2011 PROGRESS REPORT

For the Lower St. Johns River Main Stem Basin Management Action Plan

Developed by the
Lower St. Johns River TMDL Executive Committee

In cooperation with the
Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

February 2012

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LIST OF ACRONYMS

APRICOT	A Prototype Realistic Innovative Community of Today
ATAC	Allocation Technical Advisory Committee
AWT	Advanced Wastewater Treatment
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BNR	Biological Nutrient Removal
CCUA	Clay County Utility Authority
DO	Dissolved Oxygen
EFDC	Environmental Fluid Dynamics Code
EPA	Environmental Protection Agency
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FIT	Florida Institute of Technology
FSU	Florida State University
GIS	Geographic Information Systems
HSPF	Hydrologic Simulation Program – FORTRAN
LID	Low Impact Development
LSJR	Lower St. Johns River
MS4	Municipal Separate Storm Sewer System
MSMP	Master Stormwater Management Plan
MT	Metric Ton
NAS	Naval Air Station
NNC	Numeric Nutrient Criteria
NRCS	Natural Resources Conservation Service
NS	Naval Station
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
RO	Reverse Osmosis
RST	Regional Stormwater Treatment
SJRWMD	St. Johns River Water Management District
SRF	State Revolving Fund
SSAC	Site-Specific Alternative Criterion
STORET	STOrage and RETrieval (Database)
TCAA	Tri-County Agricultural Area
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
UF–IFAS	University of Florida–Institute of Food and Agricultural Sciences
USGS	U.S. Geological Survey
WBID	Waterbody identification
WWTP	Wastewater Treatment Plant
WWTF	Wastewater Treatment Facility

EXECUTIVE SUMMARY

TOTAL MAXIMUM DAILY LOADS

The Total Maximum Daily Loads (TMDLs) for the main stem of the Lower St. Johns River (LSJR) Basin were adopted by the Florida Department of Environmental Protection (FDEP) in June 2008. The TMDLs target total phosphorus (TP) and total nitrogen (TN) in the freshwater reach to achieve reductions in the chlorophyll-*a* levels in this portion of the river. In addition, a TN TMDL was established in the marine reach to meet dissolved oxygen (DO) levels that would be protective of aquatic life uses.

The LSJR Main Stem Basin Management Action Plan (BMAP) was adopted in October 2008 to implement these TMDLs. This 2011 Progress Report is the third annual progress report for the LSJR Main Stem BMAP, and it describes the major accomplishments and issues identified during the reporting period of January 1, 2011 through December 31, 2011 as well as an analysis of water quality trends since BMAP implementation.

MAJOR ACCOMPLISHMENTS

There have been many successes in BMAP implementation during the reporting period. Two WWTF projects in the freshwater section were completed with a reduction of 2,485.9 kg/yr of TP and 9,640.9 kg/yr of TN. The WWTFs in the freshwater section have achieved their portion of the TN and TP required reductions. In addition, three wastewater projects were completed in the marine section for a total reduction of 30,473 kg/yr of TN. Two municipal separate storm sewer system (MS4) projects were completed in the marine section for a reduction of 18,505 kg/yr of TN. In the freshwater section, one non-MS4 project was completed this year yielding 194.7 kg/yr of TP and 1,417.5 kg/yr of TN reductions.

The Florida Department of Agriculture and Consumer Services (FDACS) has continued to sign up growers under the vegetable and agronomic crop, sod, and cow/calf best management practice (BMP) manuals. To date, no producers have opted to monitor water quality instead of implementing BMPs. In addition, FDACS, St. Johns River Water Management District (SJRWMD), and several other agencies formed the Tri-County Agricultural Area (TCAA) Water Management Partnership to implement on-farm and regional water management projects and practices to reduce runoff of nutrients to the LSJR, improve water conservation, and result in more efficient farm management. As part of this program, SJRWMD and FDEP have provided funding towards the development of alternative nutrient and water management practices.

BMAP monitoring plan efforts have continued in the freshwater section, marine section, and tributaries. The river transect sampling in the freshwater section occurred on schedule in April through October, and the 2011 sampling was the last of the three years required by the BMAP. The continuous dissolved oxygen (DO) stations in the marine section were maintained throughout the year. The responsible entities have continued the ambient water quality sampling in the tributaries. In addition, the high-flow sampling continued and 2011 was the last of the three years of sampling required by the BMAP.

MAJOR ISSUES

The major issue in BMAP implementation this past year has been securing funding for projects. For local governments and water management districts, the economic downturn and subsequent decreases in *ad valorem* taxes and development fees has made it difficult to obtain the funding necessary to implement the BMAP projects. While funding continues to be an issue, this limitation has not caused major delays in implementation of BMAP projects

scheduled to be completed during this reporting period. Another major concern for the stakeholders is the potential impact of the U.S. Environmental Protection Agency's numeric nutrient criteria, and the potential for these federal standards to undermine ongoing BMAP efforts by establishing standards (other than the TMDLs) that could result in different reduction requirements than are required in the BMAP. However, the stakeholders are encouraged by FDEP's nutrient standards rulemaking, which would allow the TMDL to stand as the site-specific standard.

ACTIVITIES FOR THE UPCOMING YEAR

The fourth annual BMAP progress report will encompass the period of January 1, 2012 through December 31, 2012. During this time, the City of Palatka will complete their WWTF project in the freshwater section, and the City of Jacksonville Beach will complete their WWTF project in the marine section. The City of Jacksonville will continue to phase-out septic tanks and design stormwater projects to meet their marine section MS4 allocation. Camp Blanding will continue the maintenance and repair of their swales in the marine section. FDACS will continue to enroll agricultural producers in BMP programs, and they will be adopting an equine BMP manual and a consolidated citrus BMP manual. In addition, the freshwater ambient water quality sampling, DO sampling, and tributaries sampling will continue through the monitoring plan.

WATER QUALITY TRENDS

In this first comprehensive assessment of source loads, there were generally declining trends in TN and TP concentrations found in streams draining watersheds dominated by urban and dairy land uses. These reductions in urban tributaries can be attributed to regional urban stormwater treatment, aggressive identification of illicit outfalls, extension of sanitary sewer service to areas formerly on septic tanks, and removal of small wastewater treatment plants. The reductions in dairy-dominated watershed runoff concentrations can be attributed to the decline in the dairy industry.

The progress in nutrient load reduction from row crop agriculture is mixed. While there are some significant declines in TN concentrations, particularly under low flow conditions, there are no downward trends under higher flow conditions, and in some cases, there are increasing trends in both TN and TP. The tentative conclusion of the patterns in nutrient concentrations in runoff from row crop-dominated watersheds is that while best management practices and regional stormwater treatment have been successful in the reduction of TN loads, TP loads appear to be largely unchanged and may even be increasing.

Based on discharge monitoring reports, significant, downward trends are occurring in most point source effluent loads, accomplished through a combination of reduced discharge volume and lower effluent concentrations. The total of point source loads in both the freshwater and marine reaches of the LSJR is now below the TMDL allocations.

Overall trends in river concentrations of TN and TP appear to be responding to the reductions that are occurring in most categories of the external load. The timing of recent downward trends in marine reach TN concentrations appear to correspond directly with decreases in the total point source effluent load. From 2008 through 2011, there have been no exceedences in the marine reach DO criteria.

Freshwater reach TN concentrations are also trending downward from 1995 through 2011, although the control of TN concentration by nitrogen-fixing cyanobacteria and successive low-flow years near the end of the assessment time period may have affected this downward trend. While there is no trend in the freshwater reach TP concentration when all years are examined,

separating years by the prevailing flow condition reveals a downward trend for low flow years and an upward trend under high flow years. This difference in TP concentrations is believed to result from reductions in point source loads, which have proportionally greater load contribution during low flow. This downward trend in low flow TP appears to have had a positive effect on freshwater algal bloom density and duration. The decreases in river TN and TP concentrations, and the recent achievement of water quality targets, over a relatively short period of time suggests that river health can respond quickly and favorably in response to external load reductions.

SECTION 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

This is the third annual progress report for the Lower St. Johns River (LSJR) Main Stem Basin Management Action Plan (BMAP). **Section 2** and **Section 3** describe the accomplishments and issues, respectively, during the period from January 1, 2011 through December 31, 2011. A summary of efforts for the upcoming year (January 1, 2012 through December 31, 2012) is included in **Section 4**. **Section 5** provides an overview of water quality trends since BMAP adoption.

1.2 TOTAL MAXIMUM DAILY LOADS FOR THE LOWER ST. JOHNS RIVER BASIN

The area addressed by the LSJR BMAP is that portion of the St. Johns River that flows between the mouth of the Ocklawaha River, its largest tributary, and the Atlantic Ocean, encompassing a 2,750-square-mile drainage area (see **Figure 1**). Within this reach, the St. Johns River is 101 miles long and has a water surface area of approximately 115 square miles. Major centers of population within the LSJR include Palatka, a city of 10,700 at the southern entrance to the basin; Green Cove Springs, a city of 4,700 at the midpoint; and the Orange Park, Middleburg, and Jacksonville metropolitan area, with a population of over 1 million, in the northern portion of the basin. For assessment purposes, the Florida Department of Environmental Protection (FDEP) has divided the LSJR Basin into water assessment polygons with a unique waterbody identification (WBID) number for each watershed or stream reach. The main stem of the LSJR is divided into fifteen WBID segments (see **Figure 1**). The LSJR is also divided into two reaches based on salinity: the marine reach and the freshwater reach (**Figure 2**).

The total maximum daily loads (TMDLs) for the main stem of the LSJR Basin were adopted by FDEP in June 2008. The TMDLs include total phosphorus (TP) and total nitrogen (TN) in the freshwater reach to achieve reductions in the chlorophyll-*a* levels in this portion of the river. A TN TMDL was also established in the marine reach to meet dissolved oxygen (DO) levels that would be protective of aquatic life uses. **Table 1** lists the TMDLs and pollutant load allocations adopted by rule for the LSJR**.**

TABLE 1: TMDLS IN THE LOWER ST. JOHNS RIVER BASIN

RIVER SECTION	WBID(S)	TMDL (KG/YR)	TMDL BASELINE LOAD (KG/YR)	WASTELOAD ALLOCATION* (KG/YR)	LOAD ALLOCATION (KG/YR)	OVERALL NEEDED REDUCTION (KG/YR)
Freshwater	2213I to 2213N	500,325 TP	599,610	46,357 TP	453,968 TP	99,285
Freshwater	2213I to 2213N	8,571,563 TN	10,115,552	236,695 TN	8,334,868 TN	1,543,989
Marine	2213A to 2213H	1,376,855 TN	2,453,258	1,027,590 TN	349,265	1,076,403

* Includes a percent reduction from National Pollutant Discharge Elimination System (NPDES) stormwater sources.

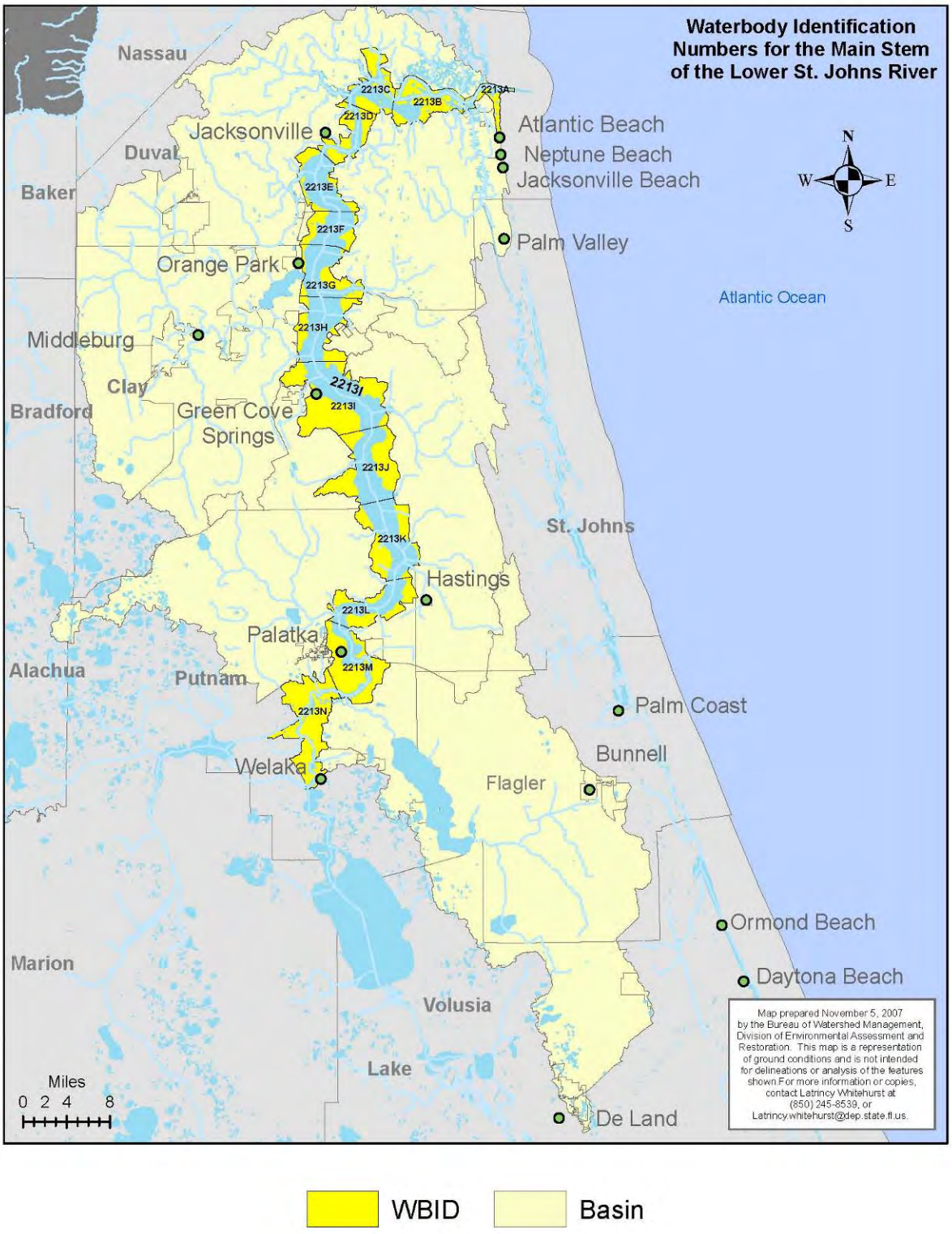


FIGURE 1: LOCATION OF THE LOWER ST. JOHNS RIVER BASIN

FIGURE 2: MARINE AND FRESHWATER REACHES IN THE LOWER ST. JOHNS RIVER BASIN

1.3 RESPONSIBLE PARTIES AND KEY STAKEHOLDERS

The LSJR BMAP identified wastewater treatment facilities (WWTFs), municipal separate storm sewer systems (MS4s), urban areas outside of MS4s (non-MS4 areas), and agricultural sources of TN and TP in the basin. Those entities that are responsible for achieving the load reductions in the freshwater reach are:

- City of Green Cove Springs WWTFs
- City of Palatka WWTF
- Georgia-Pacific WWTF
- Seminole Electric WWTF
- Clay County MS4
- Green Cove Springs MS4
- City of Palatka non-MS4
- Clay County non-MS4
- Putnam County non-MS4
- St. Johns County non-MS4
- Town of Hastings non-MS4
- Town of Welaka non-MS4
- Agriculture

The entities responsible for achieving the load reductions in the marine reach are:

- Anheuser Busch WWTF
- City of Atlantic Beach WWTFs
- City of Jacksonville Beach WWTF
- City of Neptune Beach WWTF
- Clay County Utility Authority (CCUA) WWTFs
- JEA WWTFs
- Naval Air Station (NAS) Jacksonville WWTF
- Naval Station (NS) Mayport WWTF
- Smurfit-Stone Container WWTF
- Town of Orange Park WWTF
- City of Atlantic Beach MS4
- City of Jacksonville/ Florida Department of Transportation (FDOT) MS4
- City of Jacksonville Beach MS4
- City of Neptune Beach MS4
- Clay County MS4
- NAS Jacksonville MS4
- NS Mayport MS4
- St. Johns County MS4
- Town of Orange Park MS4
- Camp Blanding non-MS4
- Clay County non-MS4
- St. Johns County non-MS4
- Agriculture

In addition to the these entities, the Florida Department of Agriculture and Consumer Services (FDACS), FDEP, and St. Johns River Water Management District (SJRWMD) are essential to the implementation of the BMAP activities.

1.4 BMAP ALLOCATIONS

The required reductions in the BMAP were developed through an extensive allocation process that built off of the three-step process recommended in the Allocation Technical Advisory Committee (ATAC) Report to the Governor and Legislature (February 2001). "Step 1" and "Step 2" reductions were only applied to nonpoint sources (urban and agriculture) to provide treatment approximately equivalent to the treatment required for domestic and industrial WWTFs. The Step 2 reductions were based on the reduction from nonpoint sources expected from implementation of their respective best management practices (BMPs). Since Step 2 reductions did not result in meeting the assimilative capacity of the river, additional "Step 3" reductions were necessary, which required the same overall percentage reduction from both point and nonpoint sources. Once the initial allocations were determined, the stakeholders had the opportunity to trade allocations before the BMAP was adopted. These "Pre-BMAP" trades mainly occurred between a WWTF and MS4 owned by the same stakeholder. The Pre-BMAP trades resulted in a change in the allocations, in which the entity trading the credits had a lower allocation than the initial allocation and the entity receiving the credits had a higher allocation than the initial allocation. The starting point loads and BMAP allocations after the Pre-BMAP

trades for each entity in the marine and freshwater reaches of the river are shown in **Table 2** through **Table 4**.

TABLE 2: TN STARTING POINT LOADS AND BMAP ALLOCATIONS IN THE FRESHWATER REACH

SOURCE	SOURCE TYPE	STARTING POINT LOAD (KG/YR)	ALLOCATION (KG/YR)
Georgia-Pacific	WWTF	258,155	165,909
Green Cove Springs WWTFs	WWTF	14,600	7,752.5
Palatka WWTF	WWTF	60,889	38,845
Seminole Electric	WWTF	21,045	14,732
Future APRICOT/ Reverse Osmosis (RO) Dischargers	WWTF	9,961	9,961
Clay County	MS4	2,770	2,418
Green Cove Springs	MS4	6,961	6,266.5
Alachua County Non-MS4	Non-MS4	636	0.0
Clay County Non-MS4	Non-MS4	5,579	4,659
Flagler County Non-MS4	Non-MS4	7	7
Hastings	Non-MS4	624	448
Palatka	Non-MS4	9,683	8,858
Pomona Park	Non-MS4	108	108
Putnam County	Non-MS4	43,616	33,976
St. Johns County Non-MS4	Non-MS4	27,277	25,340
Welaka	Non-MS4	1,175	838
Agriculture	Nonpoint Source	310,700	194,336
Upstream Anthropogenic Load	Other Source	4,148,223	2,693,852
Atmospheric Deposition	Other Source	105,688	105,688
Natural Background	Other Source	5,087,856	5,087,856
Total Freshwater TN Loads	**Total Load**	**10,115,552**	**8,401,850**

TABLE 3: TP STARTING POINT LOADS AND BMAP ALLOCATIONS IN THE FRESHWATER REACH

SOURCE	SOURCE TYPE	STARTING POINT LOAD (KG/YR)	ALLOCATION (KG/YR)
Georgia-Pacific	WWTF	63,875	33,182
Green Cove Springs WWTFs	WWTF	3,865	1,929.2
Palatka WWTF	WWTF	9,955	5,954.7
Future APRICOT/RO Dischargers	WWTF	3,320	3,320
Clay County	MS4	404.6	212.6
Green Cove Springs	MS4	1,095.7	1,043.7
Alachua County Non-MS4	Non-MS4	83.8	83.8
Clay County Non-MS4	Non-MS4	767.3	499.4
Flagler County Non-MS4	Non-MS4	0.9	0.9
Hastings	Non-MS4	92.9	49.3
Palatka	Non-MS4	1,507.8	1,507.8
Pomona Park	Non-MS4	15.8	15.8
Putnam County	Non-MS4	5,990.4	3,964.9
St. Johns County Non-MS4	Non-MS4	3,727.4	3,296.6
Welaka	Non-MS4	172.0	90.4
Agriculture	Nonpoint Source	83,455	70,974
Upstream Anthropogenic Load	Other Source	137,157	76,502
Atmospheric Deposition	Other Source	1,356	1,356
Natural Background	Other Source	282,768	282,768
Total Freshwater TP Loads	**Total Load**	**599,610**	**486,751**

TABLE 4: TN STARTING POINT LOADS AND BMAP ALLOCATIONS IN THE MARINE REACH

SOURCE	SOURCE TYPE	STARTING POINT LOAD (KG/YR)	ALLOCATION (KG/YR)
Anheuser Busch – Main Street	WWTF	24,399	12,418
Atlantic Beach Aggregate	WWTF	49,275	21,188
CCUA Aggregate	WWTF	61,569	63,963
Jacksonville Beach WWTF	WWTF	40,150	21,015
JEA Aggregate	WWTF	1,396,622	654,672
Neptune Beach WWTF	WWTF	11,448	6,162
Orange Park WWTF	WWTF	24,886	7,940
Smurfit-Stone Container	WWTF	145,989	74,305
U.S. Navy WWTF Aggregate	WWTF	42,029	11,684
Future APRICOT/RO Dischargers	WWTF	4,979	4,979
Atlantic Beach	MS4	2,474	1,651
Clay County Marine MS4	MS4	25,249	21,188
Jacksonville/FDOT	MS4	243,438	96,016
Jacksonville Beach	MS4	4,974	4,804
Neptune Beach	MS4	1,484	1,437
Orange Park	MS4	3,451	3,348
St. Johns County	MS4	3,057	746
U.S. Navy MS4s	MS4	7,530	7,232
Camp Blanding – State of Florida	Non-MS4	2,870	1,220
Clay County Marine Non-MS4	Non-MS4	12,051	11,107
St. Johns County Marine Non-MS4	Non-MS4	9,846	4,865
Agriculture	Nonpoint Source	12,800	4,170
Atmospheric Deposition - Marine	Other Source	95,028	95,028
Natural Background	Other Source	242,300	242,300
Total Marine TN Loads	**Total Load**	**2,453,094**	**1,373,438**

1.5 NUMERIC NUTRIENT CRITERIA

On December 6, 2010, the U.S. Environmental Protection Agency (EPA) promulgated numeric nutrient criteria (NNC) for freshwater streams, springs, and lakes in Florida. These criteria were originally scheduled to be effective starting March 6, 2012; however, EPA recently proposed extending the effective date to June 4, 2012 to allow FDEP to complete its nutrient standards rulemaking. The Florida Environmental Regulation Commission adopted FDEP's rules for nutrient standards for streams, lakes, springs, and selected estuaries at their December 8, 2011 meeting. However, the rules were challenged by several environmental groups and an administrative hearing is currently scheduled in February 2012. The rules were transmitted to the Florida Legislature on December 9, 2011. If the Florida Legislature ratifies FDEP's rules and the rule is upheld in the administrative hearing, FDEP will then send the rules to EPA for their review and approval. If EPA approves the rules as a change to Florida's water quality standards, it will rescind their promulgated NNC.

FDEP's nutrient rules maintain the narrative nutrient criteria and interpret the narrative using a hierarchical approach that evaluates site-specific information for the waterbody. The highest level of the hierarchy consists of site-site specific evaluations, which include nutrient TMDLs, site-specific alternative criteria (SSAC) for nutrients, estuary-specific nutrient interpretations, and other properly noticed site-specific interpretations of the narrative nutrient criterion. Therefore, if FDEP's nutrient standards are (a) upheld in the administrative hearing, (b) ratified by the Florida Legislature, and (c) approved by EPA, the LSJR TMDL would be the applicable nutrient standard for the main stem of the river. FDEP will keep the Executive Committee updated on the status of the state's nutrient rules and any implications for the LSJR Main Stem TMDL.

SECTION 2: MAJOR ACCOMPLISHMENTS

2.1 SUMMARY OF EFFORTS

There have been many successes in BMAP implementation during the reporting period. Two WWTF projects in the freshwater section were completed with a reduction of 2,485.9 kg/yr of TP and 9,640.9 kg/yr of TN. The WWTFs in the freshwater section have achieved their portion of the TN and TP required reductions. In addition, three wastewater projects were completed in the marine section for a total reduction of 30,473 kg/yr of TN. Two MS4 projects were completed in the marine section for a reduction of 18,505 kg/yr of TN. In the freshwater section, one non-MS4 project was completed this year yielding 194.7 kg/yr of TP and 1,417.5 kg/yr of TN reductions.

FDACS has continued to sign up growers under the vegetable and agronomic crop, sod, and cow/calf BMP manuals. To date, no producers have opted to monitor water quality instead of implementing BMPs. In addition, FDACS, SJRWMD, and several other agencies formed the Tri-County Agricultural Area (TCAA) Water Management Partnership to implement on-farm and regional water management projects and practices to reduce runoff of nutrients to the LSJR, improve water conservation, and result in more efficient farm management. As part of this program, SJRWMD and FDEP have provided funding towards the development of alternative nutrient and water management practices.

Additional details about the accomplishments over the past year are described in **Section 2.2** through **Section 2.5**. The individual project tables are included in **Appendix A**, and photographs of project implementation efforts are included in **Section 2.2** and **Appendix C**.

2.2 ACCOMPLISHMENTS BY SOURCE TYPE

2.2.1 WASTEWATER TREATMENT FACILITIES

2.2.1.1 Freshwater Section

City of Green Cove Springs

The City of Green Cove Springs began to cycle the South Wastewater Treatment Plant (WWTP) blowers around January/February 2011 allowing denitrification to occur resulting in much lower TN levels in the effluent. Based on these results and the anticipation that near-term growth within the city will be slow to moderate within the foreseeable future, a major capital improvement outlay to modify, expand, and/or relocate the existing South WWTP was deferred (project GCS-2). The city continues to enhance the South WWTP process control with oxidation reduction potential meters, more frequent testing, and blower timer modifications to further increase removal efficiencies with limited capital outlays. The September 2011 FDEP Minor Revision permit package provided an update related to these activities, and illustrated current compliance with the Administrative Order requirements. A meeting with FDEP and city staff occurred on October 31, 2011 to review the submittal and the city's current status related to the Administrative Order.

The city continues to pursue additional reuse capabilities with the owners of the Magnolia Golf and Country Club (project GCS-1). Based on recommendations from Mittauer and Associates, Inc., the City is pursuing mechanisms to maintain a minimum reuse level of 0.20 million gallons per day (average annual daily flow) at Magnolia Point. In addition, the city is considering

additional reuse expansion within Magnolia Point that will significantly assist the city's efforts in maintaining compliance with current TMDL requirements. The combination of the reuse and operational modifications at the South and Harbor Road WWTPs will allow the city to meet their current TMDL obligations for the foreseeable future. As growth prospects change, the city will address further improvements at the South WWTP to allow for appropriate nutrient removal efficiency as well as reuse system expansion.

Through operational controls, the city's plant operators (Mike Williams, Lead Operator) continue to consistently reduce effluent TN and TP levels at the Harbor Road WWTP and the South WWTP. With the operational adjustments, the average Harbor Road WWTP effluent for TN in 2011 was 5.08 mg/L while the average for 2010 was 6.83 mg/L. The 1.75 mg/L differential equates to a 25% decrease through operational enhancements only. The average TP concentration for 2011 at the Harbor Road WWTF was 0.739 mg/L while the average for 2010 was 0.930 mg/L. The 0.191 mg/L differential equates to a 20% decrease. Similarly, the operational changes at the South WWTP have accomplished the loading improvements, and the average TN concentration for 2011 was 11.05 mg/L while the average for 2010 was 31.05 mg/L. The 20.00 mg/L differential equates to a 64% decrease. Removal of TP is more difficult at this plant due to the blower cycling approach for TN control. The TP concentration for 2011 was 5.09 mg/L while the average for 2010 was 5.19 mg/L. The 0.10 mg/l differential equates to a 2% decrease. The city remains optimistic that further operational adjustments will result in further reductions in effluent TN and TP levels at both plants. The city will install temporary mixing pumps inside aeration units at the Harbor Road and the South WWTPs in the near future to further enhance TN and TP removal efficiencies. If successful, the city will ask its engineer to prepare documents for submittal to FDEP for a permanent installation at both plants.

Figure 3 and **Figure 4** depict the downward trends in TN and TP, respectively, since the start of the city's efforts to lower loading. The operational changes at both WWTPs have significantly lowered the TN and TP from the city's starting point and additional adjustments should continue the downward trend. The city applauds its operational staff and their efforts to accomplish these reductions through minimal capital outlays and more stringent operational controls.

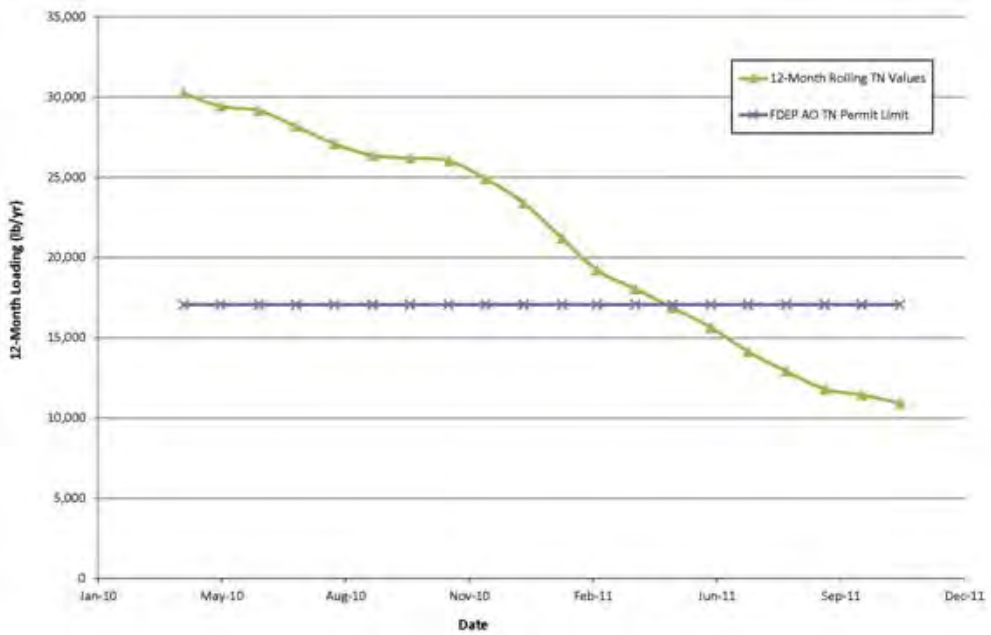


FIGURE 3: GREEN COVE SPRINGS WWTPS 12-MONTH ROLLING AVERAGE FOR TN

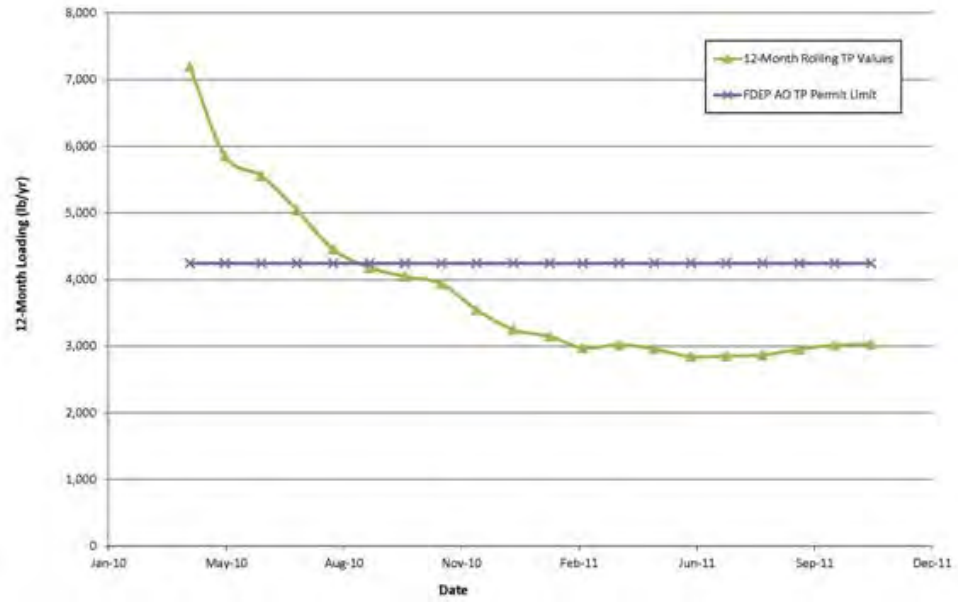


FIGURE 4: GREEN COVE SPRINGS WWTPS 12-MONTH ROLLING AVERAGE FOR TP

City of Palatka

The City of Palatka WWTF zero discharge project (PAL-5) involved several phases. Phases 1 through 3 and Phase 5 have been completed. Phase 4, which is currently under construction, consists of upgrading the treatment capacity of the WWTF to fully filter and treat the 3.5 million gallon per day design capacity (see **Figure 5** and **Figure 6**). This treated effluent will be pumped to a holding pond and used for reuse throughout the City of Palatka.

The city entered into the TMDL program with the goal of meeting the mandated reduction. Through the cooperative efforts of the SJRWMD, FDEP, and city leadership, the city increased the goal to being the first city to ultimately remove all of its wastewater from the St. Johns River. This partnership has allowed the city to construct over six miles of distribution piping and four miles of irrigation piping. These projects give the city the opportunity to remove its wastewater from the St. Johns River. The city will construct the WWTF upgrade in 2011-2012 while concurrently working to optimize reuse options and output during this same time period. It is also very likely, depending on the need and the availability, that the city will consider making available the reuse water for other uses including irrigation of homeowner's lawns.

FIGURE 5: PALATKA WWTF UPGRADES

FIGURE 6: PALATKA WWTF UPGRADES

WWTF Progress Towards the Freshwater TMDLs

Figure 7 and **Figure 8** show the progress made towards meeting the WWTF portion of the freshwater TP and TN TMDLs. The first bar in the figures shows the starting load for the freshwater WWTFs as calculated in the BMAP. The second bar shows the estimated 2011 load based on all completed freshwater WWTF projects (from the BMAP, 2009 and 2010 progress reports, and those listed above). The third bar indicates the total allocation allowed for the WWTFs in the freshwater section of the river. The WWTFs in the freshwater section have achieved their portion of the TP TMDL with the projects completed in 2011. The WWTFs in the freshwater section had already achieved their portion of the TN TMDL.

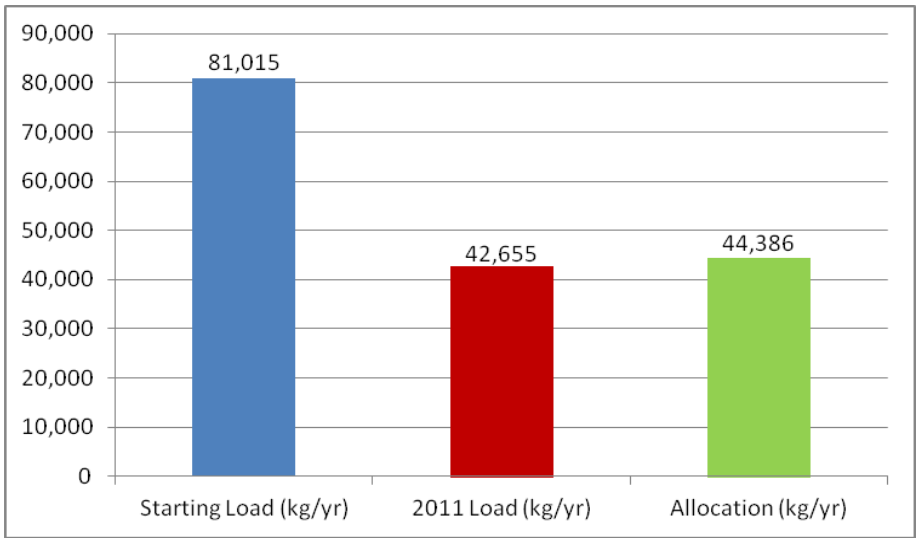


FIGURE 7: WWTF PROGRESS TOWARDS THE TP FRESHWATER TMDL

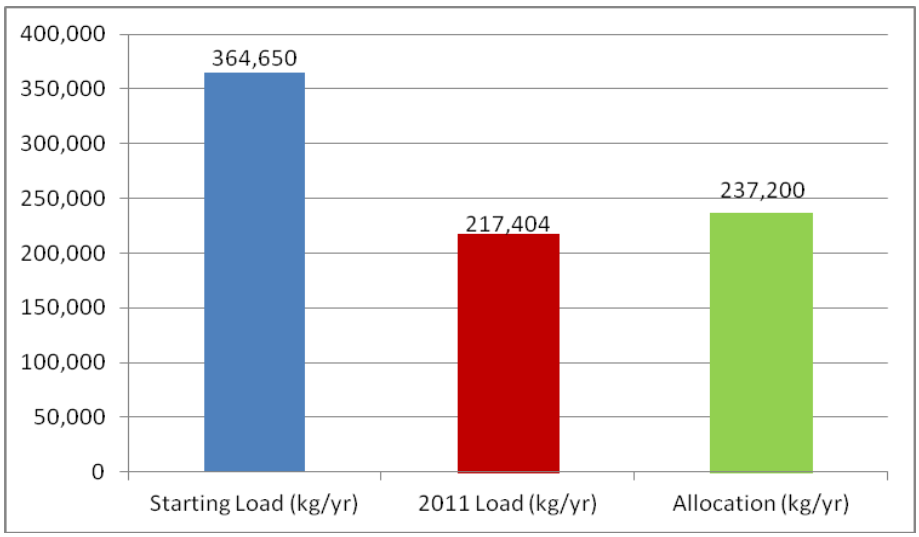


FIGURE 8: WWTF PROGRESS TOWARDS THE TN FRESHWATER TMDL

2.2.1.2 Marine Section

City of Atlantic Beach

The City of Atlantic Beach has made a lot of progress in 2011 on the Main WWTP upgrade (project AB-2). The construction of the force main from Buccaneer WWTP (WWTP #2) to Main WWTP (WWTP #1) was completed May 2011 (**Figure 9**). Directional drilling was used for much of the project to avoid damaging trees and to alleviate disruption in the affected neighborhoods. This portion of the project was completed by T.B. Landmark Construction Company ahead of schedule and under budget. The contract for the WWTP #1 upgrade was awarded to WPC Industrial Contractors in January 2011 and construction is proceeding on the project (**Figure 10**). The design of additional odor control and sludge treatment upgrades was approved in January 2011, and WPC Industrial Contractors is also proceeding on those improvements.

FIGURE 9: DIRECTIONAL DRILLING OF FORCE MAIN FOR ATLANTIC BEACH MAIN WWTP UPGRADE

FIGURE 10: LIFT STATION CONSTRUCTION TO TRANSFER FLOWS FROM ATLANTIC BEACH WWTP #2 TO WWTP #1

City of Jacksonville Beach

The new Jacksonville Beach WWTP is receiving and treating wastewater flow, and effluent water quality is improving (project JB-1). Approximately nine instrumentation cards were damaged by a lightning strike last year; therefore, the plant was staffed constantly during this time with two operators and run in manual mode. Many other startup issues and adjustments are being worked out. The odor control equipment was installed (**Figure 11**). The Lift Station 14 upgrade was completed and the lift station is in operation. Demolition work on the old WWTP was completed (**Figure 12**) and the contractor is backfilling the old treatment plant tank areas (**Figure 13**). Construction is approximately 98% complete and should be finished in February 2012. This is ahead of the BMAP schedule date of July 1, 2013.

FIGURE 11: JACKSONVILLE BEACH WWTP NEW ODOR CONTROL EQUIPMENT

FIGURE 12: JACKSONVILLE BEACH WWTP DEMOLITION OF THE OLD PLANT TANKS

FIGURE 13: BACKFILL OF JACKSONVILLE BEACH OLD WWTP AREA

City of Neptune Beach

The City of Neptune Beach WWTF improvements (project NB-1) were started well ahead of the March 2012 compliance schedule, and were completed in June 2011 (**Figure 14**). The WWTF improvements are exceeding the design goal of 3 mg/L TN on a continuous basis. The combined effluent from the package plant has been averaging 7 mg/L TN. The latest toxicity results show six days 100% survival of *Ceriodaphnia dubia*. TN levels are projected to be well below the permitted pounds per day limit required in the FDEP permit (see **Figure 15**).

FIGURE 14: AERIAL VIEW OF THE NEW NEPTUNE BEACH WWTF

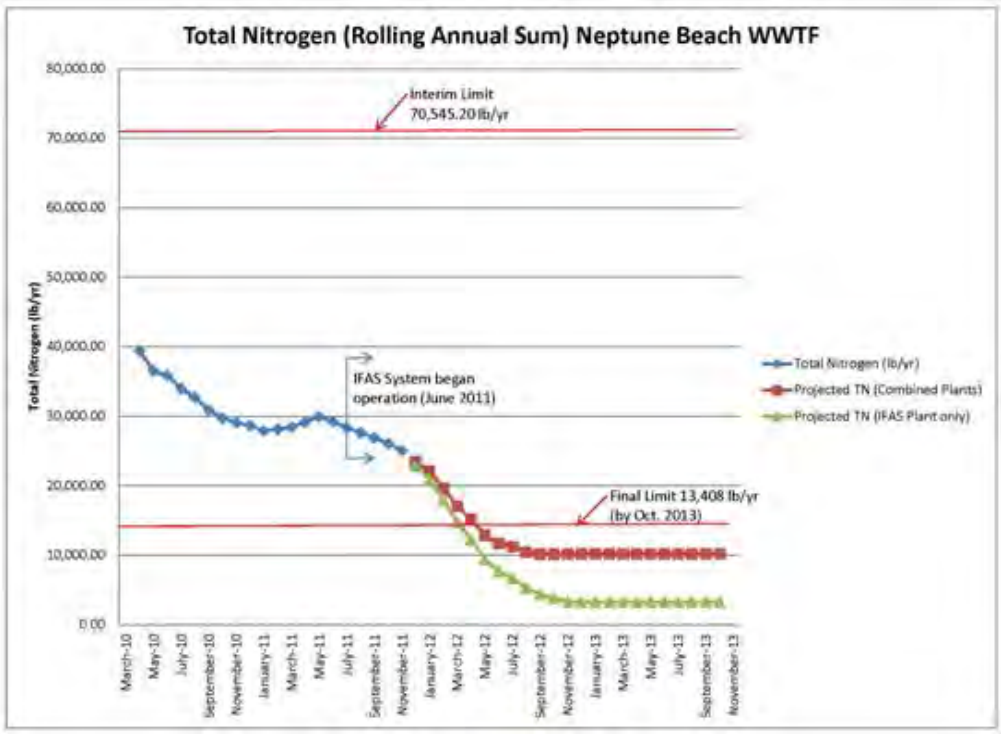


FIGURE 15: NEPTUNE BEACH WWTF ROLLING ANNUAL AVERAGE OF TN

Clay County Utility Authority

CCUA began design of the Miller Street WWTF Project (CCUA-2) in January 2007. Construction on this project started in 2008 and was completed in 2011. **Figure 16** shows the TN reduction from all of CCUA's facilities over this same time period.

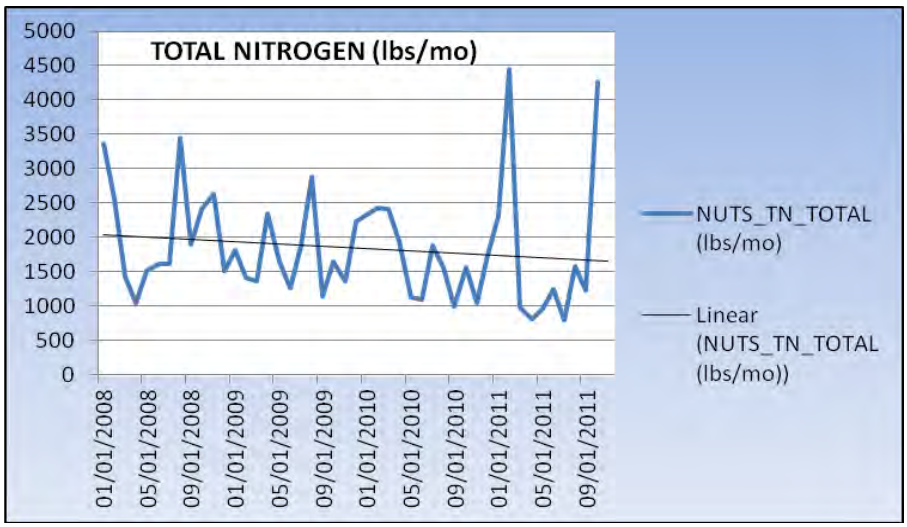


FIGURE 16: REDUCTION IN TN FROM CCUA'S WWTFS FROM 2008 TO 2011

On June 2, 2011, the Town of Orange Park transferred 937,000 gallons of treated wastewater effluent to CCUA in an historic effort to reduce nutrients in the St. Johns River and to preserve drinking water supplies. This was the initial transfer of reclaimed wastewater from the Town of Orange Park into CCUA's reclaimed water system. CCUA projects to expand the reuse system are shown in **Figure 17** and **Figure 18**.

FIGURE 17: CCUA NEW 0.75 MILLION GALLON GROUND STORAGE TANK AT OAK LEAF PLANTATION

FIGURE 18: CCUA'S RECLAIMED WATER MOBILE TESTING FACILITY

JEA

JEA is in the final stages of a decade long nitrogen reduction initiative. To date, JEA invested approximately $464 million in improvements to the sewer collection and treatment system, in a three-pronged approach. The first prong is to phase out older technology plants that JEA took over in parts of the community through acquisitions. The second prong is to upgrade the five regional wastewater treatment plants to advanced nutrient removal. The third prong is to initiate and continue to expand the reuse system as the community grows. The design of the Buckman biological nutrient removal (BNR) improvements (project JEA-16) has been completed, and construction is scheduled to commence before the end of 2012. Construction was initiated in 2011 for the phase out of the Royal Lakes (JEA-11) and San Jose (JEA-15) facilities, and both plants are scheduled to be phased out by March 2013. The influent from these two plants will be directed to the Arlington East WWTF, where it will receive more effective nutrient removal treatment.

JEA's most recent aggregate annual TN total was 518 tons, whereas the final BMAP allocation is 720 tons. As in 2010, this performance was a factor of both JEA's ongoing efforts and favorable climatic conditions.

Town of Orange Park

During the 2011 reporting period, the Town of Orange Park completed the Ash Street Advanced Wastewater Treatment Plant Phase 2 project (project OP-2). The project was substantially completed on August 15, 2011 and was fully operational on August 21, 2011 (see **Figure 19**).

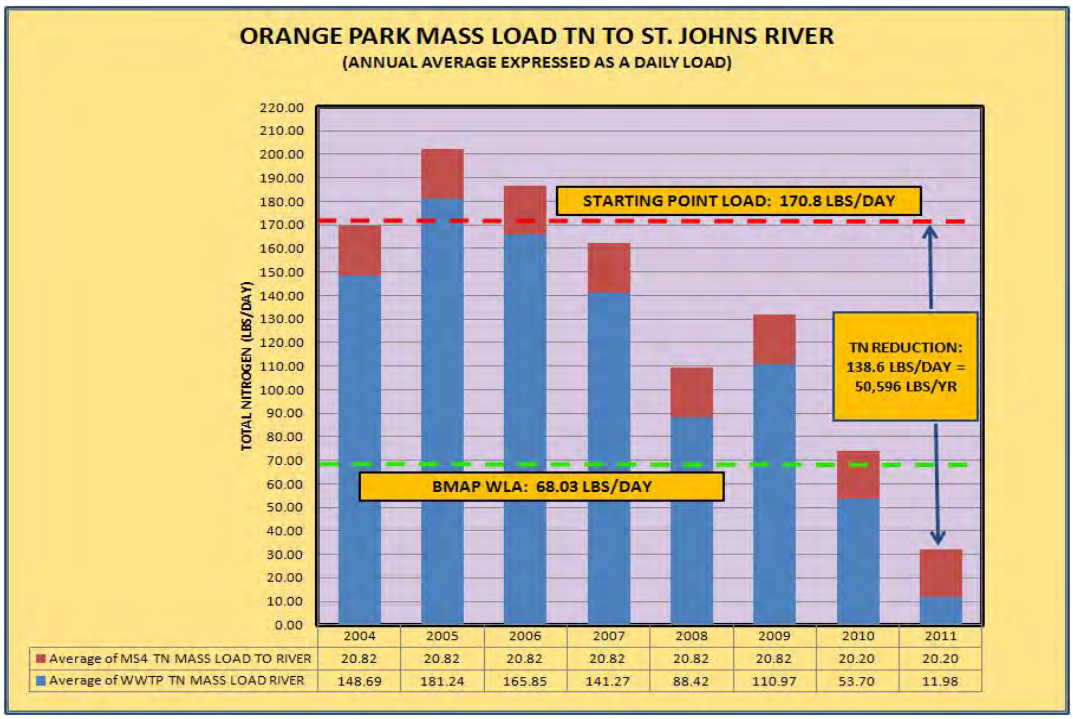


FIGURE 19: COMBINED TN EFFLUENT FROM THE ORANGE PARK MS4 AND ASH STREET WWTF

The notable achievement of 2011 was the 81.2% reduction of TN discharge from both the town's wastewater and stormwater systems from the starting point load of 170.8 pounds per day. This represents 50,596 pounds per year reduction in nutrient discharge. As shown in **Figure 19**, the Ash Street WWTF effluent represents only 37.2% of the combined TN discharge from the town's MS4 and wastewater systems. The performance of the Ash Street WWTF nutrient reduction system is attributed to the success of the BNR process and to the implementation of interlocal cooperation between the town and CCUA in utilizing treated effluent from the Ash Street WWTF in the CCUA reclaimed water system.

The town's five-stage Bardenpho BNR process has been remarkably effective and consistent in reducing TN in the wastewater effluent. Between October 2010 and August 2011, when Phase 1 improvements reached operational levels, the effluent from the Ash Street system averaged TN concentrations of 2.86 mg/L. Since August 2011, after Phase 2 improvements reached operational levels, the effluent from the Ash Street WWTF averaged a TN concentration of 1.11 mg/L. Effluent ammonia has generally been undetectable since Phase 1 improvements were placed into operation. **Figure 20** depicts the effluent concentrations of TN and ammonia since placing Phase 1 improvements into operation.

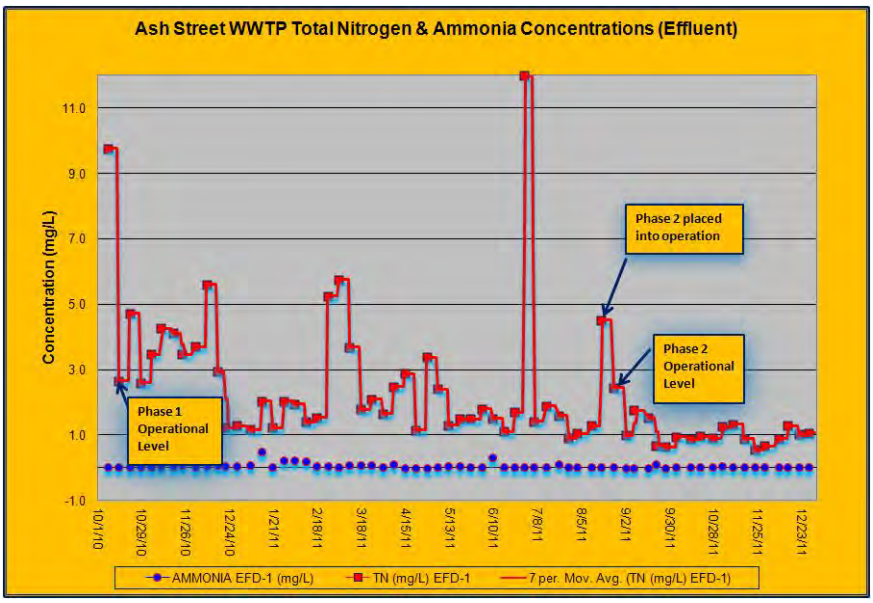


FIGURE 20: TN AND AMMONIA CONCENTRATIONS AT THE ORANGE PARK ASH STREET WWTF

The town's projects at Ash Street WWTF have resulted in outstanding effluent quality, which has the potential to be a valuable regional water resource. To achieve that potential, the town Council entered into an interlocal agreement with CCUA to transfer treated, filtered effluent to the CCUA Miller Street WWTF for incorporation into the CCUA reclaimed water system. The town's infrastructure to facilitate this agreement was constructed as part of Phase 1 improvements. The ultimate goal is to assist CCUA in reducing the need for groundwater augmentation of the reclaimed water supply. Beginning on June 1, 2011, the town and CCUA began implementing the agreement. Since that time, the Town has transferred 56.4 million gallons of treated, filtered effluent to CCUA's reclaimed water system. This represented 16.7% of all town effluent for the 2011 reporting period, and 25.4% of all town effluent during the first seven months since program implementation. **Figure 21** depicts effluent discharges to the St. Johns River and to CCUA.

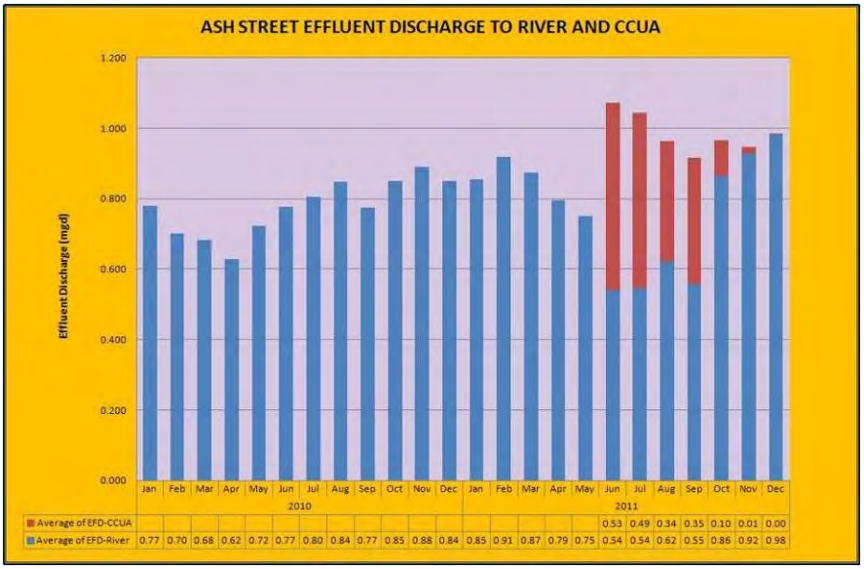


FIGURE 21: COMPARISON OF EFFLUENT DISCHARGES FROM THE ORANGE PARK ASH STREET WWTF TO THE ST. JOHNS RIVER AND TO CCUA'S RECLAIMED WATER SYSTEM

U.S Navy

The current NAS Jacksonville wastewater reuse system sends over 73 million gallons per year to the Timuquana Country Club golf course (project USN-1). The Navy completed a $2 million expansion of the reuse system from the WWTP to a reuse pond 2.2 miles away on the NAS Jacksonville golf course in May 2011. The City of Jacksonville will further expand the system to send over 110 million gallons per year to the NAS Jacksonville golf course in 2012 using SJRWMD funding ($400,000) that will also eliminate the need for withdrawal of 37 million gallons per year of water from the Floridan Aquifer. The City of Jacksonville will further expand the system in 2013 to the NAS Jacksonville weapons compound upland forests using SJRWMD funding ($1.4 million). This expansion will result in NAS Jacksonville going to zero wet weather discharge to the St. Johns River. The first step for the reductions will be completed by February 25, 2014. The second step for the reductions will involve modifying the NS Mayport WWTF and this step will be completed by October 1, 2015.

FIGURE 22: NEW REUSE PUMPS FOR PHASE 1 EXPANSION AT NAS JACKSONVILLE

FIGURE 23: NEW 2-ACRE REUSE WATER HOLDING POND ON NAS JACKSONVILLE GOLF COURSE

WWTF Progress Towards the Marine Section TMDL

Figure 24 shows the progress made towards meeting the WWTF portion of the marine TN TMDL. The first bar in the figure shows the starting load for the marine WWTFs as calculated in the BMAP. The second bar shows the estimated 2011 load based on all completed marine WWTF projects (from the BMAP, 2009 and 2010 progress reports, and those listed above). The third bar indicates the total allocation allowed for the WWTFs in the marine section of the river.

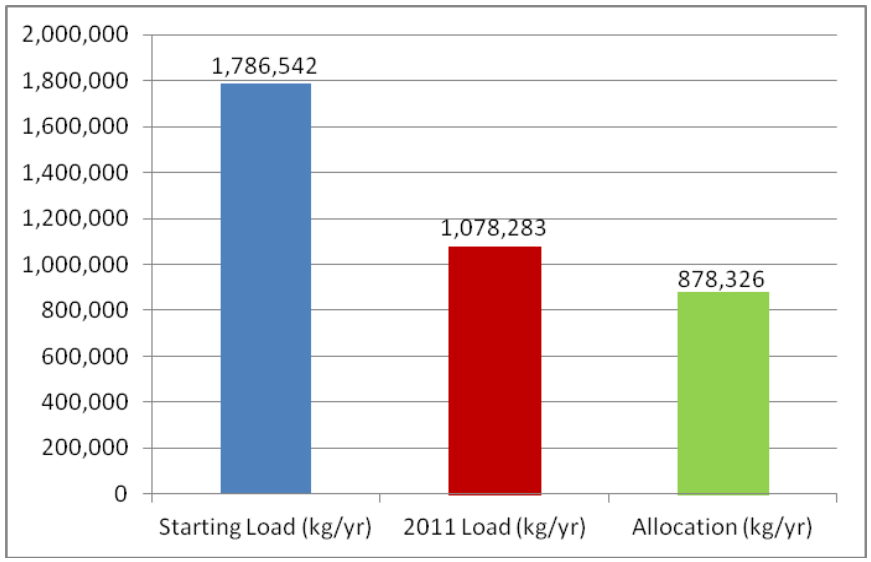


FIGURE 24: WWTF PROGRESS TOWARDS THE TN MARINE TMDL

2.2.1.3 Project Implementation Status

The section above described all the efforts in the past year related to project implementation including design and construction. These are important milestones that lead to project completion and actual load reductions. The WWTF projects that were completed during the last year and their associated load reductions are shown below in **Table 5** and **Table 6** for the freshwater section of the river and **Table 7** for the marine section.

TABLE 5: WWTF PROJECTS COMPLETED IN THE FRESHWATER SECTION FOR TP IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TP PROJECT REDUCTION (KG/YR)
Green Cove Springs	GCS-3	Operational changes to the Harbor Road and South WWTPs	2,486
Total	**-**	**-**	**2,486**

TABLE 6: WWTF PROJECTS COMPLETED IN THE FRESHWATER SECTION FOR TN IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TN PROJECT REDUCTION (KG/YR)
Green Cove Springs	GCS-3	Operational changes to the Harbor Road and South WWTPs	9,641
Total	**-**	**-**	**9,641**

TABLE 7: WWTF PROJECTS COMPLETED IN THE MARINE SECTION IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TN PROJECT REDUCTION (KG/YR)
CCUA	CCUA-2	Reuse water upgrades including Spencer WWTF	16,209

Entity	Project Number	Description	TN Project Reduction (kg/yr)
Neptune Beach	NB-1	Complete process improvements	7,322
Orange Park	OP-2	Ash Street WWTF Phase 2 Improvements	6,942
Total	**-**	**-**	**30,473**

2.2.2 MS4s

2.2.2.1 Freshwater

Clay County

Clay County continued their public education efforts (project CC-1). Video public service announcements are run before Clay County Commission meetings and during meeting breaks. These educational videos and the Commission's meetings are available to the public via the public access TV channel. In addition, the videos are indexed and available at the Clay County website: http://clayfl.swagit.com/Storm_Water_Management/. Clay County maintains a stormwater section on their website, which is available through the navigation pane of the main Clay County website: http://www.claycountygov.com/. Basic information related to erosion control, stormwater discharges, and the NPDES program is available. The county inspects for illicit discharges through their compliance department and maintains a call-in number for illicit discharges. This number is available on the county website. In addition, county staff distributed anonymous surveys to targeted small businesses along major drainage ways in the county in order to raise awareness about illicit discharges and collect information related to disposal activities. Two example surveys are provided in **Appendix C**.

The established water quality trading mechanism between Clay County and CCUA has continued for 2011 (project CC-3). An interlocal agreement between these two entities was executed in September 2009.

MS4 Progress Towards Meeting the Freshwater TMDLs

Figure 25 and **Figure 26** show the progress made towards meeting the SM4 portion of the freshwater TP and TN TMDLs, respectively. The first bar in the figure shows the starting load for the freshwater MS4s as calculated in the BMAP. The second bar shows the estimated 2011 load based on all completed freshwater MS4 projects (from the BMAP, 2009 and 2010 progress reports, and those listed above). The third bar indicates the total allocation allowed for the MS4s in the freshwater section of the river. Through completed projects from the BMAP and 2009 and 2010 progress reports, as well as the ongoing efforts listed above, the MS4s in the freshwater section have met the TP and TN reductions required under the BMAP.

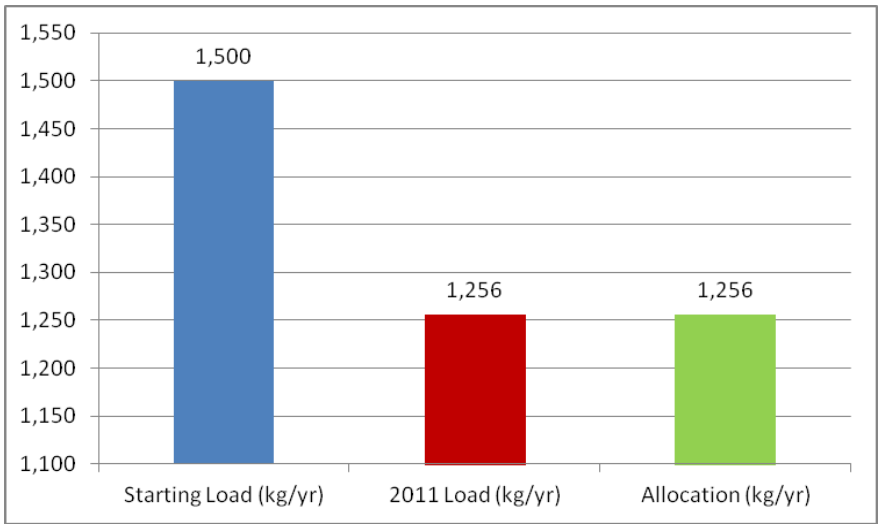


FIGURE 25: MS4 PROGRESS TOWARDS THE TP FRESHWATER TMDL

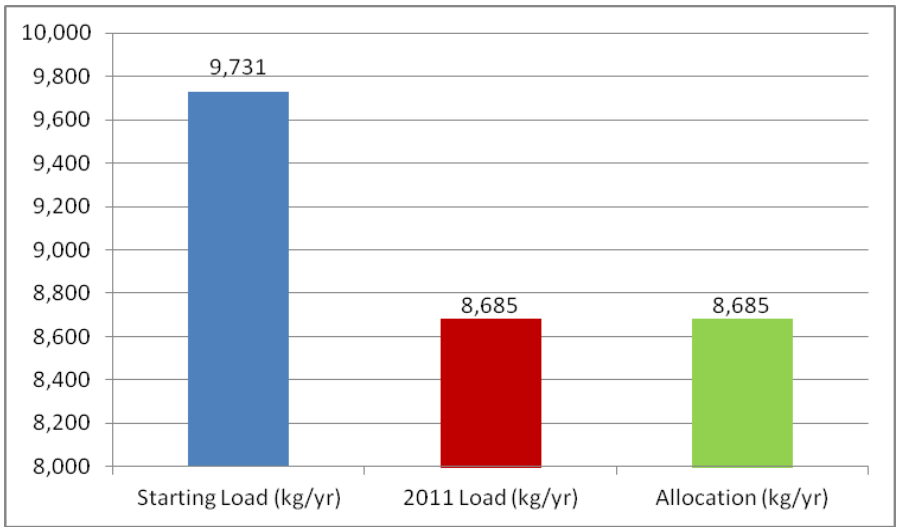


FIGURE 26: MS4 PROGRESS TOWARDS THE TN FRESHWATER TMDL

2.2.2.2 Marine

City of Jacksonville

Since the initiation of the Better Jacksonville Plan, the City of Jacksonville, in cooperation with JEA and the Water and Sewer Expansion Authority, has made approximately 4,900 sewer connections in septic tank failure areas identified by the Department of Health. Past projects including the number of properties connected are outlined in **Table 8**.

TABLE 8: BETTER JACKSONVILLE PLAN SEPTIC TANK PHASE-OUT PROJECT SUMMARY

SEPTIC TANK FAILURE AREA	TOTAL PROPERTIES ON SEPTIC TANKS	PROPERTIES CONNECTED TO SEWER	CONNECTION RATE
Oakwood Villas	1,726	720	42%
Lake Forest	887	483	54%
Scott Mill	367	280	76%
Murray Hill B	1,130	1,036	92%
Pernecia	211	196	93%
Glynlea	495	465	94%

The TN reduction attributed to these projects was calculated based on the methodology submitted with the city's BMAP projects prior to BMAP adoption. A Geographic Information Systems (GIS) exercise was performed to identify the septic tanks within a 300-meter stream buffer. The number of properties identified in each project area is presented in **Table 9**. To account for the differences in connection rates among the various phase-out areas, the connection rate established for the phase-out area as a whole was applied to the properties in the stream buffer.

TABLE 9: BETTER JACKSONVILLE PLAN SEPTIC TANK PHASE-OUT CONNECTED PROPERTIES IN STREAM BUFFER AREA

SEPTIC TANK FAILURE AREA	PROPERTIES IN BUFFER	PROPERTIES CONNECTED TO SEWER	CONNECTION RATE
Oakwood Villas	345	144	42%
Lake Forest	180	98	54%
Scott Mill	220	168	76%
Murray Hill B	780	715	92%
Pernecia	200	186	93%
Glynlea	200	188	94%

Figure 27 depicts the City of Jacksonville's progress toward meeting its septic tank phase-out nutrient reduction goal. This figure shows both the nutrient reductions based on connections to date as well as the anticipated reduction at 100% connection. As agreed to in pre-BMAP discussions and noted in the final BMAP, FDEP planned to conduct a study to quantify nutrient contributions from failing septic tanks to area waterways (see **Section 2.3.1**). Results of the study will be used to quantify the final water quality credits applicable to the city's septic tank phase-out projects. The timeline placed on this action is within six months of study completion.

In order to maximize nutrient reductions, the city has developed a dedicated annual allocation for septic tank phase-outs. These funds are intended to fund both septic tank phase-out construction projects as well as to subsidize connection fees for residents. The connection fee subsidy will dramatically increase connections to the new collection system. Additionally, the city will be revising its septic tank ordinance and developing ranking criteria for phase-outs that includes a water quality/environmental impact component in addition to the more traditional public health component.

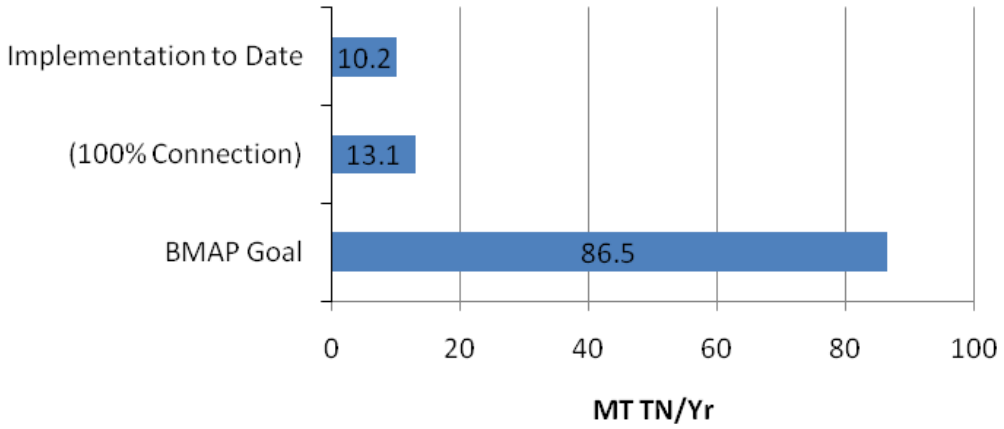


FIGURE 27: CITY OF JACKSONVILLE TN REDUCTIONS THROUGH SEPTIC TANK PHASE-OUT PROJECTS, METRIC TONS (MT) PER YEAR

During 2011, the City of Jacksonville also completed construction for four projects, began implementation for four more, and began design on an additional 17 projects as listed in **Table 10**. Of the projects completed and under construction, two contain excess water quality treatment, and these benefits are outlined in **Table 10**. **Figure 28** summarizes the nutrient reduction goals listed in the BMAP, those proposed through master stormwater management plan (MSMP) projects, and those already realized through project implementation since BMAP adoption. **Figure 29** is an example of one of the MSMP projects.

TABLE 10: SUMMARY OF CITY OF JACKSONVILLE MSMP PROJECTS

PROJECT NAME	PROJECT NUMBER	STATUS	TECHNOLOGY
Hugh Edwards Road Drainage	COJ-43	Construction Complete	Erosion Control Only
Upper Deer Creek Phase 3	COJ-42	Construction Complete	Wet Detention – 0.09 MT TN/yr
Venetia Terrace Drainage	COJ-43	Construction Complete	Flood Control Only
Newtown Drainage main trunk-line improvement (Myrtle & Beaver)	COJ-42	Construction Complete	Flood Control Only
Pine Forest/Larsen Acres	COJ-42	Under Construction	Wet Detention/Flood Control – 0.03 MT TN/yr
Air Liquide Pond Retrofit	COJ-42	Under Construction	Compensatory Treatment
McCoys Creek Pond C	COJ-42	Under Construction	Compensatory Treatment
Bay Street Bridge - Hogans Creek Downstream	Hogans Creek	Under Construction	Flood Control Only
Miruelo Circle (San Jose Estate Drainage Improvements)	COJ-42	Design in Progress, Permitting	Erosion Control Only
Paul Avenue Outfall	COJ-42	Design Complete, Permitting	Wet Detention
Hamilton Jersey Outfall	COJ-42	Design in Progress, Permitting	Flood and Erosion Control
Pinedale Area	COJ-43	Design in Progress	Wet Detention
Country Creek Area Drainage Improvements	COJ-43	Design in Progress	Wet Detention
Messer Area Drainage	COJ-48	Design in Progress	Wet Detention/Flood Control
Crystal Springs Area Drainage	COJ-43	Design in Progress	Wet Detention/Flood Control
Noroad/Lambing Drainage	COJ-43	Design in Progress	Wet Detention/Flood Control
Old Plank Road Outfall	COJ-43	Design in Progress	Wet Detention/Flood Control
Avenue B and Zinnia Drainage	COJ-48	Design in Progress	Erosion Control
Bunche Drive Pond	COJ-48	Design in Progress	Wet Detention
Durkeeville West Pond Expansion	COJ-42	Design in Progress	Wet Detention
Lower Eastside Phase III Drainage Improvements	COJ-42	Design in Progress	Wet Detention
NAS Jacksonville Reuse Partnering Project	COJ-42	Design in Progress	Stormwater Reuse
Valens Drive Low Impact Development (LID) Project	COJ-44	Design in Progress	Stormwater Reuse
Wurn Park LID Project	COJ-44	Design in Progress	Stormwater Reuse
Kennedy Center LID Project	COJ-42	Design in Progress	Stormwater Reuse

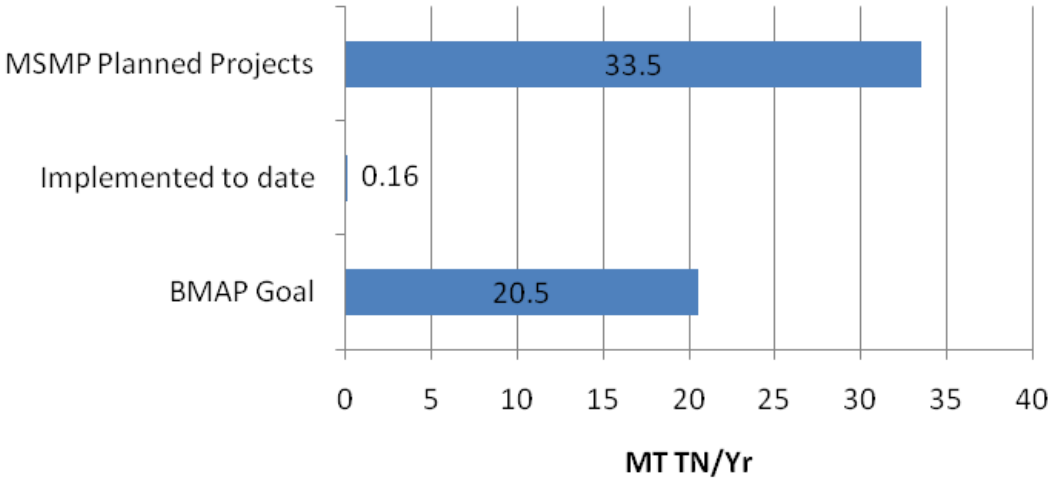


FIGURE 28: TN REDUCTIONS THROUGH STORMWATER PROJECTS

FIGURE 29: CITY OF JACKSONVILLE PINE FOREST/LARSEN ACRES POND CONSTRUCTION

In addition to septic tank phase-outs and stormwater BMPs, the city has been successful in advancing two key non-structural BMPs, which could influence nutrient reductions in the LSJR.

The first of these projects is a recent update to Environmental Protection Board Rule 3 related to water pollution. Rule 3 was updated to require all private lift stations to be under the responsible charge of a state licensed wastewater facility operator or a certified wastewater collection/transmission system operator. The lift stations are also required to be visited at a minimum of once per month to ensure proper operations and to perform routine maintenance. Additionally, if a private lift station system is found to have an overflow, the city may require the owner of the private lift station to upgrade the existing equipment to address performance shortfalls. It is anticipated that the changes to Rule 3 will improve overall private lift station operations and will reduce the amount of nutrients reaching the LSJR and its tributaries.

The second non-structural BMP the city has undertaken is adoption of low impact development (LID) practices in the city's Land Development Procedures Manual. In November 2011, the city

initiated development of its LID manual. The manual will include design specifications and guidelines for implementation of LID practices such as bioretention, pervious pavement, reduced road widths, vegetated filter strips, grassed conveyance swales, and detention with biofiltration. It is anticipated that the manual will be incorporated into the city's land development procedures manual to provide specific guidance to developers. The LID manual is expected to be completed by 2013. The City also initiated three demonstration projects to test LID principles for future implementation. First, the Valens Drive Residential LID project will include vegetated curb inlets and a pond with biofiltration. Second, Wurn and Springfield Park Commercial LID projects include supplementing irrigation with stormwater, installing pervious pavement, and instituting downspout disconnects to redirect stormwater from roofs and impervious surfaces. Finally, the Kennedy Center LID demonstration project will include curb cuts, a rooftop garden, and pervious pavement on athletic courts, picnic areas, and service entrances. These demonstration projects will provide an opportunity for the city to test LID principles in the field and conduct testing to quantify benefits related to runoff reduction and water quality improvement.

The BMAP goals for public education and outreach activities (COJ-51) received significant support during the referenced reporting period. The City of Jacksonville provides continuing support for the BMAP through several established public education and outreach programs and special events. Public education and outreach programs are supported by city organizations that include the Duval County Agricultural Extension Office; the city Environmental Protection Board; and city Environmental and Compliance, Public Works, and Planning and Development departments.

As noted in prior reports, the city enacted a fertilizer BMP ordinance and an irrigation ordinance to address residential and commercial practices that contribute to nutrient levels in the LSJR. A primary component of the ordinance code is outreach and education of residents to promote the understanding of the impacts of fertilizer and over-watering on the health of the river. Requirements of the fertilizer ordinance code include commercial fertilizer applicator training in state BMPs, spill prevention plans for bulk fertilizer facility operators, and standards for protecting surface water from fertilizer runoff. In order to accomplish the intended goals and objectives of the ordinance code, the Environmental and Compliance Department created an educational campaign to inform and educate residents about the value of natural water resources and effective fertilizer application practices for home lawns and around commercial properties.

Due to water quality and quantity concerns related to overwatering and the known contribution to the depletion of water supply and excess runoff of nutrients into the river, landscape irrigation requirements that will reduce the impact to the Floridan aquifer have been enacted. The landscape irrigation requirements include residential and non-residential irrigation limits and weekly schedules. Revisions to Chapter 656 of city ordinance code include the promotion of landscaping methods that provide for the preservation of existing plant communities, reestablishment of native plant communities, use of site-specific plant materials, use of pervious paving materials, and Florida-Friendly concepts in order to promote water conservation and surface water quality.

While the Environmental Quality Division has continued a transition to include ticket writing enforcement activities for violations of the irrigation and fertilizer ordinance code during this referenced reporting period, education is still the major component of the implementation program. Plans to implement an expanded training program for city staff and contractors are currently under review. Since the start of the fertilizer and irrigation public outreach program,

the Environmental Quality Division and other Environmental and Compliance Department staff completed a comprehensive distribution of more than 52,000 brochures.

One major goal of the city's outreach programs is public and business partnering. The city conducts surface water quality protection programs with irrigation and fertilizer educational outreach at town meetings, homeowner association meetings, businesses, civic organizations, and the Florida Pest Management Association meetings. To date, over 42,000 irrigation and fertilizer brochures have been printed and more than 36,000 have been distributed. The city continues to partner with local "greenhouse" retailers to help communicate the importance of proper irrigation and fertilizer use to their customers.

The City of Jacksonville has continued participation with the Florida Yards and Neighborhoods Program, a cooperative University of Florida Extension program, with funding now provided by the city stormwater utility. The Duval County Extension office is a partnership of the City of Jacksonville, the University of Florida Institute of Food and Agricultural Sciences (UF-IFAS), and the United States Department of Agriculture. Research- based education is offered by trained professionals and volunteers in agriculture, family and consumer sciences, and 4-H youth development. The Florida Yards and Neighborhoods Program provides educational outreach opportunities to homeowners, landscaping professionals, builders, and developers on low maintenance plants and environmentally sustainable practices to enhance landscapes while saving money, time, and energy.

Two recent city public service announcements focus on the importance of septic system maintenance and pet waste management as required by ordinance. Through a public service program with local media organizations, the completed public service announcements were aired during the 2011 Super Bowl and on several other occasions on local television stations.

Many public education and outreach events were hosted and supported during the reporting period with several significant annual events including the Annual Museum of Science and History Water Festival, Mayor's Environmental Luncheon, 41st Annual Earth Day Festival, Tree Hill Butterfly Festival, Annual Environmental Protection Board and University of North Florida Environmental Symposium, Annual Jacksonville Home and Patio Show, and EPA supported Jacksonville Riverwalk Children's Health Fair.

In addition to established annual events, the Environmental Quality Division, Environmental Protection Board, Duval County, University of Florida Agricultural Extension Office, and the Planning and Development Department provide workshops, presentations, and information related to stormwater and surface water quality protection and preservation practices to community groups that include schools, homeowners associations, neighborhood planning groups, and others. During the reporting period, over 1,900 booklets or brochures directly related to water quality protection and stormwater BMPs were distributed at the major annual events and other workshops or outreach events.

An additional 200 brochures and door hangers directly related to stormwater BMPs and local environmental ordinance code compliance were distributed during routine environmental field investigations by Environmental Quality Division Stormwater Services staff. The Environmental Quality Division provides a 24-hour public education and outreach point of contact for the community through direct email to Stormwater Services, NPDES@coj.net, and through the city's call center known as the Citizen's Active Response Effort.

Florida Department of Transportation

FDOT completed the Beach Blvd improvements project (project COJ-94) in August 2011. In addition, FDOT completed the future projects and/or trade (project COJ-120) through fertilizer cessation along their roadways. FDOT stopped fertilizer use along their roadways in 2010.

Clay County

Clay County continued their public education efforts (project CC-12) as described in **Section 2.2.1.1**. In addition, although not part of the BMAP, Clay County constructed a 2.5-acre retrofit flood control and water quality facility as part of the implementation phase of the County Stormwater Master Plan. The Loch Rane Stormwater Improvements are estimated to reduce peak flood stages by 1.2 feet for the 25-year storm, as well as reduce sediment loads by 80% (128,986 kg/yr), TP by 14% (74 kg/yr), and TN by 5% (142 kg/yr). The facility provides treatment to approximately 660 acres of development near Blanding Boulevard and Kingsley Avenue, which previously had no stormwater controls.

FIGURE 30: CLAY COUNTY LOCH RANE STORMWATER IMPROVEMENTS NEAR COMPLETION IN SPRING 2010

FIGURE 31: CLAY COUNTY LOCH RANE PROJECT NORTHEASTERN LOBE OF POND

St. Johns County

St. Johns County acquired 160 acres in 2010 for the Masters Tract Regional Stormwater Treatment (RST) facility (project SJC-17). Three agricultural canals cross the property and convey stormwater runoff from 1,426 acres of land, 74% of which is planted row crops. During 2011, the project was designed with a treatment train that yields 2,145 kg/yr of TN removal. Final permits are expected from the regulatory agencies by January 2012. Budgeting has begun for construction and grant opportunities are being sought for construction of this project.

St. Johns County has also continued their stormwater education program (SJC-11) over the last year as a fully county funded project. Efforts through the Watershed Protection Program included presentations to 260 groups with more than 1,261 student interactions and 581 adult interactions (**Figure 32** and **Figure 33**). Various events were offered at local schools and parks. Over 3,600 educational materials were distributed this year. The county's Illicit Discharge Course had 33 participants and 494 additional storm drains were marked throughout St. Johns County. The county also uses video public service announcements about stormwater, which run on the local government channel. Education flyers, entitled "Where does all the water go?" and "Protecting our waters from household chemicals," were updated. These and other informational outlets are available on the stormwater section of the St. Johns County website at www.sjcfl.us/stormwater.

FIGURE 32: ST. JOHNS COUNTY WATERSHED PROTECTION PROGRAM PRESENTATION

FIGURE 33: ST. JOHNS COUNTY WATERSHED MODEL

In addition, the county is performing a countywide pollutant loading assessment as part of the county's water quality management program. This program won the 2011 Florida Stormwater Association Excellence Award for Stormwater Programs. The county is also working with FDEP and EPA on developing the TMDL for Six Mile Creek, a large tributary to the LSJR Basin.

MS4 Progress Towards Meeting the Marine TMDLs

Figure 34 shows the progress made towards meeting the MS4 portion of the marine TN TMDL. The first bar in the figure shows the starting load for the marine MS4s from the BMAP. The second bar shows the estimated 2011 load based on all completed marine MS4 projects (from the BMAP, 2009 and 2010 progress report, and those listed above). The third bar indicates the total allocation allowed for the MS4s in the marine section of the river.

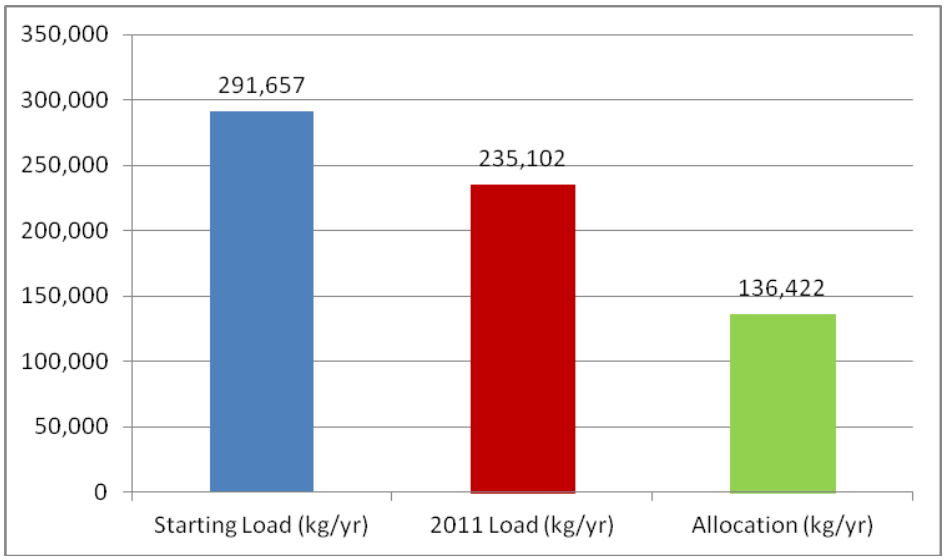


FIGURE 34: MS4 PROGRESS TOWARDS THE TN MARINE TMDL

2.2.2.3 Project Implementation Status

The section above described all of the activities that were underway during the past year, which includes efforts that are not yet complete or are continuous, such as public education. The MS4 projects that were completed during the last year and their associated load reductions are shown below in **Table 11** for the marine section. The MS4s in the freshwater section have met the required TN and TP reductions; therefore, no additional projects were completed in the reporting period.

TABLE 11: MS4 PROJECTS COMPLETED IN THE MARINE SECTION IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TN PROJECT REDUCTION (KG/YR)
FDOT	COJ-94	FDOT Beach Blvd improvement from west of FCCJ to East of San Pablo	60
FDOT	COJ-120	Future Projects and/or Trade (Fertilizer Cessation)	18,445
Total	**-**	**-**	**18,505**

2.2.3 URBAN STORMWATER

2.2.3.1 Freshwater

Clay County

Clay County continued their public education efforts (project C-4) as described in **Section 2.2.1.1**. The established water quality trading mechanism between Clay County and CCUA has continued for 2011 (project CC-6).

Putnam County

Putnam County has begun implementing education and outreach activities (project PUT-8). In March 2011, county staff participated in the Putnam County Fair by handing out the following educational materials: 500 activity books from SJRWMD entitled "Water Conservation Activity Book: A Tale of Raleigh Otter and His Friends," 500 coloring books from SJRWMD entitled "The St Johns River Coloring Book," 200 water conservation guides, water recycle poster from Florida Yards and Neighborhoods, and information on water conservation ideas around the home. Periodically, some of these materials were distributed to all the public libraries in the county. In addition, on August 19, 2011, the county held a meeting that included information on the Florida Yards and Neighborhoods Program. The credit from the education and outreach activities will help achieve a portion of the Algal Initiative project reductions (project PUT-6).

St. Johns County

St. Johns County has completed the first full year of operation and maintenance (O&M) of the Deep Creek West RST Facility (project SJC-6). The county has also continued its education and outreach efforts (project SJC-3) as described in **Section 2.2.2.2**.

Non-MS4 Progress Towards Meeting the Freshwater TMDLs

Figure 35 and **Figure 36** show the progress made towards meeting the non-MS4 portion of the freshwater TP and TN TMDLs. The first bar in the figures shows the starting load for the freshwater non-MS4s from the BMAP. The second bar shows the estimated 2011 load based on all completed freshwater non-MS4 projects (from the BMAP, 2009 and 2010 progress reports, and those listed above). The third bar indicates the total allocation allowed for the non-MS4s in the freshwater section of the river.

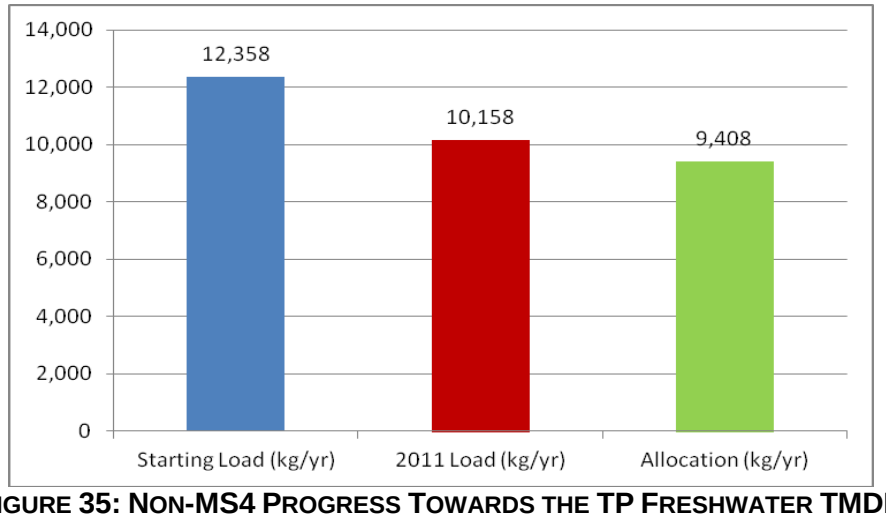


FIGURE 35: NON-MS4 PROGRESS TOWARDS THE TP FRESHWATER TMDL

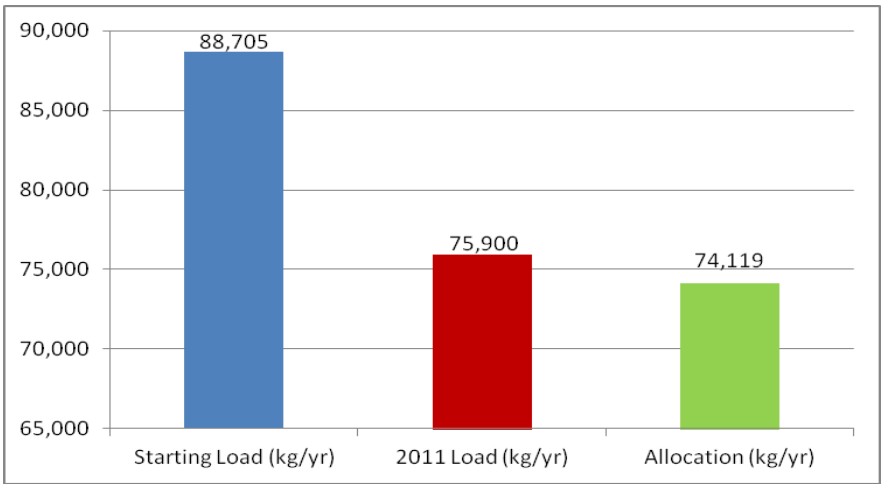


FIGURE 36: NON-MS4 PROGRESS TOWARDS THE TN FRESHWATER TMDL

2.2.3.2 Marine

Camp Blanding

The Camp Blanding Facilities Engineering Division repaired and maintained (vegetation removal and clearance) approximately 17 miles of swales and ditch line within the Cantonment Area (project CB-1). In addition, multiple road improvement projects were completed within the Cantonment Area (**Figure 37**). These projects include improve Road Avenue B North (7,966 square yards); mill and pave all of Fort Lauderdale Street (3,178 square yards); mill and pave Avenue B at Fort Lauderdale Street (1,333 square yards); mill and pave Avenue C from Arcadia Street south to Tampa Street (8,433 square yards); mill, grade, and repave Sanford Street (4,442 square yards); mill and pave Avenue B east from Duval Road to the intersection of Avenue B and Fort Pierce and pave south on Homestead Street (10,582 square yards); repave United States Property and Fiscal Office limestone parking lot with asphalt (5.25 acres) to include new retention pond and regrading of swales (0.95 acres); pre-existing swales re-graded and improved (6.208 acres) within the Cantonment Area; Enhanced Response Force Package building construction, including a new retention pond and regrading existing swales (0.62 acres); installation of 6.94 acres of new swale systems at the recreational vehicle park on Avenue A; installation of six new culvert pipes on Avenue C; installation of the North Fork Black Creek box culvert; and addendum to Spill Prevention Control and Countermeasure Plan and Contingency Plan. The replacement and restoration of the culvert and swale system on the North Fork Black Creek, which is an Outstanding Florida Water, created more efficient engineering controls to minimize the impact of road traffic and 24-hour stormwater events (see **Figure 38** and **Figure 39**). In addition, the LSJR TMDL and BMAP have become a topic of conversation at the National Guard Bureau Level to include comparisons of successes and goals.

FIGURE 37: CAMP BLANDING CANTONMENT AREA

FIGURE 38: CAMP BLANDING NORTH FORK BLACK CREEK CULVERT BEFORE REPLACEMENT

FIGURE 39: CAMP BLANDING NORTH FORK BLACK CREEK AFTER INSTALLATION

Clay County

Clay County continued their public education efforts (project CC-17) as described in **Section 2.2.1.1**. In addition, although not part of the BMAP, Clay County constructed the 2.5-acre

retrofit flood control and water quality Loch Rane facility as part of the implementation phase of the County Stormwater Master Plan (refer to **Section 2.2.2.2** for details).

St. Johns County

St. Johns County has added the Bishop Estates Road baffle boxes project (SJC-28) that will convey presently treated and untreated drainage from Julington Creek Plantation and Bishop Estates Road through Suntree Nutrient Separating Baffle Boxes (model #NSBB-8-16-117) for treatment and ultimate discharge into Julington Creek near its mouth at the St. Johns River. This project will help meet a portion of the Algal Initiative reductions. The county has also continued its education and outreach efforts (project SJC-21) as described in **Section 2.2.2.2**.

The Master's Tract RST facility became a standalone project as part of the Algal Initiative. St. Johns County has an additional 2,306 kg/yr of TN reductions to identify within the Algal Initiative. Site searches are being conducted to identify potential locations for another RST facility or facilities. Discussions have also begun with the SJRWMD to consider improvements in the treatment wetlands at the Deep Creek West RST facility. Regrading/rerouting through the treatment wetland could provide for additional TN removal and a study is being developed to explore this opportunity.

Non-MS4 Progress Towards Meeting the Marine TMDL

Figure 40 shows the progress made towards meeting the non-MS4 portion of the marine TN TMDL. The first bar in the figure shows the starting load for the marine non-MS4s from the BMAP. The second bar shows the estimated 2011 load based on all completed marine non-MS4 projects (from the BMAP, 2009 and 2010 progress reports, and those listed above). The third bar indicates the total allocation allowed for the non-MS4s in the marine section of the river.

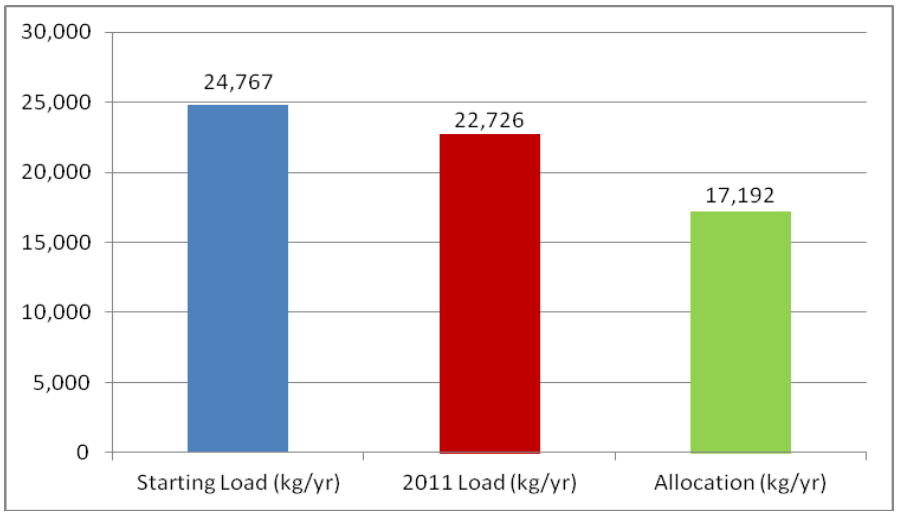


FIGURE 40: NON-MS4 PROGRESS TOWARDS THE TN MARINE TMDL

2.2.3.3 Project Implementation Status

The non-MS4 projects that were completed during the last year and their associated load reductions are shown below in **Table 12** and **Table 13** for the freshwater section of the river. No projects were completed by non-MS4s in the marine section.

TABLE 12: NON-MS4 TP PROJECTS COMPLETED IN THE FRESHWATER SECTION IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TP PROJECT REDUCTION (KG/YR)
Putnam County	PUT-8	Education and outreach	194.7
Total	**-**	**-**	**194.7**

TABLE 13: NON-MS4 TN PROJECTS COMPLETED IN THE FRESHWATER SECTION IN 2011

ENTITY	PROJECT NUMBER	DESCRIPTION	TN PROJECT REDUCTION (KG/YR)
Putnam County	PUT-8	Education and outreach	1,417.5
Total	**-**	**-**	**1,417.5**

2.2.4 AGRICULTURE

2.2.4.1 BMP Implementation Status

FDACS has continued to sign up growers under the vegetable and agronomic crop, sod, and cow/calf BMP manuals. Examples of some of the practices being conducted are illustrated in **Figure 41**, **Figure 42**, and **Appendix C**. Because of limited staff, the goals for enrolling all cow/calf and vegetable/agronomic crop operations in 2011 have not been met. The cumulative enrollment numbers, based on Notices of Intent (NOIs), are contained in **Table 14**. Enrolled parcels are depicted in **Figure 43**. To date, no producers have opted to monitor water quality instead of implementing BMPs.

FIGURE 41: AGRICULTURAL INCORPORATION OF COVER CROP INTO SOIL

FIGURE 42: WATER CONTROL STRUCTURE TO MANAGE DITCH LEVELS AND SEEP IRRIGATION

TABLE 14: AGRICULTURAL ACRES ENROLLED IN BMPS AS OF DECEMBER 31, 2010

2004 SJRWMD LAND USE	2004 ACRES	FDACS-ADJUSTED ACRES FOR ENROLLMENT	RELATED FDACS BMP PROGRAMS	ACREAGE ENROLLED[1]	RELATED NOIS	REMAINING ACREAGE[2]
Pasture	55,457	N/A	Cow/Calf, Future (Hay)	13,394	14	42,063
Row/Field/Mixed Crops	42,546	TBD	Vegetable/Agronomic Crops	18,157	37	24,389
Fallow Cropland	1,446	N/A	N/A	N/A	N/A	N/A
Horse Farm	3,145	TBD	Future Equine	N/A	N/A	3,145
Citrus	375	TBS	Ridge Citrus, Flatwoods Citrus	0	N/A	375
Abandoned Citrus	30	N/A	No enrollment needed	N/A	N/A	N/A
Tree Crops	298	TBD	Specialty Fruit & Nut	0	N/A	298
Nurseries and Vineyards	56	TBD	Future Nursery, Specialty Fruit and Nut	0	N/A	56
Tree Nurseries	1,207	TBD	Future Nursery, Specialty Fruit and Nut	0	N/A	1,207
Ornamentals	964	TBD	Container Nursery	0	N/A	964
Shade Ferns	336	TBD	Leatherleaf Ferns[3]	1,031	85	0
Hammock Ferns	362		Future Nursery	0	N/A	
Sod Farms	4,678	TBD	Statewide Sod	1,981	4	2,697
Specialty Farms	26	TBD	Conservation Plan Rule	0	N/A	26
Dairies	1,070	TBD	Conservation Plan Rule	0	N/A	1,070
Cattle Feeding	475	TBD	Conservation Plan Rule	0	N/A	475
Poultry Feeding	196	TBD	Conservation Plan Rule	0	N/A	196
Other Open Lands – Rural	854	N/A	No enrollment needed	N/A	N/A	N/A
Totals	**113,521**	**-**	**-**	**34,563**	**140**	**76,961**

[1] Due to improved mapping, reported acres are all within the LSJR Basin; previous reports were based on county boundaries.

[2] Enrollment numbers will depend on the ability of field staff to identify and locate producers, changes in land uses, and actual number of acres in production on an operation. Even with 100% enrollment, the acres will not match the 2004 land use numbers.

[3] Leatherleaf Fern NOIs predate 2004 land use data, and some acreage likely had gone out of production. Enrollment in this program has been discontinued because a modified leatherleaf fern BMP will be incorporated in revisions to the vegetable/agronomic crops manual.

In 2011, FDACS adopted a specialty fruit and nut crop manual, and completed work on an equine manual. The equine manual will be adopted in early 2012. A consolidation of the citrus BMP programs into a statewide manual is under way, with adoption expected by the end of 2012. Revisions to the vegetable/row crop and container nursery manuals have been initiated, with adoption anticipated in 2013. A new TCAA Water Management Partnership was formed in 2011, which is discussed below.

Agricultural Land Use Data

Agricultural acreage in the LSJR Basin has declined since the 2004 land use data was collected. In addition, some categories of agricultural land use may include acreage that is not in production or that is not really agriculture. This is because aerial photographs of land use are not always clear enough to interpret accurately. The potential for misinterpretation is generally greatest in the pasture categories. FDACS staff will be working with FDEP and the SJRWMD to determine more accurately the agricultural acreage in the basin.

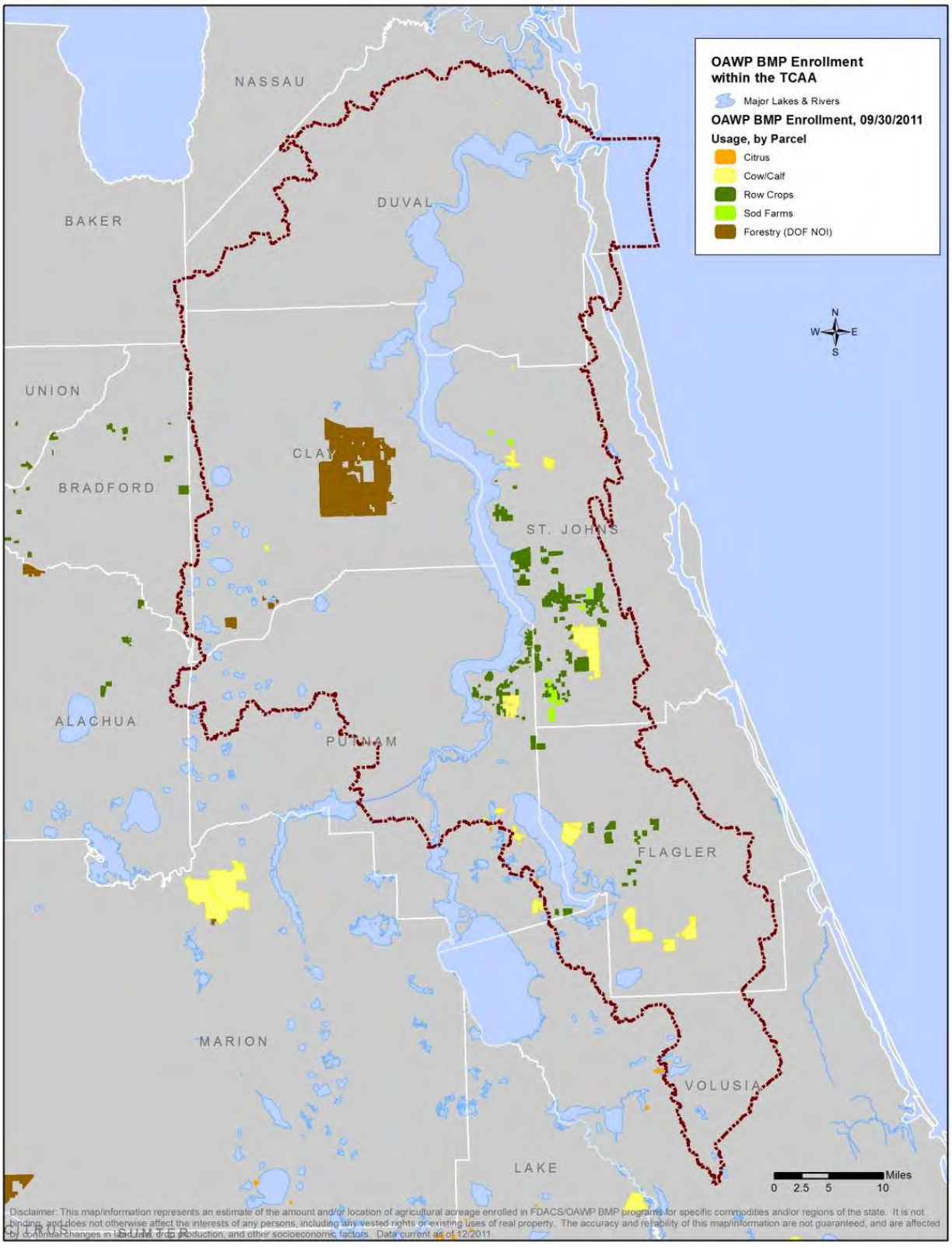


FIGURE 43: AGRICULTURAL BMP ENROLLMENT IN THE LSJR BASIN AS OF DECEMBER 2010

TCAA Water Management Partnership

The objective of the TCAA Water Management Partnership is to contribute to the improved health of the LSJR through on-farm and regional water management projects and practices that reduce the movement of nutrients to the river, improve water conservation, and result in more efficient farm management while maintaining the long-term viability of agriculture in the TCAA. The growers and agencies (FDACS, FDEP, SJRWMD, Natural Resources Conservation Service [NRCS], and UF-IFAS) will work together to install and demonstrate these projects and practices on TCAA farms through cost-share funding, education, and technical assistance.

To submit a project or practice proposal for funding under this initiative:

- The operation on which the project will be located must be within the boundaries of the TCAA.
- The agricultural operation to be served by the project must have been in operation for the three previous years.
- The agricultural operation must be in compliance with all applicable federal, state, and local laws, rules, and regulations, SJRWMD-issued permits, and SJRWMD funding agreements.
- As confirmed by FDACS staff, the agricultural operation must be enrolled in FDACS BMPs and must be implementing the applicable practices.
- The landowner/leaseholder must have control of the land for at least the anticipated contract period.
- The applicant must be willing to have the project undergo monitoring, as needed to determine the outcomes of the project.
- The applicant must be willing to host and participate in educational/demonstration activities on the project site at reasonable times and under reasonable conditions.
- The applicant must be willing to consider expanding the scope of the project, provided it proves successful and is economically feasible to do so.

Project types and cost-share items that will be considered for funding include the following; however, other ideas that would further the program objective may be proposed:

- Projects:
    - Drip irrigation;
    - Overhead irrigation;
    - Enhanced seepage irrigation;
    - Tailwater recovery;
    - Regional water reuse;
    - Regional wet detention; and
    - Irridrain.
- Practices/equipment:
    - Banding equipment;
    - Pump upgrades with soil moisture sensors; and
    - Soil moisture sensors.

Project and practice proposals will be evaluated using the following criteria:

- Key criteria:
    - Anticipated environmental benefits for water quality and water conservation;
    - Estimated cost;
    - Monitoring feasibility/reliability; and
    - Long-term maintenance.
- Additional considerations:

- Contribution to meeting national/state/regional objectives;
- Whether project is part of an NRCS conservation plan;
- Potential for transfer of technology to other farms in the region;
- Potential for onsite expansion and willingness of grower to consider expansion; and
- Long-term benefit to the grower and to agriculture in the region.

Agricultural Load Reduction Allocation and BMP Load Reduction Estimates

Table 15 contains the reductions required of agricultural land uses in the LSJR Basin and the estimated load reductions achieved through implementation of BMPs by vegetable/row crop operations. Due to the inaccuracies in 2004 land use information and changes in land use since 2004, the estimated total load for agriculture is greater than the actual loading.

TABLE 15: AGRICULTURAL TN AND TP LOAD REDUCTION ALLOCATION AND ESTIMATED REDUCTIONS IN LOADS FROM BMPS AND RSTS

REDUCTION CATEGORY	TN – FRESHWATER (KG/YR)	TP – FRESHWATER (KG/YR)	TN – MARINE (KG/YR)
Load Reduction Allocation	116,364	12,481	8,630
Estimated Load Reductions via BMPs[1]	30,720	1,098	N/A
Estimated Load Reduction via completed RSTs[2]	2,502	1,384	0
Remaining Load Reductions Needed	**83,142**	**9,999**	**8,630**

[1] Estimated reductions are based only on BMP implementation by vegetable/row crops. FDACS will work with FDEP and SJRWMD on a method to determine reductions from other commodities, and a reduction credit for acreage no longer in agricultural production.
[2] RSTs were constructed by the SJRWMD.

2.2.4.2 Regional Stormwater Treatment Facilities

At the time of the nutrient pollutant load assessment for the TMDL, dairies were the dominant operations comprising agricultural nonpoint source runoff in the LSJR marine reach. These operations have been reduced in size and number, as confirmed by land use assessments, thus negating the need for RSTs within that section of the river. Within the freshwater reach, SJRWMD contractors have completed a technical memorandum and associated BMP Optimization Model addressing a nutrient reduction strategy for the TCAA. Initial indications are that RSTs, such as those already constructed, may not offer the lowest life-cycle cost per mass of TN and TP. Field-level treatment such as reuse of irrigation water or overhead irrigation and fertigation may be more justified from an economic perspective. The memorandum and model are under internal technical staff review. The SJRWMD, FDEP, FDACS, NRCS, and others are cooperating with TCAA farmers through a TCAA Technical Support Team to identify and fund improved nutrient and water management methods. The SJRWMD has provided $1.4 million and FDEP is providing approximately $3.5 million toward the development of alternative nutrient and water management practices. Through this cost-share program, farmers and resource agency representatives work together to identify, design, and implement agreed upon alternative practices.

2.3 IMPROVING SCIENTIFIC UNDERSTANDING

2.3.1 WATER QUALITY MONITORING

2.3.1.1 Freshwater Section for the Chlorophyll-a Target

The monitoring plan includes two components to determine progress towards the chlorophyll-a target in the freshwater section: (1) routine ambient sampling; and (2) supplemental river

transects. SJRWMD is conducting the ambient sampling in the freshwater section and this monitoring occurs on a biweekly basis at nine sites. SJRWMD has conducted this sampling on schedule over the last year and the effort is ongoing. The ambient water quality data are uploaded to STORET on a regular basis.

The river transects sampling occurs biweekly from April through October in the two worst case freshwater WBIDs (2213K and 2213L). The purpose of this sampling is to augment the ambient sampling during the high chlorophyll period of the year to better estimate the mean chlorophyll-a concentration. As noted in the BMAP, 29 samples are recommended in each WBID (58 samples total per monitoring event) to estimate mean concentrations with acceptable confidence. This sampling includes both standard laboratory analyses and *in vivo* fluorescence, which occurred for the period of April 2011 through October 2011. The river transect sampling was funded by Georgia-Pacific and Seminole Electric and the samples were collected and analyzed by FDEP. The river transects data for the standard parameters are uploaded to STORET, and the fluorescence data are maintained by FDEP. The sampling in 2011 was the last of the three years of river transect sampling required by the BMAP.

2.3.1.2 Marine Section for the Dissolved Oxygen Target

Compliance with the DO target in the marine section of the river will be determined through data from three continuous DO stations, in which samples are collected every 15 minutes. The U.S. Geological Survey (USGS) station at Dames Point is an existing station, and the DO sampling occurred at this station throughout the last year. The data from this station are maintained by USGS and can be accessed through their website. There are also two BMAP stations at Fulton Point and Clapboard Creek. JEA purchased two additional sondes for these two stations, and FDEP is responsible for the operation and maintenance and is storing the continuous DO data.

2.3.1.3 Nonpoint Source Monitoring and Monitoring of Tributary Inputs

The tributaries monitoring includes both ambient and high-flow event sampling. This information will be used to determine the loads entering the main stem of the river from its tributaries and to estimate the reductions associated with the implementation of stormwater projects.

For the ambient monitoring, SJRWMD samples a total of 21 stations. Four stations are sampled biweekly, 12 stations are sampled monthly, and the remaining five stations are sampled bimonthly. This sampling occurred on schedule over the last year. In addition, JEA is responsible for sampling five stations on a bimonthly basis, and this sampling occurred on schedule throughout the year. All of the ambient monitoring data are uploaded to STORET on a regular basis.

The high-flow event sampling is conducted by CCUA, SJRWMD, and the City of Jacksonville. CCUA hired a contractor to collect the samples at their five stations following rainfall events. Samples were collected in January 2011, February 2011, March 2011, and June 2011. SJRWMD is responsible for collecting high-flow event samples at one station in Rice Creek, and samples were collected at this station in January 2011, February 2011, March 2011, April 2011, June 2011, July 2011, and August 2011. The City of Jacksonville is responsible for sampling at seven stations and the sampling occurred in January 2011, February 2011, March 2011, April 2011, June 2011, September 2011, and December 2011. The storm event data are maintained by FDEP and are included in **Appendix B**. The sampling in 2011 was the last of the three years of storm event sampling required by the BMAP.

2.3.2 SEPTIC TANK STUDY AND MODEL

FDEP has been working with the City of Jacksonville and independent researchers to develop an approach for estimating septic tank contributions of nitrogen to surface waters and conveyances that connect to the LSJR system. The approach that has evolved includes the collection of site specific and regional data on septic tank inputs from identified septic tank failure areas and the development and calibration of an innovative modeling tool. This tool can be enhanced by calibration data and applied to any given neighborhood to provide reasonable estimates of septic tank effluent loadings of nitrogen to the river system.

For two years, a research team led by Dr. Tom Belanger of the Florida Institute of Technology (FIT) conducted a study of the environmental fate of septic tank effluent from selected City of Jacksonville sites adjacent to surface waters. Samples were taken at six residential sites in or near five neighborhoods identified by the City of Jacksonville as potential septic tank phase-out as well as two additional sites in the Murray Hill B neighborhood that had been connected to sewer in the past few years. The six study areas are shown in **Figure 44**. At these sites, the FIT researchers collected ground water samples from shallow wellpoints adjacent to active and abandoned septic tank drainfields and monitored for nutrients and domestic wastewater tracer chemicals. In this study, the researchers found significant variability in results among the study sites. The nitrogen plumes at several sites may have been rapidly attenuated through denitrification and dilution within a short distance from the drainfield, while in some cases the plumes may have a highly variable path of migration and not be adequately delineated due to site-specific conditions. Significant migration of nitrogen (as nitrate) was documented at some sites included in the study. Fertilizer was also a significant source of nitrate in the shallow ground water at some sites. The sampling data from sites with decommissioned septic tanks showed varying results. The findings from this work were presented in a report to FDEP in June 2011.

In addition to the FIT study, beginning in October 2009, Florida State University (FSU) began the development of a simplified steady-state model of nitrate transport from septic tank systems via shallow ground water flow. This effort was conducted under the direction of Dr. Ming Ye with funding and oversight from FDEP. Nitrate is the most mobile form of nitrogen and is expected to constitute the primary form of nitrogen load from septic tanks to the LSJR system. This model, called ArcNLET, was developed as a tool for estimating the concentration and loading of nitrate from an area served by septic tanks to nearby surface waters. The model was developed using laboratory measurements and field observations and uses ArcGIS as its software platform. Version 1.1 of ArcNLET was released to the public in summer of 2011 and can be downloaded from the internet (http://people.sc.fsu.edu/~mye/ArcNLET/index.html). FSU provided an initial training session on the use of ArcNLET in July 2011 and has since tested ArcNLET on various scenarios that include several of the City of Jacksonville neighborhoods identified for septic tank phase-out.

Due to the mixed results of the FIT study and the further development of the ArcNLET model, FDEP recommended that the ArcNLET model be used for estimating the nitrogen loadings from septic tank contributions to surface waters and conveyances, particularly related to updating the amount of BMAP credit that should be allotted to the City of Jacksonville for septic tank phase-out.

The model is designed as a tool where the independent variables such as flow path, velocity, and travel time can be customized if site-specific data are available. It is preferable, therefore, that before it is used for the purpose of updating the City of Jacksonville's BMAP project table

and project credit amount, more work is done to calibrate the model and produce an expected range of input variables that will accurately represent the variety of soil and ground water characteristics at all of the city priority sites for septic tank phase-out. In addition, several imminent enhancements to the model will make it a more robust predictive tool. At present, the City of Jacksonville and FDEP are working together on a workplan to calibrate the model for a variety of settings and refine the modeling results so that it can be used with greater confidence. This work will include field calibration of ground water chemistry and flow characteristics, soil properties, and denitrification potential in up to five representative septic tank areas within close proximity of surface waters designated for phase-out. It also includes calibration of the ArcNLET model for these settings as well as enhancements of the ArcNLET model to incorporate soil denitrification potential based on texture and depth to ground water and provide computational tools for quantifying predictive uncertainty. In addition, the workplan will include development of an approach for estimating the nitrogen loading from failing septic tanks via overland flow in response to storm events. These efforts toward creating usable tools for the City of Jacksonville and calculating the load reductions expected from septic tank phase-out will be completed within 12 months.

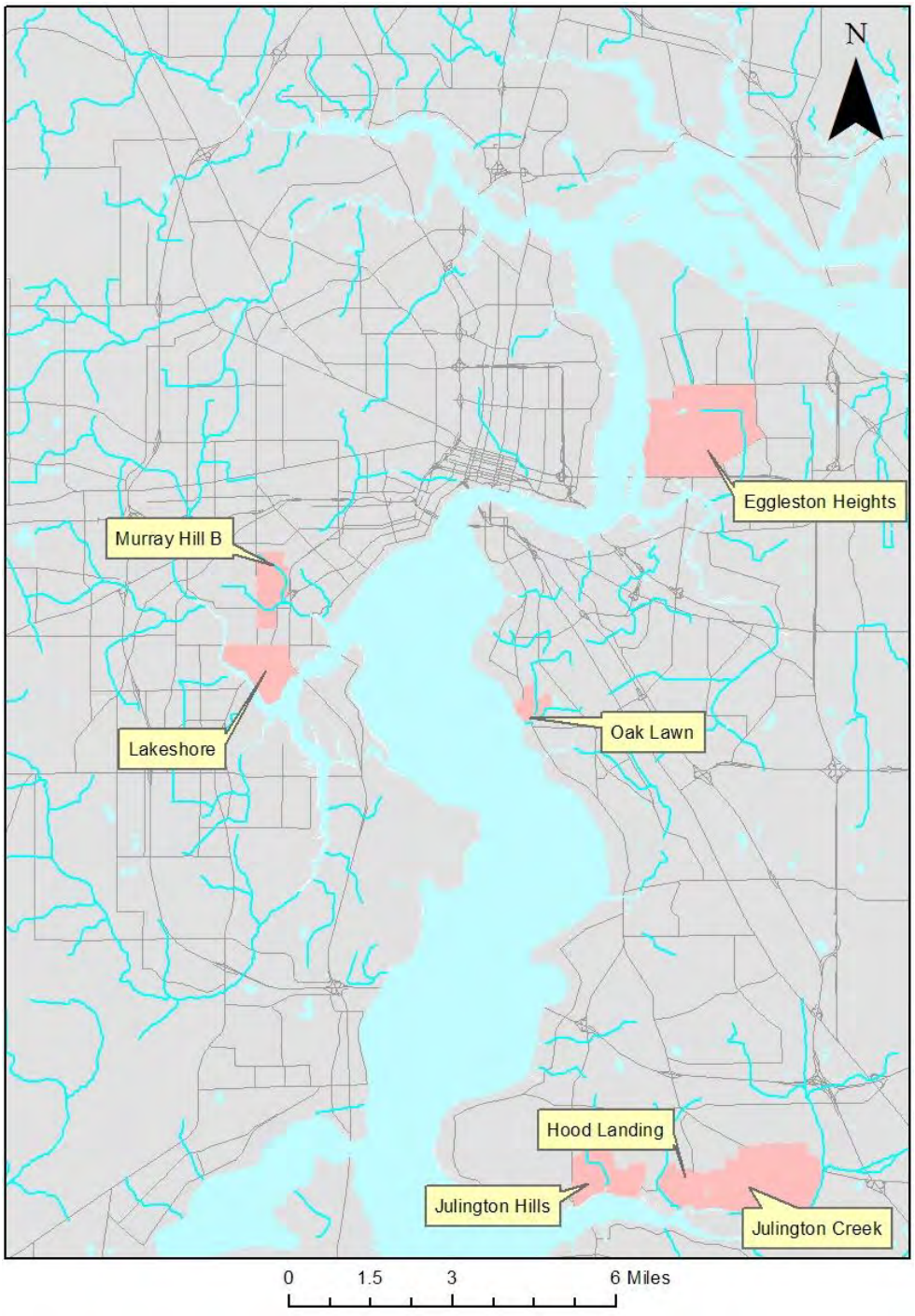


FIGURE 44: FIT SEPTIC TANK STUDY SITES

2.3.3 ALGAL INITIATIVE

The development of the St. Johns River Nutrient Reduction Initiative ("Algal Initiative") is proceeding but is challenged by internal SJRWMD staff demands related to the multi-year water supply impact study. A broad range of project options has been identified. As stated in the 2009 progress report, SJRWMD has completed two RST facilities, Deep Creek West (Yaborough) and Edgefield, in the TCAA. The Deep Creek RST was estimated to achieve 687

kg/yr of TN reduction and 562 kg/yr of TP reduction. The Edgefield RST was estimated to achieve 1,815 kg/yr of TN reduction and 822 kg/yr of TP reduction.

According to the most recent data results calculated for the Deep Creek West facility, greater treatment efficiencies were associated with storm events while treatment under ambient conditions remains somewhat less than storm events for the period 2008 – August 2011. With exception to TP for 2011 through August, greatest mass removals were also associated with storm events. As 2011 was a drier year than the previous two years, less storm events were collected and consequentially storm loading rates for both nitrogen and phosphorus were less. However, TN removed for both ambient and storm conditions combined exceeded the estimated load reduction outlined in the LSJR BMAP, which was 1,000 kg/yr. In 2009 and 2010, 3,625 kg/yr and 2,636 kg/yr were removed respectively. Through August 2011, 1,592 kg/yr was removed. TP removals in 2009 and 2010 also exceeded the LSJR BMAP reduction estimate of 818 kg/yr. In 2009 and 2010, 1,416 kg/yr and 1,385 kg/yr were removed respectively. Through August 2011, 369 kg/yr was removed falling slightly short of the LSJR BMAP reduction estimate. However, three-year averages for both TP and TN exceeded the estimated LSJR BMAP reductions.

Based on the findings of a wetland dye tracer study conducted in June 2010 for the Deep Creek RST, only 5.1 acres of the wetland are functioning under baseflow conditions. Retrofits to the wetland flow regime may be possible but construction costs are high and current funding is limited. However, the SJRWMD and St. Johns County may be able to work together to determine which improvements could cost-effectively be implemented through in-kind services, or otherwise, to increase the wetted area of the wetland, thereby increasing residence time. St. Johns County has reviewed potential improvements to the RSTs. The SJRWMD and the county are scheduled to review these options in the near future.

SJRWMD is also investigating projects to reduce nutrient loadings emanating from Lake George including the feasibility of gizzard shad harvesting (which has proven exceptionally cost effective in other areas) and macrophyte management and harvesting. Additionally, upstream project opportunities within the Middle St. Johns River Basin are being examined. These projects would help address the load reductions assigned to upstream sources in the BMAP.

2.3.4 TMDL Model Revisions

The LSJR model has continued to evolve to expand its capability to evaluate a variety of water quantity and quality management scenarios. Several significant enhancements have been added to the modeling suite over the past year in order to assess potential water withdrawals from the St. Johns River for the SJRWMD's Water Supply Impact Study.

The hydrodynamic foundation of the St. Johns River model, the Environmental Fluid Dynamics Code (EFDC) has been expanded upstream through Lake George and the Middle St. Johns River basins to just upstream of Lake Harney. The Middle St. Johns River receives considerable salt flux from diffuse groundwater and groundwater volume and salt entering the model have been estimated using MODFLOW, a groundwater flow model. The EFDC model code was modified to allow interconnection of groundwater flows through the bottom layer cells. Daily variability of spring flows entering the model was estimated for major springs (Alexander, Blue, and Blackwater Creek/Wekiva River spring groups) primarily using groundwater levels in nearby wells. The EFDC hydrodynamic model simulation period is 1995 through 2005. The modeling work was reviewed by the National Research Council, National Academies. Reports

documenting the model calibration and confirmation will be electronically published by the SJRWMD in February 2012.

A significant enhancement was also made to the St. Johns River Basin hydrologic models. These models provide surface water runoff to the EFDC hydrodynamic model. Surface water runoff has been computed for the entire St. Johns River Basin, including the Ocklawaha River Basin, utilizing the Hydrologic Simulation Program – FORTRAN (HSPF) hydrologic model for the period from 1974 through 2008. Surface water runoff from the HSPF hydrologic model is provided to the EFDC hydrodynamic model as daily discharge, although the HSPF hydrologic model can also provide hourly discharge.

The CE-QUAL-ICM water quality model was extended into Lake George and Crescent Lake, with its upstream boundary at Astor. The simulation period was expanded to over 10 years, from mid-1995 through 2005, allowing for the examination of management scenarios over a broad range of flow and loading conditions. Nutrient loads to the LSJR have not yet been updated for land use changes, however. The work to set up this model expansion was performed by the environmental consulting firm, Limno-Tech, which recently completed the Potomac River portion of the Chesapeake Bay model update. Work is ongoing with the U.S. Army Corps of Engineers' model development team to encode a more science-based computational method to predict nitrogen fixation, the important process by which blue green algae "internally" load the river by converting atmospheric nitrogen gas to organic nitrogen. This revision will also allow for the separation of the two major types of nuisance blue-green algae blooms: those dominated by Cylindrospermopsis and Anabaena, which fix atmospheric nitrogen and form extremely dense blooms that lower DO, versus blooms dominated by Microcystis, which tend to be less dense but more widespread, form surface scums, and often produce high levels of the algal toxin microcystin.

2.3.5 SJRWMD Funding for Additional Nutrient Reductions

Several cost share agreements for the expansion of reclaimed water service have been executed including those with Palatka, JEA, CCUA, Neptune Beach, and NAS Jacksonville. Per the BMAP, water quality credits are being held for the river based on the SJRWMD *ad valorem* funding contribution, prorated in relation to the total project cost. Held credits do not accrue to the recipient and are not be available for TMDL compliance or for sale as water quality credits to other entities. Credit reductions will be documented in the recipient's domestic wastewater facilities permit. The estimated amount of credit reservations by the SJRWMD is 100,316 lbs/yr of TN. These reductions will be finally calculated for adoption within permit at the time projects are completed and based on final construction costs and actual nutrient reduction data.

2.4 Funding

Camp Blanding obtained $2,113,609 for the swale regrading and improvement and roadways improvement projects completed in 2011.

The City of Atlantic Beach obtained a $1,000,000 SJRWMD grant to fund a portion of the Main WWTP upgrade project. In addition, a low-interest FDEP State Revolving Fund (SRF) loan was obtained for the remaining project costs. The total construction cost for the Main WWTP upgrades is approximately $9 million.

The City of Green Cove Springs City Council has appropriated funds for the purpose of development of a reuse (reclaimed) water master plan during the current fiscal year. In addition, funding has been reserved to complete more significant South WWTP improvements,

if required, to meet TMDL requirements. However, at this time, a major WWTP modification/ improvement project is not anticipated.

The City of Jacksonville continues to utilize funds raised through its stormwater utility to fund stormwater capital improvement projects as well as dedicated funding for septic tank phase-out projects, including both construction and subsidized connection fee. Additionally, the city's Environmental Protection Board has authorized an Environmental Protection Fund to assist in outreach and public education activities. This represents the first year that a dedicated funding source has been allocated for these types of activities.

The City of Neptune Beach has received $700,000 for the WWTF improvements and $250,000 for the reuse system from the SJRWMD.

In August 2010, CCUA amended its existing cost share agreement with the SJRWMD to expand the current basin reuse and treatment project to include a major reclaimed water transmission main and associated storage facilities to interconnect CCUA's northern and southern reclaimed water service areas. Work has started on this project and funding has been ongoing at the 50% cost share level. The total additional grant funding is $5,443,295.

In 2011, JEA received $203,612 from the SJRWMD as part of a cost share agreement for projects relating to reclaimed water (project JEA-17). JEA also received $10,654,421 in SRF money for the Arlington East BNR project (project JEA-13) completed in 2010 to close out that project.

NAS Jacksonville obtained $1.8 million in matching funding from the SJRWMD in 2011 to expand the reuse systems to result in zero discharge to the St. Johns River.

St. Johns County obtained $97,883 for the Bishop Estates Baffle Boxes (project SJC-28), $104,909 for the Masters Tract RST (project SJC-17), $782,698 for a countywide stormwater model, and $498,170 for countywide TMDLs.

The Town of Orange Park Phase 1 and Phase 2 upgrades to the Ash Street WWTF cost a total of $9,978,756.55. The town contributed $8,427,306.55 of this funding, and the balance came from an FDEP grant ($924,164) and SJRWMD grant ($627,286.00).

2.5 SUMMARY OF ACCOMPLISHMENTS

The table and figures below illustrate the load reductions made by the stakeholders in the LSJR Basin and the remainder of the nutrient loading in each segment of the river to achieve the TMDLs.

TABLE 16: PROGRESS TOWARDS THE TP TMDL IN THE FRESHWATER SECTION

SOURCE	% OF CONTROLLABLE LOAD	STARTING LOAD (KG/YR)	2011 LOAD (KG/YR)	ALLOCATION (KG/YR)	REMAINING REDUCTIONS (KG/YR)	% COMPLETE
WWTF	45%	81,015	42,655	44,386	0	100%
MS4	1%	1,500	1,256	1,256	0	100%
Non-MS4	7%	12,358	10,158	9,408	750	75%
Agriculture	47%	83,455	80,973	70,974	9,999	20%
Total	**100%**	**178,329**	**135,042**	**126,025**	**9,018**	**83%**

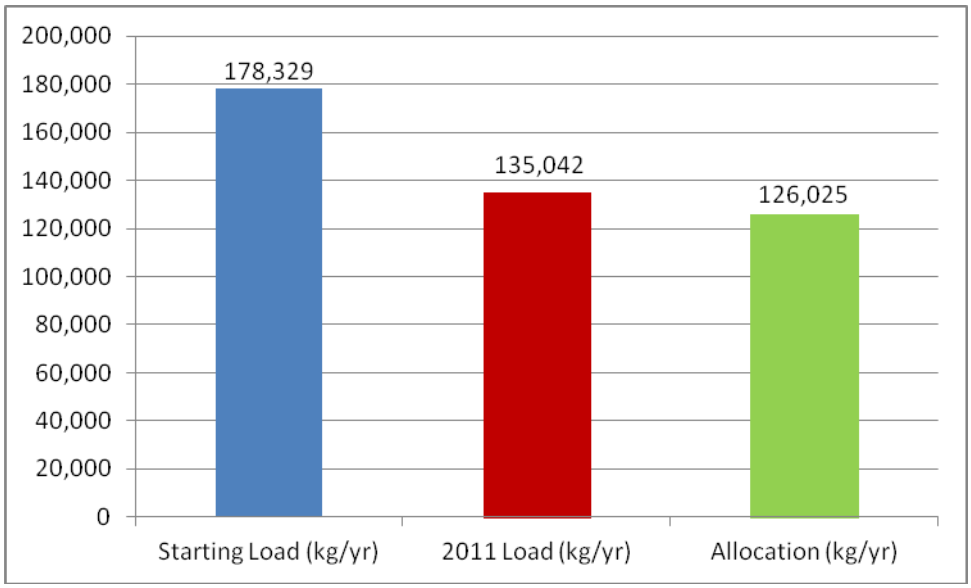


FIGURE 45: PROGRESS TOWARDS THE TP TMDL IN THE FRESHWATER SECTION

TABLE 17: PROGRESS TOWARDS THE TN TMDL IN THE FRESHWATER SECTION

SOURCE	% OF CONTROLLABLE LOAD	STARTING LOAD (KG/YR)	2011 LOAD (KG/YR)	ALLOCATION (KG/YR)	REMAINING REDUCTIONS (KG/YR)	% COMPLETE
WWTF	47%	364,650	217,404	237,200	0	100%
MS4	1%	9,731	8,685	8,685	0	100%
Non-MS4	17%	88,705	75,900	74,119	1,781	88%
Agriculture	40%	310,700	277,478	194,336	83,142	29%
Total	**100%**	**773,786**	**579,467**	**514,340**	**65,127**	**75%**

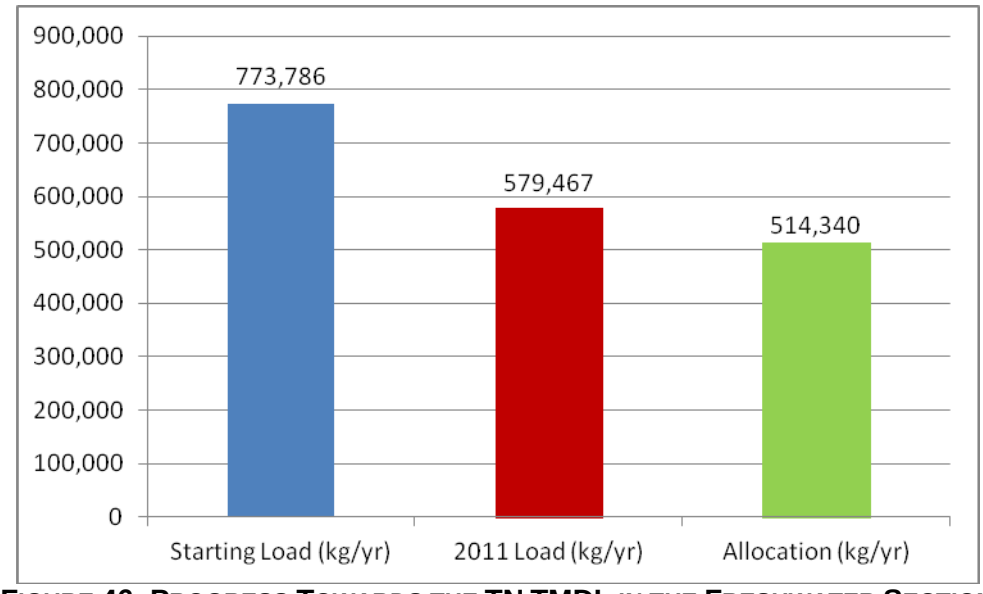


FIGURE 46: PROGRESS TOWARDS THE TN TMDL IN THE FRESHWATER SECTION

TABLE 18: PROGRESS TOWARDS THE TN TMDL IN THE MARINE SECTION

SOURCE	% OF CONTROLLABLE LOAD	STARTING LOAD (KG/YR)	2011 LOAD (KG/YR)	ALLOCATION (KG/YR)	REMAINING REDUCTIONS (KG/YR)	% COMPLETE
WWTF	84%	1,786,542	1,078,283	878,326	199,957	78%
MS4	14%	291,657	235,102	136,422	98,680	36%
Non-MS4	1%	24,767	22,726	17,192	5,534	27%
Agriculture	1%	12,800	12,800	4,170	8,630	0%
Total	**100%**	**2,115,766**	**1,348,911**	**1,036,110**	**312,801**	**71%**

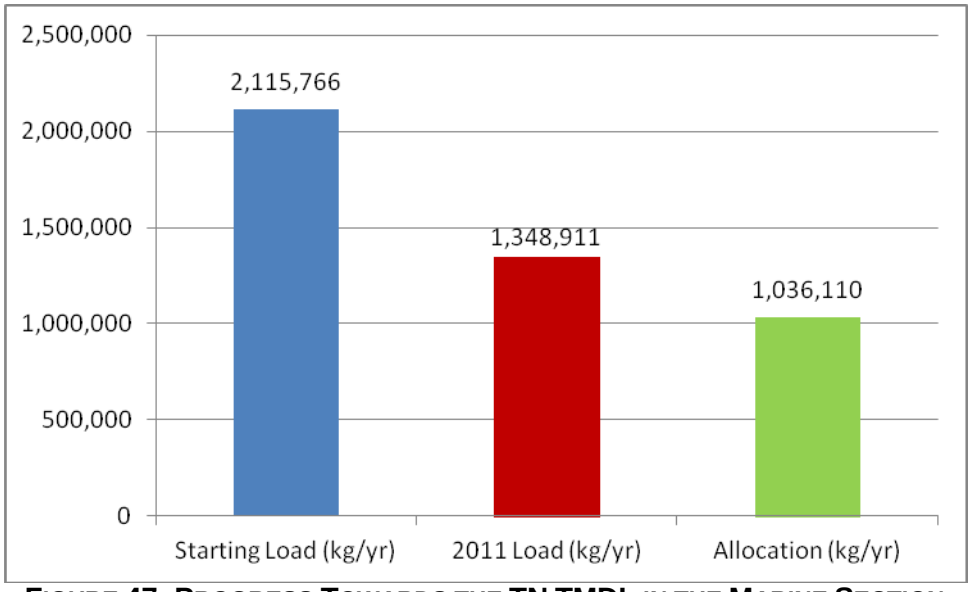


FIGURE 47: PROGRESS TOWARDS THE TN TMDL IN THE MARINE SECTION

SECTION 3: MAJOR ISSUES

3.1 SUMMARY OF ISSUES

The major issue in BMAP implementation this past year has been securing funding for projects. For local governments and water management districts, the economic downturn and subsequent decreases in *ad valorem* taxes and development fees has made it difficult to obtain the funding necessary to implement the BMAP projects. While funding continues to be an issue, this limitation has not caused major delays in implementation of BMAP projects scheduled to be completed during this reporting period. Another major concern for the stakeholders is the potential impact of EPA's NNC, and the potential for these federal standards to undermine ongoing BMAP efforts by establishing standards (other than the TMDLs) that could result in different reduction requirements than are required in the BMAP. However, the stakeholders are encouraged by FDEP's nutrient standards rulemaking, which would allow the TMDL to stand as the site-specific standard. Additional details the issues encountered this past year are described in **Section 4.2**.

3.2 ISSUES BY SOURCE TYPE

3.2.1 WASTEWATER TREATMENT FACILITIES

3.2.1.1 Freshwater

City of Green Cove Springs

Funding remains an issue for most communities including the City of Green Cove Springs. The city is currently relying solely on incoming revenue from water and sewer rates to pay for current operating expenses and maintenance of both WWTPs. Growth projections, which are less than anticipated at this time in the Reynolds area of Green Cove Springs, have also affected the ability to look for additional reuse capabilities in that area as well as upgrades to the South WWTP. However, the city is proud of its accomplishments to meet the TMDL requirements.

City of Palatka

Scheduling delays in constructing the City of Palatka WWTF upgrades have pushed the completion date for the zero discharge phase of the project from March 30, 2012 to June 30, 2012. However, the city has already achieved their TMDL required reductions; therefore, the delay in the zero discharge project does not affect the BMAP compliance. The city hopes to fully realize 100% reuse by the end of 2012.

3.2.1.2 Marine

City of Neptune Beach

While the main WWTF was offline during construction, the package plant was maximized and received all the influent from the City of Neptune Beach. However, there were no issues caused by this interim measure during construction.

Clay County Utility Authority

NNC continue to be the biggest concern for CCUA in several areas. The first concern is associated with compliance with NNC for Apricot Act Discharges. Two of CCUA's facilities have permitted Apricot Act discharges which allow a reclaimed water facility to discharge up to 30% of their reuse capacity as an annual average to surface waters as long as the effluent quality

meets the State's Advanced Wastewater Treatment (AWT) limits. However, these AWT limits are not low enough to meet the new EPA NNC for TN and TP. CCUA conducted a reasonable assurance study to determine if it could continue to discharge at current AWT levels and not cause the receiving streams to exceed the NNC or cause the streams to not meet designated uses. This study has been submitted to FDEP for review but CCUA has not received any questions or comments to date. A second concern is that FDEP's proposed revisions to 62-302, Florida Administrative Code, would adopt the LSJR TMDL as the end point NNC. However, it is uncertain at this time if EPA will accept FDEP's rule and rescind their rule or proceed to develop their own estuary criteria by November 2012. The third concern is that CCUA is presently working with the SJRWMD on a reclaimed water connection to serve an existing golf course. This connection would augment the golf course's current stormwater and private groundwater well irrigation supply and would serve to eliminate the golf course's consumptive use permit. However, the issue of co-mingling the reclaimed water with the stormwater and the potential for discharging nutrient enriched water from the pond to an adjacent drainage ditch has stalled the project. The SJRWMD's new criteria of no net increase in nutrient discharges or pre-development nutrient loading must equal post-development nutrient loading makes it almost impossible to comingle and may require a separate or isolated holding pond for the reclaimed water. This makes retrofitting existing major users a challenge in a very weak economy where funds are limited for construction.

JEA

The Royal Lakes WWTF phase-out (project JEA-11) has been delayed from June 30, 2012 to March 31, 2013. However, JEA has already achieved their BMAP reductions; therefore, the delay in this project does not affect JEA's compliance.

Town of Orange Park

Although BMAP implementation in the Town of Orange Park has been relatively free of issues, it has not been free of economic impact. The town has stretched its financial capacity to the limits to achieve good results, as have other utilities and MS4s in the LSJR Basin. This has occurred to the exclusion of expenditures on other important wastewater and stormwater functions that exist outside the realm of nutrient removal. The elected officials and senior staff in the town are encouraged by recent efforts by FDEP to take control of the NNC and develop scientifically sound rules that recognize the LSJR as a SSAC. These efforts lift the pall of uncertainty regarding the wisdom of expending precious public funds on projects that could be invalidated by capricious Federal regulatory over-reach.

The town's elected official and senior staff are also relieved to understand that the Doctors Lake TMDL, as approved in September 2009, is now considered to be an official document. This document, in its "final" form provided some assurance that the town's nutrient reductions to the LSJR would be counted as protective to the water quality of Doctors Lake. During the TMDL review and comment period, the town cited the Buckman dye study as evidence that reduced nutrient discharges from the town's Loring Avenue River outfall influenced nutrient levels in Doctors Lake. FDEP staff concurred and modified the language of the TMDL accordingly. However, the modified language was deliberately kept vague so as to be applicable in similar conditions in other TMDLs. The town would like to close the loop on nutrient reduction obligations pursuant to the Doctors Lake TMDL. The people of the town should not have to pay for the same nutrient reduction twice.

U.S. Navy

Technical issues with the starting and final TMDL loads in NAS Jacksonville/NS Mayport aggregate permit were resolved with FDEP. The NAS Jacksonville project to expand the reuse system (project USN-2), has been delayed from October 1, 2013 to February 25, 2014. However, this delay is due to the expanded scale of the project. An additional project to modify the Mayport WWTF was also added and will be completed by October 1, 2015.

3.2.2 MS4s

3.2.2.1 Marine

City of Jacksonville

The City of Jacksonville is concerned with the current state of the FDEP septic tank study, which is currently in the form of a model to predict loadings based on site-specific data. Specifically, the BMAP envisioned that a septic tank nutrient study would be conducted and, upon completion, the city would submit a revised nutrient reduction plan to address any loading the study concluded could not be credited by septic tank removal (project COJ-52). It is the city's understanding that FDEP is contemplating releasing a "model" for the city to use to determine nutrient loading attributable to septic tanks. It is not clear what impacts there will be to the city's ability to plan, fund, and meet BMAP timelines and requirements given the significant limitations and variability of the draft model. The City of Jacksonville is also concerned with the schedule to implement the water quality projects outlined in the BMAP. At the current time there is not enough identified funding to meet BMAP obligations. It is not clear what impacts there will be to the city's ability to plan, fund, and meet BMAP timelines and requirements given the significant limitations and variability of the available funding.

St. Johns County

The tight fiscal environment has proven challenging for St. Johns County to secure meaningful funding for projects. County staff are exploring grant opportunities to close any funding gaps; however, the grant availability tied to dedicated funding reduces the county's abilities to implement projects.

3.2.3 URBAN STORMWATER

3.2.3.1 Freshwater

Putnam County

Putnam County's projects for the Trade with Hiawatha WWTF (PUT-2) and septic tank phase-out (PUT-3) have been delayed due to funding issues. The funding for these projects is coming from an assortment of sources, mainly derived from Rural Development – SRF funding. The delay in receiving the funding occurred due to pending congressional action, including delays in approval of the federal budget in April 2011, and the lengthy approval for assembly of financing. The delay in funding has set back the entire schedule for the programmed final design, bidding, and construction of the Hiawatha WWTF. The initial project schedule for completion of design and construction was December 2012. The new schedule has completion of the WWTF in August 2014. Once the WWTF has been completed, the septic tanks can be phased out because the sewer collection force main has already been constructed. Septic tank phase-out is anticipated to be completed in December 2014.

3.2.4 AGRICULTURE

As discussed in the 2010 LSJR BMAP annual report, representatives of FDACS, SJRWMD, and UF-IFAS have been working with growers in the TCAA to develop guidance on the implementation of BMPs for potato operations, to fit the particular circumstances in that region. Growers were fully engaged in these discussions, and consensus on the guidance was reached in July 2011. As a result, growers that previously were hesitant to enroll in the FDACS BMP program are now doing so, and 28 of about 35 TCAA potato farms have signed up in the past 6 – 8 months. FDACS is in the process of adopting the guidance by rule in Chapter 5M-4, Florida Administrative Code, and FDACS staff is working on enrolling more growers in the TCAA and throughout the LSJR Basin. It should be noted, however, that even those not yet enrolled are implementing many of the BMPs.

SECTION 4: UPCOMING YEAR ACTIVITIES

4.1 SUMMARY OF EFFORTS FOR THE UPCOMING YEAR

The fourth annual BMAP progress report will encompass the period of January 1, 2012 through December 31, 2012. During this time, the City of Palatka will complete their WWTF project in the freshwater section, and the City of Jacksonville Beach will complete their WWTF project in the marine section. The City of Jacksonville will continue to phase-out septic tanks and design stormwater projects to meet their marine section MS4 allocation. Camp Blanding will continue the maintenance and repair of their swales in the marine section. FDACS will continue to enroll agricultural producers in BMP programs, and they will be adopting an equine BMP manual and a consolidated citrus BMP manual. In addition, the freshwater ambient water quality sampling, DO stations sampling, and tributaries sampling will continue through the monitoring plan. Additional details are included in **Section 5.2** and **Section 5.3**.

4.2 UPCOMING EFFORTS BY SOURCE TYPE

4.2.1 WASTEWATER TREATMENT FACILITIES

4.2.1.1 Freshwater

City of Palatka

The City of Palatka will complete the WWTF upgrade to zero discharge (project PAL-5), which will reduce 21,844 kg/yr of TN and 4,774 kg/yr of TP.

4.2.1.2 Marine

Jacksonville Beach

The City of Jacksonville Beach WWTF upgrade (project JB-1) is anticipated to be completed in February 2012. This project will result in a reduction of 21,555 kg/yr of TN.

4.2.2 MS4S

4.2.2.1 Marine

City of Jacksonville

The City of Jacksonville will continue with the septic tank phase-out project and the implementation of the MSMP projects.

4.2.3 URBAN STORMWATER

4.2.3.1 Marine

Camp Blanding

Camp Blanding will complete the maintenance/repair of the next set of swales (approximately one-fifth of the total swales) by December 31, 2012.

4.2.4 AGRICULTURE

FDACS will be adopting an equine manual and a consolidated citrus manual in 2012, and will continue working on revisions to the container nursery and vegetable/row crop manuals. The container nursery manual will be expanded to include in-ground nurseries and ferneries.

The primary focus will be on supporting and expanding the TCAA Water Management Partnership. Extension agents and researchers with UF-IFAS will assist growers in maximizing nutrient application and irrigation efficiencies, and in applying for cost-share funds for water management projects and BMPs. Cost-share funding is being provided by SJRWMD and FDEP, with coordination support and BMP enrollment assistance by FDACS staff, and technical support from various agencies. The TCAA Water Management Partnership partners include:

- TCAA growers (including the North Florida Growers Exchange);
- FDACS;
- FDEP;
- SJRWMD;
- NRCS;
- UF-IFAS;
- St. Johns County;
- Florida Resource Conservation and Development Council;
- Florida Farm Bureau; and
- Florida Fruit and Vegetable Association.

4.3 WATER QUALITY MONITORING

For the freshwater sampling, SJRWMD will continue to monitor at their ambient stations. FDEP will continue to operate and maintain the DO stations at Fulton Point and Clapboard Creek for the marine section monitoring. SJRWMD and JEA will continue the ambient water quality sampling in the tributaries.

SECTION 5: WATER QUALITY TRENDS

5.1 INTRODUCTION

The adoption of the TMDL in 2008 formally established the maximum nutrient load that could be assimilated by the entire LSJR, and was a significant landmark in the efforts to improve water quality and attain designated uses. This section represents the first comprehensive effort to assess progress on the reduction of the pollutant load and the condition of the river and estuary with regard to the water quality targets established during the TMDL process. In this section, the trends in point source effluent loads are examined, trends in tributary station nutrient concentrations are assessed, and results of the river monitoring designed and conducted to assess trends in eutrophication are presented.

5.2 NONPOINT SOURCE NUTRIENT LOAD ASSESSMENT

In the 1995-1999 TMDL external load assessment, the nonpoint source nutrient loads above background, referred to as augmented nutrient loads, were categorized based on source type (urban or agriculture) and the reach of the river (marine or freshwater) to which they entered. A portion of the augmented nutrient load is considered sustainable, while the portion above the sustainable load represents the reduction required to achieve designated use in the receiving waterbody. The majority of urban land use contributed loads to the marine reach. Both marine and freshwater reaches received nutrient loads from agriculture, though agricultural loads entering the marine reach were contributed almost exclusively from dairy operations, while those to the freshwater reach were almost exclusively contributed by row crop agriculture. During the LSJR TMDL process, the procedures and formulas that determined the allocation of the sustainable nutrient load were applied as described in the ATAC documentation and the Florida Watershed Restoration Act.

Unlike point source contributions, the nonpoint source load specific to a category or entity cannot easily be assessed by monitoring at one convenient discharge point. At any stream sampling point, water quality is a complex mix of many sources in the watershed. Even in cases where the entire augmented nonpoint source load arises from one land development category, with the exception of some streams wholly within the City of Jacksonville, many entities often exist within a watershed, making it impossible to ascribe individual NPDES permit-holder responsibility.

In light of these difficulties for source assessment, the approach that has been employed in the BMAP monitoring has been to maintain several key tributary monitoring stations in large watersheds in which the land development predominates in one nonpoint source load category (**Figure 48**). The agencies that contribute to the BMAP monitoring effort execute both an ambient (fixed interval) and high flow (storm event) monitoring strategy at these sites to provide a data set designed to assess load, as well as ambient conditions. The progress toward achieving load reductions for nonpoint sources is assessed by trends in stream nitrogen and phosphorus concentrations.

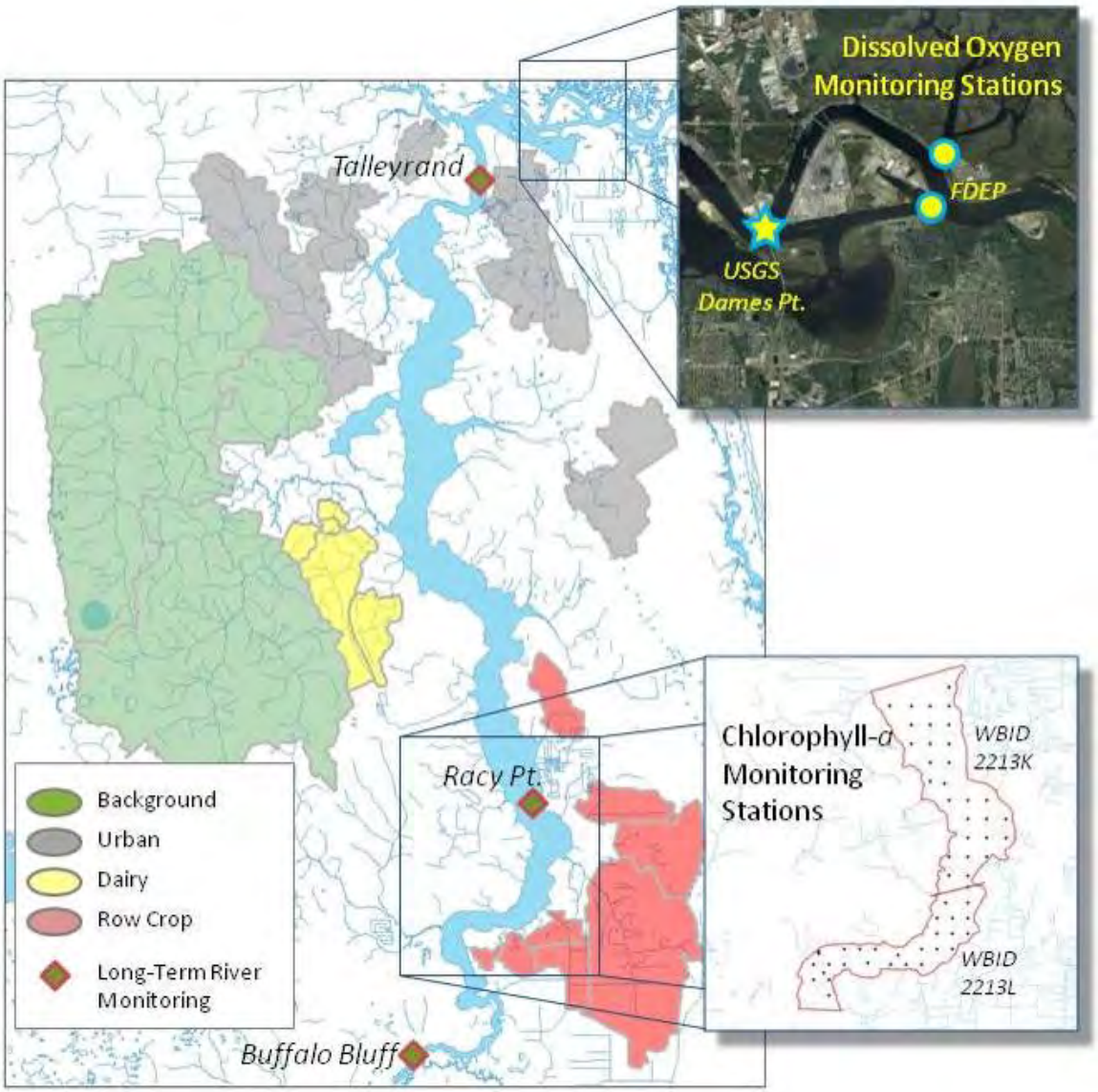


FIGURE 48: TREND MONITORING LOCATIONS FOR MAJOR NONPOINT SOURCES PROVIDED ALLOCATIONS IN THE LSJR BMAP

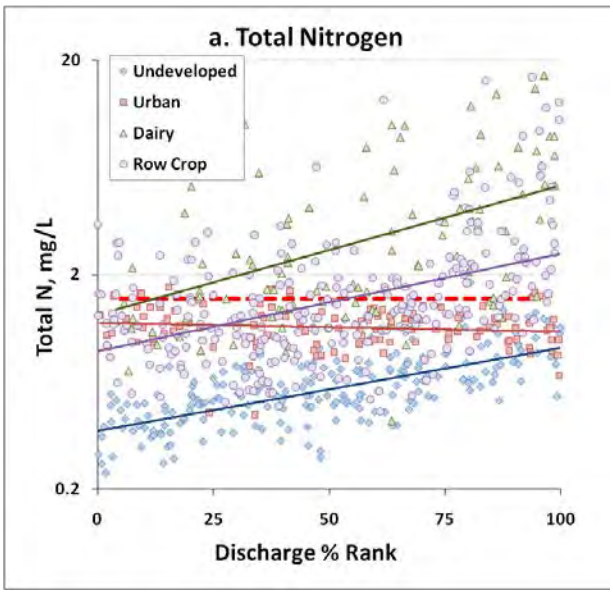


FIGURE 49: TRENDS IN TN WITH RESPECT TO STREAMFLOW FOR MAJOR NONPOINT SOURCE LOAD CATEGORIES

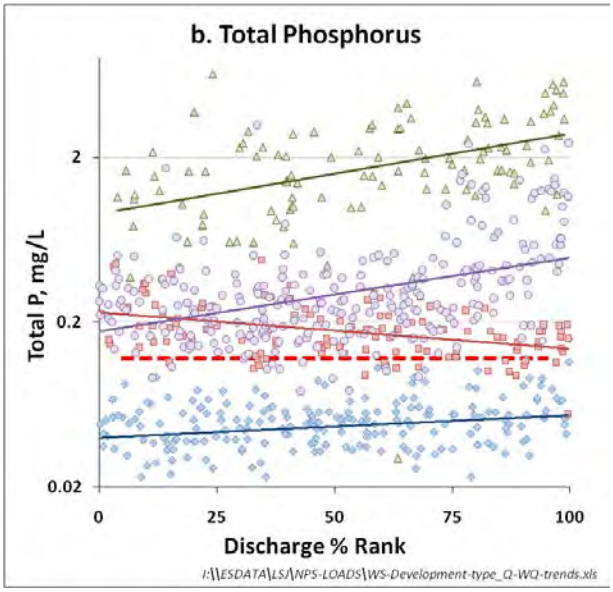


FIGURE 50: TRENDS IN TP WITH RESPECT TO STREAMFLOW FOR MAJOR NONPOINT SOURCE LOAD CATEGORIES

Figure 49 and **Figure 50** show selected data from streams that are representative of major development category types that were provided allocations in the TMDL process including undeveloped (represented by North Fork Black Creek), urban (Cedar River), dairy lands (Mill Log Branch), and row crops (Dog Branch). The dashed red line identifies the state NNC concentration, as a reference. With the exception of the Cedar River (urban watershed), all sites exhibit an increase in TN and TP concentration as discharge increases. For this reason, high flow events, dominate the load delivery to the LSJR. The inverse relationship between concentration and discharge in the Cedar River is typical for urban watersheds, as low flow is influenced by low, higher concentration constant flows, such as small package plant wastewater, sanitary sewer leakage, illicit discharges, and septic tank flows.

The Mann-Kendall non-parametric statistical test was used to evaluate the significance of nutrient concentration trends. This non-parametric statistical test, which is also used in the SJRWMD Status and Trends assessment (Ceric and Winkler, 2006), was selected because it is does not assume normality in the data set, and is not strongly influenced by outliers or changes in sampling frequency. Because discharge is the largest single factor controlling the concentration of nitrogen and phosphorus, water quality data were placed into low (the lowest one-third percentile rank discharge), medium (one-third to two-thirds percent rank), and high (upper one-third) categories based on the flow condition existing at the time of sampling, and the Mann-Kendall test was performed separately on the data trends in each flow category. Performing the test on these separate flow regimes reduced the possibility that significant trends could be concluded due to rainfall or changes in the frequency of high or low flow sampling. The results of trend tests on the set of watershed land use-specific monitoring stations are listed in **Table 19**. Two long-term monitoring stations, the upper North and South Forks of Black Creek, with minimal development in their upstream catchment area, are included as a background reference.

Five urban watersheds, located in Jacksonville and northern St. Johns County, are included in this assessment. Although Durbin Creek contained only 3% of the urban area in the TMDL assessment phase 1995 land use coverage, it is included as an urban area within the watershed that is expanding. TN and TP concentrations for these urban watersheds exhibit downward or stable trends. Significant downward trends for four out of five urban streams occur under low flow conditions, and likely reflect the continued progress toward the removal and diversion of small package waste treatment facilities to larger regional facilities, the extension of sanitary sewer to areas formerly on septic tanks, and efforts to identify and eliminate illicit connections. The urban tributaries contribute to the marine reach of the river and there is not a TMDL load limit for TP; however, the reduction in low and high flow concentrations is a positive sign and will benefit river quality when lower salinity conditions occur in the river allowing blue-green algae (cyanobacteria) to survive and grow.

It should be noted that trends in TN can appear due to changes in the predominant forms. This appears to be the case for Durbin Creek, which under the medium flow condition is exhibiting a downward trend in organic nitrogen, but an upward trend in nitrate+nitrite. Because organic nitrogen is a much larger fraction of TN, the overall effect is a downward trend in TN. However, because nitrate+nitrite is more bioavailable for algae, the overall effect on the LSJR may be negative. The decrease in organic nitrogen and increase in nitrate+nitrite may be due to the replacement of native forested land cover with urban and residential land use, or could be due to drier conditions, which would favor the oxidation of organic nitrogen, such as prolonged drought.

The effect of declining dairy operations in the Black Creek watershed is evident from the downward trends for TN and TP in almost all flow categories. Only Mill Log Branch continues to exhibit stable, high trends in TP (median concentration = 1.24 mg/L, which is 10 times greater than the state's NNC concentration). Upward trends were found under low flow conditions for Governor's Creek for TP and Bradley Creek for TN, suggesting perhaps an increased influence of effluent flows for these watersheds. However, Governor's Creek has exhibited a significant, steep decline in TN concentration with the closure of the Gustafson's Dairy (**Figure 51**). In the figure, the polynomial regression lines were fitted to low flow (dashed line) and high flow (solid line) indicate a switch over time from higher low flow concentrations, to higher high flow concentrations, consistent with a change from the predominance of effluent-dominated nutrient loads to runoff-dominated loads.

Although potato production has declined over the past 10 years, it is still one of the major agricultural commodities of the TCAA. The crop season for spring potatoes runs from January through May. Potato fields are either fallowed or planted in a cover crop from summer through early fall, and then disked, bedded, fumigated and fertilized in late fall and early winter for the next crop season. To better assess trends associated with this crop cycle, monitoring data for streams draining the TCAA were further subdivided into half-year blocks of January – June, to represent crop season trends, and July – December, to characterize fallow-season trends.

TABLE 19: MANN-KENDALL TIME TREND ANALYSIS RESULTS FOR ALLOCATION LAND USE CATEGORY MONITORING STATIONS FOR THE ASSESSMENT OF TN AND TP LOADS

LAND USE CATEGORY	TRIBUTARY	% OF WATERSHED IN LAND USE CATEGORY	ASSESSMENT INTERVAL	TN LOW	TN MEDIUM	TN HIGH	TP LOW	TP MEDIUM	TP HIGH
Background	South Fork Black Creek	89	Annual	1.48[4]	-0.73	-0.28	1.09	0.20	-1.49[3]
Background	North Fork Black Creek	85	Annual	0.00	-0.57	-0.30	0.52	-0.34	-0.59
Urban	Arlington River	68	Annual	-0.12	-0.10	0.47	-2.10[1]	0.31	-1.40[3]
Urban	Cedar River	67	Annual	-1.44[3]	-1.91[1]	0.99	-1.59[3]	0.00	-2.64[1]
Urban	Ortega River	38	Annual	-1.48[3]	0.78	-0.60	-2.43[1]	-0.06	-1.74[1]
Urban	Moncrief Creek		Annual	-2.38[1]	-0.24	-1.08	0.02	0.75	0.33
Urban	Durbin Creek	3	Annual	-1.48[3]	-2.28[1]	-0.87	-1.97[1]	0.54	-0.92
Dairy	Peters Creek	4	Annual	-4.03[1]	-3.00[1]	-1.57[3]	-2.18[1]	-3.87[1]	-2.63[1]
Dairy	Governor's Creek	20	Annual	-8.12[1]	-7.85[1]	-6.19[1]	1.81[2]	-2.04[1]	-1.53[3]
Dairy	Mill Log Branch	54	Annual	-2.11[1]	-2.11[1]	-0.48	-0.71	-0.80	0.10
Dairy	Bradley Creek	15	Annual	1.48[4]	-0.21	-0.10	-2.36[1]	-2.20[1]	-1.98[1]
TCAA Row Crop	Hastings Drainage District	26	Jan-Jun	-0.26	-0.48	-0.26	2.35[2]	1.26	0.12
TCAA Row Crop	Hastings Drainage District	26	Jul-Dec	-2.31[1]	-0.02	-0.33	-0.02	0.92	-0.33
TCAA Row Crop	Deep Creek	30	Jan-Jun	-1.64[3]	-1.13	0.56	1.64[4]	-0.02	1.24
TCAA Row Crop	Deep Creek	30	Jul-Dec	-5.86[1]	1.75[2]	-1.33[3]	-1.32[3]	1.14	-1.14
TCAA Row Crop	Dog Branch	72	Jan-Jun	-0.13	1.22	0.21	1.42[4]	3.16[2]	0.62
TCAA Row Crop	Dog Branch	72	Jul-Dec	-1.48[3]	-0.53	-0.18	-0.37	-0.62	0.38
TCAA Row Crop	Moccasin Branch	28	Jan-Jun	1.98[2]	-0.32	1.10	1.06	0.47	-0.35
TCAA Row Crop	Moccasin Branch	28	Jul-Dec	-2.51[1]	-2.29[1]	-1.89[1]	-2.45[1]	-2.46[1]	-0.68

Note: Areas are from the SJRWMD 1995 land use coverage, with the exception of the TCAA row crop areas, which are derived from the 2000 land use coverage. Trends, with the exception of urban monitoring stations, were assessed from on data from 1999 to the present. Urban watersheds were assessed with data from 1995 to the present. TCAA flow occurrences were based on conditions for Deep Creek, background and dairy flows were based on the conditions for the South Fork Black Creek, and urban streams were based on conditions for the Ortega River. Values are the Mann-Kendall Z-statistic.

[1] Dark green cells indicate a very significant (p = 0.05) downward or upward trend in TN or TP.

[2] Dark red cells indicate a very significant (p = 0.05) downward or upward trend in TN or TP.

[3] Light green cells indicate a significant (p = 0.10) downward or upward trend in TN or TP.

[4] Light red cells indicate a significant (p = 0.10) downward or upward trend in TN or TP.

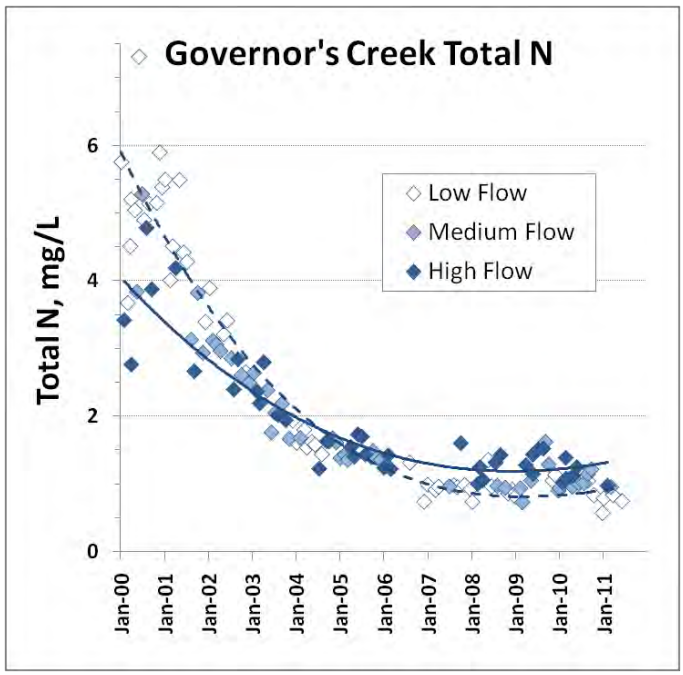


FIGURE 51: TIME SERIES TREND FOR TN IN GOVERNOR'S CREEK, 2000 – 2011

For the 1999 to 2011 assessment period, Moccasin Branch exhibits downward trends for TN and TP over most flow regimes. Downward trends in TN concentrations are evident under low flow conditions at Deep Creek, and for the July – December seasons at Dog Branch and the Hastings Drainage District outlet canal. Both Dog Branch and Deep Creek have flows cycled through RST facilities, and this, in addition to reduced acreage in production, likely contributes to the downward trend in TN observed at these sites. Upward trends were determined for nitrogen at Moccasin Branch for crop season (January – June) low flow conditions, and for Deep Creek during fallow season, moderate flow conditions. Upward trends were also determined in TP at the Hastings Drainage District, Deep Creek, and Dog Branch for low flow crop season sampling. Under high flow conditions, trends in TN and TP concentrations are mostly stable (i.e., unchanging). While a high flow, fallow season declining trend was calculated for TN at Deep Creek, the most recent data collected for this condition was August 2009, so the direction of this trend should be considered tentative.

Winkler and Ceric (2006), in their status and trends report, also employed the Mann-Kendall non-parametric test to assess trends in water quality and nutrient concentrations for the entire SJRWMD. Instead of segregating trends by discharge category, as was done here, they apply a version of the test that accounts for seasonal variance when significant. The most recent compilation of trends for this report, which are at this time of this writing still provisional, corroborate the downward trends for Jacksonville urban streams (Cedar River for TN and Ortega River for TP), and dairy watersheds (downward trend for Peters Creek in both TN and TP and a stable trend for Mill Log Branch), and the mixed trends for streams draining the TCAA. Winkler and Ceric (2006) calculated decreasing trends in TN for Deep Creek, Dog Branch, the Hastings Drainage District outlet, and Moccasin Branch, but an increasing trend for Tocoi Creek (a row-crop dominated tributary not examined here). Decreasing trends were calculated for TP at Moccasin Branch, stable trends for Dog Branch, the Hastings Drainage District, and Tocoi Creek, and an increasing trend for Deep Creek.

5.3 POINT SOURCE LOADS

Remarkable progress has been achieved in the reduction of point source nutrient loads discharged to the LSJR. Load reduction is attributable to a combination of reduction in discharge volume and to lower effluent TN and TP concentrations. At the time of the TMDL external load assessment, the LSJR had over 200 million gallons per day of direct permitted effluent discharge from 33 facilities (additional loads were discharged to tributaries), exceeding all other rivers and estuaries in the state. The average volume discharged was 137 million gallons per day, with approximately 93 million gallons per day discharged by Georgia Pacific and the five major facilities operated by JEA. The average combined discharge from these same facilities in 2011 was 67 million gallons per day, a 28% volume reduction (**Figure 52** and **Figure 53**). This reduction is impressive considering that throughout this phase, the JEA customer service base increased and numerous small package plants have had their effluent redirected to the major facilities, resulting in an overall increase of incoming effluent volume to be treated.

The sum of all domestic and industrial effluent TN load discharged to the LSJR marine reach achieved and exceeded the TMDL total point source allocation in both 2010 and 2011, with the 2011 total 23% less than the TMDL total load of 872 metric tons (**Figure 54**). Alongside JEA, significant LSJR marine reach TN load reductions were achieved by CCUA, Orange Park, Anheuser Busch and the Jacksonville RockTenn containerboard facility. Although the current marine reach TMDL applies only to the TN load, monitoring data also indicate that several JEA facilities, including Arlington, District II, and Southwest, have also reduced TP concentrations.

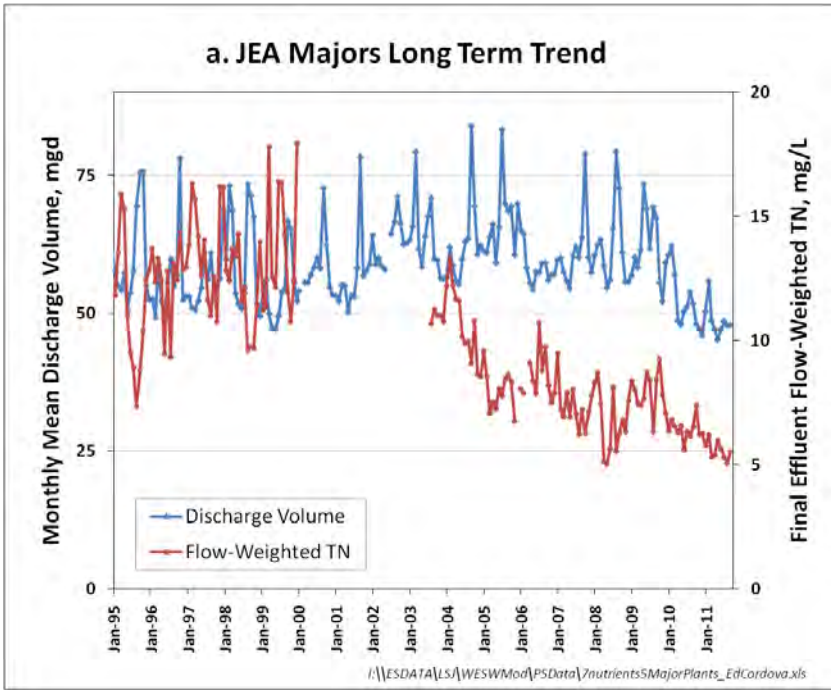


FIGURE 52: LONG-TERM TRENDS IN EFFLUENT DISCHARGE VOLUME TN AND TP CONCENTRATIONS FOR THE FIVE MAJOR DOMESTIC WWTFS OPERATED BY JEA

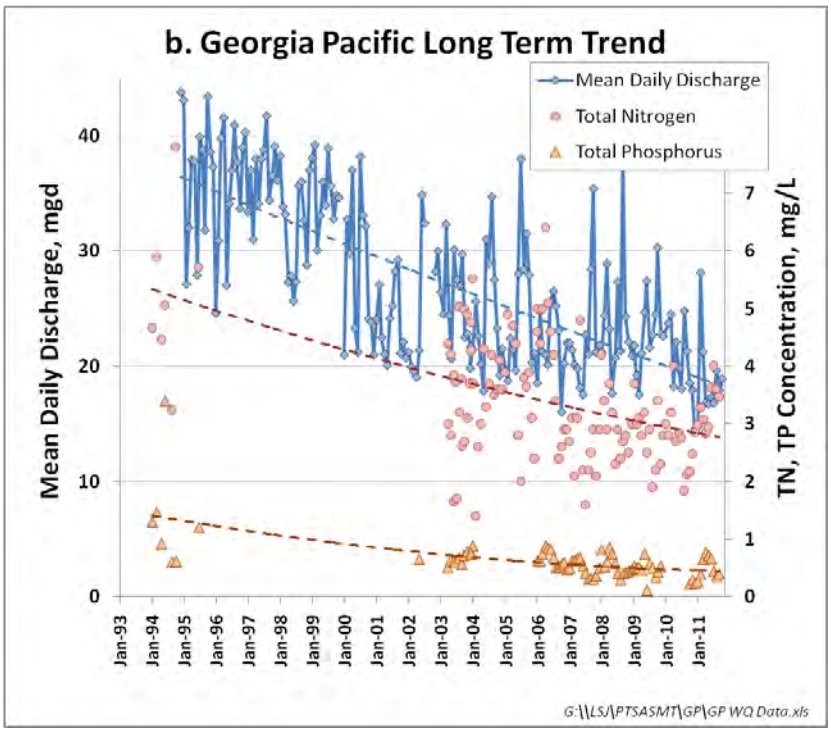


FIGURE 53: LONG-TERM TRENDS IN EFFLUENT DISCHARGE VOLUME TN AND TP CONCENTRATIONS FOR GEORGIA PACIFIC

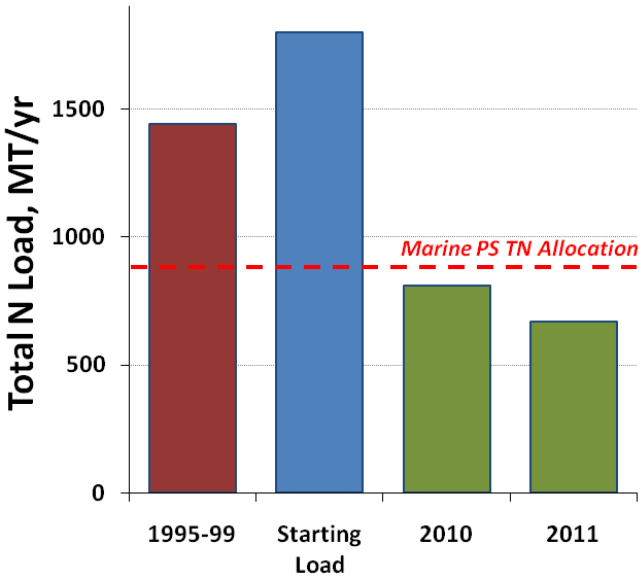


FIGURE 54: COMPARISON OF THE 1995-1999 POINT SOURCE TN LOAD, THE STARTING POINT LOAD FOR TMDL ALLOCATIONS, AND THE 2010 AND 2011 LOADS DETERMINED FROM FACILITY MONTHLY OPERATING REPORTS FOR THE MARINE REACH

In the LSJR freshwater reach, the total point source effluent load reductions for TN and TP have also exceeded the necessary TMDL reductions (**Figure 55** and **Figure 56**). The sum of the 2011 freshwater TN effluent loads is 126 metric tons, 56% of the assimilative capacity load of 227 metric tons. The sum of the 2011 TP load is 17 metric tons, only 42% of the assimilative capacity load of 41 metric tons. For the year from October 2010 through September 2011, the

effluent TN load from Georgia Pacific, the Palatka WWTF, and the combined Green Cove Springs WWTFs, was 32%, 51%, and 49% of the 1995-1999 loads, respectively. For TP, the loads for these three effluents were 18%, 41%, and 50% of the 1995-1999 loads.

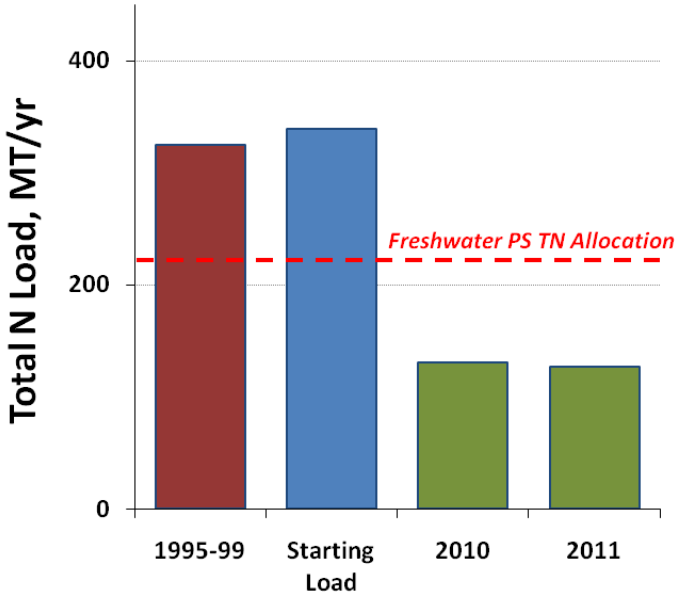


FIGURE 55: COMPARISON OF THE ACTUAL 1995-1999 POINT SOURCE TN LOADS, THE STARTING POINT LOADS FOR TMDL ALLOCATIONS, AND THE LOADS AS DETERMINED FROM FACILITY MONTHLY OPERATING REPORTS FOR 2010 AND 2011 FOR FRESHWATER REACH

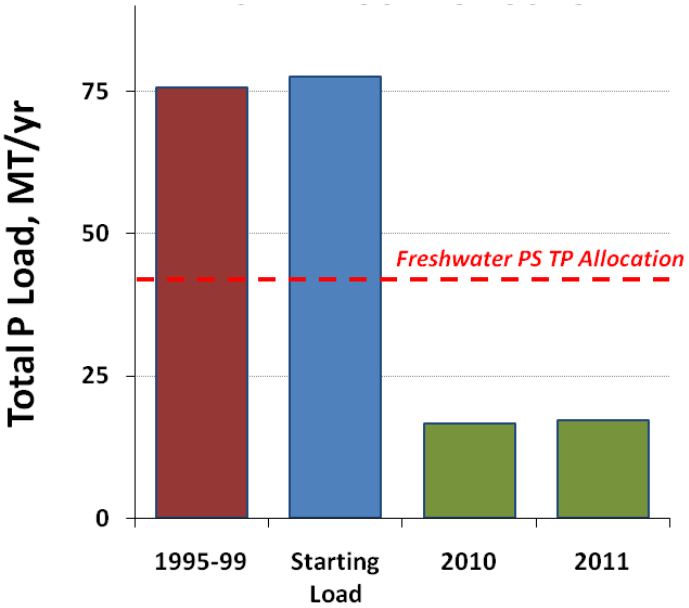


FIGURE 56: COMPARISON OF THE ACTUAL 1995-1999 POINT SOURCE TP LOADS, THE STARTING POINT LOADS FOR TMDL ALLOCATIONS, AND THE LOADS AS DETERMINED FROM FACILITY MONTHLY OPERATING REPORTS FOR 2010 AND 2011 FOR FRESHWATER REACH

5.4 TRENDS IN UPSTREAM LOADS TO THE LSJR

The upstream extent of the LSJR ends at the confluence of the Middle St. Johns River and the Ocklawaha River, 100 miles upstream of the mouth. In the TMDL external load assessment, it

was determined that the average TN and TP loads entering at this location were equivalent to 61% and 27% of the TN and TP loads to the entire LSJR. Because of this large contribution, trends in upstream concentration affect the LSJR, particularly in the freshwater reach.

The trends in half-year annual mean TN and TP concentrations for the Middle St. Johns River at the Outlet of Lake George (10 miles upstream of the Ocklawaha Rive mouth) are shown in **Figure 57**. Similar half year annual means for the Ocklawaha River are shown in **Figure 58**. The half-year intervals from which mean concentrations are derived correspond to October – March, when river discharge is typically high, and from April – September, when river discharge is lower and algal productivity is high.

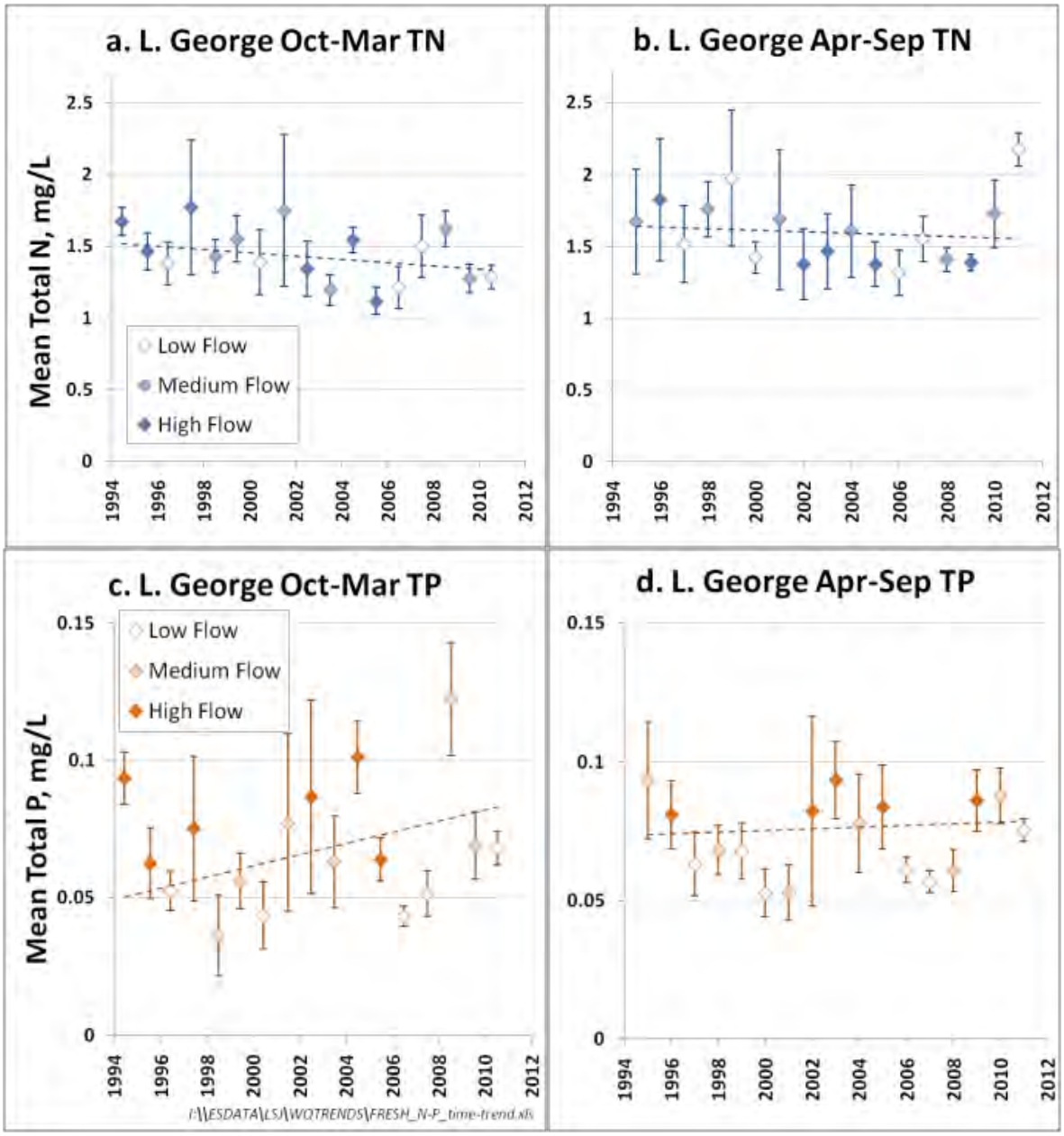


FIGURE 57: HALF YEAR (OCTOBER – MARCH [A AND C] AND APRIL – SEPTEMBER [B AND D]) MEAN CONCENTRATIONS OF TN (A AND B) AND TP (C AND D) FOR THE LONG-TERM MONITORING SITES AT THE OUTLET OF LAKE GEORGE, 1995 – 2011

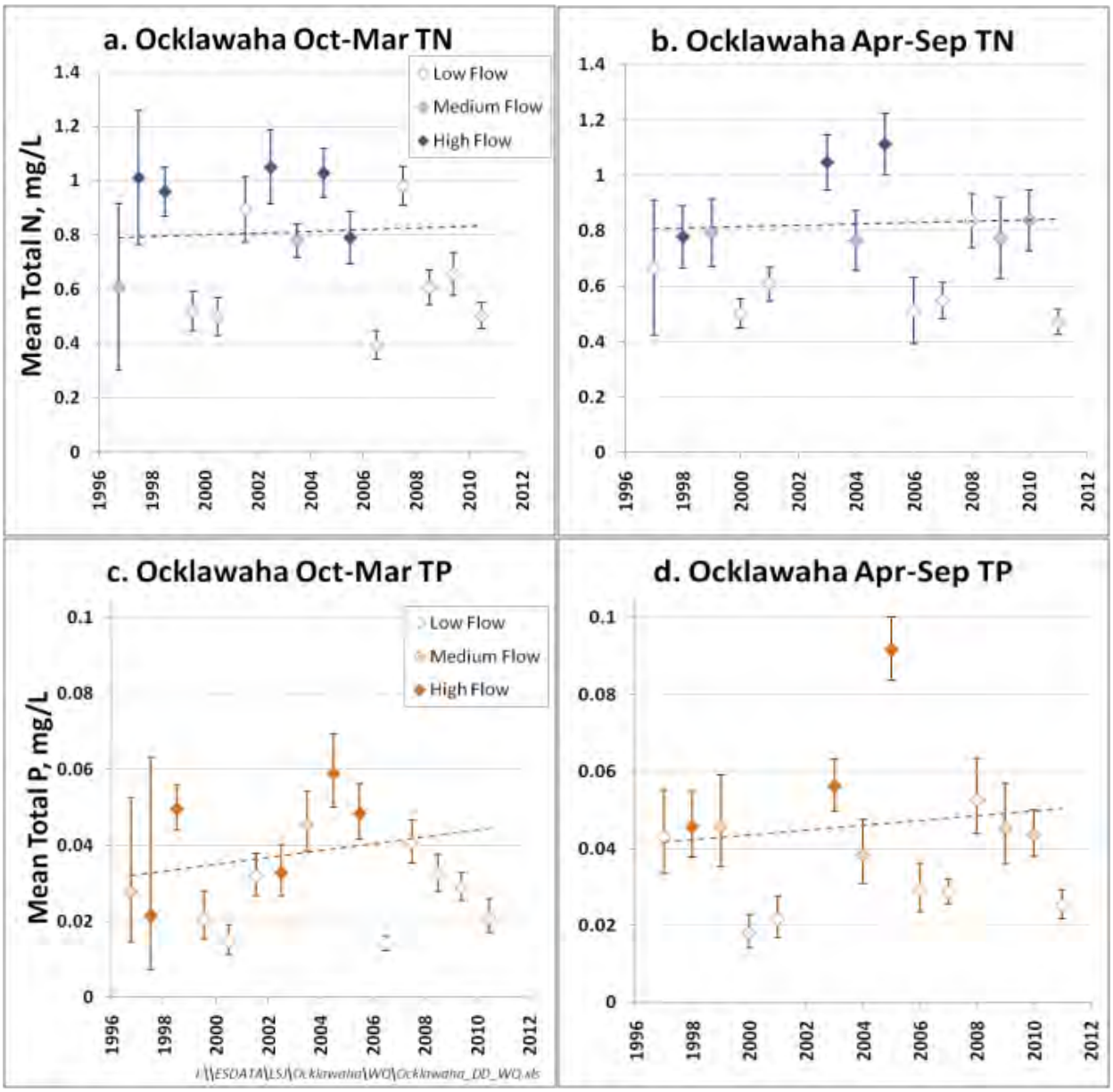


FIGURE 58: HALF YEAR (OCTOBER – MARCH [A AND C] AND APRIL – SEPTEMBER [B AND D]) MEAN CONCENTRATIONS OF TN (A AND B) AND TP (C AND D) FOR THE LONG-TERM MONITORING SITE AT THE MOUTH OF THE OCKLAWAHA RIVER, 1997 – 2011

For both the Middle St. Johns at the outlet of Lake George and the Ocklawaha River, nutrient concentrations are significantly, positively correlated to discharge. Because of this, assessments of nutrient trends that arise from changes in external nutrient supply must adjust for multi-year trends in discharge, which will also influence nutrient concentration trends. To accomplish this adjustment, multiple regression models employing both time (year) and discharge condition (mean half-year discharge occurrence frequency) as independent variables were developed to predict half-year TN and TP concentrations. The predictions of these models are shown in the frames of **Figure 57** and **Figure 58** as dashed lines, with the year value corresponding to the horizontal axis, and the discharge condition held fixed at the median

condition. Calculated as such, the lines indicate the trends in concentration attributable to change over time, irrespective of the discharge condition.

In only one case, that of the concentration of TP at the outlet of Lake George, was a significant year slope calculated, indicating a positive increase over time. This regression however was strongly influenced by one data point, the half-year mean TP concentration associated with Tropical Storm Fay in 2008. Using the multiple regression models to predict the 2011 TN and TP load that would be expected under the median discharge condition at Buffalo Bluff, the upstream boundary used in the TMDL assessment, provides an estimate of 5,949 metric tons of TN. This is less than the TMDL estimated load of 7,613 metric, based on the average from 1995-1999, although much of this difference can be attributed to the fact that the mean 1995-1999 discharge at Buffalo Bluff was 16% greater than the median discharge from 1995 – 2011, hence resulting in a greater load. The estimated 2011 TP load that would enter the LSJR under the median flow condition was calculated to be 332 metric tons. By comparison, the TMDL assessment estimated annual mean TP load entering at Buffalo Bluff was 320 metric tons.

5.5 LSJR Nutrient Concentration Trends and Water Quality Targets Attainment

5.5.1 Trends in LSJR TN and TP

The ambient condition of the LSJR is regularly assessed through a multi-agency, fixed-interval monitoring program, with the locations and timing coordinated by the participating state agencies and local governments. Regular data collection at several locations dates back to the mid 1980s. In the mid 1990s, the frequency of this monitoring program was increased to twice monthly and the coverage expanded to adequately characterize the rapidly changing conditions in this dynamic river estuary. This set of long-term monitoring stations was formally recognized in the 2008 BMAP monitoring plan as components of the river assessment strategy.

The trends in river TN and TP concentrations are a key indicator of the likelihood of adverse water quality effects from cultural eutrophication, and of the progress of nutrient pollution control endeavors. Because of the large proportion of load entering from upstream, nutrient pollution control within the LSJR Basin cannot completely achieve water quality targets, but pollution control efforts should lead to detectable changes in river monitoring data.

To assess the progress in nutrient pollution reduction, two long-term monitoring locations in or near the TMDL "worst-case" WBIDs are examined here (refer to **Figure 48** for locations). In the freshwater reach, the station in the center of WBID 2213K at Racy Point is used to assess trends. The Racy Point station has had twice-monthly sampling through the 1995 – 2011 assessment period; therefore, it has sufficient detail to elucidate trends and is balanced with respect to sampling density through time. In the marine reach, the long-term monitoring station at river mile 16 near Talleyrand was chosen to assess nutrient trends. Although this station is in WBID 2213D, two WBIDs upstream of the "worst-case" WBID 2213B, it has a continuous data record of at least monthly sampling dating back to 1985, and is less affected by marine salinity mixing; hence, it is more representative of river loads. To improve compatibility in the data collected by various programs through time, only surface collections are used from the Talleyrand site.

Trends in half-year mean TN and TP concentrations from 1995 through 2011 for the benchmark long-term monitoring station at the downstream end of the freshwater reach "worst-case" WBID at Racy Point are shown in **Figure 59** and **Figure 60**. As was the case with the tributary and

upstream nutrients, concentrations are significantly correlated with discharge, so trends over the assessment period are grouped into low, medium, and high flow categories. Trends within flow categories can be germane to the relative progress in sources of nutrient pollutant load. Elevated nutrient concentrations during low flow conditions can indicate that point source loads contribute significantly to receiving water concentrations, while elevated high flow concentrations suggests that nonpoint source runoff is a significant contributor.

When all the Racy Point half-year means are combined, significant downward trends in TN are apparent for both the April - September and October – March seasons. Trends are not significant for regressions specific to flow regimes, although the April – September low flow downward trend has a low probability ($p = 0.11$) that downward trend is not indeed genuine. The overall trend in TP at the Racy Point station is stationary. However, significant trends in TP emerge when the annual means are examined by flow condition. Downward trends in TP are evident for both the October – March and April – September seasons under the low flow condition. Under the high flow condition, April – September means exhibit a significant upward trend. These disparate trends cancel each other out for the overall trend when the entire seasonal mean time series trend is calculated.

Under low-flow conditions, blooms in the freshwater reach have sufficient time to deplete available nitrogen supplies and invariably progress to dominance by nitrogen-fixing cyanobacteria, which "internally" load nitrogen in the river by converting atmospheric nitrogen for growth. This leads to the conundrum whereby nitrogen concentration is a function of algal biomass, instead of the reverse, and rendering phosphorus supply the ultimate determinant of maximum algal biomass. For this reason, the nearly significant downward trend in low flow April – September TN is most likely a reflection of downward trend in low flow April – September TP.

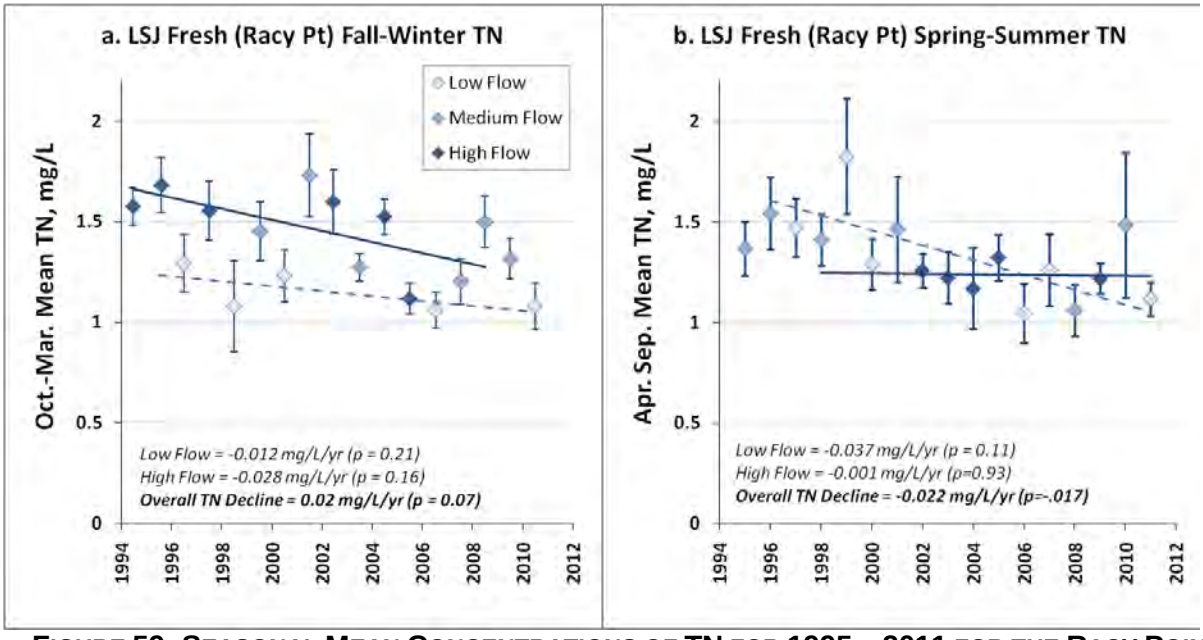


FIGURE 59: SEASONAL MEAN CONCENTRATIONS OF TN FOR 1995 – 2011 FOR THE RACY POINT STATION IN THE FRESHWATER REACH

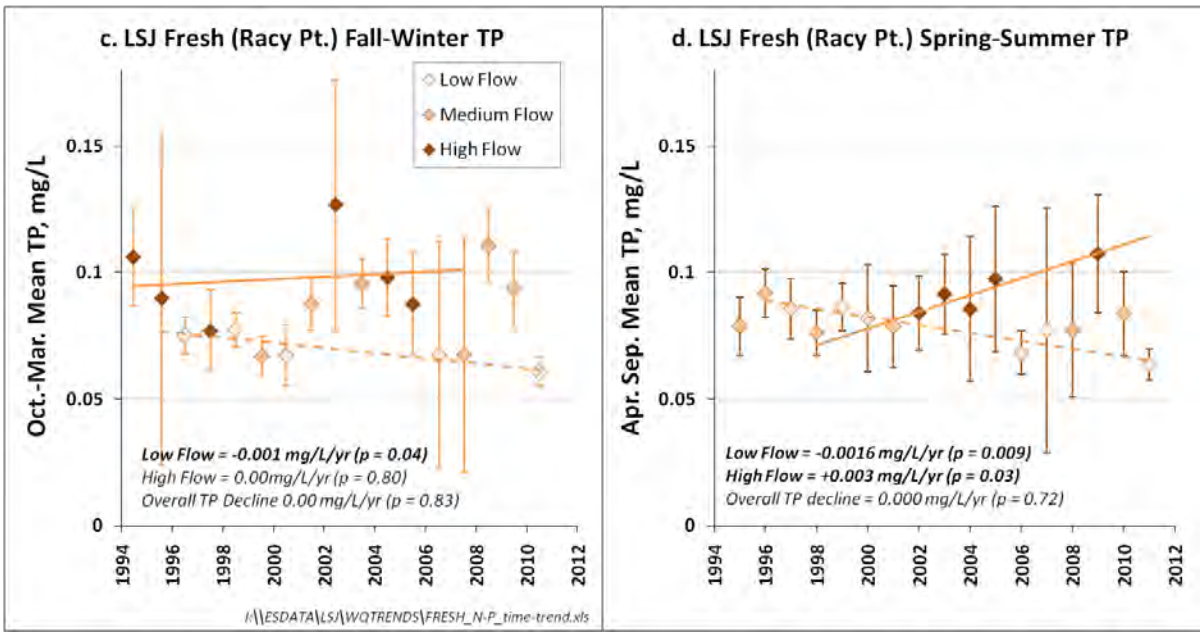


FIGURE 60: SEASONAL MEAN CONCENTRATIONS OF TP FOR 1995 – 2011 FOR THE RACY POINT STATION IN THE FRESHWATER REACH

Marine reach long-term annual mean TN and TP concentration trends at the Talleyrand sampling station are shown in **Figure 61**. Two versions of the TN and TP concentrations were examined for annual means and annual means calculated from data values that were adjusted to reflect the concentration without marine water dilution. Because marine water TN and TP concentrations on the Atlantic Inner-shelf are lower than that of the river, long-term changes in salinity that lead to a greater proportion of inner-shelf water in the river can affect river concentration trends, and obscure trends related to changes in the external load. As river salinity has increased on average from 1995 through 2011, this could lead to an apparent downward trend in concentration that is not driven by nutrient pollution load decreases.

From 1995 through the present, there has been a significant, downward trend in annual average (non-salinity-adjusted) TN concentration at the Talleyrand monitoring site. The concentration trend is flat through 2005, but begins to drop substantially from 2006 to 2011. After salinity adjustment, this trend is no longer significant over the entire period of record; however, salinity-adjusted annual means fall sharply in 2010 and 2011.

Although there is not a marine reach TP TMDL or allocation, TP trends can still indicate the effectiveness of nutrient pollution control programs. TP also can affect some types of algal growth under low salinity conditions. From 1995 through 2011, annual mean TP concentrations appear to be increasing. This increase is not significant for non-salinity-adjusted annual mean concentrations, but is significant for salinity-adjusted means.

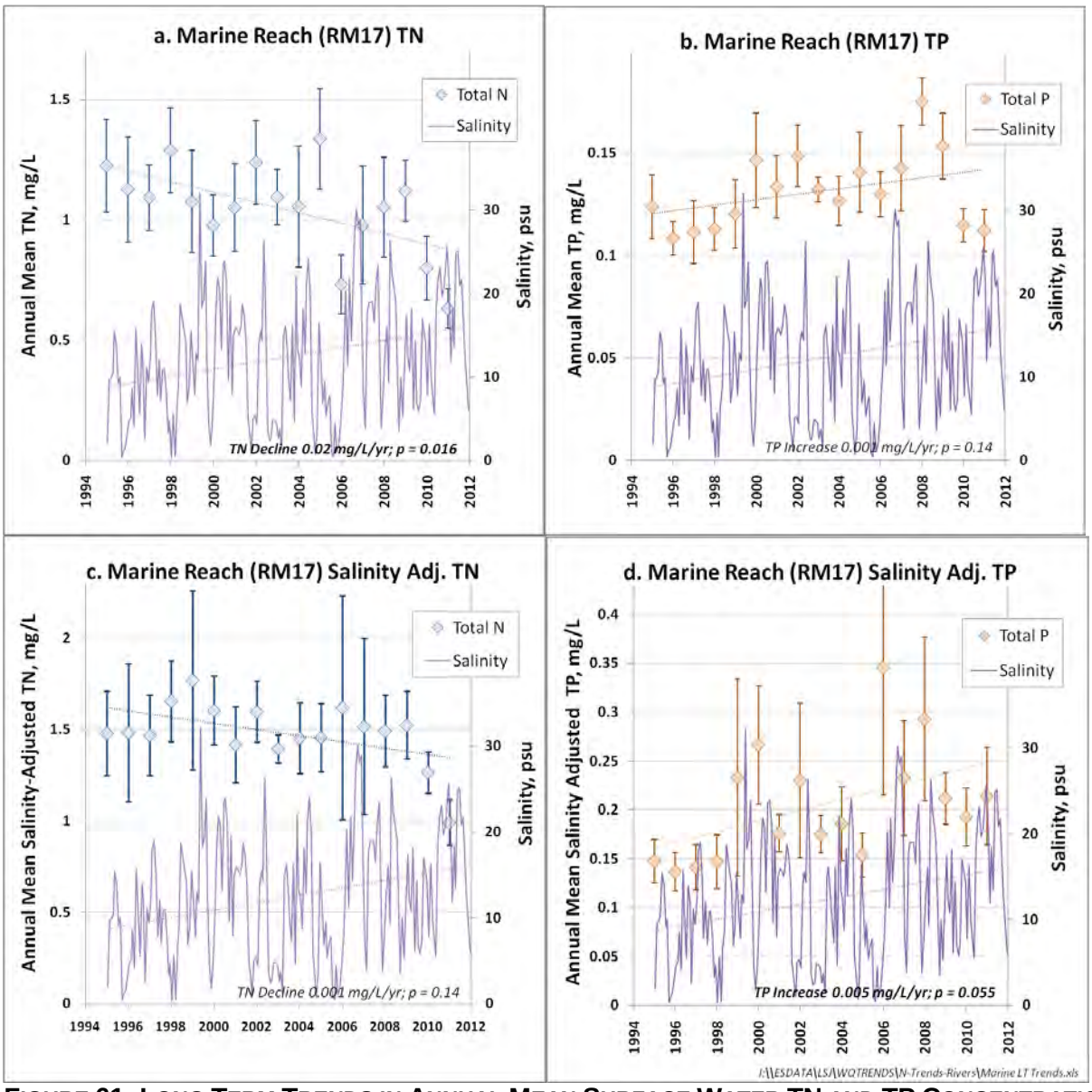


FIGURE 61: LONG TERM TRENDS IN ANNUAL MEAN SURFACE WATER TN AND TP CONCENTRATIONS AND SALINITY AT THE RIVER MILE 17 NEAR TALLEYRAND STATION (ACTUAL MEANS IN A AND B AND SALINITY-ADJUSTED MEANS IN C AND D)

5.5.2 RIVER TARGETS PERFORMANCE

In the LSJR TMDL process, nonpoint source load allocations were established to achieve separate water quality targets, tailored to the predominant eutrophication-related adverse water quality impacts affecting the fresh and marine reaches of the river.

For the freshwater reach, the primary water quality objective was to reduce the density and duration of nuisance algal blooms to a level that would not adversely affect the functioning of healthy aquatic food chains. The LSJR is a system dominated by the pelagic (open water) food chain, in which algae, the base of the food chain, are consumed by microscopic animals (rotifers, crustaceans, and insect larvae, collectively referred to as the zooplankton) which are in turn consumed by juvenile fish. Plankton monitoring in the LSJR has discovered that during

blue-green (cyanobacteria) blooms, important participants of the pelagic zooplankton decline, potentially leading to a short-circuiting of the food chain. To prevent this decline, a criteria was designed that sought to limit the duration of a nuisance bloom, defined as a concentration of chlorophyll-a of more than 40 µg/L, to a duration no longer than 40 days. This criterion was based on the observed relationship between key crustacean zooplankton, an important link in the aquatic food chain, and algal bloom intensity and duration.

In the LSJR marine reach, the primary adverse impact of eutrophication was found to arise from the oxygen demand of declining algal blooms and decomposing algal organic matter. Although there was a state criteria in force at the time, there was a general consensus in the scientific community, that for blackwater river estuaries, such as the St. John River and others of its type that predominate in the South Atlantic United Stations, occasional low DO was a natural event. As an alternative, FDEP and SJRWMD proposed a modified version of the recently published Atlantic Virginian Province estuary saltwater criteria that limited the intensity (i.e., low concentration) and duration of low DO events based on the tolerance of the most sensitive endemic fauna of the estuary. Since the adoption of this intensity-duration criteria in 2005 as a state SSAC of the St. Johns River estuary, FDEP has continued to refine this approach and is poised to promulgate it as a state-wide standard for estuarine and coastal waters.

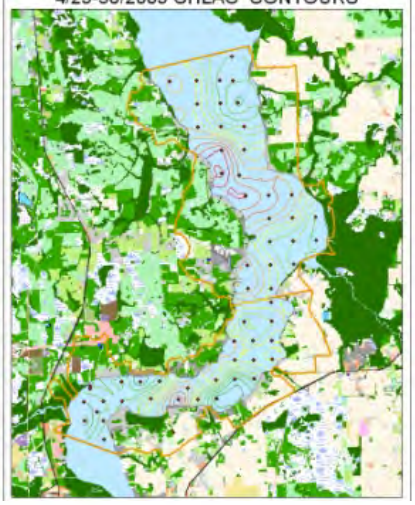
5.5.2.1 Freshwater Reach Target Compliance

During the TMDL assessment, relationships between the density of algal blooms and the concentration of TN and TP were based on bi-weekly point sampling monitoring data. In order to quantify with confidence the actual, WBID-wide density of blooms for determination of targets compliance, a multi-station sampling transect sampling network was instituted to better address the spatial heterogeneity that commonly exists during blooms in the freshwater LSJR. Sampling of this network was performed by staff of the FDEP Northeast District, with laboratory analysis funded by Seminole Electric and Georgia Pacific.

Figure 62 displays this network for a bloom sampling in WBIDs 2213K and 2213L in 2009. The degree of spatial heterogeneity in both the surface developed from transect monitoring results reinforces the need for multi-station sampling to determine WBID-wide average chlorophyll-a concentration. This level of patchiness can occur due to currents, winds, and buoyancy characteristics of certain cyanobacteria. An example of the potential deviation from the determination of the true WBID-wide average concentration is shown in **Figure 63** for the 2009 sampling events. Future WBID-wide spatial assessments will cease the transect grab sampling approach, and instead will rely on MERIS satellite imagery, allowing for the continued spatial resolution of the transect sampling network, but resulting in a significant laboratory analytical and field sampling cost savings over the transect station network.

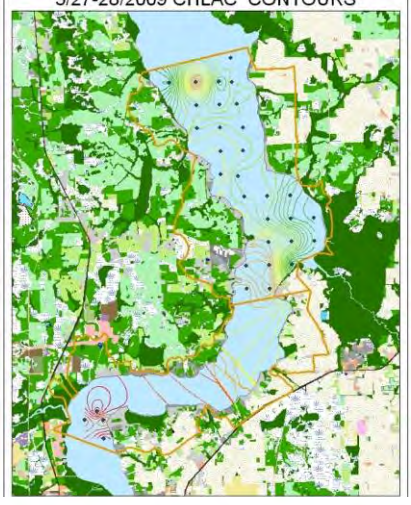
Monitoring data indicate that the incidence of blooms lasting longer than 40 days is declining in the freshwater worst-case WBIDs 2213K and 2213L (**Figure 64**). From 1995 through 2001, bloom duration exceeded 40 days in five of the seven years (71%) in WBID 2213K, and in six of the seven years (86%) in WBID 2213L. In the 10 years from 2002 through 2011, the frequency of blooms over 40 days dropped, with only three occurring in both WBIDs (30%). The exception to this downward trend in bloom duration occurred in 2010, when a massive bloom of the nitrogen-fixing cyanobacteria *Aphanizomenon flos-aquae* formed in the freshwater reach.

4/29-30/2009 CHLAC CONTOURS

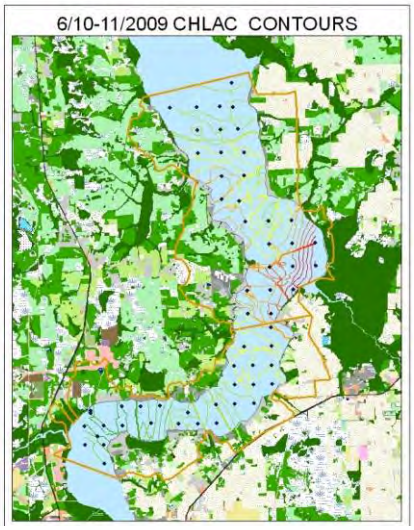


5/13-14/2009 CHLAC CONTOURS

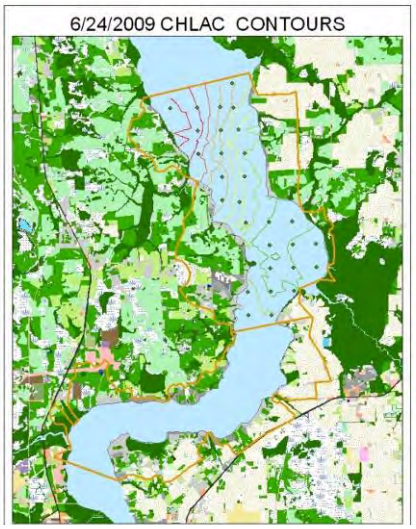
5/27-28/2009 CHLAC CONTOURS



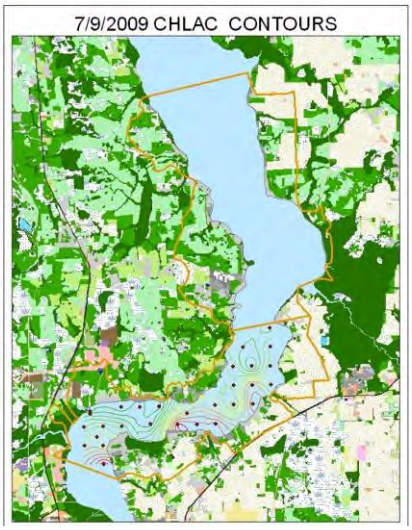
6/10-11/2009 CHLAC CONTOURS



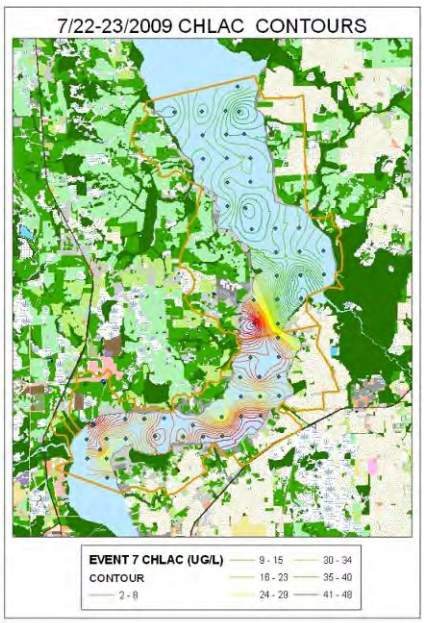
6/24/2009 CHLAC CONTOURS



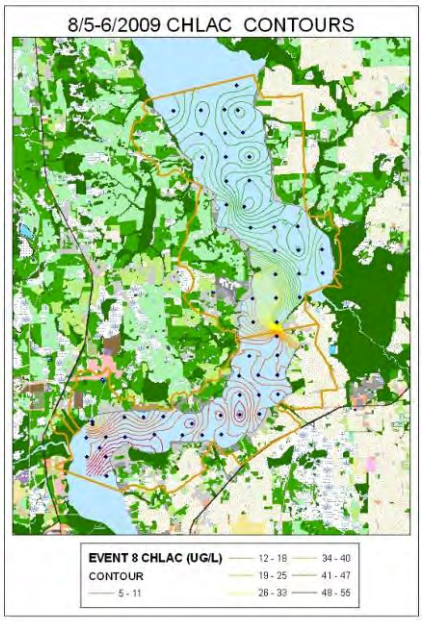
7/9/2009 CHLAC CONTOURS



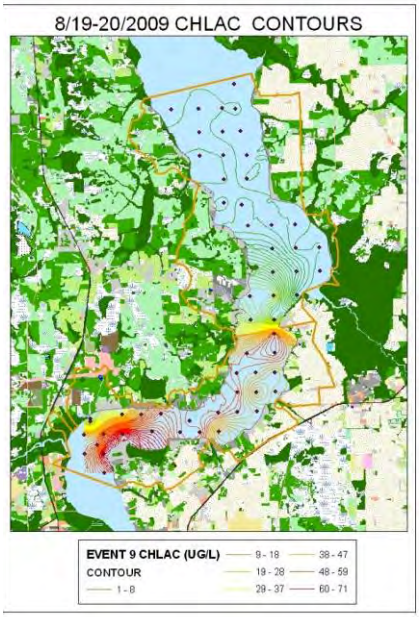
7/22-23/2009 CHLAC CONTOURS



8/5-6/2009 CHLAC CONTOURS



8/19-20/2009 CHLAC CONTOURS



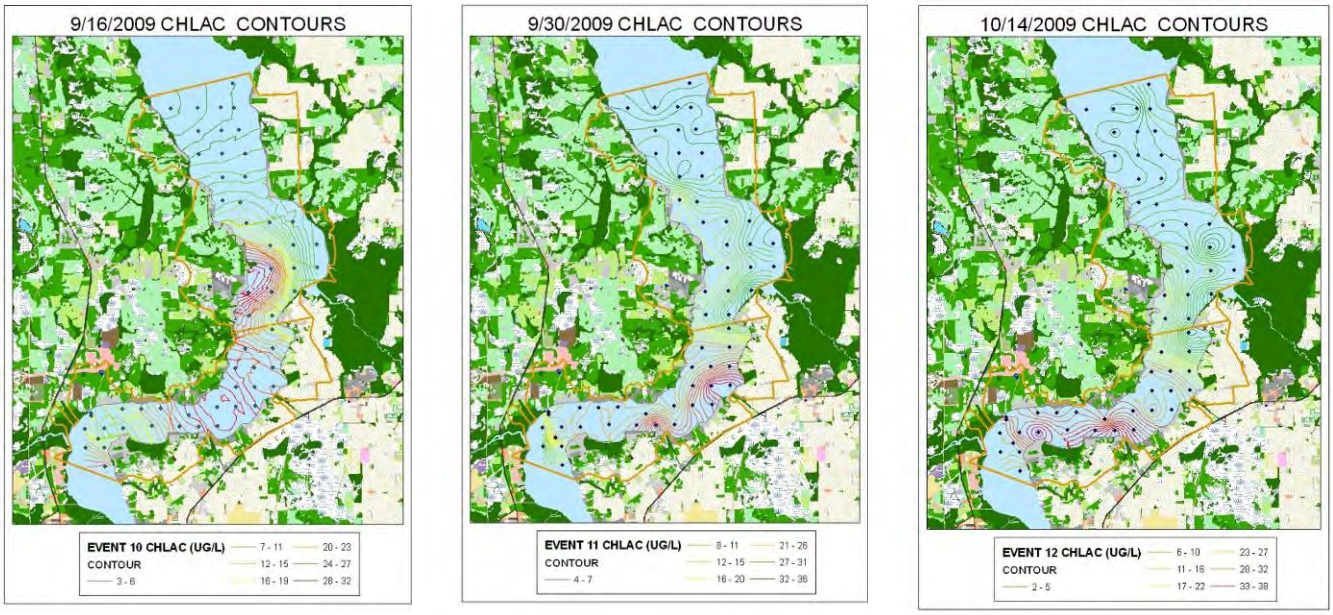


FIGURE 62: TWO-DIMENSIONAL INTERPRETATION OF CHLOROHPYLL-A IN WBIDS 2213K AND 2213L FROM TRANSECT SAMPLING DATA (BLACK DOTS) IN THE FRESHWATER REACH IN 2009

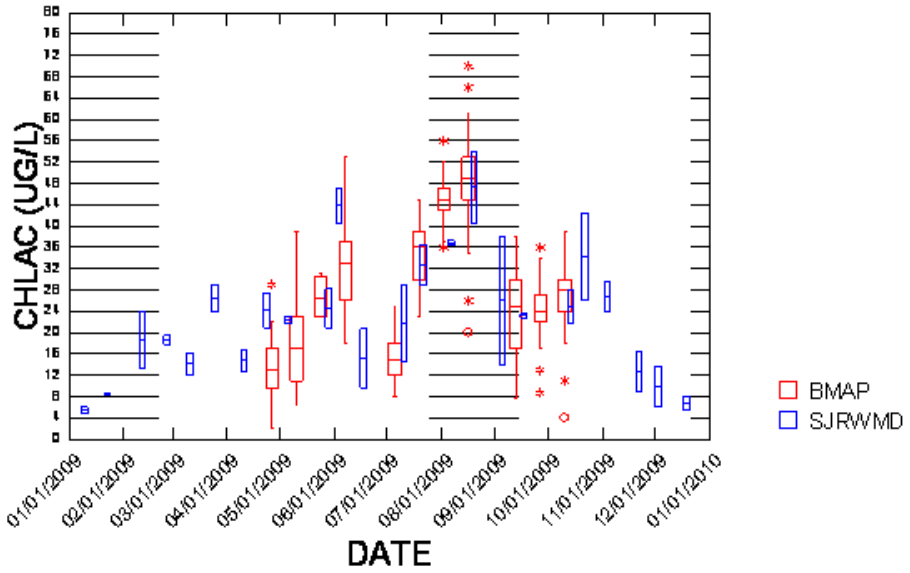
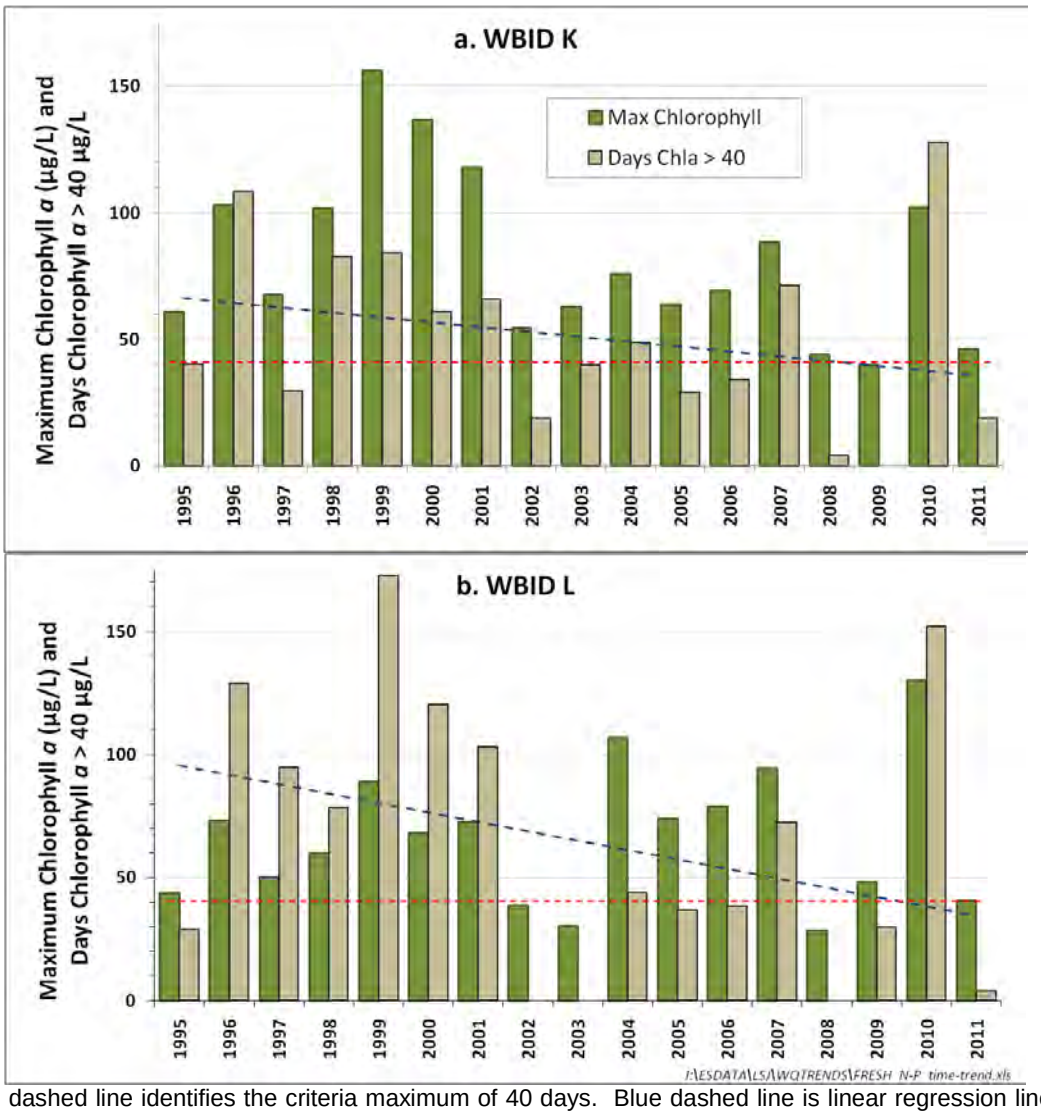


FIGURE 63: COMPARISON OF SAMPLING AVERAGES FOR WBID 2213L IN 2009



Note: Red dashed line identifies the criteria maximum of 40 days. Blue dashed line is linear regression line relating year to bloom duration.

FIGURE 64: TIME SERIES TRENDS IN ALGAL BLOOM MAXIMUM CHLOROPHYLL-*A* AND DURATION FOR FRESHWATER WBIDS 2213K AND 2213L FROM 1995 – 2011

5.5.2.2 Marin Reach Target Compliance

In the calculation of the marine reach DO criteria, exposure to low DO is treated similar to the exposure to a toxicant, where the duration and intensity combine to determine the exposure that would result in organism mortality. Exposures below 5 mg/L for a day are treated as a fraction of a lethal dose, with the strength of the "dose" increasing as DO goes lower.

Although it is not absolutely necessary to have daily data to calculate an exceedence of the criteria, not having such data requires interpolation between dates and speculation as to the DO conditions of the interpolated dates. For the BMAP compliance calculation, data collected at the USGS continuous water quality station at Dames Point in Jacksonville (station ID 302309081333001) was used. This station has been in existence since 1996, with an interruption in service in 2002-2003. The station has sensors at near surface and bottom water column locations. Because the St. Johns River in this reach is strongly vertically mixed, there is

rarely a significant difference between surface and lower water column sensors. For this calculation, the daily minimum and maximum values for each location were averaged, and then these were averaged to produce one daily average value. The results of the criteria calculation for the Dames Point daily values are shown in **Figure 65**.

For the 10 years of available data from 1996 through 2007, the DO criteria were exceeded every year except for 1996 and 2004. However, there were several large gaps in the 1996 data. Major fish kills occurred in the St. Johns River in 1999 and 2005, two years with large criteria exceedence values. From 2008 to the present, the concentrations have remained well below the exceedence level. In 2010, daily average DO never went below 5 mg/L.

To evaluate other areas of the estuary and potential sources of inflowing low DO concentration water, two additional sites were operated using deployments of YSI data sondes. Data sondes were deployed at the bridge on Heckscher Drive on Clapboard Creek, and a two-sonde array (near surface and near bottom) was placed in the river's main channel at channel marker 36 at the southeast corner of Blount Island (see **Figure 48**). In 2009 and 2010, only partial records were recorded at these sites, due to unavoidable equipment failure and availability. An uninterrupted data record was compiled in 2011 at both sites. Data collected at the channel maker 36 site were similar to that seen at the USGS Dames Point site in terms of its annual pattern and magnitude of DO depression (**Figure 66**). The minimum daily average DO concentration for the surface sonde in the 2011 period of record was 5.02 mg/L, resulting in a fractional exposure value of zero. For the bottom-water sonde, there were 20 daily average DO concentrations between 4.4 and 5.0 mg/L. For the available period of record, the calculated total fractional exposure value was 0.446, below the critical threshold level. At the Clapboard Creek site, one daily average DO concentration below 4.0 mg/L was recorded on May 25, 2011 (**Figure 67**). There were an additional 51 days where the daily averages were between 4.0 and 5.0 mg/L. For 2011, the total fractional exposure at the Clapboard Creek site was 1.315, representing an exceedence of the DO criteria. One low DO event was also recorded for this site in the partial data record that spanned from mid-July through December in 2010, reaching a minimum of 2.78 mg/L on July 28, 2010. Other than this event, there were no daily average DO concentrations less than 5 mg/L in 2010.

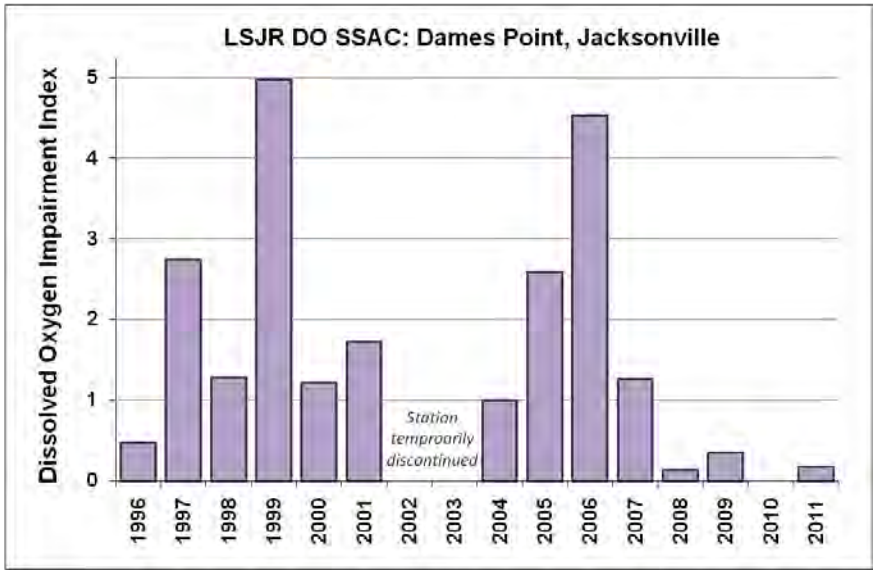


FIGURE 65: SUM OF THE DAILY FRACTIONAL DO EXCEEDENCES CALCULATED AT THE DAMES POINT USGS WATER QUALITY MONITORING STATION, 1996 – 2011

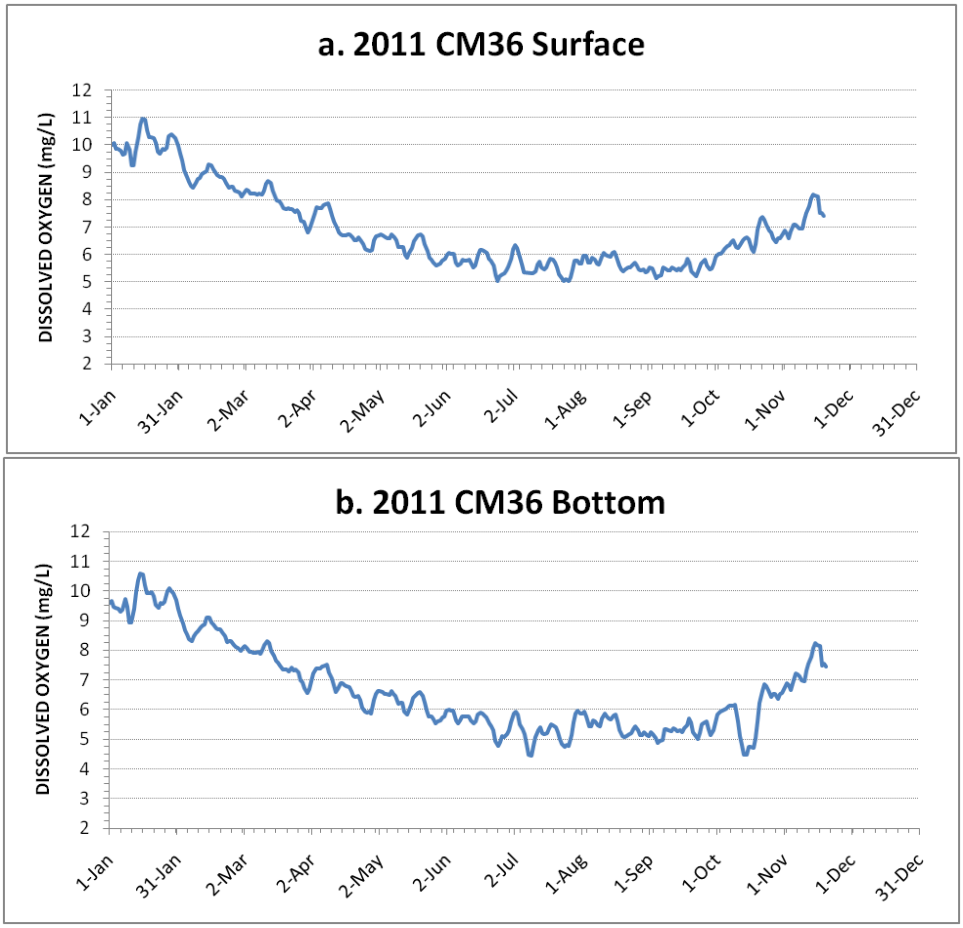


FIGURE 66: ANNUAL PATTERN IN THE 2011 NEAR SURFACE (A) AND NEAR-BOTTOM WATER (B) MEAN DAILY DO CONCENTRATION AT THE CHANNEL MARKER 36 MONITORING SITE

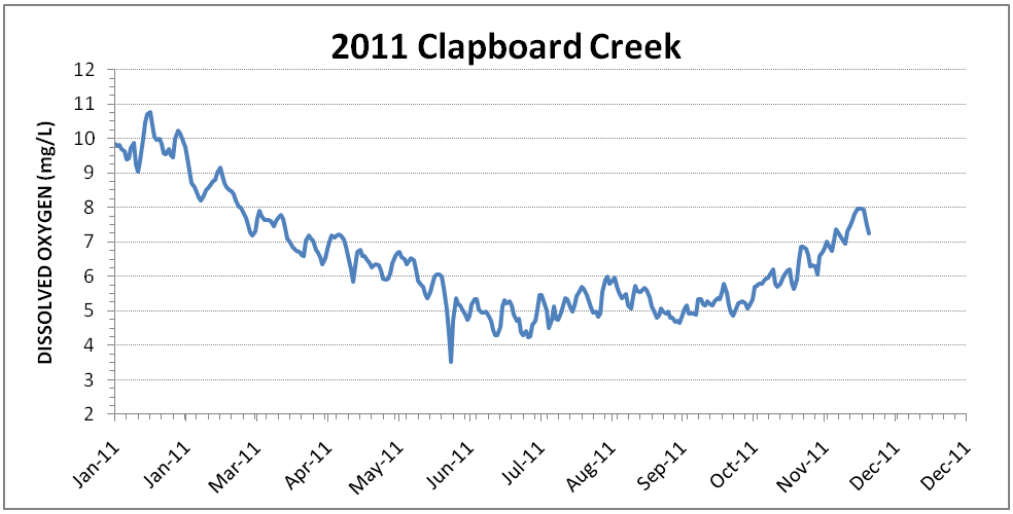


FIGURE 67: ANNUAL PATTERN IN THE 2011 MEAN DAILY DO CONCENTRATION AT THE CLAPBOARD CREEK SITE

5.6 SUMMARY

Over the last decade, nutrient pollution load to the LSJR from point sources and several categories of nonpoint sources has been significantly reduced. While the regulatory authority to mandate nutrient load reductions was enabled by the establishment of the TMDL, it should be noted that several other efforts ongoing during or prior to the TMDL were also instrumental in achieving the progress documented in this section. These include urban runoff treatment driven by NPDES stormwater rules and the Environmental Resource Permitting program for new development, the state and federal wasteload allocation process leading to improved treatment at several domestic and industrial WWTFs, the implementation of process improvements at Georgia Pacific driven by the cluster rule, the reuse of effluent and increased water use efficiency driven by more stringent water consumptive use permitting, and stricter nitrous oxides emissions for power plants which led to the selective catalytic reduction system installed by Seminole Electric. Because of these efforts, reductions in some categories of the external load were underway during the TMDL process or augmented the TMDL process, and this is evident in the downward trends in several sources prior to the final adoption of the TMDL in 2008.

In this first comprehensive assessment of source loads, there were generally declining trends in TN and TP concentrations found in streams draining watersheds dominated by urban and dairy land uses. These reductions in urban tributaries can be attributed to regional urban stormwater treatment, aggressive identification of illicit outfalls, extension of sanitary sewer service to areas formerly on septic tanks, and removal of small WWTPs. The reductions in dairy-dominated watershed runoff concentrations can be attributed to the decline in the dairy industry.

The progress in nutrient load reduction from row crop agriculture, however, is mixed. While there are some significant declines in TN concentrations, particularly under low flow conditions, there are no positive (i.e., downward) trends under higher flow conditions, and in some cases, there are increasing trends in both TN and TP. The tentative conclusion of the patterns in nutrient concentrations in runoff from row crop-dominated watersheds is that while BMPs and regional stormwater treatment have been successful in the reduction of TN loads, TP loads appear to be largely unchanged and may even be increasing.

Based on discharge monitoring reports, significant, downward trends are occurring in most point source effluent loads, accomplished through a combination of reduced discharge volume and lower effluent concentrations. The total of point source loads in both the freshwater and marine reaches of the LSJR is now below the TMDL allocations.

Overall trends in river concentrations of TN and TP appear to be responding to the reductions that are occurring in most categories of the external load. The timing of recent downward trends in marine reach TN concentrations appear to correspond directly with decreases in the total point source effluent load. From 2008 through 2011, there have been no exceedences in the marine reach DO criteria. Not only is this a positive for the biological health of the river, it provides some corroboration of the linkage between nutrient load and DO that was proposed from the TMDL investigations.

Freshwater reach TN concentrations are also trending downward from 1995 through 2011, although the control of TN concentration by nitrogen-fixing cyanobacteria and successive low-flow years near the end of the assessment time period may have affected this downward trend. While there is no trend in the overall TP concentration for the freshwater reach, when years are separated by flow condition, there is a downward trend under low flow conditions, and an upward trend under high flow conditions. The upward trend in freshwater reach TP under high

runoff conditions has significant implications for the composition of the phytoplankton community and the location of the bloom peak. Under higher flow conditions, blooms expand in space and time, and typically reach maximum biomass downstream of the current “worst-case” WBIDs 2213K and 2213L. These downstream-migrating blooms often undergo a species succession that terminates in dominance of Microcystis in the oligohaline reach, a particularly undesirable scum-forming cyanobacteria that is usually associated with cyanotoxin production.

This dichotomy in TP concentration is believed to result from reductions in point source loads, which have proportionally greater load contribution during low flow. This downward trend in low flow TP appears to have had a positive effect on freshwater bloom density and duration. During the 1995-1999 TMDL assessment, low flow conditions were associated with the most severe bloom conditions, as long residence time conditions allow the phytoplankton more time to exploit the available nutrient resources. As low flow nutrient concentrations have declined, freshwater blooms now persist for a shorter period of time, and reach the stationary phase at lower standing stock, reducing algal organic matter, the propensity for bloom crash, and low DO events. There is also evidence from the monitoring of phytoplankton community composition that lower TP concentrations keep this nutrient in balance with silica, an essential growth element for the more desirable diatom algae, reducing the relative abundance of less-desirable cyanobacteria. The decreases in river TN and TP concentrations over a relatively short period of time suggests that river health can respond quickly and favorably in response to external load reductions.

APPENDIX A: BMAP PROJECTS

The BMAP project tables below show the status of the projects as of December 31, 2011. These tables provide information on the nutrient reduction attributed to each individual project and the remaining nutrient load after each project is implemented, shown in both kilograms per year (kg/yr) and pounds per year (lbs/yr). The expected load reductions are subtracted from the entity's starting point load. The remaining nutrient balance once all projects have been implemented by an entity should be equal to or exceed the allocation for that entity's facility or facilities. The schedule to implement each of the projects is also included in the tables.

FRESHWATER PHOSPHORUS ALLOCATION

Name of Facility	*Wasteload Allocation (kg/yr)*
Clay County MS4 FLR04E045	***212.6***

FACILITY NAME	PROJECT NUMBER	DESCRIPTION	TYPE(S) OF BMP(S) IMPLEMENTED	ACRES TREATED	DEADLINE	PROJECT TP REDUCTION (KG/YR)	PROJECT TP REDUCTION (LBS/YR)
CC MS4 FLR04E045	N/A	Total Reduction Required	N/A	N/A	N/A	191.9	422.2
CC MS4 FLR04E045	CC-1	Education Program	N/A	N/A	Ongoing	16.2	35.6
CC MS4 FLR04E045	CC-2	FDOT SR 21 Widening from SR 215 to CR 220	Dry retention (1")	12	Completed	2.3	5.1
CC MS4 FLR04E045	CC-3	Trade with CCUA	N/A	N/A	Completed	173.4	381.5
CC MS4 FLR04E045	N/A	Total Project Reductions	N/A	N/A	N/A	191.9	442.2
CC MS4 FLR04E045	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

City of Green Cove Springs Aggregate.....1,929.2
FL0635618

Facility Name	Project Number	Description	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Green Cove Total (Aggregate)	N/A	Total Reduction Required	N/A	1,935.8	4,258.8
GCS – Harbor Road FL0020915, South FL0030210	GCS-3	Operational changes	Completed – December 2011	2,486	5,469.2
Green Cove Total (Aggregate)	N/A	Total Project Reductions	N/A	2,486	5,469.2
Green Cove Total (Aggregate)	N/A	Credit/(Deficit)	N/A	550.2	1,210.4

City of Green Cove Springs MS4.....1,043.7
FLR04E103

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Green Cove MS4	N/A	Total Reduction Required	N/A	N/A	N/A	52	114
GCS MS4 FLR04E103	GCS-3	SW Drainage System Improvements	Wet Detention (1”, 21 day)	54.6	Completed	15	33
GCS MS4 FLR04E103	GCS-4	Cypress Baffle Box	Baffle Box	125	Completed	6	13
GCS MS4 FLR04E103	GCS-5	Green Cove Springs Industrial Park	Wet Detention (2.5”, 21 day)	91.6	Completed	31	68
GCS MS4 FLR04E103	GCS-6	Vystar Credit Union	Dry Detention	1.8	Completed	0	0
Green Cove MS4	N/A	Total Project Reductions	N/A	N/A	N/A	52	114
Green Cove MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

City of Palatka WWTF.....5,954.7
FL0040061

Facility Name	Project Number	Description	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Palatka WWTF	N/A	Total Reduction Required	N/A	4,000.3	8,800.7
Palatka WWTF FL0040061	PAL-1	Reuse to golf course	Completed	1,730	3,806
Palatka WWTF FL0040061	PAL-2	Reuse to ball fields	Completed	691	1,520
Palatka WWTF FL0040061	PAL-3	Reuse to cemeteries	Completed	1,205	2,651
Palatka WWTF FL0040061	PAL-4	Reuse at WTP	Completed	1,555	3,421
Palatka WWTF FL0040061	PAL-5	Zero discharge	06/30/2012	4,774	10,503
Palatka WWTF	N/A	Total Project Reductions	N/A	9,955	21,901
Palatka WWTF	N/A	Credit/(Deficit)	N/A	5,954.7	13,100.3
Palatka WWTF Total			**Implementation Schedule**		
Zero Discharge a. Preliminary Plans Complete			01/31/2008		
b. Final Plans and Specifications Complete			Completed - 10/31/2008		
c. Begin Construction			Completed - 11/01/2008		
d. End Construction			06/30/2012		
e. Begin Operation			06/30/2012		
f. Operational Level Attained			06/30/2012		

Georgia-Pacific.....33,182
FL0002763

Facility Name	Project Number	Description	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Georgia-Pacific	N/A	Total Reduction Required	N/A	30,693	67,525
Georgia-Pacific	GP-1	Complete Process Improvements	Completed	30,693	67,525
Georgia-Pacific	N/A	Total Project Reductions	N/A	30,693	67,525
Georgia-Pacific	N/A	Credit/(Deficit)	N/A	0	0

Name of Facility ..... ***Load Allocation (kg/yr)***

City of Palatka Non-MS4 ..... ***1,507.8***

Facility Name	Description	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Palatka Non-MS4	Total Reduction Required	0	0
Palatka Non-MS4	Total Project Reductions	0	0
Palatka Non-MS4	Credit/(Deficit)	0	0

Clay County Non-MS4 ..... ***499.4***

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
CC Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	267.9	589.4
CC Non-MS4	CC-4	Education Program	N/A	N/A	Ongoing	30.7	67.5
CC Non-MS4	CC-5	FDOT construction of 7 new wet ponds on SR15 from Putnam County line to SR16	Wet pond (1", 14 days)	281	Completed	89.5	196.9
CC Non-MS4	CC-6	Trade with CCUA	N/A	N/A	Completed	147.7	324.9
CC Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	267.9	589.4
CC Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

Hastings Non-MS4 ..... ***49.3***

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Hastings Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	43.6	95.9
Hastings Non-MS4	HAS-1	WWTP Chemical Feed Systems	N/A	N/A	Completed	249.1	548.0
Hastings Non-MS4	HAS-2	FDOT 4 laning of SR 207	Wet Pond (1", 14 days)	12	Completed	3.6	7.9
Hastings Non-MS4	HAS-3	FDOT 4 laning of SR207 from CR305 to Cypress Link Blvd	Wet Pond (1", 14 days)	106	Completed	33.6	73.9
Hastings Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	286.3	629.9
Hastings Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	242.7	533.9

Putnam County Non-MS4.....3,964.9

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Putnam Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	2,025.5	4,456.1
Putnam Non-MS4	PUT-1	Trade with Putnam Lanes WWTF	N/A	N/A	Completed	12.5	27.5
Putnam Non-MS4	PUT-2	Trade with Hiawatha WWTF	N/A	N/A	08/31/2014	49.8	109.6
Putnam Non-MS4	PUT-3	Septic Tank Phase-Out	N/A	N/A	12/31/2014	298.0	656.0
Putnam Non-MS4	PUT-4	Edgefield RST O&M Value	N/A	N/A	Completed	269.1	592.0
Putnam Non-MS4	PUT-5	FDOT construction of 7 new wet ponds on SR15 from Clay County line to south of Gordon Wilkins Rd	Wet pond (1", 14 days)	1,181	Completed	376.8	829.0
Putnam Non-MS4	PUT-6	Algal Initiative	N/A	N/A	10/31/2017	824.6	1,814.0
Putnam Non-MS4	PUT-8	Education and Outreach	Education	N/A	Ongoing	194.7	428.0
Putnam Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	2,025.5	4,456.1
Putnam Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

Putnam County Non-MS4 Total	**Implementation Schedule**
Trade with Hiawatha WWTF a. Start Date of Project	04/01/2008
b. Completion Date - Design	Completed - 02/01/2009
c. Completion Date - Construction	The line is constructed but need the East Putnam County Regional WWTF to be completed for regional tie in. Estimated completion is 8/31/2014.
d. Completion Date – Completion of Project	08/31/2014
Septic Tank Phase-Out US 17 – tie into EPCR WWTF a. Start Date of Project	01/01/2009
b. Completion Date - Design	Completed - 02/02/2009
c. Completion Date - Construction	12/30/2014
d. Completion Date – Completion of Project	12/30/2014
Algal Initiative a. Start Date of Project	10/01/2008
b. Completion Date – Project Assessment	Completed - 10/31/2010
c. Completion Date – Project Fundraising	10/31/2012
d. Completion Date – Construction	10/31/2017

St. Johns County Non-MS4.....3,296.6

Facility Name	Project Number	Description	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
SJC Non-MS4	N/A	Total Reduction Required	N/A	430.8	947.8
SJC Non-MS4	SJC-3	Stormwater Education	Ongoing	186.4	410.1
SJC Non-MS4	SJC-4	Low-impact development	Ongoing	Not quantified	0
SJC Non-MS4	SJC-5	Slow release fertilizer ordinance	Completed	Not quantified	0
SJC Non-MS4	SJC-6	Deep Creek RST O&M value	Completed	255.9	563.0
SJC Non-MS4	SJC-7	Purchase Hastings WWTF reduction credits	Completed	198.2	436.0
SJC Non-MS4	N/A	Total Project Reductions	N/A	640.5	1,409.1
SJC Non-MS4	N/A	Credit/(Deficit)	N/A	209.7	461.3

Welaka Non-MS4 .....90.4

Facility Name	Project Number	Description	Deadline	Project TP Reduction (kg/yr)	Project TP Reduction (lbs/yr)
Welaka Non-MS4	N/A	Total Reduction Required	N/A	81.6	179.5
Welaka Non-MS4	WEL-1	Septic Tank Phase-Out	Completed	153.0	336.6
Welaka Non-MS4	N/A	Total Project Reductions	N/A	153.0	336.6
Welaka Non-MS4	N/A	Credit/(Deficit)	N/A	71.4	157.1

POINT SOURCE – FRESHWATER NITROGEN ALLOCATION

Name of Facility | ***Wasteload Allocation (kg/yr)***

Clay County MS4 FLR04E045 2,418

FACILITY NAME	PROJECT NUMBER	DESCRIPTION	TYPE(S) OF BMP(S) IMPLEMENTED	ACRES TREATED	DEADLINE	PROJECT TN REDUCTION (KG/YR)	PROJECT TN REDUCTION (LBS/YR)
CC MS4 FLR04E045	N/A	Total Reduction Required	N/A	N/A	N/A	352	774
CC MS4 FLR04E045	CC-1	Education Program	N/A	N/A	Ongoing	111	244
CC MS4 FLR04E045	CC-2	FDOT SR 21 Widening from SR 215 to CR 220	Dry retention (1")	12	Completed	5	11
CC MS4 FLR04E045	CC-7	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	236	519
CC MS4 FLR04E045	N/A	Total Project Reductions	N/A	N/A	N/A	352	774
CC MS4 FLR04E045	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

City of Green Cove Springs Aggregate.....7,752.5
FL0635618

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Green Cove Total (Aggregate)	N/A	Total Reduction Required	N/A	6,847.5	15,064.5
GCS – Harbor Road FL0020915, South FL0030210	GCS-3	Operational changes	Completed – December 2011	9,641	21,210.2
Green Cove Total (Aggregate)	N/A	Total Project Reductions	N/A	9,641	21,210.2
Green Cove Total (Aggregate)	N/A	Credit/(Deficit)	N/A	2,793.5	6,145.7

City of Green Cove Springs MS4.....6,266.5
FLR04E103

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Green Cove MS4	N/A	Total Reduction Required	N/A	N/A	N/A	694.5	1,528
GCS MS4 FLR04E103	GCS-3	SW Drainage System Improvements	Wet Detention (1", 21 day)	54.6	Completed	28	62
GCS MS4 FLR04E103	GCS-4	Cypress Baffle Box	Baffle Box	125	Completed	15	33
GCS MS4 FLR04E103	GCS-5	Green Cove Springs Industrial Park	Wet Detention (2.5", 21 day)	91.6	Completed	58	128
GCS MS4 FLR04E103	GCS-6	Vystar Credit Union	Dry Detention	1.8	Completed	0.5	1
GCS MS4 FLR04E103	GCS-7	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	593	1,305
Green Cove MS4	N/A	Total Project Reductions	N/A	N/A	N/A	694.5	1,528
Green Cove MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

City of Palatka WWTF.....38,845
FL0040061

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Palatka WWTF	N/A	Total Reduction Required	N/A	22,044	48,497
Palatka WWTF FL0040061	PAL-1	Reuse to golf course	Completed	13,000	28,600
Palatka WWTF FL0040061	PAL-2	Reuse to ball fields	Completed	5,227	11,499
Palatka WWTF FL0040061	PAL-3	Reuse to cemeteries	Completed	9,091	20,000
Palatka WWTF FL0040061	PAL-4	Reuse at WTP	Completed	11,727	25,799
Palatka WWTF FL0040061	PAL-5	Zero discharge	06/30/2012	21,844	48,057
Palatka WWTF	N/A	Total Project Reductions	N/A	60,889	133,956
Palatka WWTF	N/A	Credit/(Deficit)	N/A	38,845	85,459
Palatka WWTF Total			**Implementation Schedule**		
Zero Discharge a. Preliminary Plans Complete			Completed - 01/31/2008		
b. Final Plans and Specifications Complete			Completed - 10/31/2008		
c. Begin Construction			Completed - 11/01/2008		
d. End Construction			06/30/2012		
e. Begin Operation			06/30/2012		
f. Operational Level Attained			06/30/2012		

Georgia-Pacific WWTF 165,909
FL0002763

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Georgia-Pacific	N/A	Total Reduction Required	N/A	92,246	202,941
Georgia-Pacific	GP-1	Complete Process Improvements	Completed	92,246	202,941
Georgia-Pacific	N/A	Total Project Reductions	N/A	92,246	202,941
Georgia-Pacific	N/A	Credit/(Deficit)	N/A	0	0

Seminole Electric.....14,732
FL0036498

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Seminole Electric Total	N/A	Total Reduction Required	N/A	6,314	13,891
Seminole Electric FL0036498	SE-1	SCR Upgrade	Completed	6,314	13,891
Seminole Electric Total	N/A	Total Project Reductions	N/A	6,314	13,891
Seminole Electric Total	N/A	Credit/(Deficit)	N/A	0	0

Name of Facility ***Load Allocation (kg/yr)***

City of Palatka Non-MS4 8,858

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Palatka Non-MS4	N/A	Total Reduction Required	N/A	825	1,815
Palatka Non-MS4	PAL-6	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	825	1,815
Palatka Non-MS4	N/A	Total Project Reductions	N/A	825	1,815
Palatka Non-MS4	N/A	Credit/(Deficit)	N/A	0	0

Clay County Non-MS4 4,659

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
CC Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	920	2,024
CC Non-MS4	CC-3	Education Program	N/A	N/A	Ongoing	223	491
CC Non-MS4	CC-4	FDOT Construction of 7 new Wet Ponds on SR 15 from Putnam County Line to SR 16	Wet pond (1”, 14 days)	281	Completed	172	378
CC Non-MS4	CC-8	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	525	1,155
CC Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	920	2,024
CC Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

Hastings Non-MS4.....448

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Hastings Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	177	389
Hastings Non-MS4	HAS-1	WWTP Chemical Feed Systems	N/A	N/A	Completed	176	388
Hastings Non-MS4	HAS-2	FDOT 4 laning of SR 207	Wet Pond (1", 14 days)	12	Completed	7	15
Hastings Non-MS4	HAS-3	FDOT 4 laning of SR207 from CR305 to Cypress Link Blvd	Wet Pond (1", 14 days)	106	Completed	65	143
Hastings Non-MS4	HAS-4	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	54	119
Hastings Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	302	664
Hastings Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	125	275

Putnam County Non-MS4.....33,976

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Putnam Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	9,639	21,206
Putnam Non-MS4	PUT-1	Trade with Putnam Lanes WWTF	N/A	N/A	Completed	50	110
Putnam Non-MS4	PUT-2	Trade with Hiawatha WWTF	N/A	N/A	08/31/2014	150	330
Putnam Non-MS4	PUT-3	Septic Tank Phase-Out	N/A	N/A	12/31/2014	1,097	2,414
Putnam Non-MS4	PUT-4	Edgefield RST O&M Value	N/A	N/A	Completed	594	1,307
Putnam Non-MS4	PUT-5	FDOT construction of 7 new wet ponds on SR15 from Clay County line to south of Gordon Wilkins Rd	Wet pond (1", 14 days)	1,181	Completed	723	1,591
Putnam Non-MS4	PUT-6	Algal Initiative	N/A	N/A	10/31/2017	1,551	3,412
Putnam Non-MS4	PUT-7	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	4,056	8,923
Putnam Non-MS4	PUT-8	Education and outreach	Education	N/A	Ongoing	1,418	3,119
Putnam Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	9,639	21,206
Putnam Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

Putnam County Non-MS4 Total	**Implementation Schedule**
Trade with Hiawatha WWTF a. Start Date of Project	04/01/2008
b. Completion Date - Design	02/01/2009 – Completed
c. Completion Date - Construction	08/31/2014
d. Completion Date – Completion of Project	08/31/2014
Septic Tank Phase-Out US 17 – tie into EPCR WWTF a. Start Date of Project	01/01/2009
b. Completion Date - Design	Completed - 02/02/2009
c. Completion Date - Construction	12/31/2014
d. Completion Date – Completion of Project	12/31/2014
Algal Initiative a. Start Date of Project	10/01/2008
b. Completion Date – Project Assessment	Completed - 10/31/2010
c. Completion Date – Project Fundraising	10/31/2012
d. Completion Date – Construction	10/31/2017

St. Johns County Non-MS4.....25,340

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
SJC Non-MS4	N/A	Total Required Reduction	N/A	1,850	4,070
SJC Non-MS4	SJC-3	Stormwater Education	Ongoing	1,078	2,372
SJC Non-MS4	SJC-4	Low-impact development	Ongoing	Not quantified	Not quantified
SJC Non-MS4	SJC-5	Slow release fertilizer ordinance	Completed	Not quantified	Not quantified
SJC Non-MS4	SJC-6	Deep Creek RST O&M value	Completed	313	689
SJC Non-MS4	SJC-8	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	1,937	4,261
SJC Non-MS4	SJC-27	Application of freshwater non-MS4 TN credits to the marine non-MS4 section	Completed	-1,391	-3,060
SJC Non-MS4	N/A	Total Project Reductions	N/A	1,937	4,261
SJC Non-MS4	N/A	Credit/(Deficit)	N/A	87	191

Welaka Non-MS4 838

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Welaka Non-MS4	N/A	Total Reduction Required	N/A	337.0	741.4
Welaka Non-MS4	WEL-1	Septic Tank Phase-Out	Completed	490.0	1,078.0
Welaka Non-MS4	WEL-2	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	100.0	220.0
Welaka Non-MS4	N/A	Total Project Reductions	N/A	590.0	1,298.0
Welaka Non-MS4	N/A	Credit/(Deficit)	N/A	253.0	556.6

POINT SOURCE – MARINE NITROGEN ALLOCATION

Name of Facility ***Wasteload Allocation (kg/yr)***

Anheuser Busch – Main Street ***12,418***
FL0041530

FACILITY NAME	PROJECT NUMBER	DESCRIPTION	DEADLINE	PROJECT TN REDUCTION (KG/YR)	PROJECT TN REDUCTION (LBS/YR)
Anheuser Busch – Main Street	N/A	Total Reduction Required	N/A	11,981	26,358
Anheuser Busch – Main Street	ANB-1	Complete Process Improvements	Completed	11,981	26,358
Anheuser Busch – Main Street	N/A	Total Project Reductions	N/A	11,981	26,358
Anheuser Busch – Main Street	N/A	Credit/(Deficit)	N/A	0	0

City of Atlantic Beach Aggregate 21,188
FL0626881

FACILITY NAME	PROJECT NUMBER	DESCRIPTION	DEADLINE	PROJECT TN REDUCTION (KG/YR)	PROJECT TN REDUCTION (LBS/YR)
Atlantic Bch Total (Aggregate)	N/A	Total Reduction Required	N/A	28,087	61,791
Buccaneer WWTP FL0023248	AB-1	Complete Upgrade to Sequencing Batch Reactor	Completed	9,985	21,967
Main WWTP FL0038776	AB-2	Upgrade to Biological Nutrient Removal and Flow Transfer from Buccaneer WWTF	10/01/2013	22,119	48,661
Atlantic Bch Total (Aggregate)	N/A	Total Project Reductions	N/A	32,104	70,628
Atlantic Bch Total (Aggregate)	N/A	Credit/(Deficit)	N/A	4,017	8,837
Atlantic Beach Total (Aggregate)			**Implementation Schedule**		
Main WWTF Nutrient Removal Phase a. Preliminary Plans Complete			Completed - 03/30/2009		
b. Final Plans and Specifications Complete			Completed - 10/01/2010		
c. Begin Construction (Construction Contracts Awarded)			Completed - 12/13/2010		
d. End Construction			12/31/2012		
e. Begin Operation of Main WWTF Upgrade			03/31/2013		
f. Abandon Buccaneer WWTF			07/31/2013		
g. Operational Level Attained			10/01/2013		

City of Atlantic Beach MS4 1,651
FLS000012

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Atlantic Bch MS4	N/A	Total Reduction Required	N/A	N/A	N/A	823	1,811
Atlantic Bch MS4 FLS000012	AB-4	Core City Capital Improvement Project: stormwater, sanitary sewer and water systems upgrades	Second Generation Baffle Box	180	Completed	659	1,450
Atlantic Bch MS4 FLS000012	AB-5	Hopkins Creek Stormwater Treatment System	Wet Detention	53	Completed	12	26
Atlantic Bch MS4 FLS000012	AB-6	FDOT Widening of SR 10 (Atlantic Blvd) roadway & bridge upgrade	Wet Pond (1", 14 days)	152	Completed	50	110
Atlantic Bch MS4 FLS000012	AB-7	FDOT Atlantic Blvd and Mayport Rd Interchange	Wet Pond (1", 14 days)	50	Completed	18	40
Atlantic Bch MS4 FLS000012	AB-8	FDOT Wonderwood Connector Segment 1 – Girvin to Sandcastle	Wet Pond (1", 14 days)	70	Completed	6	13
Atlantic Bch MS4 FLS000012	AB-9	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	78	172
Atlantic Bch MS4	N/A	Total Project Reductions	N/A	N/A	N/A	823	1,811
Atlantic Bch MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

City of Jacksonville/Florida Department of Transportation MS4 FLS000012 96,016

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	N/A	Total Reduction Required	N/A	N/A	N/A	147,422	324,328
COJ MS4 FLS000012	COJ-1	Big Fishweir Creek-Murray Hill Phase I-Drainage improvements	Second generation baffle box	219	Completed	80	176
COJ MS4 FLS000012	COJ-2	Sixmile Creek-West 1st Street/Melson Avenue-Drainage improvements	Wet detention	254	Completed	470	1,034
COJ MS4 FLS000012	COJ-3	McCoys Creek Pond A & B	Wet detention	680	Completed	750	1,650
COJ MS4 FLS000012	COJ-4	McCoys Creek Pond F	Wet detention	11	Completed	10	22
COJ MS4 FLS000012	COJ-5	Riverside Ave-baffle boxes	Second generation baffle box	70	Completed	40	88
COJ MS4 FLS000012	COJ-6	St Augustine Rd (Emerson to US 1)-Regional pond facilities	Wet detention	167	Completed	200	440
COJ MS4 FLS000012	COJ-7	Powers Avenue/Old Kings Rd-Regional pond facilities	Wet detention	520	Completed	620	1,364
COJ MS4 FLS000012	COJ-8	Fouraker Rd- from Old Middleburg Rd. to Normandy Blvd. regional pond facilities	Wet detention	32	Completed	40	88
COJ MS4 FLS000012	COJ-9	Greenland Road-from St. Augustine Rd to Coastal Lane- detention pond facilities	Wet detention	33	Completed	30	66
COJ MS4 FLS000012	COJ-10	Barnes Rd-from University Blvd. to Parental Home Rd.- detention pond facilities	Wet detention	97	Completed	20	44
COJ MS4 FLS000012	COJ-11	Emerson St.-from Emerson St. Expwy. to Spring Glenn Rd - detention pond facility	Wet detention	17	Completed	20	44
COJ MS4 FLS000012	COJ-12	Bowden Rd-from U.S.# 1 to Salisbury Rd. - detention pond facilities	Wet detention	98	Completed	130	286
COJ MS4 FLS000012	COJ-13	Parental Home Rd Phase I (Bowden Rd from Salisbury Rd to Dean Rd) - detention pond facility	Wet detention	28	Completed	20	44
COJ MS4 FLS000012	COJ-14	Parental Home Rd Phase II (Beach Blvd to Ibach Rd) detention pond facility	Wet detention	82	Completed	10	22
COJ MS4 FLS000012	COJ-15	Lorretto Rd from S.R. 13 to Old St. Augustine Road - detention pond facilities	Wet detention	55	Completed	50	110
COJ MS4 FLS000012	COJ-16	Belford Rd-Pottsburg Ck. to Touchton Rd. detention pond facilities	Wet detention	20	Completed	10	22
COJ MS4 FLS000012	COJ-17	Royal Terrace phases A+B+C+D+E+1+2+3+4 - master pond facility	Wet detention	332	Completed	410	902

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-18	University Pointe regional pond facility	Wet detention	102	Completed	150	330
COJ MS4 FLS000012	COJ-19	Cleveland Road-Phase I-B wet detention pond	Wet detention	269	Completed	150	330
COJ MS4 FLS000012	COJ-20	Hogan Creek	Wet detention	48	Completed	50	110
COJ MS4 FLS000012	COJ-21	McCoy Creek Pond D	Wet detention	27	Completed	30	66
COJ MS4 FLS000012	COJ-22	Upper Deer Creek Regional Stormwater Facility	Wet detention	537	Completed	840	1,848
COJ MS4 FLS000012	COJ-23	Hugh Edwards Canal	Wet detention	329	Completed	760	1,672
COJ MS4 FLS000012	COJ-24	Cedar River Outfall Improvements	Wet detention	1,452	Completed	530	1,166
COJ MS4 FLS000012	COJ-25	Sandalwood Canal	Wet detention	3,118	Completed	880	1,936
COJ MS4 FLS000012	COJ-26	Moncrief Creek	Wet detention	619	Completed	650	1,430
COJ MS4 FLS000012	COJ-27	Lincoln Villas-East Side-regional pond facility	Wet detention	185	Completed	100	220
COJ MS4 FLS000012	COJ-28	Old Middleburg Rd from Wilson Blvd to 103rd St-regional pond facilities	Wet detention	192	Completed	210	462
COJ MS4 FLS000012	COJ-29	Lakeshore Woodcrest Drainage Improvement	Wet detention	296	Completed	440	968
COJ MS4 FLS000012	COJ-30	Townsend Rd drainage improvements	Wet detention	151	Completed	60	132
COJ MS4 FLS000012	COJ-31	Lenox Ave (Highway to McDuff)	Wet detention	108	Completed	180	396
COJ MS4 FLS000012	COJ-32	Wesconnett Blvd (Blanding to Blanding)	Wet detention	396	Completed	40	88
COJ MS4 FLS000012	COJ-33	Durkeeville West	Wet detention	106	Completed	160	352
COJ MS4 FLS000012	COJ-34	Huffman Boulevard	Wet detention	16	Completed	20	44
COJ MS4 FLS000012	COJ-35	Spring Park Rd/Emerson to University	Wet detention	36	Completed	50	110
COJ MS4 FLS000012	COJ-36	Barnes Rd/Kennerly to University	Wet detention	418	Completed	720	1,584
COJ MS4 FLS000012	COJ-37	Pritchard Rd (Jones to I-295)	Wet detention	116	Completed	0	0

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-38	Lenox, Lane to Normandy	Wet detention	47	Completed	30	66
COJ MS4 FLS000012	COJ-39	Cahoon Rd, Phase I	Wet detention	23	Completed	20	44
COJ MS4 FLS000012	COJ-40	Pulaski Road (Eastport Dr to New Berlin Rd)	Wet detention	19	Completed	20	44
COJ MS4 FLS000012	COJ-41	Lamoya Roadway Project	Wet detention	17	Completed	0	0
COJ MS4 FLS000012	COJ-42	LSJR upstream of Trout River	Wet detention[1]	3,141	12/31/2023	2,500	5,500
COJ MS4 FLS000012	COJ-43	Ortega River	Wet detention[1]	7,169	12/31/2023	4,600	10,120
COJ MS4 FLS000012	COJ-44	Arlington River	Wet detention[1]	3,352	12/31/2023	2,500	5,500
COJ MS4 FLS000012	COJ-45	LSJR Downstream of Trout River	Wet detention[1]	514	12/31/2023	200	440
COJ MS4 FLS000012	COJ-46	Intracoastal Waterway	Wet detention[1]	7,646	12/31/2023	4,600	10,120
COJ MS4 FLS000012	COJ-47	Julington Creek	Wet detention[1]	4,404	12/31/2023	2,600	5,720
COJ MS4 FLS000012	COJ-48	Trout River	Wet detention[1]	5,329	12/31/2023	2,100	4,620
COJ MS4 FLS000012	COJ-49	Broward River	Wet detention[1]	837	12/31/2023	700	1,540
COJ MS4 FLS000012	COJ-50	Dunn Creek	Wet detention[1]	1,300	12/31/2023	600	1,320
COJ MS4 FLS000012	COJ-51	Public Education Activities	N/A	N/A	Ongoing	9,859	21,690
COJ MS4 FLS000012	COJ-52	Septic Tank Phase-Out Projects[2]	N/A	N/A	12/31/2023[3]	103,619	227,962
COJ MS4 FLS000012	COJ-53	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	6,926	15,237
COJ MS4 FLS000012	N/A	City of Jacksonville Projects Subtotal	N/A	N/A	N/A	149,804	329,569
COJ MS4 FLS000012	COJ-54	FDOT Urban Office Reconstruction	Dry retention w/ underdrain	7	Completed	9	20
COJ MS4 FLS000012	COJ-55	FDOT Fort George Inlet Bridge	Wet pond (1”, 14 days)	18	Completed	6	13
COJ MS4 FLS000012	COJ-56	FDOT Widening of Riverside Area	Wet pond (1”, 14 days)	14	Completed	5	11

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-57	FDOT Widening of Merrill Road between Wompi Drive and Milcoe road	Wet pond (1", 14 days)	58	Completed	21	46
COJ MS4 FLS000012	COJ-58	FDOT Widening of Merrill Road between 9A and Wompi Drive	Wet pond (1", 14 days)	69	Completed	25	55
COJ MS4 FLS000012	COJ-59	FDOT Widening of SR 13 to six lane divided highway	Wet pond (1", 14 days)	174	Completed	63	139
COJ MS4 FLS000012	COJ-60	FDOT Bch Blvd Widening from ICWW to E. of Penman	Wet pond (1", 14 days)	25	Completed	9	20
COJ MS4 FLS000012	COJ-61	FDOT I-295 and SR 21 (Blanding) interchange upgrade	Wet pond (1", 14 days)	42	Completed	15	33
COJ MS4 FLS000012	COJ-62	FDOT I-295 and SR 17 (Blanding) interchange expansion	Wet pond (1", 14 days)	96	Completed	35	77
COJ MS4 FLS000012	COJ-63	FDOT JTB/Belfort Road Interchange	Wet pond (1", 14 days)	155	Completed	56	123
COJ MS4 FLS000012	COJ-64	FDOT Pine Avenue Sidewalk	Dry retention (1")	7	Completed	9	20
COJ MS4 FLS000012	COJ-65	FDOT 9A from Baymeadows Road to I-95	Wet pond (1", 14 days)	550	Completed	200	440
COJ MS4 FLS000012	COJ-66	FDOT Widening of I-95 from St. Johns County line to 9A/I-295	Wet pond (1", 14 days)	175	Completed	64	141
COJ MS4 FLS000012	COJ-67	FDOT Widening of I-95 from I-295 to south of JTB	Wet pond (1", 14 days)	441	Completed	160	352
COJ MS4 FLS000012	COJ-68	FDOT Widening of SR 10 (Atlantic Blvd from St. Johns Bluff to San Pablo)	Wet pond (1", 14 days)	1096	Completed	397	873
COJ MS4 FLS000012	COJ-69	FDOT Widening of Southside Blvd	Dry retention	146	Completed	53	117
COJ MS4 FLS000012	COJ-70	FDOT New JTB/9A Interchange	Detention/retention (1")	339	Completed	442	972
COJ MS4 FLS000012	COJ-71	FDOT Southside (SR 115) frontage road	Wet pond (1", 14 days)	8	Completed	3	7
COJ MS4 FLS000012	COJ-72	FDOT I-95 Improvement - from I-295 to Nassau County Line South Project	Wet pond (1", 14 days)	291	Completed	105	231
COJ MS4 FLS000012	COJ-73	FDOT I-95 Improvement - S. of Clarke rd to I-295	Wet pond (1", 14 days)	94	Completed	34	75
COJ MS4 FLS000012	COJ-74	FDOT 9A Improvement - South Project	Wet pond (1", 14 days)	176	Completed	64	141
COJ MS4 FLS000012	COJ-75	FDOT 9A from South of Atlantic to Beach Blvd	Wet pond (1", 14 days)	124	Completed	45	99
COJ MS4 FLS000012	COJ-76	FDOT I-295/I-95/9A Interchange	Wet pond (1", 14 days)	580	Completed	200	440

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-77	FDOT Branan Field Chafee roadway project	Wet pond (1", 14 days)	187	Completed	115	253
COJ MS4 FLS000012	COJ-78	FDOT Wonderwood Connector Segment 1 project Girvin to Sandcastle	Wet pond (1", 14 days)	70	Completed	19	42
COJ MS4 FLS000012	COJ-79	FDOT JIA South Access Connector project	Dry detention	63	Completed	82	180
COJ MS4 FLS000012	COJ-80	FDOT I-95 Widening from Lem Turner to I-295 project	Wet pond (1", 14 days)	117	Completed	42	92
COJ MS4 FLS000012	COJ-81	FDOT 4 laning of SR 13	Wet pond (1", 14 days)	105	Completed	38	84
COJ MS4 FLS000012	COJ-82	FDOT SR21 Widening from S. of Cedar River to E. of Cassat	Wet pond (1", 14 days)	19	Completed	7	15
COJ MS4 FLS000012	COJ-83	FDOT Arlington Expressway Project	Unknown	27	Completed	10	22
COJ MS4 FLS000012	COJ-84	FDOT Merrill Rd Southside Blvd Interchange Project	Wet pond (1", 14 days)	15	Completed	5	11
COJ MS4 FLS000012	COJ-85	FDOT Baymeadows Project from East of US 1 to SR 13	Wet pond (1", 14 days)	35	Completed	9	20
COJ MS4 FLS000012	COJ-86	FDOT SR 115/8th St Project	Wet pond (1", 14 days)	31	Completed	11	24
COJ MS4 FLS000012	COJ-87	FDOT SR 115/8th St Project	Wet pond (1", 14 days)	4	Completed	1	2
COJ MS4 FLS000012	COJ-88	FDOT JTB from I-95 to Gate Parkway Project	Wet pond (1", 14 days)	58	Completed	21	46
COJ MS4 FLS000012	COJ-89	FDOT I-295 from West of Duval to Biscayne Blvd	Wet pond (1", 14 days)	20	Completed	7	15
COJ MS4 FLS000012	COJ-90	FDOT Beaver Street (US 90) Project from Stockton to Tyler	Wet pond (1", 14 days)	7	Completed	3	7
COJ MS4 FLS000012	COJ-91	FDOT 9A from Baymeadows to JTB Project	Wet pond (1", 14 days)	195	Completed	71	156
COJ MS4 FLS000012	COJ-92	FDOT JTB/A1A Interchange Project	Wet pond (1", 14 days)	20	Completed	3	7
COJ MS4 FLS000012	COJ-93	FDOT Southside Blvd/I-95 Connector	Dry retention (1")	76	Completed	99	218
COJ MS4 FLS000012	COJ-94	FDOT Beach Blvd improvement from west of FCCJ to East of San Pablo	Wet pond (1", 14 days)	165	Completed - 08/31/2011	60	132
COJ MS4 FLS000012	COJ-95	FDOT Widening of SR 13	Unknown	227	Completed	82	180
COJ MS4 FLS000012	COJ-96	FDOT Branan Field Chafee roadway project (Argyle Forrest to 103rd)	Wet pond (1", 14 days)	112	Completed	40	88

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-97	FDOT Branan Field Chafee roadway project (103rd to I-10)	Wet pond (1", 14 days)	150	Completed	55	121
COJ MS4 FLS000012	COJ-98	FDOT Southside (SR115) & Bch Blvd (SR202) interchange & rd widening	Wet pond (1", 14 days)	33	Completed	12	26
COJ MS4 FLS000012	COJ-99	FDOT Wonderwood Connector Segment 2	Wet pond (1", 14 days)	58	Completed	21	46
COJ MS4 FLS000012	COJ-100	FDOT JTB/Kernan project	Wet pond (1", 14 days)	65	Completed	24	53
COJ MS4 FLS000012	COJ-101	FDOT I-95 from JTB to Emerson	Dry retention (1")	105	Completed	137	301
COJ MS4 FLS000012	COJ-102	FDOT Heckscher Drive / 9a Interchange-1 DRS	Dry Retention (1")	103	Completed	89	196
COJ MS4 FLS000012	COJ-103	FDOT Heckscher Drive / 9a Interchange-2 WDS	Wet pond (1", 14 days)	68	Completed	25	55
COJ MS4 FLS000012	COJ-104	FDOT Wonderwood Segment 3 Project	Wet pond (1", 14 days)	69	Completed	25	55
COJ MS4 FLS000012	COJ-105	FDOT Collins Rd Collector Distributor	Wet pond (1", 14 days)	142	Completed	51	112
COJ MS4 FLS000012	COJ-106	FDOT JTB / I-95 Ramp project (40-031-18233-6)	Wet pond (1", 14 days)	54	Completed	20	44
COJ MS4 FLS000012	COJ-107	FDOT SR 5 US 1 Project (209516-3-52-01)	Wet pond (1", 14 days)	27	Completed	10	22
COJ MS4 FLS000012	COJ-108	FDOT 4 laning of SR 207	Wet Pond (1", 14 days)	12	Completed	7	15
COJ MS4 FLS000012	COJ-109	FDOT 4 laning of SR207 from CR305 to Cypress Link Blvd	Wet Pond (1", 14 days)	106	Completed	65	143
COJ MS4 FLS000012	COJ-110	FDOT 4 laning of SR207 from SR15 (US 17) to CR207	Wet Pond (1", 14 days)	538	Completed	330	726
COJ MS4 FLS000012	COJ-111	FDOT Six laning of I-95 from Flagler County Line to SR 16	Wet pond (1", 14 days)	800	Completed	255	561
COJ MS4 FLS000012	COJ-112	FDOT I-95 Rest Area Reconstruction	Wet pond (1", 14 days)	52	Completed	17	37
COJ MS4 FLS000012	COJ-113	FDOT Six laning of I-95 from World Golf Village to Duval County line	Wet pond (1", 14 days)	537	Completed	237	521
COJ MS4 FLS000012	COJ-114	FDOT Widening of SR 16	Swale treatment system	68	Completed	22	48
COJ MS4 FLS000012	COJ-115	FDOT SR 207 from I-95 to SR 312	Wet pond (1", 14 days)	102	Completed	33	73
COJ MS4 FLS000012	COJ-116	FDOT SR 207 from SR 312 to US 1	Wet pond (1", 14 days)	536	Completed	171	376

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
COJ MS4 FLS000012	COJ-117	FDOT Stormwater Education Efforts in St. Johns County	N/A	N/A	Ongoing	286	629
COJ MS4 FLS000012	COJ-118	FDOT Education Efforts in City of Jacksonville	N/A	N/A	Ongoing	974	2,143
COJ MS4 FLS000012	COJ-119	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	769	1,692
COJ MS4 FLS000012	COJ-120	FDOT Future Projects and/or Trade (Fertilizer Cessation)	N/A	N/A	Completed - 2010	18,445	40,663
COJ MS4 FLS000012	N/A	FDOT Projects Subtotal	N/A	N/A	N/A	24,825	54,697
COJ MS4 FLS000012	N/A	Total Project Reductions	N/A	N/A	N/A	174,629	384,266
COJ MS4 FLS000012	N/A	Credit/(Deficit)	N/A	N/A	N/A	27,207	59,855

City of Jacksonville MS4 Total	**Implementation Schedule**
Future COJ Stormwater Projects a. Start Date of Project	01/01/2009
b. Completion Date – Attain 50% of required reduction	07/31/2015
c. Completion Date – Completion of Project	12/31/2023
Septic Tank Phase-Out Projects a. Start Date of Project	10/31/2008
b. Completion Date - Phase-out 50% of Septic Tanks	07/31/2015
c. Completion Date – Completion of Project	12/31/2023

[1] The estimated reductions are based on the treatment expected for wet detention ponds. The City has committed to provide a detailed implementation plan and schedule for the stormwater projects by 2010 as part of the Master Stormwater Management Plan update. In addition, the City has committed to accomplish, at a minimum, a 50% implementation of the future stormwater projects by the mid-point of the 15-year timeline shown.

[2] Significant reductions in nitrogen loading from septic tank phase-out projects are included. The City commits to re-evaluating the load reductions associated with septic tank phase-out based on the Florida State University (FSU) septic tank model calibrated with field data from selected sites within Jacksonville, which will be complete by February 2013. In the event that the expected reductions, which must be agreed to by the Department, are less than projected in the City's current submittal, the City commits to either submitting plans for an alternative project(s), potentially including additional septic tank phase-outs, or a contract to purchase the amount of credits needed no later than August 2013 (within six months of completion of the model calibration). If additional projects are required, they must be completed by the due date for the septic tank phase-out project, which is December 31, 2023.

[3] The schedule broadly outlines the project milestones for septic tank phase-outs. While the general schedule depicts implementation over a 15-year time frame, the City will continuously implement projects throughout the implementation period. At a minimum, the City will accomplish a 50% implementation of the septic tank phase out projects by the mid-point of the 15-year implementation timeline shown. This schedule will be replaced with project specific dates and milestones within six months of completion of the septic tank model calibration.

City of Jacksonville Beach WWTF 21,015
FL002031

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Jax Bch WWTF	N/A	Total Reduction Required	N/A	19,135	42,097
Jax Bch WWTF FL0020231	JB-1	Upgrade WWTF to Advance Wastewater Treatment for TN removal	12/31/2013	21,555	47,421
Jax Bch WWTF	N/A	Total Project Reductions	N/A	21,555	47,421
Jax Bch WWTF	N/A	Credit/(Deficit)	N/A	2,420	5,324
Jacksonville Beach Total WWTF			**Implementation Schedule**		
Phase One – Initial Nutrient Removal Phase a. Preliminary Plans Complete			Completed – 01/01/2008		
b. Final Plans and Specifications Complete			Completed – 2009		
c. Begin Construction			Completed – 04/06/2009		
d. End Construction			07/01/2013 – projected to be 02/2012		
e. Begin Operation			08/01/2013		
f. Operational Level Attained			12/31/2013		

City of Jacksonville Beach MS4 4,804
FLS000013

Facility Name	Project Number	Description	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Jax Bch MS4	N/A	Total Reduction Required	N/A	N/A	170	374
Jax Bch MS4 FLS000013	JB-2	FDOT Beach Blvd widening (Pond 2)	38.87	Completed	14	31
Jax Bch MS4 FLS000013	JB-3	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	Completed	156	343
Jax Bch MS4	N/A	Total Project Reductions	N/A	N/A	170	374
Jax Bch MS4	N/A	Credit/(Deficit)	N/A	N/A	0	0

City of Neptune Beach WWTF 6,162
FL0020427

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Neptune Beach WWTF FL0020427	N/A	Total Reduction Required	N/A	5,286	11,629
Neptune Beach WWTF FL0020427	NB-1	Complete Process Improvements	10/01/2012	7,322	16,108
Neptune Beach WWTF FL0020427	N/A	Total Project Reductions	N/A	7,322	16,108
Neptune Beach WWTF FL0020427	N/A	Credit/(Deficit)	N/A	2,036	4,479
Neptune Beach Total WWTF			**Implementation Schedule**		
Phase One – Initial Nutrient Removal Phase a. Preliminary Plans Complete			01/01/2009		
b. Final Plans and Specifications Complete			Completed – 05/14/2010		
c. Begin Construction			Completed – 08/03/2010		
d. End Construction			Completed – 05/31/2011		
e. Begin Operation			Completed – 06/01/2011		
f. Operational Level Attained			10/01/2012 – projected to be 01/15/2012		

City of Neptune Beach MS4 1,437
FLS000012

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Neptune Beach MS4	N/A	Total Reduction Required	N/A	47	103
Neptune Beach MS4	NB-2	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	47	103
Neptune MS4	N/A	Total Project Reductions	N/A	47	103
Neptune MS4	N/A	Credit/(Deficit)	N/A	0	0

Clay County MS4 21,188
FLR04E045

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
CC MS4 FLR04E045	N/A	Total Reduction Required	N/A	N/A	N/A	4,061	8,934
CC MS4 FLR04E045	CC-9	Wells Road Improvements	Wet Detention Pond	120	Completed	9	20
CC MS4 FLR04E045	CC-10	County Road 224 Phase I	Wet Detention Pond	70	Completed	38	84
CC MS4 FLR04E045	CC-11	County Road 224 Phase II	Wet Detention Pond	140	Completed	68	150
CC MS4 FLR04E045	CC-12	Education Program	N/A	N/A	Ongoing	1,010	2,222
CC MS4 FLR04E045	CC-13	FDOT Construction of Stormwater Management Systems for Clay County Recreational Trail on SR15	Retention/ Detention (1")	69	Completed	90	198
CC MS4 FLR04E045	CC-14	FDOT SR 15 Widening @ Fleming Island	Retention/ Detention (1")	606	Completed	1,336	2,939
CC MS4 FLR04E045	CC-15	FDOT SR 15 Widening @ Fleming Island from Village Sq Park Rd to South of Margarets Walk Rd	Retention/ Detention (1")	301	Completed	664	1,461
CC MS4 FLR04E045	CC-16	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	846	1,861
CC MS4 FLR04E045	N/A	Total Project Reductions	N/A	N/A	N/A	4,061	8,934
CC MS4 FLR04E045	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

Clay County Utility Authority Aggregate.....63,963
FL0629006

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
CCUA Total Facilities	N/A	Total Reduction Required	N/A	-2,394	-5,267
Fleming Island WWTF FL0043834	CCUA-1	Upgrade to APRICOT and Reuse	Completed	18,195	40,029
Miller Street WWTF FL0025151	CCUA-2	Reuse Water upgrades including Spencer WWTP	Completed - 06/30/2011	16,209	35,670
Miller Street WWTF FL0025151	CCUA-3	WWTF Improvements to meet APRICOT standards	Completed	10,335	22,737
CCUA Total Facilities	N/A	Total Project Reductions	N/A	44,739	98,426
CCUA Total Facilities	N/A	Credit/(Deficit)	N/A	47,133	103,693

JEA Aggregate.....654,672
FL0620564

Facility Name	Project Number	Description	Construction Complete	Achieve Operational Effectiveness	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
JEA Total Facilities	N/A	Total Reduction Required	N/A	N/A	741,951	1,632,292
JEA Julington Creek FL0043591	JEA-1	Complete Process Improvements	Completed	N/A	5,909	13,000
JEA Arlington East FL0026441	JEA-2	Complete Process Improvements	Completed	N/A	92,727	204,000
JEA District II FL0026450	JEA-3	Complete Process Improvements	Completed	N/A	140,000	308,000
JEA Southwest FL0026468	JEA-4	Complete Process Improvements	Completed	N/A	45,909	101,000
JEA Buckman FL0026000	JEA-5	Complete Process Improvements	Completed	N/A	50,455	111,000
JEA Monterey FL00230604	JEA-6	Complete Process Improvements	Completed	N/A	35,455	78,001
JEA Mandarin FL0023493	JEA-7	Complete Process Improvements	Completed	N/A	12,726	27,997
JEA San Pablo FL0024767	JEA-8	Complete Phase Out	Completed	N/A	6,364	14,001
JEA Woodmere FL0026786	JEA-9	Complete Phase Out	Completed	N/A	10,000	22,000
JEA Beacon Hills FL0026778	JEA-10	Complete Phase Out	Completed	Completed	5,700	12,540
JEA Royal Lakes FL0026751	JEA-11	Complete Phase Out	03/31/2013	03/31/2013	0	0
JEA Jax Heights FL0023671	JEA-12	Complete Phase Out	08/14/2014	08/14/2014	0	0
JEA Arlington East FL0026441	JEA-13	Complete Process Improvements	Completed	Completed - 09/30/2011	118,172	259,978
JEA District II FL0026450	JEA-14	Complete Process Improvements	09/30/2012	09/30/2014	0	0
JEA San Jose FL0023663	JEA-15	Complete Phase Out	03/31/2013	03/31/2013	0	0
JEA Buckman FL0026000	JEA-16	Complete Process Improvements	03/30/2013	09/30/2013	191,183	420,603
JEA Facilities	JEA-17	Reuse expansion (approx 10 mgd) at Arlington East, Mandarin and District II	09/30/2012	09/30/2013	59,090	129,998
JEA Total Facilities	N/A	Total Project Reductions	N/A	N/A	773,690	1,702,118
JEA Total Facilities	N/A	Credit/(Deficit)	N/A	N/A	31,739	69,826

JEA WWTF Total	**Implementation Schedule**
Phased WWTF Nutrient Removal a. Preliminary Plans Complete	09/30/2008
b. Final Plans and Specifications Complete	Completed - 01/30/2009
c. Begin Construction	Completed - 06/30/2009
d. Interim Progress Report Due	Completed - 12/01/2009
e. Interim Progress Report Due	Completed - 06/30/2010
f. Interim Progress Report Due	Completed - 12/01/2010
g. Interim Progress Report Due	Completed - 06/30/2011
h. Interim Progress Report Due	Completed - 12/01/2011
i. End Construction	09/30/2012
j. Begin Operations	10/01/2012
k. Interim Progress Report Due	03/31/2013
l. Operational Level Attained	09/30/2014

Smurfit-Stone Container 74,305
FL0000400

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Smurfit-Stone	N/A	Total Reduction Required	N/A	71,684	157,705
Smurfit-Stone	SS-1	Complete Process Improvements	Completed	71,684	157,705
Smurfit-Stone	N/A	Total Project Reductions	N/A	71,684	157,705
Smurfit-Stone	N/A	Credit/(Deficit)	N/A	0	0

St. Johns County MS4..... 746
FLR04E025

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
SJC MS4 FLR04E025	N/A	Starting Load	N/A	N/A	N/A	2,311	5,084
SJC MS4 FLR04E025	SJC-11	Stormwater Education	Education	N/A	Ongoing	153	337
SJC MS4 FLR04E025	SJC-12	Low-impact development	N/A	N/A	Ongoing	Not quantified	Not quantified
SJC MS4 FLR04E025	SJC-13	Slow release fertilizer ordinance	N/A	N/A	Completed	Not quantified	Not quantified
SJC MS4 FLR04E025	SJC-14	FDOT 4 laning of SR 312	Wet Pond (1", 14 days)	38	Completed	14	31
SJC MS4 FLR04E025	SJC-15	FDOT A1A Stormwater retrofit from Duval County line to Thousand Oaks lane	Dry detention	98	Completed	216	475
SJC MS4 FLR04E025	SJC-16	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	60	132
SJC MS4 FLR04E025	SJC-17	Algal Initiative – Masters Tract RST Facility*	Wet pond, treatment wetland	N/A	10/31/2017	1,868	4,109
SJC MS4 FLR04E025	N/A	Total Project Reductions	N/A	N/A	N/A	2,311	5,084
SJC MS4 FLR04E025	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0
St. Johns County M N/A **S4 Total**			**Implementation Schedule**				
Algal Initiative a. Start Date of Project			10/01/2008				
b. Completion Date – Project Assessment			Completed - 10/31/2010				
c. Completion Date – Project Fundraising			10/31/2012				
d. Completion Date – Construction			10/31/2017				

*Note: This project is located in the freshwater reach. The trading ratio from the freshwater reach to marine reach is 1:1.

Town of Orange Park WWTF.....7,940
FL0023922

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Orange Park WWTF	N/A	Total Reduction Required	N/A	16,946	37,281
Ash Street WWTF FL0023922	OP-1	Phase 1 Improvements	Completed	15,953	35,097
Ash Street WWTF FL0023922	OP-2	Phase 2 Improvements	Completed – 08/21/2011	6,942	15,272
Orange Park WWTF	N/A	Total Project Reductions	N/A	22,885	50,369
Orange Park WWTF	N/A	Credit/(Deficit)	N/A	5,939	13,088
Orange Park Total WWTF			**Implementation Schedule**		
Phase Two – Additional nutrient removal phase a. Preliminary Plans Complete			Completed - 06/30/2009		
b. Final Plans and Specifications Complete			Completed - 11/01/2009		
c. Begin Construction			Completed - 11/01/2010		
d. End Construction			Completed - 08/15/2011		
e. Begin Operation			Completed - 08/21/2011		
f. Operational Level Attained			Completed 1 08/21/2011		

Town of Orange Park MS4.....3,348
FLR04E075

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Orange Park MS4	N/A	Total Reduction Required	N/A	103	227
Orange Park MS4	OP-4	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	103	227
Orange Park MS4	N/A	Total Project Reductions	N/A	103	227
Orange Park MS4	N/A	Credit/(Deficit)	N/A	0	0

US Navy Aggregate 11,684
FL0639451

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
USN Total (Aggregate)	N/A	Total Reduction Required	N/A	30,345	66,759
NAS Jax WWTF FL0000957	USN-1	Reuse to Timuquana Country Club	Completed	7,693	16,925
NAS Jax WWTF FL0000957	USN-2	Expand Reuse System	02/25/2014	2,790	6,138
NAS Jax WWTF FL0000957	USN-3	Inflow/infiltration repair projects	Completed	2,790	6,138
NS Mayport WWTF FL0000922	USN-4	Inflow/infiltration repair projects	Completed	5,753	12,657
NS Mayport WWTF FL0000922	USN-5	Modifications to the Mayport WWTF	10/01/2015	11,319	24,901
USN Total (Aggregate)	N/A	Total Project Reductions	N/A	30,345	66,759
USN Total (Aggregate)	N/A	Credit/(Deficit)	N/A	0	0
US Navy Total (Aggregate)			**Implementation Schedule**		
Expand Reuse System a. Start Date of Project			02/07/2008		
b. Completion Date – Design			Completed - 09/30/2009		
c. Submit 1st Progress Report			Completed - 10/01/2011		
d. Submit 2nd Progress Report			04/01/2012		
e. Submit 3rd Progress Report			10/01/2013		
c. Completion Date - Construction			02/25/2014		
d. Completion Date – Project			02/25/2014		
Modifications to Mayport WWTF a. Start Date of Project			10/01/2012		
b. Completion Date – Design			02/25/2014		
c. Begin Construction			04/01/2014		
d. End Construction			07/01/2015		
e. Operational Level Attained			10/01/2015		

US Navy MS4s 7,232
FLR04E091 and FLR04E056

Facility Name	Project Number	Description	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
USN MS4s	N/A	Total Reduction Required	N/A	298	656
USN MS4	USN-6	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	Completed	298	656
USN MS4	N/A	Total Project Reductions	N/A	298	656
USN MS4	N/A	Credit/(Deficit)	N/A	0	0

Name of Facility ***Load Allocation (kg/yr)***

Camp Blanding Non-MS4.....1,220

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
Camp Blanding	N/A	Total Reduction Required	N/A	N/A	N/A	1,650	3,630
Camp Blanding	CB-1	Re-grade existing swale system	Swales	2,220	12/31/2013	1,999	4,398
Camp Blanding	CB-2	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	98	216
Camp Blanding	N/A	Total Project Reductions	N/A	N/A	N/A	2,097	4,613
Camp Blanding	N/A	Credit/(Deficit)	N/A	N/A	N/A	447	983
Camp Blanding Non-MS4 Total			**Implementation Schedule**				
Re-grade existing swale system a. Start Date of Project			Completed - 01/01/2009				
b. Completion Date – Re-grade 1st set of swales			Completed - 12/31/2009				
c. Completion Date – Re-grade 2nd set of swales			Completed - 12/31/2010				
d. Completion Date – Re-grade 3rd set of swales			Completed - 12/31/2011				
e. Completion Date – Re-grade 4th set of swales			12/31/2012				
f. Completion Date – Re-grade 5th set of swales			12/31/2013				
g. Completion Date – Completion of Project			12/31/2013				

Clay County Non-MS4.....11,107

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
CC Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	944	2,077
CC Non-MS4	CC-17	Education Program	N/A	N/A	Ongoing	482	1,060
CC Non-MS4	CC-18	FDOT SR 23 improvement from Kindlewood Rd to Duval County line - 5 systems	Wet pond (1", 14 days)	112	Completed	69	152
CC Non-MS4	CC-19	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	393	865
CC Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	944	2,077
CC Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

St. Johns County Non-MS4.....4,865

Facility Name	Project Number	Description	Type(s) of BMP(s) Implemented	Acres Treated	Deadline	Project TN Reduction (kg/yr)	Project TN Reduction (lbs/yr)
SJC Non-MS4	N/A	Total Reduction Required	N/A	N/A	N/A	4,981	10,958
SJC Non-MS4	SJC-17	Algal Initiative – Masters Tract RST Facility*	Wet pond, treatment wetland	N/A	10/31/2017	277	609
SJC Non-MS4	SJC-18	Greenbriar Road Paving/Improvements - 4 Stormwater Treatment Ponds	N/A	40	Completed	33	73
SJC Non-MS4	SJC-21	Stormwater Education	Education	N/A	Ongoing	492	1,082
SJC Non-MS4	SJC-22	Low-impact development	N/A	N/A	Ongoing	Not quantified	Not quantified
SJC Non-MS4	SJC-23	Slow release fertilizer ordinance	N/A	N/A	Completed	Not quantified	Not quantified
SJC Non-MS4	SJC-24	FDOT SR 312 from US 1 to SR 3	N/A	38	Completed	84	185
SJC Non-MS4	SJC-25	Atmospheric deposition load reduction – Seminole Electric SCR upgrade	N/A	N/A	Completed	390	858
SJC Non-MS4	SJC-26	Algal Initiative	N/A	N/A	10/31/2017	2,306	5,073
SJC Non-MS4	SJC-27	Application of freshwater non-MS4 credits	N/A	N/A	Completed	1,391	3,060
SJC Non-MS4	SJC-28	Bishop Estates baffles boxes	2nd generation baffle boxes		10/31/2017	8	18
SJC Non-MS4	N/A	Total Project Reductions	N/A	N/A	N/A	4,981	10,958
SJC Non-MS4	N/A	Credit/(Deficit)	N/A	N/A	N/A	0	0

St. Johns County Non-MS4 Total	**Implementation Schedule**
Algal Initiative a. Start Date of Project	10/01/2008
b. Completion Date – Project Assessment	Completed - 10/31/2010
c. Completion Date – Project Fundraising	10/31/2012
d. Completion Date – Construction	10/31/2017

*Note: This project is located in the freshwater reach. The trading ratio from the freshwater reach to marine reach is 1:1.

APPENDIX B: WATER QUALITY DATA

The following tables show the data collected by CCUA, City of Jacksonville, and SJRWMD as part of the high-flow event sampling of the tributaries monitoring.

TABLE B-1: CCUA HIGH-FLOW EVENT SAMPLING RESULTS

STATION	DATE	DO (MG/L)	TURBIDITY (NTU)	TEMP (^{o}C)	PH	SPECIFIC CONDUCTANCE (UMHO/CM)	SECCHI DEPTH (IN)	TOTAL STREAM DEPTH (FEET)	NITRITE + NITRATE (MG/L)
Peters Creek	January 2011	6.9	6.5	11.1	6.8	903	20.4	8.3	0.051
Governors Creek	January 2011	7.6	3.7	12.4	7.1	316	14.4	6.2	0.191
North Fork Black Creek	January 2011	7.3	23.3	12.9	7.3	123	26.4	15.3	0.051
South Fork Black Creek	January 2011	7.2	23.1	12.2	6.9	92	13.2	7.9	0.073
Little Black Creek	January 2011	7.2	7.0	13.3	8.3	469	16.8	7.0	<0.003
Peters Creek	February 2011	6.8	3.5	10.7	6.8	108	15.6	8.5	0.119
Governors Creek	February 2011	6.7	4.1	10.9	7.2	171	19.2	5.69	0.17
North Fork Black Creek	February 2011	7.3	18.5	9.9	6.9	94	15.6	5.7	0.038
South Fork Black Creek	February 2011	7.8	15.9	11.1	6.5	176	43.2	10.1	0.084
Little Black Creek	February 2011	6.4	8.7	9.9	6.8	105	14.4	8.8	0.018
Peters Creek	March 2011	4.6	1.9	16.5	6.5	83	27.6	9.7	0.043
Governors Creek	March 2011	5.4	11.2	15.1	6.9	104	19.2	4.3	0.155
North Fork Black Creek	March 2011	5	7.5	20.1	6.6	138	18	9.9	0.037
South Fork Black Creek	March 2011	4.5	3	19.6	6.5	112	19.2	7.9	0.048
Little Black Creek	March 2011	3.9	4.3	19.2	6.7	123	22.8	8.9	0.023
Peters Creek	June 2011	2.4	2.6	26.7	7	3	55.2	8.9	<0.048
Governors Creek	June 2011	4.5	4.1	24.9	7.2	343	19.2	1.6	<0.048
North Fork Black Creek	June 2011	4	4	27.3	6.3	3	48	5	<0.048
South Fork Black Creek	June 2011	2.4	7.3	26.8	6.3	98	40.8	7.1	<0.048
Little Black Creek	June 2011	4.1	4.5	26	6.5	3	31.2	8.3	<0.048

TABLE B-2: CCUA HIGH-FLOW EVENT SAMPLING RESULTS (CONTINUED)

STATION	DATE	AMMONIA (MG/L)	TKN (MG/L)	ORTHO-PHOSPHATE (MG/L)	TP (MG/L)	COLOR (PT-CO)	SAMPLE DEPTH (FT)	TOC (MG/L)	BOD (MG/L)
Peters Creek	January 2011	0.021	0.22	0.023	0.039	50	4.1	6.3	<2.0
Governors Creek	January 2011	0.105	0.38	0.5	0.163	80	3.1	11	<2.0
North Fork Black Creek	January 2011	0.046	0.42	0.047	0.089	90	7.5	10	<2.0
South Fork Black Creek	January 2011	0.061	0.39	0.1	0.131	80	4	11	<2.0
Little Black Creek	January 2011	<0.009	0.26	<0.19	0.39	70	3.5	11	<2.0
Peters Creek	February 2011	0.039	0.55	0.024	0.101	70	4.2	16	<2.0
Governors Creek	February 2011	0.085	0.8	0.066	0.119	100	2.5	21	<2.0
North Fork Black Creek	February 2011	0.009	1.02	0.081	0.107	90	2.3	20	<2.0
South Fork Black Creek	February 2011	0.009	1.26	0.083	0.168	90	5	20	<2.0
Little Black Creek	February 2011	0.009	0.53	0.19	0.037	70	4.2	15	<2.0
Peters Creek	March 2011	0.088	0.63	0.019	0.095	100	4.5	8.5	<2.0
Governors Creek	March 2011	0.093	0.8	0.11	0.154	140	2.2	15	<2.0
North Fork Black Creek	March 2011	0.065	0.37	0.019	0.056	120	4.5	9.2	<2.0
South Fork Black Creek	March 2011	0.052	0.42	0.14	0.193	100	3.5	7.7	<2.0
Little Black Creek	March 2011	0.037	0.64	0.019	0.048	120	4.2	13	<2.0
Peters Creek	June 2011	0.2	1.3	0.049	<0.046	60	4.4	7.9	<2.0
Governors Creek	June 2011	0.082	0.7	0.19	<0.046	100	1	13	<2.0
North Fork Black Creek	June 2011	0.081	0.55	0.038	<0.046	60	2.5	6.6	<2.0
South Fork Black Creek	June 2011	0.069	0.42	0.18	0.15	80	3.5	6.8	<2.0
Little Black Creek	June 2011	0.037	1.2	<0.019	<0.046	80	4	13	3.4

TABLE B-2: CITY OF JACKSONVILLE HIGH-FLOW EVENT SAMPLING RESULTS

STATION	DATE	SECCHI DEPTH (M)	TEMP (°C)	CONDUCTIVITY (US/CM)	SALINITY (PPT)	DO SATURATION (%)	DO (MG/L)	PH	SAMPLE DEPTH (M)	AMMONIA (MG/L)	CBOD (MG/L)
Arlington River	1/26/2011	0.61	12.89	14,810.0	8.59	79.5	7.91	7.25	0.40	0.033	4.09
Pablo Creek	1/26/2011	1.00	12.09	13,666.0	7.88	71.8	7.31	7.37	1.00	0.031	<2.00
Julington Creek	1/26/2011	0.76	13.37	287.9	0.14	51.7	5.37	7.29	1.40	<0.010	3.63
Durbin Creek	1/26/2011	N/A	13.28	367.1	0.18	45.0	4.69	6.72	0.40	<0.010	3.84
Ribault River	1/26/2011	N/A	13.06	2,441.0	1.27	80.1	8.37	7.40	0.60	0.110	2.12
Cedar River	1/26/2011	N/A	13.79	6,895.0	3.80	59.0	5.97	7.32	1.00	0.124	2.14
Ortega River	1/26/2011	N/A	12.79	231.0	0.11	64.2	6.79	6.89	2.00	<0.010	2.44
Julington Creek	2/8/2011	0.64	11.58	261.0	0.12	61.8	6.68	6.85	1.50	N/A	2.42
Durbin Creek	2/8/2011	N/A	10.80	359.0	0.18	57.1	6.29	6.83	N/A	<0.010	2.44
Julington Creek	3/30/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.078	<2.00
Durbin Creek	3/30/2011	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.067	<2.00
Ribault River	4/5/2011	0.69	21.96	27,904.0	17.13	91.2	7.20	8.07	1.00	0.029	2.87
Julington Creek	6/14/2011	0.76	26.16	3,292.0	1.78	79.9	6.35	7.04	1.30	0.064	2.68
Durbin Creek	6/14/2011	NA	26.43	1,167.0	0.61	82.3	6.56	7.50	0.30	0.036	2.01
Ortega River	9/21/2011	1.50	24.94	10,873.0	6.18	15.4	1.22	6.69	1.00	0.085	<2.00
Julington Creek	9/26/2011	0.60	25.30	2,315.0	1.24	N/A	N/A	6.64	1.50	0.065	<2.00
Durbin Creek	9/26/2011	N/A	25.05	2,172.0	1.16	29.2	2.38	6.54	0.50	0.075	<2.00
Ortega River	9/26/2011	N/A	26.57	11,862.0	6.75	19.8	1.53	6.69	2.50	0.093	<2.00
Julington Creek	12/12/2011	1.00	15.84	1,563.0	0.83	45.7	4.49	7.27	1.50	0.029	<2.00
Durbin Creek	12/12/2011	N/A	15.61	1,254.0	0.66	53.8	5.32	6.96	0.50	0.025	<2.00
Ortega River	12/12/2011	N/A	15.63	4,548.0	2.44	61.1	5.99	7.15	0.80	0.062	<2.00
Cedar River	12/12/2011	N/A	15.34	4,240.0	2.27	21.2	2.09	7.51	1.25	0.062	2.65

TABLE B-2: CITY OF JACKSONVILLE HIGH-FLOW EVENT SAMPLING RESULTS (CONTINUED)

STATION	DATE	CHLORIDE (MG/L)	COLOR (PCU)	NITRITE + NITRATE (MG/L)	ORTHO-PHOSPHATE (MG/L)	TP (MG/L)	TKN (MG/L)	TSS (MG/L)	TURBIDITY (NTU)	TOC (MG/L)	VSS (MG/L)
Arlington River	1/26/2011	4,950	20	0.063	0.037	0.140	1.210	26	16.00	8.6	12
Pablo Creek	1/26/2011	4,300	50	<0.027	0.032	0.101	0.741	5	3.60	10.4	N/A
Julington Creek	1/26/2011	<5	100	<0.027	0.045	0.072	0.907	2	3.20	19.5	N/A
Durbin Creek	1/26/2011	<5	100	<0.027	<0.024	<0.040	0.903	<2	1.60	23.8	N/A
Ribault River	1/26/2011	550	400	0.107	0.062	0.170	0.881	25	25.00	7.7	N/A
Cedar River	1/26/2011	850	30	0.170	0.056	0.116	0.828	9	13.00	6.2	N/A
Ortega River	1/26/2011	<5	60	<0.027	<0.024	0.048	0.755	2	5.00	13.1	N/A
Julington Creek	2/8/2011	<5	120	<0.027	0.028	0.073	0.963	<2	5.10	19.6	N/A
Durbin Creek	2/8/2011	<5	120	<0.027	<0.024	<0.040	<0.217	<2	<0.10	23.9	N/A
Julington Creek	3/30/2011	20	20	0.048	0.075	0.040	1.180	2.5	1.70	10.4	N/A
Durbin Creek	3/30/2011	<5	30	<0.027	0.061	<0.040	0.745	3	1.50	12.2	N/A
Ribault River	4/5/2011	9,750	10	<0.027	0.059	0.044	0.088	22	13.00	7.2	15
Julington Creek	6/14/2011	850	30	0.044	0.076	0.124	0.870	<2	2.50	10.2	N/A
Durbin Creek	6/14/2011	250	40	0.070	0.068	0.083	0.650	9.5	5.38	10.5	N/A
Ortega River	9/21/2011	3,420	90	0.074	0.047	0.051	1.230	2	1.47	17.0	N/A
Julington Creek	9/26/2011	575	150	<0.027	0.041	<0.040	1.180	<2	1.21	22.4	N/A
Durbin Creek	9/26/2011	550	120	<0.027	<0.024	0.041	1.200	2	4.02	25.6	N/A
Ortega River	9/26/2011	3,720	80	<0.027	0.085	0.089	1.280	<2	1.24	15.9	N/A
Julington Creek	12/12/2011	400	80	<0.027	0.036	0.047	0.819	<2	0.99	16.1	<10
Durbin Creek	12/12/2011	300	80	<0.027	<0.024	<0.040	0.801	<2	1.01	16.9	<10
Ortega River	12/12/2011	1,100	60	<0.027	0.049	0.074	0.937	4.5	1.65	13.3	<10
Cedar River	12/12/2011	1,250	40	<0.027	0.135	0.135	1.070	13	7.08	10.3	<14

TABLE B-3: SJRWMD HIGH-FLOW EVENT SAMPLING RESULTS

STATION	DATE	BOD (MG/L)	CHL-A (MG/L)	COLOR (PCU)	CONDUCTIVITY (US/CM)	DO (MG/L)	STREAM DEPTH (M)	AMMONIA (MG/L)	NITRITE + NITRATE (MG/L)	ORTHO-PHOSPHATE (MG/L)
RCB	1/11/2011	2.4	22.8	202.1	1,441.0	6.61	4.2	0.2093	0.1986	0.0260
RCB	1/26/2011	1.9	N/A	304.7	1,447.0	6.34	6.7	0.2282	0.3191	0.0737
RCB	2/8/2011	5.7	N/A	80.7	1,360.0	2.59	5.8	0.3067	0.2581	0.0982
RCB	2/9/2011	5.6	7.5	366.3	1,179.0	3.57	4.5	0.2675	0.2892	0.0846
RCB	3/8/2011	3	18.1	134.9	1,336.5	5.95	4.9	0.0326	0.1426	0.0221
RCB	3/10/2011	4.1	N/A	262.3	1,399.0	5.78	5.4	0.0617	0.2998	0.0674
RCB	4/4/2011	2.8	14.8	212.8	1,403.5	5.43	4.4	0.0231	0.1967	0.0389
RCB	4/26/2011	N/A	24.1	N/A	1,558.0	6.89	4.6	0.027	0.0410	0.0010
RCB	6/20/2011	1.8	31.1	151.8	1,841.5	3.51	4.9	0.0325	0.0514	-0.0008
RCB	7/25/2011	1.6	23.1	86.3	1,557.5	5.56	4.7	0.0191	0.0400	0.0021

TABLE B-3: SJRWMD HIGH-FLOW EVENT SAMPLING RESULTS (CONTINUED)

STATION	DATE	SALINITY (PPT)	SECCHI DEPTH (M)	TKN (MG/L)	TOC (MG/L)	TP (MG/L)	TSS (MG/L)	TURBIDITY (NTU)	TEMP (^{o}C)	PH
RCB	1/11/2011	0.73	0.3	1.5373	29.05	0.1495	10	7.8	11.56	7.70
RCB	1/26/2011	0.73	N/A	1.8645	45.67	0.2587	N/A	11.5	13.42	7.56
RCB	2/8/2011	0.68	N/A	1.8894	42.94	0.2611	N/A	9.6	15.40	7.49
RCB	2/9/2011	0.59	0.25	1.7549	34.97	0.2306	7	8.1	16.02	7.35
RCB	3/8/2011	0.67	0.4	1.2209	18.61	0.1122	12	5.9	20.41	7.60
RCB	3/10/2011	0.70	N/A	1.4823	27.84	0.1848	N/A	6.1	13.28	7.47
RCB	4/4/2011	0.71	0.35	1.1702	19.73	0.1418	9	7.2	21.94	7.60
RCB	4/26/2011	0.78	0.45	1.1800	N/A	0.0891	N/A	N/A	27.46	7.85
RCB	6/20/2011	0.93	0.45	1.3720	22.25	0.1016	9.5	6.1	29.29	7.62
RCB	7/25/2011	0.78	0.7	1.0876	14.64	0.0513	9	4.7	31.40	7.55

APPENDIX C: ADDITIONAL PROJECT PICTURES

Agriculture

LIQUID FERTILIZER SIDE DRESSING TO TARGET APPLICATIONS

USE OF DRIP TAPE FOR MORE EFFICIENT IRRIGATION

Camp Blanding

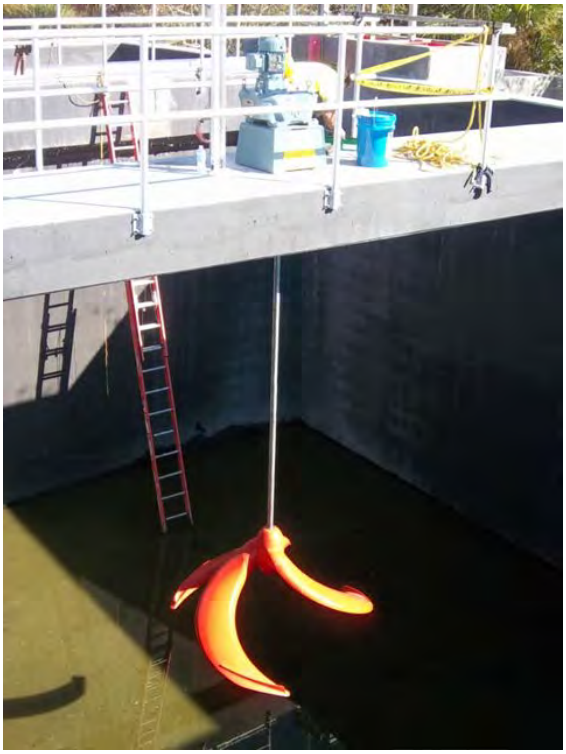
CAMP BLANDING CANTONMENT AVENUE A

CAMP BLANDING CANTONMENT AVENUE B

NORTH FORK BLACK CREEK DURING CULVERT REPLACEMENT

City of Atlantic Beach

BAFFLE WALLS CONSTRUCTED IN EXISTING AERATION TANKS AT WWTP #1



NEW MIXERS INSTALLED THE ANOXIC ZONES

NEW FINE BUBBLE DIFFUSERS ALLOW FOR BETTER OXYGEN TRANSFER

EFFLUENT FILTERS INSTALLED AT WWTP #1

REPLACED DETERIORATED CAST IRON AIR PIPING WITH STAINLESS STEEL PIPE

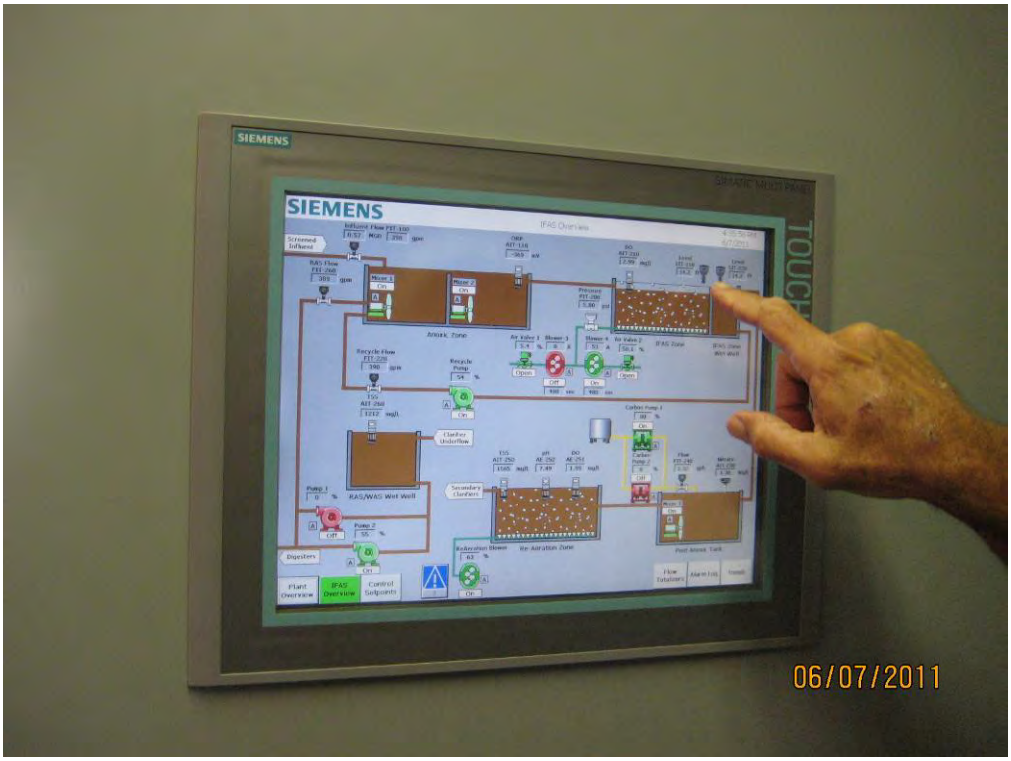
INSTALLED MORE EFFICIENT BLOWERS

ADDITIONAL STATIC SCREENS INSTALLED AT HEADWORKS

CONSTRUCTING NEW SLUDGE TREATMENT BUILDING WITH CENTRIFUGE

City of Neptune Beach

NEPTUNE BEACH UPGRADED WWTF



CONTROL PANEL FOR THE NEW NEPTUNE BEACH WWTF

CLAY COUNTY

CLAY COUNTY
FLORIDA

Department of Development Services

Engineering Division
P.O. Box 1366
477 Houston Street
3rd Floor, Admin. Building
Green Cove Springs, FL 32043

Area Code: 904
Phone: 284-6301
269-6301
Fax: 278-4708

County Manager
Stephanie C. Kopelousos

Commissioners:
Wendell D. Davis
District 1
Douglas P. Conkey
District 2
W. Travis Cummings
District 3
T. Chereese Stewart
District 4
Ronnie E. Robinson
District 5

Switchboard:
GCS (904) 284-6300
KH (352) 473-3711
KL (904) 533-2111
OP/MBG (904) 269-6300

www.claycountygov.com

Clay County Business Questionnaire

Clay County is required to inform businesses of the hazards associated with illicit discharges and improper dumping to the stormwater system as per a Florida Department of Environmental Protection National Pollution Discharge Elimination System (NPDES) stormwater generic permit. The County's coverage under this permit helps ensure State and Federal regulatory agencies that the County is doing its part in protection of our waterways.

What are Illicit Discharges and improper Dumping? An Illicit Discharge is an unallowed discharge that is not composedly entirely of stormwater, such as wastewater, washwater and other pollutant runoff into our stormwater system, surface waters, and ground waters. Improper Dumping is the dumping of waste, such as used motor oil, grease and litter, into our stormwater system, surface waters and ground waters. The stomr drain was designed to handle stormwater to prevent flooding and may not be used to dump or discharge waste. Anything that is discharged or dumped into the stormwater system flows UNTREATED to surface waters. For example, oily and soapy vehicle washwater discharged to a storm drain would then discharge, untreated to the local stream creating a hazard for children playing in the stream, and for fish and wildlife whose lives depend on the stream.

Please assist the County with the following questionnaire to help determine if additional precautions are necessary to help eliminate Illicit Discharges. Responding to the questionnaire will helps businesses understand the importance of the proper storage and disposal of chemicals, oils, soiled water, and fertilizers.

Clay County Ordinance 2006-59 allows the County to enforce standards for the proper storage and disposal of the above mention materials. Failure to comply with these standards can result in fines. Please go to our web site at the following link to understand more of the County's policy:
http://www.claycountygov.com/Departments/enforcement/index.htm

This questionnaire will not be used against you. It is being utilized to help make businesses aware of illegal dumping and potential fines. Some businesses may be unaware that it is illegal to dump soiled water down the stormdrain. Some businesses may not know that it is illegal to over fertilize or discharge a pool into the stormdrain.

Help keep Clay County beautiful! If you see an Illicit Discharge, please report to (904) 269-6301.

Your Action Counts!

COVER LETTER FOR THE CLAY COUNTY SMALL BUSINESS QUESTIONAIRE

Clay County Business Questionnaire

Type of business TOOL REPAIR & Small Eng. Repair

Types of chemicals used for your business Parts cleaner fluid, motor oil carburetor cleaner, starting fluid

Types of by-product produced by your company that needs to be disposed of motor oil and parts cleaner fluid

How are your chemicals stored? oil is in original container until sold, from where we purchased. Parts cleaner fluid is poured into the parts washer from the company that maintains the machine. They also dispose of old fluid.

Does your company contract with another company to provide disposal of any by-products?

YES - crystal Clean for parts washer fluid and Synergy Recycling for the used oil.

How can the County ensure that all other companies similar to yours follows the same standards

Please return this by mail to the following:

Att: Shawn D. Thomas – Project Administrator
P.O. Box 1366
Green Cove Springs, Fl 32043

CLAY COUNTY SMALL BUSINESS QUESTIONAIRE – EXAMPLE 1

NOV 07 2011

Clay County
Engineering Department

Clay County Business Questionnaire

Type of business Transmission Shop

Types of chemicals used for your business Mineral Spirits

Types of by-product produced by your company that needs to be disposed of
Waste Oil & Some Antifreeze

How are your chemicals stored? In a Containment Area

Does your company contract with another company to provide disposal of any by-products?
yes, Synergy / Safety Clean

How can the County ensure that all other companies similar to yours follows the same standards
Bi-Annual Inspection

Please return this by mail or contact the following:

Att: Shawn D. Thomas – Project Administrator – (904) 541-3815
P.O. Box 1366
Green Cove Springs, Fl 32043

CLAY COUNTY SMALL BUSINESS QUESTIONAIRE – EXAMPLE 2

Town of Orange Park

ASH STREET WWTF STAINLESS STEEL BRIDGEWORK FOR INVENT MIXER-AERATORS DURING PHASE 2 CONVERSION

ASH STREET WWTF CLARIFIER #2 UNDER CONSTRUCTION

ASH STREET WWTF NEUROS TURBINE BLOWERS

TERTIARY FILTER #2 AT THE ASH STREET WWTF