BASIN MANAGEMENT ACTION PLAN

for the Implementation of the Nutrient Total Maximum Daily Load by the Florida Department of Environmental Protection in the Jackson Blue Spring and Merritts Mill Pond Basin

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

in coordination with the
Jackson Blue Spring and Merritts Mill Pond Basin Stakeholders

May 2016

2600 Blair Stone Rd.
Tallahassee, FL 32399

ACKNOWLEDGMENTS

The Florida Department of Environmental Protection adopted the *Jackson Blue Spring and Merritts Mill Pond Basin Management Action Plan* by Secretarial Order as part of its statewide watershed management approach to restore and protect Florida's water quality. The plan was developed in coordination with the Jackson Blue Spring and Merritts Mill Pond Basin stakeholders, identified below, with participation from affected local, regional, and state governmental interests; elected officials and citizens; and private interests.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Jon Steverson, Secretary

Jackson Blue Spring and Merritts Mill Pond Basin participants

Responsible Stakeholders	Responsible Agencies	Other Interested Stakeholders
Agricultural producers Jackson County Town of Bascom Town of Greenwood Town of Malone	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Florida Department of Transportation – District 3 Northwest Florida Water Management District	Citizens Florida Farm Bureau University of Florida Institute of Food and Agricultural Sciences – Jackson County Extension Service

For additional information on total maximum daily loads and the watershed management approach in the Jackson Blue Spring and Merritts Mill Pond Basin, contact:

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LIST OF ACRONYMS AND ABBREVIATIONS

BMAP	Basin Management Action Plan
BMP	Best Management Practice
DEP	Florida Department of Environmental Protection
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FAR	Florida Administrative Register
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FGS	Florida Geological Survey
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
GIS	Geographic Information System
IA	Implementation Assurance
lbs/yr	Pounds Per Year
LiDAR	Light Detection and Ranging
mg/L	Milligrams Per Liter
MIL	Mobile Irrigation Lab
MS4	Municipal Separate Storm Sewer System
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWFWMD	Northwest Florida Water Management District
NSILT	Nitrogen Source Inventory and Loading Tool
OAWP	Office of Agricultural Water Policy
OFW	Outstanding Florida Water
OSTDS	On-Site Treatment and Disposal System
PFA	Priority Focus Area
QA/QC	Quality Assurance/Quality Control
RC&D	Resource Conservation and Development
RFA	Restoration Focus Area
RPS	Rapid Periphyton Survey
SBIO	Statewide Biological (Database)
SOP	Standard Operating Procedure
STORET	Storage and Retrieval (Database)
SUNA	Submersible Ultraviolet Nitrate Analyzer
SWIM	Surface Water Improvement and Management
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
UF–IFAS	University of Florida–Institute of Food and Agricultural Sciences
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WBID	Waterbody Identification (Number)
WWTF	Wastewater Treatment Facility

SUMMARY

JACKSON BLUE SPRING AND MERRITTS MILL POND BASIN

The 154-square-mile Jackson Blue Spring and Merritts Mill Pond contributing area is located in Jackson County, Florida (92%), and Houston County, Alabama (8%). **Figure ES-1** shows the Florida portion of the contributing area. Jackson Blue Spring forms the headwaters of the 270-acre Merritts Mill Pond, which was once the upper portion of a free-flowing spring run (Spring Creek) prior to 1860. The impounded Merritts Mill Pond now forms the headwaters of Spring Creek, a tributary to the Chipola River, which is designated as an Outstanding Florida Water (OFW).

Jackson Blue Spring and Merritts Mill Pond support a complex aquatic ecosystem and together are an important cultural and economic resource for the state. Jackson Blue Spring contributes 69% of the total flow of Merritts Mill Pond, as measured at the pond outfall. There are also 7 minor springs, which contribute 14% of the flow to the pond. The remaining 17% of the flow is from other unmeasured sources.

Within the Jackson Blue Spring and Merritts Mill Pond Basin, a Priority Focus Area (PFA) will be identified to focus management strategies when the BMAP is updated. This PFA will represent the areas in the basin where the aquifer is most vulnerable to inputs and where there are the most connections between ground water and Jackson Blue Spring and Merritts Mill Pond.

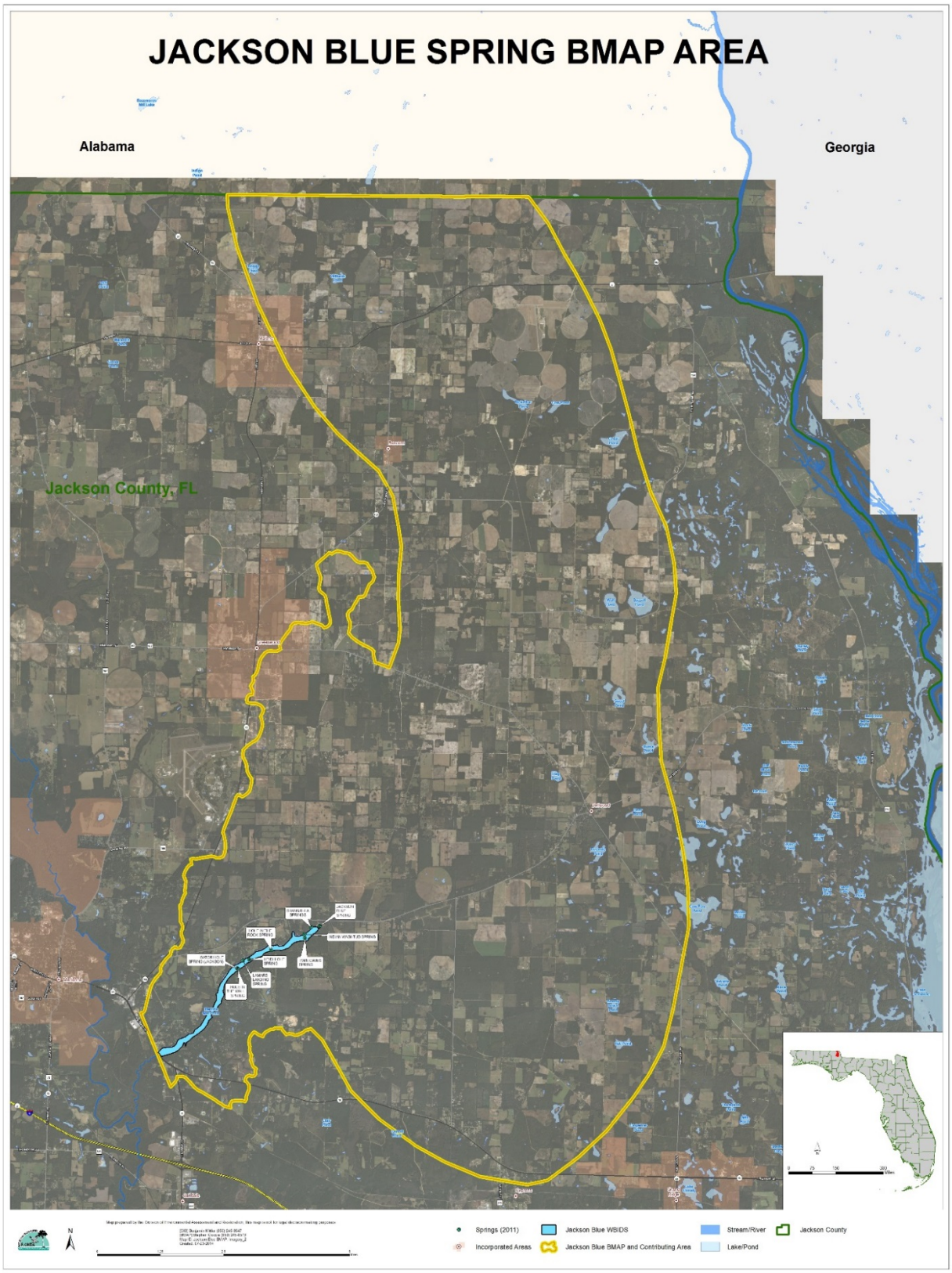

Figure ES-1: Jackson Blue Spring and Merritts Mill Pond Basin contributing area

TOTAL MAXIMUM DAILY LOADS (TMDLS)

TMDLs are water quality targets based on state water quality standards for specific pollutants, such as excessive nitrate. The Florida Department of Environmental Protection (DEP) determined that the Jackson Blue Spring segment with waterbody identification (WBID) number 180Z and Merritts Mill Pond, WBID 180A, were impaired by nitrate as nitrogen, using data from January 1, 2000, through June 30, 2007. This determination was made based on biological assessments and photographic evidence showing algal smothering in the spring and pond. The algal smothering was linked to elevated nitrate concentrations from anthropogenic sources. **Table ES-1** lists the TMDL and pollutant load allocation adopted by rule for the Jackson Blue Spring and Merritts Mill Pond WBIDs.

Table ES-1: Jackson Blue Spring and Merritts Mill Pond TMDL

[1] There are no National Pollutant Discharge Elimination System (NPDES) wastewater or stormwater facilities that discharge directly into Jackson Blue Spring or Merritts Mill Pond.
mg/L = Milligrams per liter
N/A = Not applicable

WBID	Parameter	TMDL (mg/L)	TMDL % Reduction	Wasteload Allocation for Wastewater[1]	Wasteload Allocation for NPDES Stormwater (% Reduction)[1]	Load Allocation (% Reduction)
Jackson Blue Spring (WBID 180Z), Merritts Mill Pond (WBID 180A)	Nitrate, as monthly average	0.35	90%	N/A	N/A	90%

JACKSON BLUE SPRING AND MERRITT MILL POND BMAP

Paragraph 403.067(7)(a)1, Florida Statutes (F.S.), authorizes DEP to adopt BMAPs that provide for the phased implementation of the strategies necessary to ultimately achieve the associated TMDLs. This approach allows stakeholders to establish management strategies and incrementally plan, budget, and execute projects, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the basin. This BMAP is the first iteration for the Jackson Blue Spring and Merritts Mill Pond Basin, and it covers a five-year period. The plan will be updated by July 1, 2018, to include a more detailed schedule of management actions to meet the TMDL within 20 years, as required by statute.

Using information on sources in the basin, stakeholders were asked to submit management strategies to reduce nitrate loading from sources they are responsible for managing. DEP then compared the strategies provided with the sources in the contributing area to evaluate whether each of the existing

sources was sufficiently addressed in the BMAP list of management actions and whether strategies were in place or would be put into place to reduce nitrate sources.

To ensure sufficiency for addressing onsite sewage treatment and disposal systems (OSTDS) around Merritts Mill Pond, DEP is working in cooperation with the Florida Department of Health (FDOH), Jackson County, and other parties. The objective of this effort is to identify and implement effective, financially feasible strategies to reduce nutrient loads from OSTDS sources. DEP and stakeholders will identify options for addressing OSTDS loading, identify effective strategies for the Jackson Blue Springs and Merritts Mill Pond Basin, establish education and outreach programs, determine responsibilities, and identify funding sources and an implementation schedule for the management strategies.

The requirements of this BMAP are enforceable by DEP. For urban stormwater sources, the BMAP requirements and TMDL reductions are enforceable under Section 403.067, F.S. An agricultural nonpoint source discharger included in a BMAP must demonstrate compliance with required reductions by either implementing the appropriate best management practices (BMPs) or conducting water quality monitoring prescribed by DEP or the Northwest Florida Water Management District (NWFWMD) that demonstrates compliance with state water quality standards.

ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

Through the implementation of management strategies and additional source assessment in this BMAP, stakeholders expect the following outcomes:

- Improvement in the water quality conditions in Jackson Blue Spring and Merritts Mill Pond.
- Decreased loading of the target pollutant (nitrate).
- Increased coordination among state and local governments and within divisions of local governments in problem solving for water quality restoration.
- Determination of effective management strategies through the stakeholder decision-making and priority-setting processes.
- Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions.

— Enhanced understanding of basin hydrology, water quality, and pollutant sources.

BMAP COST

Costs were provided for many of the management strategies identified in the BMAP. For these strategies, the estimated total cost is more than $10 million. Funding sources range from local contributions to legislative appropriations. Stakeholders will continue to explore new opportunities for funding assistance to ensure that the strategies listed in this BMAP can be carried out at the necessary level of effort.

BMAP FOLLOW UP AND COMMITMENT TO IMPLEMENTATION

DEP will work with stakeholders to organize the monitoring data and to track the implementation of management strategies. DEP intends to update the BMAP by July 1, 2018, to include additional details on management actions and to establish milestones for meeting the TMDL. The results of these efforts will be used to evaluate whether the BMAP is effective in reducing nitrate concentrations and loads in the basin. The Jackson Blue Spring and Merritts Mill Pond stakeholders will meet approximately every 12 months after BMAP adoption to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues. The stakeholders have committed to implementing the management strategies included in this BMAP and working together to attain the TMDL.

Chapter 1: CONTEXT, PURPOSE, AND SCOPE OF THE PLAN

Jackson Blue Spring and Merritts Mill Pond are located in Jackson County, Florida, where Jackson Blue Spring forms the headwaters of Merritts Mill Pond, which in turn forms the headwaters of Spring Creek, a tributary to the Chipola River, an Outstanding Florida Water (OFW). Jackson Blue Spring and Merritts Mill Pond support a complex aquatic ecosystem and together are an important cultural and economic resource for the state.

These waterbodies have been affected by nitrate loading from anthropogenic sources in the basin. To address nitrate impacts to the aquatic biological community in these impaired waters, the Florida Department of Environmental Protection (DEP) adopted a total maximum daily load (TMDL) to reduce nitrate inputs to the spring and pond.

This basin management action plan (BMAP) represents the joint efforts of multiple stakeholders to prepare strategies for water quality restoration for Jackson Blue Spring and Merritts Mill Pond to work towards achieving the adopted TMDL. The BMAP includes management strategies to reduce nitrate concentrations in the river and pond, targeted at restoring the natural aquatic biological community, along with a monitoring plan to guide effective long-term restoration efforts.

Stakeholder involvement is critical to develop, gain support for, and secure commitments in a BMAP. DEP invited all interested stakeholders to participate in the development of the Jackson Blue Spring and Merritts Mill Pond BMAP and facilitated participation to ensure that all voices were heard and opinions considered. This approach resulted in the use of a phased implementation process to achieve the TMDL target. The first five-year BMAP iteration is expected to achieve discernible results through the actions outlined in this document.

This chapter describes the TMDL Program, stakeholder involvement in BMAP development, BMAP purpose and scope, BMAP approach, TMDL addressed, assumptions and considerations identified during BMAP development, and future growth in the basin.

1.1 WATER QUALITY STANDARDS AND TMDLS

Florida's water quality standards are designed to ensure that surface waters can be used for their designated purposes, such as drinking water, recreation, wildlife, habitat, and agriculture. Currently, most surface waters in Florida, including those in the Jackson Blue Spring and Merritts Mill Pond Basin, are categorized as Class III waters, which means they must be suitable for recreation and must support

the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. **Table 1** shows all designated use categories.

Table 1: Designated use attainment categories for Florida surface waters

* Class I and II waters include the uses of the classifications listed below them.
** Surface water classification for waters in the Jackson Blue Spring and Merritts Mill Pond Basin.

Category	Description
Class I*	Potable water supplies
Class II*	Shellfish propagation or harvesting
Class III**	**Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife**
Class III-Limited	Fish consumption, recreation or limited recreation, and/or propagation and maintenance of a limited population of fish and wildlife
Class IV	Agricultural water supplies
Class V	Navigation, utility, and industrial use (*no current Class V designations*)

The water quality evaluation and decision-making processes for listing impaired waters and establishing TMDLs are authorized by Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA), and contained in Florida's Identification of Impaired Surface Waters Rule (IWR) (Chapter 62-303, Florida Administrative Code [F.A.C.]). The impaired waterbodies addressed in this BMAP, Jackson Blue Spring and Merritts Mill Pond, are Class III waters. The TMDL for Jackson Blue Spring and Merritts Mill Pond has been established and addresses the nitrate concentration target required for this waterbody to maintain a healthy aquatic biological community per the Class III designated use.

1.2 TMDL IMPLEMENTATION

Rule-adopted TMDLs may be implemented through BMAPs, which contain strategies to reduce and prevent pollutant discharges into impaired waterbodies through various cost-effective means. Stakeholder involvement is critical to the success of the TMDL Program and varies with each phase of implementation to achieve different purposes. The BMAP development process is structured to achieve cooperation and consensus among a broad range of interested parties. As indicated in the statute, DEP invites stakeholders to participate in the BMAP development process and encourages public participation and consensus to the greatest practicable extent.

1.3 JACKSON BLUE SPRING AND MERRITTS MILL POND BMAP

1.3.1 Plan Purpose and Scope

The purpose of this BMAP is to develop a schedule setting 5-, 10-, and 15-year targets to implement nitrate reductions, with the goal of achieving the Jackson Blue Spring and Merritts Mill Pond TMDL within 20 years of BMAP adoption. This plan outlines management strategies that have provided or will provide nitrate reductions and a schedule for implementation for the first five-year BMAP iteration. The BMAP also details a monitoring approach to measure progress towards the nitrate target concentration and improvement in the river's biological community. Stakeholders will meet approximately annually to review progress made towards achieving the TMDL. The plan will also be updated with further details by July 1, 2018.

In 2013, DEP adopted a nitrate TMDL for Jackson Blue Spring and Merritts Mill Pond, which are segments with waterbody identification (WBID) numbers 180Z and 180A, respectively. The contributing area is located in portions of southern Alabama (8%) and Jackson County (92%) in Florida. The Jackson Blue Spring and Merritts Mill Pond BMAP focuses on the portion of the contributing area located in Florida (see **Figure 1**). The BMAP basin encompasses an area of 141 square miles.

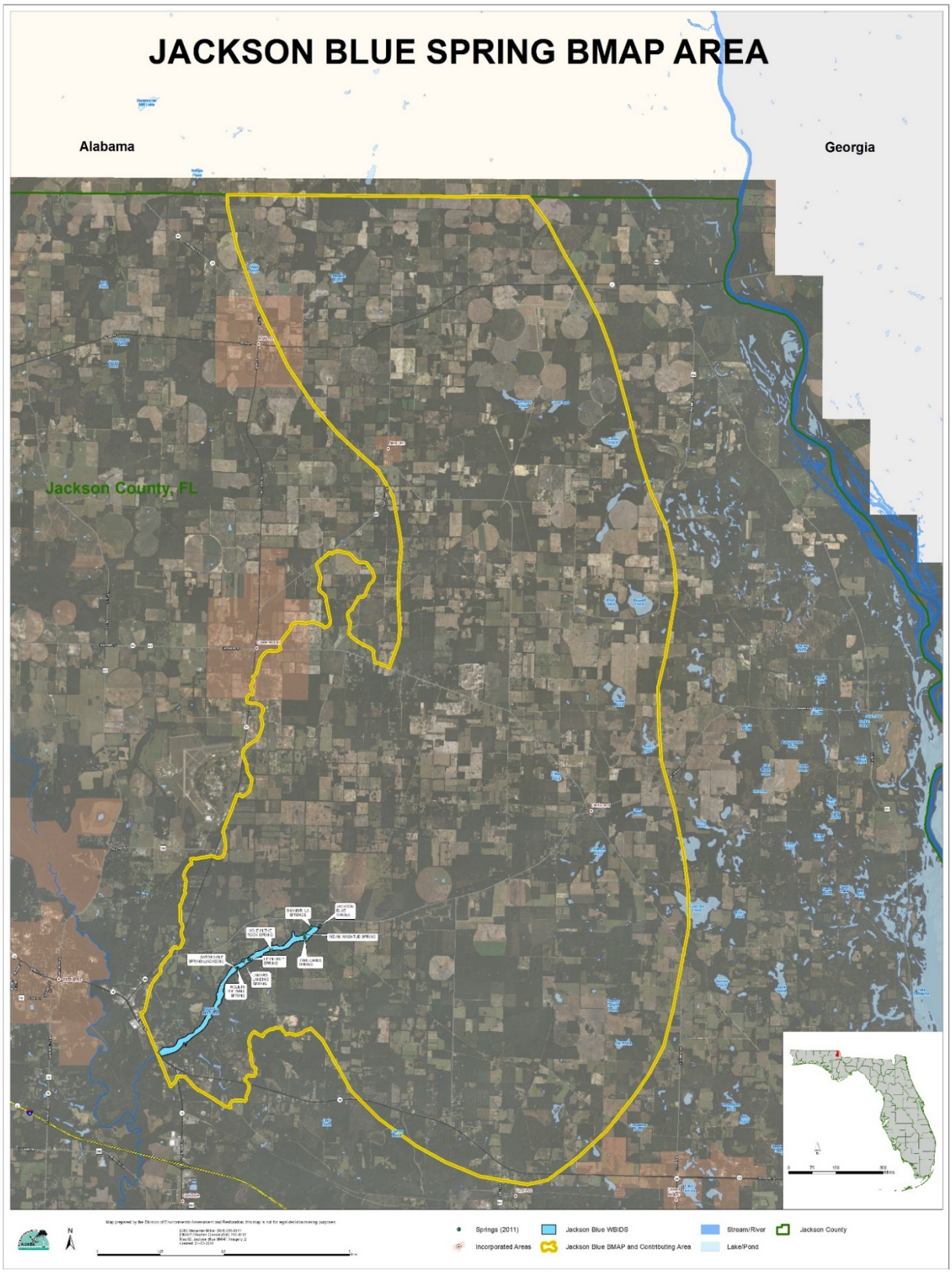

Figure 1: Jackson Blue Spring and Merritts Mill Pond Basin contributing area

1.3.2 Stakeholder Involvement

The BMAP process engages local stakeholders and promotes coordination and collaboration to address the nitrate reductions to achieve the Jackson Blue Spring and Merritts Mill Pond TMDL. The following entities and stakeholders are responsible for load reductions and monitoring:

- Agricultural producers.
- Florida Department of Agriculture and Consumer Services (FDACS).
- Florida Department of Environmental Protection (DEP).
- Florida Department of Health (FDOH).
- Jackson County.
- Town of Bascom.
- Town of Greenwood.
- Town of Malone.
- Northwest Florida Water Management District (NWFWMD).
- Citizens.
- Florida Farm Bureau.
- University of Florida Institute of Food and Agricultural Sciences (UF–IFAS) – Jackson County Extension.

In April 2014, DEP initiated the BMAP development process and held a series of technical meetings involving stakeholders and the general public. The purpose of these meetings was to consult with stakeholders to gather information about the contributing area and identify specific management strategies that would reduce nitrate loading. Technical meetings were held to gather information, identify potential sources, define management strategies currently under way or planned, and develop the BMAP contents and actions to reduce nitrate loading, with the ultimate goal of achieving the TMDL. All technical meetings were open to the public and noticed in the *Florida Administrative Register (FAR)*. Technical meetings were held regularly throughout the BMAP development process on the following dates:

- April 21, 2014.
- July 28, 2014.
- September 30, 2014.
- June 23, 2015.
- March 23, 2016.

In addition to technical meetings, DEP met with responsible stakeholders in one-on-one meetings to discuss different aspects of the BMAP, such as management strategies. Stakeholders were also encouraged to contact DEP staff via phone and email to participate in forming the plan. A public workshop on the BMAP was also held on May 12, 2016. The public workshop was noticed in the *Jackson County Floridan*.

Except as specifically noted in subsequent sections, this BMAP document reflects DEP's approach to achieving the TMDL based on research and input from stakeholders, along with public input from workshops and meetings held to discuss key aspects of the TMDL and BMAP development.

1.3.3 BMAP Approach

The BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, F.S. The management actions and adaptive management approach described in the BMAP will address nitrate reductions, and the process will continue until the TMDL target is attained. The phased BMAP approach allows for the implementation of management strategies designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics in the basin. The total reductions to achieve the Jackson Blue Spring and Merritts Mill Pond TMDL will be addressed in five-year increments.

Using information on sources in the basin (see **Section 3.1**), stakeholders were asked to submit management strategies to reduce nitrate loading from the sources they are responsible for managing. DEP compared the strategies provided with the sources to evaluate whether each of the existing sources was sufficiently addressed for BMAP adoption and whether strategies were in place or would be put into place to reduce future nitrate sources.

The management strategies included in this BMAP describe the first 5 years of management actions to address nitrate loading in the Jackson Blue Spring and Merritts Mill Pond contributing area. These

strategies are described in **Chapter 4** and are expected to make progress towards meeting the TMDL. This BMAP will be revised at the end of the first 5-year phase to include additional management strategies as well as an assessment of progress in meeting the TMDL. The overall objective of this BMAP and its subsequent updates is to meet the TMDL within 20 years of BMAP adoption.

1.3.4 On-Site Sewage Treatment and Disposal Systems (OSTDS)

OSTDS are a major source of nitrate loading to Merritts Mill Pond. DEP understands that the selection of management strategies to meet OSTDS reduction requires sufficient time for stakeholders to consult with local decision makers, plan implementation timelines, consider funding sources, and budget available funds. To help address this source of loading in the future, DEP—along with FDOH, Jackson County, and other parties—will continue to develop nitrogen-reducing projects that focus on OSTDS sources.

The objective of this effort is to identify effective, financially feasible strategies to reduce nutrient loads from OSTDS sources. DEP and stakeholders will identify options for addressing OSTDS loading, identify effective strategies for the Jackson Blue Spring and Merritts Mill Pond Basin, establish education and outreach programs, determine responsibilities, and identify funding sources and an implementation schedule for the management strategies.

1.3.5 Pollutant Reduction and Discharge Allocations

1.3.5.1 Categories for Rule Allocations

The rules adopting TMDLs must establish reasonable and equitable allocations that will alone, or in conjunction with other management and restoration activities, attain the TMDLs. Allocations may be to individual sources, source categories, or basins that discharge to the impaired waterbody. The allocations in rule identify either how much pollutant discharge each source designation may continue to contribute (discharge allocation), or the load or percentage of its loading the source designation must reduce (reduction allocation). The TMDL allocation categories are as follows:

- **Wasteload Allocation** is the allocation to point sources permitted under the National Pollutant Discharge Elimination System (NPDES) Program. It includes the following:
    - Wastewater Allocation is the discharge allocation to industrial and domestic wastewater treatment facilities (WWTFs).

- NPDES Stormwater Allocation is the allocation to NPDES stormwater permittees that operate municipal separate storm sewer systems (MS4s). These permittees are treated as point sources under the TMDL Program.

— **Load Allocation** is the allocation to nonpoint sources, including agricultural runoff and stormwater from areas that are not included in an MS4 permit.

The TMDL did not specify wasteload allocations to NPDES WWTFs or MS4s because there are no WWTFs and MS4s with discharges into Jackson Blue Spring or Merritts Mill Pond (DEP 2013).

1.3.5.2 Allocations Implemented by the BMAP

The FWRA (Section 403.067, F.S.) states that the BMAP must equitably allocate pollutant reductions to individual basins, as a whole to all basins, or to each identified point source or category of nonpoint sources, as appropriate. Allocations are determined based on a number of factors listed in the FWRA, including cost-benefits, technical and environmental feasibility, implementation time frames, and others. The adopted TMDL (see **Section 1.3.6**) sets the allocations, as a percent reduction, to the nonpoint source category (load allocation) to achieve the target concentration of 0.35 milligrams per liter (mg/L) of nitrate in Jackson Blue Spring and Merritts Mill Pond. This BMAP implements the TMDL allocations for the nonpoint sources, assigning the TMDL target as a whole to all basins. More detailed allocations may be developed, if needed, as this BMAP is updated.

1.3.6 Jackson Blue Spring and Merritts Mill Pond TMDL

DEP adopted the *Nutrient TMDL for Jackson Blue Spring and Merritts Mill Pond (WBIDs 180Z and 180A)* in January 2013. DEP determined that Jackson Blue Spring and Merritts Mill Pond were impaired by nitrate based on biological assessments and photographic evidence showing algal smothering in the spring and pond. The algal smothering was linked to elevated nitrate concentrations from anthropogenic sources (DEP 2013). **Table 2** lists the TMDL and pollutant load allocations adopted by rule for Jackson Blue Spring and Merritts Mill Pond.

Table 2: Jackson Blue Spring and Merritts Mill Pond TMDL

[1] There are no NPDES wastewater or stormwater facilities that discharge directly into Jackson Blue Spring or Merritts Mill Pond.

WBID	Parameter	TMDL (mg/L)	TMDL % Reduction	Wasteload Allocation for Wastewater[1]	Wasteload Allocation for NPDES Stormwater (% Reduction)[1]	Load Allocation (% Reduction)
Jackson Blue Spring (WBID 180Z); Merritts Mill Pond (WBID 180A)	Nitrate, as monthly average	0.35	90%	N/A	N/A	90%

1.4 ASSUMPTIONS AND CONSIDERATIONS REGARDING TMDL IMPLEMENTATION

The water quality impacts of BMAP implementation are based on several fundamental assumptions about the pollutant targeted by the TMDL, waterbody response, and natural processes. In addition, there are important considerations about the nature of the BMAP and its long-term implementation. These assumptions and considerations are discussed below.

1.4.1 Assumptions

The following assumptions were used during the BMAP process:

- Reductions in nitrate concentrations in Jackson Blue Spring and Merritts Mill Pond will result in improved biological communities, including a reduction in the amount of algae present in the river.
- The largest source of nitrate loading to Merritts Mill Pond is through Jackson Blue Spring. Therefore, management strategies that reduce nitrate loading to ground water were the priority for this BMAP iteration.
- The Nitrogen Source Inventory Loading Tool (NSILT) identifies potential source categories and their estimated load to ground water. This information will be used in determining potential load reductions associated with nutrient reduction projects.

1.4.2 Considerations

This BMAP requires that all stakeholders in the basin implement the management strategies set forth here within the first five-year BMAP cycle. However, the full attainment of the TMDL target will be a long-term process. While many of the projects and activities contained in the BMAP are recently completed or currently ongoing, there are projects that will require time to design, secure funding, and construct. Funding limitations do not impact the requirement that each entity must implement the

activities committed to in this BMAP. However, funding was considered, to the extent practicable, when determining the schedule for meeting BMAP requirements. Although funding strategies can be problematic, funding limitations do not affect the requirement that each entity must implement the management strategies listed in the BMAP to cumulatively achieve water quality standards.

This BMAP will be updated by July 2018 to include additional milestones and an overall approach to reducing nitrate loads to ground water to meet the TMDL within a 20-year timeframe. It is understood that waterbodies can respond differently to the reduced concentrations and loading. Regular follow up and continued coordination and communication by stakeholders will be essential to ensure the implementation of management strategies and the assessment of effects. Additional management strategies required to achieve the TMDL will be developed. During the BMAP process, several items were identified that could be addressed in future BMAP updates to ensure that future BMAPs use the most accurate information:

- **Water Quality Standards** –The BMAP monitoring plan (see **Section 5.3**) was designed to collect the data necessary to measure progress towards the TMDL. The TMDL represents a site-specific interpretation of the water quality criteria and therefore future assessments will be based on meeting the TMDL and, for Merritts Mill Pond, the balance of flora and fauna in the surface water. For surface waters, if the nutrient target has been achieved but the biological community is not responding, Merritts Mill Pond would still be considered impaired. DEP would then have to determine if the TMDL target should be modified or if another factor is causing the impairment.
- **Contributing Area Boundary** – The BMAP contributing area boundary was determined using potentiometric surface maps, as well as both instrument survey and light detection and ranging (LiDAR) elevation models (DEP 2013). In future iterations of the BMAP, the contributing area may be modified based on new evidence and better science.
- **OSTDS** – OSTDS are a major contributor of nitrate to Merritts Mill Pond. The results of the recent FDOH study will help to guide OSTDS management strategies in the basin. In the meantime, DEP will work with the responsible local stakeholders and FDOH (see **Section 1.3.4**) to identify appropriate management strategies and funding sources to address OSTDS loading.

- **Management Strategy Implementation** – DEP will consider the management strategies listed in this BMAP and the associated nitrogen reductions in the next BMAP iteration when identifying what additional load reductions are required to meet the TMDL and which sources should implement strategies to achieve the necessary reductions.

1.5 FUTURE GROWTH IN THE WATERSHED

The FWRA requires that BMAPs "identify the mechanisms by which potential future increases in pollutant loading will be addressed." Since the TMDL reductions are based on decreasing loads from past development, it is important that loads from new development are well controlled. Although future development may be meeting state and local standards, development may still add a nutrient load to the Jackson Blue Spring and Merritts Mill Pond Basin. To ensure that future growth does not add to the degradation of these waterbodies, local governments must be proactive in controlling loads from future growth.

Chapter 2: JACKSON BLUE SPRING AND MERRITTS MILL POND BASIN SETTING

2.1 LAND USE COVERAGE

Land uses in the Jackson Blue Spring and Merritts Mill Pond contributing area were aggregated using the simplified Level 1/Level 3 codes from the 2009 NWFWMD land use coverage shown in **Table 3** (DEP 2013). Agriculture was the predominant land use category in the contributing area (42.78%), followed closely by forestry/rural open (42%). Urban land uses comprise only 10% of the contributing area (DEP 2013). **Figure 2** shows the distribution of land uses in the Jackson Blue Spring and Merritts Mill Pond contributing area.

Table 3: 2009 land use categories in the Jackson Blue Spring and Merritts Mill Pond contributing area

Level 1 Land Use Code	Land Cover Description	Acres	% Total
1100	Low-Density Residential	4,250.27	4.72%
1200	Medium-Density Residential	1,405.18	1.56%
1300	High-Density Residential	52.79	0.06%
1400	Commercial	147.83	0.16%
1500	Light Industrial	3.86	0.00%
1600	Extractive/Quarries/Mines	186.20	0.21%
1700	Institutional	80.19	0.09%
1800	Recreational (Golf Courses, Parks, Marinas, *etc.*)	159.71	0.18%
1900	Open Land	42.98	0.05%
2000	Agriculture	38,488.82	42.78%
3000 + 7000	Rangeland	3,883.56	4.32%
4000	Forest/Rural Open	37,793.76	42.00%
5000	Water	468.64	0.52%
6000	Wetlands	2,600.54	2.89%
8000	Communication and Transportation	412.71	0.46%
	TOTAL	**89,977.04**	**100.00%**

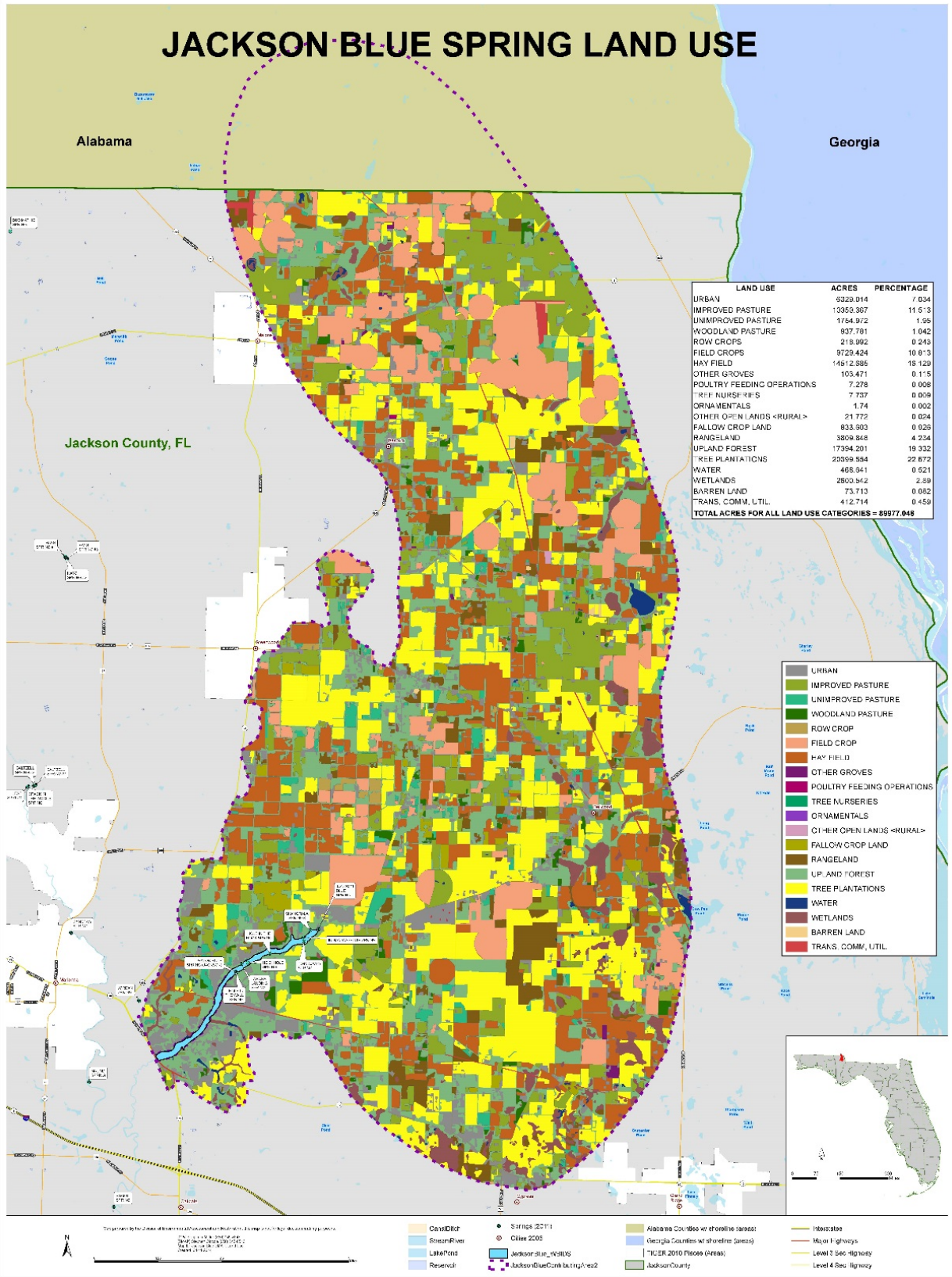

Figure 2: 2009 land use in the Jackson Blue Spring and Merritts Mill Pond contributing area

2.2 WATER QUALITY TRENDS

The predominant form of nitrogen in the samples from Jackson Blue Spring and Merritts Mill Pond is nitrate. The nitrate concentrations measured at Jackson Blue Spring have increased from 0.34 mg/L in the 1960s to greater than 3 mg/L more recently.

Figure 4 shows the total nitrogen (TN) and nitrate data for Jackson Blue Spring and Merritts Mill Pond for the period from 1981 through 2011. The nitrate concentrations from Jackson Blue Spring are consistently higher than the concentrations found in the samples from Merritts Mill Pond, which include surface water samples from Merritts Mill Pond and samples from the springs that discharge into the pond (DEP 2013).

Over the monitoring period, median nitrate concentrations in Jackson Blue Spring have ranged from 3.1 to 3.4 mg/L (see **Figure 3**). Over the most recent 10-year period of record used for TMDL development, the median nitrate concentration in Jackson Blue Spring was 3.3 mg/L. Over the same monitoring period, the median nitrate concentrations in the samples representing Merritts Mill Pond (mainly from the springs) ranged from 1.85 to 2.9 mg/L. Over the recent 10-year period, the median nitrate concentration for Merritts Mill Pond was 2.2 mg/L (DEP 2013).

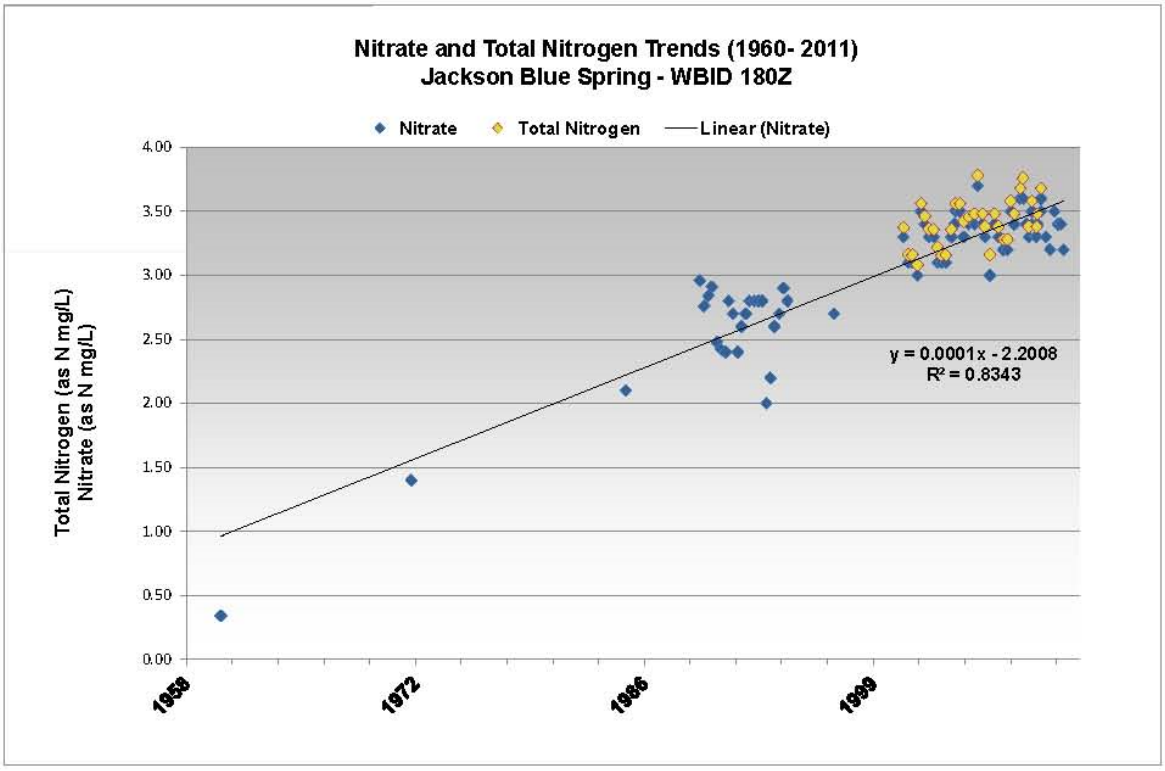

Figure 3: Nitrate and TN trends For Jackson Blue Spring, 1960–2011

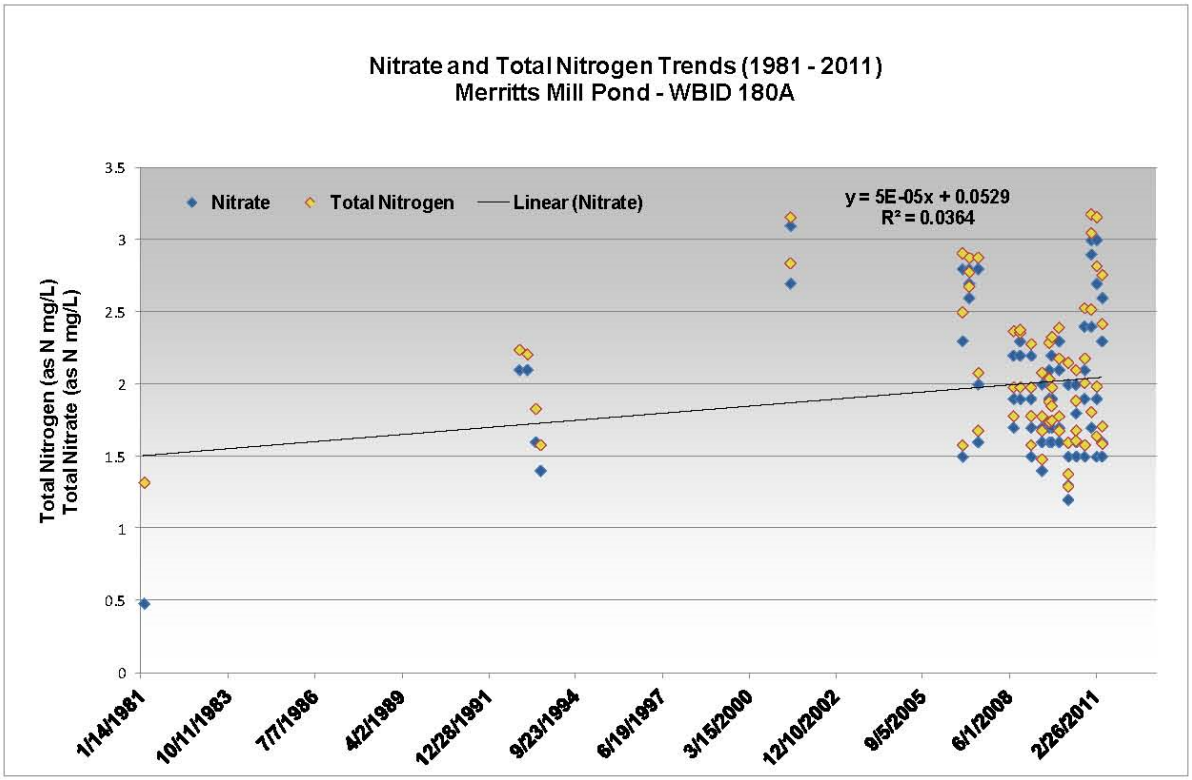

Figure 4: Nitrate and TN trends for Merritts Mill Pond, 1981–2011

Chapter 3: POLLUTANT SOURCES AND ANTICIPATED OUTCOMES

Typical nutrient sources in the Jackson Blue Springs and Merritts Mill Pond Basin are nonpoint sources dispersed throughout the contributing area. Nutrients applied over a broad area at or just below the land surface infiltrate through the soil to the aquifer. Unlike a surface water system, it is difficult to determine where pollutant sources originate in a ground water system. This chapter discusses the potential sources in the basin, and the NSILT developed to estimate the contribution from nutrient sources applied at the land surface.

3.1 NSILT

The NSILT is a geographic information system (GIS) and spreadsheet-based tool that provides estimates of the relative contribution of nitrogen from various sources, including the following:

- Atmospheric deposition.
- Septic tanks.
- Golf courses.
- Urban fertilizer.
- Farm fertilizer.
- Livestock.

DEP developed the NSILT as a resource to identify areas where nitrogen source reduction efforts could be focused to achieve the most beneficial and cost-effective effect on water quality. The general approach for the NSILT was to characterize ground water recharge, identify categories of land use that are potential nitrogen sources, estimate nitrogen input at the land surface, and calculate the estimated nitrogen load to the ground water. The NSILT for Jackson Blue BMAP generated nitrogen loads to ground water for two distinct areas, Merritts Mill Pond Corridor and the Jackson Blue Spring area (**Figure 5**). The source inventories for these two areas were then combined to generate a nitrogen load to the ground water for the entire BMAP area.

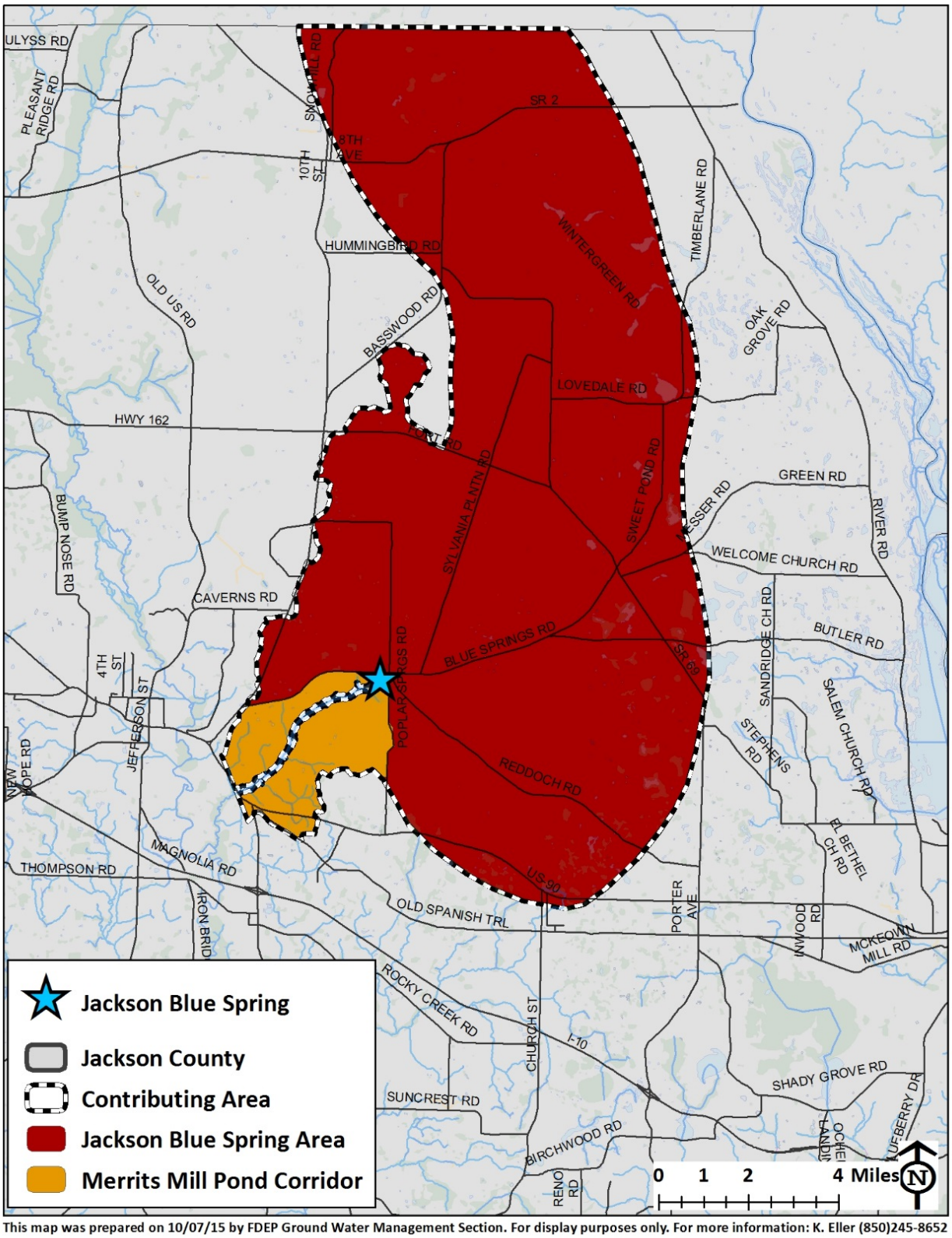

Figure 5: Merritts Mill Pond corridor and Jackson Blue Spring contributing areas

3.1.1 NSILT Process

The first step in the NSILT process was to estimate the nitrogen load to the land surface for each of the land use categories in the basin. Attenuation factors were then applied to the load based on the various environmental processes that could transform nitrogen in the subsurface, such as denitrification, the nitrification of ammonia, uptake by vegetation, and the mineralization of organic nitrogen. The final step to estimate nitrogen inputs was to apply an areal weighting factor based on the rate of recharge to ground water, resulting in the estimated nitrogen loads to ground water.

The TMDL and NSILT includes estimates of loading in the contributing area from atmospheric deposition, farm fertilizer and livestock, OSTDS, urban fertilizer, golf courses, and stormwater. Atmospheric deposition is considered an uncontrollable source; therefore, the TMDL did not require reductions from this source. Therefore, the BMAP focuses on addressing loading from the other sources. **Figure 6** shows the estimated percent of the nitrogen load to ground water from each source category in the BMAP area.

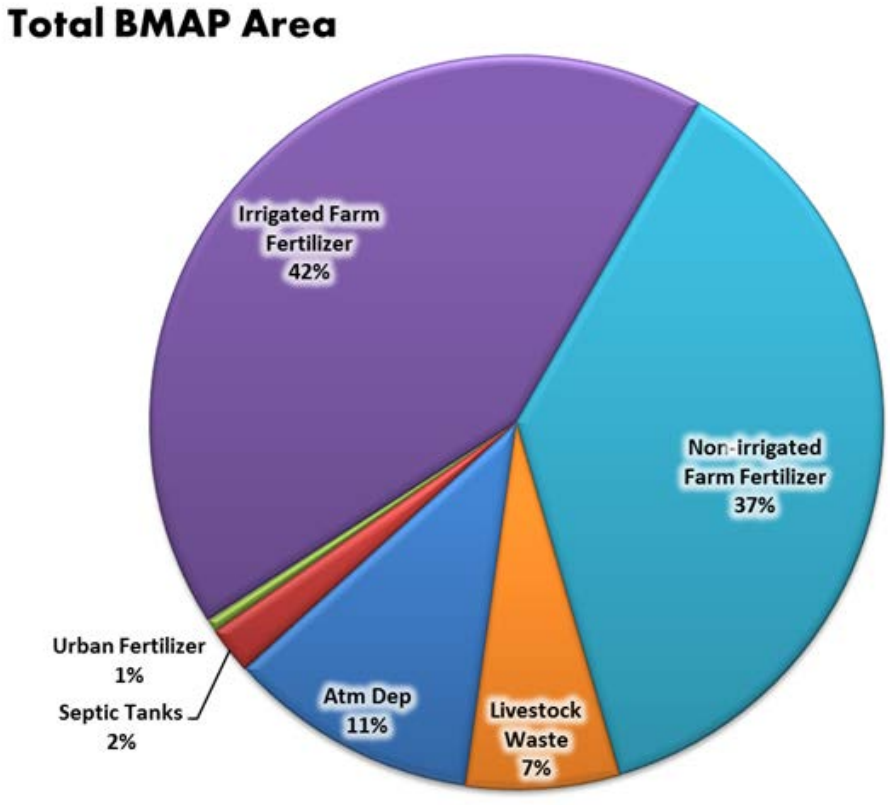

Figure 6: Summary of estimated TN loading to ground water in the Jackson Blue BMAP area

3.2 ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

With the implementation of the management strategies outlined in this BMAP, reductions in the nutrient loads to the Jackson Blue Spring and Merritts Mill Pond Basin are expected to decrease the contribution of nitrate to the river and springs. The following outcomes are expected from BMAP implementation:

- Continued improvement in water quality conditions in Jackson Blue Spring and Merritts Mill Pond.
- Decreased loading of the target pollutant (nitrate).
- Increased coordination, such as through the OSTDS Initiative and annual meetings, among state and local governments and within divisions of local governments in problem solving for water quality restoration.
- Determination of effective management strategies through the stakeholder decision-making and priority-setting processes.
- Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions.
- Enhanced understanding of basin hydrology, water quality, and pollutant sources.

Chapter 4: MANAGEMENT STRATEGIES

"Management strategies" refer to the suite of activities that the responsible Jackson Blue Spring and Merritts Mill Pond BMAP entities will be conducting to achieve nitrate reductions. These strategies include structural and nonstructural activities. Under Paragraph 403.067(7)(a), F.S., a BMAP is required to integrate the appropriate management strategies available to the state through existing water quality protection programs to achieve the TMDLs. In the case of this BMAP, management strategies include an evaluation of the previously identified source categories in the NSILT and a discussion of potential nutrient-reducing actions for these sources.

The stakeholders submitted strategies that were completed since January 1, 2004, and planned within the first five-year BMAP iteration. January 1, 2004, was selected as a starting point for the BMAP strategies because it is the mid-point of the verified period used to determine the impairment in the Jackson Blue Spring and Merritts Mill Pond TMDL. Since the Jackson Blue Spring and Merritts Mill Pond Basin is a ground water–driven system, DEP reasoned that because of the delay between reduction strategies and the detection of the results, the full benefits of the management strategies completed during the TMDL verified period were not seen in the water quality data. Therefore, these projects have provided additional benefits during the latter portion of the verified period and should be listed in the BMAP.

Management strategies are submitted to provide reasonable assurance to DEP that each responsible entity has a plan on how to reduce nitrate concentrations. The following sections discuss the NSILT source categories and potential nutrient-reducing activities.

4.1 MANAGEMENT STRATEGIES

Table 4 lists the existing management strategies to reduce nitrate concentrations in the contributing area. The nitrate load reduction strategies outlined in the project tables, including the activities highlighted below, are expected to reduce nitrate concentrations and improve water quality in Jackson Blue Spring and Merritts Mill Pond. As water quality improves as a result of these strategies and more data are collected to show the nitrate concentrations and health of the biological community in Jackson Blue Spring and Merritts Mill Pond, future BMAP iterations may recommend different or additional strategies.

Each nutrient source category identified in the NSILT also has nutrient-reducing management strategies associated with it that will need to be implemented or, if already existing, strengthened. This BMAP relies on the existing management strategies and these NSILT-identified strategies to reduce nitrate

concentrations and make substantial progress towards meeting the TMDL target. The NSILT nutrient-reducing strategies are described in more detail in the following section.

Figure 5 shows the two areas—Merritts Mill Pond and Jackson Blue—that make up the Jackson Blue BMAP area. The NSILT estimated loads to ground water in the Jackson Blue BMAP area, and **Figure 7** and **Figure 8** show the relative relationships of the loads for each area. The composite chart in **Figure 9** shows the estimated loads to ground water for the entire BMAP area. These charts help identify the main potential sources of nutrients to Mill Pond and spring and provide a basis for determining effective localized nutrient-reducing management strategies.

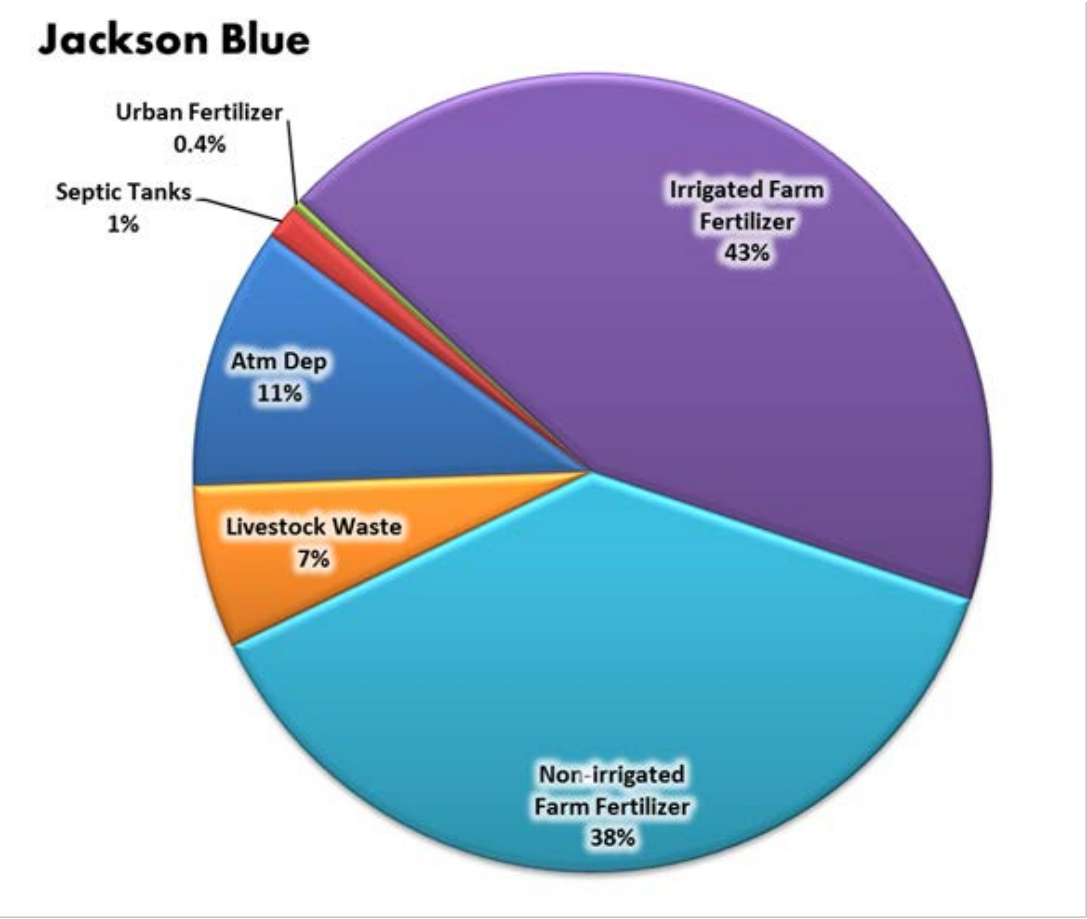

Figure 7: NSILT-estimated nitrogen load to ground water for the Jackson Blue springshed

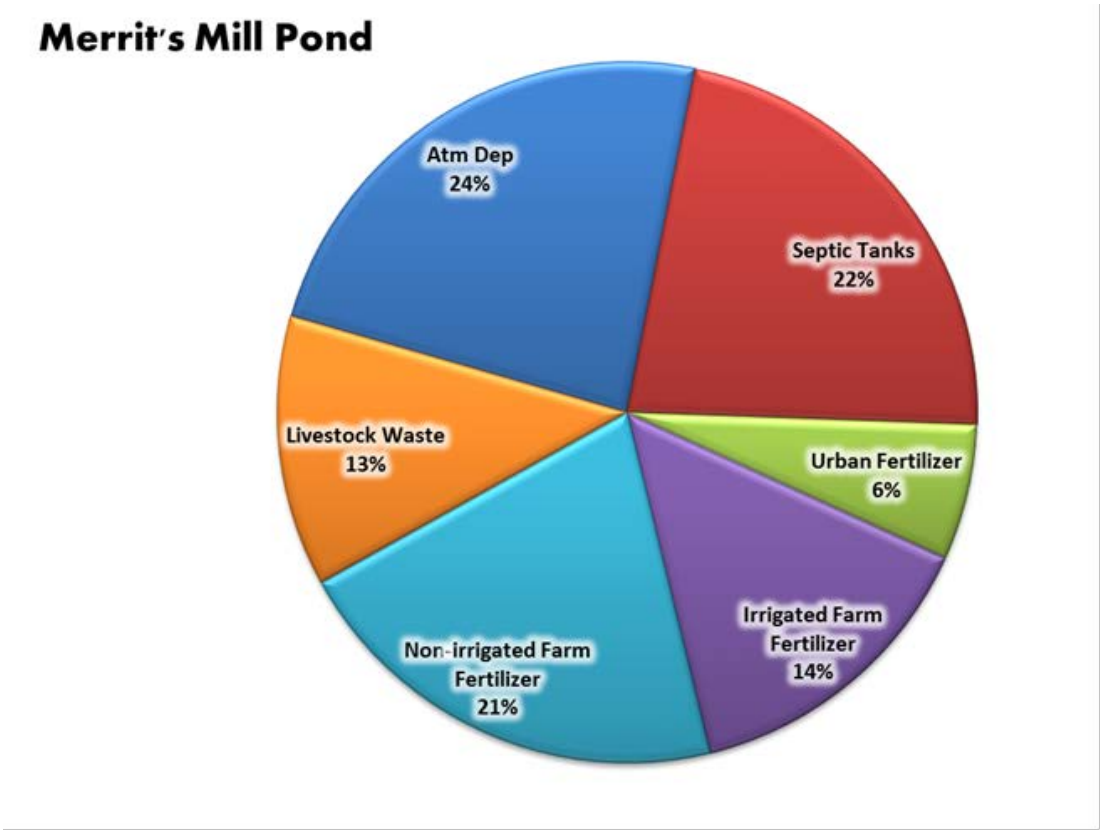

Figure 8: NSILT-estimated nitrogen load to ground water in the Merritts Mill Pond area

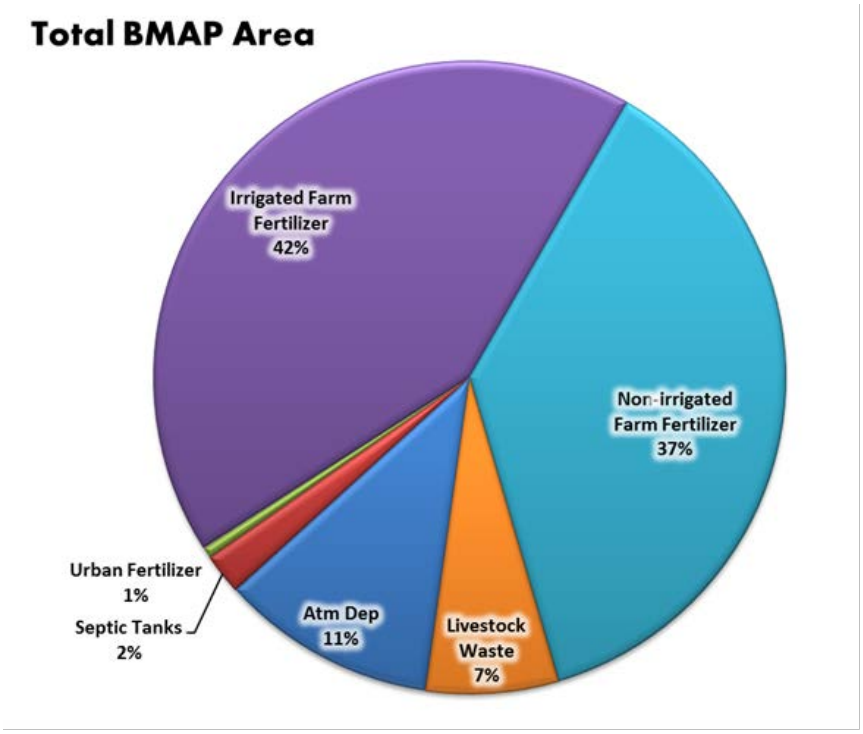

Figure 9: Composite NSILT-estimated nitrogen load to ground water in the Jackson Blue BMAP area

4.1.1 Agricultural Fertilizer and Livestock Loads to Ground Water

The estimated nitrogen loads to ground water for irrigated and nonirrigated applied fertilizer and livestock waste comprise 86% of the total load in the Jackson Blue area. Implementation of agricultural best management practices (BMPs) is estimated to achieve the maximum initial load reductions required for the springshed. The actions being taken are detailed in **Section 4.2**.

4.1.2 OSTDS (Septic Tanks) Loads to Ground Water

The estimated nitrogen loading to ground water for septic tanks is greatest in the Mill Pond area (22%). In this area DEP, FDOH, NWFWMD, Jackson County, and other interested parties will work together to identify effective management strategies, determine funding sources, and develop implementation plans for these strategies. Current activities include the replacement of existing septic tanks with sewer connections in the Indian Springs subdivision.

Certain solutions developed for the Mill Pond area will also help with septic tank loading reductions in the remainder of the BMAP area where the estimated OSTDS load is 2%. Load reductions associated with the management actions can be estimated through the application of the appropriate model.

4.1.3 Urban Fertilizer Loads to Ground Water

The estimated nitrogen load to ground water for urban fertilizer is greatest in the Mill Pond Area, where it comprises 6% of the total load. In the entire BMAP area, the load is estimated at 1%. Jackson County is required to develop and pass an urban fertilizer ordinance, and the implementation of this ordinance is estimated to achieve the reductions necessary for this nutrient source.

Table 4 summarizes the management strategies provided by each stakeholder. The projects funded by several funding sources are grouped by funding source in **Table 5**, **Table 6**, and **Table 7**. For future management strategies, stakeholders are identifying feasible funding strategies to implement the activities identified in the tables below. **Appendix B** outlines other funding strategies.

Table 4: Jackson Blue Springs management strategies

* The estimated reductions are based on the amount of TN applied to the land surface and do not represent the nitrate loading to ground water.

Project Number	Project Name	Lead Entity	Project Type	Project Description	Acres Treated	Cost	Annual O&M Cost	Funding Source	Contract Agreement Number	Project Status	Completion Year	TN Reduction* (lbs/yr)
JC-1	Indian Springs Sewer Extension Phase I	Jackson County	Septic to Sewer Connection	Extend central sewer to Lower Indian Springs Subdivision, serving 125 homes, install onsite grinders for each home, and abandon septic systems to reduce nitrate levels in Merritts Mill Pond and Jackson Blue Springs.		$1,950,000		Springs		FY 15–16 DEP contract executed; county contract executed		
NWF-1	Claiborne Aquifer Water Supply	NWFWMD	Agricultural or Ag-Related	Initiates Claiborne Aquifer testing in Jackson Blue Spring contributing area. Determine aquifer's viability as alternative water source to offset demand on Floridan aquifer.		$440,000		Springs		In progress		
NWF-2	Jackson Blue Spring Agricultural BMP Producer Cost-Share Grant Program	NWFWMD	Agricultural or Ag-Related	Cost-share funding for agricultural BMPs in Jackson Blue Spring contributing area to improve water use efficiency and reduce nutrient loading. Also supports mobile irrigation lab (MIL).		$1,121,754		Springs		Ongoing		
NWF-3	Blue Springs Plantation, Inc. Land Acquisition	NWFWMD	Land Acquisition	Fee-simple acquisition and protection of 394 acres adjacent to Jackson Blue Spring.		$2,100,000		Springs		FY 15–16 DEP contract executed		
NWF-4	Lakeshore Farms II, LLC Land Acquisition	NWFWMD	Land Acquisition	Fee-simple and/or less-than-fee acquisition and protection of 598 agricultural acres in Jackson Blue ground water contributing area.		$2,686,568		Springs		FY 15–16 contract executed; conservation easement in development		

Project Number	Project Name	Lead Entity	Project Type	Project Description	Acres Treated	Cost	Annual O&M Cost	Funding Source	Contract Agreement Number	Project Status	Completion Year	TN Reduction* (lbs/yr)
NWF-5	Sod-Based Crop Rotation Pilot Project	NWFWMD /UF–IFAS	Agricultural or Ag-Related	Demonstration project (to include subsidies) for up to four sod farms in Jackson County to improve water quality and quantity in Jackson Blue Spring over 4-year period. Project to be implemented in partnership with UF–IFAS. Match includes $256,000 from NWFWMD, $70,000 from producers.		$806,032		U.S. Environ-mental Protec-tion Agency (EPA) 319		DEP/EPA FY 14–15 Application Complete; awaiting approval		
NWF-6	NWF Mobile Irrigation Laboratory	NWFWMD	Agricultural or ag-related	Annual contract with West Florida Resource Conservation & Development (RC&D) to support water quantity evaluations and retrofits with largely agricultural producers in Jackson County, but across panhandle, in partnership with FDACS and Natural Resources Conservation Service (NRCS). Totals show funding since program began in 2004; NWFWMD annual funding amount currently $71,125 and overall program costs $207,211.		$673,938				In progress; renewed annually		
NWF-7	IFAS Sod-based Crop Rotation	NWFWMD /UF–IFAS	Agricultural or ag-related	Annual contract with UF–IFAS to provide education and outreach across NWFWMD. Annual funding amount currently $40,000, but will increase if EPA 319 project awarded.		$415,000				In progress; renewed annually		

Table 5: Projects funded with Florida Springs funding

Fiscal Year (FY)	Project	Cooperator	State Funding	Match	Total	Spring	County	Status	Project Type	Description
14-15	Claiborne Aquifer Water Supply	NWFWMD	$440,000	$0	$440,000	Jackson Blue	Jackson	In progress	Agricultural or agriculture related	Initiates Claiborne aquifer testing in Jackson Blue Spring contributing area. Determine aquifer's viability as alternative water source to offset demand on Floridan aquifer.
13-14	Jackson Blue Spring Agricultural BMP Producer Cost-Share Grant Program	NWFWMD	$752,000	$484,169	$1,236,169	Jackson Blue	Jackson	Complete	Agricultural or agriculture related	Cost-share funding for agricultural BMPs in Jackson Blue Spring contributing area to improve water use efficiency and reduce nutrient loading. Also supports MIL.
14-15	Jackson Blue Spring Agricultural BMP Producer Cost-Share Grant Program	NWFWMD	$487,500	$308,260	$795,760	Jackson Blue	Jackson	In progress	Agricultural or agriculture related	Cost-share funding for agricultural BMPs in Jackson Blue Spring contributing area to improve water use efficiency and reduce nutrient loading.
15-16	Jackson Blue Spring Agricultural BMP Producer Cost-Share Grant Program	NWFWMD	$1,000,000	$333,333	$1,333,333	Jackson Blue	Jackson	FY 15–16 DEP contract executed; BMP application cycle closed 3/25/16	Agricultural or agriculture related	Continue to implement agricultural cost-share program. Assist 32 producers in Jackson Blue Spring Basin with retrofits to improve water quality and quantity. Previous efforts have funded 33 producers.

Fiscal Year (FY)	Project	Cooperator	State Funding	Match	Total	Spring	County	Status	Project Type	Description
15-16	Blue Springs Plantation, Inc. Land Acquisition	NWFWMD	$2,100,000	$0	$2,100,000	Jackson Blue	Jackson	FY 15–16 DEP contract executed	Land acquisition	Fee-simple acquisition and protection of 394 acres adjacent to Jackson Blue Spring.
15-16	Lakeshore Farms II, LLC Land Acquisition	NWFWMD	$2,686,568	$0	$2,686,568	Jackson Blue	Jackson	FY 15–16 contract executed; conservation easement in development	Land acquisition	Fee-simple and/or less-than-fee acquisition and protection of 598 agricultural acres in Jackson Blue ground water contributing area.
15-16	Indian Springs Sewer Extension Phase I	Jackson County	$1,450,000	$500,000	$1,950,000	Jackson Blue	Jackson	FY 15–16 DEP contract executed; county contract executed	Septic to sewer connection	Extend central sewer to lower Indian Springs subdivision, serving 125 homes, install on-site grinders for each home, and abandon septic systems, reducing nitrate levels in Merritts Mill Pond and Jackson Blue Springs.
	Total		**$8,916,068**	**$1,625,762**	**$10,541,830**					

Table 6: Projects funded with EPA funding

FY	Project	Cooperator	State Funding	Match	Total	Spring	County	Status	Project Type	Description
14-15	Sod-Based Crop Rotation Pilot Project	NWFWMD/ UF–IFAS	$480,032	$326,000	$806,032	Jackson Blue	Jackson	DEP/EPA FY 14–15 Application complete; awaiting approval	Agricultural or agriculture related	Demonstration project (to include subsidies) for up to 4 sod farms in Jackson County to improve water quality and quantity in Jackson Blue Spring over 4-year period. Project to be implemented in partnership with UF–IFAS. Match includes $256,000 from NWFWMD, $70,000 from producers.
	Total		**$480,032**	**$326,000**	**$806,032**					

Table 7: Projects funded with other funding sources

FY	Project	Cooperator	State Funding	Match	Total	Spring	County/ Region	Status	Project Type	Description
Multiple Years	NWF MIL	NWFWMD/ FDACS	$673,938		$673,938	N/A	NWFWMD	In progress; renewed annually	Agricultural or agriculture related	Annual contract with West Florida RC&D to support water quantity evaluations and retrofits with largely agricultural producers in Jackson County, but across panhandle, in partnership with FDACS and NRCS. Totals show funding since program began in 2004; district annual funding amount currently $71,125 and overall program costs $207,211.
Multiple Years	UF–IFAS Sod-Based Crop Rotation	NWFWMD/ UF–IFAS	$415,000	$0	$415,000	N/A	NWFWMD	In progress; renewed annually	Agricultural or agriculture related	Annual contract with UF–IFAS to provide education and outreach across NWFWM D, annual funding amount currently $40,000, but will increase if EPA 319 project funding is awarded.
	Total		**$1,783,938**	**$0**	**$1,783,938**					

4.2 AGRICULTURAL BMP IMPLEMENTATION

Agricultural nonpoint sources in a BMAP area are required by state law (Subsection 403.067[7], F.S.) either to implement FDACS-adopted BMPs or to conduct water quality monitoring prescribed by DEP or the NWFWMD, to demonstrate compliance with water quality standards. Failure to either implement BMPs or conduct monitoring may bring enforcement action by DEP or the NWFWMD. The implementation of FDACS-adopted, DEP-verified BMPs in accordance with FDACS rule provides a presumption of compliance with state water quality standards.

Pursuant to Paragraph 403.067(7)(c), F.S., the implementation of FDACS-adopted, DEP-verified BMPs in accordance with FDACS rule provides a presumption of compliance with state water quality standards. Growers who implement BMPs may be eligible for cost-share from FDACS, the NWFWMD, or others. Through the Office of Agricultural Water Policy (OAWP), the Florida Forest Service, and Division of Aquaculture, FDACS develops, adopts, and assists producers in implementing agricultural BMPs to improve water quality and water conservation.

The breakdown of agricultural land uses in the Jackson Blue Springs BMAP area, according to 2009 NWFWMD land use data, is shown in **Table 8**. **Table 9** shows the composite land use as compiled by DEP from various data sources, including Cropscape (data from the United States Department of Agriculture [USDA]), Farm Service Agency aerial data, property appraiser data, NWFWMD 2012 data, and Florida Statewide Agricultural Irrigation Demand (FSAID) data (a geodatabase collected and maintained by FDACS OAWP) for irrigated lands. The composite land use was used to develop the NSILT. These two tables illustrate the differences in land use based on differing data sources.

DEP and FDACS will work together during BMAP implementation to identify actual acreages that are eligible for enrollment in FDACS BMP Program. **Figure 10** shows the approximate location of these agricultural lands based on 2009 NWFWMD land use, and **Figure 11** shows the approximate location of these agricultural lands based on the composite land use data from DEP. Based on the 2009 NWFWMD land use, the primary agricultural land use in the Jackson Blue Springs basin is pasture.

Table 8: Agricultural land uses in the Jackson Blue Springs Basin (2009 NWFWMD land use)

Land Use Code	Code Description	Total Acres
2100	Cropland and Pastureland	36,982.6
2200	Tree Crops	103.5
2300	Feeding Operations	7.3
2400	Nurseries and Vineyards	9.5
2600	Other Open Lands – Rural	855.4
3300	Mixed Rangeland	1,178.9
	Total	**39,137.2**

Table 9: Agricultural land uses in the Jackson Blue Springs Basin (DEP composite land use)

Composite Land Use Description	Total Acres
Pasture	12,270.7
Row Crops	21,971.9
Field Crops	8,198.1
Orchards/Ornamentals	7.1
Other Agriculture	278.8
Total Acres	**42,726.7**

Land use data are helpful as a starting point for estimating agricultural acreage and developing BMP implementation strategies; however, there are inherent limitations. The time of year when land use data are collected (through aerial photography) affects the accuracy of photo interpretation, can result in inappropriate analysis of the data, and can hinder decision making.

Another limitation is that the specific agricultural activity being conducted is not always apparent. For example, some acreage under the improved pasture classification may be used for cattle grazing, some may consist of forage grass that is periodically harvested and sold for hay, or some may comprise a fallow vegetable field awaiting planting. Operations that may fall into this land use category fertilize at different rates; for example, hay operations and some other commodities typically fertilize at or below rates recommended by UF–IFAS.

It is therefore meaningful for the purposes of evaluating potential nutrient impacts to identify specific land uses on a property, rather than assuming that operations and present conditions are uniform across a specific land use. Because of error in the collection and characterization of land use data and changes in land use over time, land use acreage estimates are subject to adjustment, as discussed later in this section.

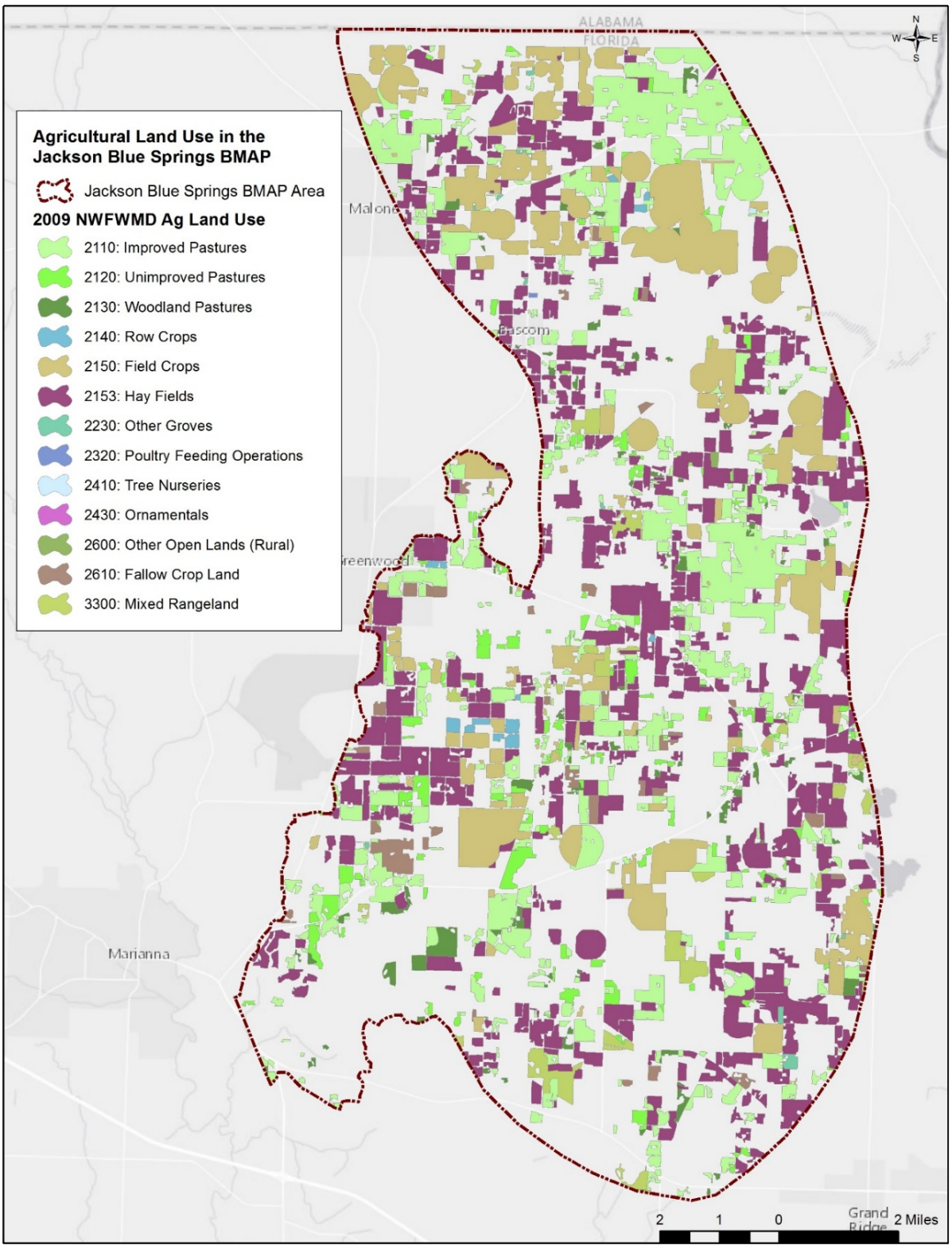

Figure 10: Agricultural lands in the Jackson Blue Springs BMAP Basin (2009 NWFWMD land use)

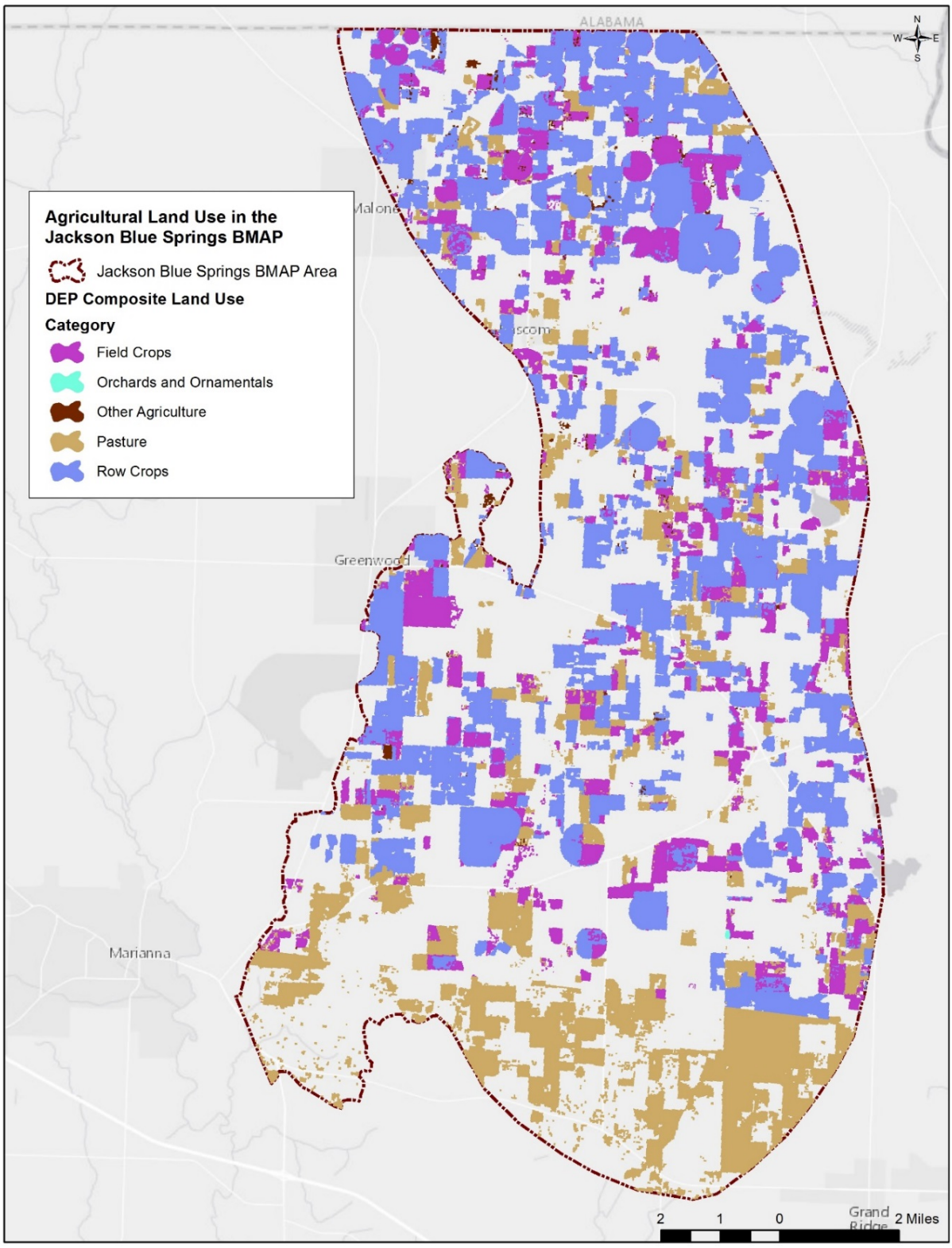

Figure 11: DEP composite agricultural lands in the Jackson Blue Springs BMAP Basin

4.2.1 Agricultural BMPs

BMPs are individual or combined 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. FDACS has authority for establishing agricultural BMPs through the Florida Forest Service (Silviculture BMP Program), Division of Aquaculture (Aquaculture Certification Program), and OAWP (all other agricultural BMP programs). As of March 2016, the OAWP has adopted manuals for cow/calf, statewide citrus, vegetable and agronomic crops, nurseries, equine operations, specialty fruit and nut, sod, and dairy operations. Manual development is under way for poultry operations, and adoption is expected in late 2016.

The OAWP BMPs fall into two categories-structural and management. Structural BMPs (*e.g.*, water-control structures, fencing, and tailwater recovery systems) involve the installation of structures or changes to the land and are usually costlier than management BMPs. Management BMPs, such as nutrient and irrigation management, comprise the majority of the practices and often are not readily observable. Nutrient management addresses fertilizer type, amount, placement, and application timing, and includes practices such as soil and tissue testing, application methods, correct fertilizer formulations, and setbacks from water resources. Irrigation management includes maintenance, scheduling, and other measures that improve the overall efficiency rating of irrigation systems. In most areas of the state, FDACS-funded MILs are available to evaluate irrigation system efficiency and provide recommendations to producers to improve efficiency. The implementation of these recommendations results in billions of gallons of water saved throughout the state and helps reduce nutrient runoff and leaching.

Table 10 identifies key management and structural BMPs that would be applicable to agricultural operations in the basin. By definition, BMPs are developed to be technically and economically feasible. However, FDACS BMP manuals do contain some BMPs that may be affordable only with financial assistance through cost-share programs. The BMP checklists allow producers to indicate whether implementing a BMP requires financial assistance. Through cost-share programs, FDACS works with producers to implement applicable key BMPs that otherwise are not affordable.

For assistance with enrolling in the OAWP BMP Program or with obtaining cost-share funds, interested producers should contact OAWP staff. Information on BMP manuals and field-staff contact information is available online. Printed BMP manuals can be obtained from local extension offices at county agricultural extension centers, USDA NRCS offices, or by contacting OAWP field staff.

Table 10: Key management and structural BMPs adopted by FDACS OAWP

BMP Category	BMP	Description
Nutrient Need Determination	Soil and Tissue Testing	Used to base fertilizer applications on plant needs and available nutrients in soil; helps prevent overapplication of fertilizer.
Nutrient Need Determination	Nutrient Budgeting	Adjustment of fertilizer regime to account for other nutrient sources, such as biosolids, legumes, manure, and nutrient-laden irrigation water; helps prevent overapplication of fertilizer.
Nutrient Application Management	Precision Application of Nutrients	Use of specialized equipment for precise placement of nutrients on targeted areas at specified rates; reduces total amount used and prevents stray applications.
Nutrient Application Management	Equipment Calibration/Maintenance	Ensures proper functioning of equipment; prevents misapplication or overapplication of fertilizer materials.
Nutrient Application Management	Split Fertilizer Applications	Multiple applications timed with optimal growth stages; allows plants to assimilate nutrients more efficiently; reduces nutrient loss in leaching and runoff.
Nutrient Application Management	Controlled-Release Fertilizer	Use of fertilizer formulations with controlled nutrient-release curve; reduces nutrient loss to leaching and runoff.
Nutrient Application Management	Fertilizer Application Setbacks from Waterbodies (*e.g.*, wetlands, watercourses, sinks, springs, *etc.*)	Establishes zone where no fertilizer will be applied; reduces nutrient loadings to waterbodies.
Irrigation Management	Irrigation Scheduling	Planning when to irrigate to reduce water and nutrient losses, based on available soil moisture content, evapotranspiration levels, recent rainfall, and time of day.
Irrigation Management	Soil-Moisture and Water-Table Monitoring	Use of devices that measure water table level and amount of water in soil; is a key component of proper irrigation scheduling.
Irrigation Management	Tailwater Recovery	Use of downgradient catchment ponds to trap irrigation tailwater to be reused on cropland; reduces off-site transport of nutrients and conserves water.
Treatment and Erosion Control	Filter Strips	Vegetated strips of land designed to reduce nutrients and sediments in surface water runoff from fields, pastures, and livestock high-intensity areas before it reaches downstream waterbodies.
Treatment and Erosion Control	Vegetative Buffers	Establishment of riparian and/or wetland buffers to attenuate and assimilate nutrient- or sediment-laden surface flows coming from cropped/grazed areas.
Treatment and Erosion Control	Ditch Maintenance and Retrofits	Use of riprap, sediment traps, staging structures, and permanent vegetative bank cover to minimize erosion and transport of nutrient-laden sediments.
Livestock Management (Applicable to Cow/Calf and Equine Operations)	Manure Management	Appropriate storage and disposal of animal waste.
Livestock Management (Applicable to Cow/Calf and Equine Operations)	Alternative Water Sources	Use of upland livestock watering ponds and/or water troughs; minimizes manure deposition in waterbodies.
Livestock Management (Applicable to Cow/Calf and Equine Operations)	Rotational Grazing	Movement of cattle to different grazing areas on planned basis; prevents concentrated waste accumulations and denuding of pasture areas. May involve fencing.
Livestock Management (Applicable to Cow/Calf and Equine Operations)	High-Intensity Areas Location	Siting of cowpens, supplemental feed areas, *etc.*, away from waterbodies to minimize nutrient loadings.

BMP Category	BMP	Description
Operations Management	Fertilizer Storage	Proper location/storage of bulk fertilizer products to prevent nutrient loadings.
Operations Management	Fertilizer Mix/Load	Use of appropriate dedicated or temporary mix/load areas located away from waterbodies to prevent nutrient loading.
Operations Management	Employee Training	Training provided to farmworkers on how to implement BMPs.
Operations Management	Record Keeping	Proper record keeping provides accountability in implementation of BMPs, and assists producers in making nutrient and irrigation management decisions.

4.2.2 BMP Enrollment

Table 11 summarizes the land use data figures for agriculture in the BMAP area, the acreages associated with commodity types addressed by OAWP BMP manuals, and the acres enrolled in BMP programs. **Figure 12** shows the acres enrolled in BMPs as of December 31, 2015.

Not all of the acreage listed as agriculture in **Table 11** is included in enrollment figures, because the notices of intent (NOIs) document only the estimated total number of acres on which applicable BMPs are implemented, not the entire land use acreage mapped as agriculture. Land use data can contain nonproduction acres (such as buildings, parking lots, and fallow acres) that will not be counted on the NOIs submitted to OAWP. There also may be acreage that is not appropriate for enrollment in OAWP BMPs, such as lands not in commercial production (defined as operations conducted as a business).

As of December 31, 2015, there are 68 NOIs covering 19,677.9 acres in the Jackson Blue Springs watershed. No producers are conducting water quality monitoring in lieu of implementing BMPs at this time.

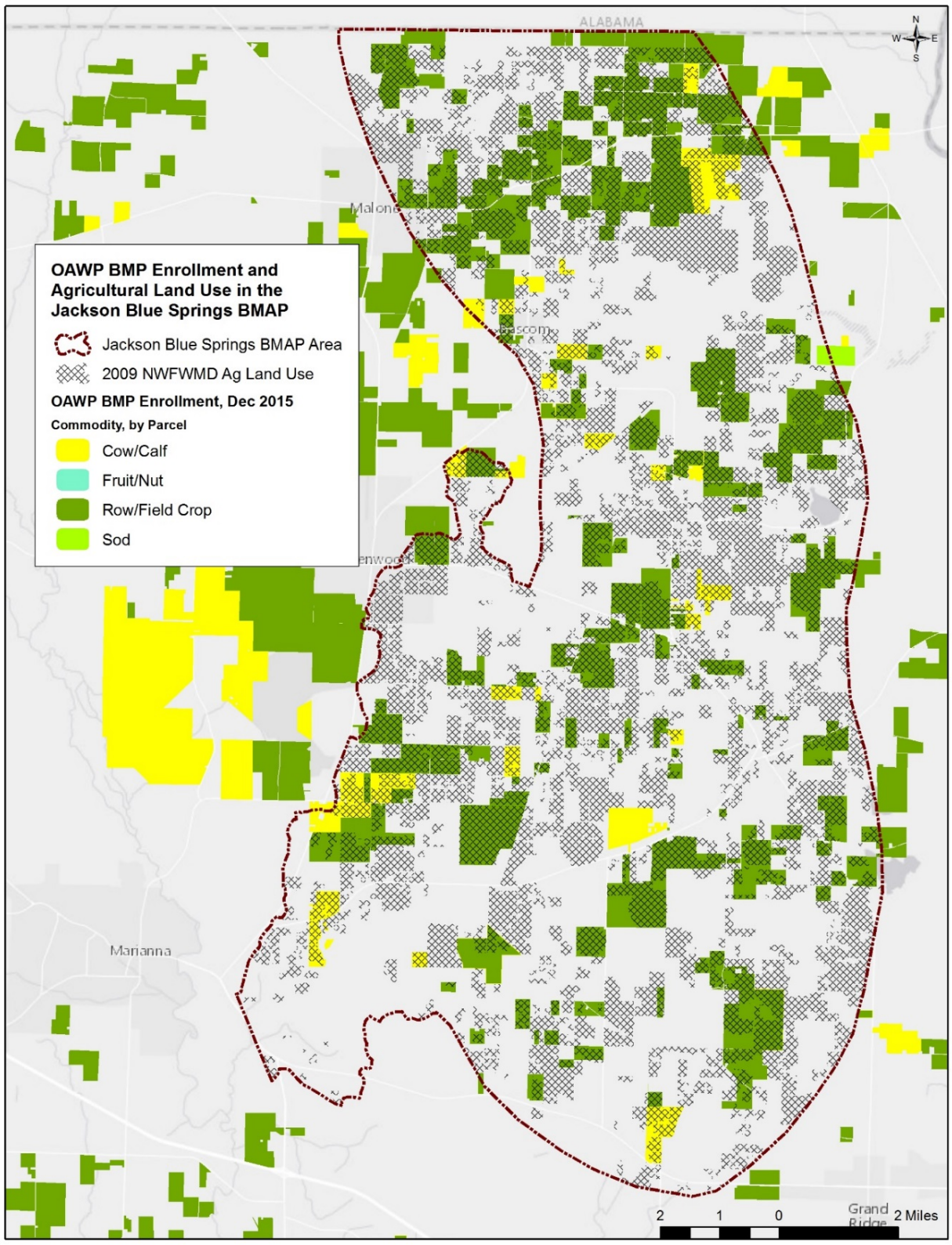

Figure 12: BMP enrollment in the Jackson Blue Springs Basin as of December 31, 2015

Table 11: Agricultural acreage and BMP enrollment for the Jackson Blue Springs BMAP area as of December 31, 2015

N/A = Not applicable.
[1] Enrollment numbers will depend on the ability of field staff to identify and locate producers and whether producers choose to implement BMPs or monitor their water quality. Also, specific agricultural land uses and number of agricultural operations may change from year to year. Progress on enrollment, based on best available information, will be included in the BMAP Annual Progress Report.
[2] Acreage in the hayfields category is likely an overestimate, as the aerial imagery is collected in the winter when producers are growing winter forage. FDACS staff will review the most recent aerial imagery to determine if any of the acreage identified as hayfields should actually be in the row/field/mixed crop category.
[3] No poultry feeding operations currently exist in the BMAP basin.

2009 NWFWMD Land Use	2009 Acres	Related FDACS BMP Programs	Acreage Enrolled[1]	Related NOIs
Pasture and Rangeland	14,093.62	Cow/Calf	3,000.89	23
Row/Field/Mixed Crops	9,655.17	Vegetable/Agronomic Crops	16,631.87	44
Hayfields[2]	14,412.68	Vegetable/Agronomic Crops	N/A	N/A
Fallow Cropland	833.6	No Enrollment Needed	45.16	1
Other Groves	103.47	Specialty Fruit and Nut	N/A	N/A
Tree Nurseries	7.74	Statewide Nursery	0.0	N/A
Ornamentals	1.74	Statewide Nursery	0.0	N/A
Poultry Feeding Operations[3]	7.28	Conservation Plan Rule/ Future Poultry Manual	0.0	N/A
Other Open Lands – Rural	21.77	No Enrollment Needed	N/A	N/A
Total	**39,137.07**	**N/A**	**19,677.92**	**68**

4.2.3 Agricultural BMP Load Reduction Estimates

Due to inaccuracies in 2009 land use data and changes in land use since 2009, agricultural loadings may be less than perceived. However, there are no detailed allocations in this BMAP, so the total estimated load or required reductions for agriculture are not defined. Consequently, an estimated average load reduction percentage was derived for agriculture in this basin, based on an averaged range of expected reductions for agricultural BMPs in Florida. Percentages represent the relative amount of nitrogen reduction expected for "typical" agricultural BMP implementation, which includes nutrient management, stormwater retention, limited wetland retention/restoration, and rotational livestock grazing practices, as applicable to the commodity and operation. A BMP average efficiency of 30% is applied to the entire Jackson Blue Springs BMAP area. This efficiency comes from an OAWP-funded analysis of the BMP treatment efficiencies in the Suwannee Basin area. Agricultural BMP implementation in the Jackson Blue Springs BMAP area is anticipated to reduce agricultural loadings of nitrogen on the applicable agricultural operations.

If DEP plans to develop an estimate of agricultural loadings in the future, the development of a basin- and commodity-specific agricultural loading/reduction model should be considered.

4.2.4 FDACS OAWP Role in BMP Implementation and Follow-Up

The OAWP works with producers to submit NOIs to implement the BMPs applicable to their operations, provides technical assistance to growers, and distributes cost-share, as available, to eligible producers for selected practices. The OAWP follows up with growers through written surveys and site visits, to evaluate the level of BMP implementation and record keeping, identify areas for improvement, if any, and discuss cost-share opportunities, among other things.

When DEP adopts a BMAP that includes agriculture, it is the agricultural producer's responsibility to implement BMPs adopted by FDACS to help achieve load reductions. If land use acreage corrections and BMP implementation do not fully account for the current agricultural load reduction allocation, it may be necessary to develop and implement cost-assisted field- and/or regional-level treatment options that remove nutrients from farms and other nonpoint sources. In that case, FDACS will work with DEP and the NWFWMD to identify appropriate options for achieving further agricultural load reductions.

The FWRA requires that, where water quality problems are demonstrated despite the proper implementation of adopted agricultural BMPs, FDACS must reevaluate the practices, in consultation with DEP, and modify them if necessary. Continuing water quality problems will be detected through the BMAP monitoring component and other DEP and NWFWMD activities. If a reevaluation of the BMPs is needed, FDACS will also include the NWFWMD and other partners in the process.

4.2.5 OAWP Implementation Assurance (IA) Program

The OAWP formally established its Implementation Assurance (IA) Program in 2005 in the Suwannee River Basin as part of the multi-agency/local stakeholder Suwannee River Partnership. In 2007, the OAWP initiated the IA Program in the Lake Okeechobee Watershed and launched a standardized follow-up program for the remaining areas of the state in 2013, beginning with the Ridge Citrus and Indian River Citrus BMPs. Because of program-specific needs, the follow-up process for each of these three components was different. In early 2014, the OAWP began to streamline the IA Program to ensure consistency statewide and across commodities and BMP manuals. This effort resulted in a single IA site-visit form, currently used by OAWP staff.

The current IA Program consists of two key components—mail-out surveys and site visits. OAWP staff develop the surveys in conjunction with commodity experts. This component of the IA Program was born out of the recognition that OAWP staff resources are limited; therefore, visits to each of the

enrolled producers across the state were not possible within a short/contemporary time frame. All enrolled producers are mailed these surveys and are asked to fill them out and return them to OAWP staff.

Site visits, the second component, are conducted by OAWP field staff and technicians as workload allows. For the visits, field staff and technicians use a standard form (not BMP manual specific) that was developed in 2014. This site-visit form focuses on nutrient-management, irrigation-management, and water-resource protection BMPs common to all of the adopted BMP manuals. The paper forms are submitted to OAWP staff and compiled into a spreadsheet, and the data are reported annually. From 2007 to 2015, the OAWP conducted 1,936 site visits. However, it is difficult to compare data collected prior to the implementation of the single IA site-visit form developed in 2014 because of regional differences (*e.g.*, different forms and information asked) in administration of the IA Program. According to the OAWP database, the OAWP conducted four site visits in 2015 in the Jackson Blue BMAP Basin. As enrollment in the FDACS BMP Program increases as a result of the adoption of this BMAP, the number of site visits associated with the IA Program in the BMAP area will also increase.

In late 2014, the OAWP commenced efforts to revise and restructure its current IA Program, and these efforts are ongoing as a result of 2016 legislation (2016–1, Laws of Florida).

Chapter 5: ASSESSING PROGRESS AND MAKING CHANGES

Successful BMAP implementation requires commitment and follow-up. In the commitment to plan implementation (see **Section 5.4**), stakeholders have expressed their intention to carry out the plan, monitor its effects, and continue to coordinate within and across jurisdictions to achieve water quality targets. Stakeholders have committed and are required to implement the assigned projects and activities within the first five-year phase of this BMAP. The FWRA requires that an assessment be conducted every five years to determine whether there is reasonable progress in achieving pollutant load reductions. This chapter contains the water quality monitoring component sufficient to make this evaluation.

5.1 TRACKING IMPLEMENTATION

DEP will work with stakeholders to track project implementation and organize the monitoring data collected each year. The project and monitoring information will be presented in an annual report. In addition to ongoing OSTDS activities, Jackson Blue Spring and Merritts Mill Pond stakeholders have agreed to meet approximately annually after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues. The following types of activities may occur at annual meetings:

- Implementation Data and Reporting –
    - Collect project implementation information from stakeholders and from FDACS on agricultural BMP enrollment, and compare with the BMAP schedule.
    - Discuss the data collection process, including any concerns and possible improvements to the process.
    - Review the monitoring plan implementation, as detailed in **Section 5.3**.
- Sharing New Information –
    - Report on results from water quality and biological monitoring and trend information.
    - Provide updates on new management strategies in the basin that will help reduce nutrient loading.
    - Identify and review new scientific developments on addressing nutrient loads and incorporate any new information into annual Progress Reports.
- Coordinating TMDL-Related Issues –

- Provide updates from DEP on the basin cycle and activities related to any impairments, TMDLs, and BMAP.
- Obtain reports from other basins where tools or other information may be applicable to the Jackson Blue Spring and Merritts Mill Pond TMDL.

5.2 ADAPTIVE MANAGEMENT MEASURES

Adaptive management involves setting up a mechanism for making adjustments in the BMAP when circumstances change or feedback indicates the need for a more effective strategy. Adaptive management measures include the following:

- Procedures to determine whether additional cooperative strategies are needed.
- Criteria/processes for determining whether and when plan components need revision due to changes in costs, environmental impacts, social effects, watershed conditions, or other factors.
- Descriptions of stakeholders' roles after BMAP completion.

Key components of adaptive management to share information and expertise are tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings. BMAP execution will be a long-term process, and some projects will extend beyond the first BMAP phase. For example, during the first iteration, the OSTDS Initiative will be implemented to identify what strategies are most applicable to the basin to reduce nitrate loading, determine a timeline for future strategies, and identify which stakeholders are responsible for implementing the necessary strategies in the next BMAP iteration.

DEP and stakeholders will track implementation efforts and monitor water quality to measure effectiveness and ensure BMAP compliance. Stakeholders will meet approximately annually to discuss implementation issues, consider new information, and, if the basin is not projected to meet the TMDL, determine additional corrective actions. Information on the implementation of management strategies will be collected annually from the participating entities and organized into reports. Stakeholders will review these reports to assess progress towards meeting the BMAP goals.

5.3 WATER QUALITY MONITORING

5.3.1 Monitoring Objectives

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. The primary objectives of the monitoring strategy for the Jackson Blue Spring and Merritts Mill Pond Basin are as follows, and will be used to evaluate the success of the BMAP:

- Track trends in nitrate concentrations and loads in Jackson Blue Spring and Merritts Mill Pond.
- Track trends in the biological communities for a balance of flora and fauna in Merritts Mill Pond.
-

5.3.2 Water Quality Monitoring Parameters, Frequency, and Network

To achieve the first objective above, the monitoring strategy focuses on collecting the suggested parameters listed in **Table 12**. The core parameters are directly related to the impairment in Jackson Blue Spring and Merritts Mill Pond. Supplemental parameters and field parameters are monitored primarily to support the interpretation of core water quality parameters. At a minimum, the core parameters will be tracked to determine progress towards meeting the TMDL.

Table 12: Water quality monitoring parameters

Core Parameters	Supplemental Parameters	Field Parameters
Nitrate + Nitrite (as N) Ammonia (as N) Kjeldahl Nitrogen	Chlorophyll-a Total Organic Carbon Total Phosphorus Chloride Sulfate Fluoride Calcium Magnesium Sodium Potassium Alkalinity Hardness Turbidity (lab) Specific Conductance (lab) Color (true) Total Suspended Solids Total Dissolved Solids	Water Temperature pH Specific Conductance Dissolved Oxygen Sample Depth Secchi Depth

Water quality monitoring in the Jackson Blue BMAP area will consist of ground water and surface water sampling. The NWFWMD is in the process of installing monitoring wells in the springshed to provide information on ground water concentrations. In addition, two submersible ultraviolet nitrate analyzers (SUNA) continuously record nitrate measurements from Jackson Blue Spring and from the Mill Pond outfall (**Figure 13**). DEP also currently monitors at three locations (**Table 10**) in the Mill Pond area.

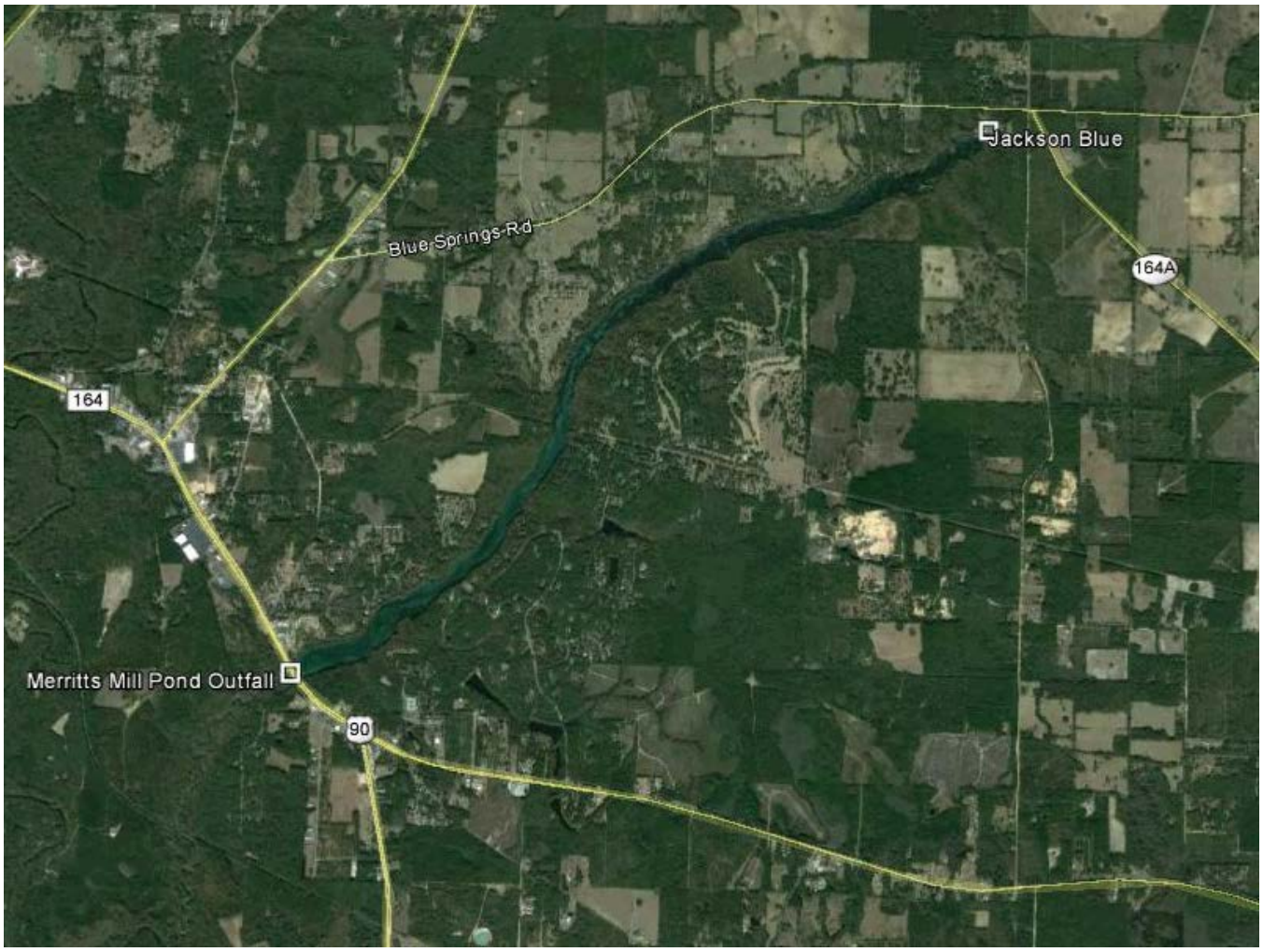

Figure 13: SUNA locations in the Jackson BMAP area

Table 13: BMAP water quality and flow monitoring network

Sampling Entity	Station ID	Station Name	Station Type	Frequency	Site Established	Start date
DEP	21FLWQA G2WA007	Merritts Mill Pond 600 meters downstream of Jackson Blue Spring	Water Quality	Quarterly	2015	7/21/2015
DEP	21FLWQA G2WA008	Merritts Mill Pond mid under power lines	Water Quality	Quarterly	2015	7/21/2015
DEP	21FLWQA G2WA009	Merritts Mill Pond 500 meters upstream of dam	Water Quality	Quarterly	2015	7/21/2015

5.3.3 Biological Monitoring

To meet the second monitoring plan objective, two types of biological monitoring will occur to assess the health of Jackson Blue Spring and Merritts Mill Pond. Biological monitoring in Merritts Mill Pond will consist of algal and plant surveys conducted by DEP. Algal surveys are conducted annually at each station. The algal surveys are performed by conducting the Rapid Periphyton Survey (RPS), which is used to quantify the extent (coverage) and abundance (thickness) of attached algae (periphyton). Plant surveys are conducted biennially for the waterbody. When biological monitoring samples are collected, field measurements and water quality samples are also collected.

Table 11 summarizes the biological monitoring, and **Figure 8** shows the sampling locations.

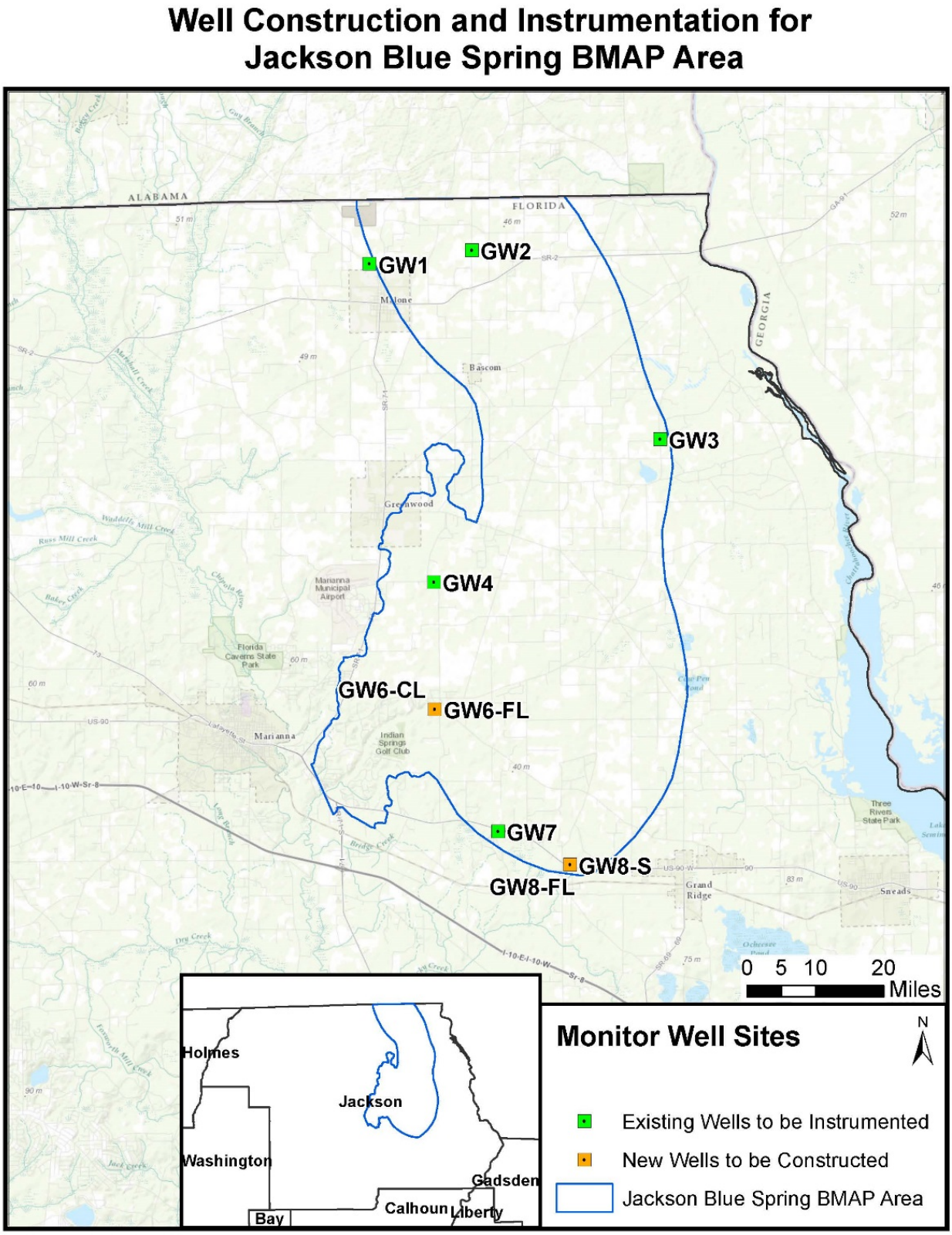

Figure 14: Monitoring network for Jackson Blue Spring and Merritts Mill Pond

Table 14: Biological monitoring

Sampling Entity	Station Identification	Station Name	Station Type	Frequency	Site Established	Start Date
DEP	21FLWQA G2WA007	Merritts Mill Pond 600 meters downstream of Jackson Blue Spring	Algal Survey	Annually	2015	7/21/2015
DEP	21FLWQA G2WA008	Merritts Mill Pond mid under power lines	Algal Survey	Annually	2015	7/21/2015
DEP	21FLWQA G2WA009	Merritts Mill Pond 500 meters upstream of dam	Algal Survey	Annually	2015	7/21/2015
DEP	21FLWQA G2WA008	Merritts Mill Pond mid under power lines	Plant Survey	Biennially	2016	6/15/2016

5.3.4 Data Management and Assessment

The Florida Storage and Retrieval (STORET) Database serves as the primary repository of ambient water quality data for the state. DEP pulls water quality data used for impaired waters evaluations and TMDL development directly from this database. Ambient water quality data collected as part of the BMAP will be uploaded into STORET for long-term storage and availability. Water quality data will be uploaded to STORET at least once every six months, upon completion of the appropriate quality assurance/quality control (QA/QC) checks.

The biological data will be stored in DEP's Statewide Biological (SBIO) Database. The biological data will be uploaded at least once every six months, after the appropriate QA/QC checks.

The water quality and biological data will be analyzed during BMAP implementation to determine trends in water quality and the health of the biological community. A wide variety of statistical methods is available for the water quality trend analyses. The selection of an appropriate data analysis method depends on the frequency, spatial distribution, and period of record available from existing data. Specific statistical analyses were not identified during BMAP development; however, commonly accepted methods of data analysis will be used that are consistent with the TMDL model.

5.3.5 QA/QC

Stakeholders participating in the monitoring plan must collect water quality data in a manner consistent with DEP's standard operating procedures (SOPs) for QA/QC. The most current version of these procedures is available online. For BMAP-related data analyses, entities should use National Environmental Laboratory Accreditation Conference (NELAC) and National Environmental Laboratory

Accreditation Program (NELAP)–certified laboratories or other labs that meet the certification and other requirements outlined in the SOPs.

5.4 COMMITMENT TO PLAN IMPLEMENTATION

Subsection 403.067(7), F.S., lays out the mechanisms for BMAP implementation. While the BMAP is linked by statute to permitting and other enforcement processes that target individual entities, successful implementation mandates that local stakeholders willingly and consistently work together to attain adopted TMDLs. This collaboration fosters the sharing of ideas, information, and resources. The stakeholders have demonstrated their willingness to confer with and support each other in their efforts.

APPENDICES

APPENDIX A: BIBLIOGRAPHY OF KEY REFERENCES AND WEBSITES

KEY REFERENCES

Barrios, K. June 2011. *Nitrate sources of springs discharging to Merritts Mill Pond, Jackson County, Florida*. Technical File Report 2011-01. Northwest Florida Water Management District.

Florida Department of Environmental Protection. 2002. *Basin status report: Apalachicola-Chipola.* Tallahassee, FL: Division of Water Resource Management.

——— 2013. *Nutrient TMDL for Jackson Blue Spring and Merritts Mill Pond (WBIDs 180Z and 180A).* Tallahassee, FL: Ground Water Management Section.

STORMWATER AND WATER QUALITY PROTECTION WEBSITES

Table A-1: Local and regional stormwater and water quality protection websites

NWFWMD

Table A-2: State stormwater and water quality protection websites

General Portal for Florida
DEP
Watershed Management
TMDL Program
BMPs, Public Information
NPDES Stormwater Program
Nonpoint Source Funding Assistance
Surface Water Quality Standards
Identification of Impaired Surface Waters Rule
STORET Program
Criteria for Surface Water Quality Classifications
FDACS OAWP
Jackson County Comprehensive Plan

Table A-3: National stormwater and water quality protection websites

EPA Office of Water
EPA Region 4 (Southeast U.S.)
Clean Water Act History
USGS: Florida Waters