Appendix 2-2: Annual Permit Report for the Loxahatchee River Watershed Restoration Project, L-8 Reservoir

Permit Report (May 1, 2012–April 30, 2013)
Permit Number: 0188365

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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 the attachments included with this report. **Table A-1** in Attachment A lists 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.

Table 1. Key permit-related information for the L-8 Reservoir.

Project Name:	L-8 Reservoir
Permit Number:	0188365-018
Issue and Expiration Dates:	
0188365-001:	Issued: 3/30/2007
0188365-018:	Issued: 3/06/2013; Expires: 1/12/2017
Project Phase:	Operation
Permit Specific Condition Requiring Annual Report:	11
Reporting Period:	May 1, 2012–April 30, 2013
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Table 2. Attachments included with this report.

Attachment	Title
A	Specific Conditions and Cross-References
B	Water Quality Data
C	Hydrologic Data
D	Total Monthly Flow at Inflow and Outflow Points of the L-8 Reservoir for WY2013

This report provides an evaluation of the results of L-8 Reservoir Project operations, and assesses whether any significant water quality degradation occurred from using the project's cells for temporary water storage during Water Year 2013 (WY2013) (May 1, 2012–April 30, 2013). In WY2013, water from the cells and canals was sampled and tested for physical parameters, nutrients, gross alpha, and mercury.

Based on the information presented in this document, and in compliance with permit requirements, no degradation in water quality has occurred to date in the L-8 canal or basin due to L-8 Reservoir Project operation. Although specific conductance levels were exceeded for the reservoir at mixing zone boundaries (Attachment B), daily averages for specific conductance were not. Water quality data indicate that chlorides and specific conductance are higher in the cells than in the L-8 canal. During the reporting period, the inflow site (SW6IN) in the L-8 canal had higher average concentrations of nutrients (mainly nitrogen and phosphorus species) than in the reservoir (SW6OUT). Since test-phase operation began in December 2001, nutrient concentrations within the L-8 Reservoir Project have frequently been lower than in samples collected from the L-8 and M canals. The L-8 reservoir is not a source of nutrients, and no other major contributing sources of nutrients are known, other than the L-8 canal. During WY2013, gross alpha concentrations were all well below the Class III criterion.

During WY2013, preparation began for the upcoming construction of new inflow and outflow structures. Discharges from the reservoir began in May 2012 using the existing 75 cfs electric pump station. This pump was removed in December when water levels became too low for it to operate. The contractor installed six temporary 25 cfs pumps in November 2012 to continue lowering the water level for armoring of the interior levees and construction of a new pump station and inflow spillway. These pumps, as well as additional temporary pumps, will continue pumping until construction is completed in 2015. On March 6, 2013, a permit modification was issued to allow an increase in the discharge rate from 150 cfs to 300 cfs. On March 29, 2013, a permit modification was issued to begin construction of the reservoir levee revetments. The only inflows that occurred during WY2013 were in August and September due to Tropical Storm Isaac. Inflow sampling stopped in January 2013. The only water quality sampling that has continued is for the water being discharged from the reservoir via the contractor's temporary pumps back through the existing inflow structure (SW6IN). Collection of outflow samples at SW6IN began when the SW6OUT pump station was removed in January 2013. This will continue until the new structures are completed.

INTRODUCTION

Water quality sampling for the L-8 Reservoir Project began in November 2001. In February 2003, FDEP executed a Consent Agreement (OGC File No. 030272-50 RO) that allowed the connection of Pits C and D (Cell 1) to the reservoir project pits. In March 2003, the South Florida Water Management District (SFWMD) submitted the first annual monitoring report to FDEP. This report presents the results of the L-8 Reservoir Project's monitoring program. The objective is to ensure that the discharge water meets water quality standards, and that water quality is suitable for water supply and environmental deliveries through the city of West Palm Beach M canal. This assessment is required by the permit to ensure that the collection and analysis of the water quality data comply with FDEP-approved quality assurance and quality control procedures.

DESCRIPTION OF REGIONAL SYSTEM

The L-8 basin encompasses approximately 170 square miles, with the majority located in northwestern Palm Beach County and approximately two square miles in southwestern Martin County (**Figure 1**). The majority of the land in the Upper L-8 basin is comprised of the J.W. Corbett Wildlife Management Area, which is owned and managed by the Florida Fish and Wildlife Conservation Commission, and by the DuPuis Reserve, which is owned and managed by SFWMD. There are areas in close proximity to Lake Okeechobee that consist of agricultural land. The Lower L-8 basin, located downstream of the M canal includes the Indian Trail Improvement District (ITID) service area and several square miles of agricultural and rural area.

Regional flow in the L-8 basin (**Figure 2**) is complex, and has several operating procedures that affect flow into and out of the system. The upstream water source is Lake Okeechobee, via SFWMD's Culvert 10A. Culvert 10A is a structure consisting of five 10-foot diameter corrugated metal pipe culverts with inverts at 5.5 feet elevation in relation to the National Geodetic Vertical Datum of 1929 (NGVD29). Four of the culverts have flap gates on the lake side, and the center barrel has a 10 feet x 10 feet operable slide gate. Therefore, inflow into the L-8 canal through Culvert 10A is a function of the head difference between the lake and canal water levels. Throughout the L-8 basin, water is discharged into the L-8 canal for drainage as well as withdrawn for water use. Current water use consists of public water supply and irrigation. The water for public water supply is pumped using the City of West Palm Beach's Control 2 Pump Station, located on the M canal. Water then flows east via the M canal, and eventually to the city's water supply lakes, Lake Mangonia and Clear Lake, where it is withdrawn for treatment.

The L-8 canal withdrawal/discharge location is south of the confluence of the L-8 and M canals. The reservoir is used for storage of excess runoff from the basin to reduce discharges from the basin to the C-51 canal and, ultimately, to tide. The stored water can be discharged during the dry season for environmental purposes, or it can be discharged for public water supply for the city of West Palm Beach. During wet season, the water can be discharged back into the L-8 canal between storm events at relatively lower discharge rates, once the stage in the L-8 canal has dropped to within the normal operating range, to recover storage capacity in the reservoir.

Discharge sources to the L-8 canal, excluding Lake Okeechobee and the L-8 Reservoir at Palm Beach Aggregates, Inc. (PBA), include ITID and Water Conservation Area 1 (WCA-1). Discharges from ITID consist of stormwater runoff from the 19,000-acre M-1 basin. Water is discharged from the ITID M-1 Basin Impoundment Area through its L-8 outfall structure located approximately 11 miles north of State Road 80. Discharges from WCA-1 are dependent on the operating criteria of SFWMD structures S-5AS, S-5AE, and S-5AW.

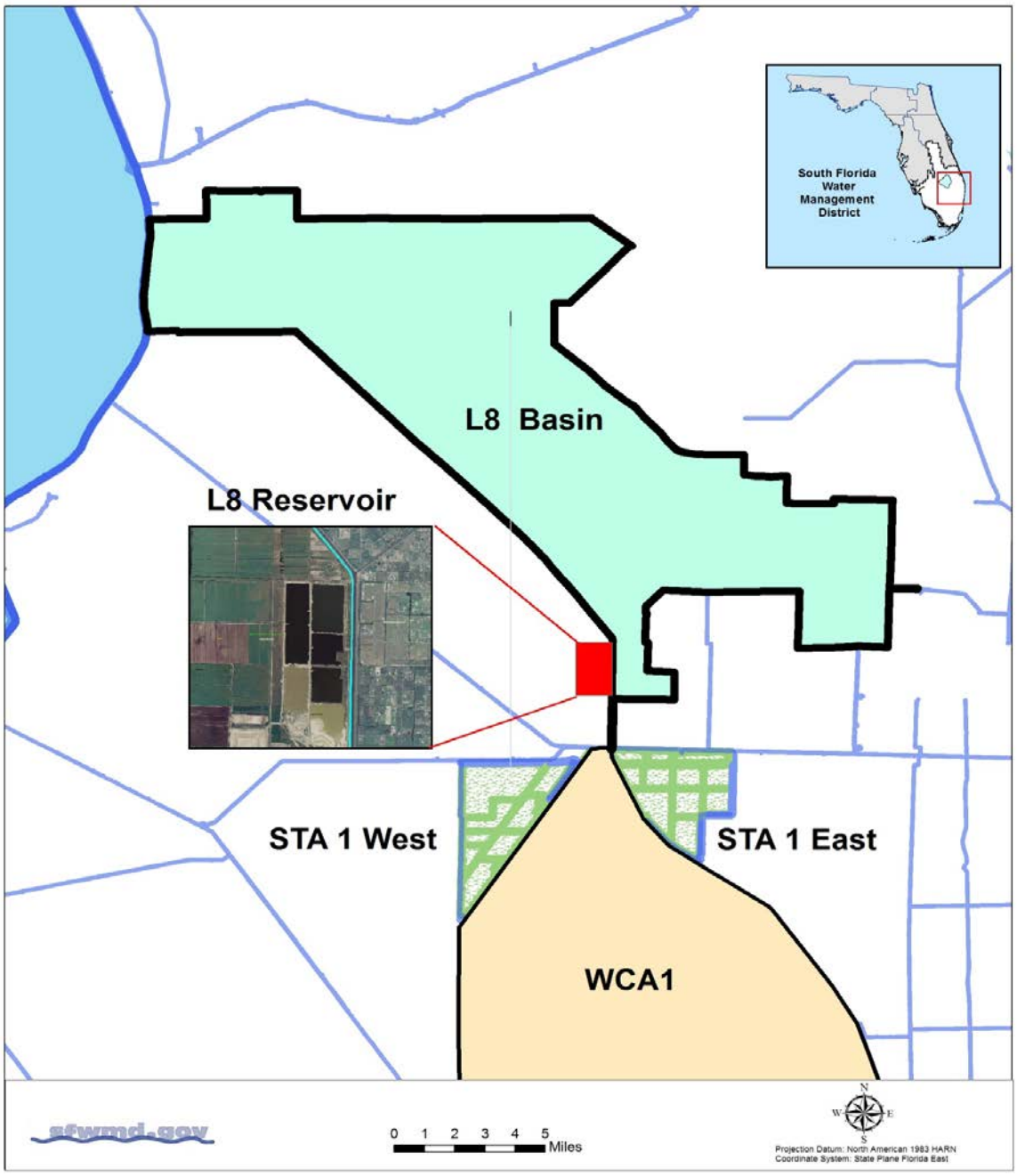

Figure 1. L-8 reservoir and basin.
[Note: STA – Stormwater Treatment Area; WCA1 – Water Conservation Area 1]

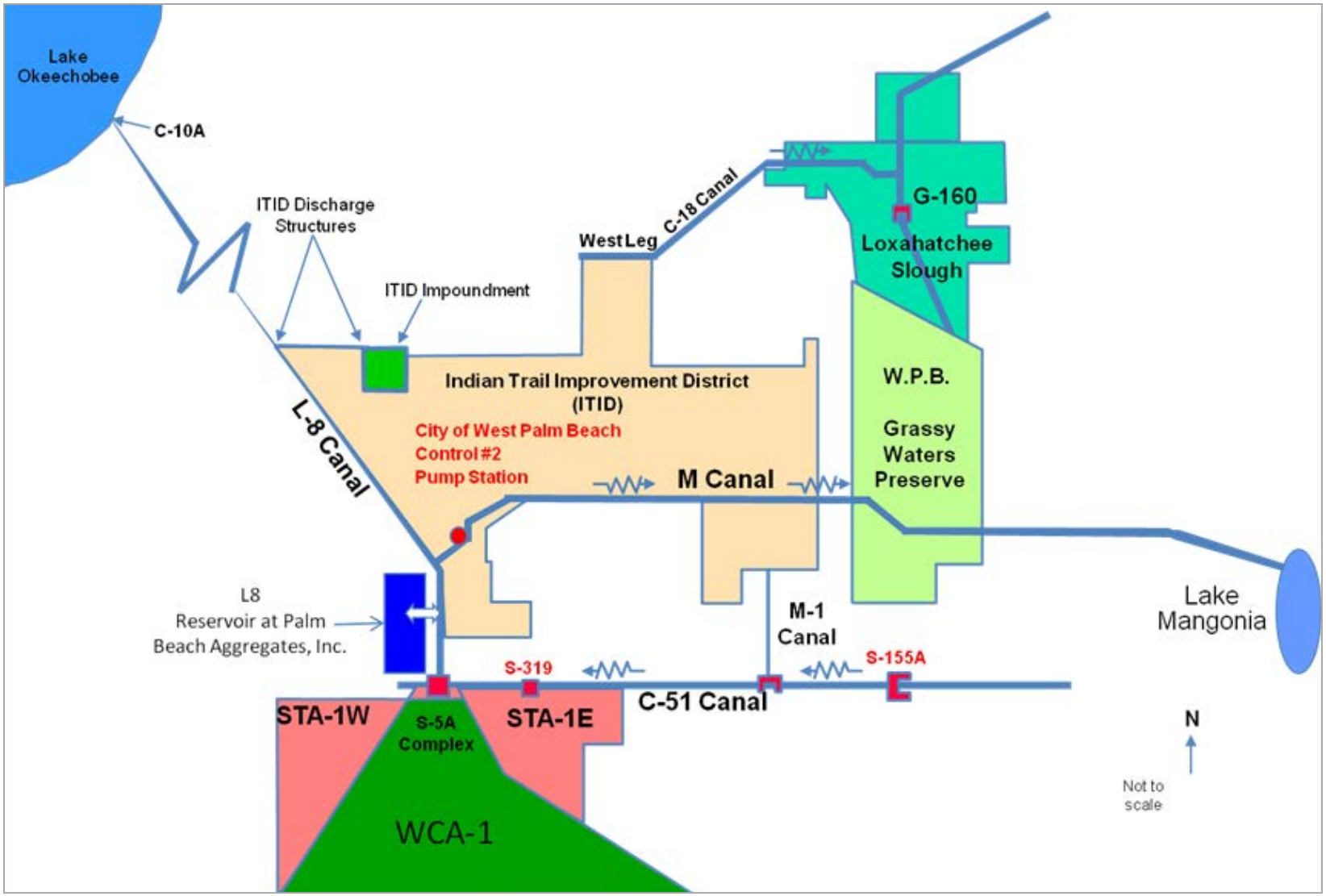

Figure 2. L-8 Reservoir Project connections to the regional system. [Note: STA-1E – Stormwater Treatment Area 1 East; STA-1W – Stormwater Treatment Area 1 West; WCA-1 – Water Conservation Area 1; W.P.B. – West Palm Beach.]

L-8 RESERVOIR PROJECT

The L-8 Reservoir Project covers approximately 1,000 acres at an average depth of 40 feet, and is made up of a series of interconnected rock pits from the mined-out portions of a limestone quarry in western Palm Beach County. The project scope includes data compilation, screening and analysis, and a characterization of the water quality impacts from the L-8 Reservoir Project. After data screening and analyses were completed, trends were reviewed, and conclusions were drawn based on the final data set.

LOCAL HYDROLOGY

The inflow structure from the L-8 canal to Cell 1/2 consists of two 72 inch x 472 linear feet of reinforced concrete pipe culverts with invert elevations of +7.5 feet NGVD29, each with a 6 feet x 6 feet sluice gate, and another 100 feet of 72-inch corrugated metal pipe culvert. The discharge structure is equipped with one 75 cubic feet per second (cfs) capacity electric pump that discharges to the water control structure box, and out of the twin 72-inch reinforced concrete pipe culverts to the L-8 canal (**Figure 3**). Flow data are provided in Attachment C.

GEOLOGY

The L-8 reservoir was previously a rock quarry excavated by Palm Beach Aggregates (PBA). It is located in central Palm Beach County, Florida, centered approximately two miles north of SR 80, near the 20-Mile Bend. The surrounding area was historically used for agricultural purposes, and to some extent, continues to be utilized for growing sugarcane and turf. The quarry was subdivided into six pits, and each pit was dewatered by pumping from sumps and perimeter rim ditches. Each pit was originally excavated to approximately 30 feet below the surrounding grade for mining purposes. Each pit has been excavated further for the reservoir project, to approximately 50 feet below the surrounding grade.

Based on reviewing the U.S. Geological Survey's 1971 quadrangle map of Loxahatchee, Florida, which was photo-revised in 1984, the PBA site has a natural ground surface elevation of approximately +15 feet NGVD29. Research of the Soil Survey of Palm Beach County Area, Florida, published by the U.S. Department of Agriculture, Soil Conservation Service indicates the site is masked by the soil association Holopaw fine sand. This nearly level, poorly drained sand that has loamy subsoil is at a depth of 40 to 72 inches. Under natural conditions (i.e., absent drainage improvements), the water table is near the ground surface.

Geologic conditions at the PBA site consist of thin depths of surficial peat and sands over a relatively thick deposit of well-cemented sand and shell of marine origin. The cemented layer is referred to as the "Carbonate Rich" zone. It has been reported that the South Florida peninsula formerly existed with sea stands considerably higher than those that currently exist (LBFH and DE&T, 2005). A series of shallow inland tidal channels became home for thousands of marine animals. These and other life forms accumulated over time into reefs, which later lithified into the cemented sand and shell Carbonate Rich zone. Beneath this layer, a thick deposit of sand and gravel with some cemented zones is common to this geologic area.

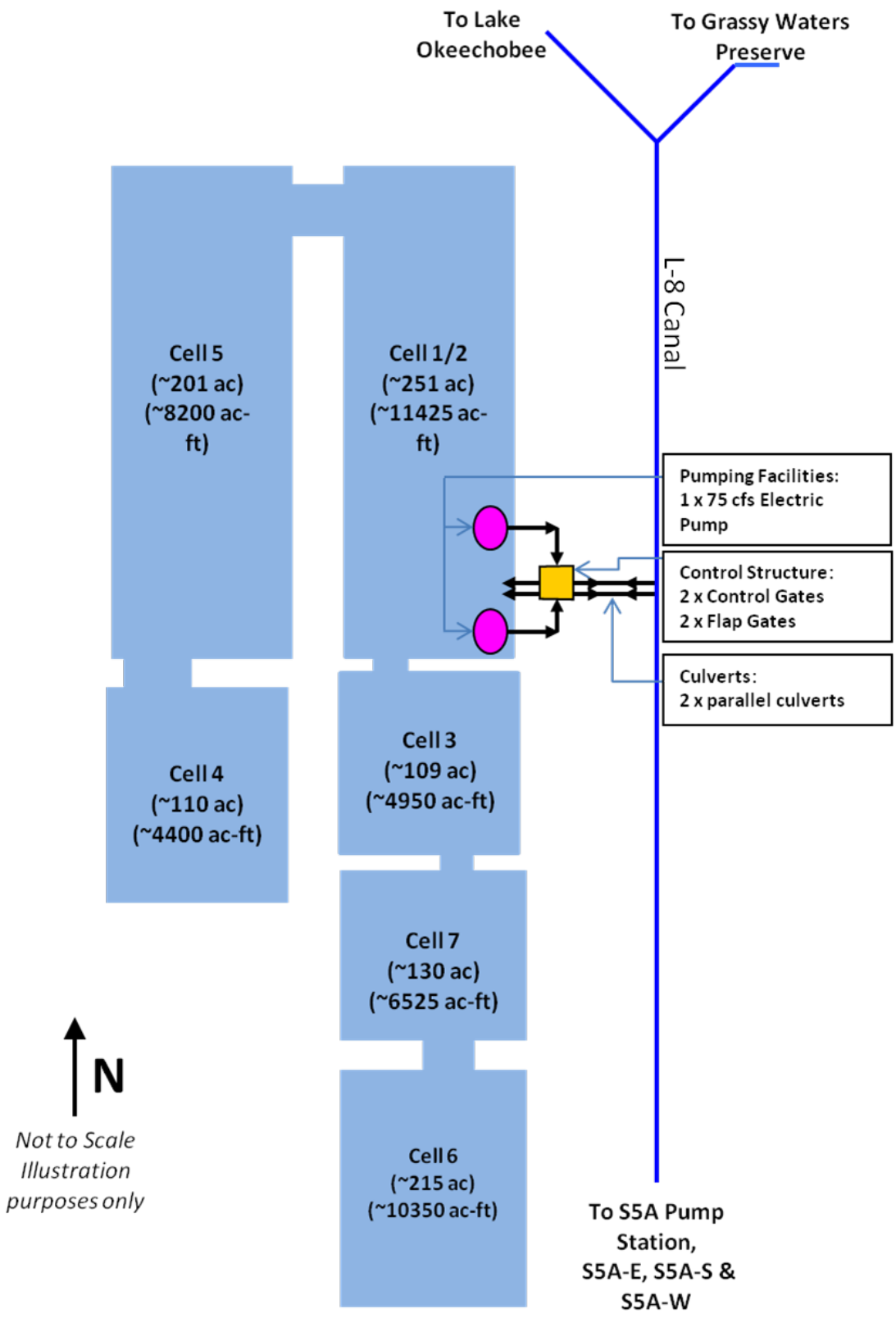

Figure 3. L-8 Reservoir project facilities.
[Note: ac – acres; ac-ft – acre-feet; cfs – cubic feet per second]

WATER QUALITY

MONITORING LOCATIONS

Surface water sampling locations are listed in **Table 3** and shown in **Figure 4**.

Table 3. Surface water quality monitoring locations.

Sample Station	Sample Location	Coordinates	
		Latitude	Longitude
SW-6IN[a]	Inflow structure southeastern corner of Cell 1/2	264338.836	802149.982
SW-6OUT[b]	Outflow structure southeastern corner of Cell 1/2	264339.412	802154.419
L8MZBN	L-8 canal 800 meters north of the discharge location	264404.689	802147.253
L8MZBS	L-8 canal 800 meters south of the discharge location	264313.305	802148.492

Note: Latitude and longitude are in degrees minutes and decimal seconds.

a: Inflow sampling was discontinued in January 2013, when the drawdown began for construction of the new inflow and outflow structures. Water from the contractor's temporary discharge pumps was routed through the inflow structure. Discharge samples were then and continued to be collected at SW-6IN.

b: SW-6OUT was discontinued in January 2013 when water levels became too low to sample inside the reservoir.

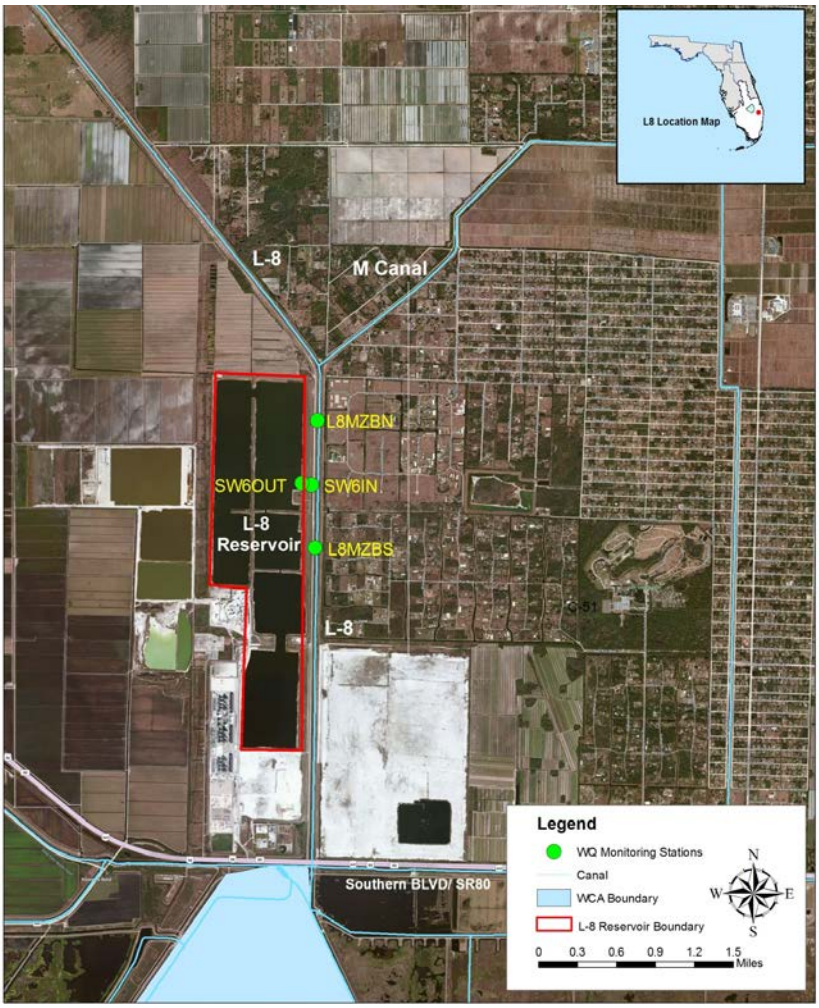

Figure 4. L-8 Reservoir Project water quality sampling locations.

SAMPLING PROTOCOL

Sampling was conducted in the six reservoir cells (Class III waters) and three sites in the L-8 canal (Class III waters). Surface water samples were collected from all sampling locations on a weekly basis only during inflow or outflow events. Gross alpha is sampled monthly only during outflow events at SW6OUT. During this reporting period all monitoring was conducted by SFWMD staff. The samples were obtained from 0.5 meters below the water surface. Specific conductivity, pH, dissolved oxygen, and temperature were measured in the field for all samples.

Water Quality Standards

Review of Chapter 62-302.530, Florida Administrative Code, Criteria for Surface Water Quality Classifications, indicates the water quality criteria for Class I (potable water supply) and Class III (predominantly fresh waters) waters for selected analytical parameters (**Table 4**). Though the point of discharge in the L-8 canal is considered Class III waters, because water can be delivered to the L-8 tieback canal and the M canal, Class I standards can be applied.

Compliance with narrative and numerical Class III water quality standards is assessed at the outfall from the L-8 Reservoir Project to the L-8 canal (SW6OUT). The exceptions are chlorides and specific conductance, for which compliance is assessed at the edges of the FDEP-approved

mixing zone at L8MZBN and L8MZBS. Chlorides have a Class I water quality standard of less than or equal to 250 milligrams per liter (mg/L), and specific conductance has a Class III water quality standard of less than or equal to 1,275 microsiemens per centimeter (µS/cm).

Table 4. Surface water quality criteria specified in Chapter 62-302.530, Florida Administrative Code.

Parameter	Units	Surface Water Criteria	
		Class I	Class III
Chlorides	mg/L	≤ 250	NA
Specific Conductance	µS/cm	≤1,275*	≤1,275*
Dissolved Oxygen	mg/L	≥5.0	≥5.0
pH	Standard	6.0 < pH < 8.5	
Total Mercury	µg/L	<0.012	<0.012
Gross Alpha	pCi/L	≤15	≤15

Notes:
µS/cm – microSiemens per centimeter
µg/L – micrograms per liter
mg/L – milligrams per liter
pCi/L – picocuries per liter
* 1,275 µS/cm or 50 percent above background, whichever is greater

Data Summary Tables

Table 5. Statistical summary of routine grab samples for physical parameters monitored in the L-8 canal and L-8 reservoir during WY2013.

Temperature (°C)			pH (units)[a]		
Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2
Count	29	44	Count	29	44
Avg	26.4	24.9	Avg	7.5	8.1
STD	3.8	3.9	STD	-NC-	-NC-
Min	19.5	17.8	Min	6.8	7.4
25%	22.2	21.5	25%	7.4	8.0
Median	27.9	24.7	Median	7.6	8.2
75%	29.1	28.2	75%	7.8	8.3
Max	31.8	31.8	Max	8.3	8.7

Dissolved Oxygen (mg/L)			Sulfate (mg/L)		
Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2
Count	29	44	Count	29	44
Avg	5.48	8.08	Avg	47.8	106.9
STD	2.24	1.53	STD	29.2	29.3
Min	1.28	2.58	Min	<0.1	32.1
25%	4.25	7.67	25%	23.5	90.1
Median	4.82	8.55	Median	43.4	105.5
75%	7.54	9.13	75%	68.8	136.5
Max	9.32	9.58	Max	107.0	149.0

Specific Conductance (µS/cm)					Calculated Chloride (mg/L)[b]				
Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	L8MZBN L8 Canal	L8MZBS L8 Canal	Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	L8MZBN L8 Canal	L8MZBS L8 Canal
Count	29	44	44	44	Count	---	44	44	44
Avg	740	1,423	583	691	Avg	---	223.7	74.1	89.2
STD	319.8	325.3	247.0	238.4	STD	---	64.8	35.5	36.3
Min	186	464	160	198	Min	---	55.6	21.3	25.1
25%	524	1,291	454	537	25%	---	191.5	54.4	65.1
Median	685	1,409	492	700	Median	---	216.0	59.2	88.1
75%	995	1,752	812	819	75%	---	294.2	105.3	106.4
Max	1,429	1,824	1,160	1,343	Max	---	312.1	165.9	202.2

Note:

[a] All pH values were converted to hydrogen ion concentrations prior to performing statistical summaries. The statistical summaries were back-converted to pH values using the following formula: $pH=-\log[H^+]$. -N- indicates that a calculation could not be made.

[b] Chlorides were calculated from specific conductance using the following equation in the latest permit:
(Predicted Chloride = $0.0000455(SpCond)^2 + 0.0845(SpCond) + 6.634$)

--- Data not available.

Key to units: ºC – degrees Celsius; µS/cm – microsiemens per centimeter; mg/L - milligrams per liter.

Key to statistics abbreviations: Avg – average; Max – maximum; Min – minimum; STD – standard deviation.

Table 6. Statistical summary of routine grab samples for nutrients and radiological parameters monitored in the L-8 canal and L-8 reservoir during WY2013.

Total Phosphorus (mg/L)			Total Kjeldahl Nitrogen (mg/L)		
Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2
Count	29	44	Count	29	44
Avg	0.060	0.061	Avg	1.22	0.95
STD	0.036	0.061	STD	0.33	0.15
Min	0.021	0.009	Min	0.61	0.67
25%	0.037	0.020	25%	1.06	0.87
Median	0.047	0.043	Median	1.10	0.92
75%	0.081	0.082	75%	1.37	1.01
Max	0.186	0.303	Max	2.17	1.42
Nitrate + Nitrite as N (mg/L)			**Total Nitrogen (mg/L)**		
Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2	Statistics	SW-6IN L8 Canal	SW-6OUT Cell 1/2
Count	27	44	Count	27	44
Avg	0.103	0.063	Avg	1.31	1.01
STD	0.099	0.114	STD	0.36	0.24
Min	<0.005	<0.005	Min	0.65	0.70
25%	0.027	0.005	25%	1.10	0.88
Median	0.064	0.007	Median	1.21	0.94
75%	0.144	0.072	75%	1.47	1.10
Max	0.321	0.458	Max	2.38	1.85

Statistics	Gross Alpha (pCi/L)
	SW-6OUT Cell 1/2
Count	9.0
Avg	4.7
STD	1.4
Min	<1.5
25%	3.3
Median	5.4
75%	5.7
Max	6.7

Key to units: mg/L - milligrams per liter; pCi/L – picocuries per liter.
Key to statistics abbreviations: Avg – average; Max – maximum; Min – minimum; STD – standard deviation.

ASSESSMENT OF WATER QUALITY DATA

Surface water quality data and mercury in fish data collected during WY2013 for the L-8 Reservoir Project are provided in Attachment B.

Gross Alpha

Gross alpha is a by-product of radioactive decay, and occurs naturally in the environment. It is present in varying amounts in nearly all rock, soils, and water. Gross alpha was sampled at SW6OUT (**Table 6**). Gross alpha at SW6OUT ranged from less than 1.5 to 6.7 picocuries per liter (pCi/L). The state criterion is less than 15 pCi/L for both state Class I and Class III waters. Based on the Class I and III criterion, there were no gross alpha values above the criterion.

Nutrients

The nutrients analyzed in the L-8 canal and L-8 reservoir include total phosphorus (TP), total Kjeldahl nitrogen (TKN), nitrate + nitrite (NOx), and total nitrogen (TN). Nutrients had consistently higher concentrations in the L-8 canal than in the reservoir (**Table 6**; **Figure 5**). **Table 6** also shows that the highest TP concentration leaving the reservoir was 0.303 milligrams per liter (mg/L), while the highest in the L-8 canal was 0.186 mg/L. The highest TN concentration in the reservoir was 1.85 mg/L, and the highest TN concentration in the L-8 canal was 2.38 mg/L. Based on available data, the L-8 reservoir does not normally cause or contribute to an increase of phosphorus or nitrogen in the L-8 canal. However, due to the steady discharge from the reservoir for the construction of the new inflow and outflow structures, nutrients have increased as water levels in the reservoir have decreased. Inflow sampling has been discontinued as of January 2013, and most likely will not resume until construction is completed and normal operations can resume.

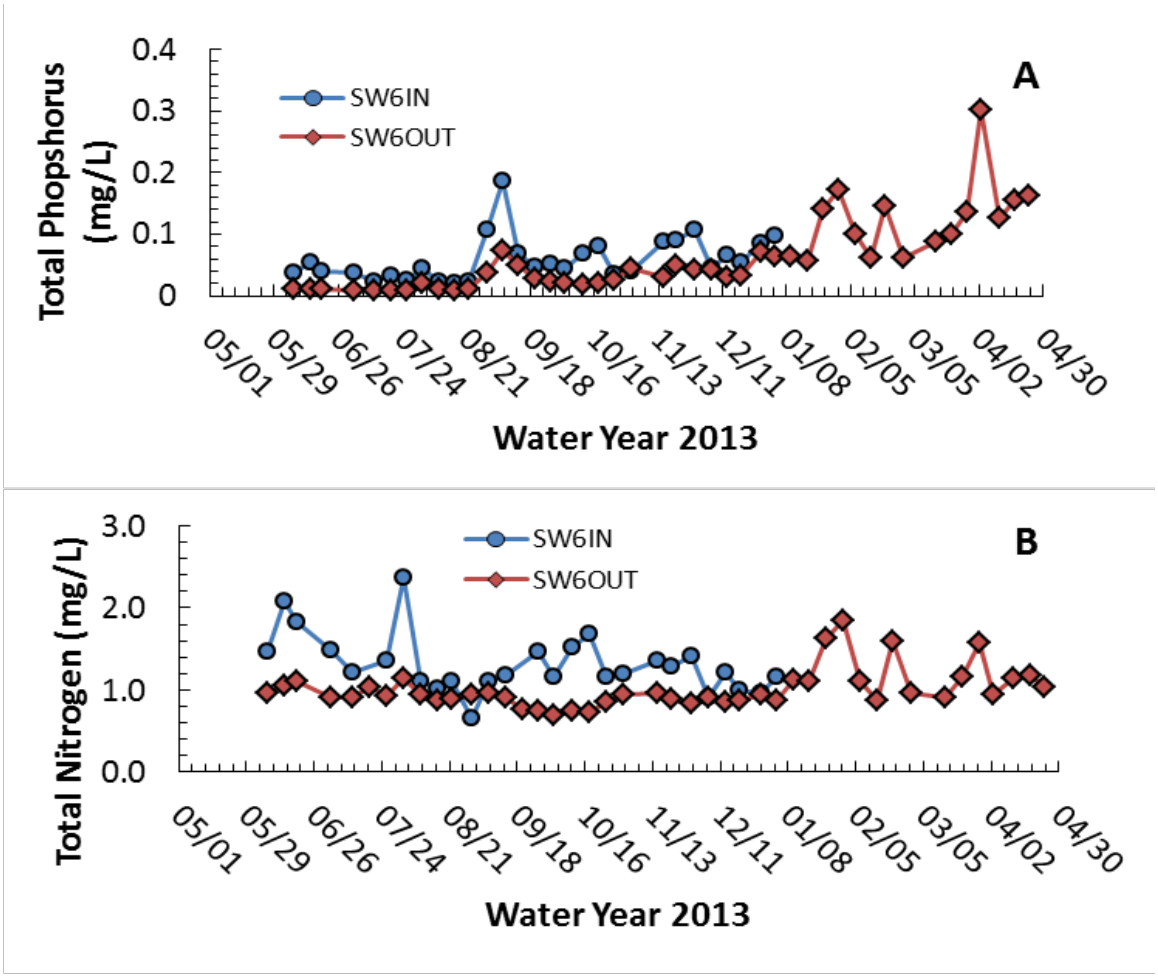

Figure 5. Time series plots of routine grab samples for (A) total phosphorus and (B) total nitrogen measured at two structures during WY2013

Physical Parameters

Physical parameters analyzed in the reservoir and canal include temperature, dissolved oxygen, pH, specific conductance, and calculated chloride. As shown on **Figure 6A** and in **Table 5**, specific conductance was consistently higher in the reservoir than in the canal. The permitted mixing zone monitoring sites, L8MZBN and L8MZBS, were initiated in October 2007. These sites are located 800 meters north and south of where discharge water enters the L-8 canal. The permit requires an in situ measurement of specific conductance at the two mixing zone sites and at the discharge location from the reservoir when inflow or outflow events occur. In addition to conducting this permit-required monitoring, the District also voluntarily conducts continuous automated 15-minute interval monitoring of specific conductance at the two mixing zone locations as an auxiliary data set to aid in internal operational decisions related to pumping, and to shut off the pumps as soon as possible if specific conductance exceeds 1,275 µS/cm at either of the mixing zone boundaries. Once the specific conductance returns to an acceptable level, the pumps are turned back on, if required. Fluctuations of values above and below 1,275 µS/cm may occur during a 24-hour period. While a daily in situ measurement above 1,275 µS/cm may constitute an exceedance, the daily average values calculated from the continuous 15-minute data are helpful for validating the in situ measurements. In situ grab data are provided in Attachment B. The continuous 15-minute results recorded at the mixing zone boundaries are available upon request.

As shown in **Figure 6** and **Table 5**, specific conductance in situ grab sample concentrations were measured during inflow and outflow events. During WY2013, SW6OUT had an average concentration of 1,423 µS/cm, with a maximum of 1,824 µS/cm. At the two mixing zone boundaries, L8MZBN and L8MZBS, the average concentrations for WY2013 were 583 µS/cm, and 691 µS/cm, respectively. These findings show that even though conductivity levels were above the Class III criteria within the reservoir, it was well mixed and diluted when it reached the boundaries of the mixing zones.

Calculated chlorides concentrations are presented in **Table 5** and **Figure 6**. These were calculated from specific conductance values recorded when routine samples were collected during inflow and outflow events by using the following equation in the latest permit: (Predicted Chloride = $0.0000455(\text{SpCond})^2 + 0.0845(\text{SpCond}) + 6.634$). Since chlorides values are derived from specific conductance, the same scenarios explained above for specific conductance also apply to chlorides. There is no state Class III standard for chlorides. SW6OUT and SW6IN exhibited the same increases as described for specific conductance. Daily specific conductance and calculated chlorides data for the L-8 Reservoir Project are provided in Attachment B.

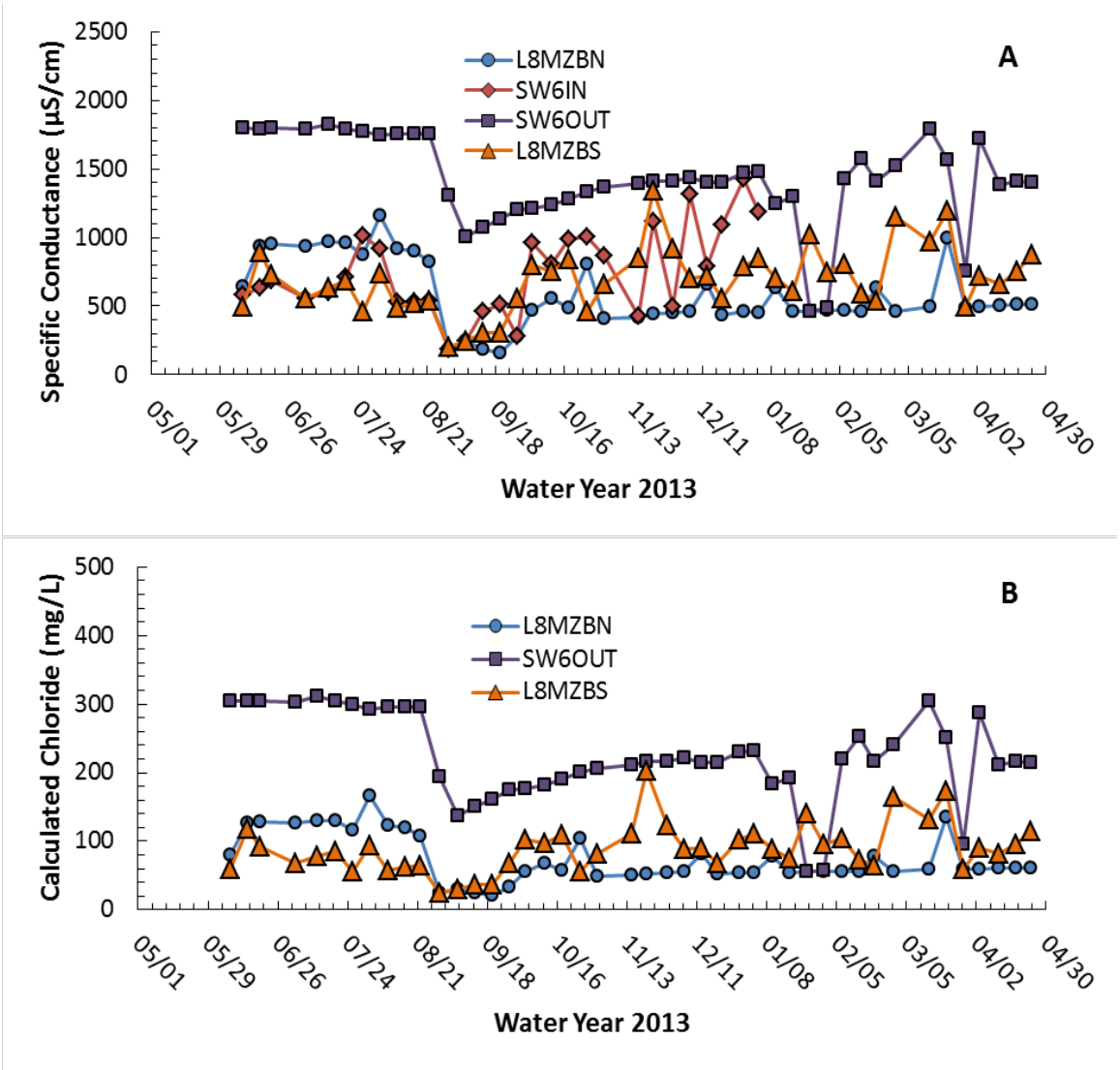

Figure 6. Time series plots of (A) specific conductance levels at four structures and (B) calculated chloride levels at three structures, including two mixing zone stations (L8MZBN and L8MZBS), during WY2013.

MERCURY MONITORING

On December 31, 2009, FDEP issued SFWMD a minor permit modification (0188365-012) to update mercury monitoring for the L-8 Reservoir project to reflect the transfer from Phase 2-Tier 1 (Routine Monitoring During Stabilization Period) to Phase 3-Tier 1 (Routine Operational Monitoring from Year 4 to Year 9). In Phase 3-Tier 1, surface water sampling is discontinued, and the frequency of mosquitofish (*Gambusia holbrooki*) collection is reduced to semiannually. Mosquitofish are collected and combined into two sets. One is from all the cells of the L-8 reservoir (named L8FISH), and the other is from a location adjacent to the reservoir, in the L-8 canal (L8GRC). The samples are analyzed for total mercury (THg). The frequency of large-bodied fish collection is reduced to one collection event every three years, and this collection took place in WY2013. Collection of sunfish (*Lepomis* sp.) and largemouth bass (*Micropetrus salmoides*) at GRL, a site about 15 miles east of the L-8 reservoir in the M Canal in Grassy Waters Preserve, was also transferred from Phase 2-Tier 1 (Routine Monitoring During Stabilization Period) to Phase 3-Tier 1 (Routine Operational Monitoring from Year 4 to Year 9). Mosquitofish samples were collected during the first quarter of WY2013 only. The second semiannual collection of mosquitofish composites was not done due to the construction of a new pump station in calendar year 2013. **Figure 7** shows the location of the mercury monitoring sites.

Table 7 provides all THg data for mosquitofish, sunfish and largemouth bass collected in WY2013. Results show that THg concentrations in mosquitofish composite samples from the L-8 reservoir interior (L8FISH) and downstream site (L8GRC) were below the U.S. Environmental Protection Agency (USEPA) standard for Trophic Level (TL) 3 fish [0.077 milligram per kilogram (mg/kg)] (USEPA 2001). For large-bodied fish, the average THg concentration for sunfish (0.106 mg/kg) from the reservoir interior (L8FISH) and the Grassy Waters Preserve outflow (GRL) were above the USEPA standard for TL3 fish, while the average THg concentration for the reservoir downstream (L8GRC) was below the USEPA standard for TL3 fish. THg concentrations in largemouth bass were above the USEPA standard for TL4 fish (0.346 mg/kg) at the reservoir interior (L8FISH) and Grassy Waters Preserve outflow (GRL), and below the USEPA standard for TL4 fish at the reservoir downstream site (L8GRC). However, THg concentrations in all species were below the 75th percentile (0.100 mg/kg in mosquitofish, 240 mg/kg in sunfish, and 678 mg/kg in largemouth bass) of the same species collected in the Everglades Protection Area for the period of record.

Table 7. Average total mercury in milligrams per kilogram (mg/kg) in mosquitofish, bluegill sunfish, and largemouth bass from reservoir interior (L8FISH), L-8 canal (L8GRC), and Grassy Waters Preserve (GRL). Numbers in parentheses indicate standard deviation values.

Fish Species	Reservoir Interior [a]	L-8 Canal [b]	Grassy Waters Preserve [c]
Mosquitofish [d]	0.070	0.059	no collection
Bluegill sunfish	0.106(0.016)	0.061(0.009)	0.113(0.032)
Largemouth bass	0.421(0.038)	0.225(0.113)	0.545(0.203)

a. Composite of fish from all cells of the L-8 reservoir.

b. Telemetry platform in L-8 Canal east of Cell 3.

c. Outflow site from Grassy Waters Preserve

d. A mosquitofish sample is a composite sample with at least 100 fish.

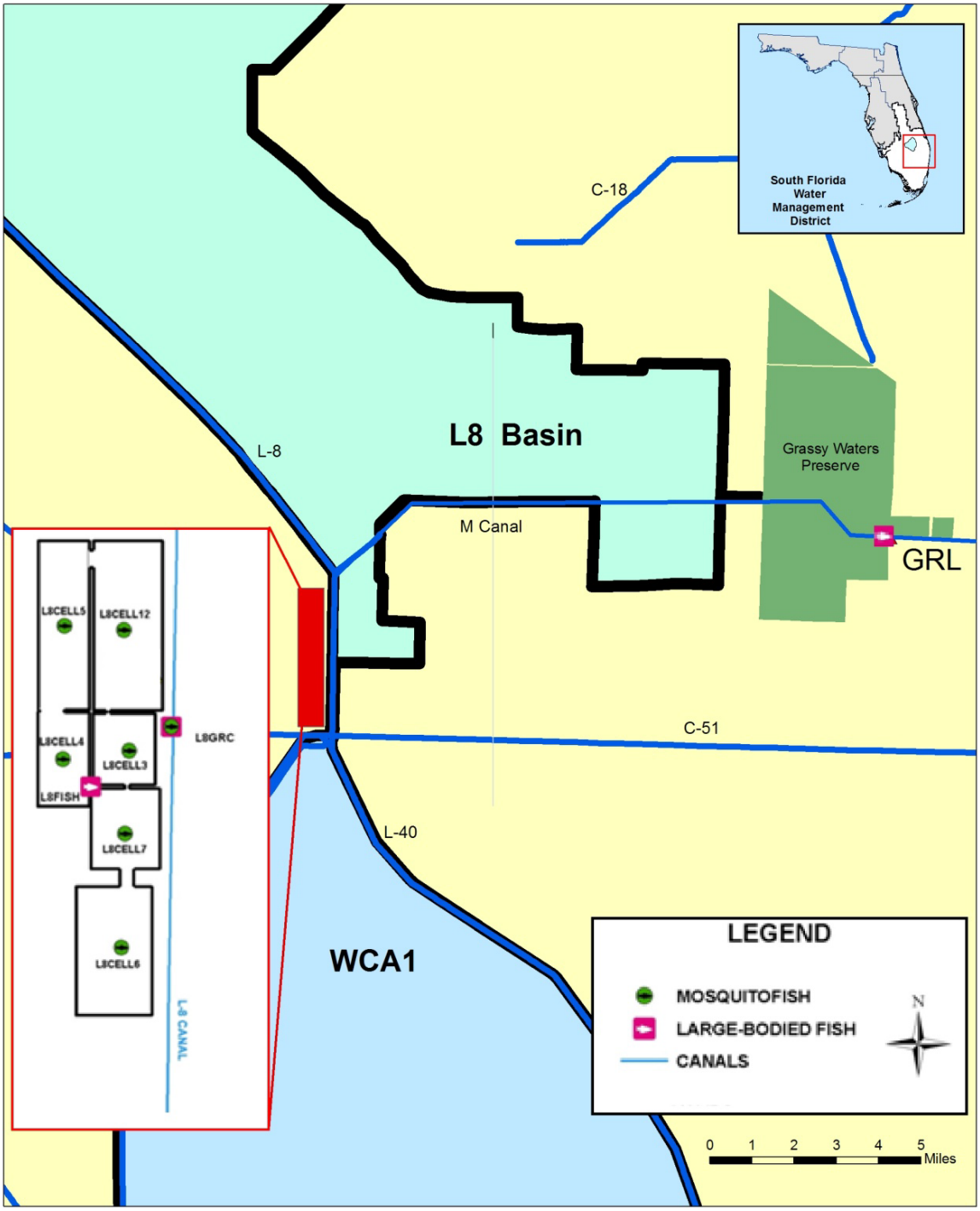

Figure 7. Mercury monitoring locations in the L-8 reservoir and the outflow of Grassy Waters Preserve.

WATER QUALITY CONCLUSIONS

Based on the preceding analyses and results, and in compliance with permit requirements, there has been no degradation in water quality due to the operation of the L-8 Reservoir Project in the L-8 canal or basin during this reporting period.

LITERATURE CITED

LBFH, Inc. and DE&T. 2005. L-8 Reservoir Project Water Quality Assessment Report. Prepared for the South Florida Water Management District, West Palm Beach, FL.

USEPA. 2001. Water Quality Criteria: Notice of Availability of Water Quality Criterion for the Protection of Human Health: Methylmercury. U.S. Environmental Protection Agency, Federal Register Environmental Document. Online at http://www.epa.gov/fedrgstr/EPA-WATER/2001/January/Day-08/w217.htm.

Attachment A: Specific Conditions and Cross-References

Table A-1. Specific conditions, actions taken, and cross-references presented in this report for the Loxahatchee River Watershed Restoration Project, L-8 Reservoir (CERPRA permit 0188365).

Specific Condition	Description	Applicable Phase	Action Taken	Reported in 2014 SFER Vol. III, App. 2-2 in:			
				Narrative (page #s)	Figure	Table	Attachment
3	Construction Best Management Practices	Construction	N/A (no new construction)				
4	Turbidity Monitoring	Construction	N/A (no new construction)				
5	Water Quantity and Flooding Impacts	Construction	No impacts occurred				
6	Operating Plan	Operation	Followed as required				
7	Monitoring Requirements	Operation	Monitoring conducted as required				B - D
8	Mercury Monitoring	Operation	Monitoring conducted as required	2, 3, 17	7	7	B
9	Daily Stage Monitoring	Operation	Monitoring conducted as required				C
10	Annual Water Quality Monitoring Requirements and Reporting	Operation	Monitoring and reporting conducted as required	All	All	All	All
12	Quality Assurance and Quality Control	Operation	Sampling and analysis were performed according to permit requirements and per Chapter 62-160, F.A.C., and the SFWMD's water quality monitoring plan				B
13	Method Detection Limits	Operation	Followed as required				B
14	Removal of Parameters	Operation	No parameters removed				
15	Addition of Parameters	Operation	No parameters added				
16	Emergency Suspension of Sampling	Operation	N/A				
17	Continued Monitoring Design and Development	Operation	N/A				
18	Permit Modifications	Operation	Permit modification 0188365-018 was issued on 3/6/2013, which increased the discharge capacity to 300 cfs. Permit modification 0188365-017 issued on 3/29/2013 authorized the construction of revetment.				
19	Construction	Construction	Pre-construction drawdown of reservoir for new inflow and outflow structures	3, 13			
20	Permit Renewal	Operation	Permit renewed on 1/12/2012, in permit modification 0188365-16.			1	
22	Mixing Zone Requirements	Operation	Requirements were complied with	2, 15		2, 5	

Attachment B: Water Quality Data

This project information is required by Specific Condition 11(a) of the L-8 Reservoir Permit – Operations Authorization (0188365), and is available upon request.

Attachment C: Hydrologic Data

This project information is required by Specific Condition 11(a) of the L-8 Reservoir Permit – Operations Authorization (0188365), and is available upon request.

Attachment D: Total Monthly Flow at Inflow and Outflow Points of the L-8 Reservoir for WY2013

Table D-1. Total monthly flow at the inflow and outflow points of the L-8 Reservoir for WY2013.

Month	Inflow (acre-feet)	Outflow (acre-feet)
May 2012	0	130
June 2012	0	2632
July 2012	0	3470
August 2012	2411	1773
September 2012	2922	3440
October 2012	0	4127
November 2012	0	4064
December 2012	0	2297
January 2013	0	1953
February 2013	0	1764
March 2013	0	1953
April 2013	0	1890

Note: Outflows were estimated using the volume change in the reservoir due to the addition of temporary pumps to dewater the reservoir for the construction of the new inflow and outflow structures