

**DRAFT - TOC Preliminary Recommendations for Further Investigations of the Relationship Between Water Management and Water Quality**

February 24, 2005

**Direction from Principals: Analyze current water management practices and water quality compliance as well as opportunities to alter water mgmt to improve wq while maintaining water quantity benefits**

**Time frame: Prepare a report to the Principals by June 2005**

1. Backdrop: Settlement Agreement water quality compliance
  - a. Refuge
    - i. Interim levels
    - ii. Long-term levels
    - iii. load reduction targets
  - b. ENP
    - i. Shark River Slough
      1. interim limits
      2. long-term limits
    - ii. Taylor Slough and Coastal Basins
      1. long-term limit
  - c. WCAs
    - i. load reduction targets
2. Analyze current water management practices that influence Settlement Agreement water quality compliance
  - a. Lake Okeechobee regulation schedule – Water Supply and the Environment (WSE)
  - b. WCA-1 regulation schedule
  - c. WCA-2A regulation schedules
  - d. WCA-3A regulation schedule
  - e. Everglades National Park
    - i. Operations for the modified water deliveries to ENP
    - ii. C-111 operations
    - iii. Interim Operating Plan (IOP)
    - iv. Combined Structural and Operational Plan (CSOP) - Cape Sable seaside sparrow
  - f. Other C&SF practices
    - i. flood control
      1. EAA interim action plan
      2. C-51W basin
      3. L-8 basin
      4. Other basins' operations
    - ii. water supply
      1. meeting environmental water supply demands of WCAs
      2. meeting water supply demands of Lower East Coast (LEC)
        - a. agreements with local drainage districts

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- g. STA operations
    - i. STA-1E/STA-1W
    - ii. STA-2
    - iii. STA-3/4
    - iv. STA-5
    - v. STA-6
  - h. CERP components
    - i. L-8 basin rock pits
3. Analyze opportunities to alter water management to improve water quality while maintaining water quantity benefits
- a. Near-term initiatives
    - i. Integrated STA-1E/STA-1W operations
      - 1. Finalize DEP permit (*DEP to lead effort*)
      - 2. Develop phased STA-1E operation plan (*DEP/SFWMD to lead effort*)
        - a. Flexibility to incorporate future operations
        - b. Integrate with STA-1W (and G-311) operation
        - c. S-155A divide structure operation plan
        - d. Integrate with L-8 basin operation (CERP project)
      - 3. Inflow and outflow pump station operation – more continuous instead of 8-hr peak pumping. (*SFWMD to continue working with upstream landowners to implement continuous pump operation. No data analysis anticipated beyond routine monitoring associated with STAs and enhanced monitoring and hydrodynamic modeling of Refuge.*)
      - 4. Meeting water supply demands of LEC by moving more water around the Refuge to the C-51 canal – limited at the present time to ~500 cfs. (via G-311) (*DEP/SFWMD to lead effort*)
    - ii. Temporary deviation from WCA-1 regulation schedule (*effort underway led by Corps; Corps to provide estimates of time frames*)
      - 1. Reduce the time period for preceding water supply deliveries. Under some conditions, the refuge water regulation schedule requires that an equivalent volume of water be supplied to the refuge must preceding water supply deliveries from the refuge. There is now a concern that under high stage conditions this process may enhance movement of phosphorus into and across the impacted fringe marsh as a result of water level fluctuations. At present, water supply accounting is routinely performed on a seven-day cycle. It has been suggested that this period be reduced to a daily accounting, or that the regulation schedule be revised to allow simultaneous inflow with water supply deliveries. However, the shorter time frame

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may impose the requirement to send untreated water to the Refuge, in recognition that the residence time of water going through the STA is generally a week or more. Since December 2004, Calvin J. Neidrauer, Chief Engineer in the Water Control Operations Section, South Florida Water Management District, has been providing regular detailed water supply accounting to refuge and SFWMD personnel. These reports will support an evaluation of the need for alteration of water delivery procedures. *Note – The above item could be part of the evaluation described in A.4. in the draft Progress Report.*

*SFWMD to report on feasibility of reduced accounting time frame*

2. Avoid water supply releases in the periods when the regulation schedule is increasing. This practice forces replenishment of the release by new inflows from the rim canal in order to satisfy the regulation schedule. *In Section A.1.a.#6., an update was given on the request for a temporary deviation from the Regulation Schedule.*
- iii. More frequent operation of S-10 gates *(DOI to prepare paper describing anticipated benefit/operation. If TOC agrees, COE will report back on the feasibility of these operations.)*
- iv. More frequent water quality sampling at the S-10 gates *(DOI to prepare briefing paper describing anticipated benefits.)*
- v. A related water quality/operations issue deals with the distribution of flow through the individual S-10 gates. Water quality monitoring in the headwater area of the gates reveals a strong gradient of total phosphorus often exists from the highest values at the more western S-10E and S-10D, to lowest values at the more eastern S-10A. It appears from water quality monitoring data, that the S-10D discharges more pumped stormwater while the S-10A discharges more rainwater drawn for the refuge interior. This implies that preferentially discharging from the S-10D might reduce impact on the pristine areas of the refuge by bypassing more stormwater south into the already impacted area of WCA-2. STA-2 discharges to the area historically “fed” by S-10E, and a system-wide balance is needed. The refuge hydrodynamic and water quality model will be used, when available, to evaluate alternative gate operation scenarios that may be more protective of pristine refuge areas. It has also been suggested that intensive field studies associated with controlled gate opening events might support better understanding.

*Note – The above items could be part of the evaluation described in A.4. in the draft Progress Report.*

*(DOI to prepare briefing paper describing anticipated benefits.)*

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- vi. Investigate, and if appropriate, avoid "reversal" in the stage. In some years (1999, for one), the stage was suddenly dropped during a period with the regulation schedule was still increasing and then subsequently increased back to the original stage to satisfy the schedule. This could effectively double the intrusion of canal water in some years. The reasons for this are unclear (possibly draw-down in anticipation of large storm events so that the Refuge can function as a flood storage facility?). *(DOI to prepare briefing paper.)*
  - vii. Water supply
  - viii. Place holder for balancing flows and loads EPA wide, including role of EAA Feasibility Study  
Action items: future topic
- b. Long-term initiatives
- i. Revisions to regulation schedules  
*Action item: COE to provide summary of time frames associated with revisions to regulation schedules*
    - 1. WCA-1 *(Action item – Susan Sylvester)*
      - a. Consider deferring the seasonal increase in stage until later in the wet season? The objective would be to "rinse" the marsh fringe areas with rainfall for a period of time and export the initial flush of elevated P water to the rim canal (vs. interior marsh).  
*(The Refuge will develop a briefing paper)*  
Explore developing a rain-driven regulation schedule, under which the seasonal maximum stage would be related to rainfall (vs. fixed). A fixed stage requires more inflow from the rim canal in dry years, whereas rainfall satisfies more of the demand in wet years. This is probably the only way to deal with marsh water quality impacts associated with hardness, chloride, and other conservative substances that cannot be reduced by BMP's or STA's. *(SFWMD to provide technical report in support of this.)*
      - b. Synchronized operation of the S-10 gates and the WCA-1 inflow structures, which will require remote operation capability of the S-10 gates.  
Would require synchronized operation of structure on the east and west side of the Refuge. *(DOI to prepare briefing paper.)*
  - ii. Explore L-40 low berm extension on west side of L-40 and/or enhancement from G-300 to south of the G94A structure (or S-39); structure at this point to allow delivery of water either to LWDD or into L-40. This enhancement would allow for (~500 cfs) water

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supply deliveries to southeast Palm Beach County without impacting the Refuge interior. (*Lake Worth Drainage District to develop briefing paper.*)

- iii. Other initiatives