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South Florida Natural Resources Center



Moving Forward: Phase II Biscayne Bay Coastal Wetlands



June 16, 2020
Presentation to the BBRRCT
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National Park Service

South Florida Natural Resources Center



- **Salinity & Flow Targets**
 - **Dry Season Flows & Targets/ Example**
- **Water Delivery**
 - **2013 Pilot Project**



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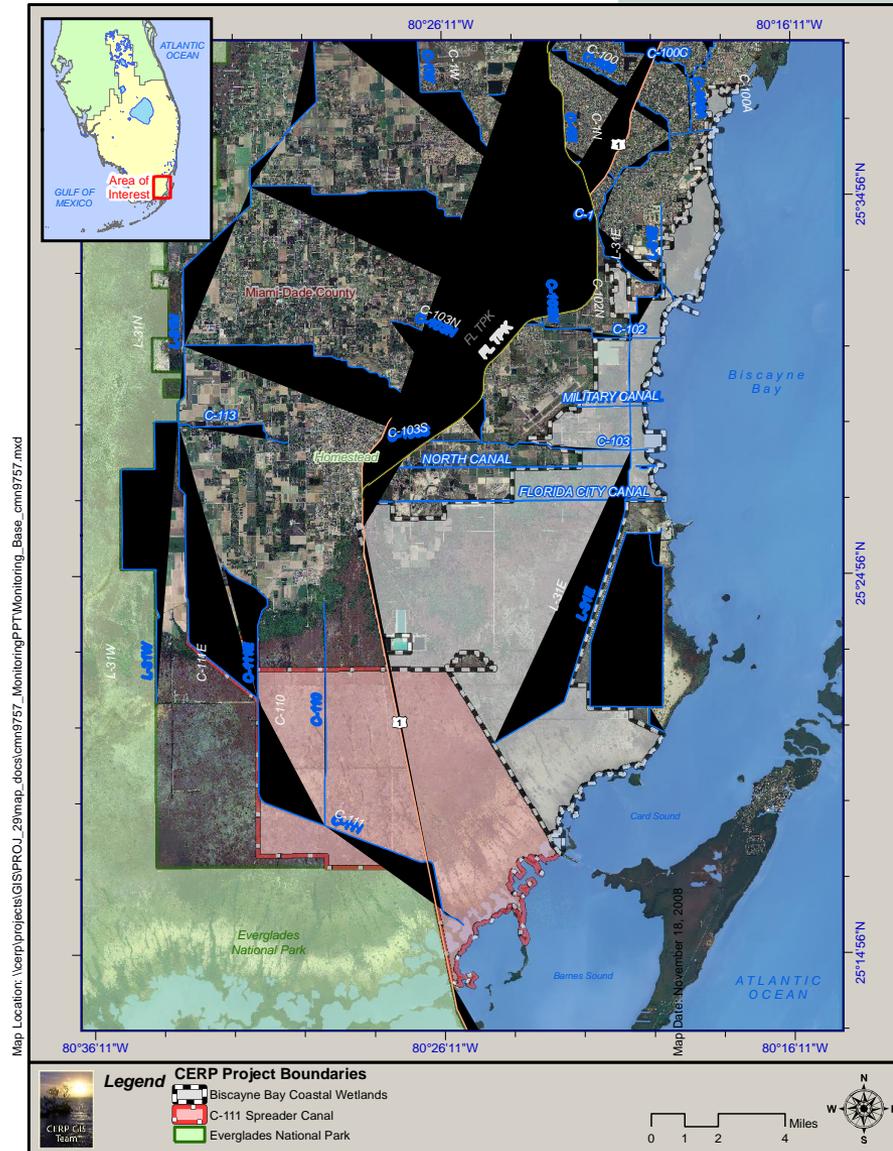


RESTORATION

Phase II: BBSEERS

Integration BBCW & C111 Spreader

- New Information
- **Targets & PM Development and Updates**
- **Water Delivery**
- Alternatives (New and Existing)
- Water Sources
- Regional Initiatives, Activities & Restoration
- Storage
- Water Quality Considerations



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BBCW PHASE I

1. Deering

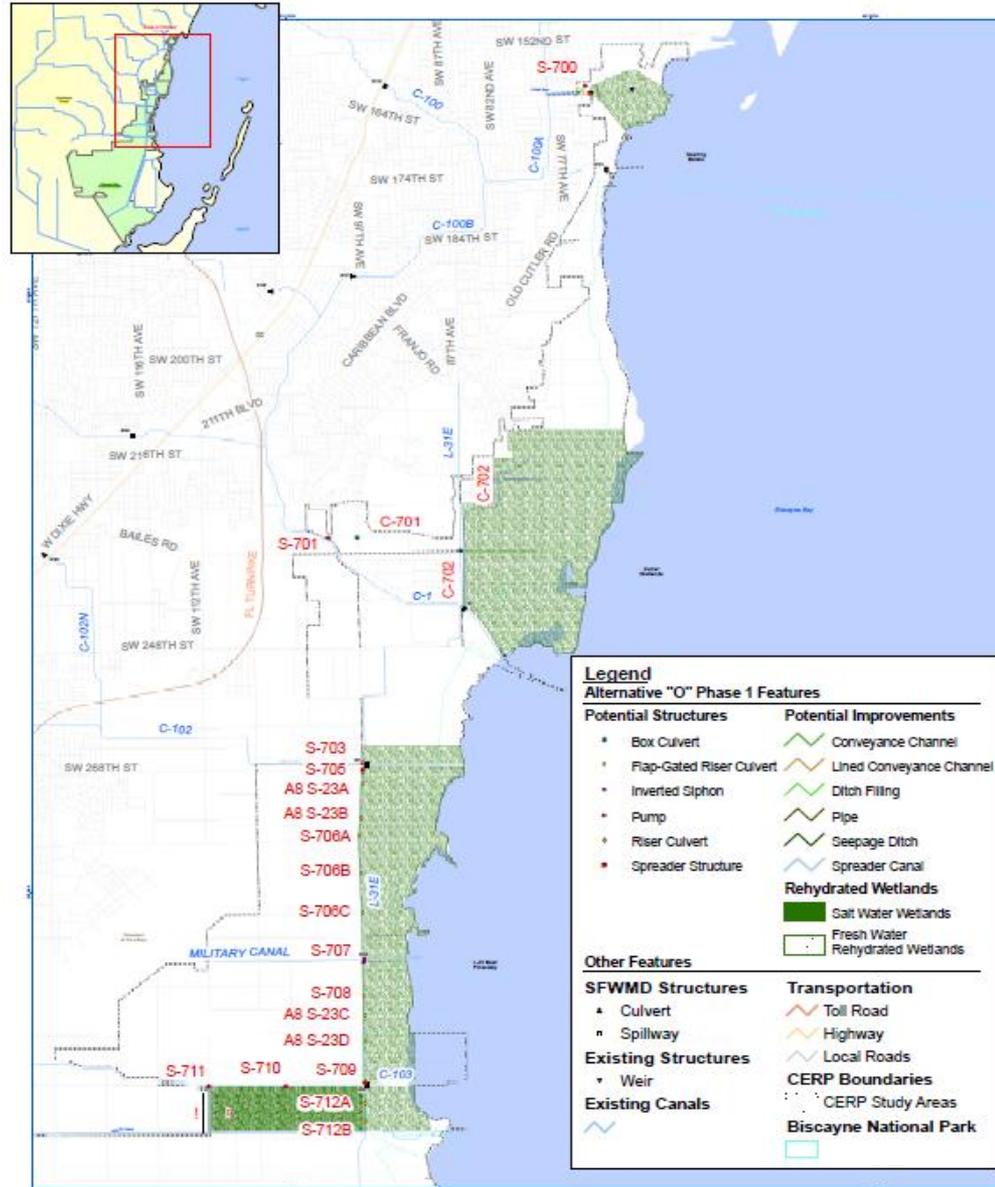
Status: Complete

2. Cutler Wetlands

Status: To Be Constructed

3. L31 E Flowway

Status: In Progress





TARGETS

Qualitative

Flows

"Restore and improve quantity, quality, timing and distribution of freshwater to Biscayne Bay, including BNP for the life of the project"

Salinity

"Re-establish productive nursery habitat along the shoreline of Biscayne Bay"

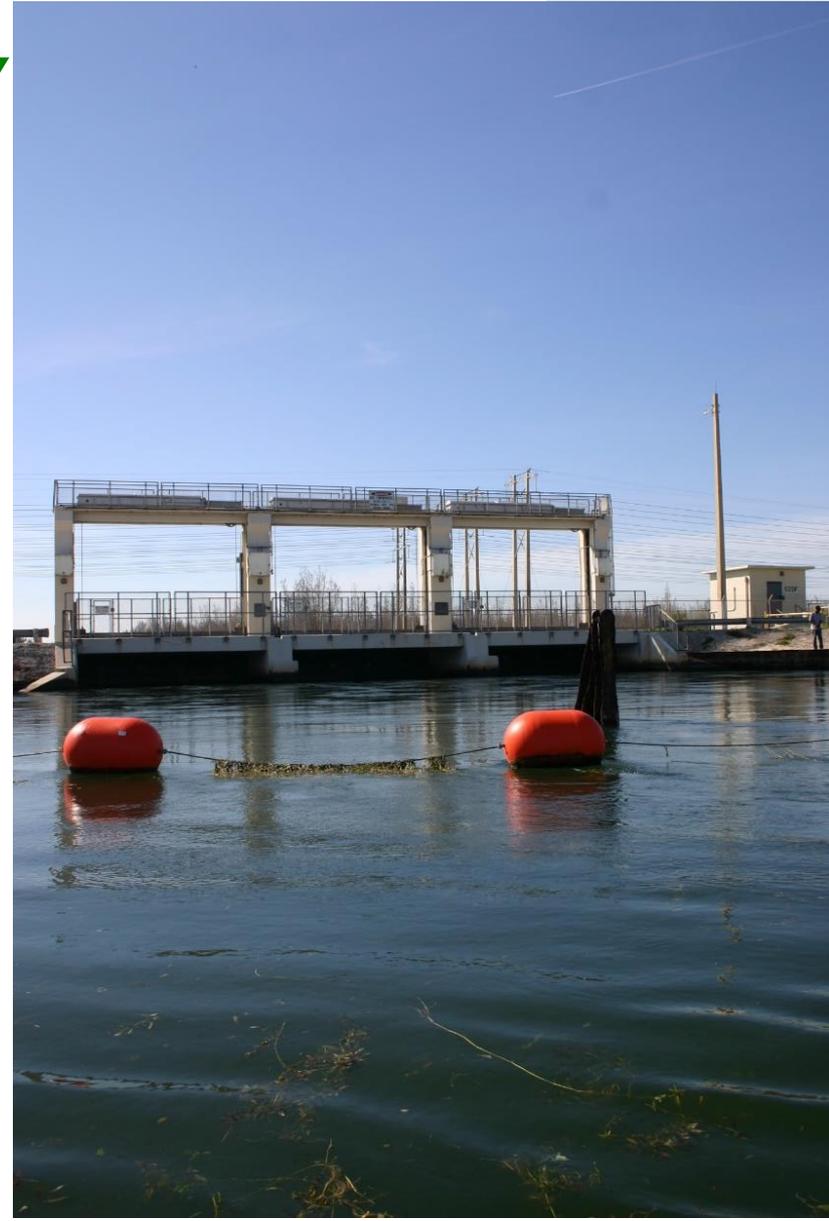
"Redistribute freshwater flow to minimize point source discharges at canals to improve freshwater and estuarine habitat."



WATER DELIVERY FLOWS

Existing water and operations
(Annex D of PIR)

Some localized adaptive
measures at BBCW features
(e.g. pumping changed from
pulsed to continuous at
Deering S-700) →
Improvement in downstream
wetland and nearshore salinity
conditions.

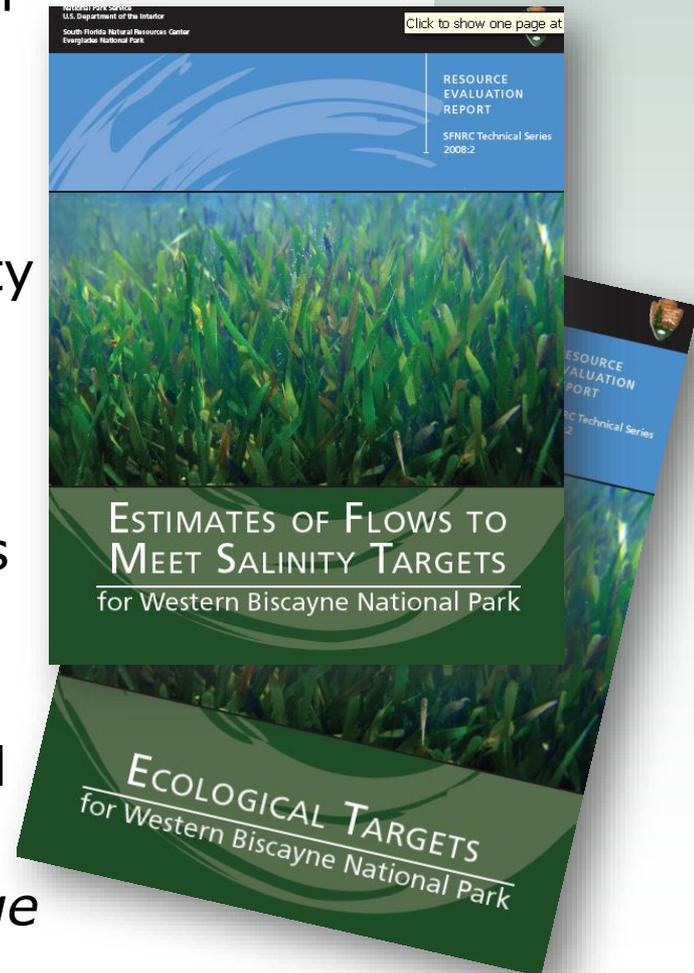




TARGETS RESTORATION & MAINTENANCE

Ecological & Hydrologic Targets for Western Biscayne National Park, 2006-2008

- Targets include restoration and critical threshold
- Ecological targets used to develop salinity targets- *have a timing component*
- Different flow estimates presented for variety of salinity targets
 - Estimates never been used as targets
 - Groundwater limited data availability and low relative to surface flows
 - Based historical data analyses, model estimates
 - Flow estimates *are presented average annual flow volumes*



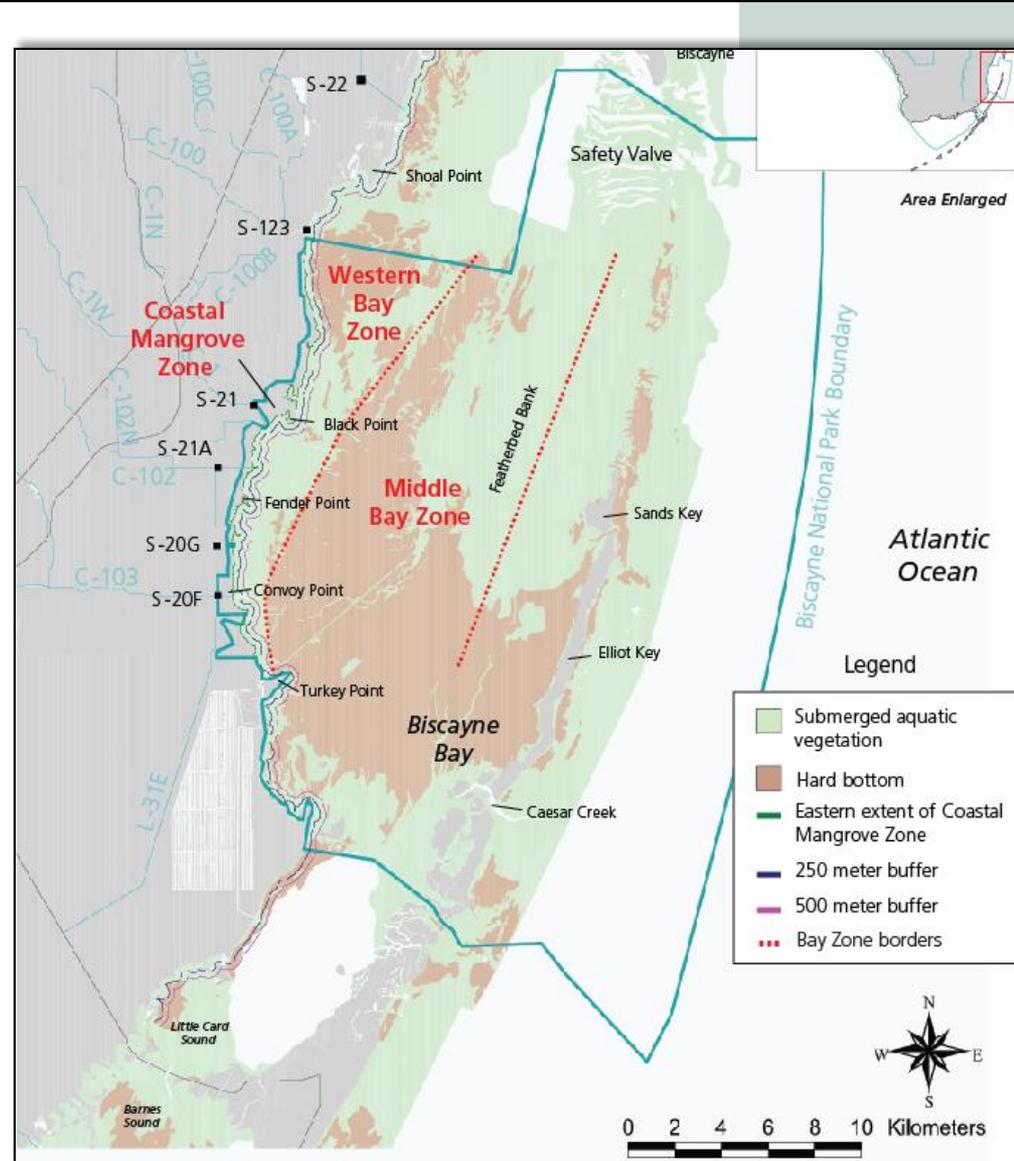


RESTORATION TARGETS

Biscayne National Park target(s) are based on salinity in Coastal Mangrove Zone (CMZ) and Western Bay Zone (WB)

Mesohaline (5-18) habitat

- Seasonal RECOVER:
 - 250 m (dry)
 - 500 m (wet)
- **NPS: > 10,000 acres**





ECOLOGY AND SALINITY

EXPERIENCE
YOUR
AMERICA

Majority of these species prefer salinities 5-20

- Late dry season - early wet season: Average daily salinity from 15 to 25 WBZ
- Late Wet Season: < 20 WBZ and 0-5 CMZ
- Never exceed 30 WBZ

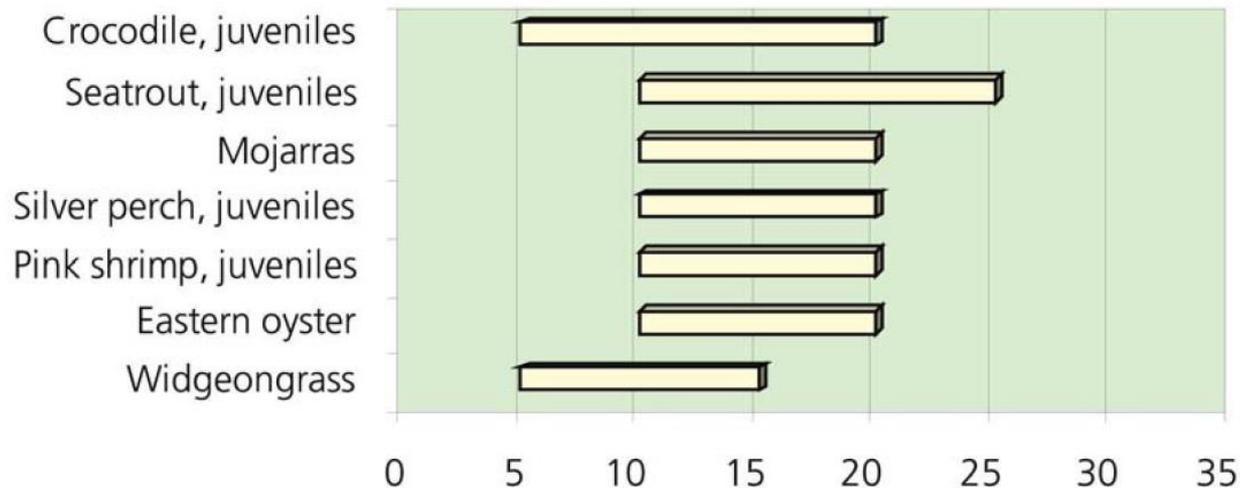


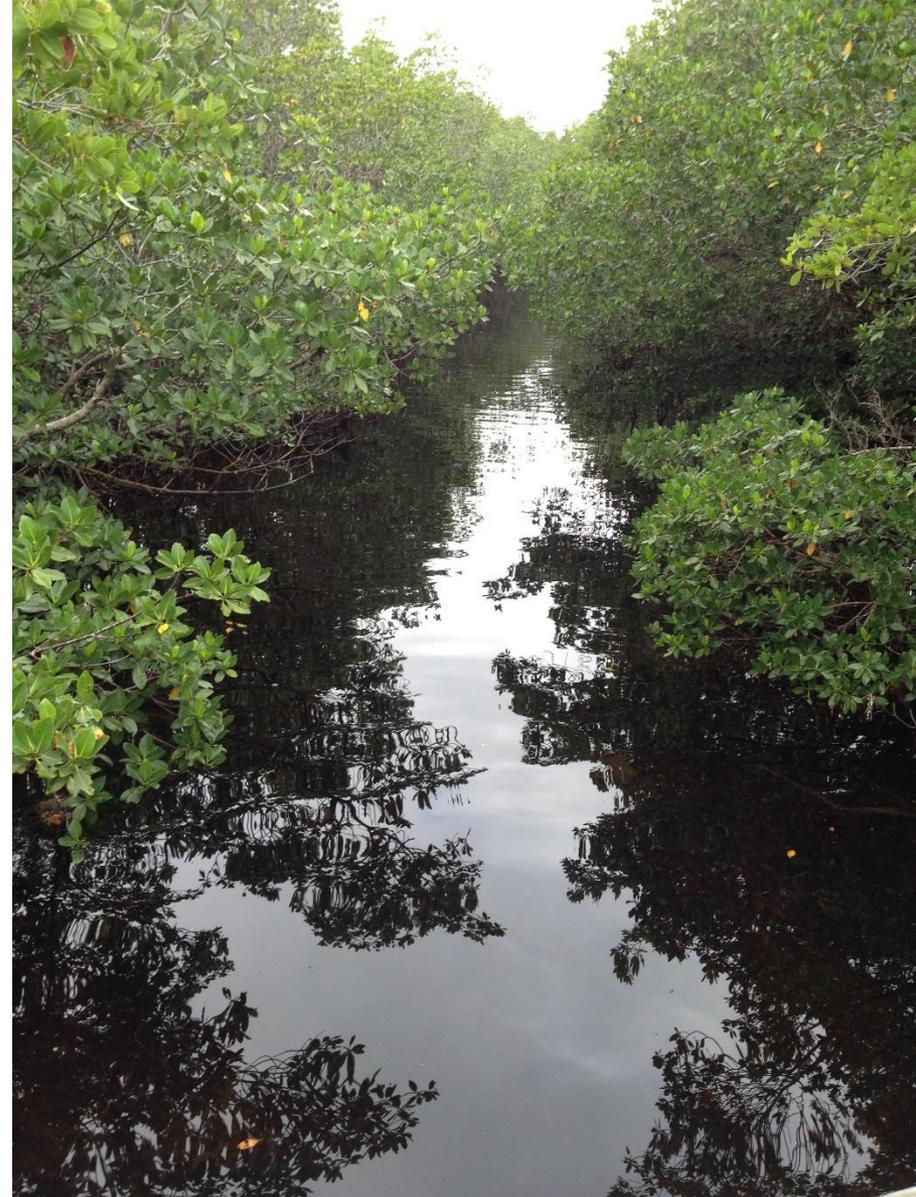
Figure 5. Optimal salinity ranges (units in ppt) for Biscayne National Park ecosystem indicators. Source: Ecological Targets for Western Biscayne Bay ; SFNRC Technical Series 2006



CRITICAL THRESHOLD

For Western Bay Zone
salinity <30

*There is no current
strategy in place or
practice to maintain
critical threshold*





Example

Nearshore Salinity, Rainfall, and Flows 2015 – 2018

- Long-term Rainfall Record-
120 + years
- Nearshore Salinity – Monthly
Average
- Structure Flow – Monthly Total

Source; M Hunt, Freshwater
Inflows to Biscayne National
Park Are All Flows Equal?, GEER
2019



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EXPERIENCE
YOUR
AMERICA

REGIONAL RAINFALL

NOAA/ NCDC long- term
data set- from 1897

Uses composite of rain
stations

Florida



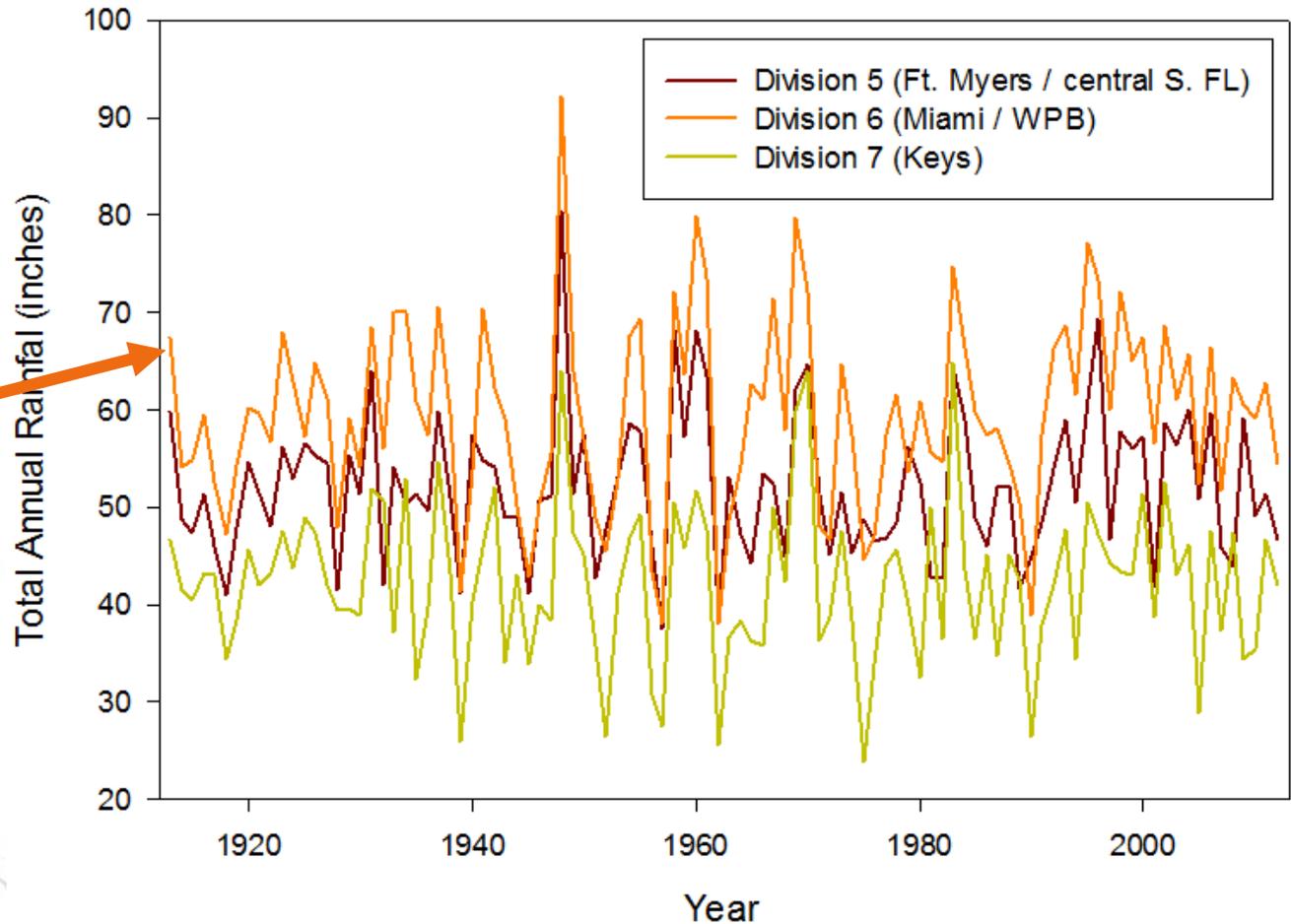
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EXPERIENCE
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ANNUAL RAINFALL SOUTH FLORIDA



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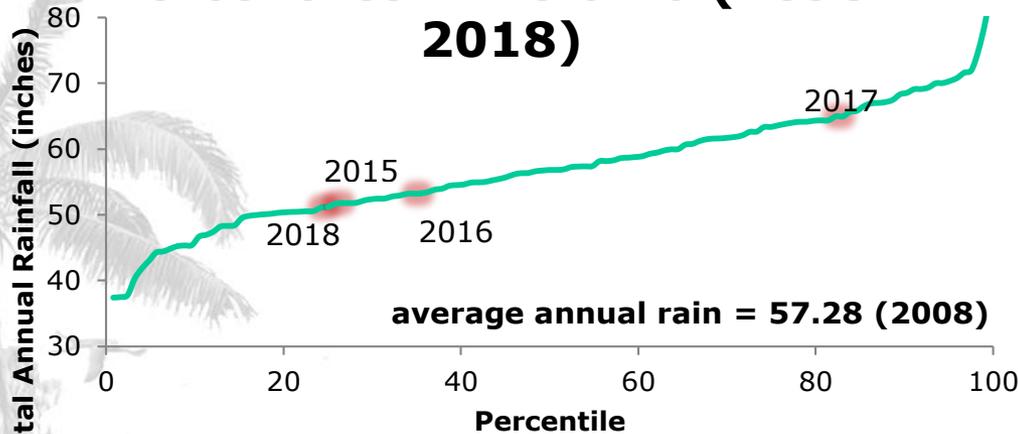
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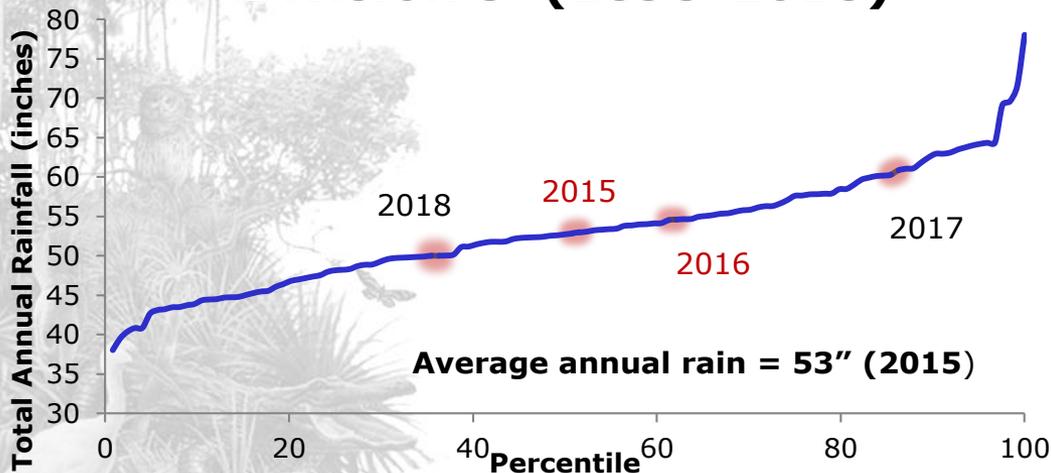
EXPERIENCE
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Annual Differences: SE Coastal (6) & Everglades/SW Coast (5)

Total Annual Rainfall Percentiles Division 6 (1895-2018)



Total Annual Rainfall Percentiles Division 5 (1895-2018)



2017, 2018 rank similar
2015, 2016 rank different



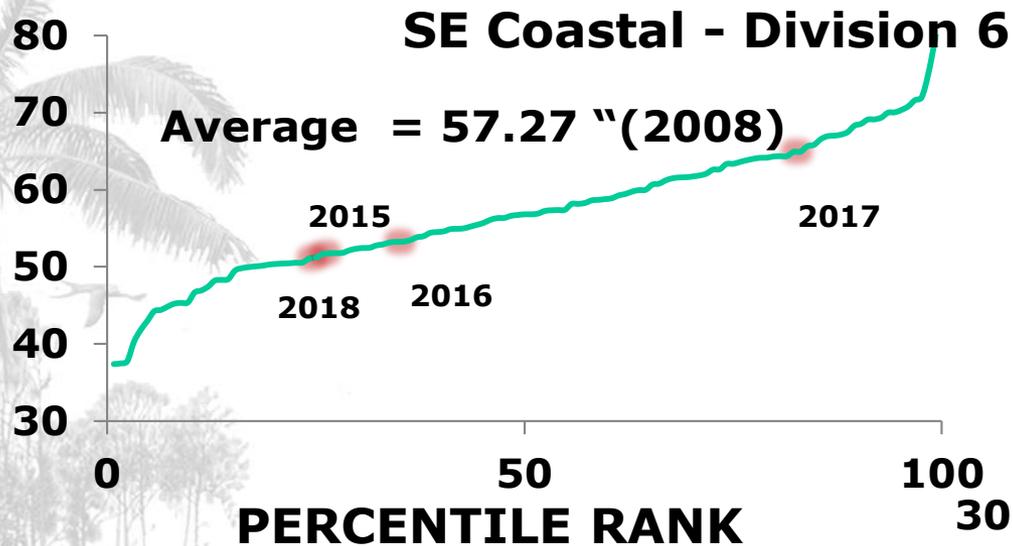
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ANNUAL RAINFALL

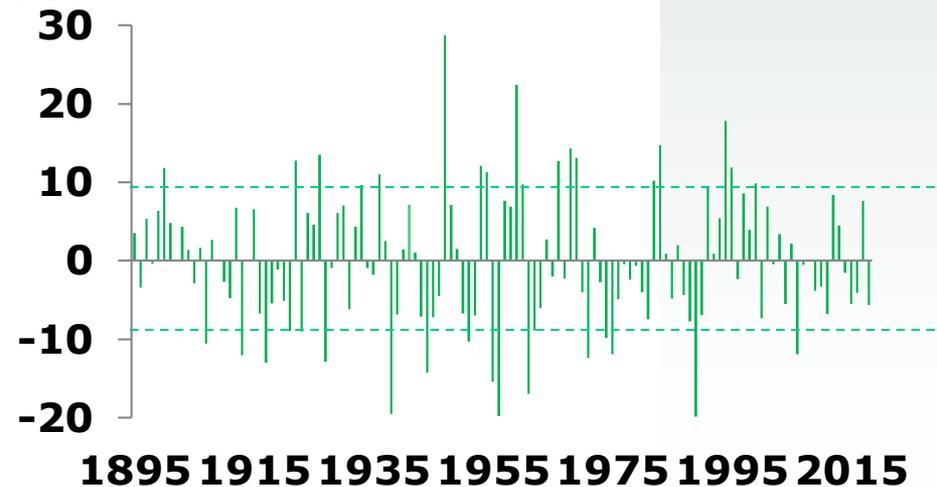
EXPERIENCE
YOUR
AMERICA



✓ **High Degree
Annual
Variability**



DIFFERENCE FROM AVERAGE

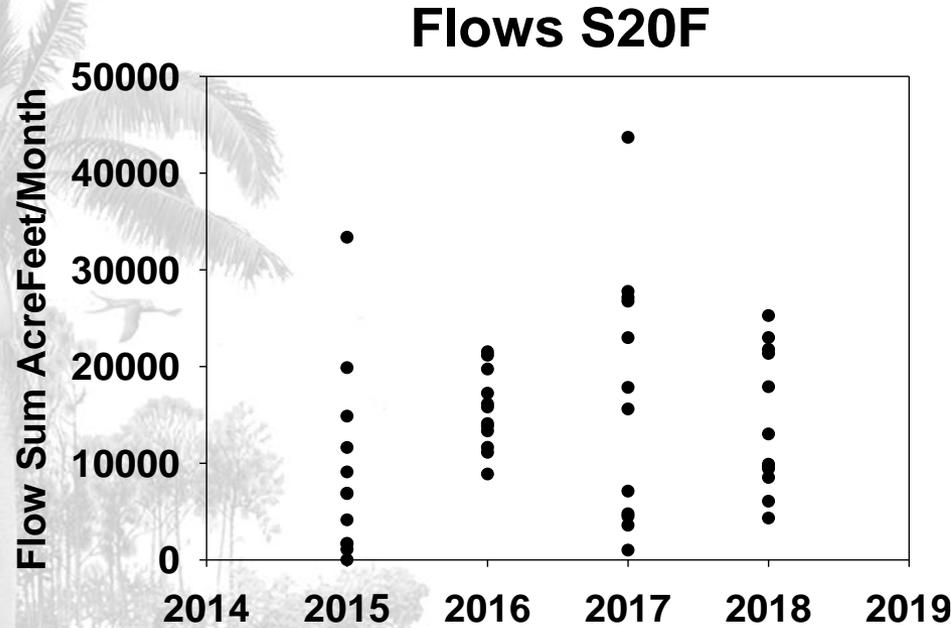


General Year Characteristics

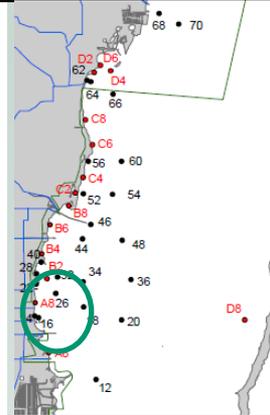
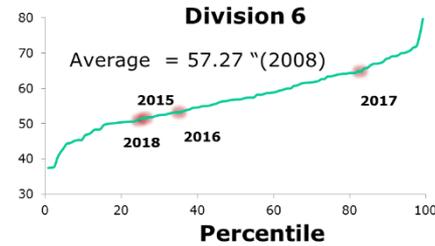
- 2015: "dry" Wet Season
- 2016: "wet" Dry Season (Jan)
- 2017: IRMA
- 2018: "Dry" with June very wet



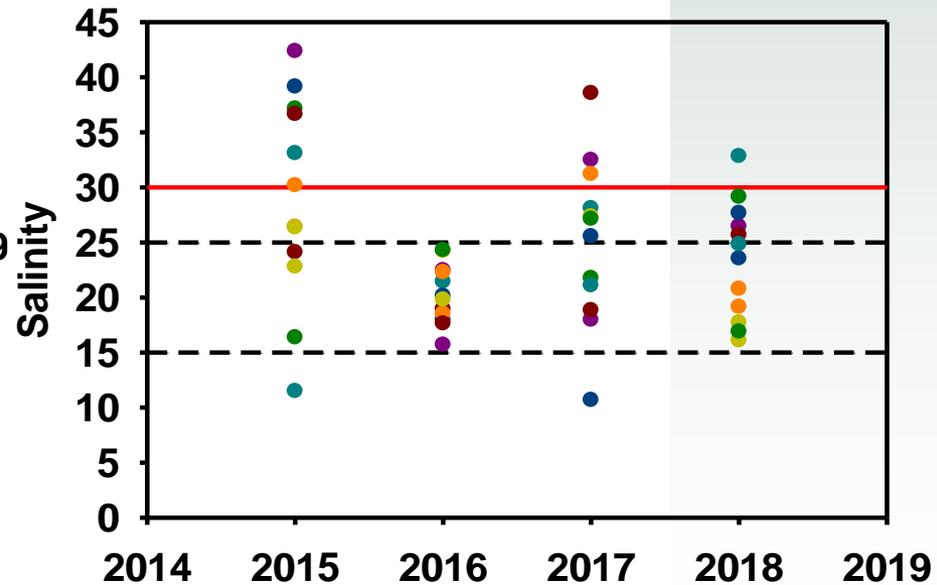
FLOW & SALINITY



✓ **Monthly Flows throughout year where minimum salinity met (2016, 2018)**



Salinity Bisc 16

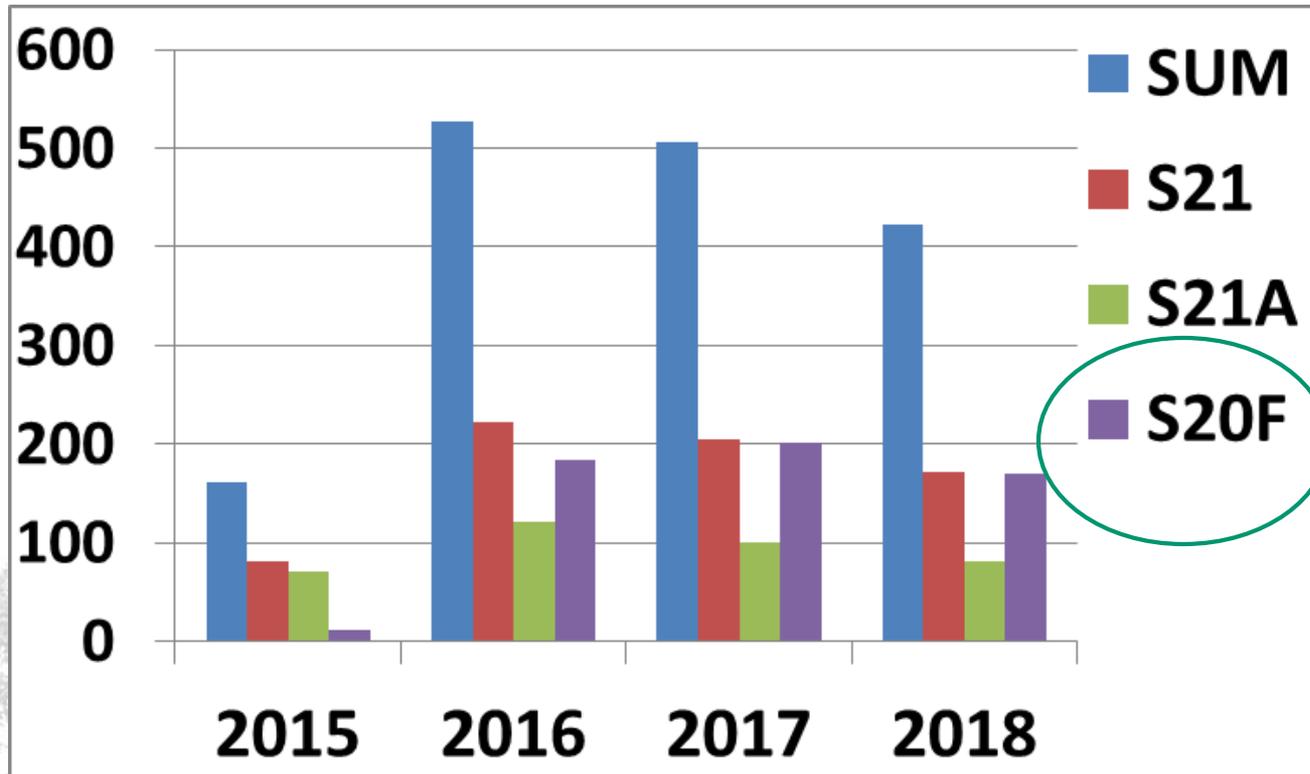




INFLOWS: ANNUAL 2015-2018

EXPERIENCE
YOUR
AMERICA

(Kacre-ft)

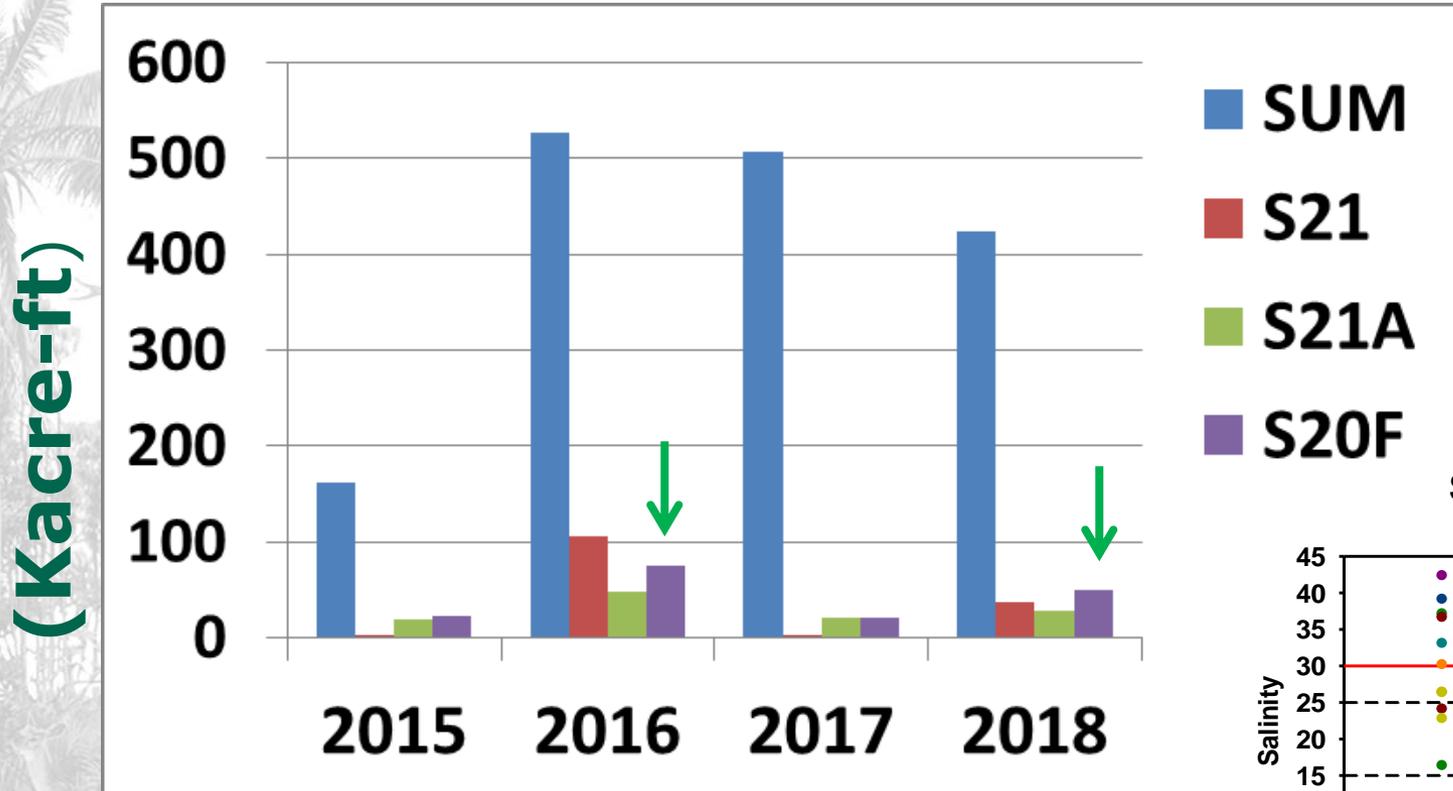


✓ 2016 and 2017,2018 Comparable **annual** canal inflows despite different annual rainfall and salinity

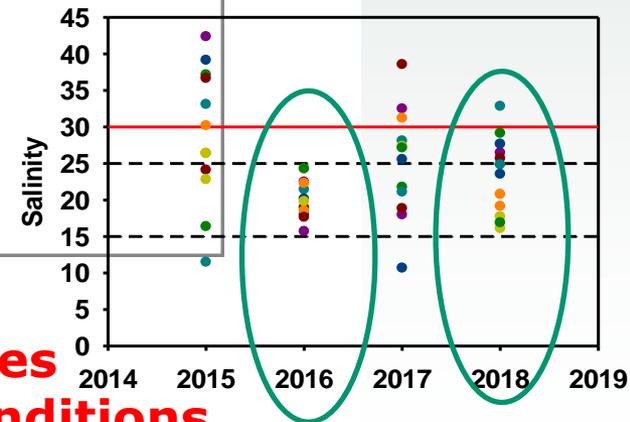


EXPERIENCE
YOUR
AMERICA

INFLOWS: JANUARY- MAY



Salinity Bisc 16

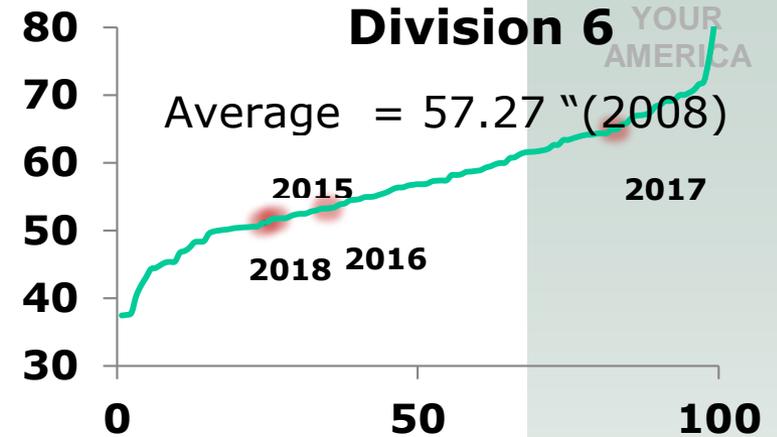


**Flows through dry season each structure:
2015 and 2017 comparable - high salinities
2018 and 2016 higher - better salinity conditions**

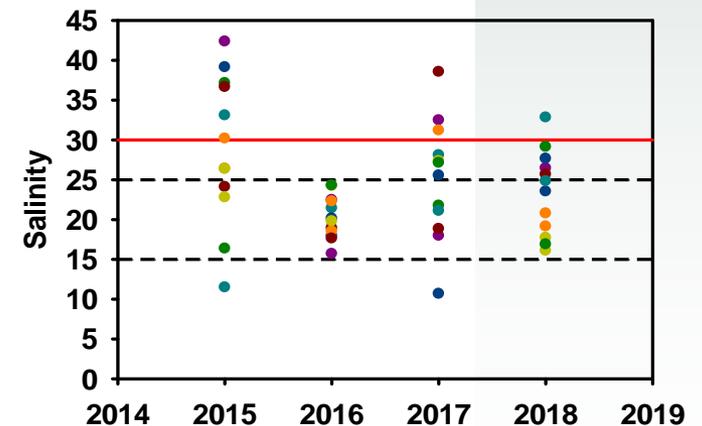


SUMMARY

- Low **annual** inflow and rainfall but met nearshore salinity targets (2016, 2018)
- *Years with low dry season inflow will not meet critical thresholds for nearshore salinity*
- *Need Monthly Flow Targets not Annual Flow*



Salinity Bisc 16



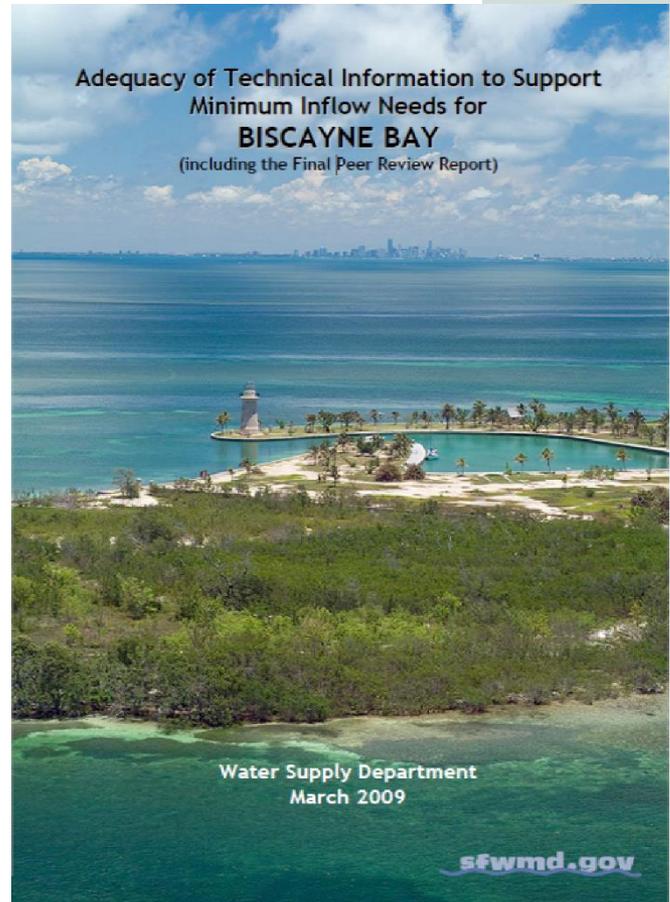
MINIMUM DRY SEASON INFLOWS

EXPERIENCE
YOUR
AMERICA

Minimum flow and level (MFL) for coastal systems specify dry season inflows

Biscayne Bay is the only coastal system in South Florida that does not have an MFL established

Last effort in 2008 - 2009, Oct 2008 Peer review conducted – hypersalinity identified as key concern for Biscayne Bay; no action taken





WATER RESERVATION

EXPERIENCE
YOUR
AMERICA

Adopted by SFWMD governing board June 13, 2013

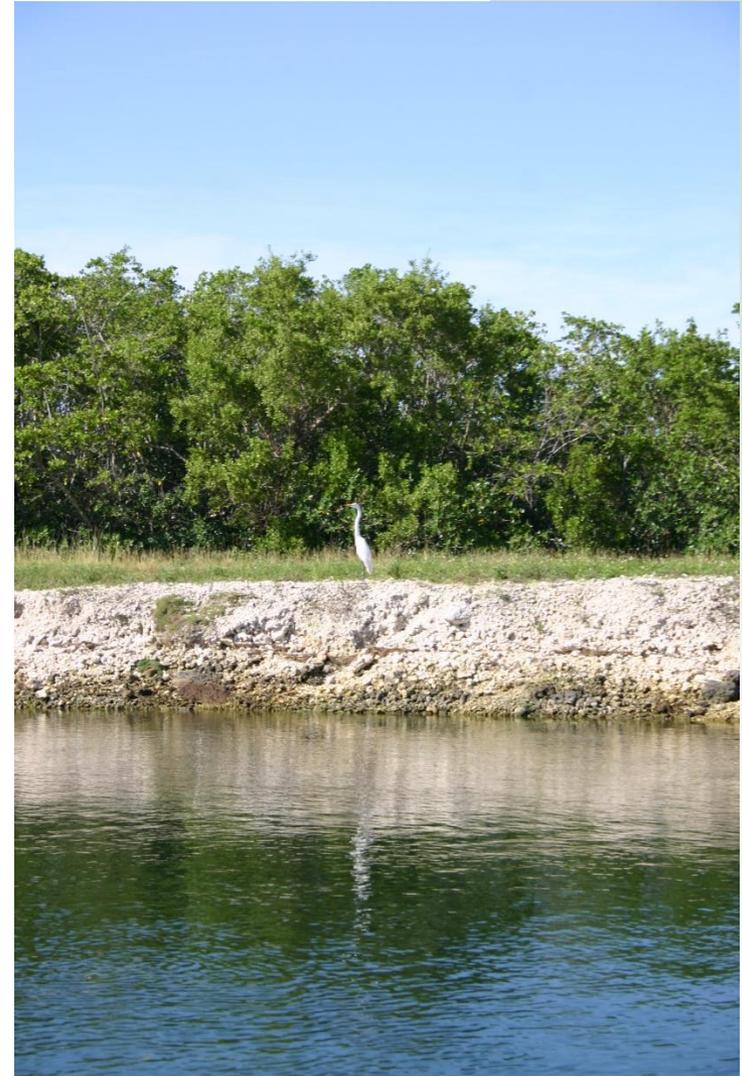
Rule 40E-10.061, FAC became effective July 21, 2013

What the Water Reservation does:
Reserves *existing annual surface water in canals* that input to
BBCW



WHAT RESERVATION DOESN'T DO

- Establish an operating regime
- Provide drought protection
- Ensure the fish and wildlife goals or project goals are achieved
- *Establish critical dry season inflows*
- *Account for groundwater withdrawals*





DRY SEASON FLOWS PILOT PROJECT 2013

EXPERIENCE
YOUR
AMERICA

- Proof of Concept
- Objective to meet Critical threshold – prevent >30

Pilot Project Tests for Supplemental Water Deliveries to Biscayne Bay

After-Action Assessment



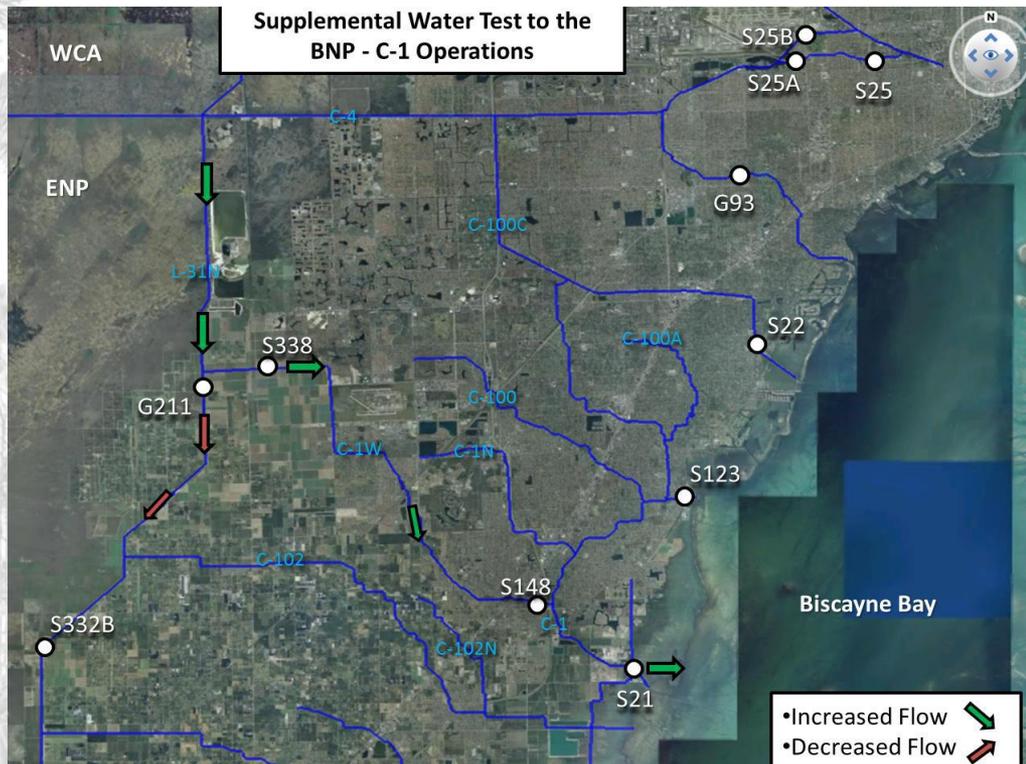
sfwmd.gov

June 2013



DELIVERY PATH

EXPERIENCE
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Path of supplemental water deliveries to Biscayne Bay used to deliver water to S-21.

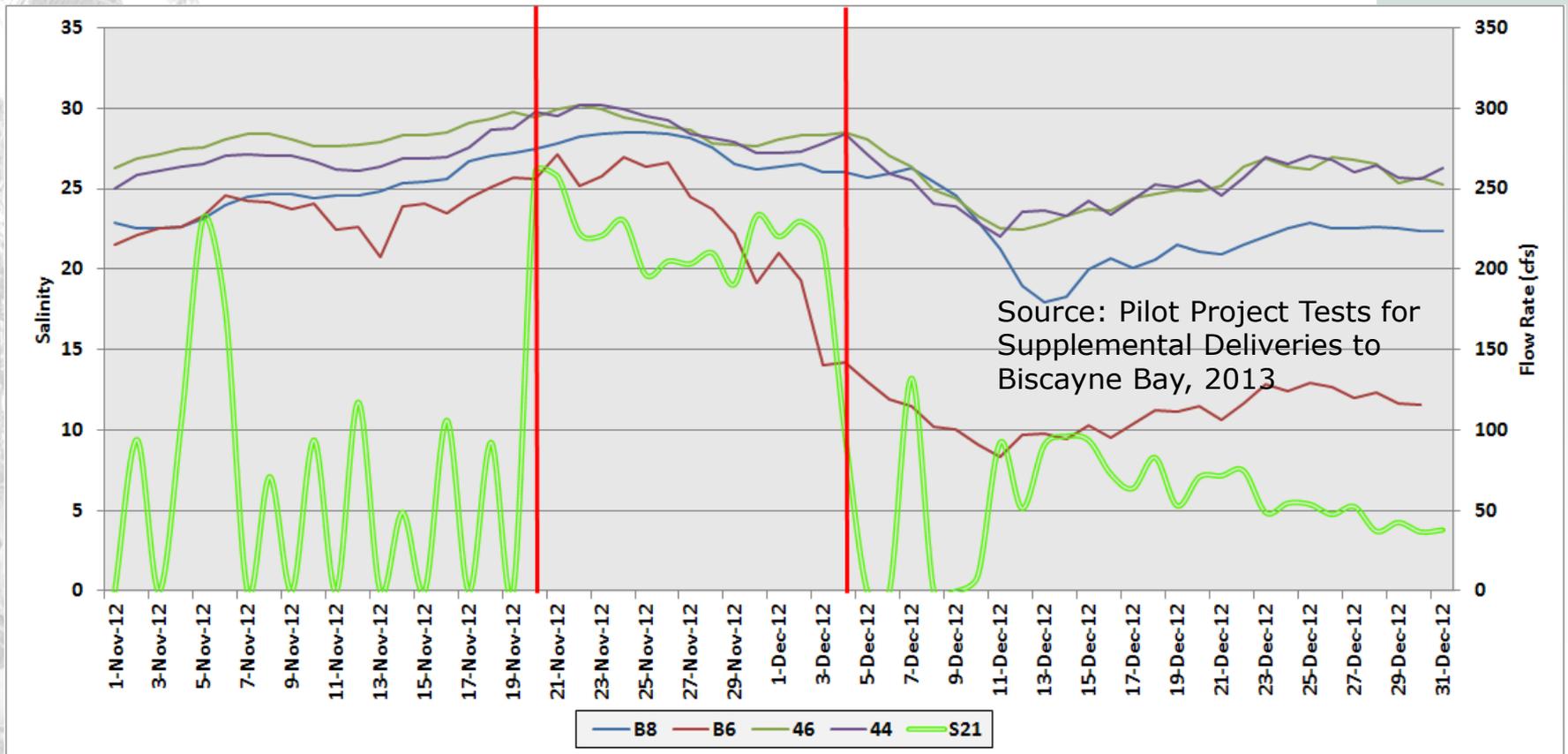
Source: Pilot Project Tests for Supplemental Deliveries to Biscayne Bay, 2013

One test was conducted from November 20, 2012 through December 4, 2012. Water was released from Water Conservation Area 3A (WCA 3A) into the South Miami-Dade Conveyance System (i.e. L-31N Canal), and into the western C-1 Canal, ultimately discharging at the coastal outfall, S-21, near Black Point.



Salinity and Flows Before, During and After Test

EXPERIENCE
FOR
AMERICA

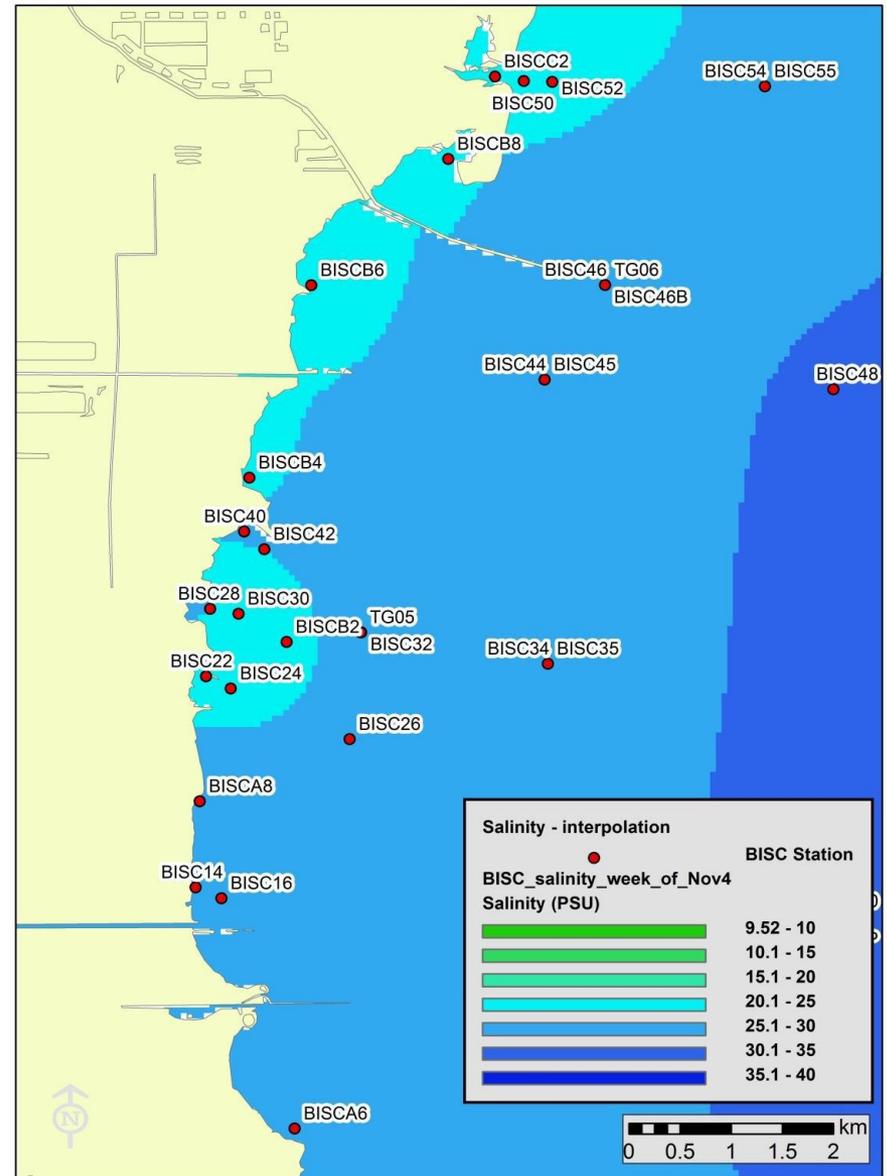




SALINITY PRIOR TO TEST

Depiction of salinity in the nearshore area of Biscayne Bay based on weekly average salinity for November 4-10, 2012.

Source: Pilot Project Tests for Supplemental Deliveries to Biscayne Bay, 2013

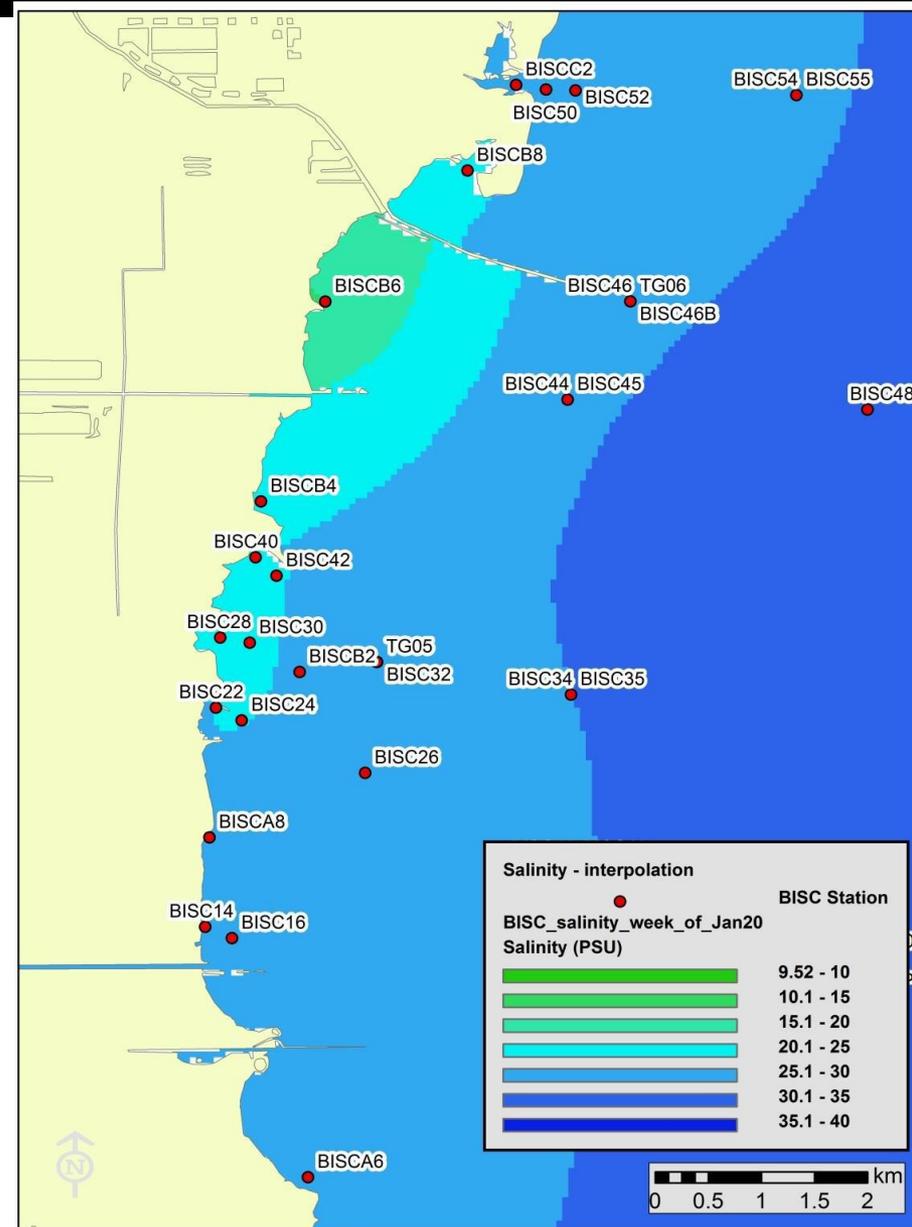




SALINITY AFTER TEST

Depiction of salinity in the nearshore area of Biscayne Bay based on weekly average salinity for January 20-26, 2012.

Source: Pilot Project Tests for Supplemental Deliveries to Biscayne Bay, 2013





TIMING

*"Restore and improve quantity, quality, **timing** and distribution of freshwater to Biscayne Bay, including BNP for the life of the project"*

Alternatives that provide

- Dry Season Water Delivery/ Operations
- Water Storage
- Sources



TARGETS

Target Flows for coastal areas

- *Monthly or seasonal targets that are consistent with and on same timescale of ecological / salinity targets, include dry season flows*

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Thank you!

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