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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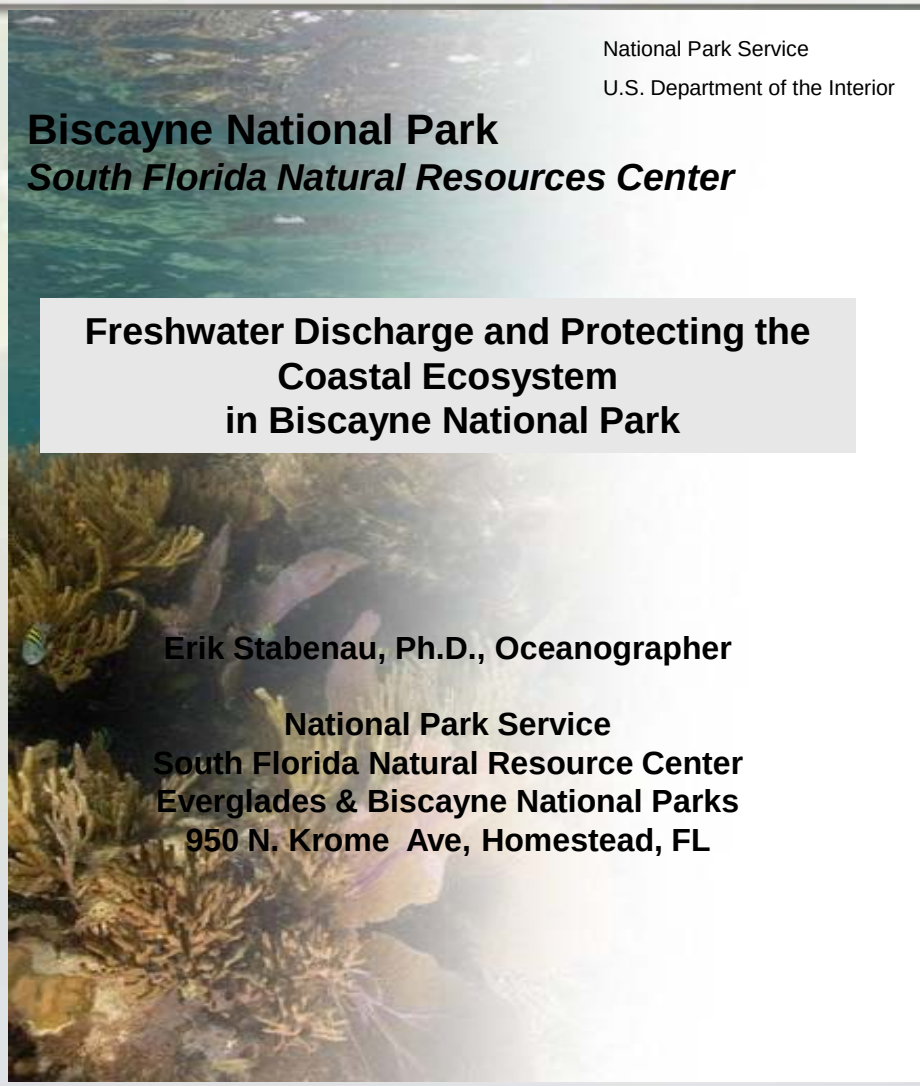
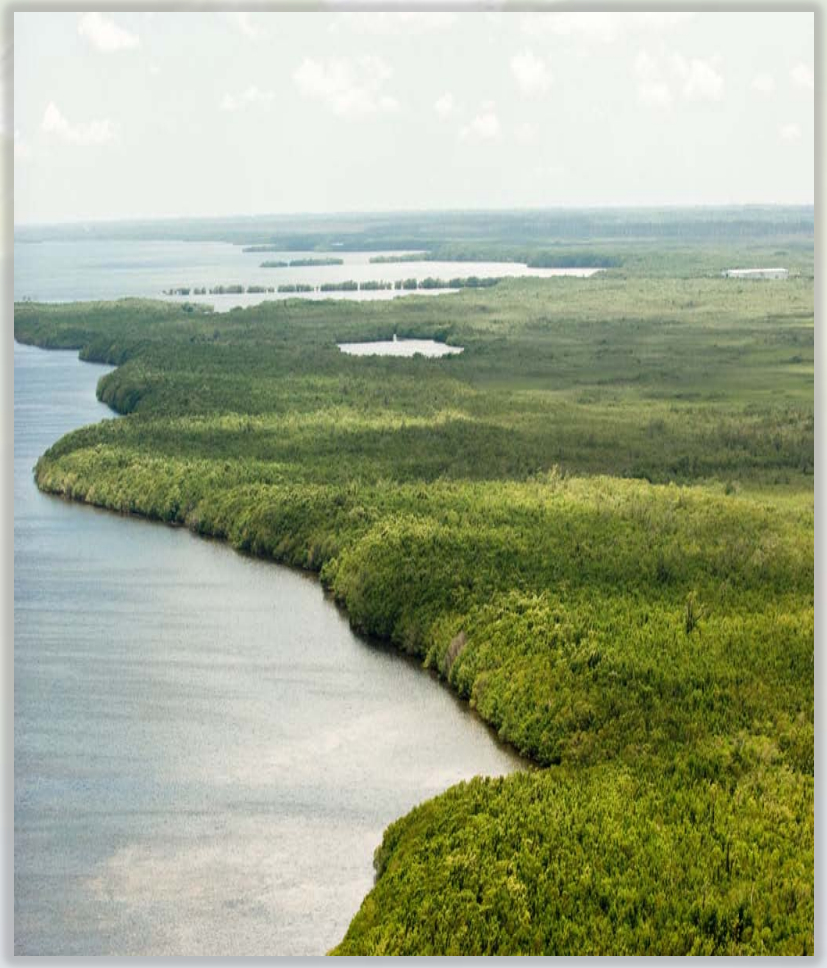
Origin of the Feasibility Evaluation

- 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



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)**

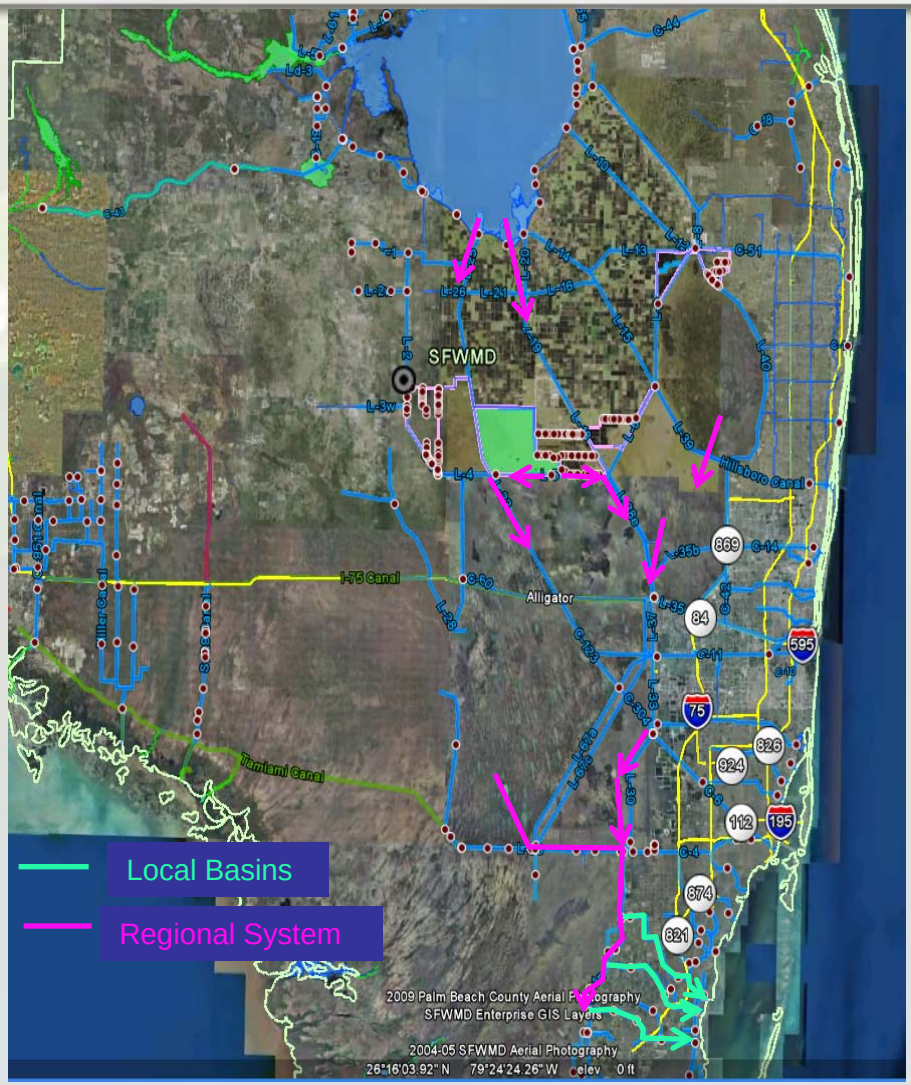
	Feb	Mar	Apr	May
Ave month flow cfs	55.2	52.2	40.1	38.6
# months < 76 cfs	19	19	22	21

System Constraints and Considerations

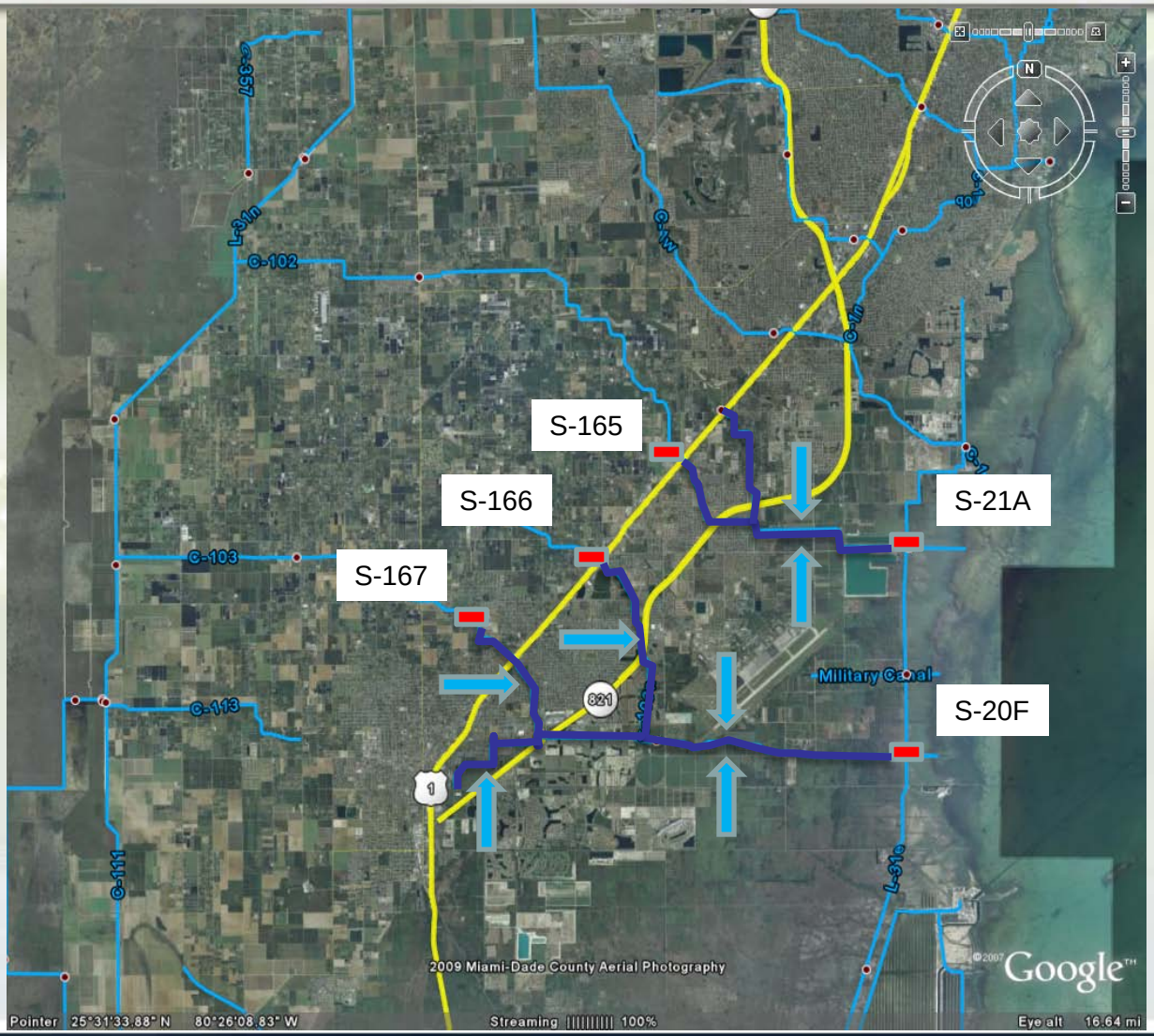
- Use existing system; no pumps or reservoirs
- Limited storage; canal prism & adjacent groundwater
- Coastal structures have limited operational ranges
  - 0.4 ft range between open and close
  - Tidal tailwater constraint
  - Pulse release approach would be needed

Sources of Supplemental Water

- Coastal basin
- Inland ‘ridge’ basin
- WCA-3
- WCA-2
- Lake Okeechobee



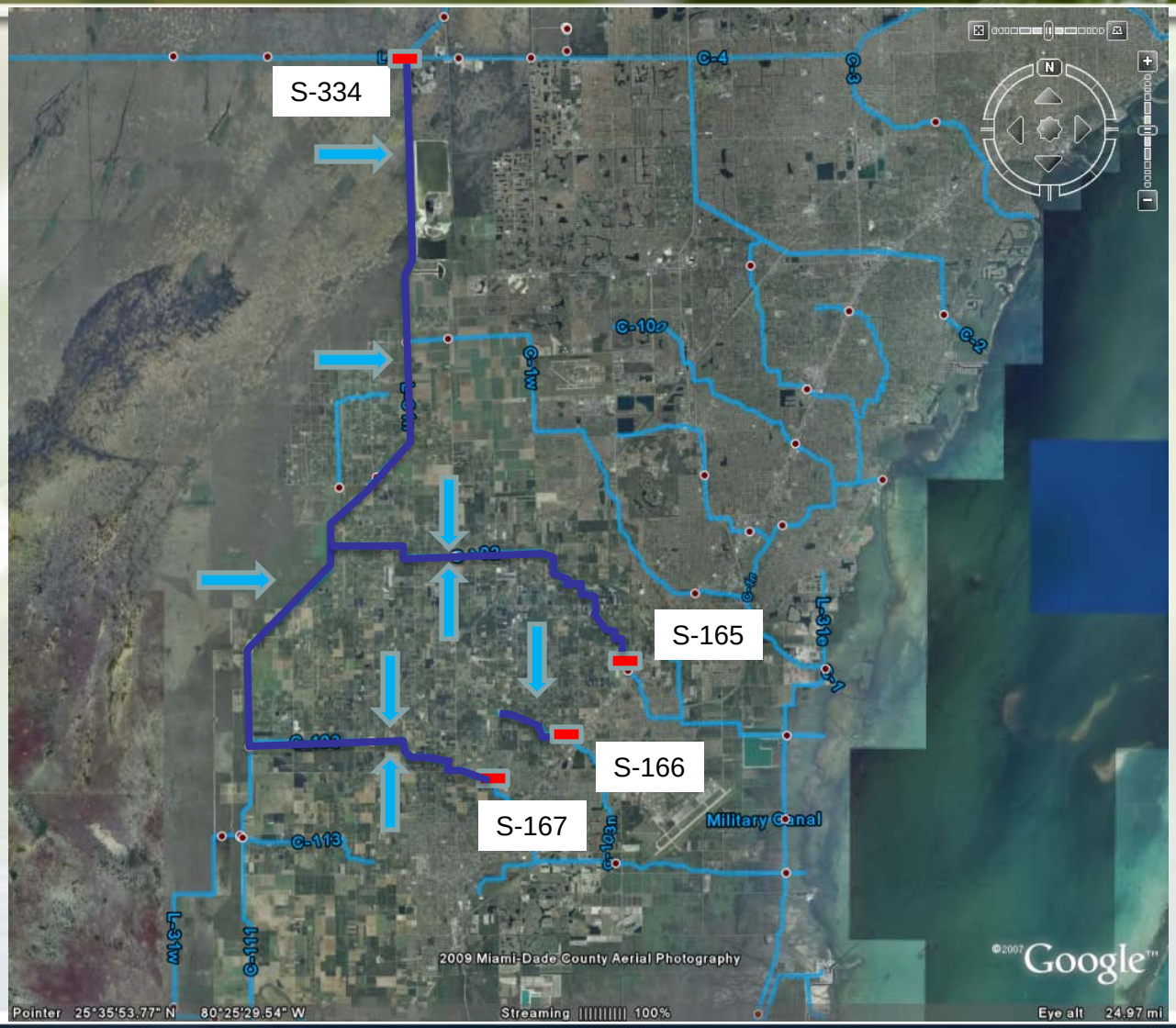
Coastal Basin



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

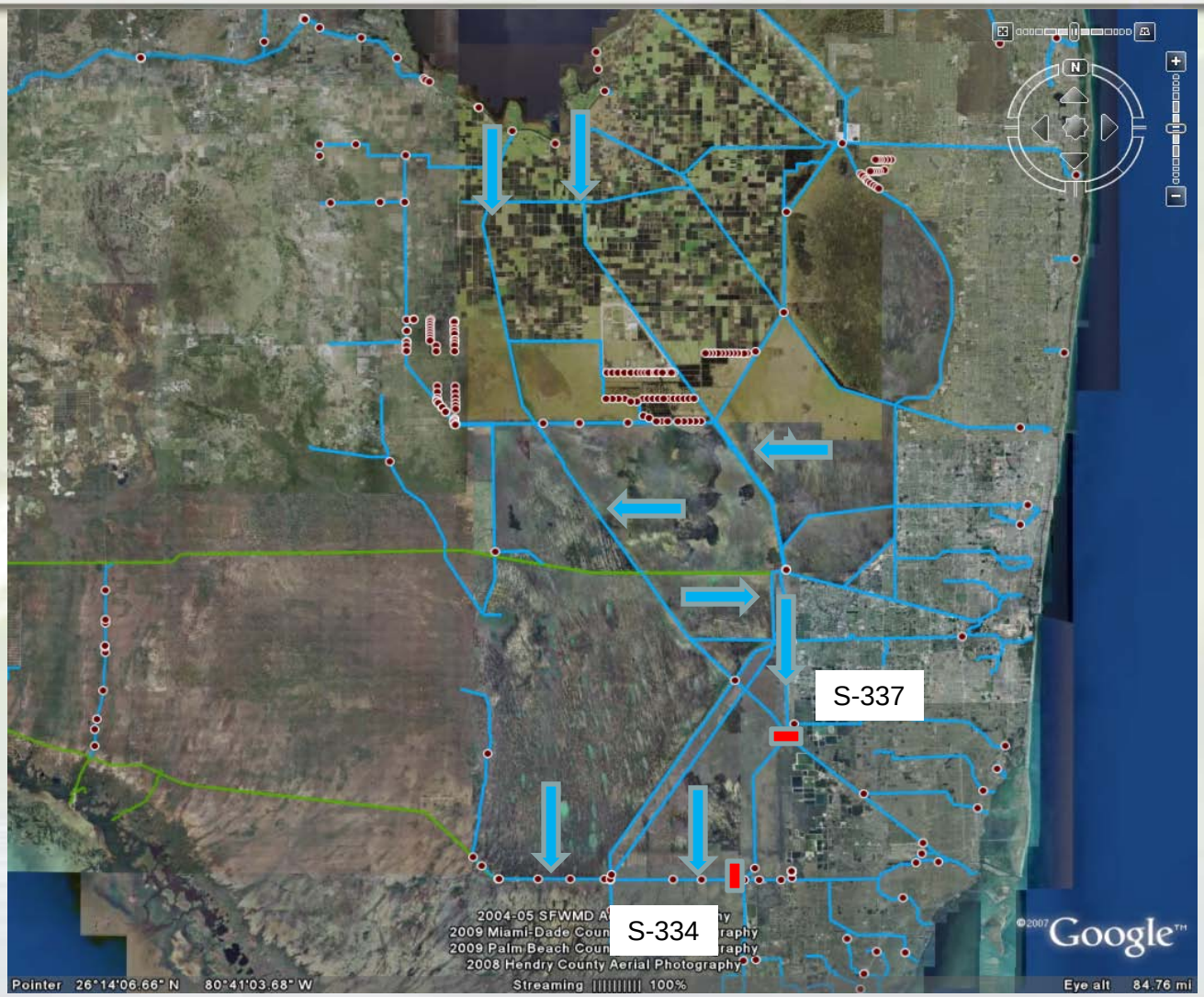
Inland Ridge Basin



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
- Compete 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?