2014 PROGRESS REPORT

for the Santa Fe River Basin
Basin Management Action Plan

prepared by the
Division of Environmental Assessment and Restoration
Water Quality Restoration Program
Florida Department of Environmental Protection

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2600 Blair Stone Road
Tallahassee, FL 32399-2400

For additional information on the watershed management approach in the Santa Fe River Basin, contact:

Terry Hansen, Basin Coordinator
Florida Department of Environmental Protection
Water Quality Restoration Program, Watershed Planning and Coordination Section
2600 Blair Stone Road, Mail Station 3565
Tallahassee, FL 32399-2400
Email: terry.hansen@dep.state.fl.us
Phone: (850) 245–8561

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LIST OF ACRONYMS AND ABBREVIATIONS

BMAP	Basin Management Action Plan
BMP	Best Management Practice
cfs	Cubic Feet Per Second
department	Florida Department of Environmental Protection
DO	Dissolved Oxygen
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FYN	Florida Yards and Neighborhoods
GIS	Geographic Information System
lbs/yr	Pounds Per Year
mg/L	Milligrams Per Liter
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
RFA	Restoration Focus Area
SRWMD	Suwannee River Water Management District
STORET	Storage and Retrieval (Database)
USDA	United States Department of Agriculture
TMDL	Total Maximum Daily Load
WBID	Waterbody Identification
WWTP	Wastewater Treatment Plant

SUMMARY

TOTAL MAXIMUM DAILY LOADS

The Basin Management Action Plan for the Santa Fe River Basin encompasses an area of over one million acres and includes all or portions of Alachua, Bradford, Columbia, Gilchrist, and Union Counties. Urban areas include Lake City and Fort White in Columbia County and Alachua, Archer, High Springs, LaCrosse, and Newberry in Alachua County. Specifically, the lower portion of the Santa Fe River from River Rise westward to its confluence with the Suwannee River has been determined to be impaired. The BMAP area also includes the Ichetucknee River and associated springs, Alligator Lake, and the New River.

The Florida Department of Environmental Protection identified the Santa Fe River as impaired for dissolved oxygen (DO) and nutrients. In September 2008, the department adopted the Santa Fe River TMDL for nitrate to protect the aquatic flora and fauna in the river. Achieving reductions in nitrate is expected to reduce any pollutant impacts associated with DO.

The Santa Fe River BMAP was adopted in February 2012 to implement the nitrate TMDL in the watershed. This is the second progress report for the Santa Fe River BMAP, and it describes the activities that occurred during the reporting period from October 1, 2013, through February 28, 2015.

STATUS OF BMAP MANAGEMENT STRATEGIES

During the reporting period, the department and the Florida Department of Agriculture and Consumer Services (FDACS) selected the Ginnie and Gilchrist Blue springsheds to focus efforts on implementing nutrient reduction activities, and to monitor pre- and postimplementation conditions. In this Restoration Focus Area (RFA), FDACS is coordinating with agricultural landowners to enroll them in appropriate best management practices (BMPs), evaluating cost-share needs for BMP implementation, and facilitating the distribution of cost-share funding. The department is characterizing the geology and ground water in the RFA, monitoring both regional conditions and nitrate source areas, and evaluating the natural attenuation processes for nitrate.

As of December 2014, FDACS had enrolled 27,605 acres, or 80% of the RFA agricultural acreage, in BMPs. For example, from October 2013 to September 2014, 38 center pivot irrigation system retrofits were completed in the Santa Fe Basin, saving approximately 690 million gallons per year of water. In addition, 39 fertigation systems were added that reduced nitrogen loading by approximately 722,982

pounds per year (lbs/yr). The department contributed $615,000 to the center pivot retrofit and fertigation program.

The city of Lake City is upgrading its existing wastewater treatment plant (WWTP) to meet advanced treatment standards, adding a new WWTP and associated sewering, and creating a wastewater reuse facility to supply both agricultural and urban users. These projects will result in a reduction of 77,000 lbs/yr of nitrogen, and the projects will be partially funded with Springs Initiative funding from the department and Suwannee River Water Management District (SRWMD). The stakeholders are also continuing their education and outreach, land acquisition, urban BMP, and ordinance development efforts.

The department, SRWMD, and Alachua County implemented the BMAP monitoring to gather additional data about the Santa Fe River, associated springs, and ground water in the basin. Additional management and data collection efforts are needed to monitor and address the slight upward trend in nitrate plus nitrite in the Santa Fe River stations observed.

UPCOMING ACTIVITIES

During the upcoming period from March 1, 2015, through February 29, 2016, FDACS will continue to enroll agricultural producers in BMPs in the RFA, and the department will continue monitoring and assessment activities for nitrates and sources in the area. FDACS and the department will also look for opportunities to implement additional cost-share BMPs in the RFA. The stakeholders in the Santa Fe River Basin will continue to implement urban BMPs, implement ordinances, encourage structural changes where applicable, and carry out public education and outreach activities. In addition, the monitoring of the Santa Fe River, associated springs, and ground water will continue.

Section 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

This is the second progress report for the Santa Fe River Basin Management Action Plan. The information presented in this report includes updates on activities that occurred from October 1, 2013, to February 28, 2015 (**Section 2**). **Section 3** summarizes upcoming efforts for the period from March 1, 2015, through February 29, 2016.

1.2 TOTAL MAXIMUM DAILY LOADS FOR THE SANTA FE RIVER BASIN

The Santa Fe River is a tributary to the Suwannee River. The Santa Fe River system drains about 1,400 square miles of north Florida, discharging an annual average flow of more than 1,600 cubic feet per second (cfs). The Santa Fe River flows west from its headwaters in the Santa Fe Lakes area, in the easternmost portion of the basin, joining the Suwannee River near Branford. Its two major tributaries, New River and Olustee Creek, have their headwaters in southern Baker County. A third tributary, the Ichetucknee River, is a clear, spring-fed stream and a very popular recreational site.

The Santa Fe River Basin encompasses over one million acres and includes all or portions of Alachua, Bradford, Columbia, Gilchrist, and Union Counties. Urban areas include Lake City and Fort White in Columbia County and Alachua, Archer, High Springs, LaCrosse, and Newberry in Alachua County. Specifically, the lower portion of the Santa Fe River from River Rise westward to its confluence with the Suwannee River is impaired. The BMAP area also includes the Ichetucknee River and associated springs, Alligator Lake, and the New River. The BMAP planning area shown in **Figure 1** provides a basis for determining where management actions are proposed.

The Florida Department of Environmental Protection identified the Santa Fe River as impaired by dissolved oxygen (DO) and nutrients. In September 2008, the department adopted the Santa Fe River TMDL for nitrate. To achieve the annual average nitrate target of 0.35 milligrams per liter (mg/L) in the Santa Fe River Basin, the nitrate loads from nonpoint sources need to be reduced by 35%. The target long-term average is 0.35 mg/L, and the percent reduction represents an estimate of the maximum reduction required to meet the target. It may be possible to meet the target before achieving the percent reduction. The Santa Fe River BMAP includes the three segments with waterbody identification (WBID) numbers that make up the Lower Santa Fe River: WBID 3605A, WBID 3605B, and WBID 3605C. **Table 1** lists the TMDL and pollutant load allocations adopted by rule for the watershed.

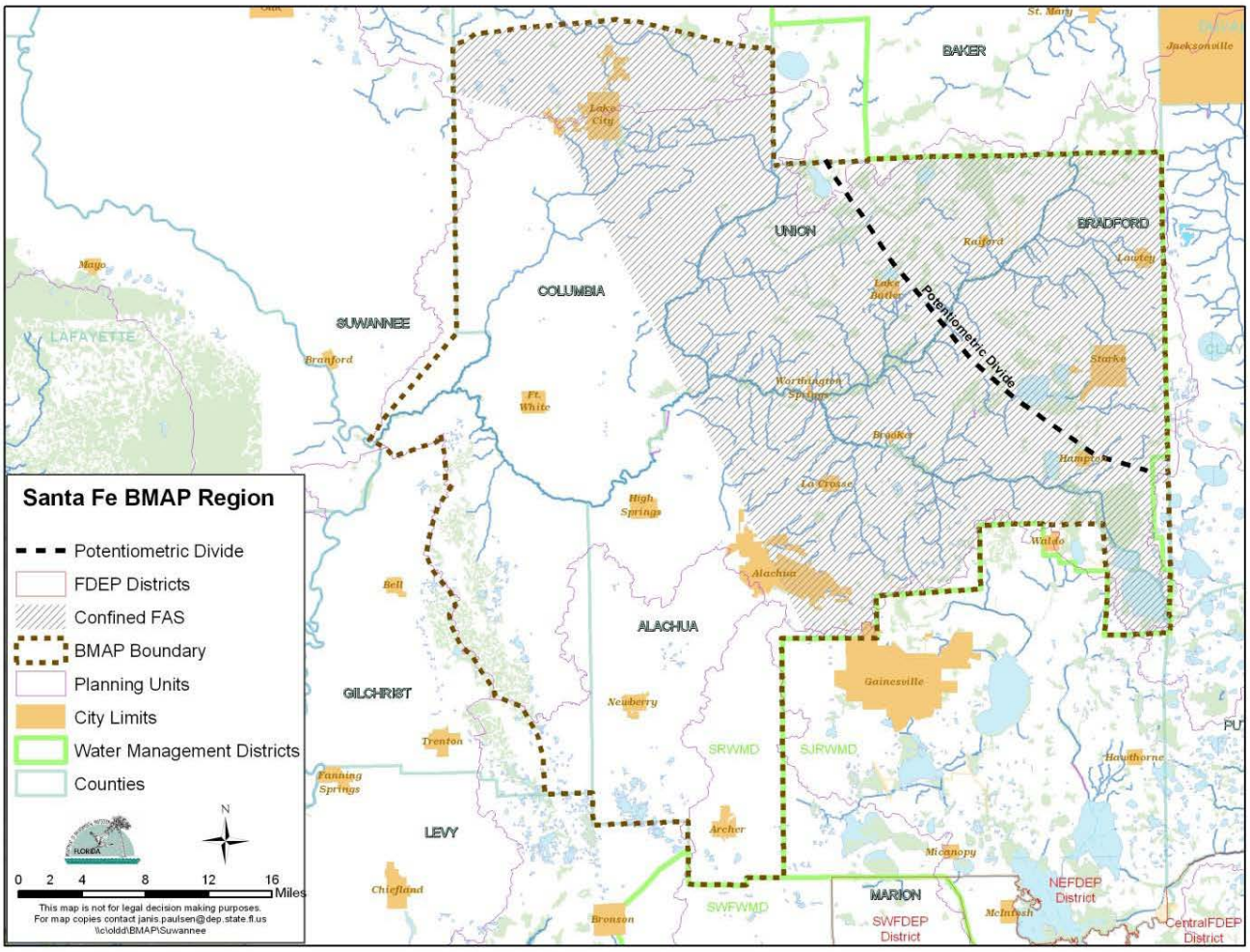

FIGURE 1: SANTA FE RIVER BMAP AREA

TABLE 1: LOWER SANTA FE PLANNING UNIT TMDLS

PLANNING UNIT (WBID)	PARAMETER	TMDL (MG/L)	WASTELOAD ALLOCATION FOR WASTEWATER	WASTELOAD ALLOCATION FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER (% REDUCTION)	LOAD ALLOCATION (% REDUCTION)
Lower Santa Fe (WBIDs 3605A, 3605B, 3605C)	Nitrate, monthly average	0.35	Not applicable	35%	35%

1.3 RESPONSIBLE PARTIES AND KEY STAKEHOLDERS

The following organizations and entities are key stakeholders in the Santa Fe River BMAP:

- Agriculture.
- Alachua County.
- Columbia County.
- Florida Department of Agriculture and Consumer Services (FDACS).
- Suwannee River Partnership.
- Suwannee River Water Management District (SRWMD).
- The Ichetucknee Partnership.
- Union County.
- Bradford County.
- Florida Department of Transportation (FDOT).

1.4 BMAP ALLOCATIONS

The stakeholders and department determined that assigning detailed allocations was not appropriate in the Santa Fe River BMAP due to the following three primary factors:

1. With a spring-fed river, the consideration of activities in multiple springsheds is necessary.
2. The quantification of denitrification in soil and ground water is not possible at the scale necessary for entity-specific allocations.
3. The Santa Fe River springshed is a hydrogeologically complex system, encompassing porous media and conduit flow regimes that comprise multiple springs.

Instead, the approach for all stakeholders in the Santa Fe Basin will be based on best management practices (BMPs). BMPs are individual or combined management and/or structural practices determined through research, field testing, and expert review to be the most effective and practicable means for improving water quality, taking into account economic and technological considerations. In

Phase 1, logical, technically, and economically feasible BMPs will be implemented to decrease nutrient inputs. All BMAP stakeholders will implement BMPs applicable to their jurisdiction and within their authority. These BMPs, to be identified by the department, FDACS, and stakeholders, will do the following:

1. Focus on pollution prevention.
2. Address all identified sources.
3. Be cost-effective.
4. Be implemented as soon as practicable.
5. Achieve nutrient reductions or provide information on which to base future activities for achieving nutrient reductions.

The identification of restoration focus areas (RFAs) for BMP implementation will allow stakeholders to prioritize their efforts in implementing nitrate reduction strategies more completely and quickly in these areas. Consequently, water quality improvements in the RFAs resulting from BMP implementation and other management actions can be assessed before changes might be observed in the impaired WBIDs. If implemented BMPs in these areas do not result in water quality improvement, the implementation of new or modified BMPs on a localized scale may be appropriate, as economically feasible, before BMPs have been implemented for the entire basin.

Section 2: STATUS OF BMAP MANAGEMENT STRATEGIES

2.1 RFA

An RFA is a portion of a basin with an adopted BMAP, in which applicable water quality restoration and monitoring activities contained in the BMAP are implemented to the greatest practicable extent in a relatively short time. The purpose of an RFA is to concentrate limited financial and staff resources on implementation and monitoring in a priority area to expedite water quality improvements in that area. In the Santa Fe River Basin, the department and FDACS selected the Ginnie and Gilchrist Blue springsheds to focus efforts on implementing nutrient reduction activities, and to monitor pre- and postimplementation conditions. **Figure 2** shows the location of the RFA.

The Sana Fe Springs RFA encompasses 185 square miles, including portions of Gilchrist and Alachua (including Newberry) Counties. The major springs in the RFA include Ginnie, Gilchrist Blue, Devil's Eye Complex, and Twin Springs. The area has mixed land uses, including agricultural activities, residential septic tanks, urban land uses, and treated wastewater disposal (see **Figure 3**).

Within the RFA, FDACS is coordinating with agricultural landowners to enroll them in appropriate BMPs, evaluating cost-share needs for BMP implementation, facilitating the distribution of cost-share funding, and providing updates on BMP implementation. The department is characterizing the geology and ground water in the RFA, monitoring both regional conditions and nitrate source areas (see **Figure 3**), evaluating the natural attenuation processes for nitrate, and providing updates on the results of these assessments.

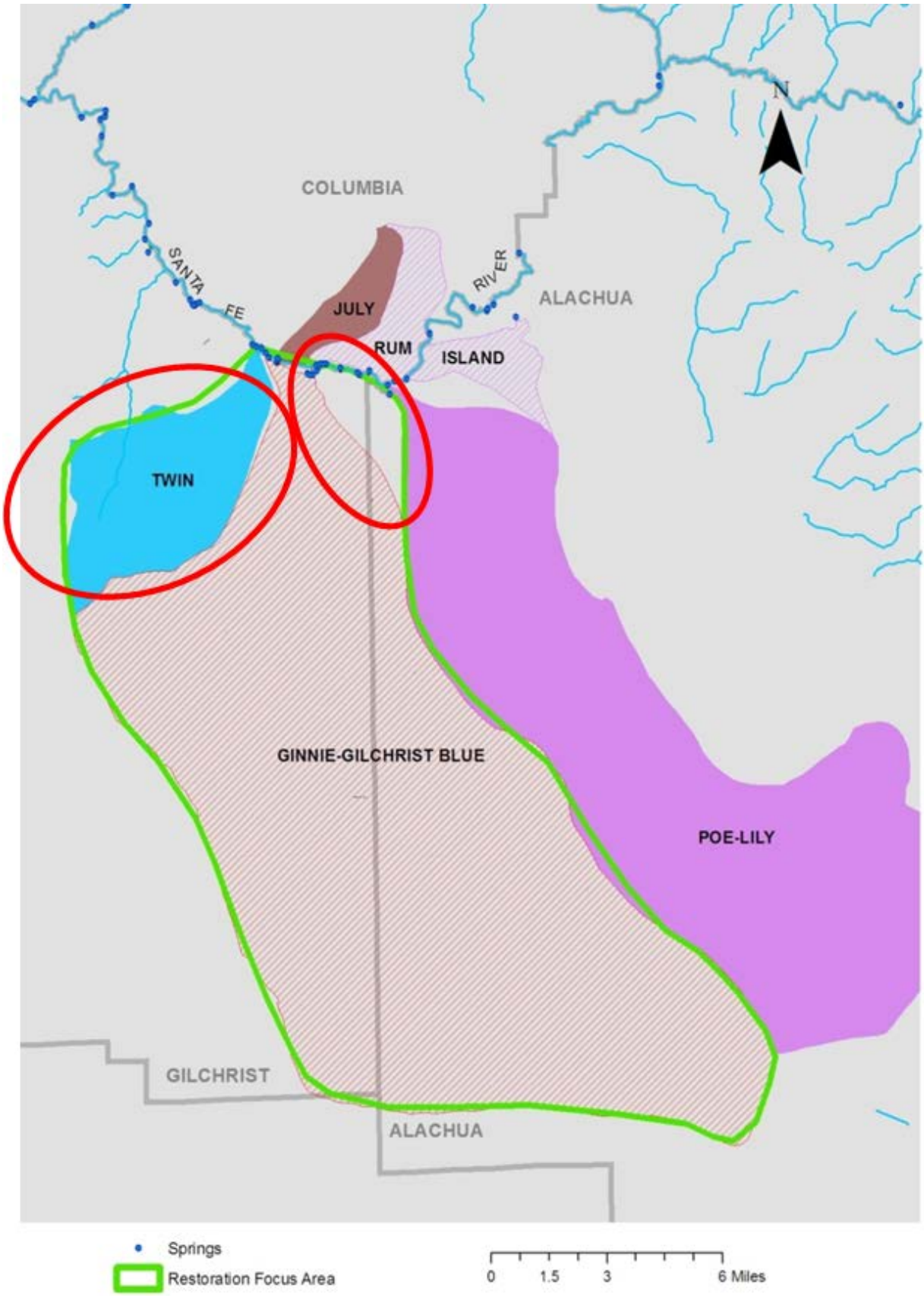

FIGURE 2: SANTA FE RIVER BASIN RFA

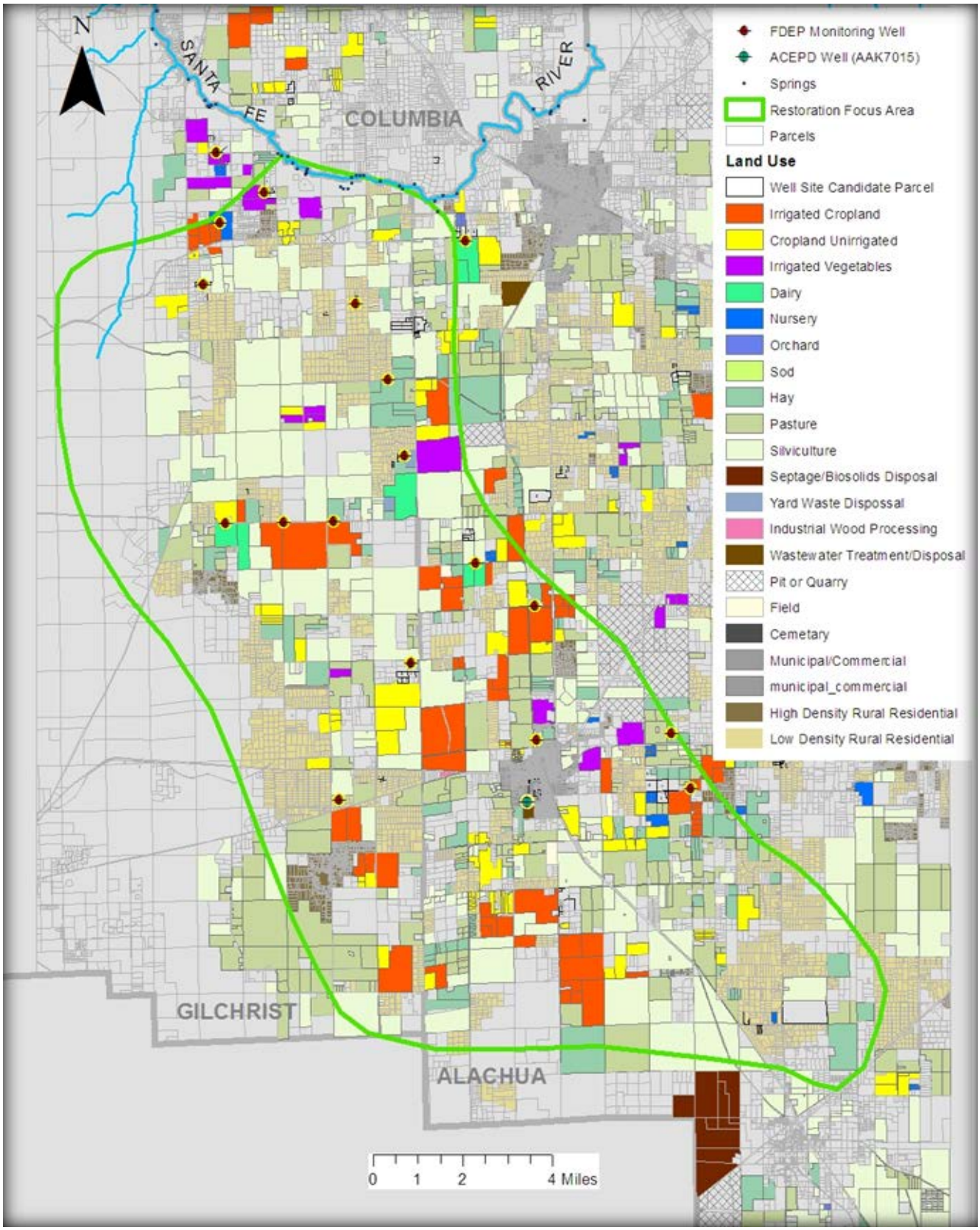

FIGURE 3: LAND USES AND MONITORING LOCATIONS IN THE SANTA FE SPRINGS RFA

2.2 AGRICULTURAL BMP IMPLEMENTATION

Agricultural BMP enrollment in the Santa Fe BMAP area increased by approximately 13,000 acres since last year, bringing the total enrollment to 86,970 acres. **Table 2** shows agricultural land use and enrollment by commodity, and **Figure 4** shows agricultural land use and BMP enrollment in the BMAP area as of December 31, 2014.

The RFA includes approximately 34,350 acres of agriculture in production. Before January 2013, 6,257 acres were enrolled in FDACS' BMPs. FDACS has since hired a new technician to focus on enrollment in this area. As of December 2014, an additional 21,347 acres in the RFA were enrolled in BMPs. Therefore, a total of 27,605 acres, or 80% of the RFA agricultural acreage, is enrolled.

TABLE 2: AGRICULTURAL LAND USE AND BMP ENROLLMENT IN THE SANTA FE BMAP AREA, AS OF DECEMBER 2014

[1] Acreage included in this land use category that is exclusively in hay production will be covered in a future revision of the *Vegetable and Agronomic Crop BMP Manual.*

2009 SRWMD LAND USE	2009 ACRES	RELATED FDACS' BMP PROGRAMS	ACREAGE ENROLLED	RELATED NOTICES OF INTENT (NOIS)
Pasture	144,175.8	Cow/Calf	25,944.4	86
Row/Field/Mixed Crops, Hay	76,833.4	Vegetable/Agronomic Crops, Future[1]	60,218.4	211
Fallow Cropland	4,103.6	No enrollment needed	Not applicable	Not applicable
Citrus	99.8	Citrus	0.0	0
Other Groves	1,903.0	Specialty Fruit and Nut	265.2	4
Nurseries and Vineyards, Tree Nurseries, Ornamentals, Shade Ferns, Hammock Ferns, Floriculture	1,716.4	Statewide nurseries	370.0	9
Sod Farms	335.2	Statewide Sod	172.3	2
Horse Farm	1,693.7	Equine	0.0	0
Specialty Farms, Dairies, Feeding Operations	800.1	Conservation Plan Rule	0.0	0
Totals	**231,661.0**	**Not applicable**	**86,970.3**	**312**

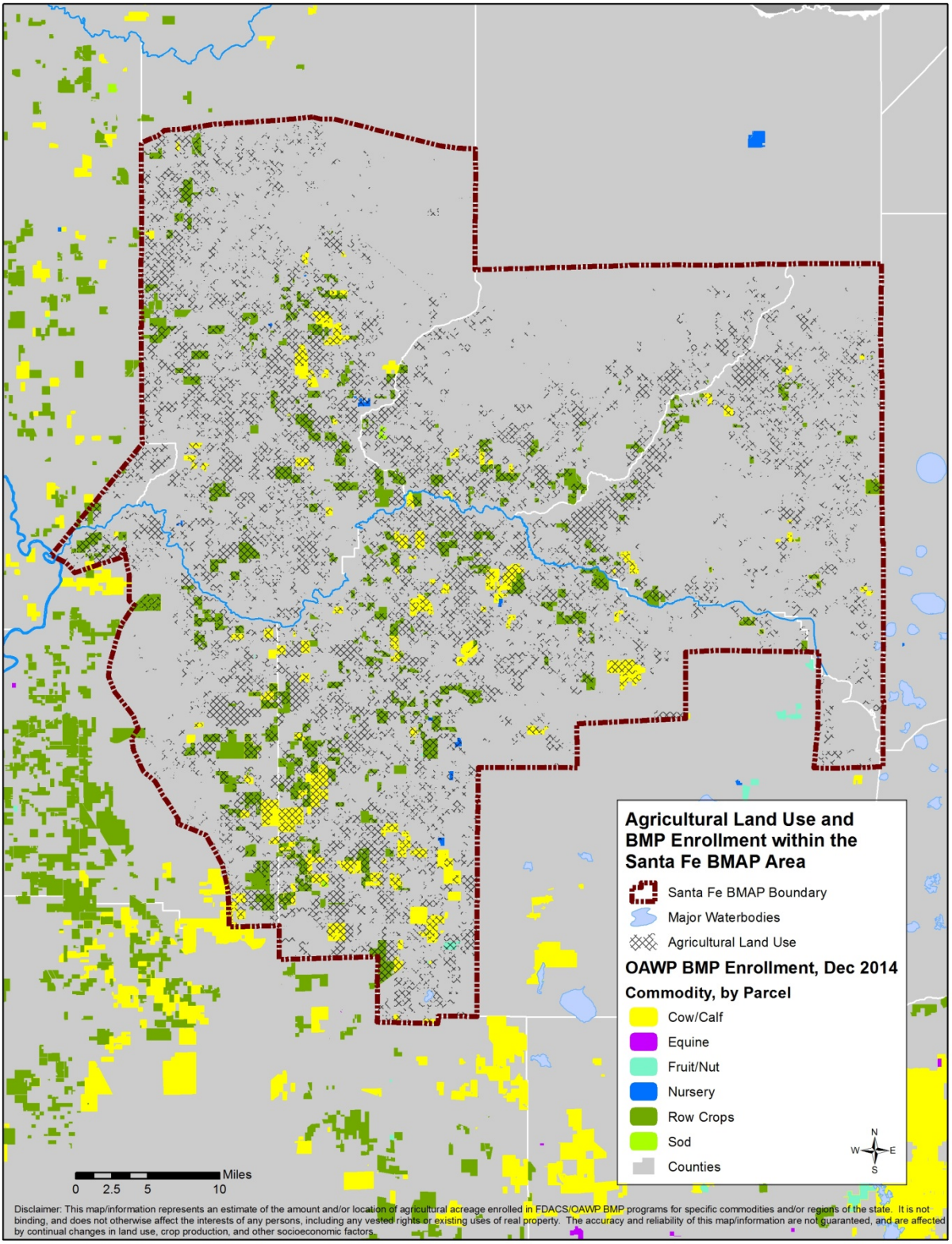

FIGURE 4: AGRICULTURAL LAND USE AND BMP ENROLLMENT IN THE SANTA FE BMAP AREA

FDACS has also been implementing cost-share BMPs in the RFA, including fertigation and retrofits to pivot irrigation systems. Fertigation is the application of fertilizer through irrigation water. It allows nutrients to be applied directly to the crop root zone and more efficiently assimilated by plants; therefore, nutrient loss through leaching and runoff is reduced. Retrofitting the pivot irrigation systems helps to optimize irrigation and reduce water consumption and runoff.

From October 2013 to September 2014, 38 pivot retrofits were completed in the Santa Fe Basin, saving approximately 690 million gallons per year of water. In addition, 39 fertigation systems were added, reducing nitrogen loading by approximately 722,982 lbs/yr. The department contributed $615,000 to the retrofit and fertigation program.

2.3 Lake City Wastewater Treatment Plant (WWTP)

The city of Lake City is upgrading its existing WWTP to meet advanced treatment standards, adding a new WWTP and associated sewer lines, and creating a wastewater reuse facility to supply both agricultural and urban users. The total cost of these projects is $22.5 million, which includes $4 million in Springs Initiative funding from the department and SRWMD. These projects will reduce nitrogen loading by about 77,000 lbs/yr.

2.4 Implementation of Other Management Strategies

In addition to the management strategies summarized in the sections above, stakeholders are also implementing the strategies summarized in **Table 3**.

Table 3: Summary of Management Strategies in the Santa Fe River Basin

Project Type	Implementation Area	RFAs	Estimated Costs
Educational activities	Alachua and Gilchrist Counties	Springshed research, public awareness, Springs Working Group	$275,000
Educational activities	Alachua County	Pet waste campaign, grass clippings campaign, public service announcements on stormwater	Ongoing
Land acquisition	Alachua County	Springshed protection	4,354 acres/ $30,000,000
Stormwater master plan implementation and updates	Alachua County	Hydrologic modeling and stormwater management improvements	$1,200,000 master plan, $650,000 modeling
Florida-Friendly Yards and Neighborhoods (FYN) fertilizer application ordinance	Alachua County	Unincorporated areas of Alachua County	Unknown

PROJECT TYPE	IMPLEMENTATION AREA	RFAS	ESTIMATED COSTS
FYN fertilizer application ordinance	Basinwide	Columbia, Levy, Gilchrist, Bradford, Union Counties within two years of BMAP adoption	In development
Educational activities	Ichetucknee Springshed (Columbia County)	The Ichetucknee Partnership and Invasive Species Working Group educational programs on benefits of and risks to springs	Unknown
FDOT right-of-way fertilizer elimination	Basinwide	State roadways	Unknown
Aquifer vulnerability studies	Columbia County, Alachua County,	County specific	Completed
Springshed protection/ development ordinance	Alachua County	Vulnerable area identification	In place
Springshed protection/ development ordinance	Columbia County, Gilchrist County	Vulnerable area identification	In development
County Alliance for Responsible Environmental Stewardship	Entire basin	Agricultural producers	Unknown
United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) cost-share	Entire basin	Agricultural producers	Varies by commodity

2.5 MONITORING AND WATER QUALITY TRENDS

The primary objectives of the Santa Fe River BMAP monitoring plan are to determine the levels of existing water quality parameters, document decreasing nutrient trends in the Santa Fe River and associated springs, and focus BMP implementation efforts by using the results of sampling data combined with appropriate Geographic Information System (GIS) information, including land use data. In addition, the monitoring plan results will be used to meet the secondary objectives, which are to identify areas where ground water data would help in understanding the hydrodynamics of the system, develop a BMP implementation plan for future phases, determine more effective nutrient reduction strategies, and determine the effectiveness of nitrogen isotope sampling for identifying organic or inorganic sources.

Ongoing sampling efforts conducted by the department and SRWMD in the Santa Fe River and associated springs will be used to meet the primary objectives (see **Figure 5**). This monitoring occurred on schedule during the reporting period, and the data were entered into the Florida Storage and Retrieval (STORET) database. The secondary (research) objectives will be met initially by the combination of a department and Alachua County/SRWMD sampling effort. Monitoring wells to be sampled will be

determined after the initial effort in the RFA provides information on the state of the system and where additional monitoring will be most effective.

Using the data from ongoing sampling efforts in the basin, the nitrate + nitrite concentration in the Santa Fe River increased slightly from January 2009 to January 2015 (see **Figure 6**). The following SRWMD river stations are included in the analysis shown in **Figure 6**:

- Santa Fe River Near Graham (Station 02320700).
- Santa Fe River Near Worthington Springs (Station 02321500).
- Santa Fe River at O'Leno State Park (Station 02321899).
- Santa Fe River at U.S. 441 Near High Springs (Station 02321975).
- Santa Fe River Near Fort White (Station 02322500).
- Santa Re River Near Hildreth (U.S. 129) (Station 02322800).

Water quality in the river is expected to improve as additional BMAP actions are implemented.

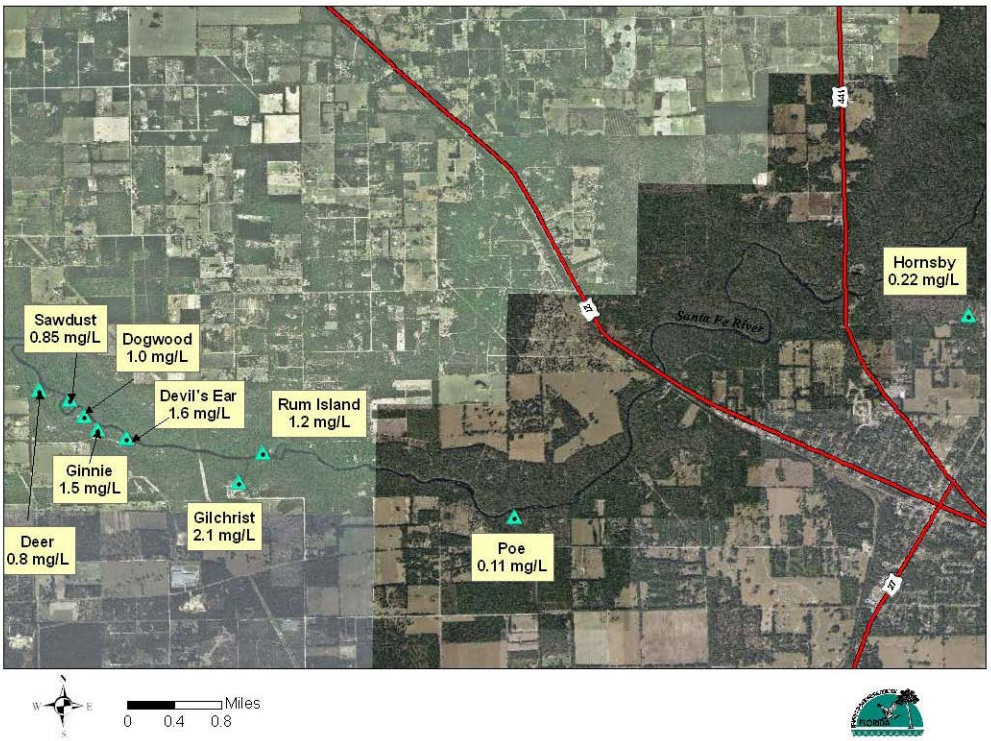

FIGURE 5: DEPARTMENT AND SRWMD SAMPLING STATIONS IN THE SANTA FE RIVER AND ASSOCIATED SPRINGS

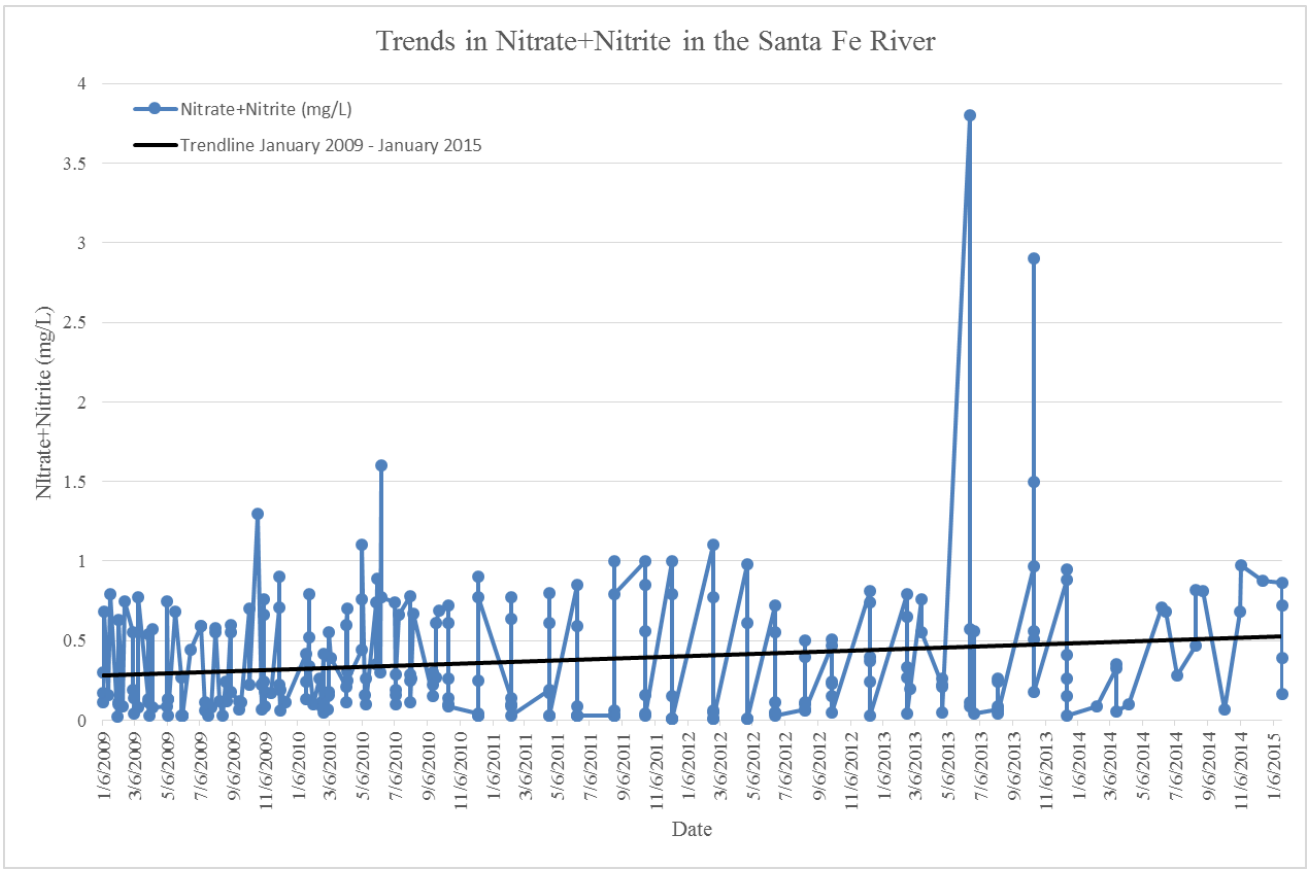

FIGURE 5: TRENDS IN NITRATE + NITRITE IN THE SANTA FE RIVER, JANUARY 2009–JANUARY 2015

Section 3: UPCOMING ACTIVITIES

The following activities are planned in the Santa Fe River Basin for the upcoming period from March 1, 2015, to February 29, 2016.

3.1 RFA AND AGRICULTURAL BMP IMPLEMENTATION

FDACS will continue to enroll agricultural producers in BMPs in the RFA, and the department will continue monitoring and assessing nitrate concentrations and sources in the area. FDACS and the department will also look for opportunities to implement additional cost-share BMPs in the RFA. Both FDACS and the department will provide quarterly updates to the stakeholders on these efforts. In addition, a webpage is planned on the Florida Springs website to share this information.

3.2 IMPLEMENTATION OF OTHER MANAGEMENT STRATEGIES

In addition to carrying out the RFA activities and implementing agricultural BMPs, the stakeholders in the Santa Fe River Basin will continue to implement urban BMPs, implement ordinances, encourage structural changes where applicable, and carry out public educational and outreach activities.

3.3 MONITORING

The monitoring of the Santa Fe River, associated springs, and ground water will continue and data will be uploaded to STORET regularly.