ANNUAL REPORT FORM FOR INDIVIDUAL NPDES PERMITS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (RULE 62-624.600(2), F.A.C.)

- This Annual Report Form must be completed and submitted to the Department to satisfy the annual reporting requirements established in Rule 62-621.600, F.A.C.
- Submit this fully completed and signed form and any REQUIRED attachments by email to the NPDES Stormwater Program Administrator or to the MS4 coordinator. Their names and email addresses are available at: http://www.dep.state.fl.us/water/stormwater/npdes/contacts.htm. If files are larger than 10mb, materials may be placed on the NPDES Stormwater ftp site at: ftp://ftp.dep.state.fl.us/pub/NPDES_Stormwater/. After uploading the ANNUAL REPORT files, an email must be sent to the MS4 coordinator or the NPDES program administrator notifying them the report is ready for downloading
- Refer to the Form Instructions for guidance on completing each section.
- **Please print or type information in the appropriate areas below**

SECTION I. BACKGROUND INFORMATION			
A.	Permittee Name: City of Lakeland		
B.	Permit Name: Polk County Municipal Separate Storm Sewer System		
C.	Permit Number: FLS000015-003 (Cycle 3)		
D.	Annual Report Year: ☐ Year 1 ☐ Year 2 ☒ Year 3 ☐ Year 4 ☐ Year 5 ☐ Other, specify Year:		
E.	Reporting Time Period (month/year): October 1, 2013 through September 30, 2014		
F.	Name of the Responsible Authority: Richard E. Lilyquist, P.E.		
	Title: Director, Public Works Department		
	Mailing Address: 228 South Massachusetts Avenue		
	City: Lakeland	Zip Code: 33801-2467	County: Polk
	Telephone Number: 863-834-6001	Fax Number: 863-834-8040	
	E-mail Address: rick.lilyquist@lakelandgov.net		
G.	Name of the Designated Stormwater Management Program Contact (if different from Section I.F above): Curtis Porterfield		
	Title: Manager, Lakes & Stormwater Division		
	Department: Public Works Department		
	Mailing Address: 407 Fairway Avenue		
	City: Lakeland	Zip Code: 33801-2467	County: Polk
	Telephone Number: 863-834-8439	Fax Number: 863-834-3308	
	E-mail Address: curtis.porterfield@lakelandgov.net		

SECTION II. MS4 MAJOR OUTFALL INVENTORY (Not Applicable In Year 1)	
A.	Number of outfalls ADDED to the outfall inventory in the current reporting year (insert "0" if none): n/a in Yr 1 (Does this number include non-major outfalls? ☐ Yes ☒ No ☐ Not Applicable)
B.	Number of outfalls REMOVED from the outfall inventory in the current reporting year (insert "0" if none): n/a in Yr 1 (Does this number include non-major outfalls? ☐ Yes ☒ No ☐ Not Applicable)
C.	Is the change in the total number of outfalls due to lands annexed or vacated? ☐ Yes ☐ No ☒ Not Applicable

SECTION III. MONITORING PROGRAM

A.	Please see City of Lakeland SWMP update attached herein.
B.	Please see City of Lakeland SWMP update attached herein.
C.	Please see City of Lakeland SWMP update attached herein.

SECTION IV. FISCAL ANALYSIS

A.	Total expenditures for the NPDES stormwater management program for the current reporting year: $9,346,017. The difference in expenditures between current and subsequent reporting years is due to rollover funds for implementation of CIPs.
B.	Total budget for the NPDES stormwater management program for the subsequent reporting year: $4,733,935.

SECTION V. MATERIALS TO BE SUBMITTED WITH THIS ANNUAL REPORT FORM

Only the following materials are to be submitted to the Department along with this fully completed and signed Annual Report Form (check the appropriate box to indicate whether the item is attached or is not applicable):

Attached	N/A	***DEP Note: Please complete Checklists A & B at the end of the tailored form.***
☐	☒	Any additional information required to be submitted in this current annual reporting year in accordance with Part III.A of your permit that is not otherwise included in Section VII below.
☒	☐	A monitoring data summary as directed in Section III.C above and in accordance with Rule 62-624.600(2)(c), F.A.C. (Attachment 2 – COL SWMP FY15 Update)
☐	☒	Year 1 ONLY: An inventory of all known major outfalls and a map depicting the location of the major outfalls (hard copy or CD-ROM) in accordance with Rule 62-624.600(2)(a), F.A.C.
☒	☐	Year 3 ONLY: The estimates of pollutant loadings and event mean concentrations for each major outfall or each major watershed in accordance with Rule 62-624.600(2)(b), F.A.C. (Attachment 4 – AMEC Scope of Services)
☐	☒	Year 4 ONLY: Permit re-application information in accordance with Rule 62-624.420(2), F.A.C.

DO NOT SUBMIT ANY OTHER MATERIALS

(such as records and logs of activities, monitoring raw data, public outreach materials, etc.)

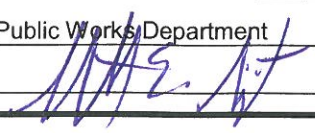
SECTION VI. CERTIFICATION STATEMENT AND SIGNATURE

The Responsible Authority listed in Section I.F above must sign the following certification statement, as per Rule 62-620.305, F.A.C:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name of Responsible Authority (type or print): Richard E. Lilyquist, P.E.

Title: Director, Public Works Department

Signature:  Date: 3/30/15

SECTION VII. STORMWATER MANAGEMENT PROGRAM (SWMP) SUMMARY TABLE

Part III.A.1 — **Structural Controls and Stormwater Collection Systems Operation**

The current MS4 inventory is comprehensive and accurate. To ensure continued accuracy of data, the MS4 is continually undergoing GIS and field reviews by the City of Lakeland's Engineering and Lakes & Stormwater Divisions, and subsequent updates are made annually to this report (as necessary).

Type of Structure	Number of Activities Performed					Documentation / Record	Entity Performing the Activity	Comments
	Total Number of Structures	Number of Inspections	Percentage Inspected	Number of Maintenance Activities	Percentage Maintained			
Dry retention systems (# of)	84	1,992	100	1,992	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.
Exfiltration trench / French drains (linear feet)	14	45	100	45	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.
Grass treatment swales (miles)	8	68	100	68	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.
Dry detention systems (# of)	32	2,489	100	2,489	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.
Wet detention systems (# of)	22	315	100	315	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.
Pollution control boxes (# of)	15	121	100	121	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES CLEANING & REPAIRS.
Stormwater pump stations (# of)	2	2	100	2	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES CLEANING & REPAIRS.
Total (major & minor) stormwater outfalls (# of)	89	2,203	100	2,153	100	COL WORK ORDER SYSTEM DATABASE; L&S MAJOR OUTFALL SPREADSHEET	Public Works Construction & Maintenance	INCLUDES INSPECTIONS, SPRAYING, CLEANING & REPAIRS.
Weirs or other control structures (# of)	11	1,014	100	11	100	COL WORK ORDER SYSTEM DATABASE and LAKES ELEVATION SPREADSHEET	Public Works Lakes & Stormwater	INCLUDES SPRAYING, CLEANING & REPAIRS.
MS4 pipes / culverts (linear feet)	1,422,833	21,361	2	21,361	2	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES CLEANINGS, INSPECTIONS & REPAIRS
Inlets / catch basins / grates (# of)	4,510	16,766	100	16,766	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES CLEANINGS, INSPECTIONS & REPAIRS
Ditches / conveyance swales (square yards)	93	9,940,885	100	9,940,885	100	COL WORK ORDER SYSTEM DATABASE	Public Works Construction & Maintenance	INCLUDES MOWING, SPRAYING, CLEANING & REPAIRS.

Part III.A.2	Areas of New Development and Significant Redevelopment				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Review of new and redevelopment projects	76	Engineering Spreadsheet for Project Review	Public Works Engineering Division	Construction engineering review of new and significant redevelopment projects

Part III.A.3	Roadways				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	PERMITTEE Litter Control Program: Frequency of litter collection	184	Maximo	COL P & R & FDOT Crews	Number of days litter was picked up
	PERMITTEE Litter Control Program: Estimated amount of area maintained (miles)	124.08	FDOT Contract	COL P & R & FDOT Crews	Miles per FDOT Contract # 412947-1-78-92
	PERMITTEE Litter Control Program: Estimated amount of litter collected (Tons)	22.2	Maximo	COL P & R & FDOT Crews	Tons of litter
	Trash Pick-up Events: Total miles cleaned	19.37	Litter Pick up Worksheet	COL L&S	
	Trash Pick-up Events: Estimated amount of litter collected (Bags collected)	115	Lakes Issues database	COL L&S	
	Adopt-A-Lake Program: Total miles cleaned	6.18	Adopt-A-Lake Worksheet	COL L&S	
	Adopt-A-Lake Program: Estimated amount of litter collected (Bags collected)	22	Lakes Issues database	COL L&S	
	Frequency of street sweeping	DAILY	Street Sweeper Log Work order database	PW C & M	Work week-Mon-Thurs 6:30am to 5pm
	Total miles -swept (per year)	27,005	Street Sweeper Log Work order database	PW C & M	Total of 6 operating street sweepers
	Estimated quantity of sweeping material collected (TONS)	2,697	Tonnage Spreadsheet	PW C & M	Includes street sweepings, catch basin cleanout, and BMP cleanout
	Total nitrogen loadings removed (pounds)	3,101	Street Sweeper Load Reduction Spreadsheet	PW C & M	FSA Assessment Tool Calculated Nutrient Load Reductions from MS4 Maintenance Practices
	Total phosphorus loadings removed (pounds)	1,975	Street Sweeper Load Reduction Spreadsheet	PW C & M	FSA Assessment Tool Calculated Nutrient Load Reductions from MS4 Maintenance Practices

	Facility	Number of Inspections	Documentation	Entity Performing the Activity	Comments
	Name of facility #1: Construction & Maintenance Yard & Transfer Station	12	Inspection reports	Public Works L & S & C & M	The Construction & Maintenance Yard and Transfer Station is inspected monthly by C&M staff and annually by L&S staff
	Name of facility #2: Parks & Recs Repair Shop/Dumpster Facility	1	Inspection reports	Public Works L & S & Fleet	The Parks & Recs repair shop and the dumpster facilities are inspected on an annual basis by the L&S staff.
	Name of facility #3: Solid Waste Facility	1	Inspection Reports	Public Works L & S	The solid waste facility is inspected by the L&S staff on an annual basis.

Part III.A.4	**Flood Control Projects**				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Flood control projects completed during the reporting period	0	Engineering Division Approved Plans Docs	Public Works Engineering	
	Flood control projects completed during the reporting period that did <u>not</u> include stormwater treatment	0	n/a	n/a	
	Stormwater retrofit projects planned	0	Lakes & Stormwater Project Files	Lakes & Stormwater	Stormwater retrofits will follow the schedule contained within the City's TMDL Prioritization Report
	Stormwater retrofit projects under construction during the reporting period	0	Lakes & Stormwater Project Files	Lakes & Stormwater	
	Stormwater retrofit projects completed during the reporting period	0	Lakes & Stormwater Project Files	Lakes & Stormwater	

Part III.A.5	**Municipal Waste Treatment, Storage, and Disposal Facilities Not Covered by an NPDES Stormwater Permit**				
	Facility	**Number of Inspections**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Name of facility #1: Construction & Maintenance Yard & Transfer Station	12	Inspection reports	Public Works L & S & C & M	The C&M Yard and Transfer Station is inspected monthly by C&M staff and annually by L&S staff
	Name of facility #2: Fleet Maintenance Facility	12	Inspection reports	Public Works L & S & Fleet	The Fleet Maintenance facility is inspected monthly by fleet staff, and annually by L&S staff
	Name of facility #3: Parks & Recs Repair Shop/Dumpster Facility	1	Inspection report	Public Works L & S & Parks & Recs	The Parks & Rec Repair Shop and Dumpster Facility are inspected annually by L&S staff

Part III.A.6	Pesticides, Herbicides, and Fertilizer Application				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	PERSONNEL: Florida Department of Agriculture and Consumer Services (FDACS) certified applicators of pesticides and herbicides	22	FDACS Certificates	Parks & Recs, L&S, C & M, & Wastewater employees	Personnel with Pesticide Applicator Licenses
	PERSONNEL: Green Industry BMP Program training completed	34	IFAS Certificates	Parks & Recs, L&S employees	Personnel with Best Management Practices Certificates
	FYN PROGRAM FUNDING: Permittee Provides Funding? ☐ Yes ☒ No				
	Estimated percentage of the population reached by the activities in total	74	L&S Educational Outreach Spreadsheet	COL L&S	For displays, distributions, web hits, and airings it's assumed the message is received by a new individual each quarter and only 1 in 2 people receiving the message actively listen to it. The total # of occurrences is divided by 4 and then by 2. This number is added to the participant counts from the remaining outreach events. The total is then divided by COL's total current population.
	Brochures/Flyers/Fact sheets distributed	3,422	Lakes Issues database, LE/AD files	COL L&S, LE/AD	3,422 COL, including 2,000 Citizens Surveys Distributed
	Neighborhood presentations: Number conducted	4	Lakes Issues database, LE/AD files	COL L&S, LE/AD, and FYN	2 COL, 2 LE/AD
	Neighborhood presentations: Number of participants	150	Lakes Issues database, LE/AD files	COL L&S, LE/AD	125 COL, 33 LE/AD
	Newspapers & newsletters: Number of articles/notices published	7	L&S NPDES file, LE/AD files	COL L&S, LE/AD	4 LE/AD Lakes LEADer newsletter, 3 COL Access Lakeland newsletter
	Newsletters: Number of newsletters distributed	287,400	L&S NPDES file, LE/AD files	COL L&S, LE/AD	2,400 LE/AD Lakes LEADer newsletters, 3 (approximately 95,000 each) Access Lakeland Utility newsletter
	Public displays (e.g., kiosks, storyboards, posters, etc.)	45	L&S Lakeside Educational file, LE/AD files	COL L&S. LE/AD	32 Lakeside educational displays, 10 pet waste stations, 3 LE/AD displays
	Radio or television Public Service Announcements (PSAs)	11,387	L&S NPDES file; LE/AD files	COL L&S, LE/AD	2 LE/AD, 11,385 COL National Cinemedia Cobb Theatre, 1 PGTV advertisement, 1 Listen Lakeland Radio advertisement
	School presentations: Number conducted	45	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	School presentations: Number of participants	4,672	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Seminars/Workshops: Number conducted	2	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Seminars/Workshops: Number of participants	43	Lakes Issues database, LE/AD files and sign in sheets	COL L&S, LE/AD	43 COL L&S
	Special events: Number conducted	15	Lakes Issues database, LE/AD	COL L&S, LE/AD	11 COL: Kid's Naturefest (Winter), Boys & Girls Club, SPCA Walk for the Animals, Green Celebration, Earth Day Clean-up, 7 Rivers Water Festival, Public Works Celebration, Kid's Naturefest (Summer), Circle B Water Festival, Alliance for Independence, Cardboard Boat Challenge; 4 LE/AD: Polk Regional Science Fair, Lakes Appreciation Month, Teneroc Nature Festival, Carbdboard Boat Challenge
	Special events: Number of participants	3,825	Lakes Issues database, LE/AD files	COL L&S, LE/AD	2,625 COL, 1,200 LE/AD
	Web Site: Number of hits / visitors to the stormwater-related pages	9,284	Website hits database	COL Public Works	

Part III.A.7.a	Illicit Discharges and Improper Disposal — Inspections, Ordinances, and Enforcement Measures				
	No amendments made to the applicable legal authority.				
Part III.A.7.c	**Illicit Discharges and Improper Disposal — Investigation of Suspected Illicit Discharges and/or Improper Disposal**				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Proactive inspections performed by Polk County on behalf of a co-permittee for suspected illicit discharges / connections / dumping	146	Lakeland hazardous waste/used oil inspections excel file	Polk County – Proactive Inspections Database	Proactive inspections performed by Polk County staff occurring within the utility boundaries of the City of Lakeland. L&S staff performed co-inspections of 9 facilities with Polk County staff during the reporting cycle.
	Proactive inspections performed by the permittee for suspected illicit discharges / connections / dumping	124	L&S access database, Inspection Reports	COL & FDOT	Includes quarterly co-permittee proactive inspections completed by L&S staff and FDOT NPDES Administrator staff
	Illicit discharges / connections / dumping found during a proactive inspection	20	L&S Access database & Inspection Reports	COL & FDOT	
	Notices of Violation (NOVs) / warning letters / citations issued for illicit discharges / connections / dumping found during a proactive inspection	5	L&S Violations Files	L&S staff	
	Fines issued for illicit discharges / connections / dumping found during a proactive inspection	0	n/a	n/a	No fines issued
	Reports received by Polk County of suspected illicit connections / discharges / dumping received	0	n/a	n/a	Polk County reports not tracked; please see Polk County report
	Reports received by the permittee of suspected illicit connections / discharges / dumping received	70	L&S Access database & Inspection Reports	COL L&S	
	Reactive investigations of reports of suspected illicit discharges/ connections / dumping	78	L&S Access database & Inspection Reports	COL L&S	
	Illicit discharges / connections / dumping found during a reactive investigation	62	L&S Access database & Inspection Reports	COL L&S	
	Notices of Violation (NOVs) / warning letters / citations issued for illicit discharges / connections / dumping found during a reactive investigation	15	L&S Access database & Inspection Reports	COL L&S	
	Fines issued for illicit discharges / connections / dumping found during a reactive investigation	0	n/a	n/a	
	Initial Illicit Discharge Training - Personnel	42	L&S Access database, sign in sheets	COL L&S	COL Parks & Rec, C&M, Water Utilities personnel
	Initial Illicit Discharge Training – Contractors	81	L&S Access database, sign-in sheets	COL L&S	Momentive Chemical, Cement Products
	Refresher Illicit Discharge Training - Personnel	349	L&S Access database, sign-in sheets	COL L&S	COL Public Works Annual Safety Fair training course; Public Works and Parks & Rec staff
	Refresher Illicit Discharge Training - Contractors	9	L&S Access database, sign-in sheets	COL L&S	Momentive Chemical Cement Products

Part III.A.7.d	Illicit Discharges and Improper Disposal — Spill Prevention and Response				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Hazardous and non-hazardous material spills responded to	17	COL Fire Dept. Response spreadsheet	COL Fire Department	
	Initial Hazardous Spill Training - Personnel	6	COL Fire Dept. Training sign-in sheets	COL Fire Department	OSHA HAZWOPER & Refresher training, pollution prevention training
	Initial Hazardous Spill Training - Contractors	0	n/a	n/a	All fire department personnel are City employees, no contractors are trained in-house.
	Refresher Hazardous Spill Training - Personnel	141	COL Fire Dept. Training sign-in sheets	COL Fire Department	OSHA HAZWOPER & Refresher training, pollution prevention training
	Refresher Hazardous Spill Training - Contractors	0	n/a	n/a	All fire department personnel are City employees, no contractors are trained in-house.

Part III.A.7.e	Illicit Discharges and Improper Disposal — Public Reporting				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Estimated percentage of the population reached by the activities in total	15	COL NPDES files, L&S Education Program files, LE/AD files, Lakes Issues Database	COL, LE/AD	For displays, distributions, web hits, and airings it's assumed the message is received by a new individual each quarter and that only 1 in 2 people receiving the message actively listen to it. Thus for these activities the total # of occurrences is first divided by 4 and then by 2. This number is added to the participant counts from the remaining outreach events. The total is then divided by COL's total current population.
	Publicize the Polk County or local Pollution Complaint Hotline	60,222	COL NPDES files	COL	12 street sweeper wraps (one each side of six sweepers), PSAs
	Brochures/Flyers/Fact sheets distributed	4,210	Lakes Issues database, LE/AD files	COL L&S, LE/AD	2,210 COL; 2,000 Citizen Surveys distributed by COL L&S
	Neighborhood presentations: Number conducted	2	COL NPDES files, LE/AD files	LE/AD and COL	
	Neighborhood presentations: Number of participants	125	COL NPDES files, LE/AD files	LE/AD and COL	
	Newspapers & newsletters: Number of articles/notices published	16	L&S NPDES files, LE/AD files	Lakeland Electric, LE/AD	12 Access Lakeland Utility Inserts; 4 LE/AD newsletters
	Newsletters: Number of newsletters distributed	1,140,000	L&S NPDES file, LE/AD Annual Report	Lakeland Electric, LE/AD	2,400 LE/AD Lakes LEADer newsletter, 12 (approximately 95,000 each) Access Lakeland Utility newsletter
	Public displays (e.g., kiosks, storyboards, posters, etc.)	38	L&S Education Programs files, LE/AD files	COL L&S, LE/AD	Permanent public education signs, street sweeper wraps
	Radio or television Public Service Announcements (PSAs)	47,783	Lakes Issues database, LE/AD files & NCM Audit Report	COL L&S, LE/AD	
	School presentations: Number conducted	45	Lakes Issues database, LE/AD files	COL L&S, LE/AD	COL: Agrifest, Teneroc Farm, Crystal Lake Middle School, Great American Teach-In
	School presentations: Number of participants	4,672	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Seminars/Workshops: Number conducted	2	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Seminars/Workshops: Number of participants	43	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Special events: Number conducted	15	Lakes Issues database, LE/AD files	COL L&S, LE/AD	11 COL: Kid's Naturefest (Winter), Boys & Girls Club, SPCA Walk for the Animals, Green Celebration, Earth Day Clean-up, 7 Rivers Water Festival, Public Works Celebration, Kid's Naturefest (Summer), Circle B Water Festival, Alliance for Independence, Cardboard Boat Challenge; 4 LE/AD: Polk Regional Science Fair, Lakes Appreciation Month, Teneroc Nature Festival, Cardboard Boat Challenge
	Special events: Number of participants	2,625	Lakes Issues database, LE/AD files	COL L&S, LE/AD	
	Web Site: Number of visitors to the stormwater-related pages	9,248	Website hits database	COL Public Works	

Part III.A.7.f	Illicit Discharges and Improper Disposal — Oils, Toxics, and Household Hazardous Waste Control				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Estimated percentage of the population reached by the activities in total	100	COL NPDES files, L&S Education Program files, LE/AD files, Lakes Issues Database	COL L&S and Solid Waste (SW), LE/AD-	% is based on the # of guides etc. distributed vs. # of households (based on 38,248 households)
	Household Chemical Collection Center Program: Amount of waste collected / recycled / properly disposed (lbs.)	16,209 lbs. liquids and 33,099 lbs. solids	COL Solid Waste; Polk County Material collected spreadsheet and waste manifests	COL & Polk County	Annual Household Hazardous Waste Event (April 5, 2014)
	Household Chemical Collection Center Program: Events	1	Local newspaper & Access Lakeland document	COL Solid Waste Division, Polk County Solid Waste	Annual Household Hazardous Waste Event (April 5, 2014); 693 participants
	Household Hazardous Waste Materials Guides distributed	95,000	COL Solid Waste public outreach spreadsheet	COL Solid Waste	Access Lakeland article (95,000 distribution)
	Brochures/Flyers/Fact sheets distributed	5,708	Lakes Issues database, Citizen's Survey mailings, COL Solid Waste database – Information Letters w/brochures, delivery of carts w/ brochures	COL L&S, COL Solid Waste	4,210 COL L&S; 1,498 COL Solid Waste
	Neighborhood presentations: Number conducted	4	Lakes Issues database & Public outreach spreadsheet SW	L&S, COL Solid Waste	2 L&S; 2 Solid Waste
	Neighborhood presentations: Number of participants	162	Lakes Issues database & Public outreach spreadsheet SW	L&S, COL Solid Waste	125 L&S, 37 COL Solid Waste
	Newspapers & newsletters: Number of articles/notices published	13	Lakes Issues database, Access Lakeland Ledger ads, COL InSite intranet time out ads; LE/AD LEADer Newsletter	L&S, COL Solid Waste, and LE/AD	4 LE/AD Lakes LEADer newsletter, 5 COL Access Lakeland newsletter articles, 3 Ledger articles, 1 In-Site
	Newsletters: Number of newsletters distributed	479,700	Ledger, Access Lakeland ads & COL InSite intranet ad docs, Utility bill insert distribution	COL L&S, COL Solid Waste, Lakeland Electric, and LE/AD	2,400 LE/AD Lakes LE/ADer newsletter, 4 (approximately 95,000 each) Access Lakeland Utility Newsletter; 2,300 COL employees (InSite intranet)
	Public displays (e.g., kiosks, storyboards, posters, etc.)	21	COL L&S Lakeside Display file, Access Lakeland; Solid Waste Spreadsheet	COL L&S & Solid Waste	6 Lakeside educational displays, 10 pet waste stations, 4 COL Solid Waste, 1 COL Solid Waste Poster
	Radio or television Public Service Announcements (PSAs)	64,490	L&S NPDES file, COL Single Stream Recycling & Solid Waste database	COL L&S & Solid Waste	Solid Waste Recycling Video, COL L&S PSAs
	School presentations: Number conducted	45	Lakes Issues database & Solid Waste database	COL L&S & Solid Waste	COL: Agrifest, Teneroc Farm, Crystal Lake Middle School, Great American Teach-In

	Permit Activity	Number of Activities	Documentation	Entity Performing the Activity	Comments
	School presentations: Number of participants	4,672	Lakes Issues database & Solid Waste database	COL L&S & Solid Waste	
	Seminars/Workshops: Number conducted	2	Lakes Issues database	COL L&S	
	Seminars/Workshops: Number of participants	43	Lakes Issues database	COL L&S	
	Special events: Number conducted	15	Lakes Issues database	COL L&S	
	Special events: Number of participants	3,825	Lakes Issues database	COL L&S	
	Storm sewer inlets newly marked/replaced	278	COL Engineering Surveying Spreadsheet	COL Engineering	
	Web Site: Number of visitors to the stormwater-related pages	9,248	Website hits database	COL Public Works	

Part III.A.7.g	**Illicit Discharges and Improper Disposal — Limitation of Sanitary Sewer Seepage**				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Activity to reduce/eliminate SSOs and inflow / infiltration: Sanitary sewer pipe inspected for infiltration (linear feet)	88,447	COL Wastewater TV main line work spreadsheet	COL Wastewater Department	
	Activity to reduce/eliminate SSOs and inflow / infiltration: Sanitary sewer pipe sealed, lined, and / or replaced (linear feet)	23,034	COL Wastewater line work spreadsheet	COL Wastewater Department	
	Activity to reduce/eliminate SSOs and inflow / infiltration: Sanitary sewer line breaks repaired	80	COL Wastewater point repair spreadsheet	COL Wastewater Department	
	Activity to reduce/eliminate SSOs and inflow / infiltration: Septic systems removed	0	n/a	n/a	See Polk County Annual Report for Polk Health Dept. records
	Activity to reduce/eliminate SSOs and inflow / infiltration: Emergency generator added	0	n/a	n/a	No emergency generators added
	SSO incidents discovered	2	COL Wastewater SSO Database	COL Wastewater	Two were discovered that impacted the MS4
	SSO incidents resolved	2	COL Wastewater SSO Database	COL Wastewater	Two were resolved that impacted the MS4
	Inflow / infiltration incidents discovered	0	n/a	n/a	None recorded
	Inflow / infiltration incidents resolved	0	n/a	n/a	None recorded
	Name of owner of the sanitary sewer system	-	-	-	City of Lakeland

Part III.A.8.a	Industrial and High-Risk Runoff — Identification of Priorities and Procedures for Inspections							
		Number of Facilities	Number of Inspections	For violations discovered during a high risk inspection		Documentation	Entity Performing the Activity	Comments
				Fines issued	Notices of Violation (NOVs) / warning letters / citations issued			
	Total high risk facilities	14	14	n/a	n/a	COL High Risk Facilities Access Database	COL Lakes & Stormwater	
	New high risk facilities added to the inventory during the current reporting period	0	n/a	n/a	n/a	COL High Risk Facilities Access Database	COL Lakes & Stormwater	
	Operating municipal landfills	0	n/a	n/a	n/a	COL High Risk Facilities Access Database	COL Lakes & Stormwater	None in jurisdiction
	Hazardous waste treatment, storage, disposal and recovery (HWTSDR) facilities	0	n/a	n/a	n/a	COL High Risk Facilities Access Database	COL Lakes & Stormwater	None in jurisdiction
	EPCRA Title III, Section 313 facilities (that are not landfills or HWTSDR facilities)	5	5	0	0	COL High Risk Facilities Access Database	COL Lakes & Stormwater	No violations observed during inspections
	Facilities determined as high risk by the permittee through the reactive inspections as per Part III.A.7.c	0	n/a	n/a	n/a	Copies of warning letters	FDEP	
	Other facilities determined as high risk by the permittee (that are not facilities identified through the reactive inspections)	9	9	0	0	COL High Risk Facilities Access Database	COL Lakes & Stormwater	No violations observed during inspections

Part III.A.8.b	Industrial and High-Risk Runoff — Monitoring for High Risk Industries	
	High risk facilities sampled	None sampled

Part III.A.9.a	Construction Site Runoff — Site Planning and Non-Structural and Structural Best Management Practices				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	PERMITTEE SITES: Construction site plans reviewed	9	COL Eng. Div. Building Plans Docs	COL Engineering Division	
	PERMITTEE SITES: Construction site plans approved	6	COL Eng. Div. Approved Plans Docs	COL Engineering Division	
	PRIVATE SITES: Construction site plans reviewed	140	COL Eng. Div. Review spreadsheet	COL Engineering Division	
	PRIVATE SITES: Construction site plans approved	55	COL Eng. Div. Review spreadsheet	COL Engineering Division	

	Permit Activity	Number of Activities	Documentation	Entity Performing the Activity	Comments
	Notified of ERP stormwater permit requirements	55	COL Eng. Div. Stamped Plans	COL Engineering division	
	Confirmed ERP coverage	0	COL Eng. Division	COL Engineering Division	This element is not currently tracked by COL. Changes to COL's development review process is ongoing to develop a plan for including signed confirmation of ERP and CGP coverage.
	Notified of CGP stormwater permit requirements	55	COL Eng. Division Stamped Plans	COL Engineering Division	
	Confirmed CGP coverage	0	n/a	n/a	This element is not currently tracked by COL. Changes to COL's development review process is ongoing to develop a plan for including signed confirmation of ERP and CGP coverage

Part III.A.9.b	**Construction Site Runoff — Inspection and Enforcement**				
	Permit Activity	**Number of Activities**	**Documentation**	**Entity Performing the Activity**	**Comments**
	PERMITTEE SITES: Active construction sites	9	COL Eng. Div. Construction Site Database	COL Engineering Division	
	PERMITTEE SITES: Inspections of active construction sites for proper stormwater, erosion and sedimentation BMPs	820	COL Eng. Div. Construction Site Database	COL Engineering Division	Database records & tracks the # of inspections for permittee and private projects in total
	PERMITTEE SITES: Percentage of active construction sites inspected	100	COL Eng. Div. Construction Site Database	COL Engineering Division	
	PRIVATE SITES: Active construction sites	15	COL Eng. Div. Construction Site Database	COL Engineering Division	
	PRIVATE SITES: Inspections of active construction sites for proper stormwater, erosion and sedimentation BMPs	794	COL Eng. Div. Construction Site Database	COL Engineering Division	Database records & tracks the # of inspections for permittee and private projects in total
	PRIVATE SITES: Percentage of active construction sites inspected	100	COL Eng. Div. Construction Site Database	COL Engineering Division	
	Red Tags issued	0	n/a	n/a	None Issued
	Notices of Violation (NOVs) issued	0	n/a	n/a	None Issued
	Stop Work Orders issued	0	n/a	n/a	None Issued
	Fines issued	0	n/a	n/a	None Issued

Part III.A.9.c	Construction Site Runoff — Site Operator Training						
		Inspector Certification Training	**Non-Inspector Initial Training (non-certification)**	**Refresher Training**	**Documentation**	**Entity Performing the Activity**	**Comments**
	Permittee construction site inspectors	23	0	3	Received Certificates	FDEP & COL Public Works	Employees sent to FDEP Certified training
	Permittee construction site plan reviewers	2	0	0	Received Certificates	FDEP & COL	Employees sent to FDEP Certified training
	Permittee construction site operators	3	0	0	Received Certificates	FDEP	Employees sent to FDEP Certified training
	Private construction site operators	0	0	55	COL Eng. Div. Stamped Plans	COL Engineering Division	# of private construction sites inspected and educated during pre-construction and project kick-off meetings

SECTION VIII. EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM (SWMP)

Permit Citation/ SWMP Element	SWMP EVALUATION
Part II.A.1 Structural control inspection and maintenance	***Strengths:*** The City of Lakeland has experienced drainage personnel dedicated solely to the inspection and maintenance of the MS4 system. Significant progress continues in upgrading the City's new work order database system which ensures extremely accurate documentation of all MS4 inspection and maintenance activities. Drainage personnel work closely with Lakes & Stormwater staff on a daily basis and activities are prioritized and directed according to the requirements of the NPDES permit. GIS, Engineering, and IT staff also partner in this effort to ensure adequate up-to-date GIS documentation of the MS4 inventory. The overall inspection and maintenance program is supported by the Public Works Department, City Manager's Office, and the Board of City Commissioners. The City's stormwater utility fee continues to generate adequate monies for operating expenses plus a reserve of at least 10% of the total budget. ***Weaknesses:*** Did not meet the minimum inspection requirement for annual linear feet of stormwater pipes. ***SWMP Revisions to address deficiencies:*** See Attachment 1 for details.
Part II.A.2 Significant redevelopment	***Strengths:*** City ordinance requires new and re-development projects be permitted. The Public Works Engineering Manual includes the applicable regulations pertaining to these projects. The Engineering Division ensures each project meets current land development regulations including the applicable NPDES permit requirements. ***Weaknesses:*** The current process for notification, verification and documentation of FDEP NOI/GCP and SWFWMD ERP permits for development projects is not well doucmented. Better tracking and documentation of permit reviews are needed prior to the initiation of construction activities. ***SWMP Revisions to address deficiencies:*** The Lakes & Stormwater and Engineering Divisions are working together to develop a consistent process and tracking mechanism to ensure that all appropriate and required permits are reviewed, adequate and on site prior to initiation of construction. This process improvement is an ongoing goal and progress will be reported in each annual report.
Part II.A.3 Roadways	***Strengths:*** The City has robust street sweeping and litter control programs. Street sweeping activities are directed according to the NPDES permit requirements and loads from sweepers, baffle boxes, and inlet baskets are accurately tracked to ensure reliable calculations of TN/TP removal numbers. ***Weaknesses:*** The sediment and debris collected and disposed of due to street sweeping, pipe cleaning, and structural control cleaning activities is not tracked by basins but in accordance with work zones. ***SWMP Revisions to address deficiencies:*** The Lakes & Stormwater Division is working with a consultant to evaluate the City's street sweeping program during Year 4 of the permit cycle. A goal of the study is to evaluate removal rates, land use, and sweeper routes to ensure accurate load reduction numbers particularly in TMDL basins.

SECTION VIII. EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM (SWMP)	
Part II.A.4 Flood control	Strengths: No flood control projects were completed during Year 3 of the current permit cycle. When flood control projects are in the design phase, Public Works Engineering staff consults with Lakes & Stormwater staff to ensure that these projects include the appropriate design criteria to maximize stormwater retention and treatment. Weaknesses: No weaknesses known at this time. SWMP Revisions to address deficiencies: No deficiencies at this time.
Part II.A.5 Waste TSD Facilities	***Strengths:*** All City TSD facilities are participants in the City Hot Spot inspection program. This program consists of routine inspections (monthly and/or annually) at each facility for compliance with stormwater regulations. The facilities are tracked with an annual summary inspection report. Inspection reports identify areas for improvement with suggested corrective actions. ***Weaknesses:*** No weaknesses known at this time. ***SWMP Revisions to address deficiencies:*** No deficiencies at this time.
Part II. A. 6 Pesticide, herbicide, fertilizer application	***Strengths:*** All of the City herbicide and fertilizer applicators are Florida Department of Agriculture and Consumer Services (FDACS) certified sprayers and have completed the Green Industry BMP training. Personnel are continually educated and supplied with refresher training as necessary. The City adopted the Polk County Fertilizer Ordinance during Year 2 of the current permit cycle. ***Weaknesses:*** No weaknesses known at this time. ***SWMP Revisions to address deficiencies:*** No deficiencies at this time.
Part II.A.7 Illicit Discharge Detection and Elimination	***Strengths:*** A stormwater hotline is set up for reporting suspected illicit discharges and/or environmental code violations occurring throughout the City. An access database is designated specifically to track this program. City staff and private industry personnel are provided with comprehensive training on IDDE on an annual basis. Proactive and reactive IDDE inspection programs are implemented by City, County, and applicable FDOT staff. The aforementioned agencies partner in this effort by sharing information, reporting violations occurring in each other's respective jurisdictions and by conducting proactive inspections together when necessary. The City's public outreach and education program is robust, well-funded, and includes informational/educational signage, brochures, attendance at major environmental education events, PSA's, and placement of advertisement wraps on our six street sweepers. ***Weaknesses:*** Lack of City environmental code enforcement has prohibited the expansion and success of this program in the past. ***SWMP Revisions to address deficiencies:*** The Lakes & Stormwater staff continually conducts proactive IDDE inspections and takes action accordingly. Additionally, a more robust inspection schedule of industrial facilities has been implemented. Most importantly, the City recently finalized the acquisition of a COL Environmental Code Enforcement Officer which will increase IDDE corrective actions tremendously.
Part II.A.8 High Risk Industry Runoff	***Strengths:*** High risk industrial facilities located within the City limits are inspected on a routine basis to ensure that stormwater pollution control measures are in place and effective and that each facility is in compliance with NPDES regulations. All high risk facilities located within City limits were inspected during Year 3 of the current permit cycle. A comprehensive summary report is provided to the facility after the inspection which identifies areas of concern or non-compliance found during facility inspections and suggested corrective actions. A follow-up inspection is completed when necessary. Lakes & Stormwater staff offer a private employee training program for high risk facilities located in Lakeland to educate their employees on stormwater pollution prevention and IDDE procedures. An access database is designated specifically to track this program. All high risk facilities in the inventory hold a current industrial FDEP NPDES permit. ***Weaknesses:*** No weaknesses ***SWMP Revisions to address deficiencies:*** No deficiencies at this time.

SECTION VIII. EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM (SWMP)		
	Part II.A.9 Construction Site Runoff	***Strengths:*** The City has three engineering inspectors certified and trained to conduct sediment & erosion (S&E) control inspections of City commercial construction sites. City S&E inspectors attend construction kick-off meetings and provide education on stormwater controls to subcontractors, as well as review S&E control plans for the project and advise contractors about the State permit requirements. City S&E inspectors perform construction site inspections and attend weekly construction progress meetings as warranted. Lakes & Stormwater staff inspect residential construction sites to ensure proper BMPs are in use and maintained appropriately. A construction site inspection database dedicated to this type of inspection provides excellent tracking. ***Weaknesses:*** Lack of ability to enforce NPDES permit requirements for construction sites. ***SWMP Revisions to address deficiencies:*** Acquisition of a COL Environmental Code Enforcement Officer.

SECTION IX. CHANGES TO THE STORMWATER MANAGEMENT PROGRAM (SWMP) ACTIVITIES (Not Applicable In Year 4)		
A.	**Permit Citation/ SWMP Element**	**Proposed Changes to the Stormwater Management Program Activities Established as Specific Requirements Under Part III.A of the Permit (Including the Rationale for the Change) — REQUIRES DEP APPROVAL PRIOR TO CHANGE IF PROPOSING TO REPLACE OR DELETE AN ACTIVITY.**
		No major changes in scope and/or direction of SWMP. An updated SWMP is provided as an attachment with this report and documents the current scope and direction of the SWMP.
B.	**Permit Citation/ SWMP Element**	**Changes to the Stormwater Management Program Activities NOT Established as Specific Requirements Under Part III.A of the Permit (Including the Rationale for the Change)**
		No major changes in scope and/or direction of SWMP. An updated SWMP is provided as an attachment with this report and documents the current scope and direction of the SWMP.

CHECKLIST A: ATTACHMENTS TO BE SUBMITTED WITH THE ANNUAL REPORTS

Below is a list of items required by the permit that may need to be attached to the annual report. Please check the appropriate box to indicate whether the item is attached or is not applicable for the current reporting period. Please provide the number and the title of the attachments in the blanks provided.

Attached	N/A	Rule / Permit Citation	Required Attachment	Attachment Number	Attachment Title/Comments
☐	☒	Part II.F	**EACH ANNUAL REPORT:** If program resources have decreased from the previous year, a discussion of the impacts on the implementation of the SWMP.		No changes in Program resources. The difference between permit Yr. 2 and Yr. 3 Stormwater Utility(SWU) revenues was due to rollover of SWU dollars from previous fiscal years to fund the drainage-related CIPs.
☒	☐	Part III.A.1	**EACH ANNUAL REPORT:** An explanation of why the minimum inspection frequency in Table II.A.1.a was not met, if applicable.	1	Minimum Inspection Frequency Deficiencies Report.
☐	☒	Part III.A.4	**EACH ANNUAL REPORT:** A list of the flood control projects that did not include stormwater treatment and an explanation for each of why it did not, if applicable.		No flood control projects completed during Year 3 of permit cycle.
☐	☒	Part III.A.7.a	**EACH ANNUAL REPORT:** A report on amendments / changes to the legal authority to control illicit discharges, connections, dumping, and spills, if applicable.		No amendments.
☒	☐	Part V.B.9	**EACH ANNUAL REPORT:** Reporting and assessment of monitoring results. **[Also addressed in Section III of the Annual Report Form]**	2	City of Lakeland FY15 SWMP Update.
☐	☒	Part VI.B.2	**EACH ANNUAL REPORT:** An evaluation of the effectiveness of the SWMP in reducing pollutant loads discharged from the MS4 that, at a minimum, must include responses to the questions listed in the permit.		The evaluation section VIII in this form satisfies this report requirement.
☒	☐	Part VIII.B.3.e	**EACH ANNUAL REPORT:** A status report on the implementation of the requirements in this section of the permit and on the estimated load reductions that have occurred for the pollutant(s) of concern.	2	City of Lakeland FY15 SWMP Update.
☒	☐	Part VIII.B.4.f	**EACH ANNUAL REPORT after approval of the BPCP:** The status of the implementation of the Bacterial Pollution Control Plan (BPCP).	2	City of Lakeland FY15 SWMP Update (See BMAP notes in the TMDL Prioritization section of SWMP).
☐	☒	Part III.A.1	**YEAR 1:** An inventory of all known major outfalls and a map depicting the location of the major outfalls (hard copy or CD-ROM).		
☐	☒	Part III.A.3	**YEAR 1:** If have curbs and gutters but no street sweeping program, an explanation of why no street sweeping program and the alternate BMPs used or planned.		
☐	☒	Part III.A.6	**YEAR 1 or YEAR 2:** A copy of the adopted Florida-friendly Ordinance, if applicable.		The Polk County Fertilizer Ordinance was adopted in Year 2.
☐	☒	Part III.A.7.c	**YEAR 1:** A proactive illicit discharge / connection / dumping inspection program plan.		
☐	☒	Part III.A.9.b	**YEAR 1:** A construction site inspection program plan. **[For approval by DEP]**		
☐	☒	Part III.A.2	**YEAR 2:** A summary report of a review of codes and regulations to reduce the stormwater impact from new development / redevelopment.		
☒	☐	Part V.A.2	**YEAR 3:** Estimates of annual pollutant loadings and EMCs, and a table comparing the current calculated loadings with those from the previous two Year 3 ARs.	3	The City of Lakeland has requested a time extension for this requirement. The City of Lakeland has retained AMEC to complete an evaluation of annual pollutant loadings and EMCs (Attachment 3).

☐	☒	Part III.A.2	**YEAR 4:** A follow-up report on plan implementation of changes to codes and regulations to reduce the stormwater impact from new development / redevelopment.		
☐	☒	Part V.A.3	**YEAR 4:** If the total annual pollutant loadings have not decreased over the past two permit cycles, revisions to the SWMP, as appropriate.		
☐	☒	Part V.B.3	**YEAR 4:** The monitoring plan (with revisions, if applicable).		
☐	☒	Part VII.C	**YEAR 4:** An application to renew the permit.		
☐	☒	Part VIII.B.3.d	**YEAR 4:** A TMDL Implementation Plan / Supplemental SWMP.		

CHECKLIST B: THE REQUIRED ANNUAL REVIEWS OF WRITTEN STANDARD OPERATING PROCEDURES (SOPs) & PLANS

The permit requires annual review, and revision if needed, of written Standard Operating Procedures (SOPs) and plans (e.g., public education and outreach, training, inspections). Please indicate your review status below. **If you have made revisions that need DEP approval, you must complete Section VIII.A of the annual report.**

Did not complete review of existing SOP / Plan	Developed new written SOP / Plan	Reviewed & no revision needed to existing SOP / Plan	Reviewed & revised existing SOP / Plan	Permit Citation	Description of Required SOPs / Plans
☐	☐	☒	☐	Part III.A.1	SOP and/or schedule of inspections and maintenance activities of the structural controls and roadway stormwater collection system.
☐	☐	☒	☐	Part III.A.2	SOP for development project review and permitting procedures and/or local codes and regulations for new development / areas of significant development.
☐	☐	☒	☐	Part III.A.3	SOP for the litter control program.
☐	☐	☒	☐	Part III.A.3	SOP for the street sweeping program.
☐	☐	☒	☐	Part III.A.3	SOP for inspections of equipment yards and maintenance shops that support road maintenance activities.
☐	☐	☒	☐	Part III.A.5	SOP for inspections of waste treatment, storage, and disposal facilities not covered by an NPDES stormwater permit.
☐	☐	☒	☐	Part III.A.6	Plan for public education and outreach on reducing the use of pesticides, herbicides and fertilizer.
☐	☐	☒	☐	Part III.A.6	SOP for reducing the use of pesticides, herbicides and fertilizer, and for the proper application, storage and mixing of these products.
☐	☐	☒	☐	Part III.A.7.c	Plan for proactive illicit discharge / connections / dumping inspections.*
☐	☐	☒	☐	Part III.A.7.c	SOP for reactive illicit discharge / connections / dumping investigations.
☐	☐	☒	☐	Part III.A.7.c	Plan for illicit discharge training.
☐	☐	☒	☐	Part III.A.7.d	SOP for spill prevention and response efforts.
☐	☐	☒	☐	Part III.A.7.d	Plan for spill prevention and response training.
☐	☐	☒	☐	Part III.A.7.e	Plan for public education and outreach on how to identify and report the illicit discharges and improper disposal to the MS4.
☐	☐	☒	☐	Part III.A.7.f	Plan for public education and outreach on the proper use and disposal of oils, toxics and household hazardous waste.
☐	☐	☒	☐	Part III.A.7.g	SOP to reduce / eliminate sanitary wastewater contamination of the MS4.
☐	☐	☒	☐	Part III.A.8	SOP for inspections of high risk industrial facilities.
☐	☐	☒	☐	Part III.A.9.a	SOP for construction site plan review for stormwater, erosion and sedimentation controls, and ERP and CGP coverage.
☐	☐	☒	☐	Part III.A.9.b	Plan for inspections of construction sites.*
☐	☐	☒	☐	Part III.A.9.c	Plan for stormwater, erosion and sedimentation BMPs training.

*** Revisions to these plans require DEP approval – please complete Section VIII.A of the annual report.**

REMINDER LIST OF THE TMDL / BMAP REPORTS TO BE SUBMITTED SEPARATELY FROM AN ANNUAL REPORT		
Rule / Permit Citation	**Report Title**	**Due Date**
Part VIII.B.3.a	**6 MONTHS from effective date of permit:** TMDL Prioritization Report.	Updated 04/01/15 (included in SWMP)
Part VIII.B.3.b	**12 MONTHS from effective date of permit:** TMDL Monitoring and Assessment Plan.	See TMDL Prioritization section of SWMP
Part VIII.B.3.c	**6 MONTHS from receiving analyses from the lab:** TMDL Monitoring Report.	See TMDL Prioritization section of SWMP
Part VIII.B.4	**30 MONTHS from start date per TMDL Prioritization Report:** A Bacterial Pollution Control Plan (BPCP).	See TMDL Prioritization section of SWMP (BMAP notes included)

BMAP Reporting

MS4 permittees are NOT required to submit the annual report required by any BMAP that applies to them since the NPDES Stormwater Staff can obtain them from the department's Watershed Planning and Coordination staff. However, to assure that the stormwater staff are aware of which BMAPs apply to the MS4 permittees and when the latest BMAP annual report was submitted, please complete the information below, if applicable:

Rule/Permit Citation	BMAP Title	COL Requirements
Part VIII.B.2	Alafia River Basin	See BMAP Section of SWMP
Part VIII.B.2	Hillsborough River Basin	See BMAP Section of SWMP

END OF REVISED TAILORED MS4 AR FORM
CYCLE 3 PERMIT

CITY OF
Lakeland
www.lakelandgov.net
228 SOUTH MASSACHUSETTS AVENUE
LAKELAND, FLORIDA 33801
863.834.6000

CITY OF LAKELAND MINIMUM INSPECTIONS DEFICIENCIES

Area of Deficiency

The City of Lakeland (COL) Construction and Maintenance staff (C&M) coordinates with Lakes and Stormwater staff (L&S) to refine maintenance and inspections procedures and ensure procedures align with the respective NPDES reporting requirements. The minimum inspection frequencies for structural controls and other MS4 infrastructure listed in Table II.A.1 of the permit were met in all categories but one; the COL is not currently meeting the 10% inspection frequency requirement for the MS4 pipes and culverts.

Corrective Actions

COL C&M, L&S, and City IT staff is implementing a new work order system (Lucity) to accurately code, identify, and track all MS4 infrastructure inspections. Additionally, L&S, IT, and Engineering staff are collaborating on a major GIS overhaul of the City's MS4 Inventory such that accurate GIS reference data is available for input into the new work order system. Additionally, in FY15, the City added 3 new employees and secured the lease of a Vacuum Truck to inspect and clean the MS4 pipe system at the required rate of 10% per year. This equates to an annual inspection goal of 144,000 linear feet per year. The specific resources secured for this portion of the City's MS4 inspection program are documented on the following two pages. It is anticipated that the required inspection frequency for MS4 pipes and culverts will be met by FY17.

CITY OF Lakeland
www.lakelandgov.net
228 SOUTH MASSACHUSETTS AVENUE
LAKELAND, FLORIDA 33801
863.834.6000

City of Lakeland
FY2015 Program Modification Form

Summary Information
Program Modification Title: Drainage System Management & Repair
Program Modification Type: Other
Proposed Funding Source: Other
Program Modification Priority: 1 of 1
Meeting Date: Select your Meeting Date.

Program	Activity	Core/Support Service(s)
Environmental & Utility Program	Lakes & Stormwater	Drainage System Management & Repair
Department(s)	**Division(s)**	**Total Budget Impact**
Public Works	Construction & Maintenance Lakes & Stormwater	Maintenance Foreman Position (PG 47) to be reclassified to a Drainage Maintenance Coord. (PG 49) = $3678 plus cell phone = $4038 annually. New Position: Equipment Operator I (PG 29). Starting salary plus 35% benefits = $37,121 plus uniforms/boots, $400 = $37,521 annually. New Position: Equipment Operator II (PG 33). Starting salary plus 35% benefits = $40,912 plus uniforms/boots, $400 = $41,312 annually. New Position: Equipment Operator III (PG 38) plus 35% benefits = $46, 247 plus uniforms/boots, $400 = $46,647 anually. Fleet Expenses of new Vac Truck (Rent, Fuel and Maint.): $60,000 Total Est. Annual Program Cost: $190,000. Capital Equipment Purchase: Vacuum Truck: $360,000 T.V. Equipment: $4,000 Computer: $1,800 Radio: $4,000

Justification
The State and Federal NPDES MS4 permit requires the City of Lakeland to inspect 10% of its storm sewer pipes annually. At present, the City has approximately 1.44 million linear feet (lf) of inventoried storm sewer pipe. To meet the NPDES requirement, staff would need to inspect 144,000 lf annually. Currently we are only capable of inspecting 25,000 lf (20% of the annual requirement). To remain in compliance with the NPDES permit requirements, the adopted Stormwater Utility CIP allocated additional funding in FY 15 – 23 within the Retrofit Existing Storm Sewers Project account ($275,000) and the TV & Cleaning Storm Drain Structures Project account ($200,000), per year, for a total allocation of $475,000

per year for the enhanced Drainage System Management and Repair Program.
In order to meet the Federal mandate, purchase of a new flusher/vacuum truck, televising equipment, and the addition of 3 Equipment Operators (EOs) to run storm sewer inspections throughout the City on a full time basis is required. The inspection and cleaning crew will be comprised of an EO III, EO II, and EO I. The EO III will lead the crew, document daily work activities and fill out timesheets, operate the televising equipment and review the video, inspect the stormwater lines, and record malfunctioning components of the inspected storm sewer system. The EO II will operate the flusher/vacuum truck to adequately prepare the stormwater lines for televising. The EO I will assist with preparation and maintenance of equipment and other resources used during daily inspections and provide traffic control and other related duties while inspections are being conducted.
The Drainage Foreman is requested to be reclassified to Drainage Coordinator as this employee would be coordinating additional on-street and off-street drainage facility maintenance activities, coordinating both the current street sweeping operations, the current drainage maintenance program, and the new inspection and repair program.

Budget Impacts: Line Items	
Line Item	**Budget Impact**
Enter the line items this proposal will affect. Have both additional costs and any increased revenues been considered in the Total Budget Impact calculation?	Enter budget dollars.
Drainage Maintenance Coordinator (Reclassification) PG 49 Step 11 Equipment Operator I PG 29 Starting Salary plus 35% benefits Equipment Operator II PG 33 Starting Salary plus 35% benefits Equipment Operator III PG 38 Starting Salary plus 35% benefits	$3678. $37,121. $40,912. $47,247.
Uniforms (3 E.O.'s) Boots (3 E.O.'s)	$750.00 $450.00
Vacuum Truck Fleet Expenses (Rent, Fuel and Maintenance) Est.	$60,000
Capital Equipment Purchases: Vacuum Truck T.V. Equipment	 $360,000 $4,000

Budget Impacts: Incidental Costs	
Internal Service Fund	**Budget Impact**
Enter any additional incidental costs this proposal will require. For example, will a new position require a stipend, radio, vehicle, computer or VPN access? Enter any such items here.	Enter budget dollars.
Cell Telephone (Drainage Maint. Coord.)	$360.00
Computer	$1,800.00
Radio	$4,000.00

March 27, 2015

Mr. Curtis Porterfield
Lakes & Stormwater Manager
City of Lakeland
407 Fairway Avenue
Lakeland, FL 33801

Via Email: Curtis.Porterfield@lakelandgov.net

Re: Scope of Services
Major Outfall Pollutant Load Comparison
Amec Foster Wheeler Project No. 600319.6

Dear Curtis:

As requested by the City of Lakeland (COL), Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) is pleased to provide you with a proposal of professional services to assist with ongoing compliance efforts associated with the Year 3 MS4 permit for the COL. The work will generally include assisting the City in the estimation of pollutant loads from the City's major outfalls to the receiving waters for Years 1999, 2006 and 2014 which are the Year 3 reporting years for the Cycle 1, Cycle 2 and Cycle 3 permits, respectively.

POLLUTANT LOADING ESTIMATES FOR OUTFALLS

Amec Foster Wheeler will provide engineering services to estimate the pollutant loads for all major MS4 outfalls for the three reporting years: 1999, 2006, and 2014. Based on our review of the City's information, there are 119 major outfall pipes and 19 major outfall ditches. The following items will be completed:

a. Obtain 1999, 2006, and the appropriate recent land use data from the City or SWFWMD's GIS library. A land use comparison will be made for the different years to make sure the land use designation is consistent from year to year. We have noticed in the past that SWFWMD used a more detailed or less detailed FLUCCS coding between different years and this can impact landuse designation (and therefore EMC choices). We want to ensure landuses are classified on a consistent basis so that landuse designation on its own does not cause a pollutant change when it is not justified.

   Note: It is assumed the COL has delineated the drainage basin for all of the major outfalls. If this has not been performed, we will need to add that task and associated budget into the scope of work.

b. Identify ERPs that were in place in the MS4 outfall basins during those three time periods. Determine the sub-basins that are treated by each ERP BMP (area and land use). As an alternative, should the COL's Stormwater Utility GIS information have coverages for parcels with BMPs (for utility fee credits), that will be used instead of or to supplement the ERP coverage.

c. Estimate loads (total phosphorus, total nitrogen, biochemical oxygen demand, total copper, and total zinc) for the MS4 basin using event mean concentrations for each land use, and then subtract the pollutant load reduction from each BMP based on cited efficiencies. Note: individual ERPs will not be reviewed. Instead, we will assume that the standard technology-based criteria (1/2" dry retention; 1" and 14 day residence time for wet detention) were used in the designs. Net loads for each outfall as well as for the receiving waters (by WBID) will be estimated.

d. A table to compare 1999, 2006 and 2014 loads will be developed and will include lb/yr estimates as well as % change between permit cycles. Pollutant load yields (lb/ac/yr) will also be computed to provide for comparative evaluation of individual outfall loads.

Deliverable:

Amec Foster Wheeler will provide to the County the following deliverables:

a. Draft deliverables will be submitted to the COL for review. Amec Foster Wheeler will incorporate changes for the final submittal.

b. Functional GIS database with the watershed boundaries and land use information for each of the major outfalls.

c. Accompanying spreadsheets containing land use data and the associated pollutant loadings based on the methodology developed in the Draft Environmental Resource Permit Stormwater Quality Applicant's Handbook (FDEP and Water Management Districts, March 2010).

d. Summary report documenting the GIS system with a comparative table for pollutant loadings (lb/year and % change).

Additional copies will be provided upon request.

SCHEDULE

The services described above will be initiated within seven days of receiving the signed work order. All tasks will be completed within two months following the receipt of notice to proceed and the required information from the COL.

DELIVERABLES

Deliverables are defined in the individual tasks above.

PROPOSED BUDGET

Amec Foster Wheeler will complete the services within a not to exceed cost of $21,492**.** The project will be invoiced monthly in accordance with the rate schedule provided in our General Services Agreement. If project costs exceed the estimate, Amec Foster Wheeler will notify you and request written authorization, in the form of a Change Order, prior to exceeding the estimated costs.

We are prepared to begin immediately upon receiving the Notice to Proceed from the COL. Please feel free to contact us at (863) 667-2345 to discuss any questions that you might have. We appreciate the opportunity to submit our proposal, and look forward to working with you to complete this project.

Sincerely,

Timothy J. Kelly, PE, CPSWQ
Project Manager

Michael Phelps, PE
Office Manager

TJK/MDP/tjm

City of Lakeland - Major Outfall Pollutant Loading Estimation

Amec Foster Wheeler Project No. 600319.6

Budget Support Spreadsheet

March 27, 2015

RESPONSIBLE STAFF	Project Mgmt. & Coordination	Pollutant Loading Estimations/ Draft Report	Final Deliverables	Total Hours	Rate ($/Hr)	Total Cost
Associate	2	4	2	8	$165	$1,320
Senior Professional	0	0	0	0	$152	$0
Project Professional	2	146	8	156	$120	$18,720
Senior CADD/GIS Technician	0	0	0	0	$108	$0
Senior Field Technician	0	0	0	0	$80	$0
Administrative/ Clerical	2	16	6	24	$60	$1,440
				0	$0	$0
TOTAL HOURS	6	166	16	188		
TASK LABOR COST	$690	$19,140	$1,650			**$21,480**
EXPENSES				Sheets	$/Sheet	Cost
Color copies	0	0	0	0	$1.40	$0
Shipping	$0	$6	$6			$12
Total Expenses	$0	$6	$6			**$12**
TASK TOTAL	**$690.00**	**$19,146.00**	**$1,656.00**			**$21,492**

City of Lakeland Stormwater Management Plan

FY15 Update

CITY OF
Lakeland
www.lakelandgov.net

TABLE OF CONTENTS

APPENDIX

City of Lakeland Stormwater Management Plan

The City of Lakeland's (COL) Stormwater Management Plan (SWMP) consists of four distinct but integral elements:

1. The COL National Pollutant Discharge Elimination System (NPDES) Annual Report and the respective documented activities
2. The COL Ambient Monitoring Program (AMP)
3. The COL Total Maximum Daily Load (TMDL) Prioritization and Implementation Plan
4. The COL Comprehensive Lakes Management Plan (CLMP)

The COL NPDES Annual Report documents all the legally required activities performed by the COL in relation to managing and operating its Municipal Separate Storm Sewer System (MS4). Detailed information of such is provided annually to the Florida Department of Environmental Protection (FDEP). A "Strengths vs Weaknesses" summary of recurring COL NPDES-related activities is provided herein.

The COL AMP is aimed at capturing general water quality trends in receiving waterbodies throughout the COL. It is conducted on a routine basis and is described in more depth herein; including a discussion of current general water quality results. More detailed water quality data assessments are conducted in accordance with the TMDL Prioritization and Implementation Plan and the Comprehensive Lakes Management Plan.

The COL TMDL Prioritization and Implementation Plan is a site-specific water quality plan required by the NPDES MS4 permit. The plan aims to prioritize and schedule water quality improvement projects for the subset of COL lakes that have a TMDL. This program's report is updated as-needed and provided to the Florida Department of Environmental Protection (FDEP) accordingly. The most updated (FY15) version of this report has been included in the appendix for reference.

The COL CLMP identifies which in-lake remediation and stormwater retrofit projects are the most feasible (for all lakes regardless of regulatory status) given the various constraints including but not limited to: available land, COL monetary resources, existing in-lake conditions, existing MS4 conditions, legal requirements, and general COL water quality objectives. The COL CLMP update is currently under development; the scope of services of such is included in the appendix of this report for reference.

Strengths vs Weaknesses Summary – NPDES Activities

The following is a summary and evaluation of activities conducted by the COL and reported to the FDEP in the NPDES Annual Report. The detailed data associated with this report is available upon request.

1. MS4 Structural Control Inspections and Maintenance

General requirement: ensure all structural control are properly maintained and inspected.

Strengths

The COL has experienced drainage personnel in the Construction and Maintenance Division (C&M) dedicated to inspecting and maintaining the MS4 system. The COL work order database system (Lucity) ensures accurate storage of all MS4 inspection and maintenance data. C&M drainage personnel work closely with the Lakes & Stormwater Division (L&S) to ensure MS4 inspection and maintenance activities are prioritized and directed according to the requirements of the NPDES permit. The Engineering Division (Engineering) also partner with L&S in this effort by ensuring GIS MS4 data is readily available and up-to-date.

Weaknesses

The COL is currently not meeting the NPDES requirement to inspect 10% of the total MS4 pipe system annually.

Revisions to Address Weaknesses

The FY15 Acquisition of 3 C&M Equipment Operators and the lease of a Flusher/Vacuum Truck will ensure inspections of the MS4 pipe system occur at the frequency required.

2. Development and Redevelopment Project Reviews

General requirement: ensure all development and redevelopment projects are properly regulated to prevent negative downstream MS4 and receiving waterbody impacts.

Strengths

The COL requires all new and re-development projects be appropriately permitted. Once a projected is approved and permitted by the COL, Engineering ensures each project meets current COL Land Development Regulations and the applicable State permitting requirements.

Weaknesses

The current process for ensuring applicable State permits (and associated plans) are on site before construction begins needs improving.

Revisions to Address Weaknesses

COL L&S and Engineering are currently working together to develop a consistent process to ensure all required permits (and associated plans) are reviewed and on site prior to initiation of construction.

3. Roadway Debris Maintenance

General requirement: ensure roadways are properly maintained to prevent negative downstream MS4 and receiving waterbody impacts.

Strengths

The COL has robust street sweeping and litter control programs. Street sweeping activities are directed according to the NPDES permit requirements and sediment loads removed from roadways, baffle boxes, MS4 pipes, and inlet baskets are tracked to ensure reliable calculations of total annual tonnage removed.

Weaknesses

Sediment and debris collected cannot currently be tracked to accurately identify the respective loads removed per waterbody basin.

Revisions to Address Weaknesses

L&S is currently working with a consultant to evaluate the City's entire street sweeping program and recommend improvements to operations and data tracking where necessary.

4. Flood Control Projects

General requirement: ensure all flood control projects also include stormwater treatment when possible.

Strengths

When COL flood control projects are in the design phase, Engineering consults with L&S to ensure the design also maximizes stormwater treatment.

Weaknesses N/A

Revisions to Address Weaknesses N/A

5. Waste Treatment, Storage, and Disposal (TSD) Facility Inspections

General requirement: ensure all TSD facilities are properly inspected and maintained.

Strengths

All COL TSD facilities are participants in the COL Hot Spot Inspection Program. This program consists of routine inspections (monthly and/or annually) at each facility for compliance with applicable stormwater regulations. The facility inspections include an annual summary inspection report. Inspection reports identify areas for improvement with suggested corrective actions.

Weaknesses N/A

Revisions to Address Weaknesses N/A

6. Pesticide, Herbicide, and Fertilizer Best Management Practices (BMPs)

General requirement: ensure City and City-contract personnel who apply fertilizers, herbicides, and pesticides are properly trained and certified to do so.

Strengths

All COL herbicide and fertilizer applicators are Florida Department of Agriculture and Consumer Services (FDACS) certified and have completed the Green Industry BMPs training. Applicable personnel are educated and supplied with refresher training as necessary. The COL also adopted the Polk County Fertilizer Ordinance in FY14.

Weaknesses N/A

Revisions to Address Weaknesses N/A

7. Illicit Discharge Detection and Elimination (IDDE) Program

General requirement: ensure that illicit discharges to the City's MS4 are inspected and corrective action provided.

Strengths

A stormwater hotline is provided by the COL for reporting suspected illicit discharges and/or environmental code violations occurring throughout the City. An access database is designated specifically to track this program. City staff and private industry personnel are provided with IDDE training annually. Proactive and reactive IDDE inspection programs are implemented by City, County, and applicable FDOT staff. The aforementioned agencies share information, report observed violations in one another's jurisdictions, and conduct proactive/reactive inspections together when necessary. The City's public outreach and education program includes IDDE topics in the various media disseminated to the general public.

Weaknesses

Lack of COL environmental code enforcement in the past has constrained the program's goal of significantly reducing illicit discharges City-wide.

Revisions to Address Weaknesses

L&S continues to conduct proactive IDDE inspections and seek corrective action accordingly. Additionally, a more robust inspection schedule of industrial facilities has been implemented by L&S. More importantly, the City recently finalized the acquisition of a COL Environmental Code Enforcement Officer to provide enforcement of City environmental code and issuance of fines where applicable.

8. High-risk Industrial Inspections

General requirement: ensure High-risk Industrial facilities in the City are inspected for compliance with the applicable stormwater regulations.

Strengths

High-risk industrial facilities located within the City limits are identified and inspected on a routine basis to ensure that stormwater pollution control measures are in place and that each facility is in compliance with NPDES regulations. A comprehensive summary report is provided to the facility after each inspection, which identifies areas of concern and/or non-compliance and suggested corrective actions. Additionally, a follow-up inspection is completed when necessary. L&S offers training to high-risk facility employees to educate them on stormwater pollution prevention and IDDE procedures. An access database is designated specifically to track this program. All high-risk facilities in the current inventory hold an up-to-date industrial FDEP NPDES permit.

Weaknesses N/A

Revisions to Address Weaknesses N/A

9. Construction Site Inspections

General requirement: ensure construction sites are properly inspected and BMPs enforced to prevent negative downstream MS4 and receiving waterbody impacts.

Strengths

COL has 3 Engineering Inspectors certified and trained to conduct sediment & erosion control (S&E) BMP inspections of City commercial construction sites. The inspectors attend construction kick-off meetings and provide education to contractors on the required S&E BMPs and State permit requirements. The inspectors also perform the required construction site inspections and attend weekly construction progress meetings as warranted. L&S inspect residential construction sites to ensure proper S&E BMPs are utilized and maintained appropriately. Commercial construction site inspection activities are documented and tracked in the applicable Engineering database; residential construction site inspection activities are documented and tracked in the applicable L&S database.

Weaknesses

Lack of ability in the past to enforce S&E BMPs and require clean-up of released sediment from all construction sites has constrained success in this area.

Revisions to Address Weaknesses

In FY15 the COL acquired an Environmental Code Enforcement Officer to enforce COL environmental code and require proper S&E BMP installation and maintenance

COL Ambient Monitoring Program

L&S in coordination with the Polk County Natural Resources Division monitors the following 15 lakes within and/or bordering COL municipal boundaries:

1. Lake Bonnet
2. Lake Beulah
3. Lake Wire
4. Lake Hunter
5. Lake Morton
6. Lake Horney
7. Lake Hollingsworth
8. Lake John
9. Lake Somerset
10. Lake Gibson
11. Lake Crago
12. Lake Parker
13. Lake Mirror
14. Lake Bonny (including Little Lake Bonny)
15. Crystal Lake

All 15 lakes are analyzed for the following suite of parameters:

1. Alkalinity
2. Chloride
3. Chlorophyll (Chl-a)
4. Corrected Chlorophyll
5. Color
6. Sulfate
7. Total Hardness
8. TSS (Total Suspended Solids)
9. Turbidity
10. Ca (Calcium)
11. Fe (Iron)
12. Mg (Magnesium)
13. Na (Sodium)
14. NH3 (Ammonia)
15. TKN (Organic Nitrogen)
16. NOx (Nitrogen Oxides)
17. TN (Total Nitrogen)
18. OP (Soluble Reactive Phosphorus)
19. TP (Total Phosphorus)

The 15 aforementioned lakes are sampled on a quarterly basis (4 times a year) barring accessibility issues. The premise of the City's ambient monitoring program is to track

long-term trends in lake water chemistry due to hydrologic variations, landuse changes, implementation of stormwater BMPs, and implementation of in-lake remediation projects.

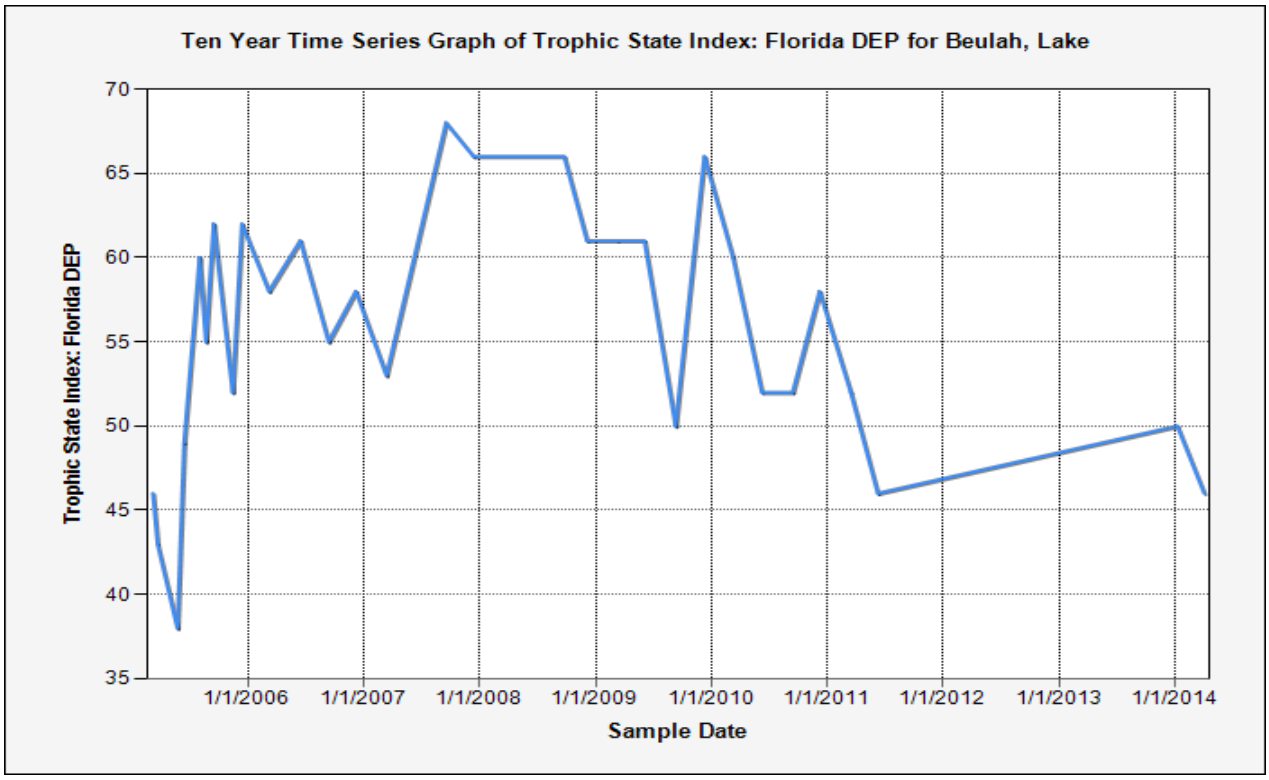
Ambient Monitoring Program Results

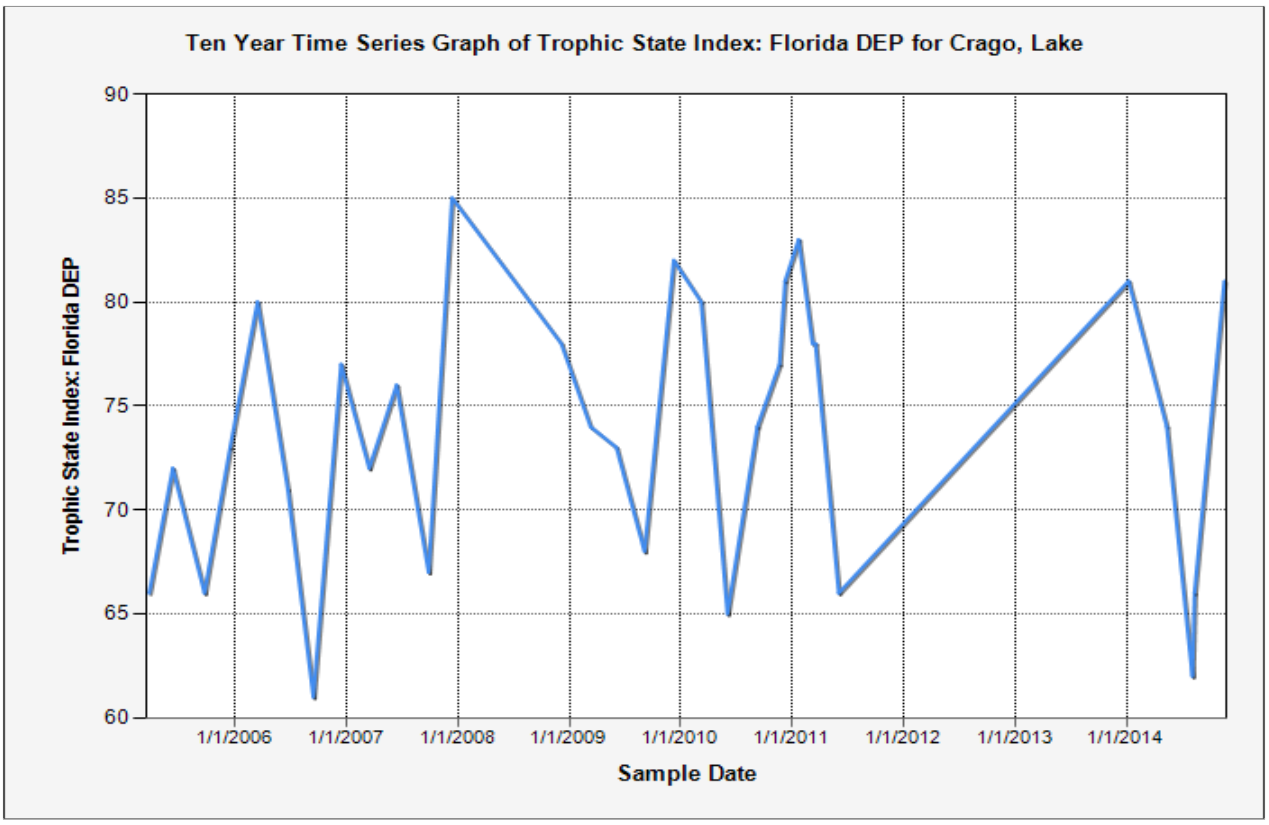
Detailed site-specific data analyses are provided in the deliverables associated with the TMDL Prioritization and Implementation Plan and the COL CLMP. The AMP's intent is to assess general in-lake water quality trends. The COL utilizes the Trophic State Index (TSI) to track long term trends of parameters of concern (TN, TP, Chl-a). Although this indicator is somewhat dated in terms of the currently used regulatory water quality parameters, it is still a reliable indicator of eutrophication in waterbodies.

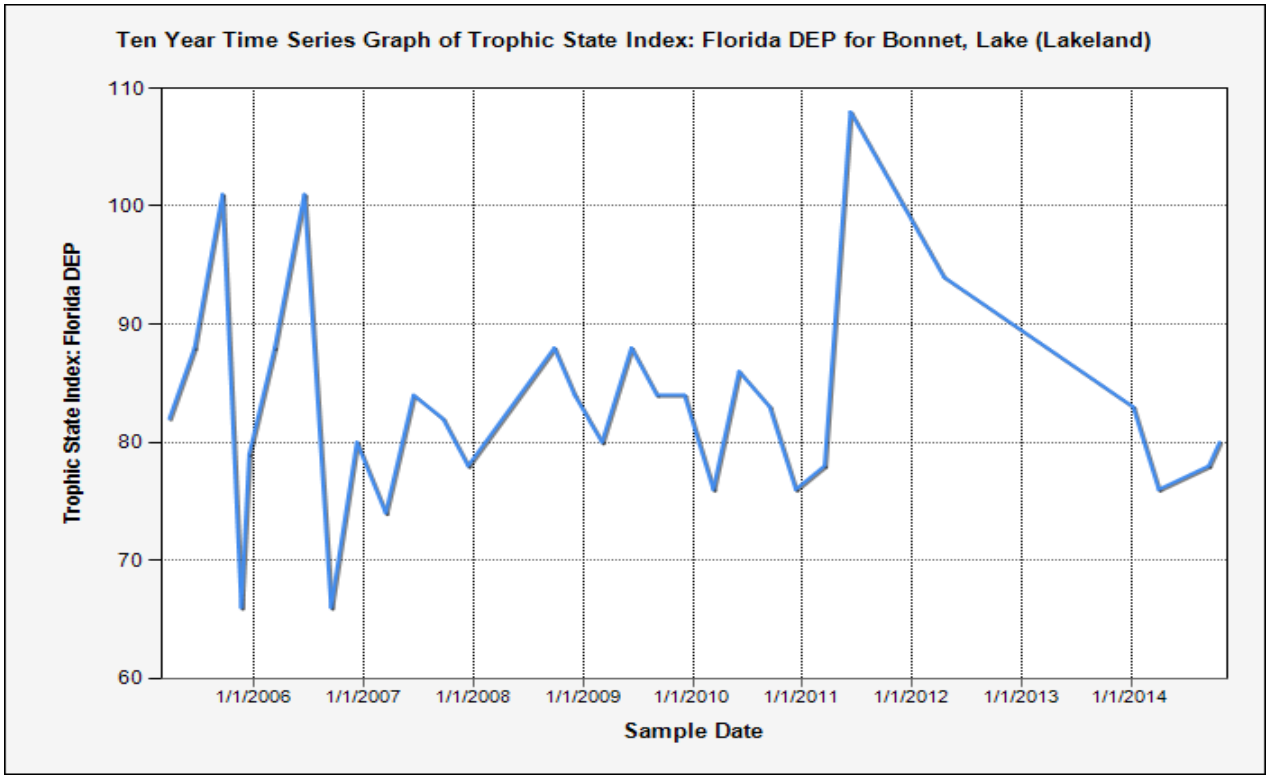
Annually, the COL reviews TSI data and graphically represents the results to give a general "snap shot" of current in-lake nutrient and algal biomass conditions. The most current TSI graphs are provided below. Every 5 years, a more detailed COL Lakes Report is published that documents the trends of all in-lake chemistry analytes. This report is currently being assembled and will be provided in the FY16 SWMP update.

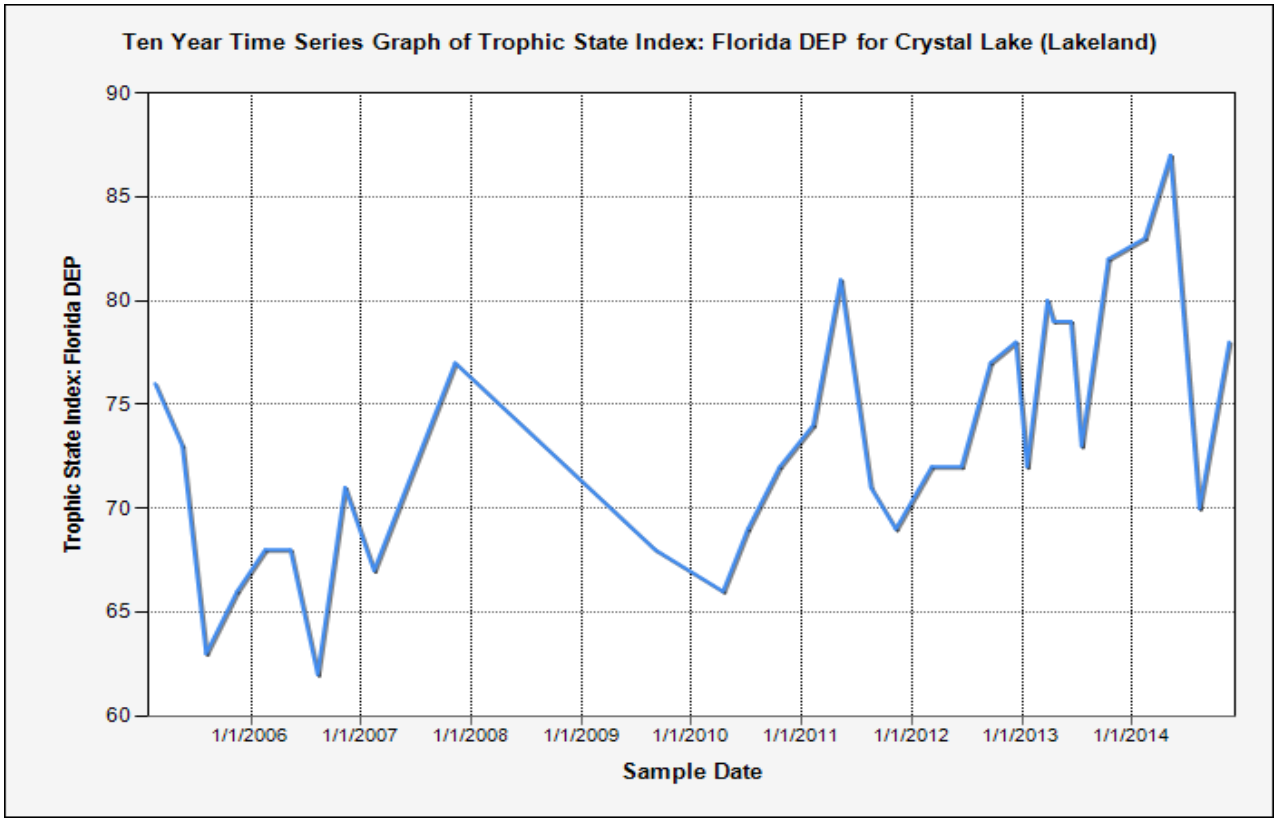
The following TSI charts reflect in-lake nutrient and Chl-a conditions for each of the 15 sampled COL lakes.

TSI Graphs – COL Lakes




Ten Year Time Series Graph of Trophic State Index: Florida DEP for Crago, Lake
Trophic State Index: Florida DEP
90
85
80
75
70
65
60
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Bonnet, Lake (Lakeland)
Trophic State Index: Florida DEP
110
100
90
80
70
60
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Crystal Lake (Lakeland)
Trophic State Index: Florida DEP
90
85
80
75
70
65
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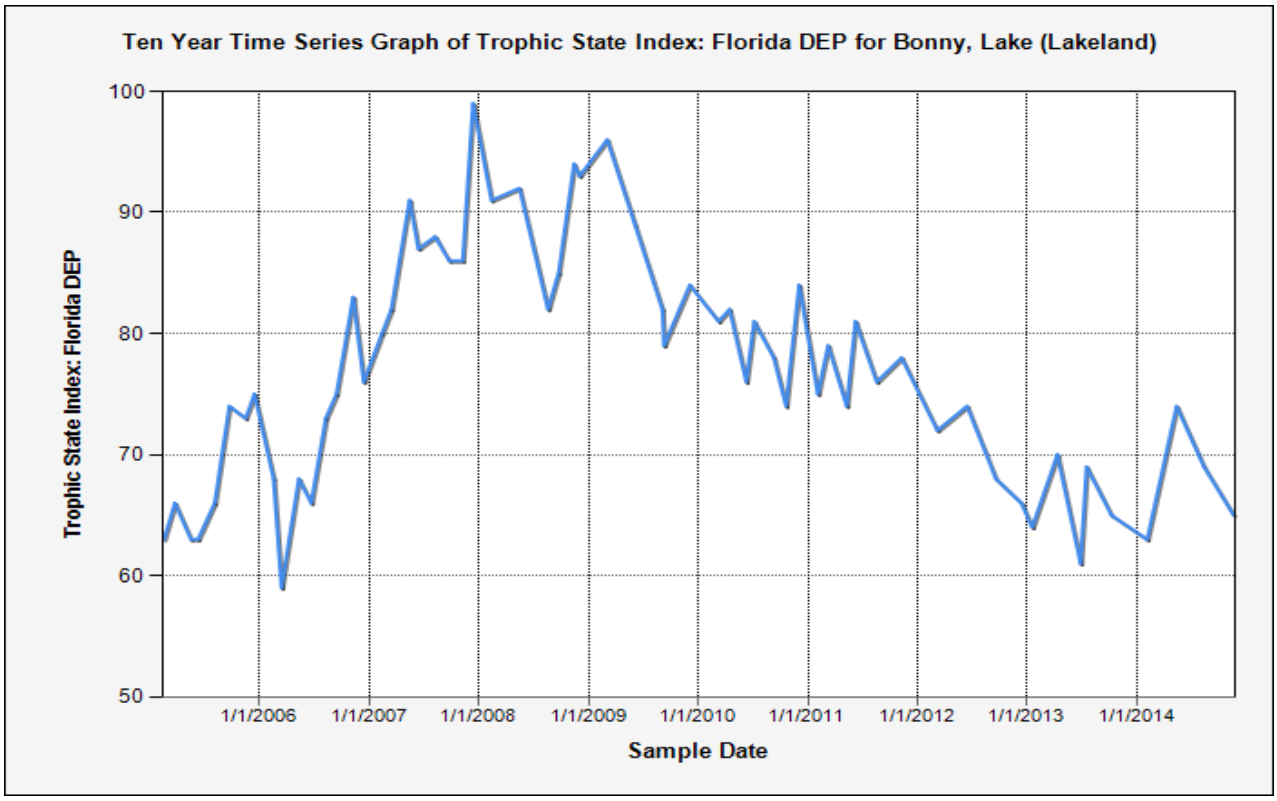
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Bonny, Lake (Lakeland)
Trophic State Index: Florida DEP
100
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1/1/2006
1/1/2007
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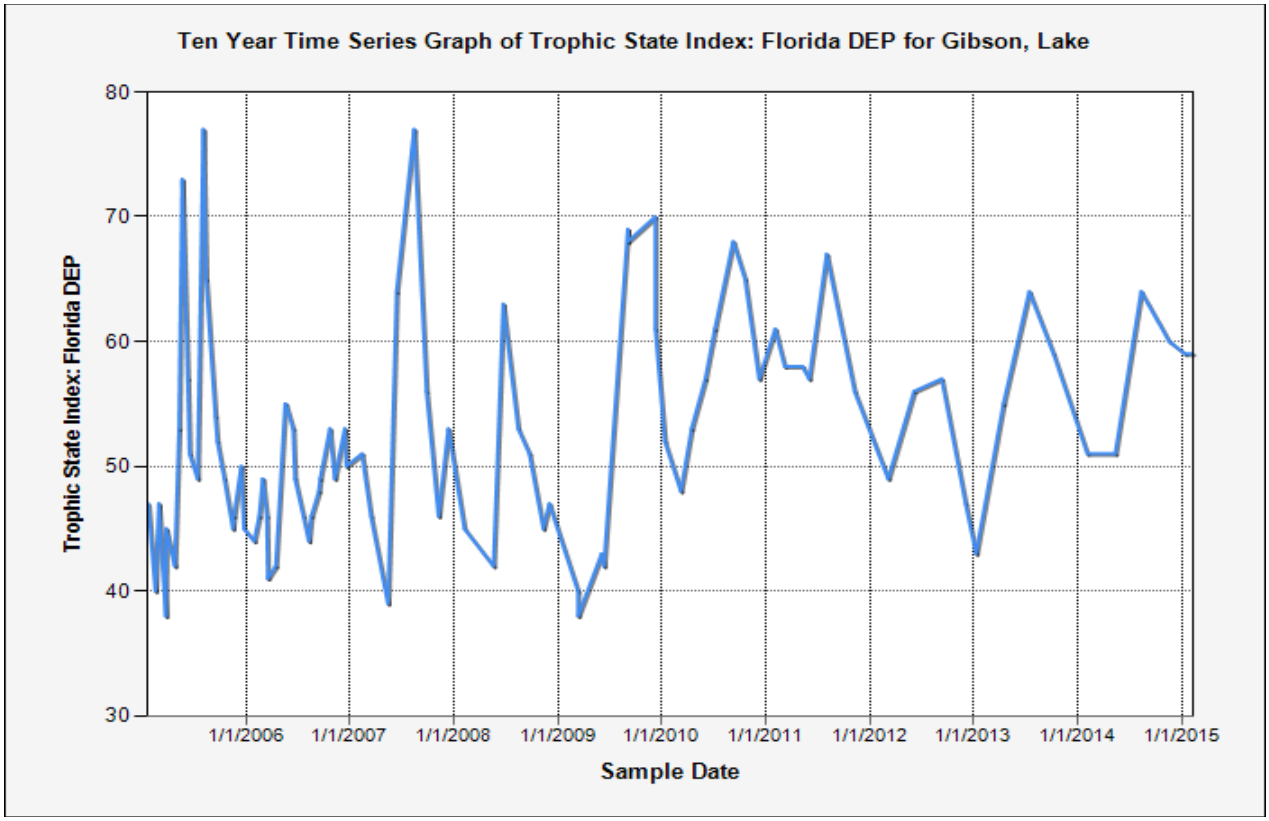
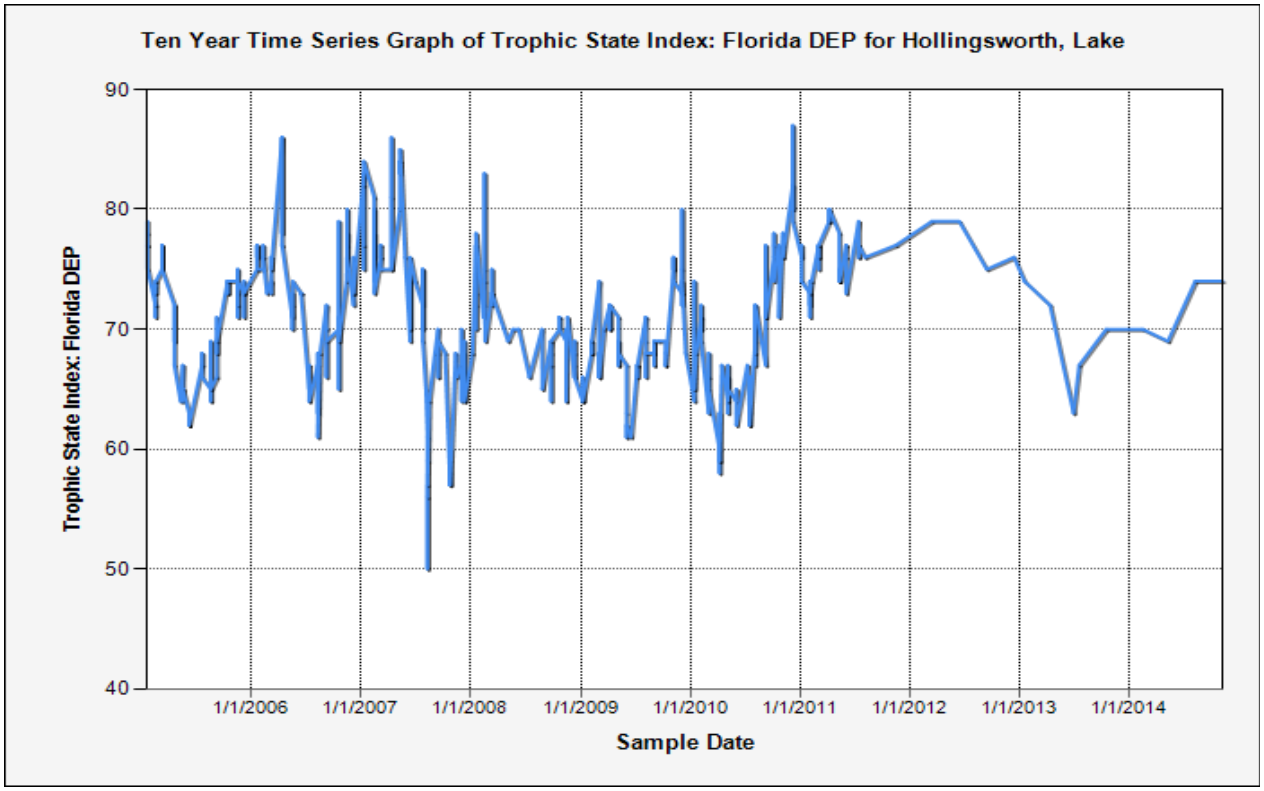
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Gibson, Lake
Trophic State Index: Florida DEP
80
70
60
50
40
30
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
1/1/2015
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Hollingsworth, Lake
Trophic State Index: Florida DEP
90
80
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1/1/2006
1/1/2007
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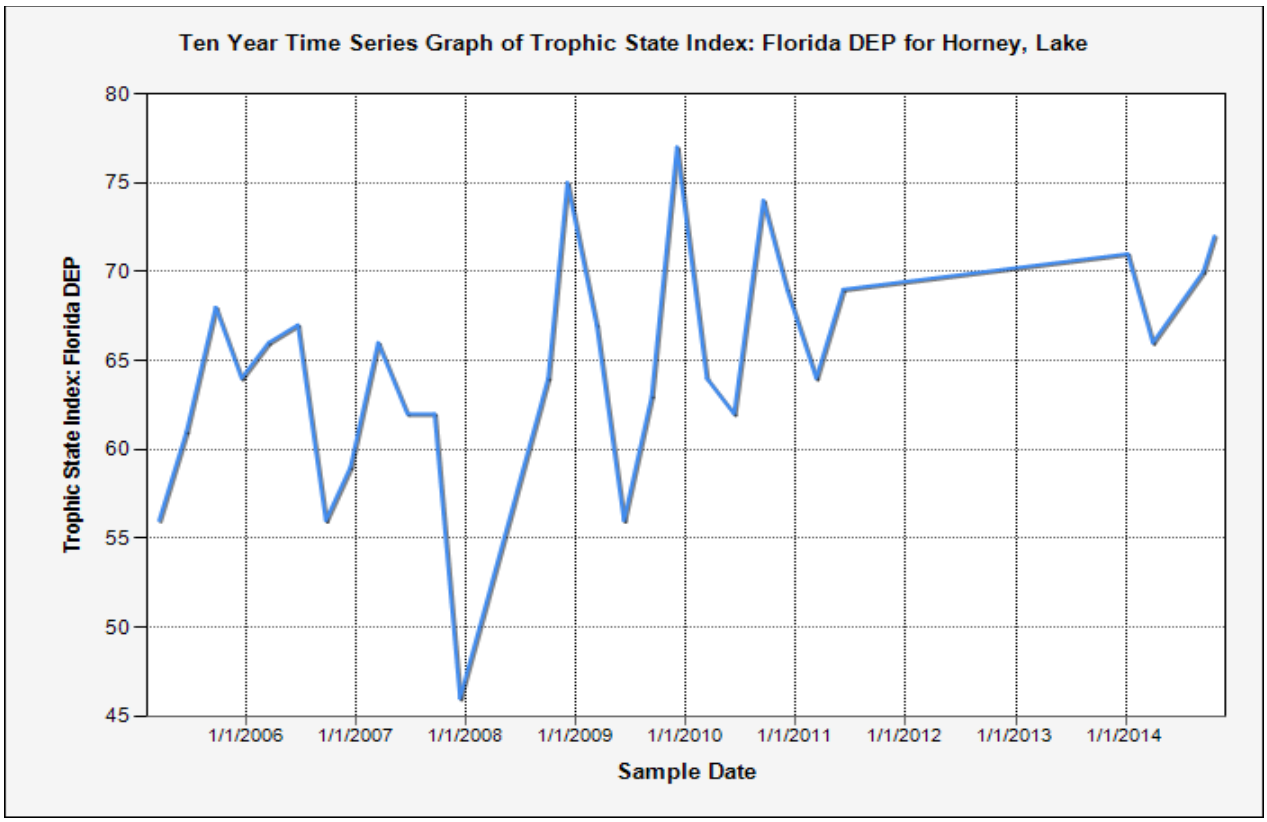
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Horney, Lake
Trophic State Index: Florida DEP
80
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70
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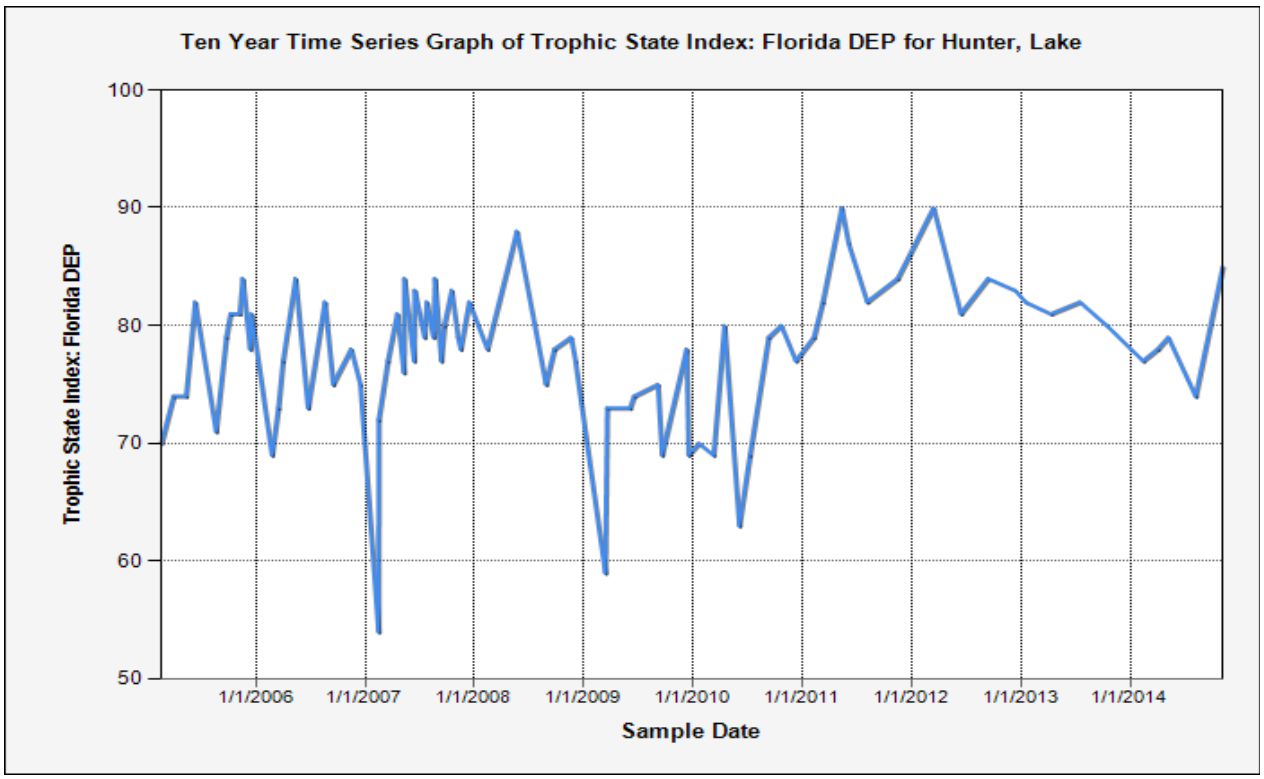
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Hunter, Lake
Trophic State Index: Florida DEP
100
90
80
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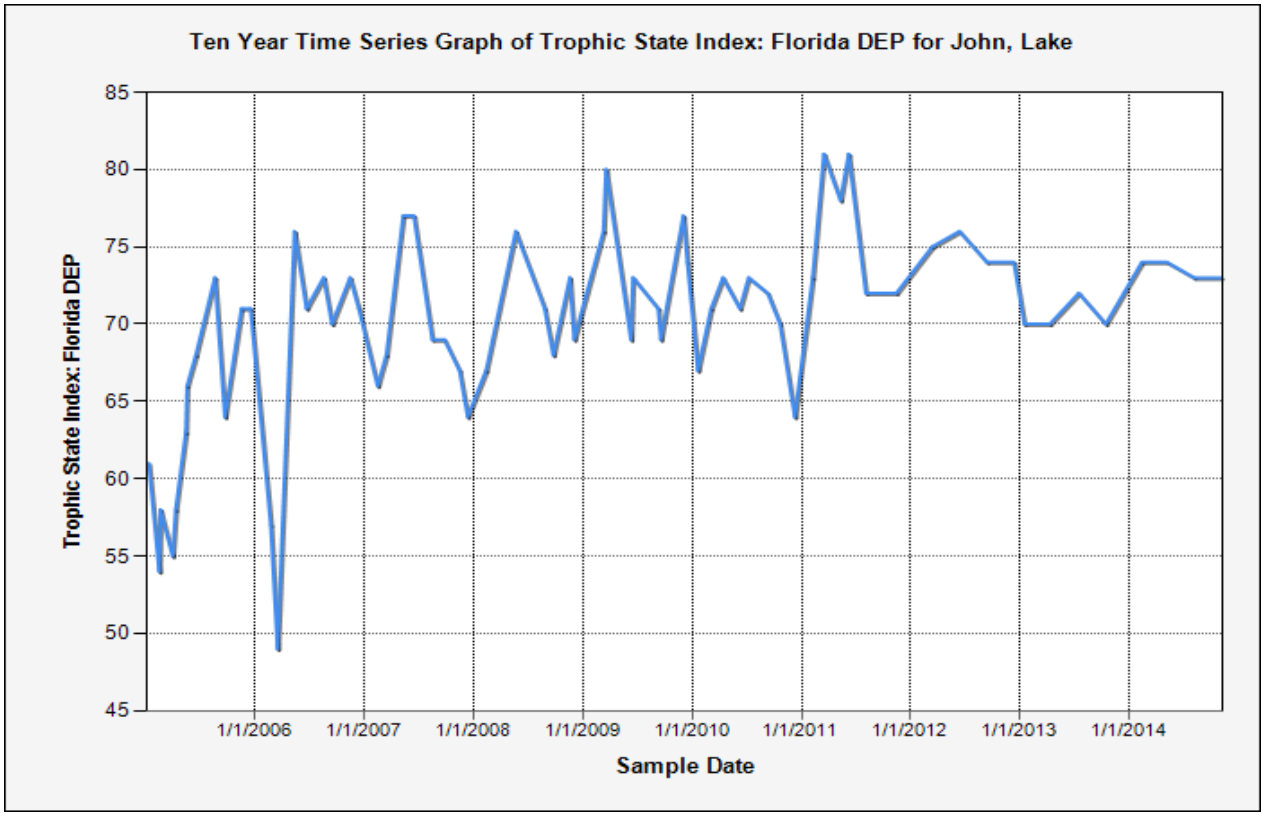
1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for John, Lake
Trophic State Index: Florida DEP
85
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1/1/2006
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1/1/2014
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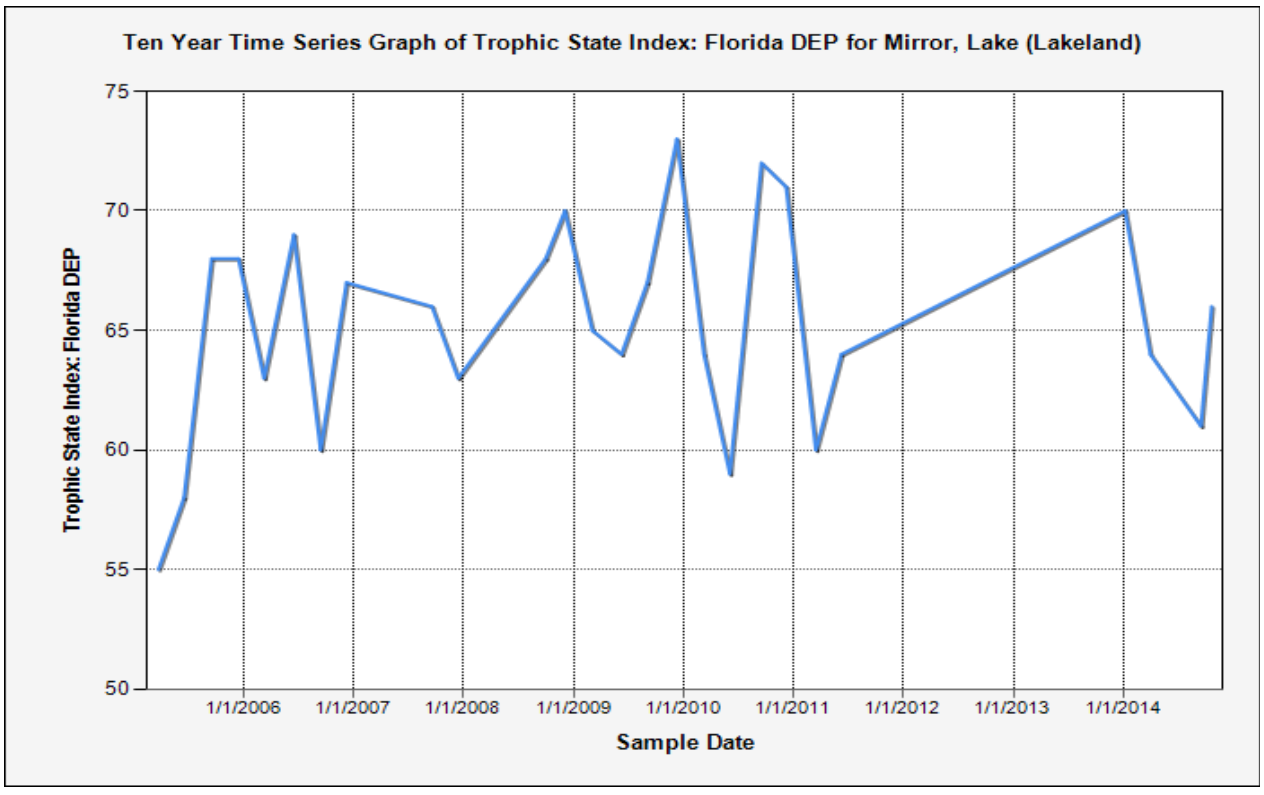
Ten Year Time Series Graph of Trophic State Index: Florida DEP for Mirror, Lake (Lakeland)
Trophic State Index: Florida DEP
75
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1/1/2006
1/1/2007
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1/1/2011
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1/1/2014
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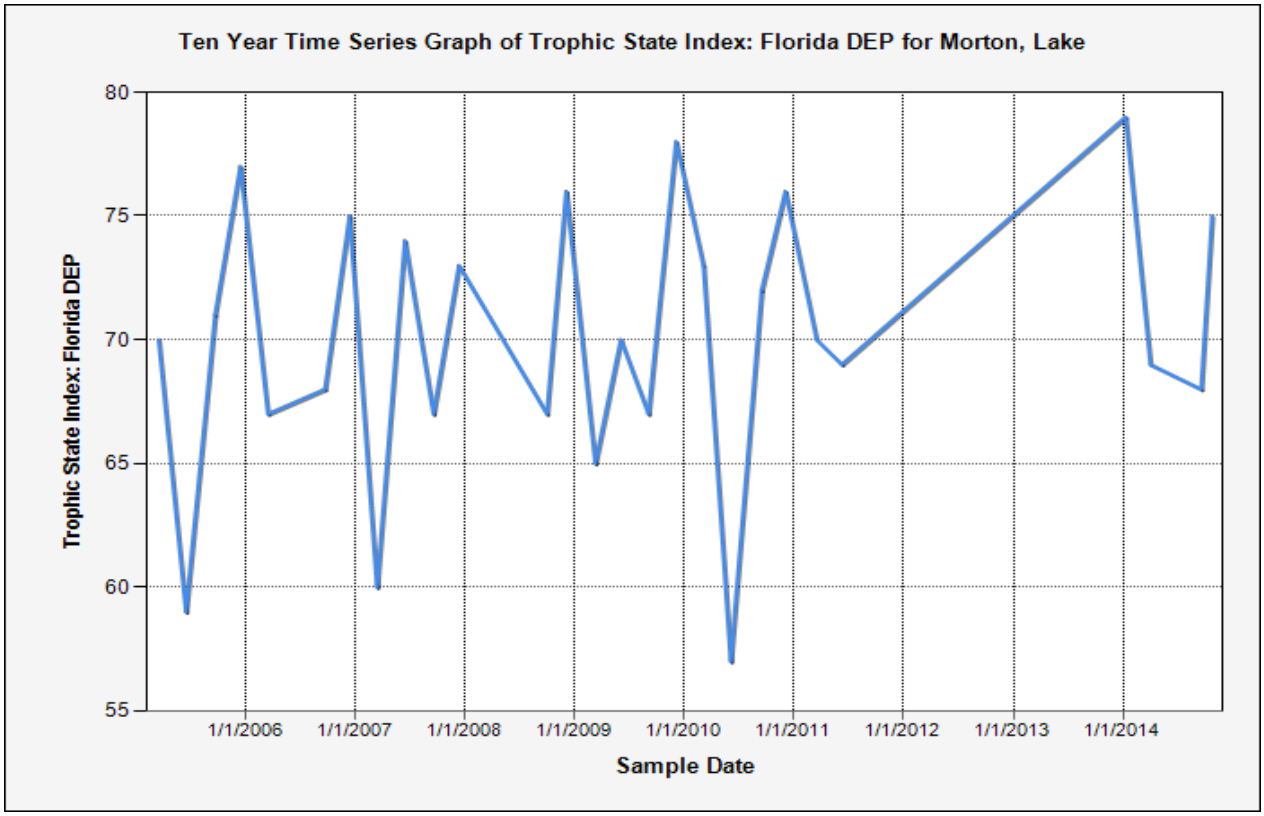
Ten Year Time Series Graph of Trophic State Index: Florida DEP for Morton, Lake
Trophic State Index: Florida DEP
80
75
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1/1/2006
1/1/2007
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1/1/2011
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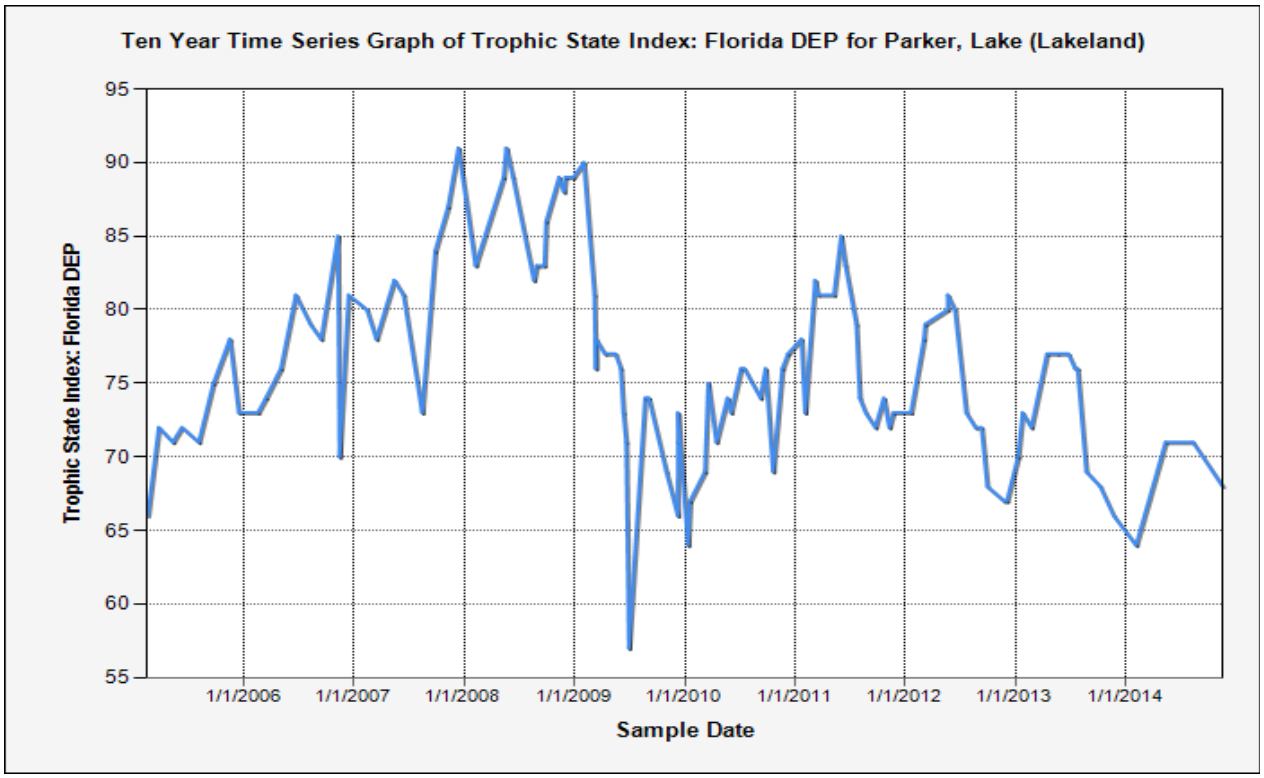
1/1/2013
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Parker, Lake (Lakeland)
Trophic State Index: Florida DEP
95
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60
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1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
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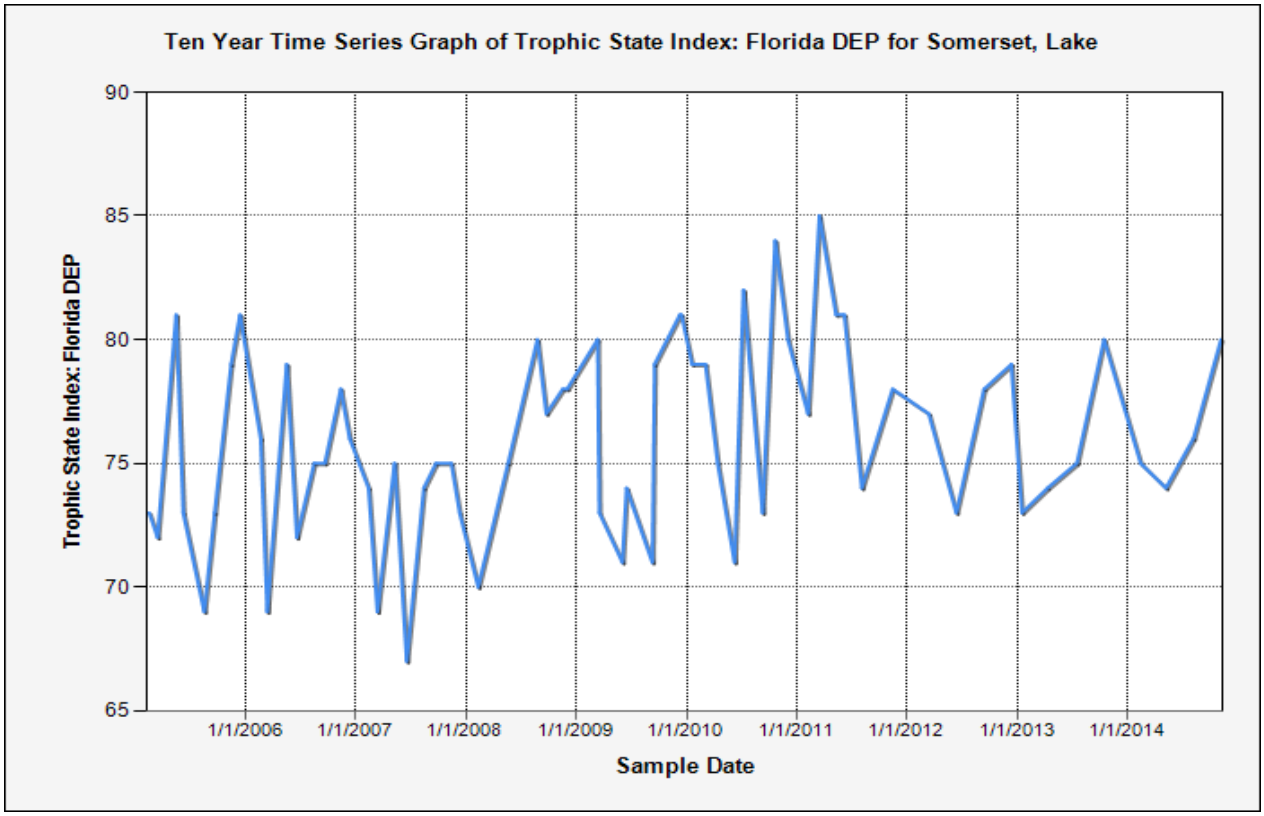
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Somerset, Lake
Trophic State Index: Florida DEP
90
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1/1/2006
1/1/2007
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1/1/2010
1/1/2011
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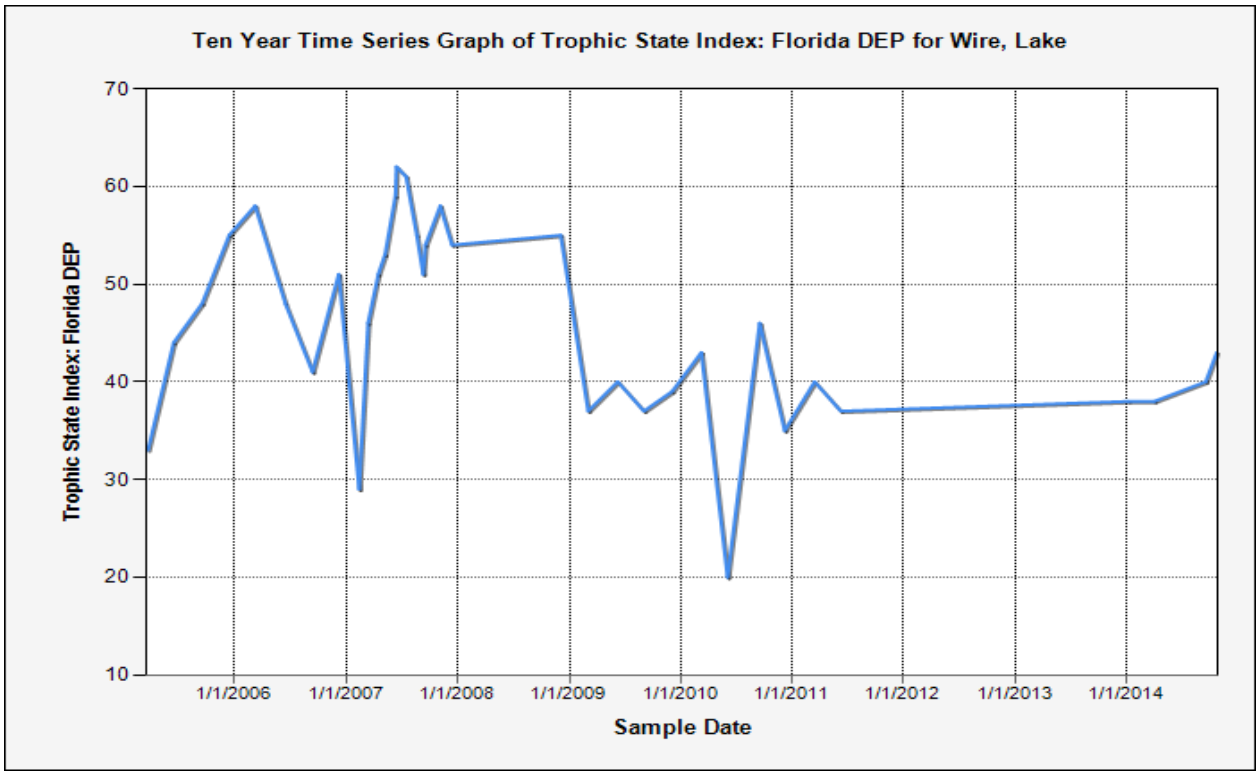
1/1/2014
Sample Date


Ten Year Time Series Graph of Trophic State Index: Florida DEP for Wire, Lake
Trophic State Index: Florida DEP
70
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1/1/2006
1/1/2007
1/1/2008
1/1/2009
1/1/2010
1/1/2011
1/1/2012
1/1/2013
1/1/2014
Sample Date

Stormwater Best Management Practices (BMPs)

The overall effect of implemented COL stormwater BMPs is a reduction of pollutants leaving the MS4 and a corresponding reduction in pollutant loads entering receiving waterbodies. Evidence of such is indicated by the relatively flat or, in some cases, decreasing TSI trends illustrated in the above TSI graphs (i.e. trophic sates of lakes are not increasing over the long term). In addition to TSI trend data, the following list documents verified field observations related to COL in-lake and MS4 improvements:

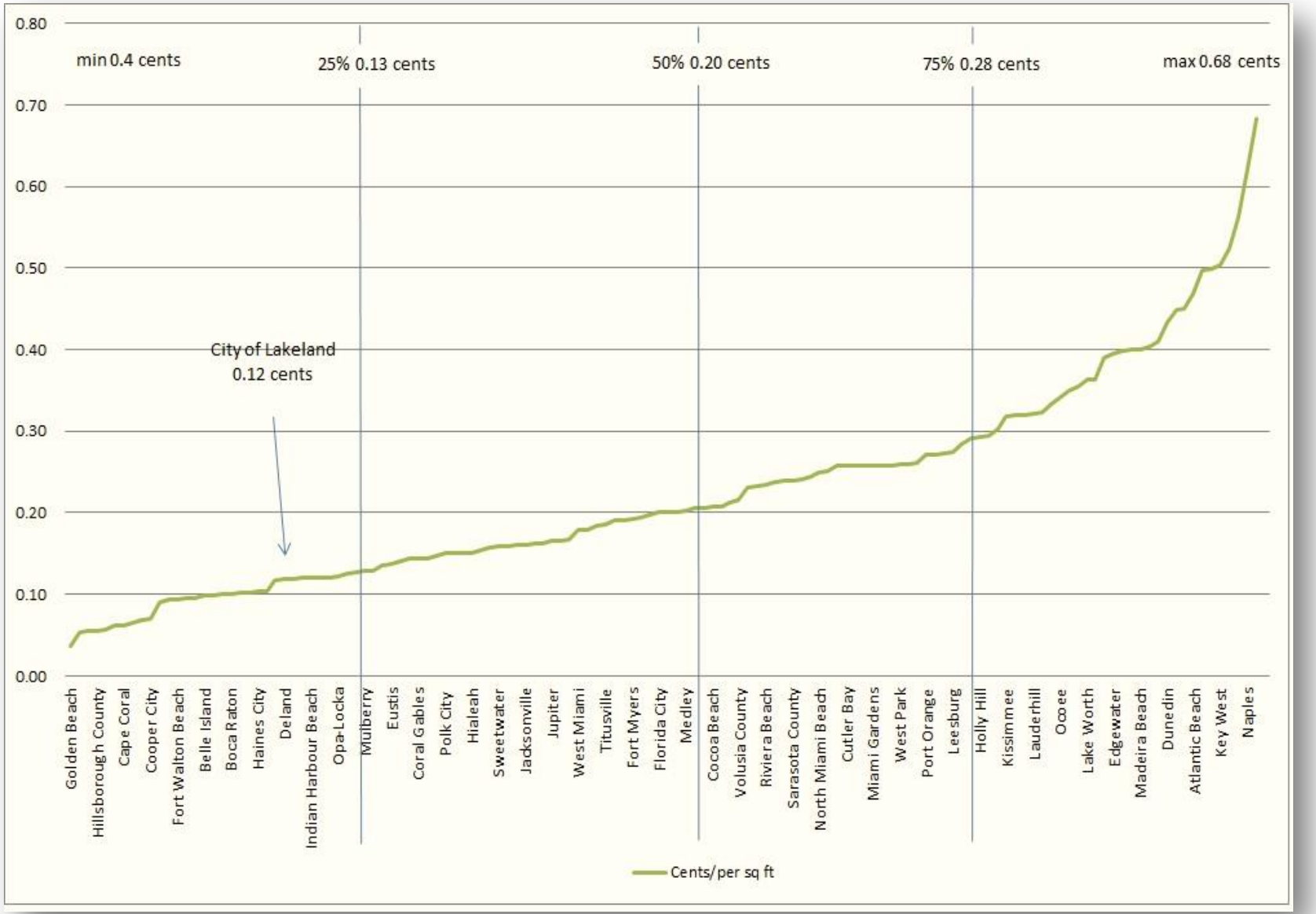
1. A reduction in floatable trash in the water column at major outfalls to lakes where baffle boxes, inlet baskets, and/or stormwater ponds have been installed up-gradient.
2. A reduction in turbidity-related problems in the water column of lakes where baffle boxes, inlet baskets, and/or stormwater ponds have been installed up-gradient.
3. A major reduction in lakeshore debris (trash, yard waste, sediment etc.) where inlet baskets are installed along lakefront roads.
4. A major reduction in debris accumulation in MS4 inlets and pipes since street sweeping was initiated.
5. Less scouring at outfalls during storm events due to up-gradient capture of stormwater pollutants in detention/retention facilities and/or other stormwater structural controls.
6. Improved lake littoral shelf ecological conditions (most noticeably aquatic plant diversity and abundance) where stormwater structural controls are implemented up-gradient.
7. More stable water-column oxygen levels due to decreases in organic debris loading during storm events where stormwater structural controls are implemented up-gradient.
8. A reduction of grass clippings and other yard debris in waterbodies City-wide due to educational outreach and IDDE inspection activities.
9. A reduction in sustained cyanobacteria blooms and related fish kills in COL lakes due to implementation of all aforementioned stormwater structural and non-structural controls.

COL Stormwater Utility

The COL Stormwater Utility (SWU) remains healthy and funds all elements of the SWMP discussed herein. The following 3 pages summarize the state of the SWU; page 16 documents projected SWU revenues from FY 2015 – FY 2020; page 17 graphically compares the current COL SWU fee relative to other SWU fees in Florida; page 18 highlights major recurring MS4-related activities/programs presently funded through the SWU.

	2015 (PROJ)	2016 (PROJ)	2017 (PROJ)	2018 (PROJ)	2019 (PROJ)	2020 (PROJ)
REVENUES:						
Revenues-Commercial	1,936,000	1,955,000	1,975,000	1,995,000	2,015,000	2,035,000
Revenues-Residential	2,419,000	2,443,000	2,467,000	2,492,000	2,517,000	2,542,000
Fees – Interfund	105,744	106,801	107,869	108,948	110,038	111,138
Investments & Earnings	143,959	141,695	141,470	164,256	162,075	164,112
TOTAL REVENUES	4,733,935	4,699,065	4,650,502	4,877,893	4,781,205	4,985,559

COL Projected Stormwater Revenues FY 2015 – FY 2020



COL Relative SWU Fee (FY15 Update

CIP Line Item	Comments
Stormwater O&M	Funds 7 positions and resources to administer the NPDES Permit and L&S Division programs/activities
Environmental Code Enforcement Officer	Funds 1 position to enforce COL environmental code
GIS Tech - Engineering	Funds 1 position for upkeep of MS4 GIS data
GIS Storm Sewer Inventory	Funds surveying of applicable MS4 infrastructure
Work Order System	Partially funds work order system (Lucity) to manage data related to all MS4 activities
Drainage Maintenance Ops and Maintain PCDs	2 Funds – together they fund 11 positions and resources to clean and inspect all outfalls, drainage easements, stormwater structural controls, and other related MS4 infrastructure
TV & Cleaning of Storm Sewer and Maint & Retrofit of Drainage Facilities	2 Funds – together they fund 3 positions and resources to inspect 1.4 million linear feet of MS4 pipe system at a level of 10% per year (140,000 lf/yr)
Equipment - Drainage Maintenance Projects	Funds annual equipment purchases for MS4 maintenance and inspection activities
Street Sweeping Operations	Funds 6 positions and 6 street sweeper trucks to clean and maintain City roads, right of ways, and associated MS4 inlets
Contribution to LEAD	Funds outsourcing of NPDES-related education (specific to lakes protection)
Public Education Programs	Funds 1 position and resources to provide general NPDES-related educational outreach activities (multiple topics as required by the NPDES permit)
Contribution to Florida Friendly Landscaping	Funds outsourcing of NPDES-related education (specific to non-structural BMPs for landscape practices including fertilizer and pesticide application BMPs)
Lake Improvement Projects	Funds ambient monitoring program, small-scale water quality improvement projects, and some site-specific water quality studies
Lake Hunter TMDL Program	Funds implementation of studies and projects related to the FDEP Lake Hunter TMDL
Lake Parker TMDL Program	Funds implementation of studies and projects related to the FDEP Lake Parker TMDL
Lake Bonny TMDL Program	Funds implementation of studies and projects related to the FDEP Lake Bonny TMDL
Crystal Lake TMDL Program	Funds implementation of studies and projects related to the FDEP Crystal Lake TMDL

COL SWU Major Recurring Line Items

Summary of Conditions

Despite the encouraging TSI-trend and observational data, and despite significant COL investments to reduce stormwater loads entering waterbodies from the City's MS4, the in-lake monitoring data clearly show a major overarching theme; the nutrient and Chl-a levels in COL lakes are predominantly trending flatly over time. This indicates that, although nutrients (TN and TP) are certainly being reduced at the source and/or up-gradient, the major response variable (Chl-a) is not decreasing to the degree one would expect given the amount of stormwater structural and non-structural BMPs implemented by the COL. Continued in-lake monitoring over the next several years may indicate otherwise sine there is often a significant time-lag between BMP installation and in-lake response. However, it seems, given the long period of record for COL in-lake chemistry data, stormwater retrofitting and other non-structural stormwater BMPs cannot alone produce a significant reduction in downstream algal biomass. Based on historic and ongoing analyses of in-lake monitoring data by COL staff and its principal water quality consultants, it is evident that internal recycling of nutrients in a majority of COL lakes is the principal driving force behind high algal biomass levels, prolonged reduction in water column clarity, and overall sustained hypereutrophic conditions. To that end, the City's CLMP may strongly recommend more aggressive in-lake remediation strategies as opposed to solely relying on stormwater BMPs to meet general and/or TMDL water quality objectives.

In regard to the aforementioned disconnect between stormwater BMP implementation and respective downstream water quality responses, strategies to reduce pollutant loads and/or in-lake concentrations first require in-depth analyses and careful planning. Ongoing and future studies to analyze external (MS4) pollutant loads vs internal (in-lake) pollutant loads will help the COL better understand why Chl-a levels in most of our lakes are not appreciably declining.

Site-specific in-lake water quality and stormwater loading analyses relating to TMDL lakes will be reported to the FDEP as scheduled in the City's TMDL Prioritization and Implementation Plan. The City's CLMP was initiated this calendar year and, once finalized, will be foundational to how the City plans to meet its overall lake water quality objectives (including that of TMDL waterbodies). For reference, the current FY15 scope of services for the CLMP provided to the COL by ATKINS North America Inc. (ATKINS) is provided in the appendix.

Appendix –TMDL Prioritization and Implementation Report

COL TMDL Prioritization Report

City of Lakeland
NPDES-MS4 Permit # FLS000015-003

INTRODUCTION

This report represents the City of Lakeland's (COL) commitment to the process mandated by the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (EPA) to reduce pollutant loads entering Total Maximum Daily Load (TMDL) waterbodies from the City's Municipal Separate Storm Sewer System (MS4). Under permit # FLS000015-003 issued by the FDEP to Polk County and co-permittees, pollutant loads to TMDL waterbodies from the City's MS4 are required to be identified, quantified, and reduced to comply with the respective Waste Load Allocations (WLAs). WLAs are attained through specified percentage reductions of either stormwater loads or in-lake pollutant concentrations. These pollutants are to be reduced through a combination of structural and non-structural stormwater and/or in-lake Best Management Practices (BMPs).

NPDES Permit Requirements

Maximum Extent Practicable (MEP) Standard

The stormwater management program (SWMP) must be designed and implemented to reduce the discharge of pollutants from each permittee's MS4 to surface waters of the State to the Maximum Extent Practicable (MEP). Implementation of BMPs consistent with the provisions of the SWMP required pursuant to this permit constitutes compliance with the standard of reducing pollutants to the MEP. The MEP standard is applied to MS4s in recognition of the fact that an operator typically does not have total control over the quality or quantity of stormwater entering its system and ultimately entering waters of the State. SWMPs must be assessed and adjusted by the permittee, as part of an iterative process, to maximize their efficiency and make reasonable further progress toward an ultimate goal of reducing the discharge of pollutants to the extent necessary to protect receiving waters.

Requirements for waterbodies with adopted TMDLs and a BMAP

If a Basin Management Action Plan (BMAP) is already adopted, the MS4 operator must comply with the adopted action items assigned to the respective permittee. If a BMAP is in development and will be adopted within two years of permit issuance, the permittee shall continue to participate in the BMAP process and shall comply with the adopted provisions of the BMAP that specify activities to be undertaken by the permittee during the permit cycle.

Requirements for waterbodies with adopted TMDL but without a BMAP

The permittee shall prepare a TMDL Prioritization Report that includes, for each respective permit cycle, a list of waterbodies that have adopted TMDLs to which its MS4 discharges, a list of factors that will be used to prioritize the waterbodies, and the most up-to-date prioritized list of waterbodies with TMDLs.

Prioritized List of Adopted COL TMDLs

Table 1: Prioritized listing of TMDL waterbodies within the City of Lakeland's MS4 jurisdiction.

TMDL Waterbody	WBID	TMDL Status	TMDL Year	Verified Impairment	BMAP	No. COL Outfalls	Pollutant	MS4 WLA	TMDL/LA (lbs/yr)
Lake Hunter (1)	1543	FDEP Adopted / EPA Approved	2004	Yes	No	35[2]	TN	80% REDUCTION	6,579
							TP	80% REDUCTION	489
Lake Bonny (2)	1497E	FDEP Established	2015	Yes	No	412	TN	64% REDUCTION	N/A (concentration based reduction)
							TP	64% REDUCTION	N/A (concentration based reduction)
Crystal Lake (3)	1497A	EPA Established	2010	Yes	No	8[2]	TN	51.3% REDUCTION	487.2
							TP	79.2% REDUCTION	26.5
Lake Parker (4)	1497B	EPA Established	2006	Yes[1]	No	36	TN	57.4% REDUCTION	151,683.6
							TP	57.1% REDUCTION	30,480.7
Lake Hollingsworth (5)	1549X	FDEP Established	2015	Yes	No	67[3]	TN	52% REDUCTION	N/A (concentration based reduction)
							TP	57% REDUCTION	N/A (concentration based reduction)

1. Lake Parker was listed as verified impaired for nutrients on the 1998 303(d) list and again on the updated verified list in 2005. In 2005 the FDEP completed a draft nutrient TMDL for the lake. This draft was used by the EPA to establish a final TMDL in 2006. The lake does not appear on the 2010 verified list nor the delist list for nutrients. The lake is listed as belonging to assessment category 5 (verified impaired) for nutrients (TSI) according to the assessment dashboard tool in the TMDL tracker at http://webapps.dep.state.fl.us/DearTmdl/welcomehz.do.
2. # is derived from AMEC Basin Delineations 2013 - 2014
3. # is estimation only - according to Go Sync

PRIORITIZATION FACTORS

The following 4 factors were considered when prioritizing the COL TMDL waterbodies:

1. Pollutant Load Allocations

The percentage of the required pollutant load reduction was taken into account while prioritizing the City's TMDL lakes. Within Table 1, pollutants of concern and their corresponding Waste Load Allocations are shown. The values shown in the table were calculated by FDEP and/or EPA from best available data, reasonable assumptions and/or extrapolations, and mathematical models, all of which are detailed in the respective FDEP TMDL reports.

2. Watershed Factors

Watershed factors were taken into account while prioritizing the City's TMDL lakes. Landuse variation within a watershed may impact the variety, concentration, and/or quantity of stormwater pollutants generated. The more varied the landuses within a watershed, the more varied BMPs may need to be in order to reduce pollutants of concern.

3. Water Quality Projects

Historical water quality projects were taken into account while prioritizing the City's TMDL lakes. For some TMDL lakes, stormwater structural controls and in-lake remediation projects had already been implemented whereas other TMDL lakes had received relatively little water quality project funding to date.

4. Water Quality Data Availability

Water quality data availability was taken into account while prioritizing the City's TMDL lakes. Good water quality improvement projects necessitate first having an adequate amount of applicable water quality data (including in-lake and MS4 water chemistry concentrations and loads).

WATERBODY PRIORITIZATION

Priority Waterbody #1 - Lake Hunter

Lake Hunter is the top priority TMDL waterbody for the COL. It has a relatively uniform watershed in terms of landuse (mixed residential / light commercial / light industrial). Water quality data is quite robust for Lake Hunter, although additional water quality studies will be necessary before implementing any stormwater retrofit and/or in-lake remediation projects. Lake Hunter has the highest required percentage reduction in TN/TP of all the COL TMDL lakes. It currently has no stormwater structural controls in place to protect it from stormwater pollutants and has had relatively few in-lake remediation projects implemented.

Priority Waterbody #2 – Lake Bonny

Lake Bonny is the #2 priority TMDL waterbody for the COL. It has a relatively uniform watershed in terms of landuse (mixed residential / light commercial / light industrial). Water quality data is quite robust for Lake Bonny, although additional water quality studies will be necessary before implementing any stormwater retrofit and/or in-lake remediation projects. Lake Bonny has the second highest required percentage reduction in TN/TP of all the COL TMDL lakes. Although it receives stormwater treatment from 8 inlet baskets, due to the watershed size, they provide little protection. Lake Bonny has had relatively few in-lake remediation projects implemented.

Priority Waterbody #3 – Crystal Lake

Crystal Lake is the #3 priority TMDL waterbody for the COL. It has a relatively uniform watershed in terms of landuse (mixed residential / light commercial / light industrial). Water quality data is quite robust for Crystal Lake, although additional water quality studies will be necessary before implementing any stormwater retrofit and/or in-lake remediation projects. Crystal Lake has the third highest required percentage reduction in TN/TP of all the COL TMDL lakes. It currently only has one stormwater structural control in place (large County stormwater pond) to protect it from stormwater pollutants and has had relatively few in-lake remediation projects.

Priority Waterbody #4 – Lake Parker

Lake Parker is the #4 priority TMDL waterbody for the COL. It has a relatively uniform watershed in terms of landuse (mixed residential / light commercial / light industrial). Water quality data is quite robust for Lake Parker, although additional water quality studies will be necessary before implementing any stormwater retrofit and/or in-lake remediation projects. Lake Parker has the fourth highest required percentage reduction in TN/TP of all the COL TMDL lakes. It currently has four stormwater structural controls in place (3 City stormwater ponds and 1 City in-lake treatment wetland). Moreover, in FY15 it will receive a fourth structural control (a nutrient separating baffle box) to further protect it from stormwater pollutants. Lake Parker has had relatively few in-lake remediation projects implemented

Priority Waterbody #5 – Lake Hollingsworth

Lake Hollingsworth is the #5 priority TMDL waterbody for the COL. It has a relatively uniform watershed in terms of landuse (mixed residential / light commercial / light industrial). Water quality data is quite robust for Lake Hollingsworth, although additional water quality studies will be necessary before implementing any stormwater retrofit and/or in-lake remediation projects. Lake Hollingsworth has the fifth highest required percentage reduction in TN/TP of all the COL TMDL lakes. It currently has a substantial number of stormwater structural controls in place (2 ponds, 5 skimmer boxes, 34 inlet baskets, and 10 baffle boxes) to protect it from stormwater pollutants. Additionally it has had a number of in-lake remediation projects implemented, including whole lake aquatic plant restoration and whole-lake dredging / alum applications.

SCHEDULE FOR COMPLETION

The following summarizes the tasks associated with the COL TMDL Prioritization and Implementation Plan:

Task #1: Outfall Basin Delineations

Each stormwater outfall in the watershed of concern will be analyzed with GIS, field surveys, and LIDAR to determine the respective sub-basin. Published and verified EMCs and landuse characteristics will be used to initially estimate pollutant loads from each outfall.

Service currently provided by AMEC Foster Wheeler.

Task #2: Monitoring Plan

Based on the Task #1 data and previously documented watershed characteristics, priority stormwater outfalls will be selected for further storm event monitoring. In-lake sampling may be conducted also. The monitoring plan will lay out specific sampling logistics and will be submitted to FDEP as scheduled in Table 2.

Service currently provided by AMEC Foster Wheeler.

Task #3: Monitoring

Stormwater and in-lake water quality sampling will be conducted to validate and/or adjust the modeled TMDL loads and help determine appropriate water quality improvement projects.

Service currently provided by AMEC Foster Wheeler.

Task #4: TMDL Implementation Plan

A site-specific water quality management plan will be developed based upon the evaluation of data from Tasks 1 – 3 and the objectives of the COL Comprehensive Lakes Management Plan.

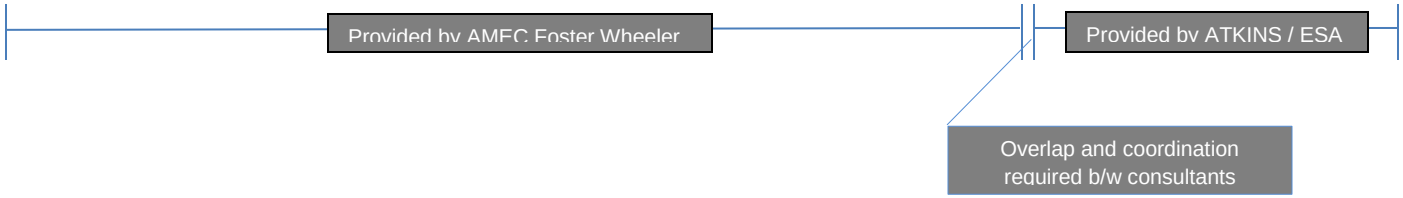
Service currently provided by Atkins North America Inc. (Atkins) and Environmental Science Associates (ESA).

BMAP Waterbodies

Table 3 documents where BMAPs are finalized for waterbodies impacted by COL MS4 loads and the required action items specified in the respective BMAP documents. If a site-specific Bacteria Pollution Control Plan (BPCP) is required in the BMAP, it will be noted in Table 3 and provided in the appendix of the COL's SWMP.

Table 2: Schedule Summary for TMDL Task Completion

Lake	WBID	Task#1 Outfall Basin Delineations (complete each FY)	Task #2 Monitoring Plan (propose w/in 2 months of each new FY)	Task #3 Monitoring (complete 2 years after Task 2)	Task #4 TMDL Implementation Plan (complete 6 months after Task 3)
Lake Hunter	1543	(FY13) 09/30/2013	12/1/13	12/1/2015	06/1/2016*
Lake Bonny	1497E	(FY14) 09/30/2014	12/1/14	12/1/2016	06/1/2017*
Crystal Lake	1497A	(FY15) 09/30/2015	12/1/15	12/1/2017	06/1/2018*
Lake Parker	1497B	(FY16) 09/30/2016	12/1/16	12/1/2018	06/1/2019*
Lake Hollingsworth	1549X	***FUNDING YET TBD THROUGH FY16 CIP UPDATE PROCESS***	***FUNDING YET TBD THROUGH FY16 CIP UPDATE PROCESS***	***FUNDING YET TBD THROUGH FY16 CIP UPDATE PROCESS***	***FUNDING YET TBD THROUGH FY16 CIP UPDATE PROCESS***



*Implementation dates are currently associated with timing of deliverables from the new FY15 City of Lakeland's Comprehensive Lakes Management Plan (Atkins / ESA). The current scope of services for the CLMP is provided in the appendix for reference.

Table 3: City of Lakeland BMAPs and Associated Action Items

BMAP	Date Issued	Status	Agency	Parameter(s) of Concern	WBID segments with COL MS4	Required COL MS4 Action Item
Alafia River Basin	April 2014	Final	FDEP	D.O. and Fecal Coliforms	1552 English Creek 1583 Poley Creek	Illicit Discharge investigations and associated corrective action. This is specifically listed as a Polk County action item in the BMAP document but applies to the COL by default as a co-permittee of the Polk County NPDES permit.
Hillsborough River Basin	June 2009	Final	FDEP	Fecal Coliforms	1482 Blackwater Creek	Monitoring plan for all involved parties being drafted by the FDEP as of 04/2015.

Appendix –TMDL Prioritization and Implementation Report

COL COMPREHENSIVE LAKES MANAGEMENT PLAN (CLMP) SCOPE

Based on COL CLMP Scope of Services provided by Atkins and ESA

Project Objective

The ecological integrity and aesthetic beauty of lakes in the City of Lakeland (COL) are integral to the identity and economic sustainability of the COL. Moreover, the COL is facing increasing pressures from the applicable State regulatory agencies to maintain or improve water quality in its 38 named lakes. In some of the lakes, water quality is declining, and cost-effective solutions to remediate these problems are needed. In other lakes, water quality appears to be stable or improving; however, State regulatory agencies have deemed them impaired, potentially requiring costly remediation measures. To protect the City's interests and assist with its general lake water quality objectives, Atkins and ESA will develop a Comprehensive Lakes Management Plan (CLMP) for 11 high priority lakes within the COL, including:

1. Lake Gibson
2. Lake Hunter
3. Lake Bonny (and Little Lake Bonny)
4. Lake Hollingsworth
5. Lake Parker
6. Lake Beulah
7. Lake Wire
8. Lake Bonnet
9. Lake Mirror
10. Lake Crystal
11. Lake Morton

The CLMP will provide a compilation of information relevant to water quality in these lakes including:

- an analysis of current water quality trends
- identification of primary degradation sources (both in-lake and external)
- identification of lake-specific potential restoration projects
- a prioritization plan for implementation of restoration projects

One of the primary features of this plan will be the recommendation of scientifically proven methods for managing lakes as integrated ecological systems, rather than managing them solely based on external nutrient loads. Recommendations will also be made in consideration of management projects implemented in the past that have had successful, documented system responses. More specifically, this CLMP will:

- Characterize water quality for the named lakes in the City of Lakeland relating to regulatory criteria, such as State impairment determinations, and the Florida Department of Environmental Protection (FDEP) Total Maximum Daily Load (TMDL) program

- Identify potential restoration, preservation, and/or treatment projects to address water quality issues (if found)
- Link potential restoration, preservation, and/or treatment projects to lakes based on COL water quality objectives
- Provide recommendations to prioritize lake restoration, preservation, and/or treatment actions

While traditional stormwater treatment projects can successfully reduce external nutrient loadings to lakes, historic point and nonpoint source runoff and subsequent sediment accumulation in some lakes may have resulted in internal nutrient loads that traditional stormwater projects cannot treat. Consequently, both traditional and non-traditional water quality management projects will be proposed. In addition to nutrients and chlorophyll *a* (a surrogate for algal biomass), factors affecting water quality in COL lakes include long-term landuse changes, hydrologic alterations, stormwater runoff, historic point source discharges, extent of in-lake submerged and emergent aquatic vegetation, lake water levels, and hydrologic connections to forested wetlands and other lakes.

A decision key will be developed for COL lakes as a means of selecting the types of restoration projects that best address stressors on a lake by lake basis. These components will be included as part of a holistic lake management approach for the named lakes. The link between water quality issues and lake-specific water quality restoration projects for the named lakes will be presented in the context of State and Federal regulations (e.g. TMDL: status), as well as established lake management science.

Project Description

This CLMP encompasses the 11 high priority lakes mentioned above. Many of these lakes have been negatively impacted through historical point and non-point sources of pollution and many have been officially listed as impaired by the FDEP. The CLMP involves incorporating existing information and previously conducted water quality studies to develop improved water quality plans for the lakes. The additional information will be used to evaluate the best alternatives and management practices to improve water quality. The CLMP could be incorporated into the TMDL Basin Management Action Plan (BMAP) process, which may include the involvement of the applicable stakeholders.

Task 1- Site Visits

Scientists from Atkins and ESA will perform site visits to each of the 11 high priority lakes within the City. During each site visit, the scientists will document the characteristics of the adjacent watershed and lake to include the following features, at a minimum:

- Dominant natural and physical features of each watershed
- Vegetation community (wetland, aquatic, submerged)
- Adjacent infrastructure (i.e. lift stations, water level control structures)
- Hydrologic features (i.e. canals, ditches, drainage features)

Deliverable:

Upon completion of the site visits, Atkins and ESA will compile the information collected for inclusion in the lake-specific characterization within the CLMP. Maps will be generated to provide a visual representation of the conditions identified in the field.

Task 2 – Data Compilation and Analyses

Lake eutrophication is a natural process of increasing nutrient enrichment and biological productivity that can be exacerbated by anthropogenic land uses (Gill et al. 2005). The accelerated eutrophication due to human activities is termed "cultural eutrophication". Increased nutrients associated with eutrophication can increase algal blooms (Smith et al. 1999), in turn increasing turbidity, particulate organic matter, and dissolved organic particulate matter in lakes.

Historic water quality impacts in the 11 named lakes, the implications of relevant State and Federal regulations for water quality restoration, and current water quality conditions will be characterized, thereby establishing the need for COL water quality improvement projects.

Existing data pertinent to characterizing lake water quality and the adjacent watershed will be compiled for evaluation. These data will include but are not limited to:

- Existing water quality data within the (FDEP) Impaired Waters Rule database
- COL water quality data
- Existing hydrologic data (i.e. stage, discharge)
- Rainfall
- History of point source discharges
- Landuses
- Historic aerial photographs
- History of SAV treatment
- History of lake management actions (including street sweeping and stormwater treatment)
- Documentation of lift station failures
- In-lake sediment characterization, as available
- Lake bathymetry
- Lake watershed boundaries
- TMDL, BMAP, and other related documents

Deliverable:

These data will be compiled and analyzed to develop lake-specific evaluations of water quality and to identify potential restoration, preservation, and/or treatment projects. The graphs and table resulting from these analyses will be used in the Task 3 report.

Task 3- Gap Analysis / Potential Early Actions- Interim Report

Based on the assimilation of the information derived from the site visits and data analyses, an interim report will be developed for the 11 high priority lakes to identify applicable data gaps. For example, a potential data gap relating to paleolimnological sediment core data is anticipated in most of the 11 lakes. Paleolimnological sediment core data has been shown to reliably provide evidence of historical water quality conditions within a lake (USF 2005).

Deliverable:

Atkins will provide an electronic copy and two print copies of an interim report to the COL summarizing the justification for additional data collection efforts and/or preliminary manipulative studies. Proposed projects will be outlined, and cost estimates and timelines for conducting such additional efforts will be included in the interim report. Atkins and ESA will meet with staff from the COL to discuss the draft report and any comments or modifications requested by the COL for the document. Comments and edits will be integrated into to the draft interim report for inclusion in the initial draft CLMP.

Task 4 – Develop a Decision Tree

A decision key will be developed specifically for the COL CLMP to select restoration, preservation and/or treatment projects. To apply the key, series of yes/no decisions will be made for each lake, first pertaining to relevant water quality regulations, and then taking other COL water quality objectives into account.

Deliverable:

Atkins and ESA will present the COL with a draft template of the decision tree for review prior to incorporation into the initial draft CLMP.

Task 5- Regulatory Workshops for TMDL Lakes

Atkins and ESA propose to have staff (Tomasko, Loy, and Keenan) available for up to three (3) meetings with the COL and representatives from FDEP to discuss how the proposed water quality restoration projects will satisfy TMDL requirements. At the discretion of the COL, such meetings could also include relevant stakeholders such as the Board of County Commissioners, Board of City Commissioners, local stakeholders, or the Southwest Florida Water Management District (District). The intent of these regulatory meetings is to initiate Basin Management Action Plans (BMAPs) for those lakes requiring load reductions as specified under their adopted TMDLs. BMAP meetings are aimed at identifying how the City intends to meet the TMDL requirements for any given lake. These meetings are typically conducted in a workshop setting with the principal stakeholders, and consist of the following elements:

a) Review of applicable adopted TMDLs
b) Review of the impacted MS4 and watershed characteristics
c) Review of the TMDL modelling approach and subsequent load allocations

d) Review of modeled and real-time data collected by the MS4 owner post TMDL issuance
e) Review of the landuse changes and implemented load-reduction projects by the MS4 owner post TMDL issuance
f) Review of design and efficacy of proposed load-reduction projects to be implemented by the MS4 owner to further reduce the pollutants of concern
g) Development of draft BMAP documentation to be submitted to the FDEP for review and comment

This Task is specifically earmarked to address the above seven (7) elements with the FDEP and other applicable stakeholders in a series of three (3) workshops. These workshops may be conducted in Tallahassee or locally depending upon the requests of the FDEP and/or other applicable stakeholders. Subsequent meetings with the FDEP to finalize applicable BMAPs will be the responsibility of the COL. This task will include a trip to Tallahassee (Loy and Tomasko) to meet with representatives from the Florida Fish and Wildlife Conservation Commission (FFWCC) and the FDEP to discuss a joint venture focused on improving water quality in Lake Parker. As a part of this task, Atkins and ESA staff will arrange a meeting with selected FFWCC representatives to discuss the feasibility of using the Tenoroc Fish Management Area (TFMA) to improve water quality within Lake Parker.

Following discussions with FFWCC, Atkins and ESA will arrange a separate meeting with FDEP staff to discuss the following:

1. The development of Site-Specific Alternative Criteria (SSAC) for City of Lakeland Lakes
2. Steps necessary to re-evaluate potentially problematic TMDLs and to identify the options available to stakeholders prior to TMDL-related project implementation
3. Discuss the steps toward COL CLMP and FDEP BMAP integration

Deliverable:

Atkins will provide minutes of the public meetings.

Task 6 – Water Quality Restoration Strategy

1. Develop a conceptual plan for restoration, preservation, and/or treatment activities for each lake
2. Develop project alternatives and BMPs that could be used to meet COL water quality objectives (e.g. TMDLs and/or other criteria)
3. Prepare full descriptions of proposed projects including alternatives and budgets.

Deliverable:

ATKINS will provide an electronic copy of the draft CLMP to the COL. Comments or modifications requested by the COL will be incorporated into the draft CLMP.

Task 7 - Prepare a draft CLMP for the COL

- Develop a draft CLMP, including recommendations, project prioritization, and cost estimates for projects to help meet water quality objectives (e.g. TMDL requirements) as well as to provide a list of projects to go beyond TMDL requirements (as appropriate).
- Develop approximate construction, restoration, preservation, and/or treatment (*i.e*., sediment removal, whole lake alum, *etc*.) techniques by lake, and a proposed schedule for implementation.
- Develop a cost/benefit estimate of proposed projects, including anticipated results once all projects are complete.
- Provide a plan for future data collection to ensure that projects are meeting their intended goals.

Deliverable:

ATKINS will provide an electronic copy of the draft CLMP to the COL. Comments or modifications requested by the COL will be incorporated. The COL will have two weeks to provide comments for integration into the document. Atkins and ESA will meet with staff from the COL, to discuss the draft report and any comments or modifications requested.

Task 8 – Prepare a Final CLMP for the City of Lakeland

ATKINS and ESA will incorporate the requested edits into the final CLMP.

Deliverable:

Atkins will provide an electronic copy and two print copies of the CLMP to the COL.

MBE SUBCONSULTANT

Katherine Kantaras Anamisis Consulting, Inc. (KKA) has been included in this project to provide GIS assistance. Ms. Anamisis is a certified geographic information system professional (GISP) at a Women's Business Enterprise (WBE) firm. Ms. Anamisis has extensive experience related to environmental planning and GIS. Ms. Anamisis applies GIS in environmental and land use planning related to mitigation, listed species locations, and site and habitat evaluation.

PROJECT BUDGET – (updated April 2015)

Task	Atkins	ESA	KKA	Total
1- Site Visits	$ 3,540	$ 2,700	$ 900	**$ 7,140**
2- Data Compilation and Analysis	$ 15,347	$ 17,393	$ 9,000	**$ 41,740**
3-Gap Analysis	$ 10,020	$ 18,000	$ 3,750	**$ 31,770**
4- Decision Tree	$ 4,560	$ 7,650		**$ 12,210**
5- Regulatory Workshops	$ 8,160	$ 14,130	$ 1,800	**$ 24,090**
6- Water Quality Restoration Strategy	$ 7,890	$ 14,400	$ 1,500	**$ 23,790**
7- Draft Water Quality Management Plan	$ 10,130	$ 9,450	$ 1,800	**$ 21,380**
8- Final Water Quality Management Plan	$ 5,890	$ 8,100	$ 1,200	**$ 15,190**
Total Direct Expenses	$ 2,450			**$ 2,450**
Total Project Budget	**$ 67,987**	**$ 91,823**	**$ 19,950**	**$ 179,760**

COMPLETION SCHEDULE

Task 1	October 2014
Task 2	May 15, 2015
Task 3	March 31, 2015
Task 4	June 30, 2015
Task 5	TBD
Task 6	TBD (based on GAP)
Task 7	TBD (based on GAP)
Task 8	February 2016
PROJECT Completion	February 28, 2016

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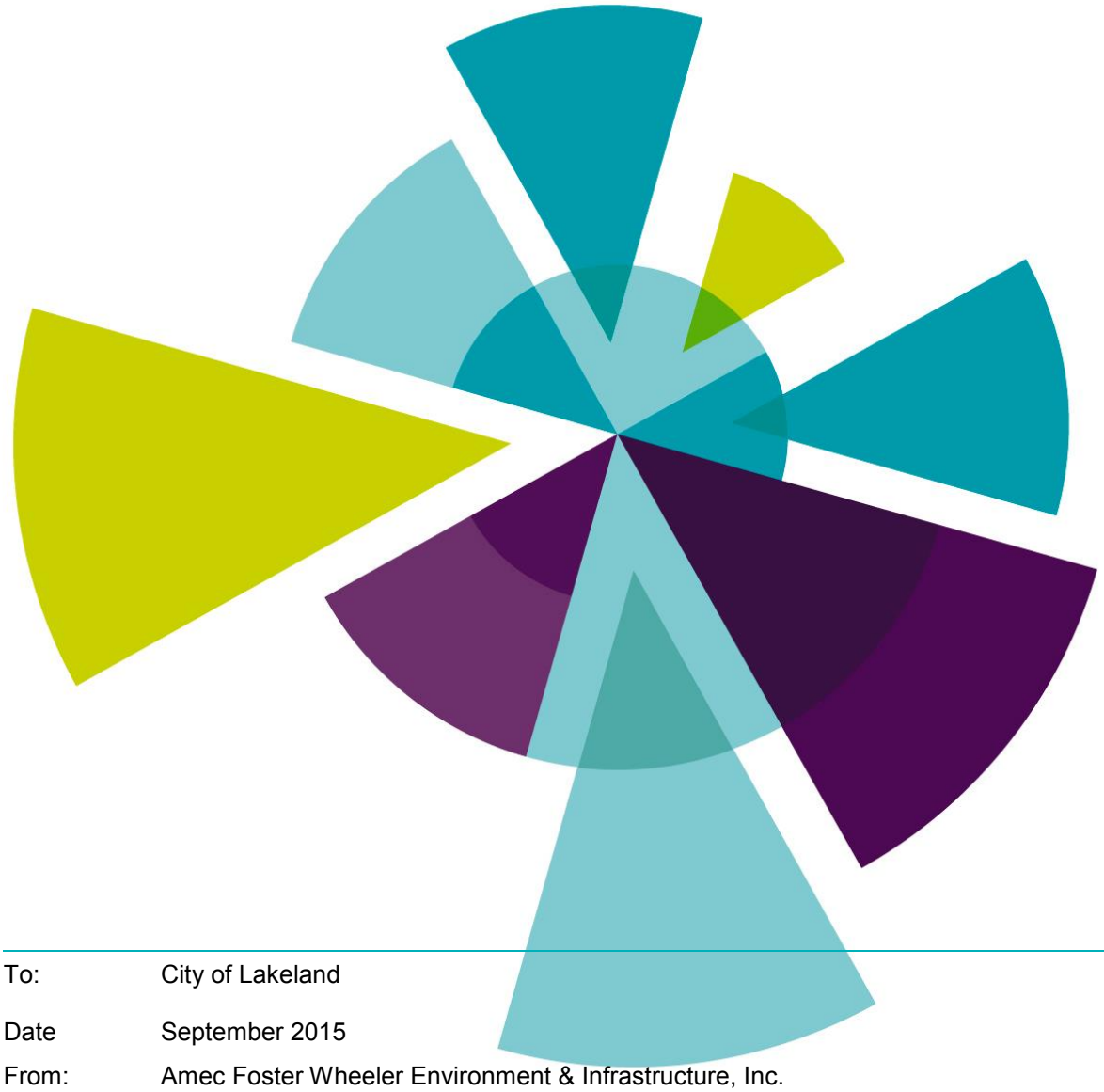
NPDES Pollutant Load Comparison 1999, 2006, 2014



To: City of Lakeland

Date September 2015

From: Amec Foster Wheeler Environment & Infrastructure, Inc.

NPDES POLLUTANT LOAD COMPARISON: 1999, 2006, 2014

Prepared for

City of Lakeland
Lakeland, Florida

Prepared by

Amec Foster Wheeler Environment & Infrastructure, Inc.
2000 E. Edgewood Drive, Suite 215
Lakeland, Florida

Amec Foster Wheeler Project No. 600319.6

September 2015

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1.0 INTRODUCTION

1.1 Purpose and Objectives

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) was contracted by the City of Lakeland to assist with the development and update of the pollutant loading assessments required by the National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Systems (NPDES MS4) permit. The tasks include identification of Environmental Resource Permit (ERP) associated Best Management Practices (BMPs) and determination of adjusted annual pollutant load estimates for the Lake Hunter, Lake Bonny and Crystal Lake watersheds. BMP nutrient reduction and land use modifications are estimated based on aerial photography for 1999, 2006 and 2014, which are the load estimation years for the MS4 Cycle 1, Cycle 2 and Cycle 3 permits, respectively. The primary goal of the Clean Water Act (CWA) program, of which MS4 permitting is a critical element, is to progressively reduce pollutant loads to the receiving waters that are impaired with the intent on improving the quality of those waters so that they eventually meet their designated use.

1.2 Project Location and General Description

Pollutant load quantification for City of Lakeland major MS4 outfalls discharging to Lake Hunter, Lake Bonny and Crystal Lake were evaluated in this study. **Figure 1**, **Figure 2** and **Figure 3** show the City's major outfalls for Lake Hunter, Lake Bonny and Crystal Lake, respectively. The majority of the outfalls' contribution areas are relatively urbanized and developed. Landuse is relatively consistent from 1999 through 2014; with most of the contribution areas developed prior to 1999. Accurate estimation and quantification of MS4 pollutant loading for 1999, 2006 and 2014 is essential in defining the effects of land development on MS4 pollutant load generation. Definition of dynamic BMP and land use conditions facilitates analysis of representative treatment and development conditions within the MS4 contributing catchments for years 1999, 2006 and 2014. The adjusted loading values reflect land use changes, selected BMPs (within the SWFWMD ERP coverage) and load reductions associated with the City's (and other MS4 operators') comprehensive public education efforts. The completed analysis provides an "adjusted" pollutant load estimate that may allow the City to assess the impacts of development and growth with respect to nutrient loading to area surface waters.

FIGURE 1
City of Lakeland Lake Hunter Major Outfalls and Contributing Basins

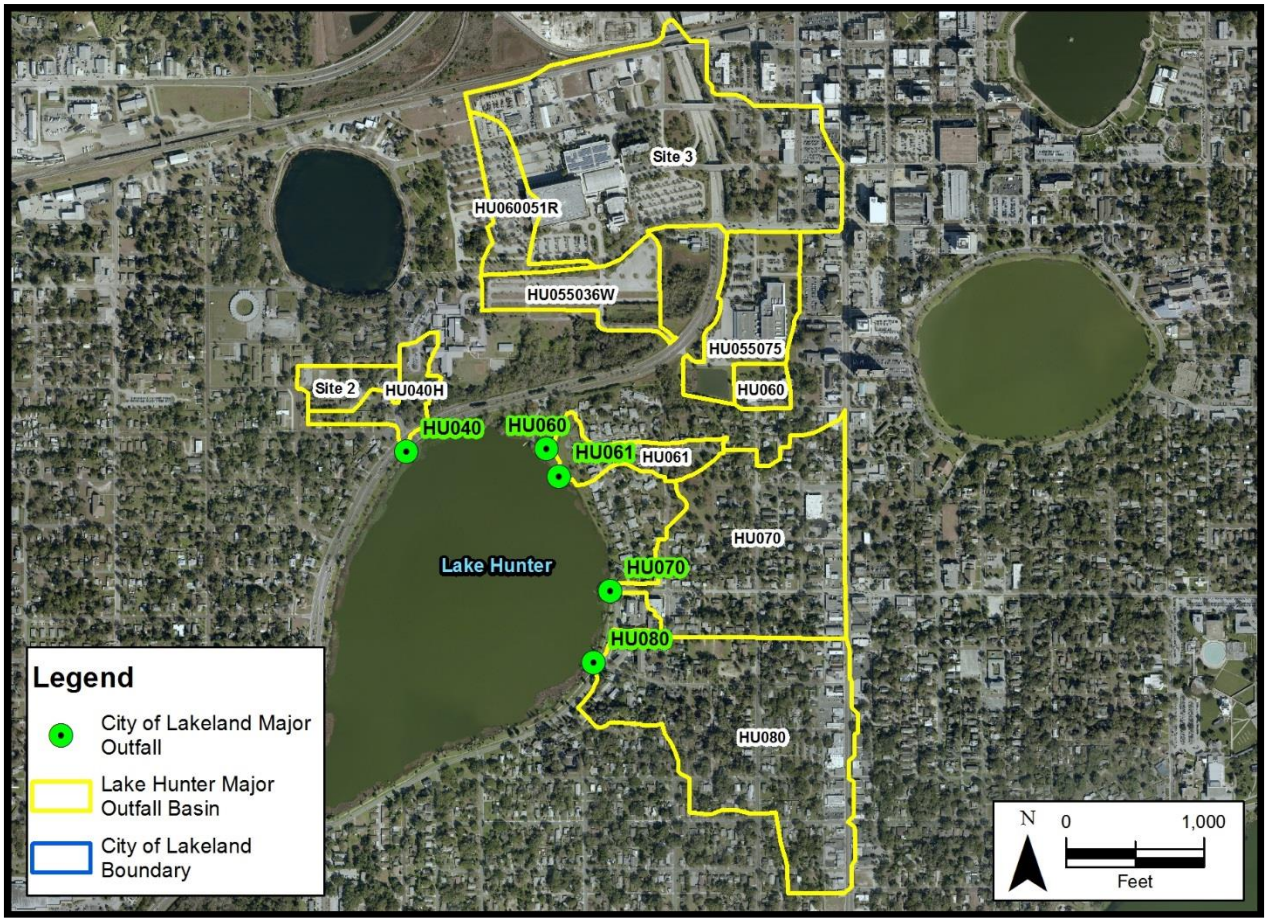


FIGURE 2
City of Lakeland Lake Bonny Major Outfalls and Contributing Basins

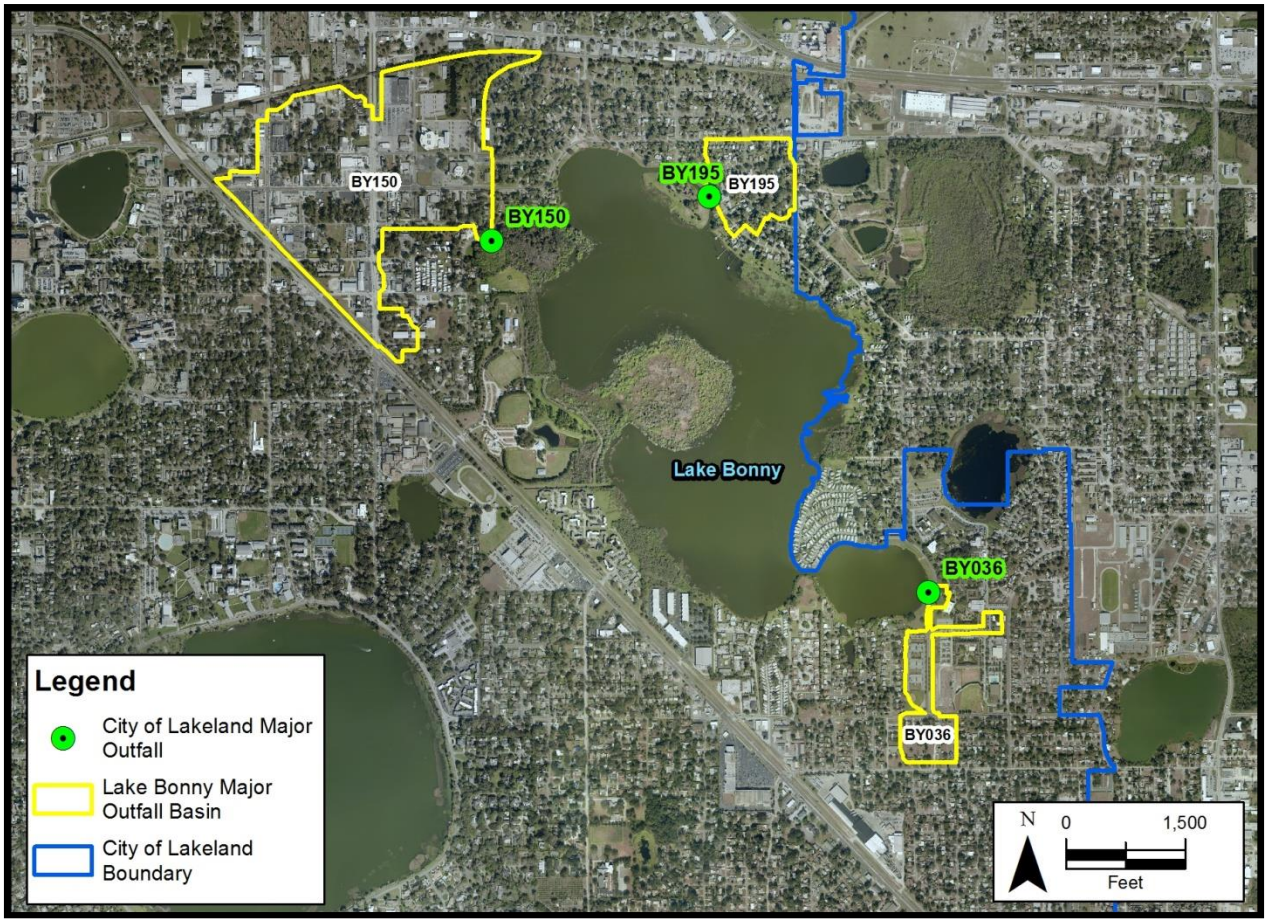
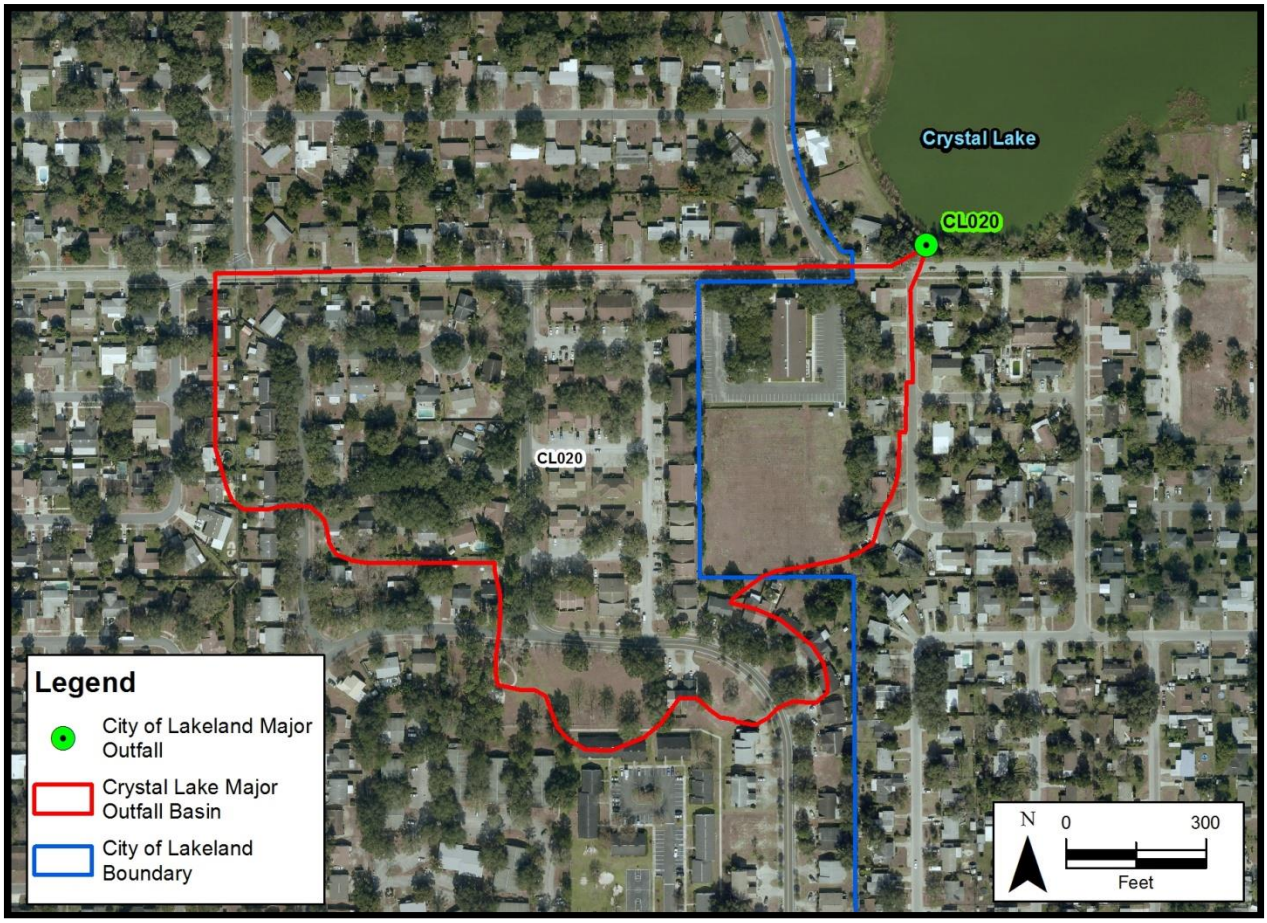


FIGURE 3
City of Lakeland Crystal Lake Major Outfalls and Contributing Basins



2.0 SURFACE WATER QUALITY MODEL

Pollutant load modeling was conducted to estimate the annual stormwater pollutant loads associated with each drainage basin associated with an MS4 outfall. The pollutant load modeling was accomplished using a Microsoft Excel spreadsheet named Pollutant Loadings Assessment (PLA) tool developed in-house by Amec Foster Wheeler that is based on design criteria that was developed by FDEP and the Water Management Districts during production of the draft guidance documents conceived during statewide stormwater regulation efforts. The model utilizes the modified U.S. Environmental Protection Agency's (EPA) Simple Method (Schueler, 1987). The Simple Method estimates stormwater pollutant loads as the product of annual runoff volume and pollutant concentrations.

The Simple Method is a three-step calculation (Ohrel, 2000):

1. Runoff coefficient calculation, Rv:

   $Rv = 0.05 + 0.009 * I$

   Where:
   Rv = Mean runoff coefficient
   I = Percent of site imperviousness

2. Runoff volume (acre-feet per year) (ac-ft/yr) calculation:

$R = (P * Pj * Rv / 12) * A$

Where:

R = Runoff volume (ac-ft/yr)
P = Annual rainfall depth (inches)
Pj = Fraction of rainfall events that produce runoff (normally equal to 0.9)
A = Study area (acres)

3. Annual pollutant loads (pounds per year)

$L = 2.72 * R * C$

Where:

L = Annual pollutant load (lb/year)
C = Event mean concentration of the pollutant (mg/l)
2.72 = Conversion factor (from mg/l to lb/ac-ft)

For this investigation, the Simple Method calculation of runoff volume was modified in accordance with the methodology developed by FDEP and the Water Management Districts when Florida was considering a statewide stormwater rule for calculating annual runoff as follows:

$Q = 0.083*ciA$

Where:

Q = Runoff Volume (ac-ft/yr)
c = Runoff coefficient determined based on Florida Meteorological Zones as classified in the draft Stormwater Quality Applicant's Handbook, March 2010.
i = Annual rainfall depth (in)
0.083 = Conversion factor (inches to feet)
A = Area (ac)

With the exception of Site 2 and Site 3 basins the runoff coefficient 'c' is determined based on the drainage basin non-directly connected impervious area curve number (NDCIA CN) and directly connected impervious area (DCIA) combination and the meteorological zone within which the project area falls. The March 2010 Draft Stormwater Quality Applicant's Handbook has the runoff coefficients published for each NDCIA CN-DCIA combination and for each meteorological zone in Florida (DEP 2010). Among the five meteorological zones defined in Florida, Polk County is within Zone 2. Published runoff coefficients for Zone 2 are tabulated in **Table 1-1 (Refer to Appendix A)**. The NDCIA CN for the various land uses and soil types comprising the drainage basins were determined by using the lookup table provided in this report as **Table 1-2 (Refer to Appendix A)**.

Specifc basin/landuse DCIA values were compiled and utilized to provide a more realistic representation of the DCIA/ impervious conditions within each basin. **Table 1-3 (a)**, **Table 1-3 (b)** and **Table 1-3 (c)** provide a summary of the DCIA/impervious assignments for each applicable basin/landuse combination. An individual MS4 outfall may receive runoff from multiple contribution basins; **Table 1-4** shows the basins and their associated outfall. Heterogenous basin/land use conditions and differing runoff coefficient 'c' estimation methodologies necessitate basin divison to provide representative runoff estimation.

Runoff coefficient 'c' parameterization for Site 2 and Site 3 was assigned based on the data collected during rainfall runoff volume sampling documented in the report titled "Lake Hunter Implementation Report- Results of Select Monitoring/Data Collection" (Amec Foster Wheeler 2015). The average runoff coefficient identified in the aforementioned report was utilized to estimate adjusted pollutant loading for Site 2 and Site 3. The average derived runoff coefficient 'c' for Site 2 and Site 3 was utilized for the 1999, 2006 and 2014 load analysis. Utilization of a uniform (rainfall runoff coefficient) average value is justified because the contribution basin characteristics (Site 2 and Site 3) are relatively consistent throughout the 1999-2014 period.

The rainfall was analyzed by summarizing the rainfall depth for each calendar year for the period of 1915 to 2011 and calculating basic statistics such as minimum, maximum, and average annual rainfall depths. The years with annual rainfall amounts closest to the average of the entire analyzed dataset were selected for use in the model simulations. From over 90 years of rainfall data available, 8 to 10 years of data had annual rainfall depths close to the mean annual depth measured for the entire period-of-record.

Within this data set, years dominated by a few days with high rainfall depths will have less total abstraction before runoff begins than a rainfall year with the same depth of rainfall spread over a longer period of time. In order to compensate for this effect, the rainfall year 1988 was selected for use to estimate pollutant loads since it had a total estimated runoff volume closest to the average runoff volume from the 8 years of rainfall data having near annual average. The year 1988 which recorded a depth of 51.65 inches was selected from this group of rainfall data and was used in determining the pollutant loading model simulations to estimate annual runoff volumes.

Although the Simple Method is accepted as an appropriate and reasonably accurate planning level technique to estimate the pollution loading contributed by storm water runoff, it does have several limitations (Center, 2003):

- This method cannot be used to estimate the pollutant loads generated by base flow, only the loads generated during the storm.
- The Simple Method should be limited to basin areas smaller than 640 acres. Larger basins require a more complex method of analysis.
- This technique may not accurately estimate pollutant loads for construction sites, heavily traveled highways, croplands, and undeveloped areas.

Despite the above limitations, the Simple Method is an accepted tool for comparing pollutant loads of different MS4 drainage basins for prioritization purposes.

Table 1-5 (Refer to Appendix A) lists the event mean concentrations (EMC) used to estimate pollutant loads for the MS4 basins. EMCs were developed using land use specific pollutant concentrations obtained from past monitoring activities conducted throughout the State of Florida, and were derived from several sources as noted in the documentation. EMCs were developed for total nitrogen (TN), total phosphorous (TP), biological oxygen demand (BOD), total suspended solids (TSS), lead (Pb), copper (Cu) and zinc (Zn).

3.0 LOAD REDUCTION ESTIMATES

3.1 Definition of BMP Area

Best Management Practice areas were identified using a multi-step process. The existing City of Lakeland MS4 contributing basins were overlaid with the SWFWMD ERP coverage. Aerial imagery (1999, 2006, and 2014) of the intersecting areas between the ERP coverage and MS4 catchments were manually reviewed to identify BMP areas. BMPs were assigned as dry retention or wet detention based on presence or absence of a wet pond. The BMP treatment for areas within the ERP/MS4 basin intersect that did not have visible dry or wet stormwater treatment facilities was assigned "none" treatment. BMPs were classified as either "wet", "dry" or "none". Load reductions were assigned based on BMP designation type. Individual ERP documents/plans were not reviewed for this effort and field documentation of existing BMPs was not performed.

3.2 BMP Load Reduction

To accurately quantify MS4 basin pollutant loading, a load reduction factor was applied to the raw storm water loads where BMPs were present. The "adjusted" pollutant loading provides MS4 basin pollutant loads minus the treatment provided by the onsite BMP. BMP treatment was assigned as wet, dry or none for all of the MS4 contributing basins. These areas were assigned a pollutant reduction factor. Wet pond pollution removal efficiencies were based on an assumed 14 day hydraulic residence time. Dry pond pollution removal efficiencies were based on 0.50" of retention. Load reductions are based on the methodology presented in Figures 13.2 and 13.3 (March 2010 DEP/WMD draft document) and Appendix D (Zone 2) (Harper 2007). Published mean annual mass removal efficiencies for 0.50-inches of Retention in Zone 2 are tabulated in **Table 1-6 (Refer to Appendix A)**. Applied BMP treatment coverage increased from 1999 to 2006 and remained constant through 2014. In the years evaluated for this report, there were 32.5 acres identified as treated by BMPs in 1999, 39.9 acres treated in 2006, and 39.9 acres treated in 2014 for the major outfall contribution areas

3.3 Public Education Load Reduction

The City of Lakeland provides a comprehensive City-wide public education program to educate residents to reduce their pollutant contribution within the MS4 catchment basins. This program has progressed over the years and now includes stormwater education messages on Street Sweepers as well as during previews at the local theatres. As a result of this progressive approach, the City has estimated a 1 percent and 3 percent reduction in pollutant loads for public education for years 1999 and 2006, respectively. A full five percent reduction for public education, consistent with past FDEP credit allowances, is applied to all of the pollutant constituents (TN, TP, TSS, BOD, Cu, Pb, Zn) within the 2014 load analysis.

3.4 Results and Discussion

Table 1, Table 2 and **Table 3** provide summary TN and TP loading analysis for 1999, 2006 and 2014 for Lake Hunter, Lake Bonny and Crystal Lake major outfalls, respectively. "Adjusted" MS4 Lake basin pollutant loads (TN,TP,BOD,TSS,Cu,Pb,Zn) for 1999, 2006 and 2014 are summarized in **Table 2-1, Table 2-2 and Table 2-3,** respectively **(Refer to Appendix B)** and these are broken down by the sub-basins that drain to the major outfalls. These basins have been differentiated because of the TMDL monitoring efforts or because of prior MS4 inventory classification efforts. Outfall pollutant loads (BOD, TSS, CU, Pb and Zn) for 1999, 2006 and 2014 are summarized in **Table 4**, through **Table 9**.

Table 10 and **Table 11** summarize Outfall Unit Area loading for 1999, 2006 and 2014. In general, loading (lb/yr/acre) remains relatively consistent from 1999 to 2006 then decreases from 2006 to 2014.

Based on only minor landuse changes the results show only a slight change in pollutant loading because no stormwater retrofit projects have been implemented in the time frame reviewed. The same landuse modification trend (insignificant landuse changes) also occurs from 2006-2014. The estimated pollutant load reductions from 2006 to 2014 are the result of the gradually applied public educational reduction credits. Additionally, the City's street sweeping efforts, such as sweeping frequency, have picked up over the years and has made a big difference as suggested by the monitoring data results gathered during the recent Lake Hunter priority TMDL waterbody monitoring efforts.

Pollutant loads from the City's MS4 are estimated to have decreased in the time frame evaluated in this report. Although the increases are slight, it is important to note that the City has invested in a number of source control measures to reduce pollutants from the MS4 including public education efforts and a rigorous street sweeping program. This approach has given the City a good "base" for its stormwater management program to which additional BMPs can be added when and where that is appropriate. As the City develops its Supplemental Stormwater Management Plan (SSWMP), it is possible that structural BMPs having greater load reduction potential will be programmed into the SSWMP. These efforts will provide greater potential for future pollutant load reduction to the receiving waters.

TABLE 1
Lake Hunter "Adjusted" MS4 Outfall TN and TP Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual TN Load (lb)	2006 Estimated Existing Annual TN Load (lb)	2014 Estimated Existing Annual TN Load (lb)	1999 Estimated Existing Annual TP Load (lb)	2006 Estimated Existing Annual TP Load (lb)	2014 Estimated Existing Annual TP Load (lb)
HU040	51.8	50.8	49.5	10.9	10.6	10.4
HU060	635.4	622.6	606.6	104.7	102.6	100.0
HU061	26.9	26.3	25.8	4.5	4.4	4.3
HU070	211.5	207.2	202.9	35.8	35.1	34.3
HU080	272.8	267.3	261.8	46.1	45.2	44.2
Totals	1198.4	1174.2	1146.6	202.0	197.9	193.3
% Reduction	0.0	-2.0	-2.3	0.0	-2.0	-2.3

TABLE 2
Lake Bonny "Adjusted" MS4 Outfall TN and TP Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual TN Load (lb)	2006 Estimated Existing Annual TN Load (lb)	2014 Estimated Existing Annual TN Load (lb)	1999 Estimated Existing Annual TP Load (lb)	2006 Estimated Existing Annual TP Load (lb)	2014 Estimated Existing Annual TP Load (lb)
BY027	1185.4	1161.4	1137.4	197.6	193.6	189.6

TABLE 2
Continued
Lake Bonny "Adjusted" MS4 Outfall TN and TP Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual TN Load (lb)	2006 Estimated Existing Annual TN Load (lb)	2014 Estimated Existing Annual TN Load (lb)	1999 Estimated Existing Annual TP Load (lb)	2006 Estimated Existing Annual TP Load (lb)	2014 Estimated Existing Annual TP Load (lb)
BY036	131.5	132.2	125.8	27.9	29.4	28.2
BY150	1086.2	1083.6	1059.8	182.2	182.7	178.7
BY195	119.6	117.2	114.7	20.1	19.7	19.3
Totals	2522.7	2494.3	2437.7	427.7	425.3	415.7
% Reduction	0.0	-1.1	-2.3	0.0	-0.6	-2.3

TABLE 3
Crystal Lake "Adjusted" MS4 Outfall TN and TP Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual TN Load (lb)	2006 Estimated Existing Annual TN Load (lb)	2014 Estimated Existing Annual TN Load (lb)	1999 Estimated Existing Annual TP Load (lb)	2006 Estimated Existing Annual TP Load (lb)	2014 Estimated Existing Annual TP Load (lb)
CL020	166.2	163.0	158.7	40.7	39.9	38.9
Totals	166.2	163.0	158.7	40.7	39.9	38.9
% Reduction	0.0	-1.9	-2.6	0.0	-2.0	-2.7

Note: A small portion of the contribution area for this outfall lies outside of the city limits, conveys through city operated stormwater infrastructure

TABLE 4
Lake Hunter "Adjusted" MS4 Outfall BOD and TSS Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual BOD Load (lb)	2006 Estimated Existing Annual BOD Load (lb)	2014 Estimated Existing Annual BOD Load (lb)	1999 Estimated Existing Annual TSS Load (lb)	2006 Estimated Existing Annual TSS Load (lb)	2014 Estimated Existing Annual TSS Load (lb)
HU040	303	297	288	2086	2044	1981
HU060	3909	3830	3697	29021	28435	27438
HU061	114	112	110	544	533	522
HU070	1240	1215	1190	7780	7623	7466
HU080	1509	1478	1448	9093	8909	8726
Totals	7075	6932	6732	48524	47544	46133
% Reduction	0.0	-2.0	-2.9	0.0	-2.0	-3.0

TABLE 5
Lake Bonny "Adjusted" MS4 Outfall BOD and TSS Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual BOD Load (lb)	2006 Estimated Existing Annual BOD Load (lb)	2014 Estimated Existing Annual BOD Load (lb)	1999 Estimated Existing Annual TSS Load (lb)	2006 Estimated Existing Annual TSS Load (lb)	2014 Estimated Existing Annual TSS Load (lb)
BY027	5586	5472	5359	36828	36076	35332
BY036	776	892	767	5476	6369	5443
BY150	8629	8497	8301	64023	63060	61603
BY195	544	533	522	2770	2714	2658
Totals	15535	15394	14949	109098	108220	105036
% Reduction	0.0	-0.9	-2.9	0.0	-0.8	-2.9

TABLE 6
Crystal Lake "Adjusted" MS4 Outfall BOD and TSS Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual BOD Load (lb)	2006 Estimated Existing Annual BOD Load (lb)	2014 Estimated Existing Annual BOD Load (lb)	1999 Estimated Existing Annual TSS Load (lb)	2006 Estimated Existing Annual TSS Load (lb)	2014 Estimated Existing Annual TSS Load (lb)
CL020	947	929	903	6581	6456	6279
Totals	947	929	903	6581	6456	6279
% Reduction	0.0	-1.9	-2.8	0.0	-1.9	-2.7

TABLE 7
Lake Hunter "Adjusted" MS4 Outfall Cu, Pb and Zn Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual Cu Load (lb)	2006 Estimated Existing Annual Cu Load (lb)	2014 Estimated Existing Annual Cu Load (lb)	1999 Estimated Existing Annual Pb Load (lb)	2006 Estimated Existing Annual Pb Load (lb)	2014 Estimated Existing Annual Pb Load (lb)	1999 Estimated Existing Annual Zn Load (lb)	2006 Estimated Existing Annual Zn Load (lb)	2014 Estimated Existing Annual Zn Load (lb)
HU040	0.50	0.49	0.48	0.19	0.19	0.18	3.00	2.94	2.84
HU060	9.30	9.12	8.81	2.72	2.67	2.57	46.68	45.73	44.05
HU061	0.23	0.23	0.22	0.06	0.06	0.06	0.90	0.88	0.86
HU070	2.73	2.67	2.62	0.73	0.71	0.70	12.76	12.51	12.25
HU080	3.28	3.21	3.14	0.87	0.85	0.83	14.94	14.63	14.33
Totals	16.0	15.7	15.3	4.6	4.5	4.3	78.3	76.7	74.3
% Reduction	0.0	-2.0	-2.8	0.0	-2.0	-3.1	0.0	-2.0	-3.1

TABLE 8
Lake Bonny "Adjusted" MS4 Outfall Cu, Pb and Zn Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual Cu Load (lb)	2006 Estimated Existing Annual Cu Load (lb)	2014 Estimated Existing Annual Cu Load (lb)	1999 Estimated Existing Annual Pb Load (lb)	2006 Estimated Existing Annual Pb Load (lb)	2014 Estimated Existing Annual Pb Load (lb)	1999 Estimated Existing Annual Zn Load (lb)	2006 Estimated Existing Annual Zn Load (lb)	2014 Estimated Existing Annual Zn Load (lb)
BY027	7.30	7.15	7.00	8.56	8.39	8.22	53.85	52.75	51.67
BY036	1.01	1.31	1.04	0.44	0.52	0.44	7.00	8.58	7.11
BY150	20.14	19.85	19.39	5.91	5.83	5.69	105.07	103.57	101.18
BY195	1.12	1.10	1.08	0.29	0.28	0.27	4.57	4.48	4.39
Totals	29.6	29.4	28.5	15.2	15.0	14.6	170.5	169.4	164.3
% Reduction	0.0	-0.5	-3.1	0.0	-1.2	-2.6	0.0	-0.7	-3.0

TABLE 9
Crystal Lake "Adjusted" MS4 Outfall Cu, Pb and Zn Loads for 1999, 2006, 2014

Outfall	1999 Estimated Existing Annual Cu Load (lb)	2006 Estimated Existing Annual Cu Load (lb)	2014 Estimated Existing Annual Cu Load (lb)	1999 Estimated Existing Annual Pb Load (lb)	2006 Estimated Existing Annual Pb Load (lb)	2014 Estimated Existing Annual Pb Load (lb)	1999 Estimated Existing Annual Zn Load (lb)	2006 Estimated Existing Annual Zn Load (lb)	2014 Estimated Existing Annual Zn Load (lb)
CL020	0.91	0.89	0.88	0.51	0.50	0.49	7.67	7.53	7.34
Totals	0.9	0.9	0.9	0.5	0.5	0.5	7.7	7.5	7.3
% Reduction	0.0	-1.7	-1.7	0.0	-1.9	-2.7	0.0	-1.8	-2.4

TABLE 10
Outfall Unit Area TN and TP Load Summary for 2014, 2006, 1999

Outfall	1999 Estimated Existing Annual TN Load (lb/yr/ac)	2006 Estimated Existing Annual TN Load (lb/yr/ac)	2014 Estimated Existing Annual TN Load (lb/yr/ac)	1999 Estimated Existing Annual TP Load (lb/yr/ac)	2006 Estimated Existing Annual TP Load (lb/yr/ac)	2014 Estimated Existing Annual TP Load (lb/yr/ac)
BY027	8.6	8.5	8.3	1.4	1.4	1.4
BY036	6.1	6.1	5.9	1.3	1.4	1.3
BY150	6.7	6.7	6.5	1.1	1.1	1.1
BY195	4.7	4.6	4.5	0.8	0.8	0.8
CL020	6.5	6.4	6.2	1.6	1.6	1.5
HU040	4.9	4.8	4.7	1.0	1.0	1.0
HU060	6.2	6.0	5.9	1.0	1.0	1.0
HU061	3.9	3.8	3.7	0.6	0.6	0.6
HU070	5.1	5.0	4.9	0.9	0.9	0.8
HU080	5.2	5.1	5.0	0.9	0.9	0.8

TABLE 11
Outfall Unit Area BOD, TSS, Cu, Pb, Zn Load Summary for 2014, 2006, 1999

Outfall	Area (acres)	1999 Estimated Existing Annual BOD Load (lb/ac/yr)	2006 Estimated Existing Annual BOD Load (lb/ac/yr)	2014 Estimated Existing Annual BOD Load (lb/ac/yr)	1999 Estimated Existing Annual TSS Load (lb/ac/yr)	2006 Estimated Existing Annual TSS Load (lb/ac/yr)	2014 Estimated Existing Annual TSS Load (lb/ac/yr)	1999 Estimated Existing Annual Cu Load (lb/ac/yr)	2006 Estimated Existing Annual Cu Load (lb/ac/yr)	2014 Estimated Existing Annual Cu Load (lb/ac/yr)	1999 Estimated Existing Annual Pb Load (lb/ac/yr)	2006 Estimated Existing Annual Pb Load (lb/ac/yr)	2014 Estimated Existing Annual Pb Load (lb/ac/yr)	1999 Estimated Existing Annual Zn Load (lb/ac/yr)	2006 Estimated Existing Annual Zn Load (lb/ac/yr)	2014 Estimated Existing Annual Zn Load (lb/ac/yr)
BY027	137.20	40.7	39.9	39.1	268	263	258	0.05	0.05	0.05	0.06	0.06	0.06	0.39	0.38	0.38
BY036	21.49	36.1	41.5	35.7	255	296	253	0.05	0.06	0.05	0.02	0.02	0.02	0.33	0.40	0.33
BY150	162.05	53.3	52.4	51.2	395	389	380	0.12	0.12	0.12	0.04	0.04	0.04	0.65	0.64	0.62
BY195	25.47	21.4	20.9	20.5	109	107	104	0.04	0.04	0.04	0.01	0.01	0.01	0.18	0.18	0.17
CL020	25.48	37.2	36.5	35.5	258	253	246	0.04	0.04	0.03	0.02	0.02	0.02	0.30	0.30	0.29
HU040	10.50	28.8	28.3	27.4	199	195	189	0.05	0.05	0.05	0.02	0.02	0.02	0.29	0.28	0.27
HU060	103.28	37.9	37.1	35.8	281	275	266	0.09	0.09	0.09	0.03	0.03	0.02	0.45	0.44	0.43
HU061	6.95	16.5	16.1	15.8	78	77	75	0.03	0.03	0.03	0.01	0.01	0.01	0.13	0.13	0.12
HU070	41.15	30.1	29.5	28.9	189	185	181	0.07	0.06	0.06	0.02	0.02	0.02	0.31	0.30	0.30
HU080	52.47	28.8	28.2	27.6	173	170	166	0.06	0.06	0.06	0.02	0.02	0.02	0.28	0.28	0.27

4.0 REFERENCES

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Appendix A

APPENDIX A

TABLE 1-1
Published Runoff Coefficients (c) for Meteorological Zone 2 Based on Non-DCIA CN and Percent DCIA

NDCIA CN	PERCENT DCIA																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	0.002	0.043	0.083	0.123	0.164	0.204	0.244	0.285	0.325	0.366	0.406	0.446	0.487	0.527	0.567	0.608	0.648	0.688	0.729	0.769	0.809
35	0.004	0.044	0.085	0.125	0.165	0.205	0.246	0.286	0.326	0.366	0.407	0.447	0.487	0.528	0.568	0.608	0.648	0.689	0.729	0.769	0.809
40	0.007	0.047	0.087	0.127	0.167	0.207	0.248	0.288	0.328	0.368	0.408	0.448	0.488	0.528	0.569	0.609	0.649	0.689	0.729	0.769	0.809
45	0.01	0.05	0.09	0.13	0.17	0.21	0.25	0.29	0.33	0.37	0.41	0.45	0.49	0.53	0.57	0.61	0.65	0.69	0.729	0.769	0.809
50	0.015	0.055	0.095	0.134	0.174	0.214	0.254	0.293	0.333	0.373	0.412	0.452	0.492	0.531	0.571	0.611	0.651	0.69	0.73	0.77	0.809
55	0.022	0.061	0.101	0.14	0.179	0.219	0.258	0.298	0.337	0.376	0.416	0.455	0.494	0.534	0.573	0.613	0.652	0.691	0.731	0.77	0.809
60	0.03	0.069	0.108	0.147	0.186	0.225	0.264	0.303	0.342	0.381	0.42	0.459	0.498	0.537	0.576	0.615	0.654	0.693	0.731	0.77	0.809
65	0.042	0.08	0.119	0.157	0.195	0.234	0.272	0.311	0.349	0.387	0.426	0.464	0.502	0.541	0.579	0.618	0.656	0.694	0.733	0.771	0.809
70	0.057	0.095	0.133	0.17	0.208	0.245	0.283	0.321	0.358	0.396	0.433	0.471	0.509	0.546	0.584	0.621	0.659	0.697	0.734	0.772	0.809
75	0.079	0.116	0.152	0.189	0.225	0.262	0.298	0.335	0.371	0.408	0.444	0.481	0.517	0.554	0.59	0.627	0.663	0.7	0.736	0.773	0.809
80	0.111	0.146	0.181	0.216	0.251	0.285	0.32	0.355	0.39	0.425	0.46	0.495	0.53	0.565	0.6	0.635	0.67	0.705	0.74	0.774	0.809
85	0.16	0.192	0.225	0.257	0.29	0.322	0.355	0.387	0.42	0.452	0.485	0.517	0.55	0.582	0.614	0.647	0.679	0.712	0.744	0.777	0.809
90	0.242	0.27	0.299	0.327	0.355	0.384	0.412	0.44	0.469	0.497	0.526	0.554	0.582	0.611	0.639	0.667	0.696	0.724	0.753	0.781	0.809
95	0.404	0.424	0.444	0.464	0.485	0.505	0.525	0.546	0.566	0.586	0.606	0.627	0.647	0.667	0.688	0.708	0.728	0.749	0.769	0.789	0.809
98	0.595	0.605	0.616	0.627	0.638	0.648	0.659	0.67	0.68	0.691	0.702	0.713	0.723	0.734	0.745	0.756	0.766	0.777	0.788	0.799	0.809

Source: Stormwater Quality Applicant's Handbook, Design Requirements for storm water Treatment Systems in Florida, March 2010 Draft

TABLE 1-2
Summary of Curve Numbers Based on Land use and Soil Group

FLUCCS	Generalized Land Use Description	Hydrologic Soils Group					
		A	B	B/D	C	D	W
1100	Residential-Low Density	39	61	61	74	80	99.8
1200	Residential-Med Density	39	61	61	74	80	99.8
1300	Residential-High Density	39	61	61	74	80	99.8
1400	Commercial	39	61	61	74	80	99.8
1500	Industrial	39	61	61	74	80	99.8
1600	Extractive	39	61	61	74	80	99.8
1700	Institutional	39	61	61	74	80	99.8
1800	Recreational	39	61	80	74	80	99.8
1900	Open Land	39	61	80	74	80	99.8
2100	Cropland and Pastureland	39	61	80	74	80	99.8
2200	Tree Crops - Citrus	32	58	79	72	79	99.8
2300	Feeding Operations	32	58	79	72	79	99.8
2400	Nurseries and Vineyards	67	78	89	85	89	99.8
2500	Specialty Farms	67	78	89	85	89	99.8
2600	Other Open Lands - Rural	39	61	80	74	80	99.8
3100	Herbaceous Rangeland	39	61	80	74	80	99.8
3200	Shrub and Brush Rangeland	30	48	73	65	73	99.8
3300	Mixed Rangeland	30	48	73	65	73	99.8
4100	Upland Coniferous Forest	32	58	79	72	79	99.8
4200	Upland Hardwood Forests	32	58	79	72	79	99.8
4300	Mixed Hardwood Forests	32	58	79	72	79	99.8

TABLE 1-2
Continued
Summary of Curve Numbers Based on Land use and Soil Group

FLUCCS	Generalized Land Use Description	Hydrologic Soils Group					
		A	B	B/D	C	D	W
4400	Tree Plantations	32	58	79	72	79	99.8
5000	Water	99.8	99.8	99.8	99.8	99.8	99.8
5100	Streams and Waterways	99.8	99.8	99.8	99.8	99.8	99.8
5200	Lakes	99.8	99.8	99.8	99.8	99.8	99.8
5300	Reservoirs	99.8	99.8	99.8	99.8	99.8	99.8
6100	Wetland Hardwood Forests	99.8	99.8	99.8	99.8	99.8	99.8
6200	Wetland Coniferous Forests	99.8	99.8	99.8	99.8	99.8	99.8
6300	Wetland Forested Mixed	98	98	98	98	98	99.8
6400	Vegetated Non-Forested Wetlands	98	98	98	98	98	99.8
7400	Mining	39	61	80	74	80	99.8
8100	Transportation / Utilities	83	89	89	92	93	99.8
8200	Communications	83	89	89	92	93	99.8
8300	Utilities	83	89	89	92	93	99.8

TABLE 1-3 (A)
Characterization of Basin/Landuse specific DCIA/Impervious Assignments Lake Hunter

Receiving Body	Basin	Outfall	Landuse (FLUCCS)	DCIA (%)	IMP (%)
Lake Hunter	HU040H	HU040	1200	10	15
Lake Hunter	HU040H	HU040	1300	10	15
Lake Hunter	HU040H	HU040	1700	30	30
Lake Hunter	HU040H	HU040	8100	75	75
Lake Hunter	HU055036W	HU060	1700	61	61
Lake Hunter	HU055036W	HU060	1900	0	0
Lake Hunter	HU055036W	HU060	4340	0	0
Lake Hunter	HU055036W	HU060	6440	100	100

TABLE 1-3 (A)
Continued
Characterization of Basin/Landuse specific DCIA/Impervious Assignments Lake Hunter

Receiving Body	Basin	Outfall	Landuse (FLUCCS)	DCIA (%)	IMP (%)
Lake Hunter	HU055036W	HU060	8100	83	83
Lake Hunter	HU055075	HU060	1400	59	59
Lake Hunter	HU055075	HU060	5300	100	100
Lake Hunter	HU055075	HU060	6400	100	100
Lake Hunter	HU055075	HU060	8100	0	0
Lake Hunter	HU060	HU060	1400	30	35
Lake Hunter	HU060051R	HU060	1400	74	74
Lake Hunter	HU060051R	HU060	1500	86	86
Lake Hunter	HU060051R	HU060	1700	90	90
Lake Hunter	HU061	HU061	1200	23	30
Lake Hunter	HU061	HU061	1900	0	0
Lake Hunter	HU070	HU070	1400	80	85
Lake Hunter	HU070	HU070	1200	24	34
Lake Hunter	HU080	HU080	1400	80	85
Lake Hunter	HU080	HU080	1200	24	34

Note: Site 2 (outfall HU040) and Site 3 (outfall HU060) DCIA not provided, runoff coefficient 'c' derived from "Lake Hunter Implementation Report- Results of Select Monitoring/Data Collection"

TABLE 1-3 (B)
Characterization of Basin/Landuse specific DCIA/Impervious Assignments Lake Bonny

Receiving Body	Basin	Outfall	Landuse (FLUCCS)	DCIA (%)	IMP (%)
Lake Bonny	BY036	BY036	1300	12	15
Lake Bonny	BY036	BY036	1700	61	61
Lake Bonny	BY036	BY036	1900	0	0
Lake Bonny	BY070	BY070	1200	25	34
Lake Bonny	BY070	BY070	1300	25	34
Lake Bonny	BY070	BY070	1400	80	85
Lake Bonny	BY070	BY070	1500	68	77
Lake Bonny	BY070	BY070	8100	66	66
Lake Bonny	BY140	BY140	1200	25	34
Lake Bonny	BY140	BY140	1300	0	0
Lake Bonny	BY140	BY140	1400	85	90
Lake Bonny	BY140	BY140	1700	44	49
Lake Bonny	BY140	BY140	1900	0	0

TABLE 1-3 (B)
Continued
Characterization of Basin/Landuse specific DCIA/Impervious Assignments Lake Bonny

Receiving Body	Basin	Outfall	Landuse (FLUCCS)	DCIA (%)	IMP (%)
Lake Bonny	BY140	BY140	8100	66	66
Lake Bonny	BY150	BY150	1700	28	28
Lake Bonny	BY150	BY150	1400	75	75
Lake Bonny	BY150	BY150	1900	0	0
Lake Bonny	BY150	BY150	8100	0	0
Lake Bonny	BY150	BY150	5300	100	100
Lake Bonny	BY150	BY150	4300	0	0
Lake Bonny	BY150	BY150	4340	0	0
Lake Bonny	BY195	BY195	1100	0	0
Lake Bonny	BY195	BY195	1200	27	35
Lake Bonny	BY195	BY195	1400	48	53

TABLE 1-3 (C)
Characterization of Basin/Landuse specific DCIA/Impervious Assignments Crystal Lake

Receiving Body	Basin	Outfall	Landuse (FLUCCS)	DCIA (%)	IMP (%)
Crystal Lake	CL020	CL020	1300	34	44
Crystal Lake	CL020	CL020	1700	56	63
Crystal Lake	CL020	CL020	1900	0	0

TABLE 1-4
MS4 Outfall and Corresponding Contribution Basins

Basins	Outfall	Outfall Waterbody
HU040H	HU040	Lake Hunter
HU055036W	HU060	Lake Hunter
HU055075	HU060	Lake Hunter
HU060	HU060	Lake Hunter
HU060051R	HU060	Lake Hunter
HU061	HU061	Lake Hunter
HU070	HU070	Lake Hunter
HU080	HU080	Lake Hunter
Site 2	HU040	Lake Hunter
Site 3	HU060	Lake Hunter

TABLE 1-4
Continued
MS4 Outfall and Corresponding Contribution Basins

Basins	Outfall	Outfall Waterbody
BY027	BY027	Lake Bonny
BY036	BY036	Lake Bonny
BY150	BY150	Lake Bonny
BY195	BY195	Lake Bonny
CL020	CL020	Crystal Lake

TABLE 1-5
Summary of Literature-Based Runoff Characterization for General Land use Categories in Florida

Land Use Category	Typical Runoff Concentration (mg/l)						
	TN	TP	BOD	TSS	Cu	Pb	Zn
Low-Density Residential[1]	1.5	0.18	4.7	23	0.008[4]	0.002[4]	0.031[4]
Single-Family	1.85	0.31	7.9	37.5	0.016	0.004	0.062
Multi-Family	1.91	0.48	11.3	77.8	0.009	0.006	0.086
Low-Intensity Commercial	0.93	0.16	7.7	57.5	0.018	0.005	0.094
High-Intensity Commercial	2.48	0.23	11.3	69.7	0.015	--	0.16
Light Industrial	1.14	0.23	7.6	60	0.003	0.002	0.057
Highway	1.37	0.17	5.2	37.3	0.032	0.011	0.126
Pasture	2.48	0.7	5.1	94.3	--	--	--
Citrus	2.31	0.16	2.55	15.5	0.003	0.001	0.012
Row Crops	2.47	0.51	--	19.8	0.022	0.004	0.03
General Agriculture[2]	2.42	0.46	3.8	43.2	0.013	0.003	0.021
Undeveloped / Rangeland / Forest	1.15	0.055	1.4	8.4	--	--	--
Mining / Extractive	1.18	0.15	7.6[3]	60.0[3]	0.003[3]	0.002[3]	0.057[3]

TABLE 1-5
Continued
Summary of Literature-Based Runoff Characterization for General Land use Categories in Florida

Land Use Category	Typical Runoff Concentration (mg/l)						
	TN	TP	BOD	TSS	Cu	Pb	Zn
Wetland	1.01	0.09	2.63	11.2	0.001	0.001	0.006
Open Water / Lake	1.6	0.067	1.6	3.1		0.025[5]	0.028

1. Average of single-family and undeveloped loading rates
2. Mean of pasture, citrus, and row crop land uses
3. Runoff concentrations assumed equal to industrial values for these parameters
4. Value assumed to be equal to 50% of single-family concentration
5. Runoff concentrations assumed equal to wetland values for these parameters

Notes: This table is a replica of the Table 4-17 in the Final Report of "Evaluation of Current Stormwater Design Criteria within the state of Florida" prepared for: Florida Department of Environmental Protection (June 2007). Prepared by Environmental Research & Design, Inc. Harvey H. Harper, Ph.D., P.E. & David M. Baker, P.E.

Total N and Total P EMC values are from the Table 3.4 in March 2010 Draft Department of Environmental Protection and Water Management Districts Environmental Resource Permit Stormwater Quality Applicant's Handbook Design Requirements for Stormwater Treatment Systems in Florida.

Wetland and Open Water/Lake EMC values are from Table 7 of the Final Report of "Evaluation of Alternative Stormwater Regulations for Southwest Florida". (Revised Sept 08, 2003) Submitted to Water Enhancement & Restoration Coalition, Inc. Prepared by Environmental Research & Design, Inc. Harvey H. Harper, Ph.D., P.E. & David M. Baker, P.E.

TABLE 1-6

Mean Annual Mass Removal Efficiencies for 0.50-inches of Retention in Zone 2 Based on Non-DCIA CN and Percent DCIA

NDCIA	Percent DCIA																			
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	97.0	96.7	94.8	91.7	87.9	83.8	79.7	75.7	71.9	68.4	65.2	62.1	59.4	56.9	54.5	52.3	50.3	48.4	46.7	45.1
35	95.2	95.5	93.8	90.9	87.3	83.4	79.3	75.4	71.7	68.3	65.0	62.1	59.3	56.8	54.4	52.3	50.3	48.4	46.7	45.1
40	92.9	94.0	92.5	89.9	86.5	82.7	78.9	75.1	71.4	68.0	64.9	61.9	59.2	56.7	54.4	52.2	50.2	48.4	46.7	45.1
45	90.2	91.9	90.9	88.6	85.5	81.9	78.2	74.6	71.1	67.7	64.6	61.7	59.1	56.6	54.3	52.2	50.2	48.4	46.7	45.1
50	86.7	89.2	88.9	87.0	84.2	80.9	77.4	73.9	70.5	67.3	64.3	61.5	58.9	56.5	54.2	52.1	50.2	48.3	46.6	45.1
55	82.7	86.1	86.4	84.9	82.6	79.6	76.4	73.1	69.9	66.8	63.9	61.2	58.6	56.3	54.1	52.0	50.1	48.3	46.6	45.1
60	78.5	82.6	83.4	82.5	80.6	78.0	75.1	72.1	69.1	66.1	63.4	60.8	58.3	56.0	53.9	51.9	50.0	48.2	46.6	45.1
65	74.2	78.6	79.8	79.5	78.1	76.0	73.5	70.7	68.0	65.3	62.7	60.2	57.9	55.7	53.6	51.7	49.9	48.2	46.6	45.1
70	69.8	74.2	75.8	76.0	75.2	73.5	71.4	69.1	66.6	64.2	61.8	59.5	57.3	55.3	53.3	51.4	49.7	48.1	46.5	45.1
75	65.4	69.6	71.4	71.9	71.5	70.4	68.8	66.9	64.9	62.7	60.6	58.6	56.6	54.7	52.8	51.1	49.5	47.9	46.5	45.1
80	61.4	64.9	66.6	67.3	67.2	66.5	65.5	64.1	62.5	60.8	59.0	57.3	55.5	53.9	52.2	50.7	49.2	47.7	46.4	45.1
85	57.6	60.1	61.6	62.2	62.3	62.0	61.3	60.4	59.3	58.1	56.8	55.4	54.0	52.7	51.3	50.0	48.7	47.4	46.2	45.1
90	54.1	55.4	56.2	56.7	56.8	56.7	56.4	55.9	55.2	54.5	53.6	52.8	51.8	50.9	49.9	48.9	47.9	46.9	46.0	45.1
95	50.1	50.5	50.7	50.8	50.8	50.8	50.6	50.4	50.2	49.9	49.5	49.1	48.7	48.2	47.7	47.2	46.7	46.1	45.6	45.1
98	47.8	47.7	47.7	47.6	47.6	47.5	47.4	47.2	47.1	46.9	46.8	46.6	46.5	46.3	46.1	45.9	45.7	45.5	45.3	45.1

Source: Evaluation of Current Stormwater Design Criteria within the State of Florida- Final Report." FDEP Contract No. SO108

Appendix B

APPENDIX B

TABLE 2-1
"Adjusted" MS4 Basin Pollutant Loads (TN, TP, BOD, TSS, Cu, Pb, Zn) for 1999

Basins	Outfall	Estimated Existing Annual TN Load (lb.)	Estimated Existing Annual TP Load (lb.)	Estimated Existing Annual BOD Load (lb.)	Estimated Existing Annual TSS Load (lb.)	Estimated Existing Annual Cu Load (lb.)	Estimated Existing Annual Pb Load (lb.)	Estimated Existing Annual Zn Load (lb.)
HU040H	HU040	30.51	5.61	177.73	1223.22	0.39	0.12	2.00
HU055036W	HU060	52.59	7.84	178.26	1168.37	0.45	0.10	1.48
HU055075	HU060	78.37	12.26	227.19	1547.52	0.64	0.13	1.76
HU060	HU060	14.47	2.49	44.93	308.68	0.13	0.02	0.33
HU060051R	HU060	62.53	11.01	504.24	3789.19	1.07	0.31	5.89
HU061	HU061	26.88	4.49	114.48	543.58	0.23	0.06	0.90
HU070	HU070	211.48	35.79	1239.80	7780.24	2.73	0.73	12.76
HU080	HU080	272.81	46.10	1508.73	9093.16	3.28	0.87	14.94
Site 2	HU040	21.31	5.26	125.13	862.99	0.11	0.07	1.00
Site 3	HU060	427.46	71.15	2954.71	22207.16	7.02	2.18	37.21
BY027	BY027	1185.40	197.58	5585.80	36828.35	7.30	8.56	53.85
BY036	BY036	131.51	27.92	776.31	5476.29	1.01	0.44	7.00
BY150	BY150	1086.20	182.16	8629.06	64023.28	20.14	5.91	105.07
BY195	BY195	119.57	20.07	543.95	2770.10	1.12	0.29	4.57
CL020	CL020	166.19	40.75	947.42	6580.82	0.91	0.51	7.67

TABLE 2-2
"Adjusted" MS4 Basin Pollutant Loads (TN, TP, BOD, TSS, Cu, Pb, Zn) for 2006

Basins	Outfall	Estimated Existing Annual TN Load (lb.)	Estimated Existing Annual TP Load (lb.)	Estimated Existing Annual BOD Load (lb.)	Estimated Existing Annual TSS Load (lb.)	Estimated Existing Annual Cu Load (lb.)	Estimated Existing Annual Pb Load (lb.)	Estimated Existing Annual Zn Load (lb.)
HU040H	HU040	29.90	5.49	174.15	1198.62	0.38	0.12	1.96
HU055036W	HU060	51.53	7.68	174.66	1144.77	0.44	0.10	1.45
HU055075	HU060	76.79	12.02	222.60	1516.26	0.63	0.12	1.72
HU060	HU060	14.18	2.44	44.02	302.44	0.13	0.02	0.32
HU060051R	HU060	61.26	10.78	494.05	3712.64	1.05	0.30	5.77
HU061	HU061	26.34	4.40	112.19	532.69	0.23	0.06	0.88
HU070	HU070	207.20	35.07	1214.75	7623.06	2.67	0.71	12.51
HU080	HU080	267.30	45.17	1478.25	8909.46	3.21	0.85	14.63
Site 2	HU040	20.88	5.16	122.62	845.66	0.11	0.07	0.98
Site 3	HU060	418.82	69.71	2895.02	21758.53	6.87	2.13	36.46

TABLE 2-2
Continued
"Adjusted" MS4 Basin Pollutant Loads (TN, TP, BOD, TSS, Cu, Pb, Zn) for 2006

Basins	Outfall	Estimated Existing Annual TN Load (lb.)	Estimated Existing Annual TP Load (lb.)	Estimated Existing Annual BOD Load (lb.)	Estimated Existing Annual TSS Load (lb.)	Estimated Existing Annual Cu Load (lb.)	Estimated Existing Annual Pb Load (lb.)	Estimated Existing Annual Zn Load (lb.)
BY027	BY027	1161.37	193.57	5471.88	36076.30	7.15	8.39	52.75
BY036	BY036	132.16	29.40	892.07	6369.40	1.31	0.52	8.58
BY150	BY150	1083.64	182.71	8497.18	63059.69	19.85	5.83	103.57
BY195	BY195	117.15	19.66	532.96	2714.14	1.10	0.28	4.48
CL020	CL020	162.96	39.95	929.36	6455.97	0.89	0.50	7.53

TABLE 2-3
"Adjusted" MS4 Basin Pollutant Loads (TN, TP, BOD, TSS, Cu, Pb, Zn) for 2014

Basins	Outfall	Estimated Existing Annual TN Load (lb.)	Estimated Existing Annual TP Load (lb.)	Estimated Existing Annual BOD Load (lb.)	Estimated Existing Annual TSS Load (lb.)	Estimated Existing Annual Cu Load (lb.)	Estimated Existing Annual Pb Load (lb.)	Estimated Existing Annual Zn Load (lb.)
HU040H	HU040	29.06	5.34	167.78	1153.14	0.37	0.12	1.89
HU055036W	HU060	49.60	7.37	155.46	1002.43	0.40	0.08	1.21
HU055075	HU060	73.28	11.47	186.30	1245.83	0.55	0.09	1.25
HU060	HU060	13.52	2.33	36.31	244.03	0.11	0.01	0.22
HU060051R	HU060	60.00	10.56	483.87	3636.09	1.03	0.29	5.66
HU061	HU061	25.80	4.31	109.90	521.80	0.22	0.06	0.86
HU070	HU070	202.93	34.35	1189.70	7465.88	2.62	0.70	12.25
HU080	HU080	261.79	44.24	1447.77	8725.76	3.14	0.83	14.33
Site 2	HU040	20.45	5.05	120.09	828.21	0.11	0.07	0.96
Site 3	HU060	410.18	68.28	2835.31	21309.79	6.73	2.09	35.71
BY027	BY027	1137.42	189.58	5359.00	35332.05	7.00	8.22	51.67
BY036	BY036	125.77	28.20	767.12	5442.75	1.04	0.44	7.11
BY150	BY150	1059.81	178.69	8301.02	61603.02	19.39	5.69	101.18
BY195	BY195	114.74	19.26	521.97	2658.18	1.08	0.27	4.39
CL020	CL020	158.71	38.85	903.37	6279.06	0.88	0.49	7.34

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