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Newnans Lake Improvement Initiative: Phase II

Alachua County, Florida

Alachua County Environmental Protection Department
Gainesville, Florida

September 2018

ECT No. 180150

Complex Challenges . . . *PRACTICAL SOLUTIONS*

Document Review

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Date	Date

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Hawthorn	Hawthorn Group
HC	Hatchet Creek
HCl	hydrochloric acid
HDC	Hydrologic Data Collection, Inc.
ICPR	Interconnected Channel and Pond Routing
ICPR3	Interconnected Channel and Pond Routing, Version 3
ICPR4	Interconnected Channel and Pond Routing, Version 4
in/yr	inch per year
KCl	potassium chloride
kg/day	kilogram per day
km^2	square kilometer
lb/yr	pound per year
LHC	Little Hatchet Creek
LiDAR	light detection and ranging
LOI	loss on ignition
m^2/yr	square meter per year
mg/kg	milligram per kilogram
mg/L	milligram per liter
MGD	million gallons per day
mm	millimeter
MSE	mechanically stabilized earth
n	number
NAIP	nonapatite inorganic phosphorus
NaOH	sodium hydroxide
NAVD88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929
NH4Cl	ammonium chloride
NLII	Newnans Lake Improvement Initiative
NLW	Newnans Lake Watershed
NTU	nephelometric turbidity unit

List of Acronyms and Abbreviations (Continued, Page 3 of 3)

OCB	Orange Creek Basin
OM	organic matter
OP	ortho-phosphate
OPO_4	phosphorus, reactive
OSTDS	onsite sewage treatment and disposal systems
PRW	permeable reactive weirs
PVC	polyvinyl chloride
r^2	coefficient of determination
RP	restoration project
SD	standard deviation
SJRWMD	St. Johns River Water Management District
SOC	soil organic carbon
SR	State Road
SRP	soluble reactive phosphorus
SU	standard unit
SWIM	surface water improvement and management
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus
TPi	total inorganic phosphorus
TPo	total organic phosphorus
TSI	trophic state index
UF	University of Florida
USGS	U.S. Geological Survey
UV	ultra-violet
WGS	Waldo Gauge Station
WMM	Watershed Management Model
WQP	water quality improvement project
XRD	X-ray diffraction

Executive Summary

The Newnans Lake Improvement Initiative (NLII) was created in response to the total maximum daily loads (TMDLs) and the management priorities identified in the basin management action plan (BMAP). The main regulatory driver behind the NLII is the 2003 TMDL established by Florida Department of Environmental Protection (FDEP) in response to the TMDL program defined by the Clean Water Act, Section 303(d), and enforced by the U.S. Environmental Protection Agency (EPA). The NLII project is divided into two phases. Phase I, funded by FDEP, consisted of two projects focused on the Little Hatchet Creek (LHC) sub-basin: (1) Water Quality Enhancement of Little Hatchet Creek, and (2) Water Quality Enhancement of Gum Root Swamp. Both projects were designed to improve understanding of how the LHC sub-basin contributes nutrients (nitrogen and phosphorus) to Newnans Lake and develop project solutions to reduce the nutrient load Newnans Lake receives on an annual basis. Phase II consists of two projects: (1) Pilot Project for Water Quality Enhancement of Little Hatchet Creek (LHC), and (2) Assessment of HC sub-basins. Both projects are designed to improve understanding of how nutrients (nitrogen and phosphorus) are contributed to Newnans Lake and develop project solutions to reduce the nutrient load Newnans Lake receives on an annual basis. In February 2018, Alachua County Environmental Department (ACEPD) commissioned Environmental Consulting and Technology, Inc. (ECT) to complete an assessment of Hatchet Creek (HC) sub-basin under Phase II of the NLII.

Newnans Lake is historically eutrophic, presumably due to the rich source of phosphorus in the Hawthorn Group (Hawthorn), a geologic layer at or near the surface in much of the lake's watershed (Odum, 1953; Brenner and Whitmore, 1998; Di *et al.*, 2012). However, water quality in Newnans Lake has declined over the last few decades, and the naturally clear tea-colored lake has turned turbid and green with planktonic algae (Lippincott, 2015). It was determined by FDEP that Newnans Lake was impaired by nutrients (nitrogen and phosphorus) based on the annual average trophic state index (TSI) threshold for impaired lakes. On August 28, 2002, adopted by Secretarial Order, Newnans Lake was included on the verified list of impaired waters for the

Orange Creek Basin. This verified impairment triggered the TMDL process, which establishes the maximum allowable loadings of pollutants for a water body. At present, Newnans Lake remains impaired and listed on the statewide comprehensive verified list of impaired waters due to elevated nutrient concentrations (total phosphorus [TP] and total nitrogen [TN]) creating conditions in the lake that result in dissolved oxygen concentrations of less than 5 milligrams per liter (mg/L).

This report provides a summary of the assessment of potential nutrient sources in HC and its connection to Newnans Lake, a synopsis of previously and newly collected data, and potential project solutions or focal areas to obtain nutrient load reductions.

The tributaries from the north, feeding into the main channel of HC have observed phosphorus concentrations higher that what is observed directly within the HC main flow path. Conducting further investigation to better characterize the potential sources of nutrients and to quantify flow volume and nutrient loading from these tributaries will provide valuable insight to the overall understanding of the total load contribution from HC to Newnans Lake.

The UF IFAS Beef Research Unit, Gainesville Raceway, and Johnson borrow pit are positioned north of these tributaries and may all be contributing sources of nutrients. More in depth assessment of nutrient runoff potential and hydrologic connectivity to the tributary flow paths is needed to determine the degree of loading potential.

Upon approval for Phase III funding, specific projects to investigate these issues will developed for implementation. It should be noted, that while OSTDS remain a concern, limited information and data is available to make conclusive recommendations. It is our recommendation to focus on the identified contributing tributaries first, confirm or eliminate the potential source locations, before the focus is shifted to OSTDS.

1.0 Introduction

In February 2018, Alachua County Environmental Department (ACEPD) commissioned Environmental Consulting and Technology, Inc. (ECT) to complete an assessment of Hatchet Creek (HC) sub-basin under Phase II of the Newnans Lake Improvement Initiative (NLII). The NLII is a restoration initiative managed by ACEPD aimed to improve water quality in Newnans Lake. The NLII was created in response to the total maximum daily loads (TMDLs) and management priorities identified in the basin management action plan (BMAP).

Phase II of the NLII, funded by the Florida Department of Environmental Protection (FDEP), consists of two projects: (1) Pilot Project for Water Quality Enhancement of Little Hatchet Creek (LHC), and (2) Assessment of HC sub-basins. Both projects are designed to improve understanding of how nutrients (nitrogen and phosphorus) are contributed to Newnans Lake and develop project solutions to reduce the nutrient load Newnans Lake receives on an annual basis.

This report provides a summary of the assessment of potential nutrient sources in HC and its connection to Newnans Lake, a synopsis of previously and newly collected data, and potential project solutions or focal areas to obtain nutrient load reductions.

1.1 Description and History

Newnans Lake is located in Alachua County and is one of four major lakes within the Orange Creek Basin (OCB) (Figure 1-1). A large drainage area north and west of the lake supplies inflow via three stream sub-basins: HC, LHC, and Lake Forest Creek. HC (the focus of this report) covers the northern extent of the Newnans Lake basin and flows to the eastern edge before discharging into the lake. Land use in the HC sub-basin is mostly rural residential and agriculture. Once water leaves Newnans Lake, approximately 45 percent of the long-term average flow is diverted into Payne’s Prairie via Prairie Creek, while the remainder flows to Camps Canal and the River Styx swamp before reaching Orange Lake (Lippincott, 2011).

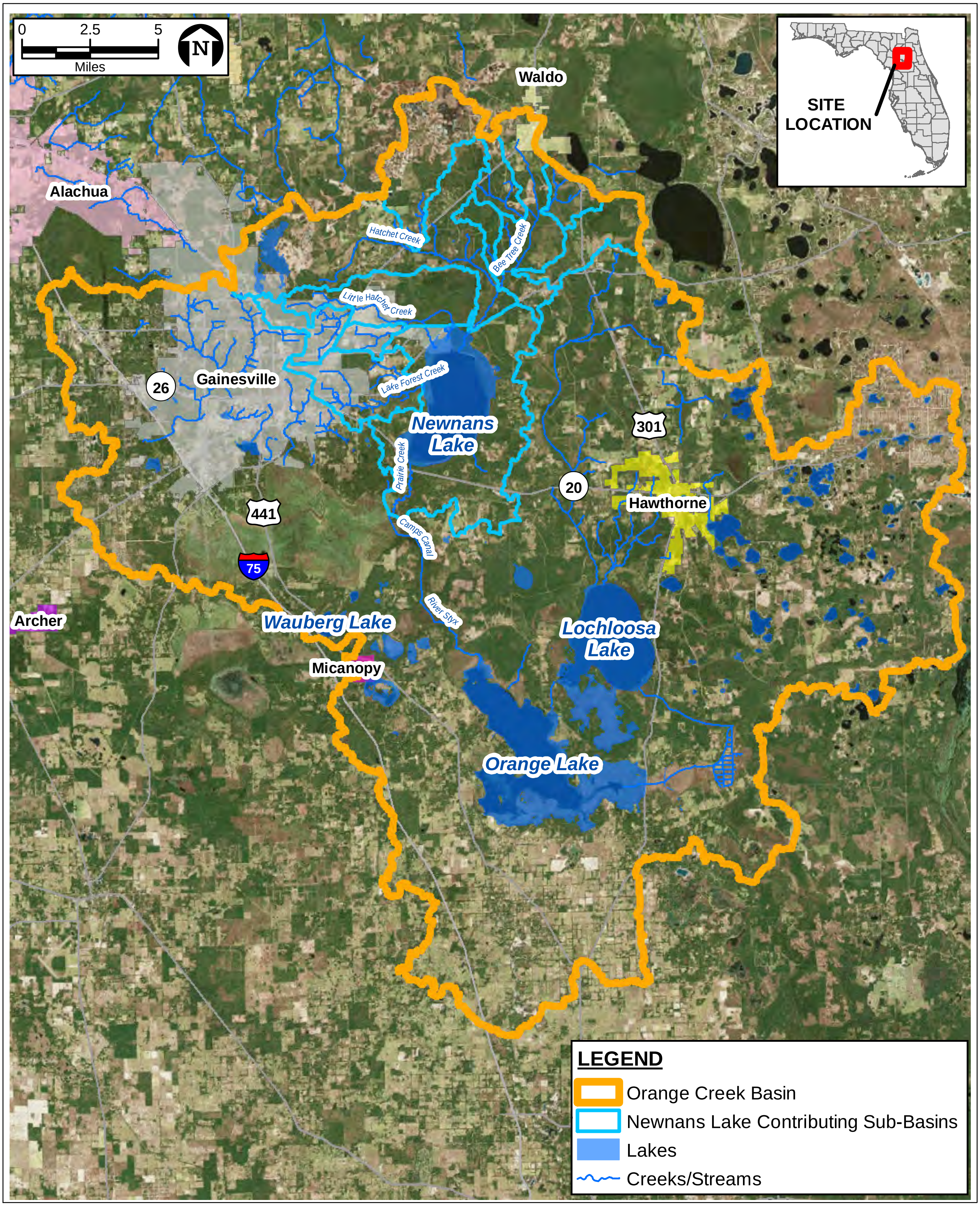

FIGURE 1-1.
NEWNANS LAKE SITE LOCATION
WITHIN ORANGE CREEK BASIN

Sources: FDEP, 2017; FDOT, 2017; ECT, 2018.

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Newnans Lake is historically eutrophic, presumably due to the rich source of phosphorus in the Hawthorn Group (Hawthorn), a geologic layer at or near the surface in much of the lake's watershed (Odum, 1953; Brenner and Whitmore, 1998; Di *et al.*, 2012). Over the past several decades, water quality in Newnans Lake has declined and conditions are hypereutrophic. The naturally clear tea-colored lake has turned turbid and green with planktonic algae (Lippincott, 2015).

The State of Florida considers Newnans Lake a Class III water body whose designated uses include recreation and propagation and maintenance of healthy well-balanced fish and wildlife populations. Currently, water quality in Newnans Lake does not meet state standards due to excessive nitrogen and phosphorus that feed growth of planktonic algae in the lake water (Gao and Gilbert, 2003). It was suggested that an increase in sediment accumulation in Newnans Lake may have occurred after 1966 when a concrete weir was constructed on Prairie Creek at State Road (SR) 20, reducing flushing from the lake. This reduction in natural flushing could have contributed to the decline in lake water quality. To test this concept, the weir was used in 1989 to conduct an experimental 90-day drawdown of Newnans Lake, which resulted in some nutrient removal from the lake due to flushing during pulsed discharges (Gottgens and Crisman, 1992); however, this experiment did not resolve all the nutrient concerns for the lake. The observed improvements associated with pulsed discharges and widening of SR 20 resulted in the permanent removal of the boards in the notch of the weir in 1991 to allow more natural lake level fluctuations (Lippincott, 2015). Despite allowing for cyclical flushing, hypereutrophic conditions have persisted and been exacerbated due to the extreme fluctuation in the lake's water levels over the past 20 years. Historic low water levels observed in more recent decades are thought to contribute to the elevated nutrient concentrations. From 1995 through 2013, concentrations of total nitrogen (TN), total phosphorus (TP), and chlorophyll-a (a measure of algae in the water column) in Newnans Lake were three to four times higher than state standards (FDEP, 2014).

Newnans Lake also shows signs of increasing carbon accumulation (Lippincott, 2011). Deeper sediments in Newnans Lake have a relatively high ratio of carbon to nitrogen compared to surface sediments, indicating a relative decrease in macrophyte production and increase in phytoplankton production, likely at the expense of submersed vegetation. Invasive aquatic vegetation has also been an ongoing management issue in Newnans Lake. Hydrilla (*Hydrilla verticillata*), water lettuce (*Pistia* sp.), and water hyacinth (*Eichhornia* sp.) have been monitored and managed by FDEP and the Florida Fish and Wildlife Conservation Commission since 1986 (Lippincott, 2011). To prevent long-term degradation of water quality and increased sedimentation and address herbicide-resistance, the St. Johns River Water Management District (SJRWMD) has recommended managing for these species at the lowest feasible level.

Newnans Lake also has the highest trophic state index (TSI) of the four major lakes in the OCB (Lippincott, 2011). TSI is a measure of water quality calculated using monthly averages of chlorophyll-a, TP, and TN. TSI values above 70 are indicative of poor lake water quality, while values less than 60 are indicative of good water quality. Median TSI values in Newnans Lake from 1994 to 2010 were 85, considered to be associated with dominant cyanobacteria (Lippincott, 2011).

1.1.1 Regulatory Drivers

The main regulatory driver behind the NLII is the 2003 TMDL established by FDEP in response to the TMDL program defined by the Clean Water Act, Section 303(d), and enforced by the U.S. Environmental Protection Agency (EPA).

It was determined by FDEP that Newnans Lake is impaired by nutrients (nitrogen and phosphorus) based on the annual average TSI threshold for impaired lakes. On August 28, 2002, adopted by Secretarial Order, Newnans Lake was included on the verified list of impaired waters for the OCB. This verified impairment triggered the TMDL process, which establishes the maximum allowable loadings of pollutants for a water body. At present, Newnans Lake remains impaired and listed on the statewide comprehensive verified list of impaired waters due to elevated nutrient concentrations (TP and TN) creating conditions in the lake that result in dissolved oxygen (DO) concentrations of less than 5 milligrams per liter (mg/L).

1.1.1.1 Total Maximum Daily Load

The 2003 TMDL set limits for TN and TP for Newnans Lake. FDEP's TMDL analysis indicated growth of planktonic algae in Newnans Lake had gradually shifted from being co-limited by both nitrogen and phosphorus, to being limited only by phosphorus (Gao and Gilbert, 2003). SJRWMD's pollutant load reduction goal analysis also indicated nitrogen and phosphorus co-limitation of algae growth in Newnans Lake, but with nitrogen limitation during some periods (Di *et al.*, 2009). Therefore, concentration of both nitrogen and phosphorus need to be addressed in Newnans Lake to reduce algae growth and improve water quality.

Of the six major sub-basins that comprise the Newnans Lake Watershed (NLW), the TMDL defined three sub-basins as primary contributors to the total nutrient load of Newnans Lake: HC, LHC, and Newnans Lake (Figure 1-2). The cumulative TN load from all sources (point, nonpoint, and background) was reported as 315,510 pounds per year (lb/yr) by FDEP (Table 1-1). The assimilative capacity of Newnans Lake required to meet water quality standards corresponds to a TN TMDL of 85,470 lb/yr, which equates to a 74-percent reduction in the total annual TN load reported. The cumulative TP load from all sources (point, nonpoint, and background) was reported as 25,732 lb/yr by FDEP (Table 1-2). The assimilative capacity of Newnans Lake required to meet water quality standards corresponds to a TP TMDL of 10,924 lb/yr, which equates to a 59-percent reduction in the total annual TP load reported.

Table 1-1. Total Nitrogen Loading for Newnans Lake and Its Defined Sub-basins

Basin	Total TN Load (lb/yr)*	TMDL TN Load (lb/yr)	Percent Reduction
Total basin	315,510	85,470	74
HC	43,090 ±6,475		
LHC	12,650 ±1,893		
Newnans Lake	28,815 ±4,328		

*Values reported for HC, LHC, and Newnans Lake are an annual average load based on five years of rainfall and land use cover.

Source: FDEP, 2003.

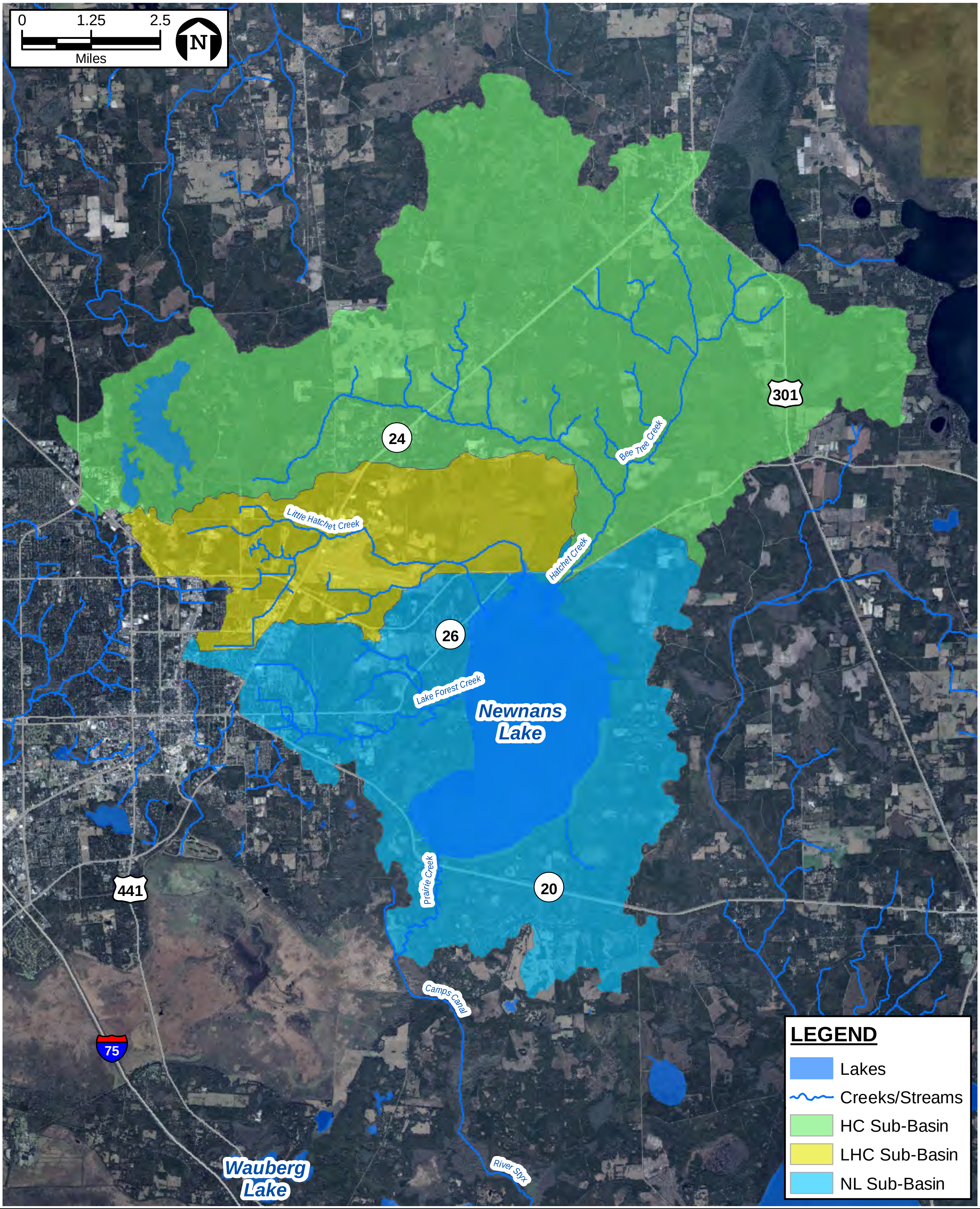

FIGURE 1-2.
TMDL AND BMAP SUB-BASINS
WITHIN NEWNANS LAKE WATERSHED

Sources: FDEP, 2017; FDOT, 2017; ECT, 2018.

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Table 1-2. Total Phosphorus Loading for Newnans Lake and Its Defined Sub-basins

Basin	Total TP Load (lb/yr)*	TMDL TP Load (lb/yr)	Percent Reduction
Total basin	25,732	10,924	59
HC	4,382 ±661		
LHC	1,628 ±222		
Newnans Lake	3,218 ±485		

*Values reported for HC, LHC, and Newnans Lake are an annual average load based on five years of rainfall and land use cover.

Source: FDEP, 2003.

To calculate TN and TP loadings from the three sub-basins contributing the majority of nutrient loads to Newnans Lake, FDEP utilized the Watershed Management Model (WMM) to estimate these loads based on the imperviousness and event mean concentration (EMC) of TN and TP from different land use types found in each sub-basin. FDEP determined HC contributes 43,090 ± 6,475 lb/yr, LHC contributes 12,650 ± 1,893 lb/yr, and Newnans Lake contributes 28,815 ± 4,328 lb/yr of TN based on a five-year average (Table 1-1). FDEP determined HC contributes 4,382 ± 661 lb/yr, LHC contributes 1,628 ± 222 lb/yr, and Newnans Lake contributes 3,218 ± 485 lb/yr of TP based on a five-year average (Table 1-2).

1.1.1.2 Basin Management Action Plan

The development of the overall management plan to address the TMDL and improve water quality in Newnans Lake was accomplished through the development of the Orange Creek BMAP. With input from stakeholders, the Orange Creek BMAP was developed through a multistage process that includes the following three iterations of the plan:

1. In accordance with the Florida Watershed Restoration Act, FDEP convened the multiple-stakeholder OCB Working Group, which developed a management action plan to restore water quality in Newnans Lake and other impaired water bodies to state standards (FDEP 2008).
2. The first Orange Creek BMAP was adopted in 2007 and contains 28 projects for improving water quality in Newnans Lake or its tributaries.

3. In 2014 FDEP updated the Orange Creek BMAP based on input from the same working group (FDEP, 2014). The second phase of the Orange Creek BMAP contains 11 projects for improving water quality in Newnans Lake or its tributaries.

In 2008, Phase I of the BMAP was implemented when the 2007 Orange Creek BMAP was adopted. Phase II of the Orange Creek BMAP was finalized in 2014 and focused specifically on identifying the sources of nutrient loads in Newnans Lake, Orange Lake, and Wauberg Lake. The TMDL for Lochloosa Lake was adopted, and a supplemental report will be created to incorporate Lochloosa Lake into the 2014 BMAP.

Phase II provides for phased implementation under Subparagraph 403.067(7)(a)1, Florida Statutes (F.S.), and this adaptive management process will continue until the TMDLs are met. The phased BMAP approach allows for incrementally reducing loadings through the implementation of projects, while simultaneously monitoring and conducting studies to better understand water quality dynamics (sources and response variables) in each impaired water body. Impaired surface waters in the OCB covered by this BMAP are designated as Class III waters in accordance with Chapter 62-302, Florida Administrative Code (F.A.C.).

1.1.1.3 Surface Water Improvement Management Plan

In 2011, SJRWMD developed the Orange Creek Basin Surface Water Improvement and Management (SWIM) Plan with input from various basin stakeholders (Lippincott, 2011). That SWIM plan contains more than 20 projects for monitoring, diagnosing, or improving water quality in Newnans Lake and its tributaries. Examples of projects that reduce pollutant loading to Newnans Lake from LHC include a watershed management plan for LHC, under development by the City of Gainesville, as well as a stormwater master plan developed by Alachua County for unincorporated areas of the county that identified 19 stormwater basins and 12 roads where water quality improvements are required (Lippincott, 2011).

1.1.2 Watershed Partnerships

Partnership with local governments, regional and state agencies, and other stakeholders have been established through the Orange Creek BMAP and Newnan's Lake Land Management Plan.

Many of these same partnerships have carried over into the NLII, as many of the goals and objectives overlap with the BMAP.

Local governments include:

- Alachua County Public Works
- ACEPD
- City of Gainesville Public Works
- Gainesville Regional Utilities (GRU)

Regional and state agencies include:

- Florida Department of Agriculture and Consumer Services (including the Florida Forest Service and Office of Agriculture Water Policy)
- Florida Department of Environmental Protection Northeast District Office
- Florida Department of Health in Alachua County
- Florida Department of Transportation
- Florida Fish and Wildlife Conservation Commission
- SJRWMD
- Payne's Prairie Preserve State Park

Other stakeholders include:

- Alachua County Environmental Protection Advisory Committee
- Florida Forestry Association
- Gainesville Water Management Committee
- Private Sector
- University of Florida (UF)

1.2 Project Purpose

The purpose of the NLII is to develop effective strategies to reduce nutrient loads (nitrogen and phosphorus) to Newnans Lake, thus improving the overall water quality of the lake. Phase I of this initiative focused on the development of nutrient reduction projects within the LHC sub-basin while Phase II focused on gaining a better understanding of the load sources in Hatchet Creek sub-basin.

1.2.1 Phase II Project 2: Water Quality Improvement of HC

Hatchet Creek watershed is located in the northeast quadrant of Alachua County and encompasses approximately 65 square miles of rural land. The main channel of the creek flows west to east and empties into Newnan's Lake. The majority of the watershed is located outside the Gainesville city limits. Hatchet Creek is listed as an impaired creek because it exceeds the TMDL for both nutrients and fecal coliform. Due to the shallow nature of the Hawthorn Group, it is a major source of total phosphorus (TP) to Newnans Lake. The variety of land use within the watershed contributes both total nitrogen (TN) and TP to Newnans Lake. Approximately 50% of the land in the Hatchet Creek Watershed is devoted to silviculture, 20% to agriculture, and 20% to natural forest habitat. Agricultural land uses include cattle, dairy, produce farms, and the 1,138-acre University of Florida IFAS Beef Research Unit.

The Hatchet Creek Watershed has many natural, undisturbed areas with diverse habitats. Flow in Hatchet Creek is derived primarily from springs and seeps from the intermediate and surficial aquifer system. Preliminary documentation indicates that the creek channel consists of areas where the Hawthorn Group is exposed resulting in high levels of phosphorus (P) being transported to Newnans Lake. The Hawthorn Group is a naturally occurring source of P, however, both natural and anthropogenic activities have resulted in the excess exposure of these soils in Hatchet Creek where they were once buried under overlying low-P soils.

The goal of this project is to develop design projects to reduce the P load from the exposed Hawthorn Group in Hatchet Creek and/or develop low-impact projects that would reduce nutrients via instream treatment solutions. The following tasks describe project specific actions to achieve this goal. Table 1 includes costs and schedule for completion for each task.

This project included the following major tasks:

1. **Land Use Assessment:** Unlike LHC, which is predominantly urban development, HC is largely silviculture and agriculture. While many, if not most, of the land owners within the watershed are implementing BMPs, there is concern that site specific BMPs need to be developed due to the shallow and unique nature of the Hawthorn Group that dominates this landscape. A desktop analysis of the current land use and potential nutrient loads from these uses was assessed.
2. **Evaluate Nutrient Loading from IFAS Beef Research Unit and Gainesville Raceway:** The Institute of Food and Agricultural Sciences (IFAS) Beef Research Unit and the Gainesville Raceway were evaluated as potential for nutrient loading to HC. Initial desk observations identified potential ditches connecting the IFAS Beef Research Unit to Hatchet Creek and were investigated further in this report. The Gainesville Raceway has a wastewater treatment facility permitted for 0.00825 MGD with an extended aeration batch treatment and aerated lagoon. ECT evaluated the permit in greater detail and their permit monitoring requirements for nutrients considered if there was potential nutrient load contribution to HC.
3. **Site-Specific BMP Concept Development:** Based on the findings from Phase I, where appropriate, ECT assessed potential areas where treatment wetlands and/or stormwater improvement projects/ponds and low impact development (LID) best management practice (BMPs) could be implemented to improve water quality to Newnans Lake. With the growing concern and focus on septic systems statewide, FDEP is developing GIS coverage identifying septic locations on open water, streams, connecting channels and wetlands. ECT utilized this data to evaluate and propose options for identifying failing on-site treatment and disposal systems (OSTDS) within 200 meters of open water and directly connected to HC.

2.0 Study Area

Newnans Lake is a shallow, hypereutrophic lake approximately 7,700 acres in size (based on the average annual water level for the past ten years and statewide light detection and ranging (LiDAR) measurements (UF GeoPlan Center, 2013]) located in Alachua County, Florida (Figure 1-1). Limnetic TP and species composition of sedimented diatom assemblages suggest Newnans Lake has been eutrophic for some time, at least before 1900 whereafter the majority of anthropogenic impacts occurred (Brenner and Whitmore, 1998). The nutrient condition history of the lake is suspected to result from the phosphorus-rich Hawthorn that variably approaches the land surface. Phosphates in the Hawthorn are found primarily in the form of fluorapatite. Across the region, the Hawthorn potentially interacts with surface water and groundwater to varying extents, thereby influencing TP loads (Section 3.2). After 1900, the hydrology of the NLW changed significantly with increased development and construction of the Alachua County Airfield in 1941 (now GNV).

2.1 Newnans Lake Watershed

The NLW encompasses 73,000 acres in eastern Alachua County and is comprised of six major sub-basins: HC (72 square kilometers [km^2]), Bee Tree Creek (66 km^2), GRS (22 km^2), Lake Forest Creek (20 km^2), LHC (18 km^2), and Airport Drain (5 km^2). HC, Bee Tree Creek, GRS, LHC, and Airport Drain all lie on the northern end of the lake, while Lake Forest Creek lies on the west side of the lake (Figure 2-1). HC drains large areas of swamp and wet flatwoods from North Gainesville before receiving flow from Bee Tree Creek and entering Newnans Lake. LHC drains wet flatwoods and industrial areas in Gainesville and receives flow from Airport Drain before flowing alongside or into GRS through one of two primary stream flow paths, depending on hydrologic conditions. These sub-basins lie within close geographic proximity and, under large storm events, likely become intimately associated.

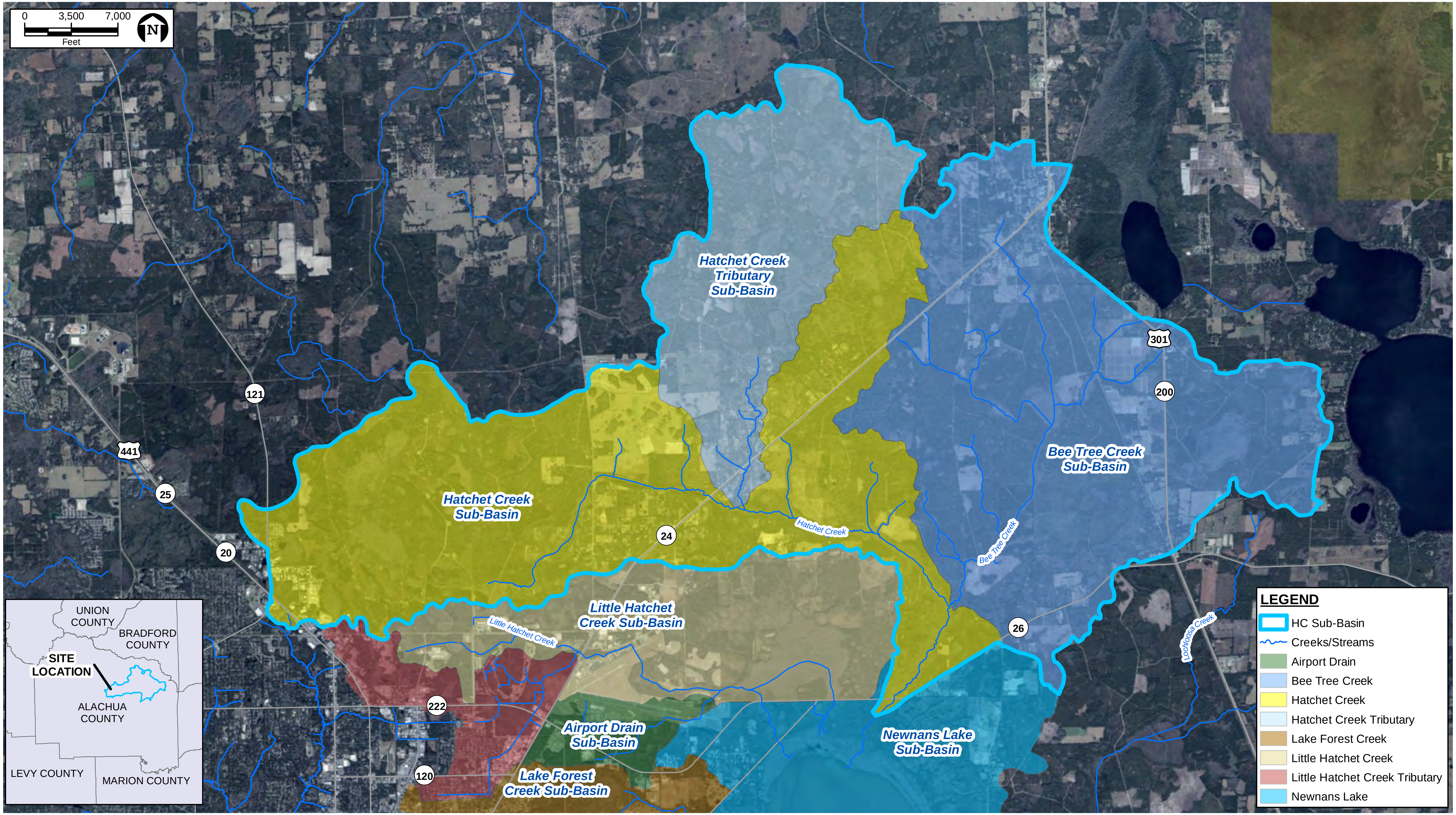

FIGURE 2-1.

CONTRIBUTING DRAINAGE BASINS
HATCHET CREEK

Sources: FDOT, 2017; Alacua Co, 2016; FDEP, 2016; USGS, 2016; ECT, 2018.

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Lake Forest Creek drains most of East Gainesville and comparatively captures the most flow associated with urban development.

2.1.1 HC Sub-basin

For the purposes of this work, the HC, HC Tributary, and Bee Tree sub-basins are combined into a single sub-basin (HC sub-basin) to maintain consistency with the 2003 TMDL report (Figure 2-2). HC is a blackwater stream with naturally high color and covers an area of 41,138 acres. Most of the creek remain in a relatively natural condition and is largely undeveloped.

Contained within HC sub-basin are two small communities, Fairbanks and Waldo. Fairbanks is located just north of Gainesville with an unreported population. Small tributaries, with relatively undisturbed floodplain wetlands, meander through this small residential community. Waldo is located along the northern boundary of HC and has a reported population of 1,153 in 2017.

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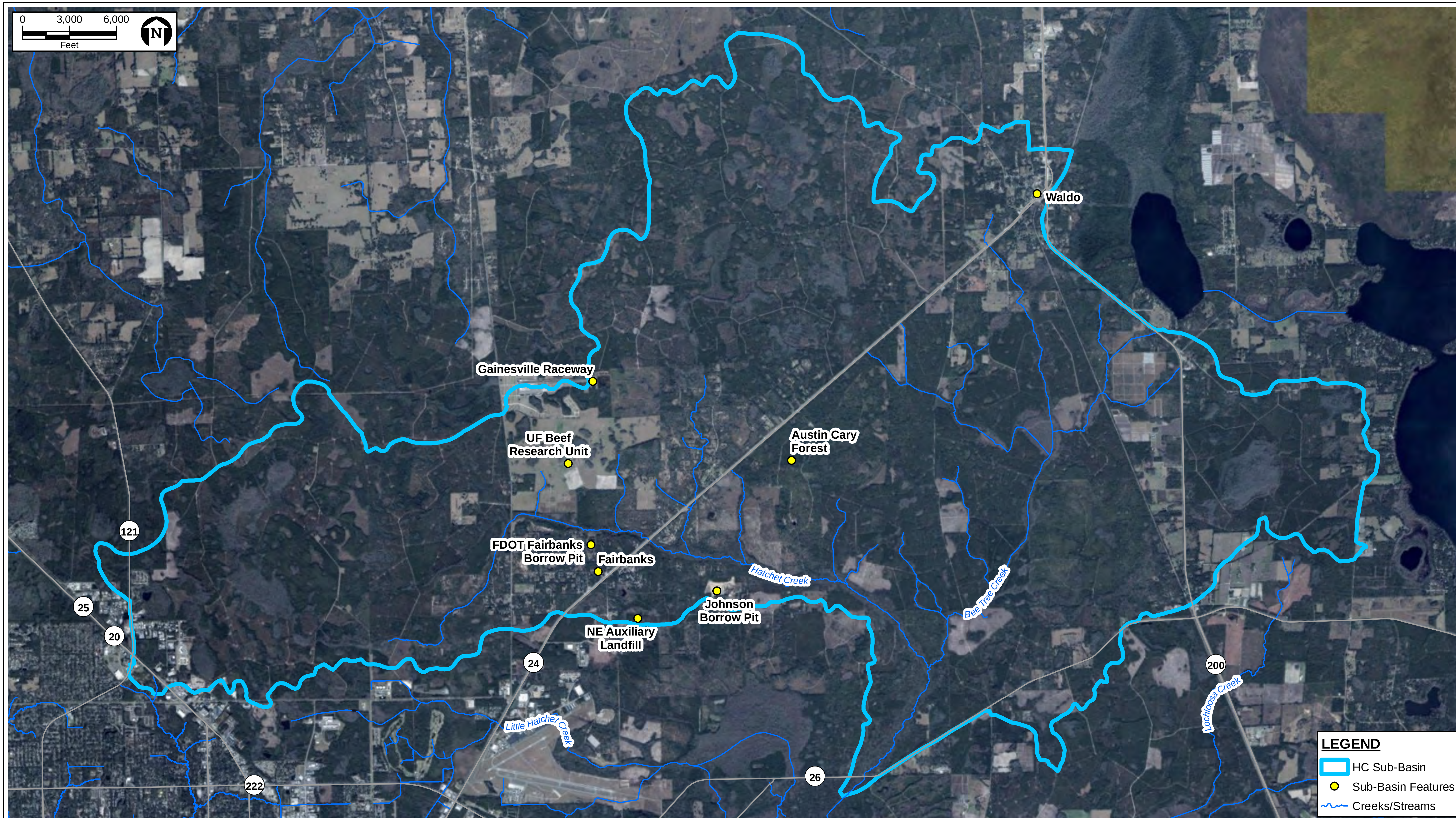

FIGURE 2-2.

SITE FEATURES
HATCHET CREEK

Sources: FDOT, 2017; Alacua Co, 2016; FDEP, 2016; USGS, 2016; ECT, 2018.

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2.2 Land Use and Land Cover

Based on 2004 land use as developed by SJRWMD, the two dominant land uses in the HC sub-basin include upland forest (62 percent), wetlands (22 percent), accounting for 84 percent of the total land cover (Figure 2-3). Much of the upland forest areas are managed silviculture, most of which is contained within Bee Tree Creek. More than half of the active agriculture occurring in the HC sub-basin is located in Bee Tree Creek with 792 acres which only accounts for 5 percent of the total land use (Table 2-1).

Only eight percent of the land use in HC sub-basin is urban/built with the majority of that found in HC with 1,852 acres (most of which is the community of Fairbanks) as compared to 838 acres in Bee Tree Creek and 489 acres in HC Tributary (Table 2-1).

A large percentage of the land use in HC is undisturbed wetland habitat. HC contains the largest wetland area at 4,234 acres, followed by Bee Tree Creek with 2,744 acres and HC tributary with 2,238 acres. The areas of greatest interest in this assessment are found along the main channel of HC. These urban/built areas include the IFAS Beef Unit and the Gainesville Raceway (Figure 2-2 and 2-3).

Table 2-1. HC Sub-basin Land Use Distribution Extent

Land Use	Bee Tree Creek		Hatchet Creek		Hatchet Creek Tributary		Total	
	Acres	% Cover	Acres	% Cover	Acres	% Cover	Acres	% Cover
Urban/Built	838	5	1,852	11	489	7	3,179	8
Agriculture	792	5	553	3	91	1	1,436	3
Upland Non-Forested	909	6	232	1	110	1	1,250	3
Upland Forested	10,896	67	10,350	60	4,399	60	25,645	62
Water	5	0.03	31	0.2	13	0.2	50	0.1
Wetlands	2,744	17	4,234	24	2,238	30	9,217	22
Disturbed lands		0	14	0.1	28	0.4	42	0.1
Roads/Utilities	187	1	113	1	19	0.3	318	1
Total	16,371		17,379		7,387		41,138	

Source: ECT, 2018.

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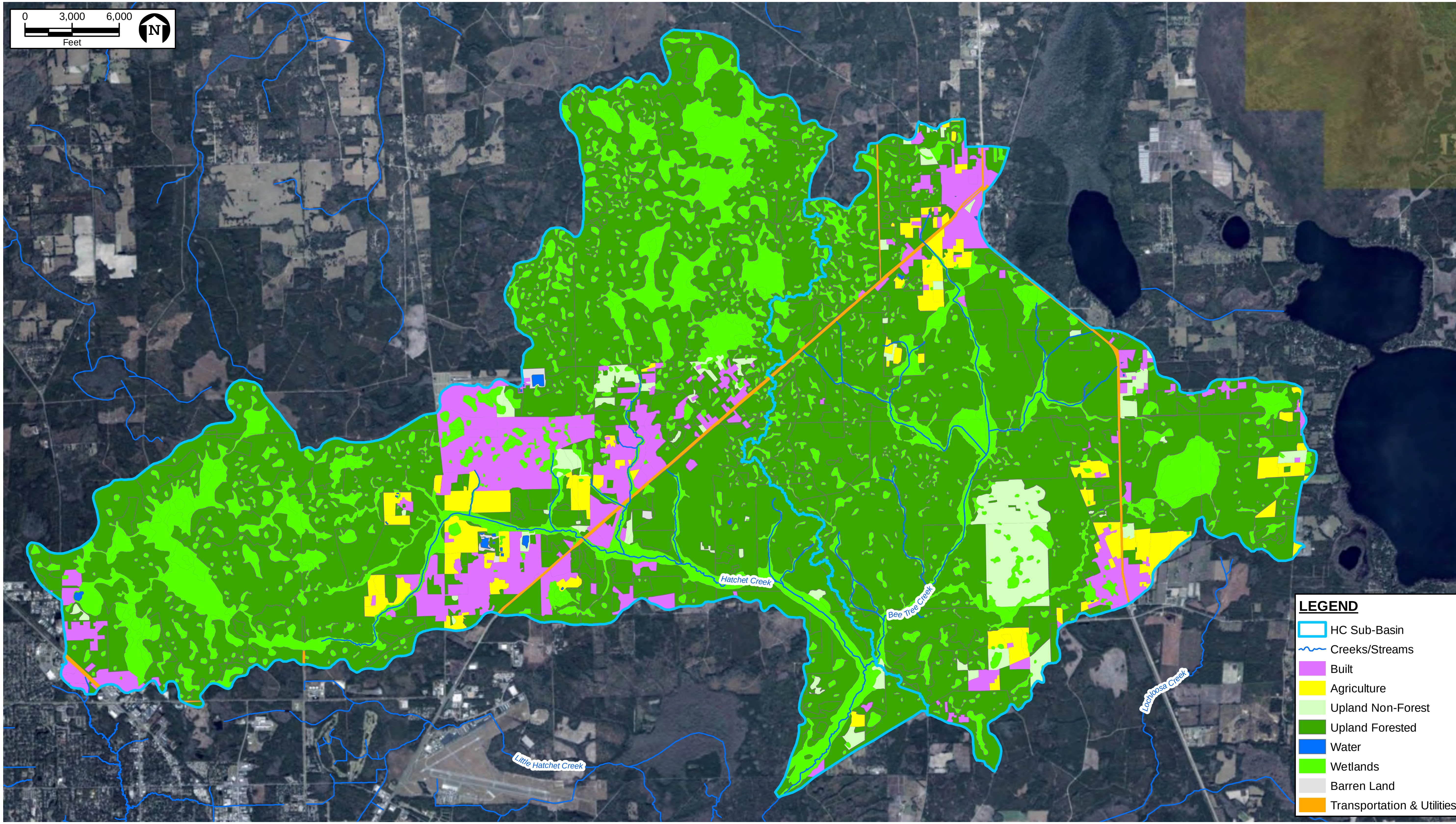

FIGURE 2-3.

LAND USE / LAND COVER
HATCHET CREEK

Sources: SRWMD, 2016; FDOT, 2017; Alacua Co, 2016; FDEP, 2016; USGS, 2016; ECT, 2018.

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2.3 Geology and Soils

Newnans Lake is located in the Northern Highlands physiographic province (White, 1970). The Hawthorn Group and Ocala Group are the major geologic formations at or near the surface in the region that have influenced soil development and thereby surface water chemistry. The HC sub-basin and Newnans Lake are within close proximity to the top of the Hawthorn. The Hawthorn consists of a sequence of beds of limestone, dolomite, phosphatic dolomite, clay, phosphatic clayey sand, and phosphorite lithologies of early and middle Miocene age. From oldest to youngest, the Hawthorn formations include the Penney Farms Formation, Marks Head Formation, Coosawhatchie Formation, and Statenville Formation (Scott, 1998) (Figure 2-4). The Hawthorn overlies the Upper Eocene Ocala Group in the NLW, where the Floridan aquifer begins. The thickness of the Hawthorn ranges from approximately 150 feet (ft) in eastern Alachua County to less than 5 ft in the western part of the county, with thicknesses generally decreasing from east to west (Scott, 1998). The Hawthorn contains variable amounts of fluorapatite, which can range in particle size from pellets (pebbles) between 1 and 10 millimeters (mm) in diameter to grains less than 1 mm in diameter, as defined by Espenshade and Spencer (1962). Beds of these phosphatic materials are more abundant in clayey sand that contains montmorillonite clay, which is generally found in the upper part of the Hawthorn (Coosawhatchie Formation) (Espenshade and Spencer, 1962). The upper part of the Hawthorn (Coosawhatchie Formation) is dominated by dolomitic sands interbedded with quartz sands and clays, with phosphate grain content ranging from a trace to more than 20 percent (Scott, 1998).

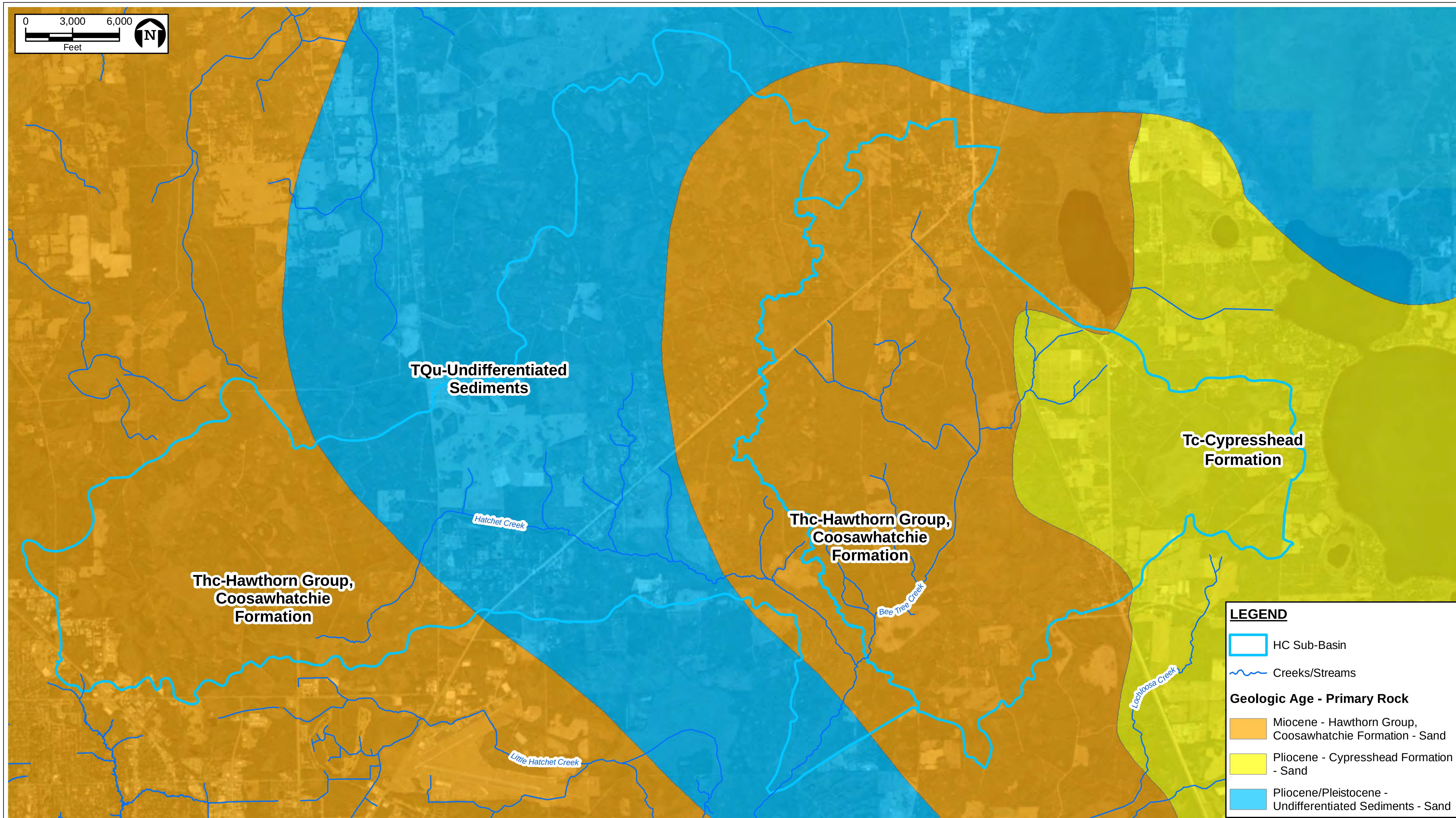

FIGURE 2-4.
GEOLOGIC AGE AND FORMATIONS
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; USGS, Gainesville East & Orange Heights Quads, 2016; ECT, 2018.

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The lower part of the Hawthorn (Penny Farms and Marks Head Formations) is dominated by siliclastic materials with carbonate and clay beds with phosphate grains present in amounts potentially greater than 25 percent with an average of 5 to 10 percent in carbonate beds (Scott, 1998). Based on Hawthorn Formation elevations reported in Scott (1998), elevations in the NLW imply the Coosawhatchie and Marks Head formations are found at or near the land surface. Apatite pebbles in this formation of the Hawthorn tend to dissolve over geologic time in the top few feet of the phosphatic beds forming dominant secondary phosphate minerals (wavellite and crandallite) as a result of the redepositing of phosphate with aluminum.

While the Hawthorn is present near the surface in the NLW, the major geologic formation at or near the surface in the rest of Alachua County is typically dictated by location in reference to the Cody Escarpment, a topographic high that approximates an ancient Florida shoreline (Upchurch, 2007). In the western and southern portions of Alachua County, the limestone of the Ocala Group is exposed where the Hawthorn was eroded via wave action under much higher sea levels. In the eastern portion of the county, the Hawthorn is primarily intact (with some sinkholes where erosion has taken place), and soils have developed over the Hawthorn. These soils are typically sandy and poorly drained, with Spodosols commonly occurring in the HC sub-basin, especially in the pine-forested regions (Figure 2-5). Soils in the region are acidic as a result of interaction with decomposing vegetative litter resulting in organic acids. These soils have variable degrees of coatings on fine to coarse sand grains comprised of organic matter (OM) and iron and aluminum oxides that can provide nutrient retention in the upper portion of the soil, with larger amounts of translocated carbon and iron/aluminum oxides in the lower portion.

These soils, along with other well-drained soils in the region (Figure 2-6), form the surficial aquifer, with the Hawthorn being the confining unit between the surficial and Upper Floridan aquifers. Due to the highly variable and thereby potentially leaky nature of the Hawthorn, water can interact extensively with the Hawthorn in this region, creating an intermediate aquifer system that provides baseflow to creeks where erosion has created seepage slopes. As such, HC is fed by both surface water from tributaries as well as water from the surficial and intermediate aquifers that discharges to HC during part of the year.

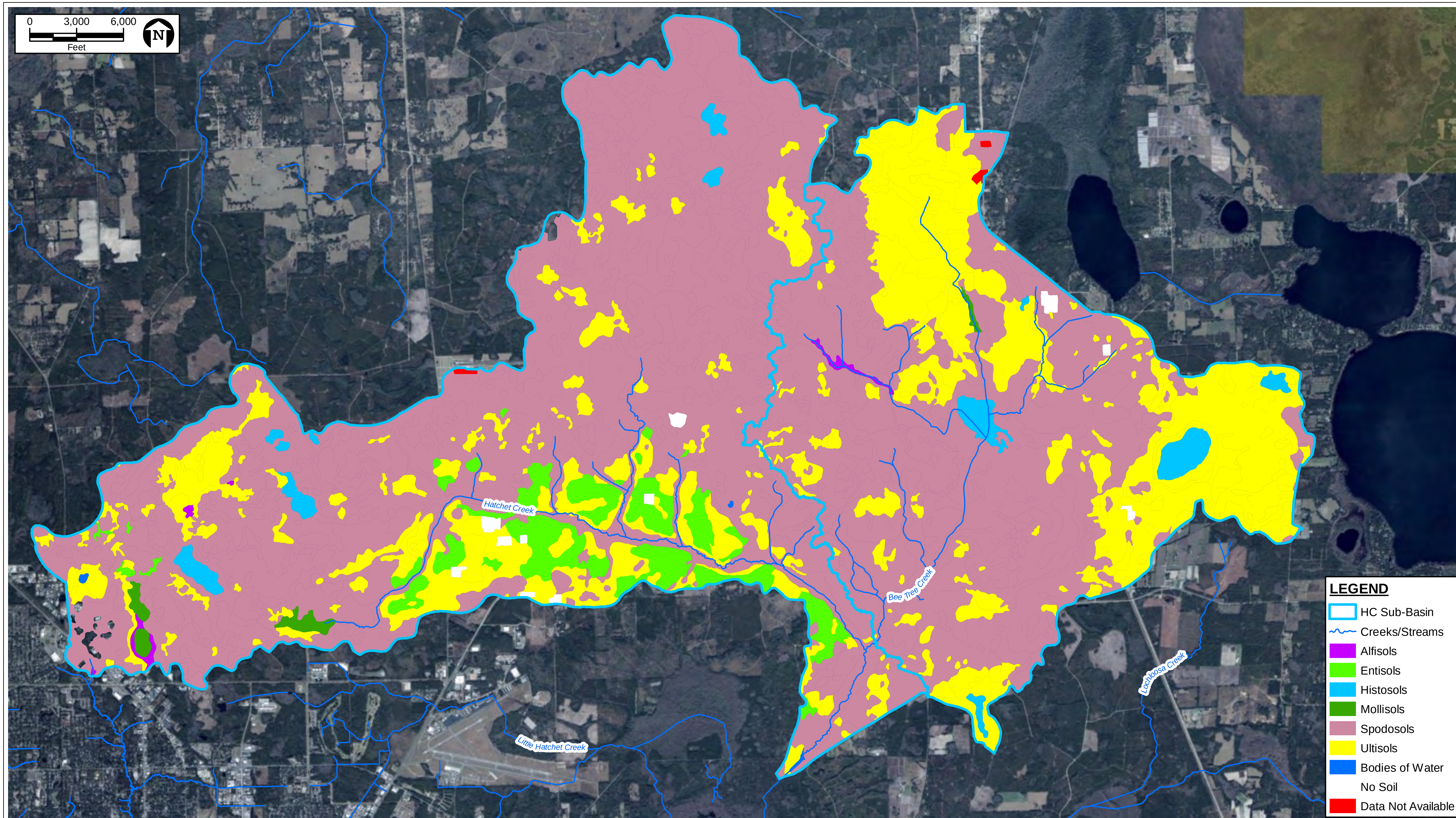

FIGURE 2-5.

SOIL ORDERS
HATCHET CREEK

Sources: USDA, 2016; FDOT, 2017; Alacua Co, 2016; FDEP, 2016; USGS, 2016; ECT, 2018.

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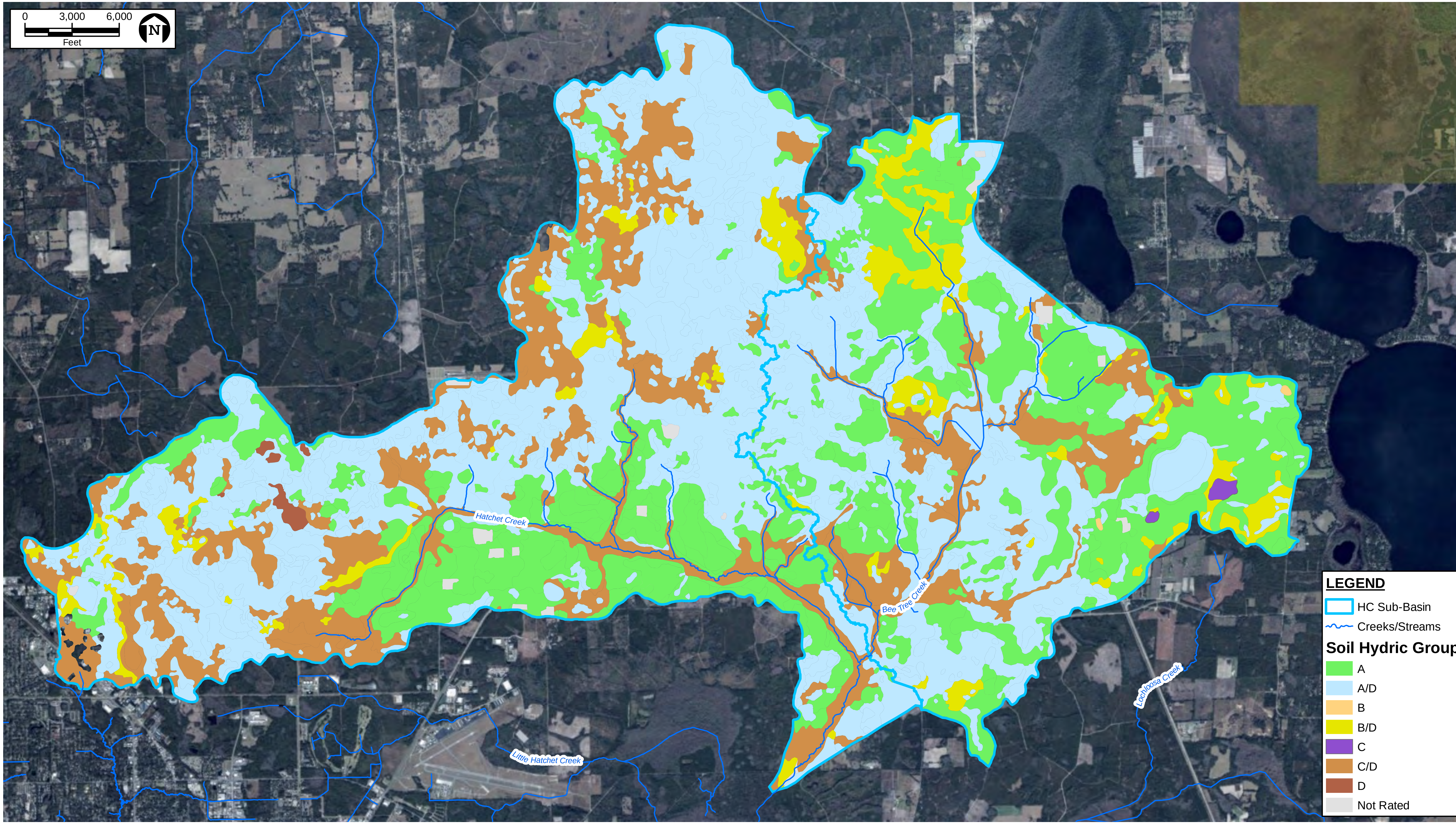

FIGURE 2-6.

SOIL HYDRIC GROUPS
HATCHET CREEK

Sources: USDA, 2016; FDOT, 2017; Alacua Co, 2016; FDEP, 2016; USGS, 2016; ECT, 2018.

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2.3.1 Topography

The majority of the HC sub-basin lies within the Northern Highlands geomorphic feature, while Newnans Lake lies within the Central Valley subunit of the Central Highlands (Hoenstine and Lane, 1991). Topography readily differentiates the two, as the Northern Highlands lie north of the Cody Scarp where elevations range from 170 to 215 feet above mean sea level (ft msl), while elevations in the Central Valley range from 70 to 100 ft msl (Hoenstine and Lane, 1991). Elevations in the headwaters of HC peak at more than 175 ft above North American Datum of 1983 (NAD 1983), gradually sloping toward the lake (Figure 2-7).

2.3.2 Depth to Hawthorn

The depth from the surface to the top of the Hawthorn was measured by Di *et al*. (2012) using direct push cores. Eight of these cores are located within the HC sub-basin and provide an estimation of the nature of the Hawthorn in this region. The greatest depths are found near the western boundary of the sub-basin, where the depth to Hawthorn measures approximately 25 ft below land surface based on visual observation (Figure 2-8). Closer to the creek channel and associated tributaries, depths to the Hawthorn fall to approximately 8 ft below land surface. These depths are some of the lowest measurements taken in the NLW and have been found to contain almost twice as much TP as locations where the depth to the Hawthorn is deeper. Furthermore, the TP content of the top 1.5 ft of the soil profile is higher than the TP content of other Spodosols in the region (Di *et al*., 2012). These findings indicate there is a significant pool of phosphorus within the soils closest to the flow path of the defined channels of HC sub-basin; however, whether this phosphorus is derived from retention in the soils of phosphorus transported via the surficial aquifer or is phosphorus associated with apatite pebbles or grains is uncertain. Using the depth to Hawthorn extrapolated from Di *et al*. (2012) (Figure 2-8), and the digital elevation model (DEM) for the sub-basin, the elevation of the Hawthorn can be estimated.

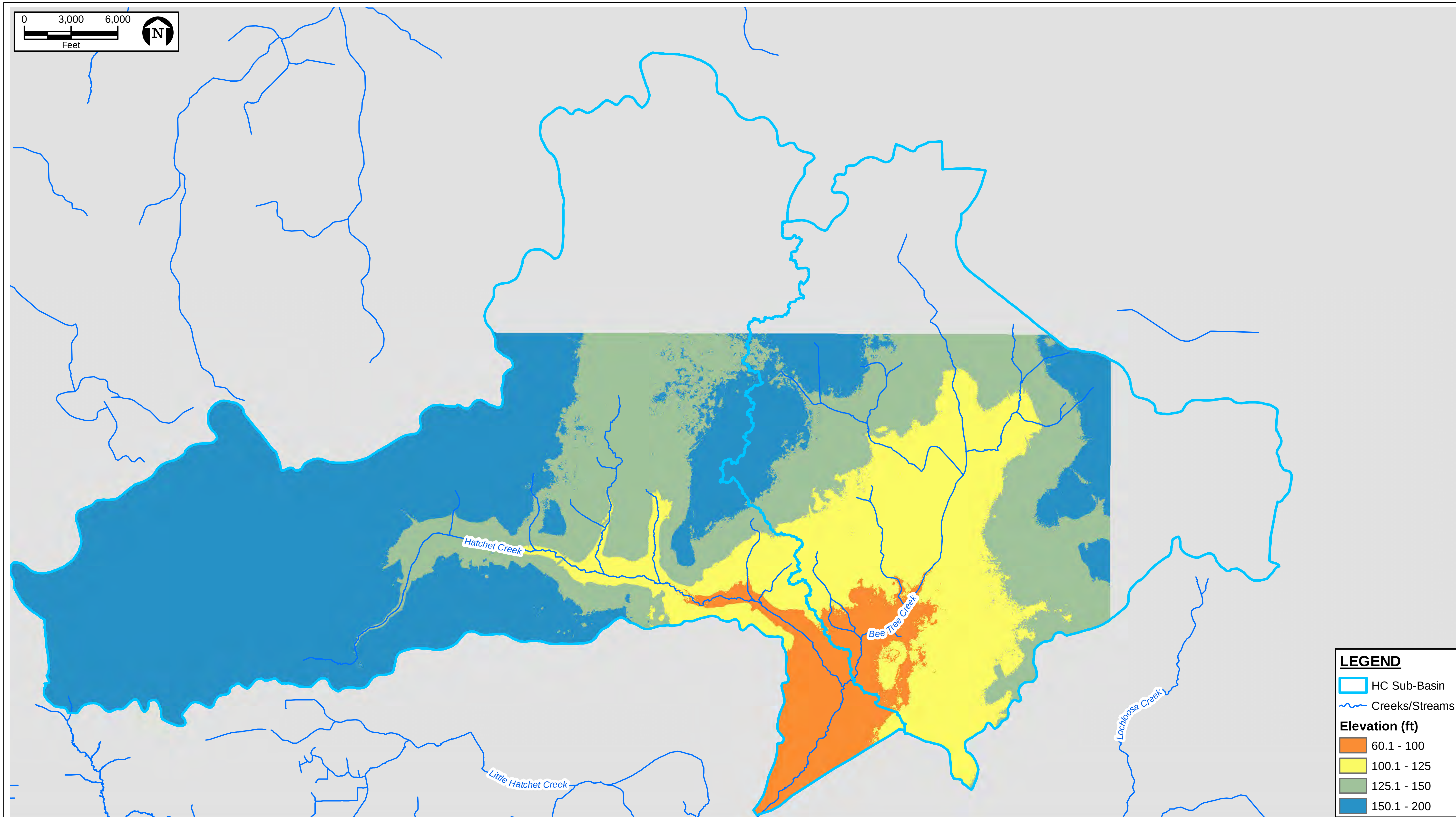

FIGURE 2-7.
ELEVATION
HATCHET CREEK

Sources: FDOT, 2017; Alachua County, 2017; ECT, 2018.

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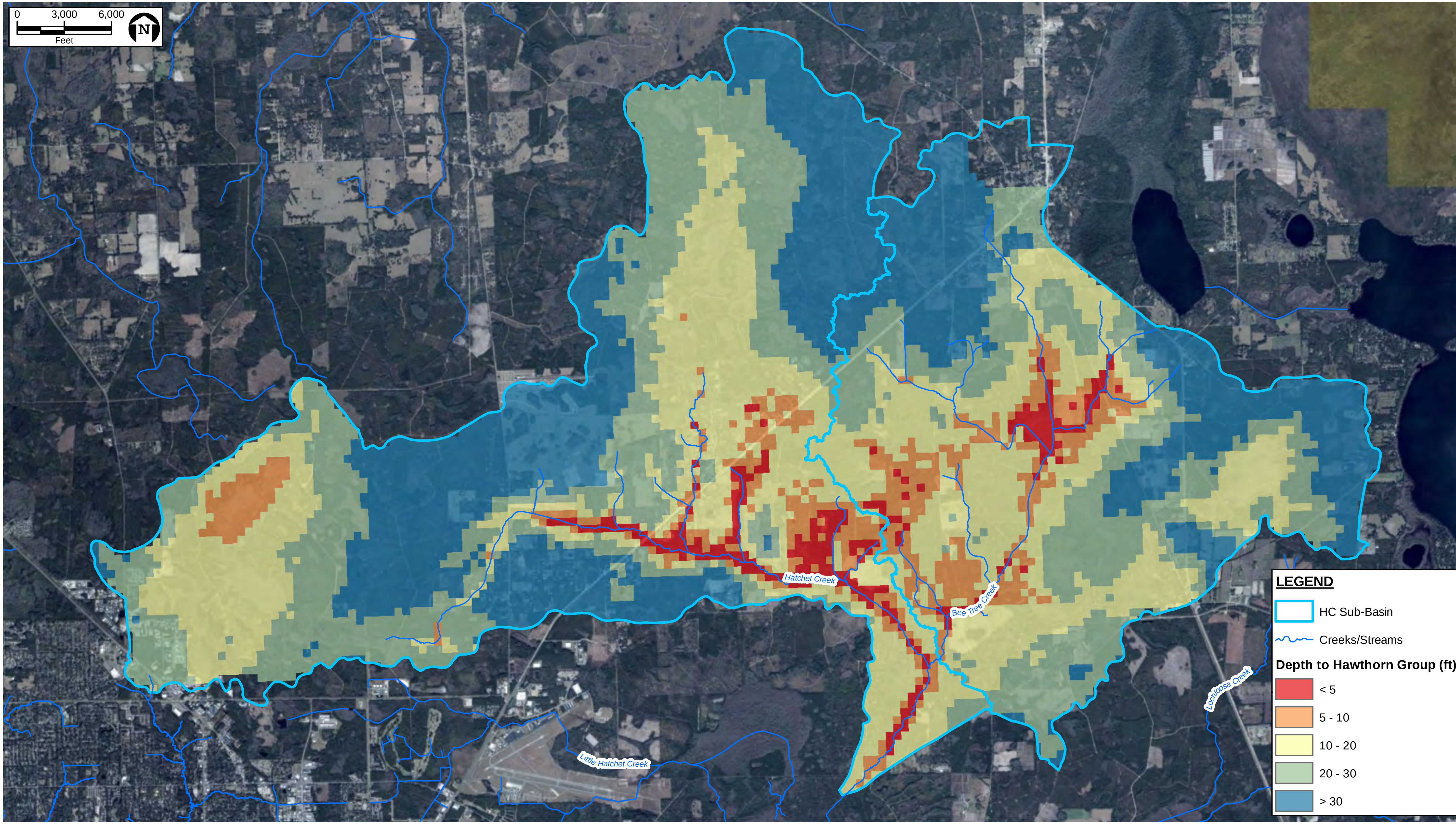

FIGURE 2-8.
DEPTH TO HAWTHORN FORMATION
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2018.

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2.4 Water Quality

The surface water chemistry of Hatchet Creek can be described by review of several different studies that investigated nutrients in the sub-basin. Data sources analyzed include, but are not limited to:

- SJRWMD. 2018. Hatchet Creek Surface Water Data (HAT26 station): 01/10/2005 to 07/25/18. Data delivery: Downloaded from SJRWMD Database July 2018.
- ACEPD. 2018. Hatchet Creek Surface Water Sampling Data (various locations): 05/01/2018 to 07/03/2018. Data delivery: Personal communication with ACEPD July 2018.
- ACEPD. 2012. Hatchet Creek Surface Water Data (HATCONA station): 11/09/2005 to 07/09/2012. Data delivery: Downloaded from Water Quality Data Portal July 2018.
- M. Cohen, S. Lamsal, L. Korhnak, and L. Long. 2008. Spatial nutrient loading and sources of phosphorus in the Newnans Lake watershed. Final Report to the St. Johns River Water Management District. Special Publication SJ2008-SP29.
- Station Monitoring Data: 14342633, Hatchet Creek at Gainesville. March 2008 to June 2018. Data delivery: Personal communication with SJRWMD June 2018.
- M. Cohen, L. Long, and L. Korhnak. 2010. Ongoing assessment of nutrient sources to Newnans Lake, Florida. Final Report.

Water quality information from these sources were categorized geographically and combined accordingly in an attempt to outline the existing conditions of each surface water feature (Figure 2-9). From these data, mean nutrient concentrations were calculated (Table 2-2, Appendix A).

Nutrient loads in the HC sub-basin were evaluated against FDEP-imposed limits on a Class III water body for rivers/streams. The numeric rule is less than or equal to 0.12 mg/L for TP concentrations and less than or equal to 1.54 mg/L for TN concentrations. Approximately 49% of all water bodies analyzed in the HC sub-basin exceeded the TP standard. Average TP concentrations exceed the standard in HC and are more than double the standard in HC tributaries. Approximately 17% of all water bodies exceeded the TN standard; however, the average TN for each branch of the HC sub-basin is below the TN standard (Table 2-2).

Most of the water quality variables monitored in the HC sub-basin are consistent across all water bodies (Table 2-2). Phosphorus concentrations and flow exhibit the most variation, with the highest flows south of CR 26 and the greatest TP and SRP concentrations in tributaries to HC. Concentrations of nitrate and nitrite are highest in HC and HC tributaries, with an apparent dilution signal as flows reach south of CR 26. Section 3.0 provides further discussion of water quality monitoring data as they relate to land use and specific activities in the HC sub-basin.

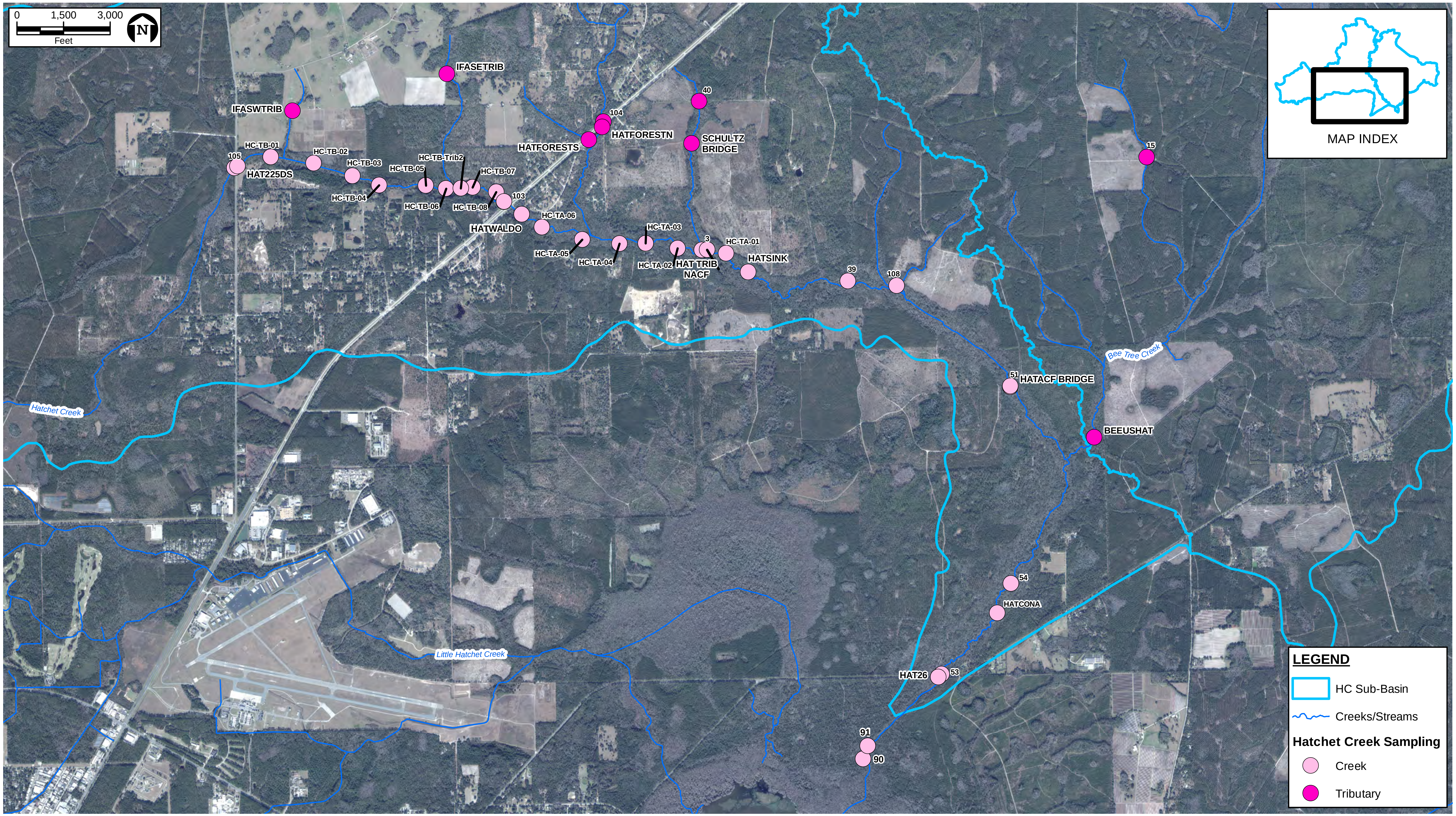

FIGURE 2-9.
SAMPLING LOCATIONS
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2018.

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Table 2-2. Nutrient Concentrations within HC sub-basin

Nutrient	Units	Hatchet Creek								
		HC			HC Tributaries			South of CR 26		
		n	Average	SD	n	Average	SD	n	Average	SD
Ammonia	mg/L	197	0.03	0.03	52	0.052	0.08	6	0.025	0.02
Nitrate and nitrite	mg/L	197	0.590	0.797	52	0.60	0.69	6	0.27	0.62
Total nitrogen	mg/L	188	1.2	0.6	52	1.35	0.64	6	1.42	0.30
Total Kjeldahl N	mg/L	221	1.1	0.5	27	1.455	0.59	5	1.386	0.33
Total phosphorus	mg/L	301	0.133	0.094	52	0.276	0.40	6	0.089	0.02
Soluble reactive phosphorus	mg/L	297	0.089	0.072	51	0.244	0.40	6	0.055	0.02
Total dissolved phosphorus	mg/L	2	0.719	0.963	3	0.233	0.32	-	-	-
Coliform	#/100 mL	11	267	326	-	-	-	-	-	-
Dissolved oxygen	mg/L	280	6.2	2.4	37	5.9	2.3	4	7.1	0.6
Flow discharge	cfs	164	8.89	20.24	31	0.37	0.69	4	123.25	70.14
pH, field	SU	283	6.18	0.86	37	6.00	1.03	4	5.52	0.65
Specific conductance	µmhos/cm	291	105	64	45	134	76	6	97	31
Turbidity	NTU	129	2.67	2.56	5	5.07	4.59	-	-	-
Inorganic chloride	mg/L	215	18.0	23.5	27	40.4	63.2	3	20.1	3.8
Inorganic sulfate	mg/L	214	2.35	2.26	27	1.64	2.69	3	2.38	2.54
Organic carbon	mg/L	220	33.1	20.5	27	33.4	16.9	5	44.2	16.4
Calcium	mg/L	269	9.9	5.7	45	13.1	9.3	4	10.2	1.9
Fluoride	mg/L	89	0.13	0.18	11	0.16	0.16	1	0.17	-
Oxidation-reduction potential	mg/L	158	174	68	31	180	55	4	239	49

Note: #/100 mL = number per 100 milliliters.
µmhos/cm = micromhos per centimeter.
cfs = cubic foot per second.
mg/L = milligram per liter.
n = number.
NTU = nephelometric turbidity unit.
SD = standard deviation.
SU = standard unit.

Source: See Appendix A for the source of each individual data point used to compile the summary statistics.

3.0 Nutrient Load Analysis

3.1 Introduction

In order to develop management actions for addressing elevated TN and TP concentrations in the HC sub-basin, the sources of nutrient loads must be determined. Based on the land use and geologic characteristics of the sub-basin, it is likely that a combination of mineral phosphate exposure and erosion as well as runoff from agriculture and other land uses influence the variability of nutrient concentrations in the region. To evaluate this, water quality and spatial data were examined.

3.2 Water Quality Analysis

Phosphorus concentrations vary widely across the HC watershed, with tributaries containing the highest concentrations of SRP and TP (Figures 3-1 and 3-2). Previous work in the NLW has suggested that phosphorus in the region is primarily derived from exposure and weathering of the Hawthorn Group (Cohen et al., 2008). Elevated calcium and fluoride concentrations, byproducts of mineral phosphate weathering, are concomitant with high phosphorus concentrations in HC tributaries (Figure 3-3 and 3-4).

Across the HC sub-basin, significant correlation between water quality parameters is absent. However, when HC tributaries are examined independently, significant correlations between parameters of interest are clear. Sampling conducted by ACEPD in 2018 provides additional data to explore these relationships. Correlations between fluoride and SRP ($r^2 = 0.49$) and pH and fluoride ($r^2 = 0.43$) suggest that SRP concentrations are largely derived from Hawthorn Group sources, which release TP in lower pH conditions.

It should be noted that due to agricultural land use in large portions of the HC tributaries region, phosphorus can be derived from multiple sources. As such the strong correlation between TN and TP in HC tributaries should be considered ($r^2 = 0.72$). When TN and TP covary, it typically indicates that nutrient sources are related to anthropogenic sources such as fertilizer or septic tanks. When the entire NLW is examined, only the covariance between TN and TP maintains any significance ($r^2 = 0.14$). This suggests that nutrient sources in HC tributaries likely serve as concentrated sources of nutrients, with concentrations and source signals experiencing dilution as they enter the main channel of HC.

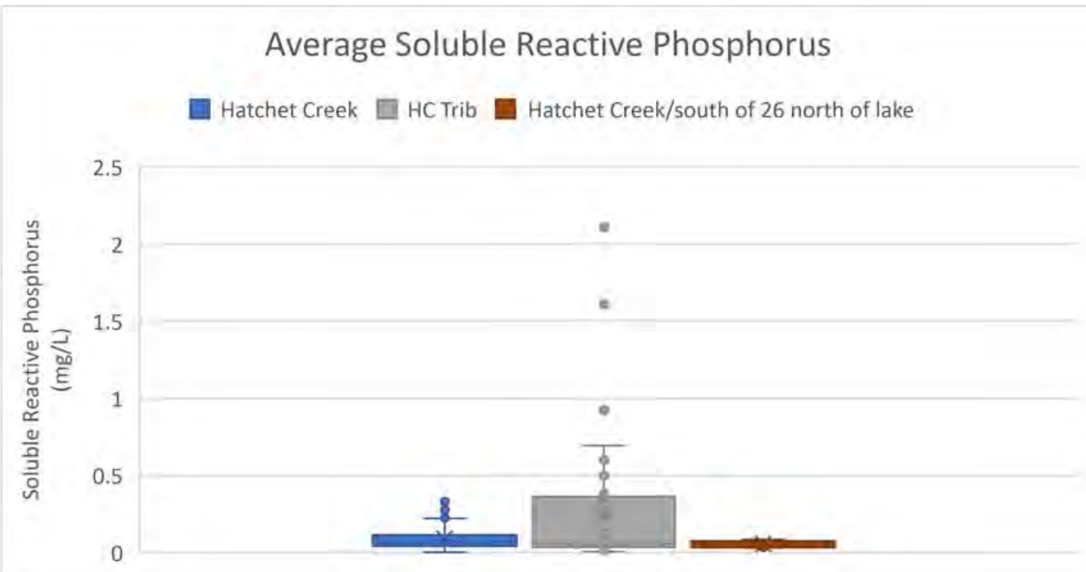

Figure 3-1. Box plots of average SRP concentrations in the HC sub-basin

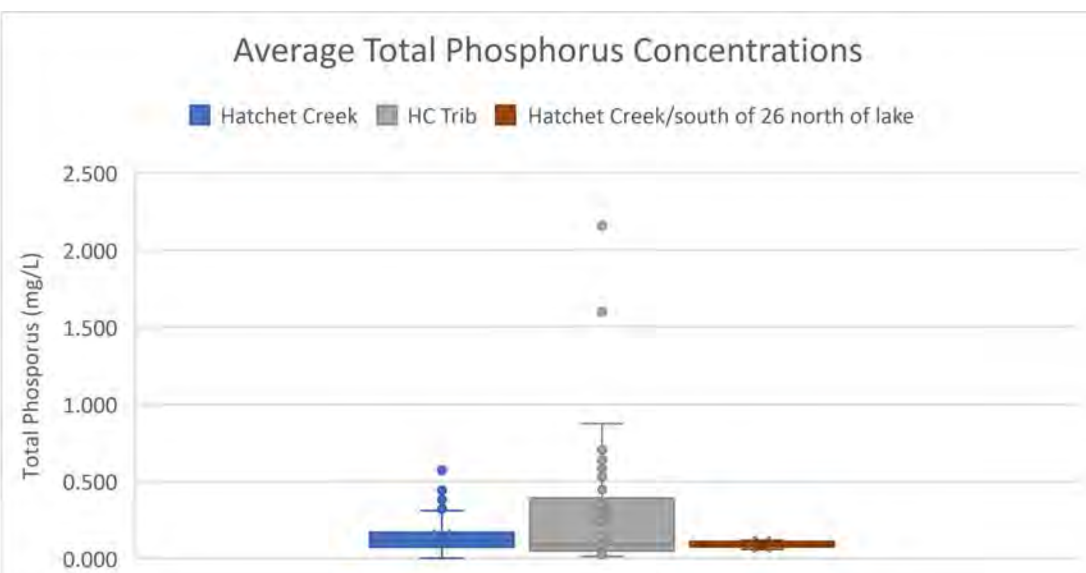

Figure 3-2. Box plots of average TP concentrations in the HC sub-basin

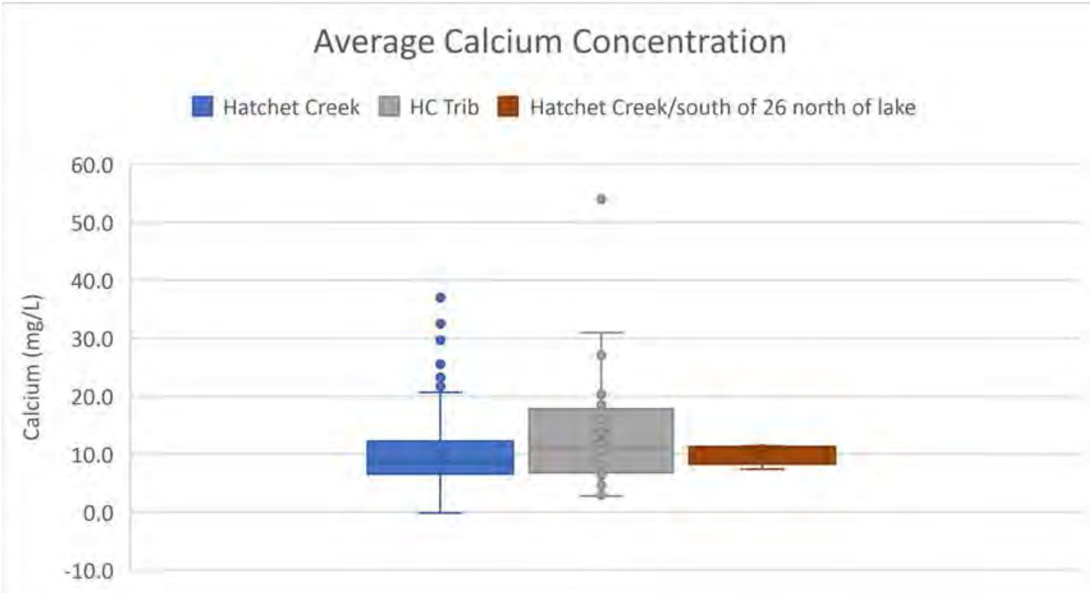

Figure 3-3. Box plots of average Ca concentrations in the HC sub-basin

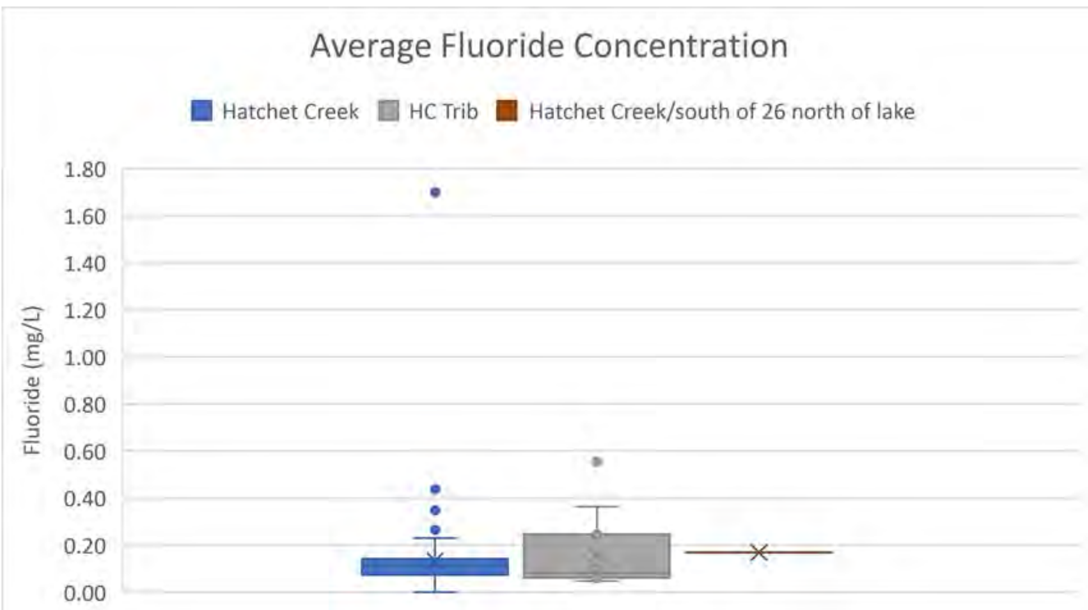

Figure 3-4. Box plots of average F concentrations in the HC sub-basin

3.3 Land Use Analysis

Since the impact of activities associated with certain land uses (e.g. urban/built, agriculture) to nutrient concentrations can be disproportionate with acreage, these land uses within the HC sub-basin were closely examined to evaluate their potential for nutrient loading.

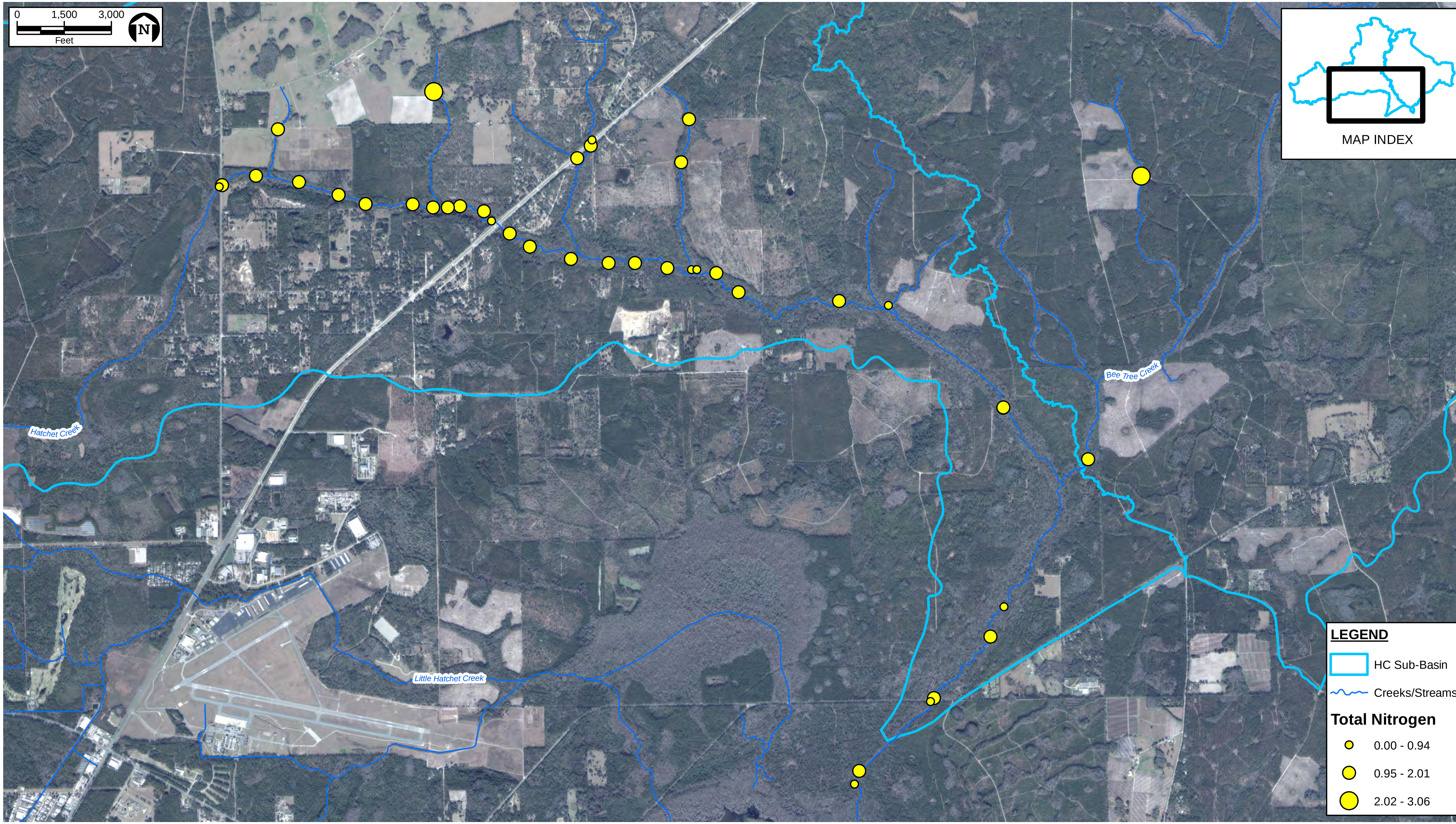

FIGURE 3-5.
SAMPLING CONCENTRATIONS TOTAL NITROGEN
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2018.

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NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic
unash 9/21/2018 4:33:05 PM

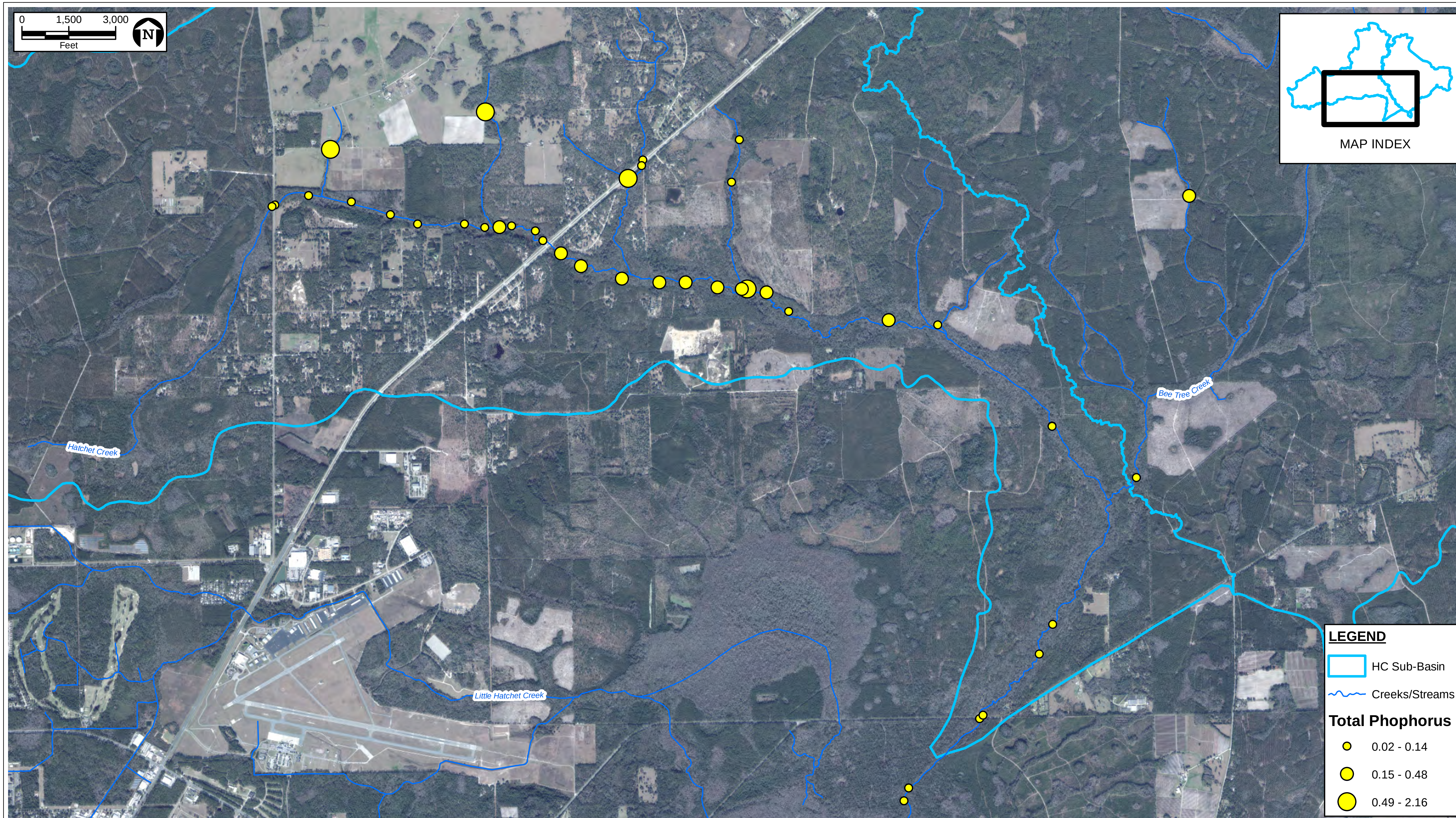

FIGURE 3-6.
SAMPLING CONCENTRATIONS TOTAL PHOSPHORUS
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2018.

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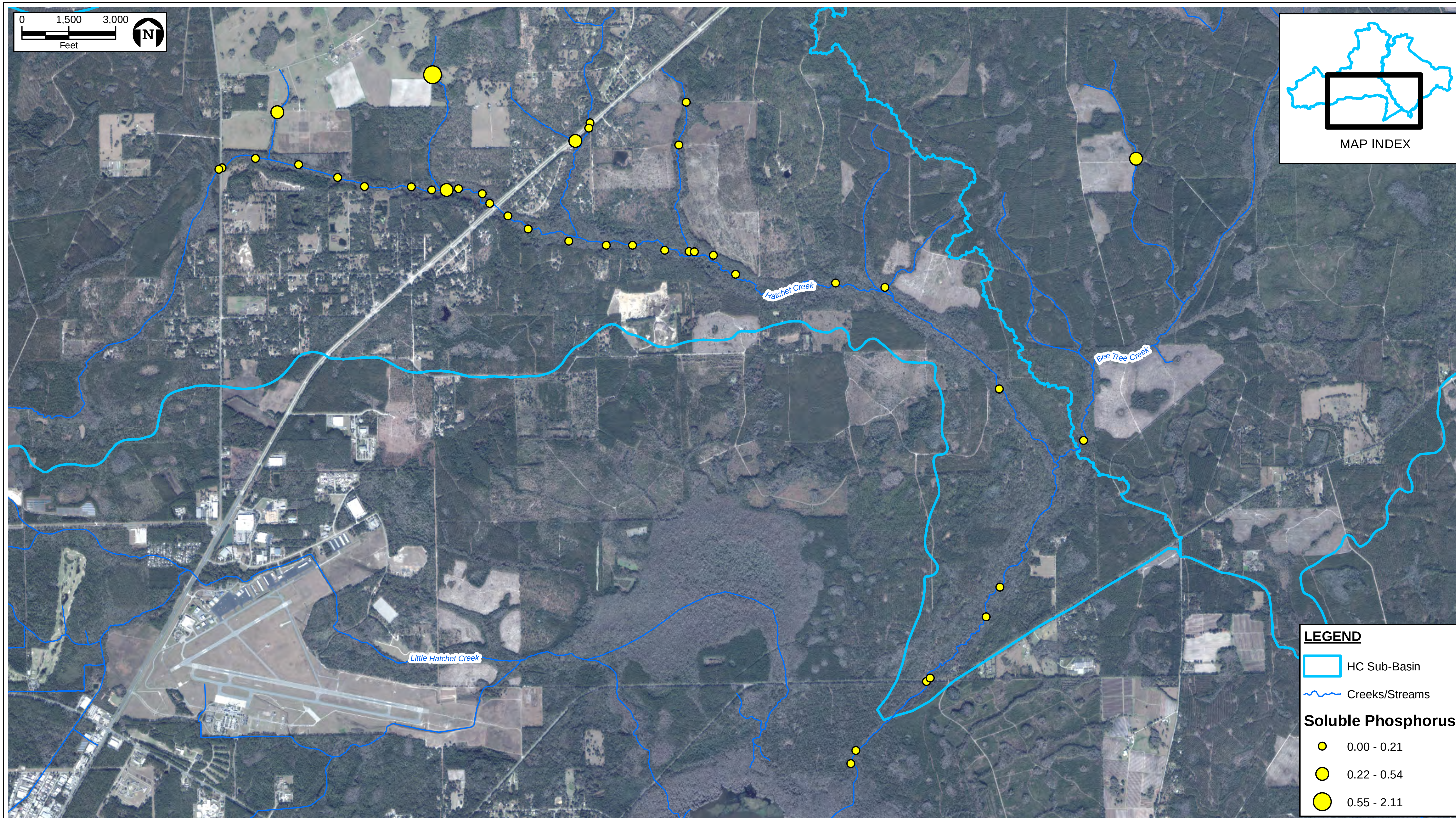

FIGURE 3-7.
SAMPLING CONCENTRATIONS SOLUBLE PHOSPHORUS
HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2018.

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3.3.1 Urban/Built Land Use

While urban/built land use only covers approximately 8% of the HC sub-basin (Table 2-1), characteristics of that land use have the potential for significant implications to water quality. The urban/built land use in the HC sub-basin is largely rural; as such, impervious area is limited. The City of Waldo represents the only significant impervious land cover and is found within the very northeastern boundary of the Bee Tree Creek sub-basin with no direct connectivity to HC. Given that impervious area is not likely to play a major role in the nutrient dynamics of the HC sub-basin, potential nutrient sources associated with rural, low-density development as well as industrial/commercial activities were further considered.

3.3.1.1 Onsite Sewage Treatment and Disposal Systems

There are approximately 124 known or likely onsite sewage treatment and disposal systems (OSTDS) located within the approximately 850-ft buffer surrounding wetland and waters directly connected to the flow path of HC, based on estimates provided by FDEP. OSTDS data were provided by the Florida Department of Health and were mapped by parcel. Without inspection information concerning condition and functional efficiency, the impact of these systems to water quality in the HC sub-basin is uncertain. However, there are several pieces of information available within the sub-basin from which inferences on OSTDS performance can be made.

Drainfields associated with OSTDS construction must be at least 2 feet (ft) above the seasonal high-water table (SHWT) in order to allow the soils above to adequately remove nutrients and pathogens before effluent reaches the surficial aquifer. The OSTDS cluster found within the central and western portions of the HC subasin is positioned in an area where the geology may limit the effectiveness of these systems. Based on current estimates, the Hawthorn Group is found anywhere from 20 ft to less than 5 ft below land surface in this region (Figure 2-8). Since these areas also represent topographic lows where surficial flows accumulate, the height of the SHWT in these regions may not meet the 2 ft soil requirement for OSTDS drainfields. If this is the case, drainfields in this area may be ineffective in providing treatment before effluent encounters the surficial aquifer and contributes to flows in HC.

There are numerous OSTDS clustered upstream of HAT225DS as well as upstream of HATFORESTS and HATFORESTN. Despite this, mean concentrations of TN and/or TP are not above the numeric nutrient criteria at HAT225DS and HATFORESTN (Figures 2-14 and 2-15). At HATFORESTS, mean concentrations of both TN and TP are above the numeric nutrient criteria. However, it is difficult to ascertain if the source of elevated concentrations is associated with septic tanks or with other sources such as silviculture and/or geologic sources. Since this location is high in both TN and TP, and fluoride concentrations are not greater than average in the sub-basin, it is unlikely that geologic sources are the reason behind elevated nutrient concentrations. Since elevated mean TN and TP concentrations are concomitant, the nutrient source is likely of fertilizer or septic origins. However, the lack of elevated concentrations at other locations downstream of numerous septic tanks suggests that further investigation is necessary to determine the source of nutrients at this location.

3.3.1.2 Excavation, Landfill, and Disposal Sites

Due to the close proximity to the Hawthorn in the HC sub-basin, excavation, landfill, and disposal sites were considered as potential sources of nutrients. Activities that occur on these sites have the potential to remove soils at the surface, exposing geologic phosphate below. If hydrologic connections exist at the surface or subsurface at these locations, this material has the potential to be transported by waters within the HC sub-basin.

Fairbanks Borrow Pit Disposal Site

The Florida Department of Transportation (FDOT) operated the Fairbanks Borrow Pit Disposal Site as a sand and clay borrow pit and later to dispose of chemical wastes from the FDOT Bureau of Materials and Research. Wastes disposed of included asphalt testing solvents, waste asphalt, small quantities of other laboratory chemicals, and construction debris (Dames and Moore 1983; WRS No Date). The original 10-acre site is in Fairbanks, northeast of Gainesville, within the HC watershed.

The Fairbanks Borrow Pit Disposal Site was active from 1956 to 1982, with most of the waste disposal occurring between 1978 and 1982 when other methods for waste treatment were not being used (Dames and Moore 1983). Various testing solvents from FDOT wastes and related degradation products were found in the groundwater at the site and in some private residential wells. The discovery of the disposal practices and groundwater contamination prompted site assessment, clean-up, and closure. This process began in 1983, with site clean-up activities continuing over the next several decades.

During initial site remediation over 1,000 drums were excavated, 513 of which contained material waste (Dames and Moore 1983; USEPA 1993), and over 111,000 cubic yards of contaminated sediments were removed (WRS No Date). In addition to source removal, surficial aquifer remediation was conducted (WRS No Date). During additional excavation activities in early 2002, free product (dense non-aqueous phase liquid or DNAPL) was reportedly observed at depths of 34 and 37 feet below land surface in the upper portion of the Hawthorn Group. Total depth of excavation was reported to be 45 feet below land surface (HSW 2010).

Phosphorus concentrations in the HC sub-basin may have been affected by excavation and soil treatment activities and groundwater treatment. Activities at the surface have the potential to mobilize geologic phosphate, and discharge of treated water from the groundwater treatment systems and surface water impoundments may exhibit elevated nutrient concentrations. Since nutrients (nitrogen and phosphorus) were not the focus of the remedial activities and monitoring, data is not available to make these determinations. After soil excavation and treatment, soils were returned to the excavated area and the site was capped and secured to limit contact with any remaining contaminated soils, if still present.

Since there are no monitoring locations immediately downstream of the Fairbanks Borrow Pit and Disposal Site, HATWALDO is the nearest location to infer any impacts for activities at the site. This location exhibits TP concentrations slightly above the numeric criteria, with a mean concentration of 0.153 mg/L. While HATWALDO is also downstream of other potential nutrient sources (e.g. IFAS Beef Research Unit), TN concentrations are not elevated at this location. The former Fairbanks Borrow Pit and Disposal Site may play a role in elevated concentrations; however, erosion and/or Hawthorn exposure at other locations within this reach may similarly influence elevated TP concentrations.

<u>Alachua County Northeast Auxiliary Landfill</u>

The former Alachua County Northeast Auxiliary Landfill, located approximately 2 miles northeast of the Gainesville Regional Airport, operated on approximately 11 acres of a former sand borrow pit north of NE 67^{th} Ave and east of NE 57^{th} Street in the HC sub-basin. It was a designated Class II landfill that accepted nonhazardous solid waste from the late 1970s to 1982 (Jones Edmunds 1996).

An investigation conducted in 1996 found that waste at the site consisted primarily of construction and demolition debris, household appliances (white goods), oil filters, plastic and glass drink containers, and food wrappers and containers (Jones Edmunds 1996). The site was owned by and managed for timber operations for the past few decades, until it was purchased by Alachua County in addition to the adjacent property on to which the contaminate plume had migrated.

Waste was covered with fill to a depth of approximately 6 ft before a cover soil was placed over the site and the landfill was closed in 1982 (Jones Edmunds 1996). However, since the landfill was unlined, groundwater contamination soon became a concern and post-closure monitoring was conducted. A series of temporary and permanent monitoring wells were constructed to evaluate groundwater contamination and to determine the extent of a potential plume. Contamination was restricted to the surficial aquifer system due to the presence of shallow clay lenses and the Hawthorn Group at depth.

Groundwater contaminants consisted primarily of volatile organic compounds, including benzene, vinyl chloride, methylene chloride, 1,1 dichlorethene, and 1,2 dichloroethane (Jones Edmunds 1996 and 2013). In November 2005 a “monitoring only” plan was approved for the site by FDEP. In 2016 a request was made to terminate the post-closure groundwater monitoring (Jones Edmunds 2016). In July of 2016 FDEP modified the permit to continue post closure groundwater monitoring to July 1, 2021.

Due to the shallow depth of excavation in the borrow pit, it is unlikely that the Hawthorn Group was disturbed during excavation and filling activities at this location. However, the composition of the cover materials is unknown. The nearest sampling location downstream of the Alachua County Northeast Auxiliary Landfill is HAT TRIB NACF. This location exhibits one of the highest mean TP concentrations in the sub-basin and exhibits greater than average fluoride concentrations. As such, it is likely that Hawthorn exposure contributes to elevated TP concentrations in this region. Determining the source of this material requires additional investigation, such as geomorphological surveys or an investigation of materials at the site.

Johnson Excavation and Fill Sites

The Johnson borrow pit is the site of a sand mining operation east of Fairbanks in Alachua County, Florida located southwest of HC. The 37-acre site first started its mining operation in 1986. After 9 years, the site was permitted to allow for “clean debris” fill on an additional 20 acres acquired by WG Johnson & Sons, Inc. (ERC 2008). Since then, the site has grown to 133 acres but is limited to 5 acres of active mining and reclamation at any one time. Stormwater from the site is currently managed by diversion into temporary stormwater basins (ERC 2008).

Maximum excavation depth is limited to approximately 1 ft above the seasonal high-water table (SHWT) and varies across the site. Boring logs from the central portion of the site indicate that the base of the pit is comprised of approximately 5 ft of tan sand with a thin orange to grey clayey sand found about 5 ft below land surface followed by white silty sand for 15 ft (UES 2003). The estimated SHWT ranges from approximately 9 to 14 feet below land surface (UES 2003). Due to the limited excavation depth permitted for the Johnson excavation pit, it is unlikely that the Hawthorn Group was disturbed during sand mining activities. However, upper Hawthorn material could have mixed with sands near lower excavation depths.

A nearby 25.3-acre area within a 103.7-acre parcel located northwest of the original borrow pit was permitted through Alachua County for excavation and filling in 2016 (EDA 2016a). Activities at this site must meet the same requirements for excavation, filling and 5-acre increments. Clean fill, which is limited to brick, glass, ceramics, and uncontaminated concrete including embedded pipe and steel and land clearing debris (not contaminated with other waste materials), can be disposed of at the site (EDA 2016b). Borings at this site conducted by Universal Engineering Sciences indicate the presence of a stiff green clay or loose grey phosphatic silty clayey sand, indicative of the Hawthorn Group, at depths of 23 to 30 ft below land surface (EDA 2016a). Stormwater runoff along the haul road is managed by a swale system; with temporary stormwater basins used to contain runoff on the excavation areas themselves (EDA 2016b). The haul road for the additional area crosses two small unnamed tributaries to the north of HC.

Exposure of the Hawthorn Group at this location is unlikely due to the depth of allowed excavation. As with the previous site, the nearest sampling location downstream of the Johnson excavation site is HAT TRIB NACF. Since this location exhibits one of the highest mean TP concentrations in the sub-basin and exhibits greater than average fluoride concentrations, it is likely that Hawthorn exposure contributes to elevated TP concentrations in this region. Determining the source of this material requires additional investigation, such as geomorphological surveys or an investigation of materials at the site.

3.3.1.3 Gainesville Raceway

Gainesville Raceway is a quarter-mile dragstrip located in the northwest portion of the HC sub-basin. The raceway is used for drag racing as well as vehicle testing and driving schools. To treat stormwater runoff and wastewater from the Gainesville Raceway, a large, approximately 12-acre treatment pond is utilized. While there is no direct surface water connection between the pond and HC tributaries located to the south, there is the potential for groundwater connectivity between the pond and HC.

Monitoring data collected as part of permitting requirements was evaluated to estimate the potential for Gainesville Raceway to contribute to nutrient loads. These data indicate that effluent from the Gainesville Raceway may contribute to elevated TN concentrations in the HC sub-basin, depending on the operational efficiency of the treatment pond (Table 3-1). However, concentrations are typically quite low for effluent, outside of August 2015 concentrations. The nearest monitoring location downstream of the Gainesville Raceway is IFASETRIB, which is also located downstream of agricultural land uses in the watershed. This location exhibits the highest average TN and TP concentrations, which indicates the source of nutrients is likely anthropogenic in origin. This location is also extremely high in ammonia (0.24 mg/L) and TKN

(2.9 mg/L). As such, agriculture may pose a greater impact to nutrient concentrations in this region as opposed to the Gainesville Raceway, since ammonia would likely have been bound by soils if traveling subsurface from the Raceway pond.

Table 3-1. TN concentrations in effluent from Gainesville Raceway

Date	TN concentration (mg/L)
February 2015	1.12
August 2015	16
February 2016	4.8

3.3.2 Agriculture

The majority of agriculture is located in the western portion of the HC sub-basin, where the University of Florida (UF) Institute of Food and Agricultural Sciences (IFAS) Beef Research Unit is located. Agricultural land use is also located in the northeastern portion of the sub-basin, near the City of Waldo, and near the southeastern boundary of the sub-basin.

Based on a review of aerial photography, it appears that agriculture near Waldo is primarily silviculture or pasture that is no longer utilized or under very low intensity. Further monitoring near this location would be necessary to determine if agriculture in this area has the potential to contribute to elevated nutrient concentrations. Agriculture in the southeastern portion of the sub-basin does not appear to be connected by surface water to HC/Bee Tree Creek and is located at distances likely adequate to remove nutrients from groundwater before reaching these surface waters. As such, the UF IFAS Beef Research Unit is likely the most important agricultural land use in the sub-basin.

The UF IFAS Beef Research Unit is located in the northwest portion of the HC-sub-basin. The unit typically has 350 head of cattle on the property that are rotated regularly across approximately 1,200 acres. Three tributaries to HC intersect the property, providing the potential for transport of nutrients from the UF IFAS Beef Research Unit to the HC main channel. All of these tributaries are elevated in average TN (Figure 2-14), TP (Figure 2-15), and SRP (Figure 2-16) with the IFASETRIB exhibiting the highest average TN and TP concentrations in the sub-basin. The covariance between TN and TP at this location suggests the source of nutrients is likely anthropogenic. This location is also extremely high in ammonia (0.24 mg/L) and TKN (2.9 mg/L). As such, activities within the UF IFAS Beef Research Unit may be contributing to elevated nutrient concentrations in this region.

3.3.3 Upland Forested and Wetlands

Since upland forested and wetlands cover such a vast majority of the HC sub-basin (approximately 62% of cover and 22% of cover, respectively), these land uses should be given some consideration for their potential to contribute to nutrient loads, despite the low-intensity activities that can occur within them (e.g. silviculture). However, spatial mapping of nutrient concentrations does not indicate numerous hot spots of elevated concentrations that are anomalous and/or located great distances from higher intensity land uses, such as urban/built up or agriculture (Figures 2-14 through 2-16).

One location in the northeastern portion of the HC sub-basin (15), exhibits elevated TN concentrations and is not in the proximity of OSTDS, agriculture, or urban/built up land uses. Land cover in this region includes planted pine associated with silviculture with several wetlands located intermittently throughout the area. As such, elevated TN in this area could be associated with fertilizer application or other land management activities. Further data collection in this region would be necessary to evaluate the potential source of nitrogen.

4.0 Project Recommendations

Due to the limited scope and budget for Phase II, no definitive conclusions can be made from this high-level analysis. This report summarizes the potential known sources of nitrogen and phosphorus and presents the limited amount of data available in this watershed.

In collaboration with UF, an in-stream sediment and nutrient study is underway, separate from this effort, that will help provide better characterization of the nutrients and sediment transport from some of the areas discussed in this report.

It is the recommendation of the authors that further investigation and task specific projects be developed to examine potential nutrient loadings from the following areas:

1. Tributaries feeding into the main channel of Hatchet Creek
    a. Nutrient focus: predominantly phosphorus; nitrogen in Bee Tree Creek
2. UF IFAS Beef Research Unit
    a. Nutrient focus: Nitrogen
3. Gainesville Raceway
    a. Nutrient focus: Nitrogen
4. Johnson borrow pit
    a. Nutrient focus: Phosphorus

The tributaries from the north, feeding into the main channel of HC have observed phosphorus concentrations higher that what is observed directly within the HC main flow path. Conducting further investigation to better characterize the potential sources of nutrients and to quantify flow volume and nutrient loading from these tributaries will provide valuable insight to the overall understanding of the total load contribution from HC to NL.

The UF IFAS Beef Research Unit, Gainesville Raceway, and Johnson borrow pit are positioned north of these tributaries and may all be contributing sources of nutrients. More in depth assessment of nutrient runoff potential and hydrologic connectivity to the tributary flow paths is needed to determine the degree of loading potential.

One location within Bee Tree Creek exhibits higher nitrogen than other locations with HC sub-basin. Additional investigation into this location for potential nitrogen sources is required before projects can be developed or enhanced BMP options can be considered.

Upon approval for Phase III funding, specific projects to investigate these issues will developed for implementation. It should be noted, that while OSTDS remain a concern, limited information and data is available to make conclusive recommendations. It is our recommendation to focus on the identified contributing tributaries first, confirm or eliminate the potential source locations, before the focus is shifted to OSTDS.

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Appendix A

Water Quality Data for HC Sub-basin

Station	Latitude	Longitude	Sample Date	Source	Spatial Grouping	Nitrogen				Phosphorous			Bacteriological	Dissolved Oxygen	Flow	Physical				Temperature		General Inorganic			Metals		Oxidation-Reduction Potential (ORP)
						Ammonia, Total	Nitrate + Nitrite	Total	Total Kjeldahl	Total	Soluble Reactive	Total Dissolved	Coliform, Fecal	Concentration	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (DB Labs Only)	#/100 mL	mg/L	cfs	SU	µmhos/cm	Feet	NTU	Celsius	Celsius	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (SJRWMD Only)
3	29.72609	-82.22971	01/10/07	UF for SJRWMD	Hatchet Creek	0.033	0.011	0.669	0.66	0.220	0.166													14.4	7.6	0.14	
3	29.72609	-82.22971	02/05/07	UF for SJRWMD	Hatchet Creek	0.025	0.032	0.982	0.95	0.134	0.109						110					23.5	9.04	28.1	8.1		
3	29.72609	-82.22971	04/10/07	UF for SJRWMD	Hatchet Creek	0.027	0.021	0.393	0.37	0.267	0.234						70					16.5	1.06	5.0	3.6		
3	29.72609	-82.22971	05/14/07	UF for SJRWMD	Hatchet Creek	0.023	0.045	0.634	0.59	0.454	0.353											15.9	0.88	5.8	4.0		
3	29.72609	-82.22971	06/07/07	UF for SJRWMD	Hatchet Creek	0.019	0.045	0.580	0.54	0.406	0.334			7.1	0.50	6.84	78				25.4	18.5	1.58	7.7	7.0		123
3	29.72609	-82.22971	07/20/07	UF for SJRWMD	Hatchet Creek	0.018	0.057	0.762	0.70	0.383	0.314			6.5	0.48	6.59	75				26.0	15.1	1.32	7.5	6.1		125
3	29.72609	-82.22971	08/09/07	UF for SJRWMD	Hatchet Creek	0.019	0.066	0.562	0.50	0.339	0.287			6.5	0.84	6.72	101				27.1	19.2	1.54	8.1	10.2		95
3	29.72609	-82.22971	08/21/07	UF for SJRWMD	Hatchet Creek	0.025	0.072	0.600	0.53	0.301	0.23			6.7	0.62	6.76	98				26.7	20.9	1.49	9.1	10.9		78
3	29.72609	-82.22971	08/28/07	UF for SJRWMD	Hatchet Creek	0.026	0.055	0.970	0.91	0.210	0.172				2.29	6.61	100					26.4	2.23	19.2	11.2		
3	29.72609	-82.22971	09/04/07	UF for SJRWMD	Hatchet Creek	0.036	0.033	1.393	1.36	0.179	0.13			5.8	4.31	6.12	80				25.5	17.6	1.08	34.7	10.5		195
3	29.72609	-82.22971	09/18/07	UF for SJRWMD	Hatchet Creek	0.012	0.045	0.425	0.38	0.258	0.207			8.5	0.71	6.59	75				24.2			5.5	8.6		133
3	29.72609	-82.22971	01/30/08	UF for SJRWMD	Hatchet Creek	0.005	0.013	1.423	1.41	0.119	0.089			9.9	11.70	6.21	87				13.7			44.7	8.5		234
3	29.72609	-82.22971	2/27/2008	UF for SJRWMD	Hatchet Creek	0.031	0.021	1.866	1.84	0.194	0.166			6.3	136	4.92	74				16.3	21.80	1.29	55.0	6.97		259
3	29.72609	-82.22971	05/16/08	UF for SJRWMD	Hatchet Creek	0.036	0.033	0.619	0.59	0.257	0.267			6.3	0.46	6.55	62				22.8			10.2			155
3	29.72609	-82.22971	11/24/08	UF for SJRWMD	Hatchet Creek	0.019	0.290	0.290		0.182	0.224			10.1	1.40	7.62	69				11.3	18.1	1.60		5.9		216
3	29.72609	-82.22971	01/09/09	UF for SJRWMD	Hatchet Creek	0.021	0.360	0.360		0.226	0.249			9.5	2.12	5.92	78				13.5	19.7	1.13		8.2		243
3	29.72609	-82.22971	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.590	1.590		0.100	0.059			8.07	21.51	4.92	76				17.31						252
15	29.73348097	-82.18443245	10/09/07	UF for SJRWMD	HC trib	0.562	0.038	3.063	3.03	0.345	0.249			5.4	0.71	5.27	79				22.7			88.1	10.8		268
39	29.72306473	-82.21498743	02/05/07	UF for SJRWMD	Hatchet Creek	0.017	0.018	1.172	1.15	0.133	0.105						114					23.3	4.66	30.8	8.0		
39	29.72306473	-82.21498743	03/15/07	UF for SJRWMD	Hatchet Creek	0.020	0.012	1.031	1.02	0.383	0.256													26.1	8.4		
39	29.72306473	-82.21498743	04/10/07	UF for SJRWMD	Hatchet Creek	0.087	0.018	1.331	1.31	0.420	0.226						125					28.6	1.93	27.9	8.6		
39	29.72306473	-82.21498743	04/16/07	UF for SJRWMD	Hatchet Creek	0.060	0.008	1.139	1.13	0.382	0.25			2.3	0.01	6.28	96				17.0	30.2	1.71	29.1	8.0		99
39	29.72306473	-82.21498743	09/04/07	UF for SJRWMD	Hatchet Creek	0.087	0.009	0.834	0.83	0.278	0.19			2.5	0.03	6.85	74				25.8	15.7	1.23	17.0	7.4		203
39	29.72306473	-82.21498743	09/25/07	UF for SJRWMD	Hatchet Creek	0.035	0.013	1.285	1.27	0.214	0.166													27.5	8.2		
39	29.72306	-82.21499	01/30/08	UF for SJRWMD	Hatchet Creek	0.010	0.011	1.307	1.30	0.112	0.089			9.5	8.20	6.04	89				13.8			45.1	8.6		207
39	29.72306	-82.21499	02/27/08	UF for SJRWMD	Hatchet Creek	0.034	0.016	1.861	1.84	0.169	0.137			6.2	85.1	4.99	70				15.6	21.23	1.28	54.4	6.87		272
39	29.72306	-82.21499	09/09/08	UF for SJRWMD	Hatchet Creek	0.134	3.090	3.090		0.108	0.057			5.5	11.10	4.53	77				26.0	16.2	0.41		8.4		316
39	29.72306	-82.21499	09/22/08	UF for SJRWMD	Hatchet Creek	0.068	1.180	1.180		0.139	0.122			7.5	6.30	5.64	67				16.3	27.7	0.03		10.6		233
39	29.72306	-82.21499	09/22/08	UF for SJRWMD	Hatchet Creek	0.130	2.170	2.170		0.244	0.234			3.7	0.87	5.49	84				24.1	21.6	0.94		9.4		212
39	29.72306	-82.21499	03/12/09	UF for SJRWMD	Hatchet Creek	0.040	1.510	1.510		0.251	0.187			3.6	0.16	6.18	110				19.9	220.0	0.09		12.9		250
39	29.72306	-82.21499	04/27/09	UF for SJRWMD	Hatchet Creek	0.099	1.770	1.770		0.220	0.172			3.1	0.07	5.35	91				20.9	13.4	0.36		9.5		22.6
39	29.72306	-82.21499	06/29/09	UF for SJRWMD	Hatchet Creek	0.045	2.380	2.380		0.310	0.215			4.6	0.13	4.9	99				25.9				9.6		188
39	29.72306	-82.21499	07/31/09	UF for SJRWMD	Hatchet Creek	0.063	1.750	1.750		0.161	0.133			4.8	4.47	4.33	67				26.0				8.0		232
39	29.72306	-82.21499	08/19/09	UF for SJRWMD	Hatchet Creek	0.055	1.580	1.580		0.244	0.183			3.6	1.38	4.76	80				26.5				7.9		227
39	29.72306	-82.21499	09/02/09	UF for SJRWMD	Hatchet Creek	0.103	2.360	2.360		0.090	0.057				3.80							13.1	0.44		9.1		
39	29.72306	-82.21499	10/07/09	UF for SJRWMD	Hatchet Creek	0.029	0.480	0.480		0.212	0.131			4.6	1.59	5.56	90				25.2	21.2	0.03		8.9		192
39	29.72306	-82.21499	11/13/09	UF for SJRWMD	Hatchet Creek	0.022	2.170	2.170		0.344	0.221			1.8	0.01	6.69	117				17.2				10.3		162
39	29.72306	-82.21499	01/05/10	UF for SJRWMD	Hatchet Creek	0.033	1.100	1.100		0.117	0.075			n.a.	2.99	n.a.	n.a.				n.a.				9.4		n.a.
39	29.72306	-82.21499	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.390	1.390		0.104	0.066			8.74	30	5.21	76				17.57						229
39	29.72306	-82.21499	04/30/10	UF for SJRWMD	Hatchet Creek	0.056	2.040	2.040		0.441	0.299			0.5	0.04	5	135				18.6						25
40	29.73923	-82.22969	01/12/07	UF for SJRWMD	HC trib	0.030	0.203	0.832	0.63	0.014	0.004						70							6.5	2.8	0.11	
40	29.73923	-82.22969	03/28/10	UF for SJRWMD	HC trib	0.000	1.470	1.470		0.034	0.013			7.5	0.74	6.27	157				17.66						166
40	29.73923	-82.22969	03/28/10	UF for SJRWMD	HC trib	0.000	1.470	1.470		0.034	0.013			7.5	0.74	6.27	157				17.7						166
51	29.71343	-82.19873	01/17/07	UF for SJRWMD	Hatchet Creek	0.034	0.008	0.783	0.78	0.109	0.079						185							16.6	20.1	0.11	
51	29.71343	-82.19873	3/15/2007	UF for SJRWMD	Hatchet Creek	0.040	0.006	0.701	0.70	0.141	0.121											19.5	1.58	14.9	23.3		
51	29.71343	-82.19873	04/05/07	UF for SJRWMD	Hatchet Creek	0.074	0.023	0.719	0.70	0.204	0.169			7.4	0.03	7.31	195				17.8	17.9	0.78	13.5	25.5		55.2
51	29.71343	-82.19873	04/16/07	UF for SJRWMD	Hatchet Creek	0.073	0.013	0.802	0.79	0.222	0.183			6.6	0.01	7.45	170				15.0	17.5	0.64	14.6	23.6		150
51	29.71343	-82.19873	08/27/07	UF for SJRWMD	Hatchet Creek	0.043	0.039	0.834	0.80	0.145	0.11			5.7	0.12	7.17	207				25.4	19.8	0.99	15.4	29.7		106
51	29.71343	-82.19873	09/04/07	UF for SJRWMD	Hatchet Creek	0.022	0.024	0.820	0.80	0.128	0.11			5.9	0.67	7.1	182				25.3	15.7	1.29	22.2	26.5		162
51	29.71343	-82.19873	01/31/08	UF for SJRWMD	Hatchet Creek	0.016	0.010	1.191	1.18	0.108	0.079			8.9	7.40	6.37	119				16.1			39.7	10.6		219
51	29.71343	-82.19873	02/27/08	UF for SJRWMD	Hatchet Creek	0.028	0.015	1.746	1.73	0.127	0.094			5.7	64.5	5	76				17	22.77	1.36	57.0	6.51		262
51	29.71343	-82.19873	03/12/08	UF for SJRWMD	Hatchet Creek	0.029	0.019	1.721	1.70	0.074	0.037			5.6	142.00	4.59	80				18.7	19.3	0.80	61.6			276
51	29.71343	-82.19873	11/24/08	UF for SJRWMD	Hatchet Creek	0.009	0.470	0.470		0.045	0.045			7.9	0.18	7.54	180				11.5	16.3	0.51		32.9		158
51	29.71343	-82.19873	01/09/09	UF for SJRWMD	Hatchet Creek	0.048	0.520	0.520		0.062	0.052			9.1	0.38	6.83	227				14.3	17.0	0.39		32.5		186
51	29.71343	-82.19873	02/13/09	UF for SJRWMD	Hatchet Creek	0.059	1.030	1.030		0.105	0.1			7.8	14.18	6.46	101				16.3	27.2	0.03		12.0		193
51	29.71343	-82.19873	03/12/09	UF for SJRWMD	Hatchet Creek	0.036	0.730	0.730		0.099	0.076			6.0	0.89	7.09	169				22.4	27.4	0.02		22.5		138
51	29.71343	-82.19873	04/27/09	UF for SJRWMD	Hatchet Creek	0.085	1.370	1.370		0.119	0.093			6.0	0.71	6.41	110				20.8	13.4	0.37		13.7		18.7
51	29.71343	-82.19873	06/29/09	UF for SJRWMD	Hatchet Creek	0.133	1.390	1.390		0.139	0.105			5.9	0.08	6.6	149				27.7				20.6		147
51	29.71343	-82.19873	07/31/09	UF for SJRWMD	Hatchet Creek	0.044	1.620	1.620		0.127	0.094			4.9	6.20	5.8	111				26.7				13.5		151
51	29.71343	-82.19873	08/19/09	UF for SJRWMD	Hatchet Creek	0.040	1.150	1.150		0.132	0.095			5.4	3.36	6.17	152				25.5				20.3		133
51	29.71343	-82.19873	10/07/09	UF for SJRWMD	Hatchet Creek	0.025	0.480	0.480		0.180	0.109			5.9	2.55	5.72	109				24.5	17.1	0.03		12.6		227
51	29.71343	-82.19873	11/13/09	UF for SJRWMD	Hatchet Creek	0.015	0.690	0.690		0.056	0.015			8.5	0.57	6.87	131				17.1				31.0		156
51	29.71343	-82.19873	01/05/10	UF for SJRWMD	Hatchet Creek	0.052	1.020	1.020		0.090	0.053			n.a.	5.98	n.a.	n.a.				n.a.				14.0		n.a.
51	29.71343	-82.19873	03/29/10	UF for SJRWMD	Hatchet Creek	0.000	1.390	1.390		0.115	0.074			6.74	43.58	5.8	77				18.51						146
51	29.71343	-82.19873	04/30/10	UF for SJRWMD	Hatchet Creek	0.067	3.470	3.470		0.118	0.072			7.6	1.13	7.3	202				18.9						51
53	29.68812	-82.20627	03/15/07	UF for SJRWMD	Hatchet Creek	0.019	0.005	0.935	0.93	0.104	0.073											23.0	3.06	20.0	17.2		
53	29.68812	-82.20627	01/31/08	UF for SJRWMD	Hatchet Creek	0.007	0.013	1.651	1.64	0.059	0.034			8.7	22.90	6.35	96				15.2			52.0	12.7		215
53	29.68812	-82.20627	02/15/08	UF for SJRWMD	Hatchet Creek	-0.004	0.007	1.230	1.22	0.109	0.079													40.8	11.2		
53	29.68812	-82.20627	02/27/08	UF for SJRWMD	Hatchet Creek	0.059	0.017	1.720	1.70	0.068	0.042			6.6	90.9	5.35	69				16.7	19.24	1.07	57.2	7.73		232
53	29.68812	-82.20627	9/9/2008	UF for SJRWMD	Hatchet Creek	0.111	2.810	2.810		0.096	0.071			5.7	19.00	5.8	73				26.6	14.6	0.56		9.0		195
53	29.68812	-82.20627	09/22/08	UF for SJRWMD	Hatchet Creek	0.076	2.010	2.010		0.103	0.081			4.5	4.00	6.3	88				24.1	16.0	0.92		12.2		168
53	29.68812	-82.20627	01/09/09	UF for SJRWMD	Hatchet Creek	0.019	0.900	0.900		0.074	0.048			5.6	0.30	6.92	171				14.4	21.8	0.56		22.1		203
53	29.68812	-82.20627	02/13/09	UF for SJRWMD	Hatchet Creek	0.171	1.530	1.530		0.081	0.062			7.6	0.30	6.62	114				16.7	29.9	0.04		13.8		202
53	29.68812	-82.20627	03/12/09	UF for SJRWMD	Hatchet Creek	0.059	1.360	1.360		0.075	0.045			4.4	0.20	6.98	167				20.1	12.1	0.07		19.1		152
53	29.68812	-82.20627	04/27/09	UF for SJRWMD	Hatchet Creek	0.074	1.810	1.810		0.082	0.056			4.4	1.00	5.5	102				20.9	15.5	0.50		13.6		233
53	29.68812	-82.20627	06/29/09	UF for SJRWMD	Hatchet Creek	0.099	2.010	2.010		0.111	0.064			2.8	0.60	5.58	183				27.1				13.1		30
53	29.68812	-82.20627	07/31/09	UF for SJRWMD	Hatchet Creek	0.041	1.820	1.820		0.069	0.045			5.4	24.00	5.5	76				26.1				10.8		184
53	29.68812	-82.20627	08/19/09	UF for SJRWMD	Hatchet Creek	0.039	1.550	1.550		0.065	0.039			5.8	14.20	5.25	61				25.9				8.7		234
53	29.68812	-82.20627	11/13/09	UF for SJRWMD	Hatchet Creek	0.026	1.450	1.450		0.058	0.025			4.7	0.57	6.14	116				16.0				20.2		227
53	29.68812	-82.20627	01/05/10	UF for SJRWMD	Hatchet Creek	0.016	1.380	1.380		0.046	0.03			n.a.	5.98	n.a.	n.a.				n.a.				12.8		n.a.
53	29.68812	-82.20627	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.490	1.490		0.070	0.037			8.85	30.0	5.6	86				17.63						192
53	29.68812	-82.20627	04/30/10	UF for SJRWMD	Hatchet Creek	0.024	4.050	4.050		0.127	0.058			2.7	0.20	6.6	98				19.9						90
54	29.69600	-82.19907	01/17/07	UF for SJRWMD	Hatchet Creek	0.041	0.007	0.899	0.89	0.122	0.088						158							21.1	14.8	0.35	
90	29.68072	-82.21442	01/22/07	UF for SJRWMD	Hatchet Creek/south of 26	0.051	0.008	0.928	0.92	0.117	0.084						133							22.2	11.0	0.17	
91	29.68186	-82.21391	02/08/07	UF for SJRWMD	Hatchet Creek/south of 26	0.032	0.021	1.187	1.17	0.089	0.065						134					24.2	5.31	32.0	10.9		
91	29.68186	-82.21391	01/31/08	UF for SJRWMD	Hatchet Creek/south of 26	0.007	0.013	1.566	1.55	0.058	0.033			7.4	81.80	6.16	95				14.7			49.9	11.4		225
91	29.68186	-82.21391	02/27/08	UF for SJRWMD	Hatchet Creek/south of 26	0.031	0.017	1.719	1.70	0.106	0.071			7.7	157.2	5.04	62				11.7	19.65	1.10	57.0	7.42		291
91	29.68186	-82.21391	03/12/08	UF for SJRWMD	Hatchet Creek/south of 26	0.029	0.018	1.608	1.59	0.084	0.03			6.3	204.00	4.89	70				17.4	16.5	0.74	59.9			262
91	29.68186	-82.21391	03/29/10	UF for SJRWMD	Hatchet Creek/south of 26	0.000	1.530	1.530		0.080	0.046			6.87	50	6	86				17.69						178
103	29.73068	-82.24970	01/09/07	UF for SJRWMD	Hatchet Creek	0.031	0.021	0.855	0.83	0.090	0.061						99							16.5	7.1	0.26	
103	29.73068	-82.24970	02/05/07	UF for SJRWMD	Hatchet Creek	0.011	0.058	1.066	1.01	0.070	0.054											27.2	4.82	28.5	7.7		
103	29.73068	-82.24970	03/15/07	UF for SJRWMD	Hatchet Creek	0.041	0.007	0.467	0.46	0.104	0.081													6.7	4.4		
103	29.73068	-82.24970	04/04/07	UF for SJRWMD	Hatchet Creek	0.049	0.050	0.452	0.40	0.140	0.117			8.2	0.84	6.92	65				21.5	17.8	1.27	4.5	3.3		102.8
103	29.73068	-82.24970	04/16/07	UF for SJRWMD	Hatchet Creek	0.040	0.076	0.522	0.45	0.129	0.117			8.8	0.70	6.69	55				16.0	17.1	1.30	4.7	2.8		156
103	29.73068	-82.24970	05/14/07	UF for SJRWMD	Hatchet Creek	0.042	0.053	0.555	0.50	0.270	0.18											19.0	1.37	3.9	4.0		
103	29.73068	-82.24970	06/22/07	UF for SJRWMD	Hatchet Creek	0.035	0.069	0.517	0.45	0.184	0.143			6.9	0.98	6.78	71				24.7	17.9	1.42	4.9	4.3		75
103	29.73068	-82.24970	07/20/07	UF for SJRWMD	Hatchet Creek	0.037	0.049	0.486	0.44	0.250	0.206			6.9	0.24	6.62	85				26.7	18.8	1.48	5.1	6.1		80
103	29.73068	-82.24970	07/26/07	UF for SJRWMD	Hatchet Creek	0.017	0.036	0.294	0.26	0.204	0.164			7.3	0.50	6.56	78				25.5	19.3	1.36	3.9	6.6		106
103	29.73068	-82.24970	08/09/07	UF for SJRWMD	Hatchet Creek	0.015	0.055	0.409	0.35	0.178	0.141			8.3	0.67	6.78	90				27.4	19.1	1.59	6.4	8.5		80
103	29.73068	-82.24970	08/21/07	UF for SJRWMD	Hatchet Creek	0.024	0.060	0.529	0.47	0.186	0.16			7.6	0.73	6.96	86				26.1	19.5	1.60	6.3	8.8		98
103	29.73068	-82.24970	08/28/07	UF for SJRWMD	Hatchet Creek	0.025	0.066	0.743	0.68	0.141	0.111				2.31	6.52	96					28.7	2.04	15.0	9.0		
103	29.73068	-82.24970	09/04/07	UF for SJRWMD	Hatchet Creek	0.057	0.062	0.620	0.56	0.133	0.115			7.4	1.21	6.56	85				25.1	23.0	1.63	11.9	8.7		112
103	29.73068	-82.24970	09/18/07	UF for SJRWMD	Hatchet Creek	0.022	0.040	0.390	0.35	0.154	0.118			9.1	0.57	6.52	77				23.7			4.8	8.0		115
103	29.73068	-82.24970	01/30/08	UF for SJRWMD	Hatchet Creek	0.025	0.021	1.260	1.24	0.111	0.087			9.4	4	5.93	96				14.6			41.2	8.93		205
103	29.73068	-82.24970	02/27/08	UF for SJRWMD	Hatchet Creek	0.008	0.024	1.981	1.96	0.357	0.339			6.4	36.9	5.1	85				15.4	28.06	1.64	58.4	6.82		242

Station	Latitude	Longitude	Sample Date	Source	Spatial Grouping	Nitrogen: Ammonia, Total	Nitrogen: Nitrate + Nitrite	Nitrogen: Total	Nitrogen: Total Kjeldahl	Phosphorous: Total	Phosphorous: Soluble Reactive	Phosphorous: Total Dissolved	Bacteriological: Coliform, Fecal	Dissolved Oxygen: Concentration	Flow: Discharge	Physical: pH, Field	Physical: Specific Conductance	Physical: Stage	Physical: Turbidity, Field	Temperature: Air	Temperature: Water	General Inorganic: Chloride	General Inorganic: Sulfate	General Inorganic: Total Organic Carbon	Metals: Calcium	Fluoride	Oxidation-Reduction Potential (ORP)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (DB Labs Only)	#/100 mL	mg/L	cfs	SU	µmhos/cm	Feet	NTU	Celsius	Celsius	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (SJRWMD Only)
103	29.73068	-82.24970	05/16/08	UF for SJRWMD	Hatchet Creek	0.027	0.038	0.565	0.53	0.147	0.142			7.4	0.35	7.4	68				22.7			5.8			78
103	29.73068	-82.24970	08/20/08	UF for SJRWMD	Hatchet Creek	0.010	0.450	0.450		0.012	0.005			6.1	0.80	7.27	76				24.4	14.6	1.08		5.1		120
103	29.73068	-82.24970	11/24/08	UF for SJRWMD	Hatchet Creek	0.047	1.840	1.840		0.077	0.059			8.7	5.05	6.9	92				15.5	34.8	0.03		10.3		164
103	29.73068	-82.24970	11/24/08	UF for SJRWMD	Hatchet Creek	0.015	0.330	0.330		0.090	0.095			10.1	1.40	7.52	47				12.4	18.4	1.84		5.5		189
103	29.73068	-82.24970	03/12/09	UF for SJRWMD	Hatchet Creek	0.040	0.780	0.780		0.085	0.073			8.3	1.82	6.6	83				18.0	129.9	0.05		9.4		183
103	29.73068	-82.24970	04/27/09	UF for SJRWMD	Hatchet Creek	0.074	1.300	1.300		0.088	0.074			7.8	1.98	6.85	74				19.9	14.9	0.44		7.2		108
103	29.73068	-82.24970	07/31/09	UF for SJRWMD	Hatchet Creek	0.023	0.630	0.630		0.107	0.096			6.4	2.35	6.04	81				25.2				7.7		129
103	29.73068	-82.24970	08/19/09	UF for SJRWMD	Hatchet Creek	0.017	0.440	0.440		0.128	0.109			6.8	1.80	6.38	63				25.4				7.1		107
103	29.73068	-82.24970	11/13/09	UF for SJRWMD	Hatchet Creek	0.020	0.430	0.430		0.103	0.077			8.1	1.40	6.63	85				16.5				5.6		82
103	29.73068	-82.24970	01/05/10	UF for SJRWMD	Hatchet Creek	0.026	0.980	0.980		0.079	0.047			n.a.	2.62	n.a.	n.a.				n.a.				9.0		n.a.
103	29.73068	-82.24970	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.650	1.650		0.065	0.041			8.77	13.96	5.1	81				18.5						200
103	29.73068	-82.24970	04/30/10	UF for SJRWMD	Hatchet Creek	0.038	1.920	1.920		0.102	0.082			7.9	1.18	6.3	29				18.4						112
104	29.73760	-82.23944	02/05/07	UF for SJRWMD	HC trib	0.015	0.027	1.239	1.21	0.026	0.015						115					21.0	4.39	32.5	5.1		
104	29.73760	-82.23944	03/15/07	UF for SJRWMD	HC trib	0.036	0.009	0.440	0.43	0.051	0.036													5.8	4.1		
104	29.73760	-82.23944	04/04/07	UF for SJRWMD	HC trib	0.029	0.007	0.761	0.75	0.091	0.044			8.5	0.00	6.83	233				30.6	56.7	1.25	17.9	16.0		77.9
104	29.73760	-82.23944	02/27/08	UF for SJRWMD	HC trib	0.001	0.013	1.942	1.93	0.297	0.261			7	3.4	3.97	89				15.2	28.01	1.00	52.3	2.96		322
104	29.73760	-82.23944	11/24/08	UF for SJRWMD	HC trib	0.031	0.700	0.700		0.034	0.028			8.3	0.14	6.39	103				16.0	45.7	0.04		7.4		183
104	29.73760	-82.23944	11/24/08	UF for SJRWMD	HC trib	0.012	0.500	0.500		0.049	0.041			10.9	0.04	7.43	80				14.1	23.4	13.04		8.4		155
104	29.73760	-82.23944	03/12/09	UF for SJRWMD	HC trib	0.034	0.400	0.400		0.033	0.033			7.0	0.08	6.46	82				18.4	11.6	0.06		8.5		198
104	29.73760	-82.23944	04/27/09	UF for SJRWMD	HC trib	0.044	0.430	0.430		0.069	0.051			8.6	0.12	6.88	81				21.6	14.1	0.55		7.2		135
104	29.73760	-82.23944	07/31/09	UF for SJRWMD	HC trib	0.027	0.560	0.560		0.068	0.054			7.1	0.05	5.87	89				26.0				9.3		126
104	29.73760	-82.23944	08/19/09	UF for SJRWMD	HC trib	0.042	0.430	0.430		0.060	0.048			7.6	0.03	5.82	84				26.8				4.6		152
104	29.73760	-82.23944	03/28/10	UF for SJRWMD	HC trib	0.000	1.096	1.096		0.076	0.044			8.11	0.32	4.06	80				17.36						250
104	29.73760	-82.23944	04/30/10	UF for SJRWMD	HC trib	0.014	0.720	0.720		0.101	0.046			9.3	0.06	6.1	63				19.5						140
105	29.73415	-82.27695	03/15/07	UF for SJRWMD	Hatchet Creek	0.029	0.170	0.719	0.55	0.013	0.006													4.5	1.8		
105	29.73415	-82.27695	04/04/07	UF for SJRWMD	Hatchet Creek	0.061	0.235	0.607	0.37	0.003	0.009			7.7	0.57	7.01	52				28.3	15.5	1.04	2.6	0.9		107.8
105	29.73415	-82.27695	04/16/07	UF for SJRWMD	Hatchet Creek	0.042	0.239	0.798	0.56	0.011	0.009			8.5	0.34	6.73	49				19.4	16.1	1.07	2.7	0.2		131
105	29.73415	-82.27695	05/14/07	UF for SJRWMD	Hatchet Creek	0.018	0.315	0.817	0.50	0.020	0.006											16.1	1.17	2.2	-0.2		
105	29.73415	-82.27695	06/22/07	UF for SJRWMD	Hatchet Creek	0.025	0.226	0.790	0.56	0.038	0.01			7.1	0.21	6.6	56				27.3	15.8	1.13	2.8	1.0		122
105	29.73415	-82.27695	07/22/07	UF for SJRWMD	Hatchet Creek	0.010	0.279	0.746	0.47	0.027	0.01			7.2	0.24	6.55	55				28.4	14.7	1.26	2.7	1.4		176
105	29.73415	-82.27695	07/26/07	UF for SJRWMD	Hatchet Creek	0.011	0.271	0.708	0.44	0.022	0.008			7.2	0.23	6.63	58				27.6	15.5	1.18	2.3	1.4		176
105	29.73415	-82.27695	08/09/07	UF for SJRWMD	Hatchet Creek	0.019	0.209	0.742	0.53	0.043	0.011			7.1	0.28	6.57	62				29.0	15.8	1.11	3.5	3.0		103
105	29.73415	-82.27695	09/04/07	UF for SJRWMD	Hatchet Creek	0.050	0.223	0.632	0.41	0.026	0.005			7.1	0.48	6.52	45				26.6	15.9	1.09	7.1	3.3		121
105	29.73415	-82.27695	01/31/08	UF for SJRWMD	Hatchet Creek	0.013	0.035	1.929	1.89	0.032	0.005			7.4	3.60	5.31	105				14.9			58.4	9.5		222
105	29.73415	-82.27695	02/27/08	UF for SJRWMD	Hatchet Creek	0.009	0.027	2.068	2.04	0.040	0.019			4.08	31	4.6	88				14.8	25.99	1.76	72.3	7.02		248
105	29.73415	-82.27695	02/28/08	UF for SJRWMD	Hatchet Creek	0.021	0.018	1.636	1.62	0.043	0.018			7.9	4.7	5.78	86				14.1	21.46	1.79	58.3	15.25		225
105	29.73415	-82.27695	05/16/08	UF for SJRWMD	Hatchet Creek	0.024	0.191	0.629	0.44	0.025	0.011			6.3	0.44	7	51				24.3			3.6			180
105	29.73415	-82.27695	08/20/08	UF for SJRWMD	Hatchet Creek	0.080	0.000	0.000		0.000	0			4.0	0.51	6.55	75				25.3	17.9	1.30		6.4		-39
105	29.73415	-82.27695	11/24/08	UF for SJRWMD	Hatchet Creek	0.014	0.510	0.510		0.007	0.007			9.2	1.10	7.31	62				13.6	14.8	1.10		4.0		128
105	29.73415	-82.27695	01/09/09	UF for SJRWMD	Hatchet Creek	0.012	0.530	0.530		0.011	0.01			8.6	0.40	8.1	66				11.6	15.6	1.04		4.6		104.8
105	29.73415	-82.27695	02/13/09	UF for SJRWMD	Hatchet Creek	0.049	1.560	1.560		0.017	0.003			6.1	4.22	5.14	94				18.0	28.1	0.03		9.4		269
105	29.73415	-82.27695	03/12/09	UF for SJRWMD	Hatchet Creek	0.050	1.330	1.330		0.013	0.01			6.1	0.79	7.06	74				18.1	250.4	0.19		7.5		99
105	29.73415	-82.27695	04/27/09	UF for SJRWMD	Hatchet Creek	0.071	1.310	1.310		0.022	0.011			6.4	1.24	5.48	65				23.5	16.0	4.01		7.3		246
105	29.73415	-82.27695	06/29/09	UF for SJRWMD	Hatchet Creek	0.028	0.640	0.640		0.021	0.012			5.8	0.56	7.1	52				27.6				2.9		50
105	29.73415	-82.27695	07/31/09	UF for SJRWMD	Hatchet Creek	0.082	0.850	0.850		0.020	0.014			5.1	1.90	5.16	74				26.2				6.3		98
105	29.73415	-82.27695	08/19/09	UF for SJRWMD	Hatchet Creek	0.023	0.570	0.570		0.021	0.012			3.5	0.71	5.06	64				27.8				4.0		117
105	29.73415	-82.27695	11/13/09	UF for SJRWMD	Hatchet Creek	0.013	0.700	0.700		0.010	0.006			5.1	0.48	5.9	69				18.0				3.4		-13
105	29.73415	-82.27695	01/05/10	UF for SJRWMD	Hatchet Creek	0.020	1.010	1.010		0.009	0.01			n.a.	1.67	n.a.	n.a.				n.a.				7.2		n.a.
105	29.73415	-82.27695	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.830	1.830		0.024	0.008			7.48	11.49	4.44	80				20						226
105	29.73415	-82.27695	04/30/10	UF for SJRWMD	Hatchet Creek	0.045	0.710	0.710		0.013	0.01			7.5	0.71	6.6	65				20.2						100
108	29.72258	-82.21004	02/09/07	UF for SJRWMD	Hatchet Creek	0.011	0.009	0.234	0.22	0.033	0.009						460					20.0	3.16	4.7	37.0		
HATCONA	29.69342	-82.20050	11/09/05	ACEPD Station Monitorin	Hatchet Creek									6.35		6.49	95		2.06	24.5	18.24						
HATCONA	29.69342	-82.20050	02/01/06	ACEPD Station Monitorin	Hatchet Creek									8.52		6.22	83		1.72	18.8	13.19						
HATCONA	29.69342	-82.20050	04/04/06	ACEPD Station Monitorin	Hatchet Creek									5.46		6.42	89		1.61		20.32						
HATCONA	29.69342	-82.20050	06/27/06	ACEPD Station Monitorin	Hatchet Creek									2.1		6.42	115		3.68		24.14						
HATCONA	29.69342	-82.20050	10/17/07	ACEPD Station Monitorin	Hatchet Creek										7.8028038				1.68	24							
HATCONA	29.69342	-82.20050	08/07/08	ACEPD Station Monitorin	Hatchet Creek								1														
HATCONA	29.69342	-82.20050	10/20/08	ACEPD Station Monitorin	Hatchet Creek								1050														
HATCONA	29.69342	-82.20050	02/10/09	ACEPD Station Monitorin	Hatchet Creek								340														
HATCONA	29.69342	-82.20050	06/22/09	ACEPD Station Monitorin	Hatchet Creek								20														
HATCONA	29.69342	-82.20050	09/02/09	ACEPD Station Monitorin	Hatchet Creek								696														
HATCONA	29.69342	-82.20050	12/22/09	ACEPD Station Monitorin	Hatchet Creek								176														
HATCONA	29.69342	-82.20050	04/12/10	ACEPD Station Monitorin	Hatchet Creek	0.03	0.028	1.31	1.28	0.119			48					2.26	2.83	25.56							
HATCONA	29.69342	-82.20050	06/01/10	ACEPD Station Monitorin	Hatchet Creek								102		6.6			2.38	2.27								
HATCONA	29.69342	-82.20050	08/12/10	ACEPD Station Monitorin	Hatchet Creek								260					2.86	2.67	28.9							
HATCONA	29.69342	-82.20050	11/03/10	ACEPD Station Monitorin	Hatchet Creek													1.07	2.71	19.4							
HATCONA	29.69342	-82.20050	02/17/11	ACEPD Station Monitorin	Hatchet Creek								72	9.04		6.6	146	1.16	2.07	20	14.35						
HATCONA	29.69342	-82.20050	06/06/11	ACEPD Station Monitorin	Hatchet Creek										0												
HATCONA	29.69342	-82.20050	08/17/11	ACEPD Station Monitorin	Hatchet Creek																						
HATCONA	29.69342	-82.20050	11/08/11	ACEPD Station Monitorin	Hatchet Creek													0.6									
HATCONA	29.69342	-82.20050	07/19/12	ACEPD Station Monitorin	Hatchet Creek								168					2.7	2.56	29.4							
HC-TA-01	29.72573	-82.22726	01/30/08	UF for SJRWMD	Hatchet Creek	0.004	0.013	1.309	1.30	0.113	0.093			9.9	10.70	6.3	89				14.1			43.7	8.2		243
HC-TA-01	29.72573	-82.22726	02/28/08	UF for SJRWMD	Hatchet Creek	0.041	0.021	1.752	1.73	0.089	0.061											21.91	1.09	61.4	5.32		
HC-TA-01	29.72573	-82.22726	07/20/07	UF for SJRWMD	Hatchet Creek	0.025	0.056	0.671	0.62	0.343	0.301			5.8	0.40	6.55	76				26.1	15.8	1.31	7.3	7.1		166
HC-TA-02	29.72626	-82.23217	01/30/08	UF for SJRWMD	Hatchet Creek	0.013	0.014	1.310	1.30	0.100	0.083			8.8	10.00	5.9	87				13.6			45.5	7.9		218
HC-TA-02	29.72626	-82.23217	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.700	1.700		0.094	0.049			8.11	24.38	4.52	74				17.24						256
HC-TA-02	29.72626	-82.23217	07/20/07	UF for SJRWMD	Hatchet Creek	0.029	0.056	0.612	0.56	0.346	0.299			3.4	0.49	6.31	76				25.9	16.2	1.25	6.9	6.5		110
HC-TA-03	29.72675	-82.23539	01/30/08	UF for SJRWMD	Hatchet Creek	0.012	0.014	1.310	1.30	0.101	0.082			9.1	9.60	5.62	87				13.7			45.4	7.8		230
HC-TA-03	29.72675	-82.23539	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.450	1.450		0.084	0.049				23.23	4.77	75				17.21						244
HC-TA-03	29.72675	-82.23539	07/20/07	UF for SJRWMD	Hatchet Creek	0.026	0.060	0.527	0.47	0.324	0.281			4.3	0.33	6.23	73				25.7	15.4	1.27	6.0	6.4		163
HC-TA-04	29.72679	-82.23804	01/30/08	UF for SJRWMD	Hatchet Creek	0.010	0.015	1.311	1.30	0.100	0.078			9.3	9.10	5.88	88				14.0			46.6	8.9		237
HC-TA-04	29.72679	-82.23804	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.490	1.490		0.077	0.051			8.36	22.25	4.44	74				17.21						241
HC-TA-04	29.72679	-82.23804	07/20/07	UF for SJRWMD	Hatchet Creek	0.014	0.074	0.511	0.44	0.321	0.276			4.9	0.37	6.32	76				25.9	17.2	1.44	6.0	6.6		155
HC-TA-05	29.72721	-82.24182	01/30/08	UF for SJRWMD	Hatchet Creek	0.029	0.015	1.339	1.32	0.093	0.075			9.2	12.20	5.7	88				13.9			47.1	8.1		228
HC-TA-05	29.72721	-82.24182	02/27/08	UF for SJRWMD	Hatchet Creek	0.016	0.018	1.834	1.82	0.212	0.183			6.2	79.6	4.62	73				16	22.21	1.24	56.8	5.98		280
HC-TA-05	29.72721	-82.24182	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.530		0.078	0.049			8.53	21.12	5	78				17.1						247
HC-TA-05	29.72721	-82.24182	07/20/07	UF for SJRWMD	Hatchet Creek	0.020	0.076	0.572	0.50	0.291	0.246			5.4	0.29	6.56	86				26.7	17.1	1.42	6.0	6.7		163
HC-TA-06	29.72837	-82.24589	01/30/08	UF for SJRWMD	Hatchet Creek	0.017	0.016	1.311	1.30	0.092	0.075			9.5	9.30	5.51	87				14.0			47.7	8.0		237
HC-TA-06	29.72837	-82.24589	03/28/10	UF for SJRWMD	Hatchet Creek	0.000	1.590	1.590		0.093	0.061			8.68	10	5.31	77				17						215
HC-TA-06	29.72837	-82.24589	07/20/07	UF for SJRWMD	Hatchet Creek	0.042	0.079	0.516	0.44	0.282	0.243			5.1	0.32	6.65	93				27.0	17.9		5.4	8.6		141
HC-TB-01	29.73505	-82.27324	01/31/08	UF for SJRWMD	Hatchet Creek	0.007	0.034	1.615	1.58	0.020	0.005			8.5	3.90	5.47	102				14.9			54.1	9.8		225
HC-TB-01	29.73505	-82.27324	02/28/08	UF for SJRWMD	Hatchet Creek	0.001	0.019	2.258	2.24	0.035	0.009			6	20.8	4.4	83				12.7	26.51	1.41	75.4	7.94		281
HC-TB-01	29.73505	-82.27324	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.650	1.650		0.016	0.008			7.51	10.98	4.6	80				19.18						220
HC-TB-01	29.73505	-82.27324	07/26/07	UF for SJRWMD	Hatchet Creek	0.010	0.204	0.671	0.47	0.028	0.011			7.1	0.35	6.95	55				23.5	14.8	1.14	2.6	2.2		199
HC-TB-02	29.73443	-82.26893	01/31/08	UF for SJRWMD	Hatchet Creek	0.024	0.029	1.524	1.50	0.035	0.021			8.4	4.00	5.61	107				14.6			52.5	9.3		198
HC-TB-02	29.73443	-82.26893	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.750	1.750		0.025	0.012			7.76	11.99	4.9	80				18.63						229
HC-TB-02	29.73443	-82.26893	07/26/07	UF for SJRWMD	Hatchet Creek	0.016	0.169	0.606	0.44	0.035	0.019			7.3	0.28	6.41	50				23.2	15.3	1.10	3.0	2.4		182
HC-TB-03	29.73323	-82.26500	01/31/08	UF for SJRWMD	Hatchet Creek	0.011	0.026	1.549	1.52	0.040	0.024			8.7	3.60	5.59	100				14.8			48.8	9.6		202
HC-TB-03	29.73323	-82.26500	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.720	1.720		0.028	0.01			8.04	10.99	4.94	80				18.02						226
HC-TB-03	29.73323	-82.26500	07/26/07	UF for SJRWMD	Hatchet Creek	0.015	0.109	0.546	0.44	0.051	0.034			7.4	0.31	6.54	56				23.3	15.0	1.05	3.9	2.8		207
HC-TB-04	29.73237	-82.26230	01/31/08	UF for SJRWMD	Hatchet Creek	0.019	0.024	1.519	1.50	0.044	0.027			8.6	4.50	5.69	101				14.8			49.4	9.5		201
HC-TB-04	29.73237	-82.26230	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.850	1.850		0.033	0.009			8.67	11.54	4.85	79				18.54						216
HC-TB-04	29.73237	-82.26230	07/26/07	UF for SJRWMD	Hatchet Creek	0.026	0.078	0.515	0.44	0.068	0.047			6.9	0.42	6.23	59				23.4	15.4	1.12	4.8	6.8		204
HC-TB-05	29.73227	-82.25757	01/31/08	UF for SJRWMD	Hatchet Creek	0.015	0.023	1.433	1.41	0.050	0.037			8.6	5.60	5.71	99				15.2			46.3	9.4		212
HC-TB-05	29.73227	-82.25757	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.570	1.570		0.035	0.017			8.58	12.21	4.89	79				18.13						205

						Nitrogen				Phosphorous			Bacteriological	Dissolved Oxygen	Flow	Physical				Temperature		General Inorganic			Metals		
						Ammonia, Total	Nitrate + Nitrite	Total	Total Kjeldahl	Total	Soluble Reactive	Total Dissolved	Coliform, Fecal	Concentration	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	Oxidation-Reduction Potential (ORP)
Station	Latitude	Longitude	Sample Date	Source	Spatial Grouping	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (DB Labs Only)	#/100 mL	mg/L	cfs	SU	µmhos/cm	Feet	NTU	Celsius	Celsius	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (SJRWMD Only)
HC-TB-05	29.73227	-82.25757	07/26/07	UF for SJRWMD	Hatchet Creek	0.028	0.040	0.388	0.35	0.160	0.122			5.8	0.41	6.06	69				23.4	17.4	1.02	4.3	6.7		167
HC-TB-06	29.73195	-82.25553	01/31/08	UF for SJRWMD	Hatchet Creek	0.005	0.021	1.345	1.32	0.056	0.037			8.6	5.30	5.81	101				15.7			46.2	9.2		211
HC-TB-06	29.73195	-82.25553	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.530		0.038	0.016			8.61	9.4	4.86	46				16.31						191
HC-TB-06	29.73195	-82.25553	7/26/2007	UF for SJRWMD	Hatchet Creek	0.021	0.036	0.473	0.44	0.159	0.129			6.3	0.50	6.18	72				23.9	18.7	1.19	4.1	6.1		174
HC-TB-07	29.73202	-82.25283	01/31/08	UF for SJRWMD	Hatchet Creek	0.012	0.019	1.315	1.30	0.070	0.052			8.6	5.70	5.57	101				15.4			44.1	9.2		209
HC-TB-07	29.73202	-82.25283	02/28/08	UF for SJRWMD	Hatchet Creek	0.012	0.018	2.116	2.10	0.123	0.085			7.8	23.3	4.62	83				12.7	28.67	1.53	71.8	7.78		280
HC-TB-07	29.73202	-82.25283	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.510	1.510		0.058	0.031			8.7	15.56	5.05	82				16.28						190
HC-TB-07	29.73202	-82.25283	07/26/07	UF for SJRWMD	Hatchet Creek	0.014	0.035	0.501	0.47	0.179	0.135			7.5	0.40	6.38	72				24.3	19.2	1.36	3.9	4.5		130
HC-TB-08	29.73155	-82.25044	07/26/07	UF for SJRWMD	Hatchet Creek	0.015	0.037	0.474	0.44	0.188	0.154			7.2	0.47	6.47	72				24.6	19.3	1.36	3.9	5.3		145
HC-TB-08	29.73155	-82.25044	01/31/08	UF for SJRWMD	Hatchet Creek	-0.001	0.020	1.315	1.30	0.072	0.052			8.6	5.30	6.65	99				15.6			43.5	9.1		195
HC-TB-08	29.73155	-82.25044	02/28/08	UF for SJRWMD	Hatchet Creek	-0.010	0.019	2.061	2.04	0.122	0.096			8.1	20.8	4.6	83				12.8	28.36	1.52	70.7	7.90		286
HC-TB-08	29.73155	-82.25044	03/27/10	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.530		0.064	0.037			8.84	9.92	5.14	82				15.97						201
HC-TB-Trib2	29.73195	-82.25404	01/31/08	UF for SJRWMD	Hatchet Creek	0.009	0.007	0.932	0.93	0.163	0.158			8.7	0.52	4.15	160				15.5			30.0	8.8		296
HC-TB-Trib2	29.73195	-82.25404	02/28/08	UF for SJRWMD	Hatchet Creek	-0.008	0.013	1.574	1.56	0.339	0.33			7.7	0.87	4.05	147				13.8	62.58	2.77	44.1	6.2		319
HAT26	29.68783	-82.20663	01/10/05	SJRWMD	Hatchet Creek	0.035	0.031		1.07	0.176	0.105			6.24		6.55	94		3.1	24.5	17.61	12.72	2.75	34.46	8.2	0.18	
HAT26	29.68783	-82.20663	2/7/2005	SJRWMD	Hatchet Creek	0.018	0.030		0.88	0.098	0.059			9.47		7.41	98		1.9	23.4	13.25	13.60	2.76	30.49	8.1	0.11	
HAT26	29.68783	-82.20663	03/07/05	SJRWMD	Hatchet Creek	0.025	0.026		1.07	0.110	0.048			8.43		7.17	100		2.6	20	13.98	14.25	3.22	32.58	8.3	0.09	
HAT26	29.68783	-82.20663	04/04/05	SJRWMD	Hatchet Creek	0.026	0.010		1.26	0.058	0.051			7.11		5.18	65		1.4	23.9	16.17	8.90	1.93	48.71	4.9	0.03	
HAT26	29.68783	-82.20663	05/02/05	SJRWMD	Hatchet Creek	0.056	0.082		1.32	0.122	0.076			6.08		6.09	73		2.3	26.1	19.14	9.94	0.67	41.67	6.6	0.07	
HAT26	29.68783	-82.20663	06/13/05	SJRWMD	Hatchet Creek	0.037	0.036		1.39	0.142	0.076			5.85		5.76	67		3.8	32	24.56	8.71	2.24	51.26	6.2	0.05	
HAT26	29.68783	-82.20663	07/06/05	SJRWMD	Hatchet Creek	0.032	0.039		1.39	0.113	0.058			5.49		5.1	55		2.2	29	26.19	6.78	0.93	55.75	5.0	0.05	
HAT26	29.68783	-82.20663	08/01/05	SJRWMD	Hatchet Creek	0.030	0.099		1.31	0.153	0.103			5.36		5.72	56		2.2	27.5	24.98	7.05	0.88	45.34	4.8	0.07	
HAT26	29.68783	-82.20663	09/12/05	SJRWMD	Hatchet Creek	0.034	0.114		1.14	0.122	0.085			6.23		6.62	64		2.2	28.3	23.81	8.49	1.34	43.6	6.3	0.08	
HAT26	29.68783	-82.20663	10/03/05	SJRWMD	Hatchet Creek				1.37	0.155	0.093			4.56		6.79	82		2.6	27.8	24.54	8.82	1.96	38	7.8	0.07	
HAT26	29.68783	-82.20663	11/02/05	SJRWMD	Hatchet Creek				0.86	0.114	0.073			7.34		6.91	80		1.8	22.1	17.28	9.57	1.26	30.14	6.6	0.06	
HAT26	29.68783	-82.20663	01/03/06	SJRWMD	Hatchet Creek				0.95	0.103	0.055			7.35		5.34	52		6.7	20.7	18	7.37	2.83	29.5	4.1	0.00	
HAT26	29.68783	-82.20663	02/06/06	SJRWMD	Hatchet Creek				0.96	0.071	0.046			9.75		4.82	51		2.8	15.2	11.58	6.99	2.29	39.36	3.7	0.06	
HAT26	29.68783	-82.20663	03/06/06	SJRWMD	Hatchet Creek				1.07	0.069	0.040			8.46		6.46	61		1.8	23.6	14.53	8.42	3.10	35.46	5.0	0.08	
HAT26	29.68783	-82.20663	4/4/2006	SJRWMD	Hatchet Creek				0.94	0.173	0.116			4.04		6.73	87		2.1	25.2	20.26	9.50	1.30	23.22	7.2	0.11	
HAT26	29.68783	-82.20663	05/01/06	SJRWMD	Hatchet Creek				1.26	0.261	0.102			2.72		7.12	138		3.9	24.2	18.4	10.80	1.28	27.95	13.8	0.14	
HAT26	29.68783	-82.20663	06/05/06	SJRWMD	Hatchet Creek				1.59	0.323	0.137			2.85		6.94	154		5.3	29	23.39	12.47	0.94	25.36	15.9	0.15	
HAT26	29.68783	-82.20663	07/11/06	SJRWMD	Hatchet Creek				0.85	0.185	0.149			5.55		6.48	129		1.9	29.3	23.86	10.00	12.36	26.07	11.5	0.05	
HAT26	29.68783	-82.20663	08/08/06	SJRWMD	Hatchet Creek				0.93	0.188	0.121			3.81		7.76	157		3.1	29.7	25.14	11.84	6.69	25.67	14.6	0.16	
HAT26	29.68783	-82.20663	09/05/06	SJRWMD	Hatchet Creek				1.13	0.237	0.096			3.7		7.77	159		17.4	27.5	24.69	11.95	3.65	22.46	14.7	1.70	
HAT26	29.68783	-82.20663	10/03/06	SJRWMD	Hatchet Creek				0.59	0.157	0.126			3.89		7.88	101		2.2	25.3	20.7	9.33	6.39	16.44	8.2	0.14	
HAT26	29.68783	-82.20663	11/07/06	SJRWMD	Hatchet Creek				0.83	0.139	0.065			3.57		6.41	117		2.9	25	16.68	10.50	5.70	15.1	10.3	0.13	
HAT26	29.68783	-82.20663	12/05/06	SJRWMD	Hatchet Creek				1.34	0.454	0.232			0.9		6.55	177		22.3	18.5	12.91	12.44	3.20	28.2	20.7	0.14	
HAT26	29.68783	-82.20663	01/03/07	SJRWMD	Hatchet Creek				0.95	0.191	0.132			4.51		7.21	110		1.8	16.9	15.4	12.56	7.37	25.17	8.9	0.11	
HAT26	29.68783	-82.20663	02/05/07	SJRWMD	Hatchet Creek				0.97	0.112	0.081			8.5		6.36	119		1.6	12.4	12.01	14.01	14.49	33.06	10.6	0.07	
HAT26	29.68783	-82.20663	03/05/07	SJRWMD	Hatchet Creek				0.77	0.129	0.083			6.67		7.05	104		1.1	17.7	14.51	11.48	6.56	24.53	16.2	0.27	
HAT26	29.68783	-82.20663	04/02/07	SJRWMD	Hatchet Creek				0.89	0.182	0.086			2.4		6.67	192		2.9	24.5	17.63	13.84	7.45	25.12	18.5	0.28	
HAT26	29.68783	-82.20663	05/01/07	SJRWMD	Hatchet Creek				1.16	0.219	0.082			3.19		7.06	197		2.8	24.5	17.69	14.24	5.23	23.37	18.6	0.15	
HAT26	29.68783	-82.20663	06/11/07	SJRWMD	Hatchet Creek				1.05	0.332	0.120			1.01		6.7	207		7.1	31.2	24	14.06	3.77	20.73	21.7	0.15	
HAT26	29.68783	-82.20663	07/05/07	SJRWMD	Hatchet Creek				0.99	0.278	0.102			0.53		6.69	163		6.1	29.5	23.61	11.73	4.02	15.93	15.6	0.11	
HAT26	29.68783	-82.20663	08/02/07	SJRWMD	Hatchet Creek				1.25	0.284	0.185			2.15		6.64	0.087		1.26	26	24.71	5.24	6.42	34.87	8.9	0.08	
HAT26	29.68783	-82.20663	09/10/07	SJRWMD	Hatchet Creek				0.97	0.217	0.145			0.89		6.55	169		2.9	28.7	23.27	11.37	8.76	35.39	18.1	0.12	
HAT26	29.68783	-82.20663	10/08/07	SJRWMD	Hatchet Creek				1.88	0.088	0.040			4.91		4.93	78		2.2	27.2	24.17	7.68	6.58	66.49	7.0	0.44	
HAT26	29.68783	-82.20663	11/06/07	SJRWMD	Hatchet Creek				2.67	0.125	0.048			5.76		6.78	148		1.7	20.3	14.93	16.71	5.30	84.42	15.2	0.07	
HAT26	29.68783	-82.20663	12/04/07	SJRWMD	Hatchet Creek				1.51	0.150	0.058			2.16		6.64	199		3.1	16.1	15.66	15.07	4.50	54.73	19.5	0.13	
HAT26	29.68783	-82.20663	01/07/08	SJRWMD	Hatchet Creek				1.30	0.096	0.039			6.55		7.69	192		1.5	21.5	11.7	15.51	5.75	43.62	17.8	0.12	
HAT26	29.68783	-82.20663	02/12/08	SJRWMD	Hatchet Creek				1.47	0.087	0.047			7.42		6.95	136		1.4	22.1	13.44	18.69	5.89	52.7	11.0	0.10	
HAT26	29.68783	-82.20663	03/03/08	SJRWMD	Hatchet Creek				1.83	0.069	0.025			7.96		5.8	95		1.3	25.5	15.07	15.12	3.58	69.77	7.7	0.07	
HAT26	29.68783	-82.20663	04/03/08	SJRWMD	Hatchet Creek				1.54	0.107	0.063			6.44		5.91	87		1.8	27.7	20.17	13.48	2.83	62.12	7.0	0.10	
HAT26	29.68783	-82.20663	05/06/08	SJRWMD	Hatchet Creek				1.46	0.163	0.054			1.84		6.45	143		4.2	28.4	19.72	16.30	4.31	55.74	12.4	0.14	
HAT26	29.68783	-82.20663	06/09/08	SJRWMD	Hatchet Creek				1.56	0.167	0.069			2.68		6.7	166		3.3	28.9	24.25	16.57	2.50	49.74	15.3	0.13	
HAT26	29.68783	-82.20663	07/07/08	SJRWMD	Hatchet Creek				1.18	0.108	0.040			4.45		6.89	157		1.97	27.8	23.18	14.61	3.65	31.87	14.6	0.15	
HAT26	29.68783	-82.20663	08/04/08	SJRWMD	Hatchet Creek				1.14	0.170	0.044			3.21		6.56	142		9.3	28.9	24.58	12.46	2.68	28.05	14.7	0.15	
HAT26	29.68783	-82.20663	9/8/2008	SJRWMD	Hatchet Creek				2.23	0.110	0.055			5.03		5.15	80		1.4	29.5	24.5	9.22	0.87	85.8	7.4	0.06	
HAT26	29.68783	-82.20663	10/07/08	SJRWMD	Hatchet Creek				1.78	0.156	0.082			0.82		6.18	120		3.8	27.3	20.93	12.00	1.98	58.79	12.2	0.10	
HAT26	29.68783	-82.20663	11/12/08	SJRWMD	Hatchet Creek				1.20	0.085	0.043			0.97		6.61	165		2.3	26.5	14.18	13.50	2.48	46.76	16.0	0.09	
HAT26	29.68783	-82.20663	12/10/08	SJRWMD	Hatchet Creek				0.78	0.121	0.074			2.68		6.77	145		1.2	23	11.81	15.00	3.66	29.07	13.3	0.12	
HAT26	29.68783	-82.20663	01/06/09	SJRWMD	Hatchet Creek				0.74	0.111	0.057			1.56		6.86	177		1.4	18.3	14.91	11.79	-0.40	26.06	16.1	0.14	
HAT26	29.68783	-82.20663	02/03/09	SJRWMD	Hatchet Creek				1.26	0.075	0.041			8.88		6.34	115		1.7	10.6	11.47	17.10	6.11	47.55	9.1	0.05	
HAT26	29.68783	-82.20663	03/03/09	SJRWMD	Hatchet Creek				1.11	0.095	0.060			8.37		6.74	117		1.7	24.1	11.36	17.35	4.34	41.34	9.8	0.10	
HAT26	29.68783	-82.20663	04/06/09	SJRWMD	Hatchet Creek				1.65	0.087	0.039			6.04		5.55	86		2.5	22.7	20.24	12.63	3.12	62.21	7.7	0.09	
HAT26	29.68783	-82.20663	05/05/09	SJRWMD	Hatchet Creek				1.59	0.174	0.090			0.89		6.24	138		5.3	23.2	20.75	16.75	4.79	53.1	16.6	0.16	
HAT26	29.68783	-82.20663	06/03/09	SJRWMD	Hatchet Creek				1.65	0.073	0.026			5.84		5.29	70		1.8	25.6	23.39	10.02	1.94	68.03	6.4	0.08	
HAT26	29.68783	-82.20663	07/08/09	SJRWMD	Hatchet Creek				1.39	0.098	0.043			4.39		6.71	123		3.55	25.3	24.66	12.37	3.40	50.36	11.9	0.12	
HAT26	29.68783	-82.20663	08/05/09	SJRWMD	Hatchet Creek				1.35	0.044	0.015			5.31		4.92	46		3.8	35.1	24.68	4.90	0.91	62.09	4.7	0.00	
HAT26	29.68783	-82.20663	9/2/2009	SJRWMD	Hatchet Creek				1.40	0.099	0.056			5.76		6.31	76		2.25	24.3	24.06	11.00	1.61	50.61	7.5	0.00	
HAT26	29.68783	-82.20663	10/07/09	SJRWMD	Hatchet Creek				1.16	0.090	0.040			4.75		6.8	139		2.7	24.9	23.58	12.00	1.40	40.95	13.6	0.09	
HAT26	29.68783	-82.20663	11/05/09	SJRWMD	Hatchet Creek				1.32	0.074	0.026			4.96		6.69	142		2.6	20	17.86	13.05	1.22	47.68	14.6	0.10	
HAT26	29.68783	-82.20663	12/02/09	SJRWMD	Hatchet Creek				1.28	0.058	0.018			7.04		6.83	133		1.7	21.3	15.53	15.00	2.40	49.67	13.0	0.07	
HAT26	29.68783	-82.20663	01/12/10	SJRWMD	Hatchet Creek				0.98	0.043	0.026			12.4		7.57	140		1.2	7.8	3.27	16.18	4.18	41.59	12.2	0.16	
HAT26	29.68783	-82.20663	02/18/10	SJRWMD	Hatchet Creek				1.14	0.042	0.021			10.68		5.57	70		1.2	13.1	7.58	11.36	2.92	49.24	5.3	0.12	
HAT26	29.68783	-82.20663	03/10/10	SJRWMD	Hatchet Creek				1.06	0.059	0.039			9.16		6.72	87		1.3	22.2	12.18	12.86	2.60	44.17	6.9	0.16	
HAT26	29.68783	-82.20663	04/13/10	SJRWMD	Hatchet Creek				1.24	0.123	0.065			6.44		6.88	106		2.3	21.6	17.56	13.40	2.90	43.59	9.4	0.05	
HAT26	29.68783	-82.20663	05/12/10	SJRWMD	Hatchet Creek				1.46	0.111	0.063			6.62		6.65	84		1.5	24.9	21.11	11.83	2.21	55.21	7.6	0.03	
HAT26	29.68783	-82.20663	06/09/10	SJRWMD	Hatchet Creek				1.02	0.179	0.130			5.28		7.16	111		2	25.7	24.11	12.44	2.81	33.23	10.0	0.06	
HAT26	29.68783	-82.20663	07/15/10	SJRWMD	Hatchet Creek				1.54	0.075	0.037			5.9		5.54	61		2.1	35.1	26.09	8.17	2.13	64.22	6.4	0.08	
HAT26	29.68783	-82.20663	08/16/10	SJRWMD	Hatchet Creek				1.28	0.060	0.022			5.83		5.95	63		2.7	27.7	26.31	8.31	2.22	54.95	5.9	0.08	
HAT26	29.68783	-82.20663	09/13/10	SJRWMD	Hatchet Creek				1.30	0.087	0.041			4.27		6.15	85		2.24	29.9	24.65	9.30	2.62	47.85	7.6	0.06	
HAT26	29.68783	-82.20663	10/11/10	SJRWMD	Hatchet Creek				1.16	0.140	0.058			0.78		6.31	144		5.07	28.3	18.63	13.77	2.92	35.9	11.8	0.11	
HAT26	29.68783	-82.20663	11/08/10	SJRWMD	Hatchet Creek				0.90	0.079	0.041			3.96		7.12	171		1.66	20.5	10.74	15.58	2.63	29.38	14.7	0.14	
HAT26	29.68783	-82.20663	12/06/10	SJRWMD	Hatchet Creek				1.03	0.222	0.086			2.47		6.93	185		4.54	13.2	8.68	16.56	1.93	33.44	16.8	0.16	
HAT26	29.68783	-82.20663	01/12/11	SJRWMD	Hatchet Creek				0.86	0.143	0.040			1.4		6.65	193		3.24	11.1	8.06	16.53	2.87	31.51	14.8	0.10	
HAT26	29.68783	-82.20663	02/09/11	SJRWMD	Hatchet Creek				0.95	0.173	0.130			9.12		6.84	127		1.85	18.8	10.16	15.46	15.08	35.71	9.8	0.11	
HAT26	29.68783	-82.20663	03/09/11	SJRWMD	Hatchet Creek				0.86	0.080	0.037			4.27		6.9	209		1.48	21.3	16.17	14.73	8.21	31.86	19.6	0.13	
HAT26	29.68783	-82.20663	03/28/11	SJRWMD	Hatchet Creek				0.96	0.169	0.093			1.61		6.53	456		2.53	21.2	18.49	15.13	8.22	32.22	19.2	0.13	
HAT26	29.68783	-82.20663	05/18/11	SJRWMD	Hatchet Creek				0.78	0.119	0.049			2.47		6.87	106		1.22	16.15	17.34	14.44	5.72	24.58	16.5	0.12	
HAT26	29.68783	-82.20663	06/14/11	SJRWMD	Hatchet Creek				0.77	0.111	0.032			2.23		6.79	206		1.60	26.6	22.3	3.16	2.09	19.98	17.2	0.20	
HAT26	29.68783	-82.20663	07/12/11	SJRWMD	Hatchet Creek				0.79	0.152	0.060			15.3		7.61	759		3.99		29.24	15.22	3.07	15.94		0.14	
HAT26	29.68783	-82.20663	08/11/11	SJRWMD	Hatchet Creek				0.67	0.168	0.062			3.05		7.33	191		1.67		25.33	15.37	2.73	11.91		0.16	
HAT26	29.68783	-82.20663	09/06/11	SJRWMD	Hatchet Creek				0.63	0.147	0.071			3.37		8.55	184		3.09	21.66	24.33	13.07	3.26	16.44		0.09	
HAT26	29.68783	-82.20663	07/10/12	SJRWMD	Hatchet Creek				3.18	0.212	0.142			4.62		4.99	87		1.36		25.87	10.23	3.77	90	7.8		
HAT26	29.68783	-82.20663	08/29/12	SJRWMD	Hatchet Creek				2.08	0.109	0.063			4.68		5.43	81		1.16		25.15	7.96	1.84	72.3	7.0		
HAT26	29.68783	-82.20663	01/09/13	SJRWMD	Hatchet Creek				1.41	0.074	0.050			7.8		6.02	98		0.77	20.8	16.06	14.91	3.36	54.2	8.7		
HAT26	29.68783	-82.20663	03/07/13	SJRWMD	Hatchet Creek				1.35	0.076	0.045			8.58		6.67	118		1.16	7.5	11.63	18.00	1.90	49.6	9.9		
HAT26	29.68783	-82.20663	05/07/13	SJRWMD	Hatchet Creek				1.46	0.086	0.048			6.87		4.91	66		1.75	18.7	17.37	0.90	0.90	59.14	5.5		
HAT26	29.68783	-82.20663	07/16/13	SJRWMD	Hatchet Creek				1.35	0.096	0.068			5.71		4.91	49		1.56	25.9	24.25	6.39	0.81	62.13	4.5		
HAT26	29.68783	-82.20663	09/11/13	SJRWMD	Hatchet Creek				1.27	0.208	0.165			6.5		6.4	74		2.49	22.8	23.63	10.67	1.55	39.54	7.5		
HAT26	29.68783	-82.20663	11/13/13	SJRWMD	Hatchet Creek				0.78	0.176	0.111			0.2		6.44	147		4.13	10.4	16.15	12.30	1.90	25.52	11.8		
HAT26	29.68783	-82.20663	01/06/14	SJRWMD	Hatchet Creek				1.34	0.069	0.043			8.44		5.82	68		1.90	20.1	13.87	14.03	5.02	48.56	7.5		
HAT26	29.68783	-82.20663	03/12/14	SJRWMD	Hatchet Creek				1.21	0.078	0.050			7.54		5.79	76		1.76	19.8	17.41	11.78	1.48	50.27	6.7		
HAT26	29.68783	-82.20663	05/08/14	SJRWMD	Hatchet Creek				1.14	0.126	0.096			6.89		6.67	71		1.87	18.5	20.41	11.33	1.28	44.7	6.5		

						Nitrogen				Phosphorous			Bacteriological	Dissolved Oxygen	Flow	Physical				Temperature		General Inorganic			Metals		
Station	Latitude	Longitude	Sample Date	Source	Spatial Grouping	Ammonia, Total	Nitrate + Nitrite	Total	Total Kjeldahl	Total	Soluble Reactive	Total Dissolved	Coliform, Fecal	Concentration	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	Oxidation-Reduction Potential (ORP)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (DB Labs Only)	#/100 mL	mg/L	cfs	SU	µmhos/cm	Feet	NTU	Celsius	Celsius	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L (SJRWMD Only)
HAT26	29.68783	-82.20663	09/10/14	SJRWMD	Hatchet Creek				1.47	0.132	0.095			6.24		4.88	58		1.65	32.4	24.29	7.40	1.10	58.76	6.0		
HAT26	29.68783	-82.20663	11/12/14	SJRWMD	Hatchet Creek				0.69	0.152	0.109			7.26		6.41	92		1.47	13.5	14.76	11.70	2.50	26.56	8.0		
HAT26	29.68783	-82.20663	01/12/15	SJRWMD	Hatchet Creek				0.69	0.096	0.065			8.85		6.51	97		0.90	17.3	12.71	13.26	1.22	33.17	8.2		
HAT26	29.68783	-82.20663	03/09/15	SJRWMD	Hatchet Creek				0.96	0.105	0.063			8.17		6.76	86		1.17	14.9	15.13	13.36	2.23	38.22	7.6		
HAT26	29.68783	-82.20663	08/03/15	SJRWMD	Hatchet Creek				1.56	0.131	0.084			6.05		5.34	73		1.10	24.8	24.56	10.65	3.29	59.74	6.7		
HAT26	29.68783	-82.20663	09/28/15	SJRWMD	Hatchet Creek				1.38	0.112	0.066			5.74		5.58	58		2.57	24	24.35	8.23	1.30	57.8	6.3		
HAT26	29.68783	-82.20663	11/19/15	SJRWMD	Hatchet Creek				0.76	0.154	0.107			6.57		6.81	92		1.77	22.6	20.91	11.52	1.91	27.7	7.0		
HAT26	29.68783	-82.20663	01/27/16	SJRWMD	Hatchet Creek				1.05	0.063	0.019			9		6.75	106		0.78	22.2	13.27	14.95	2.94	32.01	8.5		
HAT26	29.68783	-82.20663	03/21/16	SJRWMD	Hatchet Creek				1.21	0.148	0.104			6.88		6.67	98		0.92	7.5	18.35	13.60	2.44	34.94	8.9		
HAT26	29.68783	-82.20663	05/18/16	SJRWMD	Hatchet Creek				0.72	0.183	0.060			5.02		7.46	126		4.97	22.3	22.12	9.09	2.06	21.55	11.5		
HAT26	29.68783	-82.20663	07/20/16	SJRWMD	Hatchet Creek				0.83	0.288	0.111			6.07		6.88	90		1.51	22.6	24.97	10.60	3.21	25.69	9.1		
HAT26	29.68783	-82.20663	09/14/16	SJRWMD	Hatchet Creek				1.15	0.123	0.093			6.43		6.58	79.8		1.59	29.7	24.641	9.12	1.61	44.95	8.0		
HAT26	29.68783	-82.20663	11/16/16	SJRWMD	Hatchet Creek				0.77	0.075	0.035			5.32		6.63	173.1		3.29	15.8	14.537	10.33	1.28	29.4	14.0		
HAT26	29.68783	-82.20663	01/18/17	SJRWMD	Hatchet Creek				0.49	0.080	0.046			5.64		7.25	189.6		1.19	13.2	15.208	9.20	1.20	18.04	18.0		
HAT26	29.68783	-82.20663	03/15/17	SJRWMD	Hatchet Creek				0.68	0.092	0.053			5.7		7.2	178		1.37	5	13.6	10.07	0.96	25.48	16.1		
HAT26	29.68783	-82.20663	05/22/17	SJRWMD	Hatchet Creek				1.77	0.366	0.186			2.6		6.7	195		4.45	25.5	22.9	13.22	3.13	30.62	19.0		
HAT26	29.68783	-82.20663	07/12/17	SJRWMD	Hatchet Creek				1.58	0.102	0.068			4.8		5.2	55		1.30	22.4	24.5	7.07	1.81	67.04	4.9		
HAT26	29.68783	-82.20663	10/10/17	SJRWMD	Hatchet Creek				1.18	0.150	0.095			5.1		6.5	66		2.79	23.6	25.5			42.75	7.2		
HAT26	29.68783	-82.20663	11/13/17	SJRWMD	Hatchet Creek				0.67	0.218	0.183			6.32		6.81	89.3		1.88	17	19.046	9.79	2.34	19.29	8.7		
HAT26	29.68783	-82.20663	01/24/18	SJRWMD	Hatchet Creek				0.70	0.118	0.086			8.31		6.84	95.7		1.61	7.4	13.641	12.63	3.70	27.62	7.3		
HAT26	29.68783	-82.20663	03/15/18	SJRWMD	Hatchet Creek				0.74	0.148	0.104			8.23		6.78	94.9		1.33	0	11.931	12.98	3.47	27.38	8.8		
HAT26	29.68783	-82.20663	07/25/18	SJRWMD	Hatchet Creek				1.13	0.083	0.047			5.31		4.95	45.5		1.79	21.9	24.463			55.22	3.4		
HATACF BRIDGE	29.71346	-82.19872	05/01/18	ACEPD	Hatchet Creek	0.05	0.069	1	0.93	0.128				6.45		4.85	63		3.64	25.5	20.2	8.3	1.00	33	5.4	0.13	
BEEUSHAT	29.70878	-82.19032	05/01/18	ACEPD	HC trib	0.03	0.053	1.5	1.5	0.076				4.07		5.36	65		3.10	27.5	19.6	9.4	0.27	43	8.2	0.10	
HATSINK	29.72402	-82.22506	05/01/18	ACEPD	Hatchet Creek	0.03	0.067	1.3	1.2	0.115				5.84		4.48	60		1.94	28	20.3	8.2	1.20	34	4.6	0.09	
HAT TRIB NACF	29.72607	-82.22918	05/01/18	ACEPD	Hatchet Creek	0.01	0.021	0.26	0.24	0.572				7.01		5.55	54		1.85	28	20.8	4.3	0.80	6.1	5.5	0.23	
HATWALDO	29.72954	-82.24791	06/06/18	ACEPD	Hatchet Creek	0.04	0.069	1.3	1.2	0.153	0.106	1.4		4.74		4.31	53		2.11	24.5	23.8	5.8	0.47	43	4.9	0.06	
HATFORESTS	29.73602	-82.24097	06/06/18	ACEPD	HC trib	0.08	0.065	1.7	1.7	0.64	0.542	0.603		6.51		4.04	64.4		13.00	23	23.3	8.4	0.54	39	3.7	0.06	
HATFORESTN	29.73712	-82.23959	06/06/18	ACEPD	HC trib	0.03	0.02	1.4	1.4	0.033	0.016	0.033		4.43		3.78	51.1		1.66	23	24.3	4.8	0.27	41	3	0.05	
SCHULTZ BRIDGE	29.7355	-82.23055	06/06/18	ACEPD	HC trib	0.02	0.024	1.2	1.2	0.077	0.046	0.062		5.24		5.84	98.1		2.67	22	23.2	8.3	0.55	45	16	0.06	
HAT225DS	29.73428	-82.27665	06/06/18	ACEPD	Hatchet Creek	0.02	0.005	1.2	1.2	0.048	0.022	0.038		3.08		4.35	51.9		2.15	23	23.6	5.9	0.32	43	3.9	0.08	
IFASETRIB	29.7421	-82.25523	07/03/18	ACEPD	HC trib	0.24	0.055	2.9	2.9	2.16	2.11			0.61		5.32	129		4.93	25	24.8	20	1.20	37	4.7	0.08	
IFASWTRIB	29.73908	-82.27094	07/03/18	ACEPD	HC trib	0.05	0.031	1.7	1.7	0.583	0.497			4.79		5.27	68.8			27	25.5	8.5	0.99	25	6.3	0.07	