Moving Forward: Phase II
Biscayne Bay Coastal Wetlands

June 16, 2020
Presentation to the BBRRCT
Melody Hunt
➢ Salinity & Flow Targets
➢ Dry Season Flows & Targets/Example

➢ Water Delivery
➢ 2013 Pilot Project
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
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

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
REGIONAL RAINFALL

NOAA/ NCDC long-term data set - from 1897

Uses composite of rain stations
Annual Differences: SE Coastal (6) & Everglades/SW Coast (5)

2017, 2018 rank similar
2015, 2016 rank different
ANNUAL RAINFALL

SE Coastal - Division 6

Average = 57.27 "(2008)

High Degree Annual Variability

General Year Characteristics
2015: "dry" Wet Season
2016: "wet" Dry Season (Jan)
2017: IRMA
2018: "Dry" with June very wet
**FLOW & SALINITY**

Monthly Flows - Monthly Salinities

- Used 4 years flows from major structures
- Nearshore Salinities
- Compared with Salinity Targets
- Show results of Flows at S20F and Salinity at BISC 16

**Salinity Targets**

Daily Salinities Western Bay Zone
- Threshold < 30 (Always)
- Restoration 15 - 25 (March – Aug.)
FLOW & SALINITY

✓ Monthly Flows throughout year where minimum salinity met (2016, 2018)
2016 and 2017, 2018 Comparable **annual** canal inflows despite different annual rainfall and salinity
INFLOWS: JANUARY- MAY

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
MINIMUM DRY SEASON INFLOWS

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.

WATER RESERVATION

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

• Proof of Concept

• Objective to meet Critical threshold – prevent >30
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.

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
Salinity and Flows Before, During and After Test

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

Depiction of salinity in the nearshore area of Biscayne Bay based on weekly average salinity for December 2-8, 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
Thank you!

Melody Hunt
Melody_Hunt@nps.gov