

Appendix 5-2: Annual Permit Report for the C-4 Emergency Detention Basin

Permit Report (May 1, 2012–April 30, 2013)
Permit Number: EI 13-0192729

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Contributors: Matt Powers, Christopher King,
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SUMMARY

Based on Florida Department of Environmental Protection (FDEP) permit reporting guidelines, **Table 1** lists key permit-related information associated with this report. **Table 2** lists attachments included with this report. **Table A-1** in Attachment A lists the specific pages, tables, graphs, and attachments where project status and annual reporting requirements are addressed. This annual report satisfies the reporting requirements specified in the permit and its applicable modifications.

Table 1. Key permit-related information.

| | |
|---|---|
| Project Name: | C-4 Emergency Detention Basin |
| Permit Numbers: | EI 13-0192729-001 and EI 13-0192729-004 |
| Issue and Expiration Dates: | |
| EI 13-0192729-001 | Issued: 9/10/2002; Expired: 9/9/2007 |
| EI 13-0192729-002 | Issued: 2/14/2003 |
| EI 13-0192729-003 | Issued: 3/4/2003 |
| EI 13-0192729-004 | Issued: 9/26/2003; Expired: 9/25/2008 |
| EI 13-0192729-008 | Issued: 2/3/2005 |
| EI 13-0192729-010 | Issued: 7/2/2007 |
| EI 13-0192729-011 | Issued: 9/25/2008 |
| EI 13-0192729-013 | Issued: 2/20/2012 |
| Project Phase: | I & II |
| Permit Specific Condition Requiring Annual Report: | 20 (in EI 13-0192729-013) |
| Reporting Period: | May 1, 2012 – April 30, 2013 |
| Report Lead: | Chelsea Qiu cqiu@sfwmd.gov 561-682-6196 |
| Permit Coordinator: | John Leslie jleslie@sfwmd.gov 561-682-6476 |

Table 2. Attachments included with this report.

| Attachment | Title |
|------------|--|
| A | Specific Conditions and Cross-References |
| B | Water Quality Data |
| C | Hydrologic Data |
| D | Dike and Pump Station Inspection Report |

INTRODUCTION

The South Florida Water Management District (SFWMD or District) was issued Environmental Resource Permits 13-0192729-001 and 13-0192729-004 by FDEP to construct and operate Phases I and II, respectively, of the C-4 Emergency Detention Basin (C-4 EDB) (Figure 1).

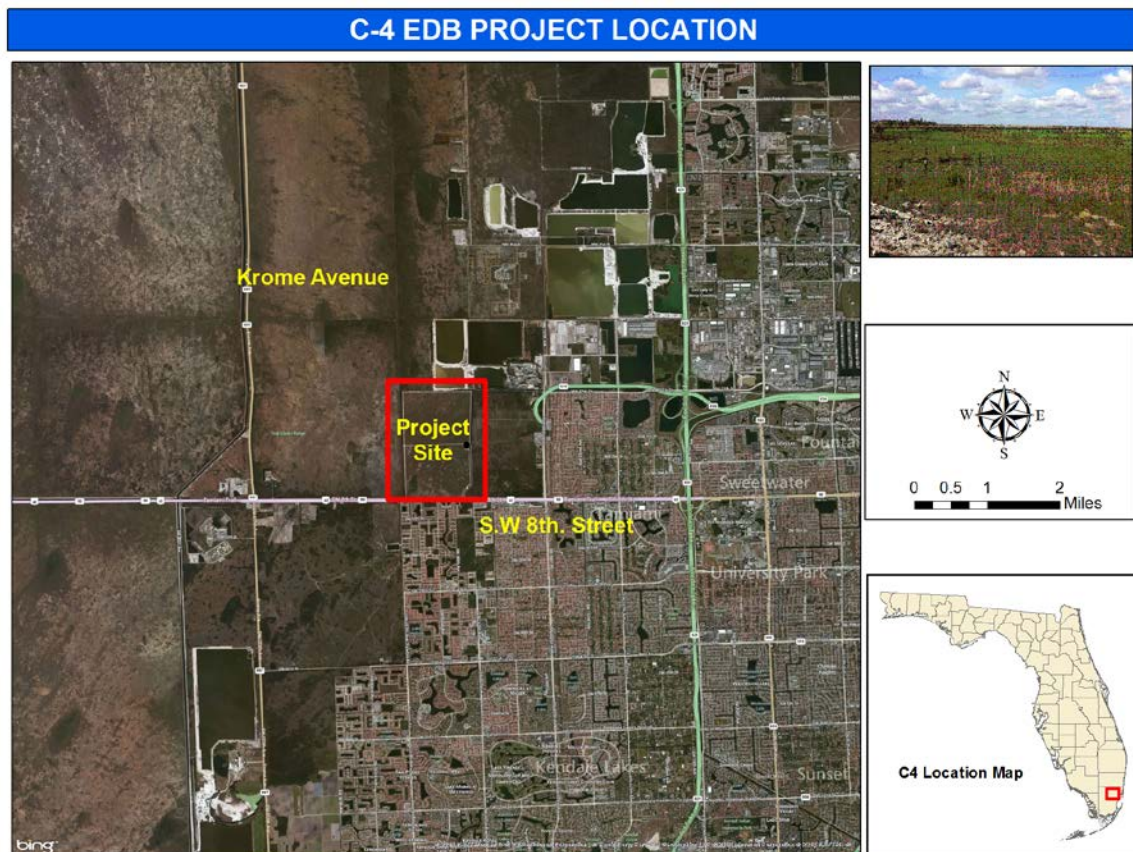


Figure 1. Overview of the C-4 EDB.

This report provides an estimate of the total phosphorus (TP) mass balance on an event basis and cumulatively for the years of operation of the C-4 EDB. This fulfills the TP mass balance reporting requirement in Specific Condition 11 of the permit modification (13-0192729-008) issued on February 3, 2005, for the Water Year 2013 (WY2013) (May 1, 2012–April 30, 2013) annual reporting period.

The C-4 EDB is in the Miami-Dade County Lake Belt Area and includes projects within jurisdictional wetlands in the North Trail Wetland Basin, located adjacent to and immediately north of the C-4 canal and west of the Dade-Broward Levee (Section 4, Township 54 South, Range 39 East). The C-4 EDB provides improved flood protection for the City of Sweetwater and surrounding areas during extreme events by providing 3,264 acre-feet (ac-ft) of aboveground storage for floodwaters. During a major storm event, the C-4 EDB pumps convey floodwaters from the C-4 canal into the storage detention basins (both Phases I and II), which helps reduce flooding of the area further east. After the event and stages in the C-4 canal have returned to normal, the floodwaters discharge from the C-4 EDB back to the C-4 canal, and eventually to tide. Construction of the water management infrastructure was certified complete in May 2005, and the facility became administratively operational in November 2006 after stage monitoring equipment was relocated and recalibrated to maximize accuracy and minimize siltation.

BACKGROUND

The C-4 EDB is in the North Trail Wetland Basin in southwestern Miami-Dade County between SW 137th Avenue and Krome Avenue, and accessible via Tamiami Trail (SW 8th Street, U.S. 41), which runs along the facility's southern border. It was constructed to reduce the magnitude, duration, and frequency of flooding of low-lying areas within the jurisdictions of the cities of Sweetwater, West Miami, and western Miami-Dade County (the "Flagami District"). Such flooding occurred during intense rainfalls accompanying several unnamed (2000) and named tropical storms and Hurricane Irene (1999) in the previous decade. A naturally low-lying, high-seepage area was chosen for the facility, between the Dade-Broward Levee and Canal to the west and an abandoned orange grove to the east, and between a mining operation to the north and the C-4 canal to the south. On the other side of the Dade-Broward Levee is the Pennsoco Wetlands Area, portions of which are owned by the District.

The C-4 EDB was constructed in phases. Phase I includes the northern section, and encompasses 415 acres. Phase II includes the remaining 416 acres. Together, the two areas total 831 acres. Construction of the Phase I levees, seepage canal, and the G-420 and G-420S pumps was completed in March 2002. Phase II was completed in May 2005. The G-420S pump was replaced in April 2006.

The Phase I and Phase II lands were both owned by private and public entities (**Figure 2**). The District obtained a 50-year easement from the State of Florida for Phase I. Phase II lands were obtained with funds from the Federal Emergency Management Agency (FEMA) and the Florida Department of Community Affairs, as well as from the Conservation and Recreation Lands Trust Fund. Phase I will eventually become part of the East Coast Buffer Project. CEMEX, Inc. has mineral extraction rights for a substantial portion of the Phase I parcel for the next 50 years, but the start date and duration of mining are not yet known. During extraction operations, the Phase I section can only be flooded to a maximum depth of 2 feet (ft), rather than the designed 4 ft. The District has been reimbursed for the entire cost of the project by FEMA. Pump and weir construction for Phase I and II were completed in July 2004 and May 2005, respectively.



Figure 2. Phase I and II lands in the C-4 EDB.

PERMIT CONDITIONS

In applying for the permit in 2002, the District agreed to remediate wetlands degraded by construction and remove all exotic trees. Both efforts have been successful. The District also assured the issuing authorities that the risk of adverse impacts to native, short hydroperiod wetland vegetation, and wildlife would be *de minimis* if the facility were operated infrequently and in a manner to minimize the stage duration by emptying the accumulated rain, groundwater, and inflow water rapidly following a pumping event.

The permits from the U.S. Army Corps of Engineers (USACE) and the Miami-Dade County Department of Environmental Resources Management cross-referenced the FDEP permit general and specific conditions, but the USACE permit added a focus on the eradication of primrose willow (*Ludwigia peruviana*) and melaleuca (*Melaleuca quinquenervia*). The effectiveness of the exotic plant eradication program is documented annually pursuant to Specific Conditions 8 and 12 of the Phase I and II permits, respectively.

The USACE has relieved the District of monitoring and reporting on wetlands within the C-4 impoundment. However, the District is still responsible for eradicating and removing nuisance species in the wetlands. The wetlands must be maintained in perpetuity.

In September 2008, FDEP issued permit modification EI 13-012729-011, which amended specific conditions 8 and 11 for the Phase 1 and 2 monitoring in permit modifications EI 13-0192729-001 and 13-0192729-004. This allowed biennial vegetation monitoring via aerial photography and quarterly monitoring of wildlife from the levees, in conjunction with water quality monitoring. A six-year biennial monitoring program was established to detect, quantify, and report significant changes in vegetation habitat, wildlife utilization, water quality, and periphyton growth within the Phase I (north) and Phase II (south) basins of the C-4 EDB.

On February 20, 2012, FDEP issued a minor modification to permit EI 13-0192729-013 to reduce the project's overall monitoring and reporting. The permit modification retains water quality, stage, and flow monitoring, and eliminates all biennial wildlife, periphyton, and vegetation monitoring and reporting. Additionally, the permit modification changed the reporting frequency from biennial to annual.

ACTIVE MANDATES AND PERMIT

The original Environmental Resource Permit (ERP) and all major modifications issued to the District are as follows:

- EI 13-0192729-001, issued September 10, 2002, with the expiration of the construction phase on September 9, 2007 (Phase 1).
- EI 13-0192729-004, issued September 26, 2006, with the expiration of the construction phase on September 25, 2008 (Phase 2).
- EI 13-0192729-008, issued on February 3, 2005, to modify the project's monitoring requirements by reducing the frequency of monitoring the wetlands within the Phase 1 and Phase 2 detention basins.
- EI 13-012729-010, issued on July 2, 2007, to modify the project's monitoring requirements, which reduced the frequency of wildlife observations from quarterly to semi-annually, periphyton monitoring will coincide with the biennial aerial survey, the biennial environmental impact evaluation workshop will be conducted in September instead of July, and the evaluation report is due in November instead of July.
- EI 13-012729-011, issued on September 25, 2008, to modify the project's monitoring requirements (wildlife observations shall be implemented once every other year incidental to ground-truthing for vegetation monitoring via aerial photography for the period 2005 through 2011).
- EI 13-012729-013, issued on February 20, 2012, to modify the project monitoring due to a reduction in overall monitoring requirements. Water quality monitoring shall be implemented during periods in which the wetlands within the detention basin are used for stormwater storage.

On November 8, 2006, FDEP approved the As-Built Certification of the C-4 EDB and concurred that this facility was constructed in accordance with the FDEP permit.

WATER QUALITY MONITORING

SAMPLING METHODS

All permit mandated project monitoring is outlined in the Operational Project Monitoring Plan for C-4 Emergency Detention Basin (SFWMD, 2012b) developed to monitor water quality in C-4 EDB. This plan assures the consistency and validity of samples and data collected through time. The plan is reviewed annually and revised as needed in response to modifications of the project's operation and/or permitted requirements.

All samples were collected using the grab method outlined in the District's Field Sampling Quality Manual (FSQM) (SFWMD, 2011) and in accordance with FDEP standard operating procedures (SOPs). To satisfy quality control requirements of the FSQM, equipment blanks were collected along with the grab samples. Samples were analyzed by the District water quality laboratory in accordance with its Chemistry Laboratory Quality Manual (SFWMD, 2012a).

Grab samples were collected at station C4IN if there was recorded flow at G-420 or G-422, and at station G-421 if there was recorded flow at G-421 (**Figure 3**). Recorded flow was determined by the District's Recorded Flow SOP (SFWMD, 2012c). The Recorded Flow SOP specifies that a grab sample must be collected when the volume of water that has passed through a specific structure exceeds two times the volume that would trigger an autosampler (i.e., "trigger volume"). Trigger volumes for each structure are defined by the District's Compliance Assessment Principal Engineer. Water quality monitoring stations, parameters, and frequencies are summarized in **Table 3**.

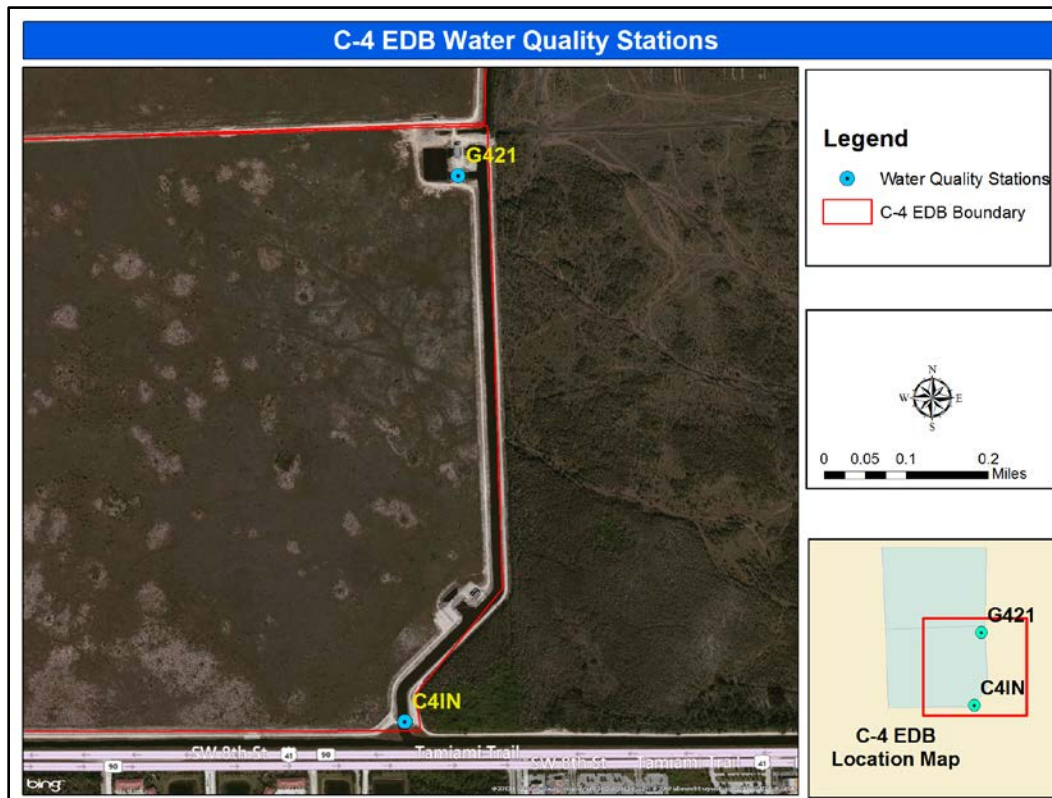


Figure 3. C-4 EDB water quality monitoring stations.

Table 3. C-4 EDB water quality monitoring stations, parameter [total phosphate (TPO4)], and frequencies.

| Station | Parameters | Frequency |
|---------|------------|---------------------------|
| C4IN | TPO4 | Biweekly if Recorded Flow |
| G421 | TPO4 | Biweekly if Recorded Flow |

SAMPLING RESULTS

During WY2013, samples were collected on four occasions. Three were in response to flow events, and one was in response to a pump test. The three flow events occurred on May 22–24, August 26–29, and September 22–24, 2012. Grab samples were collected within a day of the end of each flow event. The sample collected on May 15, 2012, was unnecessarily collected after a routine pump test was mistaken as recorded flow. **Table 4** summarizes total phosphate (TPO4) results from the four sample collection dates. There were no flow events associated with G-421, therefore, no samples were collected at that station. Data collected from these samples were used to calculate the TP mass budget for the C-4 EDB.

Table 4. TPO4 results in micrograms per liter ($\mu\text{g/L}$) for station C4IN.

| Date Collected | TPO4 ($\mu\text{g/L}$) |
|----------------|--------------------------|
| May 15, 2012 | 6 |
| May 24, 2012 | 8 |
| Aug. 29, 2012 | 5 |
| Sep. 25, 2012 | 5 |

OPERATIONAL EVALUATION

Water quality monitoring data was used to determine the TP mass budget within the C-4 EDB. The District has conducted monitoring since May 2005 to identify water quality changes caused by operation of the C-4 EDB, as required by the related permits.

The data collected were used to do the following:

- Determine overall nutrient load into and out of the C-4 EDB, and document changes that result from operational and management decisions
- Provide environmental information for management of the C-4 EDB to monitor and document physical and chemical characteristics of source and receiving environments
- Provide the data necessary to identify potential environmental and ecological impacts/shifts resulting from management decisions

FACILITY OPERATIONS

Three reportable flood control pumping events during WY2013 occurred on May 22–24, 2012 after record rainfall, on August 26–29, 2012 during Tropical Storm Isaac, and on September 22–24, 2012 due to heavy rain.

DESCRIPTION OF THE FACILITIES

G-420

Structure G-420 pumps are operated remotely. The structure is a three-unit pump station located north of the C-4 canal at the junction of U.S. 41 and S.W. 137th Avenue in Miami-Dade County. The three pumps have a combined rating capacity of 700 cubic feet per second (cfs), and are used to move water from the C-4 canal into the C-4 EDB for flood control.

G-421

Water flows out of Phase I of the C-4 EDB into the supply canal, and then to the C-4 canal via the G-421 spillway. Operation of the C-4 EDB is governed by the Interim Seasonal Operation Plan. G-421 pumps are turned on progressively if the T5 (C-4 canal at Tamiami Trail at Coral Gables) stage exceeds 5.00 feet in relation to the National Geodetic Vertical Datum of 1929 (ft NGVD 29), and all inflow impellers will be turned on if the T5 stage exceeds 5.20 ft NGVD 29. Pumping ceases when the stage in the C-4 EDB reaches 8.0 ft NGVD 29 and the T5 begins to recede below 5.90 ft NGVD 29, or the stage in the C-4 EDB exceeds the maximum elevation of 10.00 ft NGVD 29.

G-422

G-422 consists of a set of seven electric pumps powered by diesel generators. Together, the pumps have a total capacity of 700 cfs and move a maximum of 585 cfs with a 4-ft head difference. Inflow pumps are only operated when the stage in the C-4 canal meets the trigger criterion. Water gravity-flows from Phase I into the supply canal and then to the C-4 canal via the G-421 weir. Discharge occurs only after the flood-stage peak has passed. The structure was registered on March 11, 2006.

G-420S

G-420S consists of a 100-cfs submersed electric pump located just to the northeast of G-420. It is used to recirculate water collected in the seepage collection canal, which runs from north to south along the east levee, back into the Phase II area.

G-423

Water enters and leaves Phase I through the G-423 weir, which will remain open until CEMEX, Inc. exercises its mineral extraction option. After the mining operation begins, G-423 will be closed and Phase I will be operated independently of Phase II. The maximum depth of Phase I will be 2 ft, while Phase II will be able to be filled to a maximum of 4 ft. Flow is not monitored at this structure.

HYDROLOGIC MONITORING

Flow was monitored at the two inflows to the C-4 EDB, G-420, and G-422. Outflow was monitored at G-421, and seepage flow was monitored at pump G-420S. Wetland stage was monitored at C4SW2 (Figure 4).

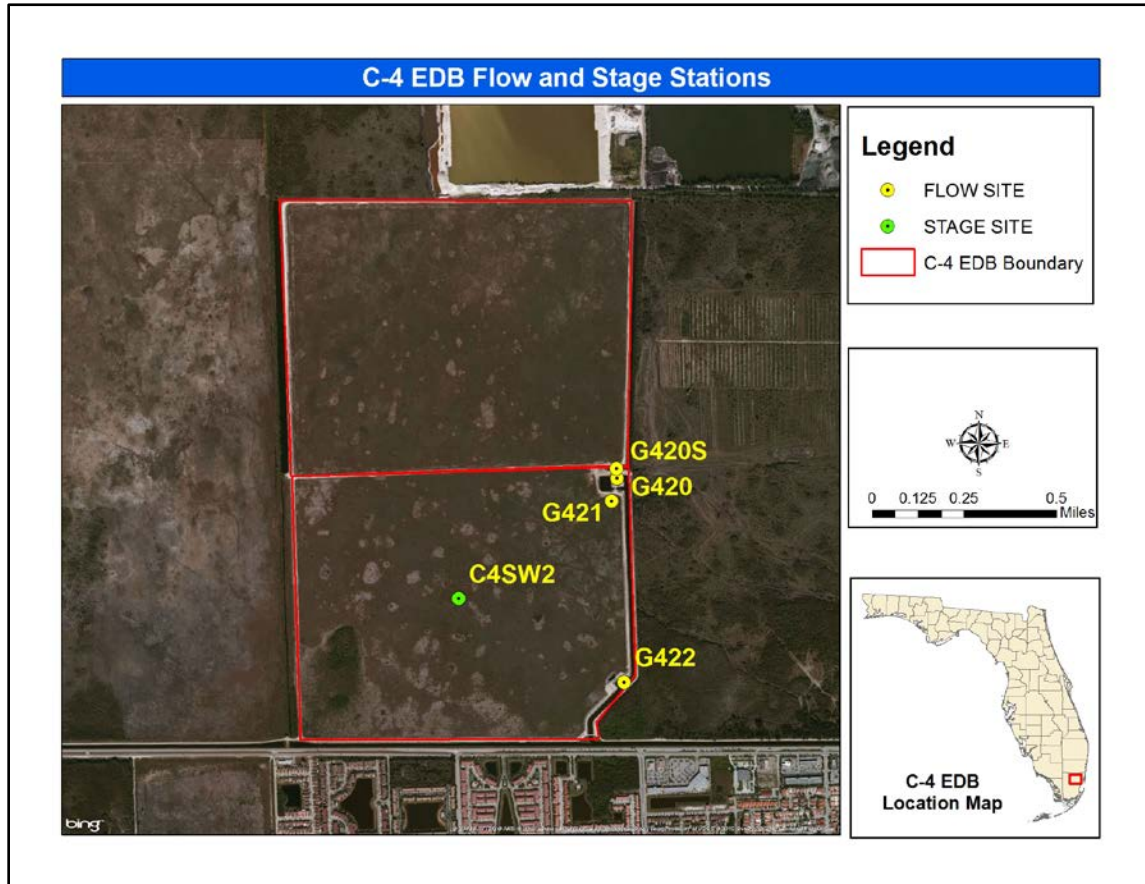


Figure 4. Flow and stage stations for the C-4 EDB.

Hydrologic data reported here were obtained from the District's DBHYDRO database. Flow rating calculations follow the District's flow management assessment quality assurance/quality control processes.

WATER AND TP MASS BUDGET METHODS

The water budget and TP mass budget were calculated for WY2013. The water budget and TP mass budget were also calculated for the reportable event during Tropical Storm Isaac (August 26–29, 2012).

Water Budget

The water budget was calculated as follows:

$$\Delta S = I + R - ET \pm Se - O - GW(\text{out})$$

Where:

- ΔS = change in water storage = $\text{Stage}_t - \text{Stage}_{t-1}$, Stage_t is the final stage and Stage_{t-1} is the initial stage
- I = inflow volume at inflow structures
- R = rainfall
- ET = evapotranspiration loss
- Se = seepage
- O = outflow volume
- GW = Groundwater
- $\text{GW}(\text{out}) = I + R - ET - O - \Delta S$ (when $\pm Se = 0$)

TP Mass Budget

The TP mass budget was calculated as follows:

$$\Delta S_{\text{tp}} = I_{\text{tp}} + D_{\text{tp}} \pm Se_{\text{tp}} - O_{\text{tp}} - \text{GW}_{\text{tp}(\text{out})}$$

Where:

- ΔS_{tp} = change in TP storage = TP storage change in soil, water, vegetation, unknown
- I_{tp} = TP coming in through inflow pumps
- O_{tp} = TP leaving out of system through outflow pumps
- Se_{tp} = TP pumped into the system through seepage pumps, no TP measurements for seeping out through seepage
- D_{tp} = Deposition estimate based on literature review (Redfield, 2002)
- GW_{tp} = GW losses or gains, unknown

$$\text{Retained plus lost through groundwater flow} = \Delta S_{\text{tp}} + \text{GW}_{\text{tp}} = I_{\text{tp}} + D_{\text{tp}} - O_{\text{tp}}$$

Daily rainfall measurements were obtained from the nearest station available at S-335, evapotranspiration (ET) was estimated using potential ET data at S-331W (**Figure 5**), and TP load was calculated by multiplying the TP concentration by the corresponding flow. TP inflow and outflow loads were calculated using the District's Nutrient Load Program. TP atmospheric deposition was calculated by multiplying the area and deposition rate (36 milligrams per square meter per year from literature compiled by Redfield [2002]). The missing outflow TP concentration (auto-sampler was not triggered) at G-421 was estimated to be equal to the inflow concentration collected at C4IN.

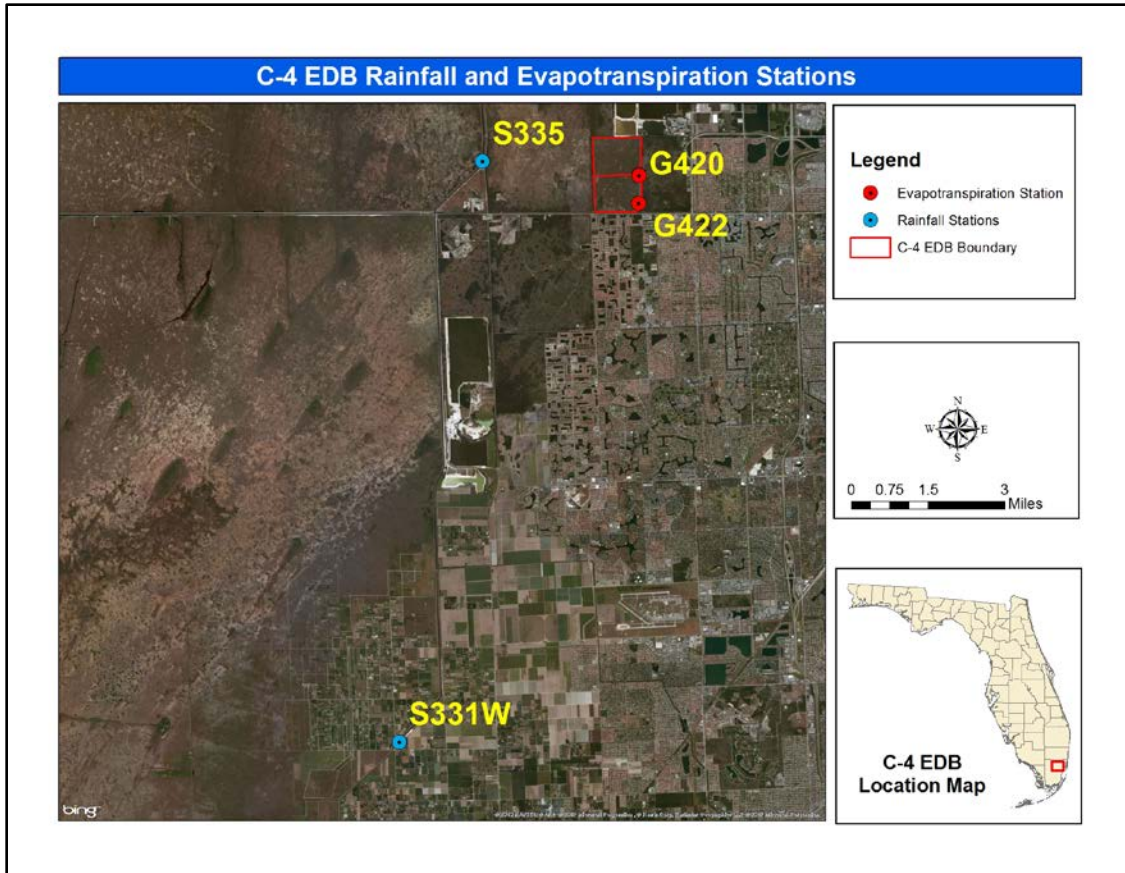


Figure 5. Rainfall and ET monitoring stations with reference to the location of the C-4 EDB.

RESULTS

Flow and Water Budget

Water quality monitoring data and hydrologic data for WY2013 are presented in **Attachment B** and **C**, respectively. Water quality data for temperature and TP monitored at inflow station C4IN are summarized in **Table B-1**.

Flows measured at each structure were as follows and are shown in **Figure 6**:

- Peak flow at G-420 was 372 cfs, and total flow was 2,722 ac-ft
- Peak flow at G-422 was 333 cfs, and total flow was 2,455 ac-ft
- Very little outflow, 5 ac-ft, went through G-421

Total flow volumes, flow-weighted mean TP, and TP load at the C-4 EDB structures for the reporting period are summarized in **Table 5**.

Water budget components including rainfall (**Figure 7**), ET (**Figure 8**), and storage changes (**Figure 9**) are used for budget calculation. There were three major pumping periods: May 22–24, 2012 after record rainfall; August 26–29, 2012 during Tropical Storm Isaac; and September 22–24, 2012 due to heavy rainfall. Storage changed rapidly during pumping operation events (**Figure 9**). Storage increased 10–16 inches during the pumping periods, and receded quickly following the last day of pumping. The quick recession of storage in the C-4 EDB was due to high seepage rates caused by its porous karst formation. Little water was continuously stored in the system. The water budget is summarized in **Table 6**.

Time series stage graphs are shown in **Figure 10**. Stage levels were high during pumping periods in the wet season. Water depth reached as high as 2 ft (stage level 7.05 ft, ground elevation 5.1 ft) during Tropical Storm Isaac. In the dry season, stage levels were low, and the basin remained dry most of the time.

As shown in **Table 6**, the major inflow components to the water budget are precipitation and surface inflow. The major outflow components are ET and groundwater loss. Outflow discharges and flows from the seepage pump are minimal.

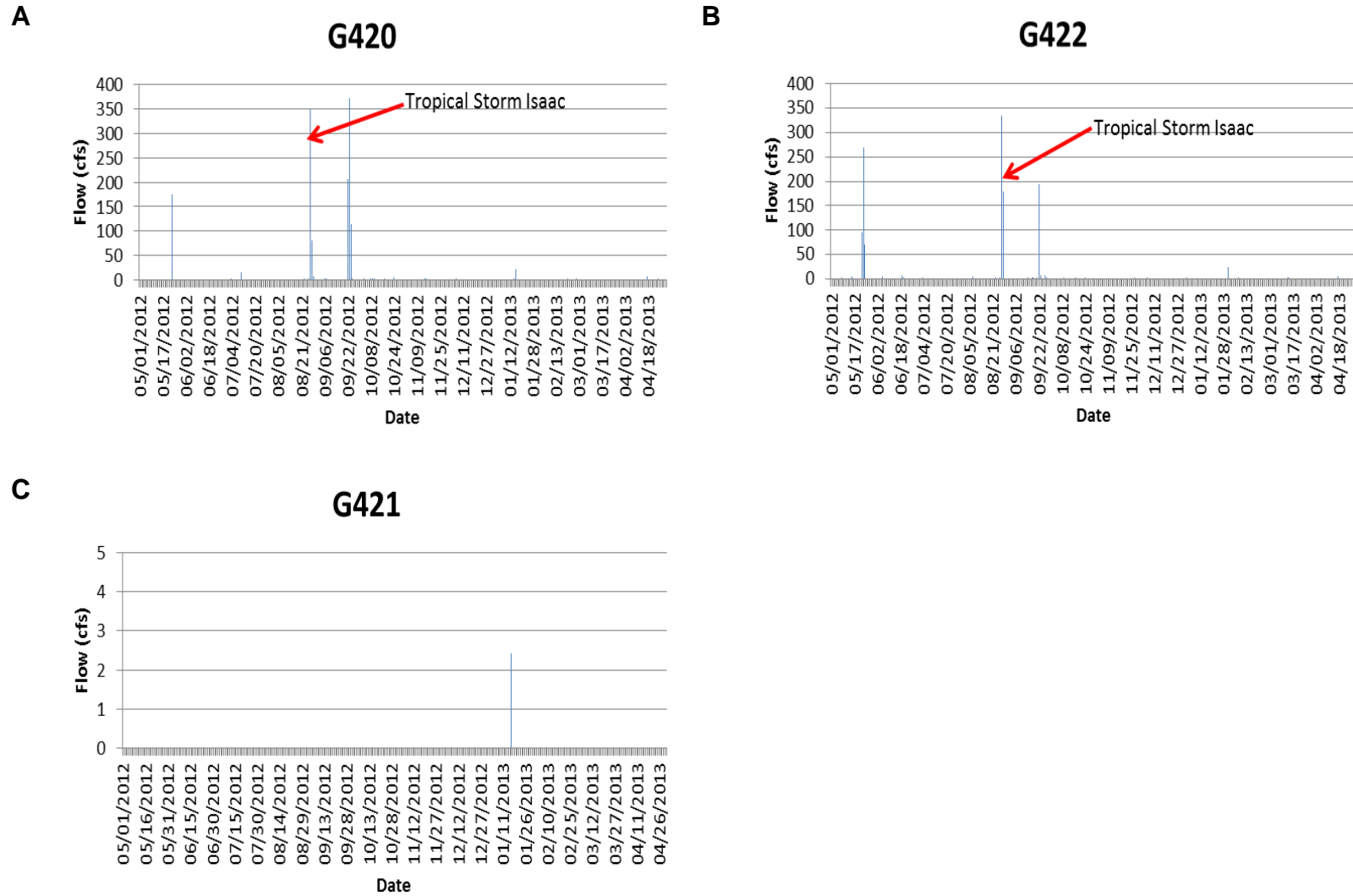


Figure 6. Flow for the C-4 EDB at (A) G-420, (B) G-422, and (C) G-421.

Table 5. Flow volumes, flow-weighted mean TP concentrations, and TP load at the C-4 EDB structures for WY2013.

| Type | Structure | Water Quality Site | Flow Station | DBKEY | Flow Volume (ac-ft) | Flow-Weighted Mean TP Concentration (µg/L) | TP Load (kilograms) |
|---------|-----------|--------------------|--------------|-------|---------------------|--|---------------------|
| Inflow | G-420 | C4IN | G420 | T0997 | 2,722 | 5 | 18.1 |
| Inflow | G-422 | C4IN | G422 | TS006 | 2,455 | 6 | 18.3 |
| Outflow | G-421 | G421 ^a | G421 | TA779 | 5 | 5 | 0.0 |

a. G-421 outflow water quality data were not available, so C4IN inflow water quality data were used.

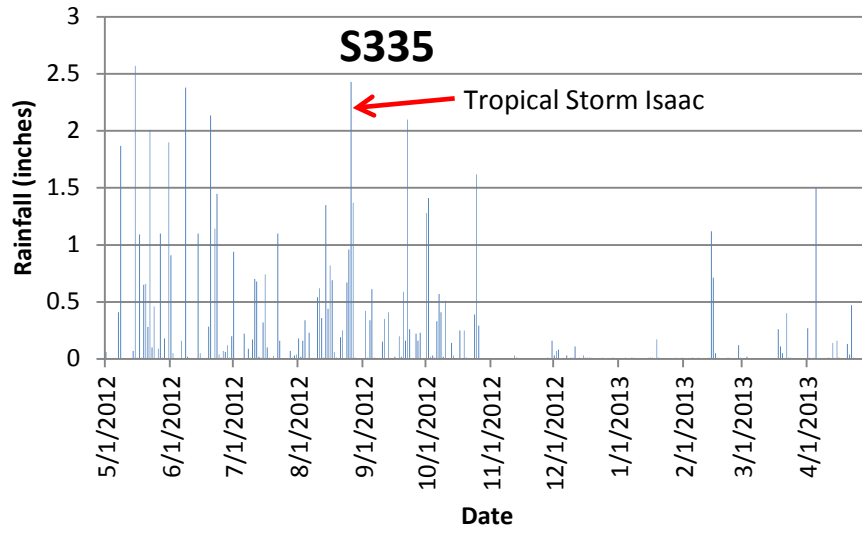


Figure 7. Rainfall for the C-4 EDB.

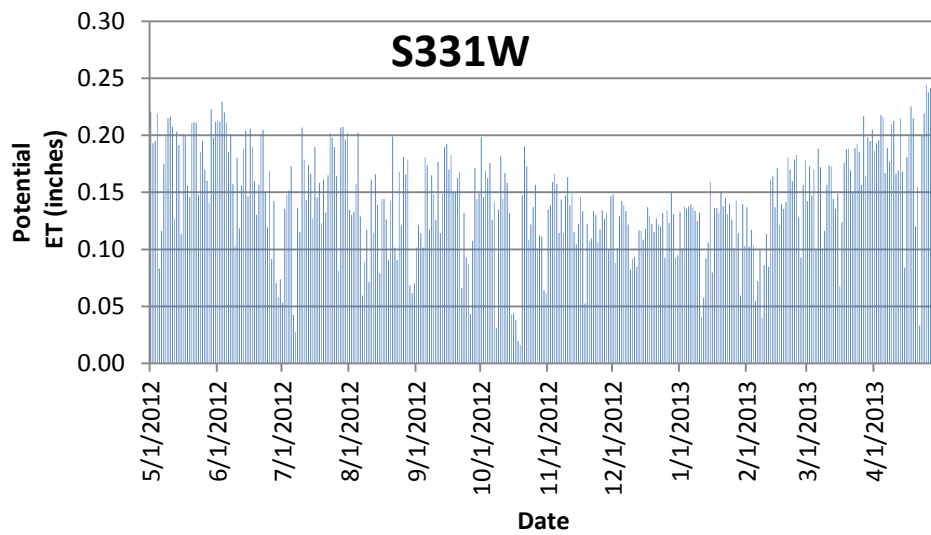


Figure 8. ET for the C-4 EDB.

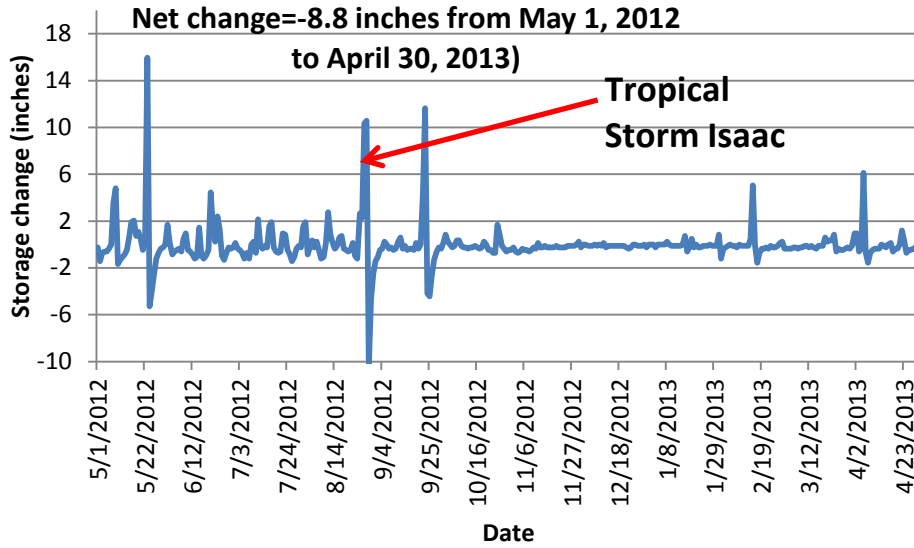


Figure 9. Storage change for the C-4 EDB.

Table 6. WY2013 water budget for the C-4 EDB.

| Component | WY2013 Total (inches) |
|--------------------------|-----------------------|
| Precipitation | 62.2 |
| Evapotranspiration (ET) | 51.8 |
| Inflow ^a | 74.8 |
| Outflow ^a | 0.1 |
| Seepage recycle | 0.1 |
| Storage change | -8.8 |
| Groundwater ^b | 93.87 |

a. Calculated by flow volume divided by total detention area (831 acres).

b. Groundwater(out) = Inflow + Rainfall – ET- Outflow – ΔS (change of water level).

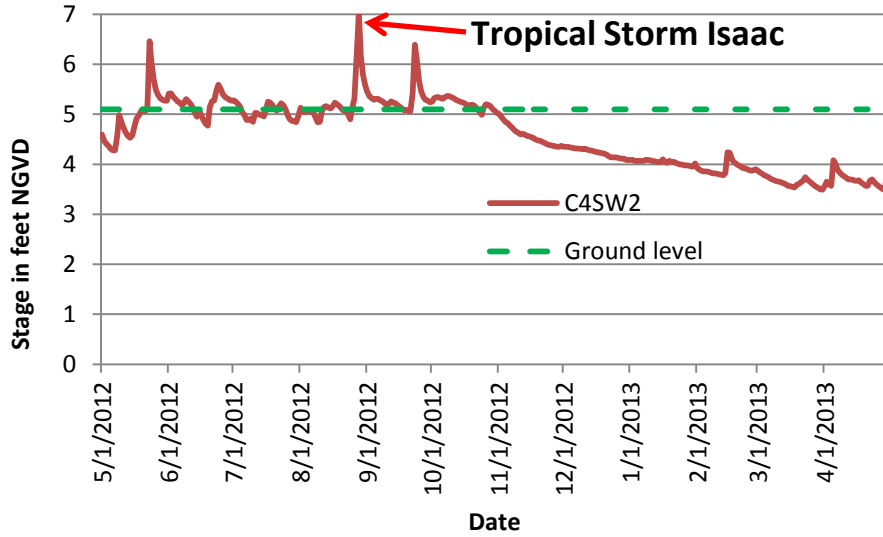


Figure 10. Stage for the C-4 EDB monitored at C4SW2 (ground elevation is about 5.1 ft NGVD).

Total Phosphorus Mass Budget

The TP mass budget is shown in **Table 7**. As shown in **Table 4**, during WY2013, four grab samples were collected at C4IN in the supply canal, and no TP samples were collected at the outflow structure (G-421). TP data collected for inflow were used to estimate the outflow concentration in the mass budget calculation, because it represents the same water body.

As shown in **Table B-1 of Attachment B**, TP concentrations at the inflow monitoring site varied from 5 to 8 micrograms per liter (µg/L) in a narrow range, with an average of 6 µg/L in the grab samples. The WY2013 flow-weighted mean TP concentration was 5.7 µg/L for inflow, which is less than the 10 µg/L numerical TP Water Quality Criterion for the Everglades. TP load to the C-4 EDB was 36 kilograms (kg) from inflow structures G-420 and G-422. Estimated outflow TP load was 0 kg due to minimal discharges. As shown in **Table 7**, the estimated atmospheric deposition (121 kg) is much higher than the inflow TP load (36 kg). It is assumed that most of the TP (157 kg) was either retained by the soil in the C-4 EDB or lost through groundwater.

Table 7. WY2013 TP mass budget in the C-4 EDB.

| | WY2013 (kg) | Tropical Storm Isaac (August 2012) (kg) |
|---|------------------|---|
| Atmospheric Deposition (kg) | 121 ^a | 1.3 |
| Inflow (kg) | 36 | 11.6 ^a |
| Outflow (kg) | 0 | 0 |
| Retained plus lost through groundwater flow (kg) ^b | 157 | 13.0 |
| Percentage for majority ^a | 77% | 90% |

a. Represents the majority or the major contribution in sources.

b, Where "Retained plus lost through groundwater flow (kg)" = $\Delta S_{tp} + GW_{tp} = I_{tp} + D_{tp} - O_{tp}$.

An event-based (Tropical Storm Isaac) TP mass budget is illustrated in **Figure 11**, and the WY2013 annual TP mass budget is illustrated in **Figure 12**. On an event basis, surface water inflow from G-420 was the major TP contributor (11.5 kg) to the C-4 EDB compared with atmospheric deposition (1.7 kg) and outflow (0 kg). The retained TP plus the amount lost through groundwater accounted for 13.2 kg. As shown in **Figure 12**, from May 2012 through April 2013, atmospheric deposition was the major (121 kg) contributor to the TP load compared with the surface water inflow from G-420 and G-422 (36 kg) and outflow pump (0 kg). The retained TP plus the amount lost through groundwater accounted for 157 kg.

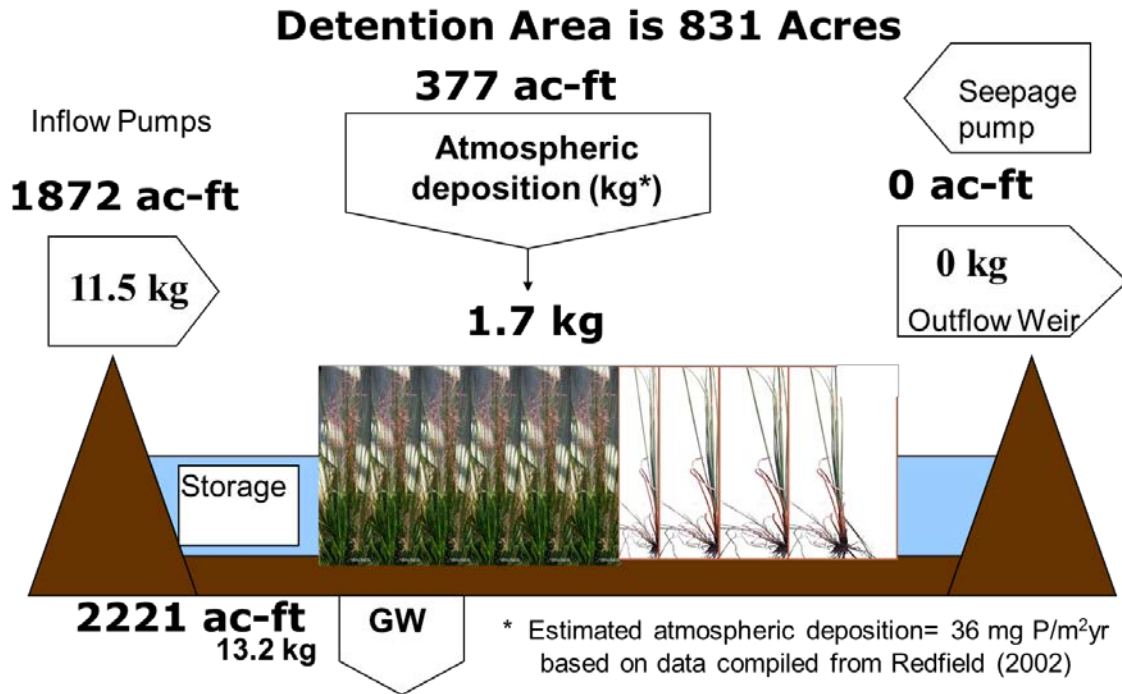


Figure 11. TP mass budget for Tropical Storm Isaac flood control pumping event (August 2012) in the C-4 EDB. [Note: ac-ft – acre-feet; GW - groundwater; kg – kilogram; and mg P/m²yr – milligrams phosphorus per square meter per year.]

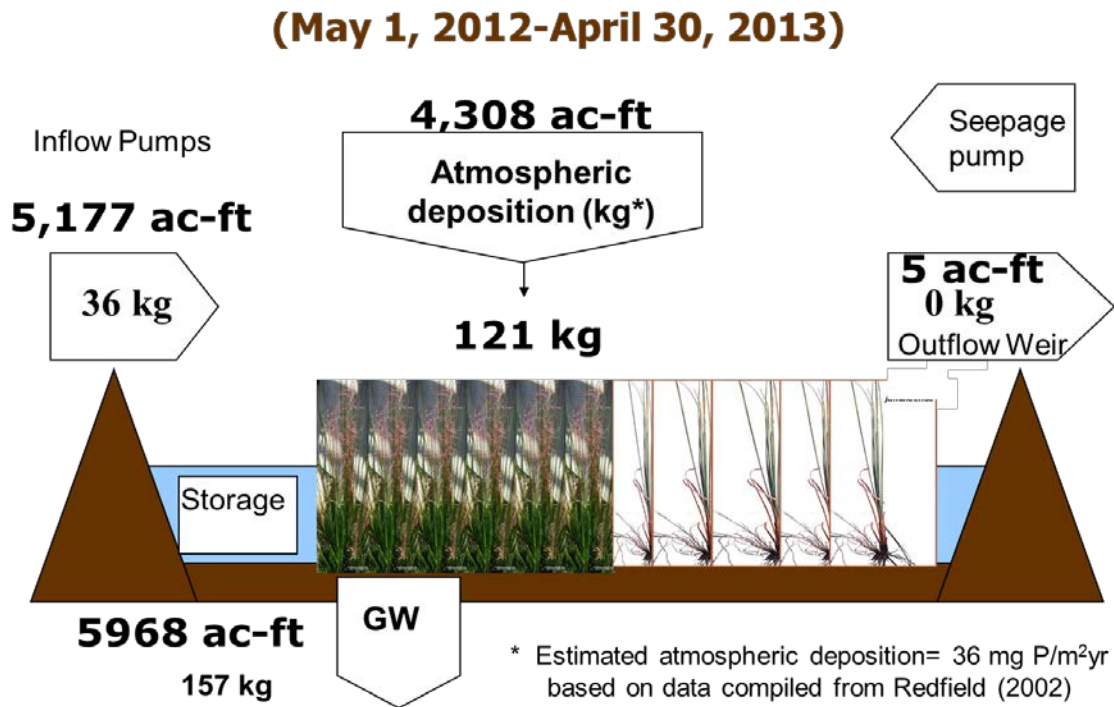


Figure 12. TP mass budget for WY2013 in the C-4 EDB.

HIGHLIGHTS

The water budget and TP mass budget calculations indicate the following:

- The major inflow components to the water budget were precipitation and surface inflows. The major outflow components were ET and groundwater loss.
- The C-4 EDB was a net sink for TP for the one representative event, Tropical Storm Isaac, with 100 percent TP retention plus loss through groundwater.
- The C-4 EDB was a net sink for TP for WY2013, with 100 percent TP retention plus loss through groundwater.
- Surface water inflow loads predominated on an event basis, but atmospheric deposition predominated for the annual reporting period.
- The outflow TP mass load from the C-4 EDB was close to 0 kg.
- Flow-weighted mean TP concentration of 6.3 µg/L in the C-4 EDB was less than 10 µg/L, the numerical TP Water Quality Criterion for the Everglades for WY2013.

LITERATURE CITED

Redfield, G.W. 2002. Atmospheric Deposition of Phosphorus: Concepts, Constraints, and Published Deposition Rates for Ecosystem Management. Technical Publication 360, South Florida Water Management District, West Palm Beach, FL.

SFWMD, 2011. Field Sampling Quality Manual. South Florida Water Management District, West Palm Beach, FL.

SFWMD, 2012a. Chemistry Laboratory Quality Manual, SFWMD-LAB-QM-2012-01, South Florida Water Management District, West Palm Beach, FL.

SFWMD, 2012b. Operational Project Monitoring Plan for C-4 Emergency Detention Basin. South Florida Water Management District, West Palm Beach, FL.

SFWMD, 2012c. Standard Operating Procedure for Recorded Flow Sampling. South Florida Water Management District, West Palm Beach, FL.

Attachment A: Specific Conditions and Cross-References

Table A-1. Specific conditions, actions taken, and cross-references presented for the C-4 Emergency Detention Basin Phase I (ERP Permit EI 13-0192729-001) and Phase II (ERP Permit EI 13-0192729-004, Mod -013) Projects.

| Specific Condition | Description | Applicable Phase | Action Taken | Reported in the 2014 SFER Vol. 3, App. 5-2 in: | | | |
|--------------------|---|------------------|---|--|---------|-------|------------|
| | | | | Narrative (page #'s) | Figure | Table | Attachment |
| 3 | Addresses: Reports and notices submitted to FDEP in accordance with this permit | Operation | Reports and notices were submitted as required. | --- | --- | --- | --- |
| 11 | Water Quality Monitoring | Operation | Conducted water quality sampling as required. Utilized water quality monitoring data to determine TP mass balance. | 6 - 19 | 3 - 12 | 3 - 7 | B |
| 14 | Stage & Flow Monitoring | Operation | Conducted stage and flow monitoring as required. | 7 - 19 | 4, 6, 9 | 5 | C |
| 15 | Dike and Pump Station Inspection | Operation | Levee inspection and report conducted as required. | --- | --- | --- | D |
| 20 | Annual Status Report | Operation | Completed report as required. | ALL | ALL | ALL | ALL |
| 21 | Data Quality | Operation | Sampling and analysis were performed according to permit requirements and per Chapter 62-160, Florida Administrative Code, and the South Florida Water Management District's water quality monitoring plan. | 6 - 7 | 3 | 3 - 4 | B |

Attachment B: Water Quality Data

This project information is required by Specific Condition 11 of the C-4 Emergency Detention Basin Permit (EI 13-0192729), and is available upon request.

Attachment C: Hydrologic Data

This project information is required by Specific Condition 14 of the C-4 Emergency Detention Basin Permit (EI 13-0192729), and is available upon request.

Attachment D: Dike and Pump Station Inspection Report

This project information is required by Specific Condition 15 of the C-4 Emergency Detention Basin Permit (EI 13-0192729), and is available upon request.