

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF FLORIDA  
Miami Division**

**Case No.: 1:16-cv-23017-DPG**

SOUTHERN ALLIANCE FOR CLEAN ENERGY,  
TROPICAL AUDUBON SOCIETY INCORPORATED,  
and FRIENDS OF THE EVERGLADES, INC.,

Plaintiffs,

v.

FLORIDA POWER & LIGHT COMPANY,

Defendant.

\_\_\_\_\_ /

**SUPPLEMENTAL DECLARATION OF W. KIRK MARTIN, P.G., CPG, CGWP**

I, W. Kirk Martin, being competent to provide this Declaration, do declare as follows:

1. I am making this Declaration to supplement my previous declaration filed in this matter on November 14, 2016, to include my review of the Consent Agreement between Florida Power & Light Company ("FPL") and the Miami-Dade County Division of Environmental Resources Management ("DERM"), including Addendum 1.

2. My professional qualifications are set out in the previous Declaration. In summary, I am a Professional Geologist and Certified Groundwater Professional with over 35 years of experience conducting water supply investigations and managing complex integrated water resource programs. My C.V. is attached to the November 14, 2016, Declaration as Exhibit A.

3. The Consent Agreement between FPL and Miami-Dade County DERM (October 2015) focused on requirements for abatement and remediation of hypersaline groundwater west and north of FPL's Cooling Canal System ("CCS"). The Consent Agreement requires essentially the

same actions that FPL is taking with respect to the Florida DEP Consent Order, as discussed in my previous Declaration: planning, permitting, and eventually operating a Recovery Well System to intercept the movement of the hyper-saline groundwater to the west over a ten-year period without creating adverse impacts to other environmental resources.

4. Addendum 1 to the DERM Consent Agreement (August 2016) focused on the assessment and management of ammonia, exceeding DERM water quality standards in surface water monitoring stations tidally connected to Biscayne Bay. Section 24-42(4) of the Code of Miami-Dade County contains water quality standards for the waters of the County, including an ammonia standard for tidal salt water. Ammonia is the only nutrient in the County water quality standards, which are not the same as the State of Florida Department of Environmental Protection (“DEP”) water quality standards. The Florida standards do not include ammonia as a specific compound; instead, they have criteria for total nitrogen, total phosphorous, and chlorophyll *a*. Florida Administrative Code (“FAC”) 62-302.532.

5. With regard to the hypersaline groundwater movement to the west of the CCS, I pointed out in Paragraph 4 of the November 14, 2016, Declaration that groundwater salinity data shows that hypersaline water emanating from the FPL CCS has moved westward of the L-31E Canal more than two miles and is influencing movement of the saline water interface within the Biscayne Aquifer more than four miles inland. Figure 1, shows the extent of the migration. I have also analyzed groundwater tritium data which shows that groundwater impacted by the CCS has extended more than four miles inland from the CCS (Figure 2). Although FPL has begun actions under the DERM Consent Agreement and the DEP Consent Order, the data show that the operation of the CCS continues to result in violations of Class II groundwater criteria west of the CCS.

6. With regard to the discharge of CCS contaminants into Biscayne Bay, groundwater sampling from beneath Biscayne Bay indicate that movement of the contaminant plume originating from the CCS is radial and likely extends as far to the east as the empirical data show the plume migration to the west. In addition to establishing the western extent of the contaminant plume, Figures 1 and 2 also show elevated salinity levels and tritium levels east of the CCS indicating the influence of waters originating from the CCS to areas to the east under Biscayne Bay. More specifically, Figure 3 shows the locations of sampling points east of the CCS and Figure 4 shows elevated tritium levels from those sampling points including tritium levels in water samples taken from sampling sites TTBSW-6, TTPSW-7 as well as TTBSW-8, TPBBCSC-B, TPSWC-7, and TPBBSCS-M, which all show measured tritium levels well above background levels in deep surface water samples near the CCS.

7. In my November 14, 2016, Declaration I discussed Florida DEP Numeric Nutrient Criteria (“NNC”) water quality standard exceedances at several of these surface water locations near Turkey Point, and I attached Figure 5 showing those exceedances in graph form. Figure 5 shows NNC exceedances for Total Phosphorous, Total Nitrogen, and Chlorophyll *a* at surface water monitoring stations TPBSW-6B and TPBSW-7B. With reference to the Miami-Dade DERM water quality standard, data from surface water monitoring stations in Biscayne Bay also show elevated ammonia concentrations above the DERM water quality standards for ammonia during periods when water levels in the CCS are high. Figure 6 shows water level conditions in the CCS along with ammonia concentrations at TPBSW-6 and TPBSW-7 indicating a correlation between driving head or water level stage in the CCS and ammonia levels in surface waters tidally connected to Biscayne Bay.

8. As part of the Florida DEP Consent Agreement, FPL has proposed to backfill the

two manmade excavations at the Barge Basin Canal (sites TPBBSW-6 and 8) and the Turtle Point Canal (site TPBBSW-7) to reduce the direct flow of contaminated groundwater into Biscayne Bay at those sites. In my previous Declaration, I expressed the opinion that other pathways for contaminant travel are not addressed by FPL's proposed plan and referred to numerous natural underground connections that exist within the Biscayne Aquifer such as cave features or voids. We now have continuous sampling data from at least one cave feature in Card Sound adjacent to the CCS which indicate migration of contaminants from the CCS into the Bay, especially during low tide events.

9. Data from electronic monitoring instruments (sondes) of salinity and water levels at a cave site in Biscayne Bay indicate that the salinity within the cave is higher when tides are low and lower when tides are high. The salinity levels at the mouth of the cave exhibit a pattern of pronounced increase upon each and every low tide event which indicates outflow from the underlying aquifer of water that is more saline than the surrounding surface water. The salinity levels of groundwater discharging from the cave are often hypersaline (>35 PSU) and show a strong correlation with salinity levels in groundwater measured within the adjacent CCS at monitoring well TPGW-16. Figure 7 demonstrates this strong correlation and indicates that source of hypersaline groundwater discharging from the cave is at least partially from the CCS. The strong correlation of deep surface water salinity at Biscayne Bay site TPBBSW-14D with salinity in the cave site and at the shallow zone of monitor well TPGW-16 indicate that both the cave and the deep surface water are hydraulically connected to the groundwater beneath the CCS. Review of Figures 6 and 7 strongly suggest continued movement of waters originating from the CCS to Biscayne Bay during times of high water level in the CCS and low water levels in Biscayne Bay, which will lead to further exceedances of the DERM ammonia standard.

10. FPL has submitted a Site Assessment Report (“SAR”) as required by Paragraph 34.a. of Addendum 1 to the Miami-Dade DERM Consent Agreement. In that SAR FPL concluded that elevated ammonia concentrations in tidal waters connected to Biscayne Bay were due to decaying vegetation in deep channels and poor circulation; not the CCS. Based on this conclusion, FPL stated that it would not provide a Corrective Action Plan to correct the elevated ammonia concentrations as required by the Addendum. DERM provided a response letter to the SAR submittal (attached to this declaration) indicating that DERM did not concur with the conclusions and recommendations of the report and requiring additional data and analyses. With FPL contesting whether the CCS is responsible for the elevated ammonia concentrations, any corrective action to correct the elevated ammonia concentrations will be delayed for the foreseeable future.

11. Both the Miami-Dade DERM Consent Agreement and the Florida DEP Consent Order with FPL rely upon a groundwater model developed by FPL and relied upon by FDEP for evaluation of various remedial measures and prediction of their success in the future. As I stated in my November 2016 Declaration, that groundwater model has a number of technical issues that should be corrected before the model can be used reliably to justify the remedial measures proposed by FPL. In my opinion the model suffers from the following inadequacies:

- Inappropriate representation of canals in the model allowing only one way of water travel between the canals and the groundwater system
- Inaccurate representation of net recharge to the groundwater system that does not allow for accurate simulation of rainfall, runoff, evaporation and transpiration.
- Use of constant hydraulic coefficients over large areas of the model known to have highly varying aquifer characteristics
- Representation of an inappropriate hydraulic disconnect of the CCS from the underlying groundwater system during the remedial action simulations

- A lack of capture of existing contaminated groundwater in the lowermost portions of the aquifer
- Impacts to wetland systems adjacent to the CCS from the proposed remedial actions

12. My opinion about the FPL groundwater model is supported by technical reviews of the FPL model by University of Florida professor Dr. Lou Motz, SFWMD senior modeler Jeff Giddings, and U.S. Geological Survey SEAWAT model code developer Dr. Weixing Guo.

13. Given the inaccuracies associated with the FPL model used to develop the proposed remedial actions and given the limitations of only addressing two possible hydraulic connections between the CCS and Biscayne Bay within a highly permeable groundwater matrix, it is my opinion that the proposed remedial actions by FPL will not stop the continued flow of contaminated water from the CCS to the surrounding groundwater system and the surface waters of Biscayne Bay.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge.

This the 11<sup>th</sup> day of August 2017.



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W. Kirk Martin, P.G., CPG, CGWP



AVERAGE SALINITY FOR DECEMBER 2014  
FPL TURKEY POINT MONITORING WELLS (DEEP)



**Water Science Associates**

PROJECT NAME: FKA  
PROJECT NUMBER: 4115-01

COA 30437  
JUNE 2015

FIGURE 1. MAP SHOWING SALINITY CONTOURS IN FPL TURKEY POINT MONITORING WELLS (DEEP), AVERAGE DECEMBER 2014 PSU VALUES.



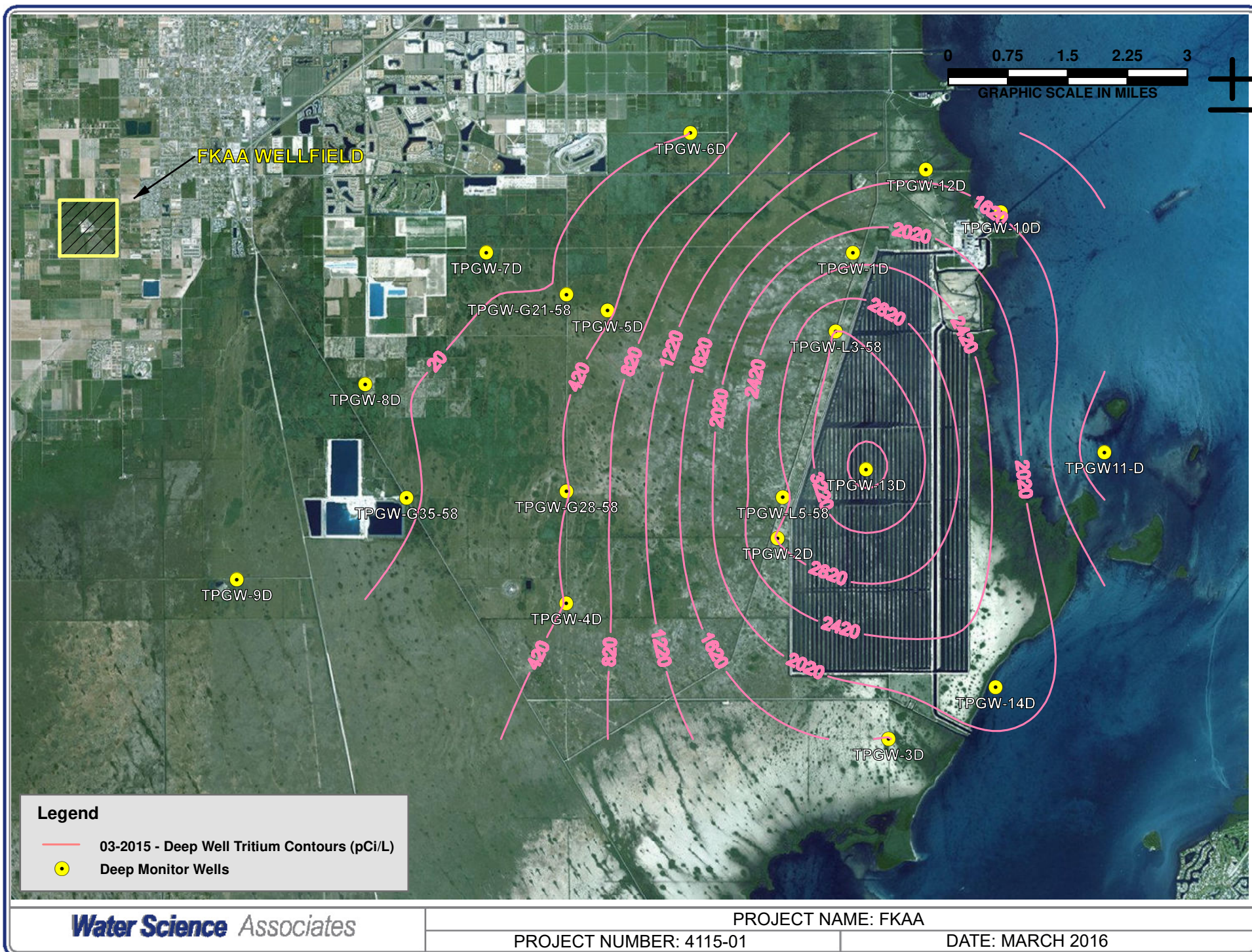
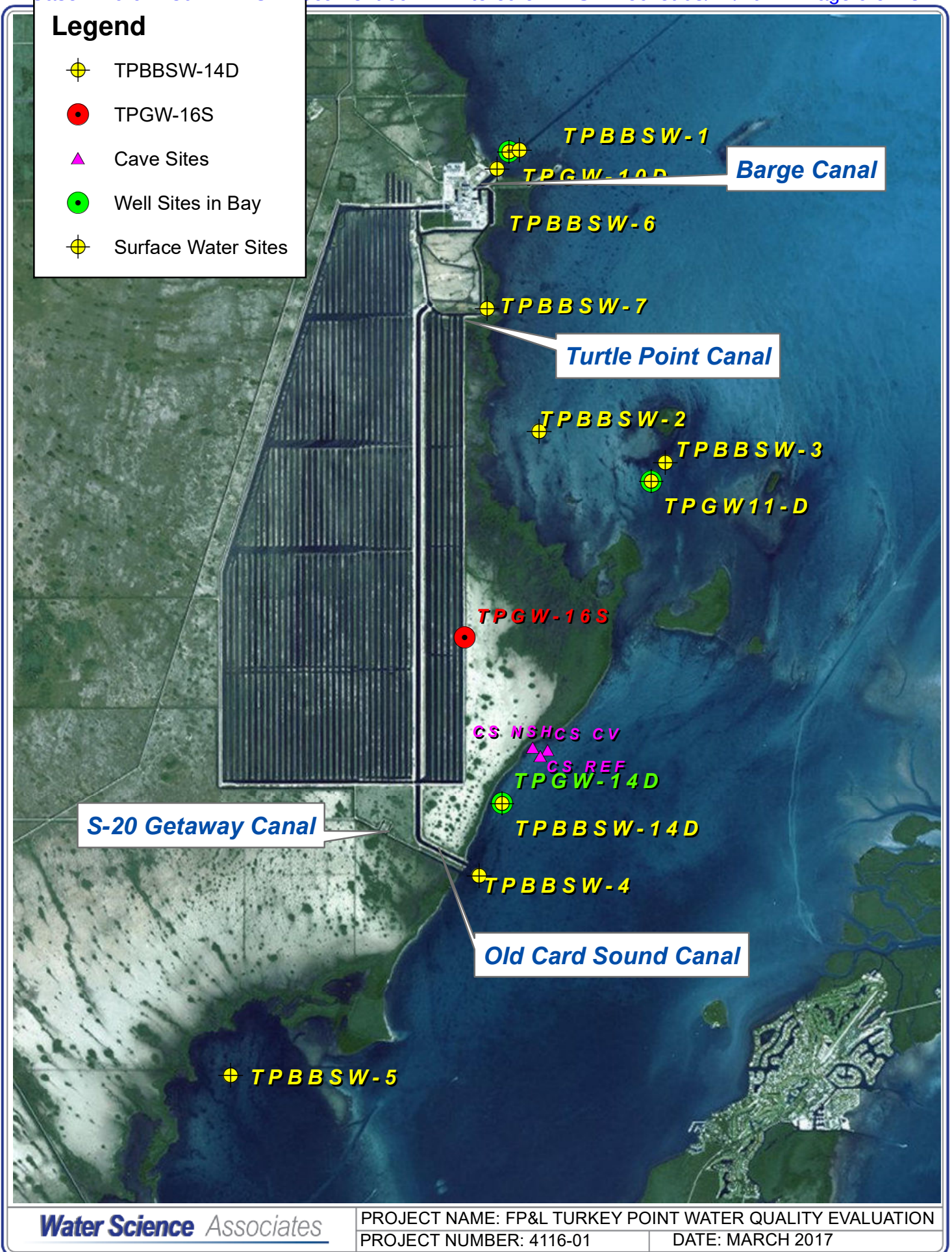


FIGURE 2. MAP SHOWING TRITIUM CONTOURS (MARCH 2015)





**Water Science Associates**

PROJECT NAME: FP&L TURKEY POINT WATER QUALITY EVALUATION  
PROJECT NUMBER: 4116-01 DATE: MARCH 2017

FIGURE. 3. LOCATION MAP OF SAMPLE SITES AND CANALS



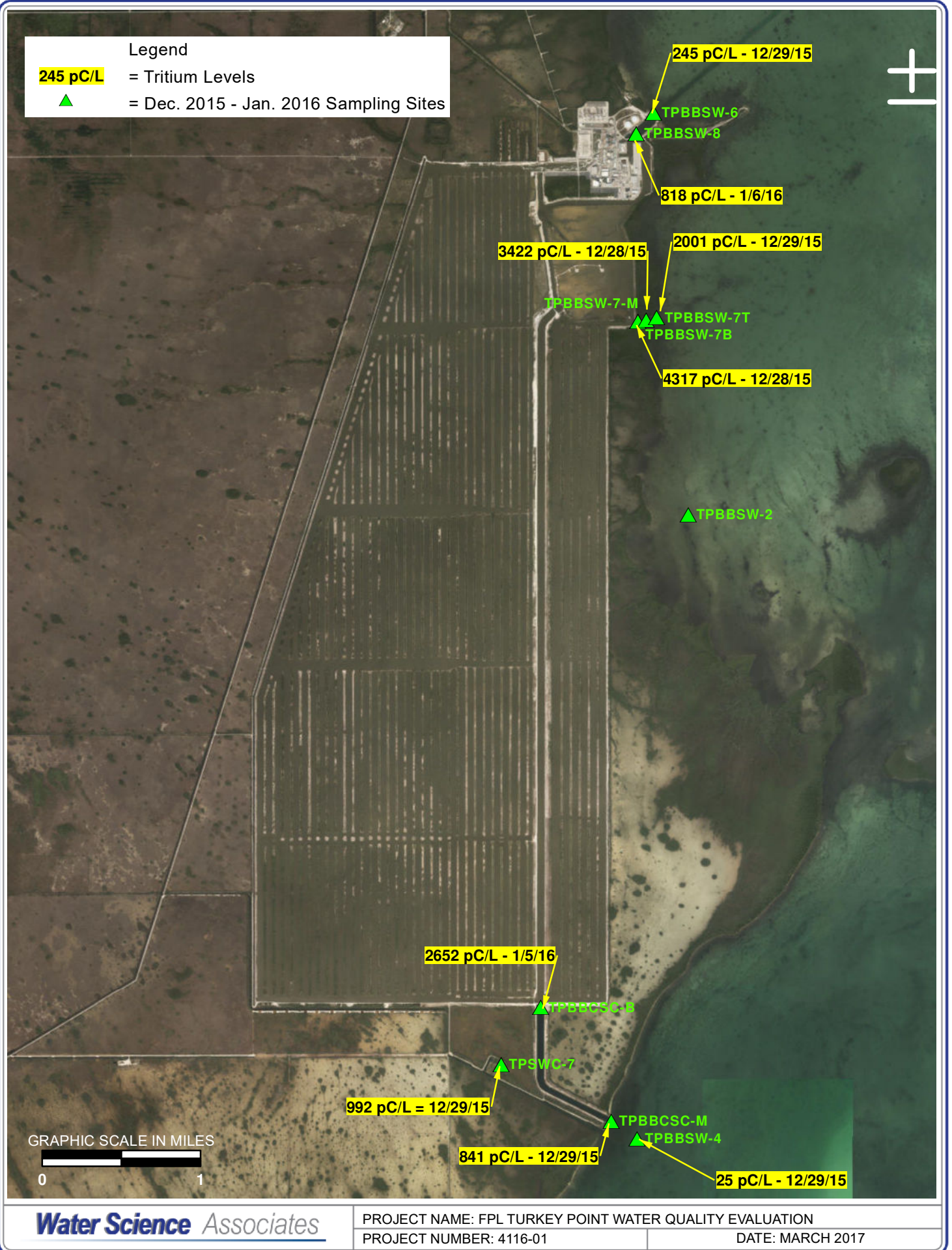
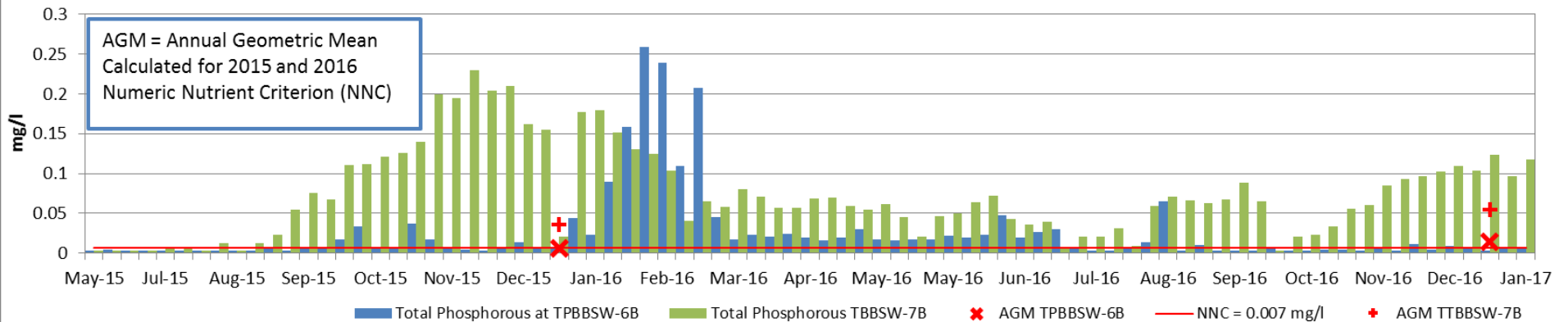
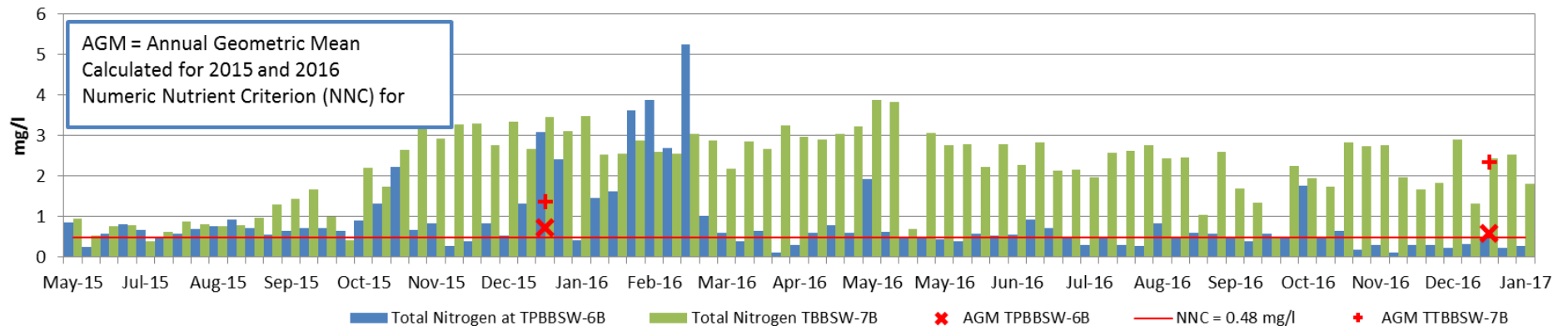


FIGURE 4. MAP SHOWING DECEMBER 2015 AND JANUARY 2016 SAMPLING SITES

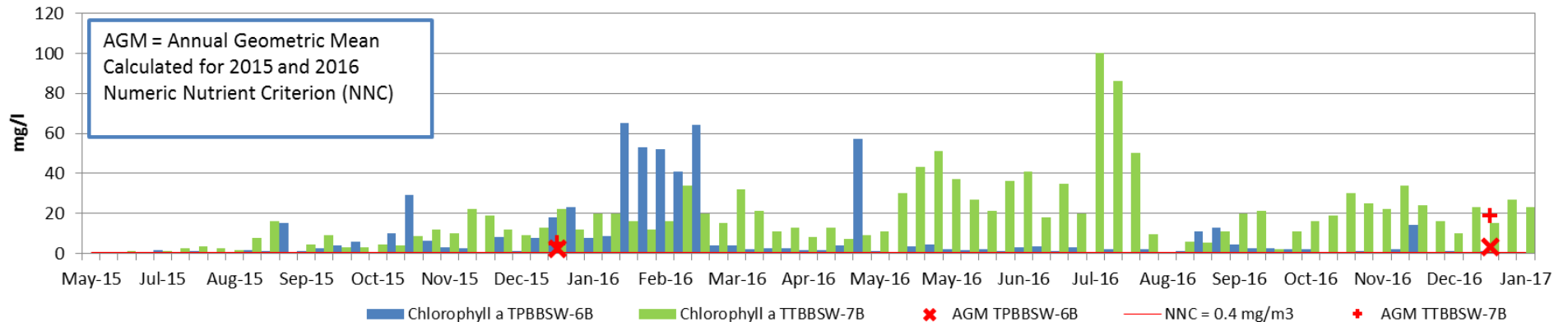
### Total Phosphorous at TPBBSW-6 and TPBBSW-7 Biscayne Bay Surface Water Monitoring Stations



### Total Nitrogen at TPBBSW-6 and TPBBSW-7 Biscayne Bay Surface Water Monitoring Stations



### Chlorophyll a at TPBBSW-6 and TPBBSW-7 Biscayne Bay Surface Water Monitoring Stations



**Water Science Associates**

PROJECT NAME: FLORIDA POWER AND LIGHT WATER QUALITY EVALUATION

PROJECT NUMBER:

DATE: MARCH 2017

FIGURE 5. NUMERIC NUTRIENT CRITERIA DATA FROM TPBBSW-6 AND TPBBSW-7



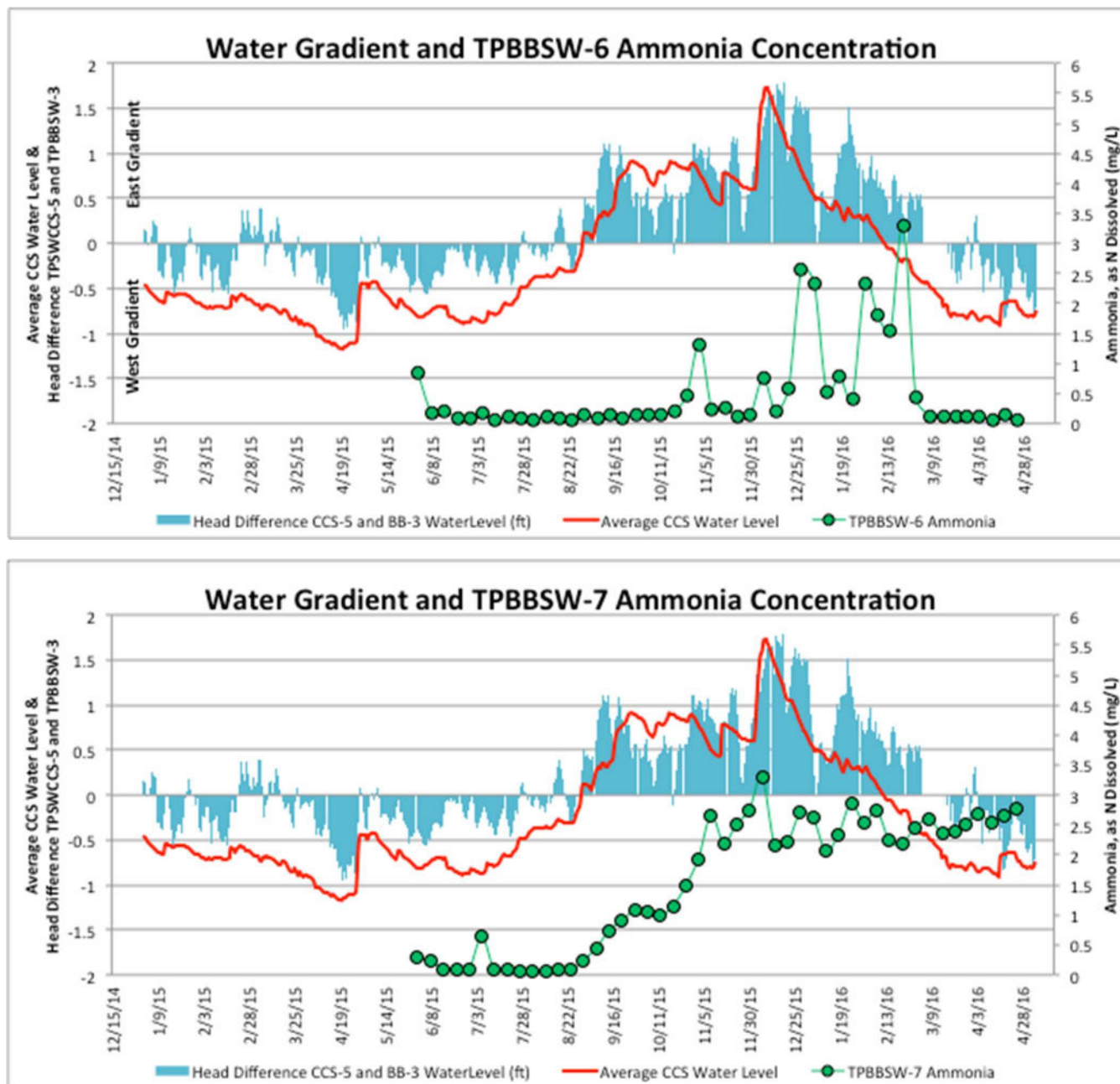
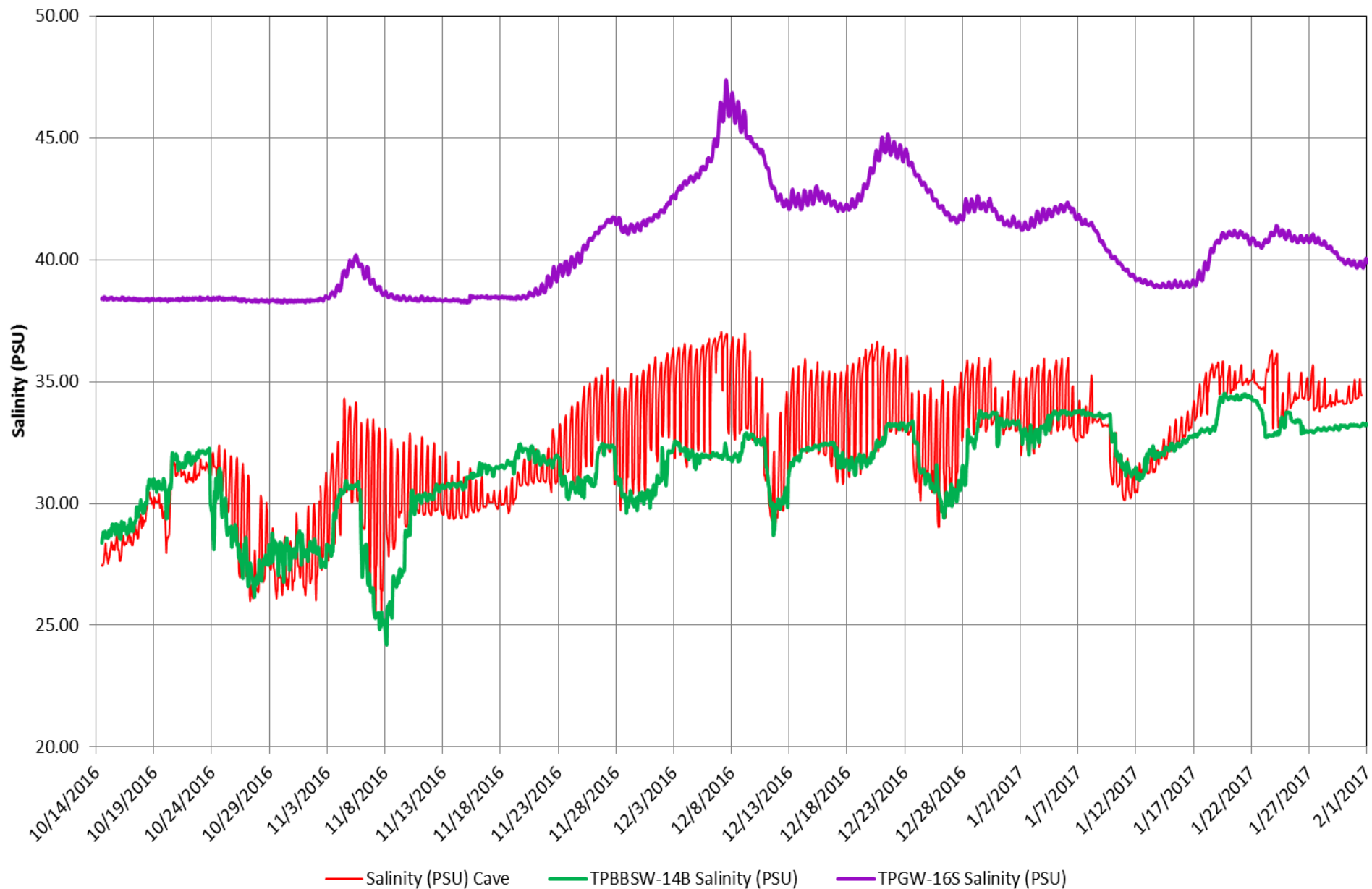


FIGURE 6. WATER GRADIENT AND AMMONIA CONCENTRATIONS OF TPBBSW-6 AND TPBBSW-7

**Salinity Profiles for Cave Site, TPGW-16S, and TPBBSW-14B  
October 14, 2016 to January 31, 2017**



**Water Science Associates**

PROJECT NAME: FLORIDA POWER AND LIGHT WATER QUALITY EVALUATION

PROJECT NUMBER:

DATE: APRIL 2017

FIGURE 7. SALINITY PROFILES FROM CAVE, TPGW-16, AND TPBBSW-14B



Carlos A. Gimenez, Mayor

Department of Regulatory and Economic Resources  
Environmental Resources Management  
701 NW 1st Court, 4th Floor  
Miami, Florida 33136-3912  
T 305-372-6754 F 305-372-6759  
miamidade.gov

July 7, 2017

Mr. Matthew Raffenberg, Director  
Environmental Licensing and Permitting  
Environmental Services Department  
Florida Power & Light Company  
700 Universe Boulevard (JES/JB)  
Juno Beach, FL 33408

CERTIFIED MAIL NO.: 7001 2510 0001 1765 4244  
RETURN RECEIPT REQUESTED

Re: Site Assessment Report (SAR) dated March 17, 2017 and submitted pursuant to Paragraph 34.b. of Addendum 1 to the October 7, 2015 Consent Agreement for FPL's Turkey Point facility located at, near, or in the vicinity of 9700 SW 344 Street, Unincorporated Miami-Dade County, Florida (DERM IW-3, IW-16, IW5-6229, DWO-10, CLI-2014-0312, CLI-2016-0303, HWR-851)

Dear Mr. Raffenberg:

The Department of Regulatory and Economic Resources-Division of Environmental Resources Management (DERM) has reviewed the referenced submittal received on March 17, 2017. Based on the data and information provided, DERM does not concur at this time with the conclusions and recommendations presented in the report. The following is required to allow for further evaluation of the SAR conclusions and recommendations:

1. The sediment data referenced in DERM's Site Assessment Plan (SAP) approval letter dated December 21, 2016 shall be provided.
2. The results of the tritium analysis per DERM's April 20, 2017 request shall be provided.
3. Maps scaled for E-sized sheets showing groundwater elevation contours shall be provided.
4. Maps scaled for E-sized sheets showing ammonia concentration contours for shallow wells (less than 16 ft.) and separately for intermediate depth wells (20 to 30 ft.) sampled shall be provided.
5. A single map scaled for E-sized sheet showing the concentrations of all the nitrogen species evaluated (measured and calculated) in groundwater as well as surface water shall be provided.
6. Please provide specific data and information used to support the following two statements in paragraph 3 of page ES-1: "... The areas studied at Turkey Point which possess these attributes and elevated ammonia are similar to many locations in Coastal Southeast Florida. Regional studies of background surface water quality data for Biscayne Bay indicate that ammonia can be detected at many locations greater than 0.5 mg/L and that the concentrations can vary both temporally and spatially."

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Mr. Matthew Raffenberg, Director  
Environmental Licensing and Permitting  
Florida Power and Light  
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7. Please provide data and information from the Site Conceptual Model referenced in paragraph 2 of page 13 that supports the following statement: "... Groundwater gradient data presented in the Site Conceptual Model for PTN (CRA, 2009) indicates that groundwater flows for shallow wells are from the Plant Complex towards the Turning Basin or Intake Canal so the wells do not appear to be influenced by quality in the Turning Basin..." Also please clarify the last part of the statement regarding the wells not being influenced by quality in the Turning Basin.
8. Please provide the correlation of Turkey Point data to regional background data referenced in the 4<sup>th</sup> bullet of paragraph 1 of page 19. The submittal shall include all supporting data and information used for the correlation.
9. Please provide data and information to support the statement on page 22 of the SAR "that the ammonia appears to be limited in extent". Is this statement limited to the ammonia that has been detected in surface waters under the Site Assessment Plan?
10. Please provide the specific data from the studies referenced in the second paragraph of page 22 that support the conclusion that the SAR results, including where the high ammonia concentrations have been detected, are consistent with background data for Biscayne Bay. In addition, copies of all other reports cited in the SAR and listed in Attachment B shall be provided in hardcopy or by electronic means.
11. All information required pursuant to the December 21, 2016 Site Assessment Plan approval shall be provided. Clarification is also required for the conclusion regarding the ammonia source FPL attributes to "the decomposition of wetland and aquatic plant material". During the May 10, 2017 meeting in the DERM offices, FPL explained that this conclusion refers to wetland vegetation "outside" the cooling canal system (CCS) and not the seagrass or mangrove vegetation that has died within the CCS. Therefore FPL shall clarify what it has concluded concerning the wetland and aquatic plant material that has decomposed within the CCS. FPL shall explain the degree to which it considers the wetland and aquatic plant material that has decomposed within the CCS to be a source of ammonia in the ground water or surface water at and adjacent to the FPL facility. In addition, FPL shall describe the fate of the organic nitrogen in the surface water as that water leaves the CCS and provide all data and information to support the conclusion. FPL shall provide all available information in support of any conclusion that the CCS is not an ammonia source pursuant to the requirements of the consent agreement and the approved Site Assessment Plan. This information shall include an evaluation of available tritium data including data required pursuant to item 2 above in support of SAR conclusions regarding ammonia sources.

Additionally, based on the groundwater characteristics documented in the area of the wastewater treatment plant and the fuel tank farm (MW South, MW North, FTF-SW, FTF-NW) DERM requires resampling of these wells for the parameters listed on Attachment A. FPL shall provide a minimum of fifteen (15) working days written notice to allow DERM the option to split samples. If resampling confirms the data previously submitted, further evaluation of the ammonia source(s) may be required for this area.

Be advised that DERM has the option to split any samples deemed necessary with the consultant or laboratory at the subject site. The consultant collecting the samples shall perform field sampling work in accordance with the Standard Operating Procedures provided in Chapter 62-160, Florida Administrative Code (FAC), as amended. The laboratory analyzing the samples shall perform laboratory analyses pursuant to the National Environmental Laboratory Accreditation Program (NELAP) certification requirements. If the data

Mr. Matthew Raffenberg, Director  
Environmental Licensing and Permitting  
Florida Power and Light  
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submitted exhibits a substantial variance from DERM split sample analysis, a complete resampling using two independent certified laboratories will be required.

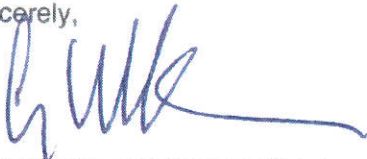
DERM shall be notified in writing a minimum of 15 working days prior to the implementation of any additional sampling or field activities. Email notifications shall be directed to [DERMPCD@miamidade.gov](mailto:DERMPCD@miamidade.gov) as well as [Barbara.brown@miamidade.gov](mailto:Barbara.brown@miamidade.gov). Please include the DERM file number on all correspondence.

Therefore, within ninety (90) days of receipt of this letter, FPL is hereby required to submit to DERM for review the additional data and information requested above in paper as well as electronic format (except for the requested reports in Appendix B, which may be provided solely in electronic format). Please provide all numerical data (laboratory analysis results, physical water quality, etc.) in Excel® format. Failure to adhere to the items and timeframes stipulated above may result in further enforcement action for this site.

Any person aggrieved by any action or decision of the DERM Director may appeal said action or decision to the Environmental Quality Control Board (EQCB) by filing a written notice of appeal along with submittal of the applicable fee, to the Code Coordination and Public Hearings Section of DERM within fifteen (15) days of the date of the action or decision by DERM.

Please contact me at (305) 372-6522 if you have any questions regarding this matter.

Sincerely,



Craig K. Grossenbacher, Chief  
Water Resources Coordination Division

Attachment A: sampling parameters  
Attachment B: list of reports and publications

c: Scott Burns, FPL  
Alan Katz, FPL  
Lee Hefty, DERM Director  
Lisa Spadafina, DERM  
Barbara Brown, DERM  
Wilbur Mayorga, DERM  
Virginia Walsh, WASD

## ATTACHMENT A

In addition to the parameters listed in Table 1 of the SAP (SAP Parameter List, on page TP-13), the following parameters\* shall also be sampled as part of the follow up sampling:

Parameter/Analyte	Procedure
Fecal Coliform	Laboratory
Caffeine	Laboratory
Sucralose	Laboratory
Chlorine	Laboratory

\*additional parameters may be required pending completion of data review by WASD



## **ATTACHMENT B**

Please provide an electronic copy of the below literature cited in the SAR:

Naturally Occurring Ammonia: South Florida Coast; Jerald S. Ault, Ph.D., Professor and Chair  
University of Miami Department of Marine Ecosystems and Society, April 2016

Ecosummary Biscayne Bay; FDEP Southeast District, December 2002

Brown and Caldwell, NW 33rd Street Suite 100 Miami, Florida 33122; Report to Miami-Dade County  
Department of Solid Waste Management titled "*Biscayne Bay Shoreline Model Technical  
Memorandum; Old South Dade Landfill Closure Enhancement Miami-Dade County, Florida,  
December, 1999*".

CRA. 2009, November. *Site Conceptual Model, Turkey Point Facility*. Prepared for the Florida Power  
and Light Company.

Gardner, WS, and MJ McCarthy. 2009. *Nitrogen dynamics at the sediment–water interface in shallow,  
sub-tropical Florida Bay: why denitrification efficiency may decrease with increased eutrophication*.  
*Biogeochemistry* 95:185-198.

Thamdrup, B. 2012. *New Pathways and Processes in the Global Nitrogen Cycle*. *Ann. Rev. Ecol. Evol.  
Syst.* 2012. 43:407–28