

February 24, 2015

Blake Guillory, Executive Director
South Florida Water Management District
P.O. Box 24680
West Palm Beach, FL 33416-24680

Subject: System Constraints

Dear Mr. Guillory:

First of all, the South Florida Water Management District (District) deserves to be commended for sending historic volumes of treated Lake water to the Everglades over the last year. Similarly, the U. S. Army Corps of Engineers (Corps) deserves recognition for exercising the flexibility contained within the Lake Okeechobee Regulation Schedule (LORS) by not sending any Lake water to the St. Lucie River during 2014.

Given these events, it is perplexing that the District recently released a technical document¹ indicating there is limited capability to send significant amounts of Lake water to the Everglades, and as a result, minimal opportunities exist to reduce the destructive Lake releases to the estuaries. Several discrepancies appear to exist between the recent document and previous District documents and data regarding the system's capacity to send significant volumes of Lake water to the Everglades (see attachment). **The recent operations and collaboration between the District and Corps regarding Lake releases have demonstrated that the existing system has capacity to send significantly more treated Lake water to the Everglades than in the past, and District data indicate that STA performance has actually improved with the additional Lake water.** This conveyance, storage and treatment capacity should increase with the completion of the A-1 Flow Equalization Basin and other on-going projects. Yet the take home message from the recent document appears to be that the existing system does not have capacity to send significant volumes of Lake water to the Everglades.

Because of the significance being attached to this document by Governing Board members and third parties, it is critical to understand these inconsistencies. In addition to the examples presented in the attachment, other descriptions of constraints in the document appear to be incomplete, potentially leading to misinterpretations by policy makers and the public. I will be happy to present the complete set of comments at your convenience, perhaps at an upcoming WRAC meeting.

Understanding system constraints is critical. As you know so well, identifying constraints is a fundamental step in engineering and water management operations. Many constraints

¹ Kivett, J., "System Constraints" dated February 2, 2015, presented to WRAC on February 5, 2015.

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represent short-term, i.e., daily or weekly, restrictions, and are not absolute limitations to achieving long-term goals. With proper planning, long-term goals can be achieved in light of these short-term restrictions. Compiling the system constraints is particularly important to identifying long-term solutions for sending additional Lake water to the Everglades and minimizing destructive releases to the estuaries. I remain confident that through open dialogue with stakeholders, the State of Florida, with the leadership of the District, can come up with creative, workable, and perhaps "out of the box" solutions to this critical water resource issue.

Again – great job in sending historic volumes of treated Lake water to the Everglades over the last year!

Sincerely,

A handwritten signature in black ink, appearing to read "G. Goforth", with a long horizontal flourish extending to the right.

Gary Goforth, P.E., Ph.D.
10924 SW Hawkview Circle
Stuart, FL 34997

Attachment

cc: Governing Board Members
Jeff Kivett, District
Dan DeLisi, District

ATTACHMENT

Key Apparent Discrepancies Between “System Constraints” and Previous District Documents

Note: In the following commentary, *statements from the “System Constraints” document are shown in italics.*

1. **Slide 2.** *No ability to reduce the water that is coming into the Lake from the North*
 - a. This statement appears to conflict with the District’s Dispersed Water Management (DWM) Program goals as described in the 2014 South Florida Environmental Report: “The goals and objectives of the DWM Program are to provide shallow water storage, retention, and detention to enhance Lake Okeechobee and estuary health by reducing discharge volumes, reducing nutrient loading to downstream receiving waters, and by expanding ground water recharge opportunities.”
 - b. Additionally, if there is no ability to reduce the water coming into the lake from the north, why is the District spending millions of dollars on Dispersed Water Management projects north of the Lake?

2. **Slide 3.** *There is NO current flexibility in the schedule that would allow temporary relief from high discharges to the estuaries that occurred in 2013.*
 - a. This statement appears to conflict with the District’s 11/14/2014 press release: “A new analysis of the 2014 rainy season shows that operations by the South Florida Water Management District (SFWMD) successfully moved south about a half foot of water depth off Lake Okeechobee, helping to prevent freshwater releases to South Florida’s estuaries. ... “Working within the constraints of a complicated system and variable rainfall, the District helped protect the fragile coastal estuaries this summer by moving a significant amount of water south of the lake,” said SFWMD Executive Director Blake Guillory. “Through sound science and engineering — plus exemplary collaboration — this work was accomplished

while continuing to protect Everglades water quality.” With water levels rising from wet season rainfall, District operations to move water south provided the U.S. Army Corps of Engineers, which manages the lake level, with increased flexibility to prevent releases to the St. Lucie Estuary.”

- b. As indicated in the press release, the Corps exercised flexibility in LORS in refraining from making any regulatory releases to the St. Lucie River and Estuary during 2014.
 - c. As demonstrated by District operations in 2014 and 2015, making steady Lake releases to the south during the dry season, consistent with LORS guidance to send the maximum practicable releases to the WCAs, is critical for minimizing destructive Lake releases to the estuaries throughout the year.
 - d. The LORS includes synchronized guidance for sending Lake water to both the WCAs and the estuaries. As mentioned by Mr. Kivett at the November WRAC, during the 2014 wet season, the increased Lake releases to the Everglades was “Equal to about 0.5 feet of depth in Lake Okeechobee”, which “Reduced Regulatory Releases to estuaries”. As Mr. Kivett mentioned at the February 2015 Governing Board meeting, the Lake stage came within 0.14 ft of the intermediate subband, which would have required major discharges to the estuaries; yet by moving significant Lake volumes to the Everglades, these major discharges were averted, thus demonstrating the flexibility in LORS that would allow temporary relief from high discharges to the estuaries.
3. **Slide 4.** *The existing structures are not sufficient to pass high volumes from the Lake to the Everglades*
- a. This statement appears to conflict with the District’s 11/14/2014 press release mentioned above.
 - b. Other District documents and data demonstrate the existing structures’ capability to deliver high volumes of Lake releases to the Everglades:

- i. During calendar year 2014 more than 381,000 acre feet (124 billion gallons) of treated Lake water was delivered to the Everglades.
- ii. Over the last 12 months, more than 460,000 acre feet (150 billion gallons) of treated Lake water was delivered to the Everglades.
- iii. During Water Year 1993, the District sent over 1 million acre feet (326 billion gallons) of Lake water to the Everglades, concurrent with sending over 1.5 million acre feet (488 billion gallons) of EAA runoff to the Everglades. Since this was before the STAs were completed, this water was untreated and there were unintended environmental consequences as far south as Florida Bay. Today's STAs would provide significant treatment which would reduce the environmental impacts. While I'm not advocating sending 1 million acre feet of Lake water to the Everglades with today's system, this one year's volume of Lake water represents the enormous magnitude of water that was sent south with then-existing hydraulic constraints.

4. **Slide 5.** *Making large releases from the Lake to the Water Conservation Areas (WCAs) would require a significant enlargement of the primary EAA canals.*

- a. This statement appears to conflict with the District's 11/14/2014 press release mentioned above.
- b. Other District documents and data demonstrate the existing canals' capability to deliver high volumes of Lake releases to the WCAs:
 - i. During calendar year 2014 more than 381,000 acre feet (124 billion gallons) of treated Lake water was delivered to the Everglades.
 - ii. Over the last 12 months, more than 460,000 acre feet (150 billion gallons) of treated Lake water was delivered to the Everglades.
 - iii. During Water Year 1993, the District sent over 1 million acre feet (326 billion gallons) of Lake water to the Everglades, concurrent with sending over 1.5 million acre feet (488 billion gallons) of EAA runoff to the

Everglades. While I'm not advocating sending 1 million acre feet of Lake water to the Everglades with today's system, this one year's volume of Lake water represents the enormous magnitude of water that was sent south within then-existing hydraulic constraints.

5. **Slide 7.** *Sustained large Lake releases to the south result in water depths and nutrient loading that could cause substantial damage to the treatment works.*

- a. This statement appears to conflict with the District's 11/14/2014 press release mentioned above, which included the statement: "Even with highly variable inflows of phosphorus to the STAs, data show that STA performance did not appear to be negatively impacted by the additional fresh water from the lake."
- b. District data further demonstrate that **STA performance has improved** with the delivery of historic volumes of Lake water in a slow and steady year-round operation. Over the last 12 months, the STAs received more than 460,000 acre feet (150 billion gallons) of Lake water, and the cumulative flow-weighted mean outflow TP concentration from STA-1E, STA-1W, STA-2 and STA-3/4 has improved by 4 parts per billion (ppb), decreasing from 21 ppb to 17 ppb. The only STA that has not exhibited a performance improvement was STA-5/6 which did not receive any Lake water.

6. **Slide 8.** *Both the structural changes and operational costs associated with moving significant Lake releases to the Everglades would be very expensive.*

- a. Other District documents and data demonstrate the existing structural and operational capability to send significant Lake releases to the Everglades:
 - i. During calendar year 2014 more than 381,000 acre feet (124 billion gallons) of treated Lake water was delivered to the Everglades.
 - ii. Over the last 12 months, more than 460,000 acre feet (150 billion gallons) of treated Lake water was delivered to the Everglades.

- iii. During Water Year 1993, the District sent over 1 million acre feet (326 billion gallons) of Lake water to the Everglades, concurrent with sending over 1.5 million acre feet (488 billion gallons) of EAA runoff to the Everglades. While I'm not advocating sending 1 million acre feet of Lake water to the Everglades with today's system, this one year's volume of Lake water represents the enormous magnitude of water that was sent south within then-existing hydraulic constraints.
- b. Although it is rarely acknowledged in most District publications, moving large volumes of untreated Lake releases to the estuaries has significant economic impacts to the coastal regions, in addition to devastating environmental impacts to rivers, estuaries, lagoons and near-shore reefs.

7. Slide 9.

- a. *Thus, one of the five STAs cannot physically receive water from Lake Okeechobee.*
 - i. This statement conflicts with STA-5/6 design documents and previous operations documented in annual reports published by the District. Lake water can be sent to STA-5/6 through synchronized operations of G-373 and the STA-5/6 structures. That being said, options for increasing the conveyance capacity for Lake water to be delivered to the front end of STA-5/6 should be evaluated; the opportunity may exist with the purchase of available U.S. Sugar property in accordance with the previous negotiations between District staff and U.S. Sugar.
- b. *Only STA-5/6 has untapped capacity to treat additional Lake water under certain conditions.*
 - i. This statement appears to conflict with previous annual reports and other documents published by the District.
 - 1. The District's operational and performance data from WY2014 and WY2015 demonstrate that, relative to prior years, all the STAs had untapped capacity to treat additional Lake water.

2. STA-3/4 was originally designed in 1994 to treat an annual average of over 250,000 acre feet per year. Over the last 12 months this STA has received 180,000 acre feet from Lake Okeechobee, and since operations began in 2003 the STA has received an annual average of less than 40,000 acre feet per year from the Lake.

8. **Slide 18.** *District was able to move small volumes of Lake O water through the STAs throughout the wet season without degrading water quality treatment within the STAs.*

- a. District data documented the delivery of a significant volume of Lake water - more than 182,000 acre feet (60 billion gallons) - through the STAs during the wet season, which is almost twice the 1979-1988 baseline average. As mentioned by Mr. Kivett at the November WRAC, the increased Lake releases to the Everglades was "Equal to about 0.5 feet of depth in Lake Okeechobee", thereby averting major discharges to the estuaries.
- b. District data further demonstrate that STA performance has actually improved with the delivery of historic volumes of Lake water in a slow and steady year-round operation. Over the last 12 months, the STAs received more than 460,000 acre feet (150 billion gallons) of Lake water, and the cumulative flow-weighted mean outflow TP concentration from STA-1E, STA-1W, STA-2 and STA-3/4 has improved by 4 ppb. The only STA that has not exhibited a performance improvement was STA-5/6 which did not receive any Lake water.

9. **Slide 19 - Conclusions**

1. *The system has been designed to send Lake Okeechobee water east and west to the Atlantic Ocean and the Gulf without hydrologic constraints*
 - a. This statement conflicts with the C&SF Project design reports and historical water management operations. The system was designed to send Lake water south, east and west, and with the construction of the STAs, there

exists the capability to send significantly greater volumes of Lake water to the south.

- b. Sending Lake water to the east and west has hydrologic constraints, including providing flood protection to landowners and businesses within the C-43 and C-44 basins.

2. *In normal years, some water can be sent south when the various constraints allow it*

- a. In characterizing “some water” compared to “significant amount of water”, this statement appears to conflict with the District’s 11/14/2014 press release mentioned above.
- b. Other District documents and data document the delivery of significant volumes of Lake releases, rather than “some water”, to the Everglades, e.g., during the last 12 months, more than 460,000 acre feet (150 billion gallons) of Lake water has been delivered to the Everglades.