SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Biscayne Bay Update

John Mulliken and Melody Hunt
Water Supply Department

Water Resource Advisory Commission
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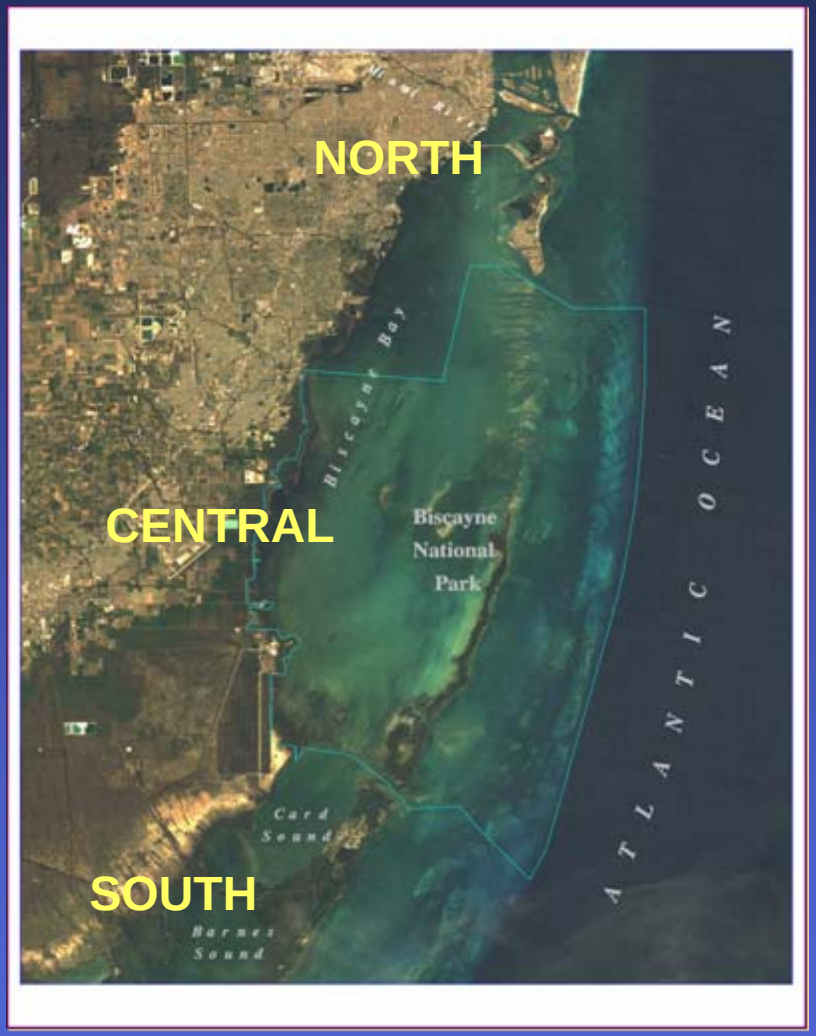
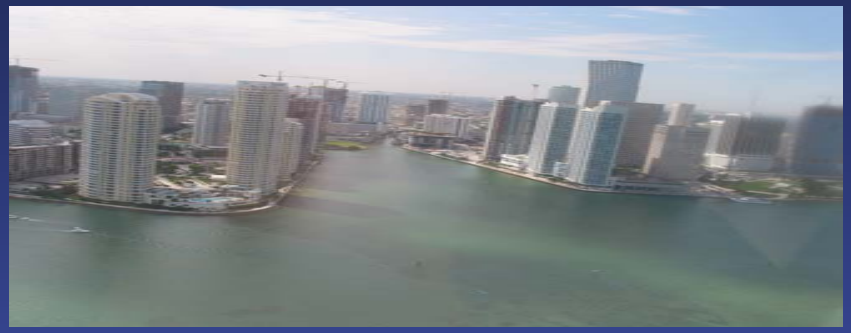
sfwmd.gov

Purpose

Brief WRAC on 2008 activities including Peer Review of Available Science

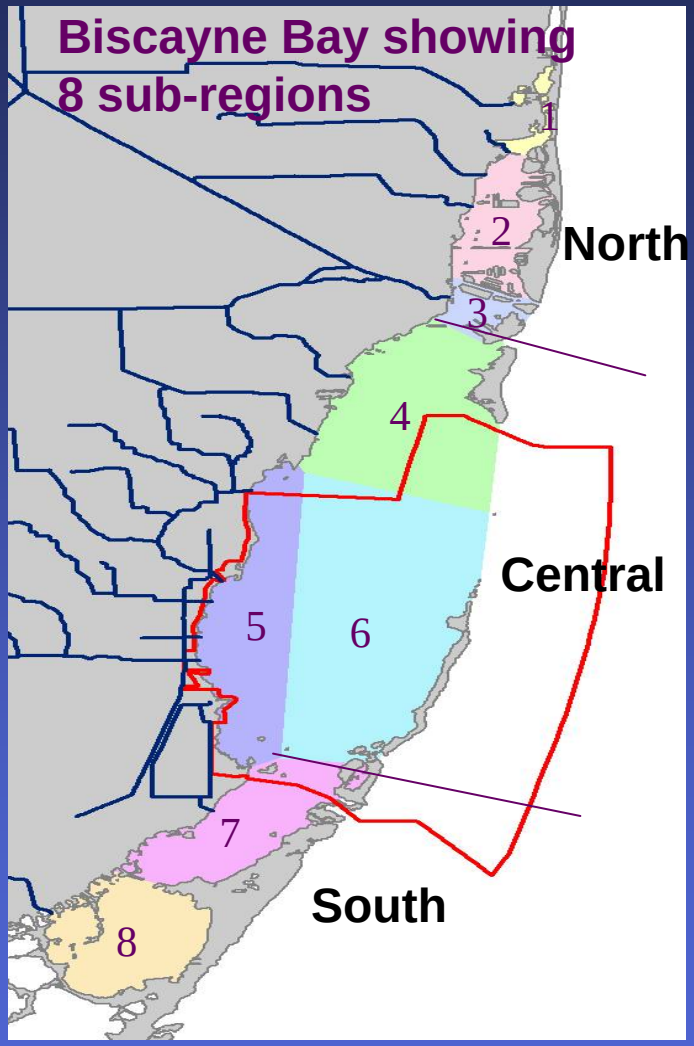
BISCAYNE BAY SUBREGIONS



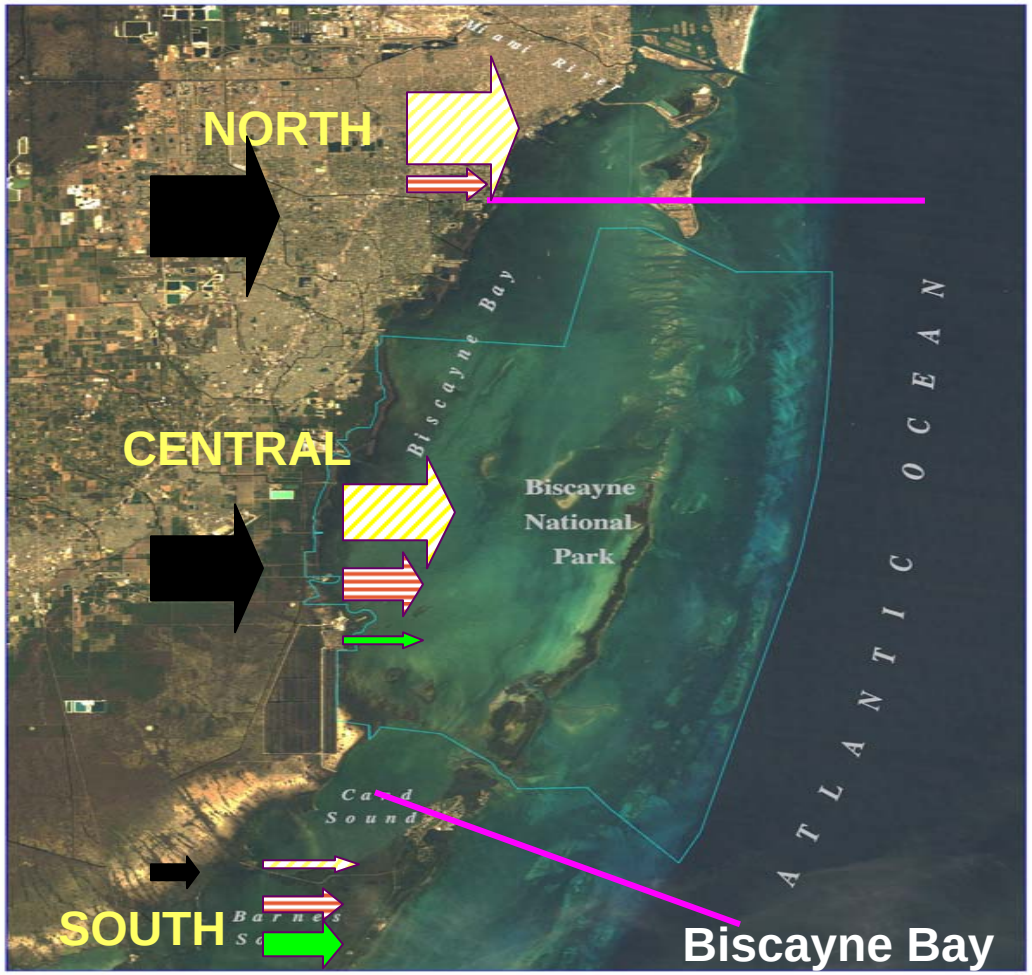


2008 ACTIVITIES

- Developed updated water budget with 8 sub-regions
- Compiled relevant science on Biscayne Bay
- Developed technical summary document and appendices
- Held Peer Review in October 2008



BAY INFLOW COMPONENTS



NORTH
Canal: 567
Groundwater: 32
Overland: NA

CENTRAL
Canal: 413
Groundwater: 107
Overland:15

SOUTH
Canal: 2
Groundwater: 28
Overland: 51

Based on estimates for “Normal” Year
1000 acre-ft/year

BISCAYNE BAY PEER REVIEW

- Adequacy of science to define inflow needs of the bay
  - Hydrology
  - Biological resources
  - Approaches to establish link between freshwater inflows and bay's existing resources

OVERALL RESULTS

- Panel suggested several long-term approaches
  - Model development and additional analyses
  - Require two or more years to implement
- Panel concurred that salinity could be a “indicator” on which to develop criteria
- Creates potential to proceed with rule development this year

HYPERSALINITY

- Identified by the peer review as a “key concern” for Biscayne Bay
- Panel Report states “preventing or ameliorating existing hypersalinity can be a very important management goal.”
- Characterized by salinities above typical marine conditions (average open ocean ~35 psu)

HYPERSALINITY
WHEN CAN IT OCCUR?

- Shallow coastal lagoons

  Evaporation > Rainfall + Flow

- Small changes in flow can have large impact on salinity
- Not common - present in very few estuaries worldwide
  - Primarily associated with Mediterranean type climates (cool wet season, hot dry season)
  - Gulf Coast, Texas; Western North America, Baja; Africa; Australia.

HYPERSALINITY
WHAT ARE THE CONCERNS?

1. Resources under stress, sub-lethal impacts
2. Impacts of other stressors magnified
3. Low diversity of species

→ Creates *Instability*

environment may have sudden, rapid regime shifts taking a decade or more to re-stabilize.

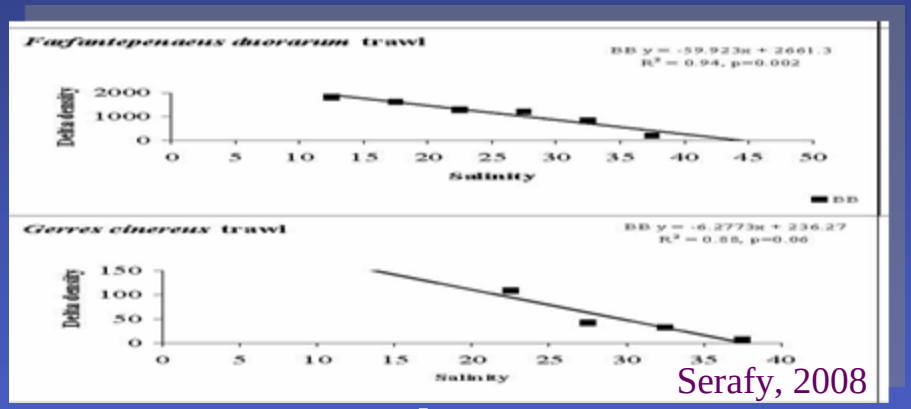
HYPERSALINITY
WHAT ARE THE CONCERNS?

1. Resources under stress, sub-lethal impacts

- **Fish - avoidance, Biscayne Bay data shows abundance declines >36 psu over grass beds**

Pink Shrimp

Yellowfin Mojarras



Serafy, 2008

- **Habitat (seagrasses, mangroves) -**
  - **use & function is reduced**
  - **stress depletes reserves**

HYPERSALINITY
WHAT ARE THE CONCERNS?

2. Effect of other stressors magnified

- Temperature: resource demand for oxygen increases

  warm water + hypersalinity = low DO saturation

  ->sub-lethal effects occur at higher DO

- Nutrients
- Physical disturbances (storms, man)
- Climatic variation (droughts, cold)

HYPERSALINITY
WHAT ARE THE CONCERNS?

3. Low Diversity of Species

- Environment uniquely selects for species that may not normally be present or exist very low numbers

Thalassia testudinum benthic community

PEER REVIEW PANEL'S CONCLUSION

- *Biscayne Bay ecosystem surprisingly resilient to stress so far, but*
  - *Many lagoonal systems are delicately poised*
  - *Change can happen quickly*