ECT Environmental Consulting & Technology, Inc.

3701 Northwest 98th Street, Gainesville, Florida 32606-5004

Newnans Lake Improvement Initiative: Phase I

Alachua County Environmental Protection Department
Gainesville, Florida

December 2017

ECT No. 160447/160705/160706

Complex Challenges . . . *PRACTICAL SOLUTIONS*

Document Review

The dual signatory process is an integral part of Environmental Consulting & Technology, Inc.'s (ECT's) Document Review Policy No. 9.03. ECT documents undergo technical/peer review prior to dispatching these documents to any outside entity.

This document has been authored and reviewed by the following employees:

Jennifer Mathia, MMM
Author

Signature

December 20, 2017
Date

Angelique M.K. Bochnak, Ph.D., PWS
Peer Review

Signature

December 20, 2017
Date

Acknowledgements

This report could not have been accomplished without significant contributions from the following individuals. These individuals have provided significant technical insight, field sampling support, project input, laboratory analysis, method development, technical writing, and peer review.

Environmental Consulting & Technology, Inc.

Sara Miller
Sam Arden
Chris Mickler, P.E.

Alachua County Environmental Protection Department

Robin Hallbourg
Greg Owen
Alexandria Whann

University of Florida

Todd Osborne
Eban Bean

*Funding for this project was provided through a legislative appropriation. The appropriation was administered through the Florida Department of Environmental Protection (FDEP) Bureau of Water Resource Restoration though Grant agreement LP01010 beginning in state fiscal year 2015/2016.

Table of Contents

Table of Contents (Continued, Page 2 of 4)

Table of Contents (Continued, Page 3 of 4)

Table of Contents (Continued, Page 4 of 4)

List of Tables

List of Tables (Continued, Page 2 of 2)

List of Figures

List of Figures (Continued, Page 2 of 4)

List of Figures (Continued, Page 3 of 4)

List of Figures (Continued, Page 4 of 4)

List of Acronyms and Abbreviations

#/100 mL	number per 100 milliliters
µmhos/cm	micromhos per centimeter
ACEPD	Alachua County Environmental Protection Department
AIP	apatite inorganic phosphorus
ANOVA	analysis of variance
BMAP	basin management action plan
BOD	biochemical oxygen demand
cfs	cubic foot per second
cm	centimeter
CMP	corrugated metal pipe
DEM	digital elevation model
DIW OPO_4	deionized water-extractable phosphorus
DO	dissolved oxygen
ECT	Environmental Consulting & Technology, Inc.
EMC	event mean concentration
EPA	U.S. Environmental Protection Agency
ET	evapotranspiration
F.A.C.	Florida Administrative Code
F.S.	Florida Statutes
FAWN	Florida Automated Weather Network
FDEP	Florida Department of Environmental Protection
FLUCCS	Florida Land Use, Cover and Forms Classification System
ft	foot
ft msl	foot above mean sea level
ft/s	foot per second
ft^2	square foot
ft^3	cubic foot
g/cm^3	gram per cubic meter
GIS	geographic information system
GNV	Gainesville Regional Airport
GPS	global positioning system
GRS	Gum Root Swamp
GRU	Gainesville Regional Utility

List of Acronyms and Abbreviations (Continued, Page 2 of 3)

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
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 several phases. Phase I, funded by FDEP, consists 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 are 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.

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 last several decades, however, water quality in Newnans Lake has declined, 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).

The purpose of the NLII is to develop effective strategies to reduce nutrient loads (nitrogen and phosphorus) to Newnans Lake to improve 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. To accurately address sources of nutrients, work in the LHC sub-basin was divided into two projects:

1. Water Quality Improvement of Little Hatchet Creek
2. Water Quality Improvement of Gum Root Swamp

Project 1 was designed to address known problem areas within the stream channel of LHC. The specific purpose of this project is to develop design projects to restore eroded sections of the stream channel to the extent possible to reduce phosphorus loads. Phosphorus loading via LHC is associated with exposed Hawthorn in areas of the creek channel impacted by anthropogenic activities and land development dating back to the 1940s, when the Gainesville Regional Airport (GNV) was constructed. Project 2 focused on improving the understanding of how Gum Root Swamp (GRS) interacts with LHC and Newnans Lake. Specifically, this project aimed to improve our understanding of the phosphorus dynamics within the wetland and characterize the extent of the high-phosphorus sediment deposition from the Hawthorn.

Based on the findings detailed in this report, projects were identified for both LHC and GRS to restore the ecosystem, reduce nutrient loading to Newnans Lake, and achieve TMDL goals. The long history of nutrient loading and source evaluation in the LHC sub-basin has resulted in an array of project considerations aimed at accomplishing these goals. As part of this work, nine projects are evaluated to determine feasibility given the conditions encountered in the project area, best available knowledge, and practicability with concern to cost, construction, and overall benefit as related to project objectives.

Based on the findings presented in this report, the elevated phosphorus loading to GRS and ultimately Newnans Lake is due to a number of related factors, both chemical and physical in nature. Development has occurred in the contributing basin, increasing peak stormflows, which are delivered into an altered and highly incised creek, the LHC impacted segment. Owing to the unique geology of the project area, this fairly typical example of urban stream syndrome is compounded by the increased exposure of naturally occurring phosphatic geologic materials, which the findings of this project implicate as a likely source of phosphorus loading to the lake.

Accordingly, the proposed projects described in the following paragraphs either address this loading directly, indirectly through hydrologic restoration, or both. These proposed projects address loadings in LHC but do not appreciably address the loadings associated with GRS. The phosphorus loads from hot spots in GRS are diffuse and, as such, are difficult to target for treatment. Based on the present findings, the best course of action for GRS may be further investigation into high phosphorus concentrations measured in the northern portion of GRS, investigating those hydrologic connections, and addressing the potential sources. These potential sources include the former landfill, as well other regions in the LHC sub-basin where it is likely Hawthorn material has been exposed and transported by a variety of actions, including routine excavation and earth-moving activities.

Considering the greatest effective reduction in phosphorus loads to Newnans Lake as well as practicability, a permeable reactive weir (PRW) in-stream baseflow treatment was estimated to provide the most direct benefit. This project is recommended in conjunction with other restoration projects to increase the longevity of effective treatment and bolster phosphorus load reduction. With continued sedimentation and Hawthorn weathering occurring in the LHC channel, the long-term effectiveness of PRWs in-stream baseflow treatment project will be reduced due to continued sedimentation. As such, a restoration project option, referred to as the LHC impacted segment restoration (Alternative 3 with targeted channel widening and bank stabilization), is recommended to reduce sediment scouring in conjunction with stormwater improvements at the GNV known as GNV stormwater improvements (sedimentation project) to reduce further sediment transport downstream. The combination of these four projects results in a total 10-year cost estimate of $4,042,000 and resulting cost benefit of $206 per pound of TP removed and $60 per pound of TN removed.

Based on these recommendations, it is reasonable to conclude that these recommended projects will attenuate the majority of the 2,570 pounds per year of TP loading associated with Hawthorn exposure in LHC. While this clearly helps to meet the objective of the TMDL TP annual load for the LHC sub-basin, GRS remains a challenge. Since these two loadings are largely hydrologically independent, it is unlikely projects successful in LHC will appreciably decrease phosphorus loadings from GRS.

1.0 Introduction

On July 1, 2016, Alachua County Environmental Department (ACEPD) commissioned Environmental Consulting and Technology, Inc. (ECT), to complete projects associated with Phase I 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 I, funded by the Florida Department of Environmental Protection (FDEP), consists 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 are 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.

This report provides a summary of LHC and its connection to Newnans Lake, a synopsis of previously and newly collected data, detailed conclusions of studies conducted under Phase I, and potential project solutions 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: Hatchet Creek (HC), LHC, and Lake Forest Creek. HC 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. LHC (the focus on Phase I of the NLII) and its tributaries drain the northeastern side of urban Gainesville, Gainesville Regional Airport (GNV), and natural wetland areas of Alachua County into Newnans Lake. Lake Forest Creek is directly west of Newnans Lake and is mostly residential land use. Once water leaves Newnans Lake, approximately 45 percent of the

M:\acad\2016\160706\Site.mxd NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic unash 6/23/2017 2:16:41 PM

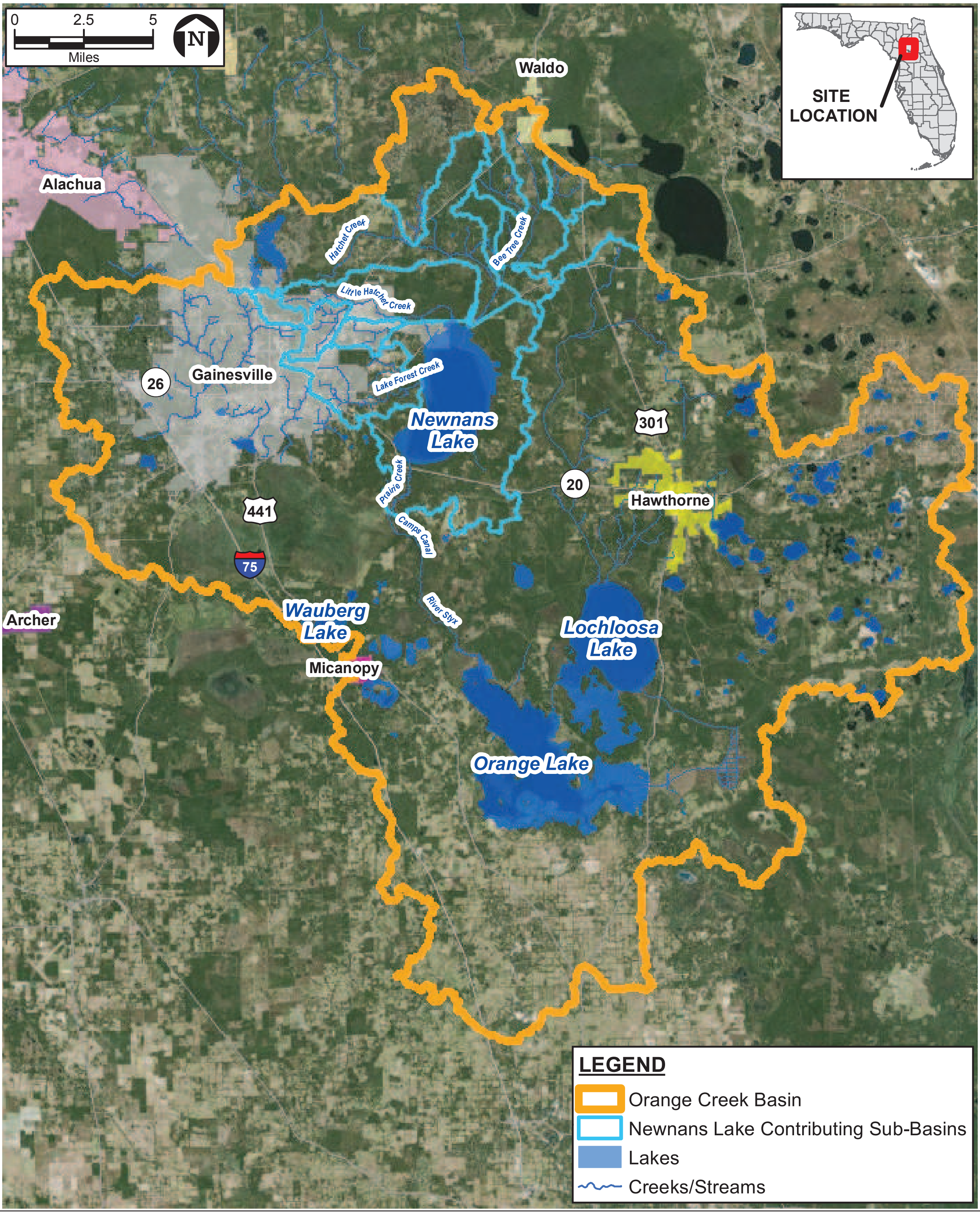


FIGURE 1-1.
NEWNANS LAKE SITE LOCATION
WITHIN ORANGE CREEK BASIN

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

ECT Environmental Consulting & Technology, Inc.

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).

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 last several decades, however, water quality in Newnans Lake has declined, and 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 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 exacerbated due to the extreme fluctuation in the lake's water levels over the past 20 years. Historically low water observed in more recent decades are thought to contribute to the elevated nutrient concentrations that continue to be observed. 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 was 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.

M:\acad\2016\160706\TMDL.mxd NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic unash 7/19/2017 8:20:42 AM

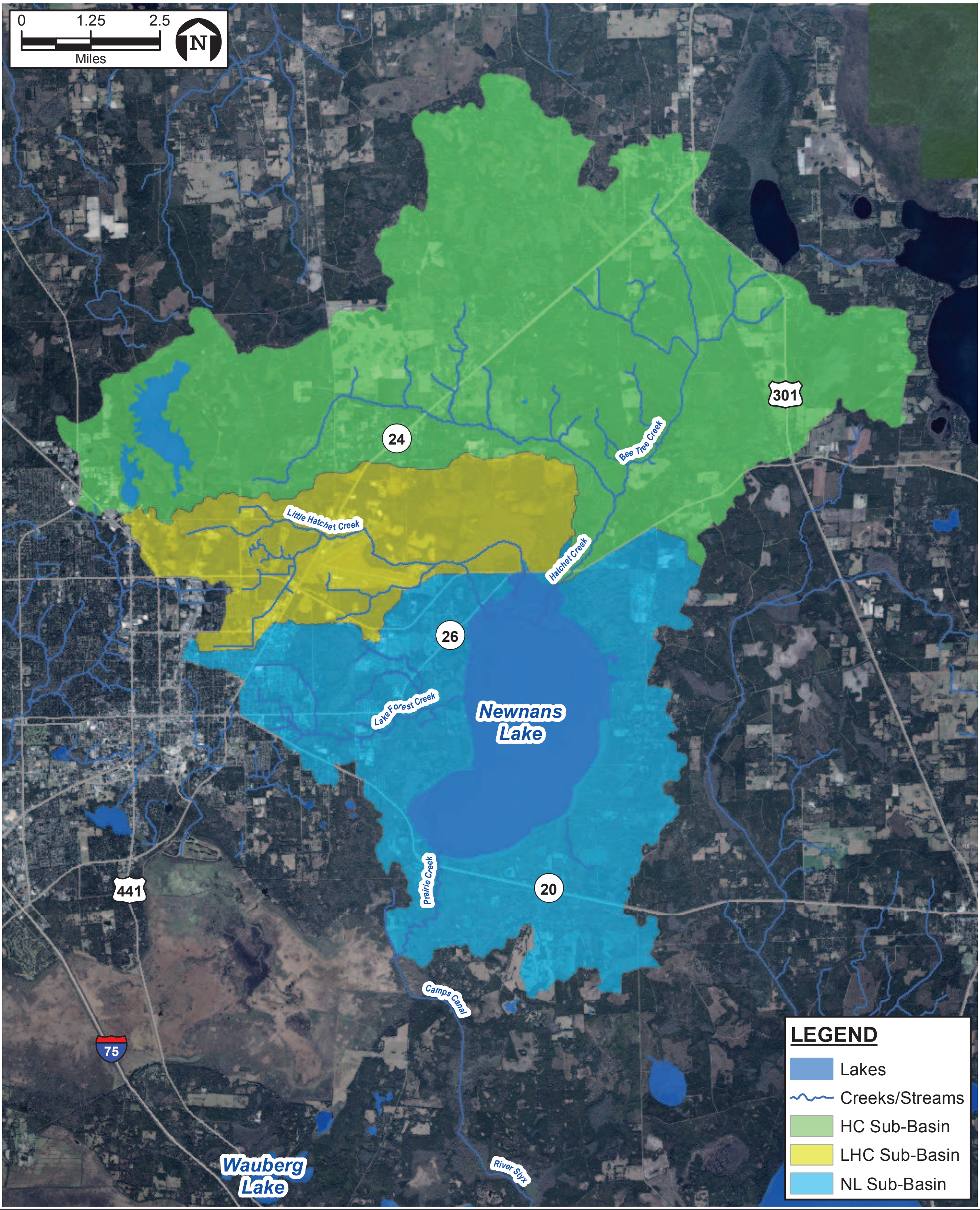


FIGURE 1-2.
TMDL AND BMAP SUB_BASINS
WITHIN NEWNANS LAKE WATERSHED

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

ECT Environmental Consulting & Technology, Inc.

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 is under final development, 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)

During Phase I of the NLII, quarterly stakeholders' meetings were held with selected partners from these lists that have direct load allocation or regulatory responsibility in Newnans Lake. These meetings were to provide information on the progress of Phase I and solicit feedback on the proposed projects and ways to improve them for the benefit of all stakeholders.

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. To accurately address sources of nutrients, LHC sub-basin was divided into two projects: (1) Water Quality Improvement of Little Hatchet Creek, and (2) Water Quality Improvement of Gum Root Swamp (Figure 1-3). The two projects included in Phase I are described in the following subsections.

1.2.1.1 Project 1: Water Quality Improvement of LHC

Project 1 was designed to address known problem areas within the stream channel of LHC. The specific purpose of this project is to develop design projects to restore eroded sections of the stream channel to the extent possible to reduce phosphorus loads. Phosphorus loading via LHC is associated with the exposed Hawthorn in areas of the creek channel impacted by anthropogenic activities and land development dating back to the 1940s, when GNV was constructed (McCarthy, 2011).

This project included the following major tasks:

1. Collect and review existing literature and data on the historical and current conditions of LHC.
2. Conduct a detailed stream survey of the impacted segment of LHC north of GNV where the channel has cut into the Hawthorn creating a continuous phosphorus source.
3. Update the existing Interconnected Channel and Pond Routing (ICPR) model for the LHC sub-basin to improve the overall understanding of the volume and velocity of storm event flows in the Section of the channel that runs north of GNV.
4. Identify ways to reduce the volume and velocity of storm event flows modeled.
5. Propose options to reduce erosion of the phosphatic sediments and restore the channel profile and streambanks to the extent possible while reducing nutrient loading.

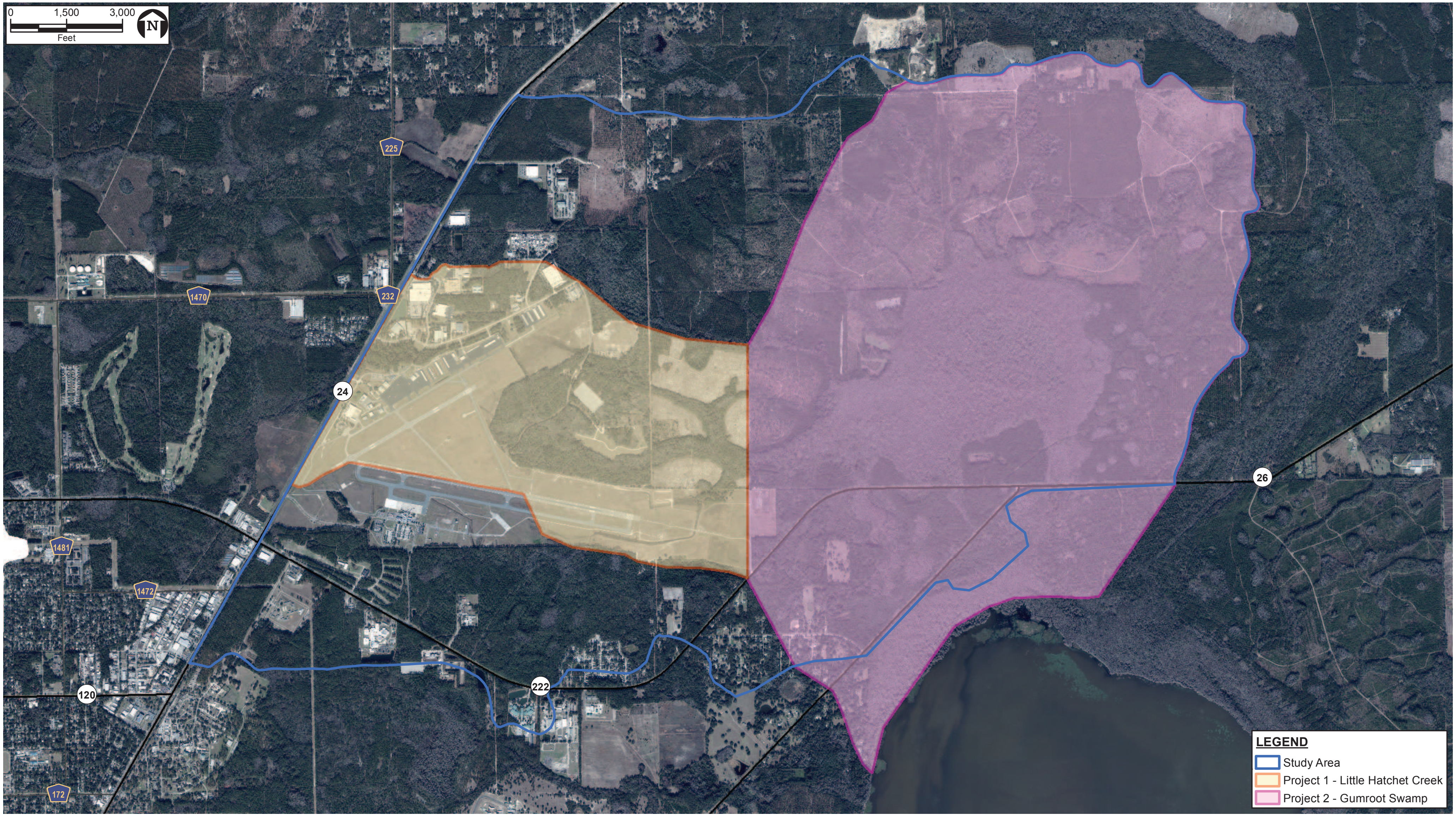


FIGURE 1-3.

PROJECT AREAS
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: Alachua County, 2016; FDOT, 2016, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

6. Identify options to address excessive sedimentation and enhance selected wetland areas for nutrient retention downstream of GNV.
7. Identify and evaluate the potential alternative advanced technologies for enhancing phosphorus reduction from LHC.

1.2.1.2 Project 2: Water Quality Improvement of GRS

Project 2 focused on improving the understanding of how Gum Root Swamp (GRS) interacts with LHC and Newnans Lake. Specifically, this project aimed to improve our understanding of the phosphorus dynamics within the wetland and characterize the extent of the high-phosphorus sediment deposition from the Hawthorn.

This project included the following major tasks:

1. Collect and review existing literature and data on the historical and current conditions of GRS.
2. Determine the phosphorus concentrations in the soils of GRS spatially across the landscape.
3. Characterize both the spatial impact of high-phosphorus loading as well as the total depth of high-phosphorus deposition from the mobilized Hawthorn.
4. Identify the biogeochemical controls on phosphorus dynamics by determining the phosphorus release or uptake rates within GRS.
5. Quantify the mass phosphorus loading in and out of GRS.
6. Develop a water budget that takes into account the inflows and outflows of the swamp and its interactions with LHC and Newnans Lake.
7. Identify and evaluate potential phosphorus treatment options and alternative advanced technologies for enhancing the reduction of phosphorus exporting the soils from GRS.

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). The precise flow paths and connectivity of the creek and swamp systems within the NLW are poorly understood and are the subject of explorative modeling conducted for this project, as discussed in Sections 2.4 and 3.5. 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.

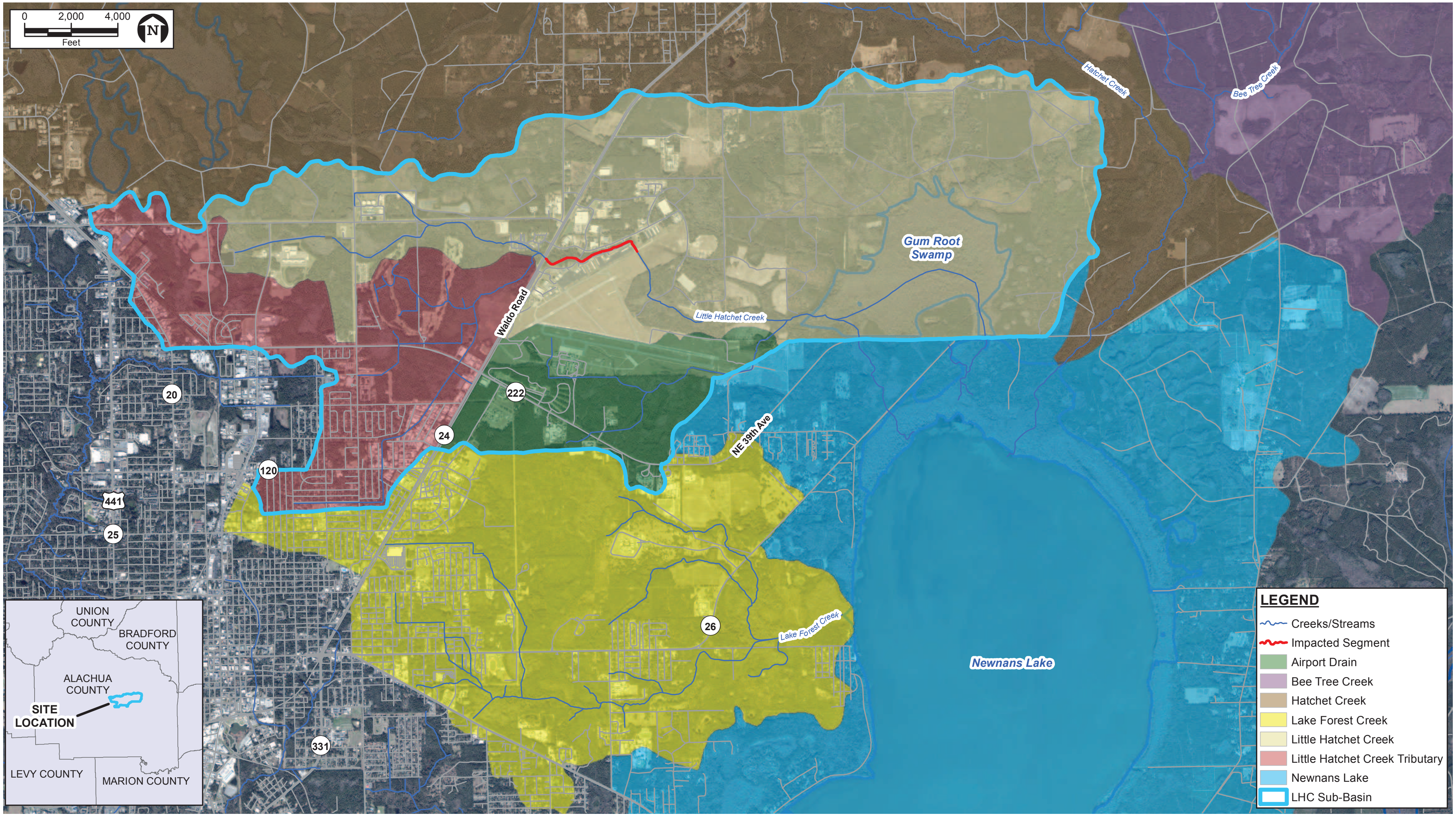


FIGURE 2-1.

CONTRIBUTING DRAINAGE BASINS
LITTLE HATCHET CREEK

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

ECT Environmental Consulting & Technology, Inc.

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

2.1.1 LHC Sub-basin

For the purposes of this work, the LHC, GRS, and Airport Drain sub-basins are combined into a single sub-basin (LHC sub-basin) to maintain consistency with the 2003 TMDL report (Figure 2-2). LHC is a blackwater stream with naturally high color and covers an area of 10,800 acres in the Northern Plains Division in the Ocala Uplift District. Portions of the creek remain in a relatively natural condition, while other sections have been manipulated to meet the needs of stormwater drainage, particularly in the western portion and at GNV. Changes in the geomorphology of the streambanks are discussed in Section 3.2.

The north branch of LHC intercepts GRU's Murphee Well Field at the western extent of the creek and passes through Ironwood Golf Course as it moves east. Tributaries to the north branch of LHC lie within the majority of the urban land use that is found within the sub-basin, running north from the eastern boundary of Gainesville toward the northern branch by Ironwood Golf Course near Brittany Estates. Once at Brittany Estates, the north branch receives flow from a tributary that drains Brittany Estates. This tributary also receives effluent from the Brittany Estates wastewater treatment facility, a 0.06-million-gallons-per-day (MGD) plant designed to reduce biological oxygen demand (BOD), TN, and TP loads coming from the mobile home park. The north branch then flows under Northeast SR 24 (C1 on Figure 2-2). From there, it flows east before reaching GNV property, where the creek becomes channelized. The south branch of LHC lies south of GNV property, where two tributaries flow east before merging at approximately the southeast corner of GNV property (Figure 2-2). The confluence of the north and south branches lies east of GNV property, where the creek becomes extremely sinuous and can be better characterized as braided or shallow diffuse flow, depending on rainfall conditions and the location.

Once merged at the southwestern side of GRS, LHC splits into the West Branch and East Branch. The West Branch flows south through a culvert under 39th Avenue/CR 222 (C2, Figure 2-2) into Gainesville's Gum Root Conservation area, then through another culvert under SR 26 (C3, Figure 2-2) before reaching the Newnan's Lake floodplain. Water from LHC that

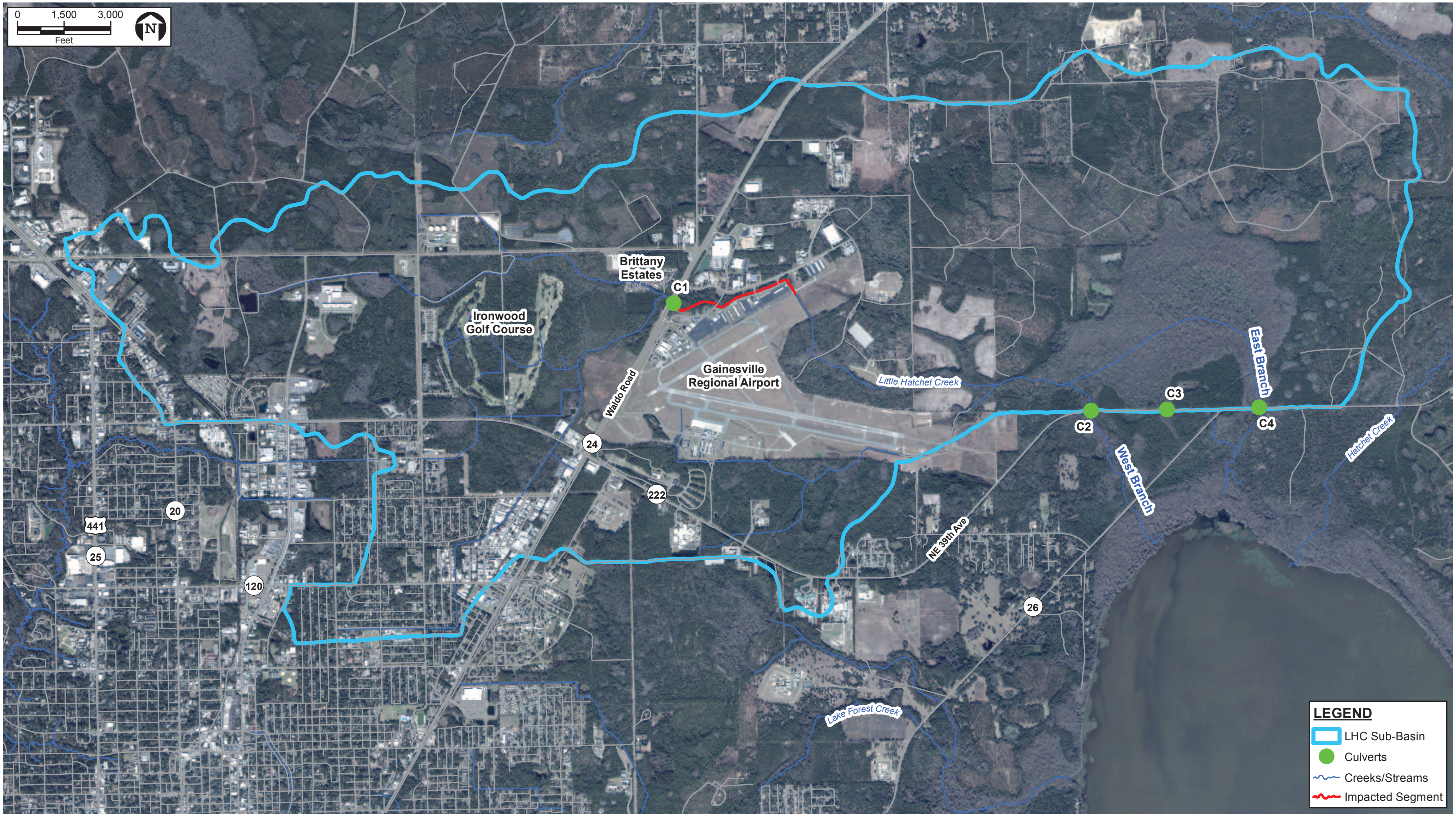


FIGURE 2-2.

SITE FEATURES
LITTLE HATCHET CREEK

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

ECT Environmental Consulting & Technology, Inc.

makes it to the East Branch must first cross the southern portion of GRS, north of CR 222. The East Branch combines this flow with flow from GRS to the north and then flows under SR 26 (C-4, Figure 2-2).

More details on the discernment of flow paths and connectivity in the sub-basin are discussed in Section 2.4.

2.2 Land Use and Land Cover

Based on 2004 land use as developed by SJRWMD, major land uses in the NLW include upland forest (52 percent), wetlands (23 percent), and urban/utilities (Figure 2-3). The combined LHC sub-basin contains the second-largest portion of utilities and urban land use in the NLW (Table 2-1). Considering that, by area, the combined LHC sub-basin comprises 25 percent of the NLW, studying this combined sub-basin as a single hydrologic unit begins to bear a greater importance than the level of attention that may be given to other individual portions (GRS, LHC, and Airport Drain) based on land use attributes.

Table 2-1. NLW Major Sub-basins Land Use Distribution Extent

Land Use	LHC Sub-basin			Newnans Lake	HC	HC Tributary	Bee Tree Creek	Lake Forest Creek
	Airport Drain	LHC	LHC Tributary					
Urban/utilities	52%	14%	47%	7%	11%	7%	6%	38%
Agriculture/pasture	0%	1%	0%	6%	3%	1%	5%	10%
Upland nonforested	2%	1%	7%	1%	1%	1%	6%	3%
Upland forested	38%	58%	33%	37%	60%	60%	67%	27%
Water	1%	<1%	1%	28%	<1%	<1%	<1%	<1%
Wetlands	7%	25%	12%	20%	24%	30%	17%	22%
Barren	0%	<1%	<1%	0%	<1%	<1%	0%	<1%

Source: ECT, 2017.

Nutrient concentrations in the LHC sub-basin are confounding at first glance, since more than 70 percent of the land area is in upland forest and wetland land uses, which are typically protective of water quality. Land use does not appear to control phosphorus concentrations in the NLW; however, phosphorus concentrations covary with concentrations of fluoride and are well predicted by proximity of the sampling location to the Hawthorn (Cohen *et al.*, 2008). These

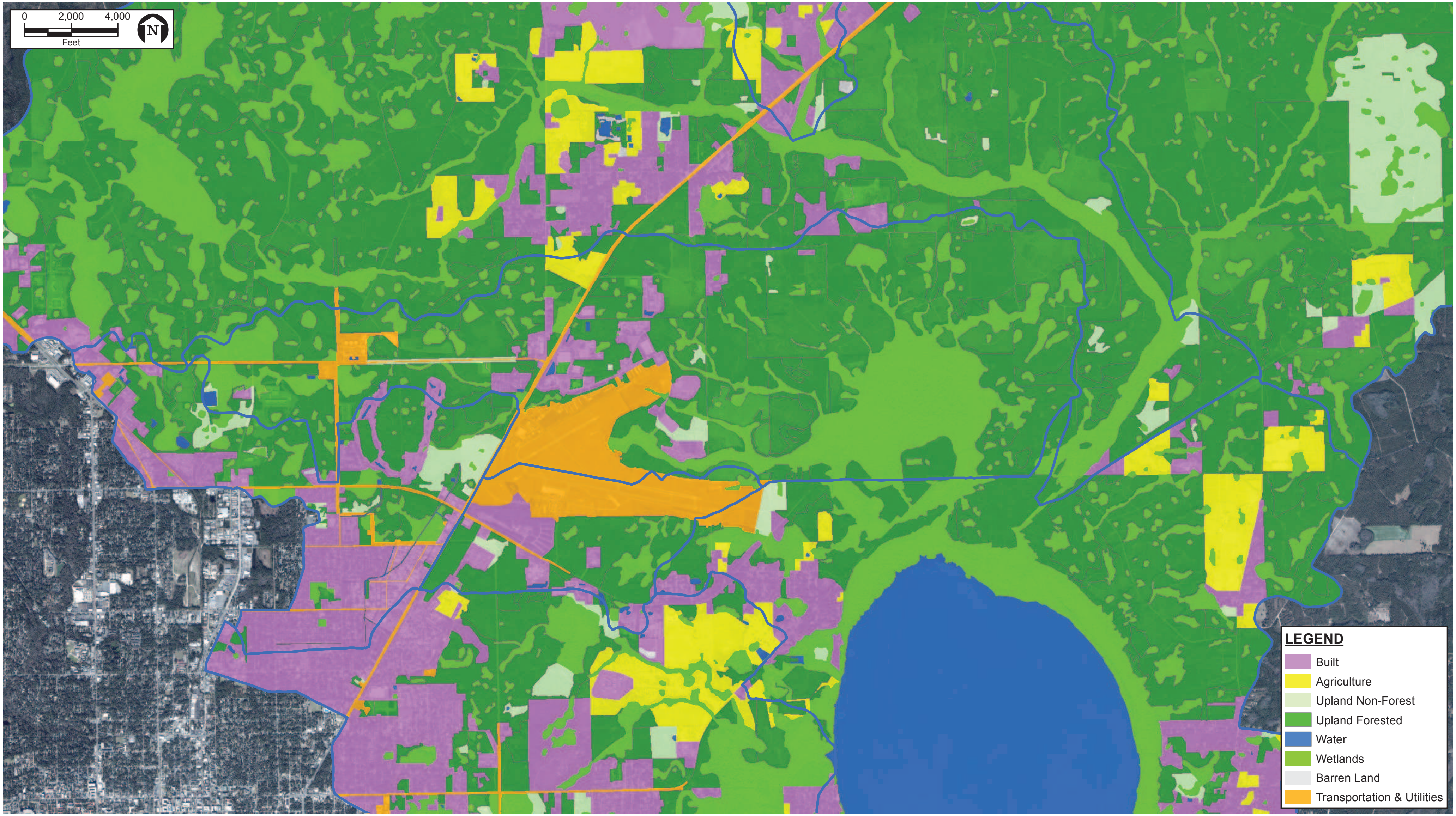


FIGURE 2-3.

LAND USE / LAND COVER
LITTLE HATCHET CREEK

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

ECT Environmental Consulting & Technology, Inc.

findings indicate a portion of the phosphorus load to Newnans Lake is derived from the Hawthorn. Since transport details required for addressing this load through management are unknown, these details are an objective of this project. While land use is unlikely to control phosphorus concentrations, examining land use may serve well to determine a vector for phosphorus delivery. Monitoring data and field observations indicate substantial flashiness in the hydrograph at locations that drain primarily developed regions (LHC and Airport Drain). Based on multiple field observations of incision and exposure of suspected Hawthorn in the LHC sub-basin, land use and associated development is likely to have increased peak flows of water delivered to the LHC sub-basin, as well as maximum velocities, resulting in increased scouring and transport of Hawthorn material.

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 LHC sub-basin and Newnans Lake are within close proximity to the top of the Hawthorn (see Section 2.3.2). 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).

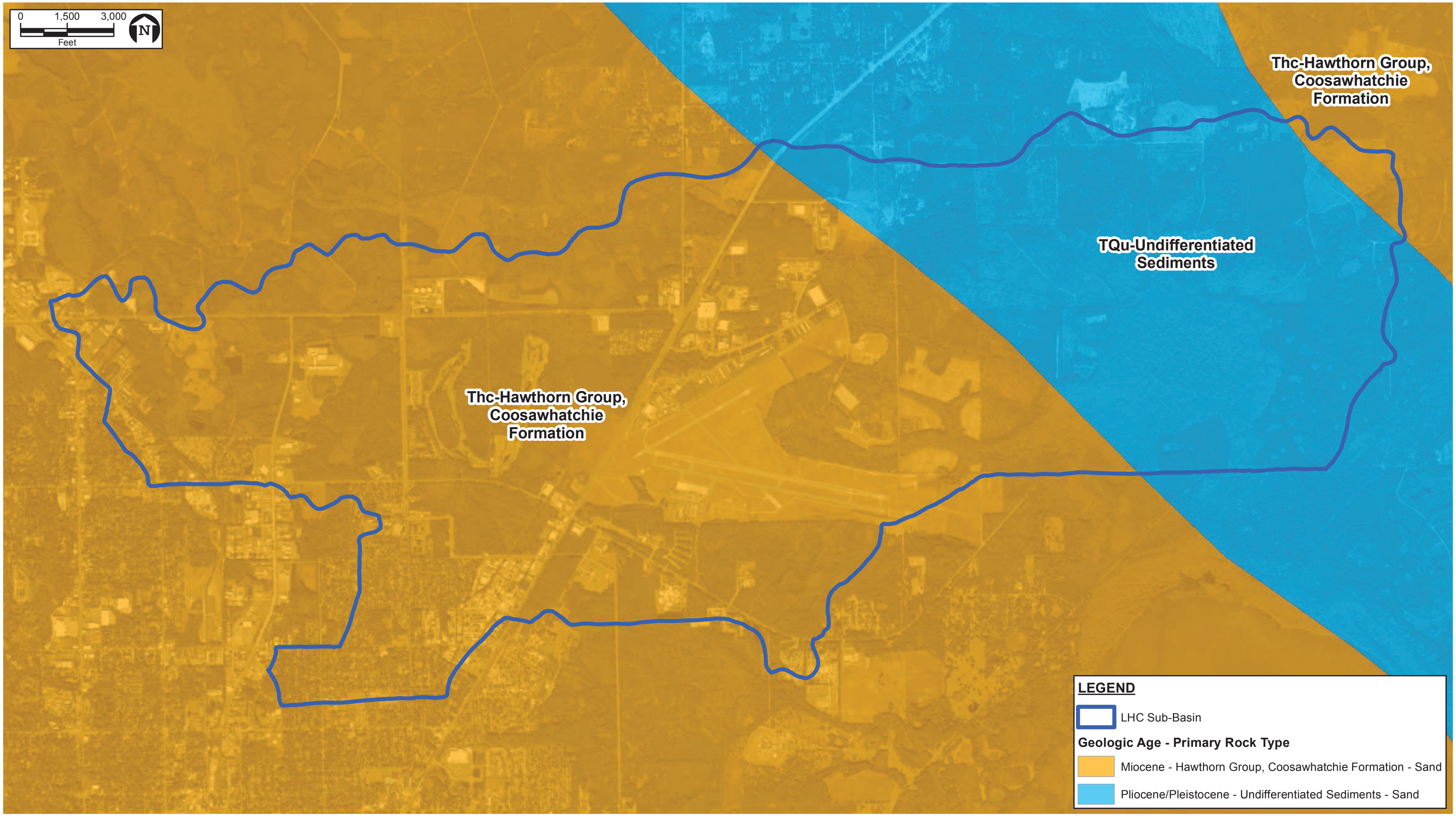


FIGURE 2-4.
GEOLOGIC AGE AND FORMATIONS
LITTLE HATCHET CREEK SUB-BASIN

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

ECT Environmental Consulting & Technology, Inc.

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 LHC 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, LHC is fed by both surface water from tributaries to the north that enter GRS as well as water from the surficial and intermediate aquifers that discharges to LHC during part of the year. This is evidenced by staff gauge observations taken at multiple locations in the LHC sub-basin (Figure 2-7), where levels in LHC appear to be controlled by surface water flows in the dry

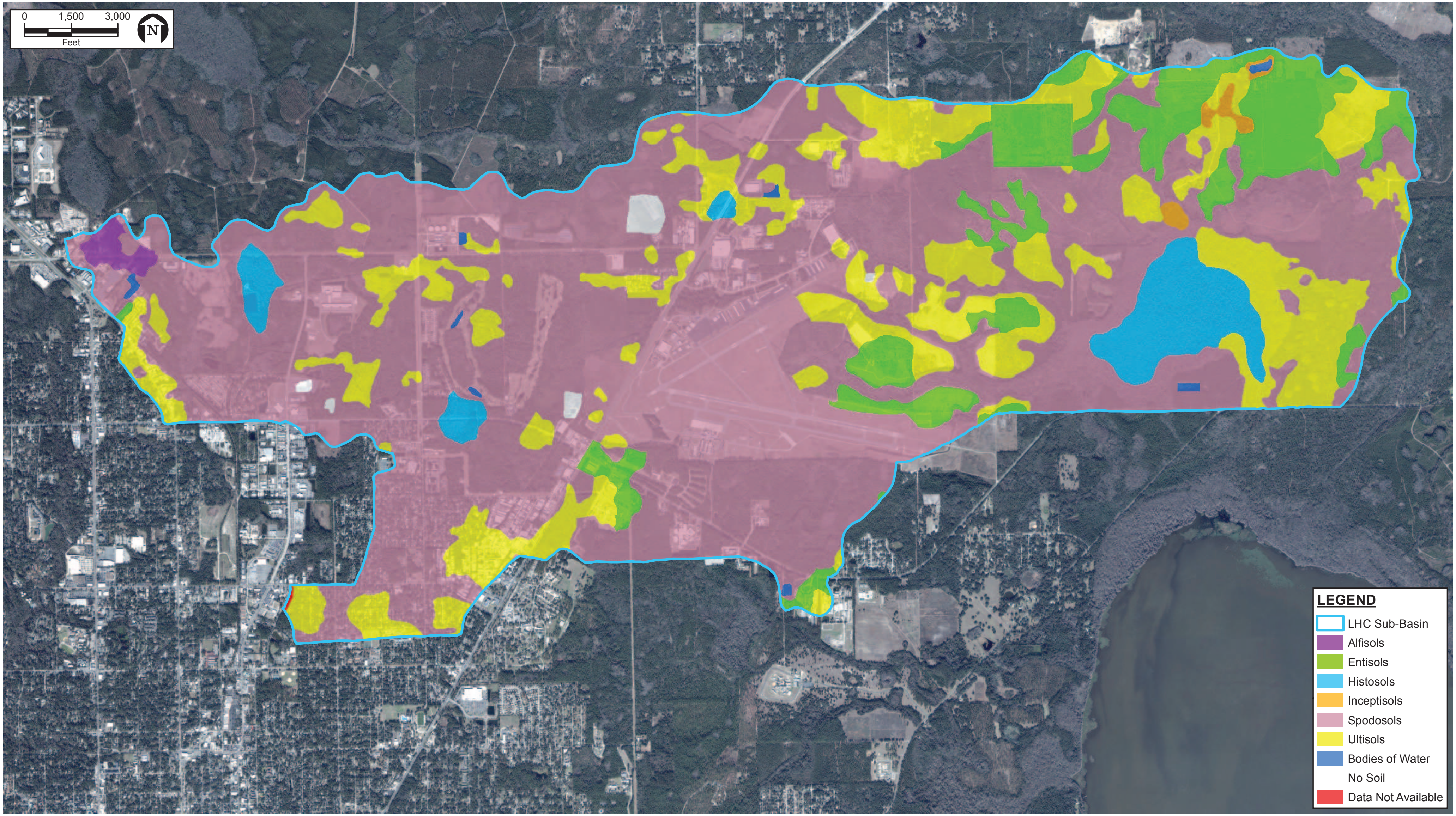


FIGURE 2-5.

SOIL ORDERS
LITTLE HATCHET CREEK

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

ECT Environmental Consulting & Technology, Inc.

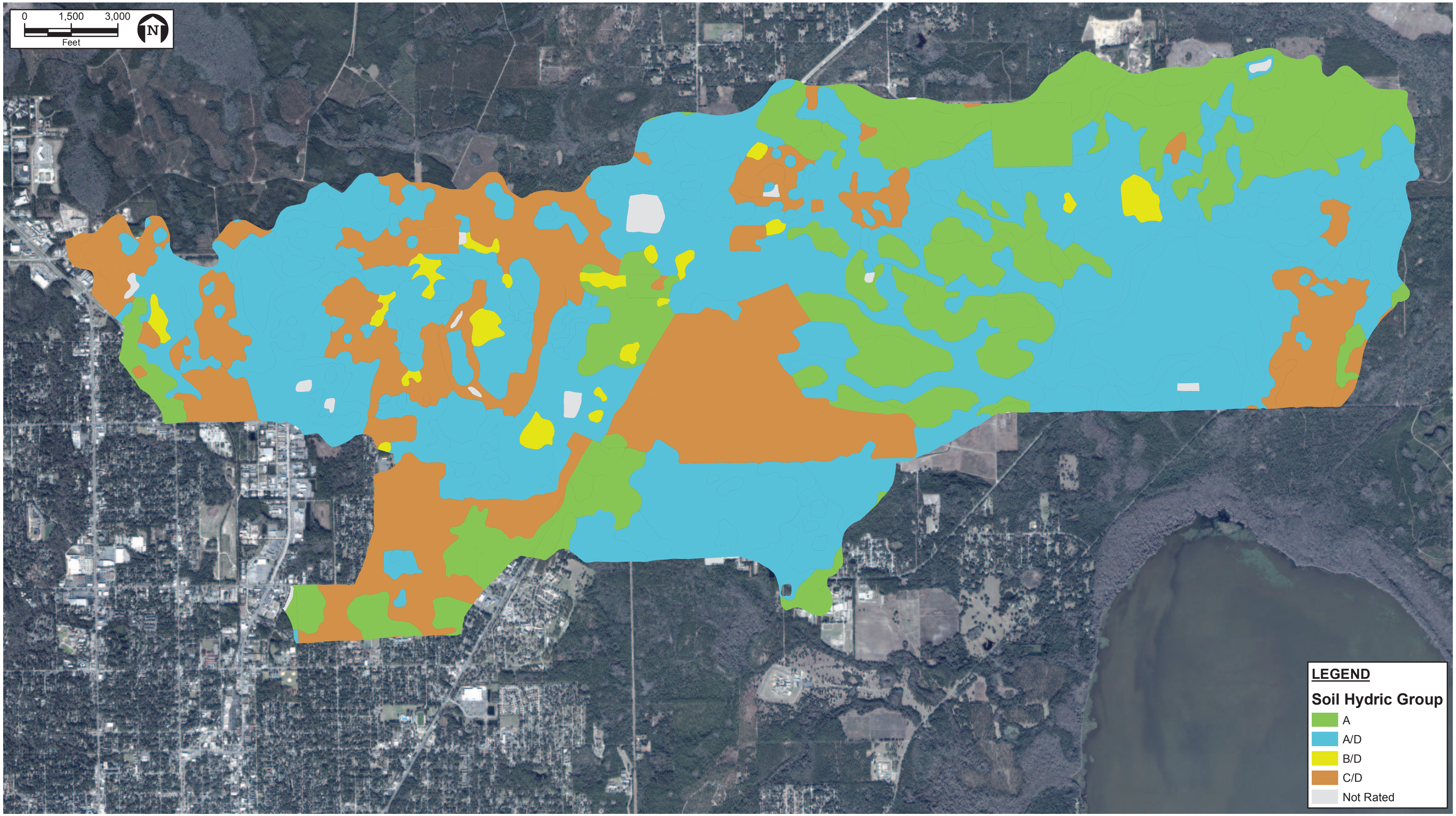
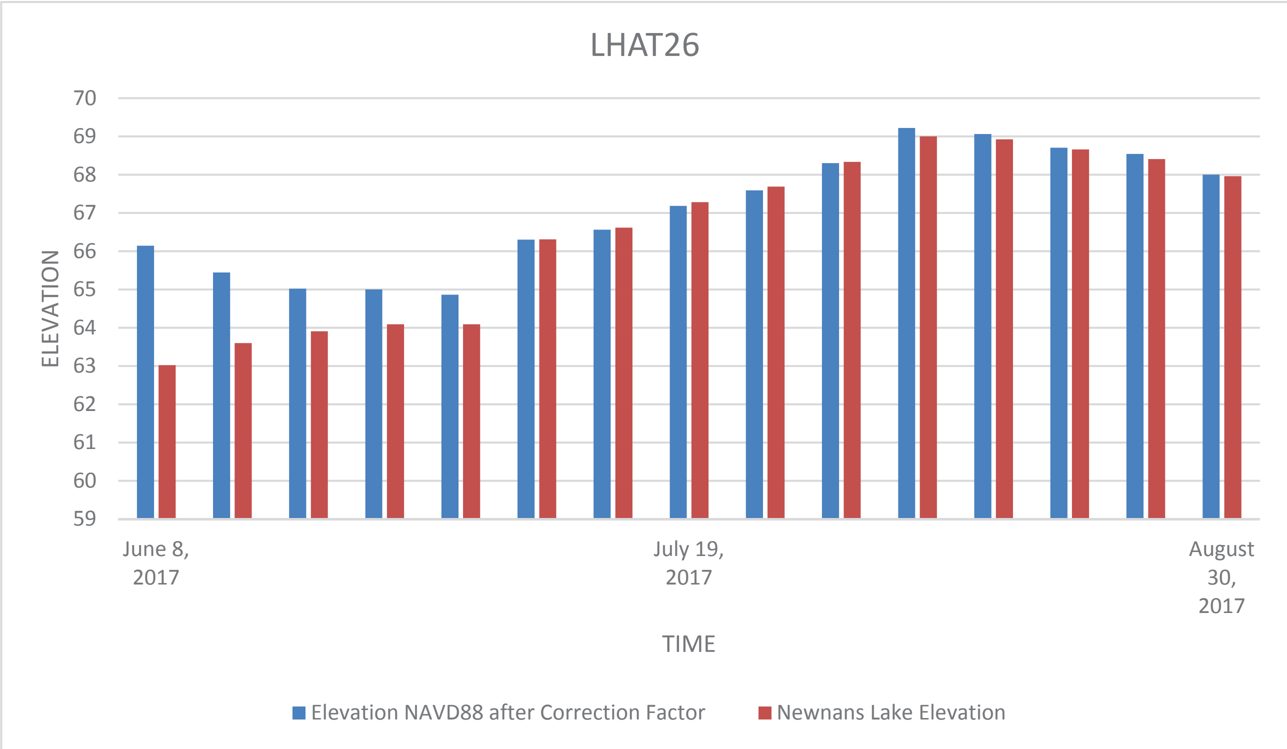


FIGURE 2-6.
SOIL HYDRIC GROUPS
LITTLE HATCHET CREEK

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

ECT Environmental Consulting & Technology, Inc.



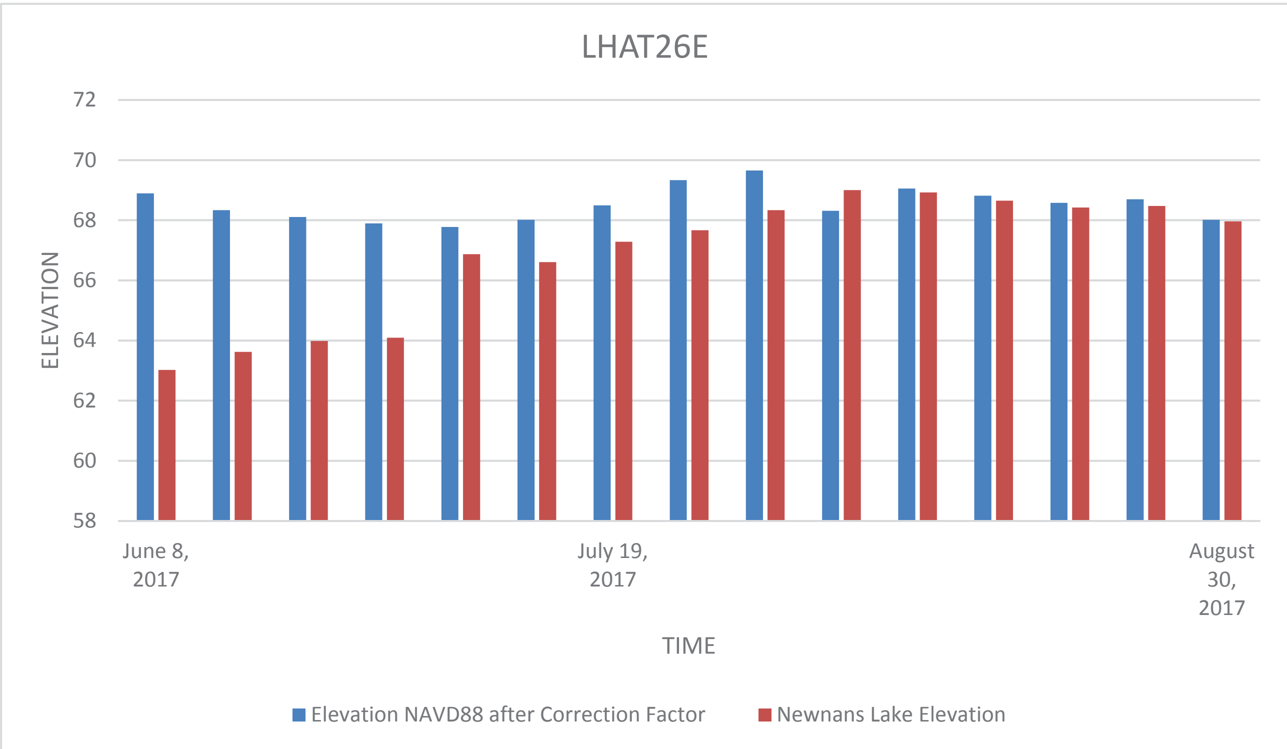


FIGURE 2-7.

STAFF GAUGE OBSERVATIONS IN LHC AND NEWNANS LAKE

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

season (October through May), and water eventually equilibrates with surficial groundwater levels in the wet season (June through September). Water from the creek may locally recharge the surficial aquifer when water levels in the creek are high, especially following flashy intermittent storm events during the dry season.

2.3.1 Topography

The majority of the LHC 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 LHC peak at more than 175 ft above National Geodetic Vertical Datum of 1929 (NGVD 29), gradually sloping toward the lake.

In GRS, the topography is relatively flat with little relief, with a gentle slope at the southern boundary guiding flow to Newnans Lake as the geomorphology transitions from the Northern Highlands to the Central Valley (Hoenstine and Lane, 1991). Newnans Lake represents a topographic low in the area, with elevations less than 60 ft above NGVD 29 (Figure 2-8).

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. Five of these cores are located within the LHC sub-basin and provide an estimation of the nature of the Hawthorn in this region. The greatest depth is found in the northern edge of the sub-basin above GRS, where the depth to Hawthorn measures approximately 25 ft based on visual observation (Figure 2-8). South of this location, depths to the Hawthorn fall to approximately 5 to 10 ft. 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 of the LHC sub-basin; however, whether this phosphorus is derived from retention in the soils of phosphorus

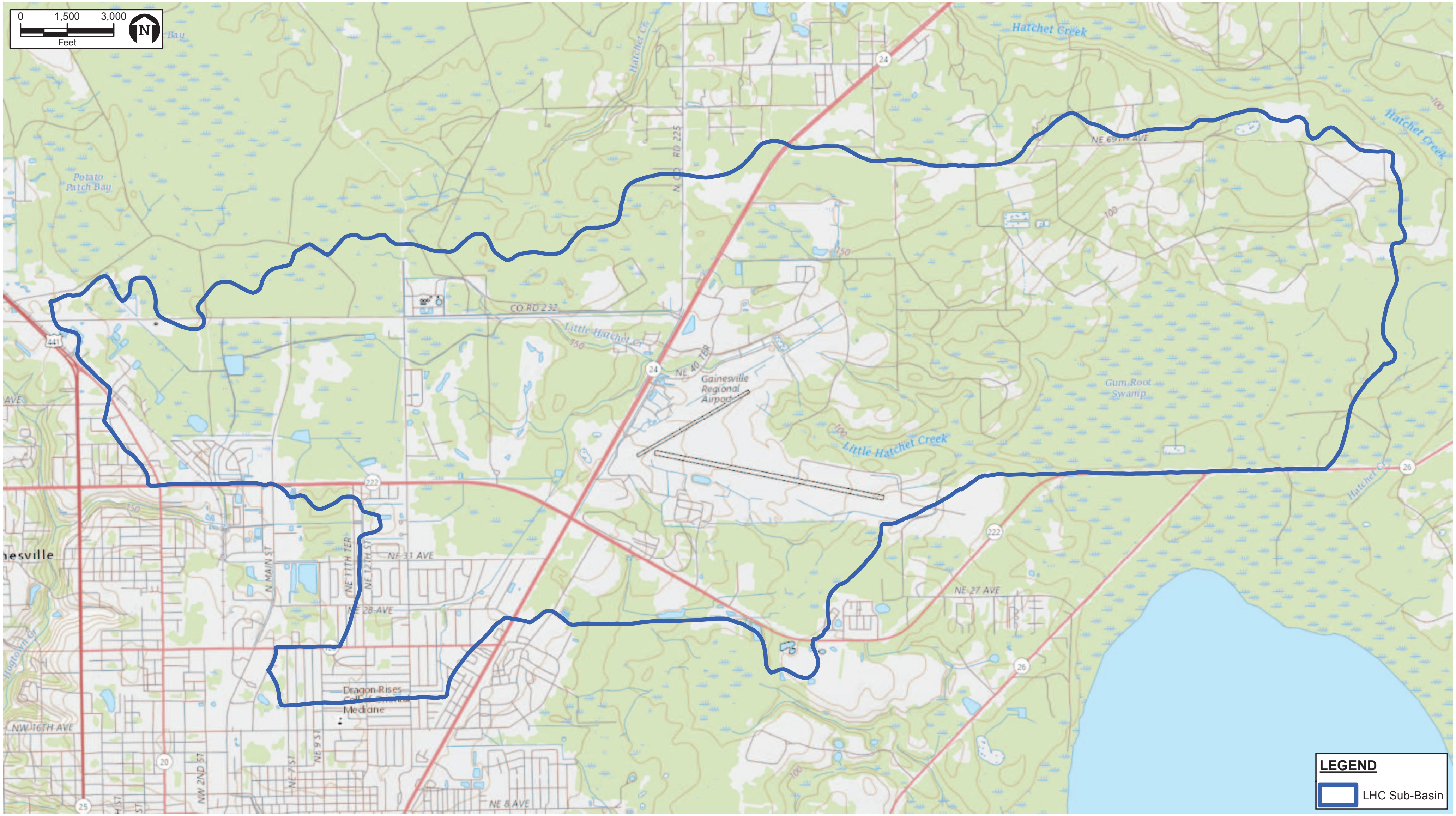


FIGURE 2-8.
TOPOGRAPHY
LITTLE HATCHET CREEK SUB-BASIN

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

ECT Environmental Consulting & Technology, Inc.

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 2-9), and the digital elevation model (DEM) for the sub-basin, the elevation of the Hawthorn can be estimated. This analysis was cross-referenced with creek channel elevations (Section 3.2) to confirm incision into the Hawthorn and estimate the spatial extent of incision. These data, coupled with TP measurements of bank material, are used to estimate potential loads from exposed Hawthorn weathering to LHC.

2.4 Hydrology

The primary surface water features within the LHC sub-basin are LHC and GRS. A number of smaller tributaries feed into GRS, primarily from the largely vegetated areas to the north, though the majority of the flow into GRS arrives via LHC. The LHC sub-basin is characterized by gentle slopes and soils derived from Miocene phosphatic, clayey sands as described in the previous subsection. Although surficial soils are fairly sandy and permeable, connection with deep groundwater is limited, as most of the basin is confined by the Hawthorn.

LHC originates in a watershed west of Waldo Road, draining an area that includes residential (mostly medium density), forested and recreational (one large golf course) land uses (Figure 2-2). The partially developed contributing area to LHC results in streamflow behavior that is a hybrid of flashy urban streams and buffered natural streams. Although considerable evidence exists as to the detrimental effects of development (discussed in the following), analysis of the recent hourly streamflow data indicates a fairly drawn-out hydrograph tail, indicative of an active shallow groundwater component in the basin. From this point on, LHC was rerouted into a "diversion canal" in the early 1940s for construction of runways and taxiways at GNV. A combination of increased impervious surface in the residential areas west of Waldo Road, industrial areas north of GNV, and GNV itself, along with larger and deeper culverts installed in the segment of LHC along the north boundary of GNV, has resulted in considerable channel incision and erosion. This segment is currently characterized by steep (greater than 45-percent slope), unstable banks (visible slope failure), which range from approximately 6 ft high near

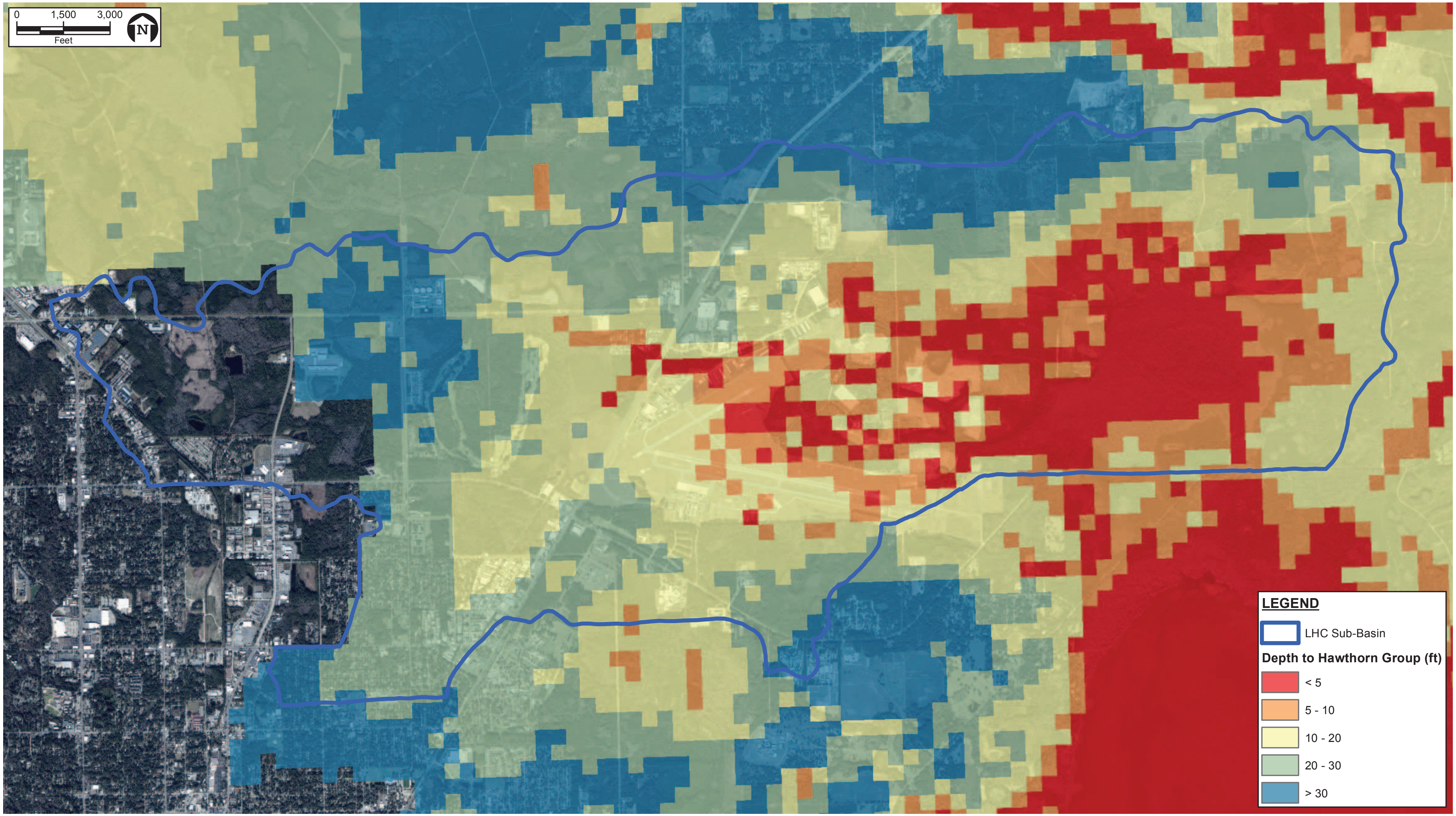


FIGURE 2-9.
DEPTH TO HAWTHORN FORMATION
LITTLE HATCHET CREEK SUB-BASIN

Sources: FDOT, 2017; FDEP, 2016; Alachua Co, 2016; ECT, 2017; Di *et al.*, 2012.

ECT Environmental Consulting & Technology, Inc.

Waldo Road to more than 20 ft high farther downstream. Once to the east side of GNV property, LHC becomes less defined, where it ultimately discharges into GRS. SJRWMD periodically collected daily flow measurements from this location (North Branch, east of GNV) from 1998 to 2003, returning an average flow rate of approximately 2 cubic feet per second (cfs) and a maximum observed flow rate of 28.4 cfs (ACEPD, 2007). Because of the sandy surficial soils and flat topography at the interface of LHC and GRS, surface flow often disappears completely here during dry times.

GRS is characterized by flat topography and vegetation characteristic of periodic inundation. Based on the LiDAR-derived DEM from 2009 (Inwood, 2009), there is one small but defined channel draining the northern tributaries and ultimately turning into the East Branch of LHC. Based on field observations and careful review of the DEM, there appears to be little connection between the West Branch of LHC and the East Branch during periods of low rainfall, with the West Branch carrying the majority of the main stem flow during these times and the East Branch often running dry. Only during periods of heavy rain do shallow groundwater levels rise enough to allow for surface water communication between the east and west sides of GRS and east and west branches of LHC. In addition to greater connection during wet times, flows within the East Branch can become much larger than those in the West Branch. Although not necessarily representative of the range of conditions in these streams, daily streamflow measurements taken by ACEPD from approximately 2000 to 2001 resulted in an average flow rate of 1.13 cfs at the West Branch and 4.00 cfs at the East Branch. However, only 11 measurements were taken at the West Branch and 30 at the East Branch. During the nine times in which flows were taken in both branches on the same day, flows on the East Branch were more than five times higher than those on the West Branch (ACEPD, 2007).

2.4.1 Groundwater

Groundwater within the LHC sub-basin is predominantly perched within a shallow sandy surficial aquifer overlying the Hawthorn. Shallow groundwater flow is lateral and generally follows the local topography, ultimately discharging through the banks of LHC or Newnans Lake. The shallow hydraulic conductivity along the banks of Newnans Lake was previously reported as 23 ft per day (Long, 2009), which is consistent with permeability values reported for

Millhopper and Pomona fine sands, the dominant soil types overlying the Hawthorn within the study area (U.S. Department of Agriculture, 1985).

2.5 Water Quality

The surface water chemistry of the NLW can be described by review of several different studies that investigated nutrients in tributaries to Newnans Lake. Data sources analyzed include, but are not limited to:

- SJRWMD. 2017. Little Hatchet Creek North Branch Surface Water Data (LHATNBWMD station): 10/30/84 to 07/19/17. Data delivery: Downloaded from SJRWMD Database July 2016 and September 2017.
- DB Environmental, Inc. 2017. Sediment Phosphorus Stability in Little Hatchet Creek. For ACEPD. August 31, 2017.
- 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.
- Hydrologic Data Collection, Inc. 2016. Station Monitoring Data: Little Hatchet Creek at SR-24. 2009 to 2016 WY.
- 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 2-10). From these data, mean nutrient concentrations were calculated (Table 2-2, Appendix A).

For the purposes of this investigation, the most important nutrient load to highlight is phosphorus. The FDEP-imposed TP concentration limit on a Class III water body is less than or equal to 0.12 mg/L. All water bodies analyzed exceed this standard with the exception of the tributaries to LHC and the downstream segment of HC (Table 2-2).

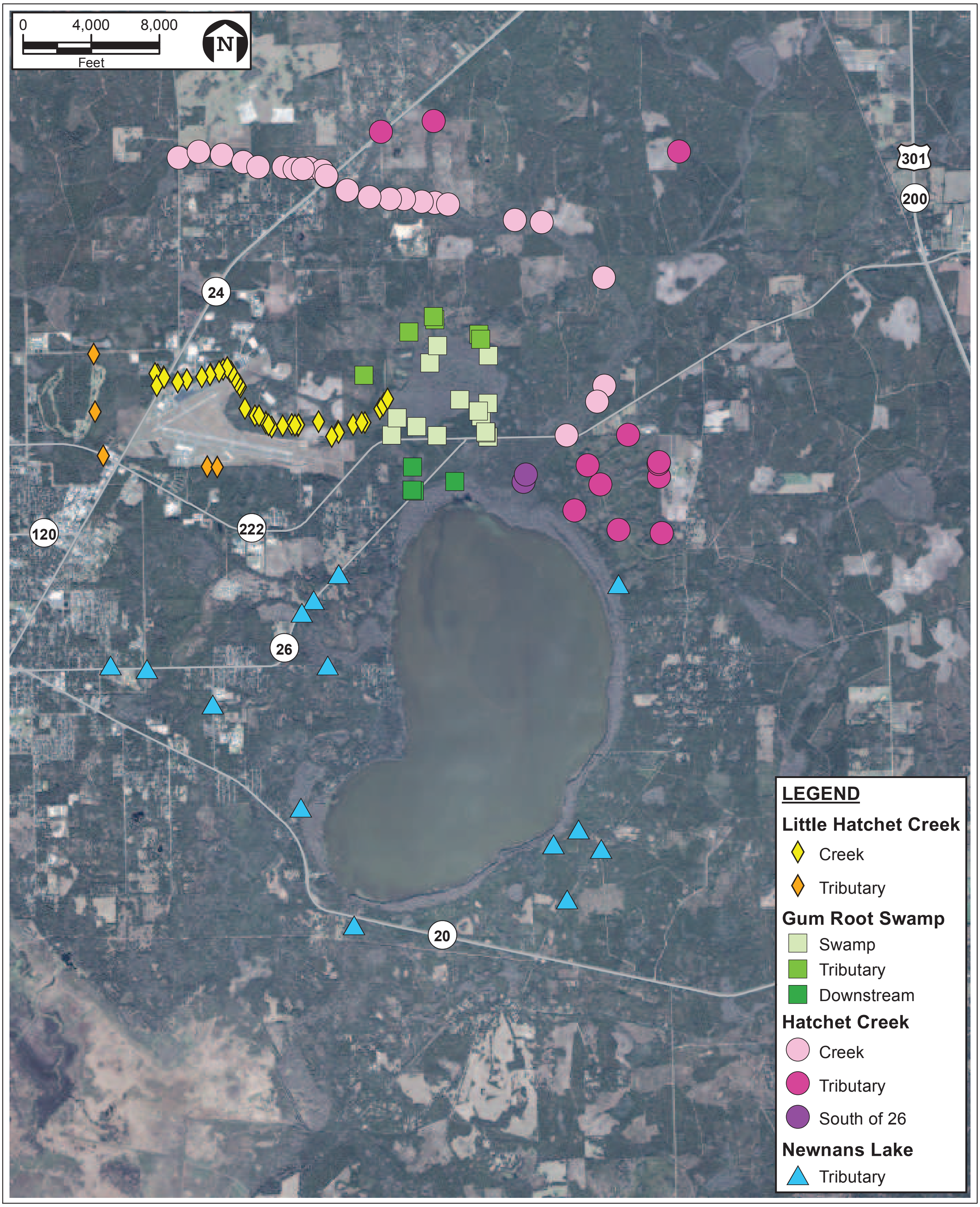


FIGURE 2-10.

SAMPLING LOCATIONS
HATCHET CREEK, LITTLE HATCHET CREEK,
AND GUM ROOT SWAMP

Sources: Alachua County 2016; FDOT, 2017; ECT, 2017; DB Labs 2015, 2016; Cohen, 2008.

ECT Environmental Consulting & Technology, Inc.

Table 2-2. Nutrient Concentrations within Newnans Lake Connected Water Bodies

Nutrient	Units	Hatchet Creek									Little Hatchet Creek						Gum Root Swamp									Newnans Lake Tributary		
		Creek			Tributaries			South of CR 26			Creek			Tributaries			Swamp			Tributaries			Downstream					
		n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD	n	Average	SD
Ammonia	mg/L	214	0.03	0.04	46	0.05	0.08	6	0.03	0.02	237	0.11	0.83	50	0.09	0.24	107	0.10	0.16	32	0.03	0.02	21	0.05	0.03	269	0.05	0.08
Nitrate and nitrite	mg/L	214	0.54	0.78	46	0.67	0.70	6	0.27	0.62	240	0.35	0.52	50	0.40	0.54	74	0.49	0.95	32	0.28	0.37	21	0.09	0.29	273	0.46	0.84
Total nitrogen	mg/L	183	1.16	0.63	46	1.30	0.64	6	1.42	0.30	166	1.01	1.49	50	0.91	0.67	85	1.72	1.19	17	0.68	0.25	4	1.53	0.22	286	1.11	0.84
Total Kjeldahl N	mg/L	134	1.00	0.53	21	1.38	0.57	5	1.39	0.33	187	0.76	1.36	26	0.98	0.63	93	1.61	1.04	20	0.78	0.31	20	1.69	0.49	255	0.83	0.61
Total phosphorus	mg/L	183	0.13	0.10	46	0.23	0.30	6	0.09	0.02	174	0.25	0.31	50	0.06	0.07	91	0.20	0.13	17	0.44	0.14	8	0.25	0.09	292	0.11	0.07
Soluble reactive phosphorus	mg/L	182	0.10	0.09	46	0.20	0.30	6	0.05	0.02	174	0.20	0.21	48	0.03	0.04	80	0.14	0.11	17	0.35	0.10	8	0.17	0.08	163	0.07	0.07
Total dissolved phosphorus	mg/L										13	0.13	0.08				6	0.31	0.13				4	0.21	0.12			
Coliform	#/100 mL	11	267	326							20	977	1792													40	520	785
Dissolved oxygen	mg/L	193	6.6	2.23	31	6.3	2.2	4	7.1	0.6	226	8.3	6.0	41	6.8	2.1	78	3.8	1.6	34	8.1	13.4	20	2.6	2.0	303	6.3	2.0
Dissolved oxygen saturated	%	167	75	17.47	31	69	24	4	72	5	174	90	12	41	78	21	51	44	16	28	61	29	12	34	20	140	73	23
Flow discharge	cfs	164	8.9	20.24	31	0.4	0.7	4	123.3	70.1	151	2.3	2.0	41	0.4	0.5	34	5.3	7.9	19	0.1	0.2	7	0.7	1.2	138	4.6	12.3
pH, field	SU	196	6.1	0.85	31	6.2	0.9	4	5.5	0.6	226	7.5	0.4	41	8.9	10.9	78	6.5	0.4	35	6.3	0.7	20	6.0	0.4	308	8.1	17.7
Specific conductance	µmhos/cm	204	101	55.20	39	143	78	6	97	31	230	242	138	44	286	46	83	141	33	36	120	99	20	111	15	318	211	155
Turbidity	NTU	42	2.3	1.07							88	5.5	5.0				40	2.2	2.0	19	4.4	4.0	13	2.2	0.7	116	3.2	2.7
Inorganic chloride	mg/L	130	22.4	29.29	21	49.2	69.5	3	20.1	3.8	130	19.8	18.2	22	30.8	18.5	73	13.8	13.3	24	24.5	11.4	14	14.8	4.9	260	19.0	28.4
Inorganic sulfate	mg/L	129	1.8	1.98	21	1.9	3.0	3	2.4	2.5	130	12.6	11.3	22	19.8	38.7	70	3.9	7.4	24	1.7	1.2	14	3.9	3.7	260	20.0	63.1
Organic carbon	mg/L	102	25.0	21.91	21	32.0	18.6	5	44.2	16.4	105	11.9	6.9	26	16.7	13.1	52	39.3	29.3	5	11.0	6.7	3	49.5	2.7	226	17.7	12.1
Calcium	mg/L	182	9.8	6.20	39	14.0	9.5	4	10.2	1.9	174	34.4	6.8	42	39.1	9.7	83	18.9	8.1	31	12.0	8.9	17	13.9	2.3	290	21.9	8.3
Fluoride	mg/L	25	0.13	0.07	5	0.27	0.19	1	0.17	-	36	0.23	0.12	1	0.33	-	32	0.13	0.15	7	0.09	0.05	4	0.13	0.03	10	0.17	0.09
Oxidation-reduction potential	mg/L	158	174	67.90	31	180	55	4	239	49	142	99	54	41	58	55	32	133	54	15	119	78	3	181	17	128	112	72

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.

Observations of pH in the NLW are variable and can depend on flow conditions, algal concentrations, and the time of sampling. The higher pH observed in Newnans Lake tributaries and HC (average pH of 8.9) is likely associated with stagnant water conditions and algal development. In both HC and LHC, it is clear pH is reduced as water moves from north to south, likely due to interaction with wetlands. Wetlands in the NLW are likely to reduce the pH for two reasons: forested wetland soils are often high in organic acids that in turn lower water column pH, and regular inundation of these soils often results in oxidation using sulfur, which results in the production of sulfuric acid (Mitsch and Gosselink, 2000).

The history of water quality monitoring in NLW tributaries provided spatial and temporal coverage adequate to incorporate into modeling efforts as well as determine target areas for sediment sampling in LHC. Sections 3.0 and 4.0 provide further discussion of water quality monitoring data as they relate specifically to LHC and GRS, respectively.

2.6 Soil Physiochemistry

Since nutrient loads in the NLW are thought to be in some part the result of weathering and transport of geologic phosphates (apatite), soil physiochemistry provides the most informative record of loading history and potential hot spots of phosphorus release. In 2016, ACEPD initiated collection of soil physiochemical data in NLW through work contracted with DB Environmental, Inc., over two sampling events (DB Environmental, 2017). Soil physiochemistry data from these events were categorized geographically and pooled accordingly in an attempt to outline the existing conditions of each surface water feature (Figure 2-10, Appendix B). From these data, mean soil nutrient concentrations were calculated (Table 2-3, Appendix B).

Table 2-3. Average Soil Nutrient Concentrations in Little Hatchet Creek Sub-basin

Nutrient	Units	Gum Root Swamp			Little Hatchet Creek
		Gum Root Swamp	Tributary to Swamp	Downstream of Swamp	
TN	mg/kg dry	14,803	5,069	11,324	425
TP	mg/kg dry	992	948	1,309	5,524
Highly available inorganic phosphorus (DIW OPO_4)	mg/kg dry	2.7	5.3	2.7	3.7
Highly available inorganic phosphorus (NH4Cl OPO_4) via sequential extraction	mg/kg dry	3.0	2.7	1.4	3.1
Iron/aluminum-bound inorganic phosphorus (NaOH OPO_4) via sequential extraction	mg/kg dry	78	55	234	437
NaOH TP via sequential extraction	mg/kg dry	403	183	809	89
Calcium/magnesium-bound inorganic phosphorus (HCl OPO_4) via sequential extraction	mg/kg dry	76	651	53	1,293
Volatile solids	%	60	22	39	0.7
Total iron	mg/kg dry	2,547	953	2,058	433
Total calcium	mg/kg dry	9,859	4,225	4,883	3,448
Biological oxygen demand	g/cm^3	0.54	1.2	0.62	1.5

Note: DIW OPO_4 = deionized water-extractable phosphorus.
NH4Cl = ammonium chloride.
OPO_4 = phosphorus, reactive.
NaOH = sodium hydroxide.
HCl = hydrochloric acid.
mg/kg = milligram per kilogram.
g/cm^3 = gram per cubic centimeter.

Source: DB Environmental, 2017.
ECT, 2017

These data offered insight into nutrient cycling and transport in the LHC sub-basin that provided the basis for the sampling approach used in this project. As suspected based on the depth to Hawthorn in the region, phosphorus concentrations associated with apatite (hydrochloric acid [HCl]-phosphorus, reactive [OPO_4]) are quite high in LHC. These concentrations are also quite high in the tributary to GRS region, which has not been an area of focus for addressing exposed Hawthorn weathering; this region is discussed further in Section 4.0. Based on these data, it is uncertain as to how GRS is operating as a source or sink for phosphorus, as well as what controls nutrient transformations in the swamp. Further discussion of these results as they relate specifically to LHC and GRS is provided in Sections 3.0 and 4.0, respectively.

3.0 Project 1: LHC Water Quality Improvement

3.1 Introduction

To better understand the sources and causes of elevated phosphorus concentrations observed within an impacted segment of LHC, a number of studies were conducted within this segment east of Waldo Road downstream to the large culvert under the GNV taxiway to identify and describe the conditions of the creek (LHC impacted segment) (Figure 3-1). These studies include:

- Reconnaissance of LHC and areas of exposed Hawthorn.
- Survey of creek cross-section profiles within reaches identified during reconnaissance.
- Sediment samples of exposed Hawthorn clays with X-ray diffraction (XRD) analysis.

3.2 Methodology

In August 2016, ECT conducted a creek reconnaissance identifying areas of exposed Hawthorn and severe erosion within the LHC impacted segment. Each area with exposed Hawthorn or severe erosion was identified as a reach (eight total reaches) (Figure 3-1). Each reach was delineated based on the degree of erosion and exposed Hawthorn observed. To better understand phosphorus loading from areas of severe erosion within certain reaches, grab samples of bank material were obtained and analyzed as described in Section 4.3.1 (Figure 3-1). During the reconnaissance, channel cross-section profiles were recorded using a sight level and survey rod. Often multiple channel cross-section profiles were recorded within each reach to provide a complete representation of the reach. In subsequent field efforts, one representative profile was surveyed with a survey rod and sight level following the U.S. Department of Agriculture Forest Service Stream Channel Reference Sites: Illustrated Guide to Field Technique (Harrelson *et al.*, 1994). The purpose of the profiles was, in part, to capture areas suitable for potential channel profile modifications to increase access to the floodplain and reduce the overall energy of the

M:\acad\2016\160705\LHC_ImpactedSegment.mxd
NAD 1983 StatePlane Florida East FIPS 0901 FeetTransverse Mercator
unash 9/27/2017 3:21:22 PM

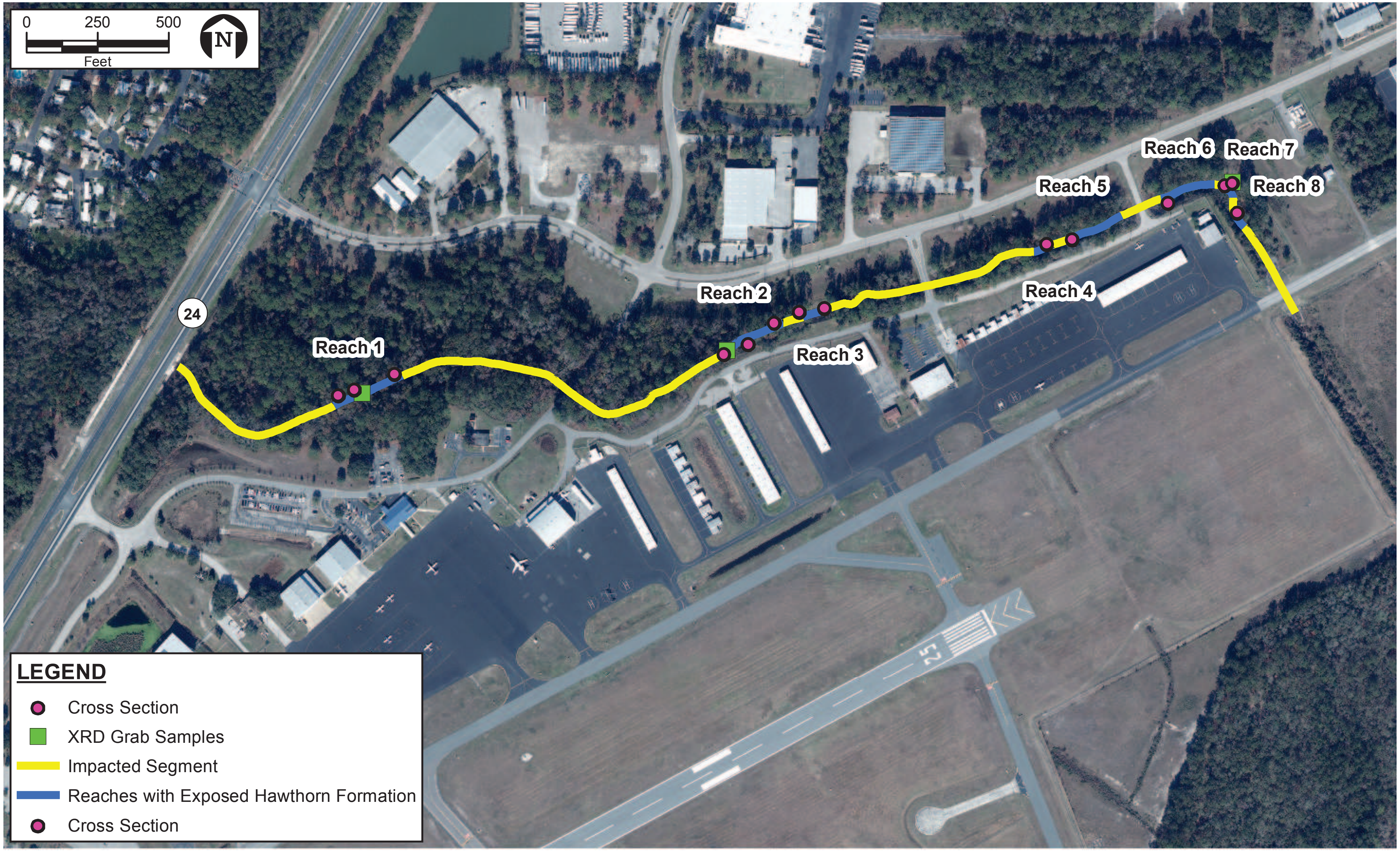


FIGURE 3-1.
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: Alachua County, 2016; FDEP, 2016; USGS, 2016; FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

system. Each surveyed profile extended to a hard surface (road) with a known elevation to provide a benchmark for the recorded elevations and was used to assist in the determination of cut-and-fill calculations for engineering design purposes.

In addition, areas of severe erosion that not only were occurring within the stream channel but also in areas above the creek channel (coming from the road at top of slope) and from drainage pipes/culverts from the adjoining properties were identified, measured, and photographed.

3.3 Stream Fluvial Geomorphology

The majority of the stream channel is comprised of sand with some gravel bars in various locations (Appendix C). The stream banks, where not eroded, are sandy with vegetation stabilizing most of the channel. The channel cross-section profiles vary greatly within the study area ranging from open and shallow (Reach 1) to narrow and heavily incised (Reach 4) (Figure 3-2 and 3-3). The baseflow within the stream can be very low; however, from gauge station readings and sand deposits within the flood plain, it is clear that LHC experiences very high flows during storm events (see Section 3.6). This high-energy system has caused a great deal of erosion along the banks and up the channel slopes. It is believed that lessening that energy will both help reduce the exposure of new Hawthorn as well as reduce the spatial extent of Hawthorn sediment transport and the amount of Hawthorn-laden sediment transported, ultimately decreasing the phosphorus loading to Newnans Lake.

3.3.1 Stream Channel Erosion

During the stream channel profiling effort of August 2016, areas of heavy erosion were documented (Figure 3-4). The erosion observed in these areas is a result of three different, though related, processes:

- Extremely high peak flows and velocities during storm events
- Overland sheet flow from the road and associated GNV tarmac south of LHC
- Concentrated discharge from stormwater drainage pipes and culverts from both GNV property (south side of LHC) and GNV industrial park properties (north side of LHC)

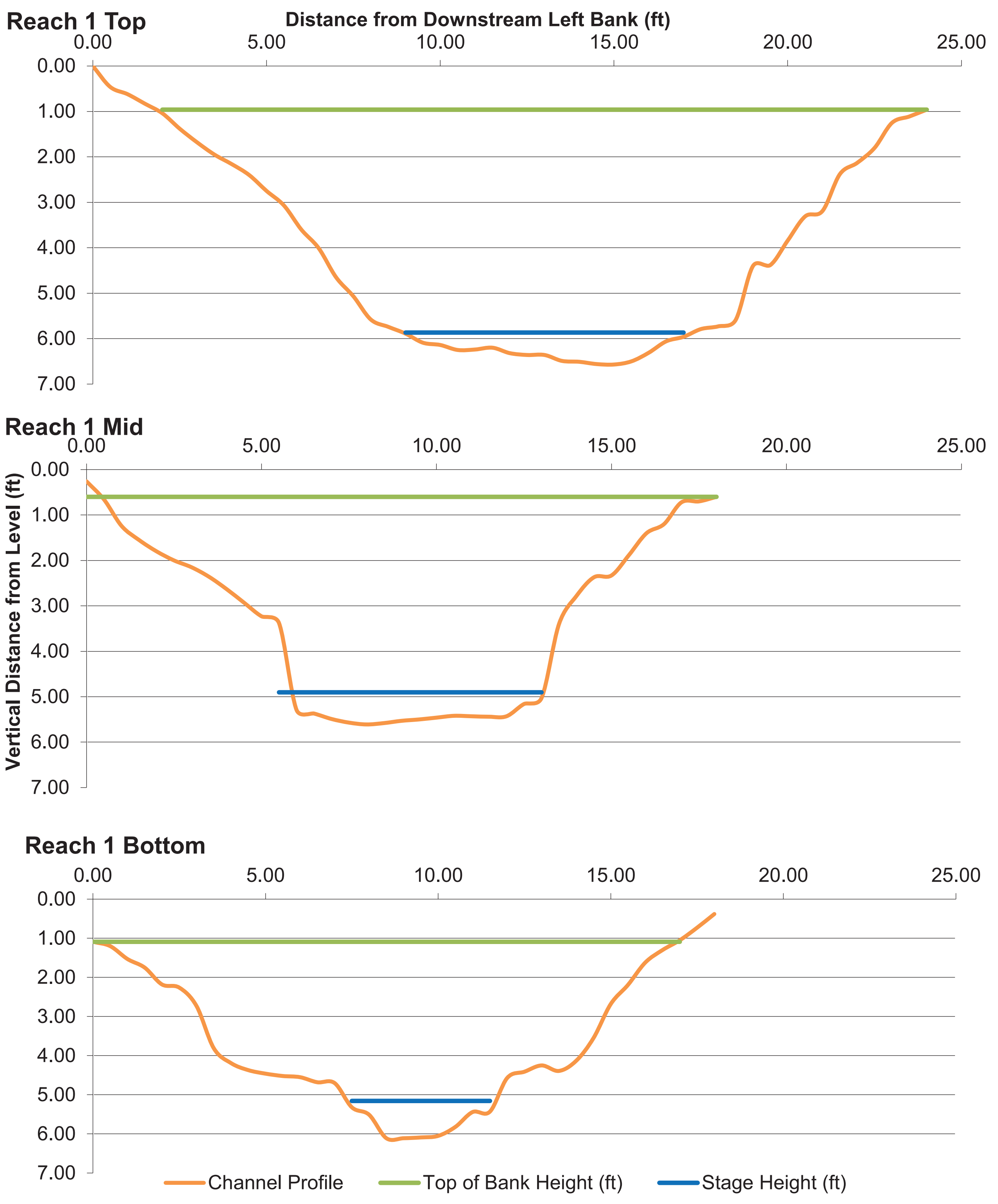


FIGURE 3-2. (Page 1 of 5)
CHANNEL CROSS-SECTION PROFILES OF REACHES IDENTIFIED IN EXPOSED HAWTHORN GROUP FORMATION

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

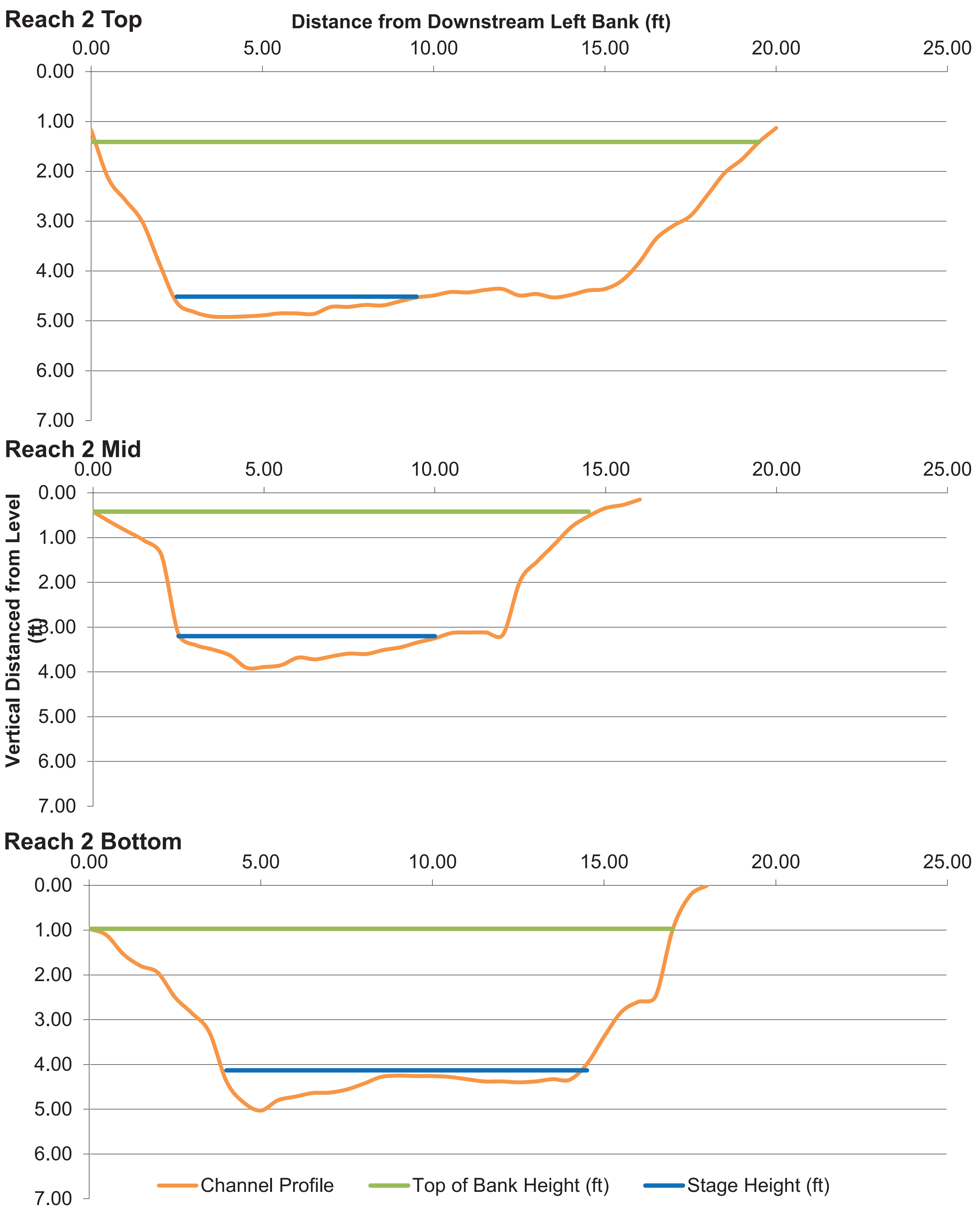


FIGURE 3-2. (Page 2 of 5)
CHANNEL CROSS-SECTION PROFILES OF
REACHES IDENTIFIED IN EXPOSED
HAWTHORN GROUP FORMATION

Source: ECT, 2017.

FIGURE 3-2. (Page 3 of 5)
CHANNEL CROSS-SECTION PROFILES OF REACHES IDENTIFIED IN EXPOSED HAWTHORN GROUP FORMATION
Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

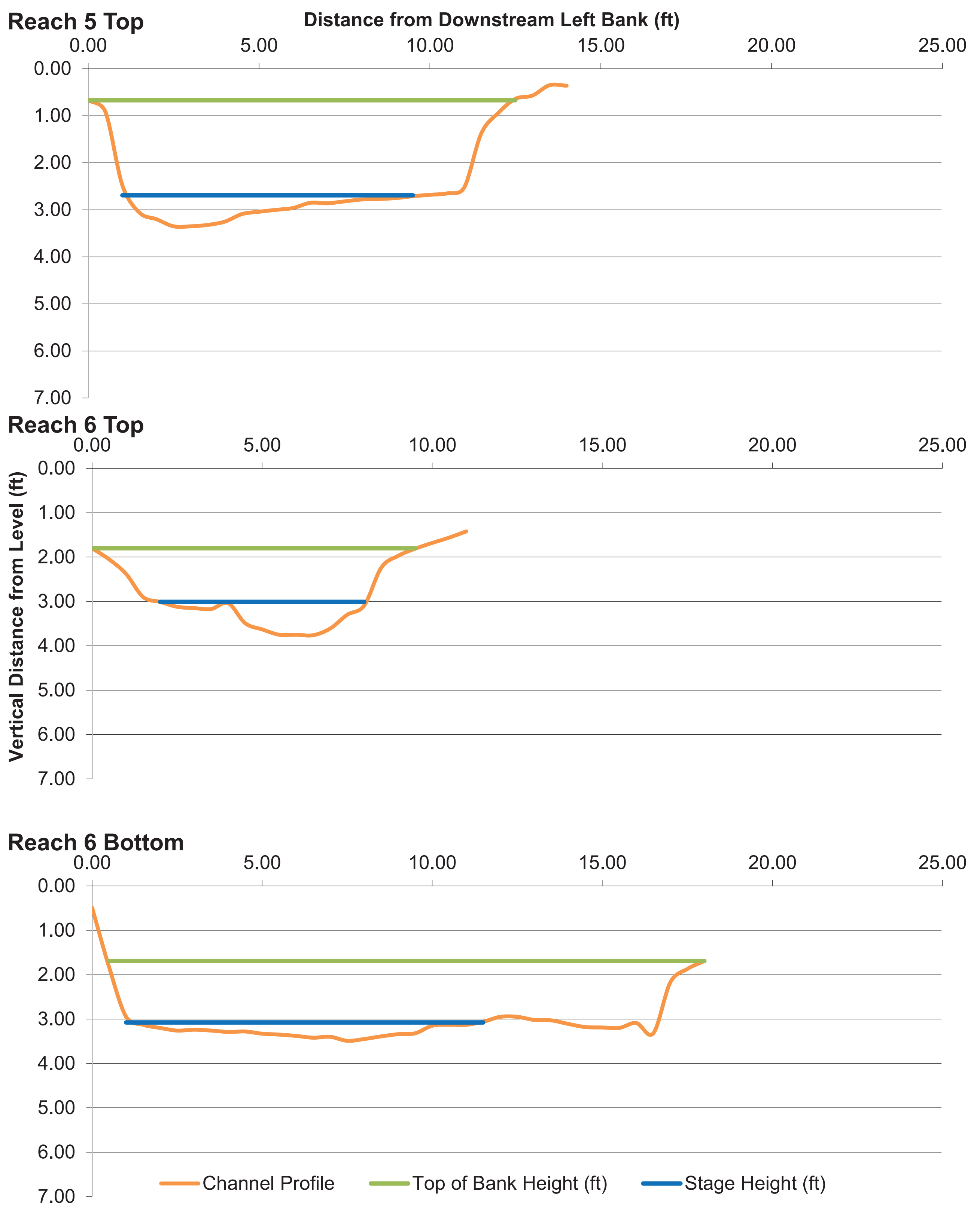
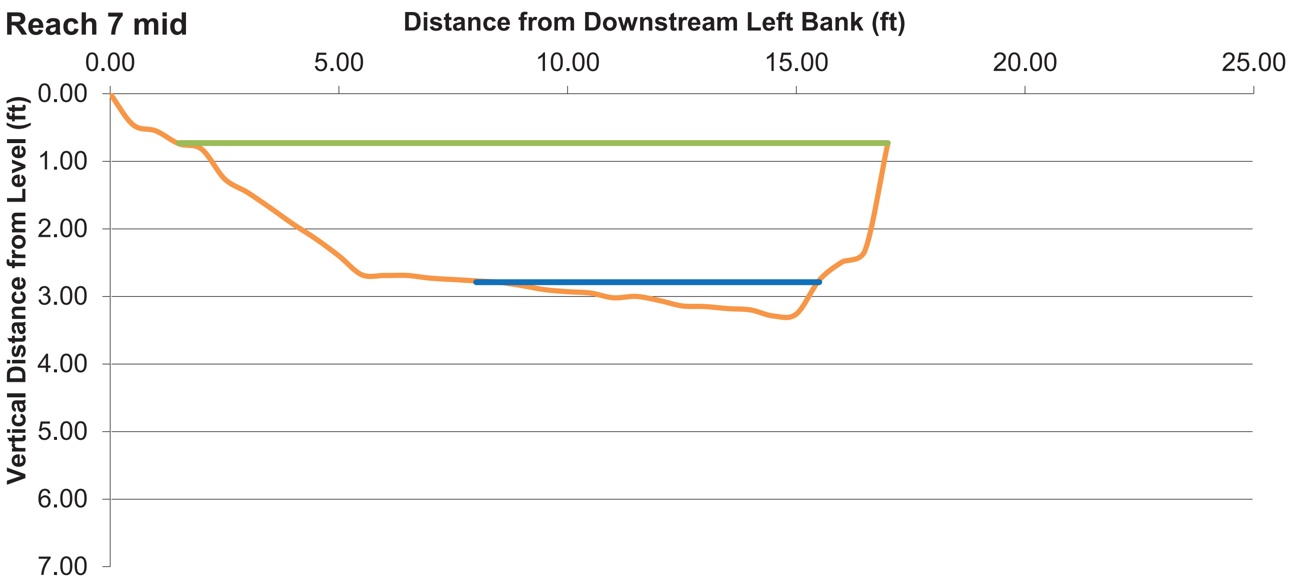


FIGURE 3-2. (Page 4 of 5)
CHANNEL CROSS-SECTION PROFILES OF
REACHES IDENTIFIED IN EXPOSED
HAWTHORN GROUP FORMATION
Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.



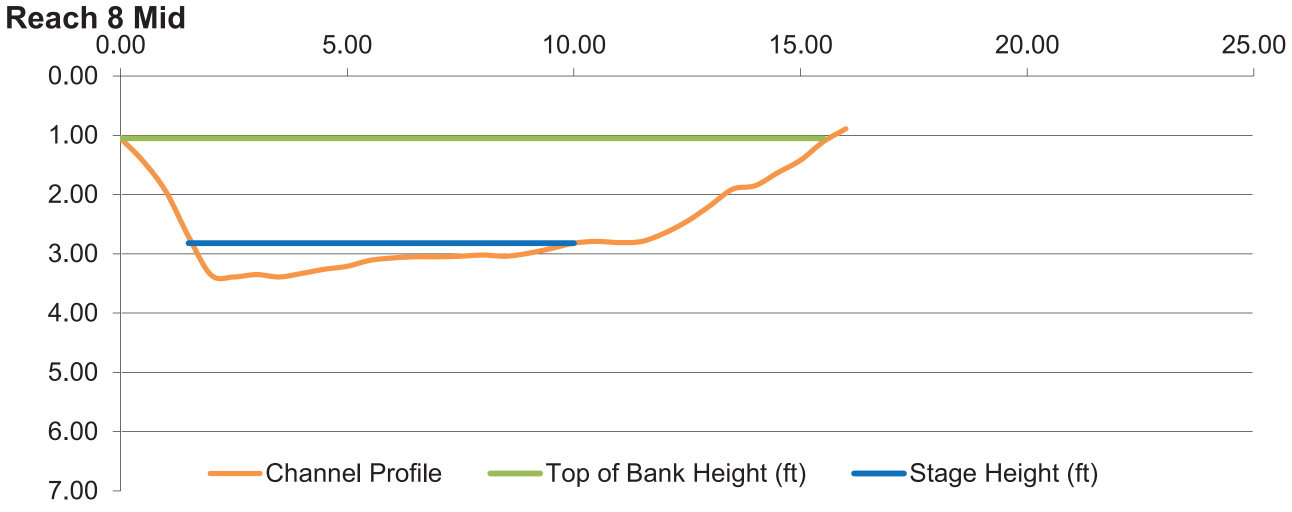


FIGURE 3-2. (Page 5 of 5)
CHANNEL CROSS-SECTION PROFILES OF REACHES IDENTIFIED IN EXPOSED HAWTHORN GROUP FORMATION

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

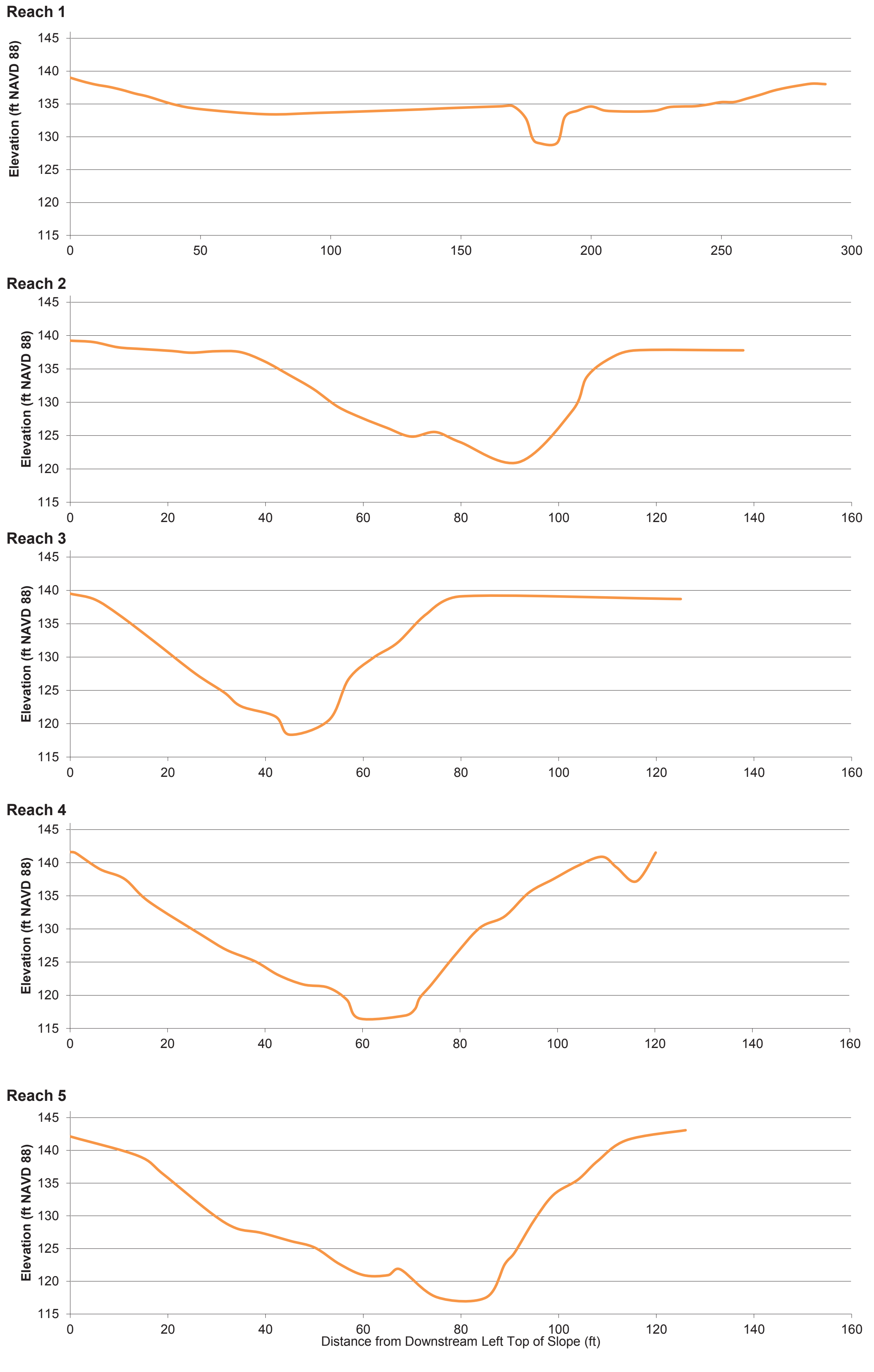


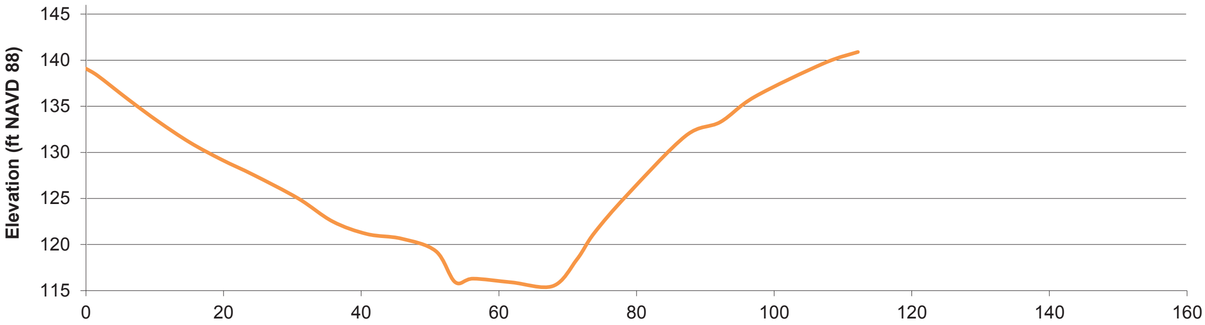
FIGURE 3-3. (Page 1 of 2)

SURVEYED PROFILES OF REPRESENTATIVE CROSS-SECTIONS
OF LITTLE HATCHET CREEK IMPACTED SEGMENT REACHES

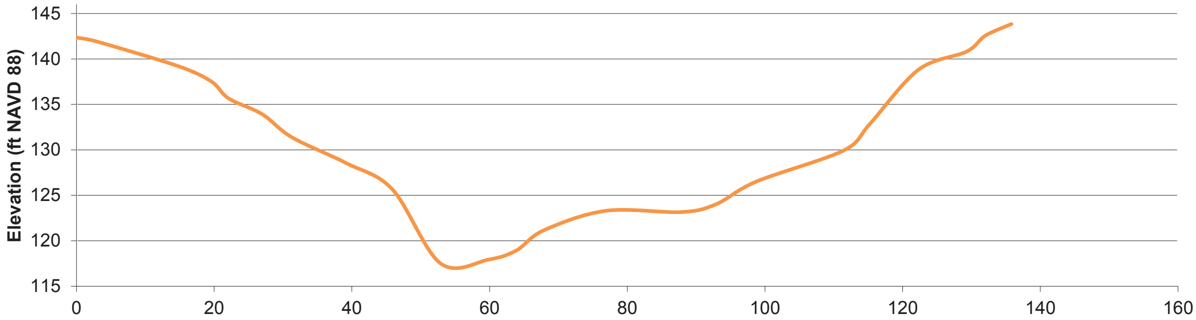
Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

Reach 6



Reach 7



Reach 8

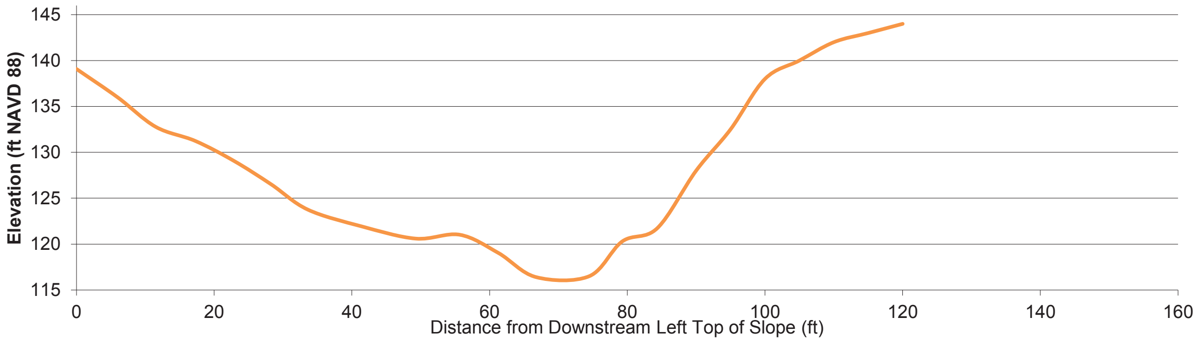


FIGURE 3-3. (Page 2 of 2)

SURVEYED PROFILES OF REPRESENTATIVE CROSS-SECTIONS
OF LITTLE HATCHET CREEK IMPACTED SEGMENT REACHES

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

M:\acad\2016\160705\LHC_ErosionAreas.mxd
NAD 1983 StatePlane Florida East FIPS 0901 FeetTransverse Mercator
unash 6/28/2017 4:08:16 PM

FIGURE 3-4.

EROSION PROBLEM AREAS WITHIN
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: Alachua County, 2016; FDEP, 2016; USGS, 2016; FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

Appendix D provides a summary of each reach and associated characteristics. The profiles are measured from the left downstream bank (always oriented to face downstream).

3.3.2 Exposed Hawthorn

The named reaches were identified based on the presence of exposed Hawthorn clays. High stream velocities during storm events have incised the LHC impacted segment to depths that further expose Hawthorn materials. During storm events the stream banks are scoured extensively, removing soils and transporting sediments downstream. Within each reach, there is evidence of this scour, resulting in Hawthorn exposure. This scour is observed in exposed roots of trees and herbaceous plants, trees that have fallen into the channel due to undercutting, rocks and other large debris within the channel that have presumably fallen from the banks, and very steep bank angles indicating severe down cutting of the channel by water. The majority of the exposed Hawthorn is present within the downstream right bank of most reaches. However, in Reach 7 at the 90-degree bend on the downstream portion of the LHC impacted segment, the exposure switches to the downstream left bank only to return to the downstream right bank after the turn. The exposed Hawthorn observed throughout the LHC impacted segment is a continual source of phosphorus to the downstream channel and GRS (Table 3-1, Appendix E).

Table 3-1. Area of Exposed Hawthorn Study Area of Little Hatchet Creek (From Field Observations of August 2016)

Reach	Reach Length (ft)	Height of Exposed Hawthorn (ft)	Percent of Reach (Takes into Account Both Sides)	Total Exposure (Surface Area ft^2)
1	282	0.5	12.5	18
2	271	1.0	35	95
3	69	0.5	5	2
4	69	6.0	40	166
5	197	6.0	50	591
6	185	6.0	30	333
7	50	6.0	40	120
8	53	6.0	50	159
			TOTAL	**1,483**

Note: ft^2 = square foot.

Source: ECT, 2017

3.3.3 Problem Areas

In addition to the exposed Hawthorn associated with channel incision, there are areas of erosion due to overland sheet flow, discharge from stormwater drainage pipes, and small tributaries with unknown sources. Each problem area was marked with global positioning system (GPS), photographed and described (Figure 3-4; Appendix E). These areas require attention as they are unstable and receive high energy flows during storm events that will further erode the soils within the channel and increase the degree of Hawthorn exposure.

In general, the problem areas can be classified into two types: overland flow and point discharges. On the south side of the channel (downstream right bank) the overland flow is due to surface runoff from Northeast 48th Avenue, which runs between LHC and GNV. No obvious signs of heavy overland flow from the north side of the channel (downstream left bank) were observed. Point discharges in the form of culverts and/or pipes are present on both sides of the channel; however, the downstream left bank, presumably from the GNV stormwater system, dominate. Of the five 36-inch diameter concrete culverts observed, four of them were on the downstream right bank of the channel. Also on the downstream right bank of the channel was a 24-inch corrugated steel culvert that was perched 3 ft above the channel bottom. On the north side was a 4-inch (polyvinyl chloride [PVC]) pipe that was perched 10 ft above the channel whose flow terminated within a depression in the ground that had been reinforced with concrete rubble. Additional flow contributions observed were in the form of flowing channels that originate from stormwater features associated with the road on either side of LHC.

3.4 Stormwater Management

In addition to flow upstream of Waldo Road, the portion of LHC within the project area receives direct runoff from GNV and the Airport Industrial Park. Stormwater flow from the Airport Industrial Park is managed through a series of curb inlets, swales, and detention basins along Northeast 49th Avenue. Swales and detention basins serving the Airport Industrial Park have control structures that ultimately discharge to LHC.

The Airport Industrial Park was predominantly constructed during the 1990s, with portions along the north side of Northeast 49th Avenue constructed during the 1970s. Other portions date back to the 1940s. Based on field observations, stormwater structures appear to be functioning as designed with no obvious indications of sediment buildup, excessive erosion, or short-circuiting. Additionally, discharges to the project area originating from this north side do not appear to be particularly problematic due to adequate attenuation from detention basins.

GNV began operation in the 1940s. Stormwater flow at GNV is managed through a series of grated inlets and open ditches which drain to LHC and GRS. Based on our review of the Airfield Drainage System Improvement Study prepared by AVCON dated July 2015, many of the original drainage structures dating back to the 1940s are still in service, though some have been abandoned or overcome with sediment and/or grass.

With some of the GNV's drainage features existing from original construction nearly 75 years ago, the majority of the drainage structures and pipes on the airfield are reaching the end of their useful life (AVCON, 2015). Deterioration has reportedly led to the development of minor sinkholes on the surface from the erosion of soil into drainage pipes and the erosion of the soil surrounding the pipe. These failures often require frequent maintenance to provide a safe environment for mowing and other service equipment or vehicles. In addition to faulty or failed structures and pipes, open ditches are also maintenance intensive and have additionally been identified as bird and wildlife attractants in GNV's Wildlife Hazard Assessment.

Previous assessment of drainage features discharging to LHC and GRS include inspection of approximately 200 structures, including ditch bottom inlets, mitered end sections, manholes, and abandoned structures. Approximately 25,000 ft of pipe is used to connect these structures ranging in size from 12 inches in diameter to more than 36 inches in diameter.

3.4.1 Problem Areas

Several problem areas have been identified on GNV property that if addressed could improve water quality in LHC and GRS. In general, problem areas are characterized by sediment and vegetation buildup, overgrown open channels, poor construction practices, and the age and capacity of structures.

Across the airfield, sedimentation and vegetation buildup have become a major issue preventing the existing drainage structures from functioning efficiently. Commonly, sediment is washed into upstream drainage structures (or through infiltration of faulty pipe joints) and makes its way to the downstream end of the system, eventually clogging the conveyances. When stormflow is unable to be conveyed effectively, the drainage basins (pipe and structure network or open channel) begin to hold water until an elevation is reached whereby the flow continues as overland flow, often with unintended erosive consequences.

Several open channels have been previously identified primarily as holding significant amounts of water and overgrowth of vegetation. These and other open channels, especially during the typical Florida rainy seasons, are generally too wet to maintain with a traditional tractor and “batwing” mower. Typically, when they become dry enough to maintain, the channels are overgrown to a point where more than a mower is required, such as herbicide or a bush hog.

The standards and design guidelines have changed significantly since GNV began construction in 1940 in comparison to the present. Currently, there are multiple governing bodies responsible for the design, construction, permitting, or regulation of drainage components at GNV, including the Federal Aviation Administration, Florida Department of Transportation, SJRWMD, and other local regulatory agencies. Materials such as concrete and reinforcement have replaced the brick structures, and relatively recent practices such as wrapping drainage pipe joints with filter fabric have been incorporated. The majority of the pipes on the airfield are likely not wrapped with filter fabric, leading to a higher probability of failed joints allowing the infiltration of soil and water into the drainage system.

3.5 Water Quality

Section 2.5 summarizes the general water quality characteristics of LHC. The following is a description of the problem areas and elevated nutrient loads that have been observed within LHC as determined by the studies discussed in Sections 2.5 and 2.6.

3.5.1 Problem Areas/Hot Spots

Phosphorus loading in the NLW is consistently over the regulatory water quality requirements (0.12 mg/L) for a Class III water body. Of the contributing tributaries in NLW, LHC contributes one of the greatest phosphorus loads (Table 2-1).

Total dissolved phosphorus concentrations within the surface waters of LHC also vary along the studied segment (Figure 3-5). Concentrations (mg/L of water) are lowest at the upstream end and increase downstream. The highest concentration of total dissolved phosphorus was observed to be 0.245 mg/L. Soluble reactive phosphorus (SRP) in water follows a similar pattern of concentration as those observed for total and dissolved phosphorus (Figure 3-6). SRP concentrations increase downstream from Waldo Road with a maximum (1.75 mg/L) observed in LHC. Total phosphorus concentrations within LHC remain elevated as the creek approaches Newnans Lake (Figure 3-7). The highest concentration (3.039 mg/L) within the immediate vicinity of Newnans Lake occured at LHC.

3.6 Precipitation and Streamflow

Historical precipitation and streamflow data were compiled to use as input and calibration of subsequent modeling efforts, respectively. Precipitation data were obtained from GNV (NOAA, 2017), while streamflow data were obtained from Hydrologic Data Collection, Inc. (HDC) (2016) for the long-term monitoring station at Waldo Road, hereafter referred to as the Waldo Gauge Station (WGS). Figure 3-8 shows the most recent five-year period of available streamflow data at WGS along with annual precipitation. The average annual flow rates shown here are representative of the flows delivered to the LHC project area. To put into context, the LHC contributing area west of Waldo Road is 2601 acres, roughly one fourth of the total LHC basin, though also containing one of the highest proportions of impervious surface other than GNV. For the five-year period, the average rainfall was 47 inches per year (in/yr), while the average of the average annual streamflows was 4.0 cfs (or 13.3 in/yr over the contributing area) making up 28 percent of the incoming precipitation volume. This ratio of streamflow to precipitation ranged from 12 percent in 2011 to 40 percent in 2014.

FIGURE 3-5.
TOTAL DISSOLVED PHOSPHORUS
IN SURFACE WATERS

Sources: Alachua County, 2016; FDEP, 2016; USGS, 2016; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

FIGURE 3-6.
SOLUBLE REACTIVE PHOSPHORUS
IN SURFACE WATERS

Sources: Alachua County, 2016; FDEP, 2016; USGS, 2016; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

FIGURE 3-7.
TOTAL PHOSPHORUS
IN SURFACE WATERS

Sources: Alachua County, 2016; FDEP, 2016; USGS, 2016; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

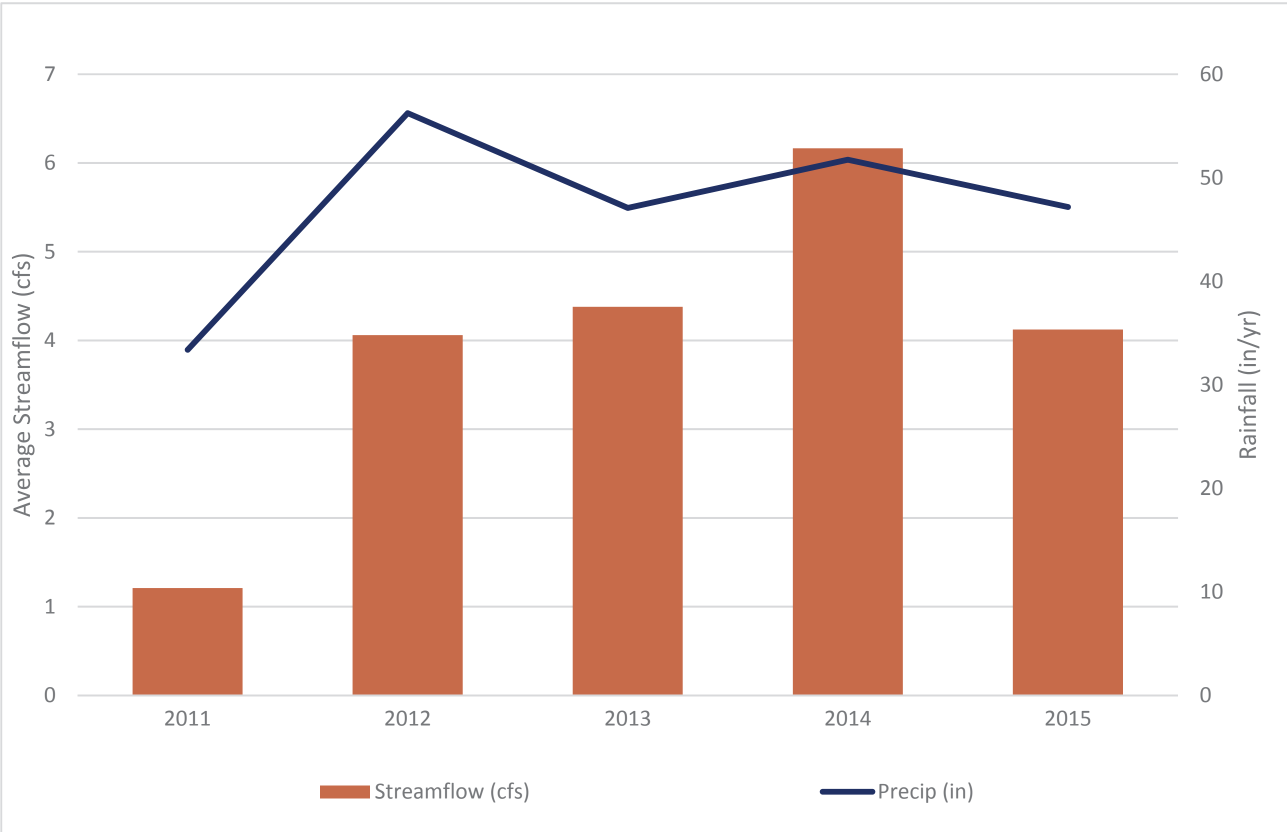


FIGURE 3-8.

ANNUAL PRECIPITATION AND LITTLE HATCHET CREEK STREAMFLOW, HYDROLOGIC YEARS 2011-2015

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

3.7 Nutrient Loading

As discussed in Section 3.5, nutrient concentrations vary along LHC, generally increasing with distance downstream. Nutrient concentrations have also been shown to vary with flow. These relationships were used to calculate annual loadings at two locations along LHC: one at the upstream end of the project area near Waldo Road and one near the downstream end of the project area prior to discharge into GRS.

Nutrient loadings were calculated from existing datasets by combining the long-term hourly flow record with past studies that defined the dependence (or lack thereof) of phosphorus and nitrogen species on flow. Although water quality data used to establish flow relationships were generally from 2007 to 2009, the first full year of data for the flow record was 2009. Therefore, it was challenging to temporally match water quality to flow. Because a multiyear period of analysis was desired to show changes across a range of hydrologic conditions, nutrient loading analyses were performed on an annual scale for the most recent five-year period of record of flow data, 2011 through 2015, though using water quality data from prior to that period.

The dependence of phosphorus concentrations on flow was determined by previous work performed in the LHC and surrounding OCB, which showed that inorganic phosphorus concentrations, either as SRP or ortho-phosphate (OP), are strongly related to flow rate in areas of known Hawthorn exposure. Contrary to typical urban watersheds where TP (in the form of OM, fertilizer, etc.) that has accumulated on the land surface is washed off during storms thus showing a positive correlation with flow, TP concentrations show a negative correlation with flow in the LHC basin. As past investigations have shown (Cohen *et al.*, 2008; ECT, 2008), this is attributed to increased mobilization of geogenic phosphorus from the exposed Hawthorn during periods of low flow, as there is greater contact time between the water and substrate. As these concentrations are higher than typical stormwater TP concentrations, a dilution effect is seen during storm events. For nitrogen, little to no flow dependence is apparent.

There are two datasets that were used to create regressions between nutrient concentrations and flow to calculate long-term loadings. The first dataset includes monitoring efforts performed by UF for SJRWMD and summarized in Cohen *et al.*, 2008 and 2010 (Appendix A). Included in this dataset is a sample location at LHC as it flows under Waldo Road (i.e., at the beginning of the project area), as well as east of GNV within the main stem prior to its merging with the South Branch (i.e., at the discharge end of the project area). The second dataset (Appendix F) is from a study performed in 2008 at the same discharge location (ECT, 2008)

The dataset supplied by Cohen *et al.* (2008, 2010) at the head of the project area consisted of 30 grab samples from 2007 through 2009, all during flow conditions of 5 cfs or less. Flow was documented for all but three samples and was compared to the long-term flow record for verification. Soluble reactive phosphorus, TP, and TN were regressed against flow with power law relationships developed for each species. Power regressions typically describe the relationship between hydraulic geometry and discharge in many stream systems, and past work in LHC has indicated this type of representation to be most appropriate (Cohen *et al.*, 2008). For SRP, the relationship with flow had a coefficient of determination (r^2) of 0.41, power of -0.74. For TP, a less defined relationship with flow was found with an r^2 of 0.33, power of -0.55, the less negative power indicating less of a flow-dependence (a power near zero would indicate no dependence of concentration on flow). Flow dependence of TN was determined to be minimal based on a comparatively lower r^2. Since samples for TN concentrations were collected during flows of less than 5 cfs, ACEPD data were only used to characterize TN concentrations for flows of less than 5 cfs. For these conditions, an average TN concentration of 1.04 was determined. For flows greater than 5 cfs, subsequent datasets were deferred to, as discussed in the following paragraphs.

The 2008 ECT study used automated water samplers monitoring 14 baseflow events and 18 stormflow events over one year. From 85 individual samples, a power law relationship between orthophosphorus and flow ($r^{2=}$0.29, power of = 0.305) was found. Cohen *et al.* (2008) analyzed data from an approximately two-year period (2007 through 2008), and included 29 baseflow samples and 8 stormflow samples. From these 37 samples, a power law relationship between SRP and flow ($r^{2=}$0.85, power of -0.40) was found. Other parameters did not show as robust a dependence on flow. Total phosphorus power law regressions yielded coefficients of determination from ECT (2008) and Cohen *et al.* (2008) of 0.0006 and 0.5, respectively. The coefficient of determination reported by Cohen *et al.* (2008) was likely due to a bias toward low flow measurements that were dominated by SRP. Only three samples were taken above a flow rate of 7 cfs, whereas approximately half of the ECT samples were taken at flows over 7 cfs. For nitrogen, both studies measured nitrate and TN. Cohen *et al.* (2008) found no dependence of nitrate concentrations on flow, though TN showed a positive correlation with flow, with a coefficient of determination of 0.50, power of 0.12. Again, the dataset was skewed toward low flow, with only three measurements taken above 7 cfs. The ECT study found no strong dependence of either nitrate or TN on flow, though with measurements across a broader range of flows, TN concentrations appeared slightly greater under baseflow conditions.

To calculate historical nutrient loadings, nutrient flow dependence equations derived from these sources were integrated into the long-term hourly flow record at the WGS, as representative of loading to the project area, and at the interface with GRS, as representative of loading from the project area. Although long-term flow data were only available at WGS, a long-term simulation was run over the same 2011 through 2015 period of record to estimate the change in flow that results from upstream to downstream ends of the project area (see Section 3.8 for discussion of model development and simulations). Simulation results indicated total annual streamflow volume increased by approximately 40 percent as LHC makes its way through the project area, which is reasonable, as this transition entails an increase in contributing basin area of 25 percent. A long-term hourly flow record for the downstream end of the project area was generated by multiplying the hourly record at WGS by 1.4. Nutrient flow dependence equations were then applied at each hour using the equations given in Table 3-2 for inorganic phosphorus, TP, and TN. Direct relationships previously discussed were used for inorganic phosphorus. TP was calculated indirectly from the ECT (2008) dataset, since there was not a strong correlation between flow and TP (r^2 of 0.0006), but there was a stronger relationship between flow and the ratio of orthophosphorus to TP, with a power law regression (r^2 =0.29). For TN, the ECT dataset was binned into baseflow (less than 5 cfs) and stormflow sets (greater than 5 cfs), and the average of the two bins applied to the hourly flow record accordingly. This stormflow value was also applied to the upstream end of the project area due to the previously discussed lack of characterization from the ACEPD dataset.

Table 3-2. Equations Used to Calculate Parameter Concentration as a Function of Flow

Parameter	Equation	Number	r^2
Upstream			
SRP*	SRP (mg/L) = 0.130 Q (cfs) $^{-0.74}$	30	0.41
TP*	TP (mg/L) = 0.160 Q (cfs) $^{-0.55}$	30	0.33
TN*†	If Q (cfs) < 5, TN = 1.04 (mg/L), else TN = 0.73 (mg/L)	89	NA
Downstream			
OP†	OP (mg/L) = 0.284 × Q (fcs) $^{-0.305}$	89	0.29
SRP‡	SRP (mg/L) = 0.305 Q (cfs) $^{-0.4}$	37	0.85
TP*	TP (mg/L) = OP (mg/L) ÷ (0.855 × Q [cfs] $^{-0.181}$)	89	0.29
TN†	If Q (cfs) < 5, TN = 0.86 (mg/L), else TN = 0.73 (mg/L)	89	NA

Source: *Cohen *et al.*, 2008; 2010.
†ECT, 2008.
‡Cohen *et al.*, 2008.

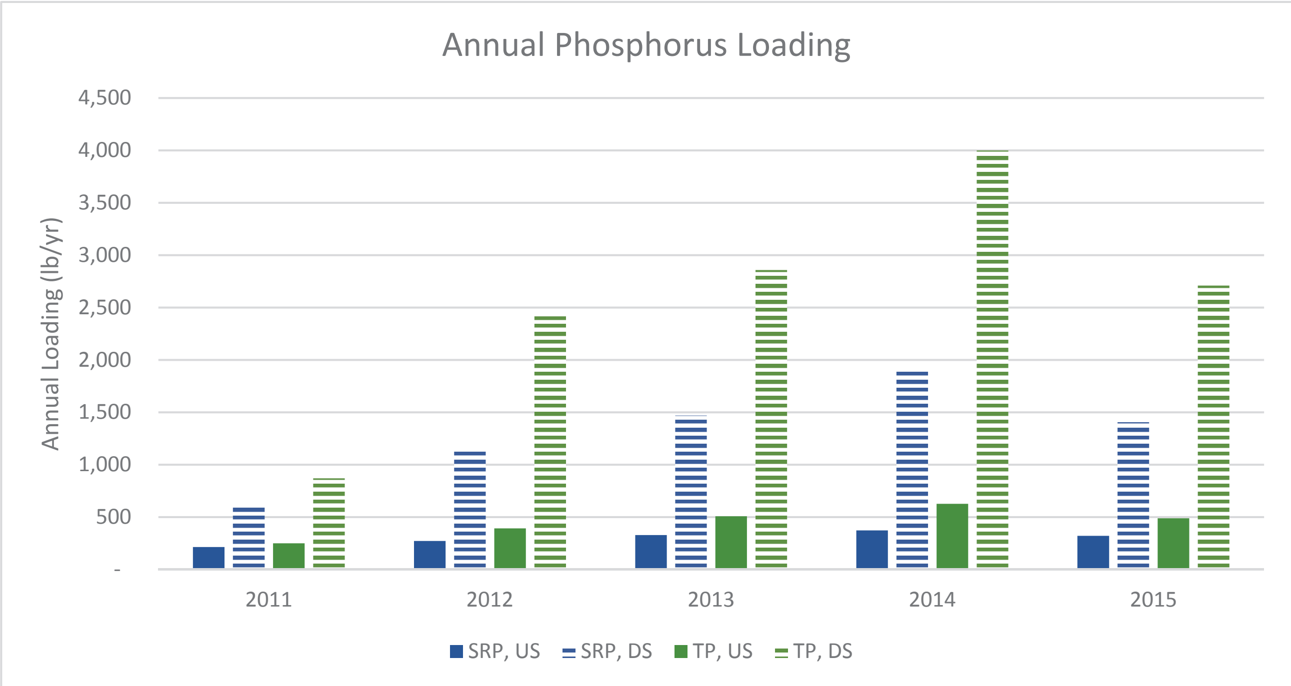
Table 3-3 and Figure 3-9 show the results of integrating the equations given in Table 3-2 with the flow records at each end of the project area. This represents nutrient loading from the project area on an annual basis, the difference of which can be assumed to be the contribution of the Project 1 area. It should be noted these loadings include the average annual contribution from the Brittany Estates wastewater treatment plant, which, from 2008 to 2013, averaged 220 lb/yr of TP and 820 lb/yr of TN (ACEPD, 2015).

Table 3-3. Annual Nutrient Loadings at Upstream and Downstream ends of LHC Impacted Segment

Year	SRP (lb/yr)		TP (lb/yr)		TN (lb/yr)	
	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
2011	214	593	250	870	2,093	2,883
2012	271	1,126	392	2,416	6,433	8,854
2013	328	1,468	508	2,857	7,314	9,896
2014	372	1,920	626	3,998	9,894	13,153
2015	320	1,405	489	2,709	6,858	9,337
Average	301	1,302	453	2,570	6,518	8,825

Source: ECT, 2017.

The increase in phosphorus loadings from upstream to downstream is quite large, averaging approximately 1,000 lb/yr of SRP and over 2,000 lb/yr of TP (Figure 3-9). While some increase



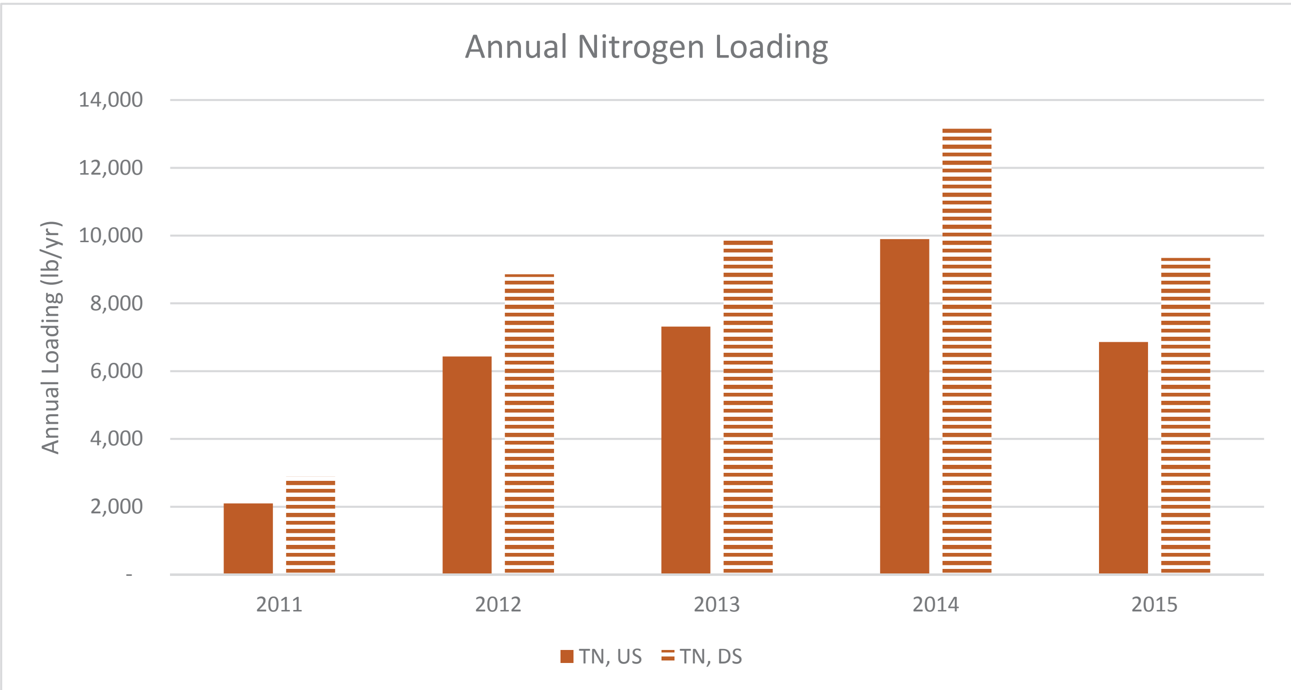


FIGURE 3-9.
ANNUAL PHOSPHORUS AND NITROGEN LOADING AT UPSTREAM/DOWNSTREAM END OF LITTLE HATCHET CREEK IMPACTED SEGMENT

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

can be expected by virtue of greater runoff contribution, the increase in annual volume is only 40 percent from upstream to downstream, not enough to warrant the 430- and 570-percent increase of SRP and TP, respectively. Accordingly, anything greater than roughly a 40-percent increase (in addition to Brittany Estates loading) can likely be attributed to the exposed Hawthorn in the LHC impacted segment, assuming the EMC of runoff from each locations' respective contributing area is roughly similar. Following this logic, the following equation is used to calculate what should be considered an upper bound of the contribution of exposed Hawthorn in the LHC impacted segment to annual phosphorus loads to Newnans Lake:

$$TP_{\text{Hawthorn Contribution}} = TP_{\text{DS}} - 1.4 \times TP_{\text{US}} - TP_{Brittany\ Estates}$$

or

$$2{,}243 = 2{,}570 - 1.4 \times (453 - 220)$$

Figure 3-9 shows the increases in TN that occur from the upstream to downstream ends of the LHC impacted segment. On average, these increases are approximately 35 percent, very close to the increase in flow volume between the two locations, indicating the LHC impacted segment likely does not impart any unexpected TN contribution.

In addition to this nutrient loading analysis, an additional analysis was performed to compare the nitrogen and phosphorus loadings to and from the LHC impacted segment to what would be expected from an average Florida watershed with the same composition of land use. To do so, a similar procedure was used, but rather than use observed nutrient flow relationships, land use-based EMCs were calculated for the specific composition of land use in the contributing areas of the upstream and downstream ends of the LHC impacted segment. Using EMCs from Harper and Baker (2007) matched to the closest equivalent level 2 Florida Land Use, Cover and Forms Classification System (FLUCCS) codes for each contributing area, area-weighted EMCs for TP of 0.146 and 0.154 mg/L were determined for upstream and downstream, respectively, and for TN of 1.32 and 1.34 mg/L for upstream and downstream, respectively. Combined with the same long-term flow records used in the previous analysis, annual loadings shown in Table 3-4 resulted.

Table 3-4. Comparison of Loadings Modeled with Table 3-2 Equations to Expected Loadings Using Standard Land Use-based EMCs

Year	TP (lb/yr)				TN (lb/yr)			
	Upstream		Downstream		Upstream		Downstream	
	EMC	Modeled	EMC	Modeled	EMC	Modeled	EMC	Modeled
2011	347	250	514	870	3,152	2,093	4,498	2,883
2012	1,164	392	1,727	2,416	10,582	6,433	15,101	8,854
2013	1,256	508	1,863	2,857	11,415	7,314	16,289	9,896
2014	1,768	626	2,622	3,998	16,071	9,894	22,934	13,153
2015	1,183	489	1,754	2,709	10,747	6,858	15,336	9,337
Average	1,144	453	1,696	2,570	10,394	6,518	14,832	8,825

Source: ECT, 2017.

By comparing expected loadings to modeled loadings (based on water quality grab samples and measured flow data) at the upstream end of the LHC impacted segment, it is apparent that, for both TP and TN, modeled loadings are less than expected. This is also despite the additional loading from Brittany Estates (220 lb/yr of TP and 820 lb/yr of TN) that would not be captured in the expected values. When we compare expected and modeled loadings at the downstream location, modeled TN loadings are less than expected, consistent with upstream results. However, modeled TP loadings are almost double what would be expected. If the TP contribution of Brittany Estates (220 lb/yr) is subtracted from the five-year modeled TP loading average (2,570 lb/yr), the difference between modeled and expected TP loadings, 650 lb/yr, may be considered a lower bound estimation of the contribution of exposed Hawthorn clay within the LHC impacted segment to annual TP loads.

3.8 Hydraulic and Hydrologic Modeling

Modeling efforts were performed for both LHC and GRS using a variety of approaches. For Project 1 components, modeling was performed to assess the hydraulic impacts of any actions proposed in the LHC sub-basin. Because proposed restoration activities in this area focus on strategies that will affect the stormflow characteristics along the creek, modelling largely consisted of the refinement of an existing ICPR model provided by Alachua County (Inwood, 2009). The model was refined based on a combination of field observations and comparison of model output to the long-term flow record at the U.S. Geological Survey (USGS) stream gauge station located on the east side of Waldo Road (WGS). For Project 2 components, the existing ICPR model was further refined for better resolution of GRS and to perform long-term simulations. Long-term water level data were obtained for comparison to model results and to further refine water budget estimates. Details of model refinement are provided in the following subsection. For details of initial model construction, refer to the referenced report (Inwood, 2009).

3.8.1 Model Updates

Before running the model received from Alachua County for the greater OCB, the portions relevant to the two project areas were reviewed in the context of field observations and existing hydrologic data.

Major changes to the areas relevant to Project 1 since initial model construction include new and larger culverts and the moving of Northeast 43rd Terrace approximately 400 ft downstream of its original location. Of particular note are the changes in the size of the pipes under Northeast 43rd Terrace and the GNV taxiway, both originally modelled as 24-inch corrugated metal pipe (CMP), subsequently replaced in the model with 16-ft cmP reflecting actual conditions. Elevation data, e.g., channel, pipe, and weir inverts, were checked against the updated (and more highly resolved) topographic contours derived from LiDAR measurements flown in 2009. This was in comparison to the 2001 LiDAR measurements from which the original model attributes were mostly defined.

Refinements to areas relevant to Project 2 consisted mostly of adding more detail, as GRS itself was previously modeled as one large basin attached to a single stage/area node, discharging to a single time/stage node representing Newnans Lake. The old basin representing GRS was subdivided into 26 individual basins to better represent long-term hydrologic behavior within the swamp. Basins were connected primarily with weirs, due to the greater computational efficiency they afford over channels (Streamline Technologies, 2016), though several channels were incorporated mainly to represent the interface between LHC and GRS as well as the east branch of GRS. For details of all model inputs, refer to Appendix G.

3.8.2 Model Validation

To test the updated existing conditions model, it was run using actual rainfall data collected from the nearby National Climactic Data Center weather station located at GNV, and flow results were compared to the observed flow from the same storm event at the WGS. Additional historical flow data are available at the downstream end of Project 1 at a station maintained by SJRWMD (North Branch Little Hatchet Creek station); however, data are only given on a daily basis without the hour specified, resulting in insufficient resolution for calibration purposes.

For model calibration, as the storm event used for permitting purposes is the 25-year, 24-hour storm (model storm), which in this part of the state refers to a cumulative rainfall amount of 7.5 inches over 24 hours, the GNV daily rainfall dataset was searched for similar-sized events that occurred over the WGS period of record (roughly 2008 through 2016). The largest daily rainfall amount recorded was 6.95 inches on June 24, 2012. Accordingly, hourly rainfall data was obtained for 2012, and the model was run for calibration. Figure 3-10 shows the calibration storm hyetograph along with the model storm hyetograph for comparison. Hour 1 for the calibration storm event was 6 a.m. on June 24, 2012. A total of 9.02 inches fell over the subsequent 36 hours.

After incorporating the structural changes described in the previous paragraphs (i.e., new topography, new culverts, and revised cross-sections), the model was run using the calibration storm event. Figure 3-11 shows the hourly flow rate at the WGS along with the model output at the same location for the 36-hour calibration storm event period. As can be seen, the ICPR model approximately doubled the maximum flow rate from the calibration storm, which also translated to an overprediction of maximum stage by approximately 1 ft (data not shown).

After a detailed review of model outputs, including mass balance and hydrograph characteristics, it was concluded the flow overprediction was due to the inability of ICPR Version 3 (ICPR3), the version in which the original model was constructed, to accurately account for the aforementioned detention capacity of the LHC basin. Under actual conditions, this buffering manifests as a more drawn-out storm hydrograph (longer tail) as well as losses to evapotranspiration (ET), the latter of which cannot be accounted for directly in ICPR3.

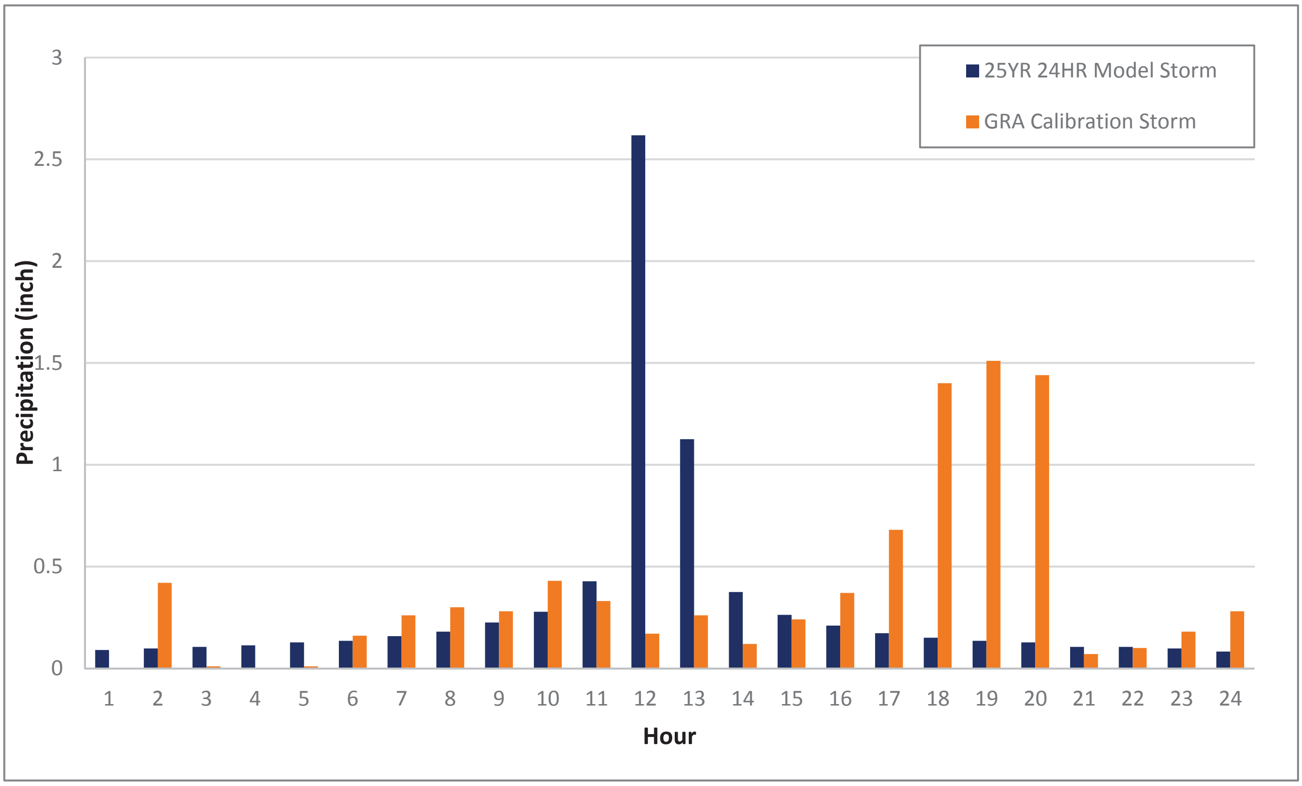


FIGURE 3-10.

COMPARISON OF MODEL STORM TO CALIBRATION STORM

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

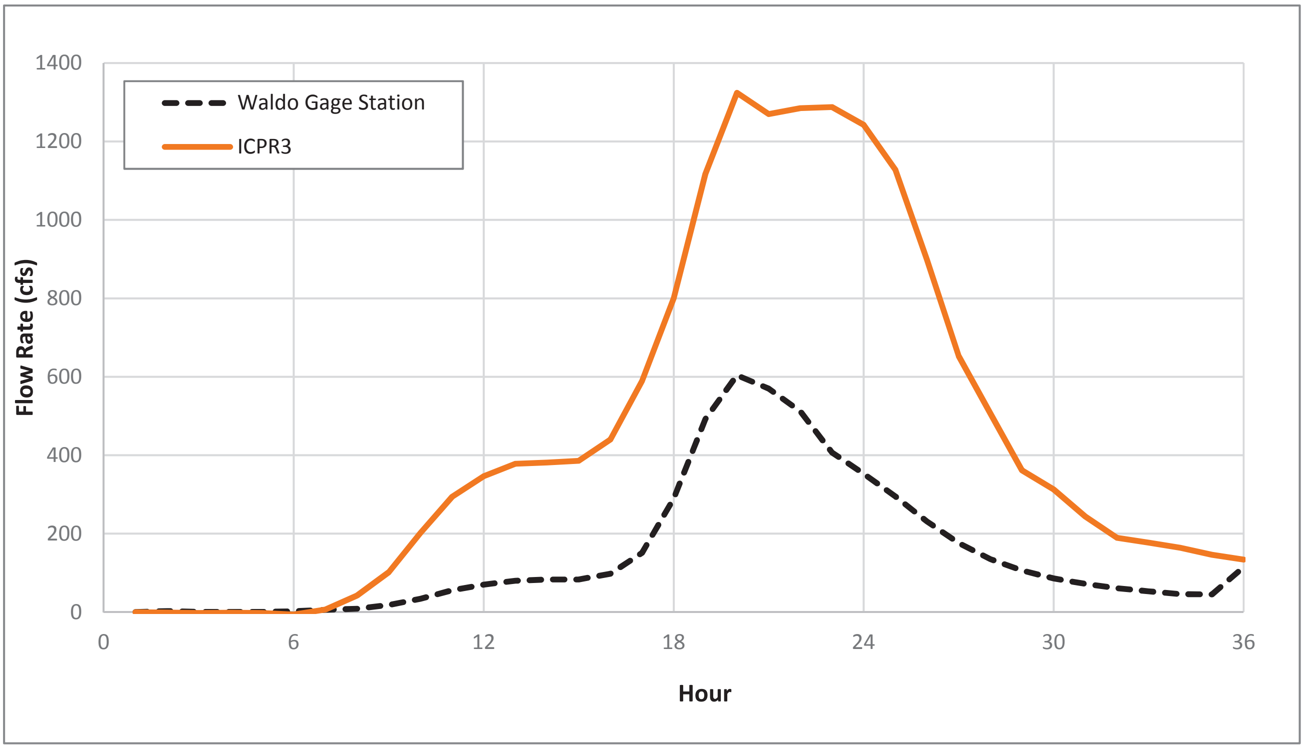


FIGURE 3-11.

COMPARISON OF OBSERVED FLOW RATE TO ICPR OUTPUT

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

Accordingly, the LHC components of the original model were migrated to ICPR Version 4 (ICPR4), which has the ability to perform long-term simulations and account for these known basin behaviors.

Migration to ICPR4 entailed several additional data inputs, all of which were implemented according to the ICPR User's Manual and Technical Reference (Streamline Technologies, Inc.). In particular, the following datasets were obtained:

- Soils—Soils data were obtained from the Natural Resources Conservation Service Web Soil Survey using the Soil Data Viewer add-on to ArcMap.
- Reference Evapotranspiration—Daily data obtained from USGS (2017). Although gridded data is available, variation across the model domain was negligible; therefore, a single station (143948) was used.
- Impervious Surface—Defined based on relationships with land use codes obtained in the 2012 SJRWMD water supply impact study (SJRWMD, 2012).
- Crop Coefficient Zones—Characteristics, including rooting depth and crop coefficient, were estimated based on professional judgement and annual mass balance (i.e., the portion of precipitation allocated to ET). Values were varied according to Level 1 FLUCCS codes.

Soils data were processed for use as input to the Green-Ampt rainfall excess method following the workflow in the User's Manual. The Green-Ampt method of infiltration determines the rate or volume of water infiltration in soils using estimates of soil parameters based on soil texture and structure, including soil suction head (wetting front), porosity (water content), hydraulic conductivity, and a time component (cumulative depth of infiltration). Simulations were run assuming vertically uniform soil delineations (i.e., Green-Ampt mode) and vertically heterogeneous soil delineations (i.e., Vertical Layers mode) with little variation in model output. Therefore, to reduce model complexity, Green-Ampt mode with vertical homogeneity was carried forward for subsequent simulations.

To assess the ability of the new ICPR4 model to effectively characterize actual conditions, continuous simulations were run for 2012 using an hourly timestep and a range of initial groundwater table elevations. The purpose of this step was twofold. First, by running for a full year, major water budget fluxes like total streamflow and total ET could be compared to actual data (for streamflow) and expected behavior (e.g., ET is generally 60 to 80 percent of incoming precipitation). Second, the ability of the model to reproduce major storm event hydrographs could be assessed, giving a feel for the degree of conservatism built in to subsequent analyses.

Table 3-5 shows the water budget results for each of the five simulations, which were run for initial groundwater tables of -1, -2, -3 and -4 ft. Total streamflow was extracted from the WGS dataset, while the annual ET reported for Alachua County by the Florida Automated Weather Network (FAWN) (http://fawn.ifas.ufl.edu) was used for an approximate comparison. As can be seen, not until the initial water table is dropped to at least -3 ft do values for streamflow and ET approach actual conditions for 2012. Figure 3-12 shows the hourly flow results for the calibration storm event, and the results are similar: an initial groundwater table elevation of -3 ft is needed to improve the accuracy of model results. Accordingly, for long-term water budget calculations performed in subsequent sections, an initial groundwater elevation of -3 ft is used, while for event-based analyses in Section 5.0, an initial groundwater elevation of -2 ft is used to add a degree of conservatism.

Table 3-5. Water Budget Results

Simulation	Initial Groundwater Depth (ft)	Precipitation (P) (in/yr)	Q (in/yr)		ET (in/yr)	
			Actual Streamflow*	Modeled Streamflow†	Alachua County ET‡	Modeled ET§
2012.WT1	-1	56	14	30	40	24
2012.WT2	-2	56	14	22	40	31
2012.WT3	-3	56	14	17	40	37
2012.WT4	-4	56	14	15	40	36

*At WGS, HDC (2016).
†WGS contributing area, node LHC_360 in model.
‡Alachua County, FAWN.
§Total model domain average.

Source: ECT, 2017.

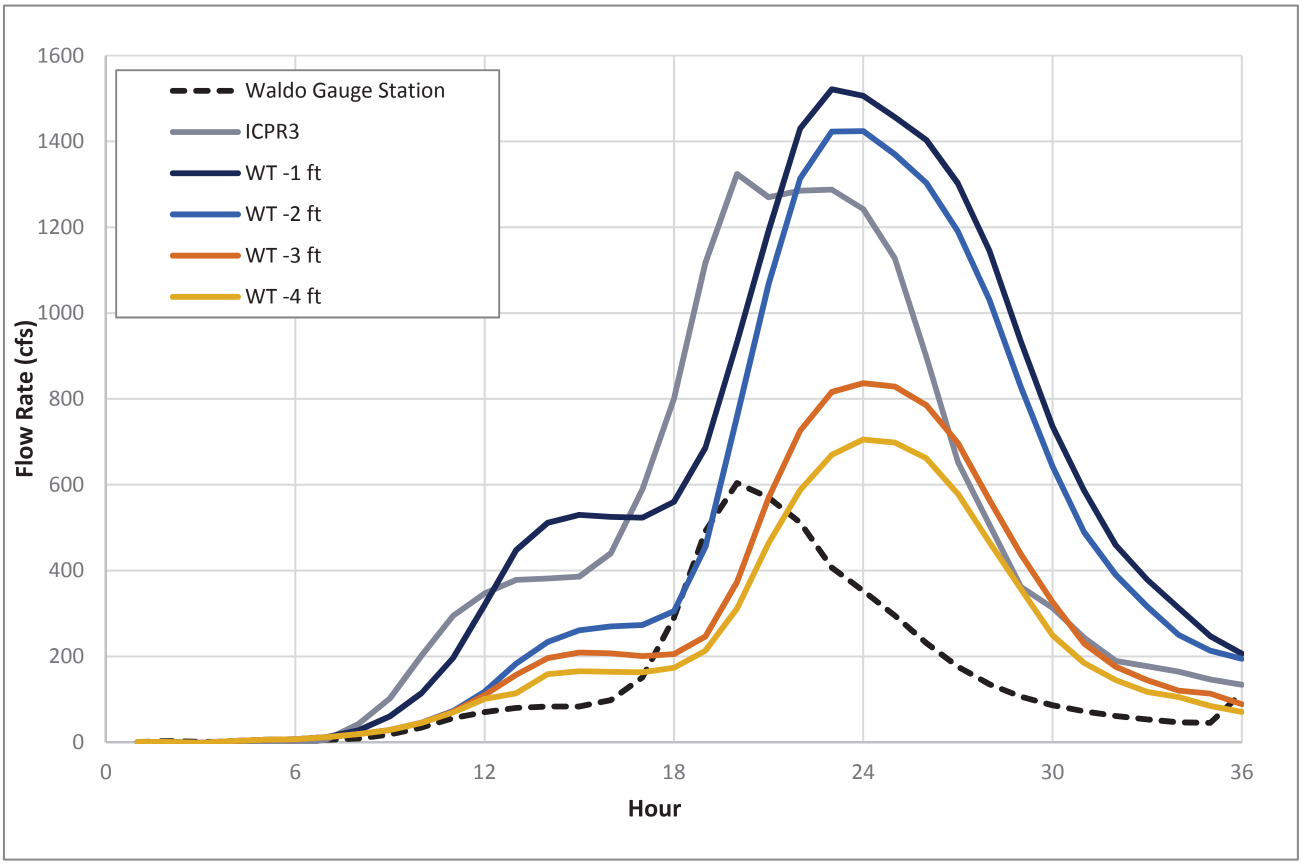


FIGURE 3-12.

MODEL UNIT HYDROGRAPH CALIBRATION

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

4.0 Project 2: GRS Water Quality Improvement

4.1 Introduction

The GRS sub-basin comprises approximately 50 percent of the LHC sub-basin and likely plays an important role in the nutrient dynamics of waters reaching Newnans Lake. However, any insights into controls on nutrient concentrations and the function of GRS as a source or sink for nutrients remained unknown until recently. There is evidence to suggest GRS operates as a sink for SRP during the winter and as a source of SRP to Newnans Lake during the summer (Cohen *et al.*, 2010). This seasonal dynamic is unexpected in most wetlands, as temperature and vegetative growth typically result in increased SRP removal during the summer season in treatment wetlands.

When investigating the biogeochemical controls on phosphorus concentrations in GRS, four overarching questions guided the investigation:

1. What are the sources of major phosphorus loadings to GRS?
2. Do phosphorus concentrations vary across GRS by wetland community?
3. What are the major pools of phosphorus, and what is their potential for release?
4. What are the controls on phosphorus release in GRS, and does phosphorus release or retention vary across wetland communities.

The information gained from this investigation was used in conjunction with hydrologic data and modeling results to estimate annual phosphorus loading concentrations from GRS to Newnans Lake and inform options for management actions to reduce loadings.

4.2 Wetland Community

The wetland immediately north of Newnans Lake is a large basin swamp locally known as GRS. Based on field observations from sampling events during 2016, three wetland communities were distinguished within GRS: creek, mixed hardwood, and gum root. Vegetation and hydrology characteristics of each wetland community are described in Table 4-1 and shown in Figure 4-1 (Appendix H). These wetland communities were determined based on field observations of differences in dominant vegetation thought to be the result of different hydrologic regimes. Examination of DEM-determined flow paths in GRS indicate the gum root community contains the termination points of various inflows from the surrounding landscape, while the mixed hardwood community is a contiguous low-lying region in the center of the swamp (Figure 4-2). This distinction was important to the study design, since the goals were to examine how biogeochemical controls (which include hydrology) may differ across GRS. It is important to note this distinction is not intended to meet regulatory wetland community classification but serve as nomenclature between different study groups in GRS (e.g., both mixed hardwood and gum root communities are mixed hardwood swamps, by definition).

Table 4-1. Wetland Communities Observed in LHC Sub-basin (From Field Observations of 2016)

	Creek Community	Mixed Hardwood Community	Gum Root Community
Wetland type	Riparian	Freshwater swamp, deepwater	Freshwater swamp, deepwater
Dominant vegetation	*Quercus* sp. (oak), *Pinus* sp. (pine), *Sabal palmetto* (cabbage palm), *Nyssa sylvatica* var. *biflora* (black gum)	Dense mixed shrub, black gum, *Taxodium distichum* (cypress)	Cypress, black gum, *Acer rubrum* (maple), oak
Hydrology	Seasonally inundated/saturated	Seasonally inundated	Seasonally inundated
Soils	Loose sand with variable OM accumulation in top horizon	Deep surface (O) horizon	Deep surface (O) horizon

Source: ECT, 2017.

Historical resource management activities in GRS are unclear, as sufficient records do not exist to indicate activities in GRS during the early 1900s. While cypress logging is known to have occurred in the area, field observations (lack of exposed cypress stumps in wetland communities) and historical imagery (no apparent change in vegetation cover, Figures 4-3 through 4-4) do not indicate cypress logging took place in this region of GRS. Therefore, it is hypothesized the small but apparent shift in vegetation is the result of slightly different hydrologic regimes.

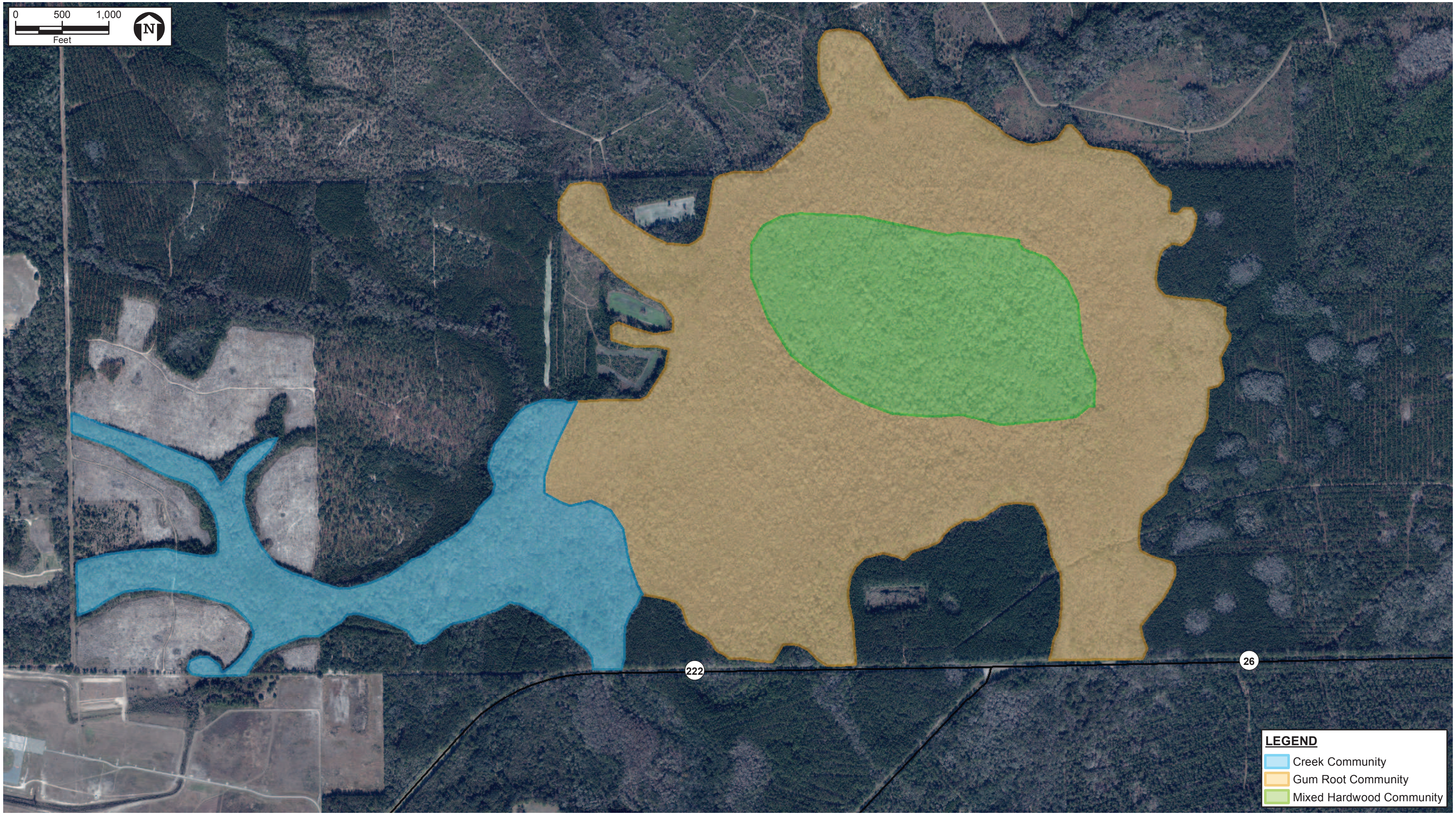


FIGURE 4-1.
VEGETATION COMMUNITIES
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

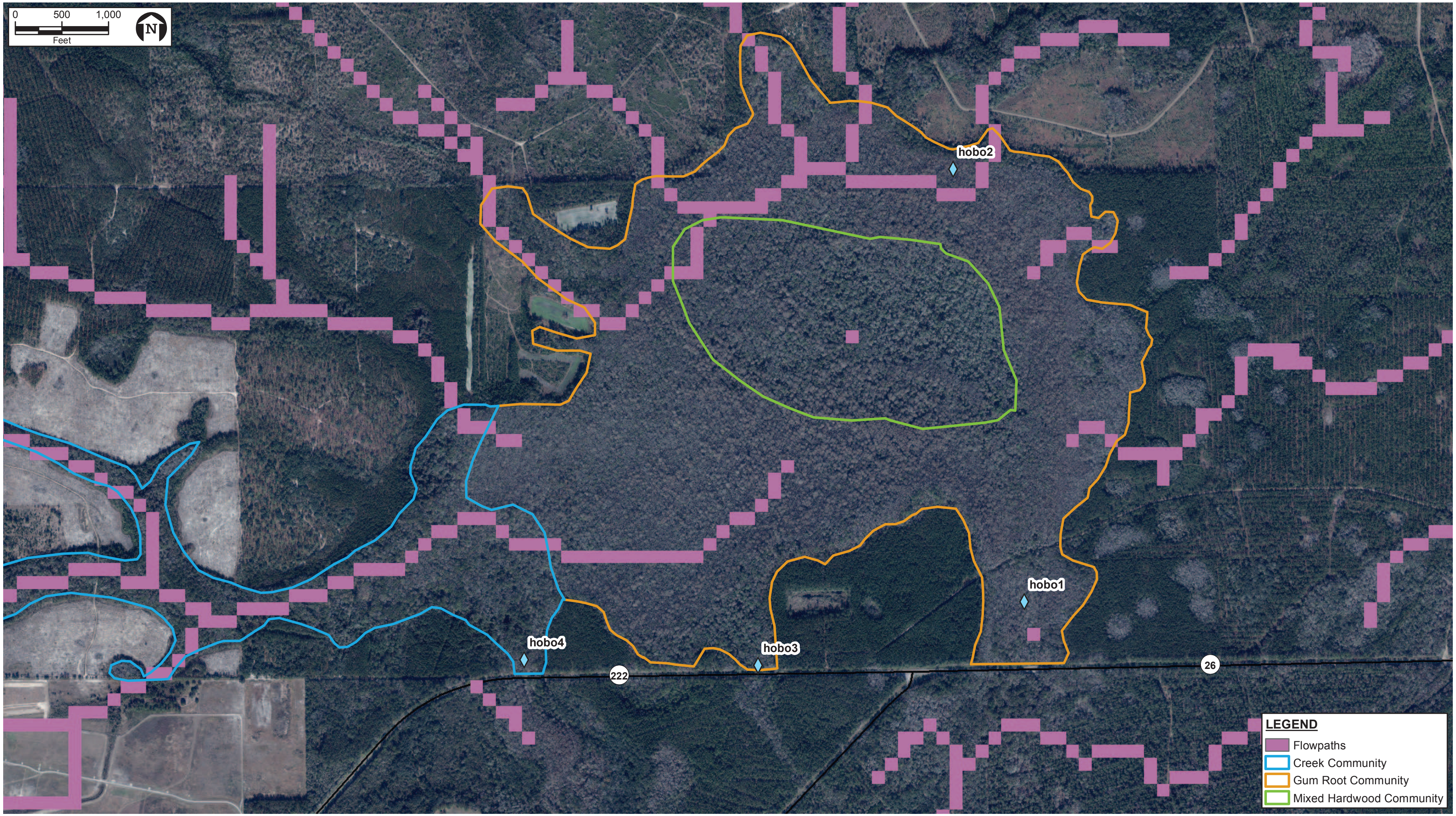


FIGURE 4-2.

FLOWPATHS
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

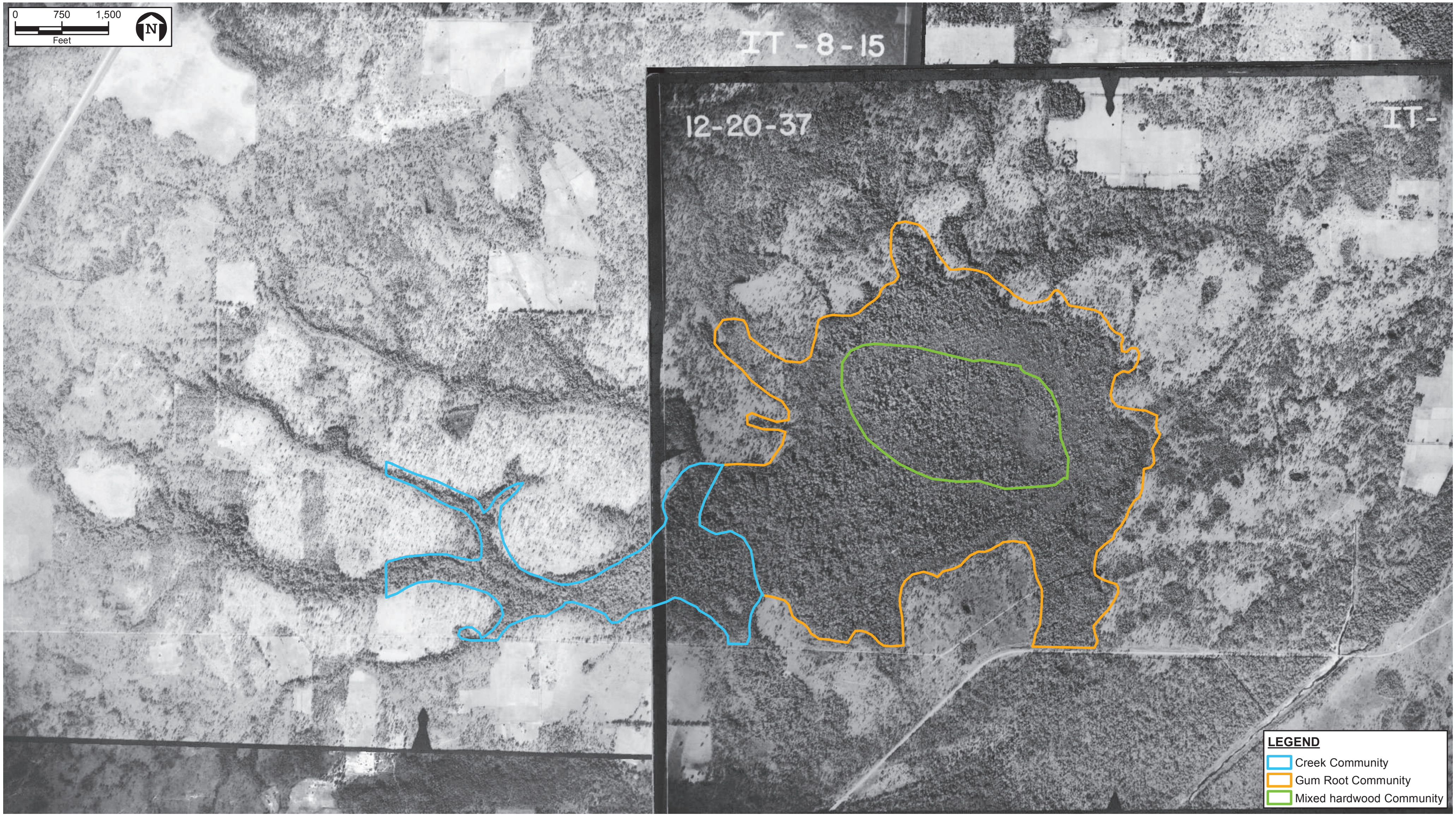


FIGURE 4-3.

HISTORICAL IMAGERY
FLY DATE 20 DECEMBER 1937
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: USDA, 1937; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

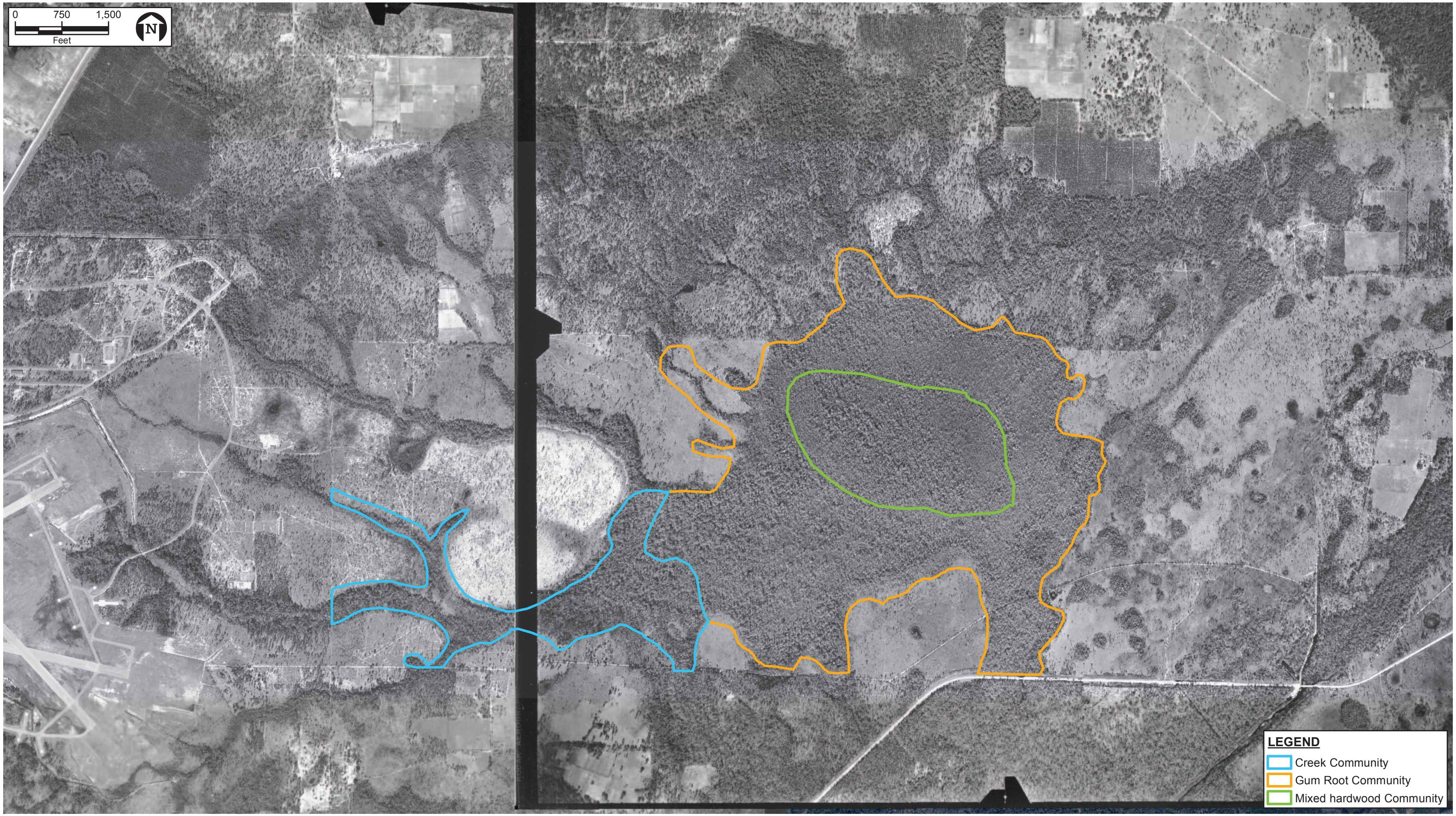


FIGURE 4-4.

HISTORICAL IMAGERY
FLY DATE 11 FEBRUARY 1949
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: USDA, 1949; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

Since GRS functions are poorly understood, samples for each new study described in the following paragraphs were collected from each wetland community to capture the potential effects of dominant vegetation or hydrology on the measured parameters. While this approach was not meant to provide an in-depth characterization of each wetland community, it does provide precursory observations that may parse out differences in each community's function to guide future work in GRS.

4.3 Phase I GRS Investigations

The following studies were conducted in GRS to provide the additional data necessary to determine suitable actions to reduce phosphorus levels in LHC and the swamp, thereby reducing TP levels in Newnans Lake.

4.3.1 Source Identification

Previous work in LHC and GRS has debated the source of phosphorus entering these systems. Most recently, it was hypothesized the majority of phosphorus loading is derived from weathering of autochthonous minerals, primarily fluorapatite found in the Hawthorn (Cohen *et al.*, 2008 and 2010). To test this hypothesis, XRD was used to determine the minerals present, sample speciation, and approximate solubility. While fluorapatite is relatively stable under the conditions at which it formed, current conditions in LHC are dramatically different. Water chemistry as well as physical forces (such as erosion by increased flows) subject these minerals to weathering of varying intensities. Therefore, fluorapatite as well as weathering products of fluorapatite such as wavellite ($Al_3(PO_4)_2(OH, F)_3 \cdot 5H_2O$) and crandallite ($CaAl_3(PO_4)(PO_3OH)(OH)_6$) are indicative of Hawthorn transport and weathering.

4.3.1.1 Methods

XRD provides detailed information about the atomic structure of crystalline substances based on the known behavior of the interlayers of minerals and the orderly array of X-ray scatter based on the arrangement of atoms in crystals. This technique can confirm the presence of apatite and can also be used as a tool to track the transport of this mineral across the landscape. In March 2017, grab samples of exposed Hawthorn material were collected from within LHC at three locations and analyzed via XRD (Figure 3-1), including a sample from a region in LHC where extensive bank erosion was evident and the creek makes a 90-degree turn on GNV property (see Section 3.2.3).

Water samples were collected from LHC following a storm event on April 4, 2017, from the West Branch (culvert under SR 26) and at the East Branch (culvert under 39th Avenue) using autosamplers. During this time, suspended particulates were likely to peak in an amount adequate for XRD of the filtrate.

The bank sample from LHC was prepared for three mounts by the following methods: (1) drying and grinding the sample and preparing a cavity mount (whole sample); (2) particle size fractionation of the sample using a process of dispersal, centrifugation, and sieving to obtain the sand fraction for preparation in a cavity mount (sand fraction sample); and (3) particle size fractionation as described previously to obtain the silt and clay fraction for preparation in a cavity mount using the aqueous suspension method (clay and silt fraction sample). The suspension method provides a strong degree of preferred orientation as well as differential sedimentation, resulting in the lighter (clay) particles settling on the uppermost layer that is exposed to the X-ray. In this study, the suspension method is preferable, since the targeted results are the lightest clay fraction that is easily transported via fluvial processes. Approximately 1 liter of aqueous grab samples were filtered on 0.45-micrometer filter paper by vacuum filtration. Filtrates were transferred to a quartz mount and suspended with water before allowing the sample to dry on the mount. XRD intensity peak plots at the two-theta (degree) detector angle position were analyzed for major peaks using XRD software in the UF Soil Mineralogy Laboratory. Major peaks were identified using mineralogical data keys and interpreted based on known landscape characteristics.

4.3.1.2 Results

Intensity peak plots at the two-theta position for the whole sample show multiple characteristic peaks for fluorapatite (Figure 4-5). The analyzed sample is relatively pure fluorapatite, with major peaks fitting those of fluorapatite mineral standards extremely well. These results indicate the material exposed is in fact Hawthorn, and the material has been subjected to relatively little weathering at this location.

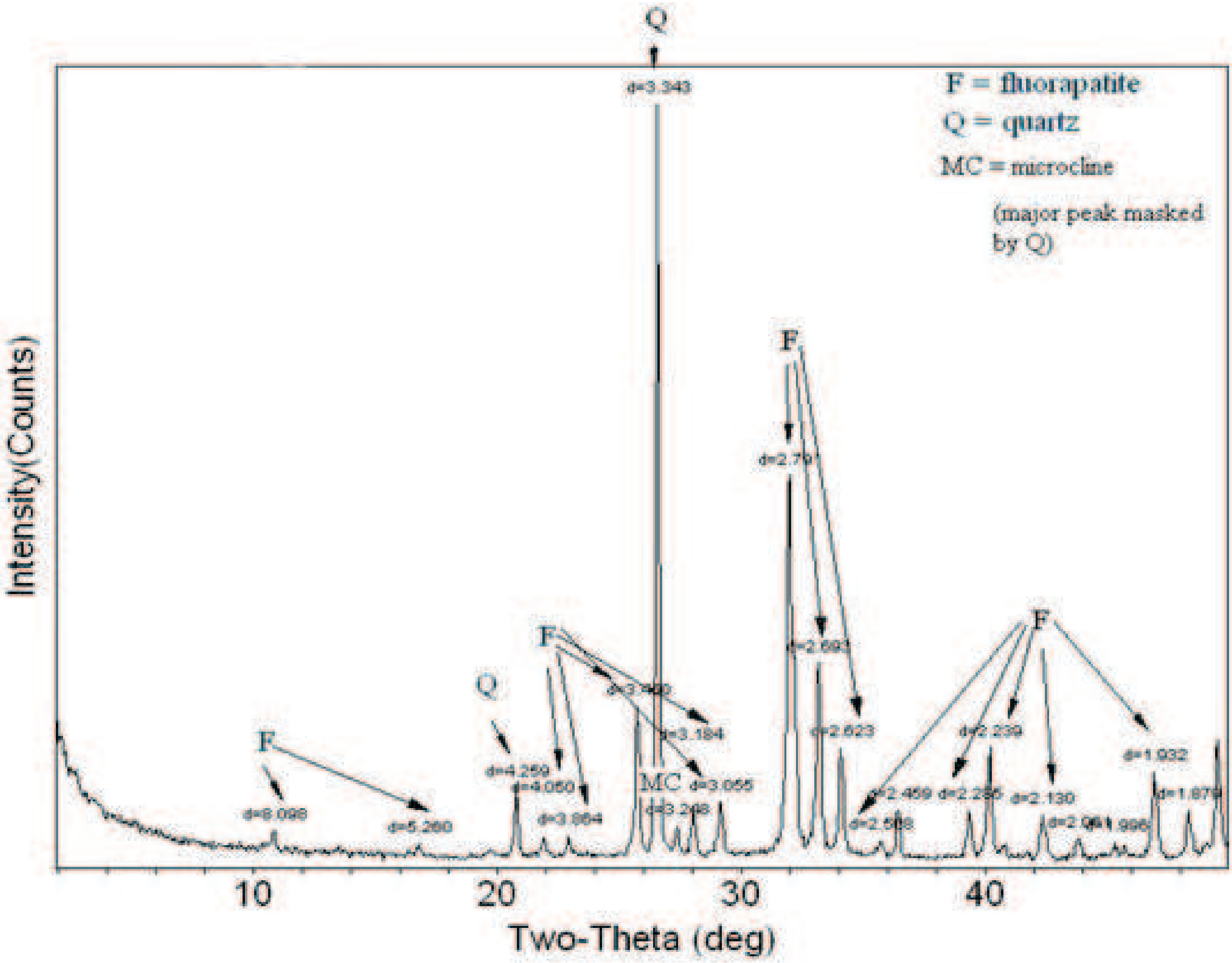


FIGURE 4-5.

INTENSITY PEAK PLOTS AT THE TWO-THETA POSITION FOR WHOLE SAMPLE FROM LHC

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

The sand fraction sample and clay and silt fraction samples also exhibit plots with characteristic peaks for fluorapatite, with higher peaks for fluorapatite in the clay and silt fraction sample inferring greater concentrations, as is expected (Figures 4-6 and 4-7). When interpreted in light of sediment transport processes, an albeit small but potentially significant TP concentration in the heavier sand fraction can be expected, which drops out from flows much faster than the clay and silt fraction and therefore is transported much shorter distances. Samples collected by Alachua County from sand bars and analyzed for TP (Appendix B and I) support this hypothesis, and TP values likely represent the phosphorus within this sand fraction (see Section 4.3.2). The peaks of the clay and silt fraction plots suggest the clay and silt fraction has much greater amounts of fluorapatite when compared to the sand fraction. The presence of montmorillonite clay with fluorapatite suggests the location sampled is a phosphatic bed, likely in the upper part of the Hawthorn. Unfortunately, the clay and silt fraction is readily transported by water and does not settle until water is stagnant. Furthermore, resuspension even under low flows is easily achieved. As such, it can be expected that when this fraction is transported during storm events, most of the eroded material is directly transported to Newnans Lake.

Filtered water samples obtained from the East Branch (C-4, Figure 2-2) and West Branch (C-2, Figure 2-2) contained only kaolinite, quartz, and an unidentifiable mineral (Figure 4-8). It is possible the kaolinite present in the sample was derived from montmorillonite weathering or apatite conversion; however, insufficient data exist to support or refute this hypothesis. The intensity peak of the unidentifiable mineral in the sample did not match the major peak for any minerals that would be present when taking into account geology and landscape position. The processes of secondary mineral formation that are likely to have taken place in wetlands can result in minerals that do not have a crystal structure that precisely fits the pure form of that mineral. As such, further investigation beyond XRD, such a scanning electron microscopy, may be warranted to determine the composition of this sample. Additionally, it is likely other minerals are transported via creek water and are not captured in this sample, because a sufficient quantity for determination by XRD is not present. What is an interesting interpretation from these data is the similarity of mineral composition in the two locations. Spatially, these culverts are quite far apart, and water interacts with wetlands much more extensively before exiting at the 39th Avenue culvert (C-2, Figure 2-2). As such, it was expected the 39th Avenue culvert sample

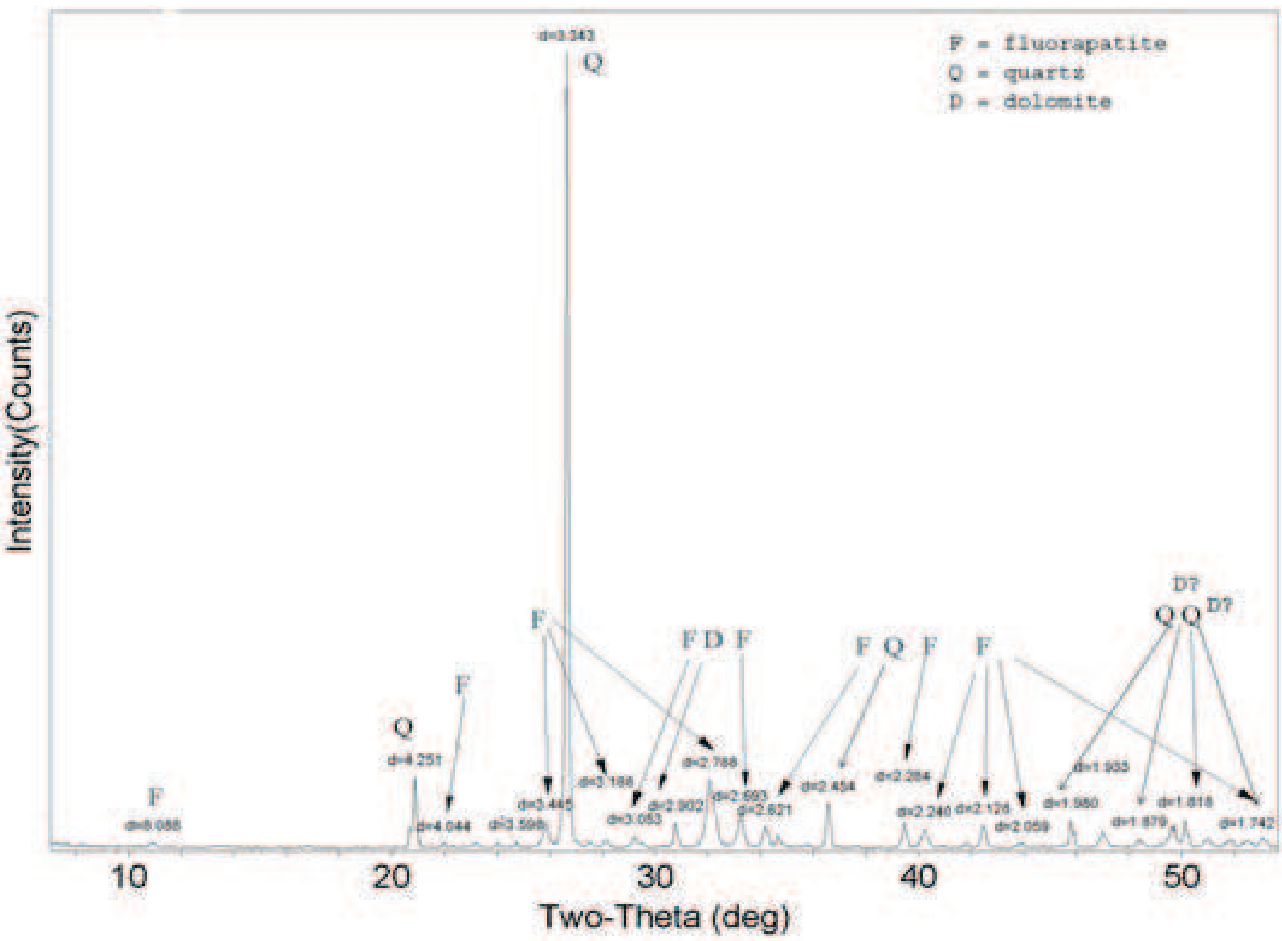


FIGURE 4-6.

INTENSITY PEAK PLOTS AT THE TWO-THETA POSITION FOR SAND FRACTION SAMPLE FROM LHC

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

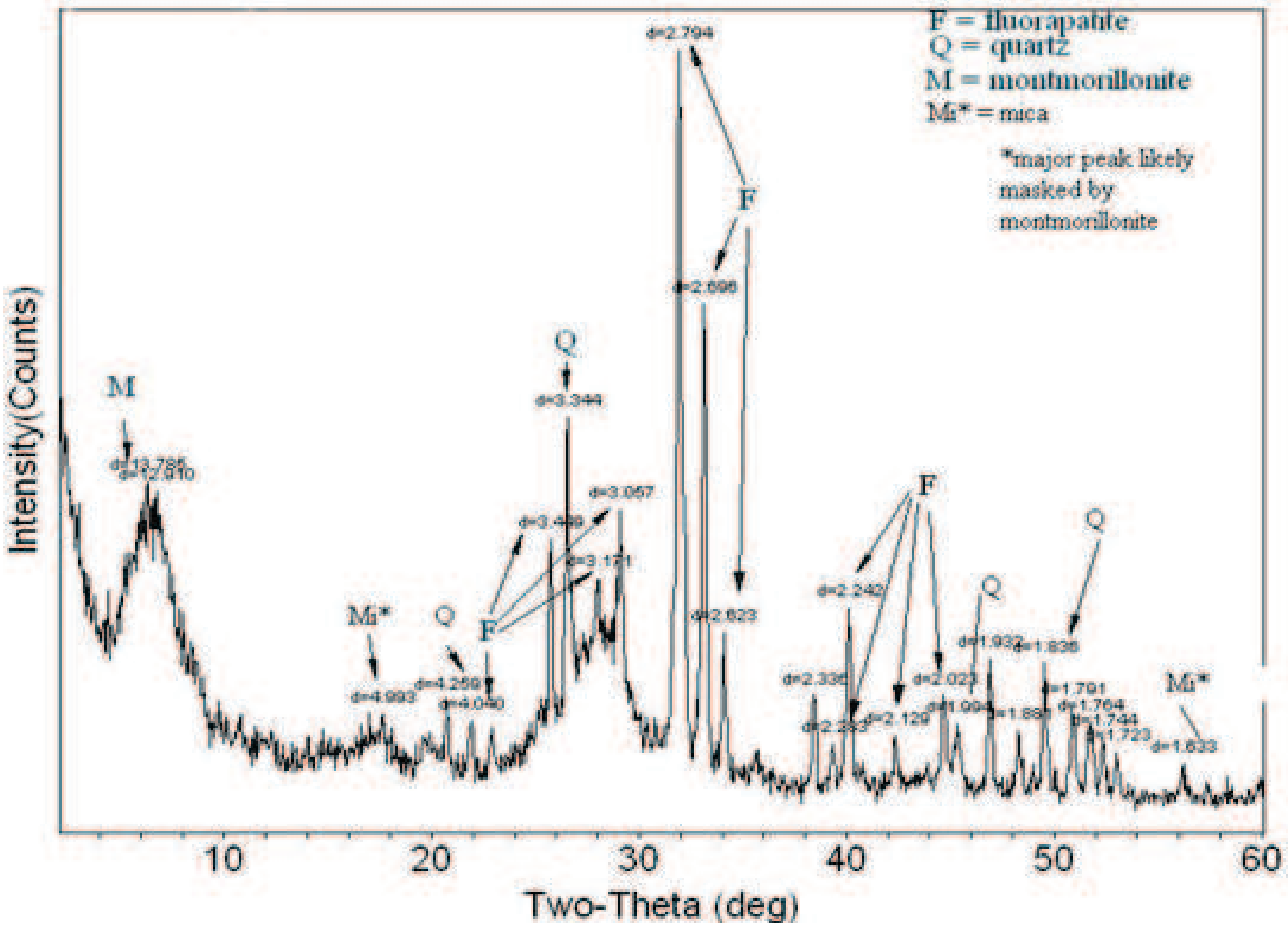


FIGURE 4-7.

INTENSITY PEAK PLOTS AT THE TWO-THETA POSITION FOR CLAY AND SILT SAMPLE FROM LHC

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

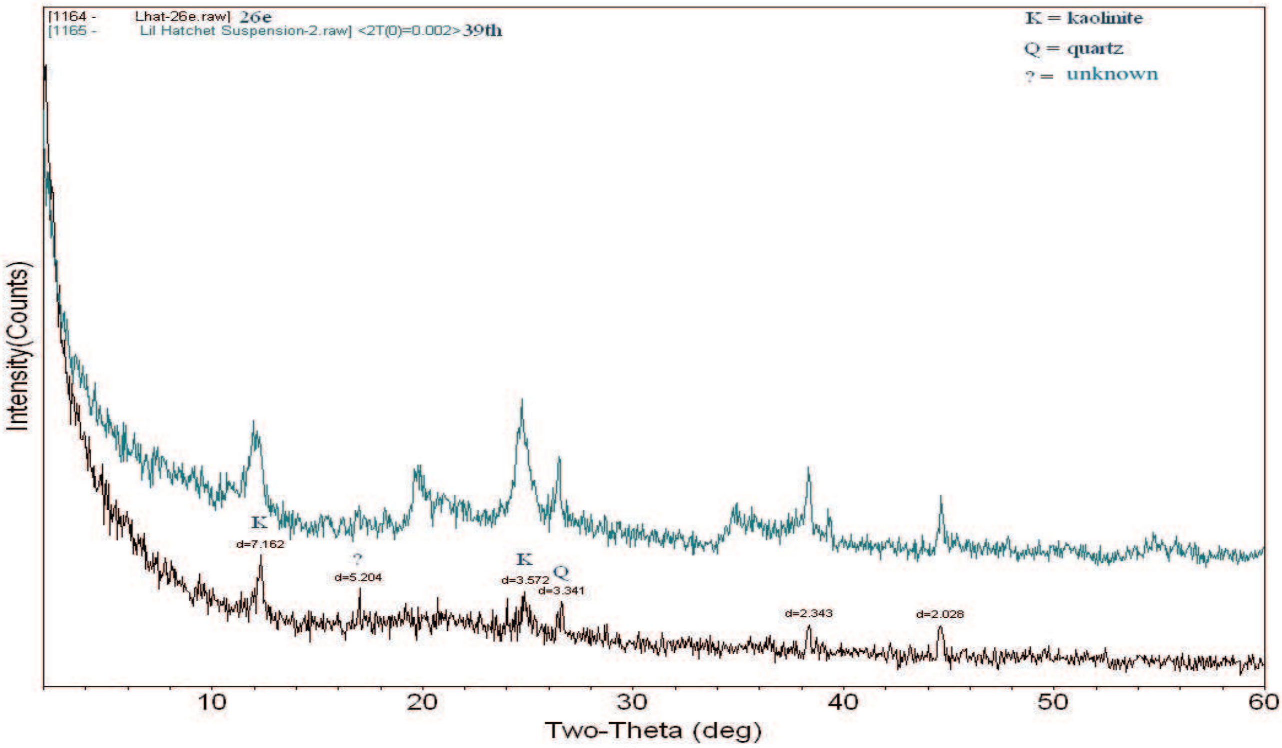


FIGURE 4-8.
INTENSITY PEAK PLOTS AT THE TWO-THETA POSITION FOR FILTERED WATER SAMPLES FROM LHC AT STATE ROAD 26 AND 39TH AVE CULVERTS

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

would have a much more varied mineral composition compared to the SR 26 sample, which is transported via channelized flow in LHC during storm events.

4.3.2 Spatial Extent of Phosphorus

Understanding the hydrologic connections (flow paths) and associated concentrations of TP and SRP in regions along these flow paths is critical to understanding nutrient loads to GRS. Depending on rainfall and lake stage conditions, flow from GRS can enter Newnans Lake through surface channelized and/or sheet flow as well as subsurface flow in the surficial aquifer. As such, understanding phosphorus concentrations both in the active upper region of the soil as well as at depth in GRS is important to estimating loads. Furthermore, exploring phosphorus concentrations at depth provides insights into the history of nutrient loading in the sub-basin. While heterogeneity of nutrient concentrations in wetland systems is expected, using a study design that provides data for each wetland community allows for better understanding of the mechanistic processes behind the total nutrient loads leaving the swamp.

4.3.2.1 Methods

Composite grab samples were collected with a small soil core with a known volume from randomly selected sampling locations within each wetland community (Figure 4-9). At these same locations, cores were augured until refusal and stratified in long sampling trays while taking regular depth measurements in the auger hole to maintain representative sample depths. Following auguring, soil horizons were identified based on color, texture, and redoximorphic features, and subsamples were collected from each horizon for analysis.

Samples were also collected from suspected Hawthorn material in LHC to confirm the presence of apatite and understand potential loadings that could result from erosion of this material. Three samples were collected from LHC banks for analysis. These data were interpreted in conjunction with the results from additional sampling efforts conducted by ACEPD and DB Environmental (2017). Spurred by field observations, additional bank samples were obtained from LHC west of Waldo Road, where additional bank erosion was observed.

Sample analyses were performed in the UF Wetland Biogeochemistry Laboratory using standard methods. Bulk density was measured by measuring soil wet and dry weights. Soil organic carbon

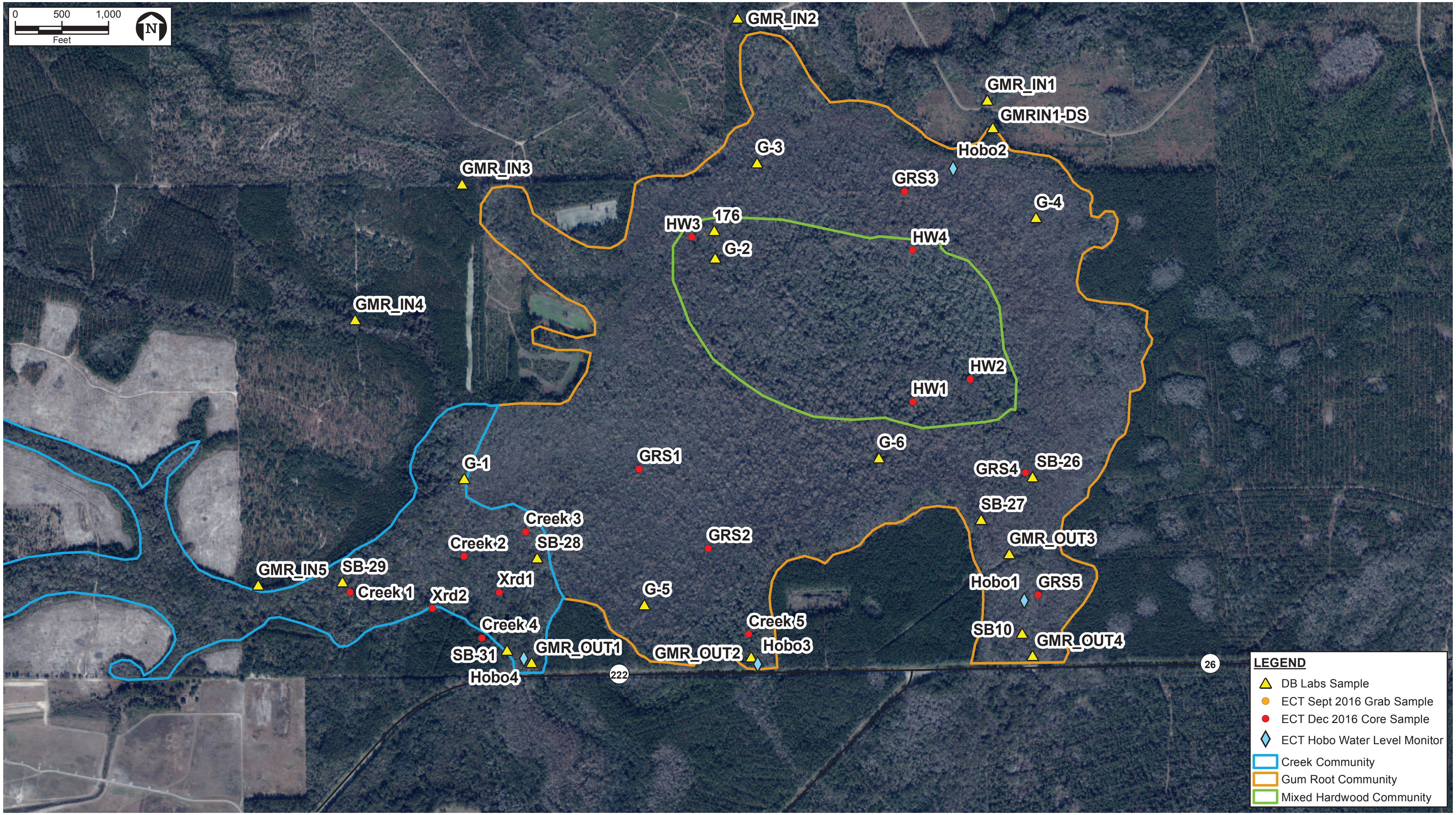


FIGURE 4-9.

VEGETATION COMMUNITIES AND SAMPLING LOCATIONS
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

(SOC) was estimated by loss on ignition (LOI). Deionized water-extractable phosphorus (DIW OPO_4) was measured for surface and deep samples by colorimetric method using a Hach® DR6000 spectrophotometer. TP was obtained for surface and deep samples by ignition and analyzed by colorimetric method using a Shimadzu® ultra-violet (UV)-1800 mass spectrophotometer. Total inorganic phosphorus (TPi) was measured by colorimetric method using a Shimadzu® UV-1800 mass spectrophotometer and total organic phosphorus (TPo) by subtraction of TPi from TP. For surface samples, sequential fractionation was used to discern inorganic phosphorus pools in the soil (Table 4-2) using a fractionation scheme based on Hieltjes and Lijklema (1980) and Reddy *et al.* (1998). To discuss data by wetland community, the analyzed values obtained from samples collected in this study were combined into a dataset with samples from previous studies (DB Environmental, 2017) to obtain the largest sampling size possible for each wetland community (Figure 4-9).

Table 4-2. Phosphorus Pools Measured by Sequential Fractionation

	KCl-OPO_4	NaOH-OPO_4	NaOH Po	HCl-OPO_4
Availability	Highly available inorganic phosphorus	Iron/aluminum-bound inorganic phosphorus	Humic and fulvic acid-bound organic phosphorus	Calcium/magnesium-bound inorganic phosphorus
Geologic context		Nonapatite inorganic phosphorus		Apatite inorganic phosphorus

Source: ECT, 2017.

The concentration of these pools in wetlands is guided to some extent by soil formation processes. Considering the buildup of OM characteristic of wetlands, the highest concentrations are expected to be found in the sodium hydroxide (NaOH) Po fraction when compared to the other three fractions. The NaOH-OPO_4 or nonapatite inorganic phosphorus (NAIP) and HCl-OPO_4 or apatite inorganic phosphorus (AIP) fractions concentrations vary depending on soil and water chemistry unique to the sample location. Highly available inorganic phosphorus, or potassium chloride (KCl)-OPO_4, is expected to be found in the lowest concentration when compared to the other soil phosphorus storage pools. This is the phosphorus that is highly available for plant production and is readily fluxed from the soil. When comparing soil phosphorus fractions in this study, it is most important to examine the relationships between the pools and the biogeochemical implications, as opposed to examining concentrations. Furthermore, while the concentration of highly available inorganic phosphorus is minuscule when compared to the other pools, the ratio of the potential for ecosystem-scale consequences over changes in concentration is much greater when compared to other pools; that is, a smaller change in KCl-OPO_4 concentration can have a much larger impact on the system.

4.3.2.2 Results and Discussion

Fractions of phosphorus in surface soils are relatively similar across wetland communities and are dominated by the organic fraction, as expected (Figure 4-10). Across community types, only highly available inorganic phosphorus concentrations varied significantly ($F(2, 36) = 3.76$, $p = 0.03$). Specifically, the mixed hardwood community exhibited higher concentrations of this phosphorus fraction when compared to the other wetland communities. The primary drivers behind this variation could lie in: (1) different sources of phosphorus within the three wetland communities with a more labile, inorganic source in the mixed hardwood community; or (2) different biogeochemical processes occurring in the wetland communities yielding different highly available inorganic phosphorus concentrations. To explore the source of variation in highly inorganic phosphorus concentrations, how other phosphorus fractions might be related must be considered.

A simple linear regression was calculated to predict highly available inorganic phosphorus concentrations based on the concentrations of other phosphorus fractions. In the mixed hardwood community, humic and fulvic acid-bound organic phosphorus concentrations account for 68 percent of the variation in highly available inorganic phosphorus concentrations ($F(1, 4) = 8.68$, $p = 0.04$). Other wetland communities did not exhibit significant relationships. Based on the extraction methods used for this study, the organic phosphorus fraction extracted represents the moderately labile pool. As a percent of TP, the mixed hardwood community contains 49.5-percent humic and fulvic acid-bound organic phosphorus, while the gum root community contains 35 percent and the creek community contains 33.7 percent. The relationship between humic and fulvic acid-bound organic phosphorus concentrations and highly available inorganic phosphorus concentrations in the mixed hardwood community suggests biological activity and accumulation of detrital material control available phosphorus concentrations in this region.

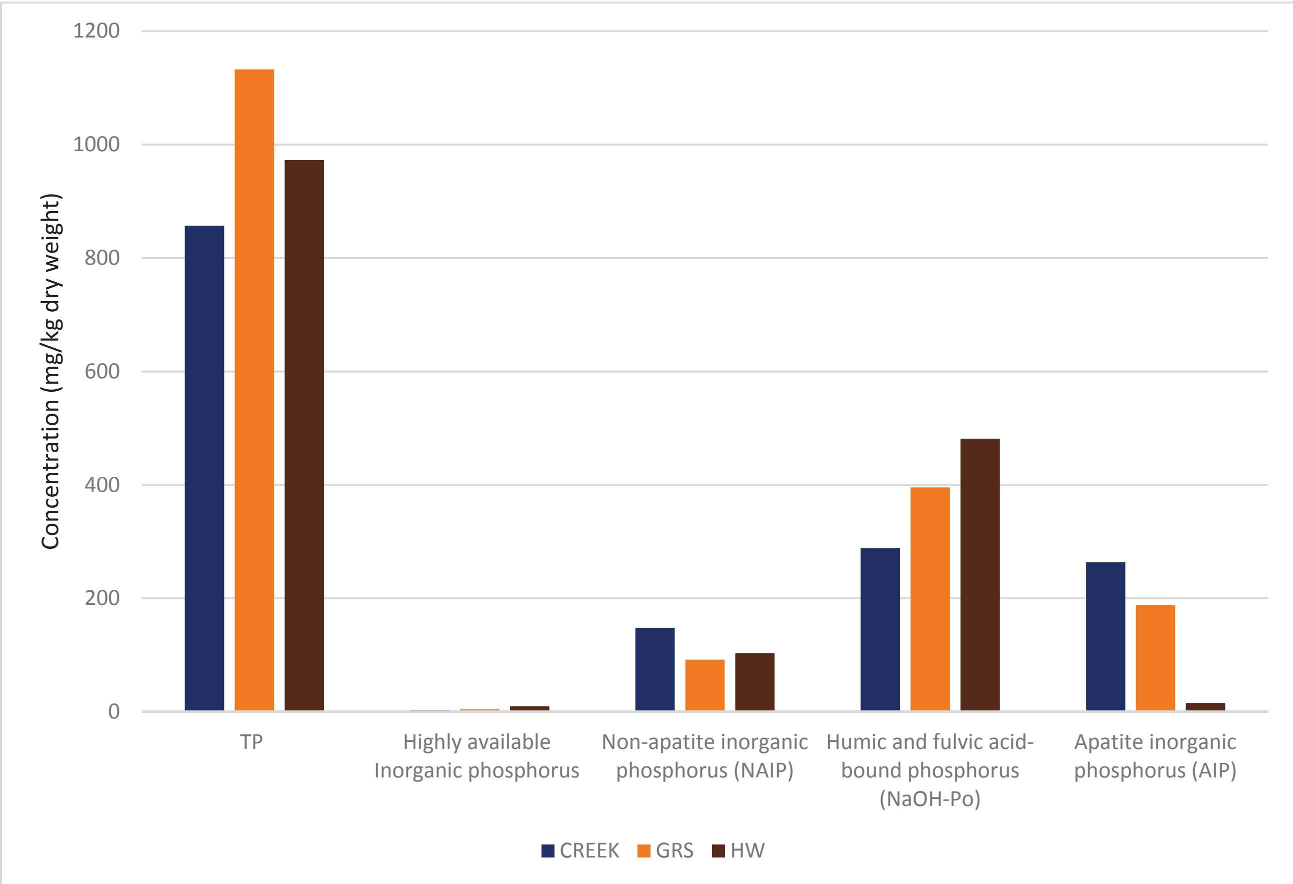


FIGURE 4-10.
AVERAGE CONCENTRATIONS OF PHOSPHORUS FRACTIONS IN CREEK, GUM ROOT, AND MIXED HARDWOOD COMMUNITY SURFACE SOILS

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

Work by Cohen *et al.* (2010) analyzed water samples at the outlet of GRS and found a positive relationship between SRP concentrations, decreasing DO, and increasing temperature. This relationship was hypothesized to drive the dynamics resulting in GRS providing a source of nutrients during the summer. These findings support the relationship between humic and fulvic acid-bound organic phosphorus concentrations and highly available inorganic phosphorus concentrations, since bacterial metabolism rates and oxygen consumption increase with increasing temperatures in bacterially regulated organic sediments (Wetzel, 1999).

As a whole, the mixed hardwood community contains significantly more highly available phosphorus when compared to the gum root and creek communities. Potential individual hot spots for existing highly available phosphorus loads were identified at Creek5 (14.2 mg/kg), GRS3 (18.3 mg/kg), and HW2 (26.9 mg/kg). These locations represent areas with the potential for the largest loads of highly available phosphorus to interact with moving water. Each of these locations is outside the flow path that water follows during major storm events upon exiting LHC (East Branch). As such, these highly available phosphorus concentrations are likely to result from biogeochemical processes occurring in GRS.

While locations high in highly available phosphorus represent existing hot spots in GRS, locations high in NAIP represent potential loads where phosphorus could be released during anoxic conditions (Figure 4-11). Sample locations high in NAIP follow the LHC West Branch flow path south to Newnans Lake from SB-28 (270 mg/kg) to GR3 (788 mg/kg) and in the wetland surrounding Newnans Lake at GR4 (430 mg/kg). These locations may load additional highly-available inorganic phosphorus to Newnans Lake when they are inundated and oxygen at the sediment interface is low.

Sample locations with high AIP represent potential legacy loads to Newnans Lake. By community, creek contains the greatest fraction of TP within AIP (30.8 percent), with gum root containing 15.9 percent, and mixed hardwood containing 1.6 percent AIP. At individual locations, Creek1 and SB-29 are within close proximity to each other, with AIP concentrations of 1,196.9 mg/kg and 741.0 mg/kg, respectively. AIP concentrations at these locations are likely the result of fluorapatite transport from LHC and, depending on system conditions, may continually release highly-available inorganic phosphorus over time (see Section 4.3.3). The sample

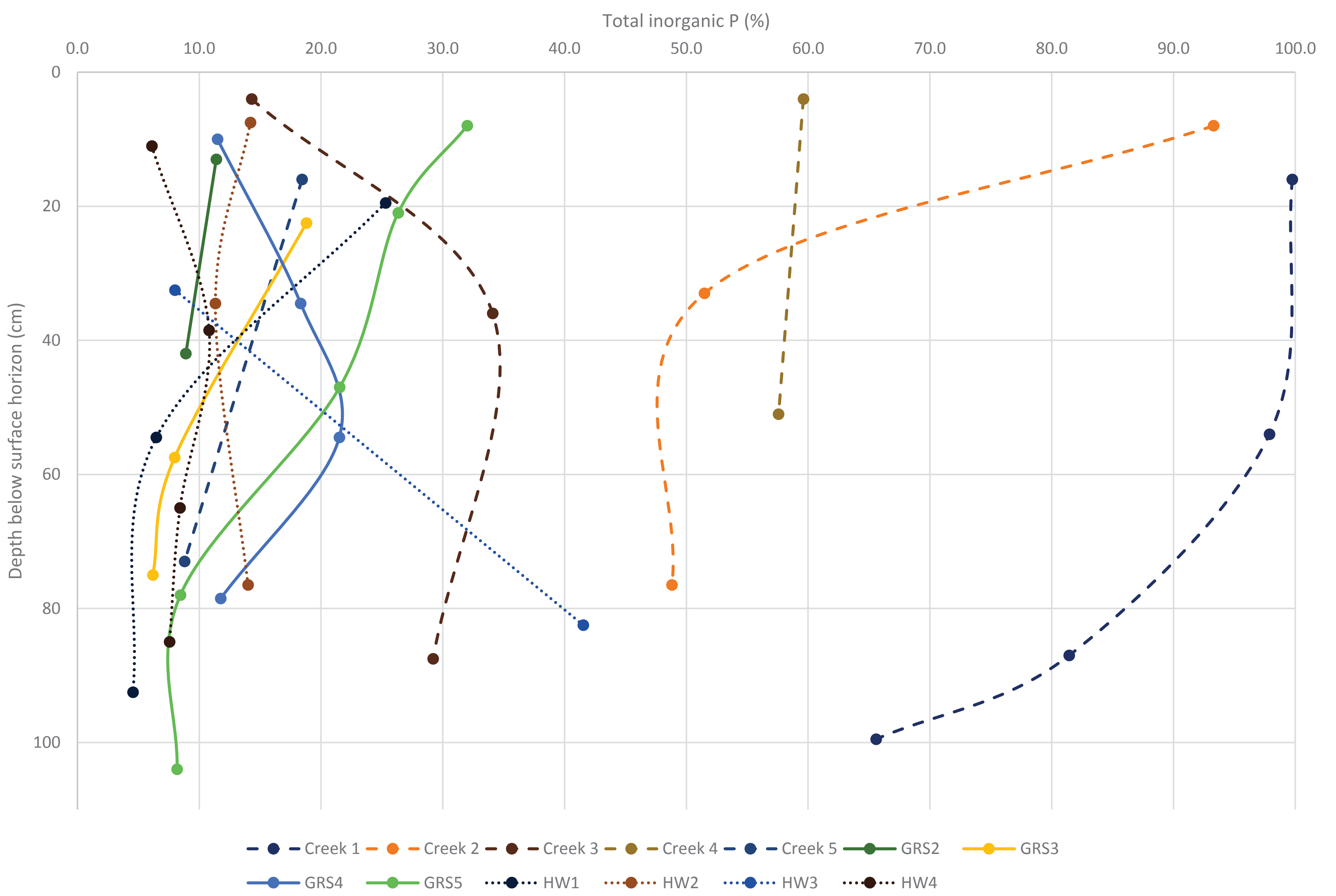


FIGURE 4-11.

PERCENT TOTAL INORGANIC PHOSPHORUS AS A FRACTION OF TP AT DEPTH IN SOIL PROFILES OF GUM ROOT SWAMP WETLAND COMMUNITIES

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

collected from GMRIN2 (2,570.0 mg/kg) contains the greatest amount of AIP. Since this sample location is located the farthest away from LHC at the northern boundary of GRS, further preliminary investigation as to the potential source of such a high level of AIP was warranted.

There are two former landfills and several groundwater contamination sites in this vicinity, including Clariant, Vital Industries, Fabco Air, and the Job Corps Center (former Sperry Rand facility). These sites have contamination primarily related to fuel or chlorinated solvents. From 1964 to 1971, the City operated the Airport Landfill on the north side of LHC east of GNV. During the wet season, monitoring records indicate an occasional leachate seep may still be seen. The former Alachua County Northeast Landfill is another site (FDEP ID 29655) with potential impacts to GRS. The leachate plume in the shallow groundwater stretches southeast toward the swamp. Former oxidation and retention ponds exist in the southeast corner of the landfill and discharge toward the swamp.

It is plausible, given the close contact of the Hawthorn with surface soils throughout the NLW, Hawthorn material was inadvertently exposed at a number of locations in the northern portion of the NLW and could be a source of AIP loading to GMRIN2; however, further investigation of soils in the area is necessary to confirm. Silvicultural activities are common in this region of the NLW and could potentially expose Hawthorn materials and increase erosion as a result of bedding, ditching, and other mechanical management activities. The creation of the two landfills in the area and associated soil excavation and trenching for waste burial and additional excavation for waste cover may have resulted in Hawthorn exposure and subsequent erosion that has contributed to high phosphorus loadings in the northern portion of GRS. While the diffuse nature of tributaries in this region make it difficult to pinpoint the location of loadings, these areas of potential Hawthorn exposure should be considered as a first approximation of potential sources. Furthermore, based on the findings of groundwater flow paths in this region, it is not unreasonable to assume some portion of surficial groundwater potentially high in nutrients in this region provides baseflow to tributaries feeding into GRS.

In most sediments, the organic phosphorus fraction is greatest in surficial sediments and decreases with depth as a greater percentage in AIP and NAIP, or TPi, is found (Wetzel, 1999). Contrary to this expectation, HW1, GRS5, GRS3, Creek1, Creek2, and Creek5 exhibit dramatic increases in percent TPi in surficial sediments when compared to sediments at depth (Figure 4-11). This increase in percent TPi near the surface at these locations may be the result of increased loading of inorganic phosphorus with time, likely in the form of AIP. Sample locations Creek1 and Creek2 have experienced the most dramatic increases in TPi loading, as TP concentrations at these locations are more than 93-percent inorganic phosphorus. Based on field observations, these locations are where the majority of sedimentation of sand-sized material from Hawthorn erosion is likely to have taken place. Additional work concerning sedimentation rates and transport modeling would provide the data necessary to explore this hypothesis. The dramatic increase in percent TPi in surficial sediments at GRS3 and HW1 warrants further exploration, since these locations are far east from the west branch of LHC where the majority of Hawthorn erosion and transport occurs.

Bank samples obtained from LHC in the project are incredibly high in TP, as expected from Hawthorn material. Sample TP concentrations ranged from 58,904 mg/kg at the 90-degree bend at GNV to 1,254 mg/kg in Reach 2, with an average concentration of 31,654 mg/kg. Almost the entirety of these bank samples is comprised of inorganic phosphorus, with the exception being Reach 2, where approximately 30 percent is inorganic. Characteristics of sediment samples obtained from sand bars in LHC (DB Environmental, 2017) exhibit characteristics that suggest sourcing from Hawthorn erosion, almost 100 percent of the average TP in these samples is held within the AIP fraction. Average DIW OPO_4 concentrations of sand bars (3.6 mg/kg) are slightly higher than those of bank samples (2.5 mg/kg), suggesting, if the sand bar material is primarily the sand fraction of Hawthorn material that has experienced erosion and deposition, either physical or chemical processes have weathered this material to some extent, releasing more available phosphorus.

4.3.3 Biogeochemical Controls and Cycling

Biogeochemical reactions are perhaps the most important controls on phosphorus release in this system. While the loading of AIP from Hawthorn exposure is apparent, the availability of this material depends entirely on the pH of the system and other interactions at play controlling phosphate-ion activity in the sediment-surface water interface. Furthermore, these interactions have an important role in dictating other forms of phosphorus, such as organic phosphorus, that have been identified as important controls on phosphorus availability in this system. To investigate biogeochemical controls and cycling, components of several important biogeochemical processes were examined:

- Characteristics of carbon in the active region of the soil, including carbon subject to oxidation and phosphorus release by measurement of SOC content
- How hydrology affects phosphorus storage and release, phosphorus conversion, and long-term stability of phosphorus in soils:
    - Phosphorus transformations in aerobic and anaerobic conditions as dictated by hydrology and associated changes in water chemistry (dissolved cations, pH, and forms of phosphorus)

Especially in wetlands, phosphorus loading can result from oxidation of OM in the upper 15 centimeters (cm) of the soil during dry periods. To estimate the potential for phosphorus loading from OM oxidation, SOC content was estimated based on LOI. Wetting and drying with seasonal variation in rainfall also results in shifts in phosphorus speciation, transport of silicates and OM, and other nutrient transformations in soils. To understand these dynamics, an incubation study using intact cores was performed with wetting and drying cycles. The inundation treatments consist of flooding the cores with synthetic rainwater for variable lengths of time and then slowly draining the cores.

4.3.3.1 Methods

Using the same surface soil samples used in the spatial extent study, OM content was estimated for the upper 15 cm of each soil core (O horizon) by LOI. Samples were air-dried, sieved through a 2-mm sieve, and ground. Container weights and dry soil weight measurements were obtained before muffling at 550 degrees Celsius in a muffle furnace. Following cooling, weights were taken and ash weights were obtained by subtraction from initial weights.

Cyclic incubation and leaching was controlled for deep cores collected from the three wetland zones: mixed hardwood (n=4), gum root (n=4), and creek (n=5). One additional core from each wetland zone was intended to act as a control for permanent inundation; however, due to leaking of the cores, inundation of these cores was not precisely controlled as intended. An additional core from the creek community was selected for spiking with bank material from LHC. Current working theory of autochthonous phosphorus loading postulates that material from the incised channel in LHC is transported to the surrounding flow-way. This spiked sample will allow us to understand the rate of potential phosphorus weathering and conversion by dissolution, as well as infer processes (i.e., aluminum hydrolysis). While not meant to represent field conditions, this portion of the experiment allowed for better estimation of the impact of this process. Cores were incubated in buckets in a laboratory under controlled temperature and dark conditions. After the initial incubation period of 43 days, water samples were obtained, and cores were then drained to field capacity for 23 days. Cores were then rewetted from the bottom, with water samples collected after 10 days of inundation. Water samples were collected from the standing water at the top of the cores using a syringe to avoid sediment disturbance. Leachate pH was measured and analyzed for dissolved organic carbon and SRP by the UF Wetland Biogeochemistry Laboratory. Leachate total Kjeldahl nitrogen and dissolved cations (calcium, magnesium, aluminum, and iron) were analyzed by Advanced Environmental Laboratories in Gainesville, Florida. Dissolved cations were measured, since this fraction in water is considered readily available in reactions. Therefore, this provides a conservative (minimal) discussion of the interpretation of these constituents. Fluoride measurements were also obtained to indicate the presence and potential dissolution of Hawthorn material. Samples were analyzed for fluoride using a Hach® DR6000 spectrophotometer. Nutrient flux rates from intact cores were calculated as milligrams per square meter (mg/m^2) using the following equation (Fisher and Reddy, 2001):

$$J_i = C\left(\frac{V}{A}\right)$$

where: J_i = flux of component i (mg/m^2).
C = component concentration (in mg/L).
V = water volume (liter).
A = sediment surface area (square meter).

4.3.3.2 Results and Discussion

As expected, SOC content in surficial sediments was greatest in the mixed hardwood and gum root communities and lowest in the creek community (Figure 4-12). Soil organic carbon content of surficial sediments in all community types explains 40.7 percent of the variation in DIW OPO_4 concentrations. It was anticipated that wetland communities with high SOC content might have greater DIW OPO_4 concentrations and that these parameters would have a significant

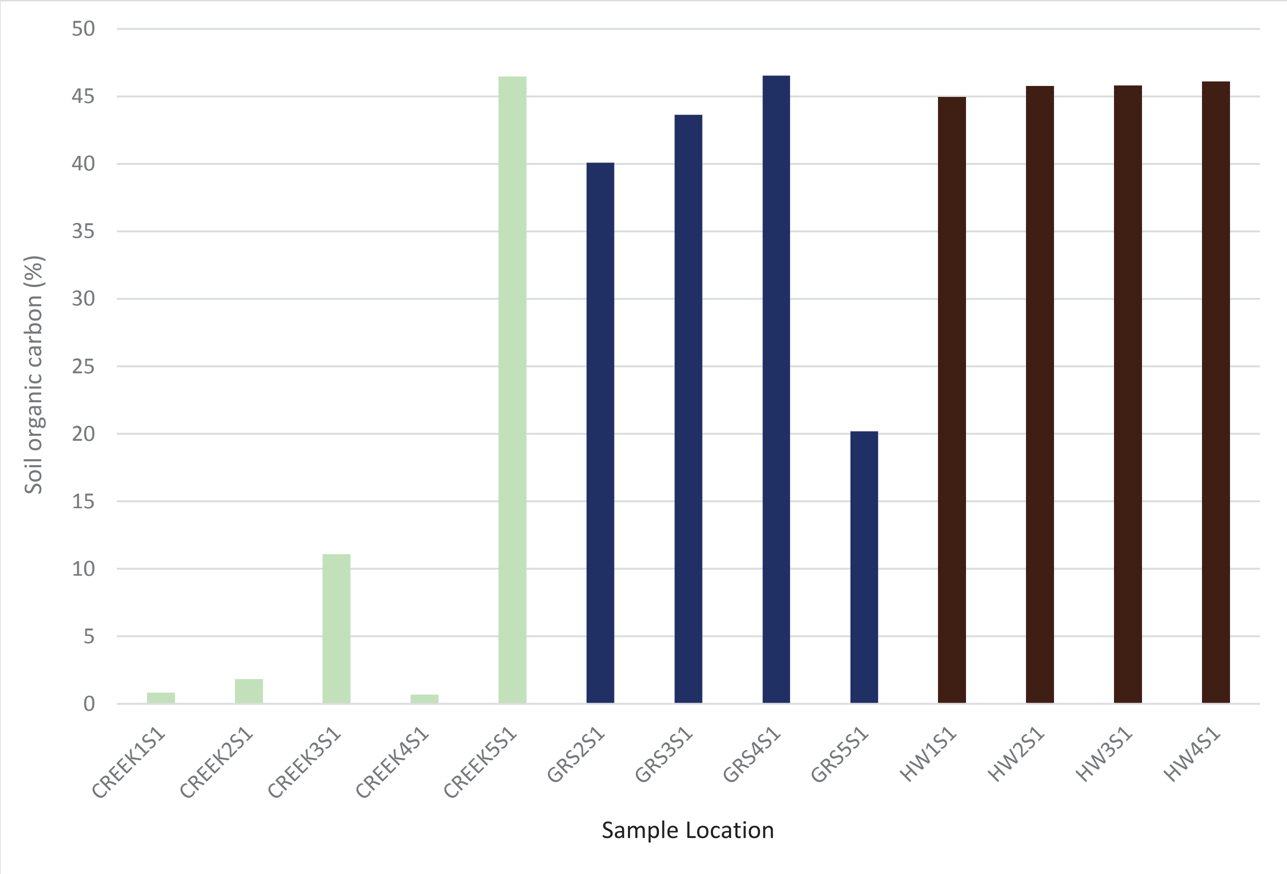


FIGURE 4-12.
SOIL ORGANIC CARBON CONTENT IN CREEK, GUM ROOT, AND MIXED HARDWOOD COMMUNITY SURFICIAL SEDIMENTS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

positive relationship. However, the relatively low SOC content of the creek community explained 90.7 percent of the variability in DIW OPO_4 concentrations ($F(1, 4) = 29.09$, $p = 0.01$), while only 59.7 percent in the gum root community and 21.2 percent in the mixed hardwood community were accounted for by this relationship ($p > 0.05$ for both). Clearly, hydrology plays an important role in the release of DIW OPO_4 from OM in these systems. In the creek community, OM appears to be the primary storage pool for inorganic phosphorus and either: (1) releases phosphorus upon rewetting after many of these soils are regularly drawn down following storm events, or (2) SOC content is an indirect measure of iron-binding ligands in the creek community. In the other wetland communities, it appears more complex processes control DIW OPO_4 concentrations.

To interpret the data from the core incubation study, the context of the mineral weathering process specific to fluorapatite is required. As with many minerals, fluorapatite weathering is a function of the pH and phosphate ion activity of the system. Under conditions where pH is greater than approximately 7, fluorapatite is predominantly stable. When fluorapatite is exposed to a system with lower pH such as hardwood-dominated wetlands, calcium from fluorapatite is released more rapidly (dissolution rate) as a result of buffering. When calcium is released, fluoride and phosphorus are released into solution as a result of changes in the chemical structure, and secondary phosphates can be formed (Figure 4-13). The formation and composition of secondary phosphates depend on other ions in solution that are suitable for substitution of calcium, typically aluminum. The rate of release and respective quantities of calcium, fluoride, and phosphorus under such circumstances are not entirely understood. Some work contends these values follow the stoichiometry of fluorapatite and are therefore relatively predictable (Chaïrat *et al.*, 2007), while others have found the release of these constituents is nonstoichiometric (Dorozhkin, 2002; Guidry and Mackenzie, 2003; Zhu *et al.*, 2009). The tendency for nonstoichiometric release appears to be rooted in the oftentimes nonstoichiometric surface of fluorapatite and initial chemical composition (Dorozhkin, 2002). Working under this assumption, calcium or fluoride is preferentially in the greatest quantity, followed by phosphorus (Guidry and Mackenzie, 2003; Zhu *et al.*, 2009). When contamination from other sources are not present (such as treated water), fluoride can be used as a convenient tracer in water for fluorapatite-sourced phosphorus.

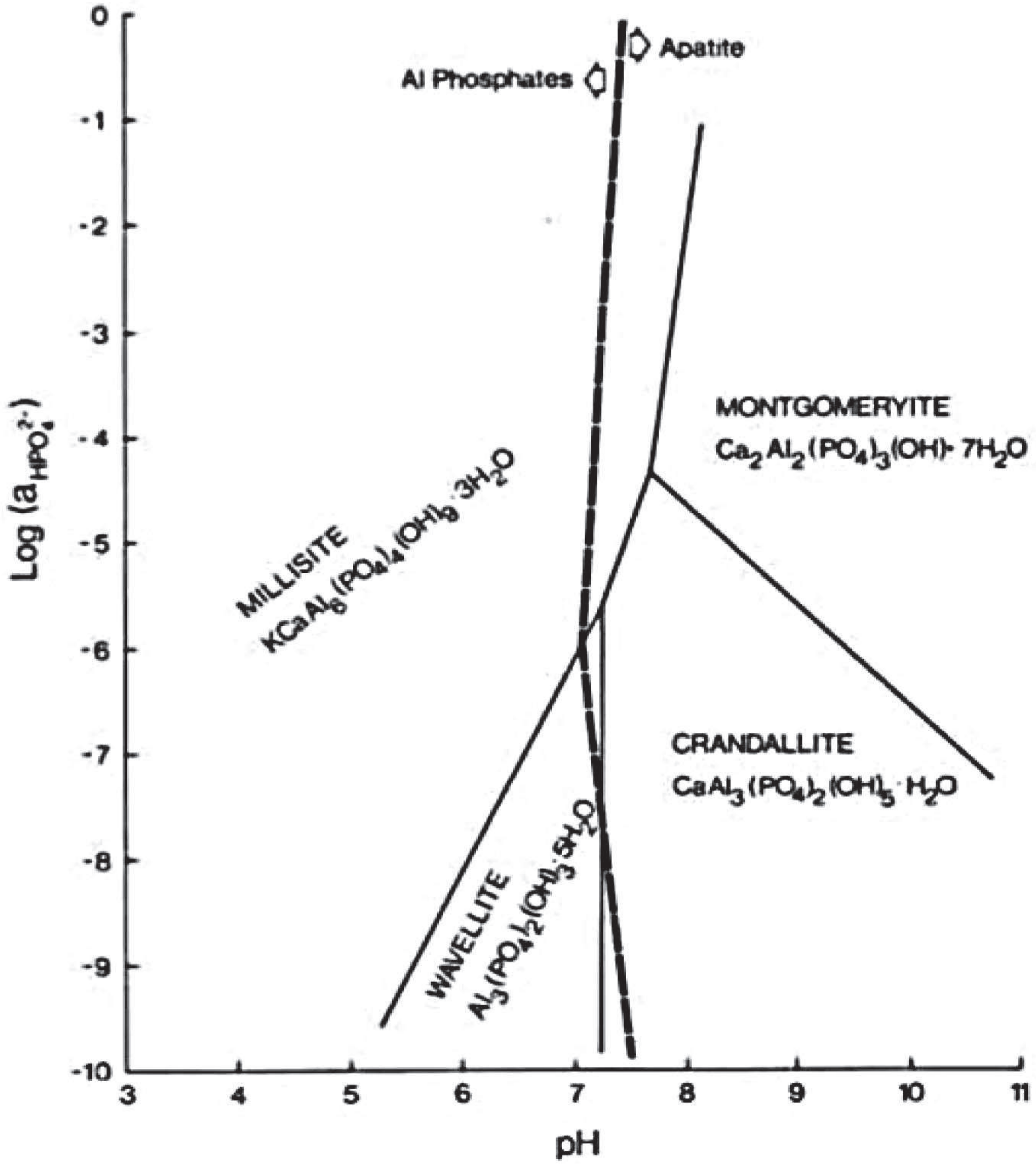


FIGURE 4-13.

SOLUBILITY OF PHOSPHATES WITH CHANGES IN pH AND PHOSPHATE ION ACTIVITY IN SOLUTION

Source: Nriagu, 1976.

ECT Environmental Consulting & Technology, Inc.

Results of the core incubation study indicate, at specific locations within wetland communities, GRS can function as a source or sink of nutrients following drawdown and rewetting (Figure 4-14). This finding likely lies in the variation at each location; under these hydrologic conditions, some locations in each community operate as SRP sinks, while some operate as SRP sources. As such, this flux data tells us the spatial variability of SRP flux is high, and fluxes cannot be attributed to individual wetland community types. However, specifically in the creek community, this data can be used to pinpoint target areas for addressing potential SRP loads (Hawthorn weathering) in an effort to reduce SRP fluxes.

When the data are analyzed by a two-way analysis of variance (ANOVA), there is not a significant relationship ($p>0.05$) between initial and postdrawdown conditions and SRP concentrations within or across communities (Figure 4-15). Even in the creek community where SOC drives DIW OPO_4 concentrations, the relationship between hydrologic conditions and SRP concentrations is insignificant. This informs us that OM oxidation and subsequent phosphorus release is not likely to be the mechanism behind phosphorus release in this community. This is supported by Creek5 results with the greatest SOC content in surficial soils but does not result in a net release of SRP upon rewetting when compared to initial conditions. It is possible the net release of SRP at other creek community locations is the result of increased iron-bound phosphorus solubility due to changes in the redox state associated with drying and rewetting; however, additional work relating dissolved organic carbon and iron concentrations would be required to better understand this. A precursory analysis of iron concentrations with changes in inundation did not yield a significant relationship.

When the other variables measured were analyzed by two-way ANOVA, only fluoride yielded a significant relationship between initial and postdrawdown conditions and variable concentrations within or across communities. Core study data suggest a significant interactive effect between community type and initial versus postdrawdown hydrologic conditions with fluoride ($F(2, 20) = 4.77$, $p<0.05$). In the creek community, SRP and fluoride are highly correlated (0.88), and fluoride and calcium are released upon drawdown and rewetting (Figures 4-16 and 4-17).

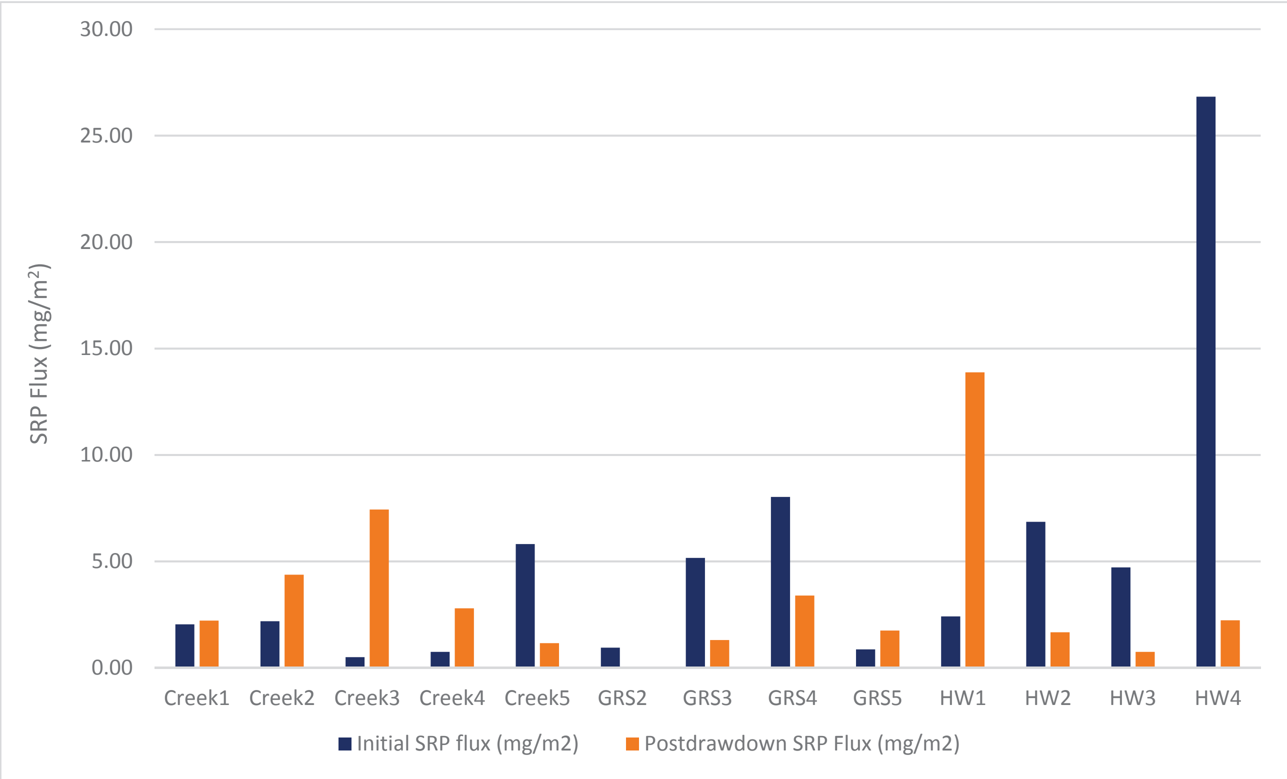


FIGURE 4-14.

SRP FLUX FROM INTACT CORES UNDER INITIAL AND POSTDRAWDOWN CONDITIONS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

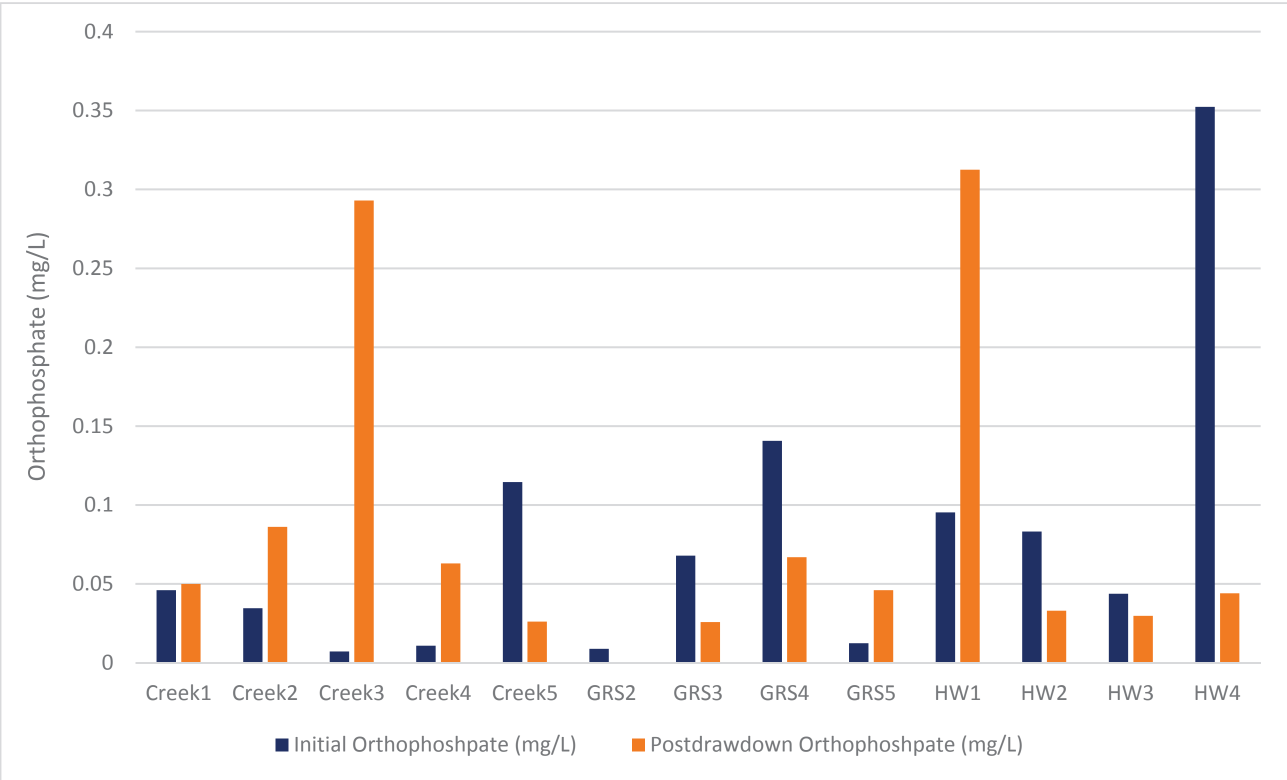


FIGURE 4-15.

SRP CONCENTRATION FROM INTACT CORES UNDER INITIAL AND POSTDRAWDOWN CONDITIONS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

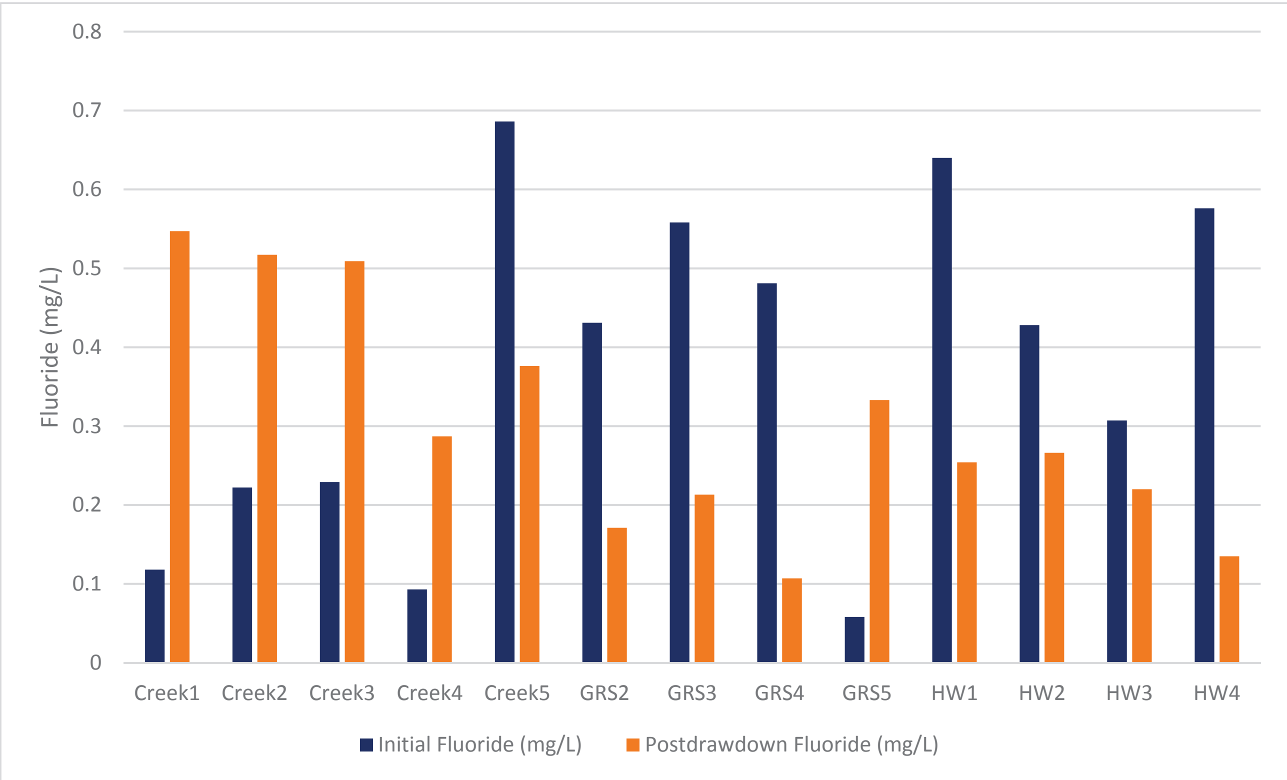


FIGURE 4-16.

FLUORIDE CONCENTRATION FROM INTACT CORES UNDER INITIAL AND POSTDRAWDOWN CONDITIONS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

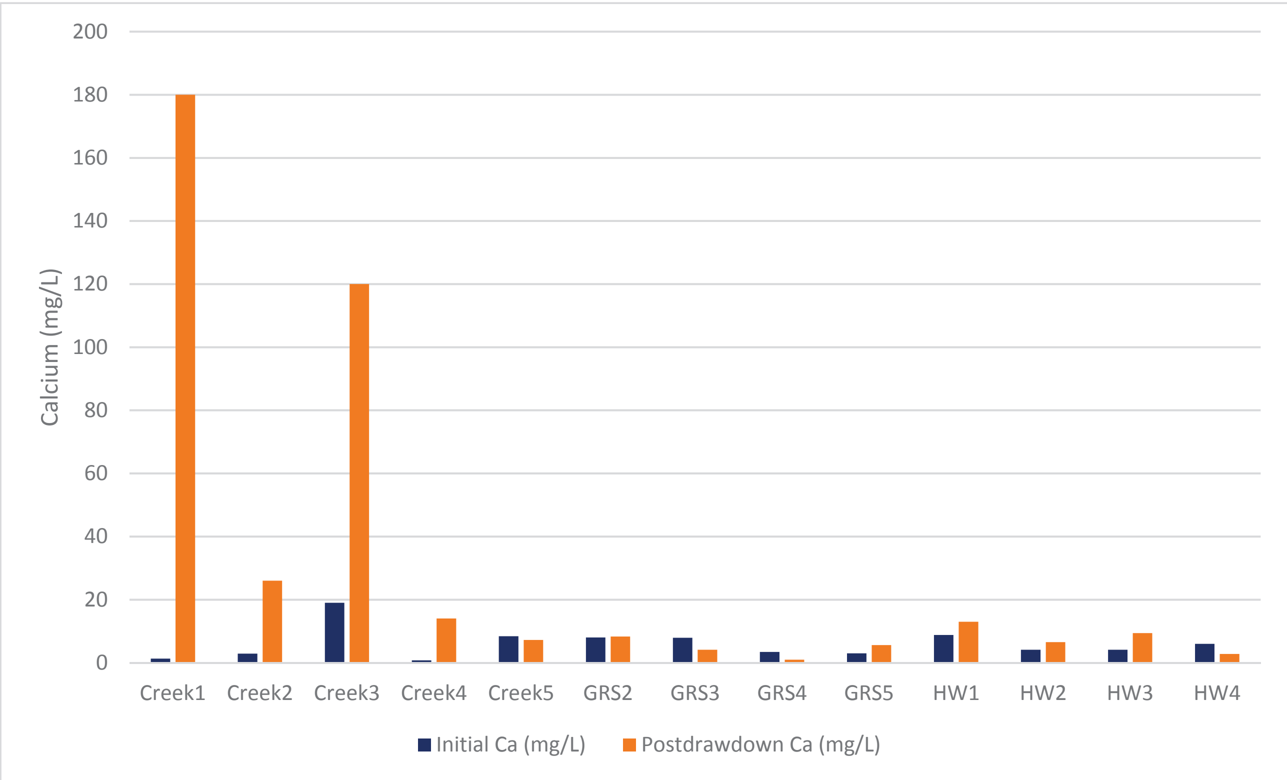


FIGURE 4-17.

CALCIUM CONCENTRATION FROM INTACT CORES UNDER INITIAL AND POSTDRAWDOWN CONDITIONS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

The differences in fluoride release across communities are explained by two hypotheses: (1) AIP is present in the creek community but is not transported to other wetland communities due to differences in hydrology, or (2) AIP is present in other wetland communities, but the degree to which fluoride is released (and other constituents) is exhausted due to differences in hydrology and water chemistry. Both theories are plausible, but the magnitude of initial fluoride concentrations in the core incubation study (Figure 4-12), the presence of hot spots in the eastern portion of GRS, and visual observations of nodules in surficial sediments suggest in this region that AIP may be present across GRS. While the transport mechanisms are unknown, we can postulate certain conditions in tannic, seasonally inundated wetlands may accelerate fluorapatite weathering and constituent release. Studies have shown that organic acids enhance element release from fluorapatite and expedite the fluorapatite dissolution rate when the system is far from equilibrium by lowering water pH (Harouiya *et al.*, 2007; Goyne *et al.*, 2006). The presence of organic acids that could markedly influence pH was evidenced in this study. The water used to flood the drawn-down cores was controlled at pH 7 due to the variability in pH across wetland communities. As such, variation in the sediment water pH observed following rewetting is a result of ions and organic acids present in the soil cores (Figure 4-18). If this weathering process by organic acids is occurring, it may support the high initial fluoride concentrations in the mixed hardwood and gum root communities and potentially explains fluxes and water quality observations in Newnans Lake. Since the hydrology of the creek community differs greatly from the mixed hardwood and gum root communities, the opportunity for these processes to take place is likely limited; therefore, fluoride release occurs upon rewetting, because the fluorapatite in this community is comparatively less weathered.

4.4 Water Budget

Although it comprises a large part of the LHC sub-basin, the hydrology of GRS is poorly understood. As such, modeling efforts and field observations were used to discern the hydrologic interaction between the West Branch and East Branch. It is important to remember, when considering modeling results, the overall purpose and goal of modeling conducted thus far in the LHC sub-basin is for environmental permitting. As such, the modeling results discussed herein portray results in which overall water budget fluxes like precipitation and ET are captured; however, interaction with groundwater and soil moisture are not captured. Thus, average fluxes

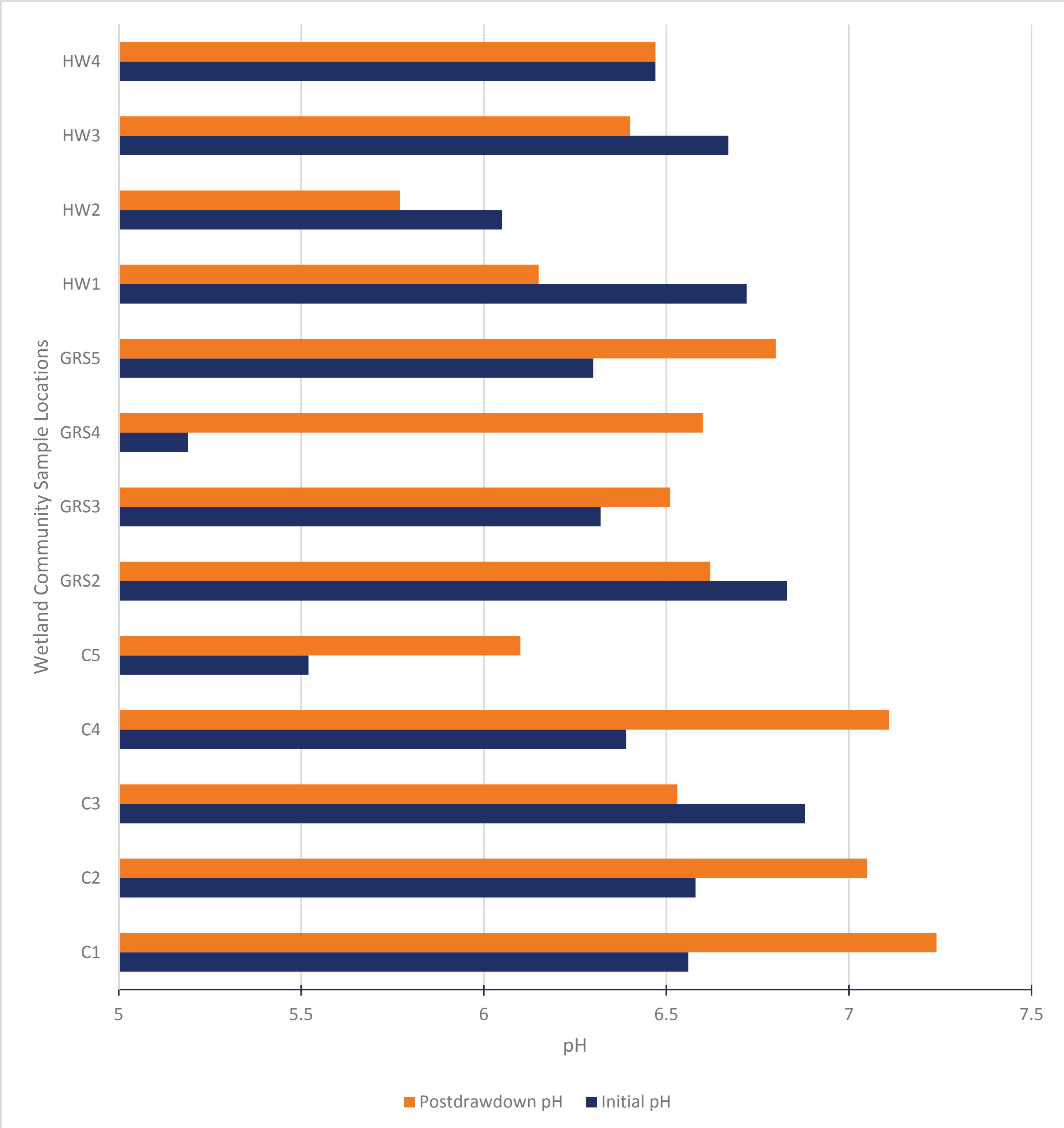


FIGURE 4-18.

pH FROM INTACT CORES UNDER INITIAL AND POSTDRAWDOWN CONDITIONS

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

reported in the following represent surface water dynamics and, in the case of streamflow, represent an upper bound of the flux that occurs above ground.

Based on modeling efforts and field observations, it appears, during drier conditions, water from storm events in LHC primarily enters Newnans Lake via the LHC West Branch and does not contribute a large volume of water to LHC East Branch. The majority of flows from GRS reach Newnans Lake through the LHC East Branch. Flows in the West Branch are extremely flashy and temporally dependent during storm events; peak stages in LHC are reached quickly as large volumes of water from the surrounding landscape are shunted into LHC. Annual water flow to LHC is largely associated with stormwater that almost immediately enters the creek during storm events due to the design of the regional stormwater system. As discussed in Section 2.3 and seen in Figure 2-7, the East Branch of LHC is primarily fed by tributaries to the north that enter GRS and does not typically receive significant flows from LHC. Flows in the East Branch exhibit a temporal delay in response to rain events; following a storm, sheet flow reaches tributaries to the north of GRS and water moves diffusely through the swamp before reaching culverts under SR 26. The majority of flows from GRS reach Newnans Lake through the East Branch of LHC. That is, flows in the West Branch and East Branch are almost entirely independent and do not interact extensively under the conditions modeled.

Annual water flow to GRS is dominated by rainwater from the swamp and contributing higher-elevation areas to the north and groundwater. The comparison of these modeling results with field observations from monitoring efforts and stream characterization in the LHC sub-basin is at first confounding. ACEPD (2007, 2017) has reported, during sampling events, flows from the East Branch are approximately five times greater than flows in the West Branch. This finding is related to the importance of the temporal component in hydrologic behavior in the LHC sub-basin; during a storm, LHC is flashy and transports large quantities of water due to mixed, channelized and sheet flow water delivery. However, soon after a storm, the sheet flow from the contributing area of the East Branch mixes with water from the surficial aquifer and enters GRS. When this occurs, flows increase dramatically in the East Branch and begin to contribute large quantities of water to Newnans Lake.

There is not a strong hydraulic gradient in the surficial aquifer between GRS and Newnans Lake; as such, water levels in GRS appear to be closely linked to lake stage. This is consistent with water quality data obtained at the East Branch by Cohen *et al.* (2010), which exhibited an average conductivity value of 161.62 microSiemens per centimeter and average calcium concentration of 22.25 mg/L; values are more consistent with ion-rich surface water or groundwater-dominated forested freshwater swamps as opposed to precipitation-dominated (Mitsch and Gosselink, 2000). Water level data loggers placed at the culvert under SR 26 (Figure 4-1) confirm stage in Newnans Lake plays a large role on water levels in GRS (Figure 4-19). Additional two-dimensional modeling under investigation by ECT is anticipated to further explore this relationship and attribute the contribution of shallow groundwater to the water budget of GRS and subsequently to Newnans Lake.

Based on preliminary one-dimensional modeling results, which do not capture shallow groundwater movement explicitly, average annual volume from the East Branch culvert location is approximately 7.3×10^7 cubic feet (ft^3). Average annual volume from the East Branch culvert location is approximately 46 percent of the average annual volume reaching Newnans Lake between both the East Branch and West Branch (1.6×10^8 ft^3). As such, GRS represents a potentially important nutrient load to Newnans Lake. The average volume from GRS is approximately doubled during the warmer wet season (March through August) compared to the cooler dry season (September through February).

4.5 Nutrient Loading

Within GRS, total dissolved phosphorus is elevated with maximum concentrations reaching 0.529 mg/L in the northern portion of the swamp (Figure 3-5). GRS has the highest SRP concentrations in surface waters within the portion of NLW studied. Soluble reactive phosphorus and TP concentrations at the East Branch outflow of GRS are greatest during the summer, with both variables significantly related to decreases in DO and increases in temperature (Cohen *et al.*, 2010). When regressed simultaneously, the effects of temperature and DO are significant predictors that account for more than 65 percent of the variation in SRP concentrations at this location. When the data at this location are evaluated in the context of fluorapatite weathering and dissolution, variation in SRP and TP concentrations are further explained by pH and calcium

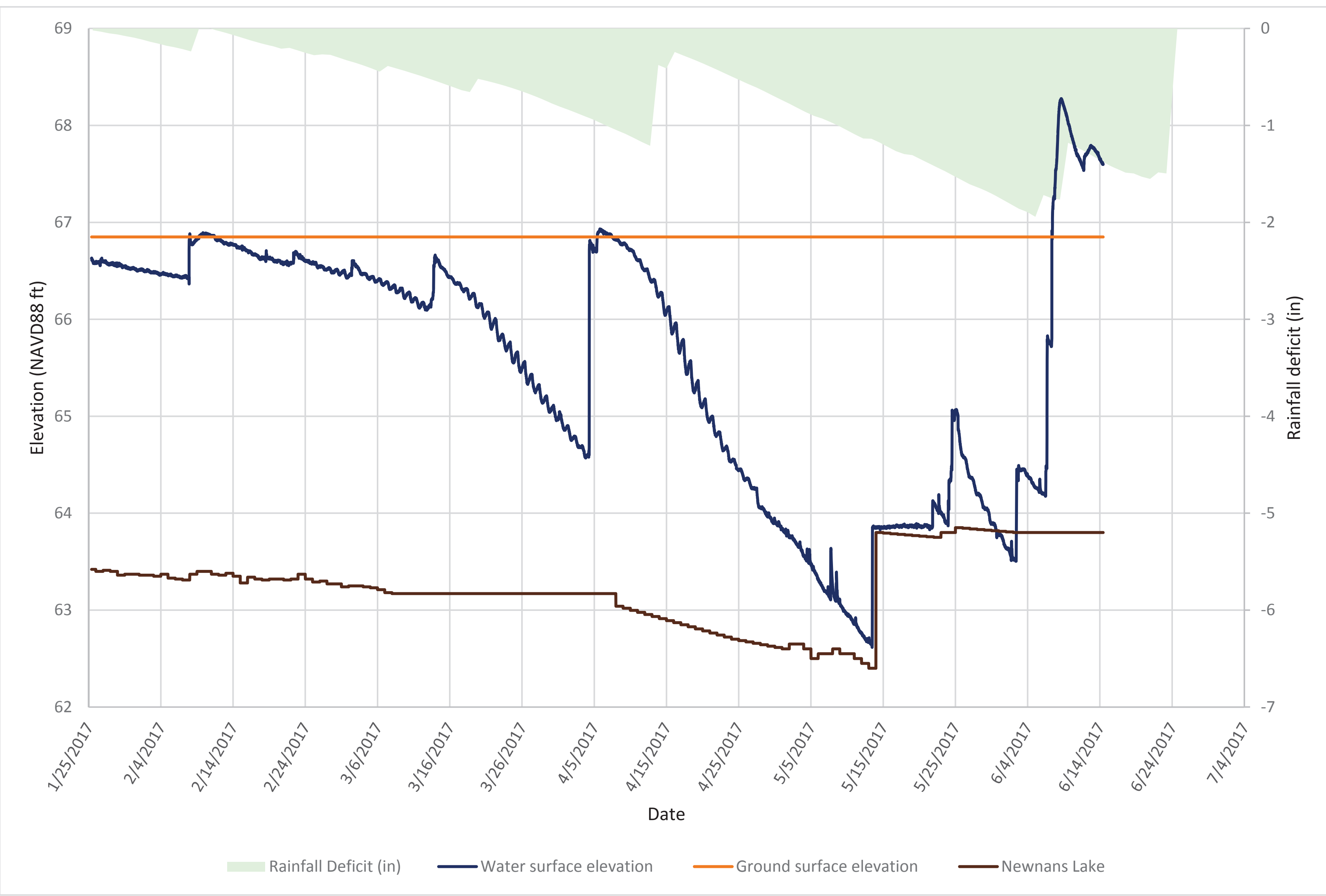


FIGURE 4-19.
MEASURED SURFACE WATER ELEVATIONS AND GROUND SURFACE ELEVATION (ft NAVD88) AT EAST BRANCH CULVERT COMPARED TO NEWNANS LAKE (ft NAVD88) AND RAINFALL DEFICIT
Source: ECT, 2017. *Note: Data for Newnans Lake was updated after report completion. Correction will be made in Phase II

Environmental Consulting & Technology, Inc.

(Figures 4-20 and 4-21). Changes in pH account for approximately 32 percent of the variability in TP concentrations ($F(1, 29) = 13.47$, $p < 0.01$) and approximately 15 percent of SRP concentrations ($F(1, 29) = 5.28$, $p = 0.03$). Similarly, changes in calcium concentrations account for approximately 35 percent of the variability in TP concentrations ($F(1, 32) = 17.14$, $p < 0.01$) and approximately 12 percent of SRP concentrations ($F(1, 32) = 4.46$, $p = 0.04$). This indicates a consequential amount of TP in GRS water is likely derived from a source that also contains calcium. Considering the other data collected in GRS, it seems plausible that fluorapatite weathering in the sediments of GRS is releasing AIP (a component of TP) and calcium into the water column. This leads us to hypothesize that phosphorus concentrations in GRS are the result of a two-step process: (1) the release of TP and calcium into the water column from sediments with changes in water pH, and (2) internal biogeochemical processes in GRS sediments controlled by DO and temperature resulting in the mineralization of organic phosphorus and the release of additional SRP to the system. Based on water quality monitoring data available from 2007 through 2009 and modeled discharge from GRS for this period of record, SRP and TP loads from GRS to Newnans Lake are approximately 799 and 1,226 lb/yr, respectively (Table 4-3). While the West Branch likely interacts with the East Branch under certain conditions, based on the current understanding from modeling efforts, this interaction only takes place under high-flow events in LHC. Since the majority of high phosphorus loads from LHC are associated with baseflow, the limited interaction between the West Branch and the East Branch (GRS) during high flows is likely to play a minimal role on phosphorus loads from GRS.

Table 4-3. Gum Root Swamp Modeled Nutrient Export Loading Rates to Newnans Lake from East Branch Discharge

Parameter	Average Discharge (cfs)	Mean Concentration (mg/L)	Modeled Loadings		
			kg/day	lb/day	lb/yr
SRP	2.1	0.15	0.99	2.19	799
TP	2.1	0.23	1.52	3.36	1226
TN	2.1	2.7	17.89	39.4	14,390

Source: ECT, 2017.

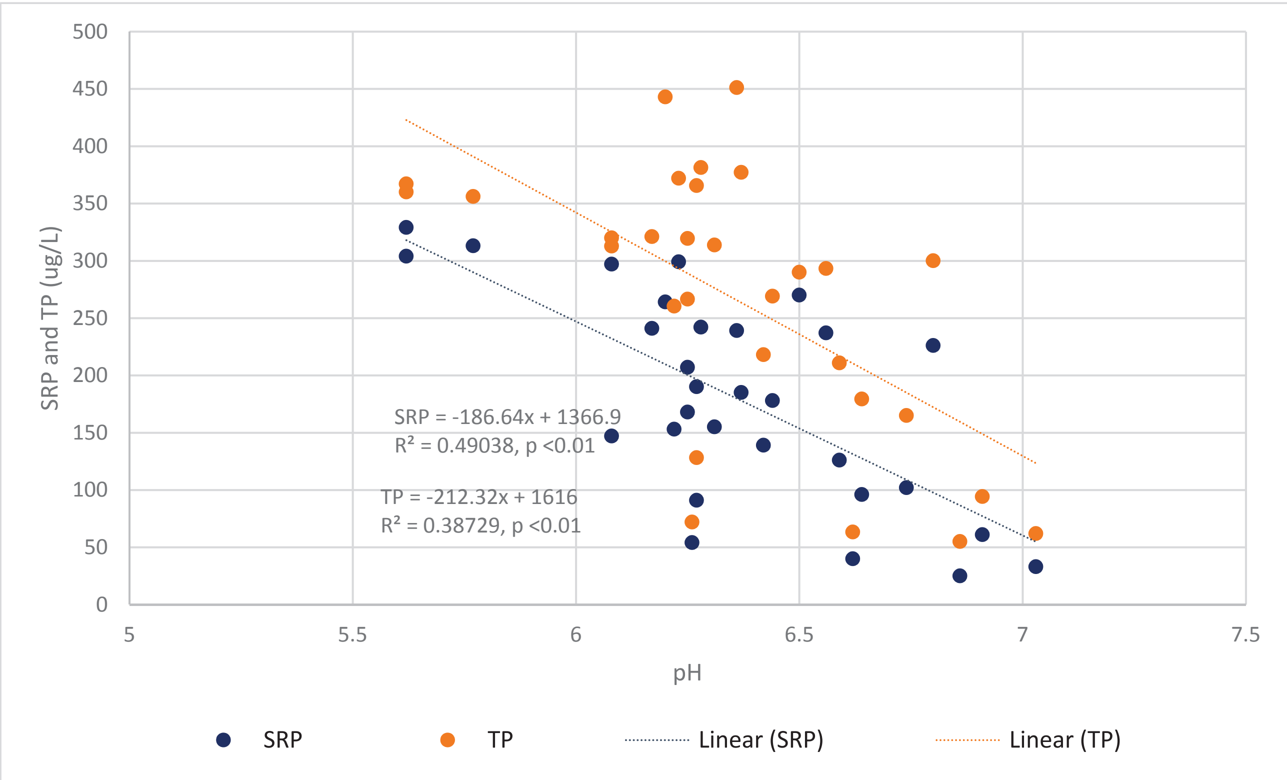


FIGURE 4-20.
RELATIONSHIPS BETWEEN pH AND SRP AND TP CONCENTRATIONS IN WATER AT THE OUTFLOW OF GUM ROOT SWAMP

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

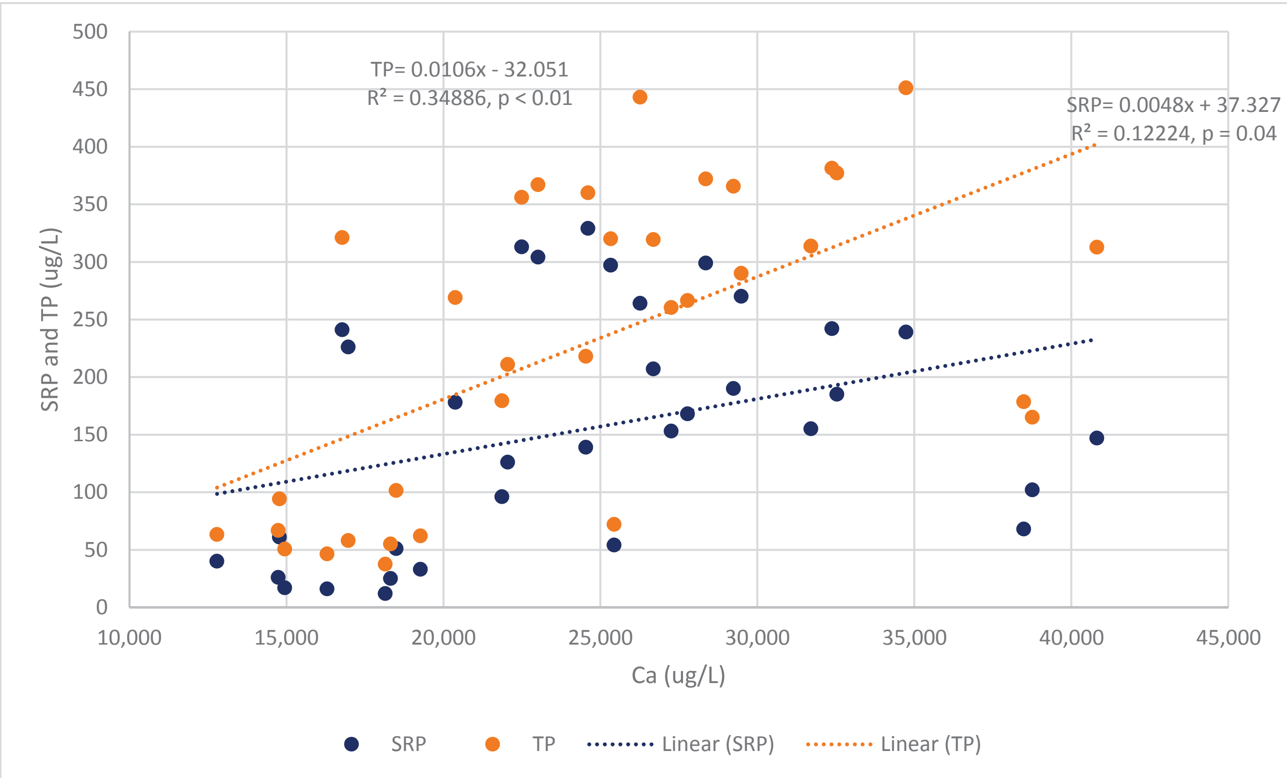


FIGURE 4-21.
RELATIONSHIPS BETWEEN CALCIUM AND SRP AND TP CONCENTRATIONS IN WATER AT THE OUTFLOW OF GUM ROOT SWAMP

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

5.0 Project Identification

Based on the findings detailed in this report, projects were identified for both LHC and GRS to restore the ecosystem, reduce nutrient loading to Newnans Lake, and achieve TMDL goals (Figure 5-1). The long history of nutrient loading and source evaluation in the LHC sub-basin has resulted in an array of project considerations aimed at accomplishing these goals. Here, nine projects are evaluated to determine feasibility given the conditions encountered in the project area, best available knowledge, and practicability with concern to cost, construction, and overall benefit as related to project objectives. This analysis serves as a road map for further project evaluation and potential implementation.

To reduce nutrient loading, projects considered for LHC and GRS fall into one of two categories: water quality improvement projects (WQPs), which provide direct improvements to water quality as a result of the project, or restoration projects (RPs), which provide indirect water quality improvements as a result of outcomes associated with restoration. This differentiation is made when discussing each project to interpret costs/benefits and understand the interactive effect of targeted WQPs and improved sub-basin conditions resulting from restoration.

5.1 LHC Project Identification

As discussed in detail in prior sections, the elevated phosphorus loading to GRS and ultimately Newnans Lake is due to a number of related factors, both chemical and physical in nature. Development has occurred in the contributing basin, increasing peak stormflows, which are delivered into an altered and highly incised creek, the LHC impacted segment. Owing to the unique geology of the project area, this fairly typical example of urban stream syndrome is compounded by the increased exposure of naturally occurring phosphatic geologic materials, which the findings of this project implicate as a likely source of phosphorus loading to the lake. Accordingly, the proposed projects described in the following paragraphs either address this loading directly, indirectly through hydrologic restoration, or both.

M:\acad\2016\160706\GRS_PotentialProjects.mxd NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic unash 7/19/2017 8:11:14 AM

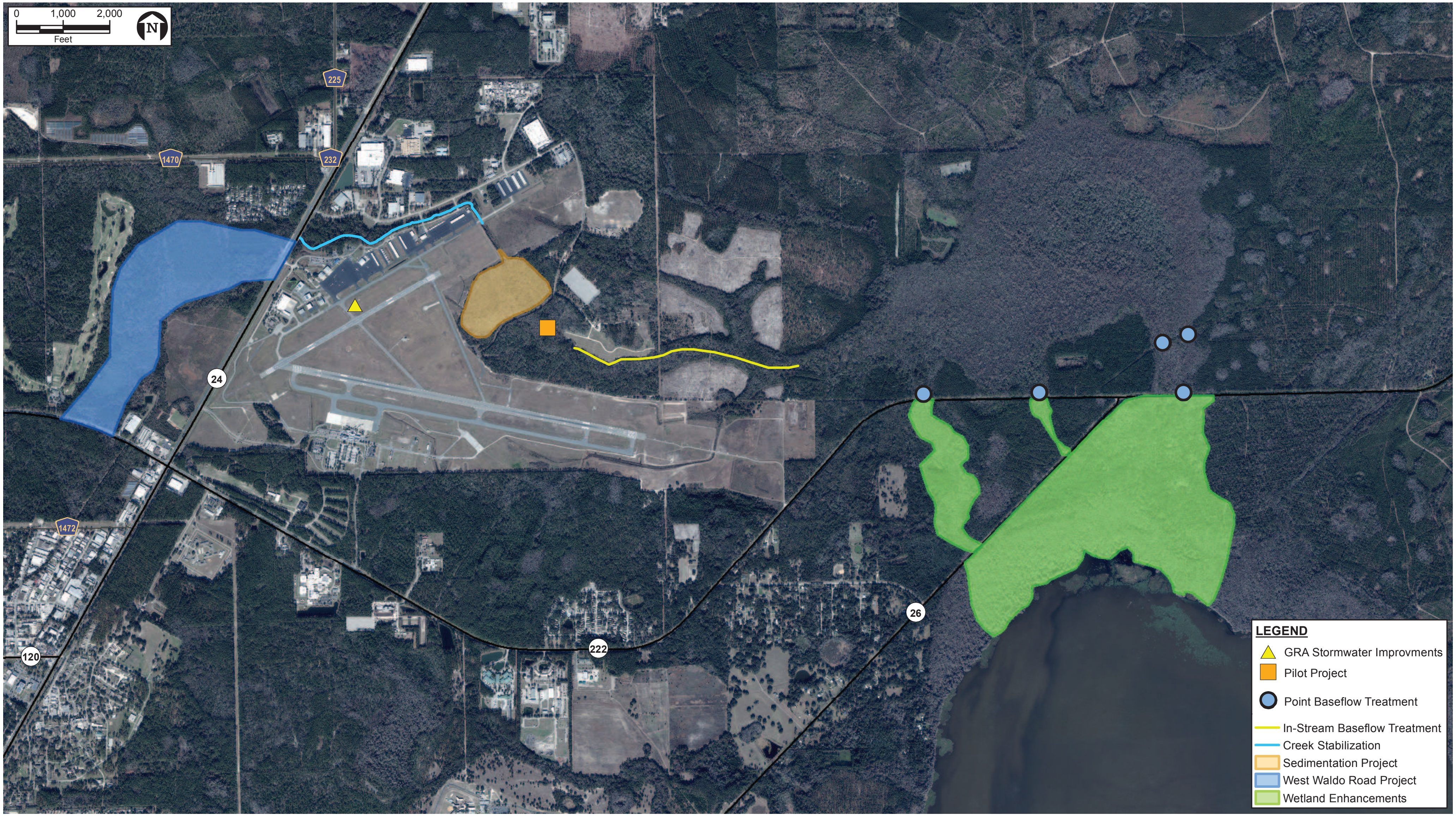


FIGURE 5-1.

POTENTIAL PROJECTS
LITTLE HATCHET CREEK - GUM ROOT SWAMP

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

5.1.1 WQP: Permeable Reactive Weir In-stream Baseflow Treatment

Permeable reactive weirs (PRW) are comprised of media placed within a weir, where targeted flows will interact with the media for a desired amount of time, allowing for the required chemical processes to take place that effectively stores the target nutrient. The media within the PRW is nutrient-specific for the greatest removal efficiency based on the known chemical behavior of the nutrients in question. In LHC, weirs would be utilized as a WQP primarily for TP removal from baseflow with some TN removal potential. These PRWs would be effective in treating baseflow in this system, since the high phosphorus loads are derived from baseflow conditions (Cohen, 2008).

5.1.1.1 PRW Pilot Project

Different mechanisms dictate phosphorus and nitrogen removal from water and must be simultaneously implemented in a PRW system to effectively remove both nutrients. The reduction of TP concentrations by PRWs relies on phosphate adsorption to positively charged minerals in the weir to remove phosphorus from water as it passes through the weir. Several media options are available that use different combinations of clay minerals, iron oxides, and polymers to remove SRP (Table 5-1). Phosphorus can also be removed by adsorption and co-precipitation with calcium; however, this option must include careful evaluation of the average pH in the system and the potential for fluctuations, thereby encouraging release of calcium-stored phosphorus. Long-term removal of phosphorus by adsorption processes in this application primarily depends on the concentration of phosphorus in the creek and the mass of phosphorus adsorbed onto the solid phase in the PRW as well as the pH of the system (Klimeski *et al.*, 2012).

Table 5-1. Media Options for Phosphorus Removal

Media	Initial TP Concentration (mg/L)	Loading Rate (L/d/g)	SRP Removal Efficiency (%)	TP Removal Efficiency (%)
Iron-coated sand*	3.95	0.0039	90	Not applicable
Biosorption activated media†	0.25	Not applicable	95	71
Filtralite P®‡	4.9	0.00048	91	
Iron oxide, calcium oxide, and limestone§	4	Not applicable	90	Not applicable

Note: L/d/g = liter per day per gram.

Sources: Klimeski *et al.*, 2012.
*Chardon *et al.*, 2011.
†Hood *et al.*, 2013.
‡Adam *et al.*, 2007.
§Baker *et al.*, 1997 and 1998.

To remove TN, PRWs exploit the biological denitrification process to promote the reduction of nitrate-N to nitrogen gas by providing an electron donor, such as carbon under anaerobic conditions. The composition of the PRW typically includes an optimized amount of a carbon source (usually sawdust) mixed with sand to reach the required hydraulic conductivity that does not impede flow in the waterway, thereby promoting bypass flow but still achieving a desirable effective porosity that meets the required contact time under anaerobic conditions for nitrate-N conversion. It is important to note this contact time has not been studied in an above-ground PRW, as PRWs for nitrogen removal are typically implemented subsurface (known as permeable reactive barriers). The pilot project described herein implements a PRW in a surface water system, aiming to achieve sufficient anaerobic conditions during the passage of baseflow through the saturated portion of the weir. As such, a goal of the pilot study is to consider and record the variables related to denitrification in the PRW to evaluate the effectiveness of the PRW for nitrogen removal. While studies using subsurface PRWs have reported greater than 95-percent nitrate reduction under optimal conditions (Kim *et al.*, 2000), the performance of PRWs in surface flow systems is unknown and likely to be much lower. For the purposes of estimated TN removal associated with this project, 35-percent TN removal was assumed.

In LHC, there are two unique issues associated with the selection of PRW phosphorus-storing media: (1) the media must not dramatically reduce the hydraulic conductivity of the PRW, and (2) the media must provide a reasonable amount of SRP storage in the long-term. Clays, polymers, and iron and aluminum oxides are likely to reduce the hydraulic conductivity of the PRW to variable extents. However, some polymers (e.g., BioFloxx) coagulate extensively and reduce flow rates up to 47 percent. Therefore, polymers such as these are not recommended for use in LHC PRWs. The hydraulic properties of various clay, aluminum/iron oxides, and calcium mixtures must be well understood before determining the quantity of these materials for use in the PRW. The loadings of SRP and TP in LHC are quite sizeable compared to typical systems. Since the phosphorus retention process is chemical, there is a finite capacity for materials to retain phosphorus. The long-term storage of each media can be evaluated given the refined nutrient loadings in LHC and the effective lifespan of the PRW for phosphorus removal can be evaluated. Ultimately, the ideal PRW composition for LHC entails a carbon source adequate for denitrification and a mix of clays and/or iron and aluminum oxides and calcium with sand that provides long-term phosphorus retention specific to the given system and current loadings and does not negatively impact the hydraulic conductivity of the PRW. A pilot study for PRW composition is essential, since the conditions within this system, including a calcium-laden phosphorus source, blackwater conditions, and iron/aluminum oxide retention, can be at odds under certain circumstances and fluctuations in phosphorus concentrations associated with adsorption/desorption processes are likely.

The proposed location of the pilot PRW project is located at a point in LHC where the stream channel is well defined and no longer experiences flashy overland storm flows and prior to the point where the channel meanders and becomes more braided (Figure 5-1).

To calculate potential SRP reductions from the permeable reactive media within the flow attenuation weirs, anticipated reduction percentages were incorporated in the long-term loading analysis provided in Section 3.0 for different flow and reduction scenarios. Although it was previously assumed the project area itself likely contributes a fairly substantial load of phosphorus, the origins of loadings within the project area are now well defined; therefore, the loading at Waldo Road was used in reduction calculations to be conservative. Figure 5-2 shows the results of this analysis, where annual SRP removal is shown on the y-axis for varying media performances and flow rates captured. Table 5-2 shows an example of these results in tabular form for the range of flow rates likely to be captured by the PRWs. There are diminishing returns for capturing larger flow rates, as SRP concentrations decrease as flow increases. Also, as these

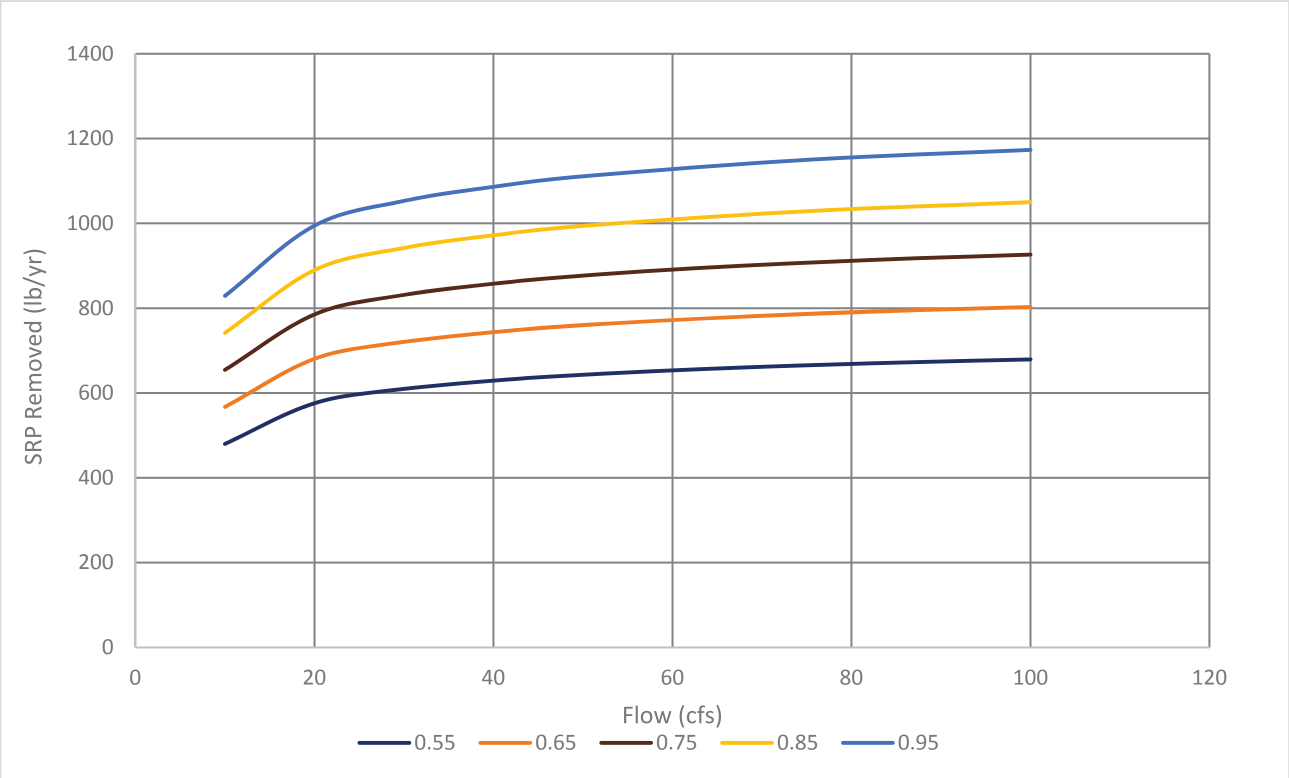


FIGURE 5-2.

SRP REMOVALS AS A FUNCTION OF FLOW RATE TREATED AND PERCENT REMOVAL

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

calculations do not take into account the increasing SRP loads as water travels through the project area, mass reductions will likely be greater.

Table 5-2. Example Annual Mass Reductions of Load by PRW Under a Range of Removal Rates and Flow Rates Captured

Baseflow Treated (cfs)	Unit	Media Removal Rate (lb/yr)				
		55%	65%	75%	85%	95%
10	SRP removed	480	567	654	742	829
20		576	681	785	890	995
30		610	720	831	942	1,053
40		629	743	858	972	1,086
50		643	760	877	994	1,111

5.1.1.2 PRW Expansion

Following the successful implementation of the pilot project, the same principles can be applied at other locations of controlled flow in the LHC sub-basin. For PRWs to be successful, a defined channel and control of flows is essential. Figure 5-1 illustrates the proposed locations for the expansion of PRWs.

5.1.2 RP: LHC Impacted Segment Restoration

To combat the release of phosphorus from the exposed Hawthorn material in the LHC impacted segment, a number of RPs were considered. The initial goal of these projects was to achieve restoration by covering up the exposed Hawthorn material, thereby eliminating the associated phosphorus load to the system. The first restoration project considered was to harden the channel (gabion baskets, concrete lining of entire channel, etc.). However, through stakeholder discussions, it was determined the preferred approach should be to maintain more of a natural channel if, and where, possible.

The next option considered was modifying the stream channel profiles to mimic a more open and stable channel profile similar to what was observed within Reach 1 of the LHC impacted segment (Alternative 1). This profile is much wider than is observed along most of the LHC impacted segment, has a more well-developed floodplain than the rest of the LHC impacted segment, and thus acts to attenuate system energy during storm events and ultimately lessen the degree of erosion and incising within the channel and reduce the phosphorus load to Newnans Lake.

Finally, the installation of flow attenuation weirs was considered to not only slow down the flows within the LHC impacted segment and thus limit the degree of erosion that occurs during storm events but also raise the stage of the channel bottom to limit the degree of downward incision by the channel (Alternative 2).

After review and careful consideration by stakeholders, it was decided a combination of widening and point hardening was needed to achieve restoration in addition to some PRWs to help treat baseflow as it flows through the channel (Alternative 3). The following sections describe in detail the elements of each mitigation measure considered.

5.1.2.1 Alternative Project Descriptions

Three restoration alternatives were considered to reduce the scouring effect caused by stormwater runoff through LHC along the north side of GNV. Each of these restoration alternatives were developed with the goal of reducing stream velocities to 1.5 feet per second (ft/s) or less (Table 5-4), thereby reducing the likelihood of future erosion contributing to further stream degradation. Each of the three alternatives discussed in the following subsections includes selective hardening at the 90-degree bend in LHC near the northeast corner of the main GNV operations area. Alternatives were modeled to assess effectiveness and ensure no offsite impacts. For upstream flooding concerns, the model node nearest a low point near Brittany Estates that chronically floods was used as a check; peak stages at this location for each alternative were kept less than or equal to peak stage under existing conditions. Model results are described in more detail in subsequent sections.

Alternative 1: Stream Widening

Alternative 1 is a hydrologic restoration that would have the effect of reducing peak velocities in the LHC impacted segment, thus reducing erosion of the exposed Hawthorn material. As described in Section 3.3, the channel throughout most of the project area is highly incised with steep (greater than 45-percent slope), unstable banks (visible slope failure). Furthermore, the natural floodplain that is still visible in some areas is now so high above the channel bottom that it does not provide for flow attenuation during storms, as it would under undisturbed conditions. Alternative 1 therefore seeks to recreate a more natural channel cross-section, albeit at lower overall elevations, so peak velocities during storms are reduced.

The profile chosen for the stream widening option was based on a portion of the channel that had the least bank erosion and appeared the most stable. This profile is located within the upper portion of the LHC impacted segment. Figure 5-3 presents the general dimensions of the profile. The channel bottom was assigned a width of 12 ft. The bank slopes were 4:1. Within each surveyed reach, the proposed profile was fit, and any adjustments needed to make the profile fit within the existing topography, beyond the channel banks, was made. Generally, bottom elevations were raised as well to limit exposure to additional Hawthorne material.

Alternative 2: Flow Attenuation Weirs

Alternative 2 consists of installation of two dual-purposed weirs within the LHC impacted segment. The first role of the weirs is hydraulic in nature. Having a notched design, they will allow the stream to stage up during storms without allowing velocities to increase immediately. The invert of the notch is also set approximately 2 ft above the existing channel bottom in both locations. This is intentional as, just as the channel bottom has become incised over time to meet the lower inverts of the two 16-ft culverts, it is anticipated the channel bottom will fill in over time and raise until it meets the new structure inverts. Not only will this help the stream access more of the historical floodplain during storm events, it may have the effect of covering up some of the currently exposed Hawthorn. Finally, once the channel has filled in to meet the notch invert, the constriction of the notch will allow baseflows to maintain sufficient velocity to keep the weir itself free from sediment blockage.

The second purpose of the weirs is chemical in nature and seeks to address the high phosphorus concentrations directly. As shown earlier, phosphorus concentrations are negatively correlated with flow in this section of LHC. Thus, the weirs will have as their base a permeable section with reactive media. The media will be designed to sorb phosphorus, particularly SRP, and during periods of low flow and high concentration, the stream will flow through this section of the weir.

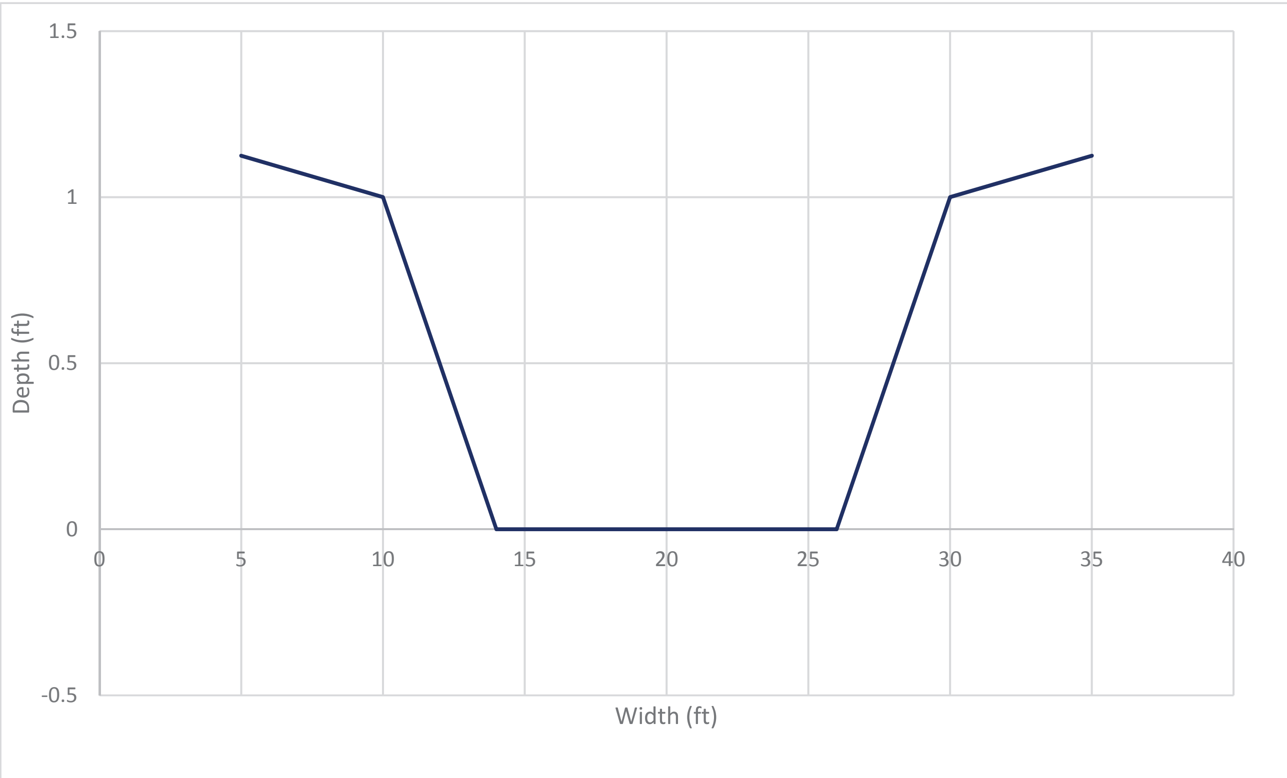


FIGURE 5-3.

CHOSEN CHANNEL PROFILE

Source: ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

Lastly, as any reactive media has a finite lifetime that is a function of both material and loading rate, the design of the weir is such that, as the media becomes saturated with phosphorus, the permeable section of the weir becomes covered with sediment as the channel bottom rises to meet the notch invert. At this point, not only will the baseflow phosphorus load have been treated for some time, it will also likely decrease as some of the exposed Hawthorn becomes covered with the newly accreting sediment.

Alternative 3: Flow Attenuation Weir with Minor Stream Widening

This alternative uses a combination of Alternatives 1 and 2 to achieve the desired goal and provide additional benefits. While both Alternatives 1 and 2 provide lower stream velocities, Alternative 2 results in a minor increase in the water elevation to the west of Waldo Road, potentially impacting the Brittany Estates subdivision. Alternative 3 incorporates minimal widening within Reach 1 of the LHC impacted segment to the east of Waldo Road with two flow attenuation weirs described in Alternative 2. The result is an option that costs less than Alternative 1 while not elevating headwater conditions as predicted by Alternative 2. Additionally, the majority of velocity reductions can still be realized in Reaches 2 through 8 with just installation of weirs.

5.1.2.2 Alternative Model Results

ICPR models for existing conditions and each alternative were run for the 25-year, 24-hour design storm to both ensure alternative strategies resulted in reduced stream velocities as well as show no upstream areas would be impacted. Twelve cross-sections were created in the ICPR model to evaluate conditions created under existing conditions and for each of the three alternatives considered (Figure 5-4). Under existing conditions, velocities throughout the majority of the impacted segment exceed the 1.5-ft/s threshold (Figure 5-5). The existing conditions model was updated to reflect each of the proposed projects. For Alternative 1, this consisted of new channel cross-sections that included wider channel bottoms where severe incision had occurred as well as more accessible bank area where the historic floodplain had been cut off (Figure 5-6). For Alternative 2, model updates consisted of new weir links to reflect installation of the notched weirs shown in the previous section (Figure 5-7). As stated, notch inverts were placed approximately 2 ft above the existing channel bottom in the installation locations. Bottom clips (the virtual filling-in of a model pipe, channel, or weir to a uniform

FIGURE 5-4.
ICPR MODEL NODE LOCATIONS
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

M:\acad\2016\160705\LHC_ExistingVv2.mxd

NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic

unash 9/28/2017 7:56:54 AM

FIGURE 5-5.
EXISTING STREAM PROFILE MAXIMUM VELOCITIES
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

FIGURE 5-6.
ALTERNATIVE 1 STREAM PROFILE MAXIMUM VELOCITIES
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

FIGURE 5-7.
ALTERNATIVE 2 STREAM PROFILE MAXIMUM VELOCITIES
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

elevation) were not used for pipes or channel bottoms, as it was assumed the channel bottom would naturally accrete over time to match the notch inverts, which would be the most constricting points within the project area. Alternative 3 modeled a combined system restoration that included the weirs plus strategic channel modifications (Figure 5-8).

5.1.2.3 Channel Hardening and Bank Stabilization

One of the options considered was broad-scale hardening of the LHC impacted segment within the reaches identified with the greatest degree of degradation and thus phosphorus contribution. However, as mentioned previously, stakeholder input leads to the choice of a more natural mitigation option for the restoration of the LHC impacted segment. Some point channel hardening and stabilization will be required to target those areas where erosion issues extend beyond the channel itself (Appendix D) regardless of which alternative is chosen.

At these locations, a number of channel hardening and bank stabilization options were considered (Figure 5-9). From options currently available on the market, the following provides a summary of the stabilization methods proposed for those areas identified in Section 3.3.3 (Table 5-3).

Assuming the improvements to stormwater management at GNV are implemented (see Section 5.1.3), it is anticipated much of the overland flow (Erosion Problem Areas 10, 13) concerns will be eliminated. However, the increased efficiency in water conveyance through the stormwater management system at GNV will increase the flows through the concrete culverts that discharge into the LHC impacted segment, requiring some hardening at the mouth of those culverts (Table 5-4).

The proposed stabilization methods will help to limit the degree and extent of erosion that occurs within the channel. Pending the results of the PRW pilot study, there may be opportunities to apply reactive media to the stabilization materials to further reduce nutrient load entering Newnans Lake by treating the flows within the LHC impacted segment that originate upstream and from GNV. These media may be incorporated within the gabion mattresses in front of the proposed weirs as well as at the discharge of the concrete culverts.

FIGURE 5-8.
ALTERNATIVE 3 STREAM PROFILE MAXIMUM VELOCITIES
LITTLE HATCHET CREEK IMPACTED SEGMENT

Sources: FDOT, 2017; ECT, 2017.

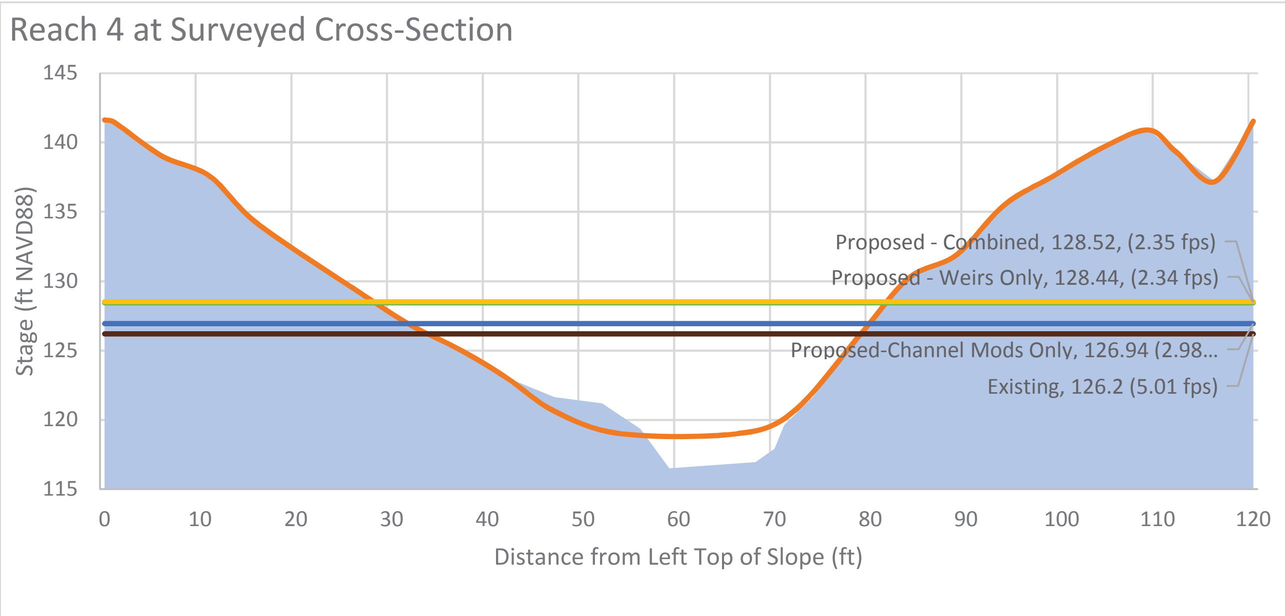
ECT Environmental Consulting & Technology, Inc.

FIGURE 5-9. (Page 1 of 3)

COMPARISON OF LHC STREAM MODIFICATIONS ALTERNATIVES

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.



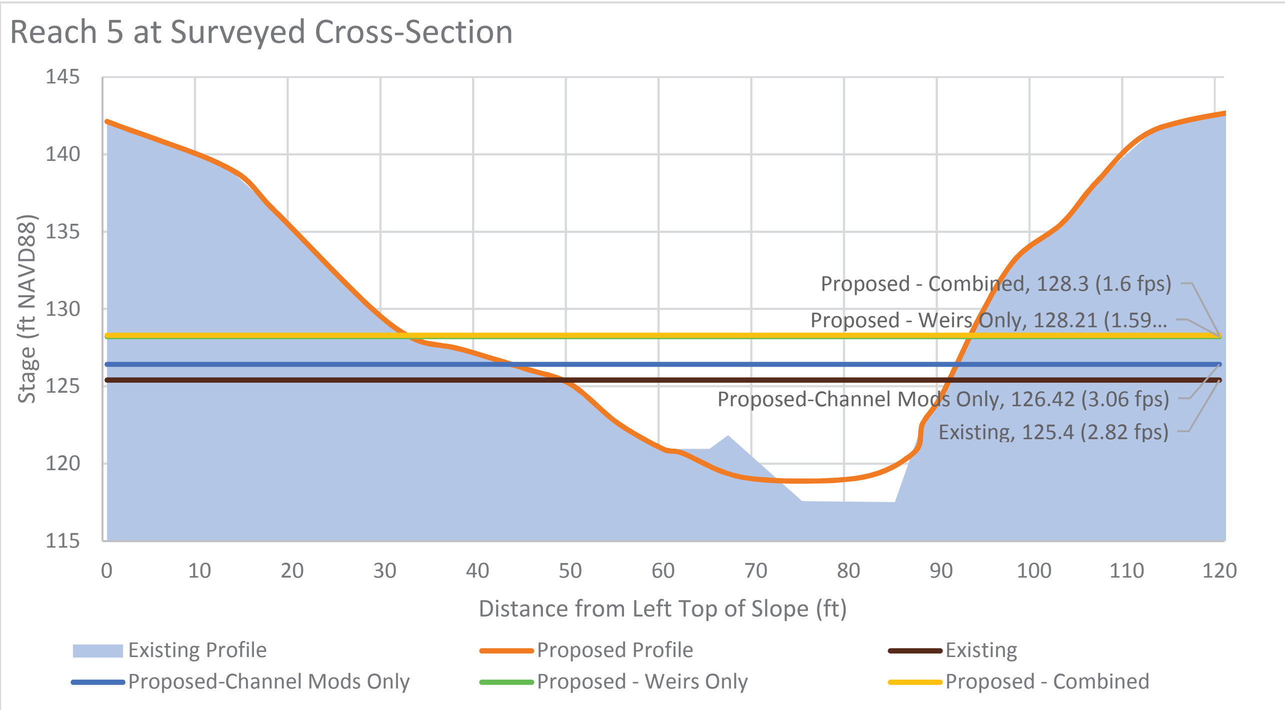
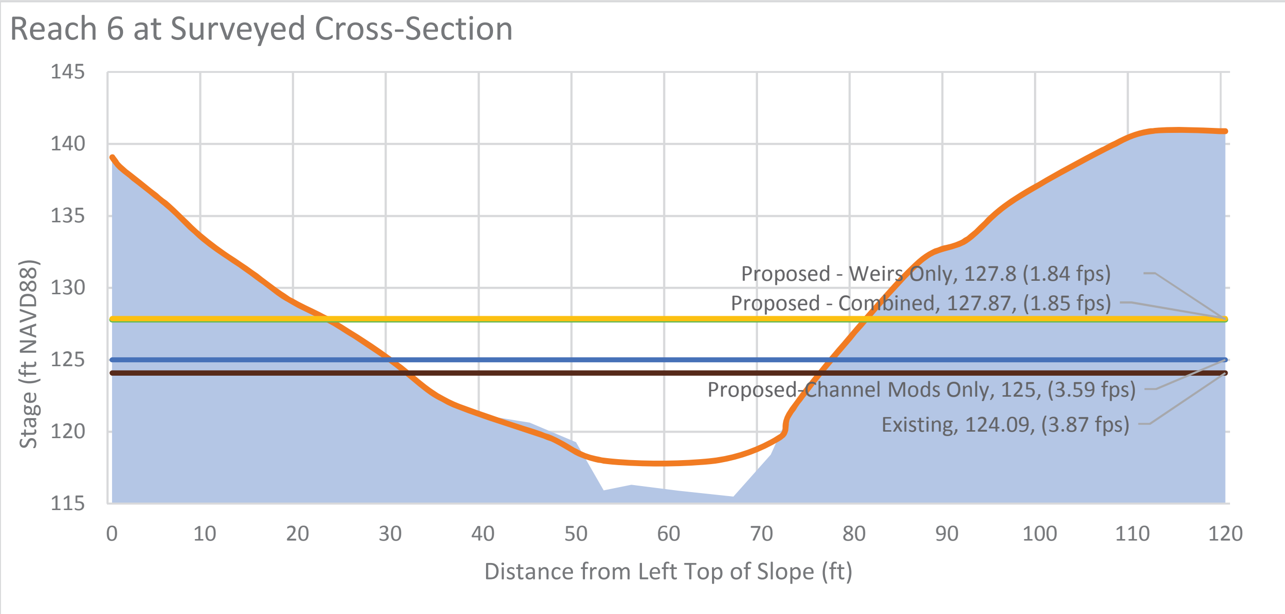


FIGURE 5-9. (Page 2 of 3)

COMPARISON OF LHC STREAM MODIFICATIONS ALTERNATIVES

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.



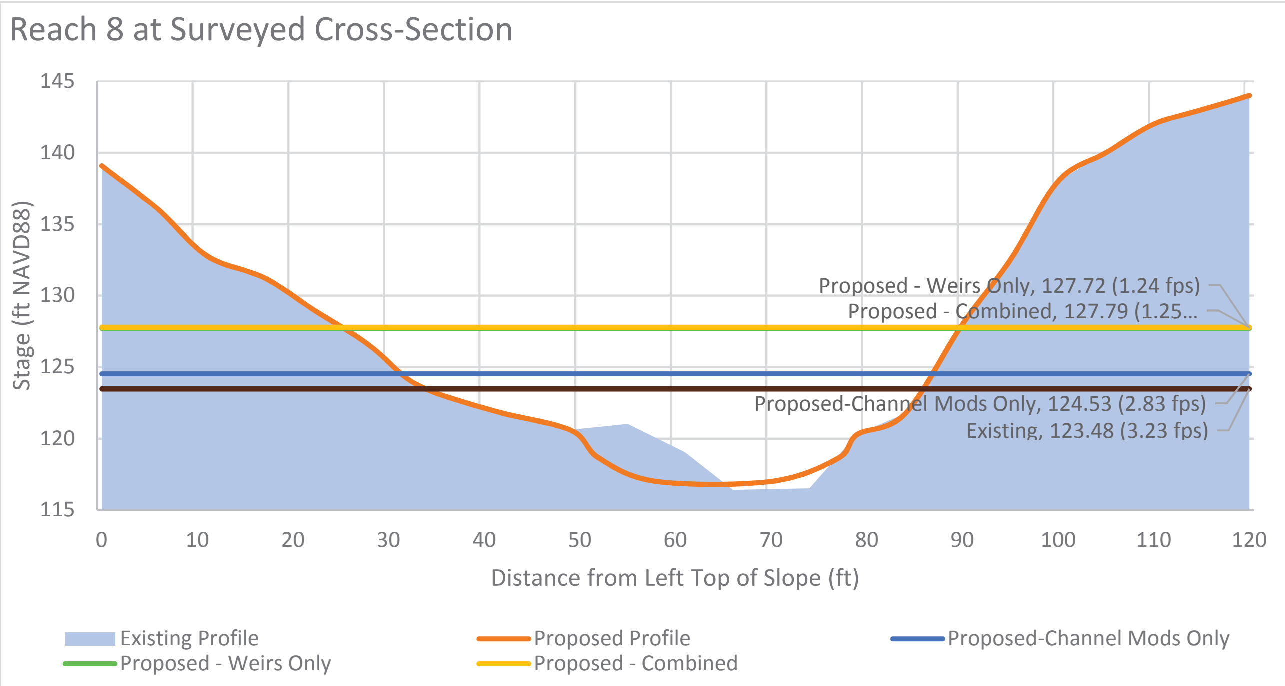


FIGURE 5-9. (Page 3 of 3)

COMPARISON OF LHC STREAM MODIFICATIONS ALTERNATIVES

Source: ECT, 2017.

Environmental Consulting & Technology, Inc.

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

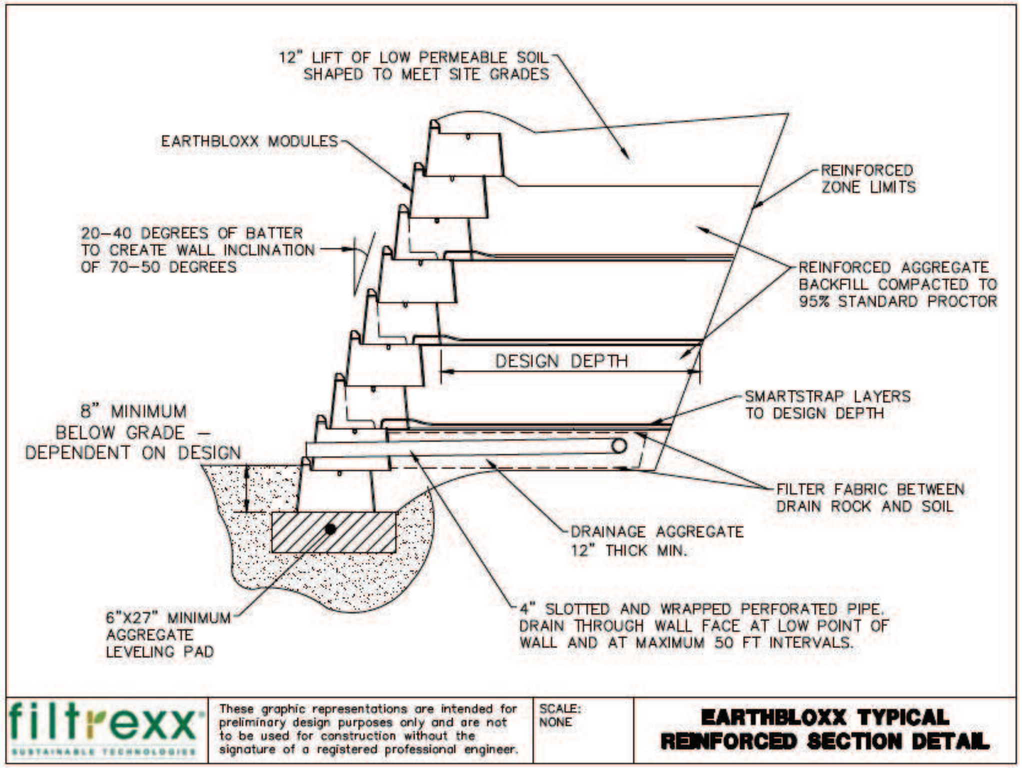
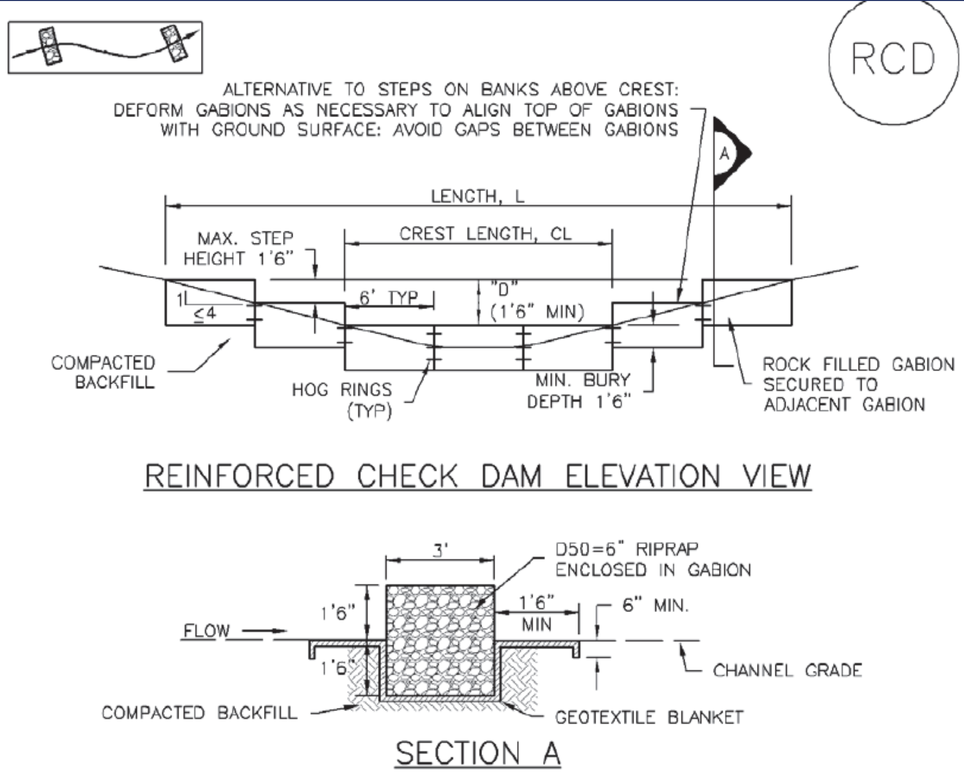
ID	Proposed Stabilization Method	Example Typical Detail
2	Mechanically stabilized earth (MSE) with vegetation—Filtrexx® EarthBloxx® living retaining wall system: • Modular retaining walls with option to fully vegetate • Stabilize channel banks where velocities are highest (thus greatest erosional forces) • Bedded in native fill	

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

ID	Proposed Stabilization Method	Example Typical Detail
	Sheet pile wall • Standard sheet piling to support failing channel slopes and withstand impact of storm event flows at elbow • No vegetating option within wall	

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

<table>
<tr><th>ID</th><th>Proposed Stabilization Method</th><th>Example Typical Detail</th></tr>
<tr><td>4, 5, 7, 8, 9, 17, 18</td><td>Check dams
Rock and gabion wire dam to reduce velocity of concentrated from coming from concrete culverts
Geotextile reinforced</td><td>

Source: Urban Drainage and Flood Control District. 2010. Check Dams (CD) EC-12. Urban Storm Drainage Criteria Manual Volume 3.</td></tr>
</table>

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

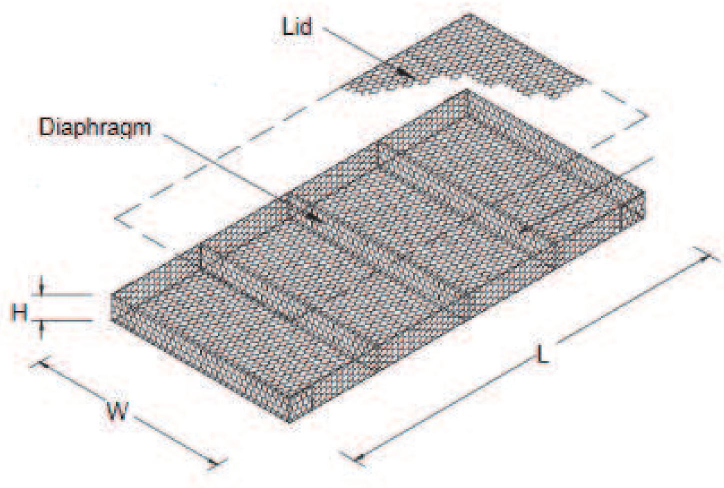
ID	Proposed Stabilization Method	Example Typical Detail
4, 5, 6, 7, 8, 9, 15	Modular gabion mats • Large rectangular baskets • Filled with rock • Provide tough, long-term erosion control for high water flow environments • Place at mouth of concrete culverts and perched steel pipe to limit erosion of channel • Can be planted with hardy vegetation if appropriate	 Source: Maccaferri Reno Mattress. Product Standard Specifications Rev: 01, Issue Date 05/01/05.

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

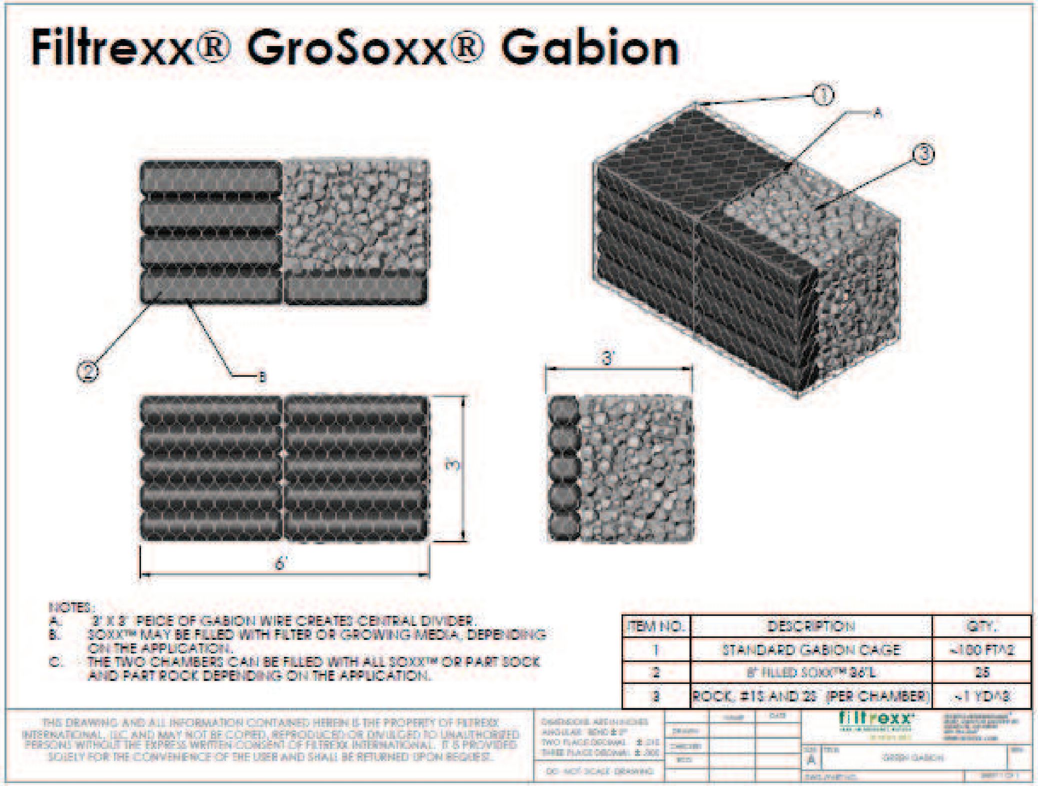
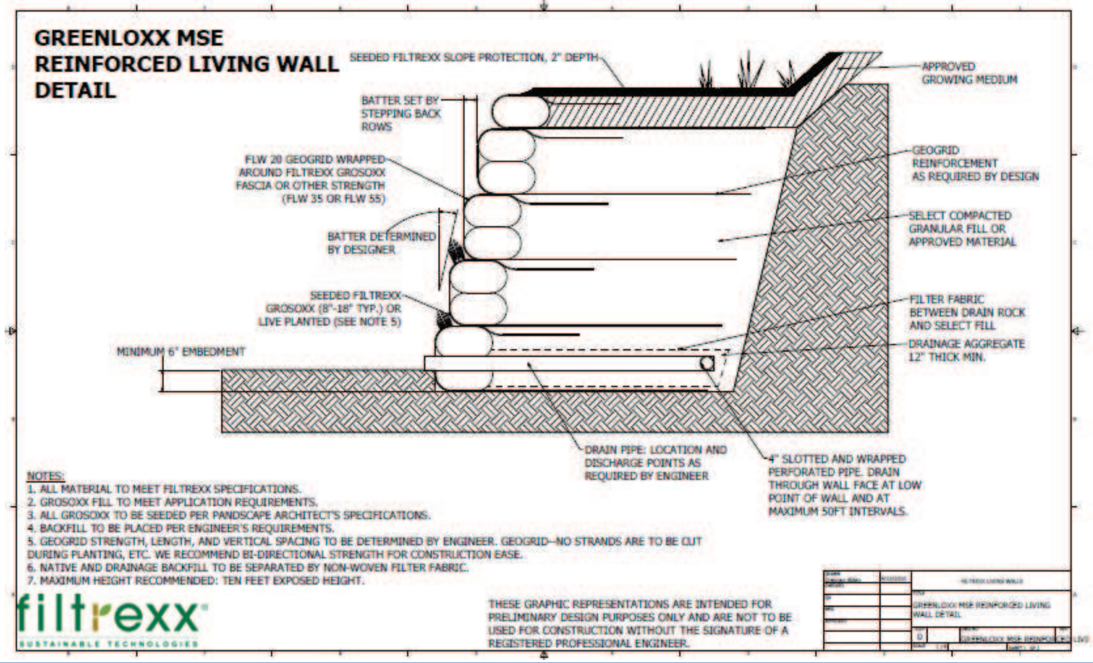
ID	Proposed Stabilization Method	Example Typical Detail
	Vegetated gabion—Filtrexx® GroSoxx® gabion mat: • Combination of hard and soft armor technology • Stabilizes and prevents erosion • Heavy duty tubular mesh netting matrix to contain and stabilize Filrexx® growing media and vegetation • Use within channel to limit channel erosion and stabilize banks	

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

<table>
<tr><th>ID</th><th>Proposed Stabilization Method</th><th>Example Typical Detail</th></tr>
<tr><td rowspan="2">11, 12, 14</td><td>Terraced slope—Filtrexx® Greenloxx® MSE reinforced living wall:

Vegetated retaining wall
MSE system reinforced with geotextile
Integrated with Filtrexx® geogrids and Filtrexx® GroSoxx® with growing media
</td><td>
</td></tr>
<tr><td>Grid confinement—Presto GEOWEB® slope and shoreline protection system:

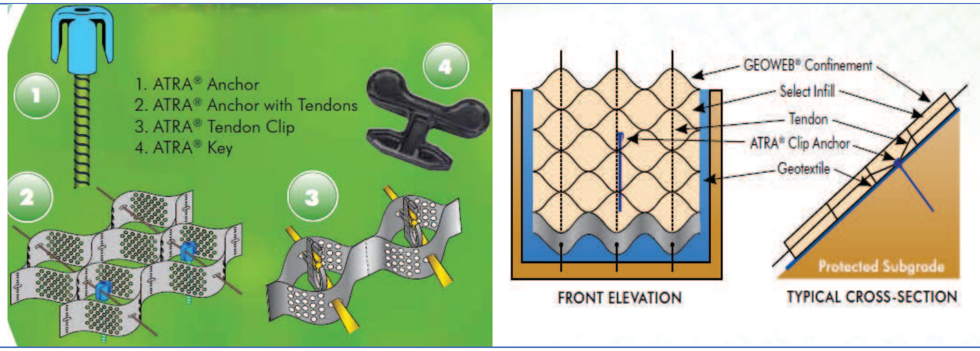
Creates structural soil stabilization system
Geotextile webbing applied over existing subsurface material or impervious geomembrane
Infilled with topsoil or vegetation infill
</td><td>
</td></tr>
</table>

Table 5-3. Proposed Stabilization Methods of Erosion Problem Areas with the Little Hatchet Creek Impacted Segment

ID	Proposed Stabilization Method	Example Typical Detail
16	Flexible downdrain/plastic pipe—ADS Bend-A-Drain® pipe: • Bendable and expandable drain pipe system • Help direct flow from perched PVC pipe down to channel without need of plunge pool	

Table 5-4. Stage and Maximum Velocity Effects of Proposed Projects for the 25-year, 24-hour Design Storm

Location*	Node	Link	Existing Maximum			Proposed - Channel Mods Only Maximum			Proposed - Weirs Only Maximum			Proposed – Combined Maximum		
			Stage (ft [NAVD88])	Velocity (ft/s)	Flow (cfs)	Stage (ft [NAVD88])	Velocity (ft/s)	Flow (cfs)	Stage (ft [NAVD88])	Velocity (ft/s)	Flow (cfs)	Stage (ft [NAVD88])	Velocity (ft/s)	Flow (cfs)
West side of Waldo	LHC_350		132.72		526.49	132.03		514.78	133.22		500.1	132.62		496.4
R1a	LHC_360	C_LHC360_370	132.44	1.69	595.82	131.67	1.57	585.9	133.02	1.65	576.46	132.38	1.48	556.91
R1b	LHC_370	C_LHC360_370	131.28	3.22	540.38	130.82	1.55	566.28	132.52	1.94	533.71	132.09	1.29	527.42
R1c	LHC_370	C_LHC370_380	131.28	2.59	540.38	130.82	1.54	566.28	132.52	2.37	533.71	132.09	1.05	527.42
R1d	LHC_380	C_LHC370_380	131.13	0.46	526.63	130.72	0.61	562.31	132.48	0.4	526.95	132.06	0.61	521.03
R2a	LHC_390	C_LHC390_400	130.58	1.89	526.39	129.74	2.44	562.2	131.62	1.58	526.71	131.22	1.71	520.72
R2b	LHC_400	C_LHC390_400	128.83	3.14	534.51	127.98	2.32	574.24	130.69	2.21	537.77	130.63	1.45	531.68
R3a	LHC_400	C_LHC400_401	128.83	3.13	534.51	127.98	2.37	574.24	130.69	2.26	537.77	130.63	1.48	531.68
R3b	LHC_401	C_LHC400_401	126.69	3.71	534.49	127.36	2.05	574.19	130.09	2.02	538.17	130.46	1.26	531.99
R4	LHC_410	C_LHC410_420	126.42	2.71	534.46	127.05	2.19	574.15	127.91	2.04	537.77	128.04	1.86	531.62
R5	LHC_420	C_LHC410_420	124.55	2.4	535.49	125.45	2.88	575.32	127.19	1.48	538.83	127.25	1.85	532.7
R6	LHC_430	C_LHC430_440	124.17	2.74	535.49	124.96	2.79	575.33	126.97	1.65	538.86	127.04	1.72	532.69
R8	LHC_440	C_LHC430_440	121.66	3.59	546.64	121.95	5.9	592	126.68	1.6	552.66	126.67	1.29	546.4

Note: NAVD88 = North American Vertical Datum of 1988.

*Refer to Figure 5-4 for specific reach locations.

Source: ECT, 2017.

5.1.3 GNV Stormwater Improvements

Two specific RPs have been identified for GNV that would significantly improve runoff to the northern segment of LHC along the north side of GNV. If implemented, these two projects would indirectly result in water quality improvement through the elimination of continued erosion of the stream bank and exposed Hawthorn.

5.1.3.1 RP: Drainage Improvements to Taxiway A

Taxiway A runs along the north side of GNV, just south of Gator Hangar and extending northeast to the North Hangar Taxilanes. Stormwater runoff in this area is collected by a series of inlets and swales. The swales are characterized as heavily overgrown (Figure 5-10). The previously referenced AVCON study indicates the swales frequently stay too wet to mow and, as such, become overgrown and do not drain properly. As a result of undrained conditions on the north side of GNV, a significant amount of runoff flows overland along the southern banks of LHC contributing to erosion of the stream banks and sedimentation into LHC.

A proposed drainage improvement consisting of demolishing the existing pipes under the taxilanes and filling the swales and constructing a new pipe and inlet system to replace the existing swales is expected to eliminate this excessive runoff and subsequent erosion of the southern LHC stream bank.

5.1.3.2 RP: Sedimentation Project

The drainage system of the eastern portion of GNV is characterized by crumbling infrastructure dating back to the 1940s and overgrown swales that do not provide adequate drainage for the site. The damaged storm sewer pipes that have either cracked or excessively settled at the pipe joints has led to surface sediment infiltration and excessive bank erosion within the LHC impacted segment, which migrates downstream into the portion of LHC east of Taxiway A and north of the runway. The majority of the sediments drop out just before a maintained access road that bisects the creek channel. The amount of sedimentation that occurs in this area is significant and currently blocks flow conveyance of LHC. The access road contains a triple culvert system blocked with sediments and debris. The creek channel has filled with sediments resulting in back flow of water into the forested area. This degree of sedimentation in this area has occurred for

M:\acad\2016\160705\LHC_TaxiwayA.mxd

NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic

unash 8/9/2017 3:10:08 PM

FIGURE 5-10.

TAXIWAY A PROJECT AREA
LITTLE HATCHET CREEK

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

several years. There is evidence of upland tree die-off and replacement by herbaceous wetland communities.

A proposed sedimentation basin in this area would allow for controlled sediment accumulation that would maintain the forested ecosystem and prevent downstream sediment transport increasing the overall effectiveness of proposed downstream projects (Figure 5-11). In addition, it would provide a level of sediment attenuation when the attenuation capacity of the upstream weirs (assuming they are installed) is reached, per design.

5.2 GRS Project Identification

Since the majority of TP loading to Newnans Lake is associated with baseflow, treatments discussed herein are aimed to provide treatment to this portion of flows. However, deciphering the amount of baseflow that enters GRS from LHC (or from the West Branch to the East Branch) is difficult to determine based on present modeling limitations and resolution of the most current DEM. While it is understood storm flows do not interact extensively, field observations have concluded, during most of the year, baseflow in LHC does not discharge directly into Newnans Lake via the West Branch. Modeling results suggest 88 percent of the total average annual flow (storm flow plus baseflow) discharges through the West Branch culvert. A further investigation to differentiate baseflow from storm flows is warranted once a higher resolution DEM is obtained. The current hydrologic understanding based on field observations of this system suggests baseflow from LHC discharges near the Creek5 sample location, where water stages up in GRS and does not exit. As such, there is some portion of the West Branch load that likely contributes an additional load to that calculated for the East Branch; however, this quantity is unknown at this time. As discussed in the projects described in the following subsections, the loading rate at the East Branch is therefore used for load reduction calculations and manipulated accordingly.

5.2.1 WQP: PRW Wetland Flow Treatment

If the PRW pilot project described in Section 5.1.1.1 is successful, additional PRWs may be placed in GRS as WQPs for treatment of wetland nutrient loading to Newnans Lake. These PRWs require controlled flow and a defined channel to meet project goals. While these

M:\acad\2016\160705\LHC_SedimentationBasin.mxd

NAD 1983 StatePlane Florida North FIPS 0903 FeetLambert Conformal Conic

unash 8/9/2017 2:52:17 PM

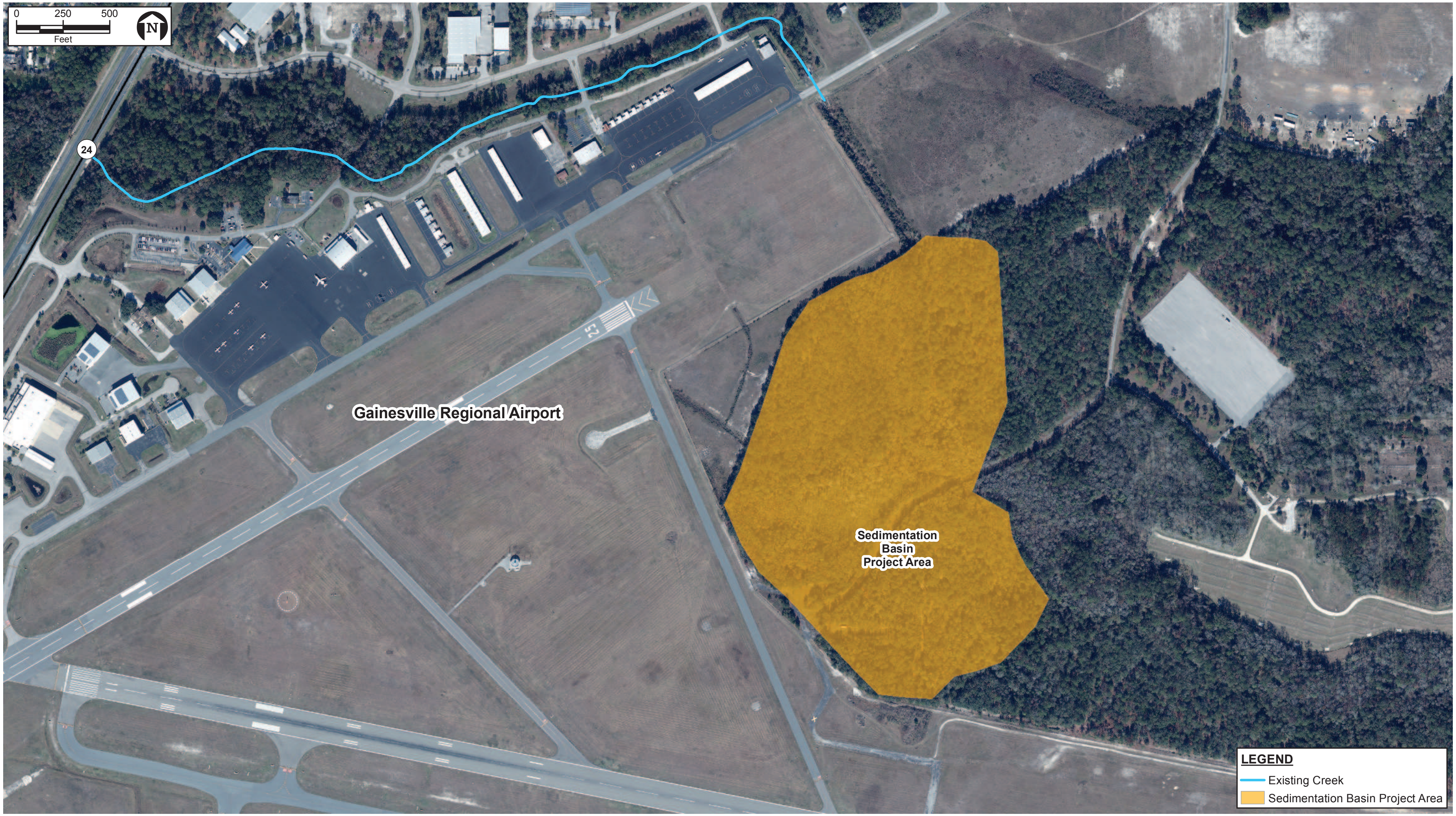


FIGURE 5-11.

SEDIMENTATION BASIN PROJECT AREA
LITTLE HATCHET CREEK

Sources: FDOT, 2017; ECT, 2017.

ECT Environmental Consulting & Technology, Inc.

conditions are not typically present in wetlands, the forest road within the Hatchet Creek Wildlife Management Area may provide conditions necessary for successful treatment. A PRW at this location would treat a portion of the flows leaving GRS before entering the floodplain where water enters Newnans Lake. Especially at this location, the design of the PRW must consider the hydraulic conductivity of the media to prevent bypass flows. Since there is a large level of uncertainty associated with flows in this area, several assumptions must be made to estimate load reductions associated with this project. Since field observations have concluded this region experiences appreciable flows only during the rainy season, loads are reduced by 50 percent. Flows in this region are diffuse and difficult to ascertain; for the purposes of this estimate, 30 percent of flows are assumed to pass through the location of the weir. These assumptions result in a loading of 338 lb/yr of TP and 3,910 lb/yr of TN at the proposed weir location. Based on the weir performance of 80-percent SRP removal and 50-percent TN removal (a higher TN removal rate at this location as opposed to LHC due to decreased flows and different conditions), this results in a removal of 271 lb/yr of TP and 1,955 lb/yr of TN.

5.2.2 WQP: Treatment Wetlands

Treatment wetlands promote denitrification to remove nitrate and potentially offer SRP reduction by inorganic phosphorus uptake by vegetation and subsequent sediment burial. Based on field observations in this region, wetlands experience hydroperiods and other conditions that support typical wetland functions. However, the vegetation in this area is not ideal for phosphorus uptake and conversion of inorganic phosphorus to organic forms. Cypress-tupelo swamps have been reported to have low net primary production compared to other wetlands, thereby reducing phosphorus uptake rates by vegetation (Mitsch and Ewel, 1979). In contrast, herbaceous plants can offer up to six times the net primary production of cypress-tupelo swamps. To utilize this potential form of phosphorus storage, a treatment wetland has been considered as a WQP that would be constructed within the existing GRS area between SR 222 and Newnans Lake. The conceptual design for this project includes creating two cuts, approximately 30 ft wide, to bisect GRS in the east-west direction for a total of 8,500 ft. Minor alterations in elevation would allow for additional water impoundment along these cuts, where herbaceous plantings could provide additional nutrient uptake, promote sheet flow, and minimize potential short-circuiting of stormwater runoff through channelized portions of GRS.

Based on the observed performance of treatment wetlands receiving nonpoint source pollution in warm climates with existing soils, a conservative estimate of 0.5 gram TP per square meter per year (m^2/yr) and 10.8 grams TN per m^2/yr was assumed for the treatment wetlands described herein (Richardson and Craft, 1993; Richardson *et al.*, 1997; Moustafa *et al.*, 1996; Moustafa, 1999). Considering the nutrient loads estimated at the East Branch, this project could result in the removal of 26 lb/yr of TP and 564 lb/yr of TN. Given the relatively low TP removal estimated here, it is unlikely the treatment wetlands would appreciably reduce SRP entering Newnans Lake. Additionally, the long-term benefits to TP or TN removal may not be worthwhile when the effort required to construct the project is considered. Phosphorus storage by plants is a short-term, cyclical outcome, while SRP is taken up by live vegetation; senescent vegetation is converted to organic phosphorus forms and eventually mineralized by the wetland microbial community under anaerobic conditions to result in burial in sediments. When the long-term loadings and availability of phosphorus in the system are taken into account, it is unlikely the rate of removal offered by a treatment wetland would outpace the rate of loading and release from sediments. As such, treatment wetlands within the existing GRS area are not likely to be a viable option for water quality improvement to Newnans Lake.

Additionally, treatment wetlands at this location are impracticable due to the listing of this portion of GRS/Newnans Lake on the National Register of Historic Places. Construction activities within this region would require extensive cultural resource permitting efforts and are likely to increase project costs and possibly render the project impossible to permit.

5.2.3 WQP: Flow-driven Dosing Treatment

The hydrologic nature of GRS creates a problematic scenario for addressing phosphorus loadings. Since diffuse flow paths and sheet flow enter GRS in the northern portion of the swamp, it is challenging to identify locations of concentrated flow for WQPs. Therefore, an innovative flow-driven dosing treatment is considered here that utilizes the existing hydrology to deliver treatment. Using this treatment, phosphorus binding in GRS waters is achieved via complexation of phosphorus with applied clay minerals such as kaolinite or those high in iron/aluminum oxides. These minerals are applied through a drip application system deployed at locations in the northern portion of GRS. Since these minerals are lightweight, they are transported by existing flows and deposited in regions where water is stagnant. Not only does this methodology address the lack of concentrated flow in GRS, but it also aims to transport treatment to the regions in GRS, where it is most needed (phosphorus hot spots). Since AIP is thought to be the source of phosphorus hotspots and is likely transported in a similar manner as utilized here for treatment, there is a greater likelihood of effective treatment.

This approach to water quality improvement has not been previously implemented and is therefore untested. While there is a hypothetical basis for the success of this technology, it is likely further investigation (e.g., pilot study implementation) with monitoring would be required before recommendations for full-scale implementation. Due to the level of effort associated with this treatment, this project is not recommended at this time.

5.3 Cost Benefit Analysis

The cost estimates for Alternatives 1, 2, and 3; channel hardening and bank stabilization; and GNV sedimentation basin were based on consultation with local contractors regarding sequencing and methods of construction, as well as unit rates from recent civil engineering stormwater improvement projects designed and managed by ECT (Table 5-5). Cut-and-fill quantities and acreage of construction were calculated based on our site survey and calculated using AutoCAD® and geographic information system (GIS) computer programs.

Cost estimates for stormwater improvements to the GNV taxiway improvements were updated from estimates provided in the Airfield Drainage Improvements Study prepared by AVCON (Table 5-5).

Table 5-5. Cost Estimates for the Projects Identified for LHC and GRS

Project Name	Implementation Estimated Cost ($)	10-year O&M Cost ($)	Total 10-year Estimated Cost ($)
LHC Projects			
PRW in-stream baseflow			
PRW pilot project	192,000	100,000	292,000
PRW expansion (pilot project + two weirs)	292,000	150,000	442,000
LHC impacted segment restoration			
Alternative 1	1,325,000	662,500	1,987,500
Alternative 2	975,000	487,500	1,462,500
Alternative 3	1,000,000	500,000	1,500,000
Channel hardening and bank stabilization	1,265,000	632,500	1,897,500
GNV taxiway stormwater improvements	2,700,000	270,000	2,970,000
GNV sedimentation basin	1,400,000	700,000	2,100,000
GRS Projects			
PRW wetland flow treatment	175,000	87,500	262,500
Treatment wetlands	500,000	250,000	750,000

Only projects considered feasible and practicable are included in costing. Projects classified as RPs do not have an associated load reduction and therefore do not have individual cost benefits. Only those projects identified as WQPs have associated load reductions.

Load reductions calculated for LHC projects were based on a TP load of 2,570 lb/yr and a TN load of 8,825 lb/yr (Table 3-3) and for GRS projects were based on a TP load of 1,226 lb/yr and a TN load of 14,390 lb/yr (Table 4-3). In an effort to be conservative, ECT assumed a 75-percent reduction would be achieved for SRP removal for a single weir (Table 5-2). Approximately 50 to 60 percent of the TP observed in the historical data collected in LHC consists of SRP. To report reductions in terms of TP to be consistent with TMDL goals, the potential reduction determined for SRP was therefore cut in half. As such, reductions reported for TP were assumed to be 38 percent of the total reduction achieved for SRP removal. A conservative approach was also taken for estimated TN reduction, assuming a similar reduction to be achieved for TN for these same projects. Due to the innovative nature of these projects, existing successful projects comparable to the setting found in the project area have not been found that provide better estimates of removal efficiencies.

The 10-year cost estimates provided herein take into account annual maintenance for sedimentation, monthly water quality monitoring before and after weir placement, and replacement of the reactive media three times during the 10-year period (Table 5-6). This is a conservative approach and likely overestimates the 10-year cost. Similar load reductions were assumed for the proposed treatment wetland project as well.

Based on these assumptions and the load calculations determined in Tables 3-3 and 4-3, the PRW pilot project will remove 977 lb/yr of TP and 3,354 lb/yr of TN at a 10-year cost benefit of $45 and $13 per pound, respectively (Table 5-6). Adding two more weirs improves the cost benefit considerably. The PRW expansion project would remove 1,957 lb/yr of TP and 6,722 lb/yr of TN at $23 and $7 per pound, respectively (Table 5-6).

The proposed PWR in GRS was estimated to remove 466 lb/yr of TP at a cost benefit of $161 per pound, while it was estimated to remove 5,468 lb/yr of TN at a cost benefit of $13 per pound (Table 5-6). The treatment wetland proposed south of SR 26 was the least effective project considered. Based on the assumptions made, the treatment wetlands only remove 26 lb/yr of TP and 554 lb/yr of TN at a cost benefit of $1,923 and $89 per pound, respectively (Table 5-6).

Table 5-6. Estimated Load Reductions for Practicable Water Quality Improvement Projects Identified for LHC and GRS

Project Name	Estimated TP Load Reduction (lb/yr)	Estimated TN Load Reduction (lb/yr)	10-year Cost Benefit ($/lb TP)	10-year Cost Benefit ($/lb TN)
LHC Projects				
PRW pilot project	977	3,354	45	13
PRW expansion (pilot project + two weirs)	1,957	6,722	23	7
GRS Projects				
PRW wetland flow treatment	466	5,468	161	14
Treatment wetlands	26	564	1,923	89

6.0 Recommendation

Long-term restoration success in NLW is dependent on implementation of multiple projects to achieve nutrient load reduction goals identified in the 2003 TMDL. Under Phase I of the NLII, nine projects were identified and investigated to determine their likelihood of success in-terms of cost, nutrient load reduction, and practicability under existing site conditions (Table 5-5):

- PRW in-stream baseflow treatment
  - PRW pilot project
  - PRW expansion
- LHC impacted segment restoration (three alternatives considered)
- Channel hardening and bank stabilization
- GNV stormwater improvements
  - GNV taxiway stormwater improvements
  - GNV sedimentation basin
- PRW wetland flow treatment
- Treatment wetlands
- Flow-driven dosing treatment.

Considering the greatest effective reduction in phosphorus loads to Newnans Lake as well as practicability, the PRW in-stream baseflow treatment was estimated to provide the most direct benefit. This project is recommended in conjunction with other RPs to increase the longevity of effective treatment and bolster phosphorus load reduction. With continued sedimentation and Hawthorn weathering occurring in the LHC channel, the long-term effectiveness of PRWs in-stream baseflow treatment project will be reduced due to continued sedimentation. As such, the LHC impacted segment restoration (Alternative 3 with targeted channel widening and bank stabilization) is recommended to reduce sediment scouring in conjunction with GNV stormwater improvements (sedimentation project) to reduce further sediment transport downstream. The combination of these four projects results in a total 10-year cost estimate of $4,042,000 and a resulting cost benefit of $206 per pound of TP removed and $60 per pound of TN removed (Table 6-1).

Table 6-1. Combined Restoration and Water Quality Improvement Project Recommendation

Project Name	10-year Cost Estimate ($)
LHC impacted segment restoration: Alternative 3	1,500,000
GNV sedimentation basin	2,100,000
PRW expansion (pilot project + two weirs)	442,000
Total	**4,042,000**
10-year cost benefit (per pound TP)	**206**
10-year cost benefit (per pound TN)	**60**

These proposed projects address loadings in LHC but do not appreciably address the loadings associated with GRS. The phosphorus loads from hot spots in GRS are diffuse and, as such, are difficult to target for treatment. Based on the present findings, the best course of action for GRS may be further investigation into high phosphorus concentrations measured in the northern portion of GRS, investigating those hydrologic connections, and addressing the potential sources. These potential sources include the former landfill, as well as other regions in the LHC sub-basin, where it is likely Hawthorn material has been exposed and transported by a variety of actions, including routine excavation and earth-moving activities.

Based on these recommendations, it is reasonable to conclude the projects recommended herein will attenuate the majority of the 2,570 lb/yr of TP loading associated with Hawthorn exposure in LHC. While this clearly helps to meet the objective of the TMDL TP annual load for the LHC sub-basin, GRS remains a challenge. Since these two loadings are largely hydrologically independent, it is unlikely projects that are successful in LHC will appreciably decrease phosphorus loadings from GRS.

6.1 Additional LHC Sub-basin Needs

In addition to the projects discussed in Section 5.0, ECT recommends the following two projects be considered further. The Phase I project boundary did not include the entire LHC sub-basin. Only the area east of Waldo Road was addressed in this phase.

6.1.1 West Waldo Road Treatment Wetland

While the nutrient loads west of Waldo Road are not as high as the loads determined for downstream of the LHC impacted segment, s significant amount of the storm flow is contributed by this area. Along with the storm flow west of Waldo comes a significant amount of sediment transport that could reduce the effectiveness of the recommended restoration solutions for the LHC sub-basin. These storm flows will also contribute to additional in-channel erosion that decreases the overall effectiveness of the restoration strategy. ECT recommends the consideration of the development of a treatment wetland project west of Waldo Road with a primary focus on flow attenuation and sediment capture. The system should also be designed to provide water quality improvement to address the loads contributed by that land area. This project would require a more thorough investigation of the forested area between Waldo Road and the Ironwood Gulf Course to determine the practicability of converting that land to a treatment, flow-attenuating wetland. This effort would also require additional updates to the ICPR model utilized in Phase I of the NLII.

6.1.2 Brittany Estates

Brittany Estates is a manufactured home community that straddles the North Branch of LHC just west of Waldo Road. Currently, wastewater is directed to a small packaging plant permitted for 0.06 MGD with minimal treatment before discharging to LHC. Additionally, the community has minimal stormwater management, and stormwater from the individual homes runs off directly to LHC with little to no treatment. ECT recommends investigating the option of connecting this community directly to the GRU collection system. This would include a current evaluation of the load coming from this community; the cost of connecting this community to GRU, including the need for a lift station; the cost to demolish the existing packaging plant; and the estimated annual cost to individual residents. It would also include a cost benefits analysis of the potential load reduction anticipated if Brittany Estates was connected to GRU.

7.0 References/Bibliography

Ádám, K., T. Krogstad, L. Vråle, A.K. Søvik, and P.D. Jenssen. 2007. Phosphorus retention in the filter materials shellsand and Fil- tralite P® - Batch and column experiment with P solution and secondary Kwastewater. Ecological Engineering 29: 200–208.

Alachua County Environmental Protection Department (ACEPD). 2007. Gainesville Creeks, 2007: A Status Report on Baseflow Water Quality, Stormwater and Ecosystem Health for the Orange Creek Basin, 1998—2003.

———. 2015. Wastewater Treatment Plant Inspection Program, 2012-2013 Data Report. November, 2015.

———. 2017. Little Hatchet Creek North Branch Surface Water Data: 10/30/1984 to 7/19/2017. Data delivery: ACEPD July 2016 and September 2017.

AVCON, Inc. 2015. Airport Drainage System Improvement Study.

Baker, M.J., D.W. Blowes, and C.J. Ptacek. 1997. Phosphorus Adsorption and Precipitation in a Permeable Reactive Wall: Applications for Wastewater Disposal Systems. LandContam.Reclam, 5, 189-193.

———. 1998. Laboratory development of permeable reactive mixtures for the removal of phosphorus from onsite wastewater disposal systems. Environ. Sci. Technol. 32:2308-2316.

Brenner, M., and T.J. Whitmore. 1998. Historical sediment and nutrient accumulation rates and past water quality in Newnans Lake. Final Report, Department of Fisheries and Aquatic Sciences, University of Florida, Gainesville.

Brooks, H.K. 1981. Physiographic divisions. Scale 1:500,000. Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

Chardon, W.J., J.E. Groenenberg, E.J.M. Temminghoff, and G.F. Koopmans. 2012. Use of reactive materials to bind phosphorus. Journal of Environmental Quality 41: 636–646.

Cohen, M., S. Lamsal, L. Korhnak, and L. Long. 2008. Spatial nutrient loading and sources of phosphorus in the Newnans Lake watershed. Final report for the St. John's River Water Management District. Gainesville, FL. Special Publication SJ2008-SP29.The School of Forest Resources and Conservation, University of Florida. 98 p.

Cohen, M., L. Long, and L. Korhnak. 2010. Ongoing assessment of nutrient sources to Newnans Lake, Florida. Final Report.

DB Environmental. 2016, 2017. Sediment Phosphorus Stability in Little Hatchet Creek. Report for the Alachua County Environmental Protection Department, 42 p.

Di, J.J., D. Smith, C. Lippincott, and E. Marzolf. 2010. Pollutant load reduction goals for Newnans Lake. Report for the St. John's River Water Management District Palatka, FL 67 p.

Di, J.J., R. Hicks, M. Paulic, and R. Hallbourg. 2012. Depth of the phosphorus-rich Hawthorn Group in Newnans Lake Watershed.

Dorozhkin, S.V. 2002. A review on the dissolution models of calcium apatites. Progress in Crystal Growth and Characterization of Materials. 2002:45-61.

Espenshade, G.H., and C.W. Spencer. 1962. Geology of phosphate deposits of northern peninsular Florida. Geological Survey Bulletin 1118. 126 p.

Fisher, M.M., and K.R. Reddy. 2001. Phosphorus Flux from Wetland Soils Affected by Long-Term Nutrient Loading. Journal of Environmental Quality, 30:261–271.

Florida Department of Environmental Protection (FDEP). 2014. Orange Creek Basin Management Action Plan –Phase 2 - for the implementation of Total Maximum Daily loads adopted by the Florida Department of Environmental Protection. Tallahassee, FL.

Gao, X., and D. Gilbert. 2003a. Nutrient Total Maximum Daily Load for Newnans Lake, Alachua County, Florida. Florida Department of Environmental Protection, Watershed Assessment Section, Tallahassee, FL.

Gottgens, J.F., and T.L. Crisman. 1992. Sediments of Newnans Lake: characteristics and patterns of redistribution following a short-term drawdown (Phase II). Special Publication SJ92-SP24. St. Johns River Water Management District, Palatka, FL. (floridaswater.com/technicalreports/pdfs/SP/SJ92-SP24.pdf)

Goyne, K.W., S.L. Brantley, and J. Chorover. 2006. Effects of organic acids and dissolved oxygen on apatite and chalcopyrite dissolution: implications for using elements as organomarkers and oxymarkers. Chemical Geology. 234:28-45.

Guidry, M.W., and F.T. Mackenzie. 2003. Experimental study of igneous and sedimentary apatite dissolution: control of pH, distance from equilibrium, and temperature on dissolution rates. Geochimica et Cosmochimica Acta. Vol. 67, 16:2949-2963.

Harrelson, C.C., C.L. Rawlings, and J.P. Potyondy, 1994. Stream channel reference sites: an illustrated guide to field technique. Gen. Tech. Rep. RM-235. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

Harouiya, N., C. Chairat, S.J. Kohler, R. Gout, and E.H. Oelkers. 2007. The dissolution kinetics and apparent solubility of natural apatite in closed reactors at temperatures from 50 to 50°C and pH from 1 to 6

Harper, H.H., and D.M. Baker. 2007. Evaluation of Current Stormwater Design Criteria within the State of Florida, Final Report. Prepared for Florida Department of Environmental Protection, FDEP Contract No. SO108. June 2007.

Hieltjes, A.H.M., and L. Lijklema. 1980. Fractionation of inorganic phosphates in calcareous sediments. J Environ. Qual. 9:405-407.

Hood, A., M. Chopra, and M. Wanielista. 2013. Assessment of biosorption activated media under roadside swales for the removal of phosphorus from stormwater. Water. 5:53-66.

Hydrologic Data Collection (HDC), Inc. 2016. Station Monitoring Data: Little Hatchet Creek at SR-24. 2009 to 2016 WY.

Inwood Consulting Engineers. 2009. Final Hydrological and Hydraulic Model Summary Report. Alachua County Stormwater Master Plan. Alachua County, Florida. Prepared for Alachua County Public Works. November.

Kim, H., E.A. Seagren, and A.P. Davis. 2000. Engineering Bioretention for Removal of Nitrate from Stormwater Runoff, in WEFTEC 2000 Conference Proceedings on CDROM Research Symposium, Nitrogen Removal, Session 19, Anaheim CA, October.

Klimeski, A., W.J. Chardon, E. Turtola, and R. Uusitalo. 2012. Potential and limitations of phosphate retention media in water protection: a process-based review of laboratory and field-scale tests. Agricultural and Food Science. 21:206-223

Lippincott, C.L. 2011. Orange Creek Basin Surface Water Improvement and Management Plan. St. Johns River Water Management District, Palatka, Fl.

———. 2015. Assessment of dredging sediment from Newnans Lake to Improve Water Quality. Alachua County Environmental Protection Department, Gainesville, FL. May 14, 2015

McCarthy, A.J., Jr. 2011. Preliminary assessment – Alachua Army airfield, AKA Fairbanks Army airfield, AKA Gainesville Regional Airport - Alachua County, Florida. Florida Department of Environmental Protection, Tallahassee, FL.

Mitsch, W.J., and K.C. Ewel. 1979. Comparative biomass and growth of cypress in Florida wetlands. American Midland Naturalist. 101:417-426.

Mitsch, W.J., and J.G. Gosselink. 2000. Wetlands (3rd Edition). John Wiley and Sons, Inc.

Moustafa, M.Z., M.J. Chimney, T.D. Fontaine, G. Shih, and S. Davis. 1996. The response of a freshwater wetland to long-term “low level” nutrient loads – Marsh efficiency. Ecological Engineering 7:15-33.

Moustafa, M.Z. 1999. Nutrient retention dynamics of the Everglades nutrient removal project. Wetlands 19:689-704.

National Oceanic and Atmospheric Administration (NOAA). 2017. National Centers for Environmental Information (NCEI), Local Climatological Data. Station USW00012816, Gainesville Regional Airport FL US. Accessed June 2017.

Nriagu, J.O. 1976. Phosphate – clay mineral relations in soils and sediments. Canadian Journal of Earth Sciences 13(6):717-736.

Odum, H.P. 1953. Dissolved phosphorus in Florida waters. Tallahassee: Florida Geological Survey, Report of Investigations no. 9, pp. 1–40.

Reddy, K.R., Y. Wang, W.F. Debusk, M.M. Fisher, and S. Newman. 1998. Forms of soil phosphorus in selected hydrologic units of the Florida Everglades. Soil Science Society Amer. J. 62:1134-1147.

Richardson, C.J., and C.B. Craft. 1993. Effective phosphorus retention in wetlands – Fact or fiction? In G.A. Moshiri, ed. Constructed Wetlands for Water Quality Improvement. CRC Press, Boca Raton, FL, pp. 271-282.

Richardson, C.J., S. Qian, C.B. Craft, and R.G. Qualls. 1997. Predictive models for phosphorus retention in wetlands. Wetlands Ecology and Management 4:159-175.

St. Johns River Water Management District (SJRWMD). 2012. Ed. E.F. Lowe, L.E. Battoe, H. Wilkening, M. Cullum, and T. Bartol. St. Johns River Water Supply Impact Study. Technical Publication SJ2012-1. Palatka, Florida.

Upchurch, S.B. 2007. An introduction to the Cody Escarpment, North-Central Florida. 2007.

U.S. Geological Survey (USGS). 2017. Evapotranspiration Information and Data. Caribbean-Florida Water Science Center. https://fl.water.usgs.gov/et/. Accessed July 2017.

Wetzel, R.G. 1999. Organic phosphorus mineralization in soils and sediments. In. Phosphorus Biogeochemistry of Subtropical Ecosystems. K.R. Reddy, G.A. O'Connor, and C.L Shelske (eds.) Lewis Pub.

White, W.A. 1970. The Geomorphology of the Florida Peninsula. Geological Bulletin No. 51, State of Florida Dept. of Natural Resources Bureau of Geology. Tallahassee, Florida.

8.0 Glossary

Adsorption. Sorption of an ion to a charged surface by electrostatic attraction or the formation of bonds between a chemical and surface functional groups. Can result in outer-sphere adsorption, where at least one water molecule remains between the chemical and the soil surface, or inner-sphere adsorption, where the chemical makes a direct covalent or ionic bond with the soil surface.

Amorphous. Pertaining to a material that lacks crystal structure or whose internal atomic arrangement is so irregular that there is no characteristic external form.

Apatite. A group of variously colored hexagonal minerals consisting of calcium phosphate together with fluorine, chlorine, hydroxyl, or carbonate in varying amounts and having the general formula Ca5(PO4, CO3)3(F, OH, Cl). Also, any mineral of the apatite group, such as fluorapatite, chlorapatite, hydroxylapatite, carbonate-apatite, and francolite; when not specified, the term usually refers to fluorapatite. The apatite minerals occur as accessory minerals in almost all igneous rocks, in metamorphic rocks, in veins and other ore deposits; and most commonly as fine-grained and often impure masses as the chief constituent of phosphate rock and of most or all bones and teeth.

Biogeochemistry. The study of the form, fate, and movement of elements through biological, geological, and chemical materials.

Calcium/magnesium-bound inorganic phosphorus. Inorganic phosphorus that is specifically found as compounds of calcium or magnesium. Obtained in sequential soil phosphorus fractionation using a 0.5 N hydrochloric acid extractant followed by analysis for extractable inorganic phosphorus. Also called apatite inorganic phosphorus, as phosphorus bound to calcium and magnesium is the form of apatite.

Clay. (1) Soil fraction consisting of particles less than 0.002 mm in diameter. (2) A soil texture class that is dominated by clay or at least has a larger proportion of clay than either silt or sand. (3) A poorly defined group of aluminum silicate minerals.

Colorimetric methods. Colorimetry, or spectrophotometry, is a chemical analytical method that exploits the link between chemical composition and color intensity for a range of dyes.

Crystalline. Having the nature of a crystal; specifically, having a crystal structure or regular arrangement of atoms in a lattice.

Deionized water-extractable phosphorus. A measurement of SRP in porewater extracted in the laboratory by centrifugation and filtration with deionized distilled water. Also DIW OPO4 or porewater P.

Denitrification. The bacterial reduction of dissolved to gaseous Denitrifying organisms require anoxic or dysoxic conditions. This process typically occurs under the anoxic conditions present in subsurface lake and wetland sediments and in the hypolimnions of strongly stratified lakes.

Erosion and sediment control. A measure placed, constructed on, or applied to the landscape that prevents or curbs the detachment of soil, its movement and/or deposition.

Erosion. The wearing away of the land surface by water, wind, ice, gravity, or other geological agents. Erosion can occur at different rates – typically naturally driven erosional processes occur slowly, while erosion accelerated by man occurs much more rapidly than normal or geologic erosion.

Iron/aluminum-bound inorganic phosphorus. Inorganic phosphorus that is specifically found as compounds of aluminum or iron. Obtained in sequential soil phosphorus fractionation using a 0.1 M sodium hydroxide extractant followed immediately by analysis for extractable inorganic phosphorus. Also called nonaptite inorganic phosphorus, as this is the fraction of phosphorus not in apatite form.

Floodplain. The lowland that borders a stream and is subject to flooding when the stream overflows its banks.

Gabion. A wire mesh cage, usually rectangular, filled with rock and used to protect channel banks and other sloping areas from erosion.

Geotextile fabric. A woven or nonwoven, water-permeable synthetic material used to trap sediment particles or prevent the clogging of aggregates with fine-grained soil particles.

Groundwater recharge. The process by which water seeps into the ground, eventually replenishing groundwater aquifers and surface waters such as lakes, streams, and oceans. This process helps maintain water flow in streams and wetlands and preserves water table levels that support drinking water supplies.

Highly available inorganic phosphorus. A term used to refer to reactive and bio-available forms of P. SRP is the most labile form of P. The extractant used to quantify labile P fractions in soils and sediments as part of sequential soil phosphorus fractionation is a weak solutions of 0.01 M potassium chloride salt.

Humic and fulvic acid-bound organic phosphorus. Organically bound phosphorus in soils. Obtained in sequential soil phosphorus fractionation using a 0.1 M sodium hydroxide extractant followed by digestion with 11 N sulfuric acid and potassium persulfate. Digestates are analyzed for TP by colorimetric method. Total soil organic phosphorus may also be quantified by subtracting total inorganic phosphorus from soil total phosphorus.

Hydraulic conductivity. The rate at which water moves through a saturated porous media under a unit potential-energy gradient. It is a measure of the ease of water movement in soil and is a function of the fluid as well as the porous media through which the fluid is moving.

Hydrograph. A graph showing for a given point on a stream the discharge, stage (depth), velocity, or other property of water with respect to time.

Hydroperiod. Depth and duration of inundation in a particular wetland area.

Inorganic phosphorus. Form of P that was not formed primarily by biological processes and is usually a collective term that refers to mineral forms of P such as compounds of either aluminum or iron in acidic media, or calcium in calcareous, alkaline media. Can be measured in soil samples by extraction with 1.0 N hydrochloric acid.

Orthophosphate. The standard procedure is to analyze OPO4 on water samples that have been filtered through 0.45-micrometer filter. When analyzed using colorimetric method, some of the condensed polyphosphates and organic phosphates maybe included in the measurement.

Peak stage. The highest stage or greatest discharge attained by a flood event, thus peak stage or peak flows.

Reactive phosphate: soluble reactive phosphate (SRP). Phosphorus form in water samples that responds to colorimetric test without preliminary hydrolysis or digestion. Reactive phosphate referenced in this report is filtered (dissolved SRP, the most commonly measured form of SRP).

Sand. (1) Soil particles between 0.05 mm and 2.0 mm in diameter. (2) A soil textural class inclusive of all soils that are at least 70-percent sand and 15-percent or less clay.

Scour(ing). The clearing and digging action of flowing water, especially the downward erosion caused by stream water in seeping away mud and silt from the stream bed and outside bank of a curved channel.

Sequential phosphorus fractionation. A process by which the pools of phosphorus in soil can be separated using a sequential process of chemical reactions related to known pools with clearly defined chemical properties.

Silt. (1) Soil fraction consisting of particles between 0.002 mm and 0.05 mm in diameter. (2) A soil textural class indicating more than 80-percent silt.

Soluble phosphorus. Soluble phosphorus is present predominantly as the ionic species orthophosphate and is thought to be the form readily taken up by plants (i.e., bio-available). Also known as labile or readily available phosphorus.

Storm event. An estimate of the expected amount of precipitation within a given period of time. For example, a 10-year frequency, 24-hour duration storm event is a storm that has a 10-percent probability of occurring in any one year. Precipitation is measured over a 24-hour period.

Total maximum daily load (TMDL). A calculation of the maximum amount of a pollutant a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources, including a margin of safety.

Total phosphorus (TP) (soil). Sum of organic and inorganic forms of phosphorus. Soil total phosphorus is quantified using a rigid oxidative process that involves ignition at high temperature followed by acid extraction of residue by 6.0 N hydrochloric acid under heated conditions.

Total phosphorus (TP) (water). Sum of organic and inorganic forms of phosphorus. TP is measured on unfiltered water samples that has been subjected to oxidative destruction of organic matter.

X-ray diffraction (XRD). The study of crystal structure, and the structure of the atoms, molecules, or ions that compose the crystal, based on diffraction of X-ray photons.

Appendix A

Water Quality Data for LHC Sub-basin

Part I—SJRWMD Monitoring Stations HATCONA, LHATNBWMD, LFC329B, LFCSE43US
Part II—DB Environmental for ACEPD 2017
Part II—UF for SJRWMD 2007, 2008, 2010

						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	Concen-tration	Saturation	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)
3	29.72609	-82.22971	01/10/07	UF for SJRWMD	Hatchet Creek	0.033	0.011	0.6692	0.66	0.220	0.166														14.4	7.63	0.14	
3	29.72609	-82.22971	02/05/07	UF for SJRWMD	Hatchet Creek	0.025	0.032	0.9817	0.95	0.134	0.109							110.00					23.47	9.04	28.1	8.08		
3	29.72609	-82.22971	04/10/07	UF for SJRWMD	Hatchet Creek	0.027	0.021	0.3930	0.37	0.267	0.234							70.00					16.45	1.06	5.0	3.58		
3	29.72609	-82.22971	05/14/07	UF for SJRWMD	Hatchet Creek	0.023	0.045	0.6337	0.59	0.454	0.353												15.90	0.88	5.8	4.04		
3	29.72609	-82.22971	06/07/07	UF for SJRWMD	Hatchet Creek	0.019	0.045	0.5797	0.54	0.406	0.334			7.1	87	0.50	6.84	78.00				25.4	18.50	1.58	7.7	7.03		123
3	29.72609	-82.22971	07/20/07	UF for SJRWMD	Hatchet Creek	0.018	0.057	0.7620	0.70	0.383	0.314			6.5	80	0.48	6.59	75.00				26.0	15.10	1.32	7.5	6.13		125
3	29.72609	-82.22971	08/09/07	UF for SJRWMD	Hatchet Creek	0.019	0.066	0.5622	0.50	0.339	0.287			6.5	81	0.84	6.72	101.00				27.1	19.21	1.54	8.1	10.18		95
3	29.72609	-82.22971	08/21/07	UF for SJRWMD	Hatchet Creek	0.025	0.072	0.6002	0.53	0.301	0.23			6.7	83	0.62	6.76	98.00				26.7	20.88	1.49	9.1	10.91		78
3	29.72609	-82.22971	08/28/07	UF for SJRWMD	Hatchet Creek	0.026	0.055	0.9699	0.91	0.210	0.172					2.29	6.61	100.00					26.42	2.23	19.2	11.21		
3	29.72609	-82.22971	09/04/07	UF for SJRWMD	Hatchet Creek	0.036	0.033	1.3933	1.36	0.179	0.13			5.8	71	4.31	6.12	80.00				25.5	17.57	1.08	34.7	10.52		195
3	29.72609	-82.22971	09/18/07	UF for SJRWMD	Hatchet Creek	0.012	0.045	0.4252	0.38	0.258	0.207			8.5	101	0.71	6.59	75.00				24.2			5.5	8.59		133
3	29.72609	-82.22971	01/30/08	UF for SJRWMD	Hatchet Creek	0.005	0.013	1.4232	1.41	0.119	0.089			9.9	96	11.70	6.21	87.00				13.7			44.7	8.52		234
3	29.72609	-82.22971	2/27/2008	UF for SJRWMD	Hatchet Creek	0.031	0.021	1.8655	1.84	0.194	0.166			6.3	65	136.00	4.92	74.00				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	0.6187	0.59	0.257	0.267			6.3	73	0.46	6.55	62.00				22.8			10.2			155
3	29.72609	-82.22971	11/24/08	UF for SJRWMD	Hatchet Creek	0.019	0.290	0.2900		0.182	0.224			10.1	92	1.40	7.62	69.00				11.3	18.07	1.60		5.87		216
3	29.72609	-82.22971	01/09/09	UF for SJRWMD	Hatchet Creek	0.021	0.360	0.3600		0.226	0.249			9.5	91	2.12	5.92	78.00				13.5	19.73	1.13		8.20		243
3	29.72609	-82.22971	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.590	1.5900		0.100	0.059			8.07	84.2	21.51	4.92	76.00				17.31						252
4	29.6995	-82.2682	04/10/07	UF for SJRWMD	Little Hatchet Creek	0.056	0.156	0.5575	0.40	0.318	0.282												19.73	3.74	6.6	34.23		
4	29.6995	-82.2682	04/27/09	UF for SJRWMD	Little Hatchet Creek	0.043	0.610	0.6100		0.221	0.18			8.5	98	1.09	7.41	249.00				22.1	24.76	6.49		42.09		82
4	29.6995	-82.2682	06/29/09	UF for SJRWMD	Little Hatchet Creek	0.036	0.450	0.4500		0.159	0.159			7.0	88	1.75	7.30	268.00				28.3				36.12		77
4	29.6995	-82.2682	07/31/09	UF for SJRWMD	Little Hatchet Creek	0.032	0.920	0.9200		0.104	0.089			6.5	81	4.30	6.83	248.00				26.6				39.31		112
4	29.6995	-82.2682	08/19/09	UF for SJRWMD	Little Hatchet Creek	0.034	0.600	0.6000		0.111	0.095			7.3	91	3.58	6.73	222.00				26.8				38.62		105
4	29.6995	-82.2682	11/13/09	UF for SJRWMD	Little Hatchet Creek	0.019	0.530	0.5300		0.184	0.194			8.2	87	1.08	6.94	305.00				18.2				38.40		105
4	29.6995	-82.2682	01/05/10	UF for SJRWMD	Little Hatchet Creek	0.041	0.920	0.9200		0.114	0.074			n.a.	n.a.	1.86	n.a.	n.a.				n.a.				32.38		n.a.
4	29.6995	-82.2682	04/30/10	UF for SJRWMD	Little Hatchet Creek	0.053	1.320	1.3200		0.252	0.194			4.9	79	1.08	7.20	261.00				20.3						65
5	29.67962	-82.23455	03/15/07	UF for SJRWMD	Downstream of Swamp	0.023	0.011	1.8243	1.81	0.344	0.27														51.0	14.79		
5	29.67962	-82.23455	01/28/08	UF for SJRWMD	Downstream of Swamp	0.012	0.013	1.5650	1.55	0.236	0.201			8.0	77	0.52	6.09	1 20	1.8			13.4			51.2	13.02		193
5	29.67962	-82.23455	03/12/08	UF for SJRWMD	Downstream of Swamp	0.040	0.019	1.4390	1.42	0.229	0.181			3.9	42	3.20	6.23	105.00	13			19.5	20.02	1.85	46.3	15.62		169
5	29.67962	-82.23455	01/27/10	UF for SJRWMD	Downstream of Swamp	0.030	1.300	1.3000		0.187	0.159			n.a.	n.a.	0.74	n.a.	n.a.				n.a.				14.76		n.a.
6	29.67591	-82.20508	02/08/07	UF for SJRWMD	HC trib	0.027	0.079	1.1749	1.10	0.193	0.162							164.00					23.75	4.27	27.3	13.09		
15	29.73348	-82.18443	10/09/07	UF for SJRWMD	HC trib	0.562	0.038	3.0629	3.03	0.345	0.249			5.4	63	0.71	5.27	79.00				22.7			88.1	10.81		268
18	29.69888	-82.28046	01/09/07	UF for SJRWMD	Little Hatchet Creek	0.043	0.555	1.5340	0.98	0.241	0.191														12.1	34.43	0.04	
18	29.69888	-82.28046	03/15/07	UF for SJRWMD	Little Hatchet Creek	0.034	0.077	0.6838	0.61	0.146	0.14														10.3	24.87		
18	29.69888	-82.28046	04/04/07	UF for SJRWMD	Little Hatchet Creek	0.054	0.038	0.5865	0.55	0.159	0.138			8.1	93	0.44	7.75	233.00				22.8	22.34	3.94	8.8	28.81		154.1
18	29.69888	-82.28046	04/16/07	UF for SJRWMD	Little Hatchet Creek	0.051	0.056	0.6042	0.55	0.105	0.092			8.8	92	0.43	7.87	218.00				18.0	20.54	5.56	9.1	31.59		2
18	29.69888	-82.28046	05/13/07	UF for SJRWMD	Little Hatchet Creek	0.266	0.144	1.1040	0.96	0.646	0.588												34.41	7.20	8.5	41.52		
18	29.69888	-82.28046	05/14/07	UF for SJRWMD	Little Hatchet Creek	0.101	0.081	0.6406	0.56	0.314	0.251												26.81	5.34	5.9	39.20		
18	29.69888	-82.28046	06/22/07	UF for SJRWMD	Little Hatchet Creek	0.034	0.034	0.5690	0.54	0.104	0.071			6.7	83	0.92	7.45	273.00				26.4	27.32	5.95	8.9	38.83		71
18	29.69888	-82.28046	07/13/07	UF for SJRWMD	Little Hatchet Creek	0.069	1.770	2.6234	0.85	0.836	0.75			7.3	91	0.17	7.48	374.00	28.15			26.4	46.69	14.00	5.0	41.49		50
18	29.69888	-82.28046	07/22/07	UF for SJRWMD	Little Hatchet Creek	0.029	0.906	1.7295	0.82	0.377	0.342			6.8	84	0.71	7.57	241.00	28.18			26.2	26.07	7.55	6.2	30.34		155
18	29.69888	-82.28046	08/09/07	UF for SJRWMD	Little Hatchet Creek	0.026	0.523	1.4656	0.94	0.221	0.171			6.8	88	1.17	7.36	282.00	28.32			29.3	26.41	5.67	13.1	49.09		25
18	29.69888	-82.28046	08/27/07	UF for SJRWMD	Little Hatchet Creek	0.014	0.029	0.8542	0.83	0.071	0.039			6.9	86	1.88	7.57	222.00				26.5	23.51	4.73	14.2	38.15		129
18	29.69888	-82.28046	09/04/07	UF for SJRWMD	Little Hatchet Creek	0.027	0.034	0.8888	0.86	0.067	0.036			7.2	90	1.81	7.50	214.00				26.4	18.32	3.76	14.3	37.39		52
18	29.69888	-82.28046	09/27/07	UF for SJRWMD	Little Hatchet Creek	0.068	0.669	1.7540	1.09	0.203	0.164			8.1	98	1.47	7.57	244.00	28.42			25.0			12.9	39.41		69
18	29.69888	-82.28046	02/08/08	UF for SJRWMD	Little Hatchet Creek	0.005	0.018	0.7042	0.69	0.043	0.021			9.3	95	3.44	7.51	185.00				16.3			14.0	35.59		108
18	29.69888	-82.28046	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.022	0.081	0.9045	0.82	0.117	0.068			8.1	90	4.90	7.50	212.00				20.7			16.1			111
18	29.69888	-82.28046	05/16/08	UF for SJRWMD	Little Hatchet Creek	0.040	0.716	1.5099	0.79	0.472	0.513			2.1	25	0.22	7.67	307.00				24.1			7.2			-4
18	29.69888	-82.28046	08/20/08	UF for SJRWMD	Little Hatchet Creek	0.032	1.230	1.2300		0.250	0.297			6.8	83	0.76	7.48	302.00				25.3	29.09	5.83		37.97		-25
18	29.69888	-82.28046	11/24/08	UF for SJRWMD	Little Hatchet Creek	0.054	1.330	1.3300		0.199	0.244			8.8	86	0.50	7.59	301.00				14.2	36.34	12.73		33.59		98
18	29.69888	-82.28046	01/09/09	UF for SJRWMD	Little Hatchet Creek	0.018	1.400	1.4000		0.258	0.279			4.3	41	0.56	8.03	294.00				13.0	33.71	10.07		38.12		87.5
18	29.69888	-82.28046	02/13/09	UF for SJRWMD	Little Hatchet Creek	0.038	0.700	0.7000		0.087	0.077			9.3	94	0.94	7.40	259.00				16.2	30.58	0.14		38.15		126
18	29.69888	-82.28046	03/12/09	UF for SJRWMD	Little Hatchet Creek	0.051	0.710	0.7100		0.110	0.098			8.8	98	1.00	7.15	272.00				20.7	190.94	0.33		38.64		194
18	29.69888	-82.28046	04/27/09	UF for SJRWMD	Little Hatchet Creek	0.052	0.590	0.5900		0.102	0.091			8.2	94	0.80	7.13	164.00				21.5	26.35	7.48		43.87		125
18	29.69888	-82.28046	06/29/09	UF for SJRWMD	Little Hatchet Creek	0.041	0.740	0.7400		0.094	0.083			6.6	85	0.91	7.17	291.00				28.2				42.39		94
18	29.69888	-82.28046	07/31/09	UF for SJRWMD	Little Hatchet Creek	0.030	0.890	0.8900		0.046	0.032			6.4	81	2.73	6.60	255.00				26.5				31.27		138
18	29.69888	-82.28046	08/19/09	UF for SJRWMD	Little Hatchet Creek	0.034	0.900	0.9000		0.096	0.087			7.0	88	3.59	6.64	249.00				26.9				38.88		118
18	29.69888	-82.28046	10/07/09	UF for SJRWMD	Little Hatchet Creek	0.049	0.370	0.3700		0.098	0.056			6.2	77	1.48	6.90	266.00				262.0	28.54	0.18		42.53		108
18	29.69888	-82.28046	11/13/09	UF for SJRWMD	Little Hatchet Creek	0.024	0.670	0.6700		0.104	0.063			8.6	90	1.25	6.97	305.00				7.5				37.13		97
18	29.69888	-82.28046	01/05/10	UF for SJRWMD	Little Hatchet Creek	0.046	0.880	0.8800		0.034	0.023			n.a.	n.a.	1.24	n.a.	n.a.				n.a.				31.19		n.a.
18	29.69888	-82.28046	04/30/10	UF for SJRWMD	Little Hatchet Creek	0.064	1.330	1.3300		0.130	0.07			7.6	84	1.42	8.00	267.00				20.0						3
18	29.69888	-82.28046	05/11/10	UF for SJRWMD	Little Hatchet Creek	0.112	1.280	1.2800		0.073	0.055			8.1	91	1.57	7.80	246.00				20.8						9
20	29.70272	-82.29335	02/07/07	UF for SJRWMD	LH trib	0.005	0.017	0.7625	0.75	0.011	0.007							291.00					28.55	17.34	15.1	34.63		
20	29.70272	-82.29335	03/15/07	UF for SJRWMD	LH trib	0.003	0.009	0.5871	0.58	0.002	0.003														9.5	40.41		
20	29.70272	-82.29335	04/04/07	UF for SJRWMD	LH trib	0.027	0.006	0.4659	0.46	0.003	0.009			6.3	71	0.03	6.74	304.00				21.2	45.54	24.88	7.3	37.56		66.8
20	29.70272	-82.29335	06/22/07	UF for SJRWMD	LH trib	0.019	0.006	0.4246	0.42	0.012	0.005			6.7	85	0.10	6.73	339.00				27.6	49.37	187.15	5.3	35.95		5
20	29.70272	-82.29335	07/13/07	UF for SJRWMD	LH trib	0.017	0.013	0.4203	0.41	0.017	0.007			6.0	75	0.06	6.96	371.00				26.7	48.94	29.26	3.6	34.15		32
20	29.70272	-82.29335	08/09/07	UF for SJRWMD	LH trib	0.027	0.015	0.8167	0.80	0.019	0.007			5.2	66	0.10	7.25	315.00				27.7	29.00	12.14	16.4	48.87		76
20	29.70272	-82.29335	09/04/07	UF for SJRWMD	LH trib	0.041	0.026	1.0301	1.00	0.036	0.005			6.3	81	0.28	7.23	253.00				27.6	21.53	7.22	17.0	43.55		29
20	29.70272	-82.29335	09/27/07	UF for SJRWMD	LH trib	0.048	0.021	1.0457	1.02	0.035	0.005			7.8	93	0.26	7.33	265.00				24.1			16.5	43.89		13
20	29.70272	-82.29335	02/08/08	UF for SJRWMD	LH trib	0.016	0.024	0.8513	0.83	0.016	0.003			8.2	87	0.72	7.39	254.00				18.0			17.3	42.22		60
20	29.70272	-82.29335	4/7/2008	UF for SJRWMD	LH trib	0.046	0.021	0.8441	0.82	0.029	0.003			7.5	85	1.94	7.42	279.00				21.3			17.2			83
20	29.70272	-82.29335	05/16/08	UF for SJRWMD	LH trib	0.026	0.017	0.5441	0.53	0.009	0.005			4.9	58	0.02	6.91	357.00				24.4			6.1			19
20	29.70272	-82.29335	11/24/08	UF for SJRWMD	LH trib	0.016	0.260	0.2600		0.007	0.009			10.5	104	0.15	7.29	329.00				13.3	49.05	32.01		35.10		119
20	29.70272	-82.29335	01/09/09	UF for SJRWMD	LH trib	0.003	0.270	0.2700		0.006	0.006			8.1	77	0.05	7.65	327.00				12.7	45.65	27.11		37.77		119.6
20	29.70272	-82.29335	02/13/09	UF for SJRWMD	LH trib	0.046	0.600	0.6000		0.013	0.003			8.5	88	0.22	6.31	266.00				17.3	35.21	0.27		42.27		203
20	29.70272	-82.29335	03/12/09	UF for SJRWMD	LH trib	0.037	0.660	0.6600		0.013	0.01			7.0	81	0.08	7.29	264.00				22.2	81.38	0.26		40.95		94
20	29.70272	-82.29335	04/27/09	UF for SJRWMD	LH trib	0.049	0.540	0.5400		0.011	0.01			7.1	82	0.06	6.57	306.00				21.2	38.33	19.52		40.45		94.5
20	29.70272	-82.29335	06/29/09	UF for SJRWMD	LH trib	0.032	0.410	0.4100		0.008	0.005			6.0	79	0.13	7.27	334.00				29.6				39.62		68

						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	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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)
20	29.70272	-82.29335	07/31/09	UF for SJRWMD	LH trib	0.053	1.090	1.0900		0.020	0.009			5.6	72	0.76	6.54	280.00				28.5				42.51		8
20	29.70272	-82.29335	08/19/09	UF for SJRWMD	LH trib	0.039	0.990	0.9900		0.014	0.01			6.0	79	0.36	7.00	277.00				29.5				43.60		51
20	29.70272	-82.29335	11/13/09	UF for SJRWMD	LH trib	0.012	0.380	0.3800		0.007	0.011			7.9	83	0.05	7.00	372.00				17.7				38.75		-2
20	29.70272	-82.29335	01/05/10	UF for SJRWMD	LH trib	0.046	1.120	1.1200		0.013	0.013			n.a.	n.a.	0.35	n.a.	n.a.				n.a.				35.59		n.a.
20	29.70272	-82.29335	04/30/10	UF for SJRWMD	LH trib	0.032	0.780	0.7800		0.010	0.009			7.8	88	0.09	74.00	321.00				21.6						32
20	29.70272	-82.29335	05/11/10	UF for SJRWMD	LH trib	0.062	1.540	1.5400		0.017	0.01			7.7	86	0.39	7.50	249.00				20.6						-10
21	29.69344	-82.29329	01/11/07	UF for SJRWMD	LH trib	0.037	0.151	1.6550	1.50	0.065	0.013														20.6	27.24	0.33	
21	29.69344	-82.29329	02/07/07	UF for SJRWMD	LH trib	0.038	0.148	1.3601	1.21	0.040	0.014							260.00							20.1	26.18		
21	29.69344	-82.29329	06/04/07	UF for SJRWMD	LH trib	0.038	0.011	1.1300	1.12	0.052	0.028			2.6	31	0.03	6.60	258.00				22.8	27.07	15.42	32.1	36.22		15.8
21	29.69344	-82.29329	01/28/08	UF for SJRWMD	LH trib	0.019	0.089	1.0715	0.98	0.040	0.017			9.5	90	0.33	7.39	246.00				13.1			21.7	28.52		82
21	29.69344	-82.29329	05/11/10	UF for SJRWMD	LH trib	0.346	2.990	2.9900		0.125	0.06			1.6	17	0.13	7.40	271.00				20.2						-70
22	29.68628	-82.29191	02/07/07	UF for SJRWMD	LH trib	0.037	0.092	0.6336	0.54	0.034	0.018							253.00					20.42	6.91	9.7	37.70		
22	29.68628	-82.29191	05/13/07	UF for SJRWMD	LH trib	0.267	0.026	1.8153	1.79	0.173	0.082												10.93	7.94	25.9	50.30		
22	29.68628	-82.29191	06/22/07	UF for SJRWMD	LH trib	0.051	0.017	0.7566	0.74	0.170	0.105			3.0	37	0.15	7.03	224.00				25.5	11.65	2.32	10.9	49.06		43
22	29.68628	-82.29191	01/28/08	UF for SJRWMD	LH trib	0.109	0.020	2.5131	2.49	0.048	0.031			10.5	103	0.74	7.49	229.00				14.8			68.5	38.34		89
22	29.68628	-82.29191	02/08/08	UF for SJRWMD	LH trib	0.054	0.013	0.7270	0.71	0.068	0.03			5.8	64	0.93	7.34	197.00				16.6			12.5	39.11		66
22	29.68628	-82.29191	4/7/2008	UF for SJRWMD	LH trib	0.063	0.026	0.8192	0.79	0.135	0.082			3.5	39	0.33	6.98	165.00				20.5			13.5			48
22	29.68628	-82.29191	01/09/09	UF for SJRWMD	LH trib	0.014	0.500	0.5000		0.078	0.051			8.5	80	0.07	8.14	343.00				12.7	39.31	19.74		57.70		140
22	29.68628	-82.29191	03/12/09	UF for SJRWMD	LH trib	0.054	0.560	0.5600		0.090	0.061			7.5	88	0.23	7.51	304.00				23.6	24.49	0.03		49.24		115
22	29.68628	-82.29191	04/27/09	UF for SJRWMD	LH trib	0.075	0.500	0.5000		0.067	0.047			7.4	86	0.21	6.93	293.00				23.0	32.69	13.41		53.10		130
22	29.68628	-82.29191	06/29/09	UF for SJRWMD	LH trib	0.051	0.520	0.5200		0.098	0.068			4.0	51	0.95	6.73	309.00				29.1				46.29		-8
22	29.68628	-82.29191	07/31/09	UF for SJRWMD	LH trib	0.034	0.580	0.5800		0.064	0.043			7.5	93	1.16	6.33	286.00				28.0				45.02		73
22	29.68628	-82.29191	08/19/09	UF for SJRWMD	LH trib	0.025	0.290	0.2900		0.054	0.038			7.3	94	2.12	6.30	279.00				27.4				43.74		174
22	29.68628	-82.29191	11/13/09	UF for SJRWMD	LH trib	0.042	0.640	0.6400		0.068	0.028			9.2	100	0.05	6.66	322.00				19.6				41.30		25
22	29.68628	-82.29191	01/05/10	UF for SJRWMD	LH trib	0.096	0.790	0.7900		0.025	0.019			n.a.	n.a.	0.55	n.a.	n.a.				n.a.				40.82		n.a.
22	29.68628	-82.29191	01/27/10	UF for SJRWMD	LH trib	0.067	0.670	0.6700		0.321	0.022			n.a.	n.a.	1.16	n.a.	n.a.				n.a.				39.22		n.a.
22	29.68628	-82.29191	04/30/10	UF for SJRWMD	LH trib	0.081	1.030	1.0300		0.065	0.026			8.8	111	0.49	7.60	300.00				27.0						40
22	29.68628	-82.29191	05/11/10	UF for SJRWMD	LH trib	0.119	0.830	0.8300		0.065	0.048			8.3	92	0.56	7.50	229.00				20.9						-7
25	29.70717	-82.23019	04/05/07	UF for SJRWMD	Tributary to Swamp	0.052	0.014	0.5623	0.55	0.572	0.457					0.03	7.45	99.00				17.8	30.18	1.39	11.9	8.34		
25	29.70717	-82.23019	04/16/07	UF for SJRWMD	Tributary to Swamp	0.048	0.008	0.7917	0.78	0.421	0.359			8.3	83	0.02	6.81	79.00				16.0	32.59	1.24	12.3	4.70		174
25	29.70717	-82.23019	06/22/07	UF for SJRWMD	Tributary to Swamp	0.040	0.008	0.3973	0.39	0.429	0.361			1.8	21	0.01	5.59	95.00				23.2	37.59	0.29	3.9	6.04		0
25	29.70717	-82.23019	09/04/07	UF for SJRWMD	Tributary to Swamp	0.110	0.003	0.4122	0.41	0.433	0.325			0.5	6	0.02	5.45	117.00				24.0	47.49	0.55	6.1	7.99		75
25	29.70717	-82.23019	11/24/08	UF for SJRWMD	Tributary to Swamp	0.064	0.570	0.5700		0.293	0.357			8.1	75	0.04	7.37	70.00				11.9	23.58	0.75		8.23		166
25	29.70717	-82.23019	01/09/09	UF for SJRWMD	Tributary to Swamp	0.008	0.390	0.3900		0.279	0.314			12.2	120	0.03	6.55	84.00				14.6	23.52	0.76		9.86		237
25	29.70717	-82.23019	02/13/09	UF for SJRWMD	Tributary to Swamp	0.022	0.450	0.4500		0.355	0.392			80.0	85	0.14	6.69	124.00				18.4	27.63	0.04		14.94		119
25	29.70717	-82.23019	03/12/09	UF for SJRWMD	Tributary to Swamp	0.026	0.600	0.6000		0.409	0.365			7.1	84	0.12	6.99	118.00				23.8	60.63	0.07		14.46		1.3
25	29.70717	-82.23019	04/27/09	UF for SJRWMD	Tributary to Swamp	0.041	0.470	0.4700		0.432	0.353			7.4	85	0.04	5.97	87.00				21.9	21.89	0.77		9.72		211
25	29.70717	-82.23019	06/29/09	UF for SJRWMD	Tributary to Swamp	0.085	1.040	1.0400		0.556	0.486			5.7	72	0.03	5.60	71.00				27.8				5.28		172
25	29.70717	-82.23019	07/31/09	UF for SJRWMD	Tributary to Swamp	0.023	0.810	0.8100		0.779	0.574			6.1	77	0.11	5.73	116.00				28.0				14.41		114
25	29.70717	-82.23019	08/19/09	UF for SJRWMD	Tributary to Swamp	0.018	0.760	0.7600		0.671	0.268			6.7	83	0.13	5.64	118.00				26.4				13.13		115
25	29.70717	-82.23019	11/13/09	UF for SJRWMD	Tributary to Swamp	0.005	0.530	0.5300		0.349	0.246			8.5	88	0.11	6.87	131.00				17.1				12.52		156
25	29.70717	-82.23019	01/05/10	UF for SJRWMD	Tributary to Swamp	0.010	0.760	0.7600		0.317	0.198			n.a.	n.a.	0.34	n.a.	n.a.				n.a.				12.75		n.a.
25	29.70717	-82.23019	01/27/10	UF for SJRWMD	Tributary to Swamp	0.018	0.810	0.8100		0.431	0.285			n.a.	n.a.	0.66	n.a.	n.a.				n.a.				38.69		n.a.
25	29.70717	-82.23019	04/30/10	UF for SJRWMD	Tributary to Swamp	0.018	1.210	1.2100		0.482	0.382			6.0	65	0.06	7.00	66.00				18.4						12
26	29.70526	-82.23496	01/11/07	UF for SJRWMD	Tributary to Swamp	0.016	0.013	1.0794	1.07	0.295	0.156							650.00							21.1	46.88	0.10	
28	29.62887	-82.25668	02/05/07	UF for SJRWMD	Newnans Lake Trib	0.037	0.014	2.2464	2.23	0.261	0.194							137.00					35.47	3.40	55.4	7.05		
28	29.62887	-82.25668	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.056	0.021	2.4584	2.44	0.209	0.151			2.9	29	1.20	4.40	118.00				16.0	48.73	0.53	62.8			251
32	29.65175	-82.25121	01/09/07	UF for SJRWMD	Newnans Lake Trib	0.022	0.130	1.2254	1.10	0.078	0.053														20.9	25.83	0.19	
32	29.65175	-82.25121	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.015	0.060	0.7255	0.67	0.069	0.062														15.1	23.44		
32	29.65175	-82.25121	04/04/07	UF for SJRWMD	Newnans Lake Trib	0.051	0.099	0.7941	0.70	0.118	0.077				90	0.77	7.24	165.00	11.05			18.1	28.75	2.87	11.4	21.30		100
32	29.65175	-82.25121	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.049	0.079	0.6270	0.55	0.074	0.072			9.1	92	0.61	7.26	148.00	11.08			15.0	25.03	3.05	12.1	22.75		157
32	29.65175	-82.25121	05/13/07	UF for SJRWMD	Newnans Lake Trib	0.155	0.060	0.9623	0.90	0.151	0.087												21.91	2.33	10.7	24.17		
32	29.65175	-82.25121	05/14/07	UF for SJRWMD	Newnans Lake Trib	0.036	0.109	0.6405	0.53	0.098	0.065												16.32	2.59	8.2	20.25		
32	29.65175	-82.25121	06/04/07	UF for SJRWMD	Newnans Lake Trib	0.042	0.079	0.7016	0.62	0.081	0.052			5.9	68	1.30	6.64	202.00	11.05			21.9	18.77	15.37	10.3	28.99		124
32	29.65175	-82.25121	06/05/07	UF for SJRWMD	Newnans Lake Trib	0.041	0.089	0.6828	0.59	0.083	0.058			5.6	65	0.70	6.73	201.00	10.98			22.3	15.01	6.31	9.3	36.41		116
32	29.65175	-82.25121	06/06/07	UF for SJRWMD	Newnans Lake Trib	0.002	0.063	0.5984	0.54	0.060	0.061			5.4	62	0.30	6.73	199.00	10.76			22.3	19.08	12.06	20.4	31.64		132
32	29.65175	-82.25121	06/07/07	UF for SJRWMD	Newnans Lake Trib	0.037	0.086	1.3221	1.24	0.091	0.061			4.5	52	0.20	6.70	201.00	9.84			23.2	19.12	10.99	9.5	33.57		182
32	29.65175	-82.25121	06/12/07	UF for SJRWMD	Newnans Lake Trib	0.058	0.113	0.9399	0.83	0.158	0.095			5.8	68	0.04	6.72	183.00	9.97			24.4	17.43	6.96	11.8	25.56		121
32	29.65175	-82.25121	06/22/07	UF for SJRWMD	Newnans Lake Trib	0.031	0.082	0.9092	0.83	0.105	0.064			4.7	56	2.75	6.60	176.00	11.2			23.7	17.66	8.03	14.3	28.34		134
32	29.65175	-82.25121	07/11/07	UF for SJRWMD	Newnans Lake Trib	0.047	0.103	0.7181	0.62	0.125	0.099			5.4	67	0.18	6.94	184.00	10.96			25.8	17.87	2.47	11.7	26.61		180
32	29.65175	-82.25121	07/17/07	UF for SJRWMD	Newnans Lake Trib	0.034	0.064	0.8586	0.79	0.140	0.093			4.9	58	0.54	6.60	163.00	11.08			24.5	16.38	3.08	15.5	25.90		173
32	29.65175	-82.25121	07/22/07	UF for SJRWMD	Newnans Lake Trib	0.063	0.100	0.8046	0.70	0.134	0.102			5.6	69	0.32	7.12	165.00	11.05			25.6	14.54	2.07	12.6	24.21		1.64
32	29.65175	-82.25121	08/09/07	UF for SJRWMD	Newnans Lake Trib	0.019	0.114	1.0946	0.98	0.127	0.087			4.7	60	1.70	6.81	200.00	11.12			28.0	21.52	3.40	21.9	35.23		33
32	29.65175	-82.25121	08/21/07	UF for SJRWMD	Newnans Lake Trib	0.036	0.102	1.0465	0.94	0.125	0.092			5.0	62	1.29	6.90	194.00	11.14			24.5	22.76	3.07	20.5	34.83		77
32	29.65175	-82.25121	08/28/07	UF for SJRWMD	Newnans Lake Trib	0.034	0.100	1.2519	1.15	0.148	0.087					0.49	6.99	191.00	11.05				26.89	2.55	16.1	33.10		
32	29.65175	-82.25121	09/04/07	UF for SJRWMD	Newnans Lake Trib	0.037	0.079	1.4092	1.33	0.129	0.09			5.6	67	2.31	6.87	162.00	11.26			24.2	19.24	2.50	23.8	31.18		109
32	29.65175	-82.25121	09/11/07	UF for SJRWMD	Newnans Lake Trib	0.060	0.098	0.9531	0.86	0.131	0.09			4.0	48	0.16	6.99	180.00	11.05			24.3	20.14	2.06	17.4	28.66		0
32	29.65175	-82.25121	09/18/07	UF for SJRWMD	Newnans Lake Trib	0.032	0.095	0.7723	0.68	0.120	0.09			5.6	65	0.72	7.04	162.00	11			22.9			14.8	27.18		31
32	29.65175	-82.25121	10/04/07	UF for SJRWMD	Newnans Lake Trib	0.039	0.060	0.8419	0.78	0.121	0.077			1.2	15	1.80	6.72	212.00	11.2			25.9			19.2	27.56		-58
32	29.65175	-82.25121	10/09/07	UF for SJRWMD	Newnans Lake Trib	0.045	0.129	1.3050	1.18	0.108	0.066			6.3	75	9.80	6.86	180.00	11.57			24.6			30.9	31.64		188
32	29.65175	-82.25121	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.039	0.109	1.0775	0.97	0.076	0.045			5.7	59	9.60	6.82	166.00	11.6			16.8	25.92	4.74	24.4			118
32	29.65175	-82.25121	05/16/08	UF for SJRWMD	Newnans Lake Trib	0.044	0.098	0.7439	0.65	0.118	0.092			4.6	52	0.23	7.11	166.00	10.9			20.9			9.1			29
32	29.65175	-82.25121	08/20/08	UF for SJRWMD	Newnans Lake Trib	0.000	0.650	0.6500		0.093	0.098			1.3	15	1.36	7.33	182.00				24.6	18.35	2.65		27.96		-94
32	29.65175	-82.25121	09/09/08	UF for SJRWMD	Newnans Lake Trib	0.030	0.650	0.6500		0.102	0.103			5.9	76	1.80	6.61	202.00				27.6	26.07	3.51		32.29		153
32	29.65175	-82.25121	09/22/08	UF for SJRWMD	Newnans Lake Trib	0.039	0.650	0.6500		0.103	0.094			7.5	90	1.53	6.94	186.00				24.5	23.87	2.77		26.57		175
32	29.65175	-82.25121	11/24/08	UF for SJRWMD	Newnans Lake Trib	0.020	0.730	0.7300		0.091	0.072			7.7	74	1.20	7.63	125.00				13.8	19.93	7.61		23.21		156
32	29.65175	-82.25121	01/09/09	UF for SJRWMD	Newnans Lake Trib	0.013	0.420	0.4200		0.070	0.061			9.0	89	0.36	7.04	170.00				14.8	24.09	2.38		25.69		170
32	29.65175	-82.25121	02/13/09	UF for SJRWMD	Newnans Lake Trib	0.030	0.590	0.5900		0.050	0.044			7.4	70	1.35	7.05	178.00				12.7	29.20	0.08		29.09		143

						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	Concen-tration	Saturation	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)
32	29.65175	-82.25121	03/12/09	UF for SJRWMD	Newnans Lake Trib	0.030	0.610	0.6100		0.076	0.063			7.6	87	0.71	7.22	164.00				22.2	11.35	0.06		22.50		51
32	29.65175	-82.25121	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.044	0.620	0.6200		0.097	0.077			6.6	72	0.88	7.56	165.00				19.5	19.39	2.16		27.97		120
32	29.65175	-82.25121	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.036	1.190	1.1900		0.122	0.102			5.9	72	1.10	7.04	162.00				25.7				24.97		125
32	29.65175	-82.25121	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.025	0.840	0.8400		0.112	0.095			5.5	67	3.50	6.50	150.00				25.0				24.75		148
32	29.65175	-82.25121	08/19/09	UF for SJRWMD	Newnans Lake Trib	0.021	0.840	0.8400		0.103	0.082			5.8	71	1.80	6.53	182.00				25.0				29.89		116
32	29.65175	-82.25121	10/07/09	UF for SJRWMD	Newnans Lake Trib	0.023	0.340	0.3400		0.102	0.069			5.6	68	0.86	6.67	177.00				25.6	20.73	0.05		28.09		100
32	29.65175	-82.25121	11/13/09	UF for SJRWMD	Newnans Lake Trib	0.044	0.680	0.6800		0.074	0.049			8.9	93	0.61	6.84	189.00				15.1				23.93		147
32	29.65175	-82.25121	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.024	0.950	0.9500		0.051	0.032			n.a.	n.a.	2.61	n.a.	n.a.				n.a.				23.36		n.a.
32	29.65175	-82.25121	02/17/10	UF for SJRWMD	Newnans Lake Trib	0.021	1.110	1.1100		0.041	0.027			7.0	66	0.40	7.08	181.00				11.7						171
32	29.65175	-82.25121	04/30/10	UF for SJRWMD	Newnans Lake Trib	0.031	0.920	0.9200		0.100	0.062			6.7	72	0.60	7.10	163.00				18.8						32
33	29.66234	-82.25357	01/09/07	UF for SJRWMD	Newnans Lake Trib	0.023	0.244	0.8446	0.60	0.225	0.199														8.0	9.99	0.09	
33	29.66234	-82.25357	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.017	0.243	0.8796	0.64	0.198	0.169														13.0	12.12		
33	29.66234	-82.25357	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.054	0.279	0.7099	0.43	0.263	0.259			8.7	94	0.26	6.80	78.00				18.1	12.07	2.09	6.8	8.50		84.2
33	29.66234	-82.25357	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.058	0.247	0.7950	0.55	0.271	0.229			9.7	98	0.24	7.08	72.00				16.0	10.57	1.68	5.9	7.49		79
33	29.66234	-82.25357	06/22/07	UF for SJRWMD	Newnans Lake Trib	0.015	0.220	0.6676	0.45	0.317	0.278			6.7	79	0.14	6.92	90.00				23.8	10.74	2.09	7.0	11.12		149
33	29.66234	-82.25357	08/09/07	UF for SJRWMD	Newnans Lake Trib	0.009	0.253	0.6968	0.44	0.287	0.248			6.9	87	0.27	7.00	101.00				27.9	11.94	1.85	6.4	15.66		135
33	29.66234	-82.25357	09/11/07	UF for SJRWMD	Newnans Lake Trib	0.025	0.268	0.7664	0.50	0.265	0.2			8.0	97	0.28	7.21	102.00				25.3	13.84	2.69	10.4	15.98		149
33	29.66234	-82.25357	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.047	0.095	1.3461	1.25	0.213	0.184			8.0	86	3.60	6.29	100.00				18.6	21.56	1.89	39.7			136
33	29.66234	-82.25357	05/16/08	UF for SJRWMD	Newnans Lake Trib	0.037	0.155	0.6222	0.47	0.285	0.314			7.8	94	0.01	7.87	87.00				25.2			5.3			131
33	29.66234	-82.25357	08/20/08	UF for SJRWMD	Newnans Lake Trib	0.035	0.330	0.3300		0.350	0.349			6.3	75	0.15	7.31	91.00				24.4	10.23	1.89		12.18		65
33	29.66234	-82.25357	11/24/08	UF for SJRWMD	Newnans Lake Trib	0.009	0.660	0.6600		0.270	0.27			8.3	79	0.12	7.58	90.00				13.0	11.16	3.72		11.49		154
33	29.66234	-82.25357	01/09/09	UF for SJRWMD	Newnans Lake Trib	0.012	0.400	0.4000		0.280	0.276			10.9	107	0.06	7.06	88.00				14.0	11.50	1.71		11.51		183
33	29.66234	-82.25357	02/13/09	UF for SJRWMD	Newnans Lake Trib	0.072	0.750	0.7500		0.181	0.196			7.6	81	0.21	6.49	112.00				17.8	19.74	0.09		15.40		166
33	29.66234	-82.25357	03/12/09	UF for SJRWMD	Newnans Lake Trib	0.062	0.690	0.6900		0.218	0.198			4.0	45	0.13	7.32	90.00				21.5	136.26	0.11		13.76		27
33	29.66234	-82.25357	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.058	0.880	0.8800		0.231	0.199			6.5	75	0.12	6.91	101.00				22.5	15.73	2.35		13.84		37
33	29.66234	-82.25357	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.042	0.890	0.8900		0.244	0.241			6.6	82	0.29	6.15	194.00				26.8				12.17		188
33	29.66234	-82.25357	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.038	1.060	1.0600		0.230	0.212			6.4	79	0.42	6.50	106.00				25.6				12.53		140
33	29.66234	-82.25357	11/13/09	UF for SJRWMD	Newnans Lake Trib	0.013	0.710	0.7100		0.219	0.165			8.3	87	0.10	6.70	102.00				17.2				10.93		122
33	29.66234	-82.25357	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.025	1.320	1.3200		0.146	0.091			n.a.	n.a.	0.52	n.a.	n.a.				n.a.				13.78		n.a.
33	29.66234	-82.25357	04/30/10	UF for SJRWMD	Newnans Lake Trib	0.040	0.960	0.9600		0.235	0.195			7.5	84	0.38	7.10	94.00				20.8						20
34	29.66642	-82.24885	01/12/07	UF for SJRWMD	Newnans Lake Trib	0.232	0.131	2.4801	2.35	0.411	0.212														48.9	9.23	0.10	
34	29.66642	-82.24885	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.039	0.044	1.0920	1.05	0.216	0.162														13.3	10.42		
34	29.66642	-82.24885	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.089	0.046	0.9771	0.93	0.294	0.14			6.0	69	0.01	5.93	56.00				19.5	1.31	0.17	15.0	13.72		59.4
34	29.66642	-82.24885	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.083	0.058	0.9894	0.93	0.197	0.105			9.0	88	0.01	6.91	75.00				14.0	14.09	0.60	14.1	14.83		77
37	29.64578	-82.27264	01/12/07	UF for SJRWMD	Newnans Lake Trib	0.095	0.132	1.4315	1.30	0.060	0.026							200.00							23.4	26.72	0.32	
37	29.64578	-82.27264	02/07/07	UF for SJRWMD	Newnans Lake Trib	0.099	0.229	1.4117	1.18	0.047	0.019							209.00					25.93	6.85	24.7	26.83		
37	29.64578	-82.27264	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.057	0.110	0.9227	0.81	0.073	0.043														16.6	24.94		
37	29.64578	-82.27264	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.065	0.247	0.8250	0.58	0.047	0.04			8.3	92	0.30	7.37	162.00	13.2			18.7	25.08	3.07	12.0	19.71		83.1
37	29.64578	-82.27264	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.045	0.227	0.7869	0.56	0.031	0.028			8.2	94	0.36	7.23	234.00	11.28			16.0	30.95	6.54	10.2	24.32		127
37	29.64578	-82.27264	05/13/07	UF for SJRWMD	Newnans Lake Trib	0.083	0.278	0.9521	0.67	0.050	0.033												11.57	1.93	6.7	14.88		
37	29.64578	-82.27264	05/14/07	UF for SJRWMD	Newnans Lake Trib	0.038	0.134	0.8081	0.67	0.051	0.018												28.12	4.10	10.8	25.84		
37	29.64578	-82.27264	06/04/07	UF for SJRWMD	Newnans Lake Trib	0.127	0.235	0.8871	0.65	0.058	0.036			6.2	71	0.21	6.95	163.00	11.27			22.2	13.65	7.59	8.9	25.52		106
37	29.64578	-82.27264	06/05/07	UF for SJRWMD	Newnans Lake Trib	0.139	0.248	0.9587	0.71	0.056	0.037			6.5	75	0.18	7.04	165.00	11.2			22.6	14.53	6.72	8.4	26.21		71
37	29.64578	-82.27264	06/06/07	UF for SJRWMD	Newnans Lake Trib	0.025	0.245	0.7511	0.51	0.018	0.04			6.7	78	0.11	7.19	161.00	11.18			22.7	12.82	5.23	20.7	23.07		53
37	29.64578	-82.27264	06/07/07	UF for SJRWMD	Newnans Lake Trib	0.155	0.296	1.4442	1.15	0.060	0.028			6.9	83	0.06	7.11	155.00	11.16			24.6	12.44	4.33	6.8	23.56		64
37	29.64578	-82.27264	06/22/07	UF for SJRWMD	Newnans Lake Trib	0.079	0.135	1.0206	0.89	0.070	0.044			6.0	75	0.65	6.96	188.00	11.47			23.7	16.08	6.18	15.4	35.54		80
37	29.64578	-82.27264	08/09/07	UF for SJRWMD	Newnans Lake Trib	0.041	0.111	1.1212	1.01	0.073	0.042			5.5	70	1.19	6.94	147.00	11.48			27.6	22.02	4.19	22.1	39.62		108
37	29.64578	-82.27264	08/21/07	UF for SJRWMD	Newnans Lake Trib	0.048	0.127	1.1011	0.97	0.065	0.042			5.5	67	1.34	7.10	175.00	11.45			25.4	23.12	3.98	21.3	35.21		74
37	29.64578	-82.27264	08/28/07	UF for SJRWMD	Newnans Lake Trib	0.041	0.153	0.9492	0.80	0.057	0.038					1.39	7.02	200.00	11.35				25.97	3.24	17.1	35.89		
37	29.64578	-82.27264	09/04/07	UF for SJRWMD	Newnans Lake Trib	0.052	0.107	1.3777	1.27	0.074	0.051			6.0	71	1.26	6.88	163.00	11.5			24.1	18.94	2.96	25.2	32.18		111
37	29.64578	-82.27264	09/11/07	UF for SJRWMD	Newnans Lake Trib	0.067	0.204	1.1183	0.91	0.070	0.054			6.5	77	0.46	6.98	170.00	11.3			23.7	19.31	2.88	18.5	31.18		101
37	29.64578	-82.27264	09/18/07	UF for SJRWMD	Newnans Lake Trib	0.051	0.208	1.0038	0.80	0.071	0.045			7.4	87	0.34	7.10	163.00	11.27			23.4			15.7	27.35		74
37	29.64578	-82.27264	10/04/07	UF for SJRWMD	Newnans Lake Trib	0.057	0.107	1.0708	0.96	0.070	0.039			6.0	74	0.96	6.82	170.00	11.42			25.4			21.9	27.38		88.5
37	29.64578	-82.27264	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.094	0.140	1.1928	1.05	0.054	0.025			7.0	73	5.70	6.40	192.00				17.2	26.96	5.33	25.9			165
37	29.64578	-82.27264	05/16/08	UF for SJRWMD	Newnans Lake Trib	0.027	0.200	0.7272	0.53	0.047	0.043			6.6	75	0.19	7.50	148.00				21.5			6.3			56
37	29.64578	-82.27264	08/20/08	UF for SJRWMD	Newnans Lake Trib	0.042	0.730	0.7300		0.058	0.045			5.6	68	0.97	7.28	176.00				24.6	19.24	3.93		30.33		87
37	29.64578	-82.27264	11/24/08	UF for SJRWMD	Newnans Lake Trib	0.034	0.790	0.7900		0.038	0.038			7.4	71	0.24	7.56	123.00				13.4	14.64	3.44		22.21		196
37	29.64578	-82.27264	01/09/09	UF for SJRWMD	Newnans Lake Trib	0.049	0.910	0.9100		0.050	0.04			8.1	81	0.21	6.97	162.00				14.7	22.75	2.94		23.03		142
37	29.64578	-82.27264	02/13/09	UF for SJRWMD	Newnans Lake Trib	0.116	0.820	0.8200		0.042	0.04			8.2	79	0.88	7.23	192.00				13.8	27.84	0.09		28.89		114
37	29.64578	-82.27264	03/12/09	UF for SJRWMD	Newnans Lake Trib	0.061	0.880	0.8800		0.061	0.044			8.1	91	0.39	7.30	117.00				21.6	154.41	0.09		27.85		110
37	29.64578	-82.27264	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.084	0.940	0.9400		0.063	0.045			6.7	73	0.41	7.41	170.00				19.8	17.82	1.63		28.78		78
37	29.64578	-82.27264	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.088	0.830	0.8300		0.066	0.049			5.4	66	0.65	6.93	172.00				25.5				24.75		81
37	29.64578	-82.27264	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.082	1.180	1.1800		0.062	0.042			5.2	62	3.52	6.40	144.00				24.4				28.37		126
37	29.64578	-82.27264	08/19/09	UF for SJRWMD	Newnans Lake Trib	0.099	1.080	1.0800		0.058	0.053			5.5	66	1.69	6.41	104.00				24.4				30.13		29
37	29.64578	-82.27264	11/13/09	UF for SJRWMD	Newnans Lake Trib	0.114	1.050	1.0500		0.057	0.026			6.8	69	0.39	8.79	161.00				16.5				22.32		77
37	29.64578	-82.27264	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.130	1.290	1.2900		0.046	0.022			n.a.	n.a.	0.93	n.a.	n.a.				n.a.				24.09		n.a.
37	29.64578	-82.27264	04/30/10	UF for SJRWMD	Newnans Lake Trib	0.157	1.230	1.2300		0.058	0.044			6.4	69	0.65	7.20	148.00				19.3						-3
39	29.72306	-82.21499	02/05/07	UF for SJRWMD	Hatchet Creek	0.017	0.018	1.1715	1.15	0.133	0.105							114.00					23.29	4.66	30.8	7.95		
39	29.72306	-82.21499	03/15/07	UF for SJRWMD	Hatchet Creek	0.020	0.012	1.0307	1.02	0.383	0.256														26.1	8.44		
39	29.72306	-82.21499	04/10/07	UF for SJRWMD	Hatchet Creek	0.087	0.018	1.3311	1.31	0.420	0.226							125.00					28.62	1.93	27.9	8.64		
39	29.72306	-82.21499	04/16/07	UF for SJRWMD	Hatchet Creek	0.060	0.008	1.1395	1.13	0.382	0.25			2.3	24	0.01	6.28	96.00				17.0	30.20	1.71	29.1	8.01		99
39	29.72306	-82.21499	09/04/07	UF for SJRWMD	Hatchet Creek	0.087	0.009	0.8344	0.83	0.278	0.19			2.5	32	0.03	6.85	74.00				25.8	15.71	1.23	17.0	7.41		203
39	29.72306	-82.21499	09/25/07	UF for SJRWMD	Hatchet Creek	0.035	0.013	1.2846	1.27	0.214	0.166														27.5	8.19		
39	29.72306	-82.21499	01/30/08	UF for SJRWMD	Hatchet Creek	0.010	0.011	1.3069	1.30	0.112	0.089			9.5	94	8.20	6.04	89.00				13.8			45.1	8.64		207
39	29.72306	-82.21499	2/27/2008	UF for SJRWMD	Hatchet Creek	0.034	0.016	1.8605	1.84	0.169	0.137			6.2	62	85.10	4.99	70.00				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	3.0900		0.108	0.057			5.5	68	11.10	4.53	77.00				26.0	16.16	0.41		8.43		316
39	29.72306	-82.21499	09/22/08	UF for SJRWMD	Hatchet Creek	0.068	1.180	1.1800		0.139	0.122			7.5	76	6.30	5.64	67.00				16.3	27.73	0.03		10.55		233
39	29.72306	-82.21499	09/22/08	UF for SJRWMD	Hatchet Creek	0.130	2.170	2.1700		0.244	0.234			3.7	44	0.87	5.49	84.00				24.1	21.56	0.94		9.38		212

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	Concen-tration	Saturation	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)
39	29.72306	-82.21499	03/12/09	UF for SJRWMD	Hatchet Creek	0.040	1.510	1.5100		0.251	0.187			3.6	40	0.16	6.18	110.00				19.9	219.99	0.09		12.86		250
39	29.72306	-82.21499	04/27/09	UF for SJRWMD	Hatchet Creek	0.099	1.770	1.7700		0.220	0.172			3.1	35	0.07	5.35	91.00				20.9	13.36	0.36		9.50		22.6
39	29.72306	-82.21499	06/29/09	UF for SJRWMD	Hatchet Creek	0.045	2.380	2.3800		0.310	0.215			4.6	57	0.13	4.90	99.00				25.9				9.56		188
39	29.72306	-82.21499	07/31/09	UF for SJRWMD	Hatchet Creek	0.063	1.750	1.7500		0.161	0.133			4.8	59	4.47	4.33	67.00				26.0				7.98		232
39	29.72306	-82.21499	08/19/09	UF for SJRWMD	Hatchet Creek	0.055	1.580	1.5800		0.244	0.183			3.6	45	1.38	4.76	80.00				26.5				7.86		227
39	29.72306	-82.21499	09/02/09	UF for SJRWMD	Hatchet Creek	0.103	2.360	2.3600		0.090	0.057					3.80							13.06	0.44		9.12		
39	29.72306	-82.21499	10/07/09	UF for SJRWMD	Hatchet Creek	0.029	0.480	0.4800		0.212	0.131			4.6	56	1.59	5.56	90.00				25.2	21.18	0.03		8.94		192
39	29.72306	-82.21499	11/13/09	UF for SJRWMD	Hatchet Creek	0.022	2.170	2.1700		0.344	0.221			1.8	19	0.01	6.69	117.00				17.2				10.25		162
39	29.72306	-82.21499	01/05/10	UF for SJRWMD	Hatchet Creek	0.033	1.100	1.1000		0.117	0.075			n.a.	n.a.	2.99	n.a.	n.a.				n.a.				9.42		n.a.
39	29.72306	-82.21499	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.390	1.3900		0.104	0.066			8.74	96	30.00	5.21	76.00				17.57						229
39	29.72306	-82.21499	04/30/10	UF for SJRWMD	Hatchet Creek	0.056	2.040	2.0400		0.441	0.299			0.5	6	0.04	5.00	135.00				18.6						25
40	29.73923	-82.22969	01/12/07	UF for SJRWMD	HC trib	0.030	0.203	0.8323	0.63	0.014	0.004							70.00							6.5	2.76	0.11	
40	29.73923	-82.22969	3/28/2010	UF for SJRWMD	HC trib	0.000	1.470	1.4700		0.034	0.013			7.5	80.5	0.74	6.27	157.00				17.66						166
40	29.73923	-82.22969	03/28/10	UF for SJRWMD	HC trib	0.000	1.470	1.4700		0.034	0.013			7.5	81	0.74	6.27	157.00				17.7						166
51	29.71343	-82.19873	01/17/07	UF for SJRWMD	Hatchet Creek	0.034	0.008	0.7829	0.78	0.109	0.079							185.00							16.6	20.12	0.11	
51	29.71343	-82.19873	03/15/07	UF for SJRWMD	Hatchet Creek	0.040	0.006	0.7014	0.70	0.141	0.121												19.45	1.58	14.9	23.26		
51	29.71343	-82.19873	04/05/07	UF for SJRWMD	Hatchet Creek	0.074	0.023	0.7187	0.70	0.204	0.169			7.4	80	0.03	7.31	195.00				17.8	17.93	0.78	13.5	25.51		55.2
51	29.71343	-82.19873	04/16/07	UF for SJRWMD	Hatchet Creek	0.073	0.013	0.8018	0.79	0.222	0.183			6.6	66	0.01	7.45	170.00				15.0	17.53	0.64	14.6	23.64		150
51	29.71343	-82.19873	08/27/07	UF for SJRWMD	Hatchet Creek	0.043	0.039	0.8343	0.80	0.145	0.11			5.7	69	0.12	7.17	207.00				25.4	19.84	0.99	15.4	29.67		106
51	29.71343	-82.19873	09/04/07	UF for SJRWMD	Hatchet Creek	0.022	0.024	0.8196	0.80	0.128	0.11			5.9	72	0.67	7.10	182.00				25.3	15.68	1.29	22.2	26.45		162
51	29.71343	-82.19873	01/31/08	UF for SJRWMD	Hatchet Creek	0.016	0.010	1.1915	1.18	0.108	0.079			8.9	91	7.40	6.37	119.00				16.1			39.7	10.57		219
51	29.71343	-82.19873	2/27/2008	UF for SJRWMD	Hatchet Creek	0.028	0.015	1.7460	1.73	0.127	0.094			5.7	59	64.50	5.00	76.00				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	1.7213	1.70	0.074	0.037			5.6	60	142.00	4.59	80.00				18.7	19.33	0.80	61.6			276
51	29.71343	-82.19873	11/24/08	UF for SJRWMD	Hatchet Creek	0.009	0.470	0.4700		0.045	0.045			7.9	72	0.18	7.54	180.00				11.5	16.32	0.51		32.91		158
51	29.71343	-82.19873	01/09/09	UF for SJRWMD	Hatchet Creek	0.048	0.520	0.5200		0.062	0.052			9.1	89	0.38	6.83	227.00				14.3	17.04	0.39		32.48		186
51	29.71343	-82.19873	02/13/09	UF for SJRWMD	Hatchet Creek	0.059	1.030	1.0300		0.105	0.1			7.8	79	14.18	6.46	101.00				16.3	27.20	0.03		11.98		193
51	29.71343	-82.19873	03/12/09	UF for SJRWMD	Hatchet Creek	0.036	0.730	0.7300		0.099	0.076			6.0	69	0.89	7.09	169.00				22.4	27.42	0.02		22.51		138
51	29.71343	-82.19873	04/27/09	UF for SJRWMD	Hatchet Creek	0.085	1.370	1.3700		0.119	0.093			6.0	70	0.71	6.41	110.00				20.8	13.38	0.37		13.68		18.7
51	29.71343	-82.19873	06/29/09	UF for SJRWMD	Hatchet Creek	0.133	1.390	1.3900		0.139	0.105			5.9	75	0.08	6.60	149.00				27.7				20.57		147
51	29.71343	-82.19873	07/31/09	UF for SJRWMD	Hatchet Creek	0.044	1.620	1.6200		0.127	0.094			4.9	60	6.20	5.80	111.00				26.7				13.49		151
51	29.71343	-82.19873	08/19/09	UF for SJRWMD	Hatchet Creek	0.040	1.150	1.1500		0.132	0.095			5.4	66	3.36	6.17	152.00				25.5				20.27		133
51	29.71343	-82.19873	10/07/09	UF for SJRWMD	Hatchet Creek	0.025	0.480	0.4800		0.180	0.109			5.9	71	2.55	5.72	109.00				24.5	17.06	0.03		12.63		227
51	29.71343	-82.19873	11/13/09	UF for SJRWMD	Hatchet Creek	0.015	0.690	0.6900		0.056	0.015			8.5	88	0.57	6.87	131.00				17.1				31.00		156
51	29.71343	-82.19873	01/05/10	UF for SJRWMD	Hatchet Creek	0.052	1.020	1.0200		0.090	0.053			n.a.	n.a.	5.98	n.a.	n.a.				n.a.				13.95		n.a.
51	29.71343	-82.19873	3/29/2010	UF for SJRWMD	Hatchet Creek	0.000	1.390	1.3900		0.115	0.074			6.74	71.9	43.58	5.80	77.00				18.51						146
51	29.71343	-82.19873	04/30/10	UF for SJRWMD	Hatchet Creek	0.067	3.470	3.4700		0.118	0.072			7.6	82	1.13	7.30	202.00				18.9						51
52	29.60974	-82.24731	01/09/07	UF for SJRWMD	Newnans Lake Trib	0.437	0.048	3.2416	3.19	0.175	0.021							94.00							20.7	5.56	0.09	
52	29.60974	-82.24731	02/04/07	UF for SJRWMD	Newnans Lake Trib	0.064	0.028	2.7853	2.76	0.192	0.05							101.00							20.3	8.08	0.26	
52	29.60974	-82.24731	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.122	0.008	3.0560	3.05	0.168	0.009												21.11	0.98	22.6	5.25		
52	29.60974	-82.24731	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.105	0.025	4.5433	4.52	0.242	0.006			9.5	95	6.01	7.20	88.00	1.81			20.8	22.22	0.80	27.7	6.39		74.3
52	29.60974	-82.24731	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.558	0.065	4.4543	4.39	0.218	0.007			4.8	58	4.19	6.94	92.00	1.63			22.0	22.94	0.72	25.0	5.51		142
52	29.60974	-82.24731	05/14/07	UF for SJRWMD	Newnans Lake Trib	0.393	0.108	3.2114	3.10	0.179	0.03												26.31	1.20	23.4	6.53		
52	29.60974	-82.24731	01/20/08	UF for SJRWMD	Newnans Lake Trib	0.113	0.006	3.6682	3.66	0.248	0.007			13.3	124		7.56	96.00	2.1			12.3			21.2	7.07		135
52	29.60974	-82.24731	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.037	0.013	2.9866	2.97	0.220	0.007			7.4	78		6.04	92.00	4.2			17.7	22.84	1.26	24.9			188
52	29.60974	-82.24731	05/16/08	UF for SJRWMD	Newnans Lake Trib	0.236	0.017	2.7669	2.75	0.148	0.01			2.3	29		7.16	109.00				24.6			28.0			63
52	29.60974	-82.24731	08/20/08	UF for SJRWMD	Newnans Lake Trib	0.000	0.000	0.0000		0.000	0.011			3.1	39	10.70	7.67	101.00				27.1	25.45	0.53		9.13		128
52	29.60974	-82.24731	09/02/08	UF for SJRWMD	Newnans Lake Trib	0.053	3.530	3.5300		0.230	0.004			9.5	123	48.00	5.90	93.00				29.6	22.47	0.88		9.67		218
52	29.60974	-82.24731	09/09/08	UF for SJRWMD	Newnans Lake Trib	0.037	2.320	2.3200		0.113	0.006			8.4	112	43.00	6.30	94.00				30.6	22.21	0.97		10.20		183
52	29.60974	-82.24731	09/22/08	UF for SJRWMD	Newnans Lake Trib	0.054	3.010	3.0100		0.164	0.004			7.3	91	36.00	6.97	95.00				26.7	22.19	1.14		10.44		159
52	29.60974	-82.24731	11/24/08	UF for SJRWMD	Newnans Lake Trib	0.060	3.670	3.6700		0.182	0.007			9.0	93	13.00	7.91	90.00				16.6	24.96	1.33		9.36		130
52	29.60974	-82.24731	01/09/09	UF for SJRWMD	Newnans Lake Trib	0.039	3.960	3.9600		0.217	0.003			13.0	135	11.00	7.27	109.00				16.5	26.27	0.62		11.39		109
52	29.60974	-82.24731	02/13/09	UF for SJRWMD	Newnans Lake Trib	0.067	3.200	3.2000		0.196	0.001			7.9	83	11.00	7.24	107.00				17.6	33.59	0.03		11.99		183
52	29.60974	-82.24731	03/12/09	UF for SJRWMD	Newnans Lake Trib	0.080	3.990	3.9900		0.255	0.014			11.0	138	13.00	7.71	108.00				27.0	417.98	0.15		10.94		131
52	29.60974	-82.24731	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.071	5.200	5.2000		0.277	0.009			7.3	86	18.00	7.73	102.00				23.5	16.68	0.49		9.99		131
52	29.60974	-82.24731	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.051	2.690	2.6900		0.135	0.006			3.3	43	51.00	6.48	96.00				30.4				10.34		156
52	29.60974	-82.24731	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.034	3.570	3.5700		0.183	0.013			2.5	33	55.00	6.30	99.00				29.0				9.85		194
52	29.60974	-82.24731	08/19/09	UF for SJRWMD	Newnans Lake Trib	0.042	2.780	2.7800		0.136	0.011			7.0	90	84.00	6.67	89.00				25.6				10.43		1.94
52	29.60974	-82.24731	11/13/09	UF for SJRWMD	Newnans Lake Trib	0.021	4.800	4.8000		0.237	0.014			8.6	90	28.50	7.04	101.00				17.0				8.79		162
52	29.60974	-82.24731	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.032	4.280	4.2800		0.209	0.008			n.a.	n.a.	29.50	n.a.	n.a.				n.a.				8.36		n.a.
52	29.60974	-82.24731	04/30/10	UF for SJRWMD	Newnans Lake Trib	0.009	1.110	1.1100		0.225	0.013			6.3	75	50.00	7.20	93.00				24.5						123
53	29.68812	-82.20627	03/15/07	UF for SJRWMD	Hatchet Creek	0.019	0.005	0.9353	0.93	0.104	0.073												23.03	3.06	20.0	17.23		
53	29.68812	-82.20627	01/31/08	UF for SJRWMD	Hatchet Creek	0.007	0.013	1.6508	1.64	0.059	0.034			8.7	86	22.90	6.35	96.00				15.2			52.0	12.74		215
53	29.68812	-82.20627	02/15/08	UF for SJRWMD	Hatchet Creek	-0.004	0.007	1.2300	1.22	0.109	0.079														40.8	11.17		
53	29.68812	-82.20627	2/27/2008	UF for SJRWMD	Hatchet Creek	0.059	0.017	1.7197	1.70	0.068	0.042			6.6	68	90.90	5.35	69.00				16.7	19.24	1.07	57.2	7.73		232
53	29.68812	-82.20627	09/09/08	UF for SJRWMD	Hatchet Creek	0.111	2.810	2.8100		0.096	0.071			5.7	71	19.00	5.80	73.00				26.6	14.61	0.56		8.99		195
53	29.68812	-82.20627	09/22/08	UF for SJRWMD	Hatchet Creek	0.076	2.010	2.0100		0.103	0.081			4.5	54	4.00	6.30	88.00				24.1	16.02	0.92		12.22		168
53	29.68812	-82.20627	01/09/09	UF for SJRWMD	Hatchet Creek	0.019	0.900	0.9000		0.074	0.048			5.6	56	0.30	6.92	171.00				14.4	21.81	0.56		22.12		203
53	29.68812	-82.20627	02/13/09	UF for SJRWMD	Hatchet Creek	0.171	1.530	1.5300		0.081	0.062			7.6	77	0.30	6.62	114.00				16.7	29.88	0.04		13.76		202
53	29.68812	-82.20627	03/12/09	UF for SJRWMD	Hatchet Creek	0.059	1.360	1.3600		0.075	0.045			4.4	48	0.20	6.98	167.00				20.1	12.13	0.07		19.13		152
53	29.68812	-82.20627	04/27/09	UF for SJRWMD	Hatchet Creek	0.074	1.810	1.8100		0.082	0.056			4.4	50	1.00	5.50	102.00				20.9	15.49	0.50		13.58		233
53	29.68812	-82.20627	06/29/09	UF for SJRWMD	Hatchet Creek	0.099	2.010	2.0100		0.111	0.064			2.8	36	0.60	5.58	183.00				27.1				13.14		30
53	29.68812	-82.20627	07/31/09	UF for SJRWMD	Hatchet Creek	0.041	1.820	1.8200		0.069	0.045			5.4	66	24.00	5.50	76.00				26.1				10.79		184
53	29.68812	-82.20627	08/19/09	UF for SJRWMD	Hatchet Creek	0.039	1.550	1.5500		0.065	0.039			5.8	72	14.20	5.25	61.00				25.9				8.67		234
53	29.68812	-82.20627	11/13/09	UF for SJRWMD	Hatchet Creek	0.026	1.450	1.4500		0.058	0.025			4.7	47	0.57	6.14	116.00				16.0				20.22		227
53	29.68812	-82.20627	01/05/10	UF for SJRWMD	Hatchet Creek	0.016	1.380	1.3800		0.046	0.03			n.a.	n.a.	5.98	n.a.	n.a.				n.a.				12.79		n.a.
53	29.68812	-82.20627	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.490	1.4900		0.070	0.037			8.85	94.4	30.00	5.60	86.00				17.63						192
53	29.68812	-82.20627	04/30/10	UF for SJRWMD	Hatchet Creek	0.024	4.050	4.0500		0.127	0.058			2.7	30	0.20	6.60	98.00				19.9						90
54	29.69600	-82.19907	01/17/07	UF for SJRWMD	Hatchet Creek	0.041	0.007	0.8988	0.89	0.122	0.088							158.00							21.1	14.76	0.35	

						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	Concen-tration	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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)
57	29.61320	-82.20785	02/05/07	UF for SJRWMD	Newnans Lake Trib	0.029	0.020	1.9903	1.97	0.118	0.078							168.00					25.32	3.02	76.5	1.76		
57	29.61320	-82.20785	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.036	0.020	1.9488	1.93	0.063	0.034			4.1	43	1.40	3.86	103.00				17.5	15.32	0.24	76.1			331
59	29.62124	-82.20135	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.035	0.013	1.8551	1.84	0.068	0.02												43.12	1.33	69.3	1.45		
59	29.62124	-82.20135	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.036	0.033	1.6509	1.62	0.028	0.014			3.1	32	2.10	5.57	162.00				16.6	15.11	0.27	79.3			84
59	29.62124	-82.20135	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.073	2.160	2.1600		0.026	0.017			2.5	27	0.59	4.07	139.00				18.9	14.34	0.20		4.32		328
59	29.62124	-82.20135	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.058	2.610	2.6100		0.050	0.034			1.5	19	0.03	3.17	13.20				26.1				5.49		3.06
59	29.62124	-82.20135	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.038	2.470	2.4700		0.038	0.035			1.2	14	0.83	307.00	124.00				24.7				3.06		323
59	29.62124	-82.20135	08/19/09	UF for SJRWMD	Newnans Lake Trib	0.050	2.900	2.9000		0.089	0.081			1.5	18	0.30	3.45	109.00				24.9				3.36		265
59	29.62124	-82.20135	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.020	1.780	1.7800		0.014	0.014			n.a.	n.a.	0.22	n.a.	n.a.				n.a.				3.10		n.a.
74	29.67197	-82.18905	01/18/07	UF for SJRWMD	HC trib	0.037	0.579	1.5877	1.01	0.025	0.017							119.00							18.7	6.59	0.08	
74	29.67197	-82.18905	02/08/07	UF for SJRWMD	HC trib	0.030	0.477	1.6314	1.15	0.027	0.02														24.7	5.34		
75	29.67262	-82.19698	03/15/07	UF for SJRWMD	HC trib	0.009	0.008	1.1147	1.11	0.047	0.03												24.58	0.53	26.9	7.00		
75	29.67262	-82.19698	03/12/08	UF for SJRWMD	HC trib	0.032	0.023	1.4148	1.39	0.176	0.15			5.8	60	0.70	6.02	90.00				17.4	18.21	0.91	49.4			148
75	29.67262	-82.19698	08/20/08	UF for SJRWMD	HC trib	0.055	1.180	1.1800		0.028	0.016			4.4	53	0.12	7.01	134.00				24.6	29.50	1.99		12.21		163
75	29.67262	-82.19698	08/22/08	UF for SJRWMD	HC trib	0.035	0.800	0.8000		0.048	0.039			7.1	68	0.11	7.06	130.00				13.5	22.85	0.03		11.95		212
75	29.67262	-82.19698	03/12/09	UF for SJRWMD	HC trib	0.037	0.710	0.7100		0.055	0.043			4.4	48	0.07	7.16	144.00				20.0	302.14	0.12		13.66		189
75	29.67262	-82.19698	07/31/09	UF for SJRWMD	HC trib	0.038	1.050	1.0500		0.091	0.074			5.1	62	0.25	5.24	126.00				25.0				11.15		250
75	29.67262	-82.19698	08/19/09	UF for SJRWMD	HC trib	0.030	0.960	0.9600		0.145	0.115			3.9	47	0.05	5.20	120.00				25.3				10.55		170
75	29.67262	-82.19698	11/13/09	UF for SJRWMD	HC trib	0.031	0.860	0.8600		0.052	0.033			5.0	51	0.03	7.39	148.00				16.5				9.26		231
75	29.67262	-82.19698	01/05/10	UF for SJRWMD	HC trib	0.021	1.400	1.4000		0.038	0.022			n.a.	n.a.	0.22	n.a.	n.a.				n.a.				9.49		n.a.
76	29.68003	-82.20019	01/18/07	UF for SJRWMD	HC trib	0.051	0.015	2.1018	2.09	0.479	0.38							188.00							41.9	13.98	0.36	
76	29.68003	-82.20019	03/15/07	UF for SJRWMD	HC trib	0.042	0.007	1.4671	1.46	0.447	0.379												34.67	4.00	29.1	19.77		
76	29.68003	-82.20019	03/12/08	UF for SJRWMD	HC trib	0.036	0.022	1.5838	1.56	0.707	0.924			5.6	58	1.00	6.41	91.00				17.7	12.35	0.90	50.3			136
76	29.68003	-82.20019	08/20/08	UF for SJRWMD	HC trib	0.085	2.010	2.0100		1.600	1.61			5.1	61	0.02	7.14	222.00				24.6	33.24	4.56		27.46		138
76	29.68003	-82.20019	08/22/08	UF for SJRWMD	HC trib	0.054	0.900	0.9000		0.350	0.362			7.1	68	0.06	7.08	221.00				13.5	28.88	0.08		27.06		206
76	29.68003	-82.20019	03/12/09	UF for SJRWMD	HC trib	0.062	1.170	1.1700		0.530	0.5			4.6	49	0.02	7.14	243.00				17.8	193.30	0.08		30.93		201
76	29.68003	-82.20019	07/31/09	UF for SJRWMD	HC trib	0.116	3.130	3.1300		0.875	0.694			1.0	13	0.05	5.23	135.00				21.5				19.46		233
76	29.68003	-82.20019	01/05/10	UF for SJRWMD	HC trib	0.030	1.610	1.6100		0.376	0.257			n.a.	n.a.	0.11	n.a.	n.a.				n.a.				18.65		n.a.
78	29.68105	-82.18936	02/08/07	UF for SJRWMD	HC trib	0.037	0.101	1.2546	1.15	0.483	0.43														26.5	14.50		
79	29.68310	-82.18939	02/08/07	UF for SJRWMD	HC trib	0.034	1.088	2.6950	1.61	0.645	0.547							460.00							18.8	54.00		
80	29.68341	-82.18932	01/18/07	UF for SJRWMD	HC trib	0.036	0.020	1.2033	1.18	0.741	0.6							274.00							18.7	16.28	0.25	
80	29.68341	-82.18932	02/08/07	UF for SJRWMD	HC trib	0.021	0.030	1.0193	0.99	0.395	0.316														17.2	20.29		
81	29.68795	-82.19487	01/18/07	UF for SJRWMD	HC trib	0.054	0.012	2.0112	2.00	0.085	0.028							215.00							37.1	18.68	0.56	
82	29.68314	-82.20250	03/15/07	UF for SJRWMD	HC trib	0.108	0.008	1.7623	1.75	0.165	0.102												35.68	1.78	37.7	13.63		
82	29.68314	-82.20250	03/12/08	UF for SJRWMD	HC trib	0.024	0.017	1.3811	1.36	0.170	0.125			6.6	70	1.90	6.20	70.00				182.0	12.22	0.83	44.8			151
82	29.68314	-82.20250	03/12/09	UF for SJRWMD	HC trib	0.047	1.260	1.2600		0.116	0.071			6.1	70	0.15	7.04	170.00				22.1	60.44	0.03		19.87		204
82	29.68314	-82.20250	07/31/09	UF for SJRWMD	HC trib	0.115	1.890	1.8900		0.242	0.162			1.2	15	0.05	5.54	138.00				25.6				17.09		77
82	29.68314	-82.20250	01/05/10	UF for SJRWMD	HC trib	0.021	1.490	1.4900		0.073	0.042			n.a.	n.a.	0.20	n.a.	n.a.				n.a.				18.50		n.a.
83	29.65171	-82.28463	01/19/07	UF for SJRWMD	Newnans Lake Trib	0.009	0.017	0.5300	0.51	0.053	0.083							294.00							8.4	30.18	0.10	
83	29.65171	-82.28463	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.025	0.030	0.5191	0.49	0.030	0.027												55.55	5.82	9.8	34.78		
83	29.65171	-82.28463	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.042	0.033	0.4637	0.43	0.017	0.018			7.9	85	0.19	7.59	282.00				19.4	42.58	4.02	9.7	35.17		86.3
83	29.65171	-82.28463	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.039	0.020	0.6084	0.59	0.035	0.018			9.8	99	0.11	7.03	253.00				15.7	41.13	5.88	10.1	37.05		144
83	29.65171	-82.28463	05/13/07	UF for SJRWMD	Newnans Lake Trib	1.047	0.364	2.6958	2.33	0.212	0.117												8.49	2.62	34.3	31.13		
83	29.65171	-82.28463	05/14/07	UF for SJRWMD	Newnans Lake Trib	0.053	0.114	0.9599	0.85	0.040	0.005												37.34	4.46	15.3	29.87		
83	29.65171	-82.28463	06/22/07	UF for SJRWMD	Newnans Lake Trib	0.039	0.009	0.5443	0.54	0.053	0.024			7.5	89	0.26	7.43	208.00				23.8	16.71	3.56	8.9	40.10		130
83	29.65171	-82.28463	10/04/07	UF for SJRWMD	Newnans Lake Trib	0.031	0.010	0.3978	0.39	0.040	0.013			8.4	107	0.42	7.47	231.00				28.6			9.8	36.43		99
83	29.65171	-82.28463	05/16/08	UF for SJRWMD	Newnans Lake Trib	0.021	0.014	0.5116	0.50	0.037	0.022			7.8	90	0.13	7.91	292.00				22.0			9.2			23
83	29.65171	-82.28463	04/27/09	UF for SJRWMD	Newnans Lake Trib	0.045	0.350	0.3500		0.032	0.025			7.3	80	0.29	7.51	253.00				19.0	15.97	2.29		34.51		-40
83	29.65171	-82.28463	06/29/09	UF for SJRWMD	Newnans Lake Trib	0.034	0.390	0.3900		0.043	0.024			6.5	80	0.78	7.28	297.00				26.1				35.72		58
83	29.65171	-82.28463	07/31/09	UF for SJRWMD	Newnans Lake Trib	0.038	0.740	0.7400		0.031	0.016			6.0	73	0.56	6.51	252.00				25.2				42.17		70
83	29.65171	-82.28463	08/19/09	UF for SJRWMD	Newnans Lake Trib	0.034	0.710	0.7100		0.031	0.022			6.6	80	0.91	6.17	269.00				25.1				44.28		166
83	29.65171	-82.28463	11/13/09	UF for SJRWMD	Newnans Lake Trib	0.019	0.690	0.6900		0.035	0.015			9.5	97	0.17	7.00	266.00				16.4				29.54		-26
83	29.65171	-82.28463	01/05/10	UF for SJRWMD	Newnans Lake Trib	0.030	0.720	0.7200		0.023	0.011			n.a.	n.a.	0.34	n.a.	n.a.				n.a.				37.96		n.a.
83	29.65171	-82.28463	04/30/10	UF for SJRWMD	Newnans Lake Trib	0.037	1.620	1.6200		0.039	0.02			2.0	19	0.28	75.00	282.00				18.7						30
84	29.65241	-82.29136	01/19/07	UF for SJRWMD	Newnans Lake Trib	0.030	0.042	0.5255	0.48	0.022	0.005							311.00							7.2	34.18	0.29	
84	29.65241	-82.29136	02/07/07	UF for SJRWMD	Newnans Lake Trib	0.098	0.093	0.7515	0.66	0.033	0.006							307.00					44.04	11.98	9.0	35.35		
84	29.65241	-82.29136	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.025	0.015	0.4460	0.43	0.015	0.014												41.79	9.61	7.6	33.53		
84	29.65241	-82.29136	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.032	0.022	0.4522	0.43	0.022	0.017			8.4	91	0.12	7.44	225.00				18.8	43.19	10.29	7.8	34.71		15
84	29.65241	-82.29136	04/16/07	UF for SJRWMD	Newnans Lake Trib	0.047	0.009	0.5407	0.53	0.010	0.012												44.30	15.97	6.8	38.16		
84	29.65241	-82.29136	06/22/07	UF for SJRWMD	Newnans Lake Trib	0.152	0.054	0.7352	0.68	0.054	0.028			7.3	88	0.08	7.43	326.00				24.7	30.55	16.32	8.5	61.10		116
84	29.65241	-82.29136	10/04/07	UF for SJRWMD	Newnans Lake Trib	0.044	0.015	0.4031	0.39	0.040	0.015			6.7	86	0.16	7.23	293.00				27.9			7.9	38.43		29
88	29.72138	-82.14121	01/19/07	UF for SJRWMD	Offsite	0.043	1.796	2.8916	1.10	0.032	0.005							433.00							9.5	59.20	0.09	
89	29.68808	-82.22076	01/09/07	UF for SJRWMD	Gum Root Swamp	0.264	0.101	3.9946	3.89	0.179	0.068							283.00							70.5	38.49	0.24	
89	29.68808	-82.22076	02/04/07	UF for SJRWMD	Gum Root Swamp	0.044	0.010	2.1835	2.17	0.067	0.026							164.00							55.4	14.74	0.18	
89	29.68808	-82.22076	02/05/07	UF for SJRWMD	Gum Root Swamp	0.043	0.010	1.9509	1.94	0.051	0.017							154.00							43.9	14.95		
89	29.68808	-82.22076	02/07/07	UF for SJRWMD	Gum Root Swamp	0.051	0.018	2.1332	2.12	0.046	0.016							170.00							49.7	16.30		
89	29.68808	-82.22076	02/10/07	UF for SJRWMD	Gum Root Swamp	0.050	0.012	2.2363	2.22	0.037	0.012							170.00							54.8	18.15		
89	29.68808	-82.22076	03/15/07	UF for SJRWMD	Gum Root Swamp	0.044	0.013	2.7675	2.75	0.101	0.051												27.36	1.74	58.1	18.50		
89	29.68808	-82.22076	04/05/07	UF for SJRWMD	Gum Root Swamp	0.166	0.031	2.9024	2.87	0.211	0.126			5.4	59	0.13	6.59	131.00	11.5			18.0	26.89	0.40	70.2	22.05		119
89	29.68808	-82.22076	04/16/07	UF for SJRWMD	Gum Root Swamp	0.064	0.052	2.3553	2.30	0.179	0.096			7.0	69	0.00	6.64	125.00	11.35			14.0	29.66	0.69	62.4	21.87		121
89	29.68808	-82.22076	08/09/07	UF for SJRWMD	Gum Root Swamp	1.033	0.051	5.8860	5.83	0.313	0.147			3.0	38	1.22	6.08	204.00	11.85			28.0	17.25	10.11	96.1	40.82		118
89	29.68808	-82.22076	08/21/07	UF for SJRWMD	Gum Root Swamp	0.509	0.091	4.2740	4.18	0.366	0.19			2.3	28	2.25	6.27	143.00	12			24.9	16.74	0.81	79.7	29.24		88
89	29.68808	-82.22076	08/27/07	UF for SJRWMD	Gum Root Swamp	0.497	0.118	4.5380	4.42	0.381	0.242			2.3	28	1.44	6.28	147.00	11.85			24.0	22.77	0.74	94.3	32.38		99
89	29.68808	-82.22076	09/04/07	UF for SJRWMD	Gum Root Swamp	0.305	0.123	3.8307	3.71	0.314	0.155			2.8	3	3.91	6.31	144.00	12.1			25.0	20.08	0.64	86.1	31.71		96
89	29.68808	-82.22076	09/11/07	UF for SJRWMD	Gum Root Swamp	0.387	0.086	3.7937	3.71	0.377	0.185			2.9	35	0.45	6.37	160.00	11.6			25.1	20.43	0.50	91.8	32.54		85
89	29.68808	-82.22076	09/18/07	UF for SJRWMD	Gum Root Swamp	0.319	0.059	4.0638	4.00	0.451	0.239			5.2	62	0.01	6.36	150.00	11.4			24.3			82.6	34.74		66
89	29.68808	-82.22076	09/25/07	UF for SJRWMD	Gum Root Swamp	0.157	0.062	3.4126	3.35	0.260	0.153			4.2	51	3.90	6.22	145.00	12.15			24.3			73.9	27.26		142
89	29.68808	-82.22076	09/27/07	UF for SJRWMD	Gum Root Swamp	0.146	0.058	3.2652	3.21	0.266	0.168			3.7	44	2.68	6.25	143.00	12.08			24.7			75.8	27.78		87

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	Concen-tration	Saturation	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)
89	29.68808	-82.22076	10/04/07	UF for SJRWMD	Gum Root Swamp	0.114	0.036	3.0610	3.03	0.319	0.207			3.1	38	4.45	6.25	143.00	12.2			25.6			77.3	26.69		118
89	29.68808	-82.22076	10/09/07	UF for SJRWMD	Gum Root Swamp	0.122	0.020	2.1354	2.12	0.321	0.241			2.6	31	36.00	6.17	99.00	13.88			23.6			54.1	16.78		229
89	29.68808	-82.22076	01/28/08	UF for SJRWMD	Gum Root Swamp	0.002	0.009	1.4192	1.41	0.063	0.04			8.3	80	14.47	6.62	109.00	12.95			13.6			39.2	12.79		168
89	29.68808	-82.22076	02/06/08	UF for SJRWMD	Gum Root Swamp	0.016	0.009	1.5987	1.59	0.094	0.061			4.2	48	6.08	6.91	107.00	12.4			21.7			43.1	14.78		125
89	29.68808	-82.22076	03/12/08	UF for SJRWMD	Gum Root Swamp	0.031	0.017	1.2392	1.22	0.128	0.091			4.7	51	26.00	6.27	102.00	13.68			19.9	17.68	1.12	39.5			200
89	29.68808	-82.22076	4/7/2008	UF for SJRWMD	Gum Root Swamp	0.125	0.024	1.7364	1.71	0.293	0.237			4.2	46	9.20	6.56	120.00				20.5			14.8			123
89	29.68808	-82.22076	08/20/08	UF for SJRWMD	Gum Root Swamp	0.268	3.970	3.9700		0.165	0.102			4.5	56	0.57	6.74	195.00				24.3	27.63	4.62		38.76		160
89	29.68808	-82.22076	09/02/08	UF for SJRWMD	Gum Root Swamp	0.246	3.220	3.2200		0.367	0.304			1.9	23	11.00	5.62	128.00				27.3	17.79	0.48		23.02		146
89	29.68808	-82.22076	09/09/08	UF for SJRWMD	Gum Root Swamp	0.409	3.440	3.4400		0.320	0.297			2.4	30	3.20	6.08	146.00				26.6	20.11	0.48		25.33		74
89	29.68808	-82.22076	09/22/08	UF for SJRWMD	Gum Root Swamp	0.305	3.330	3.3300		0.290	0.27			3.4	41	1.23	6.50	103.00				24.2	22.67	0.50		29.49		64
89	29.68808	-82.22076	01/09/09	UF for SJRWMD	Gum Root Swamp	0.063	2.030	2.0300		0.072	0.054			5.3	53	0.76	6.26	151.00				15.6	32.09	0.40		25.44		246
89	29.68808	-82.22076	02/13/09	UF for SJRWMD	Gum Root Swamp	0.080	1.690	1.6900		0.055	0.025			6.4	66	7.32	6.86	126.00				16.3	29.93	0.03		18.32		205
89	29.68808	-82.22076	03/12/09	UF for SJRWMD	Gum Root Swamp	0.062	1.770	1.7700		0.062	0.033			5.4	62	2.95	7.03	121.00				21.7	103.05	0.08		19.27		144
89	29.68808	-82.22076	04/27/09	UF for SJRWMD	Gum Root Swamp	0.143	1.860	1.8600		0.269	0.178			4.7	52	1.39	6.44	119.00				20.0	17.06	0.20		20.38		200
89	29.68808	-82.22076	06/29/09	UF for SJRWMD	Gum Root Swamp	0.108	2.190	2.1900		0.372	0.299			4.5	59	0.01	6.23	162.00				28.5				28.36		99
89	29.68808	-82.22076	07/31/09	UF for SJRWMD	Gum Root Swamp	0.057	1.970	1.9700		0.356	0.313			3.9	48	7.50	5.77	133.00				25.4				22.50		207
89	29.68808	-82.22076	08/19/09	UF for SJRWMD	Gum Root Swamp	0.060	1.460	1.4600		0.360	0.329			3.5	43	10.82	5.62	143.00				25.8				24.61		232
89	29.68808	-82.22076	10/07/09	UF for SJRWMD	Gum Root Swamp	0.049	0.970	0.9700		0.443	0.264			3.8	49	1.02	6.20	153.00				25.4	21.07	0.02		26.27		96
89	29.68808	-82.22076	11/13/09	UF for SJRWMD	Gum Root Swamp	0.024	1.790	1.7900		0.218	0.139			4.7	49	0.53	6.42	160.00				17.0				24.54		79.1
89	29.68808	-82.22076	01/05/10	UF for SJRWMD	Gum Root Swamp	0.022	1.250	1.2500		0.058	0.034			n.a.	n.a.	16.39	n.a.	n.a.				n.a.				16.97		n.a.
89	29.68808	-82.22076	04/30/10	UF for SJRWMD	Gum Root Swamp	0.029	0.890	0.8900		0.300	0.226			4.6	49	0.29	6.80	127.00				18.8						60
89	29.68808	-82.22076	05/12/10	UF for SJRWMD	Gum Root Swamp	0.091	1.880	1.8800		0.000	0.374			4.4	52	2.07	7.40	140.00				22.5						120
90	29.68072	-82.21442	01/22/07	UF for SJRWMD	HC South of 26	0.051	0.008	0.9284	0.92	0.117	0.084							133.00							22.2	11.04	0.17	
91	29.68186	-82.21391	02/08/07	UF for SJRWMD	HC South of 26	0.032	0.021	1.1872	1.17	0.089	0.065							134.00					24.17	5.31	32.0	10.93		
91	29.68186	-82.21391	01/31/08	UF for SJRWMD	HC South of 26	0.007	0.013	1.5656	1.55	0.058	0.033			7.4	77	81.80	6.16	95.00				14.7			49.9	11.38		225
91	29.68186	-82.21391	2/27/2008	UF for SJRWMD	HC South of 26	0.031	0.017	1.7193	1.70	0.106	0.071			7.7	72	157.20	5.04	62.00				11.7	19.65	1.10	57.0	7.42		291
91	29.68186	-82.21391	03/12/08	UF for SJRWMD	HC South of 26	0.029	0.018	1.6077	1.59	0.084	0.03			6.3	66	204.00	4.89	70.00				17.4	16.53	0.74	59.9			262
91	29.68186	-82.21391	3/29/2010	UF for SJRWMD	HC South of 26	0.000	1.530	1.5300		0.080	0.046			6.87	72.1	50.00	6.00	86.00				17.69						178
94	29.66392	-82.19718	02/08/07	UF for SJRWMD	Newnans Lake Trib	0.057	0.078	1.9502	1.87	0.094	0.059							94.00					21.44	7.90	51.7	9.43		
95	29.62447	-82.20554	01/22/07	UF for SJRWMD	Newnans Lake Trib	0.037	0.021	1.2333	1.21	0.168	0.123							285.00							36.3	10.17	0.09	
96	29.62210	-82.21022	01/22/07	UF for SJRWMD	Newnans Lake Trib	0.030	0.027	1.6764	1.65	0.099	0.062							223.00							64.0	8.15	0.13	
100	29.69345	-82.26559	02/04/07	UF for SJRWMD	Little Hatchet Creek	0.032	0.137	0.9991	0.86	0.137	0.06							237.00							12.0	30.76	0.10	
100	29.69345	-82.26559	02/05/07	UF for SJRWMD	Little Hatchet Creek	0.031	0.137	0.7955	0.66	0.112	0.059							247.00							11.8	31.94		
100	29.69345	-82.26559	02/07/07	UF for SJRWMD	Little Hatchet Creek	0.018	0.155	0.9009	0.75	0.142	0.077							257.00							11.1	33.38		
100	29.69345	-82.26559	02/10/07	UF for SJRWMD	Little Hatchet Creek	0.027	0.107	0.8318	0.72	0.179	0.105							245.00							12.6	35.18		
100	29.69345	-82.26559	03/15/07	UF for SJRWMD	Little Hatchet Creek	0.040	0.038	0.5277	0.49	0.346	0.275														8.2	31.64		
100	29.69345	-82.26559	04/04/07	UF for SJRWMD	Little Hatchet Creek	0.036	0.042	0.5318	0.49	0.434	0.357			9.7	115	0.80	8.41	234.00				24.0	19.31	3.46	6.6	32.53		130.2
100	29.69345	-82.26559	04/16/07	UF for SJRWMD	Little Hatchet Creek	0.042	0.025	0.4991	0.47	0.316	0.316			10.6	115	0.67	8.16	223.00				19.0	20.20	6.26	8.3	26.96		150
100	29.69345	-82.26559	05/13/07	UF for SJRWMD	Little Hatchet Creek	0.032	0.065	0.5102	0.45	0.642	0.555												19.76	3.44	5.3	34.76		
100	29.69345	-82.26559	05/14/07	UF for SJRWMD	Little Hatchet Creek	0.024	0.042	0.4872	0.45	0.582	0.49												20.35	3.86	6.1	36.28		
100	29.69345	-82.26559	06/04/07	UF for SJRWMD	Little Hatchet Creek	0.039	0.094	0.6290	0.54	0.313	0.266			8.1	94	0.90	7.56	209.00				22.9	15.68	6.62	6.9	35.37		179
100	29.69345	-82.26559	06/05/07	UF for SJRWMD	Little Hatchet Creek	0.034	0.158	0.7222	0.56	0.442	0.382			8.0	94	0.70	7.70	244.00				23.1	20.32	6.95	5.9	40.79		152
100	29.69345	-82.26559	06/06/07	UF for SJRWMD	Little Hatchet Creek	-0.004	0.103	0.4631	0.36	0.424	0.437			8.2	96	0.60	7.74	254.00				23.5	21.55	6.79	28.2	46.38		146
100	29.69345	-82.26559	06/07/07	UF for SJRWMD	Little Hatchet Creek	0.028	0.147	0.5941	0.45	0.466	0.428			8.3	103	0.50	7.85	274.00				25.6	22.68	6.53	5.2	48.44		128
100	29.69345	-82.26559	06/12/07	UF for SJRWMD	Little Hatchet Creek	0.034	0.171	0.6763	0.51	0.571	0.508			8.2	99	0.76	7.73	267.00				24.6	23.01	6.74	4.5	40.66		92
100	29.69345	-82.26559	06/22/07	UF for SJRWMD	Little Hatchet Creek	0.038	0.143	0.6779	0.54	0.283	0.238			7.3	90	1.26	7.54	221.00				25.7	19.26	4.32	7.6	36.14		129
100	29.69345	-82.26559	07/13/07	UF for SJRWMD	Little Hatchet Creek	0.025	0.320	1.7392	1.42	0.550	0.512			7.6	94	0.57	7.70	288.00				25.8	31.38	5.80	4.8	43.72		100
100	29.69345	-82.26559	07/22/07	UF for SJRWMD	Little Hatchet Creek	0.017	0.121	0.6173	0.50	0.263	0.224			7.5	95	1.44	7.63	210.00				26.7	15.53	4.01	5.4	31.87		164
100	29.69345	-82.26559	08/09/07	UF for SJRWMD	Little Hatchet Creek	0.019	0.134	0.8763	0.74	0.259	0.184			7.4	97	2.67	7.70	276.00				29.5	18.91	3.76	12.5	47.48		132
100	29.69345	-82.26559	08/21/07	UF for SJRWMD	Little Hatchet Creek	0.018	0.158	0.9236	0.77	0.245	0.205			7.6	94	3.66	7.65	248.00				26.1	19.17	3.27	12.0	46.95		115
100	29.69345	-82.26559	08/27/07	UF for SJRWMD	Little Hatchet Creek	0.043	0.198	0.9641	0.77	0.222	0.179			7.3	90	3.70	7.61	238.00				26.1	24.85	4.86	12.8	43.44		162
100	29.69345	-82.26559	09/04/07	UF for SJRWMD	Little Hatchet Creek	0.025	0.112	0.7889	0.68	0.205	0.147			7.5	94	4.62	7.65	221.00	2.1			27.0	17.31	3.84	12.3	39.77		130
100	29.69345	-82.26559	09/11/07	UF for SJRWMD	Little Hatchet Creek	0.023	0.240	0.8872	0.65	0.340	0.263			8.4	104	1.71	7.76	246.00				25.8	20.46	4.25	9.0	42.18		134
100	29.69345	-82.26559	09/18/07	UF for SJRWMD	Little Hatchet Creek	0.046	0.176	0.6744	0.50	0.403	0.342			10.0	121	2.04	7.77	240.00				25.0			8.4	44.75		135
100	29.69345	-82.26559	09/25/07	UF for SJRWMD	Little Hatchet Creek	0.023	0.041	0.6590	0.62	0.202	0.143			8.4	103	4.00	7.63	215.00				25.5			12.8	36.06		155
100	29.69345	-82.26559	09/27/07	UF for SJRWMD	Little Hatchet Creek	0.035	0.120	0.7208	0.60	0.217	0.18			8.6	105	2.87	7.66	232.00				25.6			11.9	40.97		81
100	29.69345	-82.26559	10/04/07	UF for SJRWMD	Little Hatchet Creek	0.029	0.108	0.7994	0.69	0.213	0.156			7.7	96	3.71	7.58	219.00				26.9			11.2	36.60		107
100	29.69345	-82.26559	02/08/08	UF for SJRWMD	Little Hatchet Creek	0.011	0.048	0.6205	0.57	0.159	0.147			10.1	104	6.50	7.30	198.00				16.0			11.5	37.42		135
100	29.69345	-82.26559	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.022	0.040	0.8038	0.76	0.156	0.119			8.3	94	6.70	7.62	211.00				21.5			14.0			101
100	29.69345	-82.26559	05/16/08	UF for SJRWMD	Little Hatchet Creek	0.025	0.045	0.5126	0.47	0.586	0.6			8.3	98	0.28	8.15	239.00				24.0			4.8			115
100	29.69345	-82.26559	05/12/10	UF for SJRWMD	Little Hatchet Creek	0.042	1.160	1.1600		0.259	0.203			8.3	98	2.44	7.70	252.00				25.3						61
103	29.73068	-82.24970	01/09/07	UF for SJRWMD	Hatchet Creek	0.031	0.021	0.8546	0.83	0.090	0.061							99.00							16.5	7.06	0.26	
103	29.73068	-82.24970	02/05/07	UF for SJRWMD	Hatchet Creek	0.011	0.058	1.0664	1.01	0.070	0.054												27.21	4.82	28.5	7.69		
103	29.73068	-82.24970	03/15/07	UF for SJRWMD	Hatchet Creek	0.041	0.007	0.4671	0.46	0.104	0.081														6.7	4.38		
103	29.73068	-82.24970	04/04/07	UF for SJRWMD	Hatchet Creek	0.049	0.050	0.4517	0.40	0.140	0.117			8.2	93	0.84	6.92	65.00				21.5	17.82	1.27	4.5	3.33		102.8
103	29.73068	-82.24970	04/16/07	UF for SJRWMD	Hatchet Creek	0.040	0.076	0.5217	0.45	0.129	0.117			8.8	90	0.70	6.69	55.00				16.0	17.09	1.30	4.7	2.77		156
103	29.73068	-82.24970	05/14/07	UF for SJRWMD	Hatchet Creek	0.042	0.053	0.5553	0.50	0.270	0.18												19.04	1.37	3.9	4.00		
103	29.73068	-82.24970	06/22/07	UF for SJRWMD	Hatchet Creek	0.035	0.069	0.5167	0.45	0.184	0.143			6.9	83	0.98	6.78	71.00				24.7	17.90	1.42	4.9	4.29		75
103	29.73068	-82.24970	07/20/07	UF for SJRWMD	Hatchet Creek	0.037	0.049	0.4857	0.44	0.250	0.206			6.9	86	0.24	6.62	85.00				26.7	18.77	1.48	5.1	6.11		80
103	29.73068	-82.24970	07/26/07	UF for SJRWMD	Hatchet Creek	0.017	0.036	0.2944	0.26	0.204	0.164			7.3	90	0.50	6.56	78.00				25.5	19.25	1.36	3.9	6.56		106
103	29.73068	-82.24970	08/09/07	UF for SJRWMD	Hatchet Creek	0.015	0.055	0.4093	0.35	0.178	0.141			8.3	105	0.67	6.78	90.00				27.4	19.05	1.59	6.4	8.51		80
103	29.73068	-82.24970	08/21/07	UF for SJRWMD	Hatchet Creek	0.024	0.060	0.5290	0.47	0.186	0.16			7.6	94	0.73	6.96	86.00				26.1	19.46	1.60	6.3	8.84		98
103	29.73068	-82.24970	08/28/07	UF for SJRWMD	Hatchet Creek	0.025	0.066	0.7433	0.68	0.141	0.111					2.31	6.52	96.00					28.73	2.04	15.0	9.00		
103	29.73068	-82.24970	09/04/07	UF for SJRWMD	Hatchet Creek	0.057	0.062	0.6202	0.56	0.133	0.115			7.4	89	1.21	6.56	85.00				25.1	23.04	1.63	11.9	8.74		112
103	29.73068	-82.24970	09/18/07	UF for SJRWMD	Hatchet Creek	0.022	0.040	0.3902	0.35	0.154	0.118			9.1	107	0.57	6.52	77.00				23.7			4.8	8.02		115
103	29.73068	-82.24970	1/30/2008	UF for SJRWMD	Hatchet Creek	0.025	0.021	1.2598	1.24	0.111	0.087			9.4	93.1	4.00	5.93	96.00				14.6			41.2	8.93		205
103	29.73068	-82.24970	2/27/2008	UF for SJRWMD	Hatchet Creek	0.008	0.024	1.9806	1.96	0.357	0.339			6.4	64	36.90	5.10	85.00				15.4	28.06	1.64	58.4	6.82		242
103	29.73068	-82.24970	05/16/08	UF for SJRWMD	Hatchet Creek	0.027	0.038	0.5650	0.53	0.147	0.142			7.4	86	0.35	7.40	68.00				22.7			5.8			78

						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	Concen-tration	Saturation	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)
103	29.73068	-82.24970	08/20/08	UF for SJRWMD	Hatchet Creek	0.010	0.450	0.4500		0.012	0.005			6.1	73	0.80	7.27	76.00				24.4	14.62	1.08		5.09		120
103	29.73068	-82.24970	11/24/08	UF for SJRWMD	Hatchet Creek	0.047	1.840	1.8400		0.077	0.059			8.7	87	5.05	6.90	92.00				15.5	34.83	0.03		10.26		164
103	29.73068	-82.24970	11/24/08	UF for SJRWMD	Hatchet Creek	0.015	0.330	0.3300		0.090	0.095			10.1	94	1.40	7.52	47.00				12.4	18.37	1.84		5.52		189
103	29.73068	-82.24970	03/12/09	UF for SJRWMD	Hatchet Creek	0.040	0.780	0.7800		0.085	0.073			8.3	87	1.82	6.60	83.00				18.0	129.90	0.05		9.42		183
103	29.73068	-82.24970	04/27/09	UF for SJRWMD	Hatchet Creek	0.074	1.300	1.3000		0.088	0.074			7.8	86	1.98	6.85	74.00				19.9	14.88	0.44		7.24		108
103	29.73068	-82.24970	07/31/09	UF for SJRWMD	Hatchet Creek	0.023	0.630	0.6300		0.107	0.096			6.4	77	2.35	6.04	81.00				25.2				7.68		129
103	29.73068	-82.24970	08/19/09	UF for SJRWMD	Hatchet Creek	0.017	0.440	0.4400		0.128	0.109			6.8	83	1.80	6.38	63.00				25.4				7.11		107
103	29.73068	-82.24970	11/13/09	UF for SJRWMD	Hatchet Creek	0.020	0.430	0.4300		0.103	0.077			8.1	83	1.40	6.63	85.00				16.5				5.64		82
103	29.73068	-82.24970	01/05/10	UF for SJRWMD	Hatchet Creek	0.026	0.980	0.9800		0.079	0.047			n.a.	n.a.	2.62	n.a.	n.a.				n.a.				9.01		n.a.
103	29.73068	-82.24970	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.650	1.6500		0.065	0.041			8.77	94.3	13.96	5.10	81.00				18.5						200
103	29.73068	-82.24970	04/30/10	UF for SJRWMD	Hatchet Creek	0.038	1.920	1.9200		0.102	0.082			7.9	84	1.18	6.30	29.00				18.4						112
104	29.73760	-82.23944	02/05/07	UF for SJRWMD	HC trib	0.015	0.027	1.2393	1.21	0.026	0.015							115.00					20.99	4.39	32.5	5.09		
104	29.73760	-82.23944	03/15/07	UF for SJRWMD	HC trib	0.036	0.009	0.4400	0.43	0.051	0.036														5.8	4.14		
104	29.73760	-82.23944	04/04/07	UF for SJRWMD	HC trib	0.029	0.007	0.7614	0.75	0.091	0.044			8.5	117	0.00	6.83	233.00				30.6	56.68	1.25	17.9	16.02		77.9
104	29.73760	-82.23944	2/27/2008	UF for SJRWMD	HC trib	0.001	0.013	1.9422	1.93	0.297	0.261			7	69	3.40	3.97	89.00				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	0.7000		0.034	0.028			8.3	84	0.14	6.39	103.00				16.0	45.74	0.04		7.40		183
104	29.73760	-82.23944	11/24/08	UF for SJRWMD	HC trib	0.012	0.500	0.5000		0.049	0.041			10.9	106	0.04	7.43	80.00				14.1	23.36	13.04		8.39		155
104	29.73760	-82.23944	03/12/09	UF for SJRWMD	HC trib	0.034	0.400	0.4000		0.033	0.033			7.0	75	0.08	6.46	82.00				18.4	11.65	0.06		8.45		198
104	29.73760	-82.23944	04/27/09	UF for SJRWMD	HC trib	0.044	0.430	0.4300		0.069	0.051			8.6	98	0.12	6.88	81.00				21.6	14.09	0.55		7.23		135
104	29.73760	-82.23944	07/31/09	UF for SJRWMD	HC trib	0.027	0.560	0.5600		0.068	0.054			7.1	91	0.05	5.87	89.00				26.0				9.29		126
104	29.73760	-82.23944	08/19/09	UF for SJRWMD	HC trib	0.042	0.430	0.4300		0.060	0.048			7.6	95	0.03	5.82	84.00				26.8				4.63		152
104	29.73760	-82.23944	3/28/2010	UF for SJRWMD	HC trib	0.000	1.096	1.0960		0.076	0.044			8.11	86.5	0.32	4.06	80.00				17.36						250
104	29.73760	-82.23944	04/30/10	UF for SJRWMD	HC trib	0.014	0.720	0.7200		0.101	0.046			9.3	101	0.06	6.10	63.00				19.5						140
105	29.73415	-82.27695	03/15/07	UF for SJRWMD	Hatchet Creek	0.029	0.170	0.7187	0.55	0.013	0.006														4.5	1.83		
105	29.73415	-82.27695	04/04/07	UF for SJRWMD	Hatchet Creek	0.061	0.235	0.6074	0.37	0.003	0.009			7.7	90	0.57	7.01	52.00				28.3	15.53	1.04	2.6	0.90		107.8
105	29.73415	-82.27695	04/16/07	UF for SJRWMD	Hatchet Creek	0.042	0.239	0.7984	0.56	0.011	0.009			8.5	92	0.34	6.73	49.00				19.4	16.13	1.07	2.7	0.19		131
105	29.73415	-82.27695	05/14/07	UF for SJRWMD	Hatchet Creek	0.018	0.315	0.8172	0.50	0.020	0.006												16.13	1.17	2.2	-0.16		
105	29.73415	-82.27695	06/22/07	UF for SJRWMD	Hatchet Creek	0.025	0.226	0.7898	0.56	0.038	0.01			7.1	89	0.21	6.60	56.00				27.3	15.76	1.13	2.8	0.96		122
105	29.73415	-82.27695	07/22/07	UF for SJRWMD	Hatchet Creek	0.010	0.279	0.7455	0.47	0.027	0.01			7.2	89	0.24	6.55	55.00				28.4	14.74	1.26	2.7	1.40		176
105	29.73415	-82.27695	07/26/07	UF for SJRWMD	Hatchet Creek	0.011	0.271	0.7082	0.44	0.022	0.008			7.2	91	0.23	6.63	58.00				27.6	15.53	1.18	2.3	1.37		176
105	29.73415	-82.27695	08/09/07	UF for SJRWMD	Hatchet Creek	0.019	0.209	0.7424	0.53	0.043	0.011			7.1	92	0.28	6.57	62.00				29.0	15.81	1.11	3.5	3.04		103
105	29.73415	-82.27695	09/04/07	UF for SJRWMD	Hatchet Creek	0.050	0.223	0.6323	0.41	0.026	0.005			7.1	88	0.48	6.52	45.00				26.6	15.86	1.09	7.1	3.34		121
105	29.73415	-82.27695	01/31/08	UF for SJRWMD	Hatchet Creek	0.013	0.035	1.9292	1.89	0.032	0.005			7.4	76	3.60	5.31	105.00				14.9			58.4	9.48		222
105	29.73415	-82.27695	2/27/2008	UF for SJRWMD	Hatchet Creek	0.009	0.027	2.0684	2.04	0.040	0.019			4.08	40.3	31.00	4.60	88.00				14.8	25.99	1.76	72.3	7.02		248
105	29.73415	-82.27695	2/28/2008	UF for SJRWMD	Hatchet Creek	0.021	0.018	1.6358	1.62	0.043	0.018			7.9	80	4.70	5.78	86.00				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	0.6286	0.44	0.025	0.011			6.3	75	0.44	7.00	51.00				24.3			3.6			180
105	29.73415	-82.27695	08/20/08	UF for SJRWMD	Hatchet Creek	0.080	0.000	0.0000		0.000	0			4.0	50	0.51	6.55	75.00				25.3	17.92	1.30		6.37		-39
105	29.73415	-82.27695	11/24/08	UF for SJRWMD	Hatchet Creek	0.014	0.510	0.5100		0.007	0.007			9.2	88	1.10	7.31	62.00				13.6	14.84	1.10		3.96		128
105	29.73415	-82.27695	01/09/09	UF for SJRWMD	Hatchet Creek	0.012	0.530	0.5300		0.011	0.01			8.6	78	0.40	8.10	66.00				11.6	15.62	1.04		4.63		104.8
105	29.73415	-82.27695	02/13/09	UF for SJRWMD	Hatchet Creek	0.049	1.560	1.5600		0.017	0.003			6.1	65	4.22	5.14	94.00				18.0	28.12	0.03		9.40		269
105	29.73415	-82.27695	03/12/09	UF for SJRWMD	Hatchet Creek	0.050	1.330	1.3300		0.013	0.01			6.1	65	0.79	7.06	74.00				18.1	250.44	0.19		7.52		99
105	29.73415	-82.27695	04/27/09	UF for SJRWMD	Hatchet Creek	0.071	1.310	1.3100		0.022	0.011			6.4	72	1.24	5.48	65.00				23.5	16.04	4.01		7.32		246
105	29.73415	-82.27695	06/29/09	UF for SJRWMD	Hatchet Creek	0.028	0.640	0.6400		0.021	0.012			5.8	73	0.56	7.10	52.00				27.6				2.89		50
105	29.73415	-82.27695	07/31/09	UF for SJRWMD	Hatchet Creek	0.082	0.850	0.8500		0.020	0.014			5.1	63	1.90	5.16	74.00				26.2				6.30		98
105	29.73415	-82.27695	08/19/09	UF for SJRWMD	Hatchet Creek	0.023	0.570	0.5700		0.021	0.012			3.5	46	0.71	5.06	64.00				27.8				4.01		117
105	29.73415	-82.27695	11/13/09	UF for SJRWMD	Hatchet Creek	0.013	0.700	0.7000		0.010	0.006			5.1	47	0.48	5.90	69.00				18.0				3.38		-13
105	29.73415	-82.27695	01/05/10	UF for SJRWMD	Hatchet Creek	0.020	1.010	1.0100		0.009	0.01			n.a.	n.a.	1.67	n.a.	n.a.				n.a.				7.20		n.a.
105	29.73415	-82.27695	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.830	1.8300		0.024	0.008			7.48	82.7	11.49	4.44	80.00				20						226
105	29.73415	-82.27695	04/30/10	UF for SJRWMD	Hatchet Creek	0.045	0.710	0.7100		0.013	0.01			7.5	82	0.71	6.60	65.00				20.2						100
106	29.66030	-82.25587	02/07/07	UF for SJRWMD	Newnans Lake Trib	0.022	0.765	1.9192	1.15	0.164	0.148							98.00					20.42	3.11	29.2	7.84		
106	29.66030	-82.25587	03/15/07	UF for SJRWMD	Newnans Lake Trib	0.023	0.884	2.0797	1.20	0.179	0.16														22.8	4.22		
106	29.66030	-82.25587	04/05/07	UF for SJRWMD	Newnans Lake Trib	0.106	0.866	2.1498	1.28	0.213	0.149			7.8	83	0.04	6.36	59.00				17.4	16.22	0.62	20.3	3.96		145
106	29.66030	-82.25587	03/12/08	UF for SJRWMD	Newnans Lake Trib	0.020	0.417	1.5548	1.14	0.236	0.22			3.4	67	0.90	5.02	67.00				18.0	15.35	1.29	31.1			232
107	29.67428	-82.30261	05/13/07	UF for SJRWMD	LH trib	1.730	0.706	3.8091	3.10	0.261	0.192												7.01	2.63	33.2	20.66		
107	29.67428	-82.30261	06/22/07	UF for SJRWMD	LH trib	0.233	0.012	0.8389	0.83	0.281	0.169			4.9	70	0.01	6.74	345.00				34.6	19.57	3.70	8.9	57.30		85
107	29.67428	-82.30261	01/28/08	UF for SJRWMD	LH trib	0.039	0.005	1.0159	1.01	0.049	0.025			9.1	93	0.27	7.26	242.00				16.2			4.9	29.43		7.4
108	29.72258	-82.21004	02/09/07	UF for SJRWMD	Hatchet Creek	0.011	0.009	0.2340	0.22	0.033	0.009							460.00					20.04	3.16	4.7	36.99		
109	29.69075	-82.25576	03/15/07	UF for SJRWMD	Little Hatchet Creek	0.217	0.086	0.7814	0.70	0.283	0.271														8.1	30.60		
109	29.69075	-82.25576	04/04/07	UF for SJRWMD	Little Hatchet Creek	0.256	0.133	0.8283	0.70	0.459	0.352			7.9	92	0.73	7.72	260.00				23.9	15.51	1.03	6.2	31.14		124.6
109	29.69075	-82.25576	04/16/07	UF for SJRWMD	Little Hatchet Creek	0.233	0.094	0.7393	0.65	0.352	0.292			95.0	95	1.04	8.96	193.00				17.0	21.36	6.49	6.7	36.01		70
109	29.69075	-82.25576	06/22/07	UF for SJRWMD	Little Hatchet Creek	0.097	0.099	0.8090	0.71	0.346	0.246			7.2	88	1.47	7.30	205.00				25.1	13.85	3.98	7.4	36.68		73
109	29.69075	-82.25576	07/12/07	UF for SJRWMD	Little Hatchet Creek	0.224	0.223	0.8980	0.68	0.521	0.452			7.7		0.70	7.56	266.00				25.9	19.81	4.43	4.5	42.99		
109	29.69075	-82.25576	09/27/07	UF for SJRWMD	Little Hatchet Creek	0.101	0.128	0.7585	0.63	0.236	0.192			8.6	105	1.90	7.66	226.00				25.6			12.7	41.54		84
109	29.69075	-82.25576	01/28/08	UF for SJRWMD	Little Hatchet Creek	0.018	0.014	1.3952	1.38	0.065	0.132			12.7	124	5.02	7.67	236.00	1.37			14.0			62.5	40.80		-4
109	29.69075	-82.25576	02/06/08	UF for SJRWMD	Little Hatchet Creek	0.133	0.052	0.7658	0.71	0.249	0.229			8.1	92	1.60	7.62	229.00				21.5			11.7	39.05		140
109	29.69075	-82.25576	02/08/08	UF for SJRWMD	Little Hatchet Creek	0.092	0.051	0.7368	0.69	0.207	0.177			9.4	96	3.42	6.75	200.00				16.0			12.1	38.91		230
109	29.69075	-82.25576	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.119	0.048	0.8417	0.79	0.161	0.074			8.1	88	5.30	7.68	209.00				19.7			13.8			83
109	29.69075	-82.25576	05/16/08	UF for SJRWMD	Little Hatchet Creek	0.241	0.163	0.8376	0.68	0.529	0.53			8.1	97	0.41	7.96	251.00				24.3			5.0			133
109	29.69075	-82.25576	08/20/08	UF for SJRWMD	Little Hatchet Creek	0.000	0.000	0.0000		0.000	0.311			7.3	88	1.57	7.78	239.00				25.0	18.38	3.46		42.34		48
109	29.69075	-82.25576	11/24/08	UF for SJRWMD	Little Hatchet Creek	0.320	1.130	1.1300		0.370	0.383			9.0	87	0.74	7.64	191.00				13.6	26.95	8.06		33.97		28
109	29.69075	-82.25576	01/09/09	UF for SJRWMD	Little Hatchet Creek	0.340	1.050	1.0500		0.359	0.303			4.3	41	0.88	8.03	294.00				13.0	25.44	5.94		43.88		87.5
109	29.69075	-82.25576	02/13/09	UF for SJRWMD	Little Hatchet Creek	0.183	0.870	0.8700		0.209	0.236			9.6	99	2.10	7.60	260.00				17.0	26.87	0.11		29.06		120
109	29.69075	-82.25576	03/12/09	UF for SJRWMD	Little Hatchet Creek	0.174	0.590	0.5900		0.272	0.266			10.0	113	1.30	7.62	249.00				21.7	106.47	0.06		36.70		136
109	29.69075	-82.25576	04/27/09	UF for SJRWMD	Little Hatchet Creek	0.142	0.630	0.6300		0.291	0.254			8.4	96	1.06	7.60	252.00				21.7	18.77	0.34		38.93		37
109	29.69075	-82.25576	06/29/09	UF for SJRWMD	Little Hatchet Creek	0.114	0.500	0.5000		0.262	0.262			6.8	88	1.79	7.54	255.00				28.4				39.62		112
109	29.69075	-82.25576	07/31/09	UF for SJRWMD	Little Hatchet Creek	0.075	0.840	0.8400		0.176	0.149			6.7	84	6.79	7.06	249.00				26.9				39.66		101
109	29.69075	-82.25576	08/19/09	UF for SJRWMD	Little Hatchet Creek	0.105	0.850	0.8500		0.213	0.158			7.0	88	4.13	6.81	255.00				27.2				36.35		87
109	29.69075	-82.25576	11/13/09	UF for SJRWMD	Little Hatchet Creek	0.305	0.920	0.9200		0.343	0.226			8.1	83	0.76	6.63	85.00				16.5				34.02		82

						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	Concen-tration	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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)
109	29.69075	-82.25576	01/05/10	UF for SJRWMD	Little Hatchet Creek	0.191	1.120	1.1200		0.179	0.121			n.a.	n.a.	2.97	n.a.	n.a.				n.a.				32.06		n.a.
109	29.69075	-82.25576	04/30/10	UF for SJRWMD	Little Hatchet Creek	0.423	0.770	0.7700		0.319	0.263			8.3	91	1.48	7.20	257.00				19.6						-2
109	29.69075	-82.25576	05/12/10	UF for SJRWMD	Little Hatchet Creek	0.170	1.220	1.2200		0.302	0.212			7.9	92	2.42	7.60	232.00				23.1						83
G-1	29.693819	-82.239885	Apr-16	UF for SJRWMD	Little Hatchet Creek	0.034	0.39		0.50	0.273	0.221	0.242		8.31	87	0.57	7.68	227.00		5.75		17.6					0.24	
G-2	29.700187	-82.231258	Apr-16	UF for SJRWMD	Gum Root Swamp																							
G-3	29.702971	-82.229772	May-16	UF for SJRWMD	Gum Root Swamp	0.718	0.016		2.20	0.570	0.492	0.529															0.63	
G-4	29.70119	-82.220379	May-16	UF for SJRWMD	Gum Root Swamp	0.272	0.017		2.10	0.331	0.268	0.32															0.5	
G-5	29.689989	-82.233884	Apr-16	UF for SJRWMD	Gum Root Swamp	0.185	0.032		0.83	0.246	0.191	0.222		1.9	20.2		6.87	198.00		1.86		18.4					0.19	
G-6	29.694191	-82.22586	Apr-16	UF for SJRWMD	Gum Root Swamp	0.122	0.026		0.86	0.215	0.175	0.197		1.85	20.3		7.02	171.00		11.20		20.8					0.19	
GMRIN1	29.704646	-82.22205	Apr-16	UF for SJRWMD	Tributary to Swamp									1.18	12.1	0.00	6.06	104.00		1.86		17						
GMRIN1-DS	29.703867	-82.22178	Apr-16	UF for SJRWMD	Tributary to Swamp																							
GMRIN2	29.707688	-82.230392	Apr-16	UF for SJRWMD	Tributary to Swamp									5.67	61.8	0.00	7.05	137.00		4.39		19.3						
GMRIN4	29.698437	-82.243465	Apr-16	UF for SJRWMD	Tributary to Swamp									8.17	90.8	0.00	6.67	52.00		14.60		20.5						
GMRIN5	29.690835	-82.244067	Apr-16	UF for SJRWMD	Tributary to Swamp/LHC									7.65	85.5		7.58	226.00		5.38		20.7						
GMROUT1	29.688721	-82.238555	Apr-16	UF for SJRWMD	Gum Root Swamp																							
GMROUT2	29.688434	-82.230146	Apr-16	UF for SJRWMD	Gum Root Swamp																							
GMROUT3	29.691389	-82.221959	Apr-16	UF for SJRWMD	Gum Root Swamp									3.48	36	1.32	6.60	146.00		1.58		17.3						
GMROUT4	29.688753	-82.221094	Apr-16	UF for SJRWMD	Gum Root Swamp									6.74	68.2	0.81	6.86	143.00		2.02		16						
GMROUT5	29.679722	-82.234954	Apr-16	UF for SJRWMD	Downstream of Swamp																							
GR 3	29.68350	-82.23484	9/15/2016	UF for SJRWMD	Downstream of Swamp	0.054	0.032		1.90	0.414	0.265	0.369		1.1		0.00	6.42	101.00	0.5		29.4	24.43					0.12	
GR 4	29.68097	-82.22707	9/15/2016	UF for SJRWMD	Downstream of Swamp	0.032	0.018		3.30	0.272	0.100	0.204		0.86	10.3	0.00	5.46	136.00	0.75		26.7	23.79					0.17	
GR 5	26.67936	-82.22181	9/15/2016	UF for SJRWMD	Downstream of Swamp	0.048	<0.016		1.70	0.102	0.033	0.064		0.84		0.03 fps	5.23	109.00	1.5		26.7	24.02					0.09	
GR 6	26.67880	-82.23227	9/15/2016	UF for SJRWMD	Downstream of Swamp	0.021	<0.016		1.90	0.256	0.163	0.22		0.28		0.00	5.16	95.00	0.2		29.4	24.4					0.12	
HATCONA	29.69342	-82.20050	11/9/2005	UF for SJRWMD	Hatchet Creek									6.35			6.49	95.00		2.06	24.5	18.24						
HATCONA	29.69342	-82.20050	2/1/2006	UF for SJRWMD	Hatchet Creek									8.52			6.22	83.00		1.72	18.8	13.19						
HATCONA	29.69342	-82.20050	4/4/2006	UF for SJRWMD	Hatchet Creek									5.46			6.42	89.00		1.61		20.32						
HATCONA	29.69342	-82.20050	6/27/2006	UF for SJRWMD	Hatchet Creek									2.1			6.42	115.00		3.68		24.14						
HATCONA	29.69342	-82.20050	10/17/2007	UF for SJRWMD	Hatchet Creek											7.80				1.68	24							
HATCONA	29.69342	-82.20050	8/7/2008	UF for SJRWMD	Hatchet Creek								1															
HATCONA	29.69342	-82.20050	10/20/2008	UF for SJRWMD	Hatchet Creek								1050															
HATCONA	29.69342	-82.20050	2/10/2009	UF for SJRWMD	Hatchet Creek								340															
HATCONA	29.69342	-82.20050	6/22/2009	UF for SJRWMD	Hatchet Creek								20															
HATCONA	29.69342	-82.20050	9/2/2009	UF for SJRWMD	Hatchet Creek								696															
HATCONA	29.69342	-82.20050	12/22/2009	UF for SJRWMD	Hatchet Creek								176															
HATCONA	29.69342	-82.20050	4/12/2010	UF for SJRWMD	Hatchet Creek	0.030	0.028	1.3100	1.28	0.119			48						2.26	2.83	25.56							
HATCONA	29.69342	-82.20050	6/1/2010	UF for SJRWMD	Hatchet Creek								102			6.60			2.38	2.27								
HATCONA	29.69342	-82.20050	8/12/2010	UF for SJRWMD	Hatchet Creek								260						2.86	2.67	28.9							
HATCONA	29.69342	-82.20050	11/3/2010	UF for SJRWMD	Hatchet Creek														1.07	2.71	19.4							
HATCONA	29.69342	-82.20050	2/17/2011	UF for SJRWMD	Hatchet Creek								72	9.04	88.6		6.60	146.00	1.16	2.07	20	14.35						
HATCONA	29.69342	-82.20050	6/6/2011	UF for SJRWMD	Hatchet Creek											0.00												
HATCONA	29.69342	-82.20050	8/17/2011	UF for SJRWMD	Hatchet Creek																							
HATCONA	29.69342	-82.20050	11/8/2011	UF for SJRWMD	Hatchet Creek														0.6									
HATCONA	29.69342	-82.20050	7/19/2012	UF for SJRWMD	Hatchet Creek								168						2.7	2.56	29.4							
HC-TA-01	29.72573	-82.22726	1/30/2008	UF for SJRWMD	Hatchet Creek	0.004	0.013	1.3086	1.30	0.113	0.093			9.9	95	10.70	6.30	89.00				14.1			43.68	8.18		243
HC-TA-01	29.72573	-82.22726	2/28/2008	UF for SJRWMD	Hatchet Creek	0.041	0.021	1.7525	1.73	0.089	0.061												21.91	1.09	61.37	5.32		
HC-TA-01	29.72573	-82.22726	7/20/2007	UF for SJRWMD	Hatchet Creek	0.025	0.056	0.6714	0.62	0.343	0.301			5.8	71	0.40	6.55	76.00				26.1	15.84	1.31	7.333	7.11		166
HC-TA-02	29.72626	-82.23217	1/30/2008	UF for SJRWMD	Hatchet Creek	0.013	0.014	1.3098	1.30	0.100	0.083			8.8	85	10.00	5.90	87.00				13.6			45.5	7.93		218
HC-TA-02	29.72626	-82.23217	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.700	1.7000		0.094	0.049			8.11	84.4	24.38	4.52	74.00				17.24						256
HC-TA-02	29.72626	-82.23217	7/20/2007	UF for SJRWMD	Hatchet Creek	0.029	0.056	0.6119	0.56	0.346	0.299			3.4	42	0.49	6.31	76.00				25.9	16.18	1.25	6.916	6.45		110
HC-TA-03	29.72675	-82.23539	1/30/2008	UF for SJRWMD	Hatchet Creek	0.012	0.014	1.3102	1.30	0.101	0.082			9.1	88	9.60	5.62	87.00				13.7			45.43	7.82		230
HC-TA-03	29.72675	-82.23539	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.450	1.4500		0.084	0.049				83.6	23.23	4.77	75.00				17.21						244
HC-TA-03	29.72675	-82.23539	7/20/2007	UF for SJRWMD	Hatchet Creek	0.026	0.060	0.5269	0.47	0.324	0.281			4.3	53	0.33	6.23	73.00				25.72	15.37	1.27	6.036	6.41		163
HC-TA-04	29.72679	-82.23804	1/30/2008	UF for SJRWMD	Hatchet Creek	0.010	0.015	1.3107	1.30	0.100	0.078			9.3	92	9.10	5.88	88.00				14			46.6	8.92		237
HC-TA-04	29.72679	-82.23804	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.490	1.4900		0.077	0.051			8.36	87.3	22.25	4.44	74.00				17.21						241
HC-TA-04	29.72679	-82.23804	7/20/2007	UF for SJRWMD	Hatchet Creek	0.014	0.074	0.5113	0.44	0.321	0.276			4.94	68	0.37	6.32	76.00				25.89	17.17	1.44	5.952	6.56		155
HC-TA-05	29.72721	-82.24182	1/30/2008	UF for SJRWMD	Hatchet Creek	0.029	0.015	1.3393	1.32	0.093	0.075			9.2	89	12.20	5.70	88.00				13.9			47.05	8.11		228
HC-TA-05	29.72721	-82.24182	2/27/2008	UF for SJRWMD	Hatchet Creek	0.016	0.018	1.8340	1.82	0.212	0.183			6.2	63	79.60	4.62	73.00				16	22.21	1.24	56.75	5.98		280
HC-TA-05	29.72721	-82.24182	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.5300		0.078	0.049			8.53	90	21.12	5.00	78.00				17.1						247
HC-TA-05	29.72721	-82.24182	7/20/2007	UF for SJRWMD	Hatchet Creek	0.020	0.076	0.5724	0.50	0.291	0.246			5.44	68	0.29	6.56	86.00				26.7	17.11	1.42	5.999	6.65		163
HC-TA-06	29.72837	-82.24589	1/30/2008	UF for SJRWMD	Hatchet Creek	0.017	0.016	1.3113	1.30	0.092	0.075			9.5	92	9.30	5.51	87.00				14			47.7	7.97		237
HC-TA-06	29.72837	-82.24589	3/28/2010	UF for SJRWMD	Hatchet Creek	0.000	1.590	1.5900		0.093	0.061			8.68	90.3	10.00	5.31	77.00				17						215
HC-TA-06	29.72837	-82.24589	7/20/2007	UF for SJRWMD	Hatchet Creek	0.042	0.079	0.5161	0.44	0.282	0.243			5.1	64	0.32	6.65	93.00				26.96	17.86		5.431	8.58		141
HC-TB-01	29.73505	-82.27324	1/31/2008	UF for SJRWMD	Hatchet Creek	0.007	0.034	1.6152	1.58	0.020	0.005			8.5	88	3.90	5.47	102.00				14.9			54.11	9.76		225
HC-TB-01	29.73505	-82.27324	2/28/2008	UF for SJRWMD	Hatchet Creek	0.001	0.019	2.2584	2.24	0.035	0.009			6	58	20.80	4.40	83.00				12.7	26.51	1.41	75.36	7.94		281
HC-TB-01	29.73505	-82.27324	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.650	1.6500		0.016	0.008			7.51	82.3	10.98	4.60	80.00				19.18						220
HC-TB-01	29.73505	-82.27324	7/26/2007	UF for SJRWMD	Hatchet Creek	0.010	0.204	0.6708	0.47	0.028	0.011			7.1	83	0.35	6.95	55.00				23.5	14.77	1.14	2.607	2.19		199
HC-TB-02	29.73443	-82.26893	1/31/2008	UF for SJRWMD	Hatchet Creek	0.024	0.029	1.5239	1.50	0.035	0.021			8.4	82.4	4.00	5.61	107.00				14.6			52.54	9.28		198
HC-TB-02	29.73443	-82.26893	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.750	1.7500		0.025	0.012			7.76	83.2	11.99	4.90	80.00				18.63						229
HC-TB-02	29.73443	-82.26893	7/26/2007	UF for SJRWMD	Hatchet Creek	0.016	0.169	0.6062	0.44	0.035	0.019			7.3	86	0.28	6.41	50.00				23.2	15.28	1.10	3.023	2.36		182
HC-TB-03	29.73323	-82.26500	1/31/2008	UF for SJRWMD	Hatchet Creek	0.011	0.026	1.5493	1.52	0.040	0.024			8.7	86	3.60	5.59	100.00				14.8			48.78	9.63		202
HC-TB-03	29.73323	-82.26500	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.720	1.7200		0.028	0.010			8.04	85	10.99	4.94	80.00				18.02						226
HC-TB-03	29.73323	-82.26500	7/26/2007	UF for SJRWMD	Hatchet Creek	0.015	0.109	0.5460	0.44	0.051	0.034			7.41	87	0.31	6.54	56.00				23.3	15.02	1.05	3.908	2.79		207
HC-TB-04	29.73237	-82.26230	1/31/2008	UF for SJRWMD	Hatchet Creek	0.019	0.024	1.5192	1.50	0.044	0.027			8.6	85	4.50	5.69	101.00				14.8			49.35	9.53		201
HC-TB-04	29.73237	-82.26230	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.850	1.8500		0.033	0.009			8.67	93.3	11.54	4.85	79.00				18.54						216
HC-TB-04	29.73237	-82.26230	7/26/2007	UF for SJRWMD	Hatchet Creek	0.026	0.078	0.5152	0.44	0.068	0.047			6.9	81	0.42	6.23	59.00				23.4	15.42	1.12	4.82	6.77		204
HC-TB-05	29.73227	-82.25757	1/31/2008	UF for SJRWMD	Hatchet Creek	0.015	0.023	1.4331	1.41	0.050	0.037			8.6	86	5.60	5.71	99.00				15.2			46.31	9.42		212
HC-TB-05	29.73227	-82.25757	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.570	1.5700		0.035	0.017			8.58	91.1	12.21	4.89	79.00				18.13						205
HC-TB-05	29.73227	-82.25757	7/26/2007	UF for SJRWMD	Hatchet Creek	0.028	0.040	0.3881	0.35	0.160	0.122			5.81	68	0.41	6.06	69.00				23.4	17.39	1.02	4.262	6.65		167

						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	Concen-tration	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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-06	29.73195	-82.25553	1/31/2008	UF for SJRWMD	Hatchet Creek	0.005	0.021	1.3448	1.32	0.056	0.037			8.6	87	5.30	5.81	101.00				15.7			46.16	9.16		211
HC-TB-06	29.73195	-82.25553	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.5300		0.038	0.016			8.61	88	9.40	4.86	46.00				16.31						191
HC-TB-06	29.73195	-82.25553	7/26/2007	UF for SJRWMD	Hatchet Creek	0.021	0.036	0.4732	0.44	0.159	0.129			6.32	75	0.50	6.18	72.00				23.9	18.66	1.19	4.132	6.09		174
HC-TB-07	29.73202	-82.25283	1/31/2008	UF for SJRWMD	Hatchet Creek	0.012	0.019	1.3149	1.30	0.070	0.052			8.6	86	5.70	5.57	101.00				15.4			44.13	9.17		209
HC-TB-07	29.73202	-82.25283	2/28/2008	UF for SJRWMD	Hatchet Creek	0.012	0.018	2.1165	2.10	0.123	0.085			7.8	75	23.30	4.62	83.00				12.7	28.67	1.53	71.77	7.78		280
HC-TB-07	29.73202	-82.25283	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.510	1.5100		0.058	0.031			8.7	88.8	15.56	5.05	82.00				16.28						190
HC-TB-07	29.73202	-82.25283	7/26/2007	UF for SJRWMD	Hatchet Creek	0.014	0.035	0.5012	0.47	0.179	0.135			7.5	90	0.40	6.38	72.00				24.3	19.20	1.36	3.929	4.46		130
HC-TB-08	29.73155	-82.25044	7/26/2007	UF for SJRWMD	Hatchet Creek	0.015	0.037	0.4737	0.44	0.188	0.154			7.19	83	0.47	6.47	72.00				24.58	19.26	1.36	3.942	5.28		145
HC-TB-08	29.73155	-82.25044	1/31/2008	UF for SJRWMD	Hatchet Creek	-0.001	0.020	1.3155	1.30	0.072	0.052			8.6	87	5.30	6.65	99.00				15.6			43.54	9.12		195
HC-TB-08	29.73155	-82.25044	2/28/2008	UF for SJRWMD	Hatchet Creek	-0.010	0.019	2.0608	2.04	0.122	0.096			8.1	79	20.80	4.60	83.00				12.8	28.36	1.52	70.74	7.90		286
HC-TB-08	29.73155	-82.25044	3/27/2010	UF for SJRWMD	Hatchet Creek	0.000	1.530	1.5300		0.064	0.037			8.84	89.4	9.92	5.14	82.00				15.97						201
HC-TB-Trib2	29.73195	-82.25404	1/31/2008	UF for SJRWMD	Hatchet Creek	0.009	0.007	0.9323	0.93	0.163	0.158			8.7	88	0.52	4.15	160.00				15.5			30.01	8.84		296
HC-TB-Trib2	29.73195	-82.25404	2/28/2008	UF for SJRWMD	Hatchet Creek	-0.008	0.013	1.5743	1.56	0.339	0.330			7.7	75	0.87	4.05	147.00				13.8	62.58	2.77	44.11	6.19		319
Iron Seep near Site 110	29.69075	-82.25696	2/8/2008	UF for SJRWMD	Little Hatchet Creek	12.687	0.006	19.0518	19.05	3.039	0.012														15.39	68.60		
APDR1	29.68423	-82.27274	7/26/2016	ACEPD Station	LH trib	0.060	0.014	0.5700	0.56	0.006													9.50	4.50	12	7.00		
APDR2	29.68413	-82.27091	7/27/2016	ACEPD Station	LH trib	0.060	0.012	0.4800	0.46	0.050													1.90	2.10	7.4	20.00		
LHATHDS	29.69053	-82.25585	4/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
LHATNBWMD	29.69070	-82.25570	10/30/1984	ACEPD Station	Little Hatchet Creek	0.100	0.130	1.5300	1.40					5.6	64.3752		6.30	215.00		5.41		23.5	12.50	10.10				
LHATNBWMD	29.69070	-82.25570	8/5/1985	ACEPD Station	Little Hatchet Creek	0.840	0.090	1.2300	1.14		0.030		470	6	73.1822		6.00	142.00		6.60		26	16.00	10.30				
LHATNBWMD	29.69070	-82.25570	9/14/1986	ACEPD Station	Little Hatchet Creek	0.030	0.020	0.5100	0.49		0.200		240	5.2	66.6742		6.30	191.00		4.60		29	11.00	7.50				
LHATNBWMD	29.69070	-82.25570	4/29/1987	ACEPD Station	Little Hatchet Creek	0.020	0.040	0.2500	0.21				2600	7.8	84.7938		7.00	222.60		5.80		20	13.50	10.00				
LHATNBWMD	29.69070	-82.25570	7/20/1987	ACEPD Station	Little Hatchet Creek		0.090	0.4500	0.36		0.430		380	8.2	89.1426		8.20	220.80		4.90		20	14.00	8.70				
LHATNBWMD	29.69070	-82.25570	3/24/1999	ACEPD Station	Little Hatchet Creek									2.57			6.32	170.00		1.70	28	16.93						
LHATNBWMD	29.69070	-82.25570	6/17/2008	ACEPD Station	Little Hatchet Creek								200															
LHATNBWMD	29.69070	-82.25570	8/7/2008	ACEPD Station	Little Hatchet Creek								600															
LHATNBWMD	29.69070	-82.25570	10/20/2008	ACEPD Station	Little Hatchet Creek								200															
LHATNBWMD	29.69070	-82.25570	2/10/2009	ACEPD Station	Little Hatchet Creek								510															
LHATNBWMD	29.69070	-82.25570	3/18/2009	ACEPD Station	Little Hatchet Creek								8200			0.04			1.2	3.77	16.5							
LHATNBWMD	29.69070	-82.25570	6/22/2009	ACEPD Station	Little Hatchet Creek								960															
LHATNBWMD	29.69070	-82.25570	9/2/2009	ACEPD Station	Little Hatchet Creek								1100															
LHATNBWMD	29.69070	-82.25570	9/17/2009	ACEPD Station	Little Hatchet Creek								568			10.00			1.24	4.92	26							
LHATNBWMD	29.69070	-82.25570	12/22/2009	ACEPD Station	Little Hatchet Creek								250															
LHATNBWMD	29.69070	-82.25570	4/12/2010	ACEPD Station	Little Hatchet Creek	0.182	0.145	0.8050	0.66	0.261			104						1.26	3.97	25.6							
LHATNBWMD	29.69070	-82.25570	6/1/2010	ACEPD Station	Little Hatchet Creek								154			2.50			1.35	4.70								
LHATNBWMD	29.69070	-82.25570	8/12/2010	ACEPD Station	Little Hatchet Creek								1200			3.77			1.74	22.00	29.4							
LHATNBWMD	29.69070	-82.25570	11/3/2010	ACEPD Station	Little Hatchet Creek														1.29	4.67	18.33							
LHATNBWMD	29.69070	-82.25570	2/17/2011	ACEPD Station	Little Hatchet Creek																							
LHATNBWMD	29.69070	-82.25570	2/17/2011	ACEPD Station	Little Hatchet Creek								350															
LHATNBWMD	29.69070	-82.25570	6/6/2011	ACEPD Station	Little Hatchet Creek									6.65	79.4		7.49	229.00	1.12	2.49	30	24.15						
LHATNBWMD	29.69070	-82.25570	8/17/2011	ACEPD Station	Little Hatchet Creek								160	6.8	82.4		7.61	201.00	1.16	2.94	30	25.2						
LHATNBWMD	29.69070	-82.25570	11/8/2011	ACEPD Station	Little Hatchet Creek								680	7.97	87	0.22	7.64	277.00	1.14	1.07	25.5	19.58						
LHATNBWMD	29.69070	-82.25570	7/19/2012	ACEPD Station	Little Hatchet Creek								608						1.34	6.64	29.4							
LHC - Downstream WWTP	29.69917	-82.28159	9/27/2007	UF for SJRWMD	Little Hatchet Creek	0.040	0.020	0.9846	0.96	0.058	0.009					0.55									17.26	39.35		
LHC - Downstream WWTP	29.69917	-82.28159	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.017	0.021	0.7185	0.70	0.020	0.005			9.21	96	1.56	7.57	208.00				16.6			15.93	35.70		119
LHC - Downstream WWTP	29.69917	-82.28159	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.034	0.024	0.9659	0.94	0.052	0.006			8	89	2.90	7.38	255.00				20.4			17.19			85
LHC - Downstream WWTP	29.69917	-82.28159	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.018	1.300	1.3000		0.019	0.006			8.25	92.9	0.55	8.06	225.00				21.17						-10
LHC - Upstream WWTP	29.69942	-82.28205	9/27/2007	UF for SJRWMD	Little Hatchet Creek	0.152	0.160	1.2756	1.12	0.090	0.060			7.6	93	0.01	7.11	264.00							29.82	37.70		40
LHC - Upstream WWTP	29.69942	-82.28205	9/27/2007	UF for SJRWMD	Little Hatchet Creek	0.039	0.015	0.9187	0.90	0.031	0.008			7.6	90	0.47	7.30	233.00				24.3			16.57	38.32		52
LHC - Upstream WWTP	29.69942	-82.28205	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.011	0.021	0.6894	0.67	0.016	0.004			8.8	91	0.96	7.27	210.00				16.6			15.85	35.95		64
LHC - Upstream WWTP	29.69942	-82.28205	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.029	0.022	0.8160	0.79	0.029	0.003			8.3	93	2.30	7.43	257.00				20.5			16.97			63
LHC - Upstream WWTP	29.69942	-82.28205	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.020	1.180	1.1800		0.017	0.010			8.28	93.2	0.49	7.36	223.00				21.2						-11
LHC - Upstream WWTP	29.69942	-82.28205	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.020	1.180	1.1800		0.017	0.010			8.28	93.2	0.49	7.36	223.00				21.2						-11
LHC-NE Ind park fork	29.69745	-82.28180	2/8/2008	UF for SJRWMD	Little Hatchet Creek	-0.009	0.006	0.5510	0.54	0.036	0.013			9.2	94	1.65	7.55	187.00				16.6			13.37	33.82		103
LHC-NE Ind park fork	29.69745	-82.28180	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.015	0.019	0.8123	0.79	0.077	0.027			8.5	95	2.30	7.48	170.00				20.7			15.39			104
LHC-NE Ind park fork	29.69745	-82.28180	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.049	0.960	0.9600		0.052	0.032			8.14	91.3	0.99	7.65	257.00				20.94						30
LHC-TA-01	29.69108	-82.25203	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.043	0.282	0.7783	0.50	0.500	0.439			7.35	92	0.56	7.79	276.00				27.1	20.01	4.41	4.664	44.67		140
LHC-TA-01	29.69108	-82.25203	2/6/2008	UF for SJRWMD	Little Hatchet Creek	0.104	0.070	0.8408	0.77	0.272	0.237			8.8	93	4.20	7.08	217.00				17.8			11.43	39.89		206
LHC-TA-01	29.69108	-82.25203	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.139	0.057	0.9398	0.88	0.203	0.190			7.9	85	4.00	7.50	197.00				18.7			10.2			227
LHC-TA-01	29.69108	-82.25203	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.168	1.270	1.2700		0.309	0.191			8.03	92.4	2.23	7.70	252.00				22.3						71
LHC-TA-02	29.68955	-82.24847	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.026	0.280	0.6874	0.41	0.505	0.437			7.2	89	0.41	7.75	272.00				26.4	19.64	4.20	4.99	40.66		116
LHC-TA-02	29.68955	-82.24847	2/7/2008	UF for SJRWMD	Little Hatchet Creek	0.069	0.083	0.7688	0.69	0.265	0.245			8.1	90	2.44	7.51	226.00				20.5			12.19	39.98		101
LHC-TA-02	29.68955	-82.24847	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.063	0.052	1.1719	1.12	0.250	0.059			7.8	84	3.70	7.71	197.00				18.7			13.64			202
LHC-TA-02	29.68955	-82.24847	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.110	1.180	1.1800		0.301	0.225			8.1	92.2	2.68	7.30	206.00				21.73						121
LHC-TA-03	29.69049	-82.24566	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.027	0.180	0.6167	0.44	0.329	0.274			7.22		0.64	7.78	258.00				26.4	14.75	2.97	6.845	40.28		115
LHC-TA-03	29.69049	-82.24566	2/6/2008	UF for SJRWMD	Little Hatchet Creek	0.036	0.068	0.7259	0.66	0.208	0.177			8.6	91	4.00	7.38	182.00				17.5			13.32	34.95		185
LHC-TA-03	29.69049	-82.24566	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.061	0.058	0.8520	0.79	0.176	0.170			7.7	83	6.10	7.59	176.00				18.8			16.63			32
LHC-TA-03	29.69049	-82.24566	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.073	1.080	1.0800		0.254	0.145			8.02	91	2.83	8.41	242.00				21.54						112
LHC-TA-04	29.69084	-82.24349	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.026	0.194	1.1372	0.94	0.543	0.287			6.8	85	0.51	7.62	257.00				26.4	15.29	3.02	6.348	41.12		12
LHC-TA-04	29.69084	-82.24349	2/6/2008	UF for SJRWMD	Little Hatchet Creek	0.034	0.069	0.6980	0.63	0.202	0.196			8.3	86	4.60	7.64	182.00				17.5			13.39	34.28		172
LHC-TA-04	29.69084	-82.24349	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.057	0.059	0.8232	0.76	0.181	0.168			7.6	82	6.50	7.64	177.00				18.9			14.47			100
LHC-TA-04	29.69084	-82.24349	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.037	1.040	1.0400		0.279	0.173			7.87	89	2.53	8.50	242.00				2.2						102
LHC-TA-05	29.69295	-82.24067	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.035	0.183	0.6493	0.47	0.326	0.288			6.3		0.60	7.61	260.00				26.5	15.10	2.92	6.794	41.59		153
LHC-TA-05	29.69295	-82.24067	2/6/2008	UF for SJRWMD	Little Hatchet Creek	0.019	0.068	0.7256	0.66	0.203	0.189			8.5	90	4.73	7.78	183.00				17.8			13.61	34.35		142
LHC-TA-05	29.69295	-82.24067	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.044	0.061	0.9435	0.88	0.178	0.173			7.6	82	5.40	7.62	177.00				18.9			14.7			118
LHC-TA-05	29.69295	-82.24067	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.047	1.150	1.1500		0.271	0.160			7.88	88.5	3.24	8.00	242.00				21.09						76
LHC-TA-06	29.69357	-82.24000	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.026	0.162	0.5695	0.41	0.305	0.274			6.9	86	0.58	7.72	258.00				26.5	14.50	2.74	7.296	44.41		138
LHC-TA-06	29.69357	-82.24000	2/6/2008	UF for SJRWMD	Little Hatchet Creek	0.015	0.068	0.8390	0.77	0.244	0.186			8.51	90	4.21	7.64	180.00				18			13.72	34.71		126
LHC-TA-06	29.69357	-82.24000	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.046	0.066	0.8299	0.76	0.188	0.184			7.6	82	3.70	7.60	177.00				19			15.18			109

						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	Concen-tration	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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)
LHC-TA-06	29.69357	-82.24000	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.034	1.110	1.1100		0.278	0.179			7.87	88.6	2.94	8.08	237.00				21.15						95
LHC-TA-07	29.69454	-82.23917	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.034	0.148	0.8229	0.68	0.357	0.268			6.52	81	0.27	7.27	263.00				26.6	14.45	2.78	7.615	41.86		40
LHC-TA-07	29.69454	-82.23917	2/7/2008	UF for SJRWMD	Little Hatchet Creek	0.007	0.059	0.7450	0.69	0.206	0.193			8.7	95	4.77	7.71	171.00				19.8			14.03	33.10		280
LHC-TA-07	29.69454	-82.23917	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.040	0.063	0.8864	0.82	0.188	0.176			7.7	83	4.70	7.66	176.00				19			14.63			106
LHC-TA-07	29.69454	-82.23917	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.033	1.370	1.3700		0.272	0.167			7.89	88.8	2.62	8.19	241.00				21.13						96.7
LHC-TA-Trib1	29.68932	-82.24834	7/12/2007	UF for SJRWMD	Little Hatchet Creek	0.013	0.022	0.6073	0.59	0.029	0.009			7	88	0.20	7.74	238.00				26.9	5.83	0.73	9.199	47.26		128
LHC-TA-Trib1	29.68932	-82.24834	2/6/2008	UF for SJRWMD	Little Hatchet Creek	-0.009	0.005	0.5776	0.57	0.024	0.014			8.5	93	1.40	7.25	118.00				19.6	12.73	1.18	16.48	23.63		108
LHC-TA-Trib1	29.68932	-82.24834	4/8/2008	UF for SJRWMD	Little Hatchet Creek	0.016	0.012	0.6574	0.65	0.035	0.018			7.5	82	1.60	7.69	102.00				19.1			8.41			174
LHC-TA-Trib1	29.68932	-82.24834	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.031	0.620	0.6200		0.014	0.012			7.75	89	0.65	8.04	163.00				22.21						55
LHC-TB-01	29.69042	-82.26066	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.008	0.034	0.5506	0.52	0.188	0.164			9.2	92	4.68	7.45	181.00				15.7	24.53	5.45	12.01	39.09		169
LHC-TB-01	29.69042	-82.26066	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.029	0.039	0.7437	0.70	0.164	0.135			8.1	91	8.50	7.43	212.00				21.2			13.69			146
LHC-TB-01	29.69042	-82.26066	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.042	1.040	1.0400		0.256	0.191			8.17	94.7	2.68	8.49	252.00				22.7						108
LHC-TB-02	29.69120	-82.26178	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.013	0.052	0.6527	0.60	0.175	0.147			9.2	92	4.63	7.28	198.00				15.8			12.18	38.19		66
LHC-TB-02	29.69120	-82.26178	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.033	0.039	0.7140	0.68	0.150	0.124			8.1	92	6.40	7.71	215.00				21.2			14.1			139
LHC-TB-02	29.69120	-82.26178	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.053	0.990	0.9900		0.245	0.195			8.11	94.9	2.41	7.10	253.00				23.16						39
LHC-TB-03	29.69227	-82.26375	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.015	0.054	0.6087	0.55	0.168	0.146			10.5	109	4.57	7.09	196.00				15.7			11.99	36.88		88
LHC-TB-03	29.69227	-82.26375	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.031	0.039	0.8029	0.76	0.189	0.125			8.2	92	5.70	7.65	208.00				21.3			14.47			156
LHC-TB-03	29.69227	-82.26375	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.053	1.060	1.0600		0.249	0.190			8.17	96.6	2.03	8.21	252.00				23.5						74
LHC-TB-04	29.69982	-82.26946	9/27/2007	UF for SJRWMD	Little Hatchet Creek	0.082	0.110	0.8009	0.69	0.210	0.173			8	97	2.40	7.59	223.00				24.9			11.04	39.97		117
LHC-TB-04	29.69982	-82.26946	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.000	0.032	0.5767	0.54	0.105	0.082			8.91	91	3.56	7.16	172.00				16.5			12.14	37.21		57
LHC-TB-04	29.69982	-82.26946	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.025	0.076	0.8993	0.82	0.120	0.090			8.2	91	7.10	7.53	197.00				20.7			15.02			89
LHC-TB-04	29.69982	-82.26946	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.098	2.180	2.1800		0.155	0.125			8.19	93.7	2.50	7.80	255.00				21.94						-16
LHC-TB-05	29.69913	-82.27185	9/27/2007	UF for SJRWMD	Little Hatchet Creek	0.029	0.149	0.6885	0.54	0.114	0.084			8.1	94	1.45	7.46	234.00				25.5			12.35	41.88		37
LHC-TB-05	29.69913	-82.27185	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.016	0.139	0.7501	0.61	0.101	0.080			8.9	91	3.97	7.36	200.00				16.5			12.11	35.97		92
LHC-TB-05	29.69913	-82.27185	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.029	0.071	0.9533	0.88	0.098	0.074			8	89	10.00	7.49	129.00				20.6			15.34			93
LHC-TB-05	29.69913	-82.27185	5/11/2010	UF for SJRWMD	Little Hatchet Creek	0.080	1.070	1.0700		0.104	0.068			8.11	92.9	2.50	8.10	253.00				22.06						30
LHC-TB-Trib1	29.69109	-82.26180	2/8/2008	UF for SJRWMD	Little Hatchet Creek	0.001	0.004	0.7179	0.71	1.875	1.000			6.5	72		6.99	87.00				16			15.52	19.87		35
LHC-TB-Trib1	29.69109	-82.26180	4/7/2008	UF for SJRWMD	Little Hatchet Creek	0.018	0.012	0.6868	0.68	1.671	1.750			2.7	30	0.10	6.94	91.00				20.2			29.46			151
LHC-TB-Trib1	29.69109	-82.26180	5/12/2010	UF for SJRWMD	Little Hatchet Creek	0.083	5.410	5.4100		0.000	1.292			6.11	75.4	0.01	7.45	81.00				23.45						60
SB1	29.69691	-82.26635	8/1/2015	DB Labs for ACEPD	Little Hatchet Creek																							
SB10	29.68893	-82.22114	8/1/2015	DB Labs for ACEPD	Gum Root Swamp																							
SB11	29.69064	-82.25640	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.213	0.164	0.186															0.30	
SB12	29.69058	-82.25865	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.225	0.180	0.199															0.35	
SB13	29.69079	-82.26125	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
SB14	29.69225	-82.26299	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.199	0.159	0.173															0.35	
SB15	29.69726	-82.26651	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.166	0.129	0.143															0.31	
SB16	29.69785	-82.26696	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
SB17	29.69852	-82.26737	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.217	0.116	0.128															0.33	
SB18	29.69942	-82.26795	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.134	0.104	0.119															0.31	
SB19	29.70010	-82.26870	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
SB20	29.69950	-82.27024	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.113	0.088	0.101															0.26	
SB21	29.69904	-82.27193	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
SB22	29.69864	-82.27343	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.062	0.041	0.051															0.75	
SB23	29.69827	-82.27621	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek																							
SB24	29.69798	-82.27794	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.043	0.025	0.033															0.26	
SB25	29.69869	-82.28045	1/1/2016	DB Labs for ACEPD	Little Hatchet Creek					0.041	0.022	0.03															0.25	
SB-26	29.69354	-82.22067	4/1/2016	DB Labs for ACEPD	Gum Root Swamp	0.117	0.037		2.00	0.377	0.317	0.376		1.09	12.2		6.28	127.00		2.38		19					0.43	
SB-27	29.69230	-82.22245	4/1/2016	DB Labs for ACEPD	Gum Root Swamp	0.108	0.044		1.20	0.232	0.188	0.213		2.48	27.8		6.92	153.00		2.38		20.5					0.18	
SB-28	29.69142	-82.23747	4/1/2016	DB Labs for ACEPD	Gum Root Swamp																							
SB-29	29.69084	-82.24407	4/16/2016	DB Labs for ACEPD	Little Hatchet Creek	0.055	0.370		0.51	0.280	0.227	0.245		8.34	86.6	1.14	7.60	228.00		4.44		17.2					0.25	
SB-30	29.68865	-82.24962	4/1/2016	DB Labs for ACEPD	Little Hatchet Creek	<0.020	0.031		0.35	0.020	0.011	0.016		7.89	83.3	0.11	7.12	172.00		1.64		17.9					0.13	
LFC329B	29.65167	-82.25111	3/9/1998	SJRWMD STORET	Newnans Lake Trib	0.012	0.061	0.9910	0.93	0.107				3.5			5.11	132.00		13.00	19	18.4	7.85	7.14	23.09	17.05		
LFC329B	29.65167	-82.25111	4/6/1998	SJRWMD STORET	Newnans Lake Trib	0.012	0.315	0.8550	0.54	0.127				8.27		4.87	7.20	192.00		3.41	30	18.37	14.59	11.56	14.64	21.88		
LFC329B	29.65167	-82.25111	5/12/1998	SJRWMD STORET	Newnans Lake Trib		0.259	0.5890	0.33	0.089				6.8		0.42	7.08	187.00		1.36	32.5	21.1	15.00	9.00	10.16	22.39		
LFC329B	29.65167	-82.25111	6/15/1998	SJRWMD STORET	Newnans Lake Trib	0.017	0.238	0.5980	0.36	0.091				5.51			7.32	170.00		4.97	37	25.79	10.62	6.15	7.33	21.13		
LFC329B	29.65167	-82.25111	6/15/1998	SJRWMD STORET	Newnans Lake Trib	0.017	0.238	0.6280	0.39	0.125				5.26			7.26	171.00		4.82	37	25.77	10.46	6.29	6.98	20.92		
LFC329B	29.65167	-82.25111	7/13/1998	SJRWMD STORET	Newnans Lake Trib	0.022	0.104	0.9740	0.87	0.155				5.62		4.27	6.70	157.00		10.50	25	24.82	8.58	17.92	14.43	22.78		
LFC329B	29.65167	-82.25111	8/10/1998	SJRWMD STORET	Newnans Lake Trib	0.015	0.123	0.8430	0.72	0.103				5.31		7.17	6.82	176.00		4.25	32	25.08	11.82	7.36	19.75	24.51		
LFC329B	29.65167	-82.25111	8/10/1998	SJRWMD STORET	Newnans Lake Trib	0.015	0.112	0.8620	0.75	0.116				5.33			6.86	177.00		4.34	32	25.11	11.68	7.04	21.62	24.93		
LFC329B	29.65167	-82.25111	9/15/1998	SJRWMD STORET	Newnans Lake Trib	0.012	0.195	1.0150	0.82	0.124				4.8		2.61	6.74	180.00		2.79	34	24.55	13.72	7.40	23.85	22.19		
LFC329B	29.65167	-82.25111	10/13/1998	SJRWMD STORET	Newnans Lake Trib	0.015	0.247	1.1370	0.89	0.139				5.39		3.11	6.88	199.00		7.40	29	23.79	15.36	9.40	21.32	24.08		
LFC329B	29.65167	-82.25111	11/17/1998	SJRWMD STORET	Newnans Lake Trib	0.009	0.189	0.6590	0.47	0.115				6.27		0.56	6.96	208.00		3.93	27	20.52	15.70	10.14	11.57	24.99		
LFC329B	29.65167	-82.25111	12/16/1998	SJRWMD STORET	Newnans Lake Trib	0.009	0.168	0.4380	0.27	0.091				8.35		0.99	6.88	180.00		1.40	11	12.53	12.12	9.58	10.55	21.45		
LFC329B	29.65167	-82.25111	12/16/1998	SJRWMD STORET	Newnans Lake Trib	0.012	0.171	0.6310	0.46	0.121				8.28			7.04	180.00		1.53	11	12.45	11.87	9.53	10.72	21.37		
LFC329B	29.65167	-82.25111	1/14/1999	SJRWMD STORET	Newnans Lake Trib		0.109	0.5690	0.46	0.083				6.53			6.77	187.00		1.00	27	15.52	11.53	10.07	13.78	23.00		
LFC329B	29.65167	-82.25111	2/16/1999	SJRWMD STORET	Newnans Lake Trib	0.005	0.137	0.7170	0.58	0.077				7.9			6.81	194.00		1.45	23	13.06	13.84	11.86	14.22	22.30		
LFC329B	29.65167	-82.25111	3/16/1999	SJRWMD STORET	Newnans Lake Trib	0.011	0.085	0.6150	0.53	0.074				9.26			6.95	165.00		1.57	24	14.48	11.30	8.30	14.93	20.62		
LFC329B	29.65167	-82.25111	3/25/1999	SJRWMD STORET	Newnans Lake Trib									7.74			7.01	183.00		-1.20	22	16.74						
LFC329B	29.65167	-82.25111	4/20/1999	SJRWMD STORET	Newnans Lake Trib	0.033	0.224	0.4640	0.24	0.099				7.7			6.87	166.00		1.41	32	15.07	9.30	10.10	8.16	20.76		
LFC329B	29.65167	-82.25111	5/18/1999	SJRWMD STORET	Newnans Lake Trib	0.043	0.222	0.7420	0.52	0.109				5.92			7.10	162.00		2.38	27.5	19.94	9.30	7.30	6.83	20.56		
LFC329B	29.65167	-82.25111	5/18/1999	SJRWMD STORET	Newnans Lake Trib	0.028	0.234	0.6640	0.43	0.113				5.85			7.10	162.00		1.57	27.5	19.92	9.10	8.10	6.79	20.62		
LFC329B	29.65167	-82.25111	6/14/1999	SJRWMD STORET	Newnans Lake Trib	0.022	0.100	0.6700	0.57	0.085				4.62			6.24	191.00		7.41	31	23.42	7.00	36.10	13.84	25.07		
LFC329B	29.65167	-82.25111	7/20/1999	SJRWMD STORET	Newnans Lake Trib	0.014	0.119	0.7690	0.65	0.101				5.07			6.56	189.00		2.11	31	24.94	11.60	8.50	17.65	27.16		
LFC329B	29.65167	-82.25111	8/17/1999	SJRWMD STORET	Newnans Lake Trib	0.017	0.144	0.6340	0.49	0.085				5.36			6.89	207.00		1.96	33	24.92	11.34	9.94	12.72	26.89		
LFC329B	29.65167	-82.25111	9/20/1999	SJRWMD STORET	Newnans Lake Trib	0.009	0.036	0.3880	0.35	0.094				5.57			6.96	163.00		2.85	31	24.29	8.09	7.70	11.75	21.02		
LFC329B	29.65167	-82.25111	9/20/1999	SJRWMD STORET	Newnans Lake Trib	0.009	0.030	0.3780	0.35	0.093				5.59			6.94	163.00		2.59	31	24.3	8.11	7.80	11.18	21.92		
LFC329B	29.65167	-82.25111	10/18/1999	SJRWMD STORET	Newnans Lake Trib		0.090	0.4000	0.31	0.090				6.2			6.62	194.00		1.61	27	21.05	11.90	6.43	8.1	24.15		
LFC329B	29.65167	-82.25111	11/16/1999	SJRWMD STORET	Newnans Lake Trib	0.005	0.075	0.3450	0.27	0.067				7.57			6.73	186.00		0.56	23.5	14.17	11.63	7.75	6.48	22.07		

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	Concen-tration	Saturation	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)
LFC329B	29.65167	-82.25111	12/14/1999	SJRWMD STORET	Newnans Lake Trib	0.020			0.37	0.147				5.57			6.92	221.00		1.41	20.5	17.93	16.48	18.94	13.48	23.18		
LFC329B	29.65167	-82.25111	12/14/1999	SJRWMD STORET	Newnans Lake Trib	0.029			0.34	0.141				5.55			6.92	221.00		0.97	20.5	17.93	16.43	18.79	11.75	23.20		
LFC329B	29.65167	-82.25111	1/18/2000	SJRWMD STORET	Newnans Lake Trib	0.008	0.062	0.3540	0.29	0.058				7.74			7.09	151.00		0.72	24	14.7	8.78	9.07	6.56	18.31		
LFC329B	29.65167	-82.25111	2/22/2000	SJRWMD STORET	Newnans Lake Trib	0.006	0.055	0.5200	0.47	0.069				8.78			7.06	173.00		0.85	23	13.52	11.45	10.40	13.07	20.48		
LFC329B	29.65167	-82.25111	3/21/2000	SJRWMD STORET	Newnans Lake Trib	0.024	0.107	0.5790	0.47	0.110				5.82			6.95	165.00		0.78	29	16.27	8.64	6.49	9.05	19.30		
LFC329B	29.65167	-82.25111	4/18/2000	SJRWMD STORET	Newnans Lake Trib	0.036	0.102	0.5490	0.45	0.102				4.73			6.91	174.00		1.69	20	18.4	8.20	10.93	9.31	22.06		
LFC329B	29.65167	-82.25111	4/18/2000	SJRWMD STORET	Newnans Lake Trib	0.036	0.099	0.4980	0.40	0.102				4.72			6.91	174.00		2.15	20	18.4	8.39	10.94	9.29	22.13		
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.72			5.51	941.00		4.72		24.15						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.083	0.054	0.6400	0.59	0.064				4.51			5.52	905.00		4.35		24.22	8.89	445.49	8.59			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									4.61			5.51	868.00		4.05		23.92						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.095	0.129	0.8240	0.70	0.083				5.11			5.54	809.00		5.46		23.73	6.95	389.00	10.22			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									4.96			5.56	796.00		5.47		23.7						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.065	0.133	0.7570	0.62	0.064				4.62			5.50	805.00		3.64		23.66	7.29	391.88	9.23			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.064	0.133	0.7540	0.62	0.092				4.71			5.51	805.00		3.50		23.66	7.33	390.07	9.48			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									4.32			5.51	799.00		2.76		23.65						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									4.2			5.51	795.00		2.44		23.64						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									4.07			5.52	793.00		2.36		23.63						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.034	0.107	0.6550	0.55	0.053				3.96			5.53	787.00		2.34		23.62	7.74	377.06	9.43			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.87			5.54	775.00		2.31		23.62						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.85			5.57	747.00		4.39		23.64						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.83			5.62	702.00		3.10		23.68						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.033	0.111	0.6800	0.57	0.061				3.83			5.65	647.00		3.87		23.81	6.90	310.05	9.22			
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.6			5.67	623.00		3.46		23.9						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.78			5.66	622.00		2.96		23.94						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib									3.77			5.66	631.00		2.75		23.95						
LFC329B	29.65167	-82.25111	6/20/2000	SJRWMD STORET	Newnans Lake Trib	0.018	0.127	0.6470	0.52	0.057				3.82			5.66	642.00		2.60		23.94	6.74	300.53	9.48			
LFC329B	29.65167	-82.25111	6/21/2000	SJRWMD STORET	Newnans Lake Trib									4.06			5.67	639.00		3.57		23.92						
LFC329B	29.65167	-82.25111	6/21/2000	SJRWMD STORET	Newnans Lake Trib	0.028	0.163	0.8070	0.64	0.102				4.29			5.67	641.00		3.42		23.85	6.69	297.01	9.73			
LFC329B	29.65167	-82.25111	6/21/2000	SJRWMD STORET	Newnans Lake Trib	0.015	0.770	1.7520	0.98	0.076				2.54			5.85	328.00		11.00		23.81	9.68	131.46	16.43			
LFC329B	29.65167	-82.25111	6/26/2000	SJRWMD STORET	Newnans Lake Trib	0.038	0.036	0.6220	0.59	0.047				3.29			6.16	275.00		3.03	36	24.2	8.34	84.31	15.01	37.12		
LFC329B	29.65167	-82.25111	7/25/2000	SJRWMD STORET	Newnans Lake Trib	0.033	0.031	0.8200	0.79	0.094							6.08	205.00		3.85	30	24.69	13.20	31.60	23.42	25.00		
LFC329B	29.65167	-82.25111	7/25/2000	SJRWMD STORET	Newnans Lake Trib	0.028	0.030	0.8050	0.78	0.100							6.17	205.00		3.92	30	24.74	13.10	33.90	21.04	24.90		
LFC329B	29.65167	-82.25111	8/22/2000	SJRWMD STORET	Newnans Lake Trib	0.059	0.017	0.5360	0.52	0.140				2.67			6.30	178.00		6.91	26.5	24.08	9.94	16.35	15.37	22.50		
LFC329B	29.65167	-82.25111	9/20/2000	SJRWMD STORET	Newnans Lake Trib	0.040	0.155	1.1920	1.04	0.074				3			6.43	189.00		2.14	31	23.58	14.50	17.96	36.63	23.80		
LFC329B	29.65167	-82.25111	2/6/2001	SJRWMD STORET	Newnans Lake Trib	0.005	0.009	0.3890	0.38	0.023				6.53			7.01	162.00		0.84	20	13.31	10.99	12.77	10.32	19.52		
LFC329B	29.65167	-82.25111	2/6/2001	SJRWMD STORET	Newnans Lake Trib				0.31	0.025				6.53			7.01	162.00		0.75	20	13.31	11.12	12.98	10.25	19.15		
LFC329B	29.65167	-82.25111	3/14/2001	SJRWMD STORET	Newnans Lake Trib								350															
LFC329B	29.65167	-82.25111	4/12/2001	SJRWMD STORET	Newnans Lake Trib								17															
LFC329B	29.65167	-82.25111	5/9/2001	SJRWMD STORET	Newnans Lake Trib								300															
LFC329B	29.65167	-82.25111	6/12/2001	SJRWMD STORET	Newnans Lake Trib								300															
LFC329B	29.65167	-82.25111	6/12/2001	SJRWMD STORET	Newnans Lake Trib								220															
LFC329B	29.65167	-82.25111	7/17/2001	SJRWMD STORET	Newnans Lake Trib								110															
LFC329B	29.65167	-82.25111	11/7/2001	SJRWMD STORET	Newnans Lake Trib								500															
LFC329B	29.65167	-82.25111	12/12/2001	SJRWMD STORET	Newnans Lake Trib								280															
LFC329B	29.65167	-82.25111	12/12/2001	SJRWMD STORET	Newnans Lake Trib								90															
LFC329B	29.65167	-82.25111	1/9/2002	SJRWMD STORET	Newnans Lake Trib								80															
LFC329B	29.65167	-82.25111	7/10/2002	SJRWMD STORET	Newnans Lake Trib								1600															
LFC329B	29.65167	-82.25111	8/14/2002	SJRWMD STORET	Newnans Lake Trib								300															
LFC329B	29.65167	-82.25111	10/15/2002	SJRWMD STORET	Newnans Lake Trib	0.017	0.085	0.7720	0.69	0.111			220	5.55			6.82	215.00		3.06	25	23.09	12.07	7.33	18.8	25.67		
LFC329B	29.65167	-82.25111	10/15/2002	SJRWMD STORET	Newnans Lake Trib	0.017	0.087	0.7800	0.69	0.114			540	5.49			6.91	215.00		2.34	25	23.08	15.11	9.24	18.4	26.27		
LFC329B	29.65167	-82.25111	11/6/2002	SJRWMD STORET	Newnans Lake Trib	0.016	0.118	0.8050	0.69	0.127			2200	5.49			6.99	180.00		4.17	21.5	21.92	16.80	8.61	13	21.66		
LFC329B	29.65167	-82.25111	12/11/2002	SJRWMD STORET	Newnans Lake Trib	0.011	0.016	0.6960	0.68	0.060			700	3.94			7.82	160.00		1.37	14	15.5	11.72	8.70	19.99	20.70		
LFC329B	29.65167	-82.25111	1/15/2003	SJRWMD STORET	Newnans Lake Trib	0.022	0.269	1.0480	0.78	0.050			130	9.87			7.83	202.00		2.15	14	11.1	15.85	15.40	17.83	24.19		
LFC329B	29.65167	-82.25111	2/12/2003	SJRWMD STORET	Newnans Lake Trib	0.016	0.205	1.0880	0.88	0.059			94	8.51			7.21	190.00		2.07	19.5	14.11	11.27	10.11	21.69	22.55		
LFC329B	29.65167	-82.25111	3/13/2003	SJRWMD STORET	Newnans Lake Trib	0.038	0.382	1.4670	1.09	0.091			350	6.38			6.88	198.00		2.97	23.5	19.61	14.63	14.84	28.9	10.93		
LFC329B	29.65167	-82.25111	4/17/2003	SJRWMD STORET	Newnans Lake Trib	0.019	0.285	0.9770	0.69	0.072			130	6.58			7.13	216.00		2.08	24.5	19.67	15.37	12.33	16.84	26.09		
LFC329B	29.65167	-82.25111	5/8/2003	SJRWMD STORET	Newnans Lake Trib	0.033	0.155	0.7310	0.58	0.116			130	6.13			7.03	217.00		2.71	27	23.13	16.72	7.70	14.15	25.97		
LFC329B	29.65167	-82.25111	6/2/2003	SJRWMD STORET	Newnans Lake Trib	0.023	0.144	0.5990	0.46	0.106			40	5.94			6.96	212.00		1.92	27	23.59	14.59	6.38	10.93	25.06		
LFC329B	29.65167	-82.25111	7/8/2003	SJRWMD STORET	Newnans Lake Trib	0.018	0.200	1.0080	0.81	0.123			220	6.05			7.05	209.00		2.91	32.08	25.59	15.52	8.96	20.52	25.92		
LFC329B	29.65167	-82.25111	8/11/2003	SJRWMD STORET	Newnans Lake Trib	0.021	0.160	1.1640	1.00	0.124				5.74			7.05	196.00		4.42	26	25.63	16.74	10.46	26.54	25.05		
LFC329B	29.65167	-82.25111	9/8/2003	SJRWMD STORET	Newnans Lake Trib	0.019	0.168	1.1360	0.97	0.129				6.1			6.92	184.00		2.34	28.5	23.6	14.59	8.20	26.44	22.37		
LFC329B	29.65167	-82.25111	10/6/2003	SJRWMD STORET	Newnans Lake Trib	0.027	0.132	1.2710	1.14	0.212				5.97			7.15	308.00			28	23.51	14.47	6.90	16.34	23.92		
LFC329B	29.65167	-82.25111	10/14/2003	SJRWMD STORET	Newnans Lake Trib								1600															
LFC329B	29.65167	-82.25111	11/3/2003	SJRWMD STORET	Newnans Lake Trib		0.094	0.6980	0.60	0.099				5.74			7.46	188.00			30	22.36	14.00	6.89	15.37	23.03		
LFC329B	29.65167	-82.25111	11/4/2003	SJRWMD STORET	Newnans Lake Trib								280															
LFC329B	29.65167	-82.25111	12/1/2003	SJRWMD STORET	Newnans Lake Trib		0.130	0.6970	0.57	0.063				13.02			7.84	171.00			17	11.22	12.42	7.40	13.3	20.52		
LFC329B	29.65167	-82.25111	1/5/2004	SJRWMD STORET	Newnans Lake Trib	0.015		0.5490	0.54	0.073				8.81			7.21	173.00			27.5	10.6	12.62	7.54	13.47	22.14		
LFC329B	29.65167	-82.25111	2/2/2004	SJRWMD STORET	Newnans Lake Trib		0.218	0.9510	0.73	0.084				8.43			7.41	135.00			15.5	13.52	9.29	10.98	17.92			
LFC329B	29.65167	-82.25111	3/1/2004	SJRWMD STORET	Newnans Lake Trib	0.015	0.247	1.0480	0.80	0.054				9.06			7.42	188.00			24.7	16.35	14.41	13.90	23.64	22.44		
LFC329B	29.65167	-82.25111	3/31/2004	SJRWMD STORET	Newnans Lake Trib									7.61		1.24	7.21	207.00		1.11	22	19.53	21.00	5.00				
LFC329B	29.65167	-82.25111	4/5/2004	SJRWMD STORET	Newnans Lake Trib	0.023	0.176	0.7510	0.57	0.061				8.25			7.38	194.00			24.3	15.63	15.30	11.75	13.67	22.37		
LFC329B	29.65167	-82.25111	5/3/2004	SJRWMD STORET	Newnans Lake Trib	0.022	0.153	0.7800	0.63	0.110				5.86			6.54	168.00			24.3	21.69	9.98	9.08	11.68	19.32		
LFC329B	29.65167	-82.25111	6/7/2004	SJRWMD STORET	Newnans Lake Trib	0.024	0.169	0.6670	0.50	0.098				6.53			6.95	205.00			30.5	22.87	10.13	21.42	10.29	24.75		
LFC329B	29.65167	-82.25111	6/16/2004	SJRWMD STORET	Newnans Lake Trib								260															
LFC329B	29.65167	-82.25111	7/6/2004	SJRWMD STORET	Newnans Lake Trib	0.024	0.141	0.6430	0.50	0.119				6.13			7.03	190.00			31.7	25.07	11.49	6.43	12.43	22.54		
LFC329B	29.65167	-82.25111	8/10/2004	SJRWMD STORET	Newnans Lake Trib	0.047	0.174	1.2310	1.06	0.262				6.39			7.39	162.00			27.7	29.4	9.95	4.91	13.34	21.61		
LFC329B	29.65167	-82.25111	9/16/2004	SJRWMD STORET	Newnans Lake Trib								580															
LFC329B	29.65167	-82.25111	9/30/2004	SJRWMD STORET	Newnans Lake Trib	0.038		1.5160	1.47	0.219				0.68			6.30	159.00			28.6	24.07	10.57	7.31	49.46	23.56		

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	Concen-tration	Saturation	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)
LFC329B	29.65167	-82.25111	10/13/2004	SJRWMD STORET	Newnans Lake Trib								100															
LFC329B	29.65167	-82.25111	10/19/2004	SJRWMD STORET	Newnans Lake Trib	0.076	0.187	1.1810	0.99	0.126				2.12			6.85	184.00			30	22.09	13.00	5.21	29.86	25.19		
LFC329B	29.65167	-82.25111	11/8/2004	SJRWMD STORET	Newnans Lake Trib	0.037	0.216	0.9610	0.75	0.095				5.65			6.98	187.00			24.5	18.78	14.22	8.68	20.26	23.23		
LFC329B	29.65167	-82.25111	12/6/2004	SJRWMD STORET	Newnans Lake Trib	0.025	0.153	0.7720	0.62	0.083				6.1			6.95	184.00			26.8	16.89	14.86	13.43	17.6	21.53		
LFC329B	29.65167	-82.25111	1/10/2005	SJRWMD STORET	Newnans Lake Trib	0.011	0.061	0.6850	0.62	0.089				5.96			7.94	183.00			22.9	18.64	14.32	9.16	17.51	21.70		
LFC329B	29.65167	-82.25111	2/7/2005	SJRWMD STORET	Newnans Lake Trib		0.024	0.5430	0.52	0.055				10.51			7.35	178.00			26.8	17.31	14.21	10.55	15.47	21.11		
LFC329B	29.65167	-82.25111	3/7/2005	SJRWMD STORET	Newnans Lake Trib		0.057	0.6890	0.63	0.060				10.17			7.56	184.00			24.7	18.64	14.67	11.75	16.34	23.82		
LFC329B	29.65167	-82.25111	4/4/2005	SJRWMD STORET	Newnans Lake Trib	0.024	0.091	1.0050	0.91	0.057				6.31			7.14	159.00			25.2	19.17	12.39	8.68	26.42	18.75		
LFC329B	29.65167	-82.25111	5/2/2005	SJRWMD STORET	Newnans Lake Trib	0.015	0.116	0.6430	0.53	0.080				6.79			7.32	188.00			25.4	21.28	14.64	9.11	14.86	23.35		
LFC329B	29.65167	-82.25111	5/11/2005	SJRWMD STORET	Newnans Lake Trib									6.53			7.14	187.00		3.14		21.24						
LFC329B	29.65167	-82.25111	6/13/2005	SJRWMD STORET	Newnans Lake Trib	0.027	0.119	0.8930	0.77	0.112				5.58			7.13	144.00			29.1	25.53	8.79	5.38	20.55	19.24		
LFC329B	29.65167	-82.25111	7/6/2005	SJRWMD STORET	Newnans Lake Trib	0.021	0.168	1.1300	0.96	0.134				5.58			7.32	167.00			31	26.11	11.47	7.65	27.02	22.29		
LFC329B	29.65167	-82.25111	8/1/2005	SJRWMD STORET	Newnans Lake Trib	0.014	0.200	0.8790	0.68	0.109				6.06			7.54	206.00			29.3	25.33	14.38	9.00	16.72	25.00		
LFC329B	29.65167	-82.25111	9/12/2005	SJRWMD STORET	Newnans Lake Trib	0.026	0.257	1.0410	0.78	0.104				6.48			7.38	185.00			29.8	24.99	13.25	8.14	20.7	25.79		
LFC329B	29.65167	-82.25111	10/3/2005	SJRWMD STORET	Newnans Lake Trib			0.6880	0.55	0.116				5.51			7.37	185.00			28.8	25.53	12.43	7.54	11	22.56		
LFC329B	29.65167	-82.25111	11/2/2005	SJRWMD STORET	Newnans Lake Trib			0.6940	0.52	0.089				7.84			7.48	188.00			24.4	19.9	14.50	10.90	12.67	22.76		
LFC329B	29.65167	-82.25111	12/5/2005	SJRWMD STORET	Newnans Lake Trib			0.5670	0.45	0.077				6.94			7.10	176.00			24.3	14.51	12.59	9.32	10.8	21.31		
LFC329B	29.65167	-82.25111	1/3/2006	SJRWMD STORET	Newnans Lake Trib			0.9810	0.83	0.119				6.46			6.62	93.00			21.8	19.08	6.73	7.65	17.6	12.12		
LFC329B	29.65167	-82.25111	2/6/2006	SJRWMD STORET	Newnans Lake Trib			1.2800	0.99	0.058				10.17			7.02	152.00			18.2	12.86	12.02	11.71	27.15	19.95		
LFC329B	29.65167	-82.25111	3/6/2006	SJRWMD STORET	Newnans Lake Trib			0.8620	0.65	0.059				9.53			7.37	182.00			23.7	16.41	13.74	11.61	16.88	22.08		
LFC329B	29.65167	-82.25111	3/22/2006	SJRWMD STORET	Newnans Lake Trib									6.94			7.24	207.00		1.54		18.93						
LFC329B	29.65167	-82.25111	4/4/2006	SJRWMD STORET	Newnans Lake Trib			0.7460	0.54	0.081				8.31			7.44	190.00			26	21.41	13.80	9.66	12.41	21.93		
LFC329B	29.65167	-82.25111	5/1/2006	SJRWMD STORET	Newnans Lake Trib			0.6820	0.47	0.090				8.67			7.19	201.00			25.7	18.01	16.80	6.82	11.17	22.05		
LFC329B	29.65167	-82.25111	6/5/2006	SJRWMD STORET	Newnans Lake Trib			0.7050	0.52	0.111				5.89			7.36	189.00			29.2	22.52	12.02	8.31	8.493	23.41		
LFC329B	29.65167	-82.25111	7/11/2006	SJRWMD STORET	Newnans Lake Trib			0.9700	0.80	0.112				7.54			7.08	206.00			29.8	24.25	13.27	14.94	18.59	24.74		
LFC329B	29.65167	-82.25111	8/8/2006	SJRWMD STORET	Newnans Lake Trib			0.8000	0.63	0.142				4.27			7.63	182.00			33.1	25.14	11.15	4.91	10.58	20.79		
LFC329B	29.65167	-82.25111	9/5/2006	SJRWMD STORET	Newnans Lake Trib			0.7190	0.55	0.138				6.29			7.82	186.00			28	23.73	11.74	5.41	11.67	21.59		
LFC329B	29.65167	-82.25111	10/3/2006	SJRWMD STORET	Newnans Lake Trib			0.7000	0.53	0.116				5.53			8.31	179.00			28.3	21.21	11.56	5.72	9.359	21.03		
LFC329B	29.65167	-82.25111	11/7/2006	SJRWMD STORET	Newnans Lake Trib			0.5530	0.49	0.100				7.14			6.92	184.00			20.1	19.1	11.99	12.64	12.79	21.73		
LFC329B	29.65167	-82.25111	12/5/2006	SJRWMD STORET	Newnans Lake Trib				0.37	0.111				6.31			7.16	176.00			19.5	11.76	11.75	5.80	10.73	19.96		
LFC329B	29.65167	-82.25111	1/3/2007	SJRWMD STORET	Newnans Lake Trib			0.6270	0.56	0.104				7.19			7.39	114.00			19.9	16.44	7.96	9.03	13.89	14.86		
LFC329B	29.65167	-82.25111	2/5/2007	SJRWMD STORET	Newnans Lake Trib			1.3300	1.01	0.057				8.33			6.83	113.00			15.8	13.55	13.77	18.74	26.68	23.17		
LFC329B	29.65167	-82.25111	3/5/2007	SJRWMD STORET	Newnans Lake Trib			0.8860	0.81	0.072				9.1			7.01	170.00			17.2	15.44	13.71	12.79	21.01	22.44		
LFC329B	29.65167	-82.25111	4/2/2007	SJRWMD STORET	Newnans Lake Trib			0.6210	0.50	0.110				7.07			7.10	198.00			27.4	20.17	19.06	10.08	12.73	22.10		
LFC329B	29.65167	-82.25111	5/1/2007	SJRWMD STORET	Newnans Lake Trib			0.6350	0.51	0.127				5.83			6.95	113.00			27.9	18.32	12.11	6.12	9.022	19.36		
LFC329B	29.65167	-82.25111	6/11/2007	SJRWMD STORET	Newnans Lake Trib			0.7200	0.63	0.129				4.48			6.67	205.00			33	23.88	11.17	26.38	11.41	25.41		
LFC329B	29.65167	-82.25111	7/5/2007	SJRWMD STORET	Newnans Lake Trib			0.6810	0.62	0.107				5.56			6.99	180.00			29.2	24.54	10.13	10.57	15.64	23.17		
LFC329B	29.65167	-82.25111	8/2/2007	SJRWMD STORET	Newnans Lake Trib			1.0250	0.91	0.120				6.23			7.18	119.00			28.3	24.73	10.55	10.47	21.67	22.46		
LFC329B	29.65167	-82.25111	9/10/2007	SJRWMD STORET	Newnans Lake Trib			0.8900	0.78	0.130				5.53			6.70	181.00			28.9	23.85	11.80	6.12	19.39	22.50		
LFC329B	29.65167	-82.25111	10/8/2007	SJRWMD STORET	Newnans Lake Trib			1.4520	1.27	0.098				5.76			7.01	173.00			28.7	24.47	12.90	13.20	38.02	24.20		
LFC329B	29.65167	-82.25111	10/16/2007	SJRWMD STORET	Newnans Lake Trib															3.12	28.9							
LFC329B	29.65167	-82.25111	11/6/2007	SJRWMD STORET	Newnans Lake Trib			0.7570	0.62	0.078				8.08			7.30	204.00			22.6	15.75	16.51	11.52	16.86	23.30		
LFC329B	29.65167	-82.25111	12/4/2007	SJRWMD STORET	Newnans Lake Trib				0.48	0.087				6.9			7.14	197.00			20.6	14.33	16.12	7.92	15.84	21.90		
LFC329B	29.65167	-82.25111	1/7/2008	SJRWMD STORET	Newnans Lake Trib			0.6640	0.63	0.073				7.28			7.12	194.00			26.1	15.05	16.20	11.33	17.93	21.10		
LFC329B	29.65167	-82.25111	2/12/2008	SJRWMD STORET	Newnans Lake Trib			0.7730	0.70	0.091				8.6			7.32	189.00			29.4	16.27	16.76	11.63	17.92	20.05		
LFC329B	29.65167	-82.25111	3/5/2008	SJRWMD STORET	Newnans Lake Trib			0.7680	0.71	0.098				7.54			7.80	171.00			17.5	17.36	13.71	10.42	18.66	19.91		
LFC329B	29.65167	-82.25111	4/3/2008	SJRWMD STORET	Newnans Lake Trib			0.9230	0.79	0.133				6.29			7.31	177.00			26.8	21.89	15.27	9.75	16.08	20.52		
LFC329B	29.65167	-82.25111	5/6/2008	SJRWMD STORET	Newnans Lake Trib			0.6610	0.48	0.101				6.72			7.16	178.00			31.1	20.42	15.44	3.79	10.58	18.92		
LFC329B	29.65167	-82.25111	6/9/2008	SJRWMD STORET	Newnans Lake Trib			0.8340	0.72	0.165				4.87			6.81	196.00			33.5	24.3	11.65	8.17	12.81	22.82		
LFC329B	29.65167	-82.25111	6/17/2008	SJRWMD STORET	Newnans Lake Trib								580															
LFC329B	29.65167	-82.25111	7/7/2008	SJRWMD STORET	Newnans Lake Trib			0.7010	0.55	0.118				5.68			7.13	192.00			30.6	22.82	13.14	8.98	11.42	22.43		
LFC329B	29.65167	-82.25111	8/4/2008	SJRWMD STORET	Newnans Lake Trib			0.7910	0.68	0.128				5.49			7.09	191.00			31.3	24.53	14.33	6.59	18.53	23.38		
LFC329B	29.65167	-82.25111	8/7/2008	SJRWMD STORET	Newnans Lake Trib								770															
LFC329B	29.65167	-82.25111	9/8/2008	SJRWMD STORET	Newnans Lake Trib			0.9300	0.80	0.107				5.15			7.12	197.00			32.2	24.84	14.90	8.16	18.74	25.81		
LFC329B	29.65167	-82.25111	10/7/2008	SJRWMD STORET	Newnans Lake Trib			0.6130	0.50	0.107				5.41			7.05	190.00			30.2	22.4	13.80	5.02	11.22	21.45		
LFC329B	29.65167	-82.25111	10/20/2008	SJRWMD STORET	Newnans Lake Trib								120															
LFC329B	29.65167	-82.25111	11/12/2008	SJRWMD STORET	Newnans Lake Trib			0.5030	0.38	0.088				7			7.11	176.00			28.5	17.13	11.70	7.23	9.115	19.21		
LFC329B	29.65167	-82.25111	12/10/2008	SJRWMD STORET	Newnans Lake Trib				0.41	0.101				4.87			6.85	186.00			27.8	15.95	14.80	8.07	12.89	21.07		
LFC329B	29.65167	-82.25111	1/6/2009	SJRWMD STORET	Newnans Lake Trib			0.4730	0.43	0.097				5.71			7.00	170.00			26.9	17.39	14.74	6.36	12.36	18.31		
LFC329B	29.65167	-82.25111	2/3/2009	SJRWMD STORET	Newnans Lake Trib			0.7500	0.62	0.061				7.76			6.96	149.00			12.8	12.23	14.30	8.95	15.76	16.37		
LFC329B	29.65167	-82.25111	2/10/2009	SJRWMD STORET	Newnans Lake Trib								48															
LFC329B	29.65167	-82.25111	3/3/2009	SJRWMD STORET	Newnans Lake Trib			0.5050	0.49	0.047				10.55			7.33	171.00			18.8	13.19	15.24	10.22	14.29	19.39		
LFC329B	29.65167	-82.25111	4/6/2009	SJRWMD STORET	Newnans Lake Trib			0.8900	0.75	0.101				6.37			7.07	183.00			27.9	21.44	14.54	9.60	19.44	21.99		
LFC329B	29.65167	-82.25111	6/22/2009	SJRWMD STORET	Newnans Lake Trib								56															
LFC329B	29.65167	-82.25111	9/2/2009	SJRWMD STORET	Newnans Lake Trib								4080															
LFC329B	29.65167	-82.25111	12/22/2009	SJRWMD STORET	Newnans Lake Trib								192															
LFC329B	29.65167	-82.25111	4/12/2010	SJRWMD STORET	Newnans Lake Trib														11.26	1.88								
LFC329B	29.65167	-82.25111	8/12/2010	SJRWMD STORET	Newnans Lake Trib								120						11.35	4.15	30.6							
LFC329B	29.65167	-82.25111	11/3/2010	SJRWMD STORET	Newnans Lake Trib														11.03	7.58	18.3							
LFC329B	29.65167	-82.25111	2/17/2011	SJRWMD STORET	Newnans Lake Trib								48	7.59	75.3		6.41		11.4	8.10	17.22	15.22						
LFC329B	29.65167	-82.25111	6/6/2011	SJRWMD STORET	Newnans Lake Trib											0.00												
LFC329B	29.65167	-82.25111	8/17/2011	SJRWMD STORET	Newnans Lake Trib								340	0.41	5		6.25		10.5	7.92	22.2	24.62						
LFC329B	29.65167	-82.25111	11/9/2011	SJRWMD STORET	Newnans Lake Trib								2100	4.04	41.7	0.04	6.27		10.78	1.78	28	17.11						
LFC329B	29.65167	-82.25111	7/19/2012	SJRWMD STORET	Newnans Lake Trib								620						11.2	3.83	29.4							
GRSC	29.70037	-82.25474	3/3/2009	SJRWMD STORET	Tributary to swamp	-0.001	0.023		0.38					5.99			5.33	123.35		1.20	17.5	10.02	29.70	3.40		7.23	0.04	
GRSC	29.70037	-82.25474	4/6/2009	SJRWMD STORET	Tributary to swamp	0.016	0.022		0.97					7.44			6.73	127.65		2.30	26.4	20.77	18.59	3.81		13.79	0.07	
GRSC	29.70037	-82.25474	6/3/2009	SJRWMD STORET	Tributary to swamp	0.045	0.056		1.08					7.17			6.76	134.90		7.70	30.8	22.72	19.80	3.32		15.02	0.11	
GRSC	29.70037	-82.25474	7/8/2009	SJRWMD STORET	Tributary to swamp	0.007	0.030		0.68					6.3			6.52	125.75		3.90	24.7	23.77	19.19	3.90		11.91	0.13	

						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	Concen-tration	Saturation	Discharge	pH, Field	Specific Conductance	Stage	Turbidity, Field	Air	Water	Chloride	Sulfate	Total Organic Carbon	Calcium	Fluoride	
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)
GRSC	29.70037	-82.25474	8/5/2009	SJRWMD STORET	Tributary to swamp	0.014	0.033		1.14					7.06			7.08	102.35		6.60	30.9	24.37	13.48	2.04		12.80	0.00	
GRSC	29.70037	-82.25474	9/2/2009	SJRWMD STORET	Tributary to swamp	0.021	0.041		1.03					6.35			6.43	124.00		3.29	26.4	23.36	22.00	2.29		14.50	0.15	
GRSC	29.70037	-82.25474	11/7/2012	SJRWMD STORET	Tributary to swamp	0.015	0.007		0.43					2	20.3		5.30	95.20		0.77	12.1	16.64	21.43	1.33		5.84		
GRSC	29.70037	-82.25474	1/9/2013	SJRWMD STORET	Tributary to swamp	0.035	0.016		0.54					2.86	29		5.16	94.75		2.61	20.7	16.42	20.38	3.17		6.03		
GRSC	29.70037	-82.25474	3/7/2013	SJRWMD STORET	Tributary to swamp	0.028	0.003		0.40					3.07	28.1		5.45	98.10		0.35	3.2	11.13	25.00	0.95		5.68		
GRSC	29.70037	-82.25474	5/7/2013	SJRWMD STORET	Tributary to swamp	0.019	0.010		0.78					4.22	43		5.71	95.45		0.65	13.5	16.7	18.58	2.97		6.13		
GRSC	29.70037	-82.25474	7/16/2013	SJRWMD STORET	Tributary to swamp	0.052	0.017		1.23					4.47	53		6.27	73.15		1.53	31.1	23.85	12.11	1.24		7.28		
GRSC	29.70037	-82.25474	9/11/2013	SJRWMD STORET	Tributary to swamp	0.056	0.010		1.16					3.56	41.5		6.04	88.75		13.39	26.2	22.92	18.19	0.70		9.77		
GRSC	29.70037	-82.25474	3/17/2014	SJRWMD STORET	Tributary to swamp	0.005	0.040		0.90					6.62	67.9		5.66	72.40		7.01	16.7	16.51	12.88	2.85		7.13		
GRSC	29.70037	-82.25474	9/10/2014	SJRWMD STORET	Tributary to swamp	0.022	0.043		1.17					6.46	78.4		6.40	79.95		1.98	32.6	25.17	10.00	1.50		11.96		
GRSC	29.70037	-82.25474	11/12/2014	SJRWMD STORET	Tributary to swamp	0.014	0.023		0.43					3.29	33		5.90	101.15		4.88	15.5	15.57	20.76	1.11		8.91		
HAT26	29.68722	-82.20667	1/6/2009	SJRWMD STORET	Hatchet Creek	0.010	0.018		0.74					1.56			6.86	177.85		1.40	18.3	14.91	11.79	-0.40		16.09	0.14	
HAT26	29.68722	-82.20667	2/3/2009	SJRWMD STORET	Hatchet Creek	0.043	0.009		1.29					8.88			6.34	116.50		1.70	10.6	11.47	17.10	6.11		9.13	0.05	
HAT26	29.68722	-82.20667	3/3/2009	SJRWMD STORET	Hatchet Creek	0.007	0.019		1.13					8.37			6.74	117.10		1.70	24.1	11.36	17.35	4.34		9.82	0.10	
HAT26	29.68722	-82.20667	4/6/2009	SJRWMD STORET	Hatchet Creek	0.027	0.026		1.62					6.04			5.55	85.70		2.50	22.7	20.24	12.63	3.12		7.72	0.09	
HAT26	29.68722	-82.20667	5/5/2009	SJRWMD STORET	Hatchet Creek	0.129	0.033		1.54					0.89			6.24	149.45		5.30	23.2	20.75	16.75	4.79		16.61	0.16	
HAT26	29.68722	-82.20667	6/3/2009	SJRWMD STORET	Hatchet Creek	0.034	0.034		1.60					5.84			5.29	74.05		1.80	25.6	23.39	10.02	1.94		6.44	0.08	
HAT26	29.68722	-82.20667	7/8/2009	SJRWMD STORET	Hatchet Creek	0.041	0.044		1.31					4.39			6.71	121.55		3.55	25.3	24.66	12.37	3.40		11.93	0.12	
HAT26	29.68722	-82.20667	8/5/2009	SJRWMD STORET	Hatchet Creek	0.020	0.017		1.34					5.31			4.92	45.00		3.80	35.1	24.68	4.90	0.91		4.71	0.00	
HAT26	29.68722	-82.20667	9/2/2009	SJRWMD STORET	Hatchet Creek	0.033	0.048		1.38					5.76			6.31	74.50		2.25	24.3	24.06	11.00	1.61		7.53	0.00	
HAT26	29.68722	-82.20667	10/11/2010	SJRWMD STORET	Hatchet Creek	0.069	0.014		1.07					0.78			6.31	141.60		5.07	28.3	18.63	13.77	2.92		11.79	0.11	
HAT26	29.68722	-82.20667	11/8/2010	SJRWMD STORET	Hatchet Creek	0.031	0.010		0.84					3.96			7.12	165.75		1.66	20.5	10.74	15.58	2.63		14.67	0.14	
HAT26	29.68722	-82.20667	12/6/2010	SJRWMD STORET	Hatchet Creek	0.022	0.008		0.88					2.47			6.94	186.90		4.54	13.2	8.68	16.56	1.93		16.80	0.16	
HAT26	29.68722	-82.20667	1/12/2011	SJRWMD STORET	Hatchet Creek	0.016	0.009		0.76					1.4			6.74	184.30		3.24	11.1	8.06	16.53	2.87		14.83	0.10	
HAT26	29.68722	-82.20667	2/9/2011	SJRWMD STORET	Hatchet Creek	0.024	0.039		0.92					9.12			6.85	125.65		1.85	18.8	10.16	15.46	15.08		9.76	0.11	
HAT26	29.68722	-82.20667	3/9/2011	SJRWMD STORET	Hatchet Creek	0.029	0.029		0.83					4.27			7.17	216.00		1.48	21.3	16.17	14.73	8.21		19.63	0.13	
HAT26	29.68722	-82.20667	3/28/2011	SJRWMD STORET	Hatchet Creek	0.037	0.013		0.90					1.61			6.73	332.50		2.53	21.2	18.49	15.13	8.22		19.19	0.13	
HAT26	29.68722	-82.20667	5/18/2011	SJRWMD STORET	Hatchet Creek	0.051	0.007		0.85					2.47			7.16	144.05		1.22	16.15	17.34	14.44	5.72		16.49	0.12	
HAT26	29.68722	-82.20667	6/14/2011	SJRWMD STORET	Hatchet Creek	0.026	0.014		0.77					2.23			6.97	199.95		1.60	26.6	22.3	3.16	2.09		17.20	0.20	
HAT26	29.68722	-82.20667	7/12/2011	SJRWMD STORET	Hatchet Creek	0.037	0.005		0.82					15.3			7.43	466.60		3.99		29.24	15.22	3.07			0.14	
HAT26	29.68722	-82.20667	8/11/2011	SJRWMD STORET	Hatchet Creek	0.047	0.008		0.70					3.05			7.20	179.10		1.67		25.33	15.37	2.73			0.16	
HAT26	29.68722	-82.20667	9/6/2011	SJRWMD STORET	Hatchet Creek	0.031	0.006		0.56					3.37			7.89	170.50		3.09	21.66	24.33	13.07	3.26			0.09	
HAT26	29.68722	-82.20667	7/10/2012	SJRWMD STORET	Hatchet Creek	0.421	0.054		3.14					4.62			5.28	85.15		1.36		25.87	10.23	3.77		7.80		
HAT26	29.68722	-82.20667	8/29/2012	SJRWMD STORET	Hatchet Creek	0.048	0.039		2.05					4.68			5.33	72.75		1.16		25.15	7.96	1.84		6.99		
HAT26	29.68722	-82.20667	1/9/2013	SJRWMD STORET	Hatchet Creek	0.050	0.037		1.41					7.8	79.1		6.46	97.65		0.77	20.8	16.06	14.91	3.36		8.65		
HAT26	29.68722	-82.20667	3/7/2013	SJRWMD STORET	Hatchet Creek	0.034	0.012		1.32					8.58	79		6.82	118.85		1.16	7.5	11.63	18.00	1.90		9.93		
HAT26	29.68722	-82.20667	5/7/2013	SJRWMD STORET	Hatchet Creek	0.036	0.024		1.44					6.87	71.7		5.19	94.70		1.75	18.7	17.37	0.90	0.90		5.50		
HAT26	29.68722	-82.20667	1/6/2014	SJRWMD STORET	Hatchet Creek	0.013	0.020		1.31					8.44	81.6		5.99	77.95		1.90	20.1	13.87	14.03	5.02		7.48		
HAT26	29.68722	-82.20667	3/12/2014	SJRWMD STORET	Hatchet Creek	0.011	0.025		1.18					7.54	78.7		5.80	73.45		1.76	19.8	17.41	11.78	1.48		6.74		
HAT26	29.68722	-82.20667	5/8/2014	SJRWMD STORET	Hatchet Creek	0.026	0.071		1.10					6.89	76		6.59	70.05		1.87	18.5	20.41	11.33	1.28		6.54		
HAT26	29.68722	-82.20667	9/10/2014	SJRWMD STORET	Hatchet Creek	0.009	0.043		1.45					6.24	74.5		5.02	58.20		1.65	32.4	24.29	7.40	1.10		5.99		
HAT26	29.68722	-82.20667	11/12/2014	SJRWMD STORET	Hatchet Creek	0.016	0.061		0.67					7.26	71.5		6.58	90.20		1.47	13.5	14.76	11.70	2.50		8.04		
LFC329B	29.65167	-82.25111	1/6/2009	SJRWMD STORET	Newnans Lake Trib	0.014	0.044		0.44					5.71			7.00	170.60		1.50	26.9	17.39	14.74	6.36		18.31		
LFC329B	29.65167	-82.25111	2/3/2009	SJRWMD STORET	Newnans Lake Trib	0.004	0.127		0.64					7.76			6.96	147.45		3.50	12.8	12.23	14.30	8.95		16.37		
LFC329B	29.65167	-82.25111	3/3/2009	SJRWMD STORET	Newnans Lake Trib	0.003	0.016		0.52					10.55			7.33	171.95		1.50	18.8	13.19	15.24	10.22		19.39		
LFC329B	29.65167	-82.25111	4/6/2009	SJRWMD STORET	Newnans Lake Trib	0.033	0.142		0.76					6.37			7.07	182.25		1.80	27.9	21.44	14.54	9.60		21.99		
LFC329B	29.65167	-82.25111	5/5/2009	SJRWMD STORET	Newnans Lake Trib	0.040	0.228		0.60					6.3			7.03	188.90		1.90	31.2	20.4	16.92	7.39		20.99		
LFC329B	29.65167	-82.25111	6/3/2009	SJRWMD STORET	Newnans Lake Trib	0.024	0.182		0.83					6.5			7.07	187.80		4.90	33.7	23.82	15.49	9.94		22.67		
LFC329B	29.65167	-82.25111	7/8/2009	SJRWMD STORET	Newnans Lake Trib	0.018	0.081		0.74					5.78			6.78	107.65		17.70	28.6	24.56	8.36	5.62		13.20		
LFC329B	29.65167	-82.25111	8/5/2009	SJRWMD STORET	Newnans Lake Trib	0.013	0.132		0.83					6.28			7.28	175.50		3.30	30.1	25.04	16.52	7.03		20.75		
LFC329B	29.65167	-82.25111	9/2/2009	SJRWMD STORET	Newnans Lake Trib	0.025	0.147		0.97					5.9			7.01	179.35		10.20	25.1	24.39	16.00	6.45		21.29		
LFC329B	29.65167	-82.25111	10/11/2010	SJRWMD STORET	Newnans Lake Trib	0.039	0.286		0.43					7.13			7.12	178.65		3.42	33.8	19.78	12.42	10.68		18.08		
LFC329B	29.65167	-82.25111	11/8/2010	SJRWMD STORET	Newnans Lake Trib	0.045	0.142		0.33					9.27			7.28	178.05		0.85	23.5	9.19	11.97	10.72		19.99		
LFC329B	29.65167	-82.25111	12/6/2010	SJRWMD STORET	Newnans Lake Trib	0.015	0.000		0.28					7.63			7.34	184.45		0.23	19.7	8.14	11.31	14.15		20.76		
LFC329B	29.65167	-82.25111	1/12/2011	SJRWMD STORET	Newnans Lake Trib	0.013	0.007		0.30					9.58			7.22	199.05		0.24	14.5	7.08	13.05	18.38		21.79		
LFC329B	29.65167	-82.25111	2/9/2011	SJRWMD STORET	Newnans Lake Trib	0.012	0.628		0.97					8.74			7.15	201.05		1.49	27.3	12.16	14.19	32.89		22.20		
LFC329B	29.65167	-82.25111	3/9/2011	SJRWMD STORET	Newnans Lake Trib	0.025	0.030		0.49					5.76			7.17	205.00		1.06	25.1	16.59	16.33	22.62		21.23		
LFC329B	29.65167	-82.25111	3/28/2011	SJRWMD STORET	Newnans Lake Trib	0.045	0.141		0.71					7.05			7.24	198.25		7.45	23.2	19.64	14.53	16.80		21.15		
LFC329B	29.65167	-82.25111	5/18/2011	SJRWMD STORET	Newnans Lake Trib	0.033	0.146		0.54					7.3			7.51	197.55		1.70	19.81	18.24	12.79	21.91		22.75		
LFC329B	29.65167	-82.25111	7/12/2011	SJRWMD STORET	Newnans Lake Trib	0.048	0.049		0.54					4.32			6.61	343.50		2.84		25.11	11.74	108.17				
LFC329B	29.65167	-82.25111	8/11/2011	SJRWMD STORET	Newnans Lake Trib	0.019	0.043		0.58					4.5			6.80	252.00		5.39		25.02	17.02	40.08				
LFC329B	29.65167	-82.25111	10/19/2011	SJRWMD STORET	Newnans Lake Trib	0.068	0.020		0.67					3.95			6.88	190.95		1.77		22.07	11.28	26.07		22.57		
LFC329B	29.65167	-82.25111	3/7/2013	SJRWMD STORET	Newnans Lake Trib														11.2									
LFC329B	29.65167	-82.25111	5/7/2013	SJRWMD STORET	Newnans Lake Trib	0.064	0.121		0.75					7.19	73.8		7.37	176.15		1.59	20.3	16.65	29.48	11.54		19.50		
LFC329B	29.65167	-82.25111	7/16/2013	SJRWMD STORET	Newnans Lake Trib	0.062	0.128		1.01					5.7	68.6		7.08	167.25	11.4	1.97	27.8	24.06	13.88	9.28		19.56		
LFC329B	29.65167	-82.25111	9/11/2013	SJRWMD STORET	Newnans Lake Trib	0.048	0.177		0.74					5.56	65.3		7.20	199.55		2.06	27.2	23.88	17.76	9.64		25.70		
LFC329B	29.65167	-82.25111	1/6/2014	SJRWMD STORET	Newnans Lake Trib	0.030	0.204		0.99					6.06	60.6		6.97	166.75		2.21	12.4	15.73	19.86	13.91		20.75		
LFC329B	29.65167	-82.25111	3/12/2014	SJRWMD STORET	Newnans Lake Trib	0.015	0.195		0.77					7.18	75.1		7.13	181.55	11.52	2.59	19.9	17.51	16.52	13.41		22.03		
LFC329B	29.65167	-82.25111	5/8/2014	SJRWMD STORET	Newnans Lake Trib	0.018	0.224		0.60					6.34	70.8		7.05	200.00		1.31	28.5	20.83	17.30	12.83		23.73		
LFC329B	29.65167	-82.25111	7/2/2014	SJRWMD STORET	Newnans Lake Trib	0.029	0.240		0.73					5.9	70.4		7.15	223.00		1.87	28.4	24.22	18.20	15.50		25.70		
LFC329B	29.65167	-82.25111	9/10/2014	SJRWMD STORET	Newnans Lake Trib	0.017	0.287		0.80					6.23	75.4		7.28	194.50		2.29	27.8	25.02	15.10	9.90		25.20		
LFC329B	29.65167	-82.25111	11/12/2014	SJRWMD STORET	Newnans Lake Trib	0.011	0.207		0.47					7.78	77.2		7.18	205.50		1.18	19.5	14.97	17.00	16.71		23.67		
LHAT26	29.68250	-82.23306	3/3/2009	SJRWMD STORET	Downstream of Swamp																							
LHAT26	29.68250	-82.23306	4/6/2009	SJRWMD STORET	Downstream of Swamp	0.156	0.028		2.38					0.75			6.05	135.95		2.30	23.4	20.34	15.85	7.96		15.37		
LHAT26	29.68250	-82.23306	6/3/2009	SJRWMD STORET	Downstream of Swamp	0.100	0.040		2.11					1.55			6.21	133.85		3.20	27.8	23.33	17.51	4.68		16.84		
LHAT26	29.68250	-82.23306	7/8/2009	SJRWMD STORET	Downstream of Swamp	0.042	0.014		1.57					2.17			6.47	127.15		3.52	23.8	24.84	12.86	2.83		17.25		
LHAT26	29.68250	-82.23306	8/5/2009	SJRWMD STORET	Downstream of Swamp	0.039	0.036		1.25					2.72			6.33	104.75		3.00	30.9	29.15	8.52	4.20		14.49		
LHAT26	29.68250	-82.23306	9/2/2009	SJRWMD STORET	Downstream of Swamp	0.034	0.037		1.88					3.82			5.24	98.55		1.62	26.2	23.64	20.00	0.00		9.46		

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	Concen-tration	Saturation	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)
LHAT26	29.68250	-82.23306	3/7/2013	SJRWMD STORET	Downstream of Swamp														11.6									
LHAT26	29.68250	-82.23306	5/7/2013	SJRWMD STORET	Downstream of Swamp	0.054	0.019		1.33					4.75	48.3		5.61	102.60		1.89	19.9	16.12	13.12	5.86		11.38		
LHAT26	29.68250	-82.23306	7/16/2013	SJRWMD STORET	Downstream of Swamp	0.098	0.023		1.51					1.83	21.9		6.34	87.60	14.46	2.27	27.8	23.92	7.95	2.47		12.83		
LHAT26	29.68250	-82.23306	9/11/2013	SJRWMD STORET	Downstream of Swamp	0.062	0.015		1.36					1.11	13.2		6.32	101.10	13.74	1.39	24.2	24.17	10.64	1.51		12.59		
LHAT26	29.68250	-82.23306	1/6/2014	SJRWMD STORET	Downstream of Swamp	0.017	0.014		1.38					4.64	45.4		6.18	113.95		2.11	19.4	14.45	14.03	14.63		16.04		
LHAT26	29.68250	-82.23306	3/12/2014	SJRWMD STORET	Downstream of Swamp	0.012	0.021		1.27					2.3	23.4		6.34	106.30	13.56	0.90	19.8	15.42	13.69	3.75		13.50		
LHAT26	29.68250	-82.23306	5/8/2014	SJRWMD STORET	Downstream of Swamp	0.074	0.033		1.45					1.09	11.9		6.29	120.65		1.96	24.2	19.3	21.02	1.48		10.63		
LHAT26	29.68250	-82.23306	9/10/2014	SJRWMD STORET	Downstream of Swamp	0.034	0.035		1.45					3.07	36.8		6.47	102.50		1.68	30.2	24.48	9.00	2.00		16.26		
LHAT26	29.68250	-82.23306	11/12/2014	SJRWMD STORET	Downstream of Swamp	0.027	0.035		1.25					4.55	44.7		5.99	118.35		2.47	11.3	14.47	22.50	1.74		11.60		
LHATWR	29.69868	-82.28044	3/3/2009	SJRWMD STORET	Little Hatchet Creek	0.010	0.129		0.52					10.24			7.49	256.00		5.40	18.2	10.16	16.92	21.61		29.99	0.21	
LHATWR	29.69868	-82.28044	4/6/2009	SJRWMD STORET	Little Hatchet Creek	0.045	0.093		0.66					7.97			7.47	248.50		7.40	26.5	21.27	15.33	16.82		32.18	0.16	
LHATWR	29.69868	-82.28044	5/5/2009	SJRWMD STORET	Little Hatchet Creek	0.033	0.187		0.43					8.08			7.71	297.00		3.40	30.1	21.8	19.18	27.73		31.56	0.23	
LHATWR	29.69868	-82.28044	6/3/2009	SJRWMD STORET	Little Hatchet Creek	0.042	0.093		0.62					7.58			7.49	261.00		12.00	31.5	24.07	17.70	20.68		33.22	0.22	
LHATWR	29.69868	-82.28044	7/8/2009	SJRWMD STORET	Little Hatchet Creek	0.017	0.062		0.53					6.83			7.34	159.30		16.00	28.1	25.35	8.83	13.04		20.37	0.19	
LHATWR	29.69868	-82.28044	7/16/2009	SJRWMD STORET	Little Hatchet Creek		0.172		0.76					7.09			7.47	249.00			26	25.08					0.25	
LHATWR	29.69868	-82.28044	8/5/2009	SJRWMD STORET	Little Hatchet Creek	0.041	0.182		0.91					7.24			7.39	211.50		8.30	30.1	25.73	14.81	16.75		27.11	0.07	
LHATWR	29.69868	-82.28044	9/2/2009	SJRWMD STORET	Little Hatchet Creek	0.032	0.110		0.73					7.03			7.31	235.00		5.81	28.3	24.64	18.00	20.40		28.30	0.18	
LHATWR	29.69868	-82.28044	10/11/2010	SJRWMD STORET	Little Hatchet Creek	0.050	0.283		0.47					8.13			7.29	301.00		3.16	29.6	20.73	16.53	23.99		30.03	0.25	
LHATWR	29.69868	-82.28044	11/8/2010	SJRWMD STORET	Little Hatchet Creek	0.407	0.549		0.92					9.58			7.54	321.50		1.91	20.1	12.12	19.74	27.03		32.07	0.22	
LHATWR	29.69868	-82.28044	12/6/2010	SJRWMD STORET	Little Hatchet Creek	0.041	1.028		0.50					9.8			7.78	331.50		1.25	12.6	9.75	18.16	24.58		31.92	0.24	
LHATWR	29.69868	-82.28044	1/12/2011	SJRWMD STORET	Little Hatchet Creek	0.043	0.695		0.55					10.71			7.54	298.50		3.25	11.2	8.66	18.11	33.49		29.47	0.21	
LHATWR	29.69868	-82.28044	2/9/2011	SJRWMD STORET	Little Hatchet Creek	0.053	0.223		0.70					10.23			7.47	237.50		9.60	25.1	10.93	13.49	34.44		27.86	0.11	
LHATWR	29.69868	-82.28044	3/9/2011	SJRWMD STORET	Little Hatchet Creek	0.053	0.789		0.87					8.08			7.65	298.50		3.23	24.4	18.35	20.52	29.23		28.73	0.21	
LHATWR	29.69868	-82.28044	3/28/2011	SJRWMD STORET	Little Hatchet Creek	0.127	0.460		1.07					4.3			7.46	273.50		6.13	23.9	20.17	17.32	21.67		29.08	0.23	
LHATWR	29.69868	-82.28044	5/18/2011	SJRWMD STORET	Little Hatchet Creek	0.042	0.102		0.61					8.21			7.95	277.00		2.89	18.5	18.22	14.72	25.59		30.53	0.21	
LHATWR	29.69868	-82.28044	6/14/2011	SJRWMD STORET	Little Hatchet Creek	0.052	0.383		0.90					7.05			7.80	329.50		1.25	29.4	25	18.86	24.29		31.75	0.27	
LHATWR	29.69868	-82.28044	7/12/2011	SJRWMD STORET	Little Hatchet Creek	0.059	0.163		0.91					6.27			7.51	260.50		5.07		26.62	16.13	23.39			0.15	
LHATWR	29.69868	-82.28044	8/11/2011	SJRWMD STORET	Little Hatchet Creek	0.033	0.033		0.73					6.64			7.63	243.50		4.25		26.19	12.63	17.56			0.23	
LHATWR	29.69868	-82.28044	9/6/2011	SJRWMD STORET	Little Hatchet Creek	0.017	0.040		0.56					6.76			7.51	98.85		30.90	22.22	25.27	5.26	6.61			0.08	
LHATWR	29.69868	-82.28044	12/14/2011	SJRWMD STORET	Little Hatchet Creek	0.048	0.205		0.32					7.99			7.61	1764.00		1.20		16.24	25.17	60.24		29.63		
LHATWR	29.69868	-82.28044	1/12/2012	SJRWMD STORET	Little Hatchet Creek	0.048	0.076		0.21					7.26			7.64	273.50		1.04		13.26	23.96	59.66		28.45		
LHATWR	29.69868	-82.28044	3/13/2012	SJRWMD STORET	Little Hatchet Creek	0.058	0.069		0.23					7.32			7.56	342.00		0.97		17.11	24.44	58.74		30.05		
LHATWR	29.69868	-82.28044	1/9/2013	SJRWMD STORET	Little Hatchet Creek	0.055	0.053		0.76					8.62	89.5		7.50	222.00		6.11	19.2	17.46	18.88	17.03		25.81		
LHATWR	29.69868	-82.28044	3/7/2013	SJRWMD STORET	Little Hatchet Creek	0.036	0.122		0.64					10.56	92.5		7.57	249.00		6.42	3.8	9.48	15.00	18.00		27.71		
LHATWR	29.69868	-82.28044	5/7/2013	SJRWMD STORET	Little Hatchet Creek	0.049	0.190		0.91					7.71	80.1		7.00	196.80		7.70	17.9	17.15	14.23	13.51		24.54		
LHATWR	29.69868	-82.28044	7/16/2013	SJRWMD STORET	Little Hatchet Creek	0.069	0.167		1.23					7.74	94.8		6.27	145.15		10.26	29.8	25.63	11.78	8.54		18.36		
LHATWR	29.69868	-82.28044	9/11/2013	SJRWMD STORET	Little Hatchet Creek	0.051	0.202		0.69					7.52	88.5		7.65	241.50		5.08	27.2	23.6	17.56	15.15		31.91		
LHATWR	29.69868	-82.28044	1/6/2014	SJRWMD STORET	Little Hatchet Creek	0.051	0.248		0.96					8.73	89.6		7.33	184.00		7.64	14.9	16.5	15.23	16.69		27.09		
LHATWR	29.69868	-82.28044	3/12/2014	SJRWMD STORET	Little Hatchet Creek	0.024	0.071		0.83					8.55	90		7.25	170.40		6.96	23.1	17.84	15.79	13.19		24.61		
LHATWR	29.69868	-82.28044	5/8/2014	SJRWMD STORET	Little Hatchet Creek	0.025	0.103		0.64					7.94	89.5		7.66	209.00		6.22	26.7	21.21	14.29	11.47		28.43		
LHATWR	29.69868	-82.28044	7/2/2014	SJRWMD STORET	Little Hatchet Creek	0.022	0.194		0.61					7.53	90.2		7.69	239.50		5.09	28	24.46	15.30	13.90		29.23		
LHATWR	29.69868	-82.28044	9/10/2014	SJRWMD STORET	Little Hatchet Creek	0.027	0.086		0.96					7.22	88.4		7.30	161.00		5.76	30.9	25.64	11.20	7.50		23.29		
LHATWR	29.69868	-82.28044	11/12/2014	SJRWMD STORET	Little Hatchet Creek	0.016	0.566		0.61					9.11	90.9		7.56	230.50		4.04	19.9	15.34	14.67	14.77		27.62		
LHT26E	29.68806	-82.22083	1/6/2009	SJRWMD STORET	Gum Root Swamp	0.031	0.034		2.25					4.37			6.53	161.15		2.50	19.3	16.52	21.43	1.27		19.01		
LHT26E	29.68806	-82.22083	2/3/2009	SJRWMD STORET	Gum Root Swamp	0.016	0.012		1.59					6.16			6.44	120.65		0.90	6.1	10.01	16.90	2.80		12.55		
LHT26E	29.68806	-82.22083	3/3/2009	SJRWMD STORET	Gum Root Swamp	0.012	0.019		1.43					7.78			6.59	127.15		1.00	21	11.54	18.73	2.70		12.84		
LHT26E	29.68806	-82.22083	4/6/2009	SJRWMD STORET	Gum Root Swamp	0.049	0.025		1.51					3.28			6.60	123.00		1.30	22.4	20.15	13.91	1.99		14.55		
LHT26E	29.68806	-82.22083	5/5/2009	SJRWMD STORET	Gum Root Swamp	0.278	0.123		2.06					2.61			6.75	150.95		4.30	26.3	19.91	19.41	2.74		19.08		
LHT26E	29.68806	-82.22083	6/3/2009	SJRWMD STORET	Gum Root Swamp	0.079	0.112		1.71					4.07			6.46	139.80		1.60	25.9	21.93	13.32	2.05		16.16		
LHT26E	29.68806	-82.22083	7/8/2009	SJRWMD STORET	Gum Root Swamp	0.049	0.071		1.75					4.58			6.67	137.10		2.64	26.8	24.01	13.95	3.61		16.80		
LHT26E	29.68806	-82.22083	8/5/2009	SJRWMD STORET	Gum Root Swamp	0.044	0.026		1.14					2.59			6.39	94.40		1.00	34.4	23.93	7.91	1.69		11.84		
LHT26E	29.68806	-82.22083	9/2/2009	SJRWMD STORET	Gum Root Swamp	0.037	0.041		1.35					3.39			6.60	124.80		1.32	26	23.45	13.00	1.61		14.49		
LHT26E	29.68806	-82.22083	2/9/2011	SJRWMD STORET	Gum Root Swamp	0.025	0.013		1.41					5.56			6.49	226.50		0.50	18.6	9.38	15.32	54.06		22.35		
LHT26E	29.68806	-82.22083	3/9/2011	SJRWMD STORET	Gum Root Swamp	0.073	0.030		2.03					4.49			6.76	178.70		1.18	23.3	16.75	17.67	11.00		20.82		
LHT26E	29.68806	-82.22083	3/28/2011	SJRWMD STORET	Gum Root Swamp	0.051	0.023		2.06					3.65			6.78	175.70		1.46	21.3	19.66	17.25	2.94		21.58		
LHT26E	29.68806	-82.22083	11/7/2012	SJRWMD STORET	Gum Root Swamp	0.085	0.028		2.16					2.32	22.9		6.68	165.95	11.74	3.19	14.4	14.76	16.22	1.95		21.24		
LHT26E	29.68806	-82.22083	1/9/2013	SJRWMD STORET	Gum Root Swamp	0.044	0.036		1.36					3.39	34.4		6.58	130.60		0.39	21.7	16.51	15.40	4.07		14.08		
LHT26E	29.68806	-82.22083	3/7/2013	SJRWMD STORET	Gum Root Swamp	0.035	0.015		1.43					6.71	57.8		6.74	135.40	12.41	0.97	7.7	8.79	18.00	1.70		14.34		
LHT26E	29.68806	-82.22083	5/7/2013	SJRWMD STORET	Gum Root Swamp	0.064	0.031		1.28					4.13	41.8		7.07	123.10		0.56	19.7	15.85	12.36	2.93		12.35		
LHT26E	29.68806	-82.22083	7/16/2013	SJRWMD STORET	Gum Root Swamp	0.108	0.048		1.14					2.45	28.6		6.76	106.65	14.48	1.21	25.9	23.67	7.56	2.66		14.68		
LHT26E	29.68806	-82.22083	9/11/2013	SJRWMD STORET	Gum Root Swamp	0.127	0.061		1.48					3.04	35		6.90	161.40	12.78	1.95	23.7	22.92	16.18	1.31		21.99		
LHT26E	29.68806	-82.22083	1/6/2014	SJRWMD STORET	Gum Root Swamp	0.013	0.009		1.11					4.73	46.3		6.59	105.60		0.45	20	14.26	13.42	3.92		14.13		
LHT26E	29.68806	-82.22083	3/12/2014	SJRWMD STORET	Gum Root Swamp	0.018	0.046		0.89					4.43	46.2		6.79	117.75	11.58	0.68	19.6	17.36	12.04	3.39		14.77		
LHT26E	29.68806	-82.22083	5/8/2014	SJRWMD STORET	Gum Root Swamp	0.047	0.090		1.17					4.54	49.9		7.06	132.20		3.62	21.8	19.69	12.86	1.07		17.32		
LHT26E	29.68806	-82.22083	7/2/2014	SJRWMD STORET	Gum Root Swamp	0.131	0.183		1.48					4.46	52.9		6.94	153.60		3.27	24.2	23.8	12.50	1.10		20.54		
LHT26E	29.68806	-82.22083	9/10/2014	SJRWMD STORET	Gum Root Swamp	0.026	0.041		1.12					3.75	45		6.79	114.50		1.00	33.6	24.57	8.10	1.80		16.86		
LHT26E	29.68806	-82.22083	11/12/2014	SJRWMD STORET	Gum Root Swamp	0.009	0.019		0.99					5.86	55.9		6.83	139.10		0.87	11.1	13.28	12.47	1.48		18.49		
LHT26E	29.68806	-82.22083	11/12/2014	SJRWMD STORET	Gum Root Swamp	0.007	0.023		0.99					6.26	59.4		6.80	141.60		0.89	11.1	13.23	12.53	1.46		18.81		
LHTNB	29.69306	-82.26528	1/6/2009	SJRWMD STORET	Little Hatchet Creek	0.014	0.260		0.34					9			7.73	238.50		3.50	23.3	17.95	15.63	21.76		29.99		
LHTNB	29.69306	-82.26528	2/3/2009	SJRWMD STORET	Little Hatchet Creek	0.006	0.080		0.60					8.16			7.28	160.75		10.80	14.8	11.88	8.17	9.74		22.78		
LHTNB	29.69306	-82.26528	3/3/2009	SJRWMD STORET	Little Hatchet Creek	0.012	0.141		0.47					10.12			7.64	247.50		3.70	16.7	9.33	14.22	16.04		31.55		
LHTNB	29.69306	-82.26528	4/6/2009	SJRWMD STORET	Little Hatchet Creek	0.041	0.130		0.68					7.76			7.50	235.50		5.80	25.6	21.24	13.81	14.04		31.92		
LHTNB	29.69306	-82.26528	5/5/2009	SJRWMD STORET	Little Hatchet Creek	0.021	0.104		0.35					8.58			7.74	267.50		2.50	33.2	21.35	16.05	18.89		31.87		
LHTNB	29.69306	-82.26528	6/3/2009	SJRWMD STORET	Little Hatchet Creek	0.026	0.151		0.57					7.43			7.50	254.00		6.30	31.1	23.91	16.37	18.97		31.40		
LHTNB	29.69306	-82.26528	7/8/2009	SJRWMD STORET	Little Hatchet Creek	0.022	0.096		0.53					7			7.45	146.60		28.10	24.1	25.26	7.97	9.84		20.06		
LHTNB	29.69306	-82.26528	7/16/2009	SJRWMD STORET	Little Hatchet Creek		0.186		0.65					7.14			7.52	238.00			28.1	25.71					0.20	
LHTNB	29.69306	-82.26528	8/5/2009	SJRWMD STORET	Little Hatchet Creek	0.034	0.090		0.81					7			7.44	190.95		7.20	30.8	25.69	11.08	11.63		26.43		
LHTNB	29.69306	-82.26528	9/2/2009	SJRWMD STORET	Little Hatchet Creek	0.036	0.176		0.62					6.32			7.29	231.00		5.46	25.4	24.65	13.00	14.90		29.91		

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	Saturation	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)
LHTNB	29.69306	-82.26528	10/11/2010	SJRWMD STORET	Little Hatchet Creek	0.033	0.333		0.45					8.42			7.03	263.00		2.93	28.7	20.59	13.84	17.20		25.39		
LHTNB	29.69306	-82.26528	11/8/2010	SJRWMD STORET	Little Hatchet Creek	0.248	0.145		0.49					10.16			7.51	267.00		1.80	16.2	11.76	13.39	16.57		31.50		
LHTNB	29.69306	-82.26528	12/6/2010	SJRWMD STORET	Little Hatchet Creek	0.017	0.504		0.38					10.73			7.72	278.00		1.65	18.5	8.6	14.09	18.30		30.10		
LHTNB	29.69306	-82.26528	1/12/2011	SJRWMD STORET	Little Hatchet Creek	0.018	0.296		0.32					10.9			7.65	268.50		1.44	14	7.68	14.34	23.98		30.57		
LHTNB	29.69306	-82.26528	2/9/2011	SJRWMD STORET	Little Hatchet Creek	0.046	0.182		0.67					10.16			7.45	212.50		7.52	21.7	11.22	11.65	26.39		25.79		
LHTNB	29.69306	-82.26528	3/9/2011	SJRWMD STORET	Little Hatchet Creek	0.027	0.057		0.38					10.1			7.98	245.00		2.40	25.7	17.8	13.36	15.18		29.37		
LHTNB	29.69306	-82.26528	3/28/2011	SJRWMD STORET	Little Hatchet Creek	0.046	0.176		0.47					8.19			7.78	254.00		3.58	22.3	20.29	12.40	12.41		27.98		
LHTNB	29.69306	-82.26528	5/18/2011	SJRWMD STORET	Little Hatchet Creek	0.044	0.162		0.50					8.56			8.01	244.00		1.95	18	17.96	11.82	17.89		29.18		
LHTNB	29.69306	-82.26528	6/14/2011	SJRWMD STORET	Little Hatchet Creek	0.012	0.062		0.39					7.3			7.86	255.50		2.47	29.4	23.9	12.05	12.57		28.91		
LHTNB	29.69306	-82.26528	7/12/2011	SJRWMD STORET	Little Hatchet Creek	0.045	0.060		0.82					6.16			7.58	1456.50		3.93		27.07	11.07	12.70				
LHTNB	29.69306	-82.26528	8/11/2011	SJRWMD STORET	Little Hatchet Creek	0.030	0.103		0.68					6.91			7.70	227.00		3.38		26.32	10.74	13.44				
LHTNB	29.69306	-82.26528	9/6/2011	SJRWMD STORET	Little Hatchet Creek	0.016	0.038		0.42					7.06			7.61	115.70		12.70	22.22	24.92	5.76	7.09				
LHTNB	29.69306	-82.26528	12/14/2011	SJRWMD STORET	Little Hatchet Creek	0.028	0.036		0.20					9.1			7.81	316.50		0.89		17.25	17.95	32.90		28.70		
LHTNB	29.69306	-82.26528	1/12/2012	SJRWMD STORET	Little Hatchet Creek	0.033	0.040		0.19					7.87			7.77	304.00		1.00		13.22	19.36	42.04		30.60		
LHTNB	29.69306	-82.26528	3/13/2012	SJRWMD STORET	Little Hatchet Creek	0.039	0.053		0.23					8.33			7.78	307.00		0.75		17.11	20.20	40.95		30.94		
LHTNB	29.69306	-82.26528	11/7/2012	SJRWMD STORET	Little Hatchet Creek	0.023	0.206		0.52					9.03	91.1		7.59	235.00		3.19	11.4	15.71	13.25	10.39		29.49		
LHTNB	29.69306	-82.26528	1/9/2013	SJRWMD STORET	Little Hatchet Creek	0.060	0.131		0.68					8.75	92		7.59	222.00		4.80	19.9	17.74	14.55	14.47		27.41		
LHTNB	29.69306	-82.26528	3/7/2013	SJRWMD STORET	Little Hatchet Creek	0.053	0.321		0.64					10.48	93.2		7.77	249.50		3.88	2.8	10.14	13.00	14.00		29.67		
LHTNB	29.69306	-82.26528	5/7/2013	SJRWMD STORET	Little Hatchet Creek	0.040	0.145		0.74					8.75	91.6		7.38	193.85		6.72	14.2	17.56	12.73	11.71		25.09		
LHTNB	29.69306	-82.26528	7/16/2013	SJRWMD STORET	Little Hatchet Creek	0.063	0.088		1.03					7.62	91.9		7.24	155.20		8.16	30.7	24.78	10.29	7.16		20.68		
LHTNB	29.69306	-82.26528	9/11/2013	SJRWMD STORET	Little Hatchet Creek	0.058	0.132		0.47					7.43	87.5		7.61	224.50		5.09	25.3	23.55	12.94	9.33		31.50		
LHTNB	29.69306	-82.26528	1/6/2014	SJRWMD STORET	Little Hatchet Creek	0.042	0.235		0.81					8.85	90.9		7.47	183.50		6.46	15.9	16.6	13.78	15.10		28.13		
LHTNB	29.69306	-82.26528	3/12/2014	SJRWMD STORET	Little Hatchet Creek	0.022	0.078		0.69					8.57	90.5		7.42	190.40		6.47	20.5	17.92	14.15	11.61		26.69		
LHTNB	29.69306	-82.26528	5/8/2014	SJRWMD STORET	Little Hatchet Creek	0.020	0.120		0.50					7.95	89.6		7.71	207.50		4.17	23.3	21.24	13.24	10.75		29.10		
LHTNB	29.69306	-82.26528	7/2/2014	SJRWMD STORET	Little Hatchet Creek	0.014	0.138		0.43					7.36	88.1		7.66	223.00		4.04	25.8	24.41	11.60	8.30		30.98		
LHTNB	29.69306	-82.26528	9/10/2014	SJRWMD STORET	Little Hatchet Creek	0.023	0.123		0.87					7.34	90.1		7.42	165.50		5.70	32.3	25.79	9.90	6.80		25.54		
LHTNB	29.69306	-82.26528	11/12/2014	SJRWMD STORET	Little Hatchet Creek	0.016	0.242		0.40					9.19	91.4		7.64	220.50		3.25	14.1	15.12	12.20	10.99		29.15		
LHAT26	29.68250	-82.23306	5/25/2017	ACEPD 2017	Swamp	0		1.2000		0.0	0.000												13	2.60	23.00	16	0.11	
LHAT26	29.68250	-82.23306	6/12/2017	ACEPD 2017	Swamp	0.170		1.3000		0.230	0.150			2.4				130.60		5.17			9.10	13.00	31	17.00	0.18	
LHAT26	29.68250	-82.23306	6/14/2017	ACEPD 2017	Swamp	0.000		1.6000		0.240	0.190			1.93			5.95	130.00		2.56			9.20	9.80	40	17.00	0.10	
LHAT26	29.68250	-82.23306	6/26/2017	ACEPD 2017	Swamp	0.390		1.9000		0.320	0.270			1.6			5.96	124.00					10.00	2.70	54	0.00	0.10	
LHAT26	29.68250	-82.23306	7/12/2017	ACEPD 2017	Swamp			0.0000			0.000						6.10											
LHAT26	29.68250	-82.23306	7/20/2017	ACEPD 2017	Swamp			0.8900	0.74		0.050																	
LHAT26	29.68250	-82.23306	7/24/2017	ACEPD 2017	Swamp			1.4000	0.00		0.000																	
LHAT26	29.68250	-82.23306	8/10/2017	ACEPD 2017	Swamp			1.0000	0.00		0.063																	
LHAT26	29.68250	-82.23306	9/2/2016	ACEPD 2017	Swamp			1.6000		0.140	0.000																	
LHAT26	29.68250	-82.23306	9/3/2016	ACEPD 2017	Swamp	0.050		0.8500	1.90	0.144	0.000												4.60	12.00	14	10.00	0.09	
LHAT26	29.68250	-82.23306	4/4/2017	ACEPD 2017	Swamp	0.000		0.0000	0.00	0.000																		
LHAT26	29.68250	-82.23306	4/5/2017	ACEPD 2017	Swamp	0.000		0.0000	0.89	0.000															0			
LHAT26	29.68250	-82.23306	6/1/2017	ACEPD 2017	Swamp				1.40														0.00	0.00				
LHAT26	29.68250	-82.23306	7/5/2017	ACEPD 2017	Swamp			1.9000	1.80	0.370	0.270			1.18				115.00		3.32								
LHAT26	29.68250	-82.23306	7/12/2017	ACEPD 2017	Swamp	0.000			1.00	0.000							6.04											
LHAT26	29.68250	-82.23306	7/20/2017	ACEPD 2017	Swamp	0.000			0.00	0.140				3.65				48.00					3.00	0.00	31	7.80	0.00	
LHAT26	29.68250	-82.23306	7/24/2017	ACEPD 2017	Swamp				1.40	0.130							5.40						0.00		40			
LHAT26	29.68250	-82.23306	8/2/2017	ACEPD 2017	Swamp	0.000		1.8000	1.30	0.150	0.055												6.60	1.40	0	9.20	0.00	
LHAT26	29.68250	-82.23306	8/10/2017	ACEPD 2017	Swamp	0.000			1.90	0.170													4.00	1.60	0	12.00	0.00	
LHAT26E	29.68784	-82.22087	5/25/2017	ACEPD 2017	Swamp	0.000		0.0000		0.000	0.000												0.00	0.00	0	0.00	0.00	
LHAT26E	29.68784	-82.22087	6/12/2017	ACEPD 2017	Swamp	0.220		1.4000		0.250	0.130			2.4				133.50		1.05			10.00	16.00	39	16.00	0.15	
LHAT26E	29.68784	-82.22087	6/14/2017	ACEPD 2017	Swamp	0.000		1.3000		0.210	0.140			1.8			5.75	136.00		1.27			8.40	11.00	36	18.00	0.11	
LHAT26E	29.68784	-82.22087	6/26/2017	ACEPD 2017	Swamp	0.000		1.9000		0.250	0.260			1.97			5.80	124.00					9.20	1.40	52	17.00	0.13	
LHAT26E	29.68784	-82.22087	7/12/2017	ACEPD 2017	Swamp			1.2000			0.210						6.11											
LHAT26E	29.68784	-82.22087	7/20/2017	ACEPD 2017	Swamp			1.1000	0.00		0.075																	
LHAT26E	29.68784	-82.22087	7/24/2017	ACEPD 2017	Swamp			1.4000	1.30		0.000																	
LHAT26E	29.68784	-82.22087	8/10/2017	ACEPD 2017	Swamp			0.8400	1.60		0.140																	
LHAT26E	29.68784	-82.22087	9/2/2016	ACEPD 2017	Swamp			0.0000		0.000	0.000																	
LHAT26E	29.68784	-82.22087	9/3/2016	ACEPD 2017	Swamp	0.000		0.0000	1.50	0.000	0.000												0.00	0.00	0	0.00	0.00	
LHAT26E	29.68784	-82.22087	4/4/2017	ACEPD 2017	Swamp	0.000		1.6000	1.20	0.170																		
LHAT26E	29.68784	-82.22087	4/5/2017	ACEPD 2017	Swamp	0.000		0.0000	1.10	0.150															0			
LHAT26E	29.68784	-82.22087	6/1/2017	ACEPD 2017	Swamp				1.40														0.00	0.00				
LHAT26E	29.68784	-82.22087	7/5/2017	ACEPD 2017	Swamp			1.6000	1.30	0.290	0.230			2.55				133.00		2.29								
LHAT26E	29.68784	-82.22087	7/12/2017	ACEPD 2017	Swamp	0.000			0.84	0.250							6.26											
LHAT26E	29.68784	-82.22087	7/20/2017	ACEPD 2017	Swamp	0.000			0.82	0.180				2.62				84.00					7.00	0.00	54	8.80	0.00	
LHAT26E	29.68784	-82.22087	7/24/2017	ACEPD 2017	Swamp				1.20	0.210							6.01						0.00		34			
LHAT26E	29.68784	-82.22087	8/2/2017	ACEPD 2017	Swamp	0.000		1.3000	0.92	0.290	0.200												5.70	1.70	0	18.00	0.11	
LHAT26E	29.68784	-82.22087	8/10/2017	ACEPD 2017	Swamp	0.000			0.00	0.210													6.20	1.70	0	15.00	0.12	
LHAT39W	29.68793	-82.23802	5/25/2017	ACEPD 2017	Swamp	0.000		0.8400		0.130	0.000												7.40	21.00	0	18.00	0.10	
LHAT39W	29.68793	-82.23802	6/12/2017	ACEPD 2017	Swamp	0.110		1.3000		0.190	0.100			4.55				115.90		1.00			7.10	9.60	26	17.00	0.18	
LHAT39W	29.68793	-82.23802	6/14/2017	ACEPD 2017	Swamp	0.000		0.9400		0.120	0.094			2.78			6.20	172.00		5.46			10.00	13.00	30	23.00	0.11	
LHAT39W	29.68793	-82.23802	6/26/2017	ACEPD 2017	Swamp	0.000		1.1000		0.180	0.150			1.69			6.43	189.00					12.00	5.10	32	27.00	0.13	
LHAT39W	29.68793	-82.23802	7/12/2017	ACEPD 2017	Swamp			1.0000			0.170						6.50											
LHAT39W	29.68793	-82.23802	7/20/2017	ACEPD 2017	Swamp			0.1000	0.00		0.000																	
LHAT39W	29.68793	-82.23802	7/24/2017	ACEPD 2017	Swamp			1.4000	0.86		0.000																	
LHAT39W	29.68793	-82.23802	8/10/2017	ACEPD 2017	Swamp			1.1000	0.00		0.000																	
LHAT39W	29.68793	-82.23802	9/2/2016	ACEPD 2017	Swamp			0.0000		0.144	0.000																	
LHAT39W	29.68793	-82.23802	9/3/2016	ACEPD 2017	Swamp	0.000		0.0000	1.10	0.000	0.000												0.00	0.00	0	0.00	0.00	
LHAT39W	29.68793	-82.23802	4/4/2017	ACEPD 2017	Swamp	0.000		1.1000	1.00	0.440																		
LHAT39W	29.68793	-82.23802	4/5/2017	ACEPD 2017	Swamp	0.000		0.0000	1.10	0.000															19			
LHAT39W	29.68793	-82.23802	6/1/2017	ACEPD 2017	Swamp				1.40														0.00	0.00				

Station	Latitude	Longitude	Sample Date	Source	Spatial Grouping	Nitrogen				Phosphorous			Bacteriological	Dissolved Oxygen		Flow	Physical				Temperature		General Inorganic			Metals		
						Ammonia, Total mg/L	Nitrate + Nitrite mg/L	Total mg/L	Total Kjeldahl mg/L	Total mg/L	Soluble Reactive mg/L	Total Dissolved mg/L (DB Labs Only)	Coliform, Fecal #/100 mL	Concen-tration mg/L	Saturation %	Discharge cfs	pH, Field SU	Specific Conductance µmhos/cm	Stage Feet	Turbidity, Field NTU	Air Celsius	Water Celsius	Chloride mg/L	Sulfate mg/L	Total Organic Carbon mg/L	Calcium mg/L	Fluoride mg/L	Oxidation-Reduction Potential (ORP) mg/L (SJRWMD Only)
LHAT39W	29.68793	-82.23802	7/5/2017	ACEPD 2017	Swamp			1.1000	1.30	0.230	0.160			2.24				188.00		5.25								
LHAT39W	29.68793	-82.23802	7/12/2017	ACEPD 2017	Swamp	0.000			1.10	0.230							6.71											
LHAT39W	29.68793	-82.23802	7/20/2017	ACEPD 2017	Swamp	0.000				0.100				5.37				61.00					3.40	1.80	34	10.00	0.00	
LHAT39W	29.68793	-82.23802	7/24/2017	ACEPD 2017	Swamp					0.150							6.12						0.00		40			
LHAT39W	29.68793	-82.23802	8/2/2017	ACEPD 2017	Swamp	0.330		1.3000		0.190	0.095												7.50	4.60	0	23.00	0.00	
LHAT39W	29.68793	-82.23802	8/10/2017	ACEPD 2017	Swamp	0.000				0.140													4.50	2.00	0	15.00	0.00	
LHAT 26E	29.68784	-82.22087	4/4/2017	ACEPD 2017	Swamp	0.050	0.260	1.6000	1.30	0.230																		
LHAT 26E	29.68784	-82.22087	4/4/2017	ACEPD 2017	Swamp	0.050	0.053	1.6000	1.50	0.170																		
LHAT 26E	29.68784	-82.22087	4/5/2017	ACEPD 2017	Swamp	0.050	0.010	1.6000	1.60	0.150																		
LHAT 26E	29.68784	-82.22087	4/5/2017	ACEPD 2017	Swamp	0.050	0.010	1.3000	1.30	0.150																		
LHAT 39W	29.68793	-82.23802	4/4/2017	ACEPD 2017	Swamp	0.050	0.240	1.1000	0.86	0.440																		
LHAT DSAIRPORT	29.69319	-82.26543	4/4/2017	ACEPD 2017	Creek	0.050	0.230	1.2000	1.00	0.280																		
LHAT WALDO	29.69820	-82.27998	4/4/2017	ACEPD 2017	Creek	0.050	0.220	1.1000	0.92	0.220																		

Appendix B

Soil Physiochemistry Data for LHC

STATIONID	Spatial Grouping	ALIAS	Source	DESCRIPT	LAT	LONG	ESTDATE	TYPE	SAMPLES	Event	BD (g/cm3)	TP (mg/kg dry)	DIW OPO4 (mg/kg dry)	NH4Cl OPO4 (mg/kg dry)	KCl OPO4 (mg/kg dry)	NaOH OPO4 (mg/kg dry)	NaOH TP (mg/kg dry)	HCl OPO4 (mg/kg dry)	Total Ca (mg/kg dry)	Total Fe (mg/kg dry)	Volatile Solids	TN (mg/kg dry)	SOC	TPi (mg/kg dry)	Tpo (mg/kg dry)
1	Little Hatchet Creek	1	DB Labs for ACEPD 09/03/2014	Clay outcrop at water	29.697830	-82.278370	9/3/2014	Sediment	Hawthorne	Sep-14	1.6	6590													
2	Little Hatchet Creek	2	DB Labs for ACEPD 09/03/2014	Clay from top of bank	29.697920	-82.278170	9/3/2014	Sediment	Hawthorne	Sep-14	1.05	5950													
3	Little Hatchet Creek	3	DB Labs for ACEPD 09/03/2014	Sand bar	29.698140	-82.277190	9/3/2014	Sediment	Hawthorne	Sep-14	1.5	50													
4	Little Hatchet Creek	4	DB Labs for ACEPD 09/03/2014	Sandy clay with gravel	29.698300	-82.277050	9/3/2014	Sediment	Hawthorne	Sep-14	1.667	285													
5	Little Hatchet Creek	5	DB Labs for ACEPD 09/03/2014	Clay embankment	29.700000	-82.269000	9/3/2014	Sediment	Hawthorne	Sep-14	1.467	92100													
6	Little Hatchet Creek	6	DB Labs for ACEPD 09/03/2014	Sandy clay	29.699690	-82.269640	9/3/2014	Sediment	Hawthorne	Sep-14	1.3	54100													
7	Little Hatchet Creek	7	DB Labs for ACEPD 09/03/2014	Bluegreen clay lense	29.699210	-82.270870	9/3/2014	Sediment	Hawthorne	Sep-14	0.9	1944													
8	Little Hatchet Creek	8	DB Labs for ACEPD 09/03/2014	Sandstone bluff	29.699160	-82.272240	9/3/2014	Sediment	Hawthorne	Sep-14	1.2	80.5													
176	Gum Root Swamp	176	DB Labs for ACEPD 04/2016	<Null>	29.700995	-82.231271	5/2/2016	Sediment	Organic Sediments	May-16	0.067	1380	2.2	5.3		89	602	45.7	16000	3000	86.6	24800			
G-1	Gum Root Swamp	G-1	DB Labs for ACEPD 04/2016	<Null>	29.693819	-82.239885	4/20/2016	Sediment	Sand Bar	Apr-16	1.4	521	6.8	5.2		146	178	491	1800	850	0.675	425			
G-2	Gum Root Swamp	G-2	DB Labs for ACEPD 04/2016	<Null>	29.700187	-82.231258	5/2/2016	Sediment	Organic Sediments	May-16	0.081	1150	0.98	1.9		62.5	472	46.1	19000	3100	88.4	23700			
G-3	Gum Root Swamp	G-3	DB Labs for ACEPD 04/2016	<Null>	29.702971	-82.229772	5/2/2016	Sediment	Organic Sediments	May-16	0.083	1130	1.8	4.2		58.2	437	37.7	13000	2200	89.4	21200			
G-4	Gum Root Swamp	G-4	DB Labs for ACEPD 04/2016	<Null>	29.701190	-82.220379	5/2/2016	Sediment	Organic Sediments	May-16	0.048	1350	3.5	5.1		34.2	561	10.2	10000	2100	91.1	26700			
G-5	Gum Root Swamp	G-5	DB Labs for ACEPD 04/2016	<Null>	29.689989	-82.233884	4/20/2016	Sediment	Organic Sediments	Apr-16	0.12	1710	1.3	2.6		117	622	118	17000	5200	75.1	20500			
G-6	Gum Root Swamp	G-6	DB Labs for ACEPD 04/2016	<Null>	29.694191	-82.225860	4/20/2016	Sediment	Organic Sediments	Apr-16	0.088	1200	1.1	2.4		73.2	388	67.2	19000	4600	84.2	20400			
GMRIN1	Tributary to Swamp	GMRIN1	DB Labs for ACEPD 04/2016	<Null>	29.704646	-82.222050	4/19/2016	Sediment	Organic Sediments	Apr-16	0.085	1210	5.9	2.8		63.4	541	31.3	9900	2800	84.8	19000			
GMRIN1-DS	Tributary to Swamp	GMRIN1-DS	DB Labs for ACEPD 04/2016	<Null>	29.703867	-82.221780	4/19/2016	Sediment	Sand Bar	Apr-16	1.5	19	0.97	0.2		2.3	7	0.67	250	125	0.675	425			
GMRIN2	Tributary to Swamp	GMRIN2	DB Labs for ACEPD 04/2016	<Null>	29.707688	-82.230392	4/19/2016	Sediment	Sand Bar	Apr-16	1.5	2470	10.2	6.1		142	171	2570	6500	760	0.675	425			
GMRIN4	Tributary to Swamp	GMRIN4	DB Labs for ACEPD 04/2016	<Null>	29.698437	-82.243465	4/19/2016	Sediment	Sand Bar	Apr-16	1.6	91	4	1.6		11.9	14.7	0.58	250	125	0.675	425			
GMRIN5	Little Hatchet Creek	GMRIN5, SB-29	DB Labs for ACEPD 04/2016	<Null>	29.690835	-82.244067	4/20/2016	Sediment	Sand Bar	Apr-16	1.5	723	4	2.3		67.7	73	741	2000	320	0.675	425			
GMROUT1	Gum Root Swamp	GMROUT1, SB-31	DB Labs for ACEPD 04/2016	<Null>	29.688721	-82.238555	4/19/2016	Sediment	Sand Bar	Apr-16	1.6	117	1.4	0.2		34.6	50.8	1.6	250	125	0.675	425			
GMROUT2	Gum Root Swamp	GMROUT2	DB Labs for ACEPD 04/2016	<Null>	29.688434	-82.230146	4/19/2016	Sediment	Organic Sediments	Apr-16	0.064	1010	5.6	3.9		29.7	337	46.9	9700	1700	91.8	23200			
GMROUT3	Gum Root Swamp	GMROUT3	DB Labs for ACEPD 04/2016	<Null>	29.691389	-82.221959	4/19/2016	Sediment	Sand Bar	Apr-16	0.11	1360	1.3	1.5		93.8	473	73.2	15000	5000	83	21100			
GMROUT4	Gum Root Swamp	GMROUT4	DB Labs for ACEPD 04/2016	<Null>	29.688753	-82.221094	4/19/2016	Sediment	Sand Bar	Apr-16	1.5	22	1.9			7.2	17.1	0.5	250	125	0.675	425			
GMROUT5	Downstream of Swamp	GMROUT5	DB Labs for ACEPD 04/2016	<Null>	29.679722	-82.234954	4/19/2016	Sediment	Sand Bar	Apr-16	1.4	207	2.3			28.6	34.5	141	250	125	0.675	425			
LHATHDS	Little Hatchet Creek	LHATHDS	DB Labs for ACEPD 04/2016	<Null>	29.690530	-82.255847	4/19/2016	Sediment	Organic Sediments	Apr-16															
SB-1	Little Hatchet Creek	SB-1	DB Labs for ACEPD 08/18/2015	<Null>	29.696909	-82.266354	8/18/2015	Sediment	Sand Bar	Aug-15	1.57	1130				979	145	955	2700	840		425			
SB-10	Gum Root Swamp	SB-10	DB Labs for ACEPD 08/18/2015	<Null>	29.688925	-82.221138	8/18/2015	Sediment	Sand Bar	Aug-15	1.29	50				15	35	0.7	500	125		425			
SB-11	Little Hatchet Creek	SB-11	DB Labs for ACEPD 04/2016	<Null>	29.690642	-82.256401	1/6/2016	Sediment	Sand Bar	Jan-16	1.4	2530	4.6			93.8	104	3730	6600	560		425			
SB-12	Little Hatchet Creek	SB-12	DB Labs for ACEPD 04/2016	<Null>	29.690577	-82.258653	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	3250	3.4			99.4	106	2030	7300	480		425			
SB-13	Little Hatchet Creek	SB-13	DB Labs for ACEPD 04/2016	<Null>	29.690793	-82.261249	1/6/2016	Sediment	Sand Bar	Jan-16	1.6	2420	3.1			80.2	85.6	2900	6000	400		425			
SB-14	Little Hatchet Creek	SB-14	DB Labs for ACEPD 04/2016	<Null>	29.692249	-82.262992	1/6/2016	Sediment	Sand Bar	Jan-16	1.6	3230	5.2			107	118	2460	9200	690		425			
SB-15	Little Hatchet Creek	SB-15	DB Labs for ACEPD 04/2016	<Null>	29.697257	-82.266509	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	1250	4.2			60.7	66.8	1650	3600	420		425			
SB-16	Little Hatchet Creek	SB-16	DB Labs for ACEPD 04/2016	<Null>	29.697852	-82.266955	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	1300	4.7			43.2	48.5	1050	3900	340		425			
SB17	Little Hatchet Creek	SB-17	DB Labs for ACEPD 04/2016	<Null>	29.698519	-82.267370	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	1610	5.7	3.3		60	66.9	2600	4700	460		425			
SB18	Little Hatchet Creek	SB-18	DB Labs for ACEPD 04/2016	<Null>	29.699420	-82.267951	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	1170	3.8	2.7		54.8	60.2	1510	4200	470		425			
SB19	Little Hatchet Creek	SB-19	DB Labs for ACEPD 04/2016	<Null>	29.700096	-82.268698	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	969	5.7	5.9		87.9	96.6	2180	3600	125		425			
SB2	Little Hatchet Creek	SB-2	DB Labs for ACEPD 08/18/2015	<Null>	29.696727	-82.266104	8/18/2015	Sediment	Sand Bar	Aug-15	1.53	576		4		534	38	1330	1900	125		425			
SB20	Little Hatchet Creek	SB-20	DB Labs for ACEPD 04/2016	<Null>	29.699501	-82.270243	1/6/2016	Sediment	Sand Bar	Jan-16	1.6	280	4.4	2.7		34.5	38.9	581	1100	280		425			
SB21	Little Hatchet Creek	SB-21	DB Labs for ACEPD 04/2016	<Null>	29.699041	-82.271934	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	173	3.1	2.4		196	258	162	550	380		425			
SB22	Little Hatchet Creek	SB-22	DB Labs for ACEPD 04/2016	<Null>	29.698636	-82.273428	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	420	2.2	0.8		21	23	127	1100	320		425			
SB23	Little Hatchet Creek	SB-23	DB Labs for ACEPD 04/2016	<Null>	29.698274	-82.276208	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	210	2.5	1.7		15.9	20.2	463	1100	350		425			
SB24	Little Hatchet Creek	SB-24	DB Labs for ACEPD 04/2016	<Null>	29.697978	-82.277940	1/6/2016	Sediment	Sand Bar	Jan-16	1.6	104	3.3	5		20.7	26.5	217	650	420		425			
SB25	Little Hatchet Creek	SB-25	DB Labs for ACEPD 04/2016	<Null>	29.698692	-82.280453	1/6/2016	Sediment	Sand Bar	Jan-16	1.5	54	1.2	<0.4		14.5	18.8	7.7	250	380		425			
SB-26	Gum Root Swamp	SB-26	DB Labs for ACEPD 04/2016	<Null>	29.693541	-82.220669	4/20/2016	Sediment	Organic Sediments	Apr-16	0.057	1200	4.6	9.9		59.2	410	45.8	10000	2100	92.6	23700			
SB-27	Gum Root Swamp	SB-27	DB Labs for ACEPD 04/2016	<Null>	29.692304	-82.222445	4/20/2016	Sediment	Organic Sediments	Apr-16	0.09	1470	1.1	1.4		120	569	106	15000	6400	86.9	20400			
SB-28	Gum Root Swamp	SB-28	DB Labs for ACEPD 04/2016	<Null>	29.691424	-82.237472	4/20/2016	Sediment	Organic Sediments	Apr-16	0.39	2080	5.2	2.6		270	1240	116	11000	4000	34.7	9020			
SB-29	Little Hatchet Creek	SB-29	DB Labs for ACEPD 04/2016		29.690835	-82.244067	4/20/2016	Sediment	Sand Bar	Apr-16	1.5	723	4	2.3		64.7	73	741	2000	320	0.675	425			
SB3	Little Hatchet Creek	SB-3	DB Labs for ACEPD 08/18/2015	<Null>	29.695452	-82.265933	8/18/2015	Sediment	Sand Bar	Aug-15	1.53	1250		3.2		1048	199	749	4300	680		425			
SB-30	Little Hatchet Creek	SB-30	DB Labs for ACEPD 04/2016	<Null>	29.688654	-82.249621	4/20/2016	Sediment	Sand Bar	Apr-16	1.6	31	1.8	0.7		12.8	18.7	0.82	250	125	0.675	425			
SB-31	Gum Root Swamp	SB-31	DB Labs for ACEPD 04/2016		29.688721	-82.238555	4/19/2016	Sediment	Sand Bar	Apr-16	1.6	117	1.4	0.2		34.6	50.8	1.6	250	125	0.675	425			
SB4	Little Hatchet Creek	SB-4	DB Labs for ACEPD 08/18/2015	<Null>	29.695146	-82.266012	8/18/2015	Sediment	Sand Bar	Aug-15	1.49	1310		4.8		1140	165	1400	3000	500		425			
SB5	Little Hatchet Creek	SB-5	DB Labs for ACEPD 08/18/2015	<Null>	29.694224	-82.265944	8/18/2015	Sediment	Sand Bar	Aug-15	1.47	1340		4.7		1102	233	1220	3900	1100		425			
SB6	Little Hatchet Creek	SB-6	DB Labs for ACEPD 08/18/2015	<Null>	29.693696	-82.266325	8/18/2015	Sediment	Sand Bar	Aug-15	1.55	1710		3.5		1620	87	930	4900	520		425			
SB7	Little Hatchet Creek	SB-7	DB Labs for ACEPD 08/18/2015	<Null>	29.692989	-82.264955	8/18/2015	Sediment	Sand Bar	Aug-15	1.53	1580		2.9		1508	69	1940	7400	370		425			
SB8	Little Hatchet Creek	SB-8	DB Labs for ACEPD 08/18/2015	<Null>	29.690803	-82.254808	8/18/2015	Sediment	Sand Bar	Aug-15	1.54	1530		2.7		1414	114	1776	3700	440		425			
SB9	Little Hatchet Creek	SB-9	DB Labs for ACEPD 08/18/2015	<Null>	29.691091	-82.252165	8/18/2015	Sediment	Sand Bar	Aug-15	1.57	1380		1.3		1323	56	1450	3200	280		425			
GR 4	Downstream of Swamp	GR 4	ECT samples 9/15/16		29.680970	-82.227070	9/15/2016	Sediment	organic sediments	Sep-16	0.28	1830	4.1	1.7		430	1130	21.0	6200	3100	46.8	11900			
GR 5	Downstream of Swamp	GR 5	ECT samples 9/15/16		26.679360	-82.221810	9/15/2016	Sediment	organic sediments	Sep-16	1.1	66	0.5	0.2		5.1	38.5	1.1	750	125	3.60	1340			
GR 6	Downstream of Swamp	GR 6	ECT samples 9/15/16		26.678800	-82.232270	9/15/2016	Sediment	organic sediments	Sep-16	0.16	2050	1.7	0.7	126.0	126	1310	36.5	12000	3200	72.6	21000			
GR 3	Downstream of Swamp	GR 3	ECT samples 9/15/16		29.683500	-82.234840	9/15/2016	Sediment	organic sediments	Sep-16	0.60	2440	4.2	1.7	788.0	788	1830	51.2	4300	3300	23.5	9480			
GR 7	Downstream of Swamp	GR 7	ECT samples 9/15/16		29.675680	-82.236800	9/15/2016	Sediment	organic sediments	Sep-16	0.20	1260	3.5	3.3	28.3	28.3	511	67.5	5800	2500	85.7	23800			
CREEK1S2	Gum Root Swamp	CREEK1S2	ECT samples 2017		29.690538	-82.243815	12/19/2016	Soil		Dec-16		72	0.1										0.00	71.54	1.55
CREEK1S3	Gum Root Swamp	CREEK1S3	ECT samples 2017		29.690538	-82.243815	12/19/2016	Soil		Dec-16		13	0.1										0.00	12.67	2.89
CREEK1S4	Gum Root Swamp	CREEK1S4	ECT samples 2017		29.690538	-82.243815	12/19/2016	Soil		Dec-16		28	0.2										0.00	27.58	14.47
CREEK2S2	Gum Root Swamp	CREEK2S2	ECT samples 2017		29.691529	-82.239936	12/19/2016	Soil		Dec-16		117	1.0										0.00	116.60	109.89
CREEK2S3	Gum Root Swamp	CREEK2S3	ECT samples 2017		29.691529	-82.239936	12/19/2016	Soil		Dec-16		22	0.4										0.34	22.00	23.07
CREEK3S2	Gum Root Swamp	CREEK3S2	ECT samples 2017		29.692213	-82.237842	12/19/2016	Soil		Dec-16		50	0.7										0.00	49.50	95.71
CREEK3S3	Gum Root Swamp	CREEK3S3	ECT samples 2017		29.692213	-82.237842	12/19/2016	Soil		Dec-16		14	0.2										8.05	13.55	32.84
CREEK4S2	Gum Root Swamp	CREEK4S2	ECT samples 2017		29.689108	-82.239392	12/19/2016	Soil		Dec-16		415	5.4										0.00	414.80	305.66
CREEK5S2	Gum Root Swamp	CREEK5S2	ECT samples 2017		29.689059	-82.230373	12/16/2016	Soil	organic sediments	Dec-16		25	2.9										43.71	24.75	256.64
GRS2S2	Gum Root Swamp	GRS2S2	ECT samples 2017		29.691617	-82.231682	12/19/2016	Soil	organic sediments	Dec-16		116	1.0										37.74	115.77	1184.90
GRS3S2	Gum Root Swamp	GRS3S2	ECT samples 2017		29.702046	-82.224805	12/15/2016	Soil	organic sediments	Dec-16		86	2.4										43.69	85.60	987.73
GRS3S3	Gum Root Swamp	GRS3S3	ECT samples 2017		29.702046	-82.224805	12/15/2016	Soil	organic sediments	Dec-16		35	1.2										43.91	34.60	524.34
GRS4S2	Gum Root Swamp	GRS4S2	ECT samples 2017		29.693666	-82.220909	12/16/2016	Soil	organic sediments	Dec-16		8	0.2										1.86	7.71	34.35
GRS4S3	Gum Root Swamp	GRS4S3	ECT samples 2017		29.693666	-82.220909	12/16/2016	Soil	organic sediments	Dec-16		21	0.1										1.70	21.03	76.80
GRS4S4	Gum Root Swamp	GRS4S4	ECT samples 2017		29.693666	-82.220909	12/16/2016	Soil	organic sediments	Dec-16		20	0.1										1.17	19.60	147.01
GRS5S2	Gum Root Swamp	GRS5S2	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		14	0.3										1.36	14.17	39.65
GRS5S3	Gum Root Swamp	GRS5S3	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		47	0.1										0.34	46.51	-21.59
GRS5S4	Gum Root Swamp	GRS5S4	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		39	0.1										1.35	38.77	141.27
GRS5S5	Gum Root Swamp	GRS5S5	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		17	0.2										1.18	16.60	179.77
GRS5S6	Gum Root Swamp	GRS5S6	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		19	0.1										1.18	18.60	208.63
HW1S2	Gum Root Swamp	HW1S2	ECT samples 2017		29.695825	-82.224669	12/16/2016	Soil	organic sediments	Dec-16		31	0.8										45.58	31.29	452.27
HW1S3	Gum Root Swamp	HW1S3	ECT samples 2017		29.695825	-82.224669	12/16/2016	Soil	organic sediments	Dec-16		17	0.4										45.39	17.00	356.33
HW2S2	Gum Root Swamp	HW2S2	ECT samples 2017		29.696464	-82.222722	12/16/2016	Soil	organic sediments	Dec-16		46	3.8										46.76	46.32	362.65
HW2S3	Gum Root Swamp	HW2S3	ECT samples 2017		29.696464	-82.222722	12/16/2016	Soil	organic sediments	Dec-16		31	1.6										46.92	31.46	193.20
HW3S2	Gum Root Swamp	HW3S2	ECT samples 2017		29.700824	-82.23203	12/15/2016	Soil	organic sediments	Dec-16		458	2.5										41.00	457.65	644.01
HW4S2	Gum Root Swamp	HW4S2	ECT samples 2017		29.700305	-82.224575	12/15/2016	Soil	organic sediments	Dec-16		62	4.8										45.45	61.83	510.12
HW4S3	Gum Root Swamp	HW4S3	ECT samples 2017		29.700305	-82.224575	12/15/2016	Soil	organic sediments	Dec-16		39	2.5										45.24	39.12	425.33
HW4S4	Gum Root Swamp	HW4S4	ECT samples 2017		29.700305	-82.224575	12/15/2016	Soil	organic sediments	Dec-16		26	1.5										46.24	25.75	314.58
CREEK1S1	Gum Root Swamp	CREEK1S1	ECT samples 2017		29.690538	-82.243815	12/19/2016	Soil		Dec-16		487	0.2		1.1	46.8	47.96	1196.87					0.84	487.04	1.18
CREEK2S1	Gum Root Swamp	CREEK2S1	ECT samples 2017		29.691529	-82.239936	12/19/2016	Soil		Dec-16		465	1.3		4.5	181.2	214.60	301.34					1.82	464.96	33.41
CREEK3S1	Gum Root Swamp	CREEK3S1	ECT samples 2017		29.692213	-82.237842	12/19/2016	Soil		Dec-16		79	0.4		1.9	254.8	726.25	208.23					11.08	78.99	471.46
CREEK4S1	Gum Root Swamp	CREEK4S1	ECT samples 2017		29.689108	-82.239392	12/19/2016	Soil		Dec-16		118	0.7		2.2	62.7	142.83	14.05					0.67	118.22	80.11
CREEK5S1	Gum Root Swamp	CREEK5S1	ECT samples 2017		29.689059	-82.230373	12/16/2016	Soil		Dec-16		129	6.4		14.2	92.9	664.64	11.15					46.47	129.30	571.75
GRS2S1	Gum Root Swamp	GRS2S1	ECT samples 2017		29.691617	-82.231682	12/19/2016	Soil	organic sediments	Dec-16		94	0.9		6.6	122.7	850.97	0.00					40.08	93.65	728.29
GRS3S1	Gum Root Swamp	GRS3S1	ECT samples 2017		29.702046	-82.224805	12/15/2016	Soil	organic sediments	Dec-16		104	5.2		18.3	75.4	522.12	0.00					43.64	103.60	446.77
GRS4S1	Gum Root Swamp	GRS4S1	ECT samples 2017		29.693666	-82.220909	12/16/2016	Soil	organic sediments	Dec-16		75	4.5		10.9	92.7	674.58	0.00					46.54	75.48	581.92
GRS5S1	Gum Root Swamp	GRS5S1	ECT samples 2017		29.690039	-82.220562	12/16/2016	Soil	organic sediments	Dec-16		191	0.3		5.1	60.5	466.46	9.86					20.20	191.44	405.97
HW1S1	Gum Root Swamp	HW1S1	ECT samples 2017		29.695825	-82.224669	12/16/2016	Soil	organic sediments	Dec-16		163	2.9		11.3	180.2	663.75	0.00					44.96	163.44	483.57
HW2S1	Gum Root Swamp	HW2S1	ECT samples 2017		29.696464	-82.222722	12/16/2016	Soil	organic sediments	Dec-16		116	10.3		26.9	136.5	838.27	0.00					45.76	116.18	701.74
HW3S1	Gum Root Swamp	HW3S1	ECT samples 2017		29.700824	-82.23203	12/15/2016	Soil	organic sediments	Dec-16		49	3.3		10.6	105.5	664.68	0.00					45.80	48.81	559.14
HW4S1	Gum Root Swamp	HW4S1	ECT samples 2017		29.700305	-82.224575	12/15/2016	Soil	organic sediments	Dec-16		14	6.2		2.5	46.3	267.45	0.00					46.12	14.41	221.16
XRD3	NA (upland/surrounding watershed)	XRD3	ECT samples 2017	forested upland	29.704891	-82.220027	2/22/2017	Soil	sand	Feb-17			1.8		0.6	13.9	80.00	0.00					6.46		
XRD4	NA (upland/surrounding watershed)	XRD4	ECT samples 2017	forested upland	29.701526	-82.215207	2/22/2017	Soil	sand	Feb-17			0.6		0.3	7.2	55.94	0.09					5.65		

STATIONID	Spatial Grouping	ALIAS	Source	DESCRIPT	LAT	LONG	ESTDATE	TYPE	SAMPLES	Event	BD (g/cm3)	TP (mg/kg dry)	DIW OPO4 (mg/kg dry)	NH4Cl OPO4 (mg/kg dry)	KCl OPO4 (mg/kg dry)	NaOH OPO4 (mg/kg dry)	NaOH TP (mg/kg dry)	HCl OPO4 (mg/kg dry)	Total Ca (mg/kg dry)	Total Fe (mg/kg dry)	Volatile Solids	TN (mg/kg dry)	SOC	TPi (mg/kg dry)	Tpo (mg/kg dry)
XRD5	NA (upland/surrounding watershed)	XRD5	ECT samples 2017	forested upland	29.696335	-82.214588	2/22/2017	Soil	sand	Feb-17			0.4										1.02		
XRD6	NA (upland/surrounding watershed)	XRD6	ECT samples 2017	forested upland	29.690239	-82.216313	2/22/2017	Soil	sand	Feb-17			0.1		0.5	16.8	90.71	0.26					9.97		
XRD7	NA (upland/surrounding watershed)	XRD7	ECT samples 2017	forested upland	29.686408	-82.217096	2/22/2017	Soil	sand	Feb-17			0.2		0.9	20.9	162.27	0.00					24.91		
XRD8	NA (upland/surrounding watershed)	XRD8	ECT samples 2017	forested upland	29.684276	-82.222493	2/22/2017	Soil	sand	Feb-17			0.1		0.5	32.9	261.11	0.00					9.41		
XRD9A	NA (upland/surrounding watershed)	XRD9A	ECT samples 2017	forested upland	29.683455	-82.228094	2/22/2017	Soil	sand	Feb-17			0.1		0.8	24.3	276.97	3.71					18.14		
XRD10	NA (upland/surrounding watershed)	XRD10	ECT samples 2017	forested upland	29.705993	-82.230095	2/22/2017	Soil	sand	Feb-17			1.1		2.9	8.0	45.85	0.00					3.37		
XRD11	NA (upland/surrounding watershed)	XRD11	ECT samples 2017	forested upland	29.700754	-82.237167	2/22/2017	Soil	sand	Feb-17			0.1		0.5	15.5	78.33	0.00					2.03		
WLHCAP2	NA (creek bank samples)	WLHCAP2	ECT samples 2017		29.695418	-82.284689	5/29/2017	Soil	Hawthorn	May-17		148	0.6										1.86	148.15	1219.40
WLHCAP3	NA (creek bank samples)	WLHCAP3	ECT samples 2017		29.695418	-82.284689	5/29/2017	Soil	Hawthorn	May-17		214	0.5										1.19	213.94	259.39
WLHCXRD1	NA (creek bank samples)	WLHCXRD1	ECT samples 2017		29.698927	-82.280711	5/29/2017	Soil	Hawthorn	May-17		34	1.3										0.00	33.80	28.45
WLHCXRD2	NA (creek bank samples)	WLHCXRD2	ECT samples 2017		29.697613	-82.281984	5/29/2017	Soil	Hawthorn	May-17		28	0.5										0.34	27.50	7.83
WLHCXRD3	NA (creek bank samples)	WLHCXRD3	ECT samples 2017		29.694231	-82.287420	5/29/2017	Soil	Hawthorn	May-17		14	0.5										0.00	13.63	49.41
WLHCXRD4	NA (creek bank samples)	WLHCXRD4	ECT samples 2017		29.692066	-82.289721	5/29/2017	Soil	Hawthorn	May-17		14	0.5										0.00	13.68	17.24
WLHCXRD5	NA (creek bank samples)	WLHCXRD5	ECT samples 2017		29.702592	-82.290974	5/29/2017	Soil	Hawthorn	May-17		3	0.2										0.50	2.74	6.41
R1APATITE	NA (creek bank samples)	R1APATITE	ECT samples 2017		29.697984	-82.277922	5/29/2017	Soil	Hawthorn	May-17		42490	2.6										2.50	42490.20	0.00
R2APATITE	NA (creek bank samples)	R2APATITE	ECT samples 2017		29.698440	-82.273884	5/29/2017	Soil	Hawthorn	May-17		453	2.1										0.50	452.50	801.63
BANKSAMP		BANKSAMP	ECT samples 2017		-29.700090	-82.268566	12/19/2016	Soil	Hawthorn	Dec-16		61920	2.6										1.36	61920.00	0.00

Appendix C

ACEPD Summary of Sediment Depth in Channel and Storm Sampling April 2017

Alachua County Sediment Profiles on Little Hatchet Creek

Introduction

April 24 and 25, 2017 Alachua County Environmental Protection Department performed sediment depth profiles on Little Hatchet Creek. ACEPD staff began at Little Hatchet Creek near Waldo Road and ended at Little Hatchet Creek just downstream of NE 52^{nd} Drive. A total of 17 cross sectional transects were completed by ACEPD. Sediment depths ranged from 0.18 feet at T9 to greater than 8 feet at T11, T12, T14, T15, and T16. The heaviest sediment deposits were found in the areas between T14 and T16, upstream of NE52nd Drive, which appears to be acting like a sediment trap.

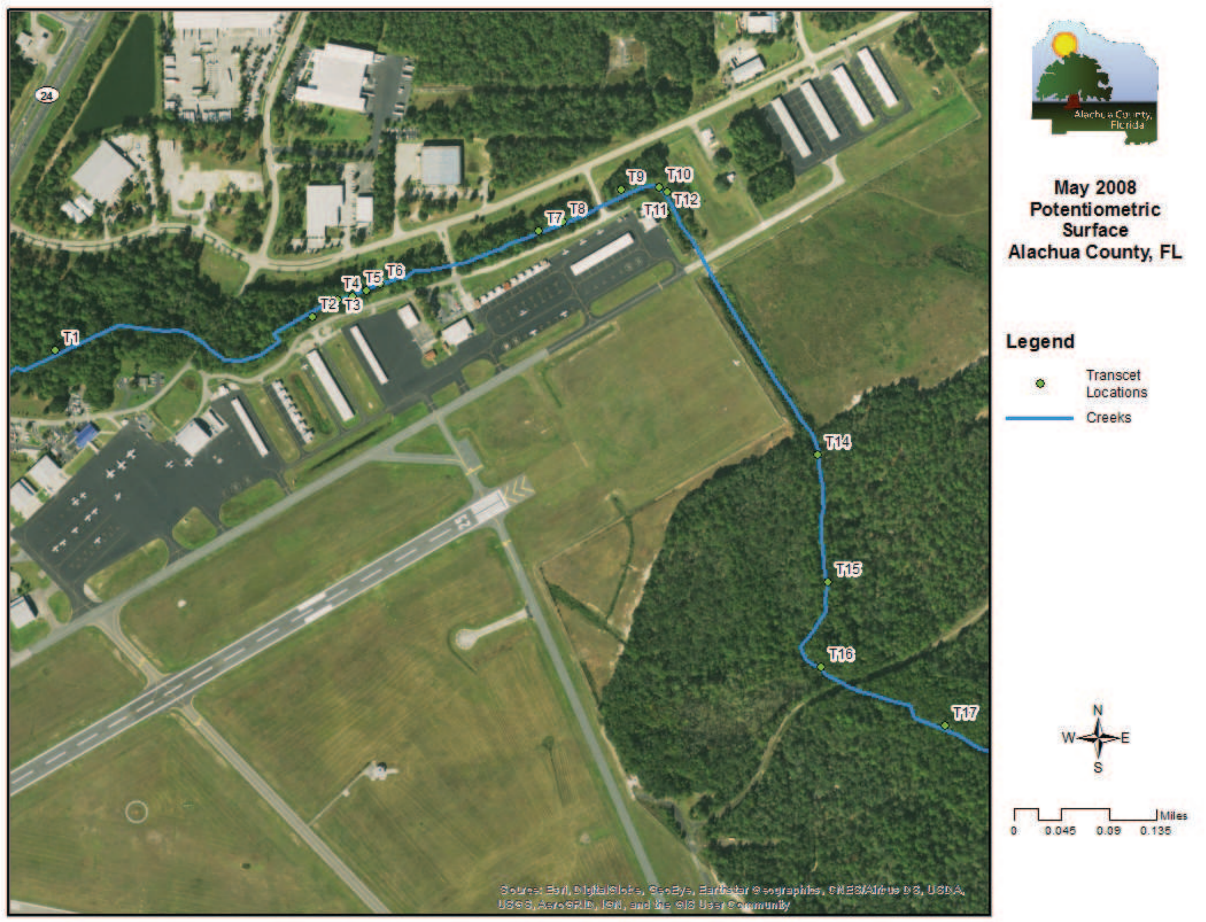


Figure 1 Transect Locations on Little Hatchet Creek

Methods

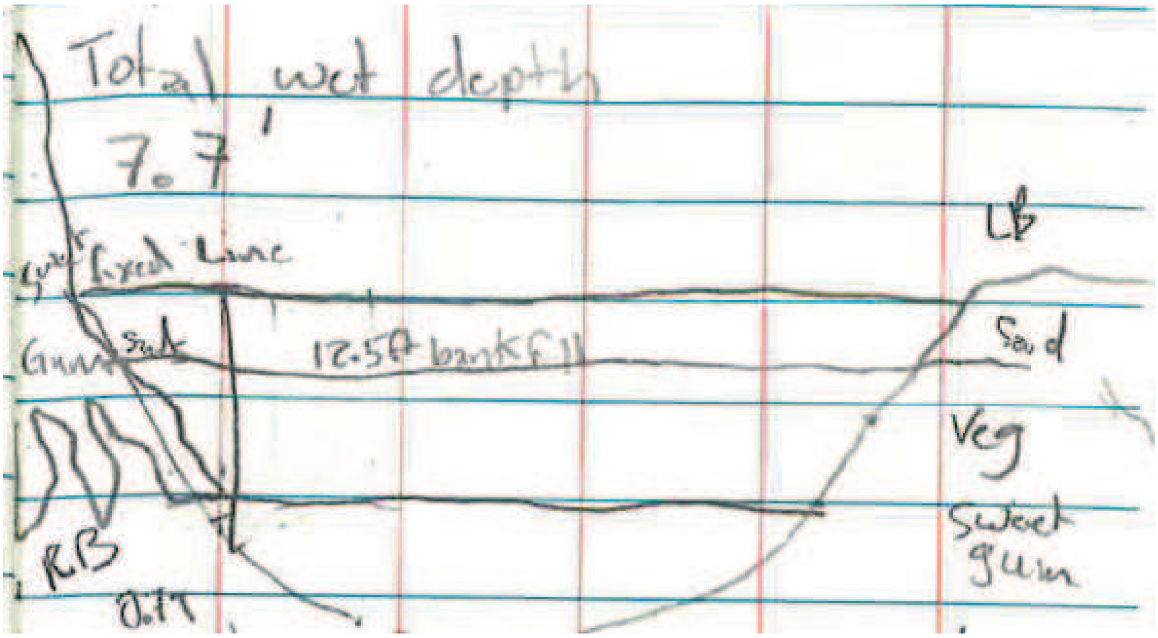
At the start and end of each day ACEPD read and recorded the staff gauge on Little Hatchet Creek and Waldo Road. ACEPD used a Garmin handheld GPSMAP64 unit to navigate to previous transects established by Environmental Consulting Technologies. Transects were numbered as T1 to T17 going in order with T1 being the furthest upstream transect and T17 the furthest downstream, skipping the nameT13. A measuring tape was run perpendicular to the creek using a 33 foot measuring tape with 1/10 ft increments to measure distances across the creek. The tape was used to measure the width of the wetted area of the creek and the width of the estimated bank full length. Then, the tape was used to record positions on the cross section while measuring depth of water and depth of deposited sands. At each site a nail was hammered into a tree near the bank to establish a permanent marking; this nail was then used to install a string across the stream, pulled taut, and leveled with string levels. Distances from the fixed string to the ground were measured and recorded from left bank to right bank, associated depth of water if applicable, and the location on the measuring tape (in feet) was also recorded across the creek. A 16 foot survey rod with 2/10ths of a foot increment was used to measure the sediment and water depths. A four foot fiberglass probe was used to estimate depth to refusal (where samplers could no longer easily probe further into the sediment) and in cases where the full four feet of the probe was driven into the ground, an eight foot steel probe was used measure depth to refusal. Photos were taken at each transect and a site sketch was also completed. A GPS unit to navigate to establish transects and collect Latitude and Longitudinal locations. Lastly flagging tape was tied to each nail to mark the location of each transect.

Results by Transect

T1

Located the furthest upstream location. ACEPD samplers were onsite on 4/24/17 at 1023. The total width of the wetted area was 7.7 feet, and the bankfull width was estimated at 12.5 feet.

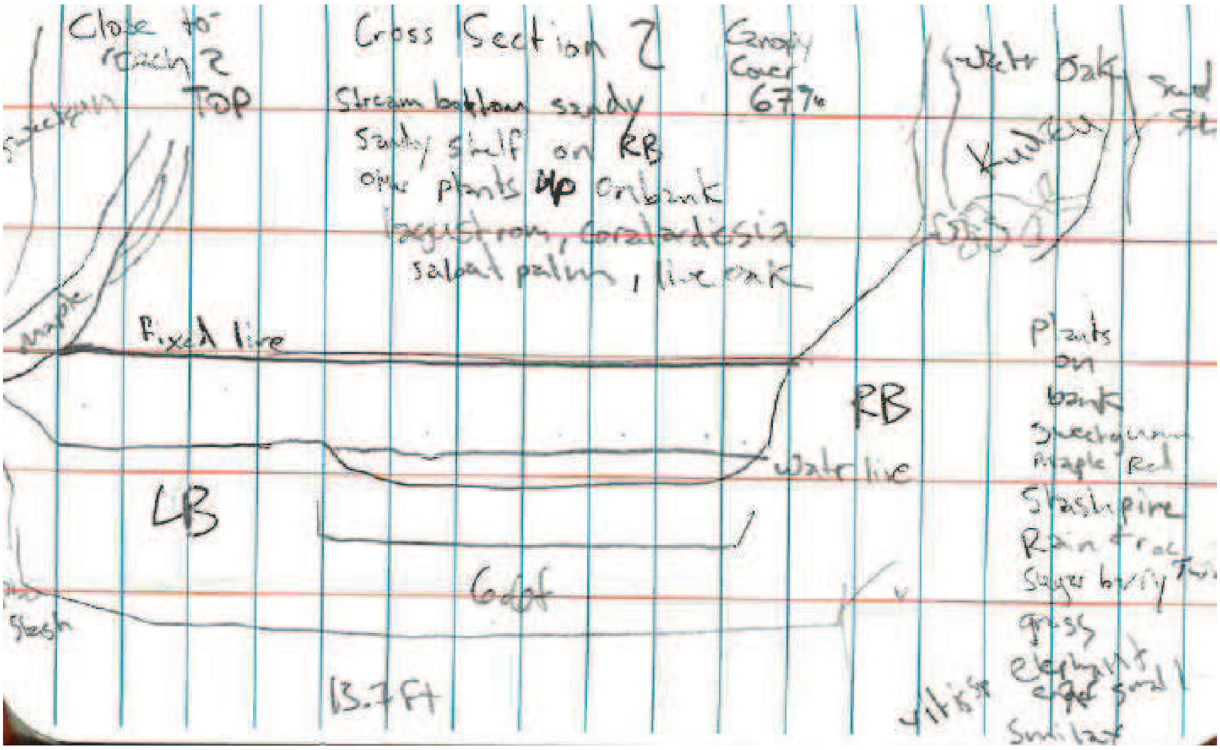
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T1	2	0.1	0.69	7.2
T1	3.5	0.92	1.78	7.98
T1	4.5	1	1.8	8.1
T1	5	0.98	2.82	7.95
T1	5.9	0.9	2.54	7.9
T1	6.8	0.94	2.1	7.95
T1	7.5	0.66	2.42	7.65
T1	8.3	0.4	0.2	7.38



T2

T2 transect was completed on 4/24/17 at 1303. The total wet width of the stream was 6.6 feet, and the total bankfull width was 13.7 feet. Right bank slope was estimated at 80 degrees and left bank slope was estimated at 65 degrees.

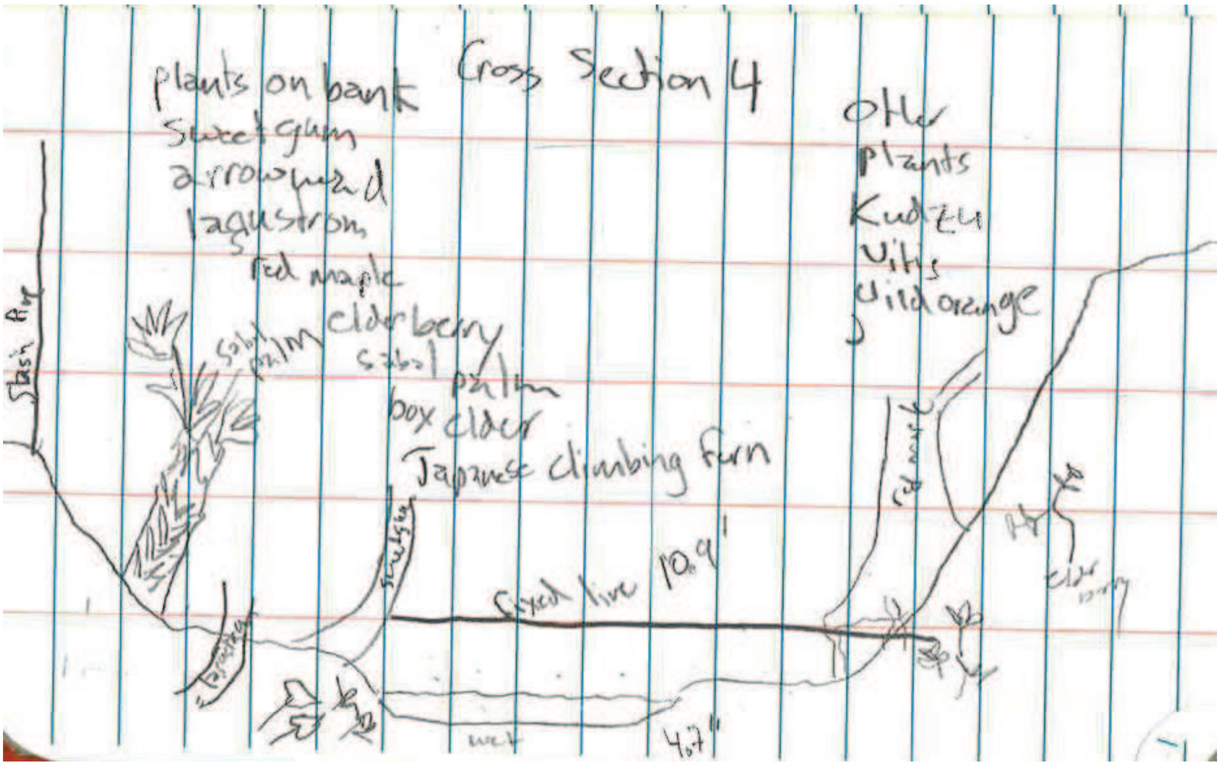
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T2	6.6	0.18	1.82	6.14
T2	7.7	0.2	1.4	6.18
T2	8.8	0.14	1.24	6.1
T2	9.9	0.18	0.76	6.12
T2	11	0.2	0.58	6.12
T2	12	0.22	0.3	6.16



T3

T3 transect was completed on 4/24/17 at 1334. The total wet width of the stream was 6.5 feet, and the total bankfull width was 11.5 feet. Canopy cover was estimated around 60 percent. Plant composition was made up of mixed hardwoods and pines. Tree species on the banks were primarily *Acer negundo*, *Sambucus nigra,* and *Liquidambar styraciflua*.

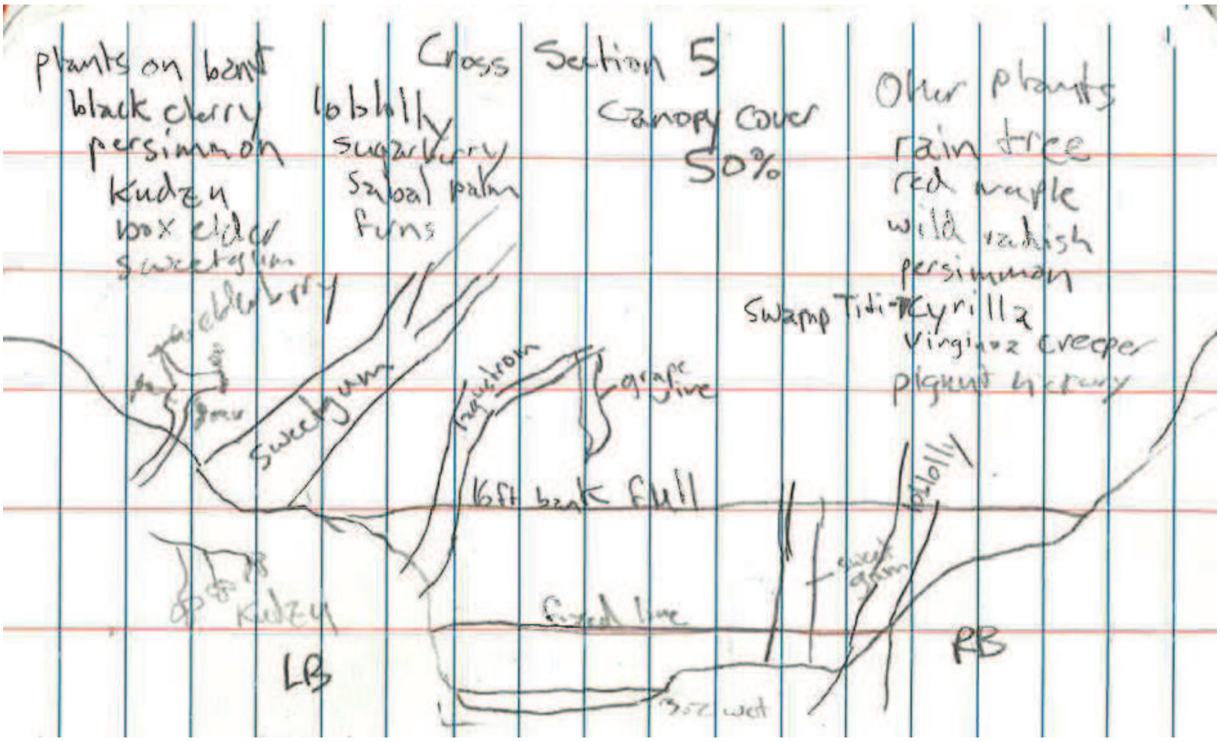
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T3	1	0.18	1.48	5.64
T3	2.5	0.16	2.12	5.6
T3	3.8	0.16	2.18	5.6
T3	5.5	0.16	2.28	5.58
T3	6.5	0.08	2.5	5.54



T4

T4 transect was completed on 4/24/17 at 1400. The total wet width of the stream was 4.7 feet, and the total bankfull width was 10.9 feet. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Acer negundo*, *Sambucus nigra, Liquidambar styraciflua*, *Acer Rubrum*, and *Sabal palmetto*.

Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T4	3.7	0.1	2.88	6.32
T4	4.7	0.18	2.8	6.6
T4	6.3	0.32	2.4	6.52
T4	7.6	0.18	3.68	6.38
T4	8.3	0.08	2.28	6.24



T5

T5 transect was completed on 4/24/17 at 1419. The total wet width of the stream was 3.2 feet, and the total bankfull width was 16 feet. The right bank slope was estimated at 70 degrees and the left bank slope was estimated at 80 degrees. The canopy cover was estimated at 50 percent. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Prunus carolinana, Acer negundo*, *Sambucus nigra, Liquidambar styraciflua*, and *Cyrilla racemiflora*.

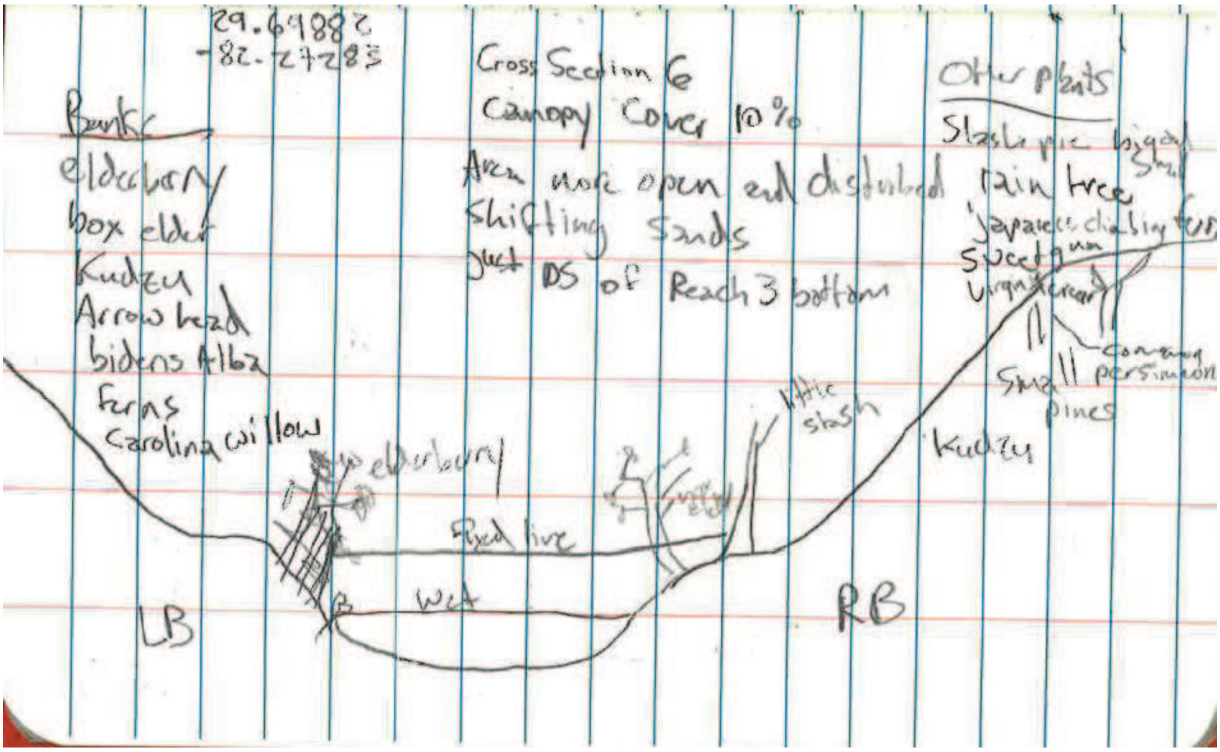
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T5	5.4	0.12	2.46	6.94
T5	6.7	0.2	1.86	7.4
T5	7.7	0.4	1.8	7.24
T5	8.3	0.26	1.34	7.08
T5	8.7	0.1	1.18	6.98

T6

T6 transect was completed on 4/24/17 at 1452. The total wet width of the stream was 8.9 feet, and the total bankfull width was 15.1 feet. The right bank slope was estimated at 75 degrees and the left bank slope was estimated at 80 degrees. The canopy cover was much more open than at the other sites with an estimated cover of 10 percent. Tree species noted on the banks included *Salix carolinana, Acer negundo*, and *Sambucus nigra,* however the banks were covered with more herbaceous and juvenile species then compared to other transects.

Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T6	4	1.4	2.48	7.66
T6	6	1.9	2.4	7.96
T6	7.3	1.7	1.2	7.78
T6	9	1.5	2.06	7.6
T6	10.4	0.72	2.4	6.84

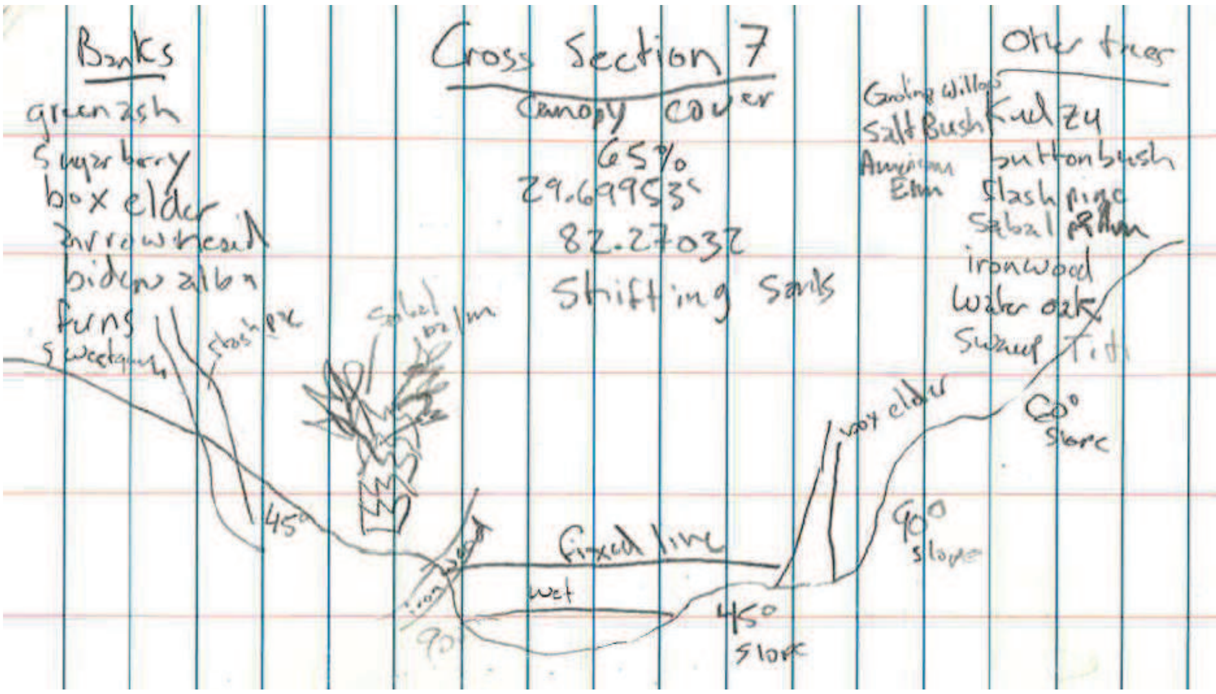
T6	11.4	0.5	3.04	6.68
T6	12.8	0.18	3.18	6.4



T7

T7 transect was completed on 4/24/17 at 1545. The total wet width of the stream was 6.0 feet, and the total bankfull width was 17 feet. The bank slopes were "stepped" with the left bank at 90 degrees then leveling off and then at 45 degrees up to the road, the right bank starts at 45 degrees then levels off for a few feet and then has a 90 degree bank slope until it eventually slopes more gently at 60 degrees up to the road. The canopy cover was estimated at 65 percent. Plant composition was made up of mixed hardwoods and pines. Tree species noted on the banks included *Acer negundo*, *Sambucus nigra, Liquidambar styraciflua*, and *Celtis laevigata*.

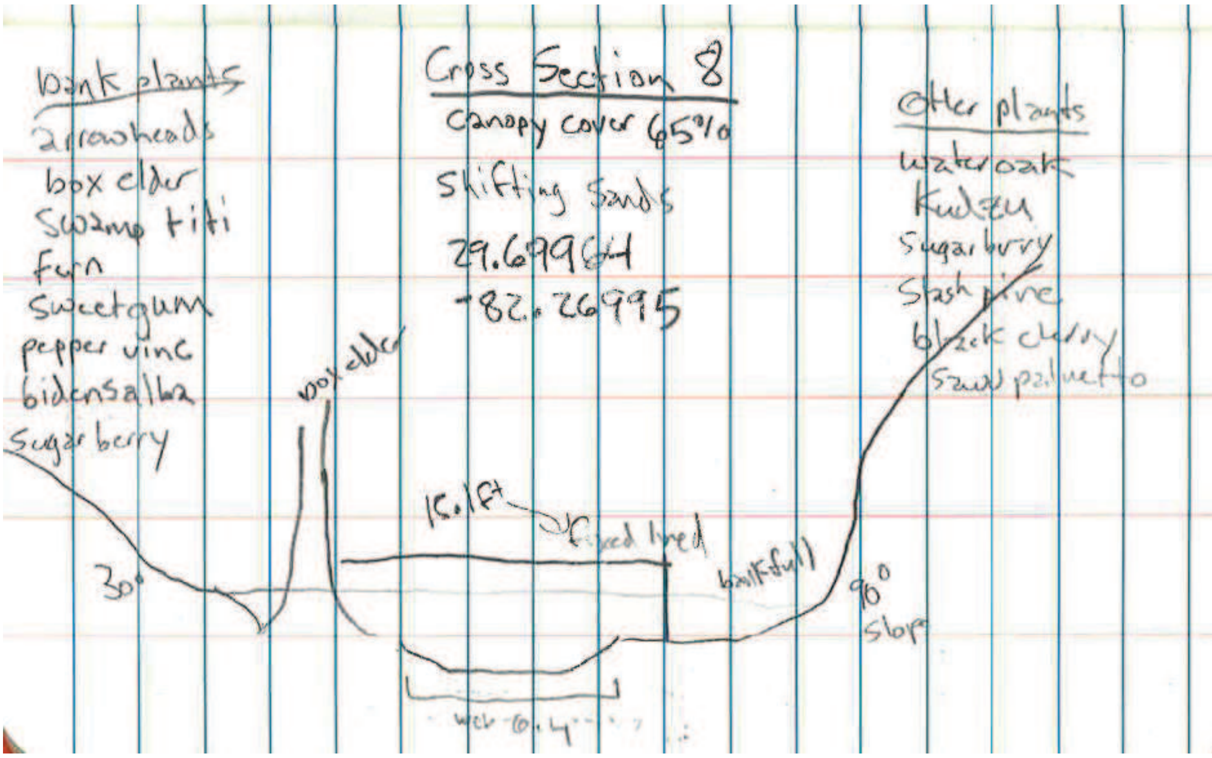
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T7	7	0.08	3.06	3.6
T7	8	0.24	3	3.76
T7	9	0.3	2.96	3.78
T7	10	0.5	2.78	3.98
T7	11	0.72	2.54	4.22
T7	12	0.78	2.64	4.3
T7	13	0.6	3.82	4.1



T8

T8 transect was completed on 4/24/17 at 1555. The total wet width of the stream was 6.4 feet, and the total bankfull width was 22.2 feet. The right bank slope was estimated at 90 degrees and the left bank slope was estimated at 30 degrees. The canopy cover was estimated at 65 percent. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Acer negundo*, *Sambucus nigra, Liquidambar styraciflua*, and *Cyrilla racemiflora*.

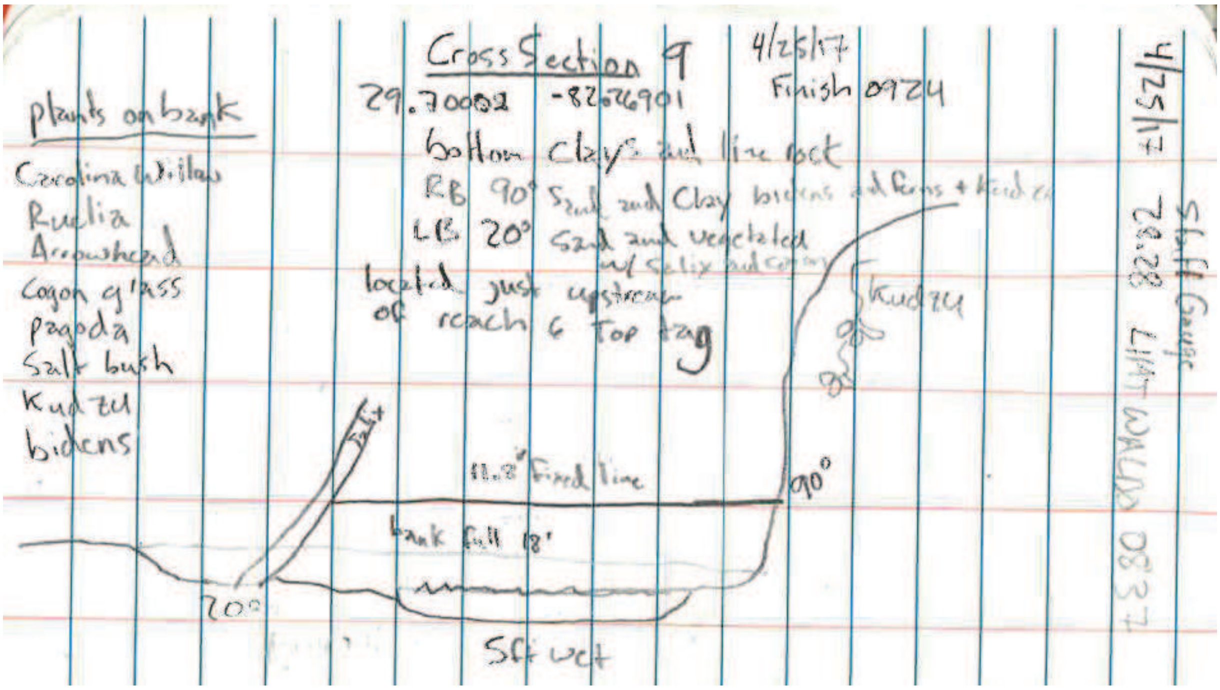
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T8	3	0.02	2.76	6
T8	4	0.2	2.36	6.12
T8	5	0.22	2.74	6.16
T8	6	0.28	2.18	6.18
T8	7	0.2	0.4	6.08
T8	8	0.18	0.88	6.08
T8	9.4	0.08	2.24	6



T9

T9 transect was completed on 4/25/17 at 0913. The total wet width of the stream was 5.0 feet and the total bankfull width was 18.0 feet. The right bank slope was estimated at 90 degrees and the left bank slope was estimated at 20 degrees. The right bank was under cutting, very steep, and mostly clear of tress, but the banks were covered in cinnamon fern and kudzu. The canopy cover was estimated at 20 percent. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Salix carolinana, and Baccharis halimifolia*.

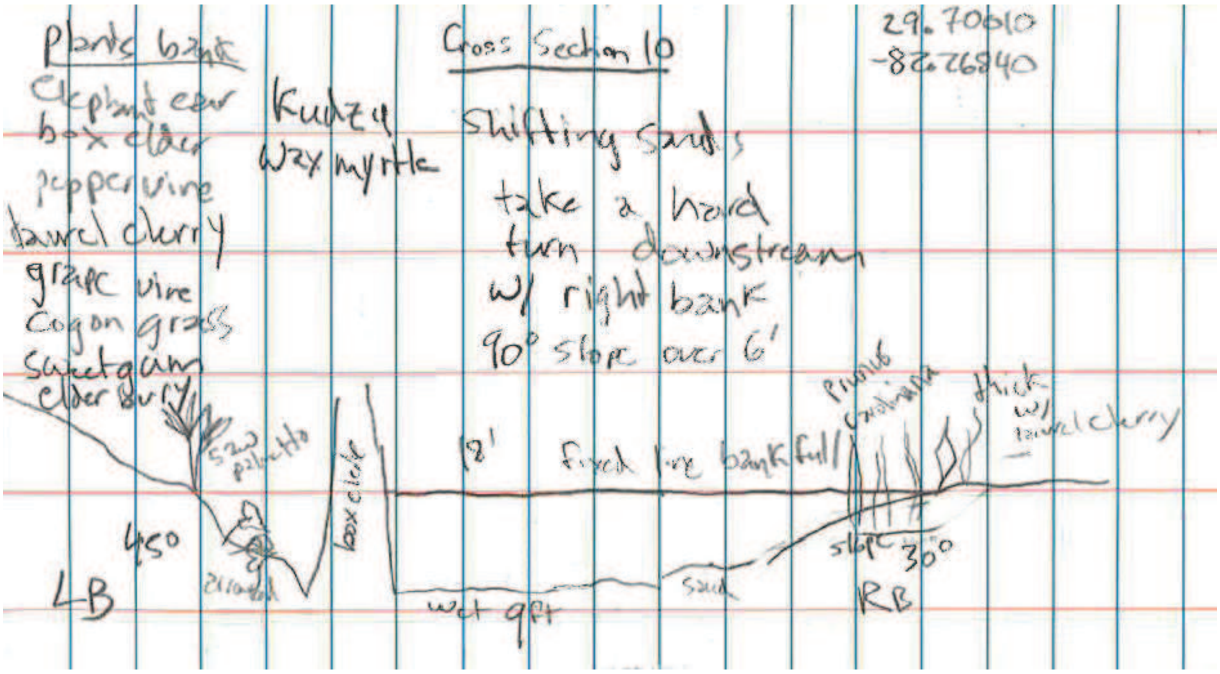
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T9	2	0	2.08	6
T9	3	0	0.78	5.98
T9	4	0.4	0.18	6.86
T9	5	0.46	0.9	6.92
T9	6	0.44	0.2	6.88
T9	7	0.46	1.02	6.9
T9	8	0.36	1.14	6.8
T9	9	0.22	2.52	6.68
T9	10	0	2.2	6.1
T9	11	0	2.8	5.52



T10

T10 transect was completed on 4/25/17 at 0937. The total wet width of the stream was 9.0 feet and the total bankfull width was 18.0 feet. The right bank slope was estimated at 30 degrees and the left bank slope was estimated at 45 degrees. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Acer negundo, Sambucus nigra*, *and Prunus carolinana*. The right bank was dominated by *Prunus carolinana*.

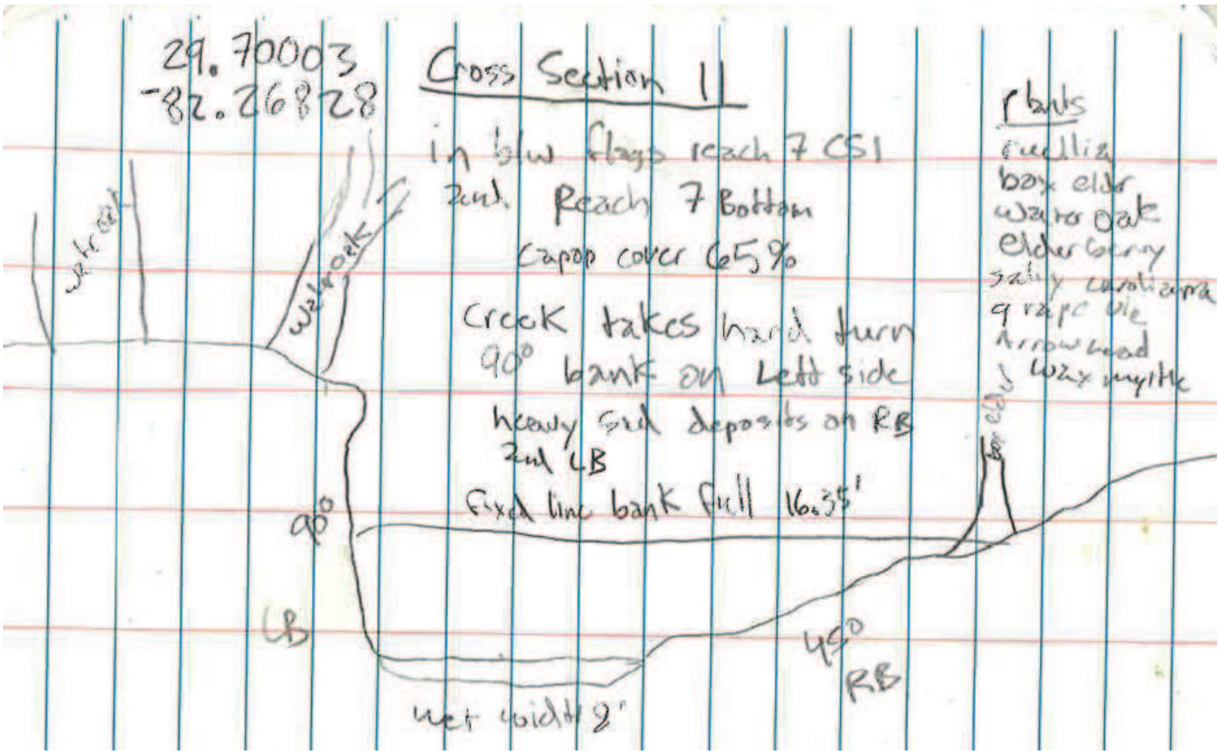
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T10	1	0.2	0.72	5.87
T10	2	0.18	0.68	5.84
T10	3	0.2	0.94	5.85
T10	4	0.26	1.12	5.91
T10	5	0.18	1.4	5.8
T10	6	0.16	1.12	5.79
T10	7	0.12	0.98	5.78
T10	8	0.12	1.12	5.8
T10	9	0.02	1.3	5.71
T10	10	0	1.26	5.5
T10	12.4	0	2.4	4.21



T11

T11 transect was completed on 4/25/17 at 1635. The total wet width of the stream was 8.35 feet and the total bankfull width was 16.35 feet. The right bank slope was estimated at 30 degrees and the left bank slope was estimated at 90 degrees. T11 was located just after the creek takes a hard right turn. Canopy cover was estimated at 65 percent. There were heavy sediment deposits within the stream bank, in which samplers were able to drive the probe to the end of the eight foot probe. In many cases the probe was driven by hand through what appeared to be a loamy calcareous clay, which left a white residue on the probe. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Acer negundo, Myrica cerifera*, and *Sambucus canadensis*.

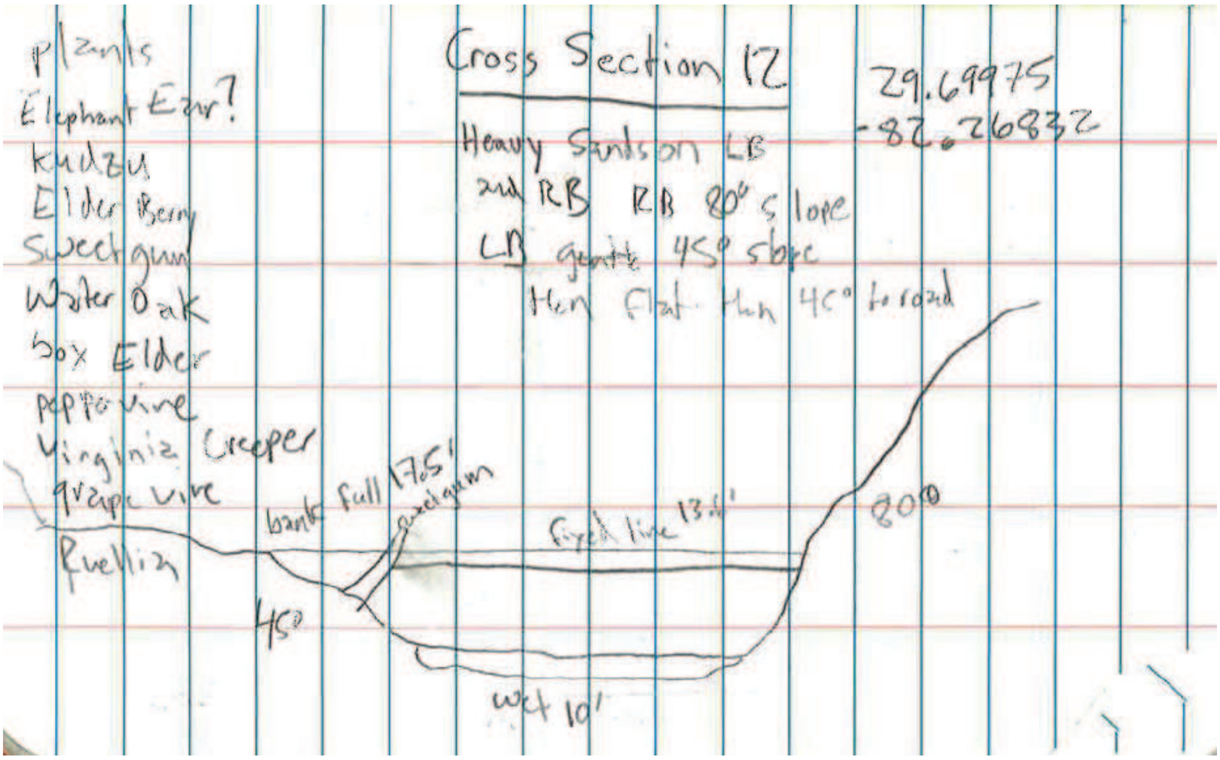
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T11	4	0	>8	5.47
T11	5	0	6.5	6.14
T11	6	0	>8	5.96
T11	7	0	>8	6.28
T11	8	0.26	4	6.9
T11	9	0.38	>8	7
T11	10	0.7	3.1	7.32
T11	11	0.74	3.14	7.32
T11	12	0.74	7.5	7.3
T11	13	0.72	>8	7.32
T11	14	0.68	>8	7.22



T12

T12 transect was completed on 4/25/17 at 1045. The total wet width of the stream was 10 feet and the total bankfull width was 17.5 feet. The right bank slope was estimated at 80 degrees and the left bank slope was estimated at 45 degrees. There were heavy sediment deposits within the stream bed with some locations in which samplers were able to drive the probe to the end of the eight feet. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Acer negundo, Liquidambar styraciflua*, and *Sambucus canadensis*.

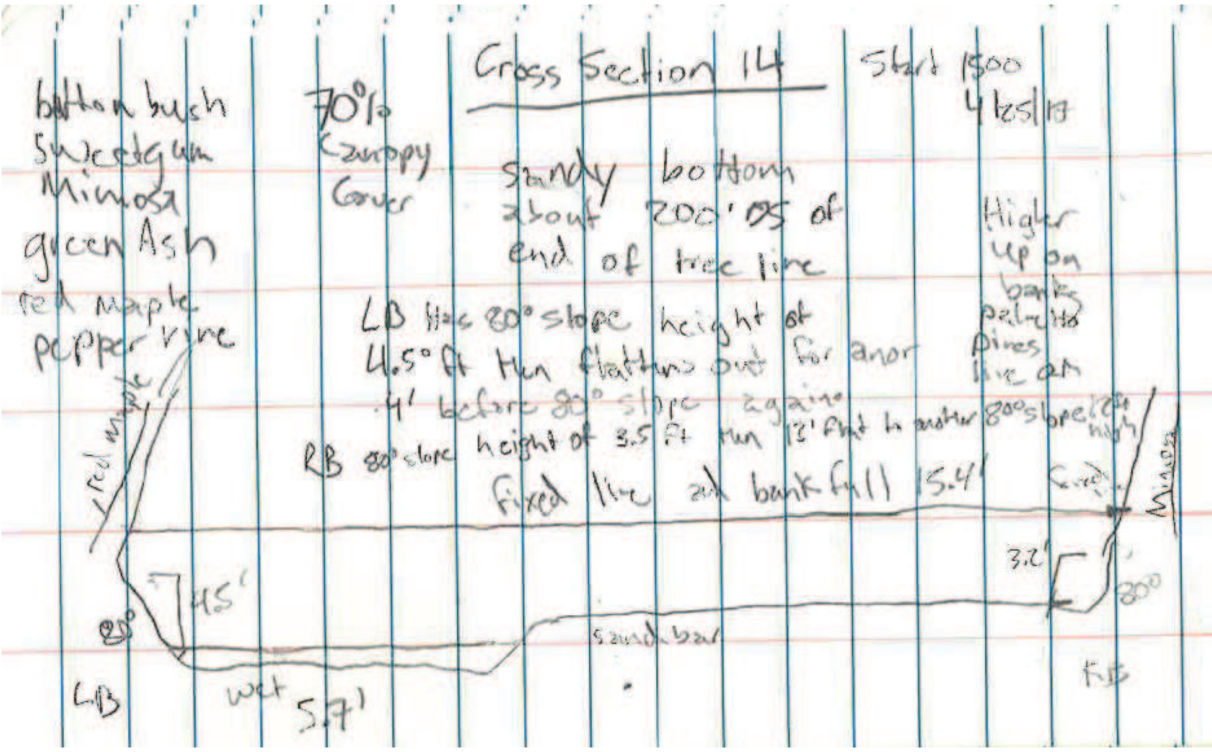
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T12	1	0.36	1.2	5.79
T12	2	0.68	2.92	6.1
T12	3	0.9	8	6.3
T12	4	0.8	>8	6.6
T12	5	1.4	3.3	6.72
T12	6	1.4	7.9	6.78
T12	7	1.42	6	6.8
T12	8	1.4	1.2	6.82
T12	9	0.98	>8	6.38
T12	10	0.9	5.4	6.36



T14

T14 transect was completed on 4/25/17 at 1448. The total wet width of the stream was 5.7 feet and the total bankfull width was 15.4 feet. The right bank slope was estimated at 70 degrees and the left bank slope was estimated at 80 degrees. The banks were formed in a step fashion with the immediate bank height on the left bank at 4.5 feet and then flattening out for another 4 feet before rising at an 80 degree slope again. The immediate right bank has a slope of 80 degrees to a height of 3.5 feet before flattening out for a width of 13 feet, and the rising again at an 80 degree slope. There were heavy sediment deposits within the stream bed with some locations in which samplers were able to drive the probe to the end of the eight feet. The canopy cover was estimated at 70 percent. Plant composition was made up of mixed hardwoods. Tree species noted on the banks included *Cephalanthus occidentalis, Liquidambar styraciflua*, and *Albizia julibrissin*.

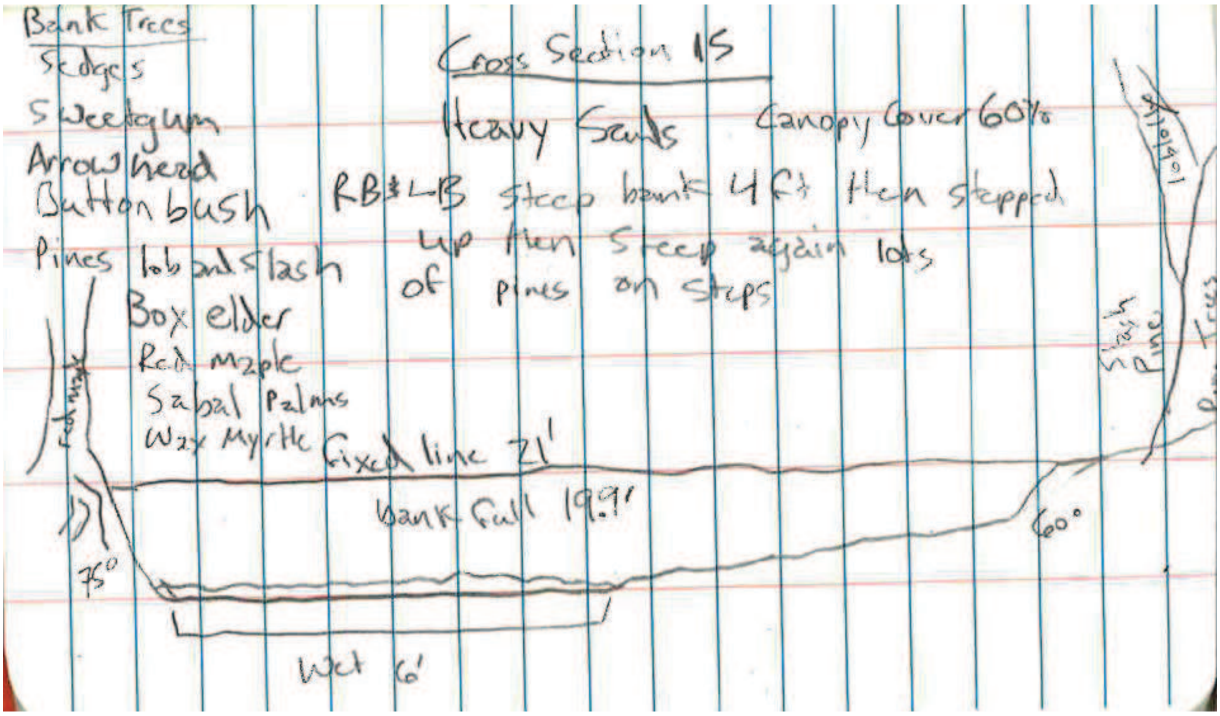
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T14	2	0	4	5.54
T14	4	0	4	5.56
T14	6	0	4	5.81
T14	8	0	>8	6.3
T14	10	0.1	>8	6.42
T14	12	0.1	>8	6.42
T14	14	0.42	3.8	6.65



T15

T15 transect was completed on 4/25/17 at 1417. The total wet width of the stream was 6 feet and the total bankfull width was 19.9 feet. The right bank slope was estimated at 15 degrees and the left bank slope was estimated at 60 degrees. The banks were formed in a step fashion with the immediate bank height on the left and right bank at 4 feet. There were heavy sediment deposits across the entire stream bed with all locations in which samplers were able to drive the probe to the end of the eight feet. Plant composition was comprised of mixed hardwoods and pines. Tree species noted on the banks included *Cephalanthus occidentalis, Liquidambar styraciflua*, and *Acer negundo*.

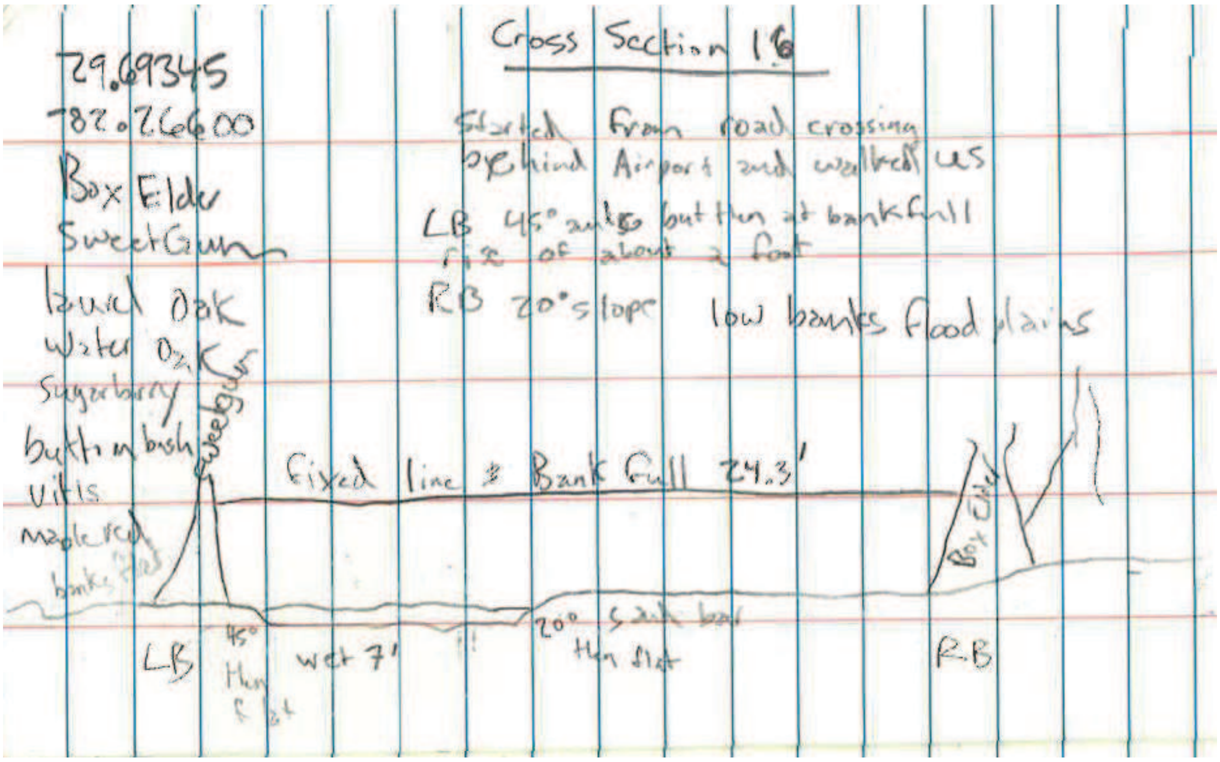
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T15	2	0.24	>8	4.28
T15	4	0.2	>8	4.22
T15	6	0.22	>8	4.3
T15	8	0	>8	4.16
T15	10	0	>8	3.91
T15	12	0	>8	3.6
T15	14	0	>8	3.34
T15	16	0	>8	2.56
T15	18	0	>8	2.6



T16

T16 transect was completed on 4/25/17 at 1305. The total wet width of the stream was 7 feet and the total bankfull width was 23.4 feet. The right bank slope was estimated at 20 degrees and the left bank slope was estimated at 45 degrees. This site was the closest site upstream of NE 52nd Drive. There were heavy sediment deposits across the entire stream bed with all locations in which samplers were able to drive the probe to the end of the eight feet. Plant composition was comprised of mixed hardwoods with an estimated canopy cover of 60 percent. Tree species noted on the banks included *Celtis laevigata Quercus nigra, Acer rubrum*, and *Acer negundo*.

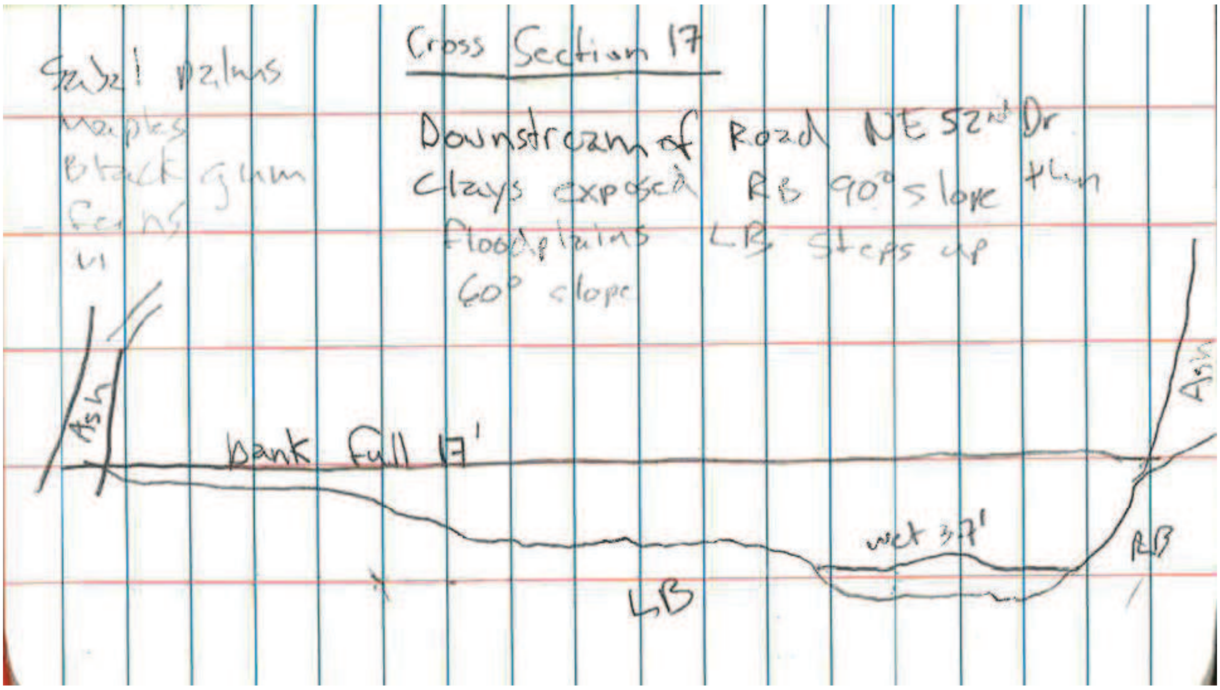
Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T16	2	0	>8	4.79
T16	4	0	>8	5.1
T16	6	0	>8	5.44
T16	8	0	>8	5.65
T16	10	0	>8	5.82
T16	12	0	>8	5.65
T16	14	0.26	>8	6.19
T16	16	0.35	>8	6.31
T16	18	0.62	>8	6.58
T16	20	0.5	>8	6.46
T16	22	0.1	>8	6.06



T17

T17 transect was completed on 4/25/17 at 1543. The total wet width of the stream was 3.4 feet and the total bankfull width was 17 feet. The right bank slope was estimated at 90 degrees and the left bank slope was estimated at 60 degrees. This site was furthest downstream site, located downstream of NE 52nd Drive. Plant composition was comprised of mixed hardwoods with an estimated canopy cover of 60 percent. Tree species noted on the banks included *Nyssa sylvatica, Acer rubrum*, and *Sabal palmetto*.

Site Name	Location on Tape	Water Depth	Sediment Depth	Depth to Stream Bottom from Fixed Line
T17	9	0	0.76	5.5
T17	11	0	1.2	5.78
T17	13	0.78	0.48	7.38
T17	15	0.46	1.02	7.06
T17	17	0	1.7	6.56


Sabal palms
Maples
Black gum
Ferns
Cross Section 17
Downstream of Road NE 52nd Dr
Clays exposed RB 90° slope thin floodplains LB steps up 60° slope
Ash
bank full 17'
wet 3.7'
RB
LB
Ash

Little Hatchet Creek Storm Sampling April 2017

During a rain event on 4/4/17 the Gainesville Regional Airport recorded 2.97" of rainfall. This rainfall occurred after a long drought period of no rainfall. A total of seven samples were collected over a two day period of 4/4/17 and 4/5/17 (Table 1). Sample locations were collected along Little Hatchet Creek with the most upstream site (LHATWALDO) located just upstream of Waldo Road, and two furthest downstream sites located at Little Hatchet West Branch on NW 39th Ave(LHAT39W), and Little Hatchet East Branch (LHAT26E) on SR26 (Figure 1). Samples were shipped to Test America Laboratories and analyzed for ammonia, total Kjeldahl nitrogen (TKN), nitrate nitrite as N (NOx), total nitrogen (TN), and total phosphorus (TP).   Results by site are summarized in Table 2. The TKN ranged from 0.86 mg/L (LHAT39W) to 1.6 mg/L (LAT26E on 4/5/17 at 0930). The NOx ranged from undetected (both the 4/5/17 LHAT26E samples) to 0.26 mg/L (LHAT26E on 4/4/17 at 1015). The TN ranged from 1.1 mg/L (LHATWALDO and LHAT39W) to 1.6 mg/L (LHAT26E on 4/4/17 at 1015 and LHAT26E on 4/5/17 at 0930). The TP ranged from 0.15 mg/L (both the LHAT26E 4/5/17 samples) to 0.44 mg/L (LHAT39W).

Table 1 Sample Collection Summary

Sample Name	Sample Date	Sample Time	Comments
LHAT26E	4/4/17	1015	Staff Gauge 11.96
LHATWALDO	4/4/17	1230	Staff Gauge 30.62
LHATDSAIRPORT	4/4/17	1300	Water flowing swiftly across road
LHAT39W	4/4/17	1800	Water depth 2' in culvert
LHAT26E	4/4/17	1815	Staff Gauge 12.44
LHAT26E	4/5/17	0930	Staff Gauge 12.70
LHAT26E	4/5/17	1940	Staff Gauge 13.06

Table 2 Sample results from Test America Laboratories

Sample Name (time)	TKN (mg/L)	NOx (mg/L)	TN (mg/L)	TP (mg/L)
LHAT26E (1015)	1.3	0.26	1.6	0.23
LHATWALDO (1230)	0.92	0.22	1.1	0.22
LHATDSAIRPORT (1300)	1.0	0.23	1.2	0.28
LHAT39W (1800)	0.86	0.24	1.1	0.44
LHAT26E (1815)	1.5	0.053	1.6	0.17
LHAT26E (0930)	1.6	0.010*	1.6	0.15
LHAT26E (1940)	1.3	0.010*	1.3	0.15

*sample parameter detection limit is reported when analysis was below detection limit.

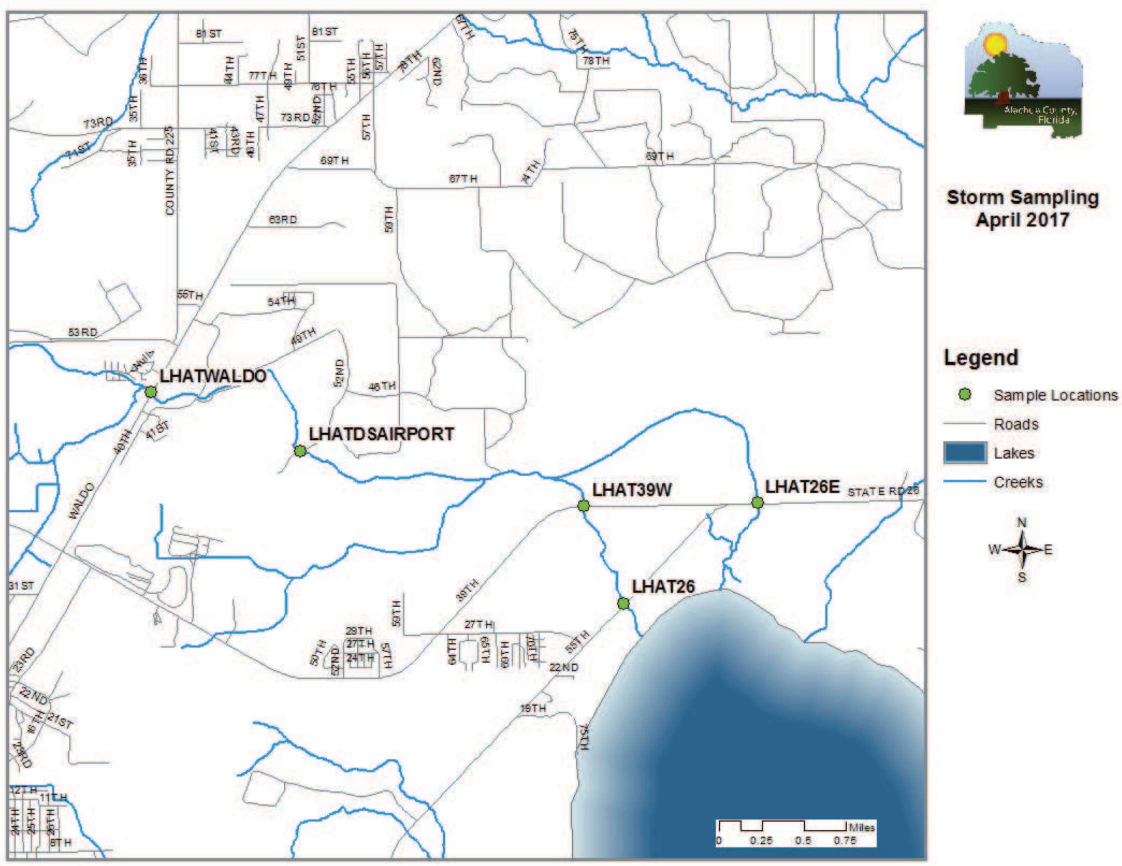


Figure 1 Sample Location Map

The first stormwater sample was collected from LHAT26E at 1015 on 4/4/17. There is a staff gauge at Little Hatchet Creek East Branch near the sampling site which was 11.96 during the first sample. The channel was flowing during the first sample, and had not been flowing before the storm.

Samplers stopped at LHAT39E at 1040. LHAT39E was a site located between LHAT39W and LHAT26E, draining a small wetted area through a 36" x 46" culvert. Water was staged up in this location, but not flowing, samplers also checked LHAT39W during this time (about 1040) and it also was not flowing. At 1200 the LHAT26E staff gauge read 12.26 (up from 11.96) but expecting the water to rise, a sample was not collected again from this location at that time.

At 1230 on 4/4/17 sample was collected from LHATWALDO. The staff gauge at Waldo Road read 30.62. The water color appeared dark and turbid. Next a sample was collected from LHATDSAIRPORT at 1300. The site is located behind the airport at NE 52nd Drive which acts much like a sediment trap, and the water sample was collected from the upstream side of the road, near the main culvert. Water was moving over the road in numerous places.

LHAT26E staff gauge was checked again at 1533 on 4/4/17 and had risen to 12.42. LHAT39E was also checked at this time and was not flowing. ACEPD returned to LHAT39W at 1800 and found it flowing. A sample was collected from LHAT39W at 1800 on 4/4/17. The water depth was measured inside the upstream (Eastern) culvert during the sample collection to a total depth of 2’, a second depth reading was taken outside the culvert with a total depth of 3.2’. Samplers next returned to LHAT26E for the last sample of the day. A sample was collected from LHAT26E on 4/4/17 at 1815 and the staff gauge read 12.44 at that time. At no time on 4/4/17 did LHAT26 or LHAT39E flow.

On 4/5/17 0926 ACEPD returned to LHAT39W and water levels had subsided from the previous day. Depth to water inside the culvert was 1.53’ and depth outside the culvert was 1.98’. LHAT26E continued to rise throughout the day on 4/5/17. A staff gauge reading of 13.06 was recorded at 14:00 and then a final reading of 13.20 recorded at 1940 on 4/5/17. A final sample was collected at 1940 on 4/5/17 from LHAT26E. LHAT26W did not flow on 4/5/17, at 1931 it was noted that there were isolated pools but no flow, also LHAT26 was checked around the same time (1940) on 4/5/17 and was not flowing.


Photos: (left)LHAT39W dry on 4/4/17 at 10:30 AM (right) LHAT39W flowing on 4/4/17 at 6:00 PM.


Photos: (left) LHATE at the start of the event on 4/4/17 at 10:15AM (right) LHATE on 4/5/17 at 9:30 AM.

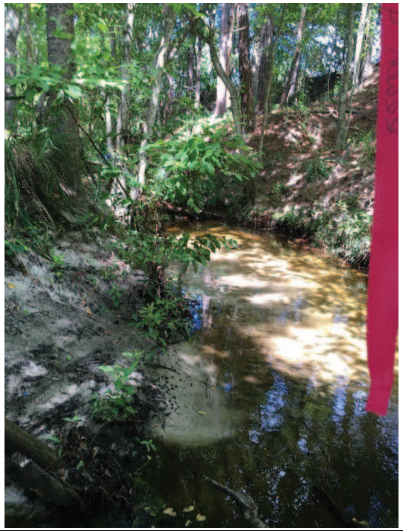

Photos: (left) LHATDSAIRPORT on 4/4/17 at 1:00PM (right) water flowing over the road near near LHATAIRPORT 4/4/17 at 1:00 PM.


Photos: (left) LHAT26 dry channel on 4/4/17 at 6:20 PM (right) LHAT39E wet but not flowing on 4/4/17 at 6:00 PM.

Appendix D

August 2016 Characterized LHC Reaches

Reach ID	Feature Type	Description
Reach 1		• Evidence of exposed Hawthorn within downstream right bank (approximately 6 inches, 25 percent of downstream right bank) • Large treed floodplain on either side • Some undercutting along both side of channel evident • Sandy substrate within channel • Exposed roots of trees and herbaceous plants • Average sediment (sand) of 1.79 ft. • Reach length of 282 ft (photo facing downstream)
Reach 2		• Hawthorn exposed on the most of reach within the downstream right bank • Hawthorn extends approximately 12 inches from bottom of channel along 70 percent of downstream right bank • Steep slopes of channel on downstream right bank • Top of slope approximately 16 feet on downstream right bank • Sandy substrate within channel • Treed floodplain present on downstream left bank • Average sediment (sand) of 1.92 ft. • Reach length of 271 ft (photo facing downstream)

Reach ID	Feature Type	Description
Reach 3	 	• Top of slope on downstream right bank approximately 22 ft • Riparian cover dominated by vines (no trees) • Within section of channel that used to be where old NE 43rd Terr was • Both sides of channel have very steep banks • No floodplain on either side • Exposed Hawthorn on downstream right bank (approximately 6 inches, 10 percent of downstream right bank) • Sandy substrate within channel • Average sediment (sand) of 2.12 ft • In need of substantial erosion control from overland flow • Reach length of 69 ft • (lefthand photo facing downstream; righthand photo of riparian cover on downstream right bank)
Reach 4	 	• Hawthorn layer exposed up to approximately six feet, exposed both above and below top of bank along 80 percent of downstream right bank • Steep slope on downstream right bank • Treed floodplain on downstream left bank • Sandy substrate within channel • Average sediment (sand) of 2.97 ft • Reach length of 69 ft • (lefthand photo facing upstream; righthand photo facing downstream)

Reach ID	Feature Type	Description
Reach 5	 	• Hawthorn layer exposed up to approximately six feet • Exposed both above and below top of bank along 100 percent of downstream right bank • Steep slope on downstream right bank • Treed floodplain on downstream left bank • Sandy substrate within channel • Average sediment (sand) of 1.89 ft • Reach length of 197 ft (lefthand photo facing downstream; righthand photo facing upstream)
Reach 6	 	• Hawthorn exposed up to approximately six feet • Exposed both above and below top of bank along 60 percent of downstream right bank • Steep slope on upstream left bank • Treed floodplain on downstream left bank • Sandy substrate within channel • Average sediment (sand) of 1.32 ft • Reach length of 185 ft (lefthand photo facing downstream; righthand photo of exposed Hawthorn on downstream right bank)

Reach ID	Feature Type	Description
Reach 7	 	• Sharp, nearly 90° bend in stream turning southward • Hawthorn exposed up to approximately six feet • Exposed both above and below top of bank along 80 percent of downstream left bank (on opposite side previously observed upstream) • Steep slope on both banks • Small floodplain on downstream right bank prior to turning up slope extremely sharply • Sandy substrate within channel • Average sediment (sand) of >6.84 ft • Reach length of 50 ft (lefthand photo facing upstream; righthand photo facing downstream)
Reach 8	 	• Hawthorn exposed up to approximately six feet • Exposed both above and below top of bank along 100 percent of downstream right bank • Steep slope on downstream right bank • Moderate treed floodplain on downstream left bank • Sandy substrate within channel • Average sediment (sand) of >5.29 ft • Reach length of 53 ft (lefthand photo facing upstream; righthand photo of exposed Hawthorn on downstream right bank)

Appendix E

Areas of Erosion Concern in LHC

ID	Feature Type	Description
Channel Erosion		
1		• Example of erosion observed along channel within Reaches identified as impacted • Exposed roots of shrubs and trees • Exposed Hawthorn Group Formation • Evidence of channel incising
2		• Example of 6ft high exposed Hawthorn Group Formation observed along channel within Reaches identified as impacted • Some exposed roots of shrubs and trees • Due to instream erosion • Evidence of channel incising • No stabilizing vegetation within channel bank • Slumping of channel bank observed

ID	Feature Type	Description
3		• Example of erosion observed along channel within Reaches identified as impacted • Some exposed roots of shrubs and trees • Exposed Hawthorn Group Formation • Clear evidence of channel incising
Concrete Culvert		
4		• 36-inch wide concrete culvert with apron • Downstream right bank • Set further up slope (approximately 15 feet from channel bottom • Set back from channel • Gully formed along path from culver to LHC mainstem

ID	Feature Type	Description
5		• 36-inch wide concrete culvert with apron • Downstream right bank • Set back from mainstem LHC • Small channel from culvert to LHC • Approximately 3 feet wide at junction with LHC
6		• 36-inch wide concrete culvert with apron • Downstream left bank • Not perched

ID	Feature Type	Description
7		• 36-inch wide concrete culvert with apron • Approximately 1.5 feet perched above stream channel bottom • Downstream right bank
8		• 36-inch wide concrete culvert with apron • Approximately 1.6 feet perched above stream channel bottom • Concrete debris at outfall of culvert • Downstream right bank
9	No photo	• 36-inch wide concrete culvert with apron • Approximately 2 feet perched above stream channel bottom

ID	Feature Type	Description
		• Downstream right bank
Overland Erosion		
10		• Gully on downstream right bank • No engineered drainage feature associated • Flow apparently coming from NE 40th Terrace
11		• Cliff erosion • Approximately 22 feet high • Trees fallen down cliff • Concrete block anchors found in channel (appear to have fallen from bank)

ID	Feature Type	Description
12		• Extremely steep cliff • Approximately 26 feet high • Downstream right bank • Trees fallen down cliff • Little riparian cover to stabilize soils
13		• Gully erosion • Begins at road at top of slope on downstream right bank and extends down to creek channel • Starting to undercut the chain link fence at edge of road

ID	Feature Type	Description
14		• Falling channel slope • No trees within riparian • Vines and shrubs attempting to stabilize slope • Evidence of failed erosion control attempts • Heavy sediment load source
Perched Pipe		
15		• Twenty-four inch diameter • corrugated steel concrete • On downstream right bank of channel • Perched approximately three feet • One-third full of sediment.

ID	Feature Type	Description
16		• Four-inch diameter • PVC construction • Perched approximately 10 feet in the air • Concrete rumble at point of contact with the ground approximately 8 feet from channel bank • Downstream left bank
17		• Tributary to LHC • Downstream left bank • Approximately three-feet wide at junction with LHC • Origin XXXXXXXXXX

ID	Feature Type	Description
18		• Tributary to LHC • Downstream right bank • Approximately three-feet wide at junction with LHC • Origin XXXXXXXXXX

Appendix F

Water Quality Data Used in Long-Term Loading Calculations

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	7/25/2007	11:45	Ammonia	0.099	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	Ammonia	0.064	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	Ammonia	0.028	mg/L		Baseflow	3	I	0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	Ammonia	0.009	mg/L		Baseflow	4	U	0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	Ammonia	0.009	mg/L		Baseflow	5	U	0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	Ammonia	0.028	mg/L		Baseflow	6	I	0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	Ammonia	0.009	mg/L		Baseflow	7	U	0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	Ammonia	0.032	mg/L		Baseflow	8	I	0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	Ammonia	0.034	mg/L		Baseflow	9	I	0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	Ammonia	0.044	mg/L		Baseflow	10		0.698	0.99	6.84349404
LittleHatch	3/25/2008	10:30	Ammonia	0.009	mg/L		Baseflow	11	U	0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	Ammonia	0.05	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	Ammonia	0.051	mg/L		Baseflow	13		0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	Ammonia	0.023	mg/L		Baseflow	14	I	0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	Ammonia	0.134	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	Ammonia	0.078	mg/L	2	Storm	1		1.067	1.63	18.5214162
LittleHatch	7/31/2007	20:58	Ammonia	0.101	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	Ammonia	0.079	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	Ammonia	0.075	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	Ammonia	0.055	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	Ammonia	0.035	mg/L	3	Storm	2	I	1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	Ammonia	0.195	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	Ammonia	0.009	mg/L	1	Storm	3	U	0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	Ammonia	0.014	mg/L	2	Storm	3	I	0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	Ammonia	0.009	mg/L	3	Storm	3	U	0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	Ammonia	0.009	mg/L	4	Storm	3	U	0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	Ammonia	0.033	mg/L	1	Storm	4	I	0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	Ammonia	0.014	mg/L	2	Storm	4	I	1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	Ammonia	0.009	mg/L	3	Storm	4	U	1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	Ammonia	0.009	mg/L	4	Storm	4	U	0.885	1.16	10.5549371
LittleHatch	10/4/2007	16:53	Ammonia	0.018	mg/L	1	Storm	5	I	0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	Ammonia	0.009	mg/L	2	Storm	5	U	1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	Ammonia	0.009	mg/L	3	Storm	5	U	2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	Ammonia	0.009	mg/L	4	Storm	5	U	0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	Ammonia	0.009	mg/L	1	Storm	6	U	0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	Ammonia	0.028	mg/L	2	Storm	6	I	0.864	1.23	10.8811935
LittleHatch	10/19/2007	18:17	Ammonia	0.009	mg/L	3	Storm	6	U	1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	Ammonia	0.009	mg/L	4	Storm	6	U	0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	Ammonia	0.036	mg/L	1	Storm	7	I	0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	Ammonia	0.054	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	Ammonia	0.03	mg/L	3	Storm	7	I	1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	Ammonia	0.009	mg/L	4	Storm	7	U	0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	Ammonia	0.043	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	Ammonia	0.095	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	Ammonia	0.025	mg/L	3	Storm	8	I	1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	Ammonia	0.022	mg/L	4	Storm	8	I	1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	Ammonia	0.025	mg/L	1	Storm	9	I	0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	Ammonia	0.023	mg/L	2	Storm	9	I	0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	Ammonia	0.026	mg/L	3	Storm	9	I	0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	Ammonia	0.059	mg/L	4	Storm	9		0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	Ammonia	0.009	mg/L	1	Storm	10	U	0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	Ammonia	0.009	mg/L	2	Storm	10	U	0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	Ammonia	0.009	mg/L	3	Storm	10	U	0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	Ammonia	0.009	mg/L	4	Storm	10	U	0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	Ammonia	0.033	mg/L	1	Storm	11	I	0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	Ammonia	0.009	mg/L	2	Storm	11	U	1.765	1.47	31.2907776

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	1/19/2008	9:24	Ammonia	0.009	mg/L	3	Storm	11	U	2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	Ammonia	0.009	mg/L	4	Storm	11	U	1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	Ammonia	0.066	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	Ammonia	0.018	mg/L	2	Storm	12	I	0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	Ammonia	0.018	mg/L	3	Storm	12	I	1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	Ammonia	0.052	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	Ammonia	0.009	mg/L	1	Storm	13	U	0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	Ammonia	0.012	mg/L	2	Storm	13	I	1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	Ammonia	0.02	mg/L	3	Storm	13	I	1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	Ammonia	0.019	mg/L	4	Storm	13	I	2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	Ammonia	0.042	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	Ammonia	0.065	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	Ammonia	0.013	mg/L	3	Storm	14	I	1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	Ammonia	0.01	mg/L	4	Storm	14	I	0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	Ammonia	0.033	mg/L	1	Storm	15	I	1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	Ammonia	0.021	mg/L	2	Storm	15	I	2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	Ammonia	0.047	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	Ammonia	0.052	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	Ammonia	0.035	mg/L	1	Storm	16	I	0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	Ammonia	0.049	mg/L	2	Storm	16		0.709	0.26	1.82970385
LittleHatch	4/6/2008	1:27	Ammonia	0.022	mg/L	3	Storm	16	I	0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	Ammonia	0.053	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	Ammonia	0.009	mg/L	1	Storm	17	U	0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	Ammonia	0.030	mg/L	2	Storm	17	I	0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	Ammonia	0.009	mg/L	3	Storm	17	U	0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	Ammonia	0.009	mg/L	4	Storm	17	U	0.285	0.5	1.29228555
LittleHatch	6/10/2008	14:26	Ammonia	0.179	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	Ammonia	0.174	mg/L	2	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/10/2008	16:56	Ammonia	0.185	mg/L	3	Storm	18		1.988	2.6	64.6665694
LittleHatch	6/11/2008	3:56	Ammonia	0.020	mg/L	4	Storm	18	I	0.73	1.38	10.0419133
LittleHatch	7/25/2007	11:45	Nitrate-Nitrite	0.361	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	Nitrate-Nitrite	0.242	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	Nitrate-Nitrite	0.243	mg/L		Baseflow	3		0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	Nitrate-Nitrite	0.249	mg/L		Baseflow	4		0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	Nitrate-Nitrite	0.193	mg/L		Baseflow	5		0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	Nitrate-Nitrite	0.144	mg/L		Baseflow	6		0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	Nitrate-Nitrite	0.234	mg/L		Baseflow	7		0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	Nitrate-Nitrite	0.1	mg/L		Baseflow	8		0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	Nitrate-Nitrite	0.052	mg/L		Baseflow	9		0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	Nitrate-Nitrite	0.165	mg/L		Baseflow	10		0.698	0.99	6.84349404
LittleHatch	3/25/2008	10:30	Nitrate-Nitrite	0.099	mg/L		Baseflow	11		0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	Nitrate-Nitrite	0.136	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	Nitrate-Nitrite	0.226	mg/L		Baseflow	13		0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	Nitrate-Nitrite	0.076	mg/L		Baseflow	14		0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	Nitrate-Nitrite	0.202	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	Nitrate-Nitrite	0.144	mg/L	2	Storm	1		1.067	1.63	18.5214162
LittleHatch	7/31/2007	20:58	Nitrate-Nitrite	0.108	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	Nitrate-Nitrite	0.078	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	Nitrate-Nitrite	0.351	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	Nitrate-Nitrite	0.227	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	Nitrate-Nitrite	0.207	mg/L	3	Storm	2		1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	Nitrate-Nitrite	0.177	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	Nitrate-Nitrite	0.602	mg/L	1	Storm	3		0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	Nitrate-Nitrite	0.296	mg/L	2	Storm	3		0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	Nitrate-Nitrite	0.187	mg/L	3	Storm	3		0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	Nitrate-Nitrite	0.125	mg/L	4	Storm	3		0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	Nitrate-Nitrite	0.210	mg/L	1	Storm	4		0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	Nitrate-Nitrite	0.077	mg/L	2	Storm	4		1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	Nitrate-Nitrite	0.133	mg/L	3	Storm	4		1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	Nitrate-Nitrite	0.090	mg/L	4	Storm	4		0.885	1.16	10.5549371

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	10/4/2007	16:53	Nitrate-Nitrite	0.190	mg/L	1	Storm	5		0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	Nitrate-Nitrite	0.177	mg/L	2	Storm	5		1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	Nitrate-Nitrite	0.109	mg/L	3	Storm	5		2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	Nitrate-Nitrite	0.071	mg/L	4	Storm	5		0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	Nitrate-Nitrite	0.318	mg/L	1	Storm	6		0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	Nitrate-Nitrite	0.111	mg/L	2	Storm	6		0.864	1.23	10.8811935
LittleHatch	10/19/2007	18:17	Nitrate-Nitrite	0.160	mg/L	3	Storm	6		1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	Nitrate-Nitrite	0.076	mg/L	4	Storm	6		0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	Nitrate-Nitrite	0.247	mg/L	1	Storm	7		0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	Nitrate-Nitrite	0.106	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	Nitrate-Nitrite	0.233	mg/L	3	Storm	7		1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	Nitrate-Nitrite	0.111	mg/L	4	Storm	7		0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	Nitrate-Nitrite	0.220	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	Nitrate-Nitrite	0.184	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	Nitrate-Nitrite	0.106	mg/L	3	Storm	8		1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	Nitrate-Nitrite	0.051	mg/L	4	Storm	8		1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	Nitrate-Nitrite	0.003	mg/L	1	Storm	9	U	0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	Nitrate-Nitrite	0.025	mg/L	2	Storm	9		0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	Nitrate-Nitrite	0.050	mg/L	3	Storm	9		0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	Nitrate-Nitrite	0.008	mg/L	4	Storm	9	I	0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	Nitrate-Nitrite	0.151	mg/L	1	Storm	10		0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	Nitrate-Nitrite	0.091	mg/L	2	Storm	10		0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	Nitrate-Nitrite	0.061	mg/L	3	Storm	10		0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	Nitrate-Nitrite	0.096	mg/L	4	Storm	10		0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	Nitrate-Nitrite	0.126	mg/L	1	Storm	11		0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	Nitrate-Nitrite	0.081	mg/L	2	Storm	11		1.765	1.47	31.2907776
LittleHatch	1/19/2008	9:24	Nitrate-Nitrite	0.075	mg/L	3	Storm	11		2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	Nitrate-Nitrite	0.003	mg/L	4	Storm	11	U	1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	Nitrate-Nitrite	0.217	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	Nitrate-Nitrite	0.066	mg/L	2	Storm	12		0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	Nitrate-Nitrite	0.098	mg/L	3	Storm	12		1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	Nitrate-Nitrite	0.024	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	Nitrate-Nitrite	0.135	mg/L	1	Storm	13		0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	Nitrate-Nitrite	0.076	mg/L	2	Storm	13		1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	Nitrate-Nitrite	0.094	mg/L	3	Storm	13		1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	Nitrate-Nitrite	0.026	mg/L	4	Storm	13		2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	Nitrate-Nitrite	0.173	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	Nitrate-Nitrite	0.212	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	Nitrate-Nitrite	0.139	mg/L	3	Storm	14		1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	Nitrate-Nitrite	0.078	mg/L	4	Storm	14		0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	Nitrate-Nitrite	0.121	mg/L	1	Storm	15		1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	Nitrate-Nitrite	0.098	mg/L	2	Storm	15		2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	Nitrate-Nitrite	0.086	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	Nitrate-Nitrite	0.336	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	Nitrate-Nitrite	0.236	mg/L	1	Storm	16		0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	Nitrate-Nitrite	0.160	mg/L	2	Storm	16		0.709	0.26	1.82970385
LittleHatch	4/6/2008	1:27	Nitrate-Nitrite	0.104	mg/L	3	Storm	16		0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	Nitrate-Nitrite	0.065	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	Nitrate-Nitrite	0.513	mg/L	1	Storm	17		0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	Nitrate-Nitrite	0.844	mg/L	2	Storm	17		0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	Nitrate-Nitrite	0.139	mg/L	3	Storm	17		0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	Nitrate-Nitrite	0.116	mg/L	4	Storm	17		0.285	0.5	1.29228555
LittleHatch	6/10/2008	14:26	Nitrate-Nitrite	0.676	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	Nitrate-Nitrite	0.334	mg/L	2	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/10/2008	16:56	Nitrate-Nitrite	0.347	mg/L	3	Storm	18		1.988	2.6	64.6665694
LittleHatch	6/11/2008	3:56	Nitrate-Nitrite	0.170	mg/L	4	Storm	18		0.73	1.38	10.0419133
LittleHatch	7/25/2007	11:45	Orthophosphate	0.508	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	Orthophosphate	0.202	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	Orthophosphate	0.101	mg/L		Baseflow	3		0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	Orthophosphate	0.236	mg/L		Baseflow	4		0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	Orthophosphate	0.378	mg/L		Baseflow	5		0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	Orthophosphate	0.335	mg/L		Baseflow	6		0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	Orthophosphate	0.127	mg/L		Baseflow	7		0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	Orthophosphate	0.183	mg/L		Baseflow	8		0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	Orthophosphate	0.13	mg/L		Baseflow	9		0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	Orthophosphate	0.077	mg/L		Baseflow	10		0.698	0.99	6.84349404

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	3/25/2008	10:30	Orthophosphate	0.144	mg/L		Baseflow	11		0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	Orthophosphate	0.169	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	Orthophosphate	0.384	mg/L		Baseflow	13		0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	Orthophosphate	0.498	mg/L		Baseflow	14		0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	Orthophosphate	0.224	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	Orthophosphate	0.096	mg/L	2	Storm	1		1.067	1.63	18.5214162
LittleHatch	7/31/2007	20:58	Orthophosphate	0.106	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	Orthophosphate	0.099	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	Orthophosphate	0.755	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	Orthophosphate	0.159	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	Orthophosphate	0.193	mg/L	3	Storm	2		1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	Orthophosphate	0.130	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	Orthophosphate	0.243	mg/L	1	Storm	3		0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	Orthophosphate	0.275	mg/L	2	Storm	3		0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	Orthophosphate	0.171	mg/L	3	Storm	3		0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	Orthophosphate	0.119	mg/L	4	Storm	3		0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	Orthophosphate	0.272	mg/L	1	Storm	4		0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	Orthophosphate	0.096	mg/L	2	Storm	4		1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	Orthophosphate	0.073	mg/L	3	Storm	4		1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	Orthophosphate	0.080	mg/L	4	Storm	4		0.885	1.16	10.5549371
LittleHatch	10/4/2007	16:53	Orthophosphate	0.240	mg/L	1	Storm	5		0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	Orthophosphate	0.223	mg/L	2	Storm	5		1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	Orthophosphate	0.158	mg/L	3	Storm	5		2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	Orthophosphate	0.088	mg/L	4	Storm	5		0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	Orthophosphate	0.134	mg/L	1	Storm	6		0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	Orthophosphate	0.089	mg/L	2	Storm	6		0.864	1.23	10.8811935
LittleHatch	10/19/2007	18:17	Orthophosphate	0.073	mg/L	3	Storm	6		1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	Orthophosphate	0.089	mg/L	4	Storm	6		0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	Orthophosphate	0.431	mg/L	1	Storm	7		0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	Orthophosphate	0.138	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	Orthophosphate	0.093	mg/L	3	Storm	7		1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	Orthophosphate	0.168	mg/L	4	Storm	7		0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	Orthophosphate	0.703	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	Orthophosphate	0.267	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	Orthophosphate	0.241	mg/L	3	Storm	8		1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	Orthophosphate	0.183	mg/L	4	Storm	8		1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	Orthophosphate	0.251	mg/L	1	Storm	9		0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	Orthophosphate	0.261	mg/L	2	Storm	9		0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	Orthophosphate	0.344	mg/L	3	Storm	9		0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	Orthophosphate	0.183	mg/L	4	Storm	9		0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	Orthophosphate	0.235	mg/L	1	Storm	10		0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	Orthophosphate	0.158	mg/L	2	Storm	10		0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	Orthophosphate	0.097	mg/L	3	Storm	10		0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	Orthophosphate	0.099	mg/L	4	Storm	10		0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	Orthophosphate	0.140	mg/L	1	Storm	11		0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	Orthophosphate	0.117	mg/L	2	Storm	11		1.765	1.47	31.2907776
LittleHatch	1/19/2008	9:24	Orthophosphate	0.215	mg/L	3	Storm	11		2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	Orthophosphate	0.145	mg/L	4	Storm	11		1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	Orthophosphate	0.174	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	Orthophosphate	0.068	mg/L	2	Storm	12		0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	Orthophosphate	0.063	mg/L	3	Storm	12		1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	Orthophosphate	0.085	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	Orthophosphate	0.145	mg/L	1	Storm	13		0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	Orthophosphate	0.08	mg/L	2	Storm	13		1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	Orthophosphate	0.081	mg/L	3	Storm	13		1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	Orthophosphate	0.071	mg/L	4	Storm	13		2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	Orthophosphate	0.153	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	Orthophosphate	0.138	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	Orthophosphate	0.051	mg/L	3	Storm	14		1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	Orthophosphate	0.087	mg/L	4	Storm	14		0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	Orthophosphate	0.097	mg/L	1	Storm	15		1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	Orthophosphate	0.053	mg/L	2	Storm	15		2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	Orthophosphate	0.05	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	Orthophosphate	0.043	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	Orthophosphate	0.206	mg/L	1	Storm	16		0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	Orthophosphate	0.115	mg/L	2	Storm	16		0.709	0.26	1.82970385

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	4/6/2008	1:27	Orthophosphate	0.073	mg/L	3	Storm	16		0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	Orthophosphate	0.095	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	Orthophosphate	0.487	mg/L	1	Storm	17		0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	Orthophosphate	0.318	mg/L	2	Storm	17		0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	Orthophosphate	0.286	mg/L	3	Storm	17		0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	Orthophosphate	0.233	mg/L	4	Storm	17		0.285	0.5	1.29228555
LittleHatch	6/10/2008	14:26	Orthophosphate	0.639	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	Orthophosphate	0.152	mg/L	2	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/10/2008	16:56	Orthophosphate	0.082	mg/L	3	Storm	18		1.988	2.6	64.6665694
LittleHatch	6/11/2008	3:56	Orthophosphate	0.079	mg/L	4	Storm	18		0.73	1.38	10.0419133
LittleHatch	7/25/2007	11:45	Phosphorus	0.473	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	Phosphorus	0.245	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	Phosphorus	0.16	mg/L		Baseflow	3		0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	Phosphorus	0.282	mg/L		Baseflow	4		0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	Phosphorus	0.440	mg/L		Baseflow	5		0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	Phosphorus	0.370	mg/L		Baseflow	6		0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	Phosphorus	0.158	mg/L		Baseflow	7		0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	Phosphorus	0.214	mg/L		Baseflow	8		0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	Phosphorus	0.153	mg/L		Baseflow	9		0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	Phosphorus	0.109	mg/L		Baseflow	10		0.698	0.99	6.84349404
LittleHatch	3/25/2008	10:30	Phosphorus	0.140	mg/L		Baseflow	11		0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	Phosphorus	0.222	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	Phosphorus	0.441	mg/L		Baseflow	13		0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	Phosphorus	0.561	mg/L		Baseflow	14		0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	Phosphorus	0.581	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	Phosphorus	0.184	mg/L	2	Storm	1		1.067	1.63	18.5214162
LittleHatch	7/31/2007	20:58	Phosphorus	0.163	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	Phosphorus	0.149	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	Phosphorus	0.547	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	Phosphorus	0.377	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	Phosphorus	0.372	mg/L	3	Storm	2		1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	Phosphorus	0.320	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	Phosphorus	0.337	mg/L	1	Storm	3		0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	Phosphorus	0.303	mg/L	2	Storm	3		0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	Phosphorus	0.222	mg/L	3	Storm	3		0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	Phosphorus	0.156	mg/L	4	Storm	3		0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	Phosphorus	0.428	mg/L	1	Storm	4		0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	Phosphorus	0.217	mg/L	2	Storm	4		1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	Phosphorus	0.209	mg/L	3	Storm	4		1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	Phosphorus	0.181	mg/L	4	Storm	4		0.885	1.16	10.5549371
LittleHatch	10/4/2007	16:53	Phosphorus	0.255	mg/L	1	Storm	5		0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	Phosphorus	0.269	mg/L	2	Storm	5		1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	Phosphorus	0.197	mg/L	3	Storm	5		2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	Phosphorus	0.129	mg/L	4	Storm	5		0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	Phosphorus	0.268	mg/L	1	Storm	6		0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	Phosphorus	0.277	mg/L	2	Storm	6		0.864	1.23	10.8811935
LittleHatch	10/19/2007	18:17	Phosphorus	0.226	mg/L	3	Storm	6		1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	Phosphorus	0.182	mg/L	4	Storm	6		0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	Phosphorus	0.52	mg/L	1	Storm	7		0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	Phosphorus	0.309	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	Phosphorus	0.248	mg/L	3	Storm	7		1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	Phosphorus	0.199	mg/L	4	Storm	7		0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	Phosphorus	0.648	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	Phosphorus	0.335	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	Phosphorus	0.377	mg/L	3	Storm	8		1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	Phosphorus	0.335	mg/L	4	Storm	8		1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	Phosphorus	0.414	mg/L	1	Storm	9		0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	Phosphorus	0.411	mg/L	2	Storm	9		0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	Phosphorus	0.505	mg/L	3	Storm	9		0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	Phosphorus	0.274	mg/L	4	Storm	9		0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	Phosphorus	0.291	mg/L	1	Storm	10		0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	Phosphorus	0.230	mg/L	2	Storm	10		0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	Phosphorus	0.176	mg/L	3	Storm	10		0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	Phosphorus	0.174	mg/L	4	Storm	10		0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	Phosphorus	0.280	mg/L	1	Storm	11		0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	Phosphorus	0.216	mg/L	2	Storm	11		1.765	1.47	31.2907776

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	1/19/2008	9:24	Phosphorus	0.262	mg/L	3	Storm	11		2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	Phosphorus	0.409	mg/L	4	Storm	11		1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	Phosphorus	0.276	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	Phosphorus	0.222	mg/L	2	Storm	12		0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	Phosphorus	0.171	mg/L	3	Storm	12		1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	Phosphorus	0.151	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	Phosphorus	0.192	mg/L	1	Storm	13		0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	Phosphorus	0.172	mg/L	2	Storm	13		1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	Phosphorus	0.141	mg/L	3	Storm	13		1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	Phosphorus	0.164	mg/L	4	Storm	13		2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	Phosphorus	0.223	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	Phosphorus	0.248	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	Phosphorus	0.147	mg/L	3	Storm	14		1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	Phosphorus	0.138	mg/L	4	Storm	14		0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	Phosphorus	0.166	mg/L	1	Storm	15		1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	Phosphorus	0.182	mg/L	2	Storm	15		2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	Phosphorus	0.221	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	Phosphorus	0.147	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	Phosphorus	0.290	mg/L	1	Storm	16		0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	Phosphorus	0.184	mg/L	2	Storm	16		0.709	0.26	1.82970385
LittleHatch	4/6/2008	1:27	Phosphorus	0.138	mg/L	3	Storm	16		0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	Phosphorus	0.148	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	Phosphorus	0.664	mg/L	1	Storm	17		0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	Phosphorus	0.577	mg/L	2	Storm	17		0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	Phosphorus	0.369	mg/L	3	Storm	17		0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	Phosphorus	0.284	mg/L	4	Storm	17		0.285	0.5	1.29228555
LittleHatch	6/10/2008	14:26	Phosphorus	1.11	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	Phosphorus	0.604	mg/L	3	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/11/2008	3:56	Phosphorus	0.418	mg/L	4	Storm	18		0.73	1.38	10.0419133
LittleHatch	6/11/2008	3:56	Phosphorus	0.344	mg/L	4	Storm	18		0.73	1.38	10.0419133
LittleHatch	7/25/2007	11:45	TKN	0.34	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	TKN	0.52	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	TKN	1.08	mg/L		Baseflow	3		0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	TKN	0.31	mg/L		Baseflow	4		0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	TKN	0.35	mg/L		Baseflow	5		0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	TKN	0.24	mg/L		Baseflow	6	I	0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	TKN	0.56	mg/L		Baseflow	7		0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	TKN	0.41	mg/L		Baseflow	8		0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	TKN	0.4	mg/L		Baseflow	9		0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	TKN	0.64	mg/L		Baseflow	10		0.698	0.99	6.84349404
LittleHatch	3/25/2008	10:30	TKN	0.63	mg/L		Baseflow	11		0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	TKN	0.52	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	TKN	0.290	mg/L		Baseflow	13	I	0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	TKN	0.25	mg/L		Baseflow	14	I	0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	TKN	0.79	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	TKN	0.54	mg/L	2	Storm	1		1.067	1.63	18.5214162
LittleHatch	7/31/2007	20:58	TKN	0.48	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	TKN	0.62	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	TKN	0.69	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	TKN	0.81	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	TKN	0.80	mg/L	3	Storm	2		1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	TKN	0.85	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	TKN	0.43	mg/L	1	Storm	3		0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	TKN	0.37	mg/L	2	Storm	3		0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	TKN	0.31 I	mg/L	3	Storm	3		0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	TKN	0.37	mg/L	4	Storm	3		0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	TKN	0.44	mg/L	1	Storm	4		0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	TKN	0.37	mg/L	2	Storm	4		1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	TKN	0.50	mg/L	3	Storm	4		1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	TKN	0.59	mg/L	4	Storm	4		0.885	1.16	10.5549371
LittleHatch	10/4/2007	16:53	TKN	0.54	mg/L	1	Storm	5		0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	TKN	0.53	mg/L	2	Storm	5		1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	TKN	0.42	mg/L	3	Storm	5		2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	TKN	1.00	mg/L	4	Storm	5		0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	TKN	0.55	mg/L	1	Storm	6		0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	TKN	0.51	mg/L	2	Storm	6		0.864	1.23	10.8811935

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	10/19/2007	18:17	TKN	0.55	mg/L	3	Storm	6		1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	TKN	0.50	mg/L	4	Storm	6		0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	TKN	0.53	mg/L	1	Storm	7		0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	TKN	0.62	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	TKN	0.48	mg/L	3	Storm	7		1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	TKN	0.59	mg/L	4	Storm	7		0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	TKN	0.43	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	TKN	0.81	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	TKN	0.68	mg/L	3	Storm	8		1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	TKN	0.75	mg/L	4	Storm	8		1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	TKN	1.05	mg/L	1	Storm	9		0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	TKN	1.16	mg/L	2	Storm	9		0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	TKN	1.27	mg/L	3	Storm	9		0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	TKN	1.07	mg/L	4	Storm	9		0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	TKN	0.23	mg/L	1	Storm	10	I	0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	TKN	0.22	mg/L	2	Storm	10	I	0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	TKN	0.30	mg/L	3	Storm	10	I	0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	TKN	0.24	mg/L	4	Storm	10	I	0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	TKN	0.49	mg/L	1	Storm	11		0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	TKN	0.53	mg/L	2	Storm	11		1.765	1.47	31.2907776
LittleHatch	1/19/2008	9:24	TKN	0.60	mg/L	3	Storm	11		2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	TKN	1.05	mg/L	4	Storm	11		1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	TKN	0.55	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	TKN	0.38	mg/L	2	Storm	12		0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	TKN	0.37	mg/L	3	Storm	12		1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	TKN	0.53	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	TKN	0.44	mg/L	1	Storm	13		0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	TKN	0.29	mg/L	2	Storm	13	I	1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	TKN	0.27	mg/L	3	Storm	13	I	1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	TKN	0.34	mg/L	4	Storm	13		2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	TKN	0.64	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	TKN	0.71	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	TKN	0.51	mg/L	3	Storm	14		1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	TKN	0.57	mg/L	4	Storm	14		0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	TKN	0.38	mg/L	1	Storm	15		1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	TKN	0.38	mg/L	2	Storm	15		2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	TKN	0.58	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	TKN	0.83	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	TKN	0.580	mg/L	1	Storm	16		0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	TKN	0.460	mg/L	2	Storm	16		0.709	0.26	1.82970385
LittleHatch	4/6/2008	1:27	TKN	0.570	mg/L	3	Storm	16		0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	TKN	0.600	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	TKN	0.790	mg/L	1	Storm	17		0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	TKN	1.26	mg/L	2	Storm	17		0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	TKN	0.540	mg/L	3	Storm	17		0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	TKN	0.65	mg/L	4	Storm	17		0.285	0.5	1.29228555
LittleHatch	6/10/2008	14:26	TKN	2.04	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	TKN	1.27	mg/L	2	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/10/2008	16:56	TKN	0.86	mg/L	3	Storm	18		1.988	2.6	64.6665694
LittleHatch	6/11/2008	3:56	TKN	0.78	mg/L	4	Storm	18		0.73	1.38	10.0419133
LittleHatch	7/25/2007	11:45	TOC	5.26	mg/L		Baseflow	1		0.155	#N/A	#N/A
LittleHatch	9/28/2007	11:00	TOC	13.9	mg/L		Baseflow	2		0.452	0.89	3.78393724
LittleHatch	10/9/2007	13:55	TOC	23.0	mg/L		Baseflow	3		0.97	1.64	16.6290476
LittleHatch	11/12/2007	11:50	TOC	11.3	mg/L		Baseflow	4		0.177	0.44	0.68926682
LittleHatch	12/11/2007	11:15	TOC	9.9	mg/L		Baseflow	5		0.198	0.48	0.84517337
LittleHatch	1/8/2008	12:30	TOC	8.04	mg/L		Baseflow	6		0.226	0.45	0.91015538
LittleHatch	1/28/2008	13:05	TOC	11.8	mg/L		Baseflow	7		0.522	0.74	3.68809274
LittleHatch	2/5/2008	12:05	TOC	11.2	mg/L		Baseflow	8		0.369	0.73	2.48856389
LittleHatch	2/19/2008	8:50	TOC	11.4	mg/L		Baseflow	9		0.418	0.75	2.92730732
LittleHatch	3/13/2008	11:00	TOC	18.3	mg/L		Baseflow	10		0.698	0.99	6.84349404
LittleHatch	3/25/2008	10:30	TOC	13.1	mg/L		Baseflow	11		0.375	0.99	3.43428061
LittleHatch	4/9/2008	14:35	TOC	12.5	mg/L		Baseflow	12		0.551	1.04	5.50481495
LittleHatch	4/30/2008	12:35	TOC	6.600	mg/L		Baseflow	13		0.255	0.41	0.94178969
LittleHatch	5/12/2008	14:45	TOC	5.5	mg/L		Baseflow	14		0.138	0.41	0.4962937
LittleHatch	7/31/2007	18:58	TOC	16.4	mg/L	1	Storm	1		0.95	1.4	13.8490706
LittleHatch	7/31/2007	19:58	TOC	9.75	mg/L	2	Storm	1		1.067	1.63	18.5214162

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	7/31/2007	20:58	TOC	10.8	mg/L	3	Storm	1		0.849	1.06	9.18720281
LittleHatch	8/1/2007	1:58	TOC	14.3	mg/L	4	Storm	1		0.815	1.12	9.25575503
LittleHatch	8/31/2007	4:23	TOC	14.2	mg/L	1	Storm	2		1.133	1.89	23.0898208
LittleHatch	8/31/2007	6:53	TOC	16.4	mg/L	2	Storm	2		2	0.29	7.270416
LittleHatch	8/31/2007	7:53	TOC	16.3	mg/L	3	Storm	2		1.83	1.79	39.9359553
LittleHatch	8/31/2007	9:53	TOC	15.4	mg/L	4	Storm	2		1.354	1.55	23.5672261
LittleHatch	9/19/2007	23:11	TOC	10.6	mg/L	1	Storm	3		0.546	0.89	4.66319191
LittleHatch	9/20/2007	0:41	TOC	8.62	mg/L	2	Storm	3		0.734	1.09	7.98158593
LittleHatch	9/20/2007	1:41	TOC	6.21	mg/L	3	Storm	3		0.786	1.13	8.95404616
LittleHatch	9/20/2007	11:41	TOC	9.32	mg/L	4	Storm	3		0.59	0.97	5.54282107
LittleHatch	10/2/2007	12:39	TOC	9.73	mg/L	1	Storm	4		0.483	1.04	4.75641177
LittleHatch	10/2/2007	15:09	TOC	7.78	mg/L	2	Storm	4		1.142	1.7	20.968915
LittleHatch	10/2/2007	18:09	TOC	11.6	mg/L	3	Storm	4		1.268	1.38	19.3455458
LittleHatch	10/3/2007	1:09	TOC	13.9	mg/L	4	Storm	4		0.885	1.16	10.5549371
LittleHatch	10/4/2007	16:53	TOC	14.4	mg/L	1	Storm	5		0.463	0.99	4.32172408
LittleHatch	10/4/2007	17:23	TOC	12.0	mg/L	2	Storm	5		1.065	1.68	19.046543
LittleHatch	10/4/2007	18:23	TOC	7.24	mg/L	3	Storm	5		2.287	2.36	70.7875417
LittleHatch	10/5/2007	14:00	TOC	21.6	mg/L	4	Storm	5		0.97	1.64	16.6290476
LittleHatch	10/19/2007	14:47	TOC	15.5	mg/L	1	Storm	6		0.677	0.92	6.14183776
LittleHatch	10/19/2007	16:47	TOC	12.0	mg/L	2	Storm	6		0.864	1.23	10.8811935
LittleHatch	10/19/2007	18:17	TOC	15.1	mg/L	3	Storm	6		1.088	1.49	17.3326493
LittleHatch	10/20/2007	0:17	TOC	16.6	mg/L	4	Storm	6		0.624	1.15	6.99939233
LittleHatch	11/22/2007	11:07	TOC	13.2	mg/L	1	Storm	7		0.346	0.63	2.00366558
LittleHatch	11/22/2007	14:34	TOC	15.2	mg/L	2	Storm	7		0.99	1.02	10.5965251
LittleHatch	11/22/2007	15:34	TOC	15.1	mg/L	3	Storm	7		1.031	0.98	10.686345
LittleHatch	11/22/2007	20:34	TOC	14.9	mg/L	4	Storm	7		0.657	0.85	5.48431078
LittleHatch	12/16/2007	2:57	TOC	13.7	mg/L	1	Storm	8		0.481	0.91	4.14285744
LittleHatch	12/16/2007	4:57	TOC	16.0	mg/L	2	Storm	8		1.956	1.88	45.7683933
LittleHatch	12/16/2007	9:52	TOC	18.3	mg/L	3	Storm	8		1.861	1.77	40.3650966
LittleHatch	12/16/2007	13:57	TOC	19.4	mg/L	4	Storm	8		1.248	1.07	14.709234
LittleHatch	1/13/2008	10:04	TOC	39.6	mg/L	1	Storm	9		0.508	0.7	3.38510589
LittleHatch	1/13/2008	10:34	TOC	39.5	mg/L	2	Storm	9		0.588	0.79	4.49707591
LittleHatch	1/13/2008	16:04	TOC	40.3	mg/L	3	Storm	9		0.561	0.73	3.94236073
LittleHatch	1/13/2008	20:04	TOC	41.2	mg/L	4	Storm	9		0.526	0.68	3.4179199
LittleHatch	1/17/2008	4:24	TOC	8.65	mg/L	1	Storm	10		0.603	0.78	4.56768052
LittleHatch	1/17/2008	5:54	TOC	6.75	mg/L	2	Storm	10		0.712	0.9	6.3642754
LittleHatch	1/17/2008	9:54	TOC	8.80	mg/L	3	Storm	10		0.769	0.86	6.64446955
LittleHatch	1/17/2008	10:54	TOC	8.88	mg/L	4	Storm	10		0.76	0.83	6.32615947
LittleHatch	1/19/2008	5:24	TOC	5.62	mg/L	1	Storm	11		0.996	1.09	11.4055328
LittleHatch	1/19/2008	7:24	TOC	6.57	mg/L	2	Storm	11		1.765	1.47	31.2907776
LittleHatch	1/19/2008	9:24	TOC	6.13	mg/L	3	Storm	11		2.138	1.38	37.8073495
LittleHatch	1/19/2008	13:24	TOC	9.12	mg/L	4	Storm	11		1.674	1.38	27.435577
LittleHatch	2/12/2008	20:23	TOC	10.2	mg/L	1	Storm	12		0.487	1.1	5.07681449
LittleHatch	2/12/2008	23:23	TOC	8.80	mg/L	2	Storm	12		0.972	1.13	11.485884
LittleHatch	2/13/2008	1:23	TOC	8	mg/L	3	Storm	12		1.173	1.21	15.419012
LittleHatch	2/13/2008	9:23	TOC	11.6	mg/L	4	Storm	12		0.775	0.95	7.4060179
LittleHatch	2/23/2008	2:28	TOC	11.1	mg/L	1	Storm	13		0.394	0.88	3.22067938
LittleHatch	2/23/2008	3:58	TOC	5.70	mg/L	2	Storm	13		1.077	1.26	14.4787793
LittleHatch	2/23/2008	4:58	TOC	4.4	mg/L	3	Storm	13		1.363	1.37	21.0028155
LittleHatch	2/23/2008	6:58	TOC	5.4	mg/L	4	Storm	13		2.031	1.61	41.1938694
LittleHatch	3/4/2008	14:48	TOC	12.6	mg/L	1	Storm	14		0.504	1.03	4.93752433
LittleHatch	3/4/2008	15:18	TOC	11.50	mg/L	2	Storm	14		0.732	1.26	9.19755176
LittleHatch	3/4/2008	18:48	TOC	9.3	mg/L	3	Storm	14		1.352	1.3	19.7297588
LittleHatch	3/5/2008	8:50	TOC	12.3	mg/L	4	Storm	14		0.68	0.81	5.43478987
LittleHatch	3/7/2008	11:56	TOC	7.6	mg/L	1	Storm	15		1.007	1.08	11.4498851
LittleHatch	3/7/2008	14:26	TOC	6.60	mg/L	2	Storm	15		2.203	2.01	57.3231682
LittleHatch	3/7/2008	18:26	TOC	8.8	mg/L	3	Storm	15		2.701	2.16	81.3989663
LittleHatch	3/8/2008	11:30	TOC	20.9	mg/L	4	Storm	15		1.758	1.76	37.2714282
LittleHatch	4/5/2008	18:57	TOC	#####	mg/L	1	Storm	16		0.351	0.95	3.06843234
LittleHatch	4/5/2008	20:57	TOC	#####	mg/L	2	Storm	16		0.709	0.26	1.82970385
LittleHatch	4/6/2008	1:27	TOC	#####	mg/L	3	Storm	16		0.789	1.19	9.47116609
LittleHatch	4/6/2008	6:27	TOC	#####	mg/L	4	Storm	16		0.662	1.03	6.70316151
LittleHatch	5/16/2008	18:19	TOC	#####	mg/L	1	Storm	17		0.285	0.58	1.49905123
LittleHatch	5/16/2008	18:49	TOC	19.4	mg/L	2	Storm	17		0.432	0.72	2.91313893
LittleHatch	5/17/2008	1:49	TOC	13.8	mg/L	3	Storm	17		0.344	0.59	1.8647817
LittleHatch	5/17/2008	7:49	TOC	15.8	mg/L	4	Storm	17		0.285	0.5	1.29228555

StationName	SampleDate	Time	Analyte	Value	Unit	Sample Number	Sample Type	Event Number	QACode	Level (ft)	Velocity (ft/s)	Flow (cfs)
LittleHatch	6/10/2008	14:26	TOC	13.1	mg/L	1	Storm	18		0.228	0.92	1.87807701
LittleHatch	6/10/2008	15:56	TOC	11.6	mg/L	2	Storm	18		1.356	2.04	31.0745095
LittleHatch	6/10/2008	16:56	TOC	7.6	mg/L	3	Storm	18		1.988	2.6	64.6665694
LittleHatch	6/11/2008	3:56	TOC	10.0	mg/L	4	Storm	18		0.73	1.38	10.0419133

Appendix G

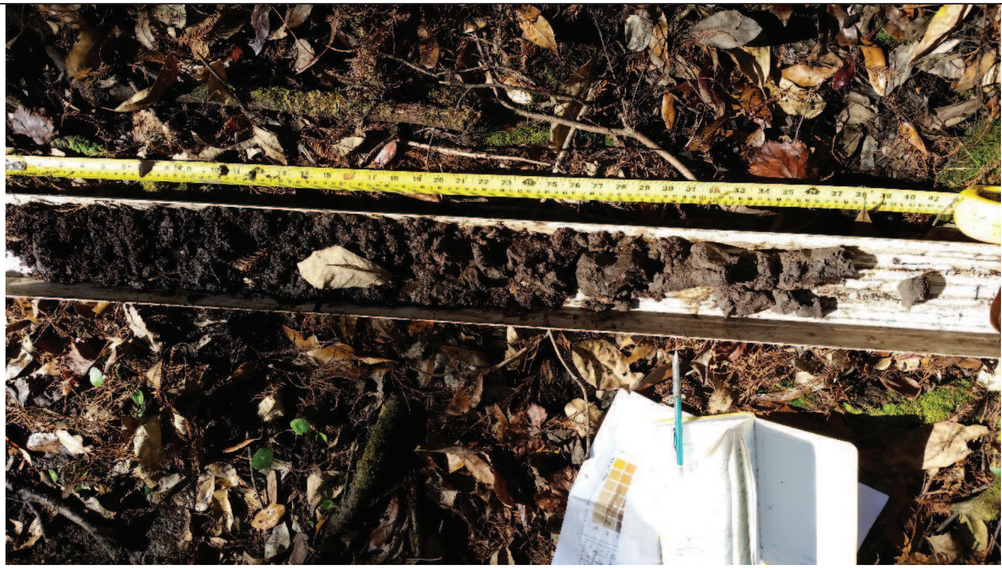
ICPR Model Inputs

See separate document entitled Appendix G - ICPR Model Inputs

Appendix H

Gum Root Swamp Sample Location Photographs

Station ID	Photos		Description
GRS2			• Sweetgum dominated wetland • Little other vegetation • 3 cypress in area
GRS3			• Sweetgum dominated wetland • Little other vegetation

Station ID	Photos	Description
GRS4	 	• Cypress dominated swamp • Some oak • Very little shrub (no herbaceous)
GRS5	 	• Cypress wetland with oak and sweetgum

Station ID	Photos		Description
HW1			• Mixed hardwood swamp • Dominate vegetation: cypress, sweet gum, maple • Hummocks • Shrubs
HW2			• Mixed harwood swamp • Dominated by oaks, sweetgum, and ferns • hummocks

<table>
<tr><th>Station ID</th><th>Photos</th><th></th><th>Description</th></tr>
<tr><td>HW3</td><td></td><td></td><td>Mixed hardwood swampl
Dominaed by maple, oaks, and cypress
Shrubby understorey</td></tr>
<tr><td>HW4</td><td></td><td></td><td>Mixed harwood swamp
Dominated by maple, oaks, cypress, sweetgum, and ferns
hummocks</td></tr>
</table>

Station ID	Photos	Description
Creek1	 	• sandbar on creek channel sampled • dominated by oak, pine, sweetgum
Creek2	No photos taken	• Creek flow path sampled • Braided creek through ephemeral wetland • Dominated by oak, sweetgum • Hummocks • Forested wetland with very little herbaceous shrub strata

Station ID	Photos		Description
Creek3			• Creek flow path sampled • Dominated by oak, sweetgum • Hummocks • Forested wetland with very little herbaceous shrub strata
Creek4			• Sampled within dry creek channel • Dominated by oak, pine, sweetgum, and palmetto

Station ID	Photos	Description
Creek5	 	• Wetland in creek flow path • Lots of shrub strata, sweetgum, oak, cypress • Hardwood swamp wetland • hummocks