



Feasibility Evaluation for Making Supplemental Freshwater Deliveries to Biscayne National Park

South Miami-Dade Water Issues Coordination Roundtable - March 1, 2011

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Origin of the Feasibility Evaluation

- Research conducted by National Park Service
- Findings presented to SMDWIC Roundtable, November 22, 2010
- Presentation to January 2011 Governing Board
 - Board requests staff to evaluate potential for making operational based water deliveries to the Bay

National Park Service

U.S. Department of the Interior

Biscayne National Park
South Florida Natural Resources Center

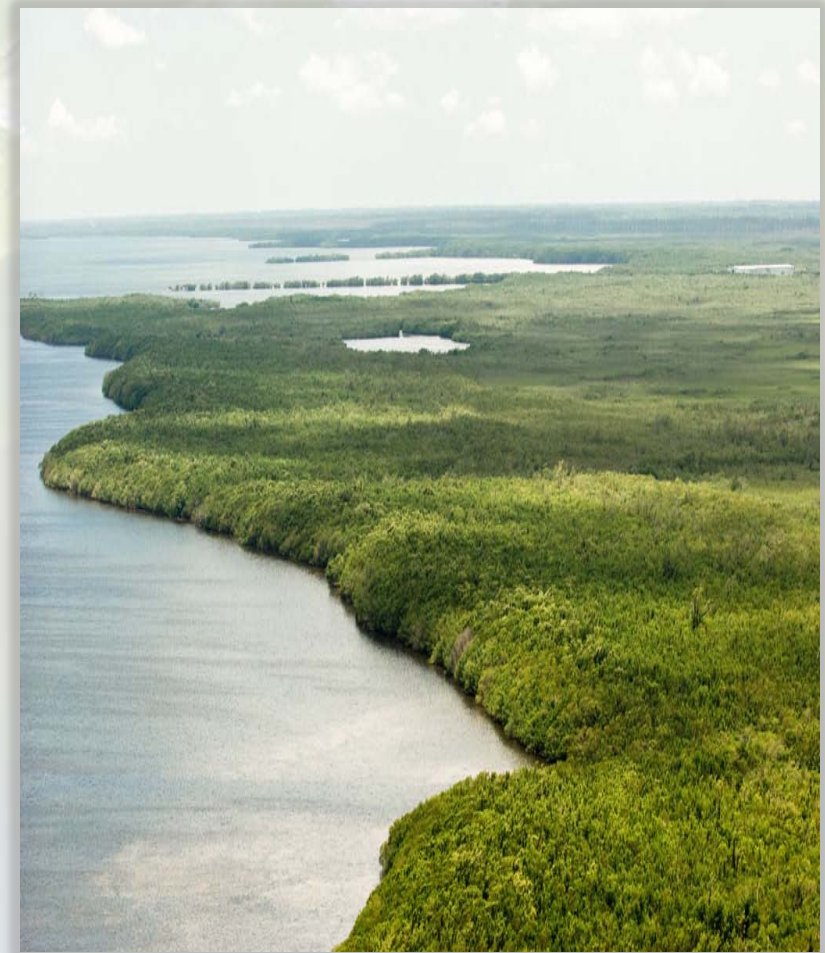
**Freshwater Discharge and Protecting the
Coastal Ecosystem
in Biscayne National Park**

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Objective of the Feasibility Evaluation

- **To identify potential operations, constraints and considerations associated with providing supplemental freshwater releases to Biscayne National Park in order to reduce the occurrence of high salinity conditions in the near-shore area**



Project Parameters

■ How much water is needed

- Sufficient freshwater discharges to limit near-shore salinity levels to 30 PSU or less

■ Where

- Outflow structures: S- 21A and S-20F
- Salinity monitoring stations: BISC14 and BISC40

■ When

- Latter part of dry season: February through May

Basis of Request for Supplemental Freshwater Flow

- Provide optimal salinity regime conducive to the variety of species that occur within the Biscayne Bay coastal zone
 - Optimal conditions: 5 to 25 psu salinity
 - “life support” conditions: 30 psu salinity
- Avoid hypersalinity conditions that, by frequency or duration, would result in reduction in habitat and associated species diversity

How Much Water is Needed

- Approximately 76 cfs from each of the two coastal structures; S-21A and S-20F during the months of February through May
 - Target flows calculated three different ways
 - Verified by District scientists



How Much Water is Needed (cont.)

- **Existing dry season flows frequently don't meet the targets**

- **S-20F average monthly discharge (1986 – 2010)**

	Feb	Mar	Apr	May
Ave month flow cfs	101.8	85.3	57.2	59.7
# months < 76 cfs	10	13	18	16

- **S-21A average monthly discharge (1986 – 2010)**

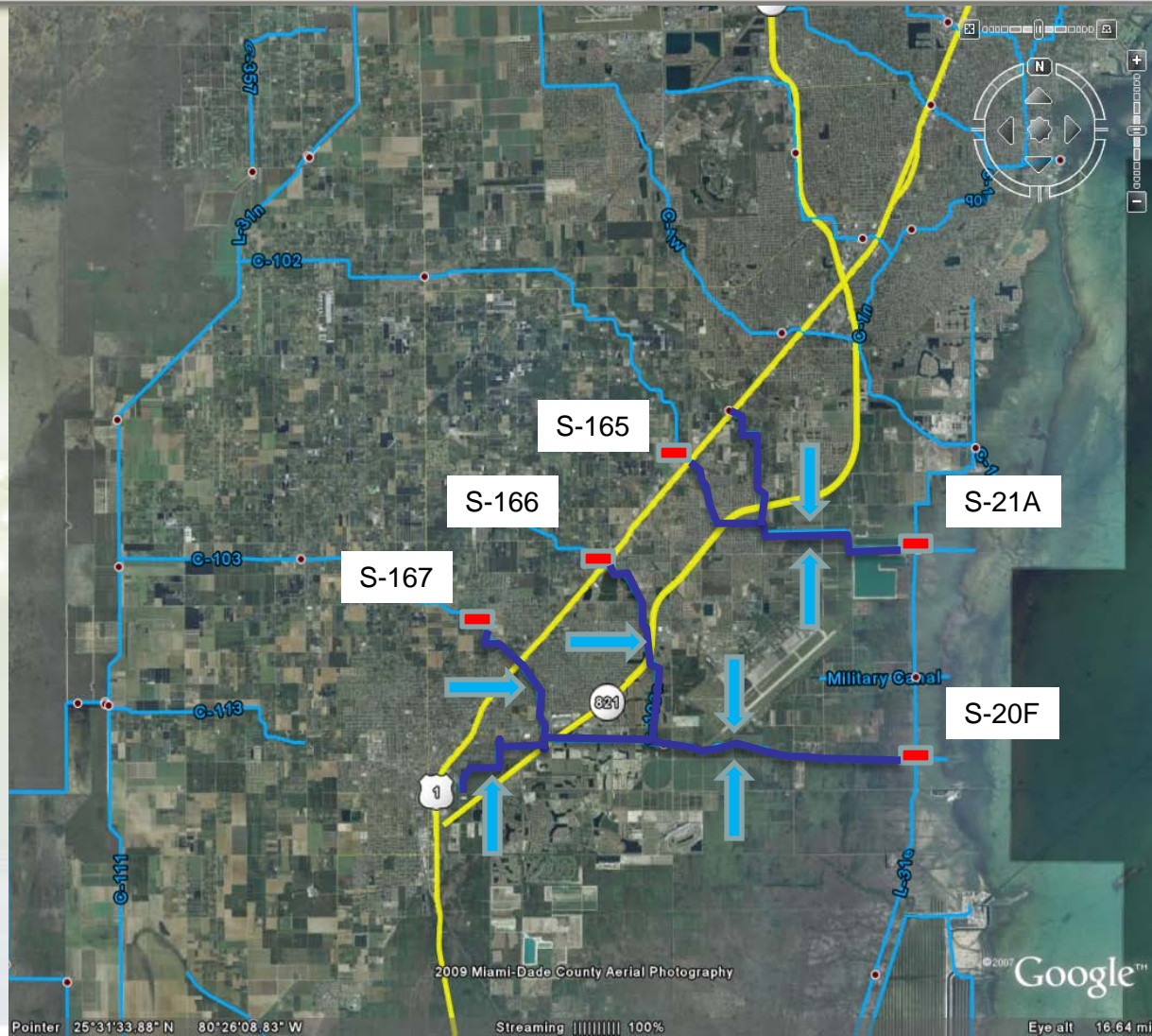
	Feb	Mar	Apr	May
Ave month flow cfs	55.2	52.2	40.1	38.6
# months < 76 cfs	19	19	22	21

System Constraints and Considerations

- **Use existing system; no pumps or reservoirs**
- **Limited storage; canal prism & adjacent groundwater**
- **Coastal structures have limited operational ranges**
 - **0.4 ft range between open and close**
 - **Tidal tailwater constraint**
 - **Pulse release approach would be needed**

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- This aerial map displays the South Florida Water Management District (SFWMD) region. The map is overlaid with a network of canals and basins. A legend in the bottom left corner identifies two types of infrastructure: 'Local Basins' represented by green lines and 'Regional System' represented by pink lines. The map shows a dense network of canals, including the Hillsboro Canal, Alligator Canal, and Tamiami Canal. Various basins are labeled with codes such as L-1, L-2, L-3, L-4, L-5, L-6, L-7, L-8, L-9, L-10, L-11, L-12, L-13, L-14, L-15, L-16, L-17, L-18, L-19, L-20, L-21, L-22, L-23, L-24, L-25, L-26, L-27, L-28, L-29, L-30, L-31, L-32, L-33, L-34, L-35, L-36, L-37, L-38, L-39, L-40, L-41, L-42, L-43, L-44, L-45, L-46, L-47, L-48, L-49, L-50, L-51, L-52, L-53, L-54, L-55, L-56, L-57, L-58, L-59, L-60, L-61, L-62, L-63, L-64, L-65, L-66, L-67, L-68, L-69, L-70, L-71, L-72, L-73, L-74, L-75, L-76, L-77, L-78, L-79, L-80, L-81, L-82, L-83, L-84, L-85, L-86, L-87, L-88, L-89, L-90, L-91, L-92, L-93, L-94, L-95, L-96, L-97, L-98, L-99, L-100. The map also shows major roads, including US Highway 1, US Highway 195, and US Highway 75. The SFWMD logo is located in the center of the map. The map is titled '2009 Palm Beach County Aerial Photography' and 'SFWMD Enterprise GIS Layers'. The map is dated '2004-05 SFWMD Aerial Photography' and includes coordinates '26°16'03.92" N 79°24'24.26" W' and a scale 'elev. 0 ft'.

Coastal Basin



Coastal basin Operations and Considerations

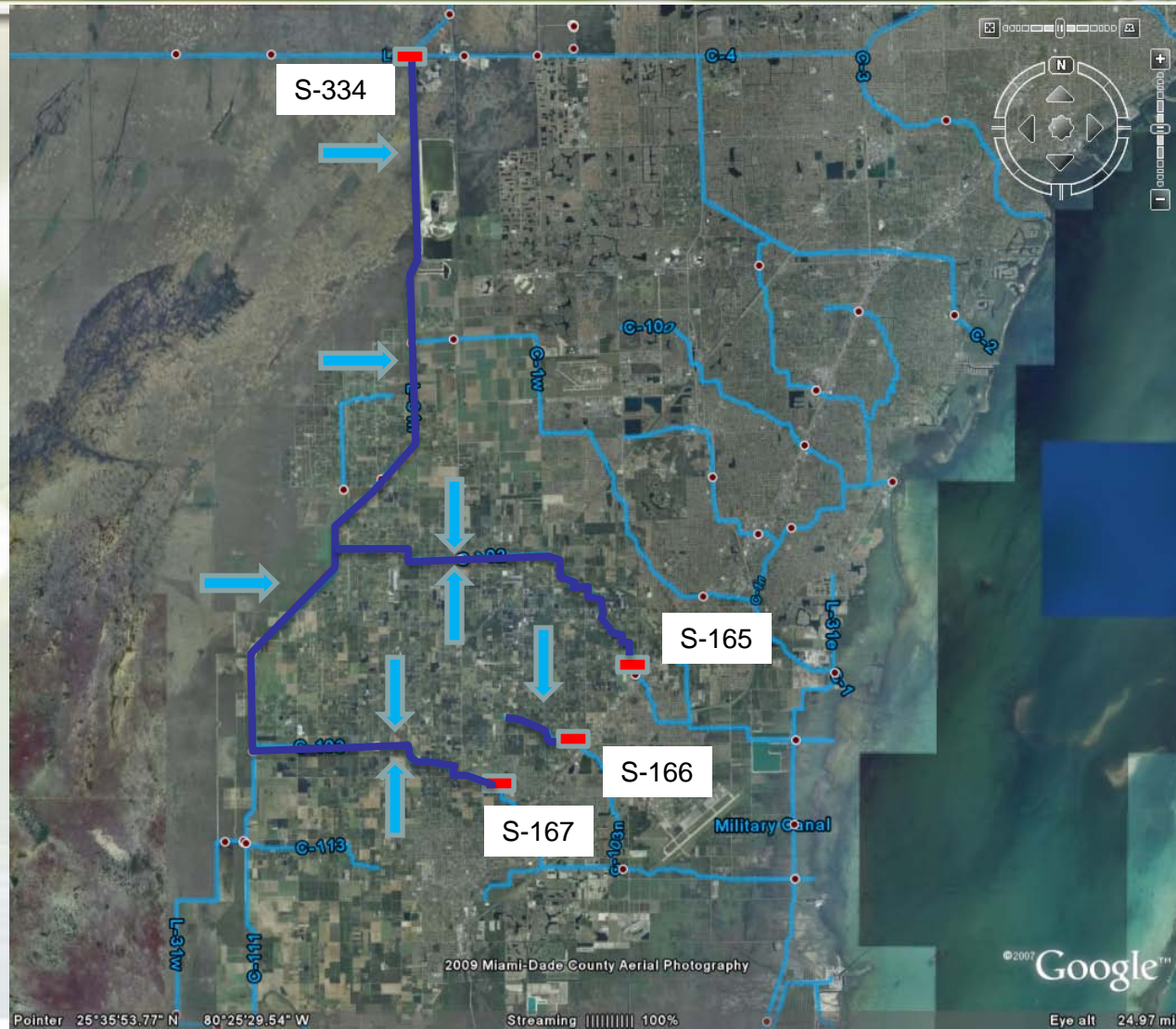
■ Operations

- S-20F and 21A gates closed to gain storage; opened to release water to Bay in a pulse.
- Primary source of surface water to Bay
- Little water available to the Bay after February

■ Considerations

- Long term operations of coastal structures in low range depletes groundwater storage near the coast and increases risk of saltwater intrusion

Inland Ridge Basin



Inland Ridge Basin Operations and Considerations

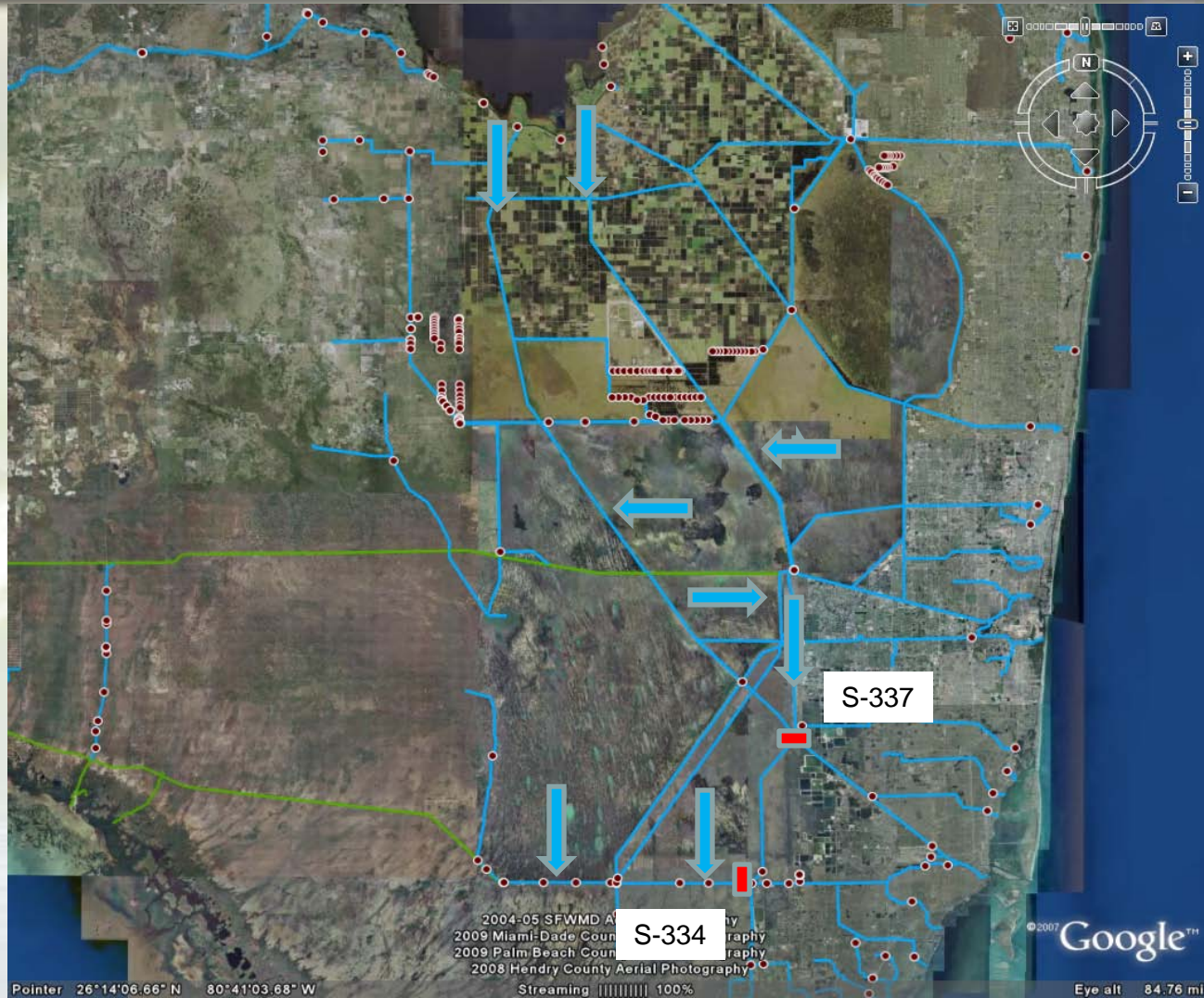
■ Operations

- S-20F and S-21A gates closed, Ridge and Divide structures (S-179, S-167 and S-165) opened to allow water from upper basin to flow to coastal structure
- Divide structures closed, coastal gates opened with falling tides to release water to Bay

■ Considerations

- Reducing storage in inland basin; affects existing legal users (ELUs)
- Induces seepage from ENP; potential to reduce flows south in the L-31N
- Increases 'pull' on upstream sources

Regional Water Deliveries



Regional System Operations and Considerations

■ Operations

- WCA-3 deliveries via S-337 and S-334
- WCA-2 to WCA-3
- Lake Okeechobee deliveries via STAs and WCAs to South Dade conveyance system

■ Considerations

- Large conveyance losses require larger volumes of supply
- Water treatment requirements and operational constraints
- Competition for water supply; environmental and ELUs
- Low regional system availability during moderate regional droughts

Operational decision tree

- Series of 'if then' protocols used to guide operational decisions
 - Considers short and future weather and salinity trends
 - Ground and surface water stage/storage conditions
 - Defines transitional thresholds which drives operational logic
- Conceptual operational decision tree drafted
 - Transitional thresholds being determined in order to finalize draft

Preliminary Findings

- The availability of fresh water in the basins is very low in the latter part of the dry season.
- Very little water is available in the regional system in the latter part of the dry season.
- Significant conveyance losses occur when moving water south in the regional system in the dry season
- Shifting water away from the inland basins and regional system will potentially conflict with existing environmental and consumptive uses

Next Steps

- Report progress to March GB
- Complete operational decision tree
- Potential to conduct limited test releases
- Conduct evaluation of impacts associated with proposed revised operations
- Review results with stakeholders
- Receive direction from decision makers on implementation



Questions?