

- Reconvene and further define direction for development of Metrics, Targets, and Evaluation Methodology.
- Develop Vision Statement to define objectives, questions, and hypotheses that PM should address.
- Interested participants should send an email to:
Melissa.a.nasuti@usace.army.mil