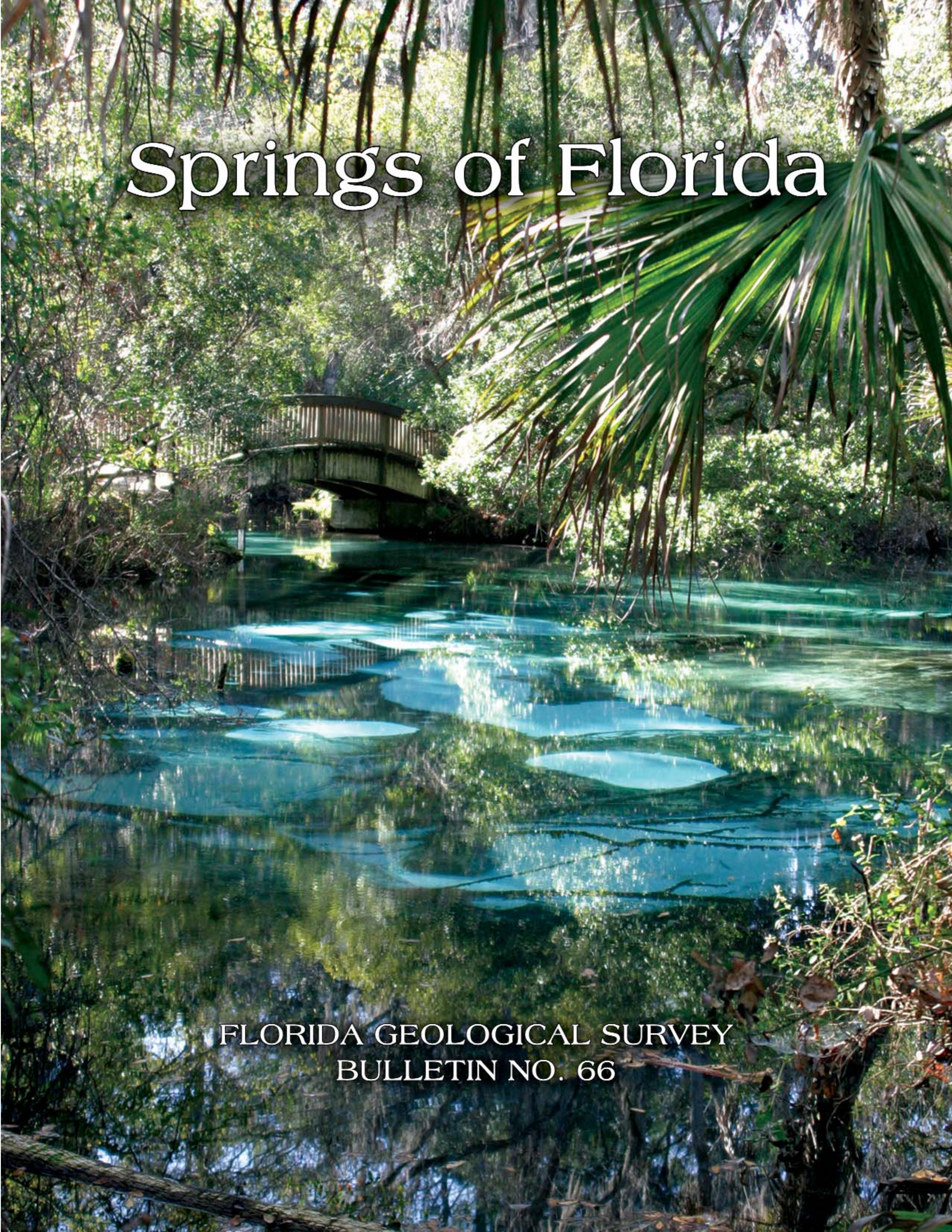
Springs of Florida



FLORIDA GEOLOGICAL SURVEY
BULLETIN NO. 66

Cover: Fern Hammock Spring, Marion County (photo by Tom Scott).

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Colleen M. Castille, *Secretary*

DIVISION OF RESOURCE ASSESSMENT AND MANAGEMENT
Edwin J. Conklin, *Director*

FLORIDA GEOLOGICAL SURVEY
Walter Schmidt, *State Geologist and Chief*

Bulletin No. 66

SPRINGS OF FLORIDA

By

Thomas M. Scott (PG #99), Guy H. Means,
Rebecca P. Meegan, Ryan C. Means,
Sam B. Upchurch, R. E. Copeland,
James Jones, Tina Roberts, Alan Willet

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PREFACE

FLORIDA GEOLOGICAL SURVEY

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The Florida Geological Survey (FGS), Division of Resource Assessment and Management, Department of Environmental Protection, is publishing as its Bulletin No. 66, Springs of Florida. In 2001, the Florida Legislature passed the Florida Springs Initiative to further the State's ability to conserve and protect our valuable freshwater spring resources. As part of this larger program the FGS began a three year project to update and complete the state's inventory of these resources. The original report by the FGS on Florida's springs was published in 1947, as Bulletin No. 31. This was revised in 1977. In recent decades, much has been learned about additional spring resources unreported in earlier compilations. In addition, a great deal of water chemistry information has been gathered to enable long-term trend analysis and interpretative dynamics of our subsurface aquifer flow regimes. Further data is being compiled to better define various springsheds to aid policy makers as they try to address land-use decisions to foster sustainable fresh water resources. The information contained in this report, provides data for scientists, planners, environmental managers, and the citizens of Florida.

Walter Schmidt

Walter Schmidt, Ph.D, PG
State Geologist and Chief
Florida Geological Survey

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INTRODUCTION

The bank was dense with magnolia and loblolly bay, sweet gum and gray-barked ash. He went down to the spring in the cool darkness of their shadows. A sharp pleasure came over him. This was a secret and a lovely place. - Marjory Kinnan Rawlings, *The Yearling*, 1938

Mysterious, magical, even "awesome" - springs elicit an emotional response from nearly everyone who peers into their crystalline depths. The clear, azure waters of Florida's springs have long been a focus of daily life during the humid, hot months of the year. Many Floridians have a lifetime of memories surrounding our springs. Florida's often warm, humid weather rendered the state's springs a welcome relief from the effects of the climate. Many children, on a hot summer day, begged their parents to take them to those cool, clear inviting pools so that, after hours in the water, the air's warmth actually felt good! The draw of the mysterious, pristine water issuing from caves and sand boils was unmistakable. Visit any spring during the muggy months and you will find people of all ages partaking of Nature's soothing remedy - spring water! Marjory Stoneman Douglas, the grandame of Florida environmentalists, stated that "*Springs are bowls of liquid light*." Writer and author Al Burt observed that "*Springs add a melody to the land*."

Springs and spring runs have been a focal point of life from prehistoric times to the present. Undoubtedly, the ancient flow of cool, fresh water attracted animals now long absent from Florida's landscape. Many a diver has recovered fossil remains from the state's spring runs and wondered what the forest must have looked like when mastodons and giant sloths roamed the spring-run lowlands.

Human artifacts, found in widespread areas of the state, attest to the importance of springs to Florida's earliest inhabitants. The explorers of Florida, from Ponce de Leon to John and William Bartram and others, often mentioned the subterranean discharges of fresh water that were scattered across central and northern Florida. As colonists and settlers began to inhabit Florida, springs continued to be the focus of human activity, becoming sites of missions, towns and steamboat landings. Spring runs provided power for gristmills. Baptisms were held in the clear, cool waters and the springs often served as water supplies for local residents. Today, even bottled water producers are interested in utilizing these waters. Some springs have been valued for their purported therapeutic effects, and people flocked to them to soak in the medicinal waters (Figure 1).

Recreational opportunities provided by the state's springs are numerous. Swimming, snorkeling, diving and canoeing are among the most common activities centering around Florida's springs. The springs and spring runs are magnets for wildlife and, subsequently,

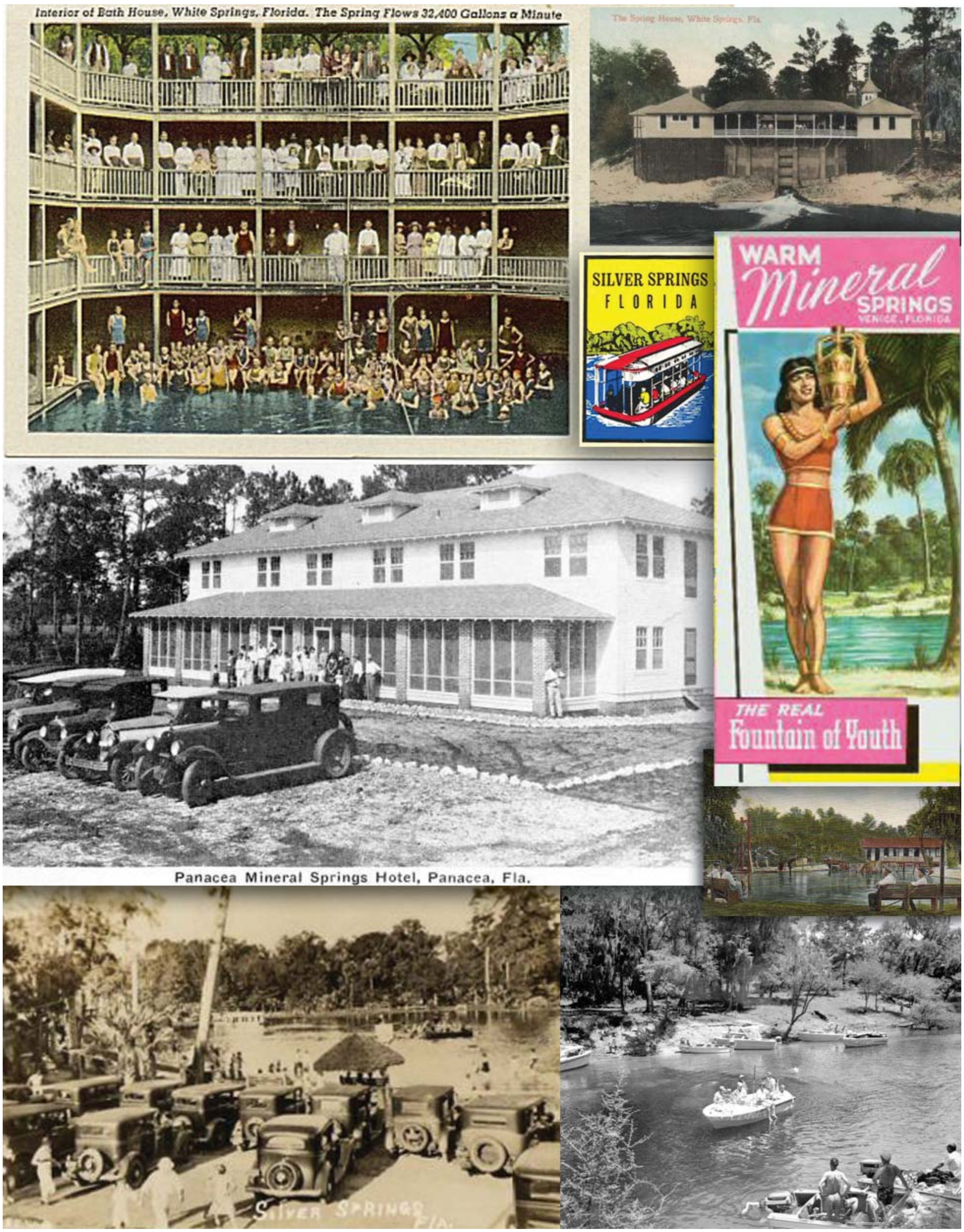

Figure 1. Old Florida spring photos and momentos. Clockwise from top left, interior of bath house at White Springs, Hamilton County, 1920s; exterior of bath house at White Springs; Silver Springs, Marion County, auto decal, 1950s; Warm Mineral Springs, Sarasota County, brochure, 1950s; Sulphur Spring, Hillsborough County, early 1900s; boating at Troy Spring, Lafayette County, 1960s; cars at Silver Springs, 1930s; Panacea Mineral Springs Motel, Wakulla County 1930s.

draw many individuals and groups to view these animals in their natural surroundings. The economic impact of the springs has been well documented (Bonn and Bell, 2003). Ichetucknee, Wakulla, Homosassa and Volusia Blue Springs alone generated more than $65 million in 2002.

Spring water is a natural discharge that comes primarily from the Floridan aquifer system, the state's primary aquifer. The springs provide a "window" into the aquifer, allowing for a measure of the health of the aquifer. Chemical and biological constituents that enter the aquifer through recharge processes may affect the water quality, flora and fauna of springs and spring runs. As water quality in the aquifer has declined, the flora and fauna associated with the springs and cave systems have been negatively affected. The change in water quality is a direct result of Florida's increased population and changed land-use patterns. The state's population has increased from approximately two million in 1940 to more than 17 million in 2004 and is projected to exceed 24 million by 2030. These changes and the subsequent degradation of our springs have led to the efforts to protect and restore Florida's treasured springs.

In 1947, the Florida Geological Survey (FGS) published the first *Springs of Florida* bulletin which documented the major and important springs in the state (Ferguson et al., 1947). This publication was revised in 1977, with many previously undocumented springs and many new water-quality analyses being added (Rosenau et al., 1977). The Florida Geological Survey's report on first magnitude springs (Scott et al., 2002) was the initial step in once again updating and revising the *Springs of Florida* bulletin. The new bulletin includes the spring descriptions and water-quality analyses from Scott et al. (2002). Nearly 300 springs were described in 1977. As of 2004, more than 700 springs have been recognized in the state and more are reported each year. To date, 33 first magnitude springs (with a flow greater than 100 cubic feet per second or approximately 64.6 million gallons of water per day) have been recognized in Florida, more than any other state or country (Rosenau et al., 1977). Our springs are a unique and invaluable natural resource. A comprehensive understanding of the spring systems will provide the basis for their protection and wise use.

ACKNOWLEDGEMENTS

The authors wish to acknowledge a number of individuals and thank them for their assistance in creating this volume. Gary Maddox, Laura Morse, Gail Sloane, Margaret Murray, Tom Biernacki, Cindy Cosper, Andy Roach, Paul Hansard, and Jay Silvanima from the Florida Department of Environmental Protection (FDEP), Division of Water Resource Management, Bureau of Watershed Management guided the spring water analyses effort. Without their knowledge and experience, the sampling, analyses and data quality and delivery could not have been accomplished within the requisite timeframe.

We would also like to acknowledge the efforts of numerous people from various water management districts and state parks who were so helpful in either collecting or helping to collect data for this project. In particular, the authors wish to thank David Hornsby from the Suwannee River Water Management District for contributing his time and expertise. We also thank Angela Chelette, Tom Pratt, Tony Countryman and Nick Wooten from the Northwest Florida Water Management District; Eric DeHaven, David DeWitt, Joe Haber, and Chris Tomlinson from the Southwest Florida Water Management District; David Toth, Jim Peterson and Bill Osburn from the St. John's River Water Management District; Will Ebaugh from the U.S. Forest Service; Richard Harris from Blue Springs State Park; Sandy Cook from Wakulla Spring State Park; Larry Arrant from Suwannee River State Park; Sally Lieb from Manatee Spring State Park; Alvin and Edith Hamlin, Lafayette Blue Spring; Steve Davenport from Fanning Springs State Park; Mike Jacobs from Weeki Wachee Springs; Steve Specht, Bob Gallager and Mike Young from Silver Springs; Guy Marwick from the Silver River Museum; Robert LaMont from the Silver Springs State Park; Mark Ludlow and Bill Maphis from Florida Caverns State Park; Boyd Blihovde and Rick "Bubba" Owen from Wekiwa Springs State Park; the staff at Silver Glen Springs, Alexander Spring, Juniper Spring and Fern Hammock Springs in the Ocala National Forest; Mark Wray of Ginnie Springs Resort; Celeste and Hoch Shitama (Running Springs); the Branham family (Bugg Spring); Amos Philman (Hart Spring); Ed Olman (Warm Mineral Spring); Jeffrey and Trudy Williams (Manatee Mineral Spring); Harold Vickers (Cypress and Beckton Springs); Jeffrey DiMaggio from Waccasassa Bay State Preserve; the land owners at Crystal Springs and Meg Andronaco, who provided access to Crystal Springs. Joe Follman and Richard Buchanan's *Springs Fever* website was a great help to us, and we appreciate their willingness to help. There are many other anonymous individuals whose efforts benefited this project.

Several individuals gave a significant amount of their personal time to lead FGS staff into remote areas. William Shirling spent several days guiding us along Holmes Creek and showing us the multitude of springs in that region. William Barton also spent time with FGS springs teams, leading us to the Spring Lake area. To both of these individuals we are greatly indebted. Joe Follman, author of *Springs Fever*, graciously provided his editorial expertise.

Many thanks go to staff members of the Florida Geological Survey. Frank Rupert organized the text, figures, tables and photographs into the digital format for publication. John Marquez, Alan Baker, Andrew Rudin and Jim Cichon, provided cartographic expertise. Walt Schmidt, Jon Arthur, Rodney DeHan, Rick Green, Tom Greenalgh, Jackie Lloyd, Frank Rupert and Steve Spencer reviewed the text and data, offering many suggestions and corrections. Kenji Butler and James McClean spent time in the field with the springs teams.

Many FDEP employees assisted with this project. They are: Division of Resource Assessment and Management, Bureau of Laboratories - Sampling Training: Russel Frydenborg, Tom Frick. Bureau of Laboratories - Chemistry and Biology Analyses: Yuh-Hsu Pan, Kate Brackett, Maria Gonzalez, Amzad Shaik, Harrison Walker, Chris Armour, Tom Ebrahimizadeh, Chris Morgan, Colin Wright, Matt Curran, Dave Avrett, Rick Kimsey, Latasha Fisher, Elena Koldacheva, Keith Tucker, Elliot Healy, Dawn Dolbee, Blanca Fach, Ping Hua, Anna Blalock, Patsy Vichaikul, Akbar Cooper, Richard Johnson, Paula Peters, Gary Dearman, Virginia Leavell, Ceceile Wight, Travis Tola, Dale Simmons, Latasha Fisher, Rob Buda, Melva Campos, Karla Whiddon, and Daisys Tamayo. Bureau of Watershed Management, Watershed Monitoring and Data Management Section: Tracy Wade, Thomas Seal. Division of Waste Management: Bill Martin, David Meyers. We appreciate the efforts of all these individuals.

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FGS would also like to thank the current and past members of the Florida Springs Task Force. In particular we would like to thank Mike Bascom, new Chair of the Springs Task Force and Coordinator of the Florida Springs Initiative for his continued support.

Finally, the Florida Geological Survey Springs Team Members wish to thank Jim Stevenson for his tireless dedication to Florida's springs. Jim retired from the FDEP and the Florida Springs Task Force as Chair during the course of this study. Jim's long career with the Department ended much like it began, with a passion for protecting Florida's natural resources for future generations of Floridians to enjoy. Governor Jeb Bush and the former FDEP Secretary, David Struhs recognized Jim's achievements and honored him by naming the highest award given to FDEP employees the Jim Stevenson Resource Manager of the Year Award. Without Jim, our springs would not have a voice. Thank you, Jim!

DEFINITIONS AND TERMS

Many terms relating to hydrogeology and springs may be unfamiliar. Copeland (2003) compiled a glossary of springs terms which is included in Appendix A.

FLORIDA SPRINGS TASK FORCE

In 1999, David Struhs, Secretary of the Florida Department of Environmental Protection (FDEP), directed Jim Stevenson of FDEP to form a multi-agency Florida Springs Task Force (the first Springs Task Force - TF I) to recommend strategies to protect and restore Florida's springs. The Task Force, consisting of 16 Floridians who represented one federal and three state agencies, four water management districts, a state university, a regional planning council, the business community, and private citizens, met monthly from September 1999 to September 2000. These scientists, planners, and other citizens exchanged information on the many factors that impact the viability of Florida's springs and the ecosystems that the springs support. They listened to guest speakers with expertise in topics relating to springs health. They discussed the conflicting environmental, social, and economic interests that exist in all of Florida's spring basins. During the months that the Task Force met, members developed recommendations for the preservation and restoration of Florida's rich treasury of springs. The implementation of the recommendations will help ensure that Florida's "bowls of liquid light" will sparkle for the grandchildren of the children who play in Florida's springs today.

The Task Force produced a report for the Secretary entitled Florida's Springs, Strategies for Protection and Restoration (Florida Springs Task Force, 2000). Armed with this report, Governor Jeb Bush requested funding from the 2001 Florida Legislature to begin the Florida Springs Initiative. Funding in the amount of $2.5 million was approved to support projects for springs restoration, research and protection. The Florida Springs Initiative is funded through the Florida Department of Environmental Protection where projects in research and monitoring, public education and outreach, and landowner assistance are coordinated. The Governor's Springs Initiative is based on the 2000 Florida Springs Task Force report.

In February 2000, the Springs Task Force sponsored the Florida Springs Conference, Natural Gems - Troubled Waters, attended by over 300 people, including scientists, business owners, representatives of environmental groups and residents from all over Florida. The meeting was such a success that it was held again in February 2003, drawing even more attendees. Future conferences are planned for every other year, the next one being in 2005. The makeup of the Task Force has changed since its original members published the Task Force Report. Less emphasis was placed on having members from the Florida Department of Environmental Protection. As such, the second Springs Task Force (TF II) was created and meeting frequency was reduced to quarterly. The meetings were held at different spring locations around the state and served as a forum for exchanging information on ongoing projects and discussing future goals for the Florida Springs Initiative. In June 2003, Jim Stevenson retired from FDEP and the Task Force. Mike Bascom succeeded Jim Stevenson as the Springs Initiative Coordinator and Chairman of the Task Force. Mike implemented several changes to the Task Force membership and created the current Task Force III (TF III)(Figure 2).

Ms. Colleen Castille succeeded David Struhs as the Secretary of FDEP in March 2004. Ms. Castille continues the support of the Florida Springs Initiative by the department.

Figure 2.- Florida Springs Task Force at Salt Springs in 2003 (photo by T. Scott).

Task Force Members and Advisors

Task Force Chairman - Jim Stevenson, Division of State Lands, FDEP. TF I,II - current citizen member TF III
Mike Bascom, Division of State Lands, FDEP, TF III

Technical Writer and Editor - Frances M. Hartnett,
Technical and Creative Writing Services

Task Force Members

Dianne McCommons Beck, FDEP, TF I
Jeff Bielling, Florida Department of Community Affairs, TF I, II, III
Greg Bitter, Withlacoochee Regional Planning Council, TF I
Bruce Day, Withlacoochee Regional Planning Council, TF I
Hal Davis, U.S. Geological Survey, TF I, II, III
Russel Frydenborg, Division of Resource Assessment and Management, FDEP, TF I, current advisor
Jon Martin, University of Florida, TF I, II, III
Gregg Jones, Southwest Florida Water Management District, TF I, II
Jack Leppert, Citizen, TF I
Gary Maddox, Division of Water Resource Management, FDEP, TF I, current advisor
Pam McVety, Division of Recreation and Parks, FDEP, TF I, II, and currently a citizen advisor
Dana Bryan, Division of Recreation and Parks, FDEP, TF III
Doug Munch, St. Johns River Water Management District, TF I, II, III
Tom Pratt, Northwest Florida Water Management District, TF I, II, III
Tom Scott, Florida Geological Survey, FDEP, TF I, current advisor
Wes Skiles, Karst Environmental Services, TF I, II III
Gary Maidhof, Citrus County, TF II, III
Brian McCord, Danone Waters of North America, TF II
Meg Andronaco, Zephyrhills, TF III
Kirk Webster, Suwannee River Water Management District, TF I, II, III
Kent Smith, Florida Fish and Wildlife Conservation Commission, TF II, III
Sam Upchurch, SDII Global Corporation, TF II, III
Kim Davis, Blue Spring Park, Inc., TF II
Don Bennink, North Florida Holsteins, Inc., TF II
Doug Shaw, The Nature Conservancy, TF II, III
Chuck Edwards, poultry farmer, TF III

Technical Advisors

Florida Department of Environmental Protection

Karl Kurka, Office of Water Policy
Kathleen Toolan, Office of General Counsel
Joe Hand, Division of Water Resource Management
Jennifer Jackson, Division of Water Resource Management
Jim McNeal, Division of Water Resource Management
Harley Means, Florida Geological Survey

Florida Department of Community Affairs

Richard Deadman

Florida Department of Health
Tim Mayer
Florida Fish and Wildlife Conservation Commission
Kent Smith
Karst Environmental Services
Tom Morris
St. Johns River Water Management District
David Miracle
Bill Osburn
Suwannee River Water Management District
David Hornsby
US Fish and Wildlife Service
Jim Valade

CLASSIFICATION OF SPRINGS

There are two general types of springs in Florida, seeps (water-table springs) and karst springs (artesian springs). Rainwater, percolating downward through permeable sediments, may encounter a much less permeable or impermeable formation, forcing the water to move laterally. Eventually the water may reach the surface in a lower-lying area and form a seep (for example the steephead seeps along the eastern side of the Apalachicola River). Karst springs form when groundwater discharges to the surface through a karst opening. Seeps may form in karst areas when water flow from the aquifer is more diffuse. The vast majority of Florida's more than 700 identified springs and all of the first magnitude springs are karst springs.

Springs are most often classified based upon the average discharge of water. Individual springs exhibit variable discharge depending upon rainfall, recharge and groundwater withdrawals within their recharge areas. One discharge measurement is enough to place a spring into one of the eight magnitude categories. However, springs have dynamic flows. A spring categorized as being a first-magnitude spring at one moment in time may not continue to remain in the same category. This can result in a spring being classified as a first magnitude spring at one point in time and a second magnitude at another. A spring assigned a magnitude when it was first described continued with that magnitude designation even though the discharge may have changed considerably through time. The Florida Geological Survey has suggested that the historical median of flow measurements be utilized in classifying spring magnitude. Therefore, the magnitude of the spring is to be based on the median value of all discharge measurements for the period of record and a historical category is defined in the Florida Springs Classification System (Copeland, 2003).

The location of a discharge measurement is critical for defining the magnitude of a spring. Whenever possible, a discharge measurement should be restricted to a vent or seep; however, this is often impractical or logistically impossible. For example, the only place to take a measurement may be in a spring run downstream where multiple springs have discharged into the run. For this reason, whenever a discharge measurement or water sample is taken, the springs (vents or seeps) included in the measurement need to be reported. The exact location of the discharge measurement (using a Global Positioning System with approved locational specifications) and a standardized locational reference point for each measurement is encouraged (Copeland, 2003).

The flow-based classification listed below is adapted from Meinzer (1927):

Magnitude	Average Flow (Discharge)
1	100 cfs or more (64.6 mgd or more)
2	10 to 100 cfs (6.46 to 64.6 mgd)
3	1 to 10 cfs (0.646 to 6.46 mgd)
4	100 gpm to 1 cfs (448 gpm)
5	10 to 100 gpm
6	1 to 10 gpm
7	1 pint to 1 gpm
8	Less than 1 pint/min

cfs = cubic feet per second
mgd = million gallons per day
gpm = gallons per minute
pint/min = pints per minute

Current Florida Geological Survey springs tabulations list 720 springs including 33 first magnitude, 191 second magnitude and 151 third magnitude springs (Figure 3). The list includes individual springs, spring groups, karst windows and river rises (Appendix B). Wilson and Skiles (1989) believe this listing has created some confusion due to the grouping of hydrogeologically unrelated springs into groups and the inclusion of river rises and karst windows. Often, individual springs comprising a group do not have the same water source region or spring recharge basin (springshed) and are not hydrogeologically related. The individual spring vents within a group may not discharge enough water to be classed as first magnitude. Wilson and Skiles (1989) recommended grouping only hydrogeologically related springs into spring groups. However, for the purposes of this report, spring groups are used in the report as presented by Rosenau et al. (1977) and by the Florida Springs Task Force (2000).

River rises are the resurgence of river water that descended underground through a sinkhole some distance away. Wilson and Skiles (1989) state that the resurging water may contain a significant portion of aquifer water but is primarily river water and therefore should not be classified as a spring. Due to the inclusion of a significant addition of groundwater, river rises have continued to be considered as springs for this report.

Karst windows form when the roof of a cave collapses exposing an underground stream for a short distance. Four karst windows are included in this report.

Future springshed (spring recharge basin) delineations will identify the hydrogeological relationships between springs, facilitating changes in the springs list. The identification of these hydrogeological relationships will be carried out considering the recommendations put forth by Wilson and Skiles (1989) and by hydrogeologists representing government agencies, the private sector and academia.

The Florida spring classification system (Copeland, 2003) (Table 1) is based on an assumption that karst activities have influenced almost all springs in Florida. Thus the system is based on geomorphology. Because of the simplicity of the system, the use of spring descriptors is encouraged.

Under this system, all springs in Florida can be classified into one of four categories, based on the spring's point of discharge. Is the point of discharge a vent or is it a seep and

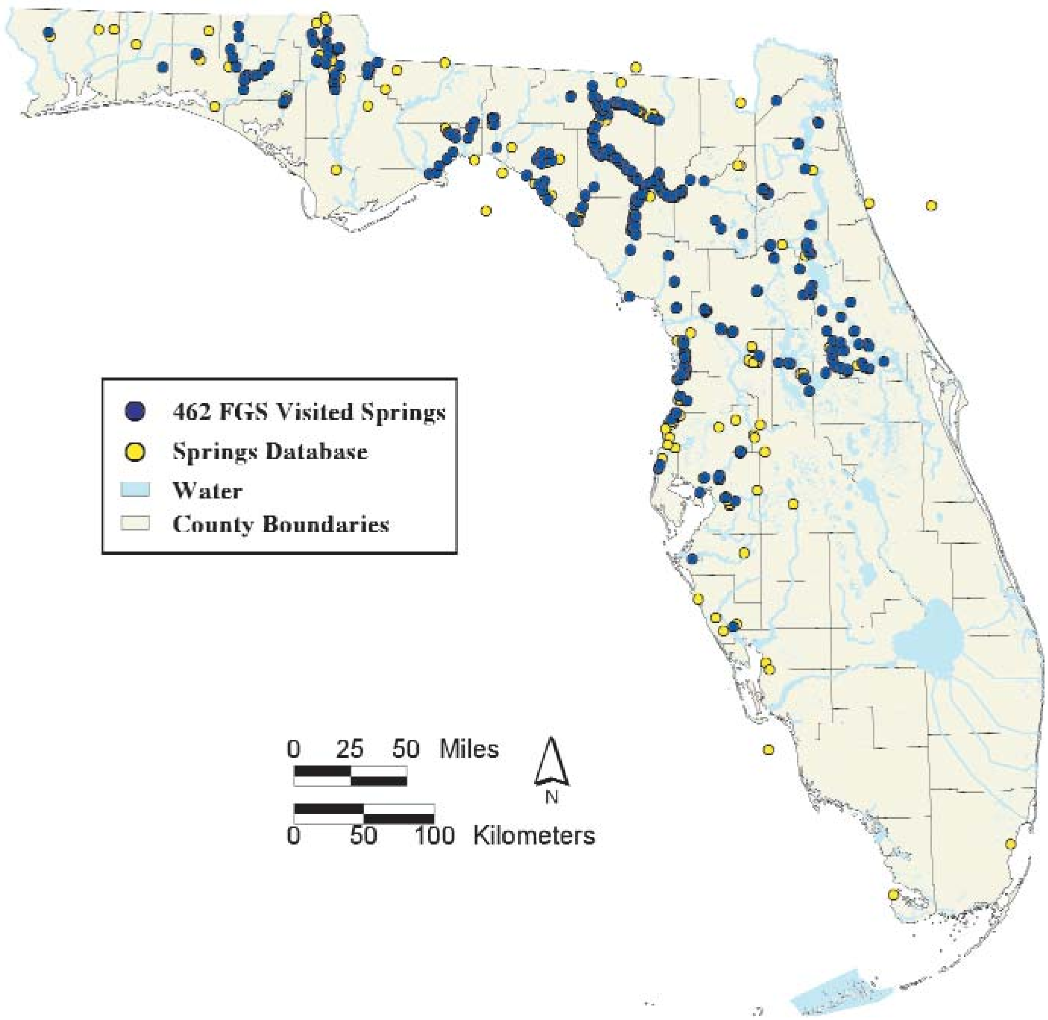

Figure 3. Location of Florida's springs.

is the point of discharge located onshore or offshore? Since all springs are either vents or seeps, the classification can be simplified into the following:

Vent	Seep
Onshore	Onshore
Offshore	Offshore

Spring throat opening size is an extremely important characteristic of Florida springs. A spring vent is defined as an opening that concentrates ground-water discharge to the Earth's surface, including the bottom of the ocean. The opening is significantly larger than that of the average pore space of the surrounding aquifer matrix. As an example, a vent occasionally is considered to be a cave, and ground-water flow from the vent is typically turbulent. On the other hand, a spring seep is composed of one or more small openings in which water discharges diffusely (or "oozes") from the ground-water environment. The diffuse discharge originates from the intergranular pore spaces in the aquifer matrix. Flow is typically laminar.

Table 1. Florida's Spring Classification System.
(from Copeland, 2003)

SPRING		
	Onshore	**Offshore**
Vent	*Onshore Vent* **Examples:** Karst spring Resurgence (River Rise) Estavelle (intermittent resurgence or exsurgence) Subaqueous riverine vent Subaqueous lacustrine vent Sand boil	*Offshore Vent* **Examples:** Offshore karst spring Unnamed offshore vent Offshore estavelle vent
Seep	*Onshore Seep* **Examples:** Subaerial riverine seep Subaqueous lacustrine seep	*Offshore Seep* **Examples:** Unnamed offshore seep Offshore estavelle seep

Using this scheme, individual springs type can be accurately classified by defining the type of spring and the magnitude.

Historically, there have been inconsistencies in the naming of springs. We have attempted to make names more precise in this volume. For example, a spring site that physically has one vent is no longer referred to as springs - Wakulla Springs becomes Wakulla Spring. Also, if a river rise or a karst window was called a spring, the term river rise or karst window now replaces "spring" in the name.

There are many "Blue Springs" in Florida. FDEP scientists have adopted the convention of referring to these springs with the county name placed before the name "Blue Spring." Thus, Blue Spring in Jackson County becomes Jackson Blue Spring.

ARCHAEOLOGICAL AND PALEONTOLOGICAL SIGNIFICANCE OF SPRINGS

Archaeological research has shown that Florida's springs have been important to human inhabitants for thousands of years. Prehistoric peoples exploited the concentration of resources found in and around springs. Fresh water, chert, clay, fish and game animals were all available in and near springs.

Florida's first people, called paleoindians, left behind evidence of their culture in the form of chert, bone and ivory tools that date to more than 12,000 years before present (Figure 4) (Dunbar et al., 1988). These people coexisted with large, now extinct, megafaunal animals including mastodon, mammoth, ground sloth, giant beaver and giant armadillo. During the latest Pleistocene Epoch, 10,000 to 12,000 years ago, sea level was approximately 115 to 148 ft (35 to 45 m) below present levels (Balsillie and Donoghue, in preparation, 2004). Deep springs and sinkholes may have been some of the only sources of fresh water in parts of ancient Florida. Investigations at Wakulla Spring, Hornsby Springs,

Figure 4. Native American artifacts from Florida springs (from the Coastal Plains Institute collection -photo by H. Means).

Ichetucknee Springs, Silver Springs and the Wacissa River - to name a few - have shown that paleoindians lived around springs and utilized the resources of these areas (Tesar and Jones, 2004; Neill, 1958; Balsillie et al., in press).

Silver Springs has long drawn curious visitors to its shores (Schmidt, 2001). Before glass-bottom boat tours and water slides invaded this magnificent spring, prehistoric people had discovered its beauty and abundant resources. Evidence of their occupation lies buried in sediments in and around the spring. W. T. Neill (1958) discovered the tools of ancient people in sand that was being excavated near the spring for use in the park. An excavation of the site produced a stratified column with paleoindian artifacts at the base and evidence of younger cultures on top. This is one of many such excavations that have taken place around the state at different springs and documents the long history of human occupation at springs.

Divers and spring visitors have reported finding chert tools and fossils in and around Florida's numerous springs and spring runs for many years. In 1927, the Simpson family began to investigate the bottom of the Ichetucknee River (Simpson, 1935). The Simpsons recovered thousands of stone and bone artifacts along with numerous remains of extinct Pleistocene animals. In the 1950s the sport of SCUBA diving made the aquatic world accessible. With this new technology, legendary diver Ben Waller began to survey the bottom of many of central Florida's spring-fed rivers (Waller, 1983). He recognized quickly that these springs and spring runs contained a long prehistoric record of human occupation spanning some 12,000 years. After Ben's pioneering work, many others have followed and continue to do so today.

More evidence of prehistoric human utilization of springs comes from Warm Mineral

Springs, located in Sarasota County. Archaeologists recovered human remains from a ledge located 43 ft (13 m) below the current water level that contained preserved brain material. The remains were radiocarbon dated and produced an age of 10,000 +/- 200 years before present (Royal and Clark, 1960). Other archaeological material and fossils were recovered from this site, which has proven to be one of the most important archaeological sites in the southeastern United States.

Florida's abundance of springs does not stop at its present shoreline. Florida has an undocumented number of offshore springs that provided resources to prehistoric people and wildlife when sea level was lower. Evidence for occupation of offshore sites has been discovered by researchers from the Florida State University Department of Anthropology. Dr. Michael Faught and his students have conducted offshore surveys at and near some offshore springs and have recovered an abundance of chert tools (Faught, in prep.). Although offshore springs may be discharging brackish to saline water today, they almost certainly discharged fresh water during times of lowered sea levels when prehistoric human occupation occurred at these sites. Further investigation of Florida's offshore springs is needed to assess the role that these springs play in the hydrogeology and archaeology of the state.

As the Pleistocene Epoch came to a close in Florida, many environmental changes were taking place. The large megafaunal animals that once had roamed the Florida landscape were becoming extinct. Global weather patterns changed, and sea level began to rise. As these drastic changes occurred, Florida's human inhabitants had to adapt. As water tables rose, springs became more abundant and people continued to exploit the resources in and around the springs. Prehistoric peoples living around springs built large shell middens and mounds as they disposed of the inedible portions of their food items and other waste. Numerous examples of these mounds exist throughout the state with some of the best examples being located along spring runs that drain into the St. John's River, the King's Bay Spring Group near Crystal River and the spring-fed Wacissa River system. Abundant supplies of fresh water, aquatic food sources, chert and clay sources made Florida's springs highly desirable habitation sites.

Sediments in and around Florida's springs are time capsules that contain valuable information about our environmental and cultural past. Prehistoric Floridians valued our state's spring resources and now modern Floridians are the stewards of a tradition that has lasted for more than 12,000 years. As our state's population continues to grow, more and more people will be putting demands on our natural resources. It is our modern society's responsibility to see that Florida's springs are preserved in their natural beauty and ecological health for future generations.

HYDROGEOLOGY OF FLORIDA SPRINGS

Florida enjoys a humid, subtropical climate throughout much of the state (Henry, 1998). Rainfall, in the region of the major springs, ranges from 50 inches (127 cm) to 60 inches (152 cm) per year. As a result of this climate and the geologic framework of the state, Florida has an abundance of fresh groundwater. Scott and Schmidt (2000) and Scott (2001) estimated that more than 2.2 quadrillion gallons of fresh water are contained within the Floridan aquifer system (FAS) in Florida. Only a very small percentage of the fresh water is available as a renewable resource for human consumption.

The Florida peninsula is the exposed portion of the broad Florida Platform. The Florida Platform, as measured between the 200 meter below sea level contour (more than 600 ft), is more than 300 miles (483 km) wide. It extends more than 150 miles (240 km) westward under the Gulf of Mexico offshore from Crystal River, and more than 70 miles (113 km) under the Atlantic Ocean from Fernandina Beach. The present day Florida peninsula is less than one half of the total platform.

The Florida Platform is composed of a thick sequence of variably permeable carbonate sediments, limestone and dolostone, lying on older igneous, metamorphic and sedimentary rocks. The Cenozoic carbonate sediments may exceed 4,000 ft (1,220 m) thick. A sequence of sand, silt and clay with variable amounts of limestone and shell overlie the carbonate sequence (see Scott [1992 a, b] for discussion of the Cenozoic sediment sequence and the geologic structure of the platform). In portions of the west-central and north-central peninsula and in the central panhandle, the carbonate rocks, predominantly limestone, occur at or very near the surface. Away from these areas, the overlying sand, silt and clay sequence becomes thicker. As the sediments compacted and were subjected to other geologic forces, fractures formed. These fractures allowed water to move more freely through the sediments and provided the template for the development of Florida's many cave systems.

There are three major aquifer systems in Florida, The Floridan, the Intermediate and the Surficial Aquifer Systems, all of which are very complex (Southeastern Geological Society, 1986; Scott, 1992a). The Floridan aquifer system (FAS) occurs within a thick sequence of permeable carbonate sediments (see Miller [1986] and Berndt et al. [1998] for discussion of the FAS). In some areas, it is overlain by the intermediate aquifer system and confining unit (IAS) which consists of carbonates, sand, silt and clay. The surficial aquifer system (SAS) overlies the IAS, or the FAS where the IAS is absent, and is composed of sand, shell and some carbonate. The vast majority of Florida's springs result from discharge from the FAS.

Natural recharge to the FAS by rainwater, made slightly acidic by carbon dioxide from the atmosphere and organic acids in the soil, dissolved portions of the limestone and enlarged naturally occurring fractures. The dissolution enhanced the permeability of the sediments and formed cavities and caverns. Sinkholes formed by the collapse of overlying sediments into the cavities. Occasionally, the collapse of the roof of a cave creates an opening to the land surface. See Lane (1986) for a description of sinkhole types common in Florida.

Karst springs occur both onshore and offshore in Florida. Currently, little is known about the offshore springs with the exception of the Spring Creek Group - the largest spring group in Florida averaging more than one billion gallons of water discharged per day (maximum flow estimated at more than two billion gallons of water per day [Rosenau et al., 1977]) (Lane, 2001). In order to better understand the water resources of the state, a water budget needs to include a comprehensive assessment of the total amount of recharge and discharge occurring to and from the aquifer. To aid in this characterization, the FGS has initiated a program to investigate the occurrence, discharge and water quality of the offshore springs.

Florida's springs occur primarily in the northern two-thirds of the peninsula and the central panhandle where carbonate rocks are at or near the land surface (Figure 5). All of these springs produce water from the upper FAS (Berndt et al., 1998) which consists of sediments that range in age from Late Eocene (approximately 38 - 36 million years old [my]) to mid-Oligocene (approximately 33 my). Miocene to Pleistocene sediments (24 my to 10,000 years) often are exposed in the springs.

The geomorphology (physiography) of the state, coupled with the geologic framework, controls the distribution of springs. The springs occur in areas where karst features (for example, sinkholes and caves) are common, the potentiometric surface of the FAS is high enough and the surface elevations are low enough to allow groundwater to flow at the surface. These areas are designated karst plains, karst hills and karst hills and valleys on Figure 6. The state's springs occur primarily within the Ocala Karst District and the Dougherty Karst Plain District (Scott, in preparation, 2004). Other springs, including Alexander, Silver Glen and Volusia Blue, occur in the Central Lakes District (Scott, in preparation, 2004). Springs generally occur in lowlands near rivers and streams. There are a number of springs known to flow from vents beneath rivers and many more are thought to exist. Hornsby and Ceryak (1998) identified many newly recognized springs that occur in the channels of the Suwannee and Santa Fe Rivers. Springs that have yet to be described have been found beneath the Apalachicola River between Gadsden and Jackson Counties (H. Means, personal communication, 2004).

Recharge to the FAS occurs over approximately 55% of the state (Berndt et al., 1998). Recharge rates vary from less than one inch (2.54 cm) per year to more than ten inches (25.4 cm) per year. Recharge water entering the upper FAS that eventually discharges from a spring has a variable residence time. Katz et al. (2001) and Katz (2004) found that water flowing from larger springs had an average ground-water residence time of more than 20 years and may reflect the mixing of older and younger waters.

Discharge, water quality and temperature of springs remain reasonably stable over extended periods of time (Berndt et al., 1998). However, because discharge rates are driven by the rate of recharge, climatic fluctuations often have a major effect on spring flow.

During 1998 - 2002, Florida suffered a major drought with a rainfall deficit totaling more than 50 inches (127 cm). The resulting reduction in recharge from the drought and normal withdrawals caused a lowering of the potentiometric surface in the FAS. Many first magnitude springs experienced a significant flow reduction. Some springs, such as Hornsby Spring, ceased flowing completely. The flow data given for each first order magnitude spring (see individual spring descriptions) reflect the drought-influenced flows. Some springs may reverse flow in response to river water levels. Higher river levels may cause a reversal of flow that introduces river water into the aquifer. Once river levels drop, the spring flow resumes, pumping dark, tannic water until the river water is forced from the aquifer. The appearance of the springs also changed during the drought as river and lake levels declined reducing the size of the spring water body and exposing more sediments along the banks.

Factors affecting quality and quantity of spring water include the distribution of karst features within a springshed, thickness of confining units, soil characteristics, topography, potentiometric surfaces, as well as others. The Florida Geological Survey is currently developing a Geographic Information System (GIS) model to estimate the relative vulnera-

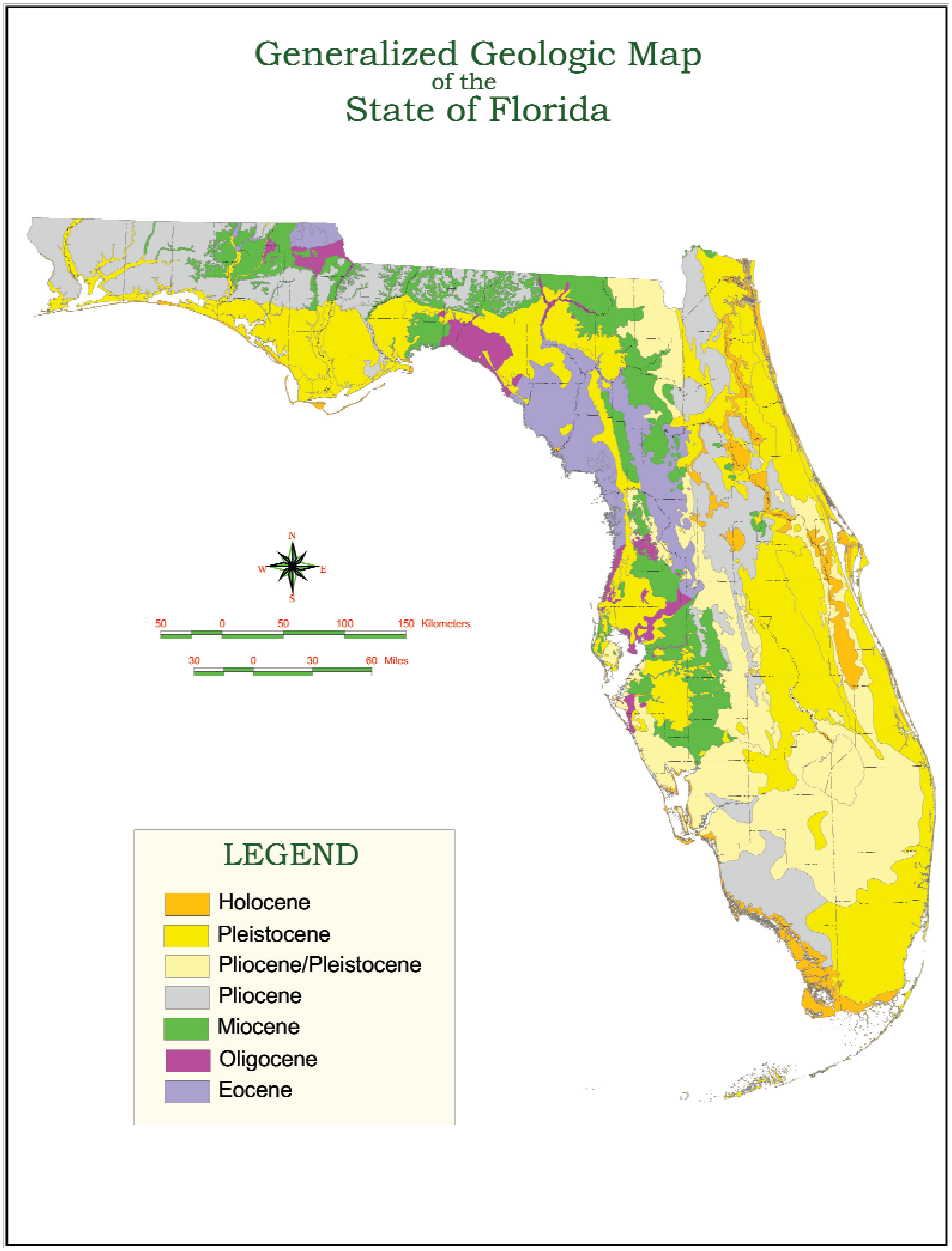

Figure 5. Generalized geologic map of Florida (modified from Scott et al., 2001).

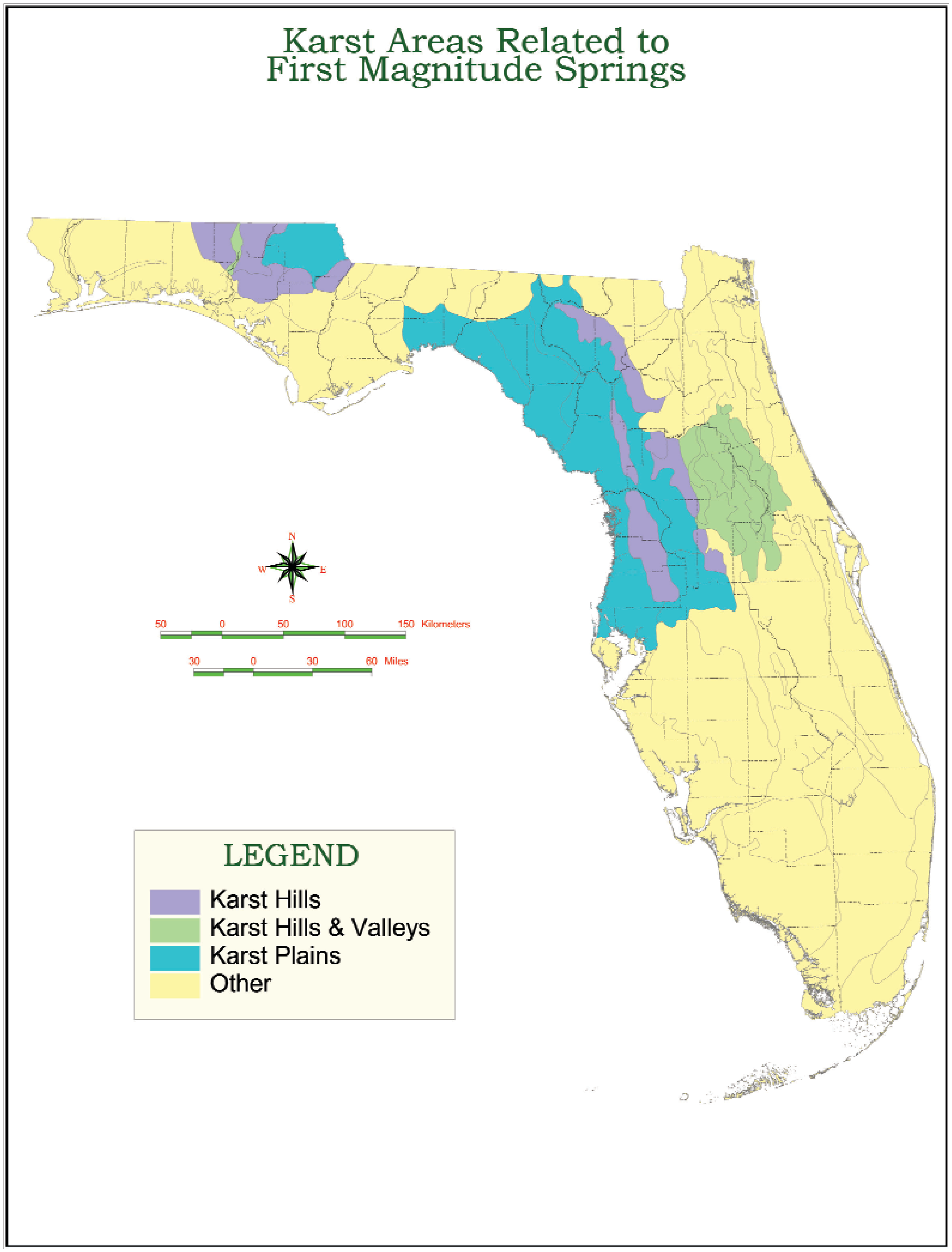

Figure 6. Karst areas related to first magnitude springs (modified from Scott, in preparation).

bility of Florida's aquifer systems: the Florida Aquifer Vulnerability Assessment (FAVA). FAVA uses a statistical method, called Weights of Evidence, to quantify relationships between spatial layers with measured contaminant occurrences. This yields a data-driven predictive model or relative probability map of the aquifer being assessed. The model utilizes many of the following spatial layers: depth to water table, thickness of confining units, soil drainage and spatial distribution of karst features. FAVA will replace a formerly used model and will more accurately define areas that are highly vulnerable to ground-water contamination. FAVA will be a powerful tool for identifying highly vulnerable areas within springsheds and is designed to assist land managers and urban planners in making informed decisions about land use and ground-water resource conservation (Figure 7).

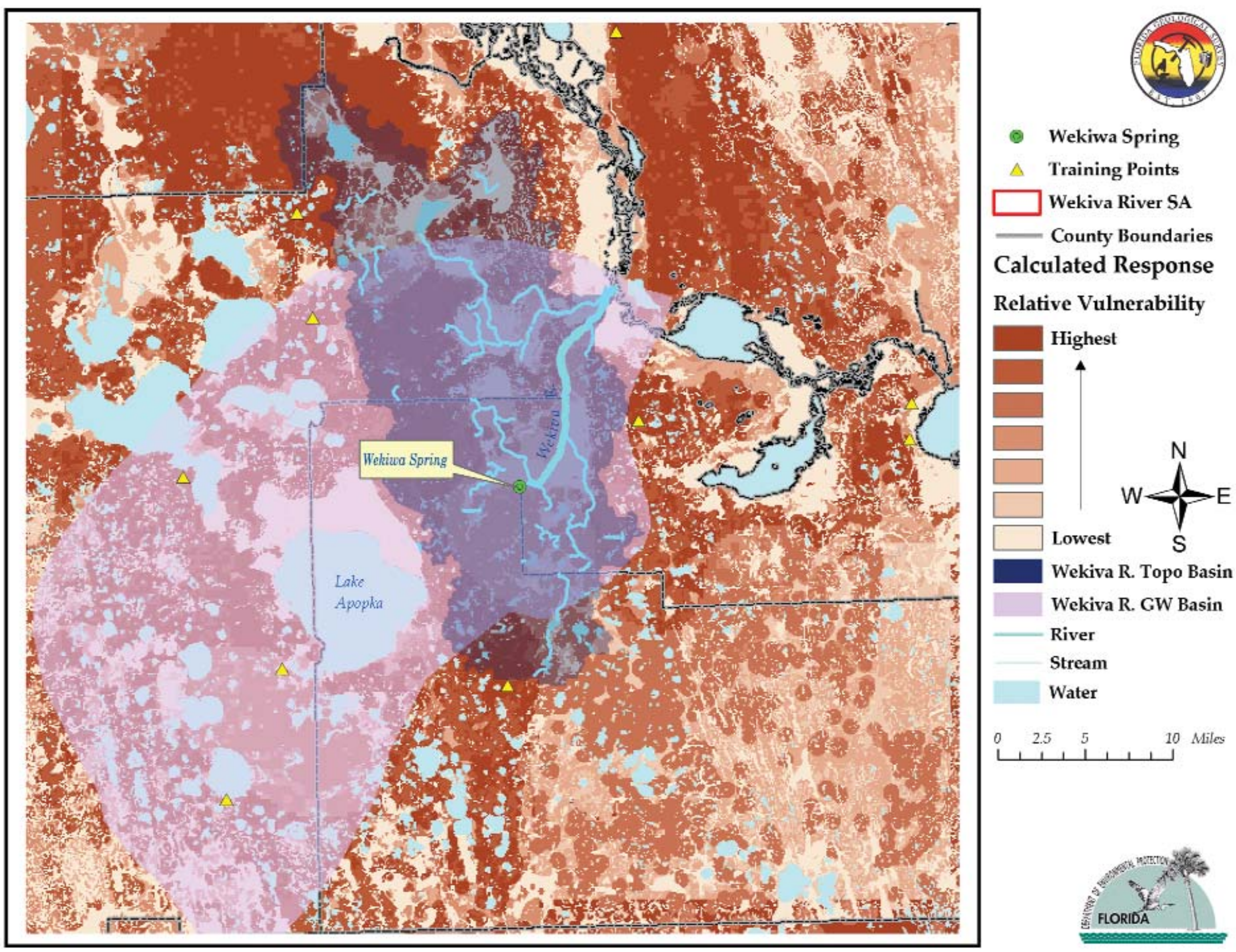

Figure 7. Example of the Florida Aquifer Vulnerability Assessment (FAVA).

Springsheds

There has been increased emphasis in the last few years on the drainage basins that supply water to Florida's springs as a result of awareness of increasing trends in contaminants, such as nitrate (Figure 8). The amount of water and the nature and concentrations of chemical constituents that discharge from a spring are functions of the geology, hydrology, and land uses within the ground- and surface-water drainage basins that collect water for discharge from the spring.

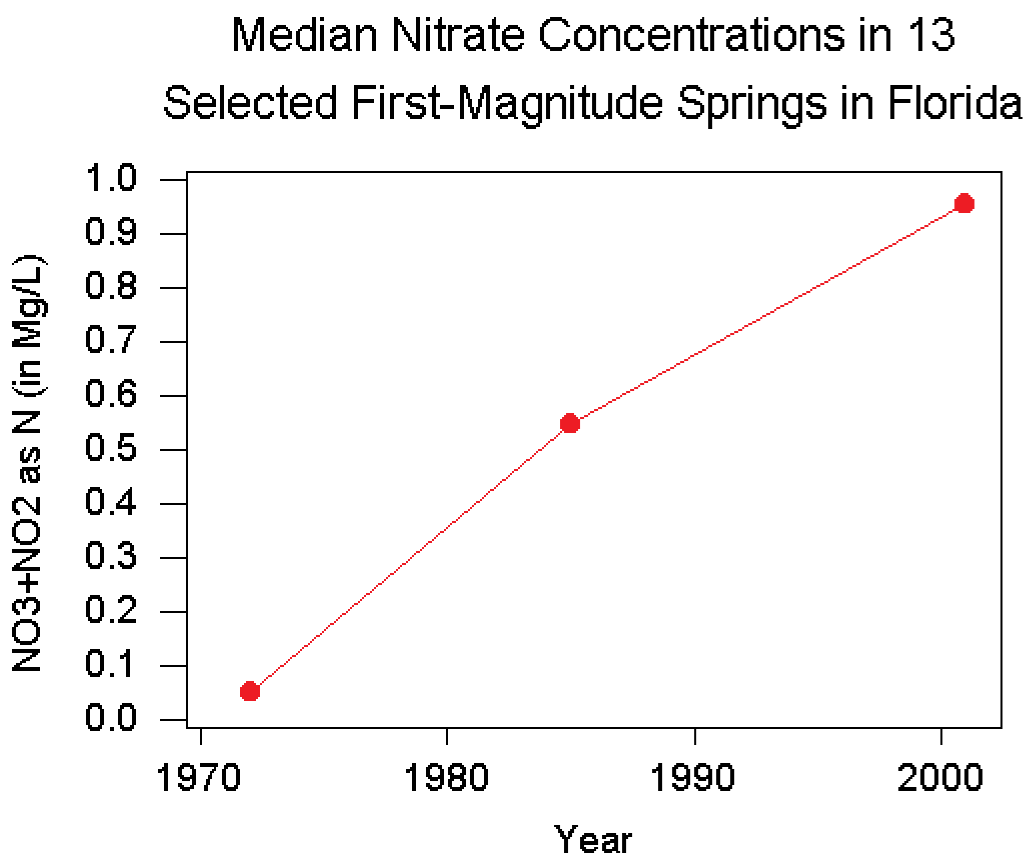

Figure 8. Median nitrate concentrations in 13 selected first magnitude springs in Florida.

Ground-water basins are traditionally identified through either (1) construction of a flow net and identifying divergent flow lines that delineate the hydraulic divides of the spring drainage system, (2) particle tracking within a computer-generated ground-water flow model, or (3) dye or chemical tracing to identify sources that contribute to the spring discharge. All of these methods have uncertainties. For example, delineation of a basin boundary from a flow net or potentiometric surface map is limited to the accuracy and resolution of the map and the flow lines which are subject to change with variations in rainfall, land use, and ground-water withdrawals. The accuracy of the computer model and our understanding of the aquifer system limit the accuracy of particle-tracking procedures. Dyes and other chemicals can be used to identify sources within a basin, but the chemicals may not be detected if they are (1) too diluted in the aquifer, (2) removed from the water (movement is retarded) by chemical interactions with aquifer materials, (3) transported to an un-monitored conduit system, or (4) travel times may be so slow that monitoring may not be feasible.

A spring recharge basin, or springshed, consists of "those areas within ground- and surface-water basins that contribute to the discharge of the spring" (DeHan, 2002; Copeland, 2003). The spring recharge basin consists of all areas where water can be shown to contribute to the ground-water flow system that discharges from the spring of interest. Because karst systems frequently include sinking streams that transmit surface water directly to the aquifer, the recharge basin may include surface-water drainage basins that bring water into the spring drainage from outside of the ground-water basin. This concept is important because contaminated surface water may be introduced to the springshed from sources well outside of the ground-water basin by streams that originate outside the basin.

The scenario shown in Figure 9 illustrates some possible contribution areas within a spring recharge basin. Two components of the springshed are shown: the ground-water basin and a surface-water basin. A portion of the ground-water basin is located within a karst plain where recharge is rapid through features such as sinkholes. Another portion extends under a highlands area where fine-grained sediments overlying the aquifer retard recharge and cause surface runoff and stream development. Because of the area of aquifer confinement, the active recharge portion of the ground-water basin is limited to unconfined portions of the basin. The surface-water basin may or may not extend outside the ground-water basin. The stream that originates on the highlands discharges onto the karst plain where it recharges the aquifer through a swallet. The hypothetical springshed (Figure 9) suggests that a springshed may be subdivided into at least three recharge-potential categories. The semi-confined area of the ground-water basin has low recharge potential and, therefore, low risk of ground-water contamination. The areas nearest the spring, where flow lines converge and transport times from recharge points (i.e., sinkholes) are short, and areas associated with swallets that receive surface water are highly vulnerable to ground-water contamination. Finally, the portions of the karst plain within the ground-water basin that are distant from the spring have an intermediate risk of contributing contamination to the spring discharge because of possible long travel times of water to the spring and a high probability of dilution or retardation of constituents. The stream is a special problem because storm water and permitted discharges upstream can cause contamination issues down gradient of the swallet. Similarly, water sources that originate outside of the springshed can cause potential contamination. For example, a sewage treatment plant that collects water from outside of the basin and disposes of the treated wastewater by land application can constitute a source that effectively extends the springshed to those portions of the wastewater collection system outside of the springshed.

The Suwannee River Water Management District has developed high-resolution monitoring programs for a number of first-magnitude spring systems, including the Ichetucknee Spring Group (Upchurch et al., 2001). High-resolution monitoring for water levels and water quality involves placement of a large number of monitoring wells within the spring basin. The number and spacing of the wells is determined by statistical methods (Upchurch, et al., 2001; Upchurch and Champion, 2003). As a result of the numerous monitoring wells, contour maps with higher resolution than normal (i.e., 1-foot contour intervals as opposed to 5-foot intervals) can be prepared.

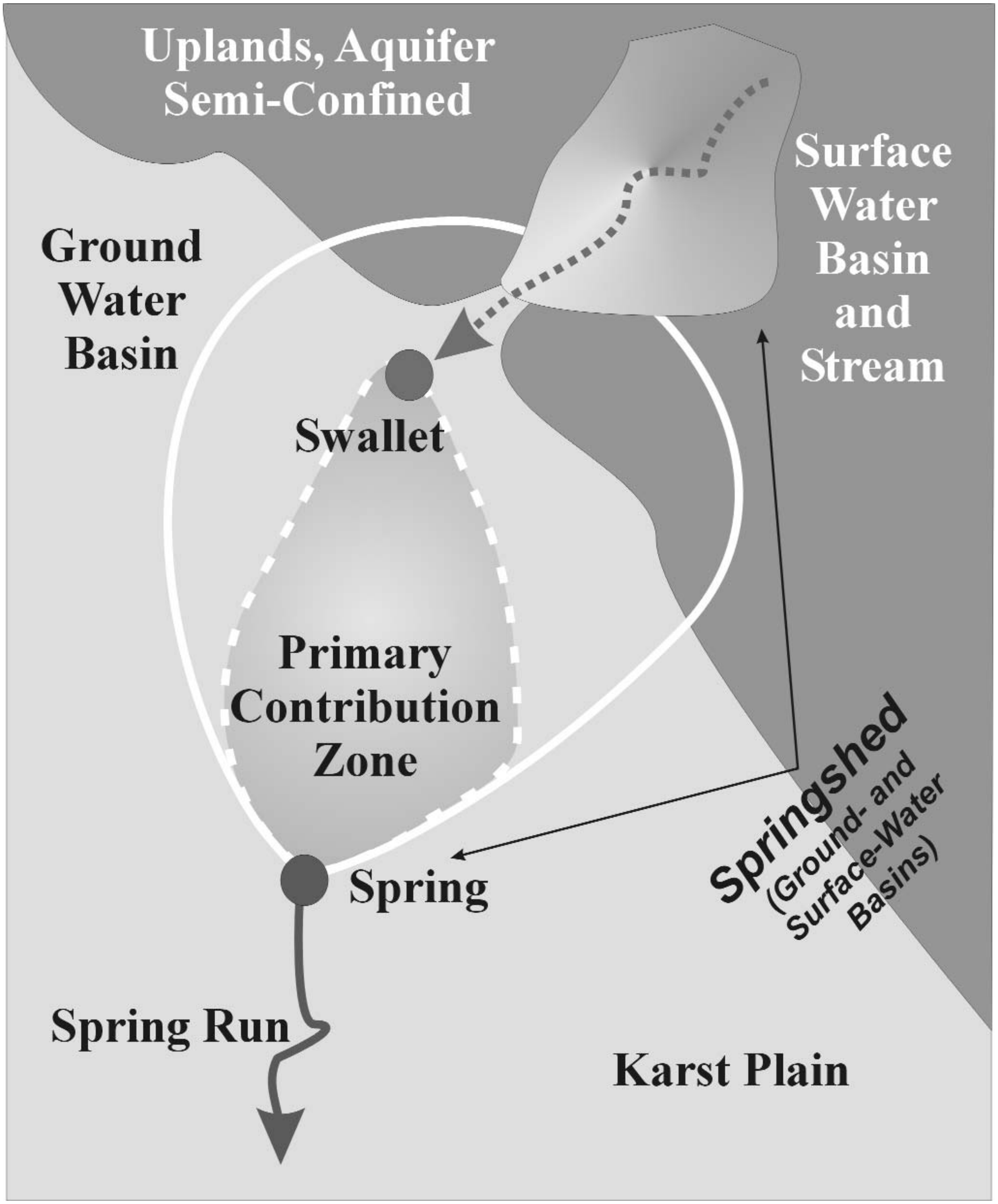

Figure 9. Idealized springshed delineation.

Figure 10 is an example that incorporates many of the features of the hypothetical springshed with a high-resolution potentiometric surface map used as a basis for delineation of the ground-water basin. This map, prepared for data collected in September 2003, shows the ground-water basin as defined by the potentiometric surface map of the upper FAS. Maps prepared for other time periods suggest that the basin boundaries change slightly over time. The zone where the isopotential lines are close together is the transition from the unconfined karst plain (Ocala Karst District) to the highlands where the FAS is confined. Up gradient from this transition zone, aquifer vulnerability is low; down gradient it is high. Aquifer vulnerability is particularly high in the transition zone where streams coming off the highlands discharge into swallets in the karst plain. The hatchered portion represents the drainage basins of the more important of those streams. Lake City is located on this transition zone and runoff from portions of the city as well as from a wastewater land application area enters the shaded area.

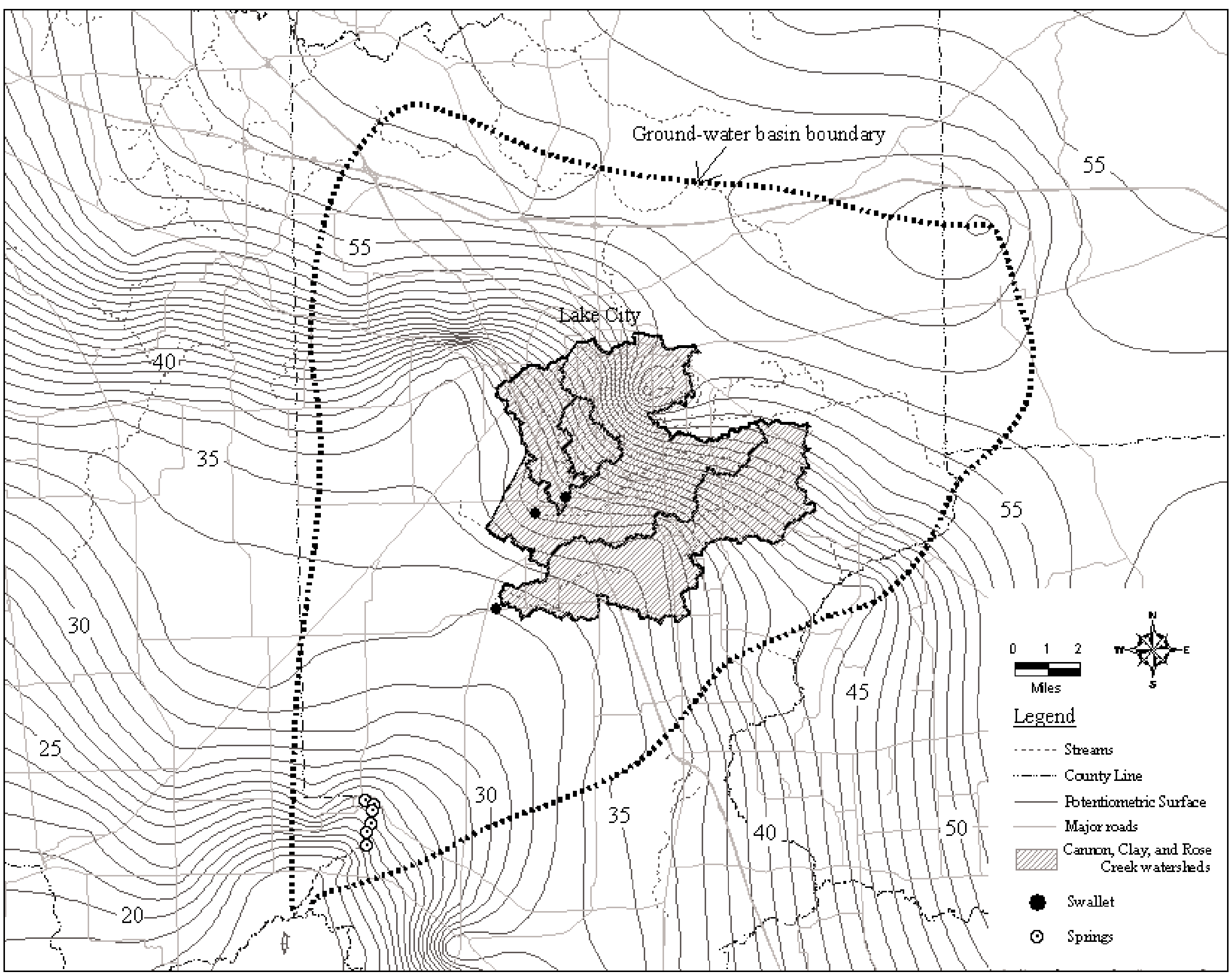

Figure 10. Potentiometric map of a springshed.

Delineation of ground- and surface-water portions of springsheds, identification of major swallets that receive storm water, and identification of land uses that may lead to contributions of nutrients or other constituents into the ground-water system are important steps in protecting Florida springs. High-resolution monitoring is an important aspect of this effort where the margins of the ground-water basin may include significant contamination sources or ground-water withdrawals. In addition, it allows for recognition of vulnerable recharge areas and potential jurisdictional issues.

Spring Water

Natural Factors Affecting Water Quality

In order to fully understand the water quality of Florida's springs, a rudimentary understanding of the origin and chemistry of Florida's groundwater is needed. Most people are aware that Florida is surrounded on three sides by salt water. Many are unaware however, that salt water also underlies the entire state. The reason for this is that the Florida Platform consists of carbonate rocks that were deposited in a shallow ocean. At the time of deposition of the rocks under the ocean, salt water existed in their intergranular pore spaces. Gradually over geologic time, sea level was lowered relative to its position when the carbonate sediments were deposited. Through compaction and downwarping of sediments on both sides of the Platform, a series of complex fracture patterns developed. The patterns are often reflected at land surface and have actually influenced the pathways of many of Florida's streams.

As sea level lowered, the central portion of the Florida Platform was exposed to the atmosphere. Over time, rainfall percolated downward and eventually replaced the upper portion of salt water in the carbonates with a fresh water "lens." Today, the "lens" is generally deepest in the central portion of the state and becomes narrower toward Florida's coastline. The lens is over 2,000 feet thick at its maximum (Klein, 1975). It should be understood that the base of the lens is transitional rather than a sharp boundary. Groundwater in the deeper portion of the lens, and along our coasts, is mixed and has relatively high concentrations of saline indicators such as sodium (Na), chloride (Cl), and sulfate (SO_4).

Water discharging from Florida's springs has its ultimate source from rainfall. Much of the rainfall reaching land surface flows overland to surface-water bodies, evaporates or is transpired by plants. However, a portion of the rainfall percolates downward through the sediments where it recharges our aquifers. During its travel downward from land surface to the water table, and while water resides within Florida's aquifer systems, many factors affect the water chemistry.

Residence time is the length of time that water is in contact with a particular portion of an aquifer system (Upchurch, 1992). A long residence time may allow sufficient time for chemical reactions between the water and the aquifer rock. As such, water chemistry reflects the composition of the aquifer rock. Typical residence times range from several days to thousands of years depending on the nature of the flow system (Hanshaw et al., 1965).

A second factor affecting ground-water chemistry is its flow path, which is the length and depth of the path that the groundwater follows as it flows through an aquifer

(Upchurch, 1992). In general, shallow, short flow paths, which are characteristic of the SAS, result in low residence times for chemical reactions. Consequently, the total dissolved solid (TDS) content is less than in longer flow-path systems. If the flow path is long (on the order of tens of kilometers), such as commonly occurs in the FAS, reactions between rock and water become more probable and the TDS content of the water increases as a result of continued rock-water chemical reactions. Because of its residence time and flow path, spring water quality is typically reflective of the interactions of the major rock types of the source aquifer and water within it.

A third factor that is of particular interest is intergranular porosity (pores through which water passes between the individual rock matrix grains). Even though Florida's karst features suggest the existence of large, secondary cavernous pores spaces, most of the pores tend to be small (Upchurch, 1992). Fortunately, whenever the pore throats are very small, they act as filters for microbes, small organic substances, and clay minerals. In general, this results in very clean groundwater that is extremely desirable for both drinking water and recreational purposes. Unfortunately, some contaminants originating from our land use activities are not always removed and contaminate groundwater.

Indicators of Water Quality Problems

Spring water, when it is in the aquifer, is considered to be groundwater. However, once spring water exits from the spring vent onto the earth's surface, it is considered to be surface water. Because of this change, the question arises whether scientists and regulators should apply ground-water or surface-water quality standards to the water. Contaminant criteria thresholds may exist for an analyte while the water is considered groundwater, but not for surface water; or vice versa. Nitrate ($NO_3 + NO_2$ as N) is a good example. Based on drinking water criteria, nitrate has a groundwater threshold value of 10 mg/l (FDEP, 1994). However, no nitrate criteria exist for surface water. The FDEP Division of Water Resource Management is currently developing criteria for spring water. Until legal criteria are established, it should be understood that any reference to threshold values in the following text simply infers potential water-quality problems.

One of the more disturbing aspects about Florida's spring water quality has been the documented steady increase of nitrate over the past several decades (Jones et al., 1996; Champion and DeWitt, 2000; Means et al., 2003). Figure 8 displays the nitrate increase in 13 selected first-magnitude springs (Alexander, Chassahowitzka Main, Fanning, Ichetucknee Main, Jackson Blue, Madison Blue, Manatee, Rainbow Group composite, Silver Main, Silver Glen, Volusia Blue, Wakulla, and Wacissa #2 Springs) between the 1970s and the early 2000s.

Of the 125 spring vents sampled in 2001-2002, none had nitrate concentrations exceeding the 10 mg/l threshold for drinking water. The natural background nitrate concentrations in groundwater in Florida are less than 0.05 mg/l (Maddox et al., 1992). Of the spring vents sampled, 52 had nitrate concentrations exceeding 0.50 mg/l (42%) and 30 (24%) had concentrations greater than 1.00 mg/l. Thus, over 40% of the sampled springs have at least a ten-fold increase in nitrate concentrations above background and approximately one quarter of them have at least a 20-fold increase. The effect of the increased concentrations of nitrate in surface water is not fully understood. Increasing nitrate concentrations may adversely affect the aquatic ecosystem in springs and spring runs. Further research is still needed and is currently being sponsored by the Springs Initiative.

The FDEP is aware of the nitrate issues and has worked with other governmental agencies to develop a series of steps to reduce nitrate concentrations in our groundwater and springs in the middle Suwannee River Basin where many of Florida's springs are located (Copeland et al., 2000). The FDEP Bureau of Watershed Management and the Florida Department of Community Affairs are active in coordinating the development of springs protection measures. In addition, in September 2003, Governor Bush and the Florida Cabinet voted unanimously to strengthen protection for Florida's freshwater springs. Improvements to the Florida Springs Rule, currently being proposed by FDEP, are designed to increase protection for water quality, flow and habitats.

Another spring-water quality concern is the influence of saline water. Sixteen of the sampled springs are "salty." Of these 16 springs, 13 had concentrations of chloride (a saline indicator) exceeding the 250 mg/l threshold for drinking water. Springs with this type of water tend to be located along Florida's coast and along the St. Johns River. The ultimate source of the saline indicators is from naturally occurring saline water within the FAS (Klein, 1975). The saline water may cause water-quality changes in spring water as the result of natural circumstances such as drought and upwelling within the FAS. The changes may also be attributed to ground-water withdrawal.

Bacteria, such as enterococci and fecal coliform, represent a third concern regarding spring water quality. It is generally believed that these bacteria originate in fecal matter from warm blooded animals (Center for Disease Control, 2004). Fecal coliform concentrations in 23 springs (18%) exceed the drinking water threshold (FDEP, 1994) of four colonies per 100 ml. However, because it has been determined that these bacteria can complete their normal life-cycle outside of warm-blooded animals, especially in a warm environment as in parts of Florida (Fjuioka and Byappanahalli, 2004), the concentrations of fecal coliform may not necessarily represent a direct link to warm-blooded animal pathogens. Further research is needed before definitive conclusions can be made regarding the source of the fecal bacteria.

FDEP encourages the development of best management practices (BMPs). BMPs are land use strategies designed to reduce pollution to our environment. In an effort to reduce nitrate concentrations in spring water FDEP cooperates with over 20 government and private organizations to develop and implement BMPs for the middle Suwannee River Basin where many of Florida's springs are located. It is believed that the net result of the BMPs will ultimately result in a reduction of nitrate concentration in spring water in the region.

The Florida Springs Initiative addresses the nitrate and microbiological issues by providing funds for the monitoring of nitrate in springs and by sponsoring research on the microbiology of caves and spring water. The FDEP also works very closely with the water management districts in monitoring salt-water intrusion and in the establishment of minimum flows for our streams and minimum levels for our aquifers. Florida law (Chapter 373, *Florida Statutes*) requires Florida's water management districts to establish minimum flows and levels (MFLs) for water courses, water bodies, and aquifers. The goal of the minimum flows and levels program is "to establish minimum flows and levels in accordance with Chapter 373.042, *Florida Statutes*, to protect Florida's water resources from significant harm caused by water withdrawals or diversions." Minimum flows and levels are designed to assure adequate quantities of water for our streams and springs. This statute also provides authority to reserve water from permit allocation to protect fish and wildlife (Chapter 373.223(4) *Florida Statutes*). These water reservations provide the highest level of protection allowed by law and will aid in protecting historical spring flows.

Offshore Springs

Offshore or submarine springs are known to exist off Florida's Atlantic and Gulf of Mexico coastlines. These springs are most common in the offshore portion of the Florida Platform from Tampa north and west to the Ochlocknee River south-southwest of Tallahassee. Offshore springs have also been identified off the northern and southwestern parts of the peninsula and the western panhandle (Rosenau et al., 1977) (Figure 11). Water-quality data from some of these springs indicate that, at best, the water is brackish. Anecdotally, there are reports of "fresh water" flowing from offshore springs.

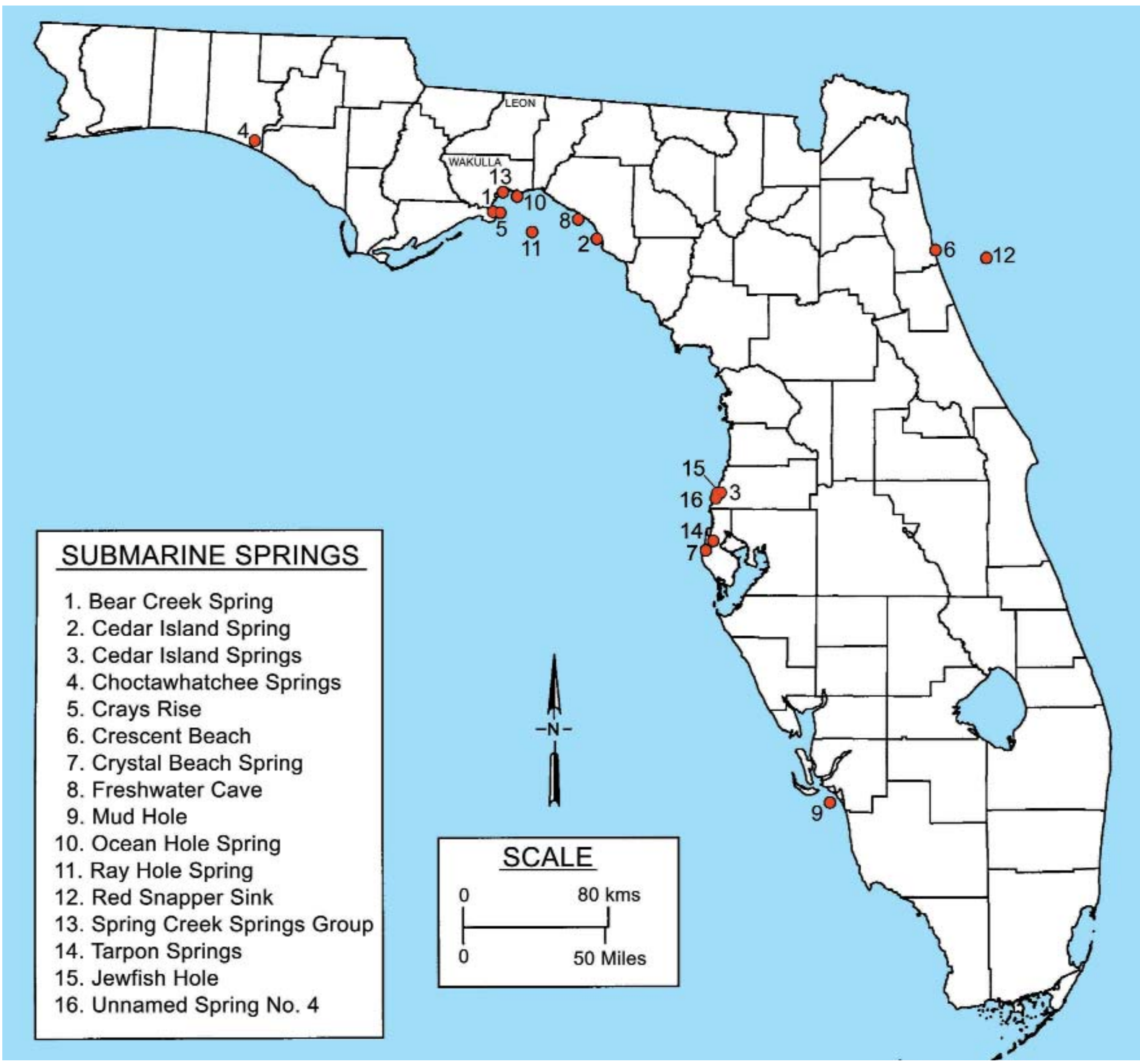

Figure 11. Offshore springs (from Rosenau et al., 1977).

The area offshore from Tampa to the Ochlocknee River has carbonate rocks of the FAS exposed on the sea bottom or slightly buried. At lower sea levels, particularly during the Pleistocene, this area was exposed and dissolution created numerous karst features. Many of these sinkholes are known to fisherman and divers (Figure 12). Some offshore karst features are springs but how many of the karst features discharge water is not known. However, to fully understand the water budget of the FAS, the determination of the flows is necessary. The FGS, along with SRWMD and SWFWMD, are investigating offshore springs to determine flow characteristics and water quality. Results of these investigations will be published in the near future.

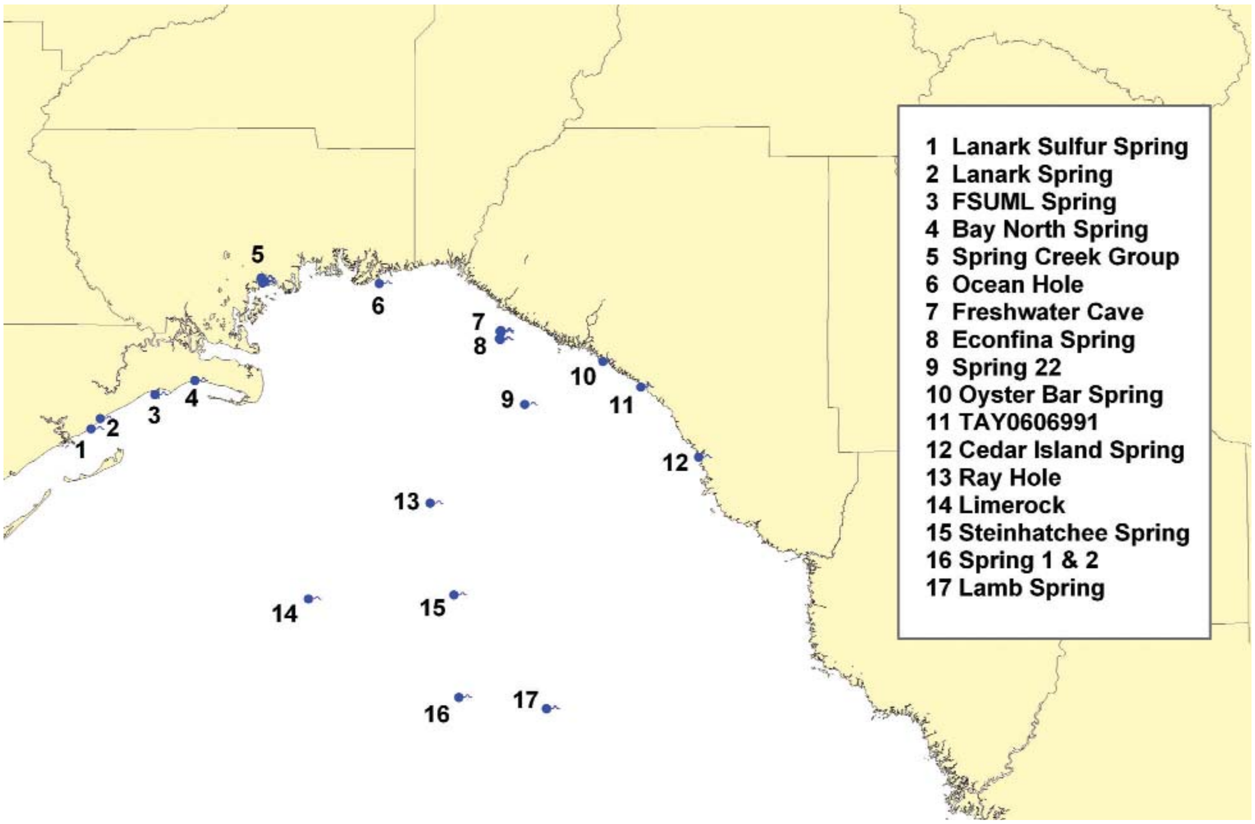

Figure 12. Known offshore springs in the Florida Big Bend Region.

WATER QUALITY

Methodology

One hundred eleven springs, two submarine springs, eight river rises, and four karst windows were sampled from September 2001 through August 2003 (Figure 13). Tidally influenced springs were sampled at low tide to minimize the influence of salt water on the water-quality samples. Standard FDEP sampling protocols were followed for each sampling event (Watershed Monitoring Data Management Section, Florida Department of Environmental Protection, 1991). Any mention of brand names does not imply an endorsement by the Florida Geological Survey or the Florida Department of Environmental Protection.

Field Parameters

Temperature, dissolved oxygen, specific conductance, and pH were measured using either a Hydrolab Quanta or a YSI data sonde (model no. 6920) and data logger (model no. 6100). Instruments were calibrated at the beginning of each sampling day. A check was performed at the end of each day to ensure calibration remained accurate throughout the sampling events. If the end of the day check failed, field data were qualified for all vents sampled that day. For quality assurance purposes, field reference standards were analyzed and equipment blanks were submitted every five to ten samples throughout the sampling period.

To begin each sampling event, two or three stainless steel weights were attached to polyethylene tubing (3/8" O.D. x 0.062" wall) which was then lowered into the spring vent opening, ensuring the intake line was not influenced by surrounding surface water. Masterflex tubing was attached to the opposite end, run through a Master Flex E/S portable peristaltic pump (model no. 07571-00), and the discharge line was fed directly into a closed system flow chamber. The datasonde was inserted into the flow chamber and water was pumped through with a constant flow rate between 0.25 and 1 gallon/minute. No purge was required because springs are considered already purged. The field parameter values were recorded after the field meter displayed a stable reading (approximately 10 min.). The tubing was adequately flushed with spring water during the gathering of field parameters. The flow chamber was removed and sampling was conducted directly from the masterflex tubing discharge line.

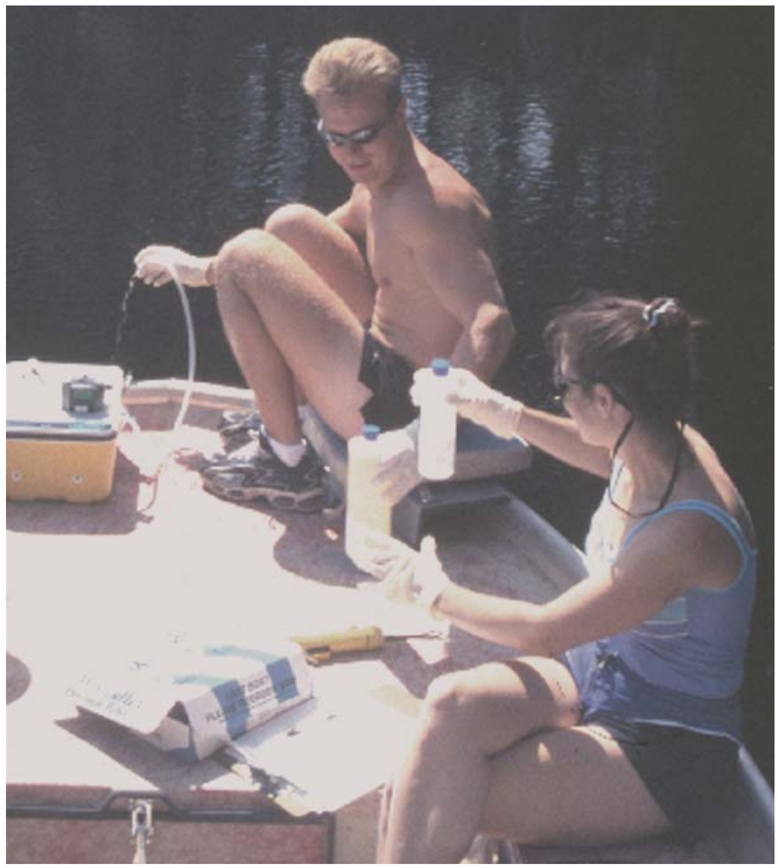

Figure 13. The FGS Spring Sampling Team, 2001.

Two exceptions to this sampling method occurred at Wakulla Spring and Homosassa Springs. Both springs have pre-set pipes running down into the cave systems where the spring vents are located. In the case of Homosassa Springs, tubes from the three vents converge at an outlet box with three valves inside, one for each vent. Sampling was conducted from these valves. At Wakulla Spring, the pipe runs to a pump on shore from which sampling is conducted. The Northwest Florida Water Management District (NWFWMD) (Wakulla Spring) and Southwest Florida Water Management District (SWFWMD)

(Homosassa Springs) designed and operated the sampling systems. Each tube was purged for 10 minutes, as there are gallons of water remaining in tubes from the last sampling effort. FDEP standard operating procedures were followed for water quality sampling

Water Samples

Seven to ten bottles and three Whirl-pack bags were filled with water from spring vents and analyzed by the FDEP Bureau of Laboratories following Environmental Protection Agency or Standard methods. All containers, with the exception of the Whirl-pak bags, were pre-rinsed with sample water prior to filling. Four to seven bottles and three Whirl-pak bags were filled with unfiltered water samples. A GWV high capacity in-line filter (0.45 um) was attached to the microflex tubing and the remaining three bottles were filled with filtered water samples. The number of bottles filled and the types of analytes sampled varied between the first magnitude springs sampling effort and the second and third magnitude spring sampling effort. The analytes sampled for each event are shown in Table 2.

Whirl-pak bags were placed on ice immediately after filling. Bottles for filtered and unfiltered nutrients were preserved with sulfuric acid followed by acidification of bottles for filtered and unfiltered metals using nitric acid. Narrow range pH litmus paper was used to confirm acidity of pH = 2. All water samples were placed on ice and delivered to the FDEP Bureau of Laboratories within 24 hours. New tubing and filters were used at each sample site.

Additional Data

General descriptions of each spring vent were made and included the aquatic, wetland, and upland (where applicable) surroundings. Water depth was measured using a hand held Speedtech sonar depth gauge. Distances were measured with a Bushnell Yardage Pro 500 range finder. Secchi depth (visibility depth) was obtained using a secchi disk. A Trimble XR Pro GPS system with a TDC1 data logger was used to record latitudinal and longitudinal coordinates. Field parameters, weather conditions, sampling times, water and secchi depth, and micro-land use information were also input into the GPS unit. Micro-land uses within 300 ft of spring vents were identified and sketched.

Discharge Measurement

Every effort was made to collaborate with various agencies to obtain the most recent discharge rate for each spring. Discharge rates of the remaining springs were measured by the FGS using either the Price-AA meter or the Marsh McBirney Flo-Mate. The source of each discharge measurement is denoted in the spring descriptions with a superscript. The legend is as follows:

(1) Rosenau et al. 1977
(2) Florida Geological Survey
(3) Northwest Florida Water Management District
(4) Suwannee River Water Management District
(5) Southwest Florida Water Management District
(6) St. Johns River Water Management District
(7) U.S. Geological Survey

Table 2. Laboratory analytes and sample tests. Analyses performed by FDEP.

INDICATOR	SAMPLE TYPE
Alkalinity	Total
Alkalinity (First magnitude only)	Total; Filtered
Ammonia	Total
Ammonia (First magnitude only)	Total; Filtered
Biological Oxygen Demand	Total
Chloride	Total
Chloride (First magnitude only)	Total; Filtered
Color	Total
E. coli (First magnitude only)	Total
Enterococci	Total
Fecal Coliform	Total
Fluoride	Total
Fluoride (First magnitude only)	Total; Filtered
Metals = Arsenic, Boron, Calcium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Sodium, Strontium, Tin, Zinc (First magnitude only)	Total
Metals = Aluminum, Arsenic, Boron, Cadmium, Calcium, Cobalt, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Radium 226, Radium 228, Selenium, Sodium, Strontium, Tin, Zinc (Second and third only)	Total
Metals = Arsenic, Aluminum, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Sodium, Zinc (First magnitude only)	Filtered
Metals = Arsenic, Calcium, Cadmium, Chromium, Copper, Iron, Manganese, Magnesium, Nickle, Lead, Potassium, Sodium, Selenium, Zinc (Second and third magnitude only)	Filtered
Nitrite-Nitrate	Total
Nitrite-Nitrate (First magnitude only)	Total; Filtered
Orthophosphate	Filtered
Orthophosphate (First magnitude only)	Total
Specific Conductance	Total
Sulfate	Filtered
Sulfate (First magnitude only)	Total; Filtered
Total Dissolved Solids	Filtered
Total Dissolved Solids (First magnitude only)	Total
Total Kjeldahl Nitrogen	Total; Filtered
Total Organic Carbon	Total
Total Phosphorus	Total; Filtered
Phosphorus (First magnitude only)	Total
Total Suspended Solids	Total
Turbidity	Total

The FGS employed the discharge measurement methodology of Buchanan and Somers (1969) and the DEP SOP for discharge measurement was also followed (FDEP, 2002). It should be noted that the FGS Springs Teams visited, sampled and measured discharge during the last phase of a major drought and early in the return to normal rainfall.

Characteristics of Spring Water

Spring water discharges provide a means of determining the quality of water in the aquifer as well as the degree of human impact in the springshed. Upchurch (1992) states that a number of factors influence ground-water chemistry. These include the precipitation chemistry, surface conditions at the site of recharge, soil type in the recharge area, mineralogy and composition of the aquifer system, nature of aquifer system porosity and structure, flow path in the aquifer, residence time of the water in the aquifer, mixing of other waters in the aquifer system, and aquifer microbiology. Refer to Upchurch (1992) for a detailed discussion of the factors affecting the chemistry of groundwater.

Descriptions of Analytes

Water quality of springs was determined by collecting and analyzing water samples (Figure 13). A series of field measurements were taken on site during sample collection. When combined, field and analytical data give a snapshot of water quality at that point in time. Comparing similar data, taken over time, can yield information about how water quality changes over time and what may be causing these changes. Analyte descriptions are summarized in Champion and Starks (2001), Hornsby and Ceryak (1998), Jones et al. (1998), Maddox et al. (1992), and Smith (1992). Table 3 gives the units of measure for each analyte.

Physical Field Parameters

Field measurements were collected prior to water sampling. They include dissolved oxygen, pH, specific conductance, water temperature and discharge. Other observations and data recorded in the field include local geology, weather conditions and adjacent land use practices.

Dissolved Oxygen - Oxygen readily dissolves in water. The source of oxygen can be atmospheric or biological. Typically, springs that discharge water from a deep aquifer source have a low dissolved oxygen content. On the other hand, relative to springs, the dissolved oxygen content in river rise water is high. This is due to a greater exposure to the atmosphere and an increase in biological activity.

pH - pH measures the acidity or alkalinity of water. It is defined as the negative log of the activity of the hydrogen ion in a solution. Values range between 0 and 14. A low pH (below 7) represents acidic conditions, and a high pH (above 7) represents alkaline conditions. A pH of 7 indicates the water is near neutral conditions.

As raindrops form they incorporate dissolved carbon dioxide, forming weak carbonic acid. The resulting rain has a low pH. In Florida, as rainwater passes through soil layers it incorporates organic acids and the acidity increases.

When acidic water enters a limestone aquifer, the acids react with calcium carbonate in the limestone and dissolution occurs. Generally, most spring water falls within a pH range of 7 to 8. During heavy rain events, spring water can drop in pH as tannic acids from nearby surface waters are flushed into the spring system. It should be noted that sampled river rises tend to have a lower pH than the clear-water spring systems, due to the surface-water component of the river rise water.

Table 3. Units of measurement.

Analyte	Abbreviation	Unit of Measure
Temperature	-	^oC
Dissolved Oxygen	DO	mg/L
pH	-	units
Specific Conductance	Sp. Cond.	μS/cm at 25 ^oC
Biochemical Oxygen	BOD	mg/L
Turbidity	-	JTU **(Historical)** NTU **(Current)***
Color	-	Platinum Cobalt Units
Alkalinity as $CaCO_3$	-	mg/L
Total Dissolved Solids	TDS	mg/L
Total Suspended Solids	TSS	mg/L
Chloride	Cl	mg/L
Sulfate	SO_4	mg/L
Fluoride	F	mg/L
Total Organic Carbon	TOC	mg/L
Total Nitrogen	$NO_{3} + NO_2$	mg/L
Total Ammonia	$NH_{3} + NH_4$	mg/L
Total Kjeldahl Nitrogen	TKN	mg/L
Total Phosphorus	P	mg/L
Orthophosphate as P	PO_4	mg/L

*JTU and NTU are approximately equivalent though not identical

Analyte	Abbreviation	Unit of Measure
Calcium	Ca	mg/L
Potassium	K	mg/L
Sodium	Na	mg/L
Magnesium	Mg	mg/L
Arsenic	As	μg/L
Barium	Ba	μg/L
Boron	B	μg/L
Cadmium	Cd	μg/L
Cobalt	Co	μg/L
Chromium	Cr	μg/L
Copper	Cu	μg/L
Iron	Fe	μg/L
Manganese	Mn	μg/L
Nickel	Ni	μg/L
Lead	Pb	μg/L
Selenium	Se	μg/L
Tin	Sn	μg/L
Strontium	Sr	μg/L
Zinc	Zn	μg/L

Specific Conductance - Specific conductance is a measure of the ability of a substance, in this case spring water, to conduct electricity. The conductance is a function of the amount and type of ions in the water. The variability of the specific conductance of spring water can be quite high when the spring is discharging saline water or when the spring is discharging into the marine environment.

Water Temperature - Geologic material is characteristically a good insulator. Rocks and sediments tend to buffer changes in the temperature of spring water. Thus, spring water temperature does not vary much and tends to reflect the average annual air temperature in the vicinity of the spring. In Florida, this temperature can range from 68°F to 75°F (20° C to 24° C), plus or minus several tenths of a degree. Temperature plays a role in chemical and biological activity within the aquifer and can help in determining residence time of the water in the aquifer.

Discharge - Discharge, or spring flow, is controlled by the potentiometric levels in the FAS.

Discharge generally changes slowly in response to fluctuations in the water levels in the aquifer. Discharge is measured in cubic feet per second or gallons per day.

Other Field Data - During sample collection, total water depth, sample depth, local geology, adjacent land use and current weather conditions are noted at each spring. This generalized information can be useful in helping to determine certain water quality-related issues of the spring. The aquatic vegetation conditions were noted along with the occurrence of algae. For specific information on the native and invasive aquatic vegetation, there is an annual aquatic plant survey of public waters conducted by FDEP's Bureau of Invasive Plant Management. For information on the survey, contact the Bureau at 850-245-2809.

Secchi Depth- A measure of the cloudiness or turbidity of surface water. This method utilizes a Secchi disk, a disk divided into black and white quarters, used to gauge water clarity by measuring the depth at which it is no longer visible from the surface.

Laboratory Analytes

Alkalinity - The alkalinity of spring water is affected primarily by the presence of bicarbonate, hydroxide and carbon dioxide. Highly alkaline waters are usually associated with high pH, dissolved solids and hardness which, when combined, may be detrimental to the aquatic environment.

Biochemical Oxygen Demand - Biochemical oxygen demand (BOD) is a measure of the quantity of molecular oxygen utilized in the decomposition of organic material, during a specified incubation time, by microorganisms such as bacteria. When the BOD is high, the depletion of oxygen can have a detrimental effect on aquatic organisms. BOD is measured in mg/l.

Chloride (Cl) - Chloride is the most abundant constituent in seawater. Springs that are tidally influenced may have high chloride concentrations. Chloride is added to the atmosphere via marine aerosols from the ocean. In most Florida's springs, chloride is introduced to the spring system via rainfall. Chloride is chemically conservative and reacts very little with spring water.

Color - The color of spring water can be affected by factors such as the presence of metallic ions, tannic acids, biological activity and industrial waste. Generally, spring water in Florida is clear. Color measurements are made on filtered water samples so the true color of the water is determined. Color is reported in either color units or Platinum Cobalt units (Pt/Co).

Nitrate + Nitrite (NO_3 + NO_2) as N - Nitrate and nitrite are both found in spring water in Florida. Nitrate contamination recently has become a problem in Florida's springs. Nitrate found in spring water originates from fertilizers, septic tanks and animal waste that enter the aquifer in the spring recharge area. Nitrate, being a nutrient, encourages algal and aquatic plant growth in spring water, which may lead to eutrophication of the spring and the associated water body. Nitrite, which is much less of a problem, can originate from sewage and other organic waste products.

Organic Carbon - Natural and non-naturally occurring organic carbon are present in varying concentrations in spring water in Florida. The primary source of naturally occurring organic carbon is humic substances (decaying plant material). Synthetic organic carbon represents a minor component.

Orthophosphate (PO_4) - Phosphate is an essential nutrient and occurs in spring water in Florida. Unfortunately, an excess of phosphate can cause run-away plant growth and the eutrophication of surface waters. The Hawthorn Group, a geological unit in Florida, is the most important source of phosphate in spring water. Other sources include organic and inorganic fertilizers, animal waste, human waste effluent and industrial waste.

Potassium (K) - Potassium occurs in trace amounts in Florida's spring water and is derived primarily from seawater. Therefore, it occurs in higher concentration along the coast. The weathering of mica, feldspar and clay minerals can contribute potassium to spring water. In addition, because potassium is an essential nutrient, it is a component of fertilizers.

Radium 226 & 228 (Ra^{226} & Ra^{228}) - Radium is a naturally occurring radioactive element that is produced when uranium and thorium minerals decay ("break down") in the environment. Radium itself decays into other elements, and eventually to lead (Pb), but exists in the environment long enough to be of concern in groundwater. Radium is of similar size and nature to phosphorus and often substitutes for it. Consumption of radium isotopes can lead to the incorporation of radium into bone and other body systems. Radium is a known carcinogen. Uranium-bearing minerals, the natural source of radium, are found in all of Florida's aquifer systems in varying, usually minor, amounts.

Sodium (Na) - In Florida, sodium occurring in spring water has several sources. Marine aerosols, mixing of seawater with fresh water and the weathering of sodium-bearing minerals like feldspars and clays are the primary sources.

Sulfate (SO_4) - Sulfate is commonly found in aquifer waters in Florida and has several sources. The two most common sources are from seawater and the dissolution of gypsum and anhydrite (naturally occurring rock types within Florida's aquifer systems). Sulfate is often used as a soil amendment to acidify soils, and thus is associated with agricultural activities. Finally, disposal and industrial waste activities release sulfate to groundwater. Sulfate-rich spring water can potentially be toxic to plants. In higher concentrations it affects the taste of drinking water.

Total Ammonia (NH_3 + NH_4) - Ammonia (NH_3) occurs in groundwater primarily as the ammonium ion (NH_4) because of the prevalent pH and reduction-oxidation potential (Upchurch, 1992). Microbial activity within the soil and aquifer can convert other nitrogenous products to ammonium.

Total Dissolved Solids (TDS) - Total dissolved solids is a measure of the dissolved chemical constituents, primarily ions, in spring water. Concentrations in Florida's spring water vary widely. Since most of Florida's spring water issues from carbonate aquifers, the total dissolved solid concentrations are fairly high. Higher concentrations are found in springs that are tidally influenced and springs that discharge into the marine environment.

Total Kjeldahl Nitrogen - This is a measure of the sum of the ammonia nitrogen and organic nitrogen in the spring water sample. The ammonia nitrogen, mainly occurring as ammonium (NH_4), occurs in trace amounts in spring water (see ammonia [NH_3] above). Organic nitrogen originates from biological sources including sewage and other waste. FDEP regulates nitrogen, in the form of nitrates and nitrites, in drinking water in Florida (see previous descriptions above).

Total Nitrogen - The amount of nitrate, nitrite, ammonia, and organic nitrogen, when summed, gives the total nitrogen content of spring water.

Total Suspended Solids - This refers to the amount of solid material suspended in the water column. As opposed to turbidity, total suspended solids does not take into account the light scattering ability of the water. Total suspended solids are filtered out of the water sample and are measured in mg/l.

Turbidity - Turbidity is a measure of the colloidal suspension of tiny particles and precipitates in spring water. High turbidity water impedes the penetration of light and can be harmful to aquatic life. Most Florida springs discharge water low in turbidity. Turbidity is measured in Nephlometric Turbidity Units (NTU's).

Trace Metals

Trace metals analyzed for this report include: aluminum (Al), arsenic (As), boron (B), calcium (Ca), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), fluoride (F), iron (Fe), lead (Pb), magnesium (Mg), manganese (Mn), nickel (Ni), phosphorous (P), selenium (Se), strontium (Sr), tin (Sn) and zinc (Zn). Trace metals, when present in spring water, are found in very low concentrations and are measured in parts per billion (ppb), or micrograms per liter (µ/l). In Florida, calcium and magnesium occur in higher concentrations and are therefore measured in milligrams per liter.

The naturally low abundance of trace metals in Florida's groundwater can be attributed to several factors including: low natural abundance in aquifer rocks, low solubility of metal-bearing minerals, high adsorption potential of metal ions on clays and organic particulates and precipitation in the form of sulfides and oxides (Upchurch, 1992). Many biochemical processes require small amounts of some trace metals; however, higher concentrations can be toxic. Industrialization and increased demand for products containing trace metals have overwhelmed the natural biogeochemical cycle, and anthropogenic sources of trace metals now far outweigh natural sources (Smith, 1992).

In Florida, lead, mercury and arsenic are among metal contaminants locally found in groundwater that are most detrimental to human health. These contaminants, along with other metals, can be distributed throughout the ecosystem within the atmosphere, water, and geological materials (soils, sediments and rocks). Atmospheric pollutants, such as mercury, are often the primary source of waterborne metals. These pollutants are introduced into the atmosphere by mining operations, smelting, manufacturing activities and the combustion of fossil fuels (Smith, 1992).

Historically, contamination of groundwater by lead was caused primarily by combustion of fossil fuels containing lead additives. Lead additives were phased out of fuels in the U.S. and Canada by 1990. Other sources of contamination still persist. Lead bioaccumulates in aquatic organisms, affecting the higher trophic levels the most. In humans, lead causes severe health problems including metabolic disorders, neurological and reproductive damage and hypertension. In Florida, the Primary Standard for lead in drinking water is 15 g/L.

When trace metals are released into the environment, they are characteristically not biodegradable and tend to stay in the environment accumulating in foodwebs and impact ecosystems. Trace metals such as arsenic, cadmium, mercury, and silver can have adverse effects on aquatic and terrestrial environments at low concentrations.

Biological Analytes

Spring water samples were analyzed for total coliform, fecal coliform, *Escherichia coli* (*E. coli*), and Enterococci. These analytes are used to assess the sanitary quality of spring water and to determine the potential for waterborne diseases (bacterial and viral). The primary source of these contaminants is fecal waste from warm-blooded animals. When spring water samples were analyzed for total coliform, fecal coliform, Escherichia coli (E. coli), and Enterococci bacteria. These analytes are used to assess the sanitary quality of spring water and to determine the potential for waterborne diseases (bacterial and viral). The primary source of these contaminants is fecal waste from warm-blooded animals. When detected in numbers that exceed the maximum contaminant level (MCL), coliforms may indicate that the spring has been contaminated by domestic sewage overflow or non-point sources of human and animal waste. Measurements made on these biological analytes are reported in colonies per 100 milliliters.

Total coliform bacteria are a group of closely related, mostly harmless bacteria that live in the digestive tract of animals. The extent to which total coliforms are present in spring water can indicate general water quality and the amount of fecal contamination. By further examining fecal coliforms, *E. coli* and Enterococci, it is possible to estimate the amount of human fecal contamination of the sample. Human contact with water that is contaminated with fecal wastes can result in diseases of the digestive tract including gastroenteritis and dysentery. Typhoid fever, hepatitis A, and cholera are also related to contact with fecally contaminated water.

DESCRIPTIONS OF INDIVIDUAL SPRINGS AND RESULTS OF ANALYSES

The FGS Springs Teams created brief descriptions for each spring group, spring, river rise and karst window visited during 2001-2003. Data for the descriptions were derived from field visits to the springs by FGS Springs Teams, FGS Bulletin 31 Revised (Rosenau et al., 1977) and the Florida Springs website http://www.tfn.net/springs/. More elaborate descriptions and links to maps are available on the websites listed in Springs Information Resources on the Web in this volume. The size, shape and appearance of the springs can vary in response to rainfall and river and lake levels. During the FGS effort to visit and describe springs, the state was in the last phase of a major drought. As a result, springs often appeared different than had been previously described by Rosenau et al. (1977), Hornsby and Ceryak (1998) and others. Many springs were visited and described but not sampled for water quality. These descriptions and the entire printed volume are provided on the enclosed CD.

Figure 14. SCUBA diver in Silver Springs (photo by G. Maddox).

The mileage in the springs location information was determined using ArcView version 3.2.

NOTE : The legend for the discharge measurements is:

(1) Rosenau et al., 1977, Springs of Florida: FGS Bulletin No. 31 (Revised)
(2) Florida Geological Survey
(3) Northwest Florida Water Management District
(4) Suwannee River Water Management District
(5) Southwest Florida Water Management District
(6) St. Johns River Water Management District
(7) U.S. Geological Survey

Water Quality-Analyses were conducted by the Florida Geological Survey and the Florida Department of Environmental Protection Bureau of Laboratories. Historical measurements were obtained from Bulletin No. 31, revised (Rosenau et al., 1977).

ALACHUA COUNTY

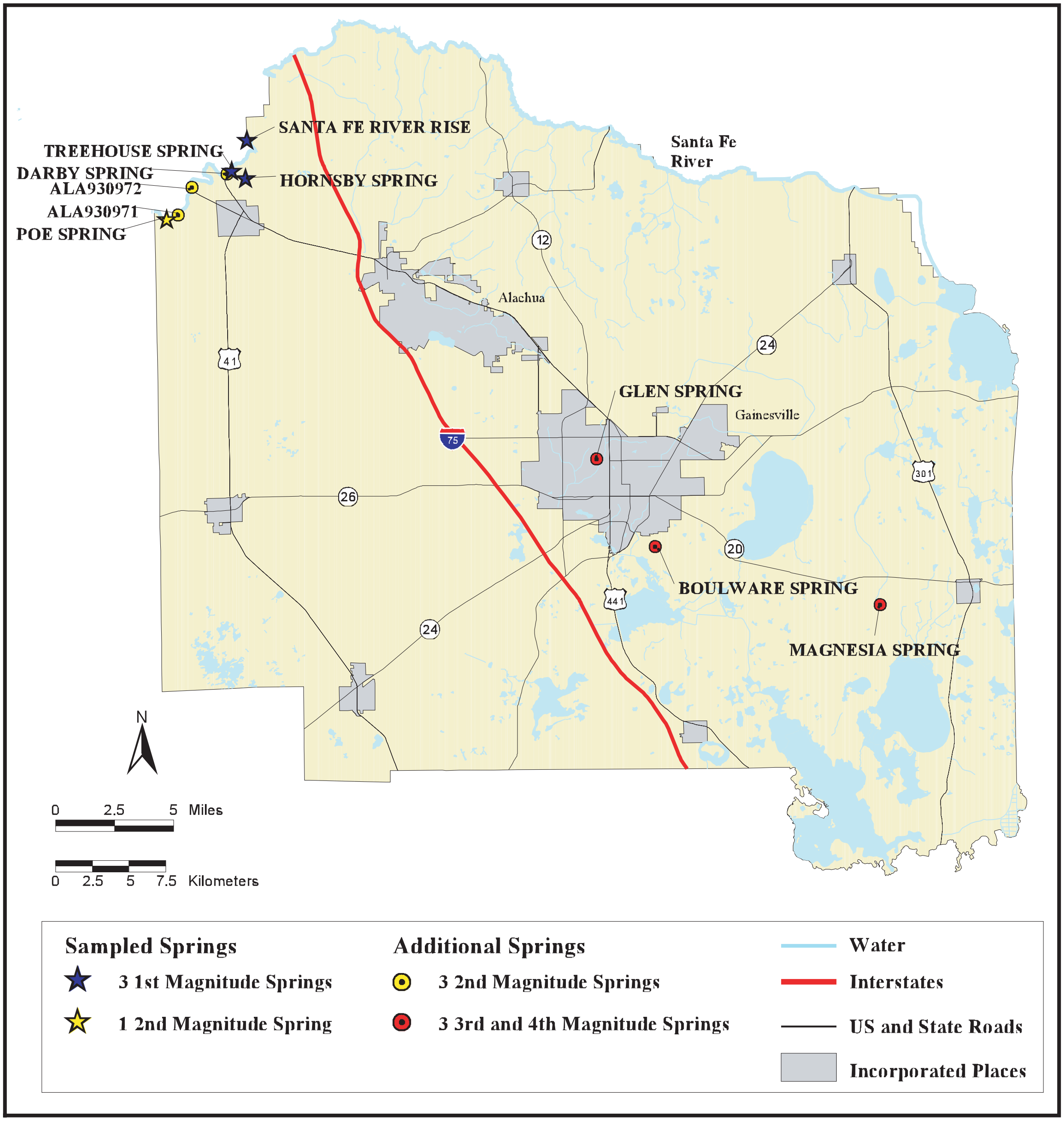

Figure 15. Springs visited by FGS in Alachua County.

Hornsby Spring

Figure 16. Hornsby Spring (photo by T. Scott)

Location - Lat. 29° 51' 01.3" N., Long. 82° 35' 35.5" W. (NE ¼ NE ¼ SE ¼ sec. 27, T. 7 S., R. 17 E.). Hornsby Spring is located in Camp Kulaqua 1.5 miles (2.4 km) north of High Springs. From the US 441/41 and CR 236 (Main Street) intersection in High Springs, drive north on US 441/41 approximately 1.5 miles (2.4 km) to Camp Kulaqua which will be on the east (right) side of the road. Turn east (right) at Camp Kulaqua sign and follow road approximately 1 mile (1.6 km) to campground entrance. The spring is located inside the campground about 300 ft (91.4 m) northwest of the camp entrance.

Description - Hornsby Spring has a circular spring pool measuring 155 ft (47.2 m) north to south and 147 ft (44.8 m) east to west. Its depth at the vent is 34.5 ft (10.5 m). The water is clear and slightly greenish blue. The spring has an underwater limestone ledge on the north side under a floating walkway. Algae patches are growing on limestone substrate. The spring run is approximately 0.9 miles (1.5 km) long, 15 ft (4.6 m) wide and up to 5 ft (1.5 m) deep. It flows generally westward into the Santa Fe River. During the first FGS visit, the spring was not flowing. The FGS sampled the spring during a subsequent visit when a small spring boil was visible near the wooden walkway. This spring is situated on the edge of the lowland floodplain of the Santa Fe River. The floodplain is forested with cypress, gum, and maple. High ground on the east side of the spring rises steeply to 6 ft (1.8 m) above water level, then gently rises to approximately 15 ft (4.6 m) and is a rolling sand hills terrain. The uplands are open and grassy. An underwater cave system has been mapped at Hornsby Spring.

Table 4. Hornsby Spring water quality analyses.

Analytes	1972	2001	
		Unfilt.	Filter
Field Measures			
Temperature	22.5	22.8	-
DO	-	0.47	-
pH	8.8	7.15	-
Sp. Cond.	390	494	-
Lab Analytes			
BOD	-	0.51 I	-
Turbidity	-	0.15	-
Color	-	5 U	-
Alkalinity	130	163 J	163 A
Sp. Cond.	-	490 A	-
TDS	-	313	-
TSS	-	4 U	-
Cl	12	12	12
SO_4	60	83	82
F	0.4	0.26	0.22
Nutrients			
TOC	-	1 I	-
$NO_3 + NO_2$	0.00	0.3 J	0.3
NH_3+NH_4	-	0.011 I	0.011 I
TKN	-	0.096 I	0.094 I
P	-	0.073	0.072
PO_4	-	0.075	-

Analytes	1972	2001	
		Unfilt.	Filter
Metals			
Ca	5.7	74.3	74.2
K	0.6	1	0.98
Na	8.5	8.46	8.55
Mg	9.6	12.8	12.6
As	-	3 U	3 U
Al	-	-	75 U
B	-	25 U	-
Cd	-	0.75 U	0.75 U
Co	-	0.75 U	-
Cr	-	2 U	2 U
Cu	-	2.5 U	2.5 U
Fe	-	35 U	35 U
Mn	-	16.7	16.2
Ni	-	2 U	2 U
Pb	-	5 U	4 U
Se	-	4 U	4 U
Sn	-	20 U	-
Sr	-	1140	-
Zn	-	5 U	5 U

A=Average Value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=exceeded holding time limit

Utilization - Hornsby Spring is the central feature of the privately-owned Camp Kulaqua. The spring is developed into a swimming and recreation area. There are numerous board-walks over and around the spring. A slide leads into the spring pool on the north side. Full facilities are located nearby.

Discharge- All discharge rates are measured in ft^3/s.

April 19, 1972	250[(1)]
April 25, 1975	76[(1)]
October 16, 2001	14.1[(4)]
October 2, 2002	0.0[(2)]

Table 5. Hornsby Spring bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	10 Q
Enterococci	4 Q
Fecal Coliform	6 Q
Total Coliform	20 Q

Poe Spring

Figure 17. Poe Spring (photo by R. Means).

Location - Lat. 29° 49' 32.58" N., Long. 82° 38' 56.30" W. (SW ¼ NW ¼ NE ¼ sec. 6, T. 8 S., R. 17 E.). Poe Spring is located within Poe Springs County Park, 3 miles (4.8 km) west of High Springs. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for 0.6 miles (1 km). Turn west (right) on SR 340 (Poe Springs Road) and travel 2.9 miles (4.7 km), then turn north (right) into the park at the park sign. The spring is down a foot path along the Santa Fe River.

Description - Poe Spring is bordered by a man-made retaining wall. It forms a circular pool 120 ft (36.6 m) in diameter. The vent is on the south side of the pool at the bottom of a conical depression where there is exposed limestone. The depth measures 18.7 ft (5.7 m) over the vent and a boil is present on the spring surface. The water is clear with a blue-greenish hue. The spring has an exposed sand bottom resulting from heavy use. Aquatic vegetation and algae are sparse within the spring. A steep, underwater limestone ledge is on the east side of the vent. The spring run is swift and short, flowing approximately 75 ft (22.9 m) northwest into the Santa Fe River. The river in this vicinity is choked with exotic aquatic vegetation, but none occurs within the spring or its run. Pavilions and picnic tables are on the east side of the spring. A wooden boardwalk is on the south side of the pool. Land around the spring is low-lying river flood plain. Dense mesic hardwood forest occurs to the south and west of the spring.

Utilization - Poe Spring is in a county recreational area with full facilities.

Table 6. Poe Spring water quality analyses.

Analytes	1924	1946	1972	2002	
				Dissolved	Total
Field Measures					
Temperature	-	-	22	22.48	
DO	-	-	-	0.38	
pH	-	7.3	8.2	7.41	
Sp. Cond.	-	-	-	437	
Lab Analytes					
BOD	-	-	-	-	0.36I
Turbidity	-	-	-	-	0.05U
Color	-	5	5	-	5U
Alkalinity	-	-	170	-	179
Sp. Cond.	-	368	380	388.0	-
TDS	204	210	212	-	259
TSS	-		-	-	4U
Cl	7	6.8	7	-	15
SO_4	10	17	16	-	35
F	-	0.1	0.2	-	0.17
Nutrients					
TOC	-	-	-	-	1.4I
$NO_3 + NO_2$ as N	-	-	0.27	-	0.20
$NH_3 + NH_4$	-	-	-	-	0.01U
TKN	-	-	-	0.1I	0.075I
P	-	-	-	0.11A	0.100
PO_4	-	-	-	0.110	-
NO_3	-	0.5	0.27	-	-
Metals					
Ca	64	65	65	68.7	67.2
K	5.7	0.9	0.6	1	0.96
Na	5.7	4.4	4.7	9.3	9.1
Mg	4.7	6.4	5.3	7.8	7.6
Al	-	-	-	-	50U
As	-	-	-	3U	3U
B	-	-	-	-	21I
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	0.75U
Cr	-	-	-	2U	2U
Cu	-	-	-	3U	3U
Fe	50	70	-	25U	25U
Mn	-	-	-	89.8	88.9
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	0.3
Ra-228	-	-	-	-	0.9U
Se	-	-	-	4U	4U
Sn	-	-	-	-	7U
Sr	-	-		-	361.0
Zn	-	-	-	15U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 7. Poe Spring bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1AKQ
Fecal Coliform	1AKQ

Discharge - All discharge rates are measured in ft^3/s.

February 19, 1917	86.5 (1)
January 31, 1929	75.1 (1)
March 14, 1932	31.2 (1)
December 13, 1941	84.0 (1)
July 22, 1946	75.3 (1)
May 2, 1956	39.2 (1)
October 17, 1960	91.7 (1)
April 18, 1972	93.1 (1)
June 26, 1997	50.59 (4)
May 14, 2002	6.1 (2)

Santa Fe River Rise

Figure 18. Santa Fe River Rise (photo by T. Scott).

Location-Lat. 29° 52' 26.0" N., Long. 82° 35' 29.9" W. (SW¼ SW¼ SW¼ sec. 14, T. 7 S., R. 17 E.). Santa Fe River Rise is located within O'Leno State Park/River Rise Preserve State Park. From the junction of US 441/41 and US 27 in High Springs, head north on US 441/41 approximately 6 miles (9.7 km) to O'Leno State Park entrance on the east (right) side of the road. Directions to the river rise via park roads can be obtained at the park entrance.

Description-Santa Fe River Rise is the re-emergence of the underground Santa Fe River. The spring pool measures 175 ft (53.3 m) east to west and 165 ft (50.3 m) north to south. There is a vertical limestone ledge on the northeast side of the pool. The depth just south of the ledge measures 49 ft (14.9m). The water color is typically that of the Santa Fe River, which may be tannic or clear depending mainly on rainfall. No boil was observed during the October 2001 visit. The river flows southward from the vent and is approximately as wide (east to west) as the spring pool. There is a narrow band of cypress growing around the pool perimeter. There are patches of duckweed around the periphery of the pool, and no aquatic vegetation could be seen through the tannic water. Several hundred yards of the Santa Fe River below Santa Fe Rise is choked with water hyacinth, and boat access to the rise is nearly impossible. Land around the river rise quickly rises to approximately 8 ft (2.4 m) above water level and levels off into a flat mesic hardwood hammock.

Utilization- The Santa Fe River Rise is a pristine, state-owned natural area.

Discharge **-** January 2, 2002: less than 75 ft^3/s (D. Hornsby, pers. comm.).

Table 8. Santa Fe River Rise water quality analyses.

Analytes	2002	
	Unfiltered	Filtered
Field Measures		
Temperature	22.50	
DO	3.50	
pH	6.67	
Sp. Cond.	259.0	
Lab Analytes		
BOD	1.80	-
Turbidity	1.90	-
Color	250.00	-
Alkalinity	43J	42.0
Sp. Cond.	260.00	
TDS	228.00	-
TSS	4U	-
Cl	31	32
SO_4	34	34
F	0.12	0.12
Nutrients		
TOC	36	1U
$NO_3 + NO_2$ as N	0.058J	0.059
$NH_3 + NH_4$	0.051J	0.06
TKN	1.2J	1.2A
P	0.23	0.22A
PO_4	0.2	-

Analytes	2002	
	Unfiltered	Filtered
Metals		
Ca	35A	28.2
K	2.2A	1.9
Na	15.1A	12.8
Mg	8.3A	6.6
Al	-	630A
As	3U	3U
B	33I	-
Cd	0.75U	0.75U
Co	0.75	-
Cr	2U	2U
Cu	2.5U	3.5I
Fe	810A	570.0
Mn	43.7A	33.5
Ni	2U	2U
Pb	5U	4U
Se	4U	4U
Sn	20U	-
Sr	388A	-
Zn	6.7I	5U

A=Average Value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value

Table 9. Santa Fe River Rise bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	8Q
Enterococci	12Q
Fecal Coliform	6Q
Total Coliform	60Q

Treehouse Spring

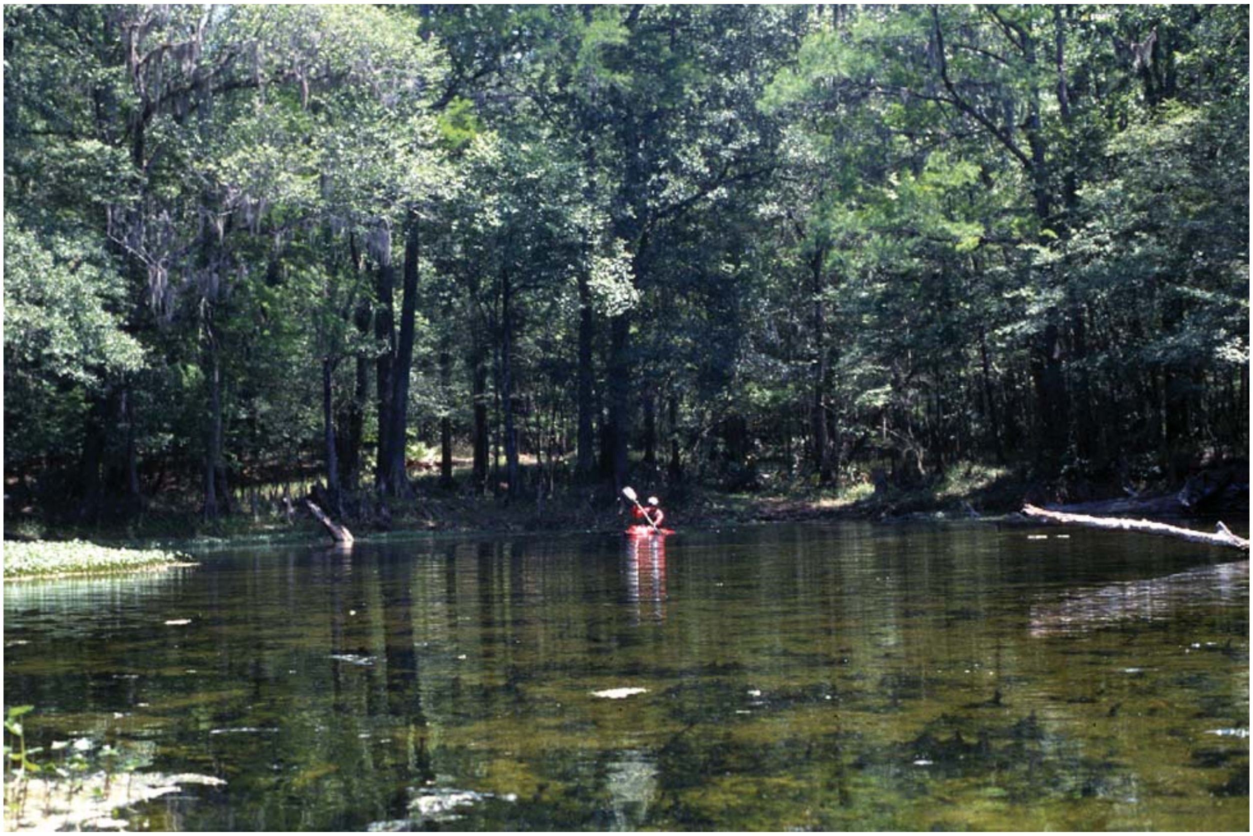

Figure 19. Treehouse Spring (photo by J. Stevenson).

Location-Lat. 29° 51' 17.6" N., Long. 82° 36' 0.4" W. (SW¼ NE¼ NW¼ sec. 27, T. 7 S., R. 17 E.). Treehouse Spring is approximately 2 miles (3.2 km) north of High Springs on the east bank of the Santa Fe River. The spring can be accessed by boat from a public boat ramp downstream from the spring. From the junction of US 441/41 and CR 236 (Main Street) in High Springs, drive north on US 441/41 approximately 1.2 miles (1.9 km). Turn west (left) at public access boat sign just before the Santa Fe River. The spring is 0.6 miles (1 km) upstream from the boat ramp on the southeast side of the river.

Description- Treehouse Spring is in a circular cove on the southeast side of the Santa Fe River. The spring discharges westward into the adjacent river. Spring pool diameter measures 125 ft (38.1 m) north to south and 175 ft (53.3 m) east to west. Pool depth over the vent is 31 ft (9.4 m). Water color was tannic, and there was no spring boil during October 2001. Water hyacinth was the only non-native plant species observed in the spring pool. No other vegetation could be seen through the dark water. Land adjacent to this spring is a forested lowland flood plain. The nearest high ground is approximately 150 ft (46 m) to the east, and it rises 10-12 ft (3-3.7 m) higher than the flood plain and is forested with mixed hardwoods and pines. Treehouse Spring is also published as ALA112971 (Hornsby and Ceryak, 1998).

Utilization-the land surrounding this spring is privately owned and is pristine. There is a small rope swing on the east side and the spring is a local swimming spot.

Discharge- All discharge rates are measured in ft^3/s.

May 26, 1998	405.96 (4)
October 30, 2001	39.9 (4)

Table 10. Treehouse Spring water quality analyses.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	21.88	-
DO	2.09	-
pH	7.31	-
Sp. Cond.	279	-
Lab Analytes		
BOD	0.2 UA	-
Turbidity	1.4	-
Color	250	-
Alkalinity	57	56
Sp. Cond.	280	-
TDS	225	-
TSS	4 U	-
Cl	27	27
SO_4	37	37
F	0.14	0.12
Nutrients		
TOC	38	-
NO3 + NO2	0.091	0.091 J
NH3 + NH4	0.034	0.028 A
TKN	1.1	1.1
P	0.2	0.19
PO_4	0.19	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	31.9	32.8
K	1.9	1.8
Na	12	11.8
Mg	6.8	7
As	3 U	3 U
Al	-	370
B	28I	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	510	490
Mn	25.2	23.6
Ni	1.5 U	2 U
Pb	5 U	4 U
Se	8.8 U	4 U
Sn	20 U	-
Sr	370	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q= exceeded holding time limit

Table 11. Treehouse Spring bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	14Q
Enterococci	46Q
Fecal Coliform	20Q
Total Coliform	180Q

BAY COUNTY

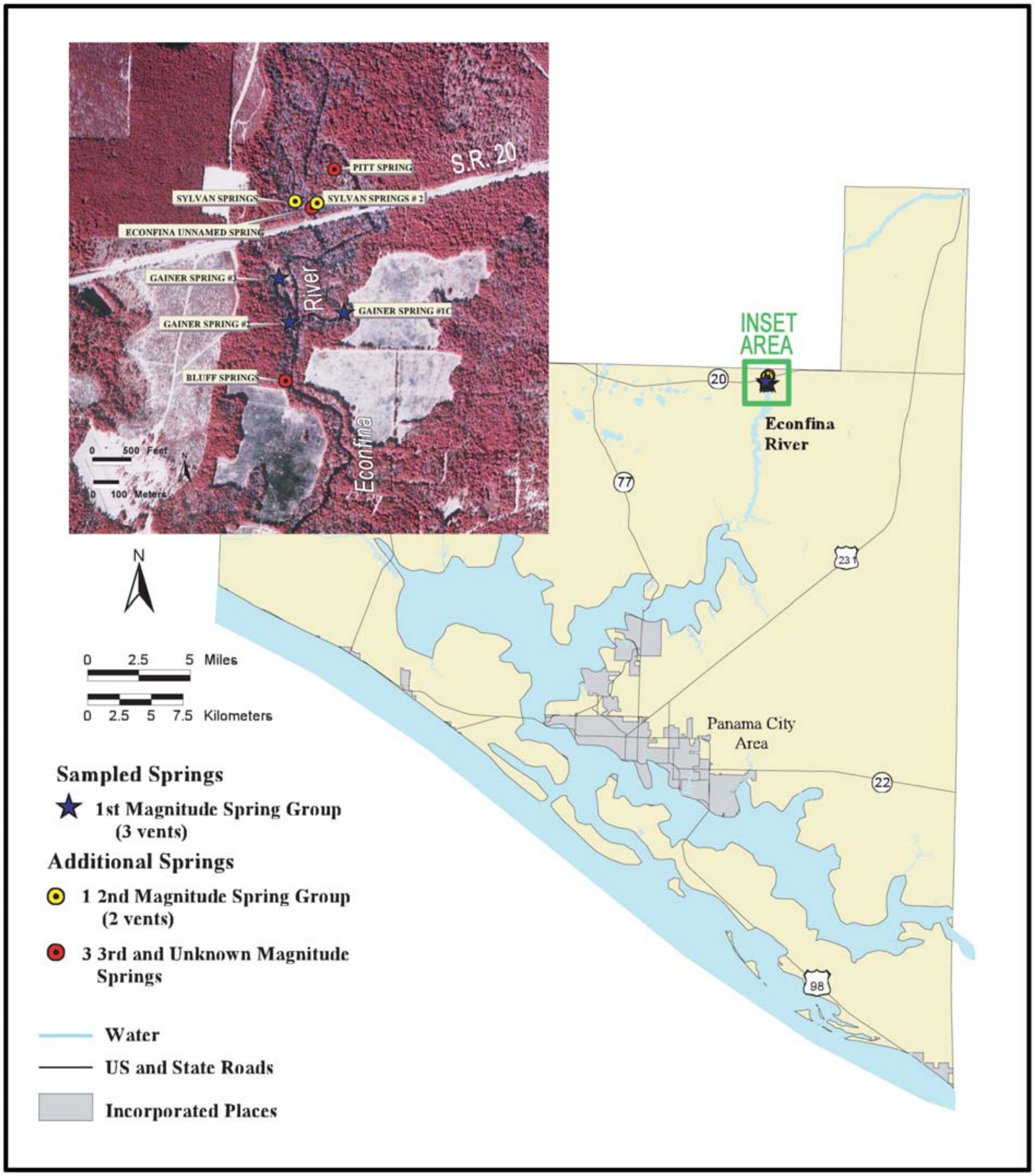

Figure 20 - Springs visited by FGS in Bay County

Gainer Springs Group

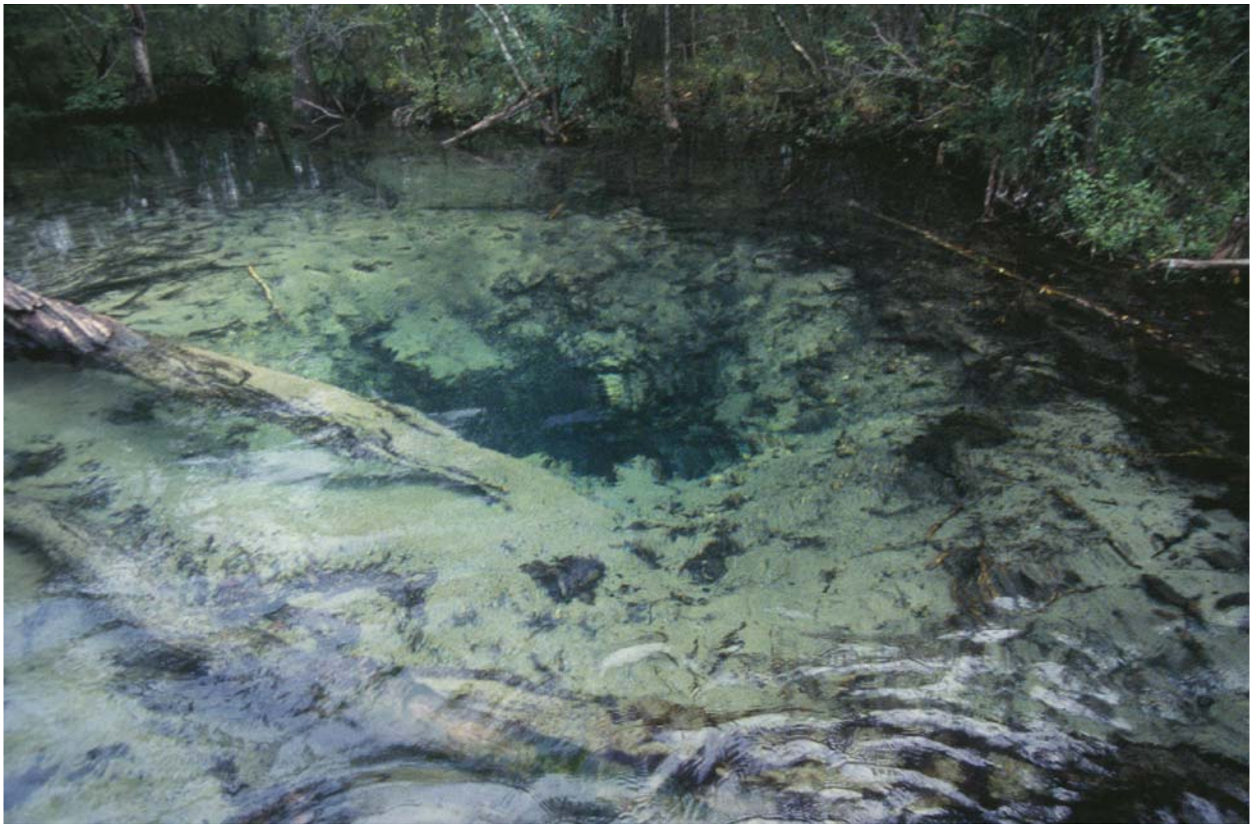

Figure 21. Gainer Springs Group Vent 1C (photo by T. Scott).

Group Location - Lat. 30° 25' N., Long. 85° 32' W. (southern half of sec. 4, T. 1 S., R. 13 W.). Gainer Springs Group is located 0.4 miles (0.6 km) downstream from the SR 20 bridge over Econfina Creek. It is best accessed by canoe, however, there is a gated dirt track on Northwest Florida Water Management District (NWFWMD) land that leads to the springs group on the east side of the creek. From the intersection of US 231 and SR 20 head west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek

Group Description - At least five known springs associated with Gainer Springs Group are along both sides of Econfina Creek. The uplands surrounding this group are high rolling sand hills that are forested with sand pine and patches of longleaf pine-turkey oak community. High ground adjoining the west side of the creek near Spring No. 2 and Spring No. 3 rises to 27 ft (8.2 m) above the water surface and is densely forested with mixed hardwoods and pines. The creek floodplain is forested with cypress and hardwoods. Land on the west side of the Econfina Creek at Gainer Springs is privately owned. The east side of the creek is owned and managed by the NWFWMD.

GAINER SPRING NO. 1C - Lat. 30° 25' 39.6" N., Long. 85° 32 45.83" W. (SW¼ NW¼ SE¼ sec. 4, T. 1 S., R. 13 W.). Gainer Spring Nos. 1A, 1B, and 1C form a 820 ft (249.9 m) long spring run that enters Econfina Creek on the east side directly across from Spring No. 2. Spring No. 1C is the first spring encountered approximately 495 ft (150.9 m) upstream from the creek, and its pool is adjacent to the run on the southeast side. Spring pool dimensions are approximately 72 ft (21.9 m) east to west and 33 ft (10.1 m) north to south. Water issues from a vertical tunnel in the limestone. Shell and sand particles are suspended in the spring flow. Pool depth is 20 ft (6.1 m) measured over the vent. There is very little aquatic vegetation; however, algae patches in spring pool are common. The adjoining, swampy lowlands are heavily forested with cypress and mixed hardwoods. The nearest uplands to the southeast support a mixed hardwood and pine forest. There is no high ground adjacent to the spring pool. These springs are also known as McCormick Springs.

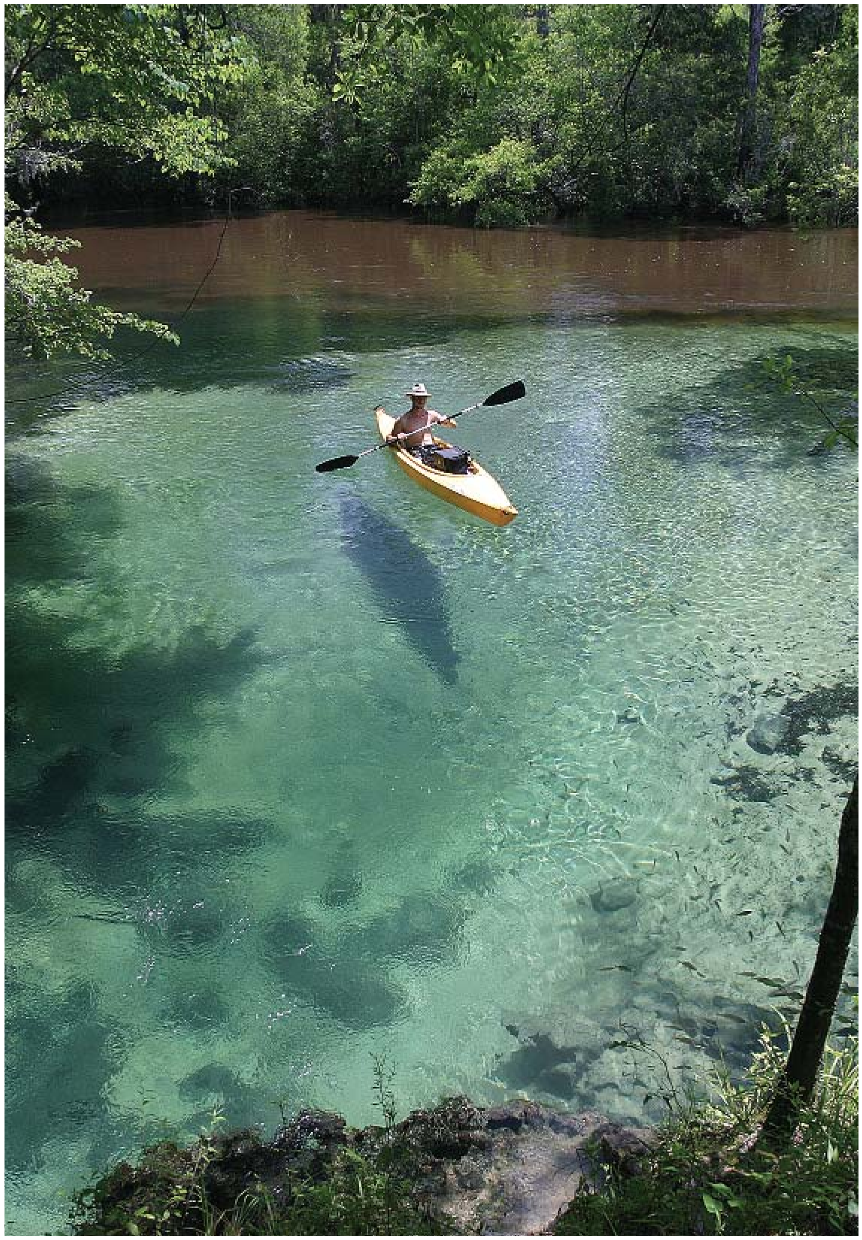

Figure 22. Gainer Springs Group Vent 2 (photo by T. Scott).

GAINER SPRING NO. 2 - Lat. 30° 25’ 38.61" N., Long. 85° 32’ 53.95" W. (SW¼ NE¼ SW¼ sec. 4, T. 1 S., R. 13 W.). This spring, also known as Emerald Spring, is located directly across from the mouth of Gainer Spring No. 1 run along the west side of Econfina Creek. Spring water issues from the base of the riverbank and forms a pool along the edge of the creek. Pool diameter is approximately 60 ft (18.3 m) east to west and 62 ft (18.9 m) north to south. Pool depth over the vent is 5 ft (1.5 m). Vent diameter is approximately 5 ft (1.5 m). There is little or no aquatic vegetation, but patches of dark green algae are present. The water is clear and light greenish blue. A concrete wall forms the south side of the spring pool. Two parallel pipes that extract drinking water run from inside the spring vent toward the top of the bluff and beyond. There are at least three other smaller vents issuing from the bank just above this spring. A 23 ft (7 m) high bluff meets the Econfina Creek at Spring No. 2. A mixed hardwood and pine forest inhabits the bluff face and high ground.

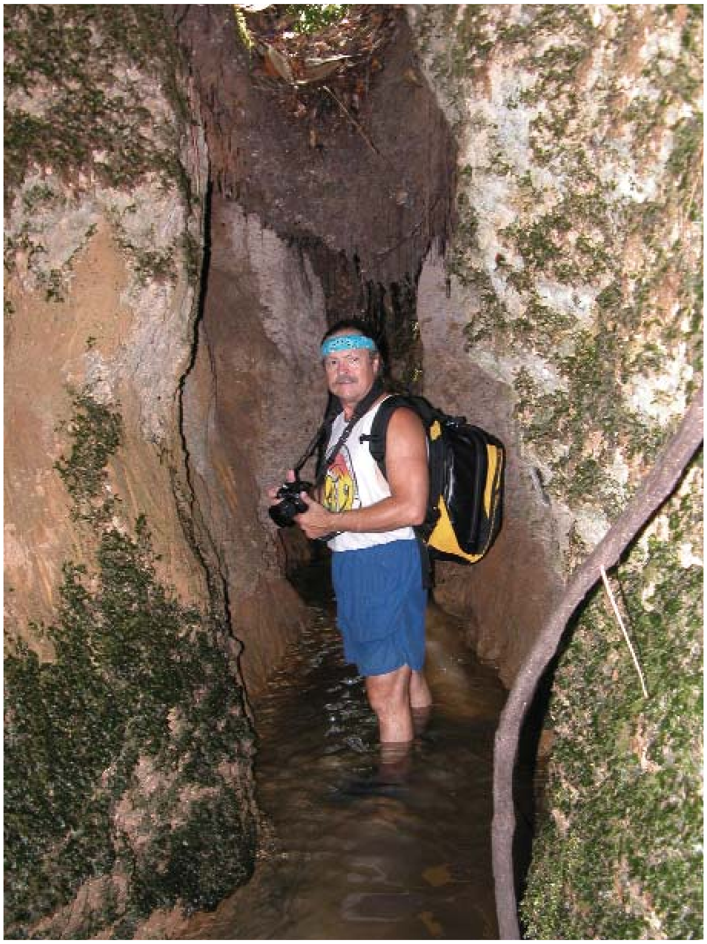

Figure 23. Gainer Springs Group fracture (photo by H. Means).

GAINER SPRING NO. 3 - Lat. 30° 25' 44.30" N., Long. 85° 32' 53.9" W. (NE¼ NE¼ SW¼ sec. 4, T. 1 S., R. 13 W.). This spring is located along the west side of Econfina Creek, and is about 655 ft (199.6 m) upstream of Spring No. 2. It is at the head of a 325 ft (99.1 m) long spring run. There are at least three vent complexes in the combined spring pool. The depression is large and mostly shallow with a sand bottom and limestone boulders. The combined spring pool diameter is about 305 ft (93 m) east to west and 125 ft (38.1 m) north to south. There is a forested island in the center of the combined spring pool. Some emergent vegetation exists along the pool's shores, but there is very little aquatic vegetation. Dark green algal mats are ubiquitous throughout the bottom of the spring pool. The western vent issues out of a limestone sidewall and has a small boardwalk nearby. The north vent, where water quality was sampled, is the largest and deepest. This spring is about 15 ft (4.6 m) south of a wooden wall presumably constructed for shore erosion management. Clear, light greenish blue water issues from the bottom of a 16 ft (4.9 m) diameter conical depression and produces a boil at the surface. The depression is 7.4 ft (2.3 m) deep over the vent. Vent diameter is about 1.5 ft (0.5 m). On the eastern side of the combined spring pool, there are at least three other vents. Uphill to the north, there are picnic tables under a pavilion in a grassy opening. The rest of the uplands adjoining the spring pool to the west are forested with mixed hardwoods and pines. In the surrounding forested area, there are karst windows, dissolutionally-enlarged fractures and other karst features.

Utilization- The uplands around Gainer Spring No. 2 are privately owned. Econfina Creek flows into Deerpoint Lake, which is a public water supply utilized by Panama City. Land around the spring group is privately owned and is pristine and forested. Swimming and canoeing occur frequently in all of Gainer Springs.

Discharge- Discharge reported here represents the total flow of the Gainer Springs complex. All discharge rates are measured in ft^3/s.

April 11, 1962	150[1]
September 11, 1962	174[1]
January 30, 1963	159[1]
October 14, 2002	128.2[3]
January 5, 2004	192.8[3]

Table 12. Gainer Springs Group water quality analyses.

Analytes	Vent #1				Vent #2				Vent #3			
	1962	1972	2001		1962	1972	2001		1962	1972	2001	
			Unfilt.	Filter			Unfilt.	Filter			Unfilt.	Filter
Field Measures												
Temperature	-	21.0	21.54	-	21.1	22.0	21.4	-	21.1	21.5	21.6	-
DO	-	2.8	2.12	-	-	2.5	2.27	-		3.0	2.18	-
pH	7.4	7.9	8.00	-	7.3	7.8	8.19	-	7.2	7.8	8.20	-
Sp. Cond.	115	127	142	-	82	108	113	-	115	125	121	-
Lab Analytes												
BOD	-	-	0.2 U	-	-	-	0.2 U	-	-	-	0.2 U	-
Turbidity	-	-	0.25	-	-	-	0.2	-	-	-	0.1	-
Color	2	5	5 U	-	7	5	5 U	-	2	10	5 U	-
Alkalinity	57	55	66	67	38	48	52	52 A	53	54	56	56
Sp. Cond.	-	-	160	-	-	-	130 A	-	-	-	130	-
TDS	-	-	79	-	-	-	60	-	-	-	61	-
TSS	-	-	4 U	-	-	-	4 U	-	-	-	4 U	-
Cl	2.5	2.5	2.5	2.5	1.5	2.0	2.3	2.3	3.0	3.0	2.9	2.8
SO_4	1.6	0.0	2.4	2.5	0.4	0.0	2.3	2.3	0.8	0.0	2.1	2
F	0.1	0.1	0.034 I	0.035 I	0.1	0.1	0.03 I	0.029 I	0.2	0.1	0.03 I	0.029 I
Nutrients												
TOC	-	-	1.1 I	-	-	0.0	1.2 I	-	-	-	1 U	-
NO3 + NO2	-	0.10	0.17	0.16	-	0.19	0.21	0.21	-	0.09	0.19	0.18
NH3 + NH4	-	-	0.038	0.01 U	-	-	0.035	0.01 U	-	-	0.01 U	0.01 U
TKN	-	-	0.06 U	0.06 U	-	-	0.06 U	0.06 U	-	-	0.06 U	0.06 U
P	-	-	0.014	0.014	-	0.02	0.013 A	0.013	-	-	0.013	0.012
PO_4	0.08	-	0.015	-	0.48	0.02	0.012	-	0.15	-	0.012	-
Metals												
Ca	19	19	22.7	22.5	13	16	17.5	17.2	18	17	18.1	17.8
K	0.2	0.3	0.26	0.26	0.2	0.2	0.25	0.25	0.1	0.2	0.24	0.25
Na	2.0	1.8	1.64	1.44	1.7	1.4	1.45	1.34	1.9	1.8	1.68	1.61
Mg	2.8	2.9	2.7	2.8	1.8	2.4	2.4	2.4	3.2	2.8	2.9	2.9
As	-	-	3 U	3 U	-	10	3 U	3 U	-	-	3 U	3 U
Al	-	-	-	75 U	-	-	-	75 U	-	-	-	75 U
B	-	-	10 U	-	-	-	10 U	-	-	-	10 U	-
Cd	-	-	0.75 U	0.5 U	-	0	0.75 U	0.5 U	-	-	0.75 U	0.5 U
Co	-	-	0.75 U	-	-	0	0.75 U	-	-	-	0.75 U	-
Cr	-	-	0.7 U	0.5 U	-	0	0.7 U	0.5 U	-	-	0.7 U	0.5 U
Cu	-	-	2 U	2 U	-	0	2 U	2 U	-	-	2 U	2 U
Fe	-	-	25 U	20 U	-	30	25 U	20 U	-	-	25 U	20 U
Mn	-	-	0.5 U	0.5 U	-	0	0.5 U	0.5 U	-	-	0.5 U	0.5 U
Ni	-	-	1.5 U	1.5 U	-	-	1.5 U	1.5 U	-	-	1.5 U	1.5 U
Pb	-	-	5 U	3 U	-	2	5 U	3 U	-	-	5 U	3 U
Se	-	-	3.5 U	3.5 U	-	-	3.5 U	3.5 U	-	-	3.5 U	3.5 U
Sn	-	-	9 U	-	-	-	9 U	-	-	-	9 U	-
Sr	-	80	76.1	-	-	70	41.5	-	-	50	42.4	-
Zn	-	-	4 U	3.5 U	-	30	4 U	3.5 U	-	-	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=exceeding holding time limit

Table 13. Gainer Springs Group bacteriological analyses.

Bacteria Results (in #/100 mL)			
Analyte	**Vent No. 1**	**Vent No. 2**	**Vent No. 3**
Escherichia coli	10Q	6Q	4Q
Enterococci	10Q	18Q	8Q
Fecal Coliform	14Q	18Q	12Q
Total Coliform	100Q	100	80Q

BRADFORD COUNTY

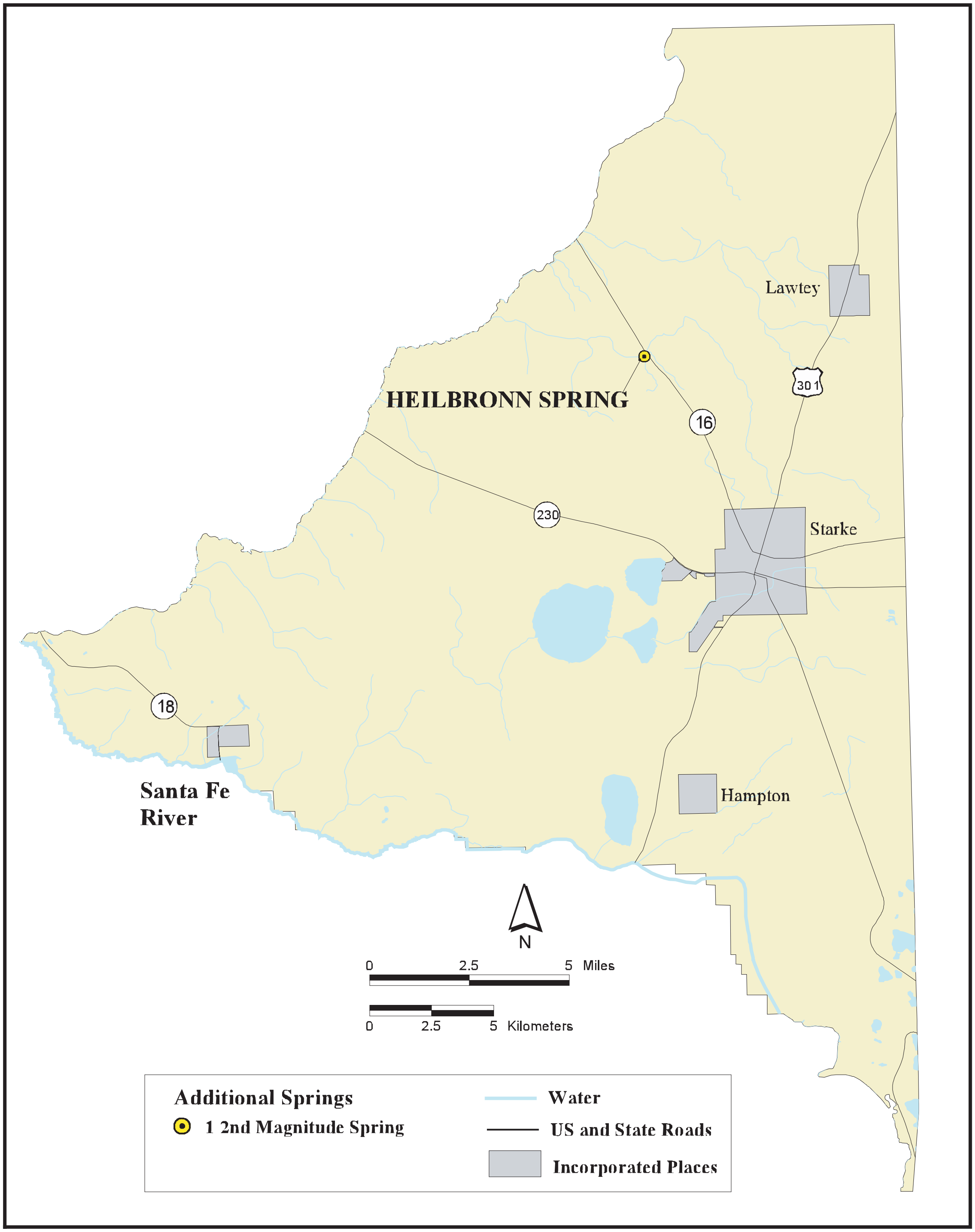

Figure 24. Springs visited by FGS in Bradford County. Spring description provided on enclosed CD.

CALHOUN COUNTY

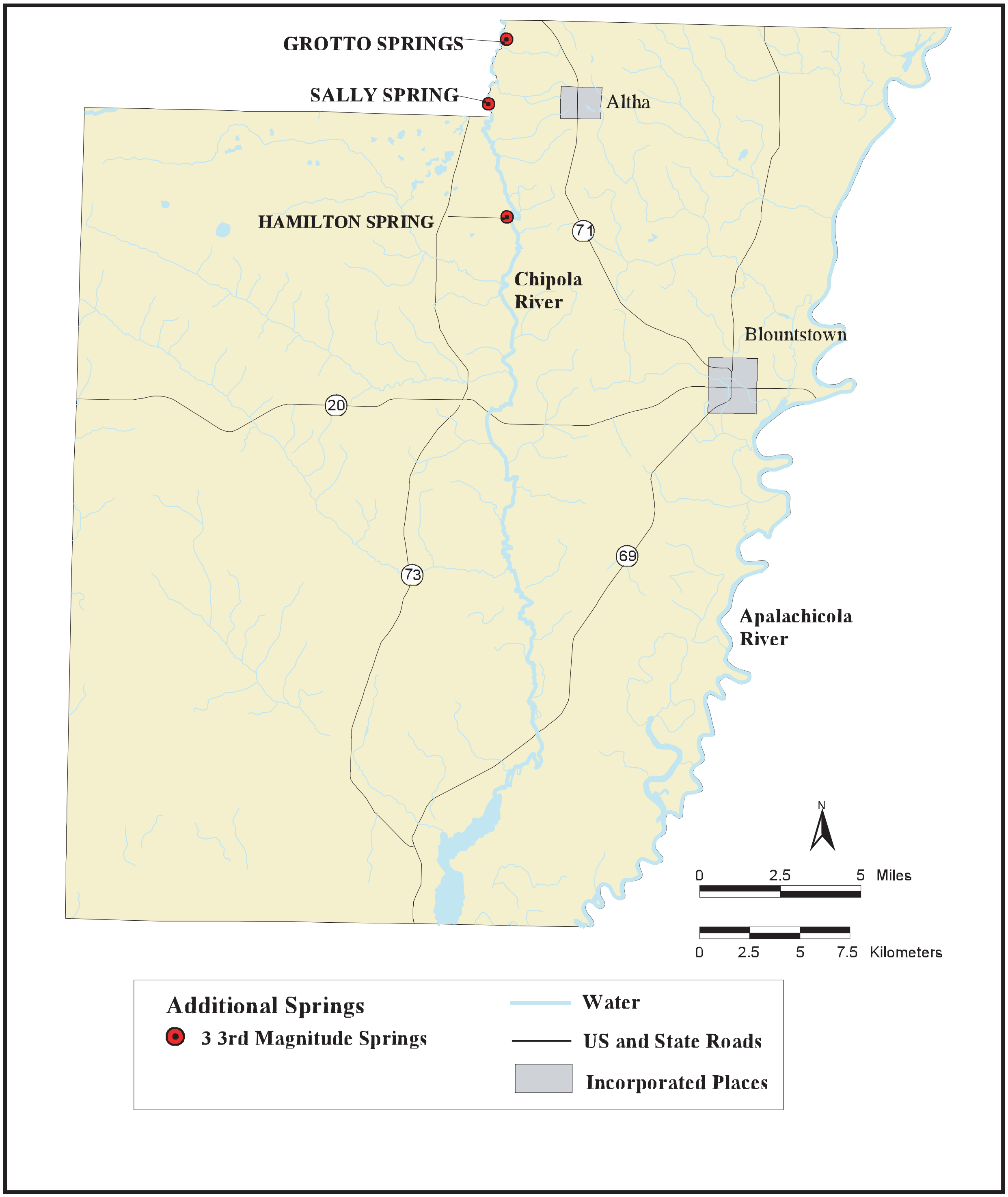

Figure 25. Springs visited by FGS in Calhoun County. Spring descriptions provided on enclosed CD.

CITRUS COUNTY

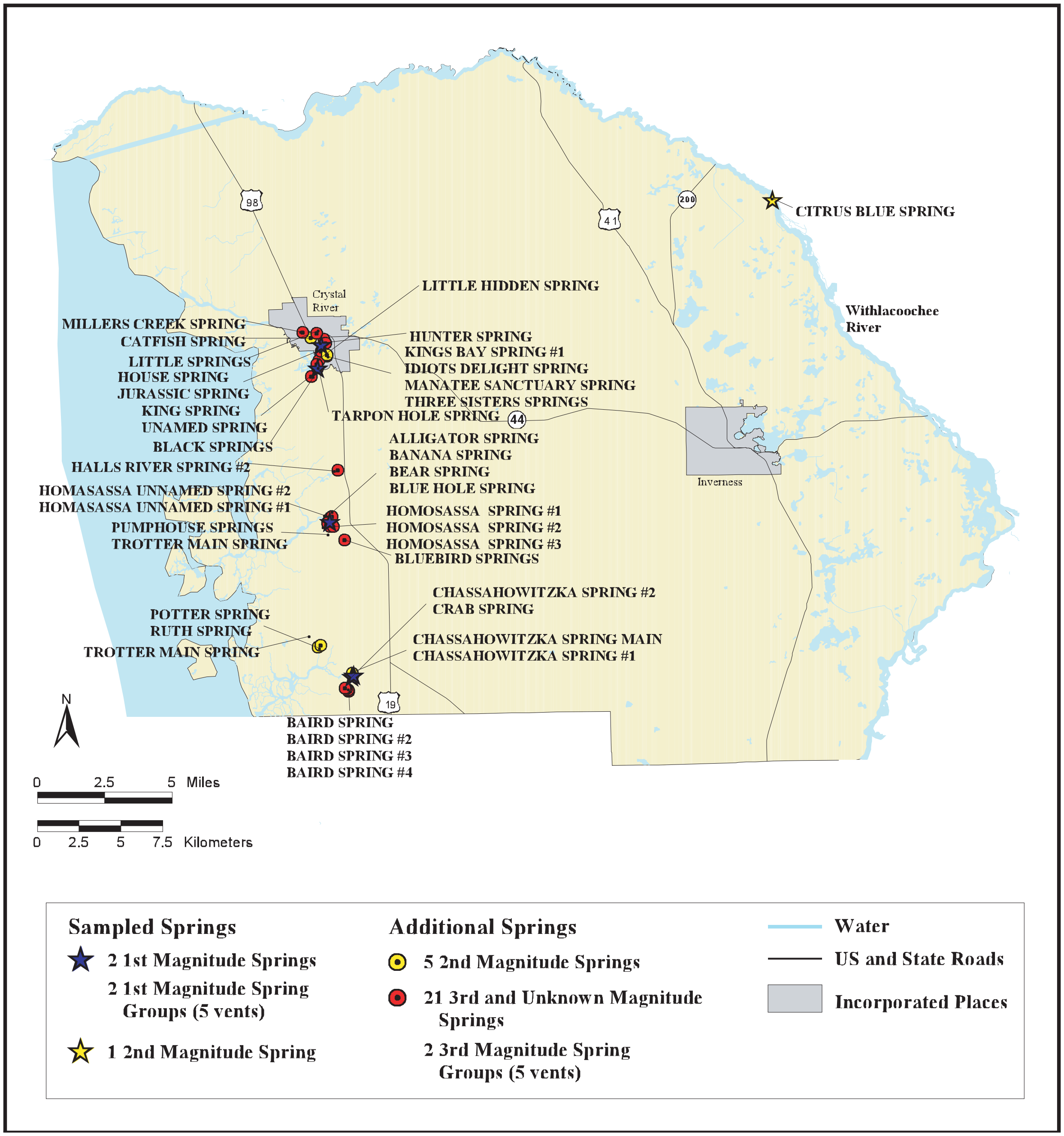

Figure 26. Springs visited by FGS in Citrus County.

Chassahowitzka Springs Group

Figure 27. Chassahowitzka Main Spring (photo by R. Means).

Figure 28. Chassahowitzka No. 1 (photo by R. Meegan).

Group Location - Lat. 28° 42' N., Long. 82° 34' W. (Both spring vents are located in the center of sec. 26, T. 20 S., R. 17 E.). The springs are 5.8 miles (9.3km) southwest of Homosassa Springs on the Chassahowitzka River. From Homosassa Springs Wildlife State Park, drive south on US 98/19 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive about 1.8 miles (2.9 km) to the public boat access area,

Group Description - Chassahowitzka Springs form the headwaters of the Chassahowitzka River, which flows westerly to the Gulf of Mexico approximately 6 miles (9.7 km) through low coastal hardwood hammock and marsh. Rosenau et al. (1977) report as many as five springs flow into the upper part of the river and many more springs are known to exist in the lower portion. The entire river is tidally influenced.

CHASSAHOWITZKA MAIN SPRING - Lat. 28° 42' 55.87" N., Long. 82° 34' 34.33" W. (NE ¼ NE ¼ SW ¼ sec. 26, T. 20 S., R. 17 E.). Chassahowitzka Main Spring is 360 ft (110 m) northeast of the boat ramp and is in the middle of the run. This spring is at the head of a large pool that measures 147 ft (44.8 m) north to south and 135 ft (41.1 m) east to west. The depth measured over the vent is 13.5 ft (4.1 m). The spring has a sand bottom. No limestone was exposed. Water is clear and greenish. The spring run from Chassahowitzka No. 1 Spring flows into the Chassahowitzka Main Spring pool from the east. There is a boat ramp with facilities on the southwest side of the pool. Aquatic vegetation is common, including exotic aquatic vegetation and algae. A boil is visible at low tide. The spring is surrounded by lowland hardwood swamp forest with mixed hardwoods, cypress, and palm.

CHASSAHOWITZKA NO. 1 - Lat. 28° 42' 58.24" N., Long. 82° 34' 30.32" W. (NW ¼ NW ¼ SE ¼ sec. 26, T. 20 S., R. 17 E.). Chassahowitzka # 1 is at the head of a spring run that flows into the Chassahowitzka River from the north approx 250 ft upstream from Chassahowitzka Main or 550 ft upstream from the boat ramp. This spring issues from a small cavern in bedrock limestone. The spring pool measures 69 ft (21 m) north to south and 81 ft (24.7 m) east to west. There are two closely spaced openings through which the flow issues. The depth over the vents is 8.3 ft (2.5 m). The water is clear and light blue. A small tannic stream flows into the northeast side of the spring pool. There is a thin layer of algae covering most of the limestone bottom of the spring pool. The surrounding land is low lying and heavily forested with hardwoods and palm. The spring run flows southwest approximately 350 ft (106.7 m) into Chassahowitzka Main Spring pool. There are several other spring vents along the spring run about half way to the Chassahowitzka Main Spring pool.

Utilization - Chassahowitzka Springs and River are used for fishing, swimming, snorkeling, and pleasure boating. Manatees frequent the springs and river year round, but are especially common in winter.

Discharge - Current discharge estimate is provisional. All discharge rates are measured in ft^3/s.

Average 1930 - 1972 (81 measurements)	138.5(1)
Maximum (May 18, 1966)	197.0(1)
Minimum (July 8, 1964)	31.8(1)
October 15, 2001	53(2)

Table 14. Chassahowitzka Springs Group bacteriological analyses.

Bacteria Results (in #/100ml)		
Analyte	**Main**	**No. 1**
Escherichia coli	1 KQ	1 KQ
Enterococci	1 KQ	1 KQ
Fecal Coliform	1 KQ	1 KQ
Total Coliform	1 KQ	20Q

Table 15. Chassahowitzka Springs Group water quality analyses.

Analytes	1946	1970	1971	1972	1975	Main 2001		No. 1 2001	
						Unfilt.	Filter	Unfilt.	Filter
Field Measures									
Temperature	23.9	26.0	24.5	23.5	22.2	22.9	-	23.2	
DO	-	-	6.1	-	5.4	3.68	-	4.10	
pH	7.5	8.2	7.6	8.2	-	7.65	-	7.71	
Sp. Cond.	470	500	530	1370	564	2790	-	1080	
Lab Analytes									
BOD	-	0.2	2.5	-	-	0.2 U	-	0.2 AU	-
Turbidity	-	3	2	-	-	1.3	-	0.45	-
Color	8	10	10	10	10	5 U	-	5 U	-
Alkalinity	-	140	140	140	130	150	152	150	152 A
Sp. Cond.	-	-	-	-	-	2800	-	1100 A	
TDS	-	-	-	-	-	1470	-	562	-
TSS	-	-	-	-	-	4 U	-	4 U	-
Cl	53	70	79	320	110	680	680	220	200
SO_4	13	13	16	56	21	110	110	39	40
F	0.1	0.2	0.3	0.2	0.2	0.13 J	0.11	0.12 J	0.11
Nutrients									
TOC	-	-	-	-	-	1 U		1 U	-
$NO_3 + NO_2$	-	-	-	0.26	-	0.45 J	0.46 J	0.49 J	0.5 J
$NH_3 + NH_4$	-	-	-	-	-	0.01 U	0.025	0.01 U	0.011 I
TKN	-	-	-	-	-	0.12 I	0.12 I	0.086 I	0.1 I
P	-	-	-	-	-	0.033	0.02	0.018	0.018
PO_4	-	-	-	-	-	0.021	-	0.021	
Metals									
Ca	49	46	48	55	47	65.2	63.4	54.5	52.8
K	1.5	1.6	1.8	6.3	2.5	14.7	14.3	4.8	4.5
Na	29	36	40	180	60	393	411	131	121
Mg	13	11	13	29	13	54.5	54.2	23.5	22.3
As	-	-	-	-	-	3 U	3 U	7 U	3 U
Ba	-	-	-	-	-	-	75 U		
B	-	-	-	-	-	186	-	68 I	
Cd	-	-	-	-	-	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	-	-	-	0.75 U	-	0.75 U	-
Cr	-	-	-	-	-	2 U	2 U	2 U	2 U
Cu	-	-	-	-	-	2.5 U	2.5 U	2.5 U	2.5 U
Fe	-	-	-	-	-	92 I	38 I	35 U	35 U
Mn	-	-	-	-	-	4.1	1.5 I	0.5 U	0.5 U
Ni	-	-	-	-	-	1.5 U	1.5 U	1.5 U	1.5 U
Pb	-	-	-	-	-	5 U	4 U	5 U	4 U
Se	-	-	-	-	-	8.6 U	4 U	8.6 U	4 U
Sn	-	-	-	-	-	20 U	-	20 U	-
Sr	-	200	200	800	310	511	-	262	-
Zn	-	-	-	-	-	5 U	5 U	5 U	5 U

A=Average Value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value

Citrus Blue Spring

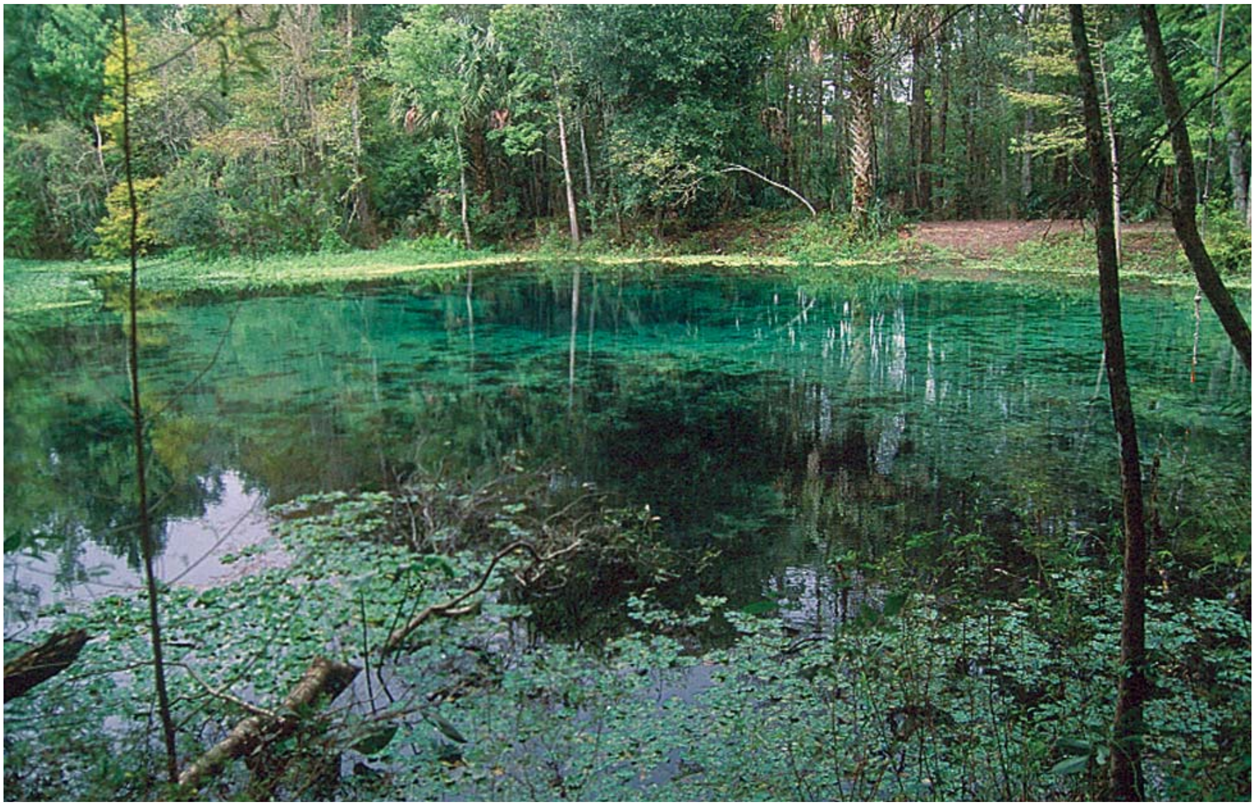

Figure 29. Citrus Blue Spring (photo by R. Means).

Location - Lat. 28° 58' 09.60" N., Long. 82° 18' 52.34" W. (SW ¼ NE ¼ SW ¼ sec. 33, T. 17 S., R. 20 E.). Citrus Blue Spring is located along the Withlacoochee River approximately 10 miles (16 km) southeast of Dunnellon. From the US 41 bridge over the Withlacoochee River in Dunnellon travel south on US 41 approximately 1.3 miles (2.1 km) to the intersection with CR 39. Head east (left) on CR 39 and travel approximately 7.6 miles (12.2 km) to the intersection with CR 200. Head northeast (left) and travel 0.1 mile (.2 km) to the bridge over the Withlacoochee River at Stokes Ferry. A boat launch is on the southeast side of the river. The spring can be accessed by boating 3 miles (4.8 km) upstream from the CR 200 bridge in Stoke's Ferry. The spring is situated on the south (right) side of the river.

Description - Citrus Blue Spring has a roughly circular pool that measures 120 ft (36.6 m) in diameter. The east side of the spring pool is partly enclosed by a man-made, five foot high dike. The spring depression is relatively shallow and uniform except at the vent in the center where depth measures 22 ft (6.7 m). A slight boil was observed over the vent during October 2002. The color of the water is bluish-green, and the sand bottom has substantial aquatic grass cover with sparse algae. Spring flow is directed northwestward through a 30 ft (9.1 m) wide man-made canal, eventually discharging into the Withlacoochee River approximately 0.4 miles (0.6 km) downstream. The canal has a sand bottom with abundant detritus as well as abundant aquatic vegetation. Before the dike was constructed, the spring apparently discharged eastward approximately 150 ft (45.7 m) into the river. The spring is within the forested Withlacoochee River floodplain. The spring reportedly has an extensive cavern system that opens southward to a depth of at least 180 ft (54.9 m) below the spring surface (Rosenau et al., 1977).

Utilization - Citrus Blue Spring is surrounded by private property and is used locally for swimming.

***Discharge* - A**ll discharge rates are measured in ft^3/s.

March 15, 1932	11.1[1]
March 7, 1961	17.7[1]
June 19, 1961	19.6[1]
May 25, 1972	15.1[1]
October 16, 2002	16.3[2]

Table 16. Citrus Blue Spring water quality analyses.

Analytes	1975	2002	
		Dissolved	Total
Field Measures			
Temperature	23	22.65	
DO	-	1.4	
pH	7.9	7.33	
Sp. Cond.	-	333	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.1
Color	-	-	5U
Alkalinity	140	-	146
Sp. Cond.	302	318.0	-
TDS	164	-	172
TSS	-	-	4U
Cl	6	-	5.2
SO_4	6.8	-	13.0
F	0.2	-	0.064I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.04	-	0.51
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.09I	0.06U
P	-	0.032Q	0.033
PO_4	-	0.04	-
NO_3	0.18	-	-

Analytes	1975	2002	
		Dissolved	Total
Metals			
Ca	58	62.8	61.4
K	0.2	0.2A	0.17
Na	2.5	3.27A	2.84
Mg	2.1	2.7A	2.7
Al	-	-	10U
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-		1U
Cr	-	2U	2U
Cu	-	2U	4U
Fe	-	5.1I	7U
Mn	-	0.25U	0.5U
Ni	-	1U	2U
Pb	-	5U	5U
Ra-226	-	-	0.5
Ra-228	-	-	1.1U
Se	-	5U	7U
Sn	-	-	26U
Sr	140	-	135
Zn	-	10.6	5.4I

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 17. Citrus Blue Spring water bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Homosassa Springs Group

Figure 30. Homosassa Springs Group (photo by H. Means).

Group Location - Lat. 28° 47' 56.65" N., Long. 82° 35' 18.70" W. (NE ¼ SW ¼ NE ¼ sec. 28, T. 19 S., R. 17 E.). The springs are located within the Homosassa Springs Wildlife State Park and form the headwaters of the Homosassa River. Coming from the north on US 19/98 into Homosassa Springs, turn west (right) on CR 490A and travel 0.5 mile (0.8 km). Turn south (left) on access road to Homosassa Springs Wildlife State Park and travel 0.3 mile (0.5 km) to park entrance. The spring pool, into which all three vents issue, is just below the underwater viewing platform in the manatee rehabilitation area.

Group Description - Homosassa Springs Group forms the head of the Homosassa River, which flows west approximately 6 miles (9.7 km) to the Gulf of Mexico. Downstream from the head springs about a mile, the spring-fed Halls River flows in from the north. The entire river system is tidally influenced.

HOMOSASSA SPRINGS NOS. 1, 2, and 3 - All three vents issue into the same spring pool. The pool measures 189 ft (57.6 m) north to south and 285 ft (86.9 m) east to west. The depth for each of the vents is 67, 65, and 62 ft (20.4, 19.8, and 18.9 m) for spring nos. 1, 2, and 3, respectively. The springs issue from a conical depression with limestone exposed along the

Table 18. Homosassa Springs Group water quality analyses.

Analytes	1956	1966	1972 (April)	1972 (Oct.)	No. 1 2001 Unfilt.	No. 1 2001 Filter	No. 2 2001 Unfilt.	No. 2 2001 Filter	No. 3 2001 Unfilt.	No. 3 2001 Filter
Field Measures										
Temperature	23.5	-	23.5	23.5	23.4	-	23.3	-	23.6	-
DO	-	-	4.3	-	3.97	-	3.86	-	4.09	-
pH	8.2	7.5	6.9	7.9	7.67	-	7.62	-	7.81	-
Sp. Cond.	2590	2900	2370	3740	5250	-	6330		1980	-
Lab Analytes										
BOD	-	-	0.1	-	0.68 I	-	0.86 I	-	0.76 I	-
Turbidity	-	-	1	-	1.3	-	0.5	-	0.25	-
Color	3	0	0	10	5 U	-	5 U	-	5 U	-
Alkalinity	110	110	120	110	120	115	120	117	110	112
Sp. Cond.	-	-	-	-	5200	-	6200	-	2000	-
TDS	-	-	-	-	2830	-	3310	-	1020	-
TSS	-	-	-	-	4 U	-	4 U	-	4 U	-
Cl	680	780	640	1100	1500	1500	1900	1900	520	510
SO_4	95	111	84	150	220	220	260	260	74	72
F		0.3	0.2	2.0	0.14	0.12	0.14	0.13	0.1	0.093 I
Nutrients										
TOC	-	-	0	-	1 U	-	1 U	-	1 U	-
NO3 + NO2	-	-	0.26	0.20	0.51	0.51 J	0.5	0.5 J	0.53	0.55 J
NH3 + NH4	-	-	-	-	0.028	0.02 I	0.034	0.026	0.01 I	0.012 I
TKN	-	-	-	-	0.15 I	0.12 I	0.13 I	0.12 I	0.091 IQ	0.11 I
P	-	-	0.02	-	0.028 I	0.029 I	0.034 I	0.029 I	0.048 Q	0.026 I
PO_4	-	-	0.01	-	0.018 J	-	0.021 J	-	0.011 J	-
Metals										
Ca	54	55	48	65	69.2	70	75.8	77.3	47.6	46.3 A
K		18	12	20	28.8	29.8	35.5	35.5	9.84	0.45
Na	-	420	340	600	815	814	972	986	267	3.7
Mg	56	57	48	86	100	103	123	124	39.1	37.5 A
As	-	-	0	-	3 U	3 U	3 U	3 U	3 U	3 U
B	-	-	60	-	344	-	422	-	125	-
Al	-	-	-	-	-	75 U	-	75 U	-	75 U
Cd	-	-	0	-	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	0	-	0.75 U	-	0.75 U	-	0.75 U	-
Cr	-	-	0	-	2 U	2 U	2 U	2 U	2 U	2 U
Cu	-	-	0	-	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Fe	-	-	10	-	300	89 I	190	52 I	370	35 U
Mn	-	-	0	-	21.4	13.5	5.8	4.9	19.9	0.5 U
Ni	-	-	-	-	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Pb	-	-	0	-	5 U	4 U	5 U	4 U	5 U	4 U
Se	-	-	-	-	4U	4U	4U	4 U	4U	4 U
Sn	-	-	-	-	10 U	-	10 U	-	10 U	-
Sr	-	-	490	5000	858	-	1030	-	372	-
Zn	-	-	10	-	5 U	5 U	5 U	5 U	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value

sides and bottom of the spring pool. The pool is teeming with salt water and freshwater fishes. Water is clear and light blue. There is a large boil in center of pool. Surrounding land is Gulf Coastal Lowlands with thick hardwood-palm forest cover. Approximately 1,000 ft (304.8 m) downstream, a fence spans across the river to keep boats out of the spring pool. There also is a barrier immediately outside the spring area which keeps the captive manatees in the spring pool. Manatees frequent the spring pool and river year round, but are especially common in winter. The springs are tidally influenced year round, especially in winter.

Utilization - The main spring pool and adjacent lands are within Homosassa Springs Wildlife State Park. The area is developed into an interpretive center for manatee and Florida wildlife education. There is a floating observation deck in the spring pool with a submerged aquatic observation room. Injured and rehabilitating manatees are captive in the spring pool for year round observation. Swimming is not allowed.

Discharge - All discharge rates are measured in ft^3/s.

Average 1931 - 1974	106(1) (90 measurements)
Maximum (August 18, 1966)	165(1)
Minimum (September 19, 1972)	80 (1)
October 16, 2001	87(2) (Estimate is provisional)

Table 19. Homosassa Springs Group bacteriological analyses.

Bacteria Results (in #/100ml)			
Analyte	**No. 1**	**No. 2**	**No. 3**
Escherichia coli	1 KQ	1 KQ	1 KQ
Enterococci	1 KQ	1 KQ	1 KQ
Fecal Coliform	1 KQ	1 KQ	1 KQ
Total Coliform	1 KQ	1 KQ	1 KQ

Kings Bay Springs Group

Figure 31. Kings Bay Springs Group, Hunter Spring (photo by R. Meegan).

Figure 32. Kings Bay Springs Group, Tarpon Hole Spring (photo by R. Means).

Group Location - Lat. 28° 53 ' N., Long. 82° 35' W. (sections 20, 21 and 28, T. 18 S., R. 17 E.). The Kings Bay Springs Group is located in Kings Bay west of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay.

Group Description - There are about 30 known springs, including Tarpon Hole and Hunter Spring, that either issue from the bottom of Kings Bay or flow into the bay from side creeks. Their combined flow feeds Crystal River, which flows approximately 7 miles (11.3 km) northwest to the Gulf of Mexico. Surrounding land is coastal lowlands with brackish marsh and hardwood-palm hammock to the west and the City of Crystal River to the east. The whole system is tidally influenced, and Kings Bay is brackish. Rosenau et al. (1977) referred to these springs as the Crystal River Springs Group.

HUNTER SPRING - Lat. 28° 53' 40.0" N, Long. 82° 35' 33.0" W (NW ¼ SW ¼ SE ¼ sec. 21, T. 18 S, R. 17 E). This spring issues vertically from the bottom of a conical depression near the head of a side creek channel feeding the eastside of Kings Bay. Another spring is at the head of the channel. Hunter Spring pool is circular and measures 210 ft (64 m) in diameter. Depth measured over the vent is 13 ft (4 m). The spring has a sand bottom with some limestone near the vent. The spring bottom is choked with dark green filamentous algae, and some *Hydrilla* is present. Water is clear and bluish. There is a large boil in pool center. Land on the north rises to approximately 4 ft (1.2 m) above water and is a county maintained recreational park. Land on all other sides of spring pool is extensively developed with apartments and houses. A concrete sea wall entirely surrounds the pool except for outflow and inflow. There is a square swimming dock floating in the center of the spring pool. This spring was closed to swimming during summer 2001 due to high coliform bacteria levels detected in the water (Eric Dehaven, SWFWMD, pers. comm.).

TARPON HOLE SPRING - Lat. 28° 52' 54.64" N., Long. 82° 35' 41.33" W. (NW ¼ NW ¼ SW ¼ sec. 28, T. 18 S., R. 17 E.). This spring issues from a deep, conical depression in Kings Bay on the south side of Banana Island. The spring pool measures approximately 450 ft (137.2 m) north to south and 550 ft (167.6 m) east to west. The depth measured over the vent is 58 ft (17.7m). Water is typically clear and bluish, but can be cloudy during high tide. There is a large boil present in center of pool. Visibility was low when visited in October 2001. Algae cover limestone substrates. The vent is a large circular hole in limestone. Nearby islands to the north are part of the Crystal River National Wildlife Refuge and have marsh grasses and hardwood-palm hammock vegetation. Land to the east is privately owned with many houses and a marina. This spring is a favorite scuba diving location and manatee observation area.

Utilization - All of Kings Bay and most of its springs are used for swimming, manatee observation, pleasure boating, and scuba diving. The west side of Kings Bay and some islands are part of the Crystal River National Wildlife Refuge. The city of Crystal River nearly adjoins the east side of Kings Bay.

Discharge - Kings Bay Group 1965-1977: 975 ft^3/s[7] average

Table 20. Kings Bay Springs Group water quality analyses.

Analytes	Tarpon Hole 2001		Hunter 2001	
	Unfilt.	Filter	Unfilt.	Filter
Field Measures				
Temperature	22.9	-	23.0	-
DO	2.09	-	5.09	-
pH	7.72	-	8.02	-
Sp. Cond.	2130	-	541	-
Lab Analytes				
BOD	0.2 U	-	0.2 AU	-
Turbidity	6.8	-	0.95	-
Color	5 U	-	5 U	-
Alkalinity	124	123	87	87
Sp. Cond.	2200	-	530	-
TDS	960	-	263 Q	-
TSS	4 U	-	4 U	-
Cl	540	550	96	94
SO_4	78	81	20	20
F	0.091 I	0.12 A	0.065 I	0.071 I
Nutrients				
TOC	1 U	-	1 U	-
$NO_3 + NO_2$	0.17	0.18 J	0.4	0.39 J
$NH_3 + NH_4$	0.01 U	0.014 I	0.01 U	0.01 U
TKN	0.084 I	0.12 I	0.06 U	0.06 U
P	0.042	0.033 I	0.023	0.024
PO_4	0.029	-	0.028	-

Analytes	Tarpon Hole 2001		Hunter 2001	
	Unfilt.	Filter	Unfilt.	Filter
Metals				
Ca	52.8	53.9	30.6	31 A
K	10.2	10.3	2.1	2 A
Na	289	290	54.9	52.9 A
Mg	39.4	40	10.4	10.3 A
As	3 U	3 U	3 U	3 U
Al	-	75 U	-	75 U
B	128	-	33 I	-
Cd	0.75 U	0.75 U	0.75 U	0.75 U
Co	0.75 U	-	0.75 U	-
Cr	2 U	2 U	2 U	2 U
Cu	2.5 U	2.5 U	2.5 U	2.5 U
Fe	130 I	35 U	35 U	35 U
Mn	13.4	7.2	0.5 U	0.5 U
Ni	2U	2U	2U	2U
Pb	5 U	4 U	5 U	4 U
Se	4 U	4 U	4 U	4 U
Sn	10 U	-	10 U	-
Sr	362	-	131	-
Zn	5U	5U	5U	5U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value

Table 21. Kings Bay Springs Group bacteriological analyses.

Bacteria Results (in #/100ml)		
Analyte	**Tarpon Hole**	**Hunter**
Escherichia coli	1KQ	1KQ
Enterococci	1KQ	1KQ
Fecal Coliform	1KQ	1KQ
Total Coliform	1KQ	1KQ

CLAY COUNTY

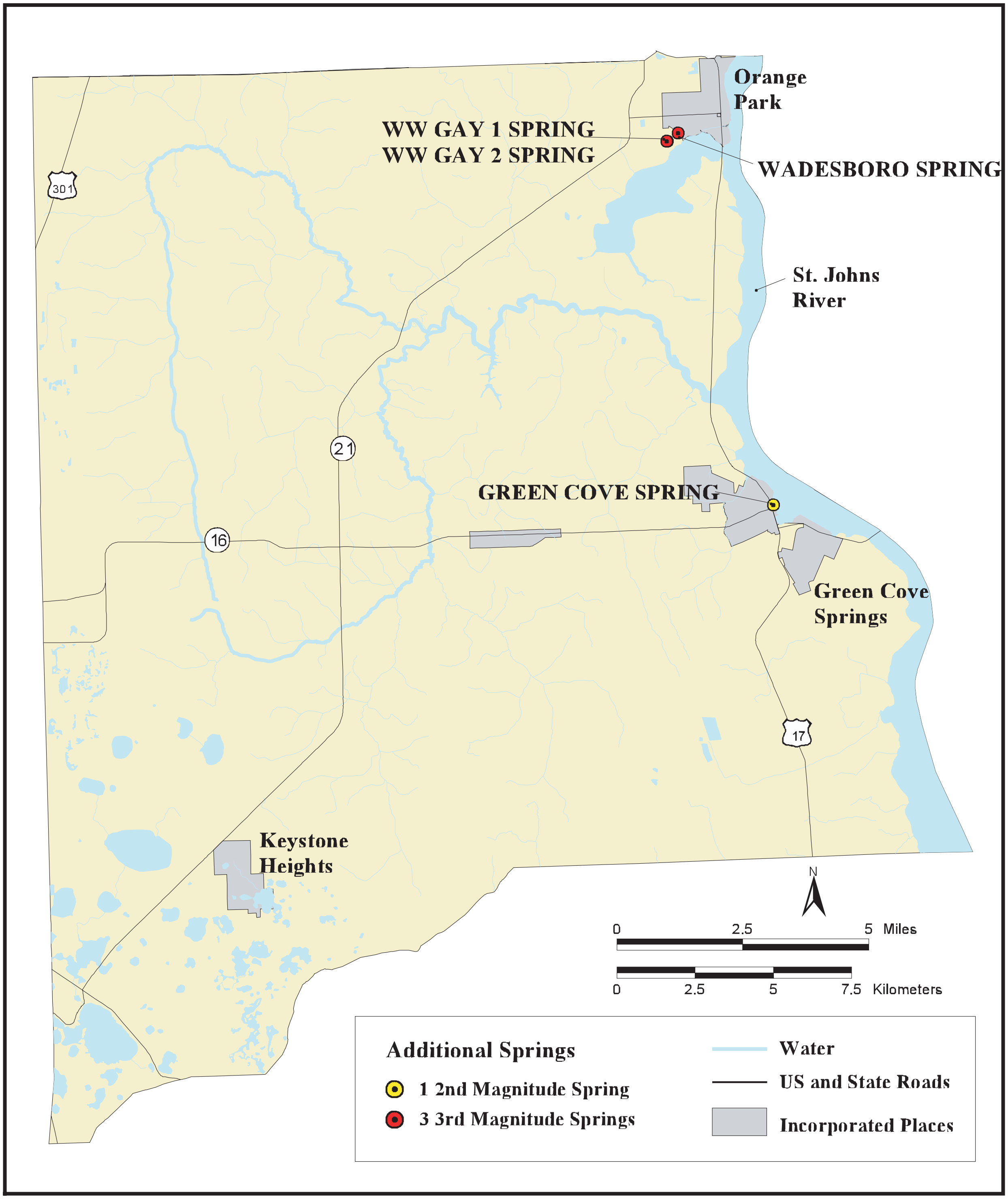

Figure 33 - Springs visited by FGS in Clay County.

Green Cove Spring

Figure 34. Green Cove Spring (photo by T. Scott).

Location - Lat. 29° 59' 36.24" N., Long. 81° 40' 40.48" W. (Land Grant 38, T. 6 S., R. 26 E.). Green Cove Spring is located within the town of Green Cove Springs. From the intersection of SR 16 and US 17 in Green Cove Springs, drive one block north on US 17. Turn east (right) on Spring Street and drive one block to the city park. The spring is within a historic city park.

Description - Green Cove Spring is entirely enclosed by a circular brick wall that measures 15 ft (4.6 m) in diameter. Spring depth is 28 ft (8.5 m). The spring vent consists of a deep vertical cave whose walls are visible through clear, slightly greenish water. No vegetation or algae are observed in the spring pool, and the spring water emits a sharp hydrogen sulfide odor. Spring water is channeled into a concrete swimming pool. A narrow spring run exits the swimming pool, cascading over a 3 ft (0.9 m) tall wall, and travels approximately 450 ft (137.1 m) eastward into the St. Johns River. The 5 ft (1.5 m) wide spring run has a sand bottom. There is a view of the nearly 2 mile (3.2 km) wide St. Johns River to the east. To the west, high ground rises into downtown Green Cove Spring 10 ft (3.1 m) higher than the spring surface. There are several piers and boat docks on the river near the spring mouth. Picnic tables, walkways, benches, and shade trees abound in the park. The City Hall and a bathhouse are on the north side of the swimming pool. The spring has an extensive cavern and cave system associated with it. Rosenau et al. (1977) report that a cavern can be accessed through a 2 ft (0.6 m) wide orifice in the bottom of the spring. The cavern extends northeastward toward the St. Johns River.

Table 22. Green Cove Spring water quality analyses.

Analytes	1924	1946	1972	2003	
				Dissolved	Total
Field Measures					
Temperature	-	-	25.0	24.36	
DO	-	-	-	0.4	
pH	-	7.3	8.0	7.55	
Sp. Cond.	-	-	-	294	
Lab Analytes					
BOD	-	-	-	-	0.6AI
Turbidity	-	-	-	-	0.05U
Color	-	0	5	-	5U
Alkalinity	-	-	79	-	86A
Sp. Cond.	-	289	290	270.0	-
TDS	170	171	199	-	165.0
TSS	-	-	-	-	4U
Cl	5.7	6.1	6.0	-	6.4
SO_4	49	51	55	-	55
F	-	0.2	0.4	-	0.27
Nutrients					
TOC	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	-	-	-	0.004U
$NH_3 + NH_4$	-	-	-	-	0.038
TKN	-	-	-	0.06U	0.076I
P	-	-	-	0.015U	0.015U
PO_4	-	-	-	0.005I	-
NO_3	-	-	-	-	-
Metals					
Ca	28	28	28	27.9	28.6
K	1.8	1.2	1.3	1.4	1.4
Na	2.4	4.6	4.3	4.8	4.04
Mg	16	15	16	14.8	15
Al	-	-	-	-	10U
As	-	-	-	3U	3U
B	-	-	-	-	11I
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	1U
Cr	-	-	-	2U	2U
Cu	-	-	-	3.5U	4U
Fe	30	60	-	5U	7U
Mn	-	-	-	0.25U	0.5U
Ni	-	-	-	2U	2U
Pb	-	-	-	5U	5U
Ra-226	-	-	-	-	0.5
Ra-228	-	-	-	-	0.9U
Se	-	-	-	8U	8U
Sn	-	-	-	-	11I
Sr	-	-	-	-	1230
Zn	-	-	-	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization - Green Cove Spring is located within a city park and is a popular swimming area. No swimming is allowed in the actual spring. Water from the spring directly supplies the water for the swimming pool. In the 19th century, the spring was a popular health spa.

Discharge - All discharge rates are measured in ft^3/s

February 12, 1929	5.4[1]
April 18, 1946	4.42[1]
November 4, 1950	4.15[1]
June 18, 1954	2.68[1]
April 25, 1956	2.74[1]
October 19, 1960	3.52[1]
March 8, 1972	3.03[1]
January 8, 2003	2.79[2]

Table 23. Green Cove Spring bacteriological analyses.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

COLUMBIA COUNTY

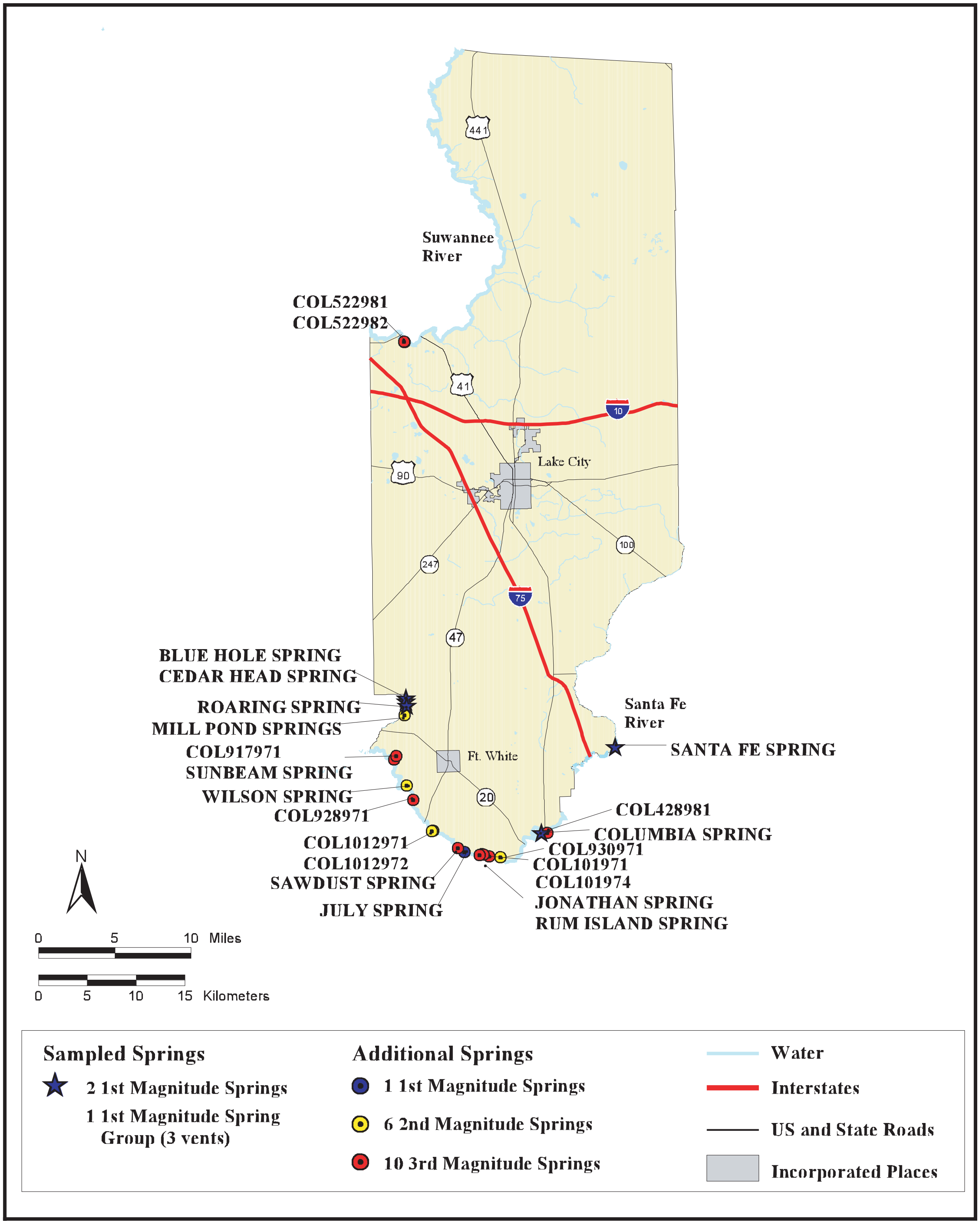

Figure 35 - Springs visited by FGS in Columbia County.

Columbia Spring

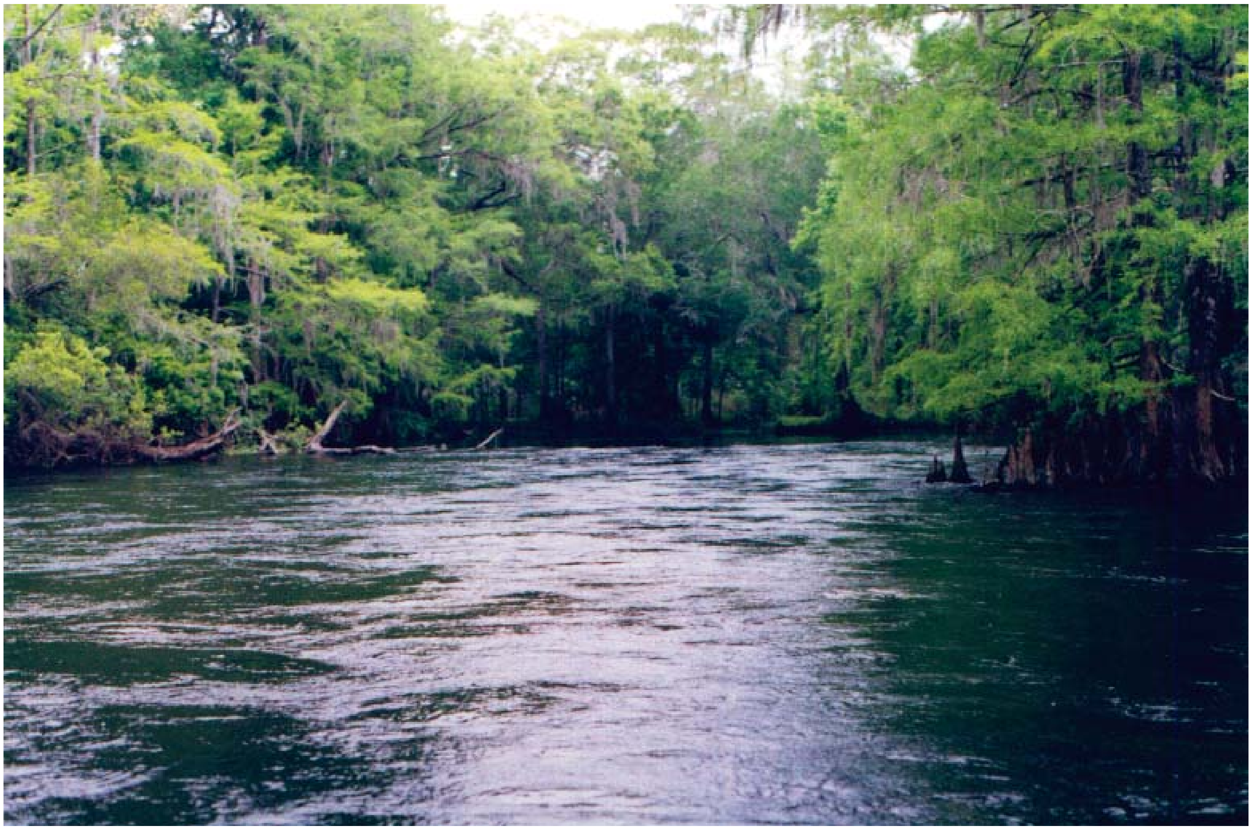

Figure 36. Columbia Spring (photo by D. Hornsby).

Location - Lat. 29° 51' 14.80" N., Long. 82° 36' 43.03" W. (NW¼ SE¼ NE¼ sec. 28, T. 7 S., R. 17 E.). Columbia Spring is located 2 miles (3.2 km) northwest of High Springs on the Santa Fe River and can be accessed by small boat. From the junction of US 441/41 and CR 236 in High Springs, drive north on US 441/41 approximately 1.2 miles (1.9 km). Turn west (left) at public access boat sign just before the Santa Fe River. Spring is in a cove on the northeast bank of the river, 900 ft (274.3 m) downstream from the boat ramp.

Description - Columbia Spring has an oval-shaped pool that measures 75 ft (23 m) north to south and 150 ft (45.7 m) east to west. The depth at the vent is 25 ft (7.6 m). Water is typically clear, but was tannic in October 2001. It has a 30 ft (9.1 m) wide spring run that flows approximately 600 ft (182.9 m) westward to the Santa Fe River. There are native aquatic grasses in the spring run and some algae are present on most substrates. The spring run has a jagged limestone and sand bottom. There is a 1-2 ft (0.3 - 0.6 m) tall man-made line of rocks that stretches across the spring run about 90 ft (27.4 m) west of the vent. The entire spring and spring run are within the lowland flood plain of the Santa Fe River. The flood plain in this area is heavily forested with cypress and other swamp inhabiting hardwoods. The nearest high ground is approximately 600 ft (182.9 m) east of the spring, and it rises to nearly 10 ft (3 m) above the flood plain. It is generally forested with mixed hardwoods and pines. A house sits on the high ground to the east of the spring.

Utilization - The land surrounding the spring is privately owned. The spring is a local swimming hole with pristine surroundings.

Discharge - November 1, 2001: 39.5 $ft^3/s^{(4)}$

Table 24. Columbia Spring water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	22.39	-
DO	2.29	-
pH	7.19	-
Sp. Cond.	270	-
Lab Analytes		
BOD	0.23 I	-
Turbidity	2.1	-
Color	250	-
Alkalinity	54	54
Sp. Cond.	270	-
TDS	217	-
TSS	4 U	-
Cl	28	27
SO_4	34	34
F	0.14	0.12
Nutrients		
TOC	39	-
NO3 + NO2	0.089	0.088 J
NH3 + NH4	0.062	0.038
TKN	1.3	1.1
P	0.3	0.21
PO_4	0.19	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	33.6	31.5
K	2	1.8
Na	12.7	12
Mg	7.1	6.6
As	3 U	3 U
Al	-	530
B	29 I	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	640	500
Mn	30.3	23.9
Ni	1.5 U	2 U
Pb	5 U	4 U
Se	8.8 U	4 U
Sn	20 U	-
Sr	358	-
Zn	5 I	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=exceeded holding time limit

Table 25. Columbia Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	26Q
Enterococci	158Q
Fecal Coliform	38Q
Total Coliform	340Q

Ichetucknee Springs Group

Figure 37. Ichetucknee Springs Group, Ichetucknee Head Spring (photo by T. Scott).

Figure 38. Ichetucknee Springs Group, Blue Hole Spring (photo by T. Scott).

Group Location - Lat. 29° 59' N., Long. 82° 45' W. (sections 12 and 13, T. 6 S., R. 15 E. and section 7, T. 6 S., R. 16 E.). The Ichetucknee Springs Group is located within the Ichetucknee Springs State Park which is approximately 10 miles (16.1 km) northeast of Branford. From the bridge over the Suwannee River in Branford, drive east on US 27/129 for 7 miles (11.2 km). Turn north (left) onto CR 137 and continue for 1.3 miles (2.1 km). Turn east (right) and go 4.2 miles (6.8 km) through the north park entrance to the parking area.

Group Description - These springs comprise a group of nine named and many unnamed springs along the upper 2.5 mile (4 km) stretch of the Ichetucknee River. The most northerly spring forms the head of the river and is named Ichetucknee Head Spring. From here, the river flows about 1.5 miles (2.4 km) south, then 4 miles (6.4 km) southwest to discharge into the normally darker tannic water of the Santa Fe River. Of the springs sampled for water quality, all are located within Columbia County except for Ichetucknee Head Spring, which is located just inside Suwannee County.

ICHETUCKNEE HEAD SPRING - Lat. 29° 59' 03.10" N., Long. 82° 45' 42.73" W. (SE ¼ NE ¼ NE ¼ sec. 12, T. 6 S., R. 15 E.). This spring forms the head of the Ichetucknee River. The spring pool measures 102 ft (31.1 m) east to west and 87 ft (26.5 m) north to south. The depth measures 17 ft (5.2 m) over the vent. Water is clear and light blue and issues from a fracture in the limestone forming a visible boil. A thin layer of algae carpets most of the bottom of the spring. The spring has sand and limestone bottom with little or no aquatic vegetation. North and east shorelines have thick emergent grass and shrubs, and the west shore is near high ground sloping to approximately 15 ft (4.6 m) above water. All surrounding land is densely forested. Restroom facilities are about 200 ft (61 m) west. This spring is easily accessed by a path and is a popular swimming hole.

BLUE HOLE - Lat. 29° 58' 49.91" N., Long. 82° 45' 30.44" W. (SW ¼ SW ¼ NW ¼ sec. 17, T. 6 S., R. 15 E.). This spring is located in the spring run channel of Cedar Head Spring, which is north of Blue Hole. The spring pool and outflow greatly widens the incoming spring run, and the combined run flows south a short distance to the Ichetucknee River. The spring pool measures 87 ft (26.5 m) east to west and 117 ft (35.6 m) north to south. The depth measured over the vent is 37 ft (11.3 m). The water is clear and light blue, and a boil is visible on the pool surface. Water issues from a cavern in limestone. The pool has a sand and limestone bottom with abundant aquatic grass and some algae. The land around the spring is heavily forested with mixed hardwoods and palm. The spring run is fenced off approximately 100 ft (30.5 m) south of vent. This is a swimming spot with a wooden boardwalk for spring access. A foot path leads to the spring from the north.

CEDAR HEAD SPRING - Lat. 29° 58' 59.88" N., Long. 82° 45' 31.32" W. (SW ¼ NW ¼ NW ¼ sec. 7, T. 6 S., R. 15 E.). This is a small spring at the head of a stream that flows south into Blue Hole Spring. The spring pool diameter is approximately 20 ft (6.1 m) east to west. The depth measures 6 ft (1.8 m) over the vent. No boil was present on the pool surface during the October 2001 visit, although outflow stream was flowing. The bottom is covered with sand, logs and organic matter. Water is clear but does not appear blue due to dark particulate layer on bottom. The vent is a small upwelling in the sand. A steep bank occurs along the west side of the spring and rises to 8 ft (2.4 m) above water level. There is higher ground 150 ft (45.7 m) east of spring across a small lowland flood plain. Cypress, gum, and maple forest occur in lowlands near water with mixed hardwood forest on higher

Table 26. Ichetucknee Springs Group water quality analyses.

Analytes	1946	1975	Main 2001		Blue Hole 2001		Cedar Head 2001		Mission 2001	
			Unfilt.	Filter	Unfilt.	Filter	Unfilt.	Filter	Unfilt.	Filter
Field Measures										
Temperature	22.2	21.0	21.95	-	21.9	-	21.9	-	21.8	-
DO	-	4.5	3.52	-	2.01	-	2.98	-	0.63	-
pH	7.7	7.6	7.91	-	7.49	-	7.41	-	7.91	-
Sp. Cond.	329	290	319	-	287	-	299	-	312	-
Lab Analytes										
BOD	-	2.0	0.2 UJ	-	0.2 UJ	-	0.2 UJ	-	0.2 UAJ	-
Turbidity	-	1	0.05 U	-	0.1	-	0.05 U	-	0.05 U	-
Color	0	1	5 U	-	5 U	-	5 U	-	5 U	-
Alkalinity	-	140	154	154	145	145	151	151	148	147
Sp. Cond.	-	-	320	-	290	-	300	-	310	-
TDS	-	-	183	-	171	-	168	-	172	-
TSS	-	0	4 U	-	4 U	-	4 U	-	4 U	-
Cl	3.6	4.4	3.6	3.7	4.3	4.3	3.9	3.9	5.4	5.4 A
SO_4	8.4	6.9	8.3	8.5	4.8	4.9	5.3	5.4	8.7	8.8 A
F	0.1	0.4	0.1	0.097 I	0.11	0.11 A	0.1	0.091 I	0.14	0.13
Nutrients										
TOC	-	0.0	1 U	-	1 U	-	1 U	-	1 U	-
NO3 + NO2	-	0.37	0.83	0.84	0.7	0.72	0.86	0.89	0.51	0.53
NH3 + NH4	-	-	0.015 I	0.012 I	0.011 I	0.01 U	0.011 I	0.011 I	0.01 U	0.019 I
TKN	-	-	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
P	-	0.05	0.023	0.022 J	0.048	0.048 J	0.033	0.034 J	0.059	0.05 JA
PO_4	-	0.05	0.02	-	0.044	-	0.027	-	0.056	-
Metals										
Ca	58	52	54.5	52.5	47.9	48.4	54	51.2	49.7	48.6
K	0.3	0.3	0.15	0.14	0.31	0.33	0.22	0.22	0.46	0.48
Na	3.1	3.4	2.12	2.02	2.67	2.45	2.37	2.26	3.65	3.53
Mg	6.6	6.0	5.8	5.8	4.7	4.8	5.3	5.2	6.3	6.4
As	-	1	3 U	3U	3 U	3 U	3U	3 U	3U	3U
Al			-	75 U	-	75 U	-	75 U	-	75 U
B	-	-	25 U	-	25 U	-	25 U	-	25 U	-
Cd	-	0	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	0.75 U	-	0.75 U	-	0.75 U	-	0.75 U	-
Cr	–	–	2 U	2 U	2 U	2U	2 U	2 U	2U	2 U
Cu	-	3	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	4.4 I	2.5 U
Fe	30	340	35 U	20 U	35 U	20 U	35 U	20 U	35 U	20 U
Mn	-	20	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ni	-	0	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Pb	-	7	5 U	4 U	5 U	4 U	5 U	4U	5 U	4U
Se	-	-	4 U	4 U	4U	4 U	4U	4U	4U	4U
Sn	-	-	10 U	-	10 U	-	10 U	-	10 U	-
Sr	-	170	156	-	76	-	105	-	107	-
Zn	-	0	5 U	5 U	5 U	5U	5U	5U	5U	5U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=exceeded holding time limit

ground. Access is limited to an obscure foot path from the west. The spring is not used for swimming because of its low water level and limited access.

ROARING SPRING - Lat. 29° 58' 34.44" N., Long. 82° 45' 28.44" W. (SE ¼ NW ¼ SW ¼ sec. 7, T. 6 S., R. 15 E.). Roaring Spring is the largest spring in a complex of springs often referred to as Mission Springs. Roaring Spring along with Singing Spring and other small springs emanate from the base of high banks about 250 ft (76.2 m) east of the Ichetucknee River. Roaring Spring discharges out of a cavern in a limestone ledge on the north side of the island into the northwest flowing run. Its spring pool measures 10 ft (3 m) east to west and 15 ft (4.6 m) north to south. The depth measured near the limestone ledge is 3 ft (0.9 m). The ledge rises steeply to approximately 12 ft (3.7 m) above the water level. Water is clear and bluish. Algae coat the aquatic grasses in the spring run. There are two small runs; one flows to the northwest and the other flows southwest. Both meet the river approximately 250 ft (76.2 m) from each other. At this point, the trickling northwest run becomes a turbulent run with swaying aquatic grasses. The uplands east of the spring rise to nearly 20 ft (6.1 m) above the springs and are heavily forested with mixed hardwoods at lower elevations and pines on the hilltops. An historic Spanish mission once stood on the high ground approximately 200 ft (61 m) east of the springs.

Utilization - The springs, river, and surrounding forested land are part of Ichetucknee Springs State Park from the US 27 bridge northward. The park is a high quality natural area that is partly developed and whose heavy public use is highly regulated in order to minimize damage to the environment. Camping, hiking, swimming, tubing, and canoeing are some of the activities that are offered in the state park.

Discharge -All discharge rates are measured in ft^3/s. Discharge is measured for the entire group.

May 17, 1946	197.2 ft^3/s[(1)]
October 3, 2001	186 ft^3/s[(4)]

Table 27. Ichetucknee Springs Group bacteriological analyses.

Bacteria Results (in #/100 mL)				
Analyte	**Main**	**Blue Hole**	**Cedar Head**	**Mission**
Escherichia coli	1KQ	1KQ	2Q	1AKQ
Enterococci	1KQ	1KQ	42Q	1AKQ
Fecal Coliform	1KQ	1KQ	2Q	1AKQ
Total Coliform	1KQ	1KQ	20Q	1AKQ

Santa Fe Spring (formerly COL61981)

Figure 39. Santa Fe Spring (photo by T. Scott).

Location-Lat. 29° 56' 05.30" N., Long. 82° 31' 49.51" W. (NW¼ SE¼ SE¼ sec. 29, T. 6 S., R. 18 E.). Santa Fe Spring is located approximately 8 miles (12.9 km) northeast of High Springs on the west bank of the Santa Fe River. From the intersection of US 441/41 and CR 236 in High Springs head north on US 441/41 approximately 6.2 miles (10 km) to the O'Leno State Park sign on the east (right) side of US 441/41. Turn east (right) onto an access road, which parallels US 441/41 and travel 0.3 miles (0.5 km) to a dirt road on the east (right) side of the road, just past the O'Leno State Park entrance. Turn east (right) onto the dirt road and travel approximately 3.3 miles (5.3 km) to a boat landing just upstream from the I-75 bridge. The road makes a series of 90 degree turns to the north and east before finally bearing southeast to the Santa Fe River. The spring is 2 miles (3.2 km) upstream from the I-75 bridge over the river. At this point, a narrow spring run comes in from the north. The spring is approximately 90 ft (27.4 m) up the spring run at the head.

Description-This spring, formerly named COL61981 (Hornsby and Ceryak, 1998), is a large circular depression with steep sides. Spring pool diameter measures 192 ft (58.5 m) north to south and 215 ft (65.5 m) northeast to southwest. Spring depth is 83 ft (25.3 m). The water color is typically clear and tinged greenish blue though it was tannic in October 2001. No boil was observed during the October 2001 visit. The spring run is approximately 90 ft (27.4 m) long and flows southeasterly into the Santa Fe River. Some algae are present on limestone substrate in the spring run. No other aquatic vegetation could be seen through the dark water. Very little emergent vegetation is present. Cypress trees are common along the water line. The spring pool is surrounded by 15-20 ft (4.6- 6.1 m) high steep, sandy banks. The uplands around the pool are generally forested with live oaks and pines.

Utilization-The uplands around this spring are privately owned. At least five cabins are evenly distributed around the pool on the high banks.

Discharge-All discharge rates are measured in ft^3/s.

June 1, 1998	149.99[(4)]
November 1, 2001	47.9[(4)]

Table 28. Santa Fe Spring water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	22.69	
DO	0.78	
pH	7.40	
Sp. Cond.	271	
Lab Analytes		
BOD	0.2 U	-
Turbidity	0.8	-
Color	120	-
Alkalinity	107	107
Sp. Cond.	270	-
TDS	193	-
TSS	4 U	-
Cl	10	9.9
SO_4	18	18
F	0.2	0.17
Nutrients		
TOC	22	-
NO3 + NO2	0.023	0.018 J
NH3 + NH4	0.057	0.051
TKN	0.76	0.62
P	0.2	0.19
PO_4	0.19	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	39.3	38.2
K	1.3	1.3
Na	5.5	5.57 A
Mg	7.9	7.8
B	25U	-
Al	-	200 I
As	3 U	3 U
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	250	210
Mn	41	39.8
Ni	1.5 U	2 U
Pb	5 U	4 U
Se	4 U	4 U
Sn	10 U	-
Sr	276	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q= Exceeded holding time limit

Table 29. Santa Fe Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	1KQ
Enterococci	1KQ
Fecal Coliform	2Q
Total Coliform	10Q

DIXIE COUNTY

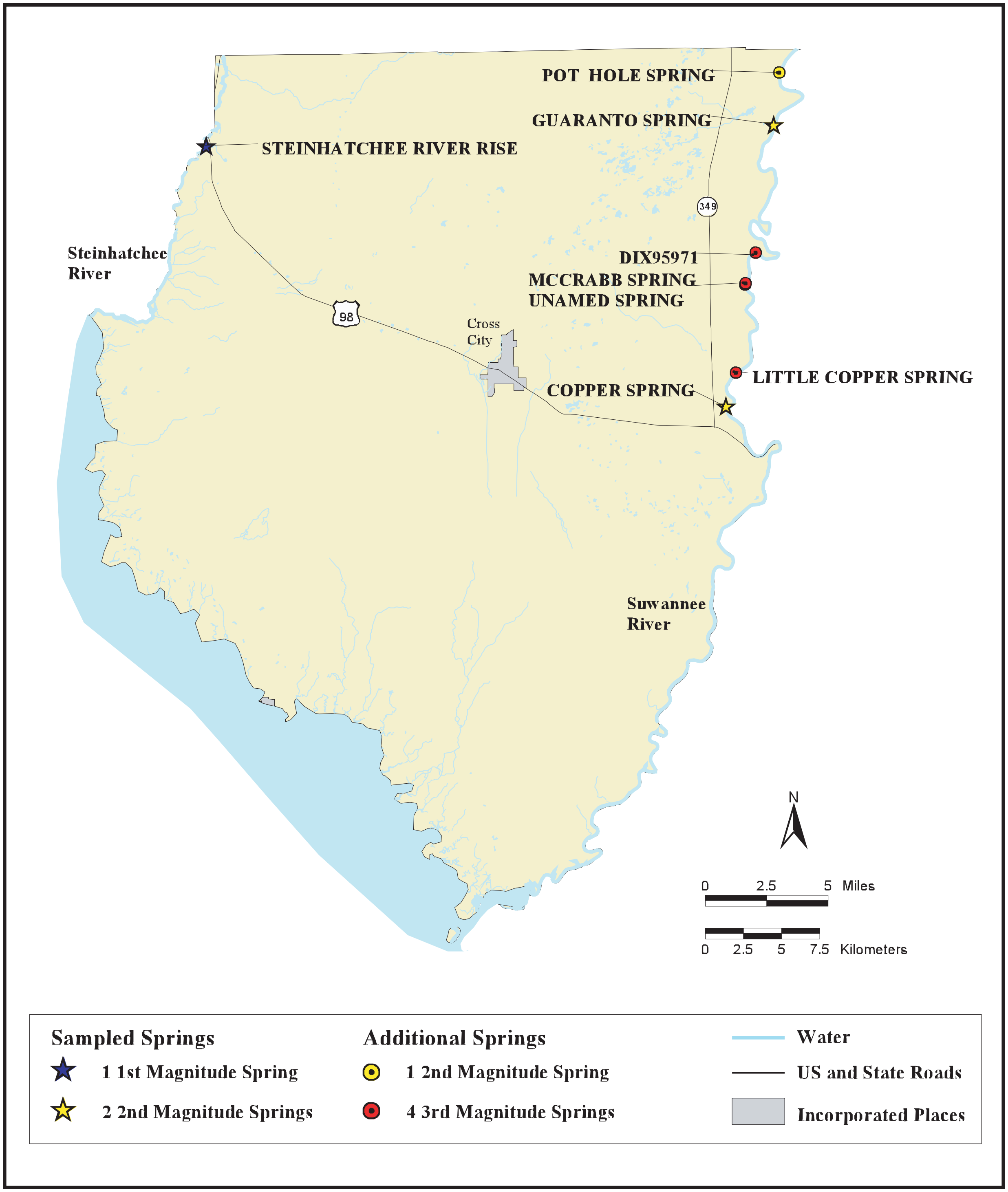

Figure 40 - Springs visited by FGS in Dixie County.

Copper Spring

Figure 41. Copper Spring No. 2 (photo by R. Means).

Location **-** Lat. 29° 36' 50.45" N., Long. 82° 58' 25.89" W. (SE ¼ SE ¼ NW ¼ sec. 13, T. 10 S., R. 13 E.). Copper Spring is located 1 mile (1.6 km) northeast of Old Town and flows into the Suwannee River from the west. The spring is surrounded by private property. It can be accessed by boat. From the intersection of US 19/27A/98 and CR 349 in Old Town, travel north on CR 349 approximately 5.6 miles (9 km) to the intersection with Purvis Landing Road. Turn east (right) onto Purvis Landing Road and travel approximately 2.1 miles (3.4 km) to the boat landing. The spring run is 3 miles (4.8 km) downstream from the Purvis Landing Road boat ramp.

Description – Copper Spring consists of a group of 3 springs: Spring No. 1, Spring No. 2, and Spring No. 3. Spring No. 2 was sampled. Copper Spring No. 2 has a roughly circular spring pool measuring 126 ft (38.4 m) north to south and 84 ft (25.6 m) east to west. The Spring No. 2 vent is 5.3 ft (1.6 m) deep and is located on the north side of the pool, discharging from a small cavern at the base of 12 ft (3.7 m) high banks. A prominent boil is seen on the pool surface. The water is clear to slightly turbid with a bluish-green tint. There is a sharp hydrogen sulfide odor near the vent, and a copper-colored, iron-rich deposit coats plants and tree bases along the edge of the spring and run. The spring has a soft sand and silt bottom. The spring run exits the southeast side of the pool and flows slowly southeastward about 500 ft (152.4 m) to the dark-colored Suwannee River. The two additional springs, Spring No. 1 and Spring No 3, are located northeast of Spring No. 2. Spring No. 1 is a circular vent in a pool 28 ft (8.5 m) deep and 34 ft (10.4 m) in diameter located on the

Table 30. Copper Spring water quality analysis.

Analytes	1975	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	21.74	
DO	1	0.24	
pH	7.1	7.26	
Sp. Cond.	390	420	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	20	-	29
Color	0	-	80
Alkalinity	200	-	201
Sp. Cond.	390	358A	-
TDS	228	-	224
TSS	-	-	6I
Cl	6.2	-	6.3
SO_4	3.5	-	3.7
F	0.1	-	0.08I
Nutrients			
TOC	5	-	1.8I
$NO_3 + NO_2$ as N	-	-	0.004U
$NH_3 + NH_4$	0.03	-	0.1
TKN	-	0.16I	0.17I
P	0.03	0.039A	0.039A
PO_4	-	0.032	-
NO_3	0	-	-

Analytes	1975	2002	
		Dissolved	Total
Metals			
Ca	7.4	76.8	78.5
K	0.2	0.26J	0.24
Na	3.5	3.4I	3.3I
Mg	3.7	3.9	4.0
Al	-	-	50U
As	-	17	15.0
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	1100	2590	2640
Mn	-	51.4	53.4
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	1.0
Ra-228	-	-	0.9U
Se	-	4U	4U
Sn	-	-	7U
Sr	200	-	160
Zn		15U	4.4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 31. Copper Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

south side of two houses. Discharge is through a narrow run approximately 40 ft (12.2 m) south to the run from Spring No. 3, which is in a low swampy area to the west. The combined flow is then eastward about 135 ft (41.2 m), discharging through two culverts into Spring No. 2 pool, the main spring pool (Rosenau et al., 1977). Two houses on stilts are located on the bank west of Copper Spring. An old concrete slab is directly on the banks just west of Copper Spring (Spring No. 2). An area of abundant cypress knees is adjacent south of Copper Spring. These springs are situated in the forested floodplain of the Suwannee River. Copper Spring may also be locally known as Old Town Spring (Rosenau et al., 1977).

Utilization – Copper Spring is surrounded by private property and is undeveloped.

Discharge - All discharge rates are measured in ft^3/s

May 12, 1932	18.8[1]
November 18, 1960	31.9[1]
November 11, 1975	25.4[1]
September 22, 1997	20.73[1]
July 16, 2002	13.60[2]

Guaranto Spring

Figure 42. Guaranto Spring (photo by R. Means).

Location – Lat. 29° 46' 47.27" N., Long. 82° 56' 23.85" W. (NW ¼ NW ¼ NW ¼ sec. 20, T. 8 S., R. 14 E.). Guaranto Spring is located within a county park along the west bank of the Suwannee River, 12.5 miles (20 km) south of Branford. Travel west from the Suwannee River bridge in Branford on US 27 for 1.3 miles (2.1 km). Turn south (left) on SR 349 and travel 11.8 miles (19 km). Turn east (left) on CR 353 (Rock Sink Church Road) at the flashing lights. The road turns sharply to the south (right) just in front of the church, follow the road approximately 2.5 miles (4 km) to the county park.

Description – Guaranto Spring, also locally known as "Gronto" or "Gornto" Spring, is an impounded swimming hole along the west side of the Suwannee River. An earthen dam blocks the outflow channel adjacent to the river, creating an oblong spring pool. The pool measures 240 ft (73.2 m) northwest to southeast and 87 ft (26.5 m) northeast to southwest. The depth over the vent is 11.5 ft (3.5 m). A slight boil is present on the northwest end of the pool directly over the vent. The water is clear and greenish. The spring has a sand bottom. Limestone is exposed at the vent. Algae are abundant, but there is virtually no aquatic vegetation. Two wooden access structures are built into the pool on the north and south sides. The north shore has bluish clay banks, and the spring's steep banks rise to approximately 12 ft (3.7 m) above the water level. The land around the spring is developed into a county recreation park. The spring discharges through a 5 ft (1.5 m) diameter culvert in the dam directly into the Suwannee River.

***Utilization* -** Guaranto Spring is within a county park and is a popular swimming area.

There is a boat ramp and access area on the nearby Suwannee River. There are limited facilities.

Discharge **-** All discharge rates are measured in ft^3/s.

May 12, 1932	12.4[(1)]
March 9, 1962	3.41[(1)]
November 2, 1972	12.0[(1)]
July 21, 1997	12.76[(4)]
July 16, 2002	9.33[(2)]

Table 32. Guaranto Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	22	22.75	
DO	2.5	1.10	
pH	6.8	7.06	
Sp. Cond.	-	371	
Lab Analytes			
BOD	0.5	-	0.2U
Turbidity	-	-	0.35
Color	0	-	5U
Alkalinity	153	-	183
Sp. Cond.	343	380.0	-
TDS	182	-	200
TSS	-	-	4U
Cl	4	-	6.0
SO_4	5.6	-	6.1
F	0.1	-	0.093I
Nutrients			
TOC	-	-	1.5I
$NO_3 + NO_2$ as N	1.14	-	0.78
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.009I	0.012
PO_4	-	0.006I	-
NO_3	0.6	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	60	64.1	64.0
K	0.2	0.69	0.67
Na	2.3	2.9I	2.7I
Mg	4	3.9	3.9
Al	-	-	50U
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	35I
Mn	-	1.9I	2.9
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	0.9U
Se	-	4U	4U
Sn	-	-	7U
Sr	400	-	164.0
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 33. Guaranto Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1K
Fecal Coliform	1K

Steinhatchee River Rise

Figure 43. Steinhatchee River Rise (photo by R. Means)

Location—Lat. 29° 46' 11.68" N., Long. 83° 19' 30.13" W. (NE ¼ NW ¼ SE ¼ sec. 21, T. 1 S., R. 12 E.). The Steinhatchee River Rise is located between Perry and Cross City off US 19/27A/98. From the intersection of US 98 and US 19/27 in Perry, travel south on US 19/27A/98 approximately 28 miles (45 km) to the Steinhatchee River bridge. After crossing bridges over the Steinhatchee River, veer south (right) into grassy area beside the road. Follow to a small dirt road marked by a Public River Access #5 sign. This dirt road ends at the river rise.

Description-Steinhatchee River Rise is the re-emergence of the Steinhatchee River from underground. There was very little flow during October 2001 visit. Spring pool measures 72 ft (21.9 m) north to south and 30 ft (9.1 m) east to west. The depth is 12 ft (3.7 m). Tannic water flows northwest out from underneath a limestone ledge. Algae are present on limestone substrate. Some cypress trees are near water's edge. The area around the rise has nearby sink depressions and elongated fissures in limestone that run into the Steinhatchee River from its banks. Uplands both north and south of the rise have planted pines. The uplands rise steeply to 10-12 ft (3-3.7 m) above water level on both sides of river channel. This river rise is located in a river flood channel. High water would bring river water flowing over the rise depression from the southeast.

Utilization-Land owned by SRWMD and public access granted. No development, planted pines nearby.

Discharge- July 6,1999: 350 ft^3/s[4]

Table 34. Steinhatchee River Rise water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	21.1	
DO	1.07	
pH	6.98	
Sp. Cond.	504	
Lab Analytes		
BOD	0.4 AI	-
Turbidity	1.8	-
Color	50 A	-
Alkalinity	279	279
Sp. Cond.	560	-
TDS	322	-
TSS	4 U	-
Cl	7.6	7.2
SO_4	11	11
F	0.12	0.12 A
Nutrients		
TOC	12 A	-
$NO_{3+}NO_2$	0.056	0.053
$NH_{3+}NH_4$	0.038	0.042
TKN	0.41 A	0.16 J
P	0.055 A	0.027 A
PO_4	0.03	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	108 A	101
K	0.26 A	0.25
Na	4.15 A	4.01
Mg	8.3 A	7.9
As	3 U	3 U
Al	-	75 U
B	25U	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	450 A	130 I
Mn	186 A	173
Ni	1.5 U	1.5 U
Pb	5 U	4 U
Se	4 U	4 U
Sn	10 U	-
Sr	165 A	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated Q=Exceeding holding time

Table 35. Steinhatchee River Rise bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	6Q
Enterococci	34Q
Fecal Coliform	6Q
Total Coliform	100Q

DUVAL COUNTY

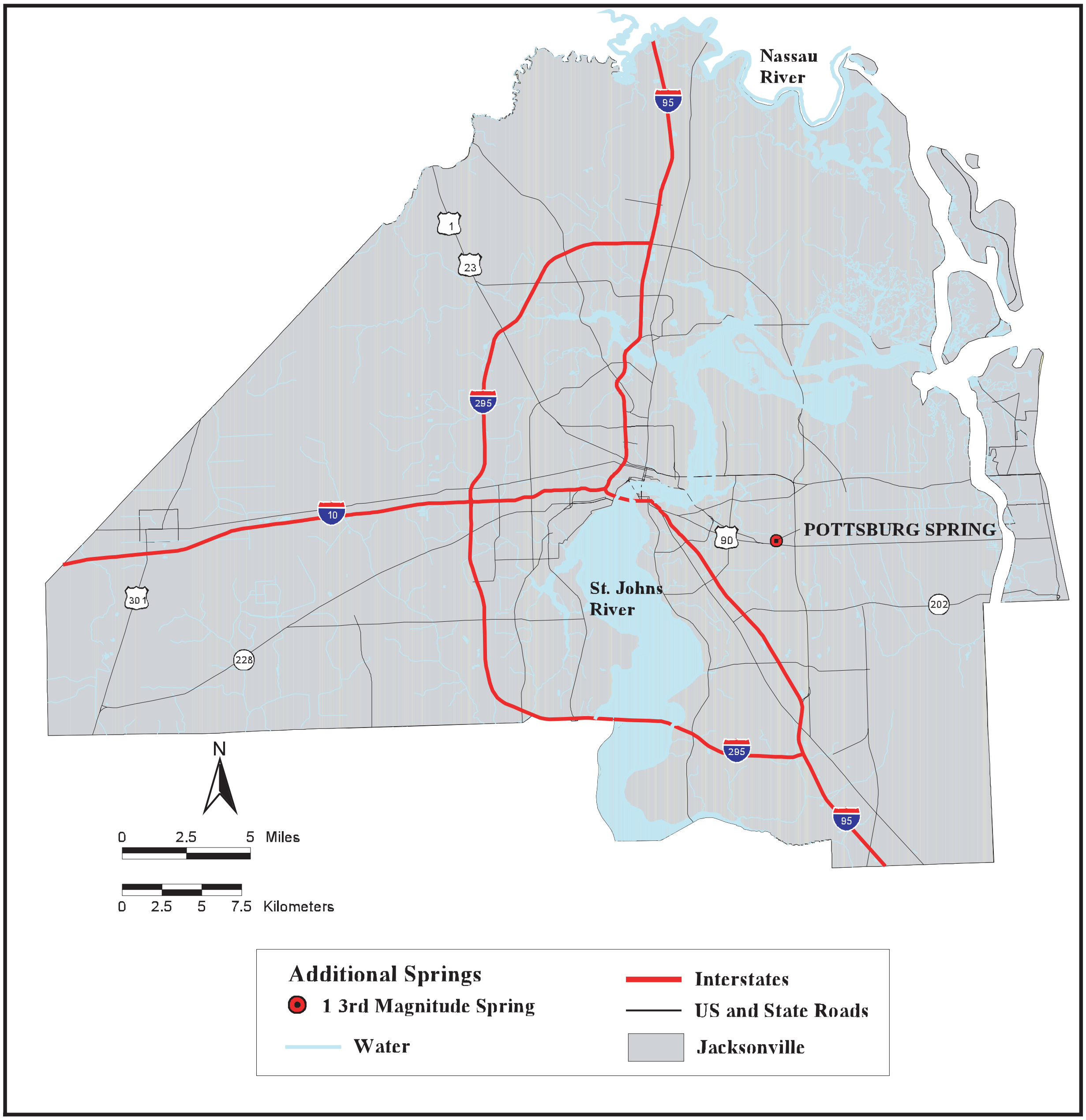

Figure 44. Spring visited by FGS in Duval County.
Spring description provided on enclosed CD.

FRANKLIN COUNTY

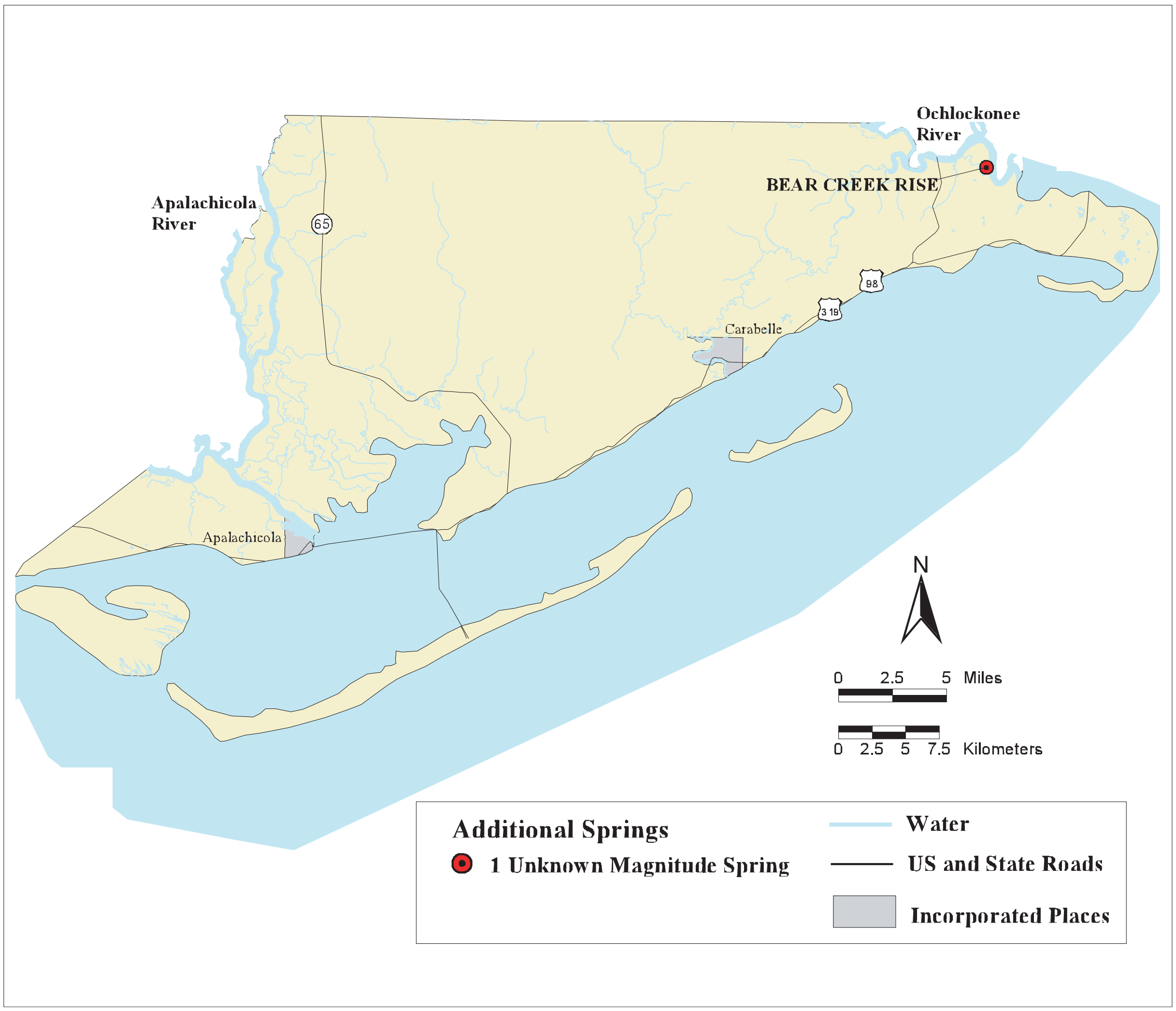

Figure 45. Spring visited by FGS in Franklin County. Spring description provided on enclosed CD.

GADSDEN COUNTY

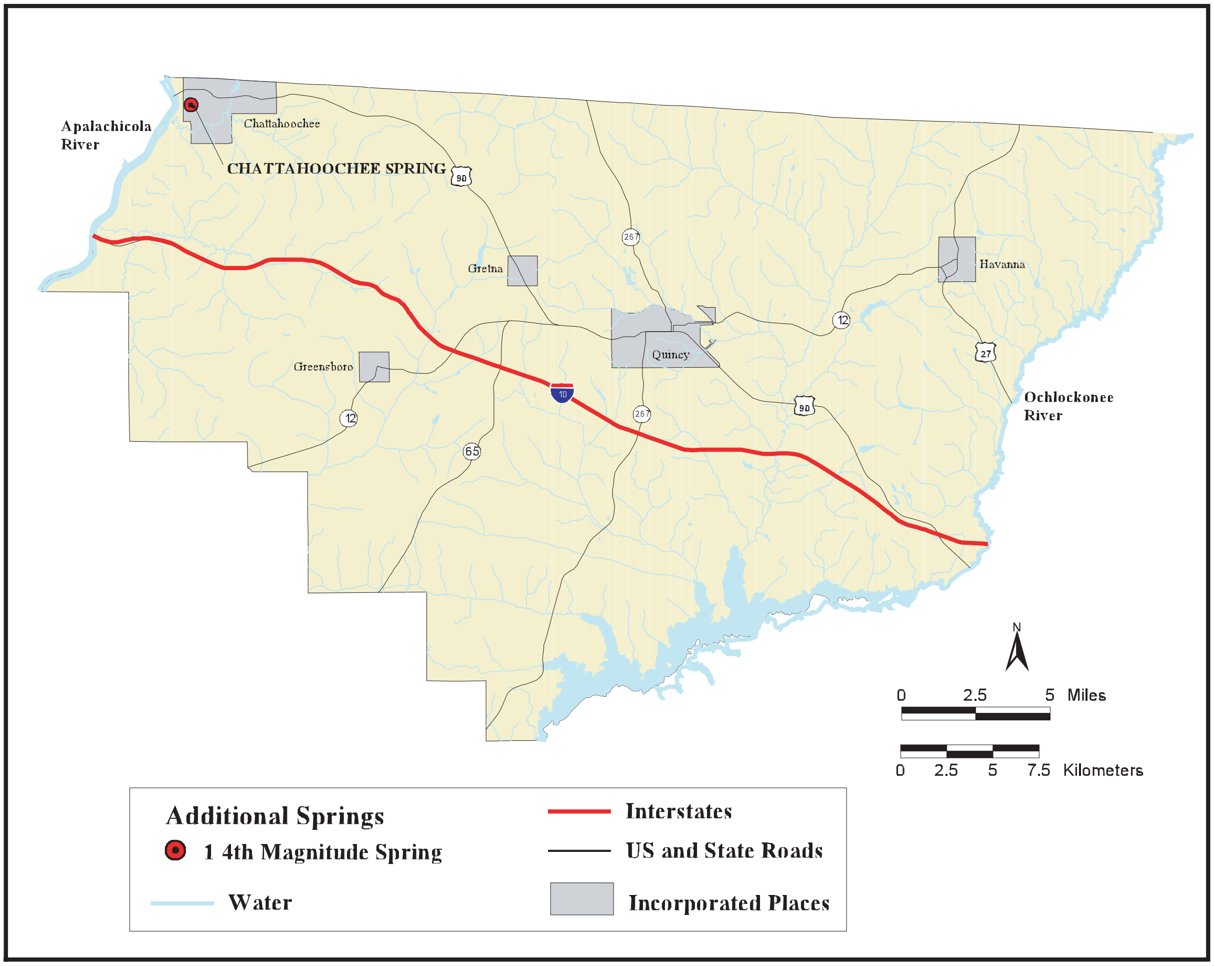

Figure 46. Spring visited by FGS in Gadsden County.
Spring description provided on enclosed CD.

GILCHRIST COUNTY

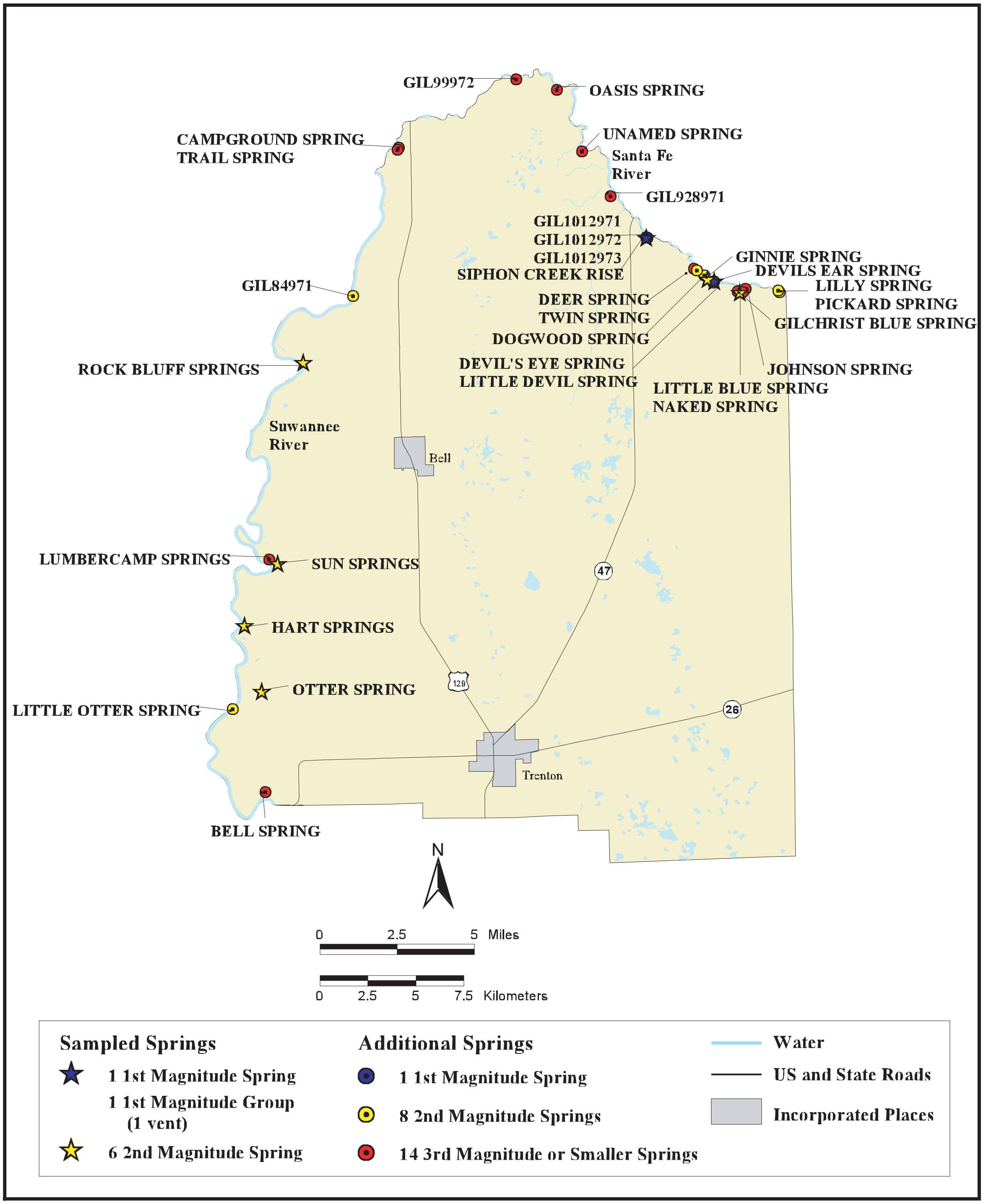

Figure 47. Springs visited by FGS in Gilchrist County.

Devil's Ear Spring

Figure 48. Devil's Ear Spring (photo by H. Means).

Location-Lat. 29° 50' 07.26" N., Long. 82° 41' 47.76" W. (SE¼ SW¼ NE ¼ sec. 34, T. 7 S., R.16 E.). Devil's Ear Spring is located among a complex of springs on the south bank of the Santa Fe River. The spring is approximately 6.5 miles (10.5 km) northwest of High Springs and can be accessed either by river or through the privately owned Ginnie Springs Resort. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for

0.8 miles (1.3 km). Turn west (right) on SR 340 (Poe Springs Road), drive 6.6 miles (10.6 km) west on SR 340. Following the signs to Ginnie Springs, turn north (right) on a graded road and go 1.2 miles (1.9 km) to the Ginnie Springs Resort entrance. Follow the road around to the back of the office and towards the river. Turn right just before the bathhouse and follow the sand road to the parking area. Devils Ear Spring is part of a complex of three vents and is the vent nearest the Santa Fe River.

Table 36. Devil's Ear Spring water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	22.57	-
DO	3.09	-
pH	7.21	-
Sp. Cond.	372	-
Lab Analytes		
BOD	0.36 I	-
Turbidity	0.05 U	-
Color	5 U	-
Alkalinity	175 A	175
Sp. Cond.	380	-
TDS	215	-
TSS	4 U	-
Cl	6.9	6.9
SO_4	13	13
F	0.11	0.094 I
Nutrients		
TOC	1 U	-
NO3 + NO2	1.3 J	1.4
NH3 + NH4	0.013 I	0.032
TKN	0.06 U	0.1 I
P	0.047	0.098
PO_4	0.047	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	62	62.5
K	0.43	0.44
Na	3.84	4.05
Mg	6.5	6.4
As	3 U	3 U
Al	-	75 U
B	25 U	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	35 U	35 U
Mn	0.5 U	0.5 U
Ni	2 U	2 U
Pb	5 U	4 U
Se	8.8 U	4 U
Sn	20 U	-
Sr	151	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=exceeded holding time limit

Table 37. Devil's Ear Spring water quality analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	1AKQ
Enterococci	2AQ
Fecal Coliform	1AQ
Total Coliform	25AQ

Description-Devil's Ear Spring is situated at the mouth of a 375 ft (114.3 m) long spring run that enters into the Santa Fe River from the south side. It is an elongated limestone fissure that discharges directly into the adjacent Santa Fe River. The spring pool measures approximately 105 ft (32 m) east to west and 60 ft (18.3 m) north to south. The vent is an oval shaped opening in limestone with steep sides leading down to a depth of 34 ft (10.4 m). There is a large boil over the spring vent. Dark water from the river contrasts distinctly with clear, bluish water issuing from the spring along the side of the river. Native aquatic grasses are common around the vent opening, and some algae are on grass blades and limestone walls. The banks on the south side of the river rise steeply to approximately 3 ft (0.9 m) above water level, then levels off. On top of the bank, a mesic hardwood forest with interspersed clearings is present. An underwater cave system has been mapped at Devil's Ear Spring.

Utilization-Devil's Ear Spring is part of the privately-owned Ginnie Springs Resort. The spring is heavily used for swimming and scuba diving and is a hotspot for cave diving. Full facilities are located nearby to the east.

Discharge—Devil's Ear Spring complex total:
September 5, 2001: 206.59 ft^3/s[4]

Gilchrist Blue Spring

Figure 49. Gilchrist Blue Spring (photo by R. Means).

Location – Lat. 29° 49' 47.64" N., Long. 82° 40' 58.27" W. (NW ¼ SW ¼ SE ¼ sec. 35, T. 7 S., R. 16 E.). Gilchrist Blue Spring is located within Blue Springs Park and Campground, a privately run facility 3.5 miles (5.6 km) west of High Springs. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for 0.8 miles (1.3 km). Turn west (right) on SR 340 (Poe Springs Road), travel west on SR 340 (Poe Springs Road) 4.6 miles (7.4 km). Turn north (right) onto Blue Spring Road and continue 1.1 miles (1.8 km) to the parking area just south of the spring.

Description – Gilchrist Blue Spring has a circular spring pool that measures 132 ft (40.2 m) in diameter. The depth at the vent is 18.9 ft (5.8 m). Water issues from a cave under a submerged limestone ledge on the northwest side of the spring pool. No boil was observed on the pool surface in May 2002. The water is clear and blue. A wooden platform is on the northwest side of the spring pool directly over the vent. The spring pool is shallow with a sand bottom, except for limestone near the vent. The pool is enclosed by a wooden retaining wall. An elevated wooden boardwalk runs along the south side of the pool and the east side of the run to the Santa Fe River. The spring run flows north approximately 1,100 ft (335.3 m) to the river under a forest canopy through the river floodplain. Exotic aquatic vegetation is abundant in the run and much of the spring pool. Three additional springs enter Gilchrist Blue Spring Run. Little Blue Spring discharges from the west and Naked Spring and Johnson Spring discharge from the east into the run approximately 100 ft (30.5 m) and 500 ft (152.4 m) downstream from the spring pool. Gilchrist Blue Spring is along the south edge

Table 38. Gilchrist Blue Spring water quality analysis.

Analytes	1975	2002 Dissolved	2002 Total
Field Measures			
Temperature	22.5	22.69	
DO	-	4.26	
pH	7.4	7.49	
Sp. Cond.	-	358	
Lab Analytes			
BOD	-	-	0.21I
Turbidity	2	-	0.05U
Color	5	-	5U
Alkalinity	148	-	173
Sp. Cond.	340	317.0	-
TDS	176	-	198.0
TSS	-	-	4U
Cl	6.2	-	5.4
SO_4	7.9	-	11.0
F	0.1	-	0.11
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	1.7
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.034	0.035
PO_4	-	0.037	-
NO_3	-	-	-

Analytes	1975	2002 Dissolved	2002 Total
Metals			
Ca	54	60.4A	60.5
K	0.2	0.39A	0.36
Na	2.9	3.1I	3.1I
Mg	5	6.3A	6.3
Al	-	-	50U
As	-	3U	6U
B -		-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	25U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.5
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	7U
Sr	230	-	153.0
Zn	-	15U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

of the Santa Fe River flood plain at the base of sandy slopes. The hillside rises gently to the south and west to about 12 ft (3.7 m) above water level, leading up to a concession area and picnic tables.

Utilization **-** The spring is operated as a private recreation area with full facilities.

Discharge **-** All discharge rates are measured in ft^3/s.

April 28, 1975 70.4[(1)] (Combined, 28.3 of which is Naked Springs)
April 27, 1998 79.98[(4)]

Table 39. Gilchrist Blue Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Ginnie Spring

Figure 50. Ginnie Spring (photo by H. Means).

Location – Lat. 29° 50' 10.82" N., Long. 82° 42' 00.44" W. (SE ¼ SE ¼ NW¼ sec. 34, T. 7 S., R. 16 E.). Ginnie Spring is located within a privately-operated park and resort, called Ginnie Springs Outdoors, approximately 6.5 miles (10.5 km) northwest of High Springs on the south side of the Santa Fe River. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for 0.8 miles (1.3 km). Turn west (right) on SR 340. Drive 6.6 miles (10.6 km) then turn north (right) on a graded road. Travel 1.2 miles (1.9 km) to the Ginnie Springs Resort entrance. Follow the road behind the office, turn north (left) at the bathhouse, and continue down to the spring.

Description – The Ginnie Spring pool is roughly circular, measuring 90 ft (27.4 m) in diameter and 12.2 ft (3.7 m) deep in the center. Clear, bluish water issues from a cavernous vent underneath a limestone ledge on the east side of the pool. No boil was visible in May 2002. The spring has a sand and limestone bottom. Some aquatic vegetation occurs in both the spring and its run. There are two scuba diving/swimming access platforms along the south side of the spring pool. The pool is otherwise surrounded by cypress and hardwood trees. The spring run is approximately 35 ft (10.7 m) wide, 3 ft (0.9 m) deep and flows east about 500 ft (152.4 m) under a forest canopy into the Santa Fe River. The spring and run are situated entirely within the river floodplain. The Santa Fe River was crystal clear during the May 2002 visit; however, it normally is tea-colored. Exotic aquatic vegetation is abundant

Table 40. Ginnie Spring water quality analysis.

Analytes	1974	2002	
		Dissolved	Total
Field Measures			
Temperature	22.5	22.51	
DO	-	3.49	
pH	7.7	7.52	
Sp. Cond.	-	337	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	0.05U
Color	3	-	5U
Alkalinity	-	-	159.0
Sp. Cond.	-	321.0	-
TDS	160	-	180.0
TSS	-	-	4U
Cl	3.6	-	5.2
SO_4	7.8	-	10.0
F	0.2	-	0.11
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	1.30
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.037	0.046
PO_4	-	0.036	-
NO_3	-	-	-

Analytes	1974	2002	
		Dissolved	Total
Metals			
Ca	48	58.8A	60.7A
K	0.2	0.34A	0.34A
Na	2.7	2.9I	3I
Mg	5	6A	6.2A
Al	-	-	50U
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	10	25U	25U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	1.1U
Se	-	4U	4U
Sn	-	-	7U
Sr	150	-	141A
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

in both the spring run and nearby Santa Fe River. Rosenau et al. (1977) report that an extensive cave system extends well beyond the vent underneath the limestone ledge to the east and south. The cave system includes some 1,100 ft (335.3 m) of known passages (Rosenau et al. 1977). Cavern diving is popular in Ginnie Spring; however, the cave system is blocked with a gate to prevent divers from entering beyond the light zone. Several other springs that are open to cave diving occur within the park.

Utilization **-** Ginnie Spring is within the privately-owned Ginnie Springs Outdoors Resort. The resort is extensive, has full facilities, and is a major scuba diving attraction offering open water and cave diving.

Discharge – All discharge rates are measured in ft^3/s.

April 28, 1975	45.8[1]
November 4, 1997	58.19[4]

Table 41. Ginnie Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	2Q
Fecal Coliform	1KQ

Hart Springs

Figure 51. Hart Springs (photo by T. Scott).

Location – Lat. 29° 40' 32.67" N., Long. 82° 57' 06.16" W. (SW ¼ NE ¼ NW ¼ sec. 30, T. 9 S., R. 14 E.). Hart Springs is located within a county recreation area 6.5 miles (10.5 km) northwest of Fanning Springs. After crossing over the Suwannee River on US 98/27A heading east, turn north (left) on SR 26 and drive approximately 1.4 miles (2.2 km) to the town of Wilcox. In Wilcox, SR 26 makes a 90 degree bend to the east (right). At this bend continue north (straight) onto CR 232. Drive 4.1 miles (6.6 km) and turn west (left) on CR 344. Travel 1.6 miles (2.6 km), then turn north (right) into the recreation area.

Description – The head of Hart Springs Run has three merging spring runs. In April 2002, the only significantly flowing spring in this system was at the head of the middle channel and was the one sampled for water quality. The middle spring pool measures 51 ft (15.6 m) north to south and 45 ft (13.7 m) east to west. The depth of the pool measured over the vent was 19.9 ft (6.1 m). The water was clear and greenish. In the center of the spring pool, a prominent boil is produced on the surface by spring discharge. The vent is a vertical limestone fissure with 15 ft (4.6 m) high walls. The spring pool has a nearly rectangular shape and is enclosed by a 4 ft (1.2 m) high metal retaining wall. The metal wall extends several hundred feet southward and forms the perimeter of the entire southernmost spring and its run. The bottom is sand in the swimming area where the three spring channels merge. The northern run was not flowing, but the southernmost spring had slight flow with no boil on its surface. Exotic aquatic vegetation is abundant in the spring pool. Algae are abundant in the pool and the run. Other aquatic plants occur on the edges of the pool. From the swim-

Table 42. Hart Spring water quality analysis.

Analytes	1946	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	23	22.0	22.17	
DO	-	2.7	0.99	
pH	7.3	7.2	7.03	
Sp. Cond.	-	-	431	
Lab Analytes				
BOD	-	0.2	-	0.54I
Turbidity	-	-	-	0.20
Color	5	0	-	5U
Alkalinity	-	170	-	191
Sp. Cond.	355	330	440.0	-
TDS	-	208	-	244.0
TSS	-	-	-	4U
Cl	3.8	6.0	-	7.1
SO_4	12	16	-	25.0
F	0	0.2	-	0.096I
Nutrients				
TOC	-	-	-	1.2I
$NO_3 + NO_2$ as N	-	0.8	-	1.10
$NH_3 + NH_4$	-	-	-	0.01U
TKN	-	-	0.06U	0.06U
P	-	-	0.082	0.080
PO_4	-	-	0.074	-
NO_3	2.3	3.5	-	-
Metals				
Ca	67	66	77.8	77.3A
K	0.6	0.2	0.69	0.69A
Na	2	2.4	3.2	3I
Mg	4.8	4.2	5.4	5.6A
Al	-	-	-	50U
As	-	-	3U	3U
B -		-	-	10U
Cd	-	-	0.5U	0.5U
Co -		-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3.5U	3.5U
Fe	-		35U	35U
Mn	-	-	1.2I	1.6I
Ni	-	-	2U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	0.6
Ra-228	-	-	-	0.9
Se	-	-	8.4U	4U
Sn	-	-	-	7U
Sr	0	60	-	96.8A
Zn	-	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

ming area at the confluence of the spring runs, Hart Springs Run flows northwest approximately 850 ft (259.1 m) into the Suwannee River from the east. The springs are situated within the forested river floodplain. A 0.3 mile (0.5 km) long wooden boardwalk follows along the north side of the spring run and the east side of the river, and footbridges cross over both the northernmost and main spring runs. An underwater cave system occurs at Hart Springs.

Utilization **-**The spring is within a county recreation area that provides full facilities.

Discharge **-** All discharge rates are measured in ft^3/s.

March 14, 1932	40(1)
May 12, 1932	62.1(1)
July 24, 1946	58.6(1)
April 27, 1956	58.6(1)
November 23, 1960	152(1)
November 1, 1972	79.4(1)
June 26, 1997	51.28(4)

Table 43. Hart Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Otter Spring

Figure 52. Otter Spring (photo by H. Means).

Location - Lat. 29° 38' 41.29" N, Long. 82° 56' 33.91" W (NW ¼ SE ¼ NE ¼ sec. 6 (irregular section shape), T. 10 S., R. 14 E.). The spring is located 4.5 miles (7.2 km) north of Fanning Springs on the east side of the Suwannee River. After crossing over the Suwannee River on US 98/27A heading east, turn north (left) on SR 26 and travel north on SR 26 approximately 1.4 miles (2.2 km) to the town of Wilcox. In Wilcox, SR 26 makes a 90 degree bend to the east (right). At this bend continue north (straight) onto CR 232. Once on CR 232 continue north to the intersection with CR 334 approximately 1.7 miles (2.7 km). Turn west (left) onto CR 334 and drive approximately 2.3 miles (3.7 km) to the boat ramp. The spring run enters the river 0.5 miles (0.8 km) upstream from the CR 334 boat ramp.

Description – Otter Spring has a nearly circular, bowl-shaped spring pool measuring 68 ft (20.7 m) in diameter. It is surrounded by a concrete bag retaining wall. The spring issues from a vertical fissure in limestone. The depth over the fissure measures 27.5 ft (8.4 m). There was a very slight boil on the pool surface in April 2002. The water is clear and greenish. There is very little aquatic vegetation within the spring; however, algae cover the entire spring depression. A small, limestone, man-made dam stretches across the outflow channel on the west side of the pool. A distinct hydrogen sulfide odor was present at the spring in April 2002. The flow is southwest approximately 110 ft (33.5 m) into a larger, apparently man-made, circular pool having a diameter of about 130 ft (39.6 m). The larger pool averages 10 ft (3 m) deep and is utilized as a swimming area. Otter Spring discharges westward 0.8 miles (1.3 km) where it joins the Suwannee River. Its shallow, sand bottomed run is

Table 44. Otter Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	22.5	22.63	
DO	3.8	1.47	
pH	7.5	6.88	
Sp. Cond.	-	451	
Lab Analytes			
BOD	0.3	-	0.73AI
Turbidity	-	-	11.0
Color	0	-	40.0
Alkalinity	160	-	209.0
Sp. Cond.	330	480.0	-
TDS	215	-	264.0
TSS	-	-	58A
Cl	8	-	8.2
SO_4	20	-	29.0
F	0.2	-	0.10
Nutrients			
TOC	-	-	1I
$NO_3 + NO_2$ as N	1.08	-	1.10
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.065	0.078
PO_4	-	0.062	-
NO_3	4.4	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	66	79.7A	81.3
K	0.2	0.64A	0.63
Na	2.5	2.8I	2.9I
Mg	5.2	6.5A	6.5
Al	-	-	50U
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	26I
Mn	-	0.88I	0.99I
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.4
Ra-228	-	-	1.0
Se	-	4U	4U
Sn	-	-	7U
Sr	60	-	124.0
Zn	-	3.4U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

approximately half as wide as the spring. The run flows through the heavily forested river floodplain. Land surrounding the spring is relatively low and rises to approximately 5 ft (1.5 m) above water level. Most of the uplands are covered in large grassy areas with interspersed live oak trees. Private residences are visible from the spring several hundred feet (90 plus meters) to the east through oak trees.

Utilization **-** The spring is surrounded by private property and was previously operated as a private campground and swimming area.

Discharge **-** All discharge rates are measured in ft^3/s.

March 14, 1932	5.0[1]
May 12, 1932	5.45[1]
November 1, 1972	16.1[1]
September 19, 1997	21.24[4]
July 16, 2002	4.80[2]

Table 45. Otter Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4Q
Fecal Coliform	1KQ

Rock Bluff Springs

Figure 53. Rock Bluff Springs (photo by H. Means).

Location **-** Lat. 29° 47' 56.70" N., Long. 82° 55' 7.11" W. (SE ¼ NE ¼ SW ¼ sec. 9, T. 8 S., R. 14 E.). Rock Bluff Springs are located 11 miles (18 km) south of Branford. The springs can be accessed by boat. From the bridge over the Suwannee River in Branford head west on US 27 approximately 1.3 miles (2.1 km) to the intersection with CR 349. Turn south (left) on CR 349 and travel approximately 10.5 miles (16.9 km) to the intersection with CR 340. Turn east (left) onto CR 340 and travel approximately 3.3 miles (5.3 km) to Rock Bluff boat landing on the east side of the river. The 750 ft (228.6 m) spring run flows into the east side of the Suwannee River approximately 0.25 miles (0.4 km) upstream from Rock Bluff Landing.

Description – The Rock Bluff Springs pool measures 250 ft (76.2 m) north to south and 171 ft (52.1 m) east to west. Numerous vents feed the large shallow spring pool, and the most prominent vent discharges from a deep vertical limestone fissure on the north end of the pool. The depth over the fissure measures 27.8 ft (8.5 m). The water is clear with a greenish tint, and the bottom is exposed limestone and sand. Water quality was sampled from a smaller, circular vent opening in limestone 20 ft (6.1 m) south of the main vent. The circular opening measures approximately 1.5 ft (0.5 m) in diameter. Discharge over the sampled vent creates a prominent boil on the pool surface. A rock retaining wall is constructed along the north shore of the spring pool. There are numerous cypress trees both in the spring pool and along the perimeter of the spring. The spring run flows southwest approximately 750 ft (228.6 m) before entering the Suwannee River from the east about 0.25 miles (0.4 km) upstream from Rock Bluff. The surrounding land is forested lowland floodplain. There is a cleared sandy area on the north shore above the rock retaining wall. Rosenau et al. (1977) report that two smaller springs enter Rock Bluff Springs Run about 100 ft (30.5 m) downstream from the spring pool. An underwater cave system has been mapped at this spring.

Table 46. Rock Bluff Springs water quality analysis.

Analytes	1956	1960	1972	2002	
				Dissolved	Total
Field Measures					
Temperature	23.9	21.7	22	22.00	
DO	-	-	3.2	0.27	
pH	7.5	7.5	7.5	7.20	
Sp. Cond.	-	-	-	281	
Lab Analytes					
BOD	-	-	0.2	-	0.2AU
Turbidity	-	-	-	-	0.1
Color	5	0	0	-	5U
Alkalinity	-	-	120	-	129.0
Sp. Cond.	250	249	230	290.0	-
TDS	137	146	142	-	157.0
TSS	-	-	-	-	4U
Cl	4	3	6	-	4.6
SO_4	7	9.2	10	-	12.0
F	0.1	0.2	0.1	-	0.07I
Nutrients					
TOC	-	-	-	-	1.6I
$NO_3 + NO_2$ as N	-	-	0.48	-	0.59J
$NH_3 + NH_4$	-	-	-	-	0.012I
TKN	-	-	-	0.06U	0.06U
P	-	-	-	0.079	0.077
PO_4	-	-	-	0.070	-
NO_3	0.3	2	2.1	-	-
Metals					
Ca	46	49	45	48.5	50A
K	0.2	0.1	0.2	0.49	0.49A
Na	2	2	1.8	2.2I	2.3I
Mg	2.7	6.2	2.6	3.4	3.5A
Al	-	-	-	-	50U
As	-	-	-	3U	3U
B	-	-	-	-	10U
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	0.75U
Cr	-	-	-	2U	2U
Cu	-	-	-	3U	3U
Fe	-	-	-	25U	25U
Mn	-	-	-	2.1	2.2A
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	0.4
Ra-228	-	-	-	-	0.9U
Se	-	-	-	4U	4U
Sn	-	-	-	-	7U
Sr	-	-	60	-	45.9A
Zn	-	-	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** The springs are surrounded by private property and are locally used for swimming.

Discharge **-** All discharge rates are measured in ft^3/s.

December 8, 1942	42.1[1]
April 19, 1956	25.0[1]
April 28, 1956	23.8[1]
November 23, 1960	40.3[1]
November 2, 1973	39.3[1]
July 17, 1997	27.64[4]

Table 47. Rock Bluff Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	8Q
Fecal Coliform	2Q

Siphon Creek Rise

Figure 54. Siphon Creek Rise (photo by T. Scott).

Location-Lat. 29° 51' 22.29" N., Long. 82° 43' 58.98" W. (SW¼ SW ¼ SE¼ sec. 20, T. 7 S., R. 16 E.). Siphon Creek Rise is approximately 4 miles (6.4 km) south of Fort White on the Santa Fe River. From the intersection of US 27 and SR 47 in Ft. White, drive south on SR 47 approximately 4.5 miles (7.2 km) to the boat launch on the northwest side of the Santa Fe River. The river rise is upstream approximately 0.75 mile (1.2 km) on the south of the river at the mouth of Siphon Creek.

Description-Siphon Creek Rise is the reemergence of Siphon Creek that discharges from a single vent along the west bank of the Santa Fe River in the mouth of Siphon Creek. The spring pool measures 45 ft (13.7 m) north to south and 90 ft (27.4 m) east to west. Spring pool depth is 11.8 ft (3.6 m). The water is tannin colored, like that of the adjacent Santa Fe River. There is a voluminous boil over the vent. Native aquatic grass grows in the vicinity of the vent and sways back and forth in the powerful current. The adjacent west riverbank rises steeply to 2 ft (0.6 m) above the water, and fresh water shell marl is exposed. All land adjacent to the spring is lowland river floodplain with cypress, gum, and maple.

Utilization-Land around Siphon Creek Rise is pristine and owned by the SRWMD.

Discharge— October 11, 2001 120 ft^3/s[4]

Table 48. Siphon Creek Rise water quality analysis.

Analytes	2001 Unfilt.	2001 Filter
Field Measures		
Temperature	22.46	-
DO	3.96	-
pH	7.39	-
Sp. Cond.	325	-
Lab Analytes		
BOD	0.43 I	-
Turbidity	0.9	-
Color	50 A	-
Alkalinity	146	147
Sp. Cond.	370	-
TDS	215	-
TSS	4 U	-
Cl	13	13 A
SO_4	24	24 A
F	0.13	0.11
Nutrients		
TOC	6.9	-
$NO_3 + NO_2$	0.7	0.7
$NH_3 + NH_4$	0.026 J	0.027
TKN	0.34 JA	0.24
P	0.09	0.086
PO_4	0.092	-

Analytes	2001 Unfilt.	2001 Filter
Metals		
Ca	56.3	56.4
K	0.79	0.84
Na	6.29	7.4
Mg	6.4	6.7
As	3 U	3 U
Al	-	80 I
B	25 U	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	110 I	84 I
Mn	16.3	9.9
Ni	1.5 U	1.5 U
Pb	5 U	4 U
Se	4 U	4 U
Sn	10 U	-
Sr	245	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value

Table 49. Siphon Creek Rise bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	20Q
Enterococci	80Q
Fecal Coliform	24Q
Total Coliform	260Q

Sun Springs

Figure 55. Sun Springs (photo by H. Means).

Location **-** Lat. 29° 42’ 17.05” N., Long. 82° 56’ 00.70” W. (SE ¼ NE ¼ NW ¼ sec. 17, T. 9 S., R. 14 E.). Sun Springs is approximately 7.8 miles (12.6 km) north of Fanning Springs within a private community and not accessible to the public by land. From the intersection US 98/19 and SR 26 in Fanning Springs travel north on SR 26 approximately 1.4 miles (2.2 km) to the town of Wilcox. In Wilcox, SR 26 makes a 90 degree bend to the east (right). At this bend continue north (straight) onto CR 232 and travel approximately 6.2 miles (9.9 km) to the intersection with SW 25th Street. Head west (left) on SW 25th Street and go approximately 0.8 mile (1.3 km) to the boat ramp. The spring run flows into the Suwannee River from the east approximately 0.35 miles (0.6 km) upstream from the boat ramp.

Description – Sun Springs is situated in a bowl-shaped depression. The spring pool measures 99 ft (30.2 m) north to south and 132 ft (40.2 m) east to west. Maximum depth of the pool measures 14.2 ft (4.3 m). There are two vents. The main vent, which was sampled for water quality, is roughly in the center. The other, smaller vent is situated on the south side of the pool upslope from the main vent. The bottom of the spring is sand with some limestone exposed near both vents. The water was clear with a greenish tint in April 2002. No boil was present on the water surface at this time, but there was noticeable current in the shallow spring run. There are concrete terraces along the east side of the pool. The spring

Table 50. Sun Springs water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	22.2	22.61	
DO	3	0.99	
pH	7.3	7.12	
Sp. Cond.		390	
Lab Analytes			
BOD	0.2	-	0.39AI
Turbidity		-	0.15
Color	0	-	5U
Alkalinity	120	-	166.0
Sp. Cond.	312	400.0	-
TDS	168	-	217.0
TSS	-	-	4U
Cl	4.0	-	6.2
SO_4	14	-	24.0
F	0.1	-	0.077I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.55	-	1.80
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.066	0.064
PO_4	-	0.061	-
NO_3	2.4	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	53	69	68.3
K	0.2	0.55	0.54
Na	1.9	2.9	2.7I
Mg	3.6	5.0	5.0
Al	-	-	50U
As	-	7U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	0.9
Se	-	4U	4U
Sn	-	-	7U
Sr	60	-	65.7
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 51. Sun Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

has a fence around the southern portion near the dirt access road. The spring run averages about 15 ft (4.6 m) wide and 2 ft (0.6 m) deep. It flows north then west a total distance of approximately 1,900 ft (579.1 m). At the time of the visit, there was relatively little aquatic vegetation in the spring pool and run, but both harbored abundant algal mats. However, two months earlier, there was abundant *Hydrilla* and water lettuce (Follman, personal communication, 2004). High banks of the spring and run rise to approximately 15-18 ft (4.6-5.5 m) above the water level. The surroundings consist of private residences and hardwood trees on the banks and some cypress trees along spring and run edges.

***Utilization* -** The spring is developed into a private swimming area for local residents and is not open to the public. In April 2002, water levels in the spring run were too low to allow spring access through the run; however, access would be possible during higher water levels.

***Discharge* -** All discharge rates are measured in ft^3/s.

November 2, 1972	27.6[1]
September 19, 1997	31.15[4]
July 16, 2002	7.00[2]

HAMILTON COUNTY

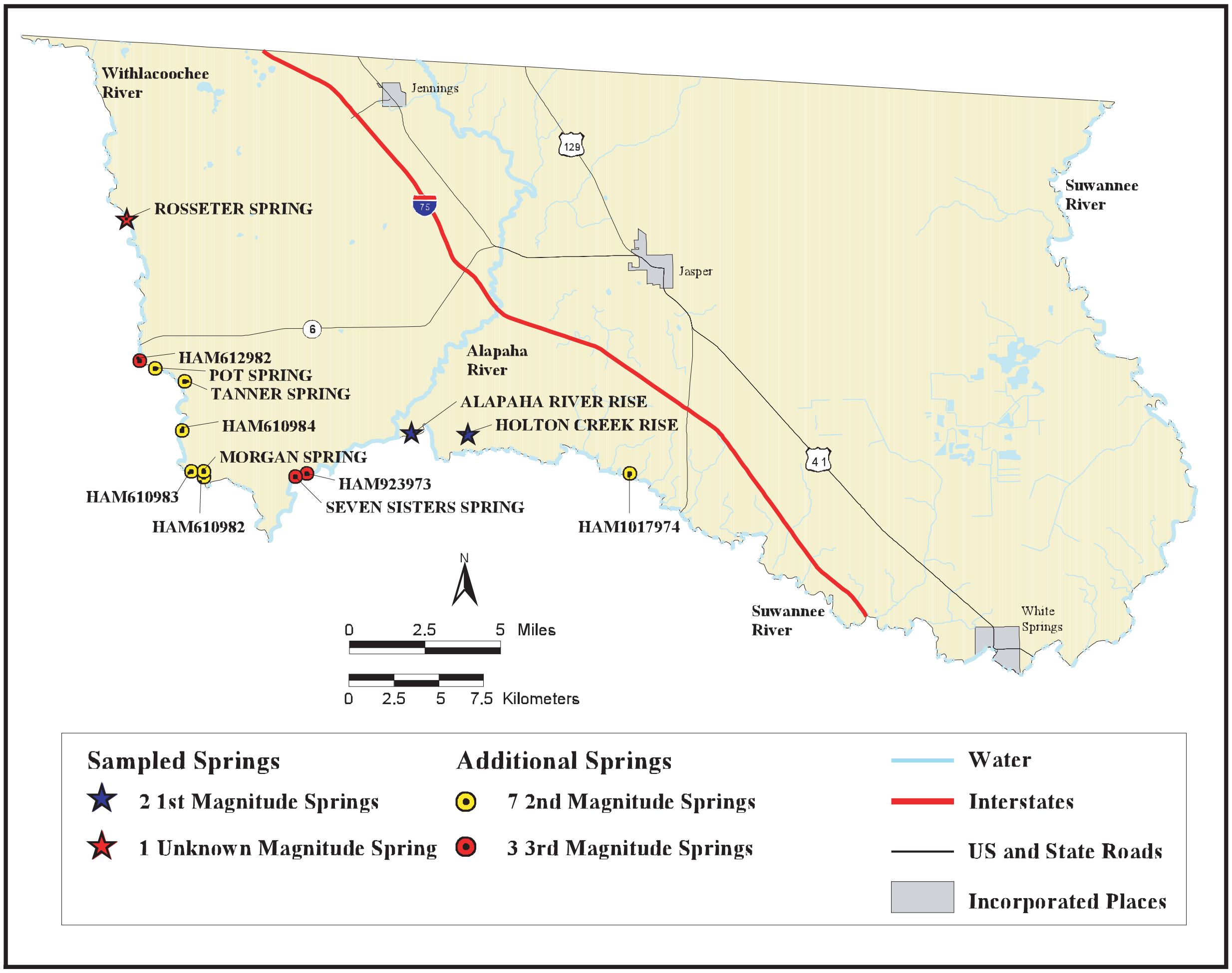

Figure 56 - Springs visited by FGS in Hamilton County.

Alapaha River Rise

Figure 57. Alapaha River Rise (photo by T. Scott).

Location-Lat. 30° 26' 20.29" N., Long. 83° 05' 22.42" W. (NW ¼ SW ¼ SE ¼ sec. 35, T. 1 N., R. 12 E.). The Alapha River Rise is approximately 19 miles (30.6 km) southeast of Madison on the north side of the Suwannee River. From the bridge over the Withlacoochee River on SR 6, drive 8.7 miles (14 km) east and turn south (right) on CR 751. Drive 3.5 miles (5.6 km) to a park and boat launch on the north side of the Suwannee River. The spring is approximately 0.3 miles (0.5 km) upriver to the east on the north side.

Description-The Alapaha River Rise is the re-emergence of a portion of the Alapaha River. The spring is composed of a single vent at the head of a circular depression. The spring pool measures 75 ft (22.9 m) southeast to northwest and 108 ft (32.9 m) north to south. Pool depth is 71 ft (21.6 m). Some algae are present on submerged limestone substrates. The water is dark and tannic. There is no visible boil; however, the run flows swiftly to the Suwannee River. The river rise flows south for approximately 900 ft (274.3 m) until reaching the Suwannee River. At low water levels in the Suwannee River, the run from the river rise is shallow with exposed limestone, making it difficult to take a boat into the rise. This depression has deeply scalloped vertical limestone sidewalls that are estimated to rise 30 ft (9.1 m) above water level. High ground around the spring is densely forested with pines and oaks.

Utilization-Land around the river rise is privately owned and in pristine condition.

Table 52. Alapaha River Rise water quality analysis.

Analytes	1975	2001	
		Unfilt.	Filter
Field Measures			
Temperature	19.0	21.3	-
DO	1.5	0.48	-
pH	7.6	7.11	-
Sp. Cond.	225	242	-
Lab Analytes			
BOD	-	0.56 I	-
Turbidity	-	1.2	-
Color	60	100	-
Alkalinity	83	93 J	92
Sp. Cond.	-	240	-
TDS	-	160	-
TSS	-	4U	-
Cl	5.3	6.7 A	6.6
SO_4	18	20 A	19
F	0.2	0.15	0.12
Nutrients			
TOC	-	12	-
NO3 + NO2	-	0.4 J	0.4
NH3 + NH4	-	0.024 J	0.038 A
TKN	-	0.43 J	0.4
P	-	0.13	0.13
PO_4	-	0.14	-

Analytes	1975	2001	
		Unfilt.	Filter
Metals			
Ca	33	39.8	34.7
K	0.7	1.3	1.1
Na	4.2	5.68	4.87
Mg	5.0	6.5	5.6
As	-	3 U	3 U
Al	-	-	75 U
B	-	25 U	-
Cd	-	0.75 U	0.75 U
Co	-	0.75 U	-
Cr	-	2 U	2 U
Cu	-	2.5 U	2.5 U
Fe	-	310	370
Mn	-	29.6	25.2
Ni	-	1.5 U	1.5 U
Pb	-	5 U	4 U
Se	-	4 U	4 U
Sn	-	10 U	-
Sr	90	63	-
Zn	-	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q= Exceeded holding time limit

Table 53. Alapaha River Rise bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1 KQ
Enterococci	1 KQ
Fecal Coliform	1 KQ
Total Coliform	1 KQ

Discharge- All discharge rates are measured in ft^3/s.

November 25, 1975	508[1]
April 2, 1976	699[1]
April 27, 1976	594[1]
May 21, 1976	632[1]
August 2001	594[4]

Holton Creek Rise

Figure 58. Holton Creek Rise (photo by T. Scott).

Location-Lat. 30° 26' 16.51" N., Long. 83° 03' 27.41" W. (NE¼ SE¼ SW¼ sec. 31, T. 1 N., R. 13 E.). The Holton Creek Rise is 11 miles (17.7 km) northwest of Live Oak on SRWMD land. From the intersection of US 90 and CR 249 in Live Oak, drive northwest on CR 249 (Noble's Ferry Road) approximately 12 miles (19.6 km) to the bridge over the Suwannee River. From the bridge travel approximately 0.3 (0.5 km) mile to the second right graded road. Follow SRWMD signs to Holton Creek. The spring is at the head of the creek.

Description- The spring pool measures 225 ft (68.6 m) northwest to southeast and 177 ft (53.9 m) northeast to southwest. Along the north shore, a vertical limestone ledge drops quickly off to a depth of 100 ft (30.5 m); however, the bottom is highly irregular in the rest of the depression. The water is dark and tannic (water was reported as clear in Rosenau et al., 1977). There is very little aquatic and emergent vegetation in the spring pool. No boil was observed during October 2001. The spring has steep sandy banks that rise to approximately 25 ft (7.6 m) above water level, and the high ground is forested with pines and oaks. Holton Creek Rise discharges through Holton Creek, a run that meanders generally southeast approximately 1 mile (1.6 km) to the Suwannee River.

Utilization-Land around the spring is pristine and owned by the SRWMD. The Florida National Scenic Trail winds along the north side of Holton Creek.

Table 54. Holton Creek Rise water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	22.1	-
DO	0.49	-
pH	7.00	-
Sp. Cond.	290	-
Lab Analytes		
BOD	0.6 AI	-
Turbidity	2	-
Color	140	-
Alkalinity	115 J	115
Sp. Cond.	300	-
TDS	213	-
TSS	4 U	-
Cl	6.6	6.5
SO_4	31	30
F	0.17	0.14
Nutrients		
TOC	17	-
NO3 + NO2	0.004 U	0.004 U
NH3 + NH4	0.13 J	0.13
TKN	0.56 J	0.55 A
P	0.15	0.15
PO_4	0.16	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	35.6	41.7
K	0.85	1
Na	5.65	5.3
Mg	7.5	9
As	3 U	3 U
Al	-	130 I
B	25 U	-
Cd	0.75 U	0.75 U
Co	0.75 U	-
Cr	2 U	2 U
Cu	2.5 U	2.5 U
Fe	420	500
Mn	30.4	35.8
Ni	1.5 U	1.5 U
Pb	5 U	4 U
Se	4 U	4 U
Sn	10 U	-
Sr	101	-
Zn	5 U	5 U

A=Average value U,K=Compound not detected, value shown is method detection limit
I=Value is less than practical quantitation limit J=Estimated Q= exceeded hold time limit

Discharge— All discharge rates are measured in ft^3/s.

February 13, 1976	482(1)
March 31, 1976	313(1)
April 28, 1976	69(1)
June 8, 1998	167(4)
December 7, 2001	0(2)

Table 55. Holton Creek Rise bacteriological analysis.

Bacteria Results (in #/100 ml)	
Analyte	**Value**
Escherichia coli	1KQ
Enterococci	12Q
Fecal Coliform	2Q
Total Coliform	10Q

Rossetter Spring

Figure 59. Rossetter Spring (photo by H. Means).

Location – Lat. 30° 32' 40.78" N., Long. 83° 15' 00.20" W. (NE ¼ NE ¼ SE ¼ sec. 30, T. 2 N., R. 11 E.). Rossetter Spring is on the east side of the Withlacoochee River approximately 11 miles (18 km) northeast of Madison. From the intersection of SR 53 and SR 6 in Madison, travel east on SR 6 approximately 11.6 miles (18.6 km) to the intersection with CR 143, which is approximately 1.5 miles (2.4 km) past the bridge over the Withlacoochee River. Turn north (left) onto CR 143 and travel approximately 4.1 miles (6.6 km) to the intersection with Florida Campsite Road. Turn west (left) and travel approximately 3 miles to the boat landing. The spring can be accessed by boating approximately 4.2 miles (6.8 km) upstream from the boat ramp off CR 143 and Florida Campsite Road.

Description – Rossetter Spring emerges directly from a small cave at the base of 25 ft (7.6 m) high limestone and sand banks. The small, circular pool is 15 ft (4.6 m) in diameter. The depth of the spring measured near the cave opening is 4.5 ft (1.4 m). The water was slightly turbid, greenish colored, and had abundant filamentous algae in August 2002. The shallow run is L-shaped and it flows 60 ft (18.3 m) south then turns sharply west, flowing another 60 ft (18.3 m) until reaching the river. It has a sand and rock bottom with some detritus deposition. There is a 3 ft (0.9 m) high, man-made, limestone wall at the mouth of the spring run intended to capture water for swimming. During the August 2002 visit, the Withlacoochee River was at historically low levels, and the rock wall was entirely exposed

Table 56. Rossetter Spring water quality analysis.

Analytes	2002 Dissolved	2002 Total
Field Measures		
Temperature	24.75	
DO	0.45	
pH	7.08	
Sp. Cond.	390	
Lab Analytes		
BOD	-	0.2AU
Turbidity	-	0.60
Color	-	5.0
Alkalinity	-	131.0
Sp. Cond.	384A	-
TDS	-	224.0
TSS	-	4U
Cl	-	9.1
SO_4	-	50.0
F	-	0.18
Nutrients		
TOC	-	3.2I
$NO_3 + NO_2$ as N	-	0.16
$NH_3 + NH_4$	-	0.015I
TKN	0.12I	0.15I
P	0.14	0.130
PO_4	0.13	-
NO_3	-	-

Analytes	2002 Dissolved	2002 Total
Metals		
Ca	39	35.8J
K	2.6	2.3
Na	30.1	27.1
Mg	6.4	5.9
Al	-	5U
As	3U	3U
B	-	22
Cd	0.5U	0.5U
Co	-	1U
Cr	2U	2U
Cu	2.6U	2U
Fe	23	40
Mn	5.79	6.8
Ni	1U	1.5U
Pb	5U	5U
Ra-226	-	-
Ra-228	-	-
Se	13I	7U
Sn	-	28U
Sr	-	75.4
Zn	2.2U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

with only a small amount of spring water trickling through the cracks. State-owned land around the spring supports a well managed pine forest.

Utilization – The spring is undeveloped and surrounded by state land.

Discharge – No discharge measurements are available.

Table 57. Rossetter Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	8
Fecal Coliform	1K

HERNANDO COUNTY

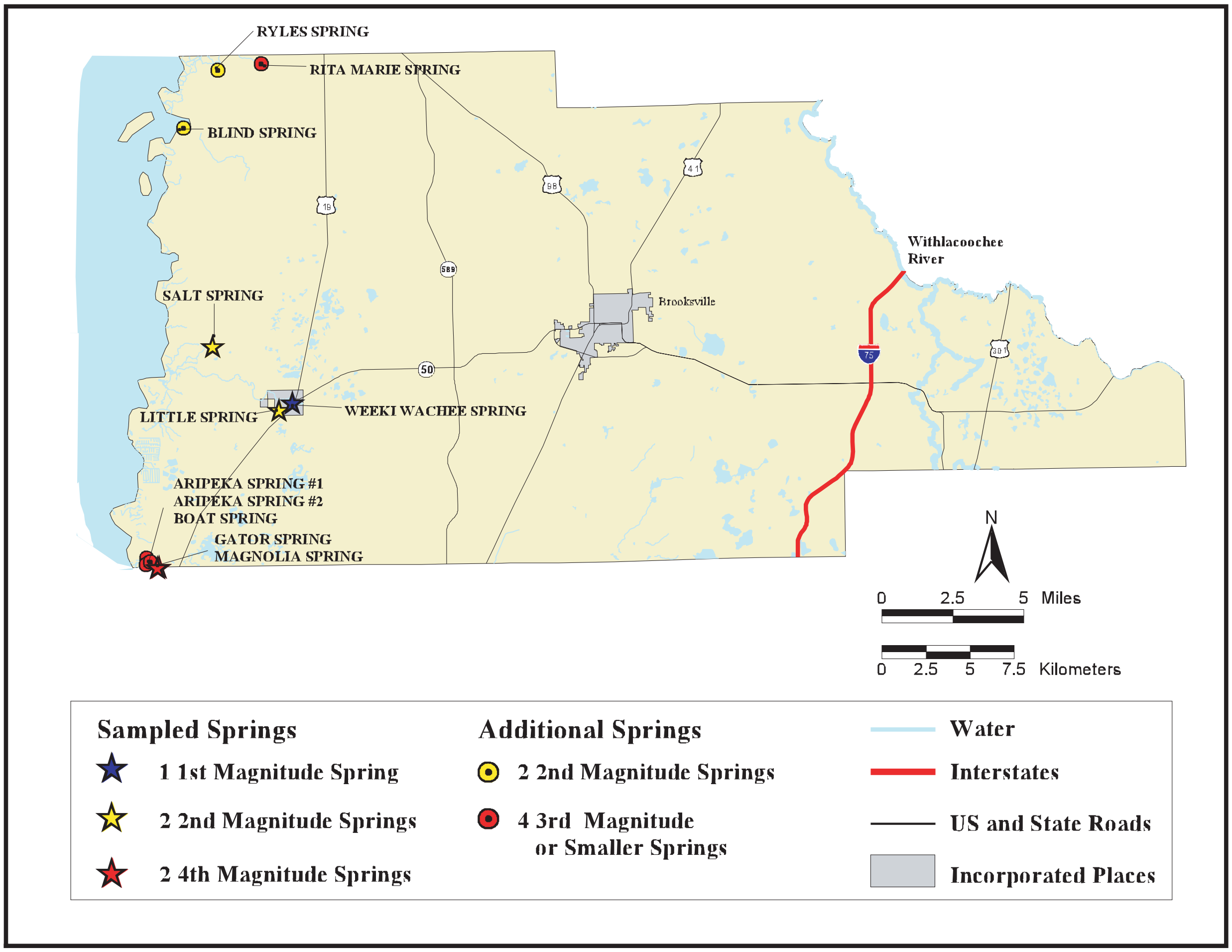

Figure 60. Springs visited by FGS in Hernando County.

Gator Spring

Figure 61. Gator Spring (photo by R. Means).

Location **-** Lat. 28° 26’ 02.75” N., Long. 82° 39’ 05.61” W. (SE ¼ SE ¼ SE ¼ sec. 36, T. 23 S., R. 16 E.). Gator Spring is located 0.8 miles (1.3 km) west of Aripeka near the head of the south fork of Hammock Creek.

Description – Gator Spring has an elongated spring pool measuring 114 ft (34.7 m) northeast to southwest and 195 ft (59.4 m) north to south. The spring pool ranges from 3 ft (0.9 m) to 7 ft (2.1 m) deep. This spring bottom is sand. The pool has been altered to form a swimming pond; however, there is no evidence of recent use. There was no boil over the spring vent in the west side of the pool in January 2003. The water is clear with a greenish hue. Algae are both suspended in the water and attached to substrates. There is aquatic and emergent vegetation in and around the spring pool. There is a small culvert on the northwest side of the pool that drains the meager flow from the spring and channels the water through an earthen dam into the spring run. Some limestone boulders occur near the culvert and the vent. Gator Spring Run is a small, narrow, sand-bottomed stream that flows southwest for approximately 350 ft (106.7 m) and enters upper Magnolia Spring Run, just below Magnolia Spring. There is a private residence approximately 350 ft (106.7 m) west of Gator spring, or 300 ft (91.4 m) north of Magnolia Spring. Formerly cleared land surrounding Gator Spring is now overgrown with dense brush.

Utilization – The spring is located on private property and is inaccessible to the public.

Discharge – January 7, 2003 0.36 $ft^3/s^{(2)}$

Table 58. Gator Spring water quality analysis.

Analytes	2003	
	Dissolved	Total
Field Measures		
Temperature	18.63	
DO	4.69	
pH	8.12	
Sp. Cond.	272	
Lab Analytes		
BOD	-	0.29I
Turbidity	-	0.25
Color	-	5U
Alkalinity	-	115
Sp. Cond.	256.0	-
TDS	-	149.0
TSS	-	4U
Cl	-	10
SO_4	-	9.8
F	-	0.064
Nutrients		
TOC	-	1U
$NO_3 + NO_2$ as N	-	0.49
$NH_3 + NH_4$	-	0.041
TKN	0.092I	0.06U
P	0.015U	0.015U
PO_4	0.006I	-
NO_3	-	-

Analytes	2003	
	Dissolved	Total
Metals		
Ca	44.5A	45.3
K	0.32A	0.32
Na	5.2	4.68
Mg	3.7A	3.7
Al	-	10U
As	3U	3U
B	-	10U
Cd	0.5U	0.5U
Co	-	1U
Cr	2I	2.5I
Cu	3.5U	4U
Fe	5U	7U
Mn	0.63I	0.5U
Ni	2U	2U
Pb	5U	5U
Ra-226	-	0.7
Ra-228	-	0.9U
Se	8U	8U
Sn	-	4U
Sr	-	226
Zn	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 59. Gator Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	2Q
Fecal Coliform	8Q

Little Spring

Figure 62. Little Spring (photo by R. Means).

Location **-** Lat. 28° 30’ 48.47” N., Long. 82° 34’ 51.70” W. (NE ¼ NW ¼ SW ¼ sec. 2, T. 23 S., R. 17 E.). Little Spring is located within the town of Weeki Wachee, approximately 0.5 miles (0.8 km) southeast of Weeki Wachee Main Spring. The spring is located in back of the main parking lot adjacent south of Weeki Wachee Main Spring. A sand track leads to the spring beyond a locked gate. The spring is surrounded by a locked chain link fence and is not accessible to the public.

Description – Little Spring is also known as Twin Dees Spring. The spring pool measures 36 ft (10.9 m) east to west and 75 ft (22.8 m) north to south. Two vent openings occupy the oval spring pool. The spring measures 13 ft (3.9 m) deep over the south vent. The spring water is clear and blue-greenish. There was a moderate boil on the water surface over the south vent where water samples were taken in March 2003. The north vent was not flowing during either of the visits. Two spring runs that eventually merge exit the spring pool and flow generally northward into the Weeki Wachee River. The smaller of the two runs exits the pool on the west, and the larger exits on the north side. The surroundings to the east are recently cleared upland sand hills. To the west is a dense swamp forest along the Weeki Wachee River. In the Spring of 2002, Little Spring was not flowing, and the spring run was dry. By March 2003, the spring was again flowing, and the spring run averaged about 10 ft (3.0 m) wide and 1.5 ft (0.5 m) deep. An underwater cave has been mapped in this spring.

Table 60. Little Spring water quality analysis.

Analytes	1962	1964	1965	1972	2003	
					Dissolved	Total
Field Measures						
Temperature	-	-	24.5	23.5	23.65	
DO	-	-	-	-	1.45	
pH	7.8	8.0	7.7	-	7.55	
Sp. Cond.	-	-	-	-	315	
Lab Analytes						
BOD	-	-	-	-	-	0.2U
Turbidity	-	-	-	-	-	0.15
Color	2	3	0	-	-	5U
Alkalinity	160	130	130	-	-	140
Sp. Cond.	268	265	260	286	316.0	-
TDS	168	-	-	-	-	176.0
TSS	-	-	-	-	-	4U
Cl	5.0	4.0	5.0	6.0	-	7.8A
SO_4	6.8	6.4	6.8	-	-	9A
F	0.1	0.1	0.1	-	-	0.12I
Nutrients						
TOC	-	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	-	-		-	0.71
$NH_3 + NH_4$	-	-	-	-	-	0.01U
TKN	-	-	-	-	0.086I	0.06U
P	-	-	-	-	0.011	0.01
PO_4	-	-	-	-	0.01I	-
NO_3	0.00	1.0	0.10	-	-	-
Metals						
Ca	48	47	48	-	52.8A	54.1
K	0.2	0.3	0.4	-	0.32A	0.33
Na	3.2	3.0	3.0	-	3.8I	4.1
Mg	3.9	5.0	4.5	-	5.4A	5.5
Al	-	-	-	-	-	22U
As	-	-	-	-	3U	9.6U
B	-	-	-	-	-	17I
Cd	-	-	-	-	0.5U	0.5U
Co	-	-	-	-	-	1U
Cr	-	-	-	-	2U	2U
Cu	-	-	-	-	3.5U	4U
Fe	-	-	-	-	29I	37I
Mn	-	-	-	-	1.04A	0.62I
Ni	-	-	-	-	2U	2U
Pb	-	-	-	-	5U	5U
Ra-226	-	-	-	-	-	0.3
Ra-228	-	-	-	-	-	0.9U
Se	-	-	-	-	8U	8U
Sn	-	-	-	-	-	4U
Sr	-	-	-		-	194
Zn	-	-	-	-	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** The spring is undeveloped and surrounded by SWFWMD land. There is no public access.

Discharge – All discharge rates are measured in ft^3/s.

December 15, 1972	7.8 (1)
December 11, 1975	14.7 (1)
March 5, 2003	5.22 (2)

Table 61. Little Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Magnolia Spring

Figure 63. Magnolia Spring (photo by R. Means).

***Location* -** Lat. 28° 26’ 01.93” N., Long. 82° 39’ 08.96” W. (SW ¼ SE ¼ SE ¼ sec. 36, T. 23 S., R. 16 E.). Magnolia Spring is located 0.7 miles (1.1 km) west of Aripeka at the head of the south fork of Hammock Creek.

Description – Magnolia Spring sits in an oval depression measuring 45 ft (13.7 m) north to south and 54 ft (16.5 m) east to west. The spring pool is shallow, averaging 4 ft (1.2 m) deep. The water is clear and light blue, with little aquatic vegetation covering a sand bottom. There is a private residence approximately 300 ft (91.4 m) to the north. At least a dozen small sand boils are visible on the spring bottom. Gator Spring Run enters Magnolia Springs Run from the northeast approximately 75 ft (22.9 m) downstream from the spring head. Magnolia Springs Run is clear and sand-bottomed. It averages 20 ft (6.1 m) wide and 3 ft (0.9 m) deep with frequent constrictions and shallow areas. There is a small private boat/canoe shack standing on the northwest side of the spring pool. The spring and its run are within a heavily wooded, lowland swamp. The two springs form the headwaters of the south fork of Hammock Creek.

Utilization **–** The spring is located within private property and is inaccessible to the public.

Table 62. Magnolia Spring water quality analysis.

Analytes	1964	1965	1972	2003	
				Dissolved	Total
Field Measures					
Temperature	-	-	24	23.51	
DO	-	-	-	1.15	
pH	8.2	7.5	-	7.67	
Sp. Cond.	-	-	-	499	
Lab Analytes					
BOD	-	-	-	-	0.2U
Turbidity	-	-	-	-	0.1
Color	10	30	-	-	5U
Alkalinity	110	110	-	-	112
Sp. Cond.	388	395	450	453.0	-
TDS	230	-	-	-	266.0
TSS	-	-	-	-	4U
Cl	52	53	65	-	75
SO_4	13	13	-	-	19
F	0.1	0.1	-	-	0.066I
Nutrients					
TOC	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	-	-	-	0.54
$NH_3 + NH_4$	-	-	-	-	0.01U
TKN	-	-	-	0.093I	0.06U
P	-	-	-	0.015U	0.015U
PO_4	-	-	-	0.055	-
NO_3	0.20	1.1	-	-	-
Metals					
Ca	43	42	-	42.7	44.7A
K	1.2	1.8	-	1.7	1.6A
Na	29	29	-	42.8	37.2A
Mg	5.2	5.6	-	8	8.2A
Al	-	-	-	-	10U
As	-	-	-	3U	3U
B	-	-	-	-	20I
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	1U
Cr	-	-	-	2U	2U
Cu	-	-	-	3.5U	4U
Fe	210	60	-	5U	7U
Mn	-	-	-	0.25U	0.5U
Ni	-	-	-	2U	2U
Pb	-	-	-	5U	5U
Ra-226	-	-	-	-	0.5
Ra-228	-	-	-	-	1.1
Se	-	-	-	8U	8U
Sn	-	-	-	-	5.5I
Sr	-	-	-	-	290
Zn	-	-	-	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 63. Magnolia Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Discharge – All discharge rates are measured in ft^3/s.

April 30, 1964	11.0[(1)]
July 24, 1964	7.92[(1)]
September 13, 1964	9.12[(1)]
February 4, 1965	9.35[(1)]
August 5, 1965	10.0[(1)]
December 12, 1972	0.86[(1)]
January 7, 2003	0.47[(2)]

Hernando Salt Spring

Figure 64. Hernando Salt Spring (photo by R. Means).

Location **-** Lat. 28° 32' 46.75" N., Long. 82° 37' 08.28" W. (NW ¼ NE ¼ NE ¼ sec. 29, T. 22 S., R. 17 E.). Hernando Salt Spring is located 3 miles (4.8 km) northwest of Weeki Wachee. From the intersection of US 19 with SR 50 and SR 550 in Weeki Wachee head west on SR 50/550 (Cortez Boulevard) approximately 3.4 miles (5.5 km) to the intersection with SR 595. Continue west (straight) 0.2 miles (0.3 km) west of the T-shaped intersection with SR 595. The spring is 200 ft (61 m) south (left side) of SR 50/550.

Description – Hernando Salt Spring, at the head of Salt Creek, has a circular spring pool with a diameter of 60 ft (18.2 m). The pool is 46.5 ft (14.2 m) deep. The spring emerges from a cavern in limestone. Exposed limestone in the spring has a soft, chalky texture. Most limestone and sand substrates are covered in thick iron-reducing bacterial mats and algae. Another smaller vent is located at the north end of the pool. The saline water is blue-greenish with slight murkiness. Several logs are submerged within the spring pool, and one of the logs has the remains of an old platform. The spring is tidally influenced, and the size of the boil in the center may fluctuate depending on tides. The spring run flows southwest for about 1 mile (1.6 km) into Mud River and averages approximately 30 ft (9.1 m) wide and 4 ft (1.2 m) deep. Land surrounding Hernando Salt Spring is low-lying, and the spring is situated within a subtropical hardwood and palm hammock. An underwater cave system occurs at Hernando Salt Spring. Depths within the cave system reach 170 ft (51.8 m) (Rosenau et al., 1977).

Utilization **–** The spring is undeveloped and surrounded by privately owned lands.

Table 64. Hernando Salt Spring water quality analysis.

Analytes	1962	1965	1972	2002 Dissolved	2002 Total
Field Measures					
Temperature	-	25	24.0	23.86	
DO	-	-	-	1.27	
pH	7.6	7.3	-	7.31	
Sp. Cond.	-	-	-	15500	
Lab Analytes					
BOD	-	-	-	-	0.2U
Turbidity	-	-	-	-	31.0
Color	2	5	-	-	20.0
Alkalinity	-	130	-	-	129.0
Sp. Cond.	3280	1800	6430	17000.0	-
TDS	2180	-	-	-	8000Q
TSS	-	-	-	-	31A
Cl	1000	490	1900.0	-	5600.0
SO_4	140	73	-	-	750.0
F	0.2	0.1	-	-	0.22
Nutrients					
TOC	-	-	-	-	1U
$NO_3 + NO_2$	-	-	-	-	0.38J
$NH_3 + NH_4$	-	-	-	-	0.052
TKN	-	-	-	0.26	0.23
P	-	-	-	0.14J	0.031I
PO_4	-	-	-	0.017	-
NO_3	0.4	0.5	-	-	-
Metals					
Ca	64	56	-	149	167.0
K	21	9.8	-	112	113.00
Na	540	260	-	2990	3020.0
Mg	68	43	-	338	344.0
Al	-	-	-	-	50U
As	-	-	-	3.7I	18.0
B					1290.0
Cd	-	-	-	0.5U	0.5U
Co					0.75U
Cr	-	-	-	2U	2.7I
Cu	-	-	-	3U	3U
Fe	-	-	-	142	3200.0
Mn	-	-	-	2.3	29.2
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	4.4
Ra-228	-	-	-	-	1.7
Se	-	-	-	4U	4U
Sn	-	-	-	-	7U
Sr	-	-	-	-	2590.0
Zn	-	-	-	24U	26U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 65. Hernando Salt Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Discharge – All discharge rates are measured in ft³/s.

January 18, 1961	24.7[1]
December 8, 1965	38.9[1]
June 30, 1966	28.4[1]
December 14, 1972	31.9[1]
December 11, 1975	31.2[1]
Annual Mean 1988-1989	33.0[5]

Weeki Wachee Spring

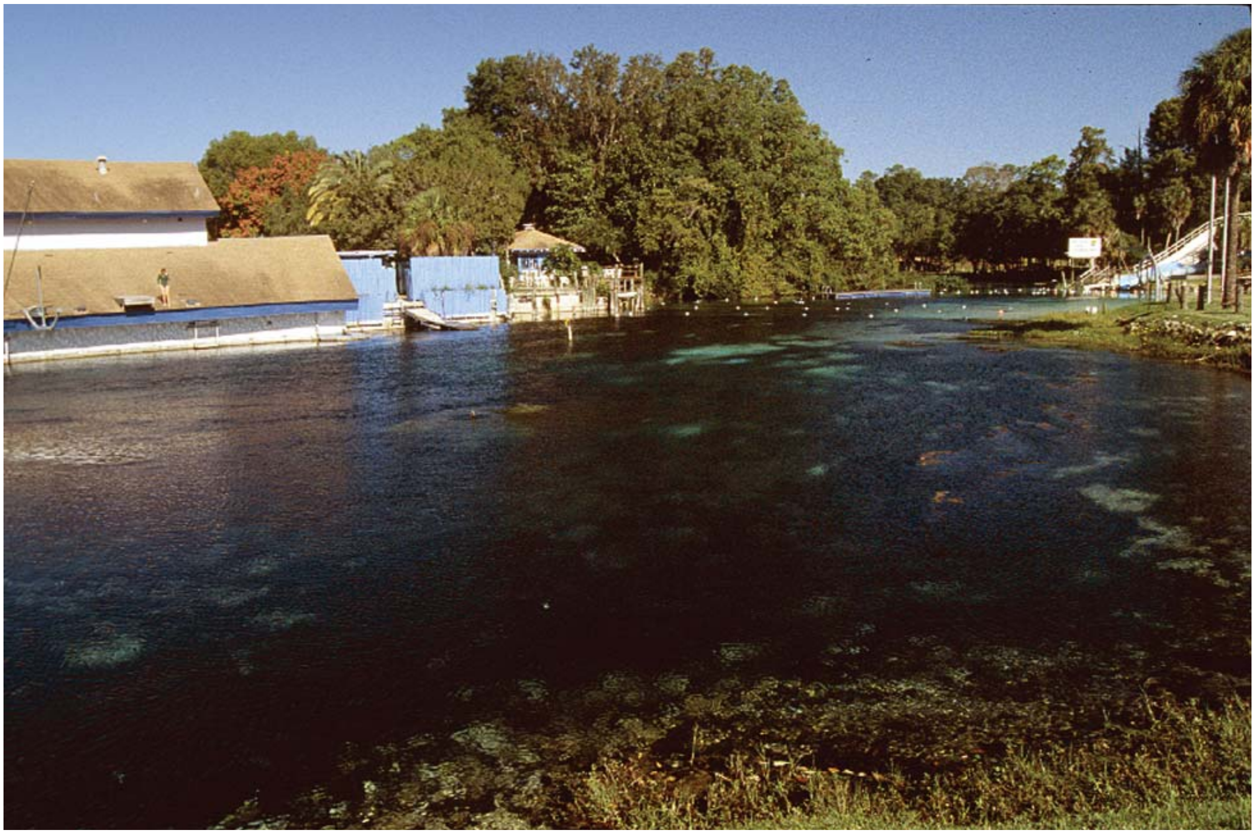

Figure 65. Weeki Wachee Spring (photo by R. Means).

Location-Lat. 28° 31' 01.89" N., Long. 82° 34' 23.40" W. (NE ¼ SW ¼ NE ¼ sec. 2, T. 23 S., R. 17 E.). The spring is located in the town of Weeki Wachee on the west side of US 19. From the intersection of US 19 and SR 50, drive south 0.2 miles (0.3 km). Turn west (right) into Weeki Wachee Springs Park parking lot. The spring vent is in the large pool used for mermaid shows.

Description-Weeki Wachee Spring discharges from the bottom of a conical depression with gentle side slopes. The spring pool measures 165 ft (50.3 m) east to west and 210 ft (64 m) north to south. Spring depth is 45 ft (13.7 m) over the vent in the center of the pool. Bare limestone is located near the vent, but none is exposed around the pool edges. The water is clear and light greenish blue, and a boil is visible in the center of the pool. Thick, filamentous algae cover the majority of the spring bottom, and there are some native aquatic grasses in the spring pool. The spring is rich with fresh and salt water fishes and aquatic turtles. The Weeki Wachee River flows westward approximately 5 miles (8 km) into the Gulf of Mexico. The river flows through low-lying, densely forested swamp. The nearest high ground east of the spring is rolling sand hills terrain and gently rises to 15 ft (4.6 m) above the water level. All uplands and land adjacent to spring are developed. U.S. 19 is approximately 225 ft (68.6 m) east of the spring.

Utilization-Weeki Wachee Spring is extensively developed into a tourist attraction that features underwater mermaid shows with a submerged observation area. It was recently

Table 66. Weeki Wachee Spring water quality analysis.

Analytes	1964	1969	1974	2001 Unfilt.	2001 Filter
Field Measures					
Temperature	-	24.0	21.5	23.7	-
DO	-	2.0	-	1.3	-
pH	7.9	8.0	7.7	7.7	-
Sp. Cond.	262	275	284	320	-
Lab Analytes					
BOD	-	-	-	0.76 I	-
Turbidity	-	-	-	0.4	-
Color	3	5	1	5U	-
Alkalinity	130	130	140	147	147
Sp. Cond.	-	-	-	320	-
TDS	-	-	-	176	-
TSS	-	-	-	4U	-
Cl	4.0	8.0	4.6	6.7	6.6 A
SO_4	6.4	9.6	7.4	9.2	9.2 A
F	0	0.1	0.1	0.084 I	0.1
Nutrients					
TOC	-	-	-	1U	-
NO3 + NO2	-	-	-	0.67	0.66 J
NH3 + NH4	-	-	-	0.01 U	0.01 U
TKN	-	-	-	0.06 U	0.06 U
P	-	-	-	0.005 I	0.007 I
PO_4	-	-	-	0.005 I	-

Analytes	1964	1969	1974	2001 Unfilt.	2001 Filter
Metals					
Ca	44	48	50	49.5	50.7
K	0.3	5.0	0.6	0.31	0.32
Na	3.0	3.2	4.0	3.78	3.93
Mg	7.8	5.0	6.0	5.9	6
As	-	-	7	3 U	3 U
Al	-	-	-	-	75 U
B	-	-	-	25 U	-
Cd	-	-	0	0.75 U	0.75 U
Co	-	-	-	0.75 U	-
Cr	-	-	-	2 U	2 U
Cu	-	-	1	2.5 U	2.5 U
Fe	0	10	10	35 U	35 U
Mn	-	-	0	0.5 U	0.5 U
Ni	-	-	14	2 U	2 U
Pb	-	-	1	5 U	4 U
Se	-	-	-	4 U	4 U
Sn	-	-	-	10U	-
Sr	-	-	150	174	-
Zn	-	-	0	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

purchased from private ownership by the Southwest Florida Water Management District (SWFWMD). The District leases the land to a private firm for the continuation of the mermaid shows. Shops and facilities are located all around the spring.

Discharge—Historically, discharge for Weeki Wachee Springs was measured at the Weeki Wachee River and include the flow of Weeki Wachee Springs, Little Springs, Unknown Spring No. 3, and flow from the bed of the river and the run from Little Springs. All discharge rates are measured in ft^3/s.

Table 67. Weeki Wachee Spring bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1KQ
Enterococci	1KQ
Fecal Coliform	1KQ
Total Coliform	1KQ

Average 1917 – 1974	176[1]	(364 measurements)
Maximum (October 19, 1964)	275[1]	
Minimum (24, 1956)	101[1]	
October 18, 2001	161[7]	estimate is provisional.

HILLSBOROUGH COUNTY

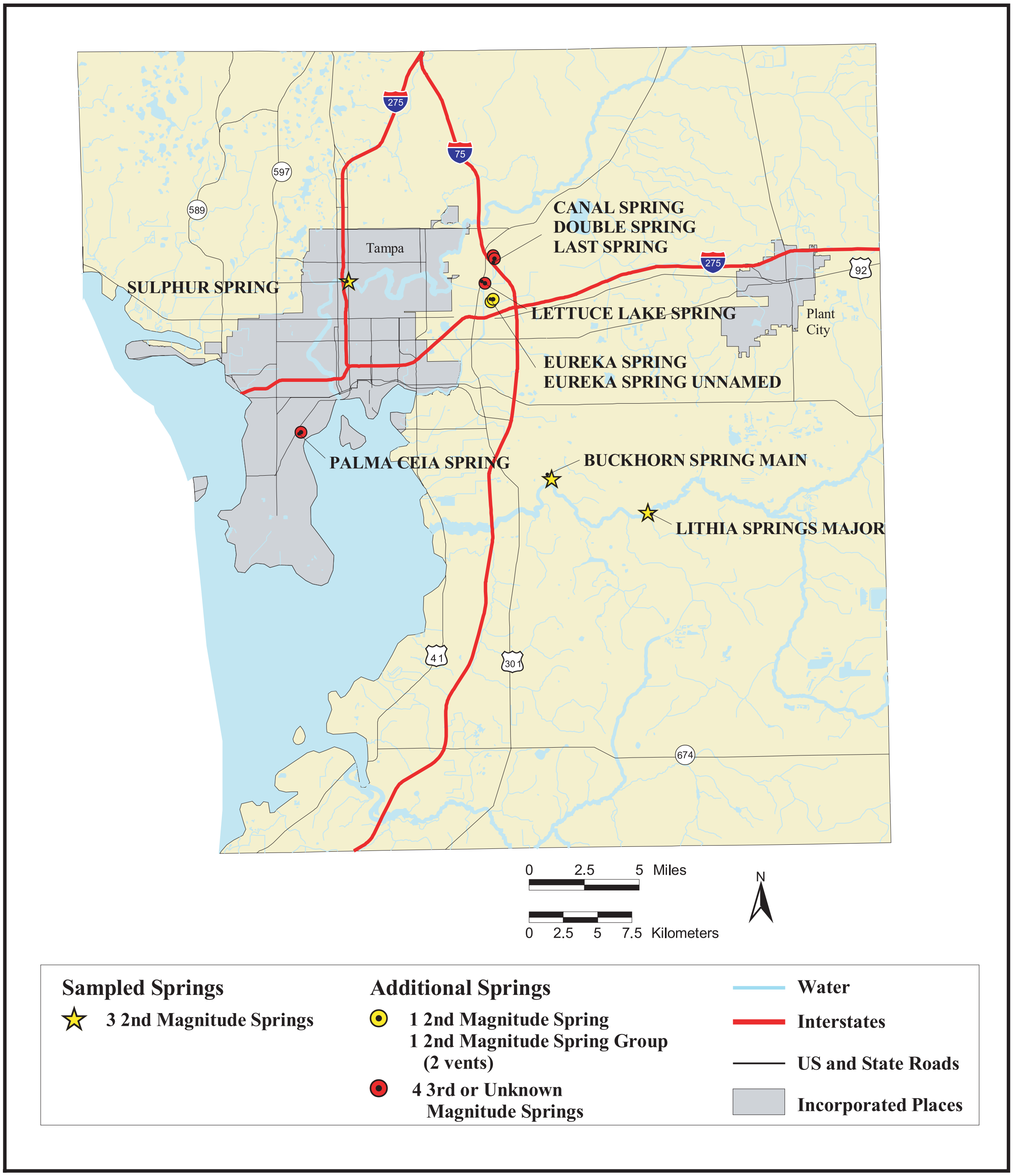

Figure 66. Springs visited by FGS in Hillsborough County.

Buckhorn Main Spring

Figure 67. Buckhorn Main Spring (photo by R. Means).

Location **-** Lat. 27° 53' 21.81" N., Long. 82° 18' 09.80" W. (NE ¼ SE ¼ NE ¼ sec. 9, T. 30 S., R. 20 E.). The Buckhorn Main Spring is located approximately 1.6 miles (2.6 km) northeast of Riverview. The spring run flows into the Alafia River from the north 2.7 miles (4.3 km) upstream from the US 301 bridge in Riverview.

Description – Buckhorn Main Spring pool is roughly circular and has a diameter of approximately 45 ft (13.7 m). It is 8.3 ft (2.5 m) deep. The vent consists of a cave entrance in limestone on the northwest side of the spring depression. Limestone and sand form the pool bottom. The water is clear and bluish. A prominent boil was present in April 2002. There is a rich aquatic plant community within the spring. The spring pool perimeter is entirely lined with concrete bags for erosion control, and there is a chain link fence around the pool and across the 15 ft (4.6 m) spring run. The spring is on the northwest side of Buckhorn Creek. Upstream from Buckhorn Main Spring, Buckhorn Creek was slightly tannic during the sampling visit. Downstream of the spring, Buckhorn Creek takes on a clear water spring run appearance, with a swift current and a sand bottom with exposed limestone. From Buckhorn Main Spring, Buckhorn Creek travels approximately 0.4 miles (0.6 km) to the Alafia River. There are two other springs in the vicinity of Buckhorn Springs called Buckhorn Tributary Spring and Buckhorn Tributary Spring 3. All three springs are northwest of Buckhorn Creek and north of the Alafia River (Rosenau et al., 1977). Land rises steeply north of the spring to approximately 12 ft (3.7m) above spring water level, and a residence is visible a few hundred feet away. Land to the south is forested lowland associated with Buckhorn Creek. Buckhorn Main Spring has a water pumping facility owned by a fer-

Table 68. Buckhorn Main Spring water quality analysis.

Analytes	1966	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	23.5	23.5	24.70	
DO	-	-	1.43	
pH	7.3	8	7.48	
Sp. Cond.	-	-	455	
Lab Analytes				
BOD	-	-	-	0.2U
Turbidity	-	-	-	0.3
Color	5	5	-	5U
Alkalinity	110	100	-	122
Sp. Cond.	424	416	484.0	-
TDS	258	250	-	262
TSS	-	-	-	4U
Cl	29	26	-	25.0
SO_4	67	64	-	62.0
F	0.2	0.3	-	0.2A
Nutrients				
TOC	-	-	-	1U
$NO_3 + NO_2$ as N	-		-	2J
$NH_3 + NH_4$	-	-	-	0.01U
TKN	-	-	0.06U	0.06U
P	-	-	0.044	1.9A
PO_4	-	-	0.044	-
NO_3	1.1	4.9	-	-
Metals				
Ca	56	50	56.8	63.9
K	0.8	0.8	0.67	0.7
Na	16	14	12	13.1
Mg	11	12	10.9	11.8
Al	-	-	-	50U
As	-	-	3U	3U
B	-	-	-	20I
Cd	-	-	0.5U	0.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3U	3U
Fe	-	-	25U	25U
Mn	-	-	0.5U	2I
Ni	-	-	2U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	1.4
Ra-228	-	-	-	1U
Se	-	-	4U	4U
Sn	-	-	-	7U
Sr	-	920	-	836.0
Zn	-	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

tilizer company just west of the pool and a platform suspended over the spring with a water extraction tube running into the vent.

Utilization – The spring is owned by a fertilizer company that uses a portion of the spring water for industrial purposes. A locked fence surrounds the spring and also blocks access from the spring run, no public access is allowed.

***Discharge* -** All discharge rates are in ft^3/s

Maximum	15.7[5]
Average	11.3[5]
June 2, 1966	10.9[1]
June 5, 1972	15.0[1]

Table 69. Buckhorn Main Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Lithia Spring Major

Figure 68. Lithia Spring Major (photo by R. Means).

Location **-** Lat. 27° 51' 58.60" N., Long. 82° 13' 53.29" W. (SW ¼ SE ¼ SW ¼ sec. 17, T. 30 S., R. 21 E.). The spring is within Lithia Springs County Park, 5.5 miles (8.9 km) southeast of Brandon. From the intersection of SR 60 and SR 640, drive south from Brandon on SR 640 (Lithia Rd) approximately 6.4 miles (10.3 km) to the bridge over the Alafia River. Travel 0.6 miles (1.0 km) past the bridge over the Alafia River, and turn west (right) onto Lithia Springs Rd. and follow the road 1.5 miles (2.4 km) to the park.

Description – Lithia Spring Major is situated within a large, man-modified, spring pool. The pool measures 168 ft (51.2 m) north to south and 180 ft (54.9 m) east to west, and depth measured over the vent is 8.2 ft (2.5). The water is clear and blue-greenish. The pool bottom is sand with a limited exposure of limestone near the vent. The spring pool has steep retaining walls with several access stairways leading down into the water. The entire bottom of Lithia Spring Major is bare white sand with sparse algae resulting from use. The vent in the center of the pool is covered by a barred metal barricade to prevent entry. Spring water discharges through the bars and a boil was present on the pool surface in April 2002. The clear, sandy spring run exits east and flows approximately 200 ft (61 m), then turns south flowing approximately 750 ft (228.6 m) into the tannic Alafia River. There are some algae and other aquatic vegetation in the run. Land around Lithia Major is a developed county park. Lithia Spring Minor joins the Alafia River approximately 100 ft (30.5 m) downstream from the mouth of Lithia Spring Major.

Table 70. Lithia Spring Major water quality analysis.

Analytes	July 1923	4/30/1946	4/23/1968	10/10/1972	2002	
					Dissolved	Total
Field Measures						
Temperature	21	24.5	24	-	25.1	
DO	-	-	-	-	2.01	
pH	-	7.5	7.2	7.7	7.39	
Sp. Cond.	-	-	-	-	457	
Lab Analytes						
BOD	-	-	-	-	-	0.2U
Turbidity	-	-	-	-	-	0.05U
Color	-	5	0	10	-	5U
Alkalinity	-	-	100	110	-	121.0
Sp. Cond.	-	469	403	468	474A	-
TDS	331	285	257	284	-	264A
TSS	-	-	-	-	-	4U
Cl	23	21	21	22	-	26.0
SO_4	93	86	61	79	-	56.0
F	-	0.3	0.6	0.4	-	0.22
Nutrients						
TOC	-	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	-	-	2.4	-	3J
$NH_3 + NH_4$	-	-	-	-	-	0.01U
TKN	-	-	-	-	0.06U	0.06U
P	-	-	-	-	0.055A	0.060
PO_4	-	-	-	-	0.059	-
NO_3	0.8	0.7	6	-	-	-
Metals						
Ca	65	62	57	58	58.3	64.1A
K	-	0.9	0.6	0.6	0.76	0.78A
Na	-	14	10	12	11.7	12.6A
Mg	14	10	9.6	11	8.6	9.2A
Al	-	-	-	-	-	50U
As	-	-	-	-	3U	3U
B	-	-	-	-	-	23A
Cd	-	-	-	-	0.5U	0.5U
Co	-	-	-	-	-	0.75U
Cr	-	-	-	-	2U	2U
Cu	-	-	-	-	3U	3U
Fe	150	40	0	-	25U	25U
Mn	-	-	-	-	0.5U	0.5U
Ni	-	-	-	-	2U	2U
Pb	-	-	-	-	3U	5U
Ra-226	-	-	-	-	-	1.0
Ra-228	-	-	-	-	-	1U
Se	-	-	-	-	4U	4U
Sn	-	-	-	-	-	7U
Sr	-	-	1100	1300	-	929A
Zn	-	-		-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization – The spring is within a county park with full facilities and a lifeguard on duty.

Discharge **-** All discharge rates are measured in ft^3/s.

Minimum	0.73[(5)]
Maximum	69.4[(5)]
Average	30.5[(5)]

Table 71. Lithia Spring Major water quality analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Sulphur Spring

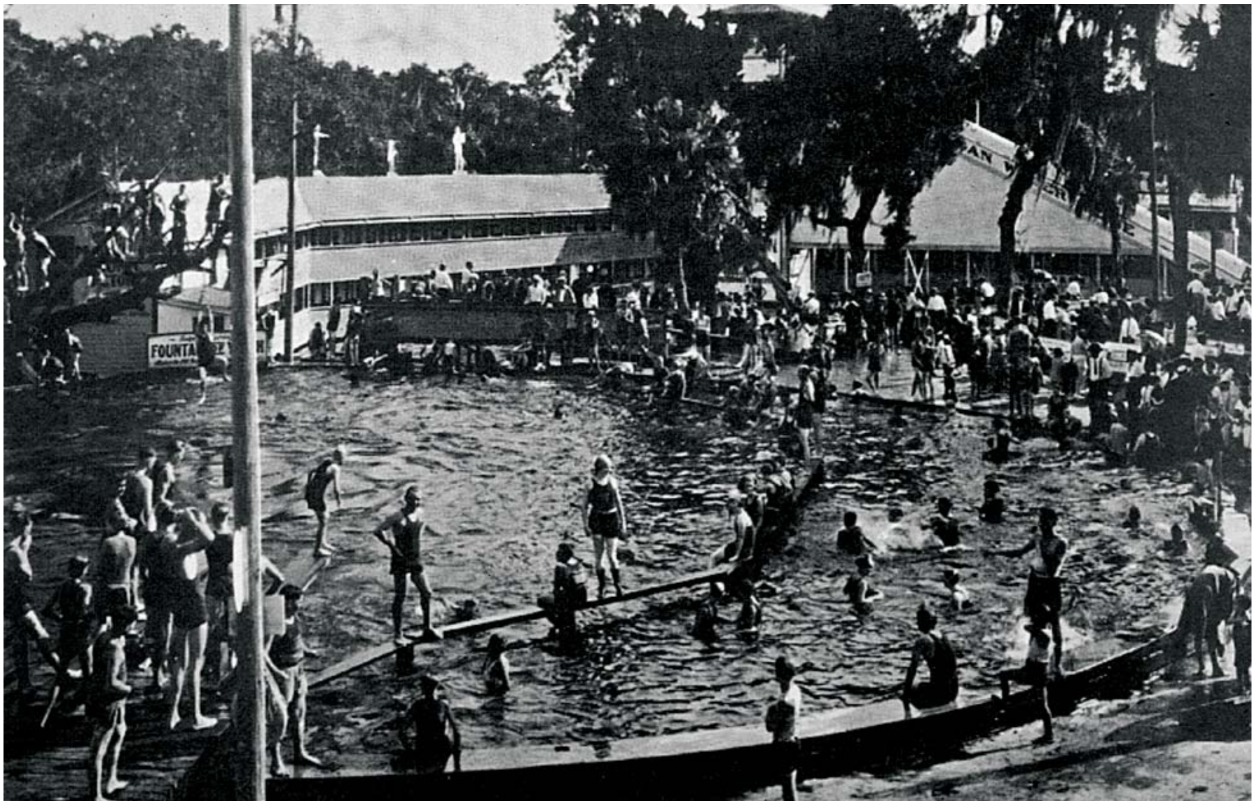

Figure 69. Sulphur Spring circa 1930 (anonymous).

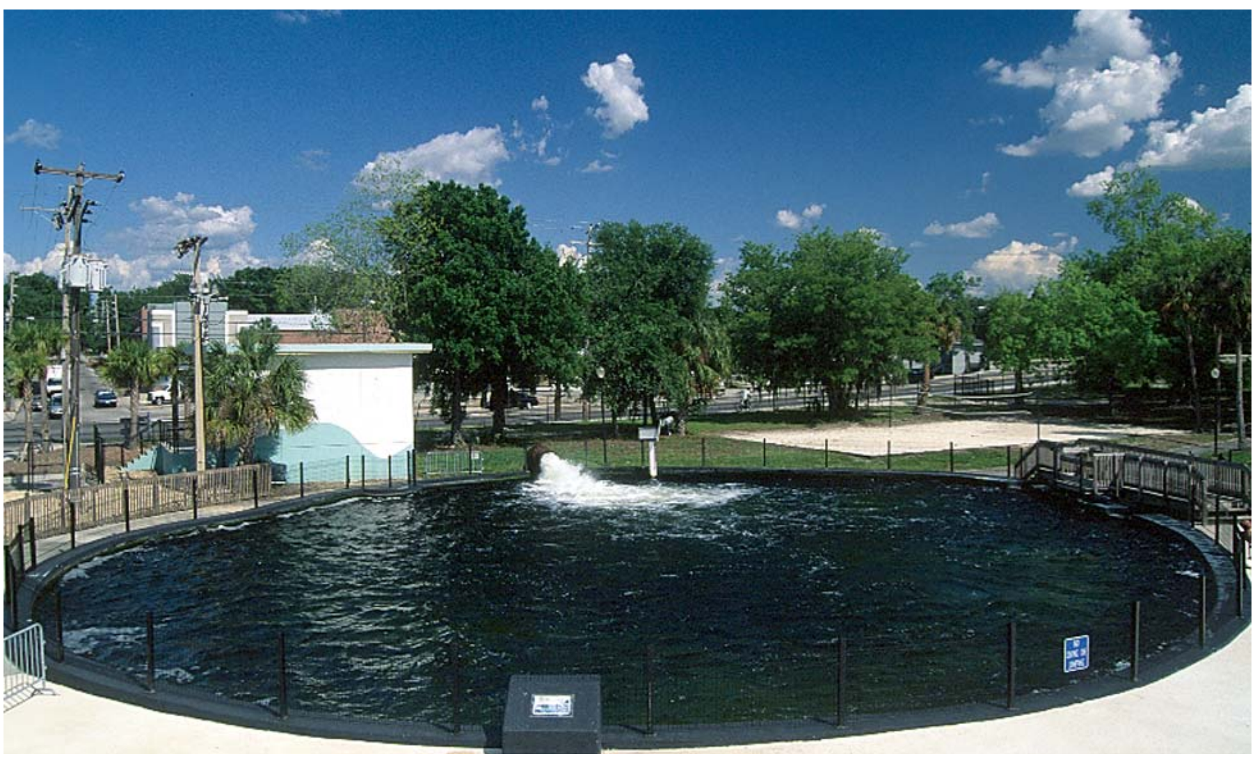

Figure 70. Sulphur Spring (photo by R. Means).

Location **-** Lat. 28° 01' 16.08" N., Long. 82° 27' 5.89" W. (NE ¼ SE ¼ NE ¼ sec. 25, T. 28 S., R. 18 E.). Sulphur Spring is located in a city park within the City of Tampa. From the Sligh Avenue exit on I-275, drive 0.12 miles (0.2 km) east on Sligh Avenue to US 41 (Nebraska Avenue). Turn north (left) on US 41 and go 0.8 miles (1.3 km) to Bird Street. Turn west (left) on Bird Street and go 0.1 miles (0.12 km) to the Sulphur Springs parking lot entrance which is on the south side of Bird Street.

Description – Sulphur Spring has been highly altered from its natural condition into a circular pool enclosed by concrete walls. The diameter of the pool is 90 ft (27.4 m). The pool is uniformly about 15 ft (4.6 m) deep with a limestone and sand bottom. Rosenau et al. (1977) report a maximum depth of 30 ft (9.1 m). The water is slightly murky and greenish colored. Algae are abundant in the pool. Spring outflow is southeast, cascading over a 7 ft (2.1 m) high weir. The falls continue for approximately 50 ft (15.2 m), and the rest of the run travels approximately 600 ft (182.8 m) to the Hillsborough River. The spring run is sand-bottomed and algae-laden. A hydrogen sulfide odor is associated with the spring. There is a City of Tampa water pumping facility on the west side of the pool where a large metal pipe discharges water forcefully into the spring. The facility pumps a portion of the spring flow for municipal use, and the other portion is rerouted out the pipe into the pool. The spring itself is closed to swimming, but the surrounding area is developed into a swimming and recreation park with a large swimming pool just a few feet east of the spring pool. Park personnel report that the spring's cave system has been explored by divers and heads northward under the city. Divers have connected the cave system to several nearby sinkholes. No swimming is allowed in the spring or spring run.

Utilization **-** The actual spring pool is fenced and a portion of the spring water is extracted for municipal uses. The area around the spring has been developed into an urban recreation area.

Discharge – Discharge rates are measured in ft^3/s.

15 Year Mean	44 [1]
May 11, 1971 (Min)	3.81 [1]
August 3, 1945 (Max)	163 [1]
Annual Mean 1999	38.9 [7]

Table 72. Sulphur Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	480Q
Fecal Coliform	180Q

Table 73. Sulphur Spring water quality analysis.

Analytes	1946	1956	1966	1972	2002	
					Dissolved	Total
Field Measures						
Temperature	-	-	-	25.0	25.31	
DO	-	-	-	-	4.02	
pH	7.5	7.4	7.3	7.8	7.01	
Sp. Cond.	-	-	-	-	2190	
Lab Analytes						
BOD	-	-	-	-	-	0.2U
Turbidity	-	-	-	-	-	0.25
Color	10	28	10	15	-	5.0
Alkalinity	-	120	130	140	-	170
Sp. Cond.	259	1030	1190	1240	2100.0	-
TDS	-	-	-	700	-	1180.0
TSS	-	-	-	-	-	4U
Cl	160	200	220	230.0	-	490.0
SO_4	60	79	84	100	-	170.0
F	0.1		0.2	0.2	-	0.150
Nutrients						
TOC	-	-	-	-	-	3.1I
$NO_3 + NO_2$ as N	-	-	-	0.53	-	0.24J
NH_3 + NH4	-	-	-	-	-	0.013I
TKN	-	-	-	-	0.28	0.30
P	-	-	-	-	0.094	0.094
PO_4	-	-	-	-	0.1	-
NO_3	1.5	0	2.7	2.3	-	-
Metals						
Ca	64	77	84	93	126	129.0
K	3.4	-	4.4	4.4	9	9.60
Na	86	-	120	140	264	259.0
Mg	12	13	15	18	28.8	32.1
Al	-	-	-	-	-	50U
As	-	-	-	-	3U	3U
B	-	-	-	-	-	73.0
Cd	-	-	-	-	0.5U	0.5U
Co	-	-	-	-	-	0.75U
Cr	-	-	-	-	2U	2U
Cu	-	-	-	-	5.1I	9.4I
Fe	20	20	0	-	25U	25U
Mn	-	-	-	-	21.6	24.1
Ni	-	-	-	-	4U	4U
Pb	-	-	-	-	3U	5U
Ra-226	-	-	-	-	-	2.5
Ra-228	-	-	-	-	-	1U
Se	-	-	-	-	4U	4U
Sn	-	-	-	-	-	7U
Sr	-	-	-	2000	-	1500.0
Zn	-	-	-	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

HOLMES COUNTY

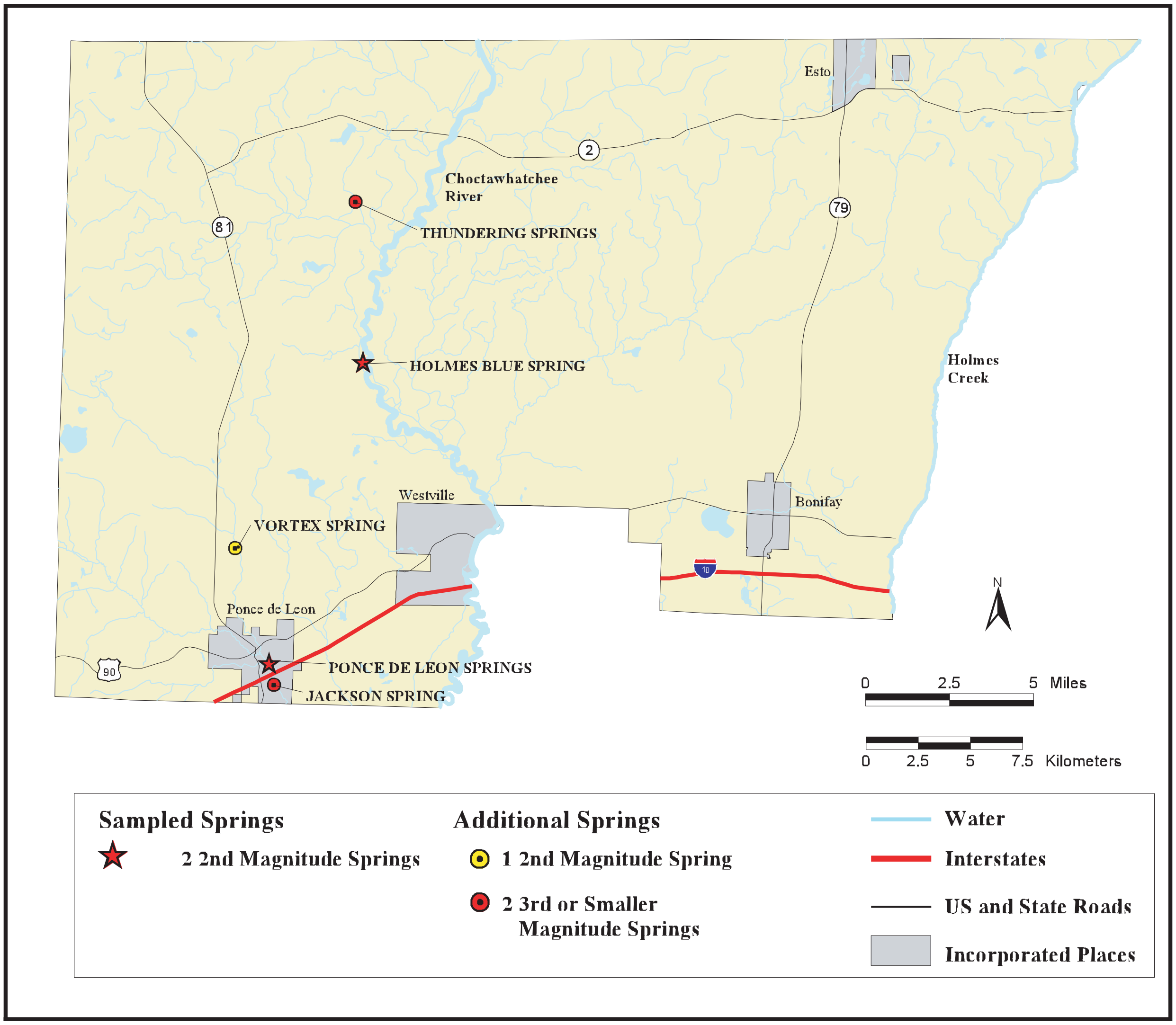

Figure 71. Springs visited by FGS in Holmes County.

Holmes Blue Spring

Figure 72. Holmes Blue Spring (photo by R. Meegan).

Location – Lat. 30° 51' 06.03" N., Long. 85° 53' 09.05" W. (NE ¼ SE ¼ SE ¼ sec. 12, T. 5 N., R. 17 W.). Holmes Blue Spring is located on the west bank of the Choctawhatchee River 1.4 miles (2.3 km) northeast of the community of Cerrogordo. Exit I-10 at SR 279 and turn north toward Caryville. Go 1 mile (1.6 km) to the intersection of SR 279 and US 90. Turn west (left) and drive 2.5 miles (4 km) to the intersection of US 90 and SR 179A/181. Turn north (right) and follow 179A for 5 miles (8 km) to Cerrogrodo. In Cerrogordo, turn east (right) toward the river and follow signs to boat ramp about 0.5 miles (0.8 km). From the public boat ramp in Cerrogordo, travel 1.5 miles (2.4 km) upstream on the Choctawhatchee River to the mouth of the spring. The narrow spring run flows in from the northwest (left) bank.

Description – Holmes Blue Spring has a circular spring pool that measures 30 ft (9.1 m) in diameter. The vent is a deep, vertical, steep-walled opening in limestone over which the depth measures 29.2 ft (8.9 m). The spring sits in a conical, circular depression with 8 ft (2.4 m) high clay banks. Limestone is exposed near the circular vent in the center of the depression. Its waters are bluish and crystal clear. A copious boil emerges over the vent, and water flows approximately 3 in. (7.6 cm) higher that the surrounding spring surface. There are a few sticks and logs on the sand, clay, and limestone bottom. There is no aquatic vegetation in the spring or its run. The short spring run averages 3 ft (0.9 m) deep and flows

Table 74. Holmes Blue Spring water quality analysis.

Analytes	2002	
	Dissolved	Total
Field Measures		
Temperature	20.06	
DO	4.95	
pH	7.79	
Sp. Cond.	211	
Lab Analytes		
BOD	-	0.2U
Turbidity	-	0.1
Color	-	5U
Alkalinity	-	102
Sp. Cond.	207.0	-
TDS	-	114.0
TSS	-	4U
Cl	-	2.7
SO_4	-	1.2
F	-	0.075I
Nutrients		
TOC	-	1U
$NO_3 + NO_2$ as N	-	0.46
$NH_3 + NH_4$	-	0.013I
TKN	0.074I	0.12U
P	0.029I	0.025I
PO_4	0.024	-
NO_3	-	-

Analytes	2002	
	Dissolved	Total
Metals		
Ca	34.2	34.7
K	0.38	0.38
Na	1.84	1.80
Mg	5.1	5.2
Al	-	10U
As	6U	6U
B	-	14U
Cd	0.5U	0.5U
Co	-	1U
Cr	2U	2U
Cu	6U	4U
Fe	18U	7.8I
Mn	0.25U	0.61I
Ni	1I	2U
Pb	5U	5U
Ra-226	-	0.3U
Ra-228	-	0.8U
Se	24U	24U
Sn	-	18U
Sr	-	44
Zn	1.7I	6U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

150 ft (45.7 m) southeast into the murky brown Choctawhatchee River. Spring-water levels are closely tied to fluctuations of the nearby river. The spring run is under a forest canopy within the heavily wooded river floodplain.

Utilization – Holmes Blue Spring is undeveloped and exists in a natural condition.

Discharge – Discharge is measured in ft^3/s.
December 3, 2002 13.67(2)

Table 75. Holmes Blue Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	2Q
Fecal Coliform	2Q

Ponce de Leon Springs

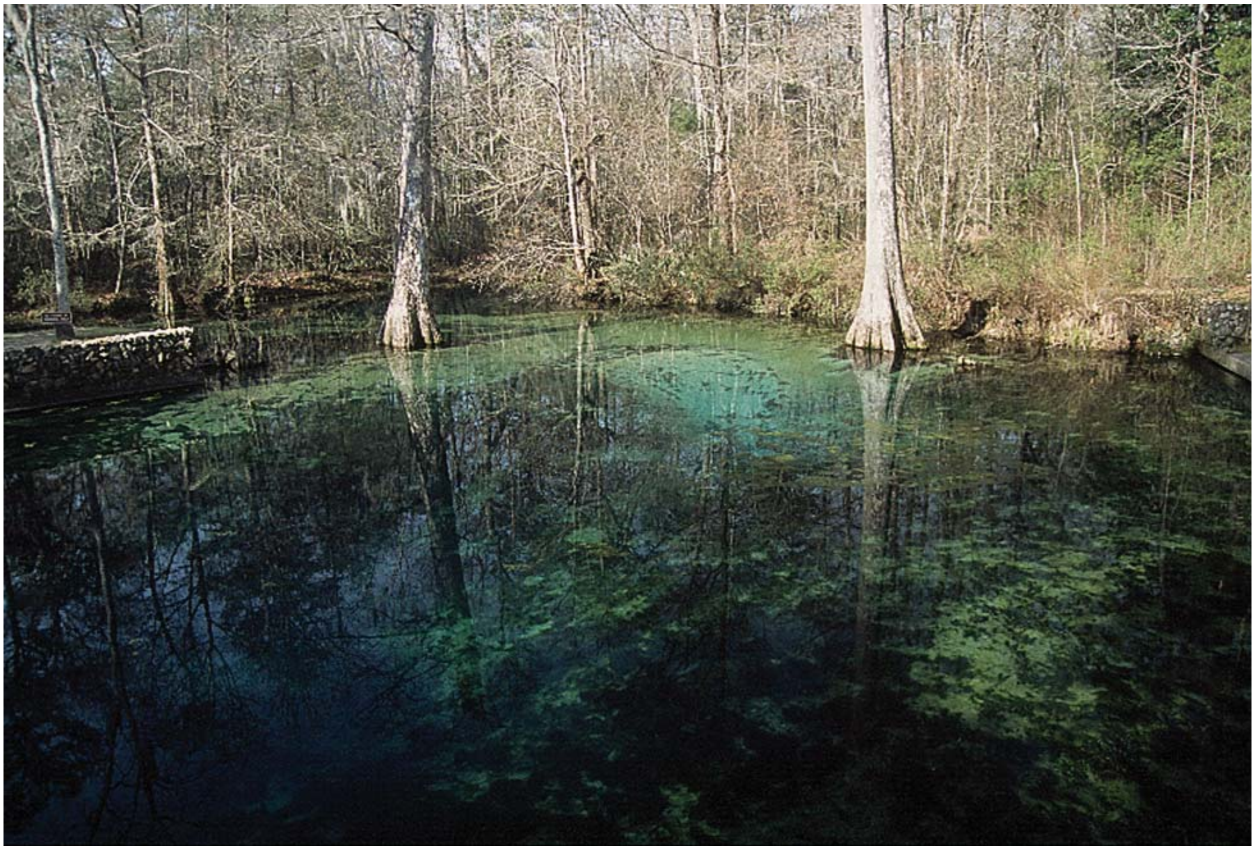

Figure 73. Ponce de Leon Springs (photo by R. Means).

Location – Lat. 30° 43' 16.33" N., Long. 85° 55' 50.47" W. (NW ¼ SE ¼ SW ¼ sec. 27, T. 4 N., R. 17 W.). The springs are located within the Ponce de Leon State Park in the town of Ponce de Leon. From the I-10 exit at SR 81, travel north on SR 81 for 1 mile (1.6 km) then turn east (right) on US 90 and travel 0.6 miles (1 km) to the intersection with CR 181A. Turn south (right) on CR 181A and travel 0.6 miles (1 km) to the state park entrance on the right.

Description – Ponce de Leon Springs has a crescent-shaped pool that measures 105 ft (32 m) north to south and 111 ft (33.8 m) east to west. There are at least three spring vents within the spring pool. The sampled vent is located in the northern section of the spring pool. The depth throughout the pool averages approximately 5 ft (1.5 m) deep, but it measures as much as 16.0 ft (4.9 m) deep over the vents. The bottom is sand and limestone is exposed near the vents. The water is clear and light greenish blue. There is a slight boil over the northern vent. There is sparse aquatic vegetation, but thick patches of algae are present on the bottom. Algal strands and particles also are suspended in the water. There are two cypress trees growing in the spring pool north and west of the sampled vent. Flow from the springs discharges over a weir designed to raise water levels in the spring pool suitable for swimming. There is a boardwalk over the weir that leads to hiking trails. The spring run exits the pool to the northwest. After a short distance, it veers back to the south, flowing into Sandy Creek approximately 350 ft (106.7 m) downstream. Land on the east side of the spring is a state recreation area developed for picnicking and swimming. From the

Table 76. Ponce de Leon Springs water quality analysis.

Analytes	1927	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	-	20.5	19.88	
DO	-	-	3.44	
pH	-	6.8	7.53	
Sp. Cond.	-	-	180	
Lab Analytes				
BOD	-	-	-	0.2U
Turbidity	-	-	-	0.05U
Color	-	0	-	5U
Alkalinity	-	100	-	107
Sp. Cond.	-	208	200.0	-
TDS	-	118	-	117.0
TSS	-	-	-	4U
Cl	2.6	3.0	-	2.3I
SO_4	3.8	2.0	-	2.3
F	-	0.1	-	0.067I
Nutrients				
TOC	-	-	-	1U
$NO_3 + NO_2$ as N	-	0.14	-	0.24
NH_3 as N	-	-	-	0.01U
TKN	-	-	0.06U	0.06U
P	-	-	0.022	0.028
PO_4	-	-	0.024	-
NO_3	-	0.6	-	-
Metals				
Ca	30	30	32.1A	31.2
K	0.4	0.4	0.48A	0.46
Na	1.9	1.6	1.6I	1.4I
Mg	9.2	7.4	7.8A	7.6
Al	-	-	-	75U
As	-	-	3U	3U
B	-	-	-	15U
Cd	-	-	0.5U	0.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3.5U	3.5U
Fe	0.27	-	35U	130I
Mn	-	-	0.5I	1.1I
Ni	-	-	4U	4U
Pb	-	-	3U	5U
Ra-226	-	-	-	0.2U
Ra-228	-	-	-	1.5
Se	-	-	4U	4U
Sn	-	-	-	10U
Sr	-	40	-	44.9
Zn	-	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

spring pool, land on this side gently rises to approximately 8 ft (2.4 m) above spring water level. West of the spring, there are walking trails that lead through a heavily forested area associated with Sandy Creek.

Utilization **-** The spring is developed within a state park and is a popular swimming and picnic destination.

Discharge **-** All discharge rates are measured in ft^3/s.

May 20, 1942	20.7[(1)]
December 9, 1946	18.1[(1)]
April 19, 1972	18.8[(1)]
June 28, 2002	8.83[(2)]

Table 77. Ponce de Leon Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

JACKSON COUNTY

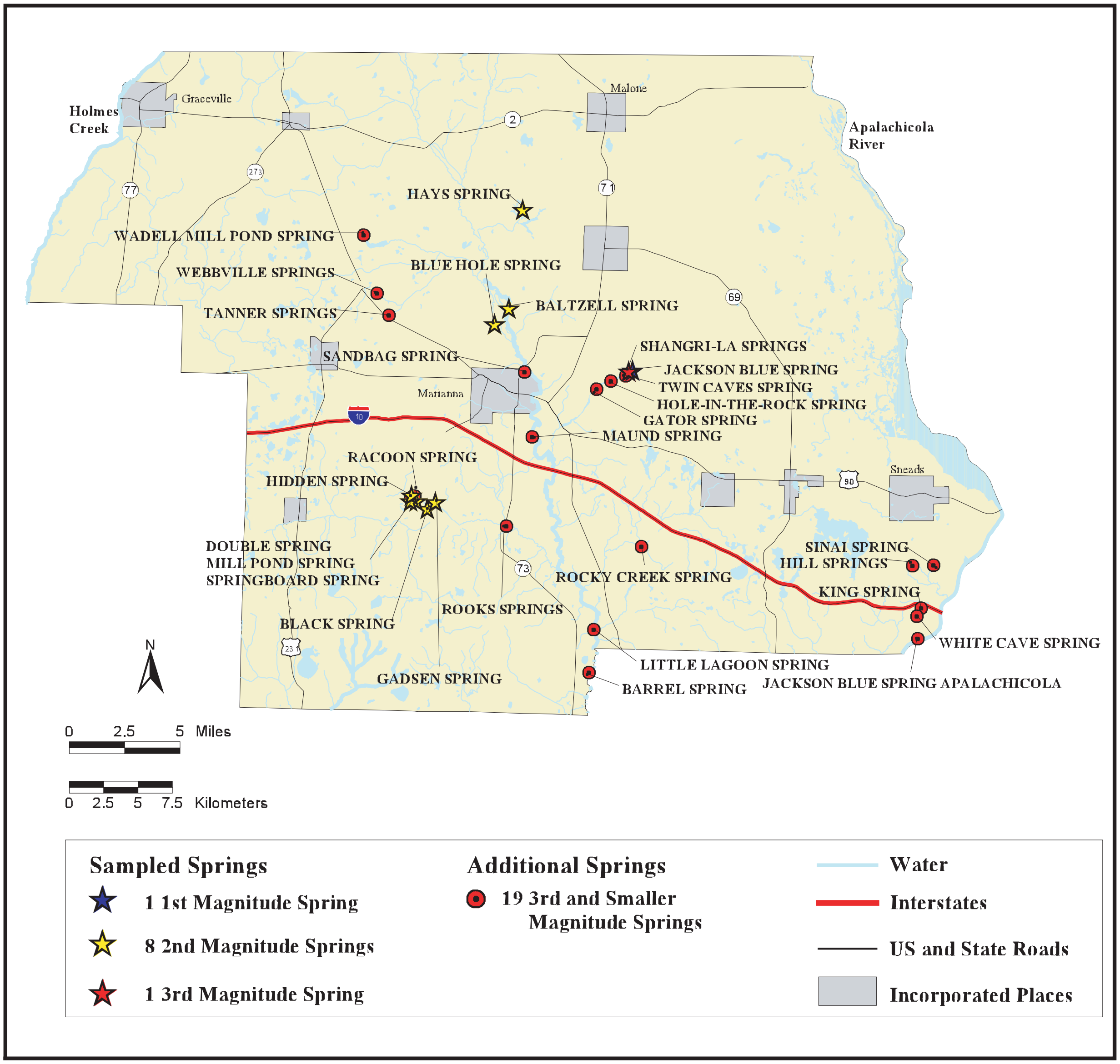

Figure 74. Springs visited by FGS in Jackson County.

Baltzell Spring

Figure 75. Baltzell Spring (photo by R. Means).

Location **-** Lat. 30° 49' 50.16" N., Long. 85° 14' 03.84" W. (NE ¼ SW ¼ SE ¼ sec. 16, T. 5 N., R. 10 W.). Baltzell Spring is located approximately 3.5 miles (5.6 km) north of Marianna. From the intersection of US 90 and SR 166 (Jefferson Street) in Marianna, travel north for 2.6 miles (4.2 km) on SR 166 to the Florida Caverns State park entrance. Turn west (left) into the Florida Caverns State Park and travel 1.7 miles (2.7 km) to the boat landing on the north (right) side of the road. The spring and spring run are surrounded by private property but may be accessed by traveling 1 mile (1.6 km) upstream from the Florida Caverns State Park boat ramp on the Chipola River. The spring run enters the river from the east.

Description – Baltzell Spring is also referred to as Bosel or Bozel Spring. The spring pool measures 75 ft (22.9 m) north to south and 54 ft (16.5 m) east to west. The depth of the spring over the vent measures 14.0 ft (4.3 m). The water is light blue-green with a slight murkiness. Limestone is exposed near the vent and a slight boil is present on the pool surface. There is an old collapsed dock on the east shore of the spring. A small spring run enters the spring pool from the north, and the combined flow from both exits to the south. The spring and its run support rich native aquatic vegetation. Baltzell Spring run flows south, then east for a total distance of approximately 800 ft (243.8 m) (Rosenau et al., 1977), before entering the Chipola River from the east. To the east, the ground rises to approximately 12 ft (4 m) above the water surface. An old house and cleared pasture are visible a short distance to the east. Land west of the spring is comprised of the river and its floodplain swamp forest. There are at least three other springs in close proximity to Baltzell Spring that maybe collectively referred to as the Baltzell Springs Group.

Table 78. Baltzell Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	20.5	19.81	
DO	-	5.77	
pH	7.6	7.24	
Sp. Cond.	-	276	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	1.2
Color	5	-	5U
Alkalinity	120	-	127
Sp. Cond.	270	300.0	-
TDS	144	-	165
TSS	-	-	4U
Cl	4	-	5.4A
SO_4	0.4	-	1.7A
F	0	-	0.05I
Nutrients			
TOC	-	-	1I
$NO_3 + NO_2$ as N	0.88	-	2.5
NH_3	-	-	0.01U
TKN	-	0.11I	0.12I
P	-	0.026	0.028
PO_4	-	0.024	-
NO_3	3.9	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	48	51.6	50.7A
K	0.4	0.44	0.42A
Na	2.4	2.4I	2.3I
Mg	1.4	1.7	1.7A
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	36I
Mn	-	0.78I	1.7I
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2U
Ra-228	-	-	4
Se	-	4U	4U
Sn	-	-	10U
Sr	70	-	38.7A
Zn	-	3.4U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** The spring is undeveloped and bordered by private lands.

Discharge **-** All discharge rates are measured in ft^3/s.

August 16, 1973 72.8[1]
March 22, 2002 48.76[2]

Table 79. Baltzell Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	64Q
Fecal Coliform	14Q

Blue Hole Spring

Figure 76. Blue Hole (photo by R. Means).

Location – Lat. 30° 49' 12.52" N, Long. 85° 14' 41.62" W (SW ¼ SW ¼ NW ¼ sec. 21, T. 5 N., R. 10 W.). Blue Hole Spring is located within the Florida Caverns State Park, 3 miles (4.8 km) north of Marianna. From the intersection of US 90 and SR 166 (Jefferson Street) in Marianna, travel north 2.6 miles (4.2 km) on SR 166 to the park entrance on the west (left) side of the road. Follow the park road 0.8 miles (1.3 km) then turn north (right) on Blue Hole Drive. Travel on Blue Hole Drive for 1.8 miles (2.9 km) to the spring and picnic area.

Description – Blue Hole Spring pool is elongated and measures 159 ft (48.5 m) east to west and 258 ft (78.6 m) northwest to southeast. The depth of the spring pool is variable and measures up to 26 ft (7.9 m) (Rosenau et al., 1977). The spring has a sand bottom. Thick patches of filamentous green algae cover about half of the spring bottom. The water color is greenish and murky. No boil was visible on the water surface in June 2002. Water lettuce is abundant in the southeast portion of the pool. The west side of the pool has a limestone boulder wall with stairs leading down to a sandy swimming area. The south side of the spring has a wooden footbridge over the outflow channel. The east side has a limestone boulder wall and a wooden swimming dock. On the north side of the main pool, there is another much smaller pool that is separated from the main pool by a narrow land bridge. During the January 2002 visit, the water in the small pool was crystal clear and light blue, contrasting with the murky greenish water of the main spring pool. There is a wooden walkway that leads over the land bridge. The spring run discharges south approximately 1.6

Table 80. Blue Hole Spring water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	-	17.87	
DO	4.3	5.94	
pH	7.1	7.21	
Sp. Cond.	-	219	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	4.0
Color	5	-	5U
Alkalinity	130	-	118
Sp. Cond.	255	240.0	-
TDS	134	-	147
TSS	-	-	4U
Cl	6	-	7.9
SO_4	0.4	-	2.3
F	0.1	-	0.063I
Nutrients			
TOC	-	-	3.1I
$NO_3 + NO_2$ as N	0.12	-	0.47
$NH_3 + NH_4$	-	-	0.013I
TKN	-	0.1I	.14I
P	-	0.02A	0.032
PO_4	-	0.02	-
NO_3	0.5	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	43	41.2A	41.7
K	0.5	0.69A	0.69
Na	2.5	3.8I	4.1
Mg	2.6	3.1A	3.1
Al	-	-	84I
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	3.5U	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	120I	270
Mn	-	7.3A	11.1
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.1U
Ra-228	-	-	1U
Se	-	0.5U	4U
Sn	-	-	10U
Sr	80	-	47.6
Zn	-	1.5U	7U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 81. Blue Hole Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	160Q
Fecal Coliform	180Q

miles (2.6 km) into the Chipola River through a heavily forested lowland. All immediate surroundings are landscaped with grassy lawns, scattered tall pines, picnic tables, restroom facilities, and parking area. The ground rises gently away from the spring on the west side to approximately 10 ft (3 m) above water level. Blue Hole Spring may be a river rise of an underground channel of the nearby Chipola River. During the January 2002 visit, the physical characteristics of both spring and river water were similar (relatively high DO, low temperature, and similar color).

Utilization - The spring is a popular swimming area within Florida Caverns State Park. Picnic tables and full facilities are near the spring. The park provides campgrounds, cavern tours, horse trails and boat access to the Chipola River.

Discharge - Discharge rates are measured in ft^3/s.

August 8, 1973 56.8(1)
June 28, 2002 1.30(2)

Hays Spring

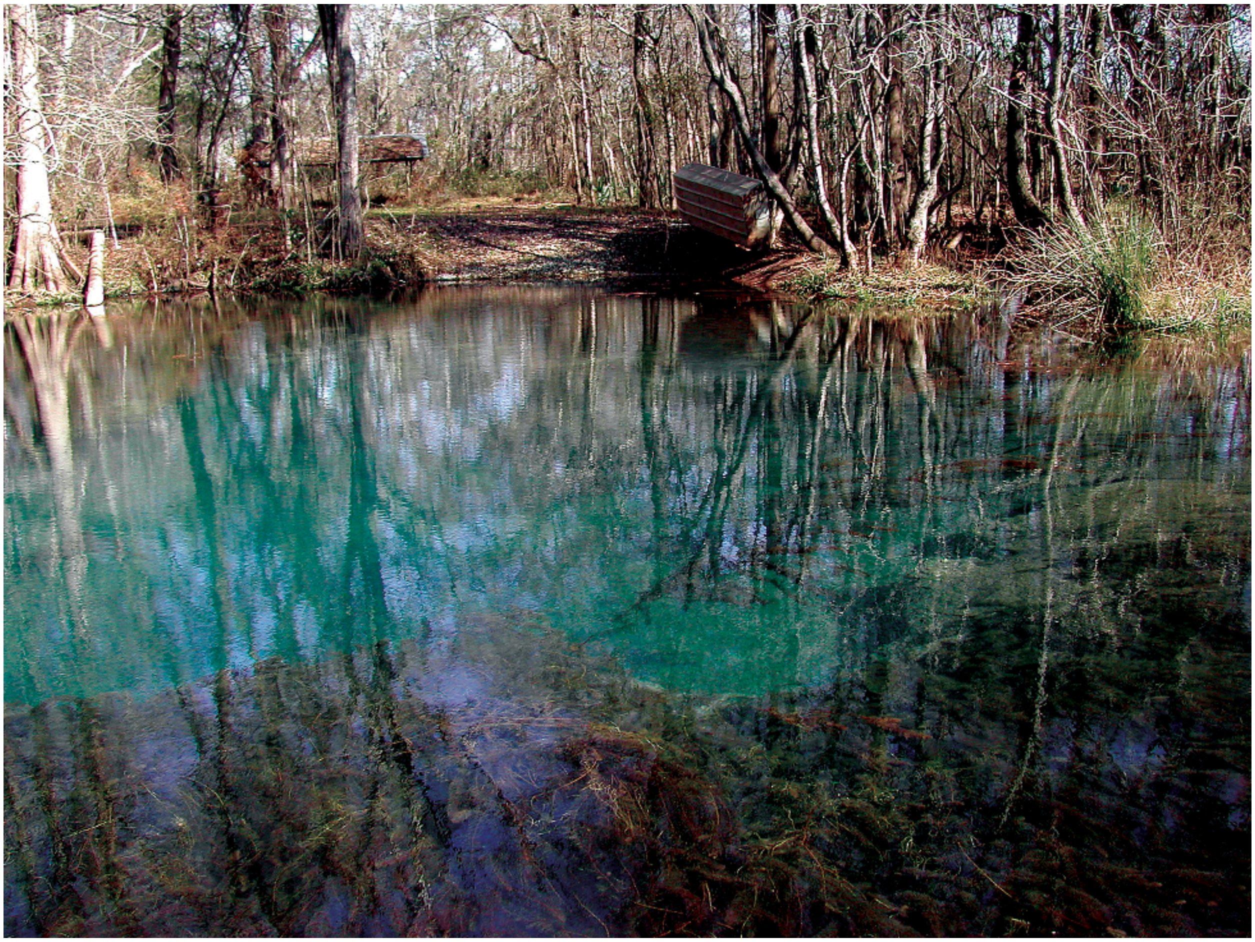

Figure 77. Hays Spring (photo by R. Means).

Location – Lat. 30° 53' 42.33" N., Long. 85° 13' 28.15" W. (NE ¼ SW ¼ NW ¼ sec. 27, T. 6 N., R. 10 W.). Hays Spring enters the Chipola River approximately 10 miles northwest of Marianna. The spring run enters the Chipola River from the northeast about 0.3 miles (0.5 km) upstream from the CR 162 bridge over the Chipola River. From Marianna head north on CR 166 (Jefferson Street) approximately 3 miles (4.8 km) to the intersection with CR 167. Turn north (left) on CR 167 and drive approximately 4.2 miles (6.8 km) to the intersection with CR 162. Turn west (left) on CR 162 and travel approximately 2.6 miles (4.2 km) to the bridge over the Chipola River. There is limited small watercraft access to the river south of the bridge on the west bank.

Description – Hays Spring pool measures 75 ft (22.9 m) north to south and 100 ft (30.5 m) east to west. Spring bathymetry is dramatic, with limestone cliffs and overhangs near the vent. The spring pool is shallow, except over the elongated vent opening, where depths reach 14.9 ft (4.5 m). Rosenau et al. (1977) report that the bottom is soft and muddy. Hays Spring is bluish and slightly murky. Water lettuce and exotic aquatic vegetation are present. There was no visible boil over the spring during the February 2003 sampling visit. A creek channel comes in on the northwest side of the spring pool. Hays Spring Run exits the pool to the southwest. The upper section of the spring run is approximately 0.5 mi (0.8 km) long and 100 ft (30.5 m) wide. Thereafter, the spring run narrows, is often multi-chan-

Table 82. Hays Spring water quality analysis.

Analytes	2003	
	Dissolved	Total
Field Measures		
Temperature	20.45	
DO	6.37	
pH	7.61	
Sp. Cond.	269	
Lab Analytes		
BOD	-	0.4AI
Turbidity	-	0.30
Color	-	5U
Alkalinity	-	120
Sp. Cond.	280.0	-
TDS	-	149.0
TSS	-	4U
Cl	-	4.2
SO_4	-	0.62
F	-	0.05U
Nutrients		
TOC	-	1U
$NO_3 + NO_2$ as N	-	3.10
$NH_3 + NH_4$	-	0.01U
TKN	0.06U	0.06U
P	0.021I	0.015U
PO_4	0.018	-
NO_3	-	-

Analytes	2003	
	Dissolved	Total
Metals		
Ca	50.9	52.3A
K	0.36	0.38A
Na	1.7I	1.8I
Mg	1.1	1.1A
Al	-	10U
As	3U	3U
B	-	10U
Cd	0.5U	0.5U
Co	-	1U
Cr	2U	2U
Cu	3.5U	4U
Fe	5U	11I
Mn	0.25U	1.1I
Ni	2U	2U
Pb	5U	5U
Ra-226	-	0.4
Ra-228	-	0.8U
Se	8U	8U
Sn	-	4U
Sr	-	35.4A
Zn	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

neled, and runs for a total length of approximately 2.8 mi (4.5 km) southwestward into the Chipola River. A pipe leads into the Hays Spring from the northeast bank. The northeast side also has a pavilion and cleared boat launch area. The immediate surroundings are forested, with cleared farmland visible through the trees to the east.

Utilization – The spring is undeveloped and surrounded by private lands.

Discharge – No discharge rate is available.

Table 83. Hays Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4Q
Fecal Coliform	1KQ

Jackson Blue Spring

Figure 78. Jackson Blue Spring (photo by T. Scott).

Figure 79. Jackson Blue Spring aerial photo (photo by T. Scott).

Location—Lat. 30° 47' 25.85" N., Long. 85° 08' 24.31" W. (SW ¼ SE ¼ NW ¼ sec. 33, T. 5 N., R. 9 W.). Jackson Blue Spring is about 5 miles (8 km) east of Marianna at the northeast end of Merritts Mill Pond. From the intersection of US 90 and SR 73 in Marianna, head east 1.4 miles (2.3 km) on U.S. 90. Turn north (left) on SR 71 and travel 1.2 miles (1.9 km) to the intersection of SR 164. Turn east (right) and drive 3.3 miles (5.3 km) to the county park entrance on the south (right) side of the road. The spring is 0.1 mile (0.2 km) southeast of SR164 in a county park.

Description-Numerous springs feed Merritts Mill Pond. Jackson Blue Spring is the main spring at the head of the pond. It is situated about 10 ft (3 m) west of the diving platform. Spring pool diameter is approximately 240 ft (73.2 m) southwest to northeast and 233 ft (71 m) northwest to southeast. Maximum depth over the vent is 16.5 ft (5 m). The vent is elliptical and approximately 5 ft (1.5 m) high and 25 feet (7.6 m) wide. Limestone is exposed near the vent, and it bears backhoe scars. Clear bluish water issues from the vent. A boil is slightly visible at the surface. There is approximately 40% algae coverage on the pool bottom and very little aquatic or emergent vegetation. The spring pool is a designated swimming area separated from the rest of Merritts Mill Pond by a chain link fence across the channel approximately 300 ft (91.4 m) downstream. The southern shore of the spring pool meets a lowland cypress-gum forest. The northern half of the pool is bordered by high ground sloping upward to nearly 20 ft (6.1 m) above water level. Most of the high ground is cleared and grassy. All nearby uplands are developed. There are buildings and a parking

Table 84. Jackson Blue Spring water quality analysis.

Analytes	1924	1946	1972	2001	
				Unfilt.	Filter
Field Measures					
Temperature	-	-	20.5	20.94	-
DO	-	-	7.8	7.26	-
pH	-	7.5	7.5	7.58	-
Sp. Cond.	-	-	220	243	-
Lab Analytes					
BOD	-	-	0.0	0.2 AU	-
Turbidity	-	-	0	0.05 U	-
Color	-	-	0	5U	-
Alkalinity	-	-	98	108	109
Sp. Cond.	-	-	-	270	-
TDS	-	-	-	139	-
TSS	-	-	-	4U	-
Cl	2.0	2.5	2.5	3.7	3.8 A
SO_4	2.4	0.9	0.0	1	1.1 A
F	-	0.0	0.1	0.036 I	0.035 I
Nutrients					
TOC	-	-	0.0	1 U	-
NO3 + NO2	-	-	1.4	3.3	3.3
NH3 + NH4	-	-	-	0.01 U	0.01 U
TKN	-	-	-	0.074 I	0.06 U
P	-	-	0.02	0.023	0.022
PO_4	-	-	0.02	0.02	-

Analytes	1924	1946	1972	2001	
				Unfilt.	Filter
Metals					
Ca	43	38	37	44.5	43.6
K	-	0.4	0.2	0.29	0.29
Na	2.3	1.7	1.6	1.73	1.54
Mg	1.0	2.1	2.1	2.3	2.1
As	-	-	10	3 U	3 U
Al	-	-	-	-	75 U
B	-	-	0	30 U	-
Cd	-	-	-	0.75 U	0.5 U
Co	-	-	0	0.75 U	-
Cr	-	-	1	2 U	2 U
Cu	-	-	10	2 U	2 U
Fe	-	-	-	25 U	20 U
Mn	-	-	-	0.5 U	0.5 U
Ni	-	-	-	2 U	2 U
Pb	-	-	2	5 U	3 U
Se	-	-	-	3.5 U	3.5 U
Sn	-	-	-	7U	-
Sr	-	-	40	32 I	-
Zn	-	-	-	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

area constructed on the uplands. Surrounding the spring, are a concrete retaining wall near shore, slides, a diving board, and picnic tables. An extensive underwater cave system has been mapped at Jackson Blue Spring.

Utilization- Jackson Blue Spring is a county swimming and recreational park.

Discharge- Current discharge measurement was calculated at Turner Landing, below the damn on Merritts Mill Pond. All discharge rates are measured in ft^3/s.

January 24, 1929	134[1]
December 22, 1934	56[1]
May 20, 1942	265[1]
November 15, 1946	178[1]
January 30, 1947	178[1]
August 6, 1973	287[1]
December 17, 2001	63.6[2]

Table 85. Jackson Blue Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	1 K
Enterococci	1 K
Fecal Coliform	1 K
Total Coliform	1 K

Shangri-La Springs

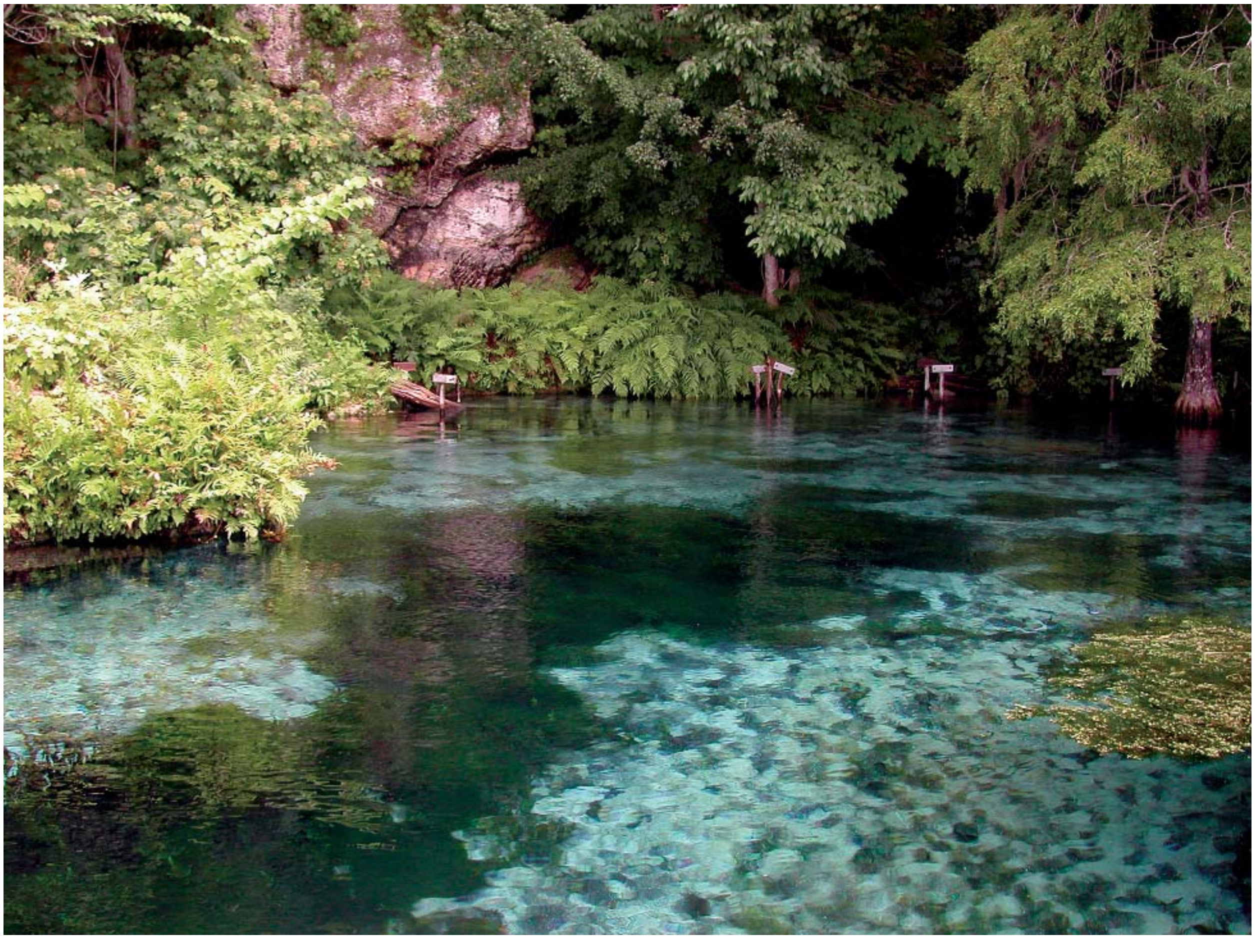

Figure 80. Shangri-La Springs (photo by R. Means).

Location – Lat. 30° 47' 24.60" N., Long. 85° 08' 34.39" W. (SE ¼ SW ¼ NW ¼ sec. 33, T. 5 N., R. 9 W.). Shangri-La Springs is located near the west bank of Merritts Mill Pond, 5 miles (8 km) east of Marianna. The spring is accessible by canoe or small boat from the public boat ramp on Hunter Fish Camp Road. From Marianna head east on US 90 to the intersection with SR 71, approximately 1.4 miles (2.3 km). Turn north (left) onto SR 71 and travel 1.2 miles (1.9 km) to the intersection with CR 164. Turn east (right) onto CR 164 and travel approximately 1.7 miles (2.7 km) to the intersection with Hunter Fish Camp Road. Turn south (right) on Hunter Fish Camp Road and travel approximately 0.6 mile (1 km) to the public boat landing. The spring vent is approximately 1.5 miles (2.4 km) upstream. Just after passing the recreation area buoys, look to the left. The spring is in a cove adjacent to a vegetated, car-sized boulder. There are a few dozen metal poles that stick out of the water near the vent. Alternatively, the spring is 2,100 ft (640 m) downstream from Jackson Blue Spring and can be accessed using Blue Springs Recreation Area boat launch.

Description – Shangri-La Springs is situated between a large boulder and a 20 ft (6.1 m) high vertical limestone bluff on the west side of Merritts Mill Pond and forms a 40 ft (12.2 ft) diameter spring cove with native aquatic vegetation and little algae. Shangri-La Springs vent is 7 ft (2.1 m) deep and sand-bottomed with exposed limestone. Another vent is situat-

Table 86. Shangri-La Spring water quality analysis.

Analytes	2003	
	Dissolved	Total
Field Measures		
Temperature	20.92	
DO	6.26	
pH	7.54	
Sp. Cond.	275	
Lab Analytes		
BOD	-	0.2U
Turbidity	-	0.05
Color	-	5U
Alkalinity	-	119
Sp. Cond.	263.0	-
TDS	-	168.0
TSS	-	4U
Cl	-	4.3A
SO_4	-	1.2A
F	-	0.05U
Nutrients		
TOC	-	1U
$NO_3 + NO_2$ as N	-	3.4
$NH_3 + NH_4$	-	0.01U
TKN	0.06U	0.06U
P	0.035I	0.032I
PO_4	0.021	-
NO_3	-	-

Analytes	2003	
	Dissolved	Total
Metals		
Ca	53.4A	51A
K	0.29A	0.29A
Na	1.5I	1.87A
Mg	1.8A	1.8A
Al	-	10U
As	4U	7U
B	-	10U
Cd	0.5U	0.5U
Co	-	2U
Cr	2U	2U
Cu	5U	3U
Fe	15U	10U
Mn	0.25U	1U
Ni	2U	2U
Pb	5U	12U
Ra-226	-	0.1
Ra-228	-	0.9U
Se	8U	15U
Sn	-	11U
Sr	-	39A
Zn	3U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

ed in a limestone fissure 50 ft (15.2 m) to the east. The water is light blue and clear. A prominent boil is seen over the vent near the bluff. A lone scraggly cypress tree stands in the open waters of the mill pond, 100 ft (30.5 m) southeast of the main vent. The bluff face, boulder, and surrounding area are lush with ferns and other vegetation. Merritts Mill Pond is a 5 mile (8 km) long impounded spring run. Several springs feed into the pond along the edges or directly from the pond bottom. Jackson Blue Spring forms the headwaters of Merritt's Mill Pond.

Table 87. Shangri-La Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Utilization – The spring is surrounded by private, forested land on one side and Merritts Mill Pond, a popular fishing area, on the other.

Discharge – No discharge rate is available at this time.

Spring Lake Springs

The Florida Geological Survey sampled five second magnitude springs that flow into Spring Lake. Spring Lake actually is a 100-200 ft (30.5-61 m) wide spring run that forms at the confluence of Mill Pond Spring and Springboard Springs. Three other named springs enter into the lake (run) downstream, Double Spring and Black Spring from the south, and Gadsen Spring from the north. A low-lying swamp forest buffer surrounds the entire lake basin, and farther upslope becomes cleared farmland. Spring Lake discharges into Dry Creek, a dark water stream that flows approximately 13 miles (21 km) to the Chipola River. From the confluence, Dry Creek is clear and often flows over limestone.

Location - Spring Lake is located approximately 6.5 miles (10.5 km) southwest of Marianna and has one boat launch that is privately owned but open to the public. Due to extremely shallow spring run conditions, these springs are accessible by canoe or small boat only. From I-10, drive southwest 0.7 miles (1.1 km) on SR 276 to its intersection with SR 167. Turn south (left) on SR 167, travel 4.3 miles (6.9 km). Turn east (left) on Mystery Springs Road and travel 1.4 miles (2.3 km). Turn north (left) on a small track just before the end of the road. Follow this track down to the water and the boat launch. Directions to each spring are given in relation to Black Spring run where this boat launch is located.

Black Spring

Figure 81. Black Spring (photo by R. Means).

Location – Lat. 30° 41' 55.40" N., Long. 85° 17' 40.08" W. (SE ¼ SW ¼ SW ¼ sec. 36, T. 4 N., R. 11 W.). Black Spring is 150 ft (45.7 m) upstream (west) of the boat launch on the south side of Spring Lake.

Description – Black Spring is also known as Black Hole (Rosenau et al., 1977). The spring pool is nearly circular, steep-sided, and deep. It measures 150 ft (45.7 m) in diameter, and is 49.1 ft (15.0 m) deep northeast of the pool's center. Approximately 20 ft (6.1 m) below the surface on the northeast side, a 25 ft (7.6 m) vertical limestone wall leads down to the spring vent. The water is clear to slightly tannic but appears very dark. Black Spring derives its name from its tendency to issue tannic water during times when all other springs associated with Spring Lake may be discharging clear water. This was the case during the March 2002 sampling visit; however, the water of Black Spring was clear and bluish two months later. Abundant aquatic vegetation, including water lettuce, exotic aquatic vegetation and algae, covers the shallow areas around the perimeter of the spring pool. No boil was visible in March 2002. Black Spring flows through three separate stream channels. The main channel flows north, another northeast, and the other east, all under a swamp forest canopy and into Spring Lake. The north-flowing channel is approximately 150 ft (45.7 m) long, the northeast-flowing and smallest channel is approximately 300 ft (91.4 m), and the east-flowing run approximately 350 ft (106.7 m). The runs are up to 50 ft (15.2 m) wide and 5 ft (1.5 m) deep. All immediate surroundings are low-lying with dense hardwood and cypress

Table 88. Spring Lake Springs, Black Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	21	20.64	
DO	3	4.30	
pH	6.8	7.26	
Sp. Cond.	-	180	
Lab Analytes			
BOD	-	-	0.3AI
Turbidity	-	-	0.7
Color	5	-	5U
Alkalinity	90	-	89A
Sp. Cond.	190	180.00	-
TDS	112	-	105.0
TSS	-	-	4U
Cl	4	-	3.0
SO_4	1.2	-	1.7
F	0.2	-	0.065I
Nutrients			
TOC	-	-	2.9I
$NO_3 + NO_2$ as N	0.09	-	0.43J
$NH_3 + NH_4$	-	-	0.019I
TKN	-	.083I	0.16I
P	-	0.016	0.017
PO_4	-	0.011	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	30	27.2	28.4
K	0.4	0.4	0.4
Na	1.4	1.6	1.5I
Mg	5.2	5.1	5.3
Al	-	-	93I
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	66I	100I
Mn	-	11.2	14.1
Ni	-	2U	2U
Pb	-	3U	5U
Ra226	-	-	0.2
Ra228	-	-	0.7
Se	-	4U	4U
Sn	-	-	10U
Sr	60	-	32.8
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

swamp forest. The nearest high ground is approximately 150 ft (45.7 m) south and gently rises to a height of about 12 ft (3.7 m) above the lowlands.

***Utilization* -** The spring is undeveloped and surrounded by private land.

***Discharge* -** Discharge rates are measured in ft^3/s.

July 18, 1973	73.2(1)
May 23, 2002	51.60(2)

Table 89. Spring Lake Springs, Black Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	520Q
Fecal Coliform	134Q

Double Spring

Figure 82. Double Spring (photo by R. Means).

Location – Lat. 30° 42’ 13.68” N., Long. 85° 18’ 11.16” W. (NE ¼ NW ¼ SE ¼ sec. 35, T. 4 N., R. 11 W.). The short spring run flows into Spring Lake from the southwest, 0.6 miles (1 km) upstream from Black Spring Run.

Description – Double Spring, a karst window, is composed of a spring, a short run, and a siphon, all on the south side of Spring Lake. Double Spring is nearly circular and sits in a bowl-shaped depression measuring 87 ft (26.5 m) in diameter. The depth of the spring pool is 18.0 ft (5.5 m), and the water is somewhat murky with a bluish hue. Limestone can be

Table 90. Spring Lake Springs, Double Spring water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	21	20.06	
DO	4.5	5.89	
pH	7.4	7.46	
Sp. Cond.	-	250	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	1.1
Color	5	-	5U
Alkalinity	120	-	121.0
Sp. Cond.	210	240.0	-
TDS	144	-	131.0
TSS	-	-	4U
Cl	4	-	3.4
SO_4	0	-	1.9
F	0.2	-	0.086I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.2	-	0.95
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.019	0.021
PO_4	-	0.018	-
NO_3	0.9	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	41	42.6	38.6A
K	0.4	0.35	0.32A
Na	1.8	1.7I	1.8I
Mg	5	5.6	5.3A
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	1.4U	1.4U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.1U
Ra-228	-	-	1.2U
Se	-	4U	4U
Sn	-	-	10U
Sr	80	-	44.9A
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

found near the vent and siphon, but the rest of the spring, siphon and run has a soft sand bottom. A moderate boil is present on the water surface. There are large, thick mats of filamentous algae scattered about the pool among native aquatic vegetation with some exotic invasive aquatic plants. The spring discharges through a run as wide as the spring and flows for approximately 75 ft (22.9 m), where it splits into two channels, one flowing north and one flowing east. The majority of flow travels eastward approximately 200 ft (61 m) into a siphon that is estimated to have a depth of 15 ft (4.6 m). The northward run flows through a narrow channel a short distance into Spring Lake. Higher ground on the south side of the spring rises gently to approximately 8 ft (2.4 m) above the water. There is a wooden dock on the south side of the pool, and a private residence can be seen to the southwest on the higher ground. The area around the spring is within in a dense hardwood and cypress swamp forest.

Utilization – Double Spring is surrounded by private lands and is used privately for swimming.

Discharge - Discharge rates are measured in ft^3/s.
July 17, 1973 37.5[1]
May 22, 2002 appeared to be siphoning during the 2002 visit[2]

Table 91. Spring Lake Springs, Double Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	16Q
Fecal Coliform	2Q

Gadsen Spring

Figure 83. Gadsen Spring (photo by R. Means).

Location – Lat. 30° 42’ 12.09” N., Long. 85° 17’ 18.42” W. (NW ¼ NW ¼ SE ¼ sec. 36, T. 4 N., R. 11 W.). Gadsen Spring flows into Spring Lake from the north, 2100 ft (640 m) downstream from Black Spring Run.

Description – Gadsen Spring occupies a deep, conical, nearly circular to oval depression 120 ft (36.6 m) north to south and 141 ft (43 m) east to west. The depth of the spring pool measured over the vent is 43 ft (13.1m). The vent is located beneath a vertical limestone ledge that is slightly north of the pool’s center. The water is slightly murky with a greenish blue color. No boil on the pool surface was observed in March 2002. There is abundant native aquatic vegetation with some thick algae mats. Gadsen Spring discharges south 75 ft (22.9 m) through a narrow run that is shallow, approximately 1-3 ft (0.3-0.9 m) deep. The run then widens to about 100 ft (30.5 m) forming a pool that is approximately 150 ft (45.7 m) long and has dense aquatic vegetation. This pool is reported to be a sinkhole that takes some of the water (Rosenau et al., 1977). Continuing downstream southward, the run again narrows and flows swiftly for approximately 800 ft (243.8 m) through low-lying swamp forest until entering Spring Lake. A mowed grassy track accesses the spring on the north side. To the north, land rises very gently to a height of about 10 ft (3.1 m) above the lowlands. There is a small water-filled sinkhole to the north a short distance. All surrounding lands are forested.

***Utilization* -** The spring is undeveloped and surrounded by private land.

Discharge **-** Discharge rates are measured in ft^3/s.

July 18, 1973	18.0[1]
May 23, 2002	12.8[2]

Table 92. Spring Lake Springs, Gadsen Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	20	20.54	
DO	-	4.36	
pH	7.2	7.26	
Sp. Cond.	-	250	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.5
Color	5	-	5U
Alkalinity	120	-	125
Sp. Cond.	220	250.0	-
TDS	140	-	134
TSS	-	-	4U
Cl	2	-	3.6
SO_4	0.8	-	1.7
F	0.2	-	0.084I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.16	-	0.84J
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.02	0.017
PO_4	-	0.016	-
NO_3	0.7	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	39	40	41.7
K	0.3	0.35	0.34
Na	1.7	1.8	1.6I
Mg	5.7	6.3	6.5
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	1.1I	2.5
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.4
Ra-228	-	-	1.2U
Se	-	4U	4U
Sn	-	-	10U
Sr	90	-	49.7
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 93. Spring Lake Springs, Gadsen Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4Q
Fecal Coliform	4Q

Mill Pond Spring

Figure 84. Mill Pond Spring (photo by R. Means).

Location – Lat. 30° 42' 13.32" N., Long. 85° 18' 27.00" W. (NE ¼ NE ¼ SW ¼ sec. 35, T. 4 N., R. 11 W.). Mill Pond Spring flows into the lake from the southwest 0.85 miles (1.37 km) upstream from Black Spring Run. The spring is surrounded by private land.

Description – Mill Pond Spring pool measures 126 ft (38.4 m) north to south and 150 ft (45.7 m) east to west. It occupies a conical depression. The depth measured near the center of the pool is 16.8 ft (5.1 m). The sides of the pool are steep and sandy, leading down to a deeper central area with limestone exposed in the spring vent. The water is clear and light blue. No boil was visible on the pool surface during the March 2002 visit. The pool has an abundance of exotic aquatic vegetation, except for the deeper central portion. Mill Pond Spring flows into uppermost Spring Lake on the southwest side via a 600 ft (182.8 m)-long, shallow spring run. The run averages 2 ft (0.6 m) deep. Private residences are present along the northwest side of the spring and the uppermost part of its run. The houses are situated on a gently sloping 8 ft (2.5 m) high ridge. The rest of the land surrounding the spring and its run is densely forested and mostly low-lying. High ground is also adjacent to the spring run on its south side approximately 400 ft (121.9 m) downstream from the spring.

***Utilization* -** The spring is located on private land and a portion of the water is extracted by a water bottling company.

Discharge **-** All discharge rates are measured in ft^3/s.

July 18, 1973	33.2[(1)]
May 22, 2002	23.21[(2)]

Table 94. Spring Lake Springs, Mill Pond Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	20.5	20.39	
DO	6.5	4.17	
pH	7.4	7.53	
Sp. Cond.	-	204	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.2
Color	5	-	5U
Alkalinity	97	-	120
Sp. Cond.	180	237.0	-
TDS	117	-	130
TSS	-	-	4U
Cl	2	-	3.4
SO_4	0.4	-	1.8
F	0.2	-	0.082I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.2	-	0.97
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.02	0.020
PO_4	-	0.018	-
NO_3	0.9	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	30	41.4	37.5
K	0.4	0.35	0.32
Na	1.5	1.8I	1.5I
Mg	5.8	5.4	5.0
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	1U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	1.2U
Se	-	4U	4U
Sn	-	-	10U
Sr	60	-	42.3
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 95. Spring Lake Springs, Mill Pond Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	16Q
Fecal Coliform	2Q

Springboard Spring

Figure 85. Springboard Spring (photo by R. Means).

Location – Lat. 30° 42' 26.64" N., Long. 85° 18' 23.76" W. (NE ¼ SE ¼ NW ¼ sec. 35, T. 4 N., R. 11 W.). Springboard Spring is on the northwest side of Spring Lake 0.9 miles (1.5 km) upstream from Black Spring run at the head of Spring Lake. At the head of Spring Lake, take the spring run that enters from the north and follow it approximately 1,000 ft (304.8 m) to the spring.

Description – Springboard Spring pool measures 78 ft (23.8 m) north to south and 60 ft (18.3 m) east to west. The spring issues from a deep crack in limestone near the center of the spring pool and is 18.4 ft (5.6 m) deep. Its water is clear and bluish. Aquatic vegetation including exotic aquatic vegetation and algae are abundant. A very slight boil was present in March 2002. It has two spring runs, one flowing southwest, and one flowing southeast. The southwest run, approximately 1,000 ft (304.8 m) long, is narrow, averages 2 ft (0.6 m) deep, and merges with Mill Pond Spring run to form upper Spring Lake. The southeast-flowing run is approximately 125 ft (38.1 m) wide and averages less than 1 ft (0.3 m) deep. It has a soft sand and detritus-covered bottom with rich aquatic vegetation and freshwater mollusks. Approximately 800 ft (243.8 m) downstream, half of the southeast run flows into a swirling siphon approximately 50 ft (15.2 m) in diameter. The other half flows southward a short distance from the first siphon into another. During higher water levels, water flows past the siphons via an ephemeral stream channel southward to the northwest portion of Spring Lake. This intermittent channel was dry in March 2002. The immediate lands to the north of the spring are all low-lying and densely forested with mixed hardwoods and cypress.

A forested island surrounded by the two spring runs is south of the spring along the northwest perimeter of Spring Lake.

Utilization **-** The spring is remote, undeveloped, and surrounded by private property.

Discharge **-** Discharge rates are measured in ft^3/s.

July 18, 1973	17.4[(1)]
May 22, 2002	33.96[(2)]

Table 96. Spring Lake Springs, Springboard Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	20.27	
DO	7.5	4.22	
pH	7.7	7.34	
Sp. Cond.	-	245	
Lab Analytes			
BOD	-	-	0.2U
Turbidity		-	0.20
Color	10	-	5U
Alkalinity	120	-	99A
Sp. Cond.	240	198.0	-
TDS	137	-	110.0
TSS	-	-	4U
Cl	3.0	-	2.8
SO_4	0.8	-	1.4
F	0.2	-	0.07
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.2	-	0.64
$NH_3 + NH_4$	-	-	0.011I
TKN	-	0.06U	0.06U
P	-	0.016	0.018
PO_4	-	0.018	-
NO_3	0.9	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	39	31.3A	26.6
K	0.3	0.39A	0.34
Na	1.7	1.6I	1.4I
Mg	4.8	6.4A	5.5
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.1
Ra-228	-	-	1.2U
Se	-	4U	4U
Sn	-	-	10U
Sr	100	-	31.2
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 97. Spring Lake Springs, Springboard Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

JEFFERSON COUNTY

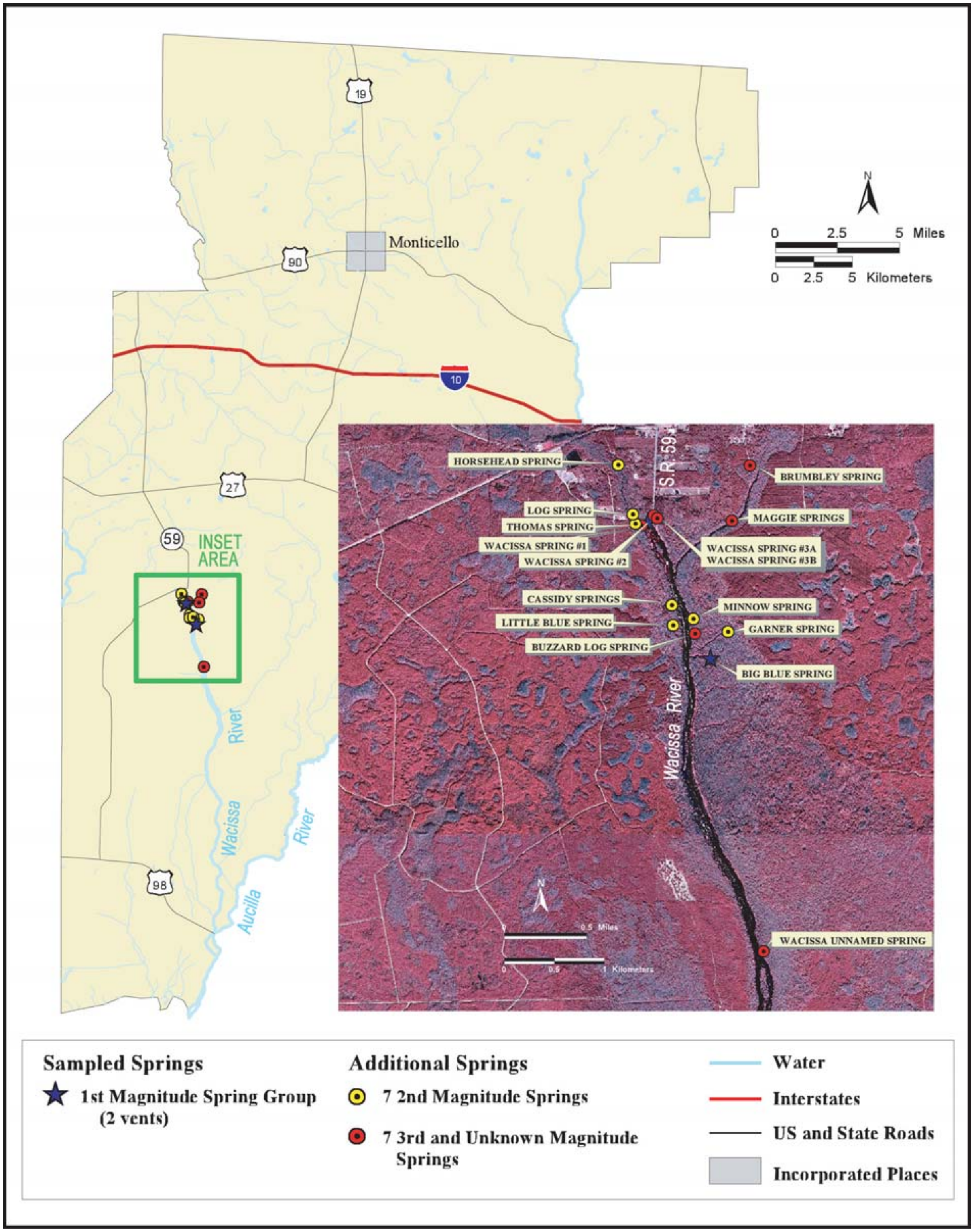

Figure 86. Springs visited by FGS in Jefferson County.

Wacissa Springs Group

Figure 87. Wacissa Springs Group, Big Spring (Big Blue Spring) (photo by R. Means).

Group Location—Lat. 30° 20' N., Long. 83° 59' W. (Sections 2 and 12, T. 2 S., R. 3 E.). The Wacissa Springs Group is approximately 19 miles (30.6 km) southeast of Tallahassee and 1.2 miles (1.9 km) south of Wacissa. From the intersection of Tram Road and SR 59 in Wacissa, travel south on SR 59 approximately 0.7 mile (1.1 km) where SR 59 turns sharply to the west less than 1 mile (1.6 km) south of Wacissa. At this sharp right turn, a paved county road continues south (straight) and ends 0.6 miles (1 km) beyond at a county park and boat ramp situated on the east side of the head of the Wacissa River.

Group Description-The Wacissa Springs Group consists of at least 12 springs that give rise to the Wacissa River (Rosenau et al., 1977). Several springs are located at the head of the river near the county park. The rest are scattered along the upper 2 miles (3.2 km) of the river. Hornsby and Ceryak (2000) list 16 springs in this group. These include Wacissa, Big, Blue, Buzzer's Log, Cassida, Garner, Horse Head, Log, Minnow, Thomas, JEF63991, JEF63992, JEF63993, JEF64991, JEF312991, and Acuilla springs. Land along the upper part of the river is low and flat, and it supports a lush mixed hardwood-palm forest.

Spring No. 2—Lat. 30° 20' 23.59" N., Long. 83° 59' 29.34" W. (SE¼ SE¼ NE¼ sec. 2, T. 2 S., R. 3 E.). Spring No. 2 is located 15 ft (4.7 m) south of the diving board platform at the county park. There are multiple small vents near this spring. Spring pool diameter measures 45 ft (13.7 m) north to south. The maximum depth of the spring pool measures 8 ft (2.4 m). The spring pool is choked with exotic aquatic vegetation, and algae are present throughout the pool. There are no adjacent uplands. Land near the spring supports cypress

Table 98. Wacissa Springs Group water quality analysis.

Analytes	Big Spring				Spring No. 2 (Aucilla)		
	1946	1960	2001		1972	2001	
			Unfilt.	Filter		Unfilt.	Filter
Field Measures							
Temperature	-	20.0	20.5	-	20.5	21.0	-
DO	-	-	0.9	-	3.2	5.6	-
pH	7.4	7.9	7.4	-	8.0	7.6	-
Sp. Cond.	320	318	326	-	267	272	-
Lab Analytes							
BOD	-	-	0.31 I	-	0.6	0.2 U	-
Turbidity	-	-	0.1	-	1	0.25	-
Color	2	5	5U	-	5	5U	-
Alkalinity	-	150	163	163	120	132	132
Sp. Cond.	-	-	370	-	-	300	-
TDS	-	-	184	-	-	159	-
TSS	-	-	4 U	-	-	4 U	-
Cl	5.1	5.0	5.1	5.1	6.0	4.9	4.9
SO_4	6.7	6.4	6.4	6.6	5.2	5.3	5.4
F	0.1	0.2	0.13	0.13	0.3	0.14	0.14
Nutrients							
TOC	-	-	1I	-	0	1I	-
$NO_3 + NO_2$	-	-	0.16	0.16	0.2	0.41	0.41
$NH_3 + NH_4$	-	-	0.01 U	0.01 U	-	0.01 I	0.02 I
TKN	-	-	0.06 U	0.06 U	-	0.06 U	0.078 I
P	-	-	0.051	0.046	0.02	0.037	0.036
PO_4	-	-	0.045		0.02	0.036	-
Metals							
Ca	52	52	53.8	52.9	37	41.4	40.9 A
K	0.8	0.6	0.41	0.41	0.4	0.41	0.41 A
Na	3.1	3.6	2.94	2.92 A	3.6	2.81	2.88
Mg	8.6	9.8	8.4	8.2	7.9	8.3	8.2 A
As	-	-	3 U	3 U	290	3 U	3 U
Al	-	-	-	75 U	-	-	75 U
B	-	-	30 U	-	10	30 U	-
Cd	-	-	0.75 U	0.5 U	-	0.75 U	0.5 U
Co	-	-	0.75 U	-	-	0.75 U	-
Cr	-	-	2 U	2 U	0	2 U	2 U
Cu	-	-	2 U	2 U	0	2 U	2 U
Fe	-	-	37 I	20 U	40	25 U	20 U
Mn	-	-	7.1	1.74	-	1.9 I	0.75 I
Ni	-	-	2 U	2 U	-	2 U	2 U
Pb	-	-	5 U	3 U	2.0	5 U	3 U
Se	-	-	3.5 U	3.5 U	-	3.5 U	3.5 U
Sn	-	-	7 U	-	-	7 U	-
Sr	-	-	71.4	-	140	68.4	-
Zn	-	-	4 U	3.5 U	50	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value less than practical quantitation limit J=Estimated value Q=exceeding holding time limit

swamp forest and mesic hardwood forest. A sand and gravel parking lot borders the east side of the spring pool.

Big Spring (Big Blue Spring)-Lat. 30° 19’ 39.84” N., Long. 83° 59’ 05.44” W. (NW¼ SE¼ NW¼ sec. 12, T. 2 S., R. 3 E.). Big Spring is located approximately 1 mile (1.6 km) south of Spring No. 2 on the east side of the Wacissa River. It has two spring runs. The larger is about 66 ft (20.1 m) wide and flows 1,300 ft (396.2 m) northwest and west to the Wacissa River. The other run is about 33 ft (10.1 m) wide and it flows southwest 1,000 ft (304.8 m) to the river. Big Spring has one main vent nearly 6 ft (1.8 m) in diameter at the bottom of the circular spring pool. Pool diameter is 150 ft (45.7 m) northwest to southeast, 160 ft (48.8 m) northeast to southwest. Maximum depth of pool is 42 ft (12.8 m). The water is light greenish blue with large suspended particles, and the bottom is barely visible. A boil is present on the pool surface. Exotic aquatic vegetation covers nearly 50% of the depression. Water lettuce and some algae are present. There is no high ground immediately near the spring. The surrounding lowland forest is completely intact and is a mixture of cypress, hardwoods, and cabbage palm. A rope swing is located on the southwest side of the pool, and there is a floating wooden platform near the beginning of the larger spring run.

Utilization—Some of these springs are used as swimming and recreation areas, especially Spring No. 2 and Big Spring. The land around Wacissa River was purchased by the State of Florida, Conservation and Recreation Lands (CARL).

Discharge—Current discharge measurement is for the Wacissa Springs Group. All discharge rates are measured in ft^3/s.

July 16, 1942	69.4[1]
December 7, 1960	64.5[1]
October 2, 2001	293[4]

Table 99. Wacissa Springs Group bacteriological analysis.

Bacteria Results (in #/100 mL)		
Analyte	**Big Spring**	**Spring No. 2**
Escherichia coli	1 KQ	2Q
Enterococci	1 KQ	46Q
Fecal Coliform	1 AQ	4Q
Total Coliform	1 KQ	270Q

LAFAYETTE COUNTY

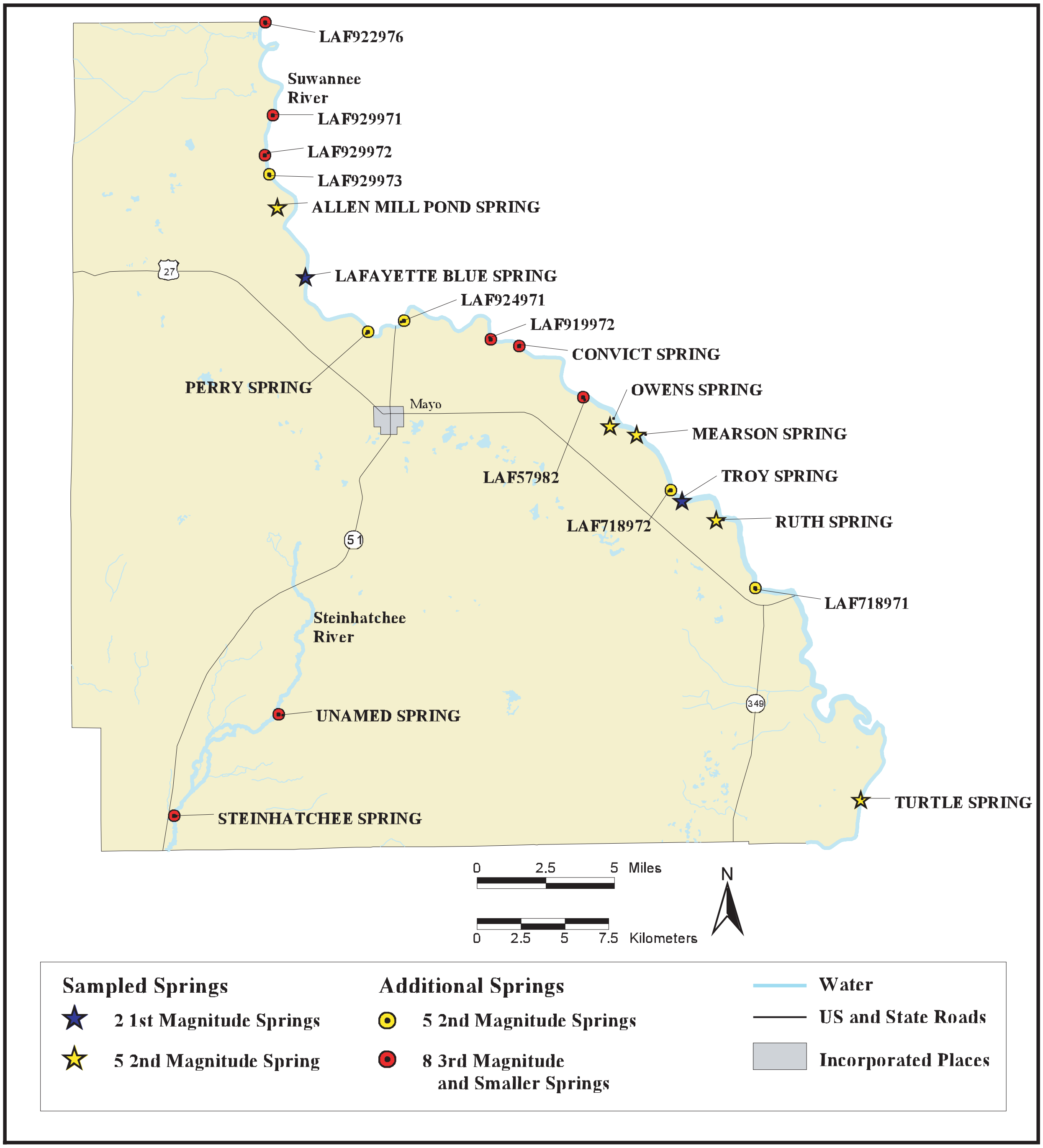

Figure 88. Springs visited by FGS in Lafayette County.

Allen Mill Pond Springs

Figure 89. Allen Mill Pond Springs (photo by R. Means).

Location – Lat. 30° 09' 46.23" N., Long. 83° 14' 35.06" W. (SW ¼ NE ¼ SW ¼ sec. 5, T. 4 S., R. 11 E.). Allen Mill Pond Springs are located on SRWMD land approximately 8.5 miles (14 km) northwest of Mayo. The springs are on the west side of the Suwannee River at the head of Allen Mill Pond. From the intersection of US 27 and SR 51 in Mayo, travel northwest on US 27 for approximately 4.8 miles (7.7 km). Turn north (right) on CR 251B and travel 3.7 miles (6 km) to the SRWMD sign for Allen Mill Pond on the east (right). Follow road to a parking area near the lower section of the spring run. The spring vent is approximately 0.6 miles (1.0 km) upstream from the mouth of the spring run. A footpath follows the west side of the run upstream to the spring.

Description – At least three spring vents occupy an elongated limestone fissure that spans 186 ft (56.7 m) east to west. The vent is a 2.5 ft (0.8 m) diameter hole in exposed limestone and has a maximum depth of 8.6 ft (2.6 m). The fissure reaches a maximum width of approximately 40 ft (12.2 m). The banks are exposed limestone. The bottom is dark due to organic debris. The entire elongated spring pool was covered with a thick layer of duckweed in July 2002. Water quality was sampled from the westernmost spring vent in the fissure system. The sampled spring pool is estimated to be 15 ft (4.6 m) east to west and 8 ft (2.4 m) north to south. The depth of the sampled vent is estimated at 8 ft (2.4 m). Allen Mill Pond Springs discharge southeastward from the east end of the fissure through a shallow run that averages about 1 ft (0.3 m) deep and 40 ft (12.2 m) wide. The spring run flows over scalloped limestone and rippled sand. There is an abundance of aquatic vegetation including exotic aquatic vegetation. Spring water is clear. There is a thick algal covering on limestone.

Table 100. Allen Mill Pond Springs water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	21.0	21.49	
DO	1.9	0.24	
pH	7.2	7.06	
Sp. Cond.	-	379	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	0.2
Color	0	-	5 U
Alkalinity	170	-	194.0
Sp. Cond.	377	372.0	-
TDS	186	-	208.0
TSS	-	-	4U
Cl	3.2	-	4.9
SO_4	4.5	-	4.9
F	0	-	0.14
Nutrients			
TOC	-	-	2.1I
$NO_3 + NO_2$ as N		-	0.52J
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.1I	0.06U
P	-	0.051	0.046A
PO_4	-	0.043	-
NO_3	-	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	46	55.3	56.3
K	0.5	0.48	0.47
Na	1.9	2.7	2.6I
Mg	17	13.8	14.1
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	24.5	26.3
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.4
Ra-228	-	-	1.6
Se	-	4U	4U
Sn	-	-	10U
Sr	0	-	46.0
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Several additional springs feed the upper part of Allen Mill Pond Springs Run. Approximately 100 ft (30.5 m) downstream from the head springs, on the west side of the spring channel, a small spring discharges vertically near the bank. A small vent producing a slight boil also is present out in the middle of the shallow stream channel 20 ft (6.1 m) to the east. Continuing downstream about 100 feet (31 m) farther, another smaller spring run, that is approximately 80 ft (24.4 m) long, feeds in from the east side. At its head is a small spring that has a pool measuring 15 ft (4.6 m) in diameter. From this point, Allen Mill Pond Springs Run continues to flow southeast another 0.6 miles (1.0 km) into the Suwannee River.

Utilization – The spring and spring run are within heavily forested SRWMD land. A public access area is located along the west side of the lower part of the spring run.

Discharge – All discharge rates are measured in ft^3/s.

November 26, 1973	21.8(1)
September 23, 1997	11.23(4)
July 9, 2002	5.78(2)

Table 101. Allen Mill Pond Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	2Q
Fecal Coliform	1KQ

Lafayette Blue Spring

Figure 90. Lafayette Blue Spring (photo by T. Scott).

Location-Lat. 30° 07' 33.00" N., Long. 83° 13' 34.08" W. (SW ¼ NE ¼ NW ¼ sec. 21, T. 4 S., R. 11 E.). Lafayette Blue Spring is located 7 miles (11.3 km) northwest of Mayo on the west side of the Suwannee River. From the intersection of US 27 and SR 51 in Mayo, drive northwest on US 27 for 4.9 miles (7.9 km). Turn north (right) on CR 251B and continue for 2.1 miles (3.4 km) on a gravel road. Turn east (right) onto a dirt road and go 0.2 miles (0.3 km) to the county park entrance. Spring vent is east of the parking area in the pool farthest from the river.

Description—Lafayette Blue Spring discharges from a single horizontal vent in the south side of the sink depression. The spring pool measures 57 ft (17.4 m) north to south and 102 ft (31.1 m) east to west. Spring depth measures 21 ft (6.4 m). The water is clear and light bluish green. Algae are very thick on limestone and sand substrates within the spring pool and run. The spring run flows east approximately 300 ft (91.4 m) before reaching the Suwannee River. Clear water from the spring contrasts sharply with the tannin-colored water of the river. Limestone is cropped out throughout the spring pool and run. A 20 ft (6.1 m) wide land bridge stretches north to south across the spring run approximately 120 ft (36.6 m) east of the vent. There is a narrow band of a few cypress trees near spring run. The spring pool is steep sided with limestone and sand. Adjacent high ground is approximately 20 ft (6.1 m) above the water level, and it is sparsely forested with a few pines and oaks. Several sinks and karst windows are present in the woods west of the main spring.

Utilization-This spring is developed into a county swimming and recreation park with a camping area, boat ramp and other facilities.

Discharge- All discharge rates are measured in ft^3/s.

November 23, 1973	92.8[(1)]
June 15,1998	102[(4)]
October 24, 2001	45.9[(4)]

Table 102. Lafayette Blue Spring water quality analysis.

Analytes	1973	2001	
		Unfilt.	Filter
Field Measures			
Temperature	21.5	21.7	-
DO	2.0	0.92	-
pH	7.2	7.17	-
Sp. Cond.	400	382	-
Lab Analytes			
BOD	-	0.2 AU	-
Turbidity	-	0.1	-
Color	5	5U	-
Alkalinity	170	200	200
Sp. Cond.	-	430	-
TDS	-	233	-
TSS	-	4U	-
Cl	7.0	9	9.2
SO_4	8.1	13	13
F	0.0	0.1	0.088 I
Nutrients			
TOC	-	1U	-
$NO_3 + NO_2$	-	1.8	1.8
NH_3+NH_4	-	0.059	0.022
TKN	-	0.16 I	0.1 I
P	-	0.041 A	0.041
PO_4	-	0.045	-

Analytes	1973	2001	
		Unfilt.	Filter
Metals			
Ca	54	67.2	65.3
K	1.0	0.84	0.86
Na	4.2	4.68	4.88
Mg	11	11.7	11.8
As	-	3 U	3 U
Al	-	-	75 U
B	-	25 U	-
Cd	-	0.75 U	0.75 U
Co	-	0.75 U	-
Cr	-	2 U	2 U
Cu	-	2.5 U	2.5 U
Fe	-	35 U	35 U
Mn	-	3.7	3.4
Ni	-	1.5 U	1.5 U
Pb	-	5 U	4 U
Se	-	4 U	4 U
Sn	-	10 U	-
Sr	0	94	-
Zn	-	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Table 103. Lafayette Blue Spring bacteriological analysis.

Bacteria Results (in #/100 ml)	
Analyte	**Value**
Escherichia coli	2Q
Enterococci	10Q
Fecal Coliform	6Q
Total Coliform	40Q

Mearson Spring

Figure 91. Mearson Spring (photo by D. Hornsby).

Location – Lat. 30° 02' 28.84" N., Long. 83° 1' 30.10" W. (NE ¼ NW ¼ NW ¼ sec. 21, T. 5 S., R. 13 E.). Mearson Springs are located approximately 9 miles (14.5 km) east of Mayo along the southwest bank of the Suwannee River. From the intersection of US 27 and SR 51 in Mayo, head east on US 27 for approximately 6.6 miles (10.6 km) to the intersection with CR 251. Turn east (left) onto CR 251 and drive approximately 2 miles (3.2 km) until the road makes a 90 degree bend to the north. Continue north on CR 251 approximately 0.7 miles (1.2 km) to a boat landing at the end of the road. The spring are 0.8 miles (1.3 km) downstream from the boat ramp on SR 251. Mearson Springs occupy a southwest to northeast-trending cove surrounded by high banks along the southwest bank of the Suwannee River.

Description – Mearson Springs pool, which has three vents, measures 75 ft (22.9 m) southwest to northeast and 51 ft (15.5 m) southeast to northwest. The largest spring vent is southernmost, where a cavern opens beneath a limestone shelf. The depth over the largest spring measures 11.8 ft (3.6 m). The bottom is limestone and varying amounts of sand. Spring water is clear and slightly green, contrasting with the dark water of the Suwannee River. There are thick patches of algae but little to no other aquatic vegetation. Three springs producing prominent boils are oriented linearly along a 30 ft (9.1 m) long, north-south trending limestone fissure. On the southwest side, a wooden boardwalk and stairs lead down into the spring from the 15 to 25 ft (4.6 – 7.6 m) high banks. The short spring run discharges northeast about 30 ft (9.1 m) into the river. Land around the spring is privately owned and forested adjacent to the spring. Spring discharge is dictated by Suwannee River stage. Bare limestone and sand banks that are typically underwater were exposed during the April 2002 visit due to extremely low river levels. The adjacent riverbanks are composed of scalloped limestone, shell marl, and sand.

Utilization - The spring is surrounded by private land and is used locally for swimming.

Table 104. Mearson Spring water quality analysis.

Analytes	1975	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	21.45	
DO	-	0.53	
pH	7.6	7.20	
Sp. Cond.	-	357	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.70
Color	5	-	5U
Alkalinity	150	-	167.0
Sp. Cond.	317	360.0	-
TDS	182	-	199.0
TSS	-	-	4U
Cl	3.2	-	5.0
SO_4	8.2	-	14.0
F	0.2	-	0.12A
Nutrients			
TOC	-	-	1.4I
NO_3+NO_2 as N	-	-	1.5J
$NH_3 + NH_4$	-	-	0.01UV
TKN	-	0.06UV	0.06U
P	-	0.033A	0.035
PO_4	-	-	0.034
NO_3	-	-	-

Analytes	1975	2002	
		Dissolved	Total
Metals			
Ca	52	52	54.3
K	0.3	0.72	0.73
Na	2.6	2.6I	2.8I
Mg	8.1	9.6	9.9
Al	-	-	50U
As	-	3U	3U
B	-	-	11I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	0	25U	25U
Mn	-	1.6I	2I
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	7U
Sr	60	-	67.6
Zn	-	3.4U	3.4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge - All discharge rates are measured in ft^3/s.

May 14, 1927	50.6 (1)
December 3, 1975	62.1 (1)
September 15, 1997	68.52 (4)
August 14, 2002	45.02 (2)

Table 105. Mearson Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Owens Spring

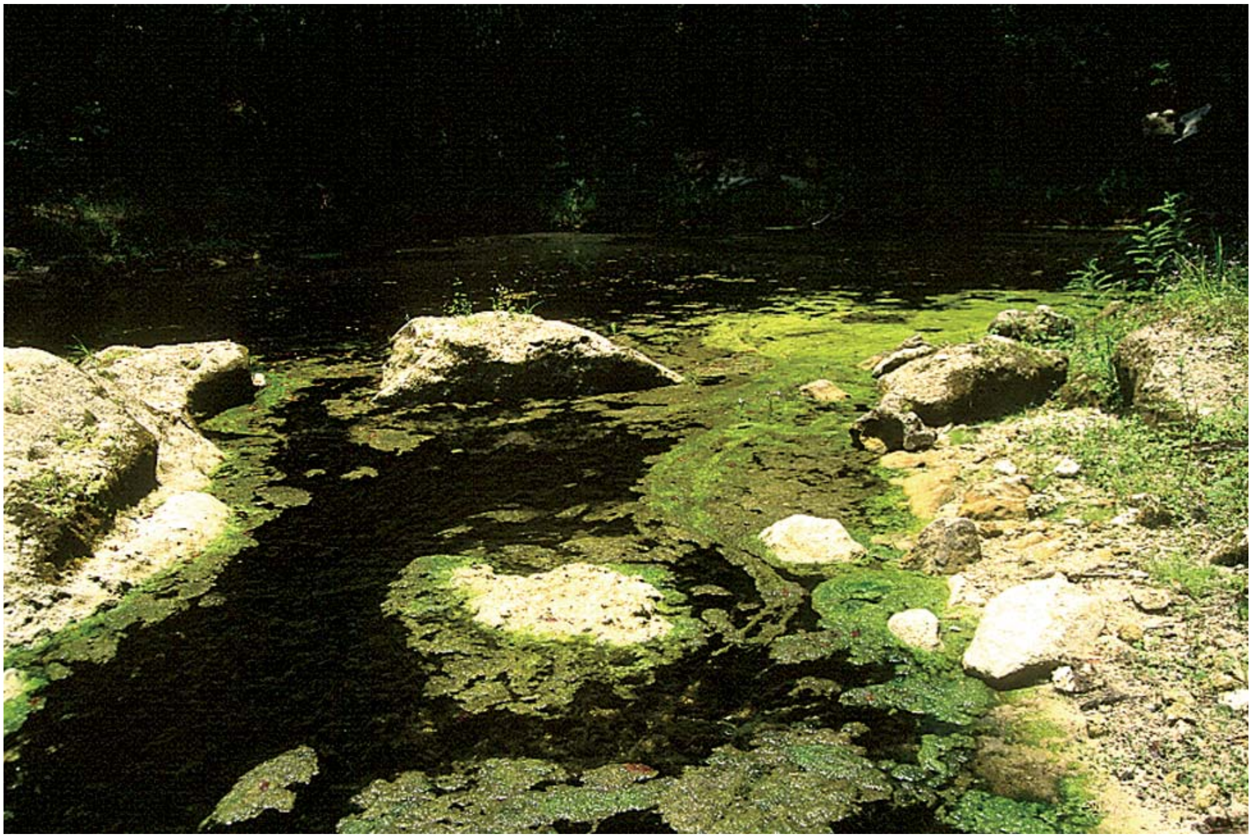

Figure 92. Owens Spring (photo by R. Means).

Location – Lat. 30° 02' 45.39" N, Long. 83° 02' 28.07" W (NW ¼ SE ¼ SW ¼ sec. 17, T. 5 S., R.13 E.). Owens Spring is located on SRWMD land about 8 miles (12.9 km) east of Mayo. From the intersection of US 27 and SR 51 in Mayo head east on US 27 for approximately 6.8 miles (10.9 km) to the intersection with CR 251. Turn east (left) onto CR 251 and drive approximately 2 miles (3.2 km) until the road makes a 90 degree bend to the north. Continue on CR 251 north approximately 0.7 miles (1.2 km) until the road comes to an end at a boat landing. The spring pool is approximately 0.25 miles (0.4 km) east of the CR 251B boat ramp on the Suwannee River.

Description – Owens Spring pool measures 114 ft (34.7 m) north to south and 87 ft (26.5 m) east to west. The pool is shallow, less than 8 ft (2.4 m) deep except in the deepest area at the vent where it measures 31.3 ft (9.5 m) deep. The vent lies beneath a submerged limestone ledge on the southwest side of the pool. The water is clear bluish to slightly tannic. There is very little aquatic vegetation and the bottom is mainly rock and sand. There are thick patches of dark green filamentous algae covering more than half of the pool substrates. Owens Spring has steep limestone and sand banks. Its west and north banks rise vertically to approximately 20 ft (6.1 m) higher than the water surface. In July 2002, the spring had a short run with steep sandy banks. It flowed approximately 125 ft (38.1 m) northeast into a siphon. Also at this time, the spring was barely flowing, crystal clear, and averaged less than 1 ft (0.3 m) deep. During a prior visit in March 2002, the water level was approximately 5 ft (1.5 m) higher, flowing swiftly, and was slightly tannic. At higher water levels, Owens Spring flows overland through a lowland corridor leading to the Suwannee River.

Table 106. Owens Spring water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	21.5	21.04	
DO	2.7	0.20	
pH	7.5	7.14	
Sp. Cond.	-	384	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.25
Color	0	-	5U
Alkalinity	150	-	163
Sp. Cond.	330	381.0	-
TDS	181	-	214A
TSS	-	-	4U
Cl	6.0	-	10.0
SO_4	4.4	-	15.0
F	0.1	-	0.094I
Nutrients			
TOC	-	-	2.8I
$NO_3 + NO_2$ as N	0.51	-	1.9J
NH_3 + NH4	-	-	0.01U
TKN	-	0.19I	0.13I
P	-	0.073	0.073
PO_4	-	0.07	-
NO_3	-	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	48	56.1	57.6
K	0.2	3.4	3.30
Na	2.4	5.2	5.2
Mg	8.9	10	10.3
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	18.1	18.5
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	2.2
Se	-	4U	4U
Sn	-	-	10U
Sr	0	-	54.7
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

This intermittent channel is dotted with sinkholes and karst windows, and limestone frequently is exposed along its course. A gated sand road accesses the spring on the south side where there is a small gravel parking area. All surrounding lands are forested with mixed hardwoods and pines.

Utilization – Owens Spring is owned by the SRWMD.

Discharge - All discharge rates are measured in ft^3/s.

September 10, 1973	51.2[(1)]
June 2, 1998	90[(4)] (estimate)
July 10, 2002	0.89[(2)]

Table 107. Owens Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Ruth Spring

Figure 93. Ruth Spring (photo by R. Means).

Location – Lat. 29° 59' 44.78" N., Long. 82° 58' 36.50" W. (SE ¼ NE ¼ NW ¼ sec. 1, T. 6 S., R. 13 E.). The Ruth Spring is located 4 miles (6.5 km) northwest of Branford within the SRWMD Troy Spring Conservation Area. From the bridge over the Suwannee River in Branford, travel west and northwest for approximately 4.8 miles (7.7 km) on US 27, then turn north (right) on CR 425. Drive 1 mile (1.6 km) and turn east (right) into the Troy Spring Conservation Area. Follow dirt road 1.1 miles (1.8 km), turn north (left) on another dirt road and continue 0.1 mile (0.2 km) to the spring.

Description – Ruth Spring pool measures 75 ft (22.9 m) in diameter north to south and 51 ft (15.5 m) east to west. The vent is located beneath a limestone ledge on the west side of the pool, where the depth measured 5.9 ft (1.8 m). There is a wooden erosion control wall built along the west side of the depression approximately 3 ft (0.9 m) higher than the spring water level at the time of the visit. The bottom of the spring pool is mainly exposed sand. Limestone crops out around the pool edge. The water is clear, with a slight greenish hue and a small boil present on the pool surface near the vent. There is very little aquatic vegetation and algae. The shallow, sand-bottomed spring run travels eastward approximately 550 ft (167.6 m) and flows into the Suwannee River. On the south and west sides of the spring, the land rises steeply to approximately 20 ft (6.1 m) above the lowlands that contain the spring and its run. All lowlands and adjacent uplands are forested. There is a dirt access road and small parking area near the west side of the spring. Ruth Spring also is locally known as Sulfur Spring. Local swimmers reported that the spring often has a slight hydrogen sulfide odor, but this was not the case in March 2002.

Utilization **-** The spring is undeveloped, open to the public, and is a popular local swimming area.

Discharge **-** All discharge rates are measured in ft^3/s.

November 14, 1973	11.5[(1)]
June 24, 1997	14.35[(4)]

Table 108. Ruth Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	21.58	
DO	1.5	0.68	
pH	7.3	6.99	
Sp. Cond.	-	388	
Lab Analytes			
BOD	-	-	0.4AI
Turbidity	-	-	0.25
Color	10	-	5U
Alkalinity	150	-	167
Sp. Cond.	330	380.0	-
TDS	187	-	212.0
TSS	-	-	4U
Cl	4.8	-	7.3
SO_4	7.8	-	13.0
F	0	-	0.076I
Nutrients			
TOC	-	-	2.8I
$NO_3 + NO_2$ as N	-	-	4.00
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.23	0.2I
P	-	0.044J	0.045A
PO_4	-	0.044	-
NO_3	-	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	58	64.8	63.8
K	0.7	2.3	2.20
Na	2.5	4.1	3.7I
Mg	6.4	6.4	6.4
Al	-	-	19I
As	-	3U	3U
B	-	-	13I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	1.2
Ra-228	-	-	1.1U
Se	-	4U	4U
Sn	-	-	7U
Sr	0	-	248.0
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 109. Ruth Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	16Q
Fecal Coliform	1KQ

Troy Spring

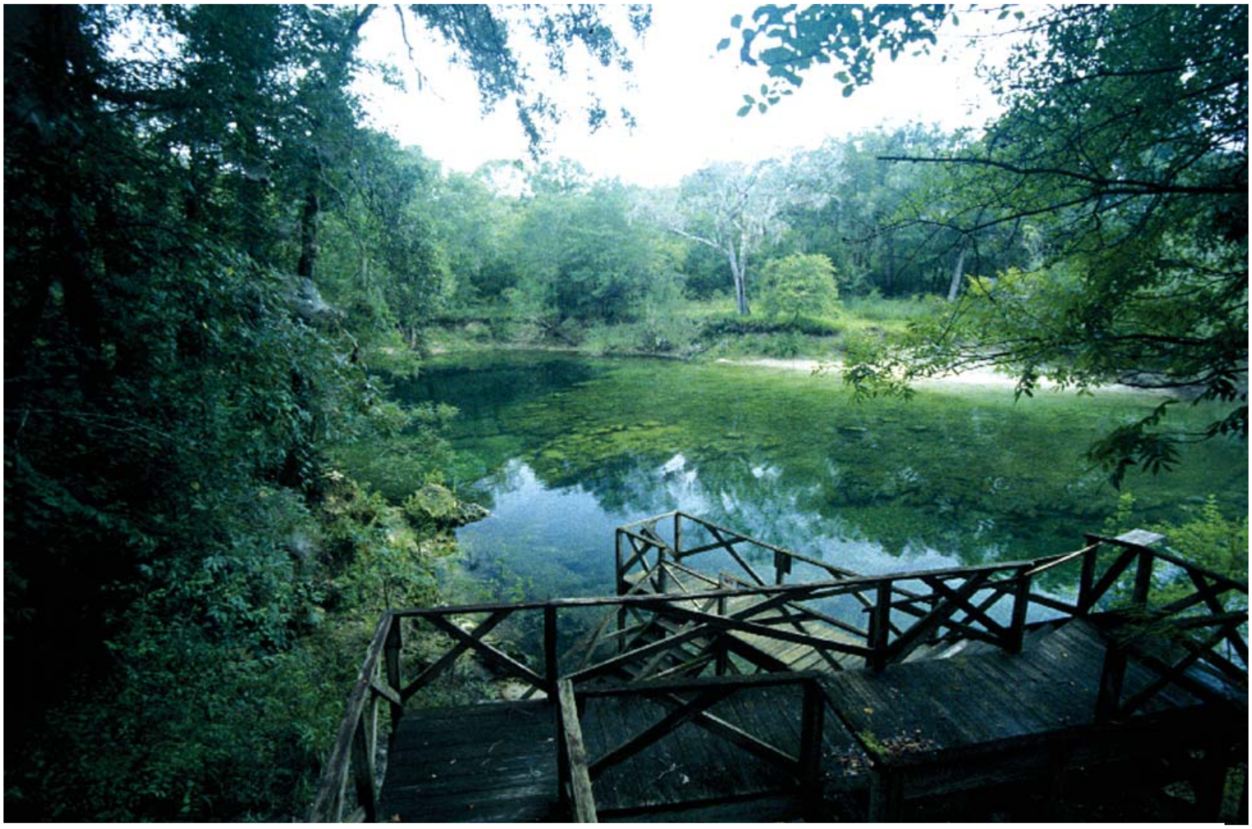

Figure 94. Troy Spring (photo by T. Scott).

Location— Lat. 30° 00' 21.69" N., Long. 82° 59' 51.01" W. (NW ¼ NE ¼ SE ¼ sec. 34, T. 5 S., R. 13 E.). Troy Spring is located within Troy Spring State Park, 5.5 miles (8.8 km) northwest of Branford. From the bridge over the Suwannee River in Branford, travel northwest on US 27 for 4.8 miles (7.7 km). Turn north (right) on CR 425 and travel 1.2 miles (1.9 km) to the state park entrance on the right.

Description-Troy Spring issues from a depression with vertical limestone walls. The pool diameter measures 138 ft (42.1 m) north to south and 118 ft (36 m) east to west. The pool depth is 61 ft (18.6 m). The spring run is about 325 ft (99 m) long and flows in a straight path eastward to the Suwannee River. A thick layer of dark green filamentous algae covers nearly all aquatic substrates. There is little to no other aquatic or emergent vegetation. Water color is clear and greenish. Limestone is exposed around the spring pool and has a scalloped appearance. High ground surrounds the spring and rises to approximately 18 ft (5.5 m) above water surface. The uplands are generally forested with pines and hardwoods. The Springs Fever website notes that at the lower end of the run lie the keel timbers/ribs of the 19th century steamship, Madison, which was purposely sunk in the run during the Civil War to prevent it from falling into Union hands. The ribs resemble railroad ties. There is a nearby cabin to the south. An underwater cave system has been mapped at Troy Spring.

Utilization— Troy Spring was recently acquired by the state park system. It has been developed with parking area, restrooms, a cement and wooden ramp leading down to the spring and wooden deck surrounding the spring. Troy Spring is a swimming, snorkeling, and scuba diving hotspot.

Discharge- All discharge rates are measured in ft^3/s.

July 17, 1942	149[1]
November 26, 1960	161[1]
May 28, 1963	148[1]
October 16, 1973	205[1]
October 30, 2001	106[4]

Table 110. Troy Spring water quality analysis.

Analytes	1960	1973	2001	
			Unfilt.	Filter
Field Measures				
Temperature	21.7	21.5	21.66	-
DO	-	1.4	0.85	-
pH	7.8	7.1	7.49	-
Sp. Cond.	307	358	357	-
Lab Analytes				
BOD	-	0.2	0.25 I	-
Turbidity	-	1	0.15	-
Color	5	0	5U	-
Alkalinity	150	150	163	164
Sp. Cond.	-	-	350	-
TDS	-	-	196	-
TSS	-	-	4U	-
Cl	3.0	4.0	5.3	5.2
SO_4	6.0	5.6	12	12
F	0.1	0.1	0.085 I	0.09 I
Nutrients				
TOC	-	0.0	1.8 I	-
NO3 + NO2	-	0.96	2.3	2.2
NH3 + NH4	-	-	0.012 I	0.01 U
TKN	-	-	0.075 I	0.067 I
P	-	0.03	0.034 A	0.03 A
PO_4	-	0.02	0.024 J	-

Analytes	1960	1973	2001	
			Unfilt.	Filter
Metals				
Ca	54	56	57.3	59.3
K	0.2	1.3	0.9	0.97
Na	2.4	2.6	2.68	2.45
Mg	6.7	6.4	7	7.3
As	-	-	3 U	3 U
Al	-	-	-	75U
B	-	-	25 U	-
Cd	-	0	0.75 U	0.5 U
Co	-	0	0.75 U	-
Cr	-	0	2 U	2 U
Cu	-	10	2 U	2 U
Fe	-	-	25 U	20 U
Mn	-	-	0.73 I	0.31 I
Ni	-	-	1.5 U	1.5 U
Pb	-	6	5 U	3 U
Se	-	-	3.5 U	3.5 U
Sn	-	-	7U	-
Sr	-	240	66.8	-
Zn	-	-	4 U	3.5 U

A=Average value U,K=Compound not detected, value is the method detection limit
I=Value less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 111. Troy Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	1 KQ
Enterococci	1 KQ
Fecal Coliform	1 KQ
Total Coliform	1 KQ

Turtle Spring

Figure 95. Turtle Spring (photo by R. Means).

Location – Lat. 29° 50' 50.62" N., Long. 82° 53' 25.03" W. (SE ¼ SW ¼ NW ¼ sec. 26, T. 7 S., R. 14 E.). Turtle Spring is located 8 miles (13 km) southeast of Branford on the west side of the Suwannee River. From the bridge over the Suwannee River in Branford head west on US 27/20 approximately 1.3 miles (2.1 km) to the intersection with SR 349. Head south (left) on SR 349 and drive approximately 7.3 miles (11.7 km) to the second CR 342 intersection with CR 349 (second CR 342 sign – CR 342 loops around and joins CR 349 at two points). Turn east (left) onto CR 342 and drive approximately 5 miles (8 km) to the Simms Landing boat ramp. CR 342 makes several right angle turns prior to the boat landing. The spring is 0.5 miles (0.8 km) downstream from the CR 342 boat ramp.

Description – Turtle Spring pool measures 30 ft (9.1 m) north to south and 66 ft (20.1 m) east to west. The depth over the spring vent is 21.4 ft (6.5 m). The vent is an elongated fracture beneath a limestone ledge. The spring pool bottom is sand and limestone. The spring water is clear and greenish. There was a small boil in the center of the pool during May 2002. Algae are abundant on both rock and sand substrates. Several downed logs are inundated within the spring pool. The spring run is shallow, 90 ft (27.4 m) long and 20 ft (6.1 m) wide. It flows into the dark waters of the Suwannee River. Limestone is exposed in the shallow spring run and near the vent. Turtle Spring is situated along the Suwannee River in a cove surrounded by 15-18 ft (4.6-5.5 m) high sandy banks. The surrounding lands are all forested with mixed hardwoods.

Utilization - The spring is undeveloped and surrounded by private land. It is locally used for swimming.

Discharge - All discharge rates are measured in ft^3/s.

November 3, 1972	40.8[1]
September 22, 1997	36.39[4]
July 17, 2002	11.43[2]

Table 112. Turtle Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	22.0	22.32	
DO	2.1	1.43	
pH	6.6	6.90	
Sp. Cond.	-	394	
Lab Analytes			
BOD	0.2	-	0.23I
Turbidity	-	-	0.30
Color	0	-	5.0
Alkalinity	150	-	216.0
Sp. Cond.	282	378.0	-
TDS	181	-	217.0
TSS	-	-	4U
Cl	6.0	-	5.9
SO_4	9.6	-	7.2
F	0.1	-	0.058I
Nutrients			
TOC	-	-	1.5I
$NO_3 + NO_2$ as N	0.42	-	0.36J
$NH_3 + NH_4$	-	-	0.02I
TKN	-	0.06U	0.096I
P	-	0.018	0.021
PO_4	-	0.016	-
NO_3	-	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	58	70.3	67.4
K	0.3	0.56	0.58
Na	2.3	2.5I	2.5I
Mg	3.4	4.5	4.4
Al	-	-	50U
As	-	3U	3U
B	-	-	5U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	27I	28I
Mn	-	15.7	16.9
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2U
Ra-228	-	-	0.9U
Se	-	4U	4U
Sn	-	-	7U
Sr	320	-	94.0
Zn	-	7.8U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 113. Turtle Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	18
Fecal Coliform	8

LAKE COUNTY

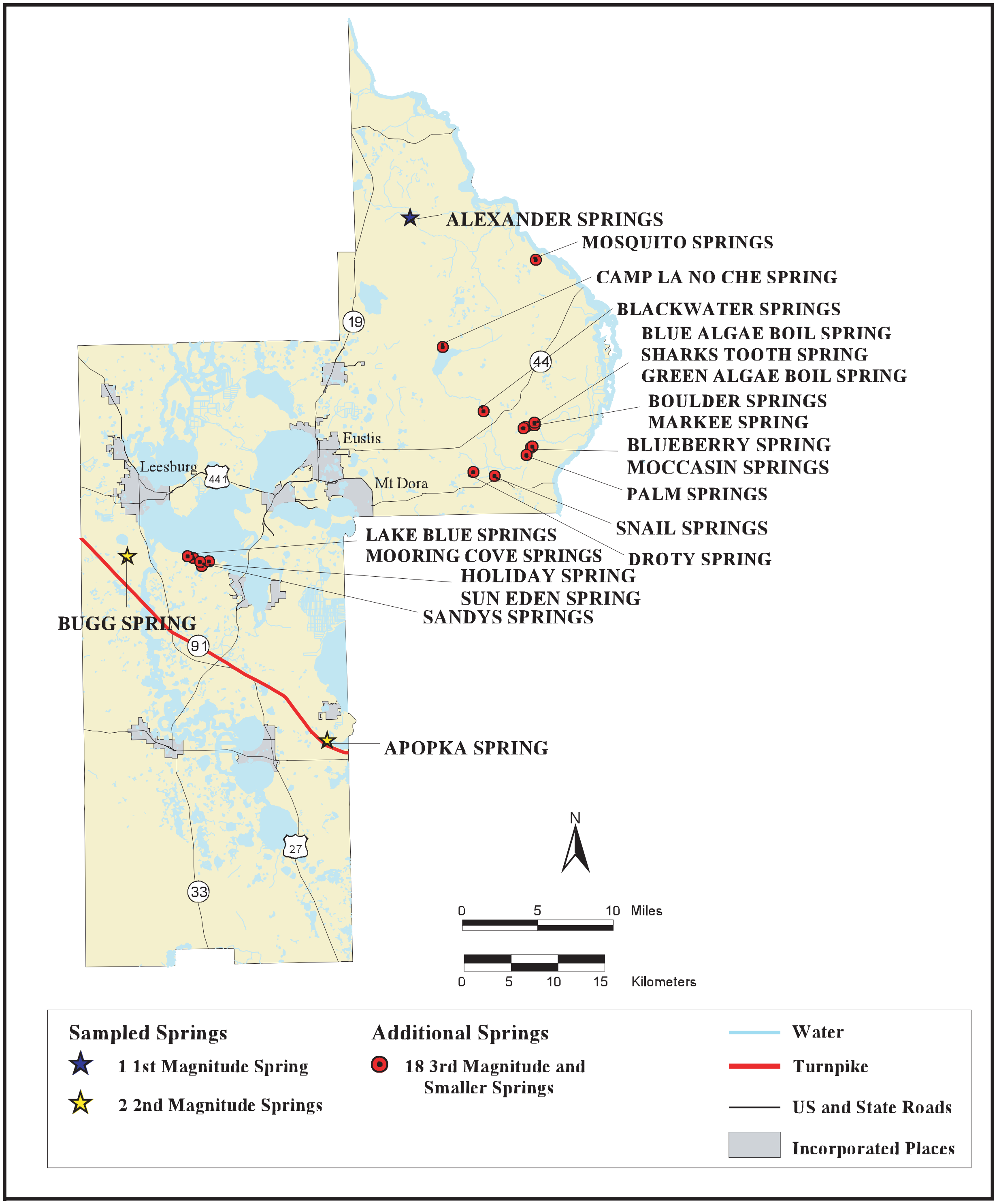

Figure 96. Springs visited by FGS in Lake County.

Alexander Spring

Figure 97. Alexander Spring (photo by T. Scott).

Location-Lat. 29° 04' 52.68" N., Long. 81° 34' 33.18" W. (Levy Grant 39, T. 16 S., R. 27 E.). Alexander Spring is approximately 37 miles (59.5 km) east of Ocala in the Ocala National Forest. From the intersection of US 441 (Magnolia Avenue) and SR 40 (Silver Springs Road) in Ocala travel east on SR 40 for approximately 31.8 miles (51.2 km) to the intersection with SR 19. Turn south (right) onto SR 19 and travel approximately 9.4 miles (15.1 km) to the intersection with CR 445. Turn east (left) onto CR 445 and travel approximately 5 miles (8 km) to Alexander Springs Recreation Area on the north (left) side of the road. Follow signs to parking area.

Description-Alexander Spring issues from a conical depression and has a large spring pool that measures 300 ft (91.4 m) north to south and 258 ft (78.6 m) east to west. The depth is 25 ft (7.6 m). The bottom is mostly sand with limestone exposed near the vent. A vertical ledge running north to south occurs near the vent. There are multiple vents in a tight cluster. The water is clear and blue. There is a large boil on the pool surface over the vent. Native aquatic grasses are plentiful. Thin algae patches are present on limestone substrate. High ground to the south rises gently to 12 ft (3.7 m) above the water level. A rock wall forms the south shoreline. There is a mixed hardwood and palm forest around the spring. Alexander Spring Run flows east approximately 8 river miles (12.9 km) until reaching the St. Johns River. Alexander Spring is the only 1st magnitude spring in the federal parks and forests system (Follman, personal communication, 2004).

Utilization-Alexander Spring is in the Ocala National Forest. Camping, swimming, scuba diving, and canoeing are available with full facilities.

Figure 98. Alexander Spring aerial photo (photo by H. Means).

Table 114. Alexander Spring water quality analysis.

Analytes	1946	1972	2001	
			Unfilt.	Filter
Field Measures				
Temperature	-	24.0	23.6	-
DO	-	-	1.13	-
pH	6.9	7.9	7.55	-
Sp. Cond.	920	1050	1026	-
Lab Analytes				
BOD	-	0.1	0.2 AU	-
Turbidity	-	-	0.05	-
Color	0	5	5 U	-
Alkalinity	-	120	82	82
Sp. Cond.	-	-	1000	-
TDS	-	-	547	-
TSS	-	-	4 U	-
Cl	192	230	230	230
SO_4	56	60	63	62
F	0.9	0.5	0.11	0.11
Nutrients				
TOC	-	3.0	1 U	-
NO3 + NO2	-	0.03	0.04	0.044
NH3 + NH4	-	-	0.01 U	0.01 U
TKN	-	-	0.06 U	0.074 I
P	-	0.04	0.048	0.044
PO_4	-	0.04	0.045	-

Analytes	1946	1972	2001	
			Unfilt.	Filter
Metals				
Ca	41	44	43.4 J	43.4
K	2.3	2.0	3.9	3.9
Na	100	130	122	117
Mg	18	20	20	19.9
As	-	0	3 U	3 U
Al	-	-	-	75 U
B	-	180	47 I	-
Cd	-	0	0.75 U	0.75 U
Co	-	0	0.75 U	-
Cr	-	0	2 U	2 U
Cu	-	0	2.5 U	2.5 U
Fe	30	10	35 U	35 U
Mn	-	0.0	0.5 U	1 U
Ni	-	-	2 U	2 U
Pb	-	-	5 U	4 U
Se	-	-	4 U	4 U
Sn	-	-	10 U	-
Sr	-	-	722	-
Zn	-	10	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Discharge- All discharge rates are measured in ft^3/s.

February 12, 1931	112[1]
February 7, 1933	124[1]
April 13, 1935	162[1]
October 15, 1935	74.5[1]
December 3, 1935	131[1]
April 2, 1946	101[1]
April 23, 1956	136[1]
November 16, 1960	124[1]
June 8, 1960	124[1]
April 25, 1967	146[1]
June 22, 1967	114[1]
July 2, 1969	109[1]
April 19, 1972	103[1]
September 12, 2001	94.2[7]

Table 115. Alexander Spring bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1 KQ
Enterococci	1 KQ
Fecal Coliform	1 KQ
Total Coliform	10Q

Apopka Spring

Figure 99. Apopka Spring (photo by R. Means).

Location – Lat. 28° 33’ 59.77” N., Long. 81° 40’ 50.41” W (NW ¼ SW ¼ SE ¼ sec. 14, T. 22 S., R. 26 E.). Apopka Spring is located on the southwest side of Lake Apopka in Gourd Neck, 2 miles (3.2 km) south of Monteverde and is accessible only by boat. From Clermont head east on SR 50 approximately 3.5 miles (5.6 km) to the intersection with CR 455. Turn north (left) onto CR 455 and travel approximately 4.2 miles (6.8 km) to the town of Monteverde. Turn east (right) once in Monteverde and follow signs to the boat landing approximately 0.5 mile (0.8 km).

Description – Apopka Spring occupies an open cove on the northwest side of Gourd Neck of Lake Apopka. The circular spring pool measures 180 ft (54.9 m) in diameter, while the larger spring cove containing the spring measures 450 ft (137.2 m) north to south and 360 ft (109.7 m) east to west. The vent is in the center of the deep, bowl-shaped spring depression where the depth measures 45 ft (13.7 m). The spring bottom is a mixture of sand and dark organic matter. Cloudy lake water quickly turns to clear spring water as the spring is approached. There is some exotic aquatic vegetation along the sandy slopes of the spring depression. The spring produces a large boil, and suspended particles can be seen within the clear water column. The spring cove is shallow around the perimeter with an organic, mucky bottom and emergent vegetation. Gourd Neck is buffered by marsh and lowland swamp forest on its west side before giving way to sand hills with extensive agriculture. The east side of Gourd Neck is bordered by a sand hill peninsula with planted pines. An underwater cave system has been recognized in this spring.

Utilization – The spring is undeveloped and surrounded by private property.

Discharge **-** All discharge rates are measured in ft^3/s.

May 4, 1971	28.6[(1)]
Annual Mean 1998	32.05[(6)] (7 measurements)
Mean 1971-1999	35.0[(6)] (22 measurements)
Annual Mean 2001	24.71[(6)] (2 measurements)

Table 116. Apopka Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	24.5	24.15	
DO	-	2.07	
pH	7.7	7.90	
Sp. Cond.	162	249.00	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.2
Color	0	-	5U
Alkalinity	65	-	80.0
Sp. Cond.	162	249.00	-
TDS	108	-	137.0
TSS	-	-	4U
Cl	7	-	12.0
SO_4	3.6	-	10.0
F	0.2	-	.087I
Nutrients			
TOC	-	-	1I
$NO_3 + NO_2$ as N	2.11	-	5.10
$NH_3 + NH_4$	-	-	.014I
TKN	-	0.14I	0.11I
P	-	0.034	0.033
PO_4	-	0.03	-
NO_3	0.2	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	20	30.6	29.3
K	0.4	1.1	1A
Na	4.4	5.27	4.94A
Mg	5	8	7.9A
Al	-	-	10U
As	-	3U	3U
B	-	-	14.0
Cd	-	0.5U	0.5U
Co	-	-	1U
Cr	-	2U	2U
Cu	-	2U	4U
Fe	-	5U	7.7I
Mn	-	0.25U	1.5I
Ni	-	1U	2U
Pb	-	5U	5U
Ra226	-	-	0.6
Ra228	-	-	1.1U
Se	-	5U	7U
Sn	-	-	15U
Sr	100	-	58.6A
Zn	-	2I	6U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 117. Apopka Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	2Q

Bugg Spring

Figure 100. Bugg Spring (photo by T. Scott).

Location – Lat. 28° 45' 07.15" N., Long. 81° 54' 05.46" W. (SE ¼ NW ¼ NW ¼ sec. 15, T. 20 S., R. 24 E.). Bugg Spring is located 0.4 miles (0.6 km) northwest of Okahumpka on privately owned property.

Description – Bugg Spring is a large, very deep, circular spring situated south of Lake Denham. The spring pool measures 396 ft (120.7 m) north to south and 372 ft (113.4 m) east to west. There is a vertical limestone ledge a few feet out from the south shore, and depths beyond the ledge eventually reach 170 ft (51.8 m). The water is clear and blue-greenish. No boil was observed on the pool surface during April 2002. There is very little aquatic vegetation, but algae are abundant. A large U.S. Navy platform supporting a laboratory for field instrument calibration is floating in the middle of the spring with a walkway attached to the northeast shore. The slow-moving spring run flows north approximately 0.8 mile (1.3 km) into Helena Run, the outflow of Lake Denham. Lands immediately surrounding the spring are low-lying and densely forested. The landowner's residence is to the south, where the land begins to rise, eventually becoming rolling sand hills used primarily for agriculture.

Utilization - Bugg Spring is leased to the U.S. Naval Research Laboratory for underwater sound reference work. The spring is on private property.

Table 118. Bugg Spring water quality analysis.

Analytes	1946	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	-	24	23.45	
DO	-	-	1.43	
pH	7.4	8	7.24	
Sp. Cond.	-	-	300	
Lab Analytes				
BOD	-	0.1	-	0.25I
Turbidity	-	-	-	0.35
Color	5	5	-	5U
Alkalinity	120	120	-	126
Sp. Cond.	259	260	290.0	-
TDS	140	151	-	171
TSS	-	-	-	4U
Cl	6.6	6	-	13.0
SO_4	2	3.2	-	9.7
F	0	0.1	-	0.056I
Nutrients				
TOC	-	-	-	1U
$NO_3 + NO_2$ as N	-	0.3	-	0.61J
$NH_3 + NH_4$	-	-	-	0.021A
TKN	-	-	0.06U	0.092I
P	-	0.06	0.057	0.085
PO_4	-	0.02	0.082	-
NO_3	0.3	-	-	-
Metals				
Ca	44	44	46.9	47.1
K	0.2	0.4	1.2	1.3
Na	4.4	4.8	6.5	6.8
Mg	2.9	2.8	3.1	3.2
Al	-	-	-	50U
As	-	-	3U	3U
B	-	-	-	17I
Cd	-	-	0.5U	.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3U	3U
Fe	80	20	25U	35I
Mn	-	-	4	5.3
Ni	-	-	2U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	1.0
Ra-228	-	-	-	1U
Se	-	-	4U	4U
Sn	-	-	-	7U
Sr	-	50	-	62.0
Zn	-	10	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge - Measurements are annual means obtained from the landowner and measured in conjunction with the SJRWMD. All discharge rates are measured in ft^3/s.

1946	17.6
1956	10.3
1960	18.6
1967	12.4
1972	10.8
1985	10.2
1990	8.5
1991	11.43
1992	8.09
1993	8.61
1994	9.13
1995	10.7
1996	11.67
1997	8.61
1998	11.68
1999	8.95
2000	8.5

Table 119. Bugg Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	18Q
Fecal Coliform	6Q

LEON COUNTY

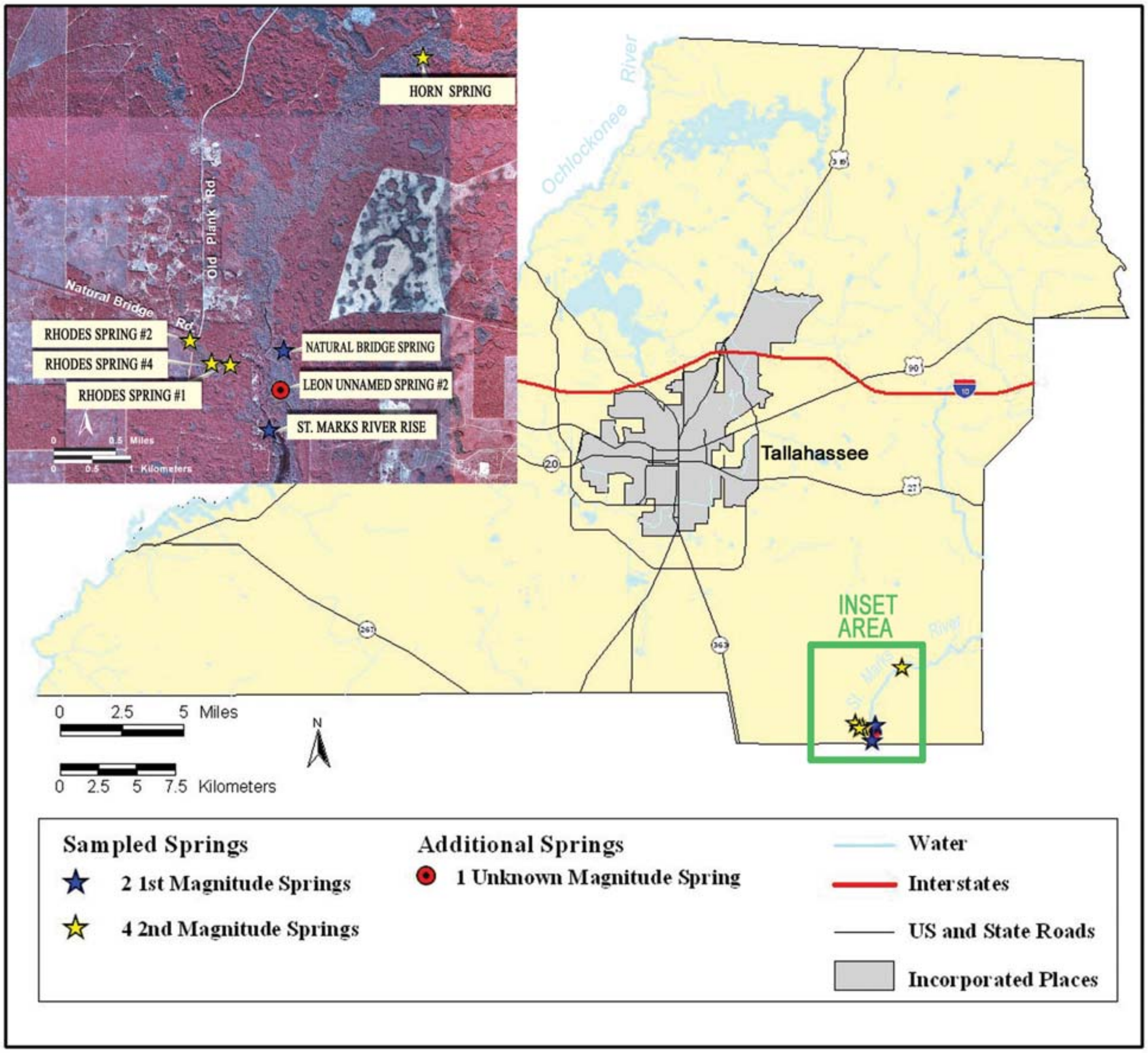

Figure 101. Springs visited by FGS in Leon County.

Horn Spring

Figure 102. Horn Spring (photo by H. Means).

Location – Lat. 30° 19' 08.89" N., Long. 84° 07' 43.45" W. (SW ¼ SE ¼ SE ¼ sec. 9, T. 2 S., R. 2 E.). Horn Spring is located 12.5 miles (20 km) southeast of Tallahassee. From the intersection of US 319 (Capital Circle Southeast) and SR 363 (Woodville Highway) in Tallahassee, head south on SR 363 (Woodville Highway) approximately 4.6 miles (7.4 km) to the intersection with Natural Bridge Road in the town of Woodville. Turn east (left) onto Natural Bridge Road and travel approximately 6.2 miles (10 km) to the St. Marks River. The spring run flows southwest into the St. Marks River from the east approximately 3 miles (4.8 km) upstream from the Natural Bridge Battlefield State Historic Site. Access to the spring is by canoe from Natural Bridge.

Description – Horn Spring pool is circular and is approximately 100 ft (30.5 m) in diameter. The depth measures 22.0 ft (6.7 m) near the center. The bottom of Horn Spring is covered with logs and sand, and water issues from numerous sand boils. The spring water is clear with a slight greenish hue. Algal particles are suspended in the water. The spring has an abundance of exotic aquatic vegetation. There was no detectable boil on the water surface in February 2002. A hunt camp is situated on the south side of the spring pool. The rest of the pool edge is forested. Horn Spring run discharges west approximately 500 ft (152.4 m) into the tannic upper St. Marks River. About half-way down Horn Springs Run, another smaller spring run feeds in from the south side. Up this feeder run a short distance is a circular spring covered in duckweed. The smaller spring is approximately 30 ft (9.1 m) in diameter. A second spring run from the smaller spring flows west directly into the St. Marks River downstream from Horn Spring Run. There are planted pine flatwoods to the south and east, and the lowland floodplain forest associated with the river is west. The highest ground is to the south, and it rises gently to approximately 4 ft (1.2 m) above the water.

Utilization – Horn Spring is located on private land and is leased to a hunt club. Land access is not open to the public. The spring may be accessed by a canoe. It is used locally for swimming.

Discharge – Discharge rates are measured in ft^3/s.

November 12, 1971	28.8(1)
February 20, 2002	14.15(2)

Table 120. Horn Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	19.5	20.21	
DO	-	2.15	
pH	7.5	7.30	
Sp. Cond.	-	280	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.4
Color	10	-	5U
Alkalinity	110	-	125
Sp. Cond.	250	250.0	-
TDS	151	-	156
TSS	-	-	4U
Cl	7	-	5.2A
SO_4	4	-	11A
F	0.2	-	0.16
Nutrients			
TOC	-	-	1I
$NO_3 + NO_2$ as N	1.2	-	0.34
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.046A	0.046
PO_4	-	0.045	-
NO_3	-	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	34	40	38.7A
K	0.5	0.5	0.48A
Na	3.7	3.6I	3.5I
Mg	8.5	9	8.6A
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	72I
Mn	-	0.5U	3.2A
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2U
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	10U
Sr	-	-	92.7A
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 121. Horn Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4
Fecal Coliform	1K

Natural Bridge Spring

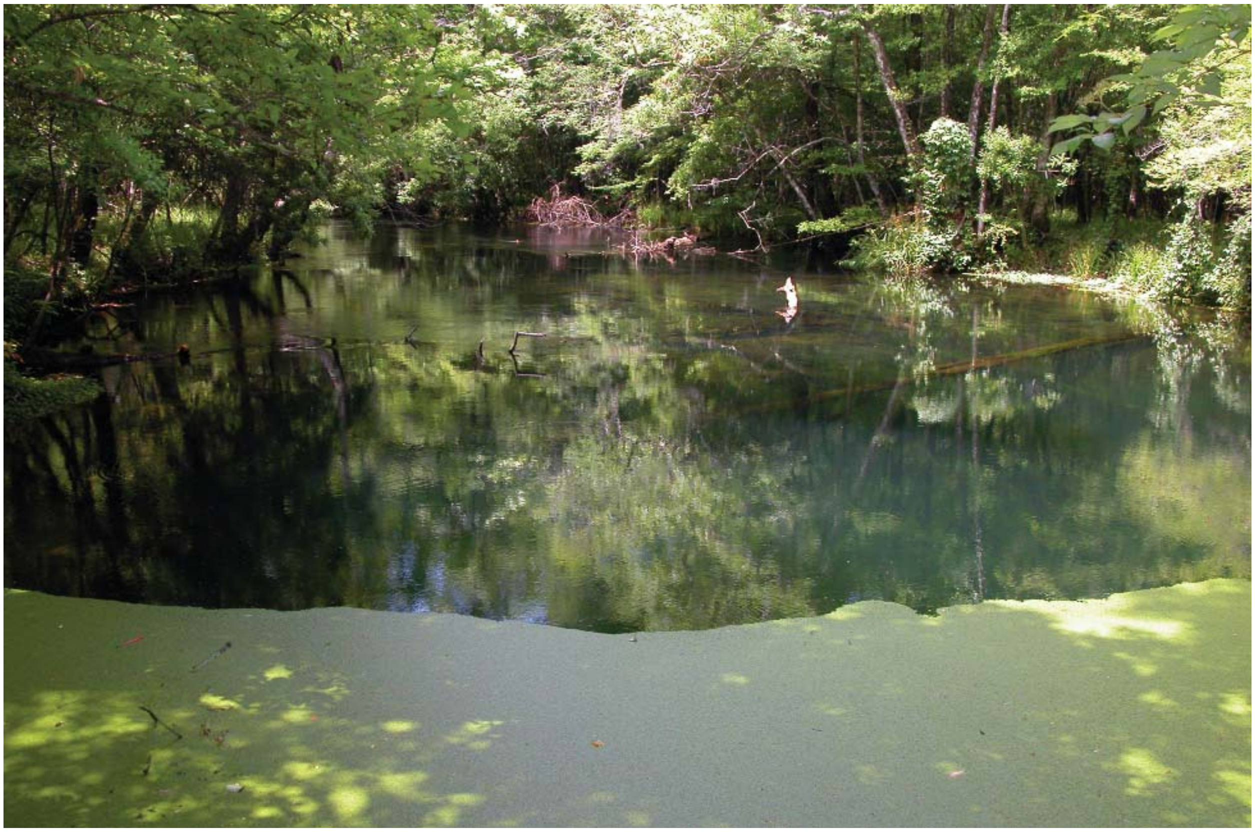

Figure 103. Natural Bridge Spring (photo by R. Means).

Location – Lat. 30° 17' 06.67" N., Long. 84° 08' 49.64" W. (SW ¼ NE ¼ NE ¼ sec. 29, T. 2 S., R. 2 E.). Natural Bridge Spring is located on private property 13.5 miles (22 km) southeast of Tallahassee, or 0.3 miles (0.5 km) east of the Natural Bridge State Historic Site.

Description – Natural Bridge Spring pool measures 66 ft (20.1 m) north to south and 75 ft (22.9 m) east to west and it is situated in a conical depression. Spring depth measured 33.1 ft (10.1 m) out from the north bank. The water is clear and blue-greenish. There is much algae growing on the limestone substrate. The spring run is as wide as the spring pool, averages approximately 6 ft (1.8 m) deep and flows swiftly over limestone and sand bottom. The majority of spring water flows southwest for approximately 0.25 miles (0.4 km), disappearing into a siphon approximately 300 ft (91.4 m) east of Natural Bridge; however, nearly 200 ft (61 m) downstream from the spring, a small channel splits off from the main spring run and travels westward approximately 1,000 ft (304.8 m) into the St. Marks River. At Natural Bridge, the St. Marks River flows into a siphon. The river continues underground to the south. Its underground course is dotted with sinkholes and karst windows for approximately 0.6 miles (1 km) until it re-emerges as St. Marks River Rise (or St. Marks Spring). Natural Bridge Spring flows into a siphon that is approximately 250 ft (76.2 m) east of the St. Marks River siphon. It is suspected that Natural Bridge Spring and the St. Marks River merge underground in the vicinity of Natural Bridge. There may be a cave system associated with this spring.

Table 122. Natural Bridge Spring water quality analysis.

Analytes	1946	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	20.5	19.5	20.05	
DO	-	-	0.91	
pH	7.4	7.4	7.26	
Sp. Cond.	226	241	272	
Lab Analytes				
BOD	-	-	-	0.2AU
Turbidity	-	-	-	0.55
Color	40	35	-	5U
Alkalinity	-	110	-	125.0
Sp. Cond.	-	-	240.0	-
TDS	137	147	-	151.0
TSS	-	-	-	4U
Cl	5	5	-	5.0
SO_4	7.1	5.6	-	6.7
F	0.3	0.2	-	0.14
Nutrients				
TOC	-	0	-	1.9I
$NO_3 + NO_2$ as N	-	0.002	-	0.27
$NH_3 + NH_4$	-	-	-	0.01U
TKN	-	-	0.06U	0.06U
P	-	-	0.049	0.048
PO_4	-	0.03	0.046	-
NO_3	1.2	-	-	-
Metals				
Ca	35	34	40.4	40.1
K	0.5	4	0.48	0.52
Na	3.3	3.3	3.3I	4.3
Mg	6.5	7.2	8.3	7.8
Al	-	-	-	75U
As	-	-	3U	3U
B	-	-	-	15U
Cd	-	-	0.5U	0.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3.5U	3.5U
Fe	-	-	35U	64I
Mn	-	-	0.75I	2.5
Ni	-	-	2U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	0.5
Ra-228	-	-	-	1.5
Se	-	-	4U	4U
Sn	-	-	-	10U
Sr	-	-	-	75.9
Zn	-	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** The spring is undeveloped and is surrounded by private land.

Discharge **-** All discharge rates are measured in ft^3/s.

May 19, 1942	115[(1)]
May 14, 1946	132[(1)]
December 5, 1960	97[(1)]
May 15, 1963	79[(1)]
October 6, 1971	106[(1)]
April 25, 2002	151.98[(2)]

Table 123. Natural Bridge Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1K
Fecal Coliform	1K

Rhodes Springs

Figure 104. Rhodes Spring No. 4 (photo by H. Means).

Rhodes Springs are a group of karst windows that may be exposures of the same subterranean conduit system. Flow from all Rhodes Springs moves east and south toward the Natural Bridge area and may converge underground with the subterranean St. Marks River somewhere above St. Marks River Rise. The Florida Geological Survey sampled three of the karst windows within this group. The springs are located on private property approximately 13 miles (21 km) southeast of Tallahassee. From the intersection of SR 363 (Woodville Highway) and Natural Bridge Road in Woodville, head east on Natural Bridge Road approximately 5.6 miles (9 km) to the intersection with Old Plank Road. Turn south (right) onto Old Plank Road and the spring run will be immediately on the west (right) side of the road. There is an unpaved pull out area near the spring run.

RHODES SPRING NO. 1

Location – Lat. 30° 17' 01.79" N., Long. 84° 09' 18.56" W. (NW ¼ SE ¼ NW ¼ sec. 29, T. 2 S., R. 2 E.). Rhodes Spring No. 1 is located 0.3 miles (0.5 km) southeast of the intersection of Old Plank Road and Natural Bridge Road.

Description – Rhodes Spring No. 1 is a karst window that flows 250 ft (76.2 m) from west to east, and is crescent-shaped. The circular spring pool is on the west end and measures

75 ft (22.8 m) in diameter. The depth at the pool's center is approximately 15.7 ft (4.8 m). The water is clear and colorless. Half of the surfaces of both the spring and siphon are covered with duckweed. Abundant native aquatic vegetation and some algae occur on the sand and limestone substrates. Exotic aquatic vegetation also is present but not dominant. No boil is present on the surface of the spring pool, but there is swift current in the stream channel. To the west, the ground rises gently to approximately 6 ft (1.8 m) above the water level. The rest of the nearby lands are low-lying and densely forested with mixed hardwoods and cypress. Rhodes Spring No. 1 is located down gradient from Rhodes Springs No. 2 and 4, and is suspected to be a downstream window into the same conduit system.

RHODES SPRING NO. 2

Location – Lat. 30° 17' 11.26" N., Long. 84° 09' 35.84" W. (SW ¼ NW ¼ NW ¼ sec. 29, T. 2 S., R. 2 E.). Rhodes Spring No. 2 is located 330 ft (100.6 m) southwest of the intersection between Old Plank Road and Natural Bridge Road.

Description – Rhodes Spring No. 2 is a karst window system with two springheads (2a and 2b). Rhodes Spring 2a is approximately 100 ft (30.5 m) south of 2b, and it flows eastward for about 50 ft (15.2 m) until the similar-sized No. 2b feeds in on the north side. Rhodes Spring No. 2a has a circular spring pool measuring approximately 35 ft (10.7 m) in diameter. It has a depth of 12.0 ft (3.7 m), and the water is clear. The bottom of the springs and their short runs is sandy with some exposed tree roots in bluish clay. There are small boils on the surface of both spring pools. Combined flow is due east approximately 200 ft (61 m) into a siphon that is adjacent to the west shoulder of Old Plank Road just south of the intersection with Natural Bridge Road. The area is under the dense canopy of a mixed hardwood and pine forest. The surrounding land is low-lying, and numerous sinkholes are located to the north and west of the springheads. Planted pine flatwoods are 300 ft (91 m) northward, on the north side of Natural Bridge Road. Rhodes Spring No. 2 is up gradient from the other karst windows in the Rhodes Spring system.

RHODES SPRING NO. 4

Location – Lat. 30° 17' 00.71" N., Long. 84° 09' 26.18" W. (NE ¼ SW ¼ NW ¼ sec. 29, T. 2 S., R. 2 E.). Rhodes Spring No. 4 is located 675 ft (205.7 m) west southwest of Rhodes Spring #1.

Description – Rhodes Spring No. 4 is a karst window that flows 190 ft (57.9 m) to the southeast. The circular spring pool, at the northwest end of the karst window, measures 45 ft (13.7 m) in diameter. The depth measures 16 ft (4.9 m). The water is clear with a light greenish hue. There are some emergent plants along the shore and a thin layer of algae throughout the pool. The banks rise steeply to approximately 6 ft (1.8 m) above the water level. The surrounding karst plain is flat and heavily forested. Planted pine flatwoods are to the north, and swampy lowland is south. Rhodes Spring No. 4 is the middle karst window of the Rhodes Spring karst window system.

***Utilization* -** All three springs are undeveloped and surrounded by private lands.

Table 124. Rhodes Springs water quality analysis.

Analytes	1971	Rhodes #1		Rhodes #2		Rhodes #4	
		2002		2002		2002	
		Dissolved	Total	Dissolved	Total	Dissolved	Total
Field Measures							
Temperature	20.5	21.00		20.12		20.21	
DO	0.7	1.29		0.96		0.95	
pH	7.6	7.33		7.33		7.35	
Sp. Cond.	-	278		276		278	
Lab Analytes							
BOD	-	-	0.2U	-	0.2U	-	0.2U
Turbidity	-	-	0.3	-	0.3	-	0.4
Color	-	-	5U	-	5U	-	5U
Alkalinity	120	-	127	-	126.0	-	127.0
Sp. Cond.	259	250A	-	250.0	-	250.0	-
TDS	156	-	155	-	153.0	-	154.0
TSS	-	-	4U	-	4U	-	4U
Cl	6	-	5.0	-	5.0	-	5.1
SO_4	12	-	9.0	-	9.0	-	9.2
F	0.2	-	0.17	-	0.16	-	0.15
Nutrients							
TOC	-	-	1.4I	-	1.8I	-	1.4I
$NO_3 + NO_2$ as N	0.2	-	0.25	-	0.26	-	0.26
$NH_3 + NH_4$	-	-	0.01U	-	0.01U	-	0.01U
TKN	-	0.06U	0.06U	0.06U	0.06U	0.06U	0.06U
P	-	0.044	0.046	0.046	0.045A	0.046A	0.046
PO_4	-	0.046	-	0.045	-	0.046	-
NO_3	0.7	-	-	-	-	-	-
Metals							
Ca	40	40.2	39.6A	40.1	39.7	40	39.9
K	0.6	0.49	0.46A	0.49	0.48	0.49	0.48
Na	3.8	3.3I	3.1I	3.4I	3.3I	3.3I	3.2I
Mg	8.4	8.3	8.1A	8.3	8.2	8.3	8.3
Al	-	-	75U	-	75U	-	75U
As	-	3U	3U	3U	3U	3U	3U
B	-	-	15U	-	15U	-	15U
Cd	-	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U
Co	-	-	0.75U	-	0.75U	-	0.75U
Cr	-	2U	2U	2U	2U	2U	2U
Cu	-	3.5U	3.5U	3.5U	3.5U	3.5U	3.5U
Fe	-	35U	39I	35U	35U	35U	35U
Mn	-	0.81I	2.3A	0.68I	2.0	0.5U	2.1
Ni	-	2U	2U	2U	2U	2U	2U
Pb	-	3U	5U	3U	5U	3U	5U
Ra-226	-	-	0.3	-	0.3	-	0.2
Ra-228	-	-	1.5	-	1.2	-	1.1U
Se	-	4U	4U	4U	4U	4U	4U
Sn	-	-	10U	-	10U	-	10U
Sr	200	-	85A	-	86.4	-	87.8
Zn	-	1.5U	7U	1.5U	7U	1.5U	7U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s.

Rhodes No. 1		Rhodes No. 2		Rhodes No. 4	
October 14, 1941	15.8[1]	May 19, 1942	13.8[1]	May 19, 1942	21.1[1]
May 19, 1942	22.4[1]	December 7, 1960	19.8[1]	October 8, 1971	15.4[1]
October 8, 1971	18.6[1]	October 8, 1971	14.0[1]	July 19, 2002	12.46[2]
July 19, 2002	11.60[2]	June 25, 2002	12.41[2]		

Table 125. Rhodes Springs bacteriological analysis

Bacteria Results (in #/100 mL)			
Analyte	**Rhodes #1**	**Rhodes #2**	**Rhodes #4**
Enterococci	8Q	1KQ	4Q
Fecal Coliform	1KQ	1KQ	1KQ

St. Marks River Rise

Figure 105. St. Marks River Rise (photo by H. Means).

Location—Lat. 30° 16' 33.77" N., Long. 84° 08' 56.16" W. (NE ¼ SW ¼ SE ¼ sec. 29, T. 2 S., R. 2 E.). St. Marks River Rise is located 0.6 miles (0.9 km) south of Natural Bridge Battlefield Park. The river rise is surrounded by private property but can be accessed by small boat. From the intersection of US 319/SR 263 (Capital Circle Southeast) and SR363 (Woodville Highway), drive south on SR 363 14.7 miles (23.7 km) to US 98. Turn east (left) and go 2.5 miles (4 km) to the public boat ramp sign on the east side of the St. Marks River and north side of US 98. St. Marks River Rise is 6.5 miles (10.5 km) upstream from the boat ramp.

Description-St. Marks River Rise issues from an elongated fracture in the limestone. The river rise pool diameter measures 315 ft (96 m) east to west and 195 ft (59.4 m) northwest to southeast. Just south of the vent, the St. Marks River widens to 420 ft (128 m) northwest to southeast. The vent is nearly circular and its diameter is approximately 90 ft (27.4 m). St. Marks River Rise pool depth measures 62 ft (18.9 m). The vent is limestone with almost a sheer drop on northeast side from 18 ft (5.5 m) to 48 ft (14.6 m). Water was clear and colorless to light blue. Area near the vent is choked with exotic aquatic vegetation, and there is abundant native aquatic grass farther downstream. Some water hyacinth is present. Uplands near the spring rise gently to approximately 5 ft (1.5 m) above water level and are generally forested with a mix of pines, oaks, and cabbage palms.

Utilization—Land around the river rise is privately owned and access is restricted to dirt 4 x 4 tracks. A pipe leads into the vent from the north.

Discharge- December 18, 2001: 452 $ft^3/s^{(2)}$

Table 126. St. Marks River Rise water quality analysis.

Analytes	1974	2001	
		Unfilt.	Filter
Field Measures			
Temperature	21.0	20.43	-
DO	1.7	3.79	-
pH	7.6	7.54	-
Sp. Cond.	270	270	-
Lab Analytes			
BOD	0.3	0.36 I	-
Turbidity	2	0.55	-
Color	8	5U	-
Alkalinity	130	131	132
Sp. Cond.	-	280	-
TDS	-	164	-
TSS	-	4U	-
Cl	5.4	5	4.8
SO_4	8.8	9.1	9.1
F	0.1	0.13	0.14
Nutrients			
TOC	0	1.7 I	-
NO3 + NO2	0.14	0.21 J	0.23 A
NH3 + NH4	-	0.01 I	0.043
TKN	-	0.09 I	0.067 I
P	0.07	0.045	0.043
PO_4	0.05	0.041	-

Analytes	1974	2001	
		Unfilt.	Filter
Metals			
Ca	39	42.4 A	42.7
K	0.5	0.46 A	0.47
Na	3.6	3.26	3.16
Mg	8.2	8.2 A	8.3
As	1	3U	3U
Al	-	-	75 U
B	-	25 U	-
Cd	3	0.75 U	0.5 U
Co	-	0.75 U	-
Cr	-	2 U	2 U
Cu	0	2 U	2 U
Fe	0	63 I	31 I
Mn	17	10.6 A	6.64
Ni	-	1.5 U	1.5 U
Pb	27	5 U	3 U
Se	-	3.5 U	3.5 U
Sn	-	7U	-
Sr	100	84 A	-
Zn	3	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Table 127. St. Marks River Rise bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	20Q
Enterococci	64Q
Fecal Coliform	28Q
Total Coliform	130Q

LEVY COUNTY

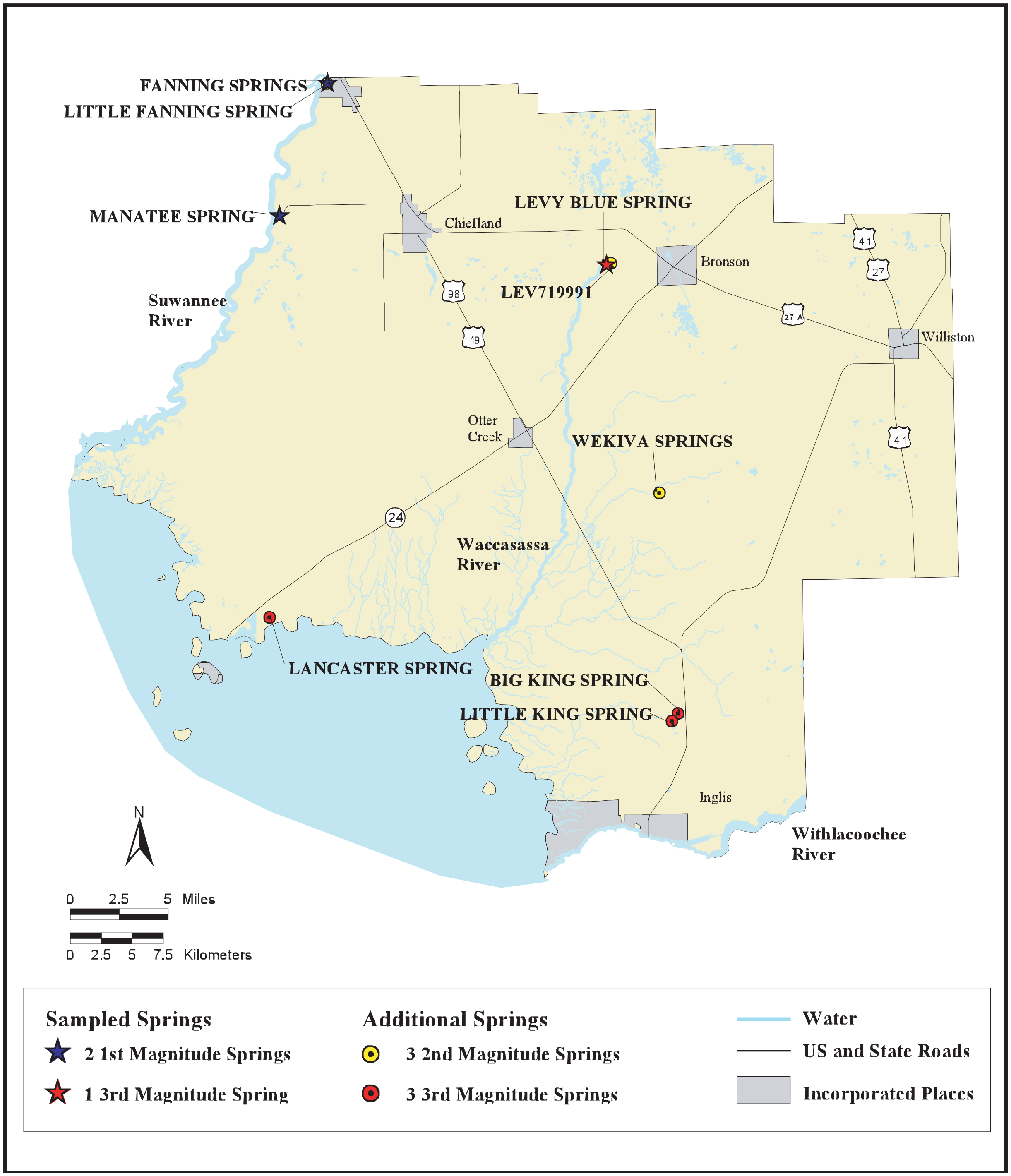

Figure 106. Springs visited by FGS in Levy County.

Fanning Springs

Figure 107. Fanning Springs (photo by T. Scott).

Location-Lat. 29° 35' 15.32" N., Long. 82° 56' 07.10" W. (SW ¼ NE ¼ NW ¼ sec. 29, T. 10 S., R. 14 E.). Fanning Springs is located in Fanning Springs State Park in the town of Fanning Springs. The park entrance is located on the east side of the Suwannee River on US 19/27/98. It is approximately 0.2 miles (0.3 km) east of the bridge over the Suwannee River. Follow access road to parking lot. The spring vent is southwest of parking area.

Description—At Fanning Springs, Big Fanning is in a conical depression with steep sand and limestone banks. The spring pool measures 207 ft (63.1 m) north to south and 144 ft (43.9 m) east to west. The depth of the spring pool measured over the vent is 18 ft (5.5 m). The vent area is nearly funnel shaped, with a sand and limestone bottom and limestone sides, and it issues from the southeast side of the depression. The main vent issues horizontally from a small orifice in the limestone; however, multiple small boils in the sand bottom were present when the spring was visited. Also, there are numerous tiny spring seeps flowing into the spring pool from the limestone banks. The water is bluish and clear. There is native aquatic grass in much of the shallow spring pool. Some patches of algae are present in the spring pool. There are cypress and gum trees along both sides of the spring run. Floating walkways and ropes delineating a swimming area exist in the spring pool. The spring run flows north briefly before turning westward and flowing approximately 450 ft (137.2 m) to the tannic Suwannee River. Boat traffic from the river is not allowed past a floating wooden walkway across spring run. There is sandy high ground on the south and east sides adjacent to the spring. Elevations rise steeply to approximately 20 ft (6.1 m) above water level. The slopes are lush with ferns and mosses. On the high ground, there are pines and hardwoods scattered about.

Utilization-Fanning Springs is a state park with facilities developed for recreation.

Table 128. Fanning Springs water quality analysis.

Analytes	1946	1956	1960	1972	2001	
					Unfilt.	Filter
Field Measures						
Temperature	23.0	23.0	22.0	22.5	22.7	-
DO	-	-	-	-	2.15	-
pH	7.3	8.0	7.9	8.0	6.97	-
Sp. Cond.	357	330	344	345	421	-
Lab Analytes						
BOD	-	-	-	-	0.2 U	-
Turbidity	-	-	-	-	0.05	-
Color	2	14	0	0	5U	-
Alkalinity	-	170	-	160	193	192
Sp. Cond.	-	-	-	-	440 A	-
TDS	-	-	-	-	256	-
TSS	-	-	-	-	4U	-
Cl	4.0	4.5	4.0	1.0	8.3	8.5
SO_4	9.9	12	10	11	19	20
F	0.0	-	0.3	0.2	0.098 I	0.12
Nutrients						
TOC	-	-	-	2.0	1 U	-
NO3 + NO2	-	-	-	-	3.7	4.1
NH3 + NH4	-	-	-	-	0.01 U	0.01 U
TKN	-	-	-	-	0.06 U	0.06 U
P	-	-	-	-	0.066	0.063 A
PO_4	-	-	-	-	0.072	-

Analytes	1946	1956	1960	1972	2001	
					Unfilt.	Filter
Metals						
Ca	66	64	66	63	77.7	77.5
K	0.6	0.1	0.1	0.2	2.4	2.5
Na	2.6	2.7	2.8	2.9	4.15	4.1
Mg	4.8	5.5	3.8	4.1	5.8	5.8
As	-	-	-	-	3U	3U
Al	-	-	-	-	-	75U
B	-	-	-	-	25U	-
Cd	-	-	-	-	0.75 U	0.75 U
Co	-	-	-	-	0.75 U	-
Cr	-	-	-	-	2U	2U
Cu	-	-	-	-	2.5 U	2.5 U
Fe	0.08	0.01	-	-	35 U	35 U
Mn	-	-	-	-	0.5 U	0.5 U
Ni	-	-	-	-	2U	3U
Pb	-	-	-	-	5U	4U
Se	-	-	-	-	4U	4U
Sn	-	-	-	-	20U	-
Sr	-	-	-	100	77	-
Zn	-	-	-	-	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Discharge- All discharge rates are measured in ft^3/s.

October 25, 1930	109(1)
March 14, 1932	79.2(1)
December 17, 1942	137(1)
May 1, 1956	64(1)
November 18, 1960	111(1)
March 27, 1963	83.4(1)
April 25, 1972	98.7(1)
July 31, 1973	139(1)
October 24, 2001	51.5(7)

Table 129. Fanning Springs bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1KQ
Enterococci	1KQ
Fecal Coliform	1KQ
Total Coliform	1KQ

Levy Blue Spring

Figure 108. Levy Blue Spring (photo by T. Scott).

Location **-** Lat. 29° 27' 02.69" N., Long. 82° 41' 56.28" W. (NE ¼ SE ¼ SW ¼ sec. 10, T. 12 S., R. 16 E.). Levy Blue Spring is located 3.5 miles (5.6 km) west of Bronson in a county park. From the US 27A/ SR 24 intersection in Bronson, travel 2.3 miles (3.7 km) northwest on US 27A to CR 339A. Turn west then southwest (left) on CR 339A (NE 94th Place or Blue Springs Road) and follow the road 2 miles (3.2 km) down to the park.

Description **-** Levy Blue Spring has a roughly circular spring pool measuring 156 ft (47.5 m) in diameter. The depth measures 9 ft (2.7 m) over the deepest point, however, most of the pool is considerably shallower. Several small sand boils can be seen upwelling from the sand spring bottom off from the wooden platform on the north side. There is very little aquatic vegetation within the spring itself, but algae cover much of the spring bottom. A concrete and wooden retaining wall encircles most of the spring pool. There is a grassy lawn with tables and playground equipment around the spring pool on all sides except near the outflow channel. Several access ladders can be found around the pool. The spring run is approximately 40 ft (12.2 m) wide, shallow, slow-moving and contains abundant aquatic and emergent vegetation. The spring run flows through a dense lowland swamp forest toward the southwest until meeting the upper Waccassasa River. At least two small blackwater streams feed into the spring run during its course to the river. Pine flatwoods are to the north and east of the swimming area, and adjacent land outside the park is generally forested with planted pines. Levy Blue Spring is near the headwaters of the Waccasassa River, which flows approximately 30 miles (48 km) southwest into the Gulf of Mexico.

Utilization **-** Levy Blue Spring is located within a county park and is a popular swimming area.

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1917-1974	8.87 (1) (56 measurements)
Min (June 28, 1973)	4.5 (1)
Max (August 3, 1945)	22.0(1)
December 17, 2002	1.71(2)

Table 130. Levy Blue Spring water quality analysis.

Analytes	2002	
	Dissolved	Total
Field Measures		
Temperature	21.0	
DO	2.68	
pH	7.80	
Sp. Cond.	231	
Lab Analytes		
BOD	-	0.2U
Turbidity	-	0.2
Color	-	5U
Alkalinity	-	110
Sp. Cond.	222.0	-
TDS	-	122Q
TSS	-	4UQ
Cl	-	4.8
SO_4	-	1.5
F	-	0.079I
Nutrients		
TOC	-	1.5I
$NO_3 + NO_2$ as N	-	0.51
$NH_3 + NH_4$	-	0.012I
TKN	0.16I	0.18U
P	0.025I	0.045U
PO_4	0.034	-
NO_3	-	-

Analytes	2002	
	Dissolved	Total
Metals		
Ca	35.5A	35.4
K	0.12A	0.12I
Na	2.51A	2.48
Mg	5.4A	5.1
Al	-	10U
As	3U	3U
B	-	10U
Cd	0.5U	0.5U
Co	-	1U
Cr	2U	2U
Cu	2U	4U
Fe	8.6I	44U
Mn	0.38I	0.54I
Ni	1U	2U
Pb	5U	5U
Ra-226	-	0.3U
Ra-228	-	0.9U
Se	5U	7U
Sn	-	4.5I
Sr	-	38.3
Zn	1U	2.1I

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 131. Levy Blue Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	8Q
Fecal Coliform	1KQ

Manatee Spring

Figure 109. Manatee Spring (photo by T. Scott).

Location - Lat. 29° 29' 22.20" N., Long. 82° 58' 36.74" W. (SE ¼ SW ¼ SE ¼ sec. 26, T. 11 S., R. 13 E.). Manatee Spring is approximately 7 miles (11.2 km) west of Chiefland within Manatee Springs State Park. From the US 19/27A and CR 320 intersection in Chiefland, drive west approximately 5.2 miles (8.4 km) on CR 320 to the entrance of the park. Follow park road to the main parking area; the spring is 200 ft (61 m) north of the parking lot.

Description - Manatee Spring and its run are on the east side of the Suwannee River within a densely wooded, lowland floodplain. The spring discharges into a conical sink depression. The spring pool measures 60 ft (18.3 m) north to south and 75 ft (22.9 m) east to west. The depth of the spring pool is 25 ft (7.6 m). The bottom of the spring pool is sand with numerous submerged logs. There is a limestone ledge 3 ft (0.9 m) below the water surface and a vertical wall on the south side of the spring pool where wooden steps lead down into the water for swimming access. There is a tremendous boil associated with this spring. Thick algae cover approximately 75% of the limestone ledge and wall. The water is sky blue. Native aquatic grasses inhabit the spring run. There are many cypress trees and knees on the north and east shores of the spring pool. The spring run flows southward to the Suwannee River approximately 1200 ft (365.8 m). A boardwalk follows the run to a dock at the mouth of the run on the Suwannee River. Uplands on the south side of the spring rise to approximately 15 ft (4.6 m) above the water level and are developed into a recreation area underneath a thick canopy of live oak and pine. There are numerous walkways and a rock wall along the south shore of the spring pool. The north shore is relatively pristine and wooded. An extensive underwater cave system has been mapped at Manatee Spring. Divers report that entry into the cave against the current is very difficult.

Table 132. Manatee Spring water quality analysis.

Analytes	1946	1956	1972	2001	
				Unfilt.	Filter
Field Measures					
Temperature	23.0	23.0	22.0	22.5	-
DO	-	-	-	1.6	-
pH	7.4	8.0	8.0	7.04	-
Sp. Cond.	402	390	413	430	-
Lab Analytes					
BOD	-	-	-	0.2 AU	-
Turbidity	-	-	-	0.2	-
Color	0	5	0	5U	-
Alkalinity	-	180	170	198	200
Sp. Cond.	-	-	-	460	-
TDS	-	-	-	268	-
TSS	-	-	-	4U	-
Cl	5.1	-	4.0	7.2	7.3
SO_4	23	22	25	32	32
F	0	0.2	0.2	0.09 I	0.11
Nutrients					
TOC	-	-	-	1U	-
$NO_3 + NO_2$	-	-	-	1.7	1.8
$NH_3 + NH_4$	-	-	-	0.011 I	0.01 U
TKN	-	-	-	0.06 U	0.06 U
P	-	-	-	0.025	0.023
PO_4	-	-	-	0.027	-

Analytes	1946	1956	1972	2001	
				Unfilt.	Filter
Metals					
Ca	75	74	74	84.1	82.4
K	0.4	0.2	0.2	1.1	1.1
Na	2.9	3.1	3.0	3.78	3.64
Mg	6.3	7.7	5.2	6.5	6.3
B	-	-	-	25U	-
Al	-	-	-	-	75 U
As	-	-	-	3 U	3 U
Cd	-	-	-	0.75 U	0.75 U
Co	-	-	-	0.75 U	-
Cr	-	-	-	2 U	2 U
Cu	-	-	-	2.5 U	2.5 U
Fe	-	-	-	35 U	35 U
Mn	-	-	-	0.5 U	0.5 U
Ni	-	-	-	2 U	3 U
Pb	-	-	-	5 U	4 U
Se	-	-	-	4 U	4 U
Sn	-	-	-	20U	-
Sr	-	-	100	187	-
Zn	-	-	-	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Utilization-The spring and its surroundings constitute Manatee Springs State Park. The area is developed for camping, hiking, swimming, scuba diving, and nature study.

Discharge- All discharge rates are measured in ft^3/s.

March 14, 1932	149[(1)]
December 17, 1942	218[(1)]
July 24, 1946	137[(1)]
April 27, 1956	110[(1)]
November 18, 1960	238[(1)]
May 28, 1963	145[(1)]
April 19, 1972	220[(1)]
April 25, 1972	210[(1)]
July 31, 1973	203[(1)]
October 23, 2001	154[(7)]

Table 133. Manatee Spring bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	8Q
Enterococci	8Q
Fecal Coliform	6Q
Total Coliform	310Q

MADISON COUNTY

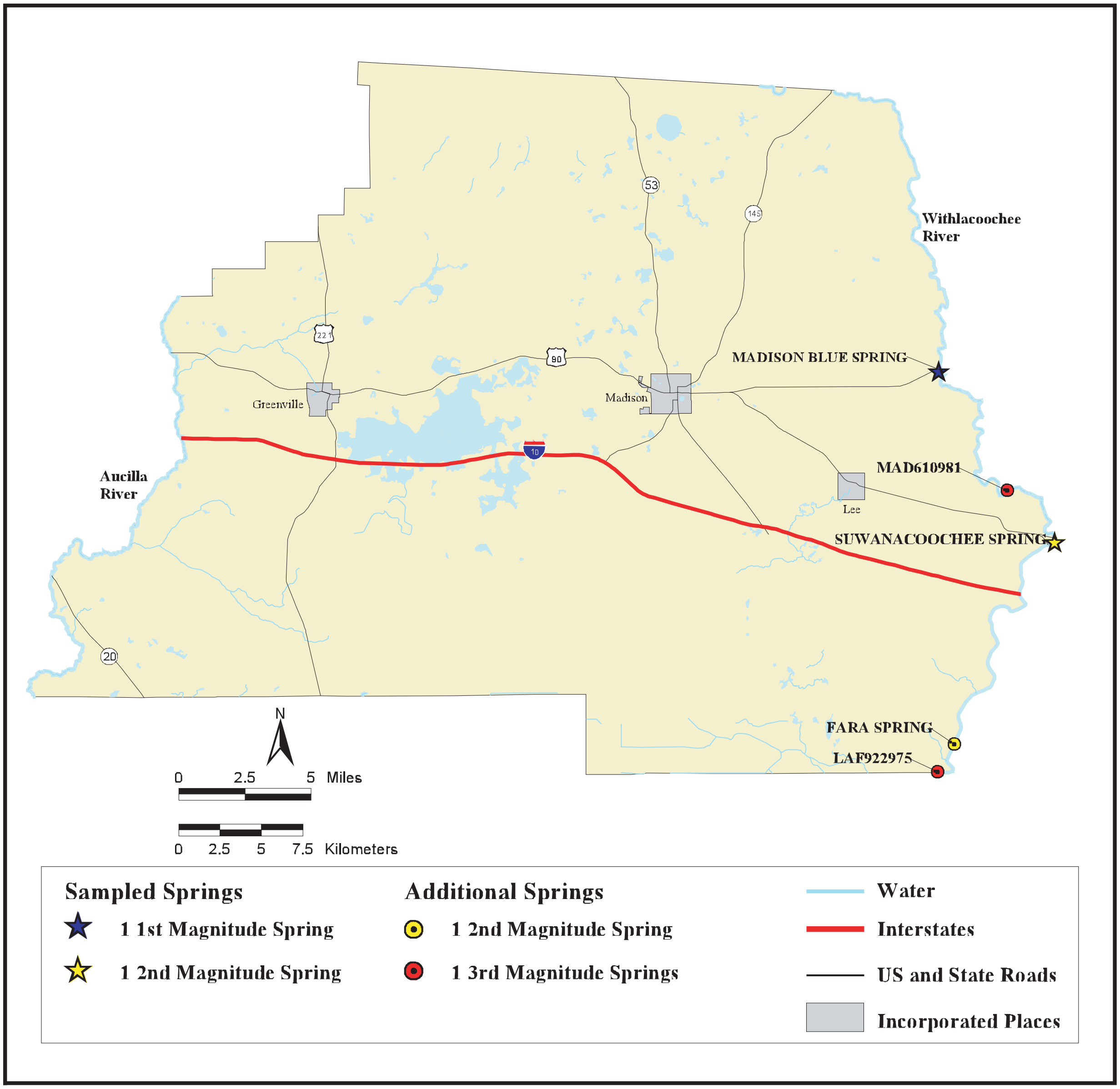

Figure 110. Springs visited by FGS in Madison County.

Madison Blue Spring

Figure 111. Madison Blue Spring (photo by T. Scott).

Location - Lat. 30° 28' 49.57" N., Long. 83° 14' 39.71" W. (SW ¼ SE ¼ SW ¼ sec. 17, T. 1 N., R. 11 E.). Madison Blue Spring is approximately 10 miles (16 km) east of Madison on the west bank of the Withlacoochee River. From the intersection of US 90 and SR 6 just east of Madison, drive east on SR 6 approximately 8 miles (12.9 km) to the bridge over the Withlacoochee River. Turn south (right) at the park sign just before the bridge. The spring is 525 ft (160 m) south of the highway.

Description - This spring issues from the bottom of conical depression. The spring pool diameter is about 72 ft (21.9 m) north to south and 82 ft (25 m) northeast to southwest. Pool depth measures 24 ft (7.3 m). The spring has vertical limestone walls. The 100 ft (30.5 m) long and 15 to 25 feet wide (4.6 – 7.6 m) spring run flows swiftly into the tannic Withlacoochee River. There was no visible boil in October 2001. Nearly the entire spring bottom and sides are covered with dark green algae. Sandy high ground surrounds the spring and rises to approximately 20 ft (6.1 m) above water level. Mixed hardwoods and pines occur along with numerous dirt pathways. An underwater cave system has been mapped at Madison Blue Spring.

Utilization - Madison Blue Spring is state-owned and is managed as a county recreational park with picnic tables, parking lot, and facilities. Swimming and scuba diving occur frequently here. A wooden access platform for scuba diving is located on the north side of the pool.

Discharge- All discharge rates are measured in ft^3/s.

March 16, 1932	75[1]
April 24, 1956	77.8[1]
November 15, 1960	141[1]
May 28, 1963	113[1]
November 6, 1973	139[1]
October 23, 2001	71.4[4]

Table 134. Madison Blue Spring water quality analysis.

Analytes	1946	1960	1973	2001	
				Unfilt.	Filter
Field Measures					
Temperature	21.5	21.1	21.0	21.29	-
DO	-	-	2.5	1.76	-
pH	7.6	7.7	7.7	7.75	-
Sp. Cond.	262	257	261	277	-
Lab Analytes					
BOD	-	-	0.7	0.29 I	-
Turbidity	-	-	4.0	0.9	-
Color	0	0	5	5U	-
Alkalinity	-	120	120	122	123
Sp. Cond.	-	-	-	280	-
TDS	-	-	-	155	-
TSS	-	-	-	4U	-
Cl	3.6	4.0	4.0	4.7 A	4.7
SO_4	10	9.6	11.0	14 A	14
F	0.1	0.4	0.1	0.14	0.15
Nutrients					
TOC	-	-	0.0	1 U	-
NO3 + NO2	-	-	0.01	1.3	1.4
NH3 + NH4	-	-	-	0.013 I	0.01 UQ
TKN	-	-	-	0.06 U	0.06 U
P	-	-	0.03	0.041	0.042
PO_4	-	-	0.52	0.03 J	-

Analytes	1946	1960	1973	2001	
				Unfilt.	Filter
Metals					
Ca	39	41	40	41.3	41.4
K	0.7	0.3	0.8	0.47	0.47
Na	2.4	2.6	2.9	2.77	2.77
Mg	8.7	7.2	10	8.4	8.5
As	-	-		3 U	3 U
Al	-	-	-	-	75U
B	-	-	0	25 U	-
Cd	-	-	-	0.75 U	0.5 U
Co	-	-	0	0.75 U	-
Cr	-	-	5	2 U	2 U
Cu	-	-	4	2 U	2 U
Fe	-	-	-	25 U	20 U
Mn	-	-	-	0.91 I	0.32 I
Ni	-	-	-	1.5 U	1.5 U
Pb	-	-	10	5 U	3 U
Se	-	-	-	3.5 U	3.5 U
Sn	-	-	-	7U	-
Sr	-	-	0	56.4	-
Zn	-	-	-	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=exceeding holding time limit

Table 135. Madison Blue Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	6Q
Enterococci	8Q
Fecal Coliform	4Q
Total Coliform	40Q

Suwanacoochee Spring

Figure 112. Suwanacoochee Spring (photo by R. Means).

Location – Lat. 30° 23' 12.02" N., Long. 83° 10' 18.36" W. (NW ¼ SW ¼ NE ¼ sec. 24, T. 1 S., R. 11 E.). The spring flows into the Withlacoochee River near its confluence with the Suwannee River, 13 miles (21 km) northwest of Live Oak. From the intersection with I-10 northwest of Live Oak, drive northwest on US 90 approximately 6 miles (9.7 km) to the Suwannee River. Cross over the river and turn north (right) on NE Drew Way. Follow the road to the Suwannee River State Park Picnic Area Annex. Follow the gated track in the picnic area southeast under the railroad trestle to the spring. Suwanacoochee Spring is situated on the southwest bank of the Withlacoochee River within view of the river's confluence with the Suwannee River.

Description – The single vent opening on the west end of the pool runs down into the bank to a line of sight depth of 10 ft (3 m). The small spring pool has a 15 ft (4.6 m) diameter. Limestone is exposed around the pool and sand covers the bottom. The water is clear and greenish. Algae are prevalent on submerged surfaces. This spring was discharging tannic water during April 2002 in response to a late March heavy rain. The water didn't entirely clear up until early August 2002, at which time the spring was barely flowing. Suwanacoochee Spring discharges from the base of 25 ft (7.6 m) high banks along the river through the remains of a late 1800's rock bath house intended to pool the water for swimming. The rock structure has rectangular window openings and has become disfigured with age. Both sides of the river have high forested banks with limestone overlain by sand. Also, in August 2002, the adjacent Withlacoochee River was at a historically low stage and was an estimated 2 ft (0.6 m) below the spring pool surface. Cave divers report that Suwanacoochee and Ellaville Springs are connected by an extensive underwater cave system that extends underneath the Suwannee River bed.

Table 136. Suwanacoochee Spring water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	21.0	21.07	
DO	1.6	0.25	
pH	7.3	7.02	
Sp. Cond.	-	360	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.15
Color	5	-	5U
Alkalinity	160	-	152
Sp. Cond.	370	338.0	-
TDS	196	-	203.0
TSS	-	-	4U
Cl	3.6	-	5.8
SO_4	11	-	27.0
F	0.1	-	0.14
Nutrients			
TOC	-	-	1.7I
$NO_3 + NO_2$ as N	-	-	0.48
$NH_3 + NH_4$	-	-	0.015I
TKN	-	0.065I	0.065I
P	-	0.064A	0.069A
PO_4	-	0.063	-
NO_3	-	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	53	53A	53.8
K	0.6	1A	1.0
Na	2.4	11.2A	11.2
Mg	11	7.8A	7.9
Al	-	-	10U
As	-	0.5U	0.75U
B	-	-	18I
Cd	-	0.025U	0.025U
Co	-	-	2U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	21I	40U
Mn	-	27.4A	27.6
Ni	-	3.6U	2U
Pb	-	0.025U	0.1U
Ra-226	-	-	0.3
Ra-228	-	-	1U
Se	-	0.69I	1U
Sn	-	-	5U
Sr	0	-	88.0
Zn	-	2U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization – The spring was historically used for bathing in the 1800's, but is currently undeveloped on state park property.

Discharge - All discharge rates are measured in ft^3/s.

November 6, 1931	40.8(1)
March 16, 1932	18.3(1)
November 8, 1973	51.6(1)
September 24, 1997	35.46(4)
August 6, 2002	0.54(2)

Table 137. Suwanacoochee Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

MANATEE COUNTY

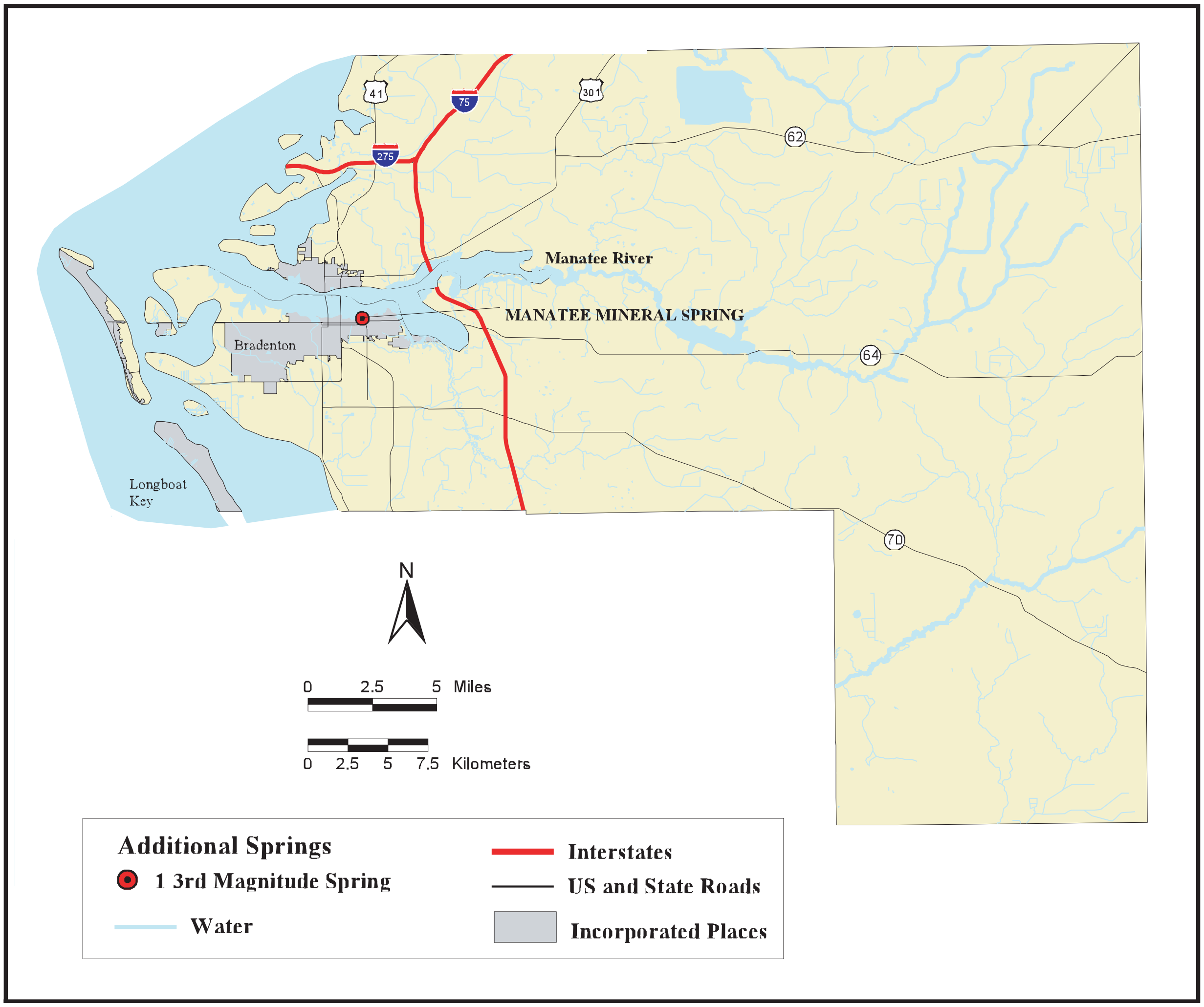

Figure 113. Spring visited by FGS in Manatee County.
Spring description provided on enclosed CD.

MARION COUNTY

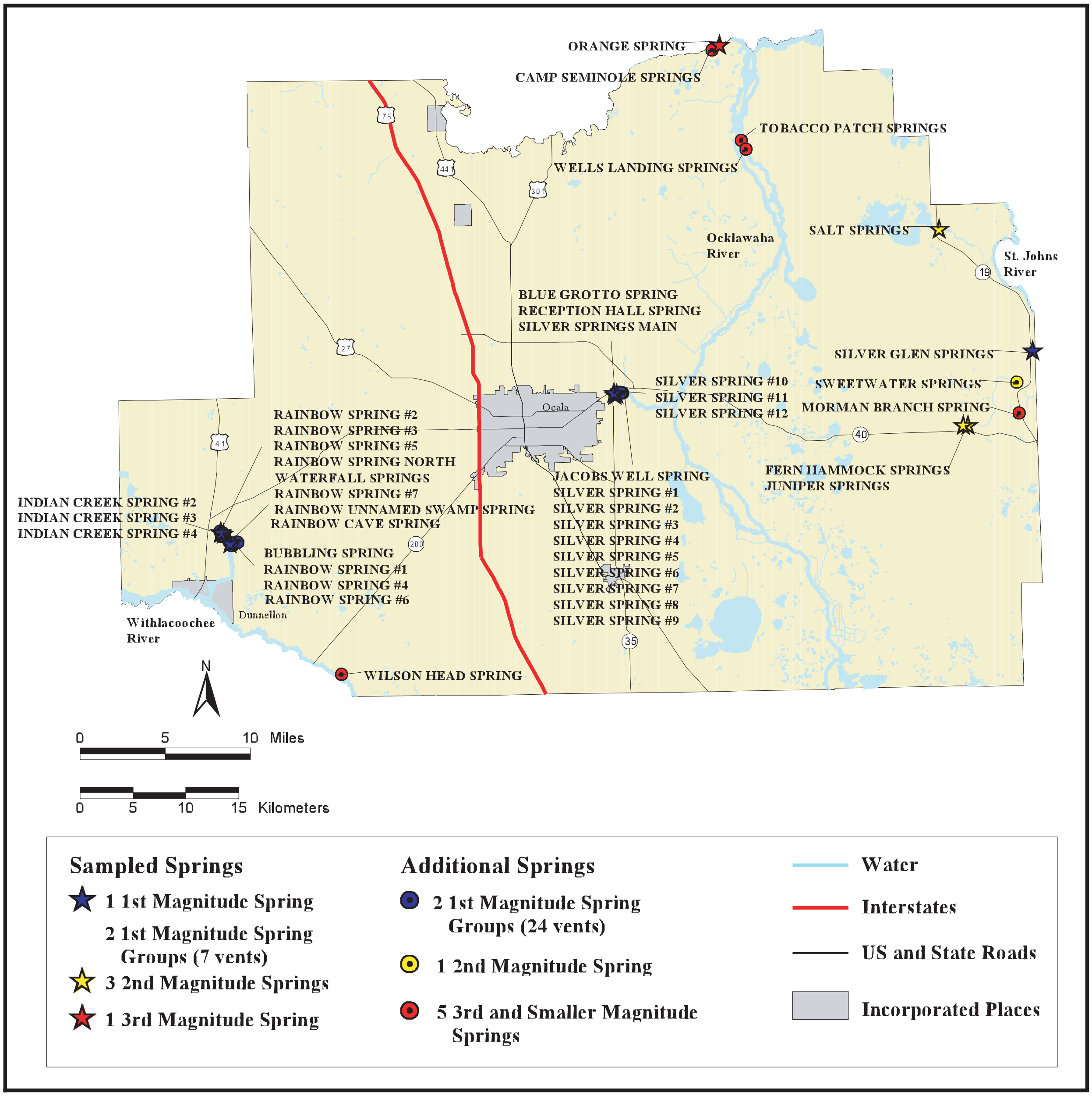

Figure 114. Springs visited by FGS in Marion County.

Fern Hammock Springs

Figure 115. Fern Hammock Springs (photo by T. Scott).

Location – Lat. 29° 11' 00.86" N., Long. 81° 42' 29.50" W. (SE ¼ SE ¼ SE ¼ sec. 17, T. 15 S., R. 26 E.). Fern Hammock Springs are located in the Juniper Springs Recreation Area, adjacent to the Juniper Prairie Wilderness in the Ocala National Forest. The recreation area entrance is on the north side of SR 40, 26 miles (42 km) east of Ocala. From the intersection of SR 40 and CR 326 just east of Ocala in Silver Springs, travel east on SR 40 approximately 20.3 miles (32.7 km) to the Juniper Springs Recreation Area on the north (left) side of the road. Access to the springs is via a hiking trail. Fern Hammock Springs are located downstream from Juniper Springs along Juniper Springs Run.

Description - The pool measures 75 ft (22.9 m) north to south and 156 ft (47.5 m) east to west. There are at least 20 sandy boils scattered throughout the spring pool. The largest sand-filled boil, located directly under the footbridge, was sampled for water quality. The depth measured over the sampled boil is 5.0 ft (1.5 m), but the rest of the spring pool is shallow, averaging approximately 2 ft (.6 m) deep. The bottom of the pool is sand with abundant patches of native aquatic grasses. The water is clear and has a light bluish tint. Limited exotic aquatic vegetation is present in the spring pool. Algae are present as a thin and patchy coating on the aquatic grasses. The springs are situated in a shallow spring pool that is a widened section of a side channel of Juniper Creek. A clear water channel flows into the pool on the south side. Water exits via a clear stream channel on the northwest side of the pool flowing approximately 600 ft (182.9 m) to Juniper Creek. There are additional small springs along the creek. A wooden footbridge arches over the center of the elongated spring pool. This spring is maintained in a more natural state than the neighboring Juniper Springs. Much of the pool is under a hardwood forest canopy and is within a dense mesic forest of pine, palm, and hardwoods. The banks are pristine, rising steeply to 3 ft (0.9 m) above water level. There is an interpretive pavilion near the northeast shore up in the woods, and two old ceramic drainage pipes lead down into the pool.

Utilization - The springs are within the Ocala National Forest. Campgrounds are near the springs but swimming is prohibited due to ecological restoration efforts.

Table 138. Fern Hammock Springs water quality analysis.

Analytes	1972	2002 Dissolved	2002 Total
Field Measures			
Temperature	21.5	22.07	
DO	-	5.84	
pH	8.3	7.73	
Sp. Cond.	-	116	
Lab Analytes			
BOD	0	-	-
Turbidity	-	-	0.15
Color	0	-	5U
Alkalinity	43	-	46
Sp. Cond.	110	120.0	-
TDS	63	-	65.0
TSS	-	-	4U
Cl	4.3	-	4.0
SO_4	5.2	-	5.8
F	0.2	-	0.071I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	0.09
$NH_3 + NH_4$	-	-	0.015I
TKN	-	0.06U	0.06U
P	-	0.022A	0.031
PO_4	-	0.033	-
NO_3	0.26	-	-

Analytes	1972	2002 Dissolved	2002 Total
Metals			
Ca	12	12.5	12.4
K	0.2	0.26	0.26
Na	2.7	2.4I	2.3I
Mg	4.4	4.5	4.4
Al	-	-	20U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.1
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	10U
Sr	90	-	75.5
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s.

December 16, 1935 15.5(1)
Annual Mean 1936 16.8(1) (5 measurements)
March 11, 1937 15.6(1)
April 4, 1946 17.6(1)
April 23, 1956 11.6(1)
November 15, 1960 17.7(1)
April 19, 1972 12.7(1)
Annual Mean 1985 13.6(6) (4 measurements)
Annual Mean 1990 11.0(6) (6 measurements)
Annual Mean 1995 13.0(6) (4 measurements)
Annual Mean 2000 10.9(6) (5 measurements)
Annual Mean 2001 10.6(6) (4 measurements)

Table 139. Fern Hammock Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1200Q
Fecal Coliform	88Q

Juniper Springs

Figure 116. Juniper Springs (photo by H. Means).

Location – Lat. 29° 11' 01.34" N., Long. 81° 42' 44.68" W. (SE ¼ SW ¼ SE ¼ sec. 17, T. 15 S., R. 26 E.). Juniper Springs is located in the Juniper Springs Recreation Area adjacent to the Juniper Prairie Wilderness in the Ocala National Forest. The recreation area entrance is on the north side of SR 40, 26 miles (42 km) east of Ocala. From the intersection of SR 40 and CR 326 just east of Ocala in Silver Springs, travel east on SR 40 approximately 20.3 miles (32.7 km) to the Juniper Springs Recreation Area on the north (left) side of the road.

Description - Juniper Springs has a generally shallow, oval shaped pool with multiple vents. The pool measures 90 ft (27.4 m) east to west and 120 ft (36.6 m) north to south. The vent sampled for water quality is located on the east side of the spring pool. Pool depth measured over the sampled vent is 11.7 ft (3.6 m). A small boil was present over this vent in January 2002. The bottom consists of sand and limestone with patches of native aquatic grasses. Limestone is exposed near the vents. The vent on the west side of the pool is a sandy boil approximately 6 ft (1.8 m) below the surface. Another vent is near the center of the pool. The water is clear and pale blue. Some algae are growing on aquatic grass blades, but overall algal presence is relatively sparse. A limestone wall with multiple accesses surrounds the spring pool. An old millhouse with a spillway is located along the run just downstream and within view of Juniper Springs. Juniper Springs forms the headwaters of Juniper Creek. It flows generally eastward through the Juniper Prairie Wilderness approximately 10 miles (16.1 km) into Lake George. There are many small springs along the run. To the south and west of the spring, higher ground rises to approximately 8 ft (2.4 m) above the water level. All land adjacent to spring pool is landscaped and developed into a recreation area.

Utilization – Juniper Springs is located within the Ocala National Forest and is popular for swimming. Camping and full facilities are available. Juniper Springs Run is a superb canoeing and kayaking stream, and boat rentals are available. Motorized boats are not allowed inside the wilderness area.

Table 140. Juniper Springs water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	22.0	22.02	
DO	-	6.24	
pH	8.5	8.03	
Sp. Cond.	-	115	
Lab Analytes			
BOD	-	-	-
Turbidity	-	-	0.1
Color	0	-	5U
Alkalinity	40	-	48
Sp. Cond.	110	120.0	-
TDS	68	-	62.0
TSS	-	-	4U
Cl	5.0	-	4A
SO_4	8.4	-	5.6A
F	0.2	-	0.069I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.03	-	0.084
$NH_3 + NH_4$	-	-	0.012I
TKN	-	0.06U	0.06U
P	-	0.028	0.034
PO_4	-	0.027	-
NO_3	0.08	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	13	12.5A	12.8A
K	0.9	0.26A	0.26A
Na	2.7	2.3I	2.3I
Mg	4.6	4.3A	4.4A
Al	-	-	20U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	10U
Sr	120	-	78.4A
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 141. Juniper Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

***Discharge* -** All discharge rates are measured in ft^3/s.

February 10, 1931	0.5[1] (estimated)
April 13, 1935	8.94[1]
December 16, 1935	15.7[1]
Annual Mean 1936	13.1[1] (4 measurements)
March 11, 1937	12.8[1]
April 4, 1946	14.1[1]
April 23, 1956	9.66[1]
November 5, 1960	13.6[1]
April 19, 1972	10.1[1]
Annual Mean 1985	12.2[6] (5 measurements)
Annual Mean 1990	9.12[6] (6 measurements)
Annual Mean 1995	11.96[6] (4 measurements)
Annual Mean 2000	8.81[6] (5 measurements)
Annual Mean 2001	8.24[6](4 measurements)

Orange Spring

Figure 117. Orange Spring (photo by R. Means).

Location – Lat. 29° 30' 38.34" N., Long. 81° 56' 38.66" W. (SE ¼ NE ¼ NE ¼ sec. 25, T. 11 S., R. 23 E.). Orange Spring is located on Orange Creek approximately 8 miles (12.8 km) southwest of Interlachen. From the intersection of SR 20 and CR 21 just west of Interlachen, head south on CR 21 and travel approximately 8.1 miles (13 km) to the bridge over Orange Creek. The spring is 0.15 miles (0.24 km) northeast of the SR 21 bridge over Orange Creek.

Description – Orange Spring sits in a slightly ovoid depression entirely ringed with a rock retaining wall. It measures 99 ft (30.2 m) east to west and 111 ft (33.8 m) northeast to southwest. The bottom is sand with depths ranging from 3 ft (0.9 m) to 12 ft (3.7 m) over the vent. The water color is murky greenish, and there are iron-reducing bacteria, algae, and some aquatic vegetation occurring in the spring. The vent is located in the northwest quadrant of the spring. The Springs Team visiting the spring was told there is a locked gate over the vent preventing access. It is uncertain if limestone is exposed in the vent. A slight boil is visible on the spring surface. There is a sharp odor of hydrogen sulfide emanating from the spring water. The relatively short spring run exits the pool toward the northeast over a 2 ft (0.6 m) high, man-made, limestone waterfall. Past the waterfall, the spring run is then channeled through a narrow concrete chute. The spring run flows approximately 500 ft (152.4 m) and joins the dark waters of Orange Creek. The spring is situated on the south edge of the heavily forested floodplain of Orange Creek. A water bottling facility and historical house are located to the south of the spring. Historically, Orange Spring attracted people during the 1800's and early 1900's for bathing and healing in its mineral-rich waters.

Utilization – Orange Spring is owned by a water bottling company, and access is closed to the public. It was formerly used for swimming.

Discharge - All discharge rates are measured in ft^3/s.

September 11, 1972	7.59(1)
January 8, 2003	2.95(2)

Table 142. Orange Spring water quality analysis.

Analytes	1972	2003	
		Dissolved	Total
Field Measures			
Temperature	24.0	23.31	
DO		0.41	
pH	7.6	7.45	
Sp. Cond.	-	279	
Lab Analytes			
BOD	-	-	0.21I
Turbidity	-	-	0.7
Color	0	-	5U
Alkalinity	120	129	-
Sp. Cond.	280	-	255
TDS	169	-	150.0
TSS	-	-	4U
Cl	6.0	-	6
SO_4	11	-	10
F	0.2	-	0.2
Nutrients			
TOC	-	-	1.2I
$NO_3 + NO_2$ as N	0.02	-	0.004U
$NH_3 + NH_4$	-	-	0.083
TKN	-	0.095I	0.24
P	-	0.072	0.078
PO_4	-	0.085	-
NO_3	0.00	-	-

Analytes	1972	2003	
		Dissolved	Total
Metals			
Ca	37	37.7	38.6
K	0.9	0.74	0.75
Na	4.4	4.2	3.6
Mg	9.5	9.3	9.3
Al	-	-	10U
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	1U
Cr	-	5U	2U
Cu	-	3.5U	4U
Fe	-	5U	7.3I
Mn	-	3.69	3.8
Ni	-	2U	2U
Pb	-	5U	5U
Ra-226	-	-	0.6
Ra-228	-	-	0.9U
Se	-	8U	8U
Sn	-	-	8.8I
Sr	250	-	204
Zn	-	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 143. Orange Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Rainbow Springs Group

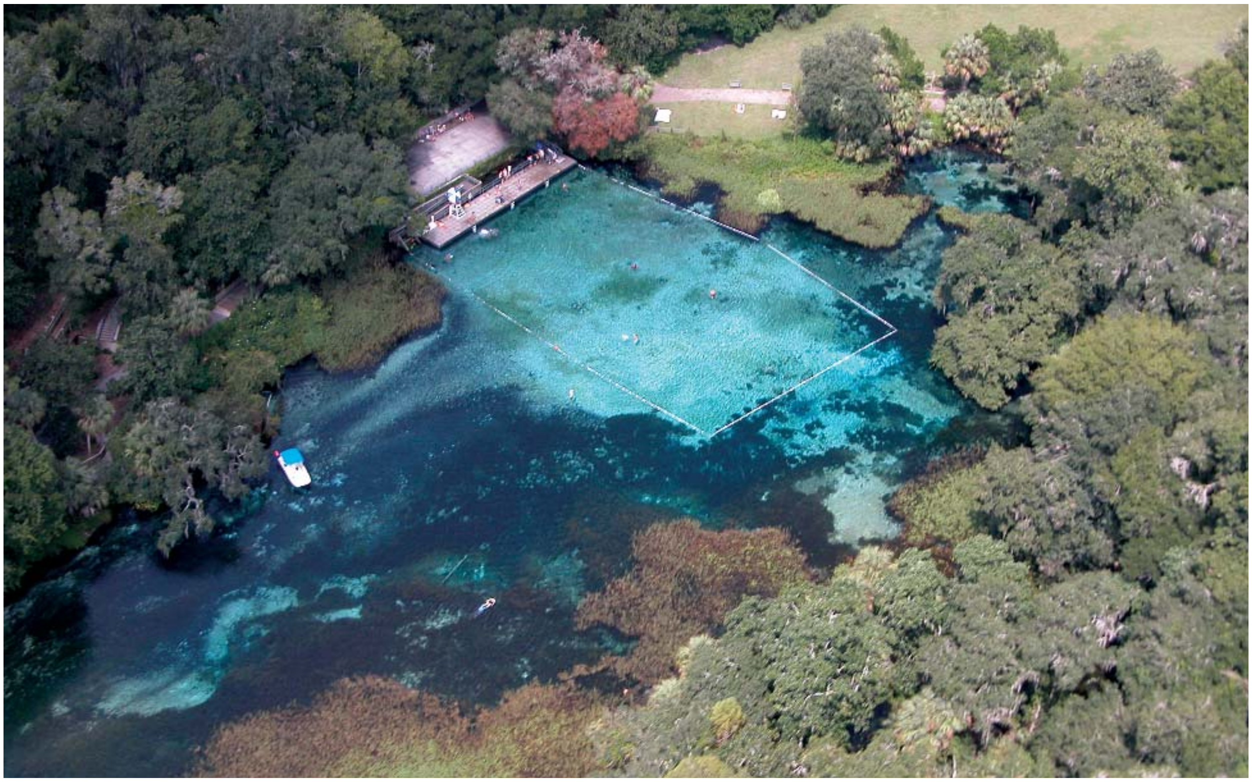

Figure 118. Rainbow Springs Group aerial photo (photo by H. Means).

Figure 119. Rainbow Springs Group head spring (photo by T. Scott).

Group Location— Lat. 29° 06' N., Long. 82° 26' W. (sections 7, 12, and 18, T. 16 S., R. 18 E.). The Rainbow Springs Group is approximately 3.5 miles (5.6 km) north of Dunnellon and forms the headwaters of the Rainbow River. From the intersection of US 41 and CR 484 in Dunnellon, drive north on US 41 approximately 3.7 miles (6 km) to a large sign on the east (right) side of the road indicating the entrance to the Rainbow Springs State Park, at 83rd Place Road. Turn east (right) onto 83rd Place Road and continue 0.8 miles (1.3 km) to the parking area near the head of the Rainbow River.

Group Description—Rainbow Springs Group forms the Rainbow River, which flows approximately 5.7 miles (9.2 km) south to the tannic Withlacoochee River. Surrounding land has high rolling sand hills with pine forest, agricultural fields and developed areas. Springs, in addition to those at and near the head of the Rainbow River, discharge from numerous limestone crevices and sand boils in the bed of the river and along the banks through the upper 2 miles (3.2 km).

RAINBOW NO. 1— Lat. 29° 06' 08.91" N., Long. 82° 26' 14.88" W. (SE ¼ NE ¼ SE ¼ sec. 12, T. 16 S., R. 18 E.). Rainbow No. 1 is at the head of the Rainbow River. The spring pool measures 330 ft (10.6 m) north to south and 360 ft (109.7 m) east to west. The large spring pool has multiple vents. The depth over the main vent is 9.9 ft (3 m). The bottom is sand with occasional limestone boulders. Water is clear and blue. A boil is visible over the main vent. Aquatic vegetation is patchy, including some exotic aquatic vegetation. Motorized boats are prohibited, but the area is accessible by canoe or kayak. There is a designated swimming area on the west side of pool. Land around the northern half of the pool rises sharply to approximately 25 ft (7.6 m) above the water. Rainbow Springs State Park facilities are situated on the high ground to the north. Live oak and pines are abundant on high ground. There is a dense hardwood-palm swamp forest along the pool's east and west edges.

Figure 120. Rainbow Springs Group rocks underwater (photo by T. Scott)

Table 144. Rainbow Springs Group water quality analysis.

Analytes	1927	1946	1974	No. 1 2001		No. 4 2001		No. 6 2001		Bubbling 2001	
				Unfilt.	Filter	Unfilt.	Filter	Unfilt.	Filter	Unfilt.	Filter
Field Measures											
Temperature	-	-	22.5	23.4	-	23.5	-	23.4	-	23.0	-
DO	-	-	6.0	6.61	-	5.33	-	5.71	-	4.45	-
pH	-	7.9	7.8	7.95	-	7.68	-	7.65	-	7.41	-
Sp. Cond.	-	145	121	161	-	251	-	347	-	337	-
Lab Analytes											
BOD	-	-	0.0	0.2 U	-	0.2 U	-	0.2 U	-	0.2 U	-
Turbidity	-	-	1	0.05 U	-	0.05 U	-	0.1	-	0.05 U	-
Color	-	2	0	5 U	-	5 U	-	5 U	-	5 U	-
Alkalinity	-	-	53	67 A	67 A	115	115	123	123	160	158
Sp. Cond.	-	-	-	160	-	250	-	340	-	330	-
TDS	-	-	-	89	-	134	-	207	-	192	-
TSS	-	-	-	4 U	-	4 U	-	4 U	-	4 U	-
Cl	3.0	3.5	3.3	3.9	3.8	4.4	4.4	6.5	6.5	5.4	5.2 A
SO_4	16.0	4.7	4.3	4.8	4.8	4.9	4.8	44	44	8.2	7.9 A
F	-	0.0	0.2	0.079 I	0.095 I	0.097 I	0.11	0.12	0.13	0.11	0.13
Nutrients											
TOC	-	-	0.0	1 U	-	1 U	-	1 U	-	1 U	-
NO3 + NO2	-	-	0.17	1.2	1.2	1.3	1.3	0.9	0.92	1.1	1.1
NH3 + NH4	-	-	-	0.01 U	0.013 I	0.011 I	0.01 U	0.01 U	0.01 U	0.017 I	0.01 U
TKN	-	-	-	0.06 U	0.06 U	0.06 U	0.06 UQ	0.06 U	0.06 U	0.06 U	0.06 U
P	-	-	-	0.029	0.028	0.034	0.036	0.028	0.028	0.034	0.037
PO_4	-	-	0.03	0.034	-	0.037	-	0.026 Q	-	0.04	-
Metals											
Ca	21	21	20	22.4 J	22.9	39.6 J	40.3	53.8 AJ	54	57.4 J	55.2
K	0.5	0.4	0.1	0.11	0.11	0.12	0.13	0.28 A	0.28	0.17	0.16
Na	1.4	2.9	2.0	2.33	2.31	2.41	2.53	3.74 A	3.68	2.97	2.85
Mg	5.1	4.0	3.1	3.6	3.7	4.9	5	6.8 A	6.8	6.3	6.1
As	-	-	-	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Al	-	-	30	-	75 U	-	75 U	-	75 U	-	75 U
B	-	-	4	25 U	-	25 U	-	25 U	-	25 U	-
Cd	-	-	0	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	-	0.75 U	-	0.75 U	-	0.75 U	-	0.75 U	-
Cr	-	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cu	-	-	0.2	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5.2 I
Fe	-	-	0	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U
Mn	-	-	0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ni	-	-	3	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Pb	-	-	6	5 U	4 U	5 U	4 U	5 U	4 U	5 U	4 U
Se	-	-	-	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Sn	-	-	-	10 U	-	10 U	-	10 U	-	10 U	-
Sr	-	-	70	55	-	82	-	423 A	-	153	-
Zn	-	-	0	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

RAINBOW NO. 4 - Lat. 29°06' 06.87" N., Long. 82° 26' 13.77" W. (SE ¼ NE ¼ SE ¼ sec. 12, T. 16 S., R. 18 E.). Rainbow No. 4 is approximately 350 ft (106.7 m) downstream from Spring No. 1. It issues from a conical depression at the bottom of the river. The circular spring pool measures approximately 75 ft (2.9 m) in diameter. The depth measured over the vent is 10.9 ft (3.3 m). Water is clear and pale blue. A boil is not visible. Aquatic grasses sway in the current with very little exotic aquatic vegetation. Algae are present but are not dominant. This spring is located within the State Park no motorized boat zone. Land on both sides of the river is low lying and harbors pristine hardwood swamp forest.

RAINBOW NO. 6 - Lat. 29° 05' 34.11" N., Long. 82° 25' 42.83" W. (NE ¼ SE ¼ NW ¼ sec. 18, T. 16 S., R. 18 E.). Rainbow No. 6 is just off the south bank approximately 0.4 miles (0.6 km) downstream from the headwaters. It emerges from the bottom of the Rainbow River between 1 and 1.5 miles (1.6-2.4 km) downstream from the head of the river. It issues from a conical depression nearest the west bank of the river and forms a boil on the river surface. The spring pool measures approximately 60 ft (18.3 m) north to south and 75 ft (22.9 m) east to west. The depth measured over the vent is 16.9 ft (5.2 m). Limestone is evident on the bottom of the spring. River and spring water are clear and pale blue. Aquatic grasses are common in the spring pool. Exotic aquatic vegetation is present on the south side of the pool. Algae occur thinly on limestone substrate. High ground on the west side of the river rises to nearly 20 ft (6.1 m) above the water. There are some pines on the hill top. This spring is downstream from the state park, and private houses are along the west bank. The east side of the river is low-lying and heavily forested state land.

BUBBLING SPRING - Lat. 29° 06' 04.46" N., Long. 82° 26' 05.45" W. (SW ¼ NW ¼ SW ¼ sec. 7, T. 16 S., R. 18 E.). Bubbling Spring flows into the Rainbow River from the east approximately 200 ft (61 m) downstream from Spring No. 4. The spring pool measures 45 ft (13.7 m) north to south and 75 ft (22.9 m) east to west. The shallow spring pool measures only 2.8 ft (0.9 m) over the vent. Water issues from a small crevice in the limestone. The force of the boil pushes the water column approximately 0.5 ft (0.2 m) higher than the surrounding spring pool. The pool bottom is sand and limestone and the water is clear and pale blue. This spring and its run have very rich aquatic vegetation. Algae are thinly present on limestone substrate. Bubbling Spring is at the head of a spring run that is approximately 400 ft (121.9 m) long. Densely forested high ground adjoins the east side of the pool and rises to approximately 15 ft (4.6 m) above water. There is a hardwood forest canopy over the spring pool. The spring is within the state park.

Utilization- The uppermost portion of Rainbow River is part of Rainbow Springs State Park. It is developed into an interpretive and recreation area with emphasis on preserving the natural quality of the watershed. The east side of the river below the state park is state-

Table 145. Rainbow Springs Group bacteriological analysis.

Bacteria Results (in #/100ml)				
Analyte	**Vent No. 1**	**Vent No. 4**	**Vent No. 6**	**Bubbling**
Escherichia coli	1 KQ	1AKQ	1 KQ	1 KQ
Enterococci	1 KQ	1AKQ	1 KQ	1 KQ
Fecal Coliform	1 KQ	1AKQ	1 KQ	1 KQ
Total Coliform	1 KQ	1AKQ	1 KQ	1 KQ

owned and protected. The west side below the state park is subdivided into private lots, often with houses near the river's edge.

Discharge- All discharge rates are measured in ft^3/s.

Average 1965 - 1974	763[1]
Maximum (October 12, 1964)	1230[1]
Minimum (October 3, 1932)	487[1]
October 23, 2001	634[7]

Salt Springs

Figure 121. Salt Springs (photo by T. Scott)

Location – Lat. 29° 21' 02.36" N., Long. 81° 43' 58.05" W. (irregular section 42, T. 13 S., R. 26 E.). Salt Springs are located within the Ocala National Forest in the Salt Springs Recreation Area. From the intersection of SR 40 and CR 314, approximately 12 miles (19.3 km) east of the US 301/SR 40 intersection in Ocala, head north on CR 314 approximately 18 miles (29 km) to the junction with SR 19. From the junction of SR 19 and CR 314 continue north (left) 0.5 miles (0.8 km) to the entrance of Salt Springs Recreation Area which is located on the east (right) side of the road.

Description - There are several vents located in a large, shallow spring pool. The pool measures approximately 129 ft (39.3 m) northeast to southwest and 189 ft (57.6 m) northwest to southeast. The spring pool averages approximately 2 ft (0.6 m) deep; however, it is deeper over the vents. Some vents are reported to be up to 20 ft (6.1 m) deep (Springs Fever website). The sampled vent is located in the north corner of the spring pool nearest the concrete wall, and the depth there is 8.0 ft (2.4 m). Limestone and sand form the pool bottom. The water is clear and light blue. Native aquatic vegetation is abundant with some exotic aquatic vegetation. Some algae are present as patches and thin layers on limestone and vegetation substrates. Salt Springs Run flows southeast approximately 4 miles (6.4 km) into the northwest corner of Lake George. The north, south, and west sides of the pool are built up with a vertical 5 ft (1.5 m) concrete wall with an accompanying sidewalk. Motorboats are not allowed in the spring pool, but they frequent the run. The surrounding environment consists of rolling sand hills to the north, south, and west, rising steeply to approximately

Table 146. Salt Springs water quality analysis.

Analytes	1924	1946	1972	2002	
				Dissolved	Total
Field Measures					
Temperature	-	-	24.0	23.62	
DO	-	-	-	2.63	
pH	-	7.1	7.8	7.33	
Sp. Cond.	-	-	-	6070	
Lab Analytes					
BOD	-	-	-	-	0.2AU
Turbidity	-	-	-	-	0.20
Color	-	0	-	-	5U
Alkalinity	-	-	-	-	67
Sp. Cond.	-	9330	6500	6300.0	-
TDS	5210	5850	-	-	3440.0
TSS	-	-	-	-	4U
Cl	2400	2800	1900.0	-	1800.0
SO_4	540	610	-	-	410.0
F	-	0	0	-	0.10
Nutrients					
TOC	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	-	0.12	-	0.11
NH_3 + NH4	-	-	-	-	0.018I
TKN	-	-	-	0.17I	0.18I
P	-	-	-	0.015U	0.015U
PO_4	-	-	-	0.014	-
NO_3	-	-	0.53	-	-
Metals					
Ca	220	240	-	160	160
K	-	38	-	29.7	28.7
Na	1400	1500	-	925	982
Mg	140	170	-	102	102
Al	-	-	-	-	75U
As	-	-	-	3U	3U
B	-	-	-	-	320
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	0.75U
Cr	-	-	-	2U	2U
Cu	-	-	-	3.5U	3.5U
Fe	-	100	-	35U	35U
Mn	-	-	-	2U	2U
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	3.8
Ra-228	-	-	-	-	0.9U
Se	-	-	-	4U	4U
Sn	-	-	-	-	10U
Sr	-	-	6000	-	3490
Zn	-	-	-	7.5U	7.5U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

18 ft (5.5 m). The uplands adjacent to the springs are developed and landscaped with grassy lawn and shady live oaks. An old house from the late 1800's sits on a hill to the southwest of the pool. Salt Springs derives its name from its saline waters.

Utilization **-** The springs are within Salt Springs Recreation Area. Camping and full facilities are available.

Discharge **-** All discharge rates are measured in ft^3/s.

February 9, 1929	87.3[1]
September 8, 1930	81.4[1]
Annual Mean 1931	92.5[1] (5 measurements)
March 3, 1932	73.3 [1]
February 7, 1933	61.8[1]
Annual Mean 1935	69.57[1] (3 measurements)
April 4, 1946	78.7[1]
April 24, 1956	79.9[1]
November 16, 1961	88.2[1]
June 8, 1966	107.0[1]
April 25, 1967	91.9[1]
April 20, 1972	77.1[1]
Annual Mean 1985	88.51[6] (5 measurements)
Annual Mean 1990	70.22[6] (6 measurements)
Annual Mean 1995	73.43[6] (4 measurements)
Annual Mean 2000	74.83[6] (5 measurements)
Annual Mean 2001	76.38[6] (4 measurements)

Table 147. Salt Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Silver Glen Springs

Figure 122. Silver Glen Springs circa 1930 (anonymous).

Figure 123. Silver Glen Springs (photo by T. Scott).

Location-Lat. 29° 14' 45.04" N., Long. 81° 38' 36.50" W. (SE ¼ NE ¼ SE ¼ sec. 25, T. 14 S., R. 26 E.). Silver Glen Springs is in the Ocala National Forest approximately 30 miles (48.3 km) northeast of Ocala. From the intersection of SR 40 and CR 326 just east of Silver Springs, travel east on SR 40 approximately 24.8 miles (40 km). Turn north (left) on SR 19 and travel approximately 6 miles (9.7 km) to Silver Glen Springs Recreation Area located on the east (right) side of SR 19. The spring is south of the parking area.

Description-Silver Glen Springs has a large combined spring pool with two vents. Water quality was sampled at the east vent. The combined springs pool measures 200 ft (61 m) north to south and 175 ft (53.3 m) east to west. The depth is 18 ft (5.5 m) at the east vent which is a conical depression. The second vent, often referred to as "Natural Well", is on the southwestern edge of the pool. It is 12–15 feet (3.7-4.6 m) in diameter and is approximately 40 feet (12.2 m) deep. The west vent is a vertical cave opening in limestone. Much of the pool has a bare sand bottom. Water is clear and light blue. Large boils occur over both vents. Some patches of aquatic grass are in the combined pool. Exotic aquatic vegetation is present, but not common. Algae are common. Native aquatic vegetation is abundant around the "Natural Well." Two ropes close off the springs pool to boat traffic. Within the main pool, access to "Natural Well" is restricted. There are many large fresh and salt water fishes in both vents but are especially common in "Natural Well". The spring run is approximately 200 ft (61 m) wide on average and flows east approximately 0.75 mile (1.2 km) to the St. Johns River. The spring run is heavily used and has suffered damage from the boat traffic and recreational use. Uplands rise gently around the springs to approximately 12-15 ft (3.7-4.6 m). Oak, cedar, and pine are common. An underwater cave system has been mapped at Silver Glen Springs.

Utilization-Silver Glen Springs is part of the Ocala National Forest. There are swimming and picnic facilities. Boats are not allowed in the spring pool, however, the spring run may become crowded with hundreds of recreational boats during peak use periods.

Discharge- All discharge rates are measured in ft^3/s.

Average 1931 – 1972	112[1] (11 measurements)
Maximum (April 12, 1935)	129[1]
Minimum (February 7, 1933)	90[1]
September 13, 2001	109[7]

Table 148. Silver Glen Springs bacteriological analysis

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1KQ
Enterococci	1KQ
Fecal Coliform	1KQ
Total Coliform	20Q

Table 149. Silver Glen Springs water quality analysis.

Analytes	1946	1972	2001	
			Unfilt.	Filter
Field Measures				
Temperature	22.8	23.0	23.4	-
DO	-	-	3.66	-
pH	7.4	7.8	7.64	-
Sp. Cond.	2480	2220	1810	-
Lab Analytes				
BOD	-	0.1	0.2 U	-
Turbidity	-	0	0.05 U	-
Color	0	0	5U	-
Alkalinity	-	69	69	69
Sp. Cond.	-	-	2000	-
TDS	-	-	1050	-
TSS	-	-	4U	-
Cl	610	520	470	480
SO_4	200	190	170	180
F	0.0	0.2	0.12	0.12
Nutrients				
TOC	-	0.0	1 U	-
NO3 + NO2	-	0.03	0.046	0.05
NH3 + NH4	-	-	0.011 I	0.01 U
TKN	-	-	0.093 I	0.069 I
P	-	0.02	0.025	0.024
PO_4	-	0.02	0.028	-

Analytes	1946	1972	2001	
			Unfilt.	Filter
Metals				
Ca	87	74	69.7	70.4
K	10	11	9.1	9.2
Na	330	290	238	241
Mg	46	38	35.6	35.9
As	-	0	3 U	3 U
Al	-	-	-	75 U
B	-	570	101	-
Cd	-	-	0.75 U	0.75 U
Co	-	0	0.75 U	-
Cr	-	-	2 U	2 U
Cu	-	10	2.5 U	2.5 U
Fe	80	-	35 U	35 U
Mn	-	-	1 U	2 U
Ni	-	-	2 U	2 U
Pb	-	0	5 U	4 U
Se	-	-	4 U	4 U
Sn	-	-	10 U	-
Sr	-	-	1480	-
Zn	-	20	5 U	5 U

A=Average Value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Silver Springs Group

Figure 124. Silver Springs Group, Main Spring aerial photo (photo by H. Means).

Figure 125. Silver Springs Group, Main Spring (photo by Steve Specht).

Group Location— Lat. 29° 12’ N., 82° 03’ W. (sec. 6, T. 15 S., R. 23 E.). The Silver Springs Group is located approximately 6 miles (9.7 km) northeast of Ocala. From the intersection with US 301 and SR 40, drive east on SR 40 for 6.1 miles (9.8 km) to the Silver Springs theme park entrance on the south side of SR 40. Turn onto the access road and continue 0.3 miles (0.5 km) to the parking area. The springs can also be accessed by water. Boats can be launched at a boat ramp on SR 40 at the west end of the bridge over the Oklawaha River approximately 4 miles (6.4 km) east of Silver Springs theme park.

Group Description— The Silver Springs Group, flowing from numerous vents, forms the headwaters of the Silver River, a major tributary of the Oklawaha River. There are numerous smaller springs in the bed or at the edges of the spring run within about 3,500 ft (1,066.8 m) of the main orifice. The run is usually clear and the bottom at all locations in the springs and run is easily visible. The Silver River flows from its headspring eastward for approximately 5 miles (8 km) through a dense mixed hardwood and cypress swamp to the Oklawaha River. The Oklawaha River flows northward and is a tributary to the St. Johns River. Higher sandy terrain with pine and the Silver Springs community lie to the west of the springs.

MAIN SPRING - Lat. 29° 12’ 58.34” N., Long. 82° 03’ 09.47” W. (SW ¼ SW ¼ NW ¼ sec. 6, T. 15 S., R. 23 E.). The spring is in a steep-walled depression in the limestone. The main spring is approximately 200 ft (61 m) northeast of the glass-bottom boat loading area. This is the headspring of the Silver River and the largest spring of the group. The spring pool measures 300 ft (91.4 m) north to south and 195 ft (59.4 m) east to west. The depth measured over the vent opening is 33 ft (10.1 m). The vent opening is a horizontal oval-shaped orifice in the base of a limestone ledge on the northeast side of the spring pool. The bottom is sand with limestone pieces that have fallen from the walls. The water is clear and light blue. Aquatic vegetation is abundant across the spring bottom, and a layer of algae covers most substrates. There was no visible boil on the water surface during the October 2001 visit; however, divers observed flow coming out of the vent. Most of the pool edge is a wooden retaining wall. The west side of the pool is developed into glass-bottom boat dock. All nearby uplands to the north, west, and south are developed as parts of the Silver Springs theme park. An underwater cave system has been mapped at the Silver Springs Main Spring.

RECEPTION HALL - Lat. 29° 12’ 52.61” N., Long. 82° 03’ 05.05” W. (NW ¼ NW ¼ SW ¼ sec. 6, T. 15 S., R. 23 E.). Reception Hall is now referred to as The Abyss by most theme park personnel. It is located on the south side of the Silver River approximately 1,000 ft (304.8 m) downstream from Main Spring. It is one of three side springs that form a larger, conjoined spring pool. Reception Hall Spring pool is approximately 30 ft (9.1 m) in diameter and 25 ft (7.6 m) deep. The bottom is sand with limestone exposed near and around the vent. Water discharges from a vertical crack in the limestone. The water is clear and light blue, and sand and shell particles are suspended in the spring flow. No boil was visible on the surface of the spring pool during October 2001. An old boat is wrecked and half buried on the north side of the pool. Aquatic vegetation is common around the outskirts of the spring pool. The area near the vent is bare sand around the limestone orifice. Uplands to the south rise to nearly 6 ft (1.8 m) above the water and are forested with hardwoods. To the north, on the other side of the river, the land is developed by the theme park.

BLUE GROTTO - Lat. 29° 12' 54.91" N., Long. 82° 02' 59.59" W. (NE ¼ NW ¼ SW ¼ sec. 6, T. 15 S., R. 23 E.). Blue Grotto is the next spring pool east of the conjoined pool with Reception Hall. Blue Grotto is also on the adjacent south side of the Silver River. It is about 300 ft (91.4 m) east of Reception Hall Spring. The circular spring pool measures 105 ft (32 m) in diameter. The depth over the vent is 21.6 ft (6.6 m). Water discharges from a cavity in the limestone. Bare sand surrounds the orifice. Sand and shell particles are suspended in the upwelling. A boil is visible on the water surface. There is aquatic vegetation along the outskirts of the spring pool. During the October 2001 visit, a 10-12 ft (3-3.7 m) alligator was lying on the bottom near the vent with a dusting of sand and shell on its back. The water is clear and light blue. Along the south shore is a thin strip of hardwood and cypress trees. Just past the trees is a man-made spring channel called the Fort King Waterway. It flows parallel to the Silver River and eastward. South of this channel the land rises up to about 15 ft (4.6 m) above water surface. On these banks is an exotic animal zoo.

Utilization—Land on the north side of the Silver River near the headspring is part of the Silver Springs theme park which is privately operated. Land along the south side of the Silver River is part of the Silver River State Park.

Discharge—Silver Springs Group

October 1932 to September 1974:	820 ft^3/s (1) average
Maximum October 7, 13-17, 20, 1960:	1,290 ft^3/s (1)
Minimum May 7, 1957:	539 ft^3/s (1)
November 15, 2001:	556 ft^3/s (7)

Table 150. Silver Springs Group bacteriological analysis.

Bacteria Results (in #/100ml)			
Analyte	**Main**	**Blue Grotto**	**Reception Hall**
Escherichia coli	1KQ	48Q	1AKQ
Enterococci	1KQ	34Q	1AKQ
Fecal Coliform	1KQ	52Q	1AKQ
Total Coliform	1KQ	110Q	1AKQ

Table 151. Silver Springs Group water quality analysis.

Analytes	1907	1946	1972	Main 2001		Blue Grotto 2001		Reception Hall 2001	
				Unfilt.	Filter	Unfilt.	Filter	Unfilt.	Filter
Field Measures									
Temperature	-	-	23.5	23.2	-	23.5	-	23.6	-
DO	-	-	-	2.38	-	3.16	-	3.73	-
pH	-	7.8	8.1	7.20	-	7.26	-	7.24	-
Sp. Cond.	-	401	420	471	-	443	-	468	-
Lab Analytes									
BOD	-	-	0.1	0.2 U	-	0.2 AU	-	0.2 U	-
Turbidity	-	-	0	0.05 U	-	0.05 U	-	0.05 U	-
Color	-	4	0	5 U	-	5 U	-	5 U	-
Alkalinity	-	-	170	176	176	153	153	158	157
Sp. Cond.	-	-	-	510	-	480	-	500	-
TDS	-	-	-	285	-	273	-	292	-
TSS	-	-	-	4 U	-	4 U	-	4 U	-
Cl	7.7	7.8	8.0	9.1	9.2	8.9	9	8.8	8.9
SO_4	44	34	39	59	60	63	64	73	74
F	-	0.1	0.2	0.17	0.17	0.15	0.15 A	0.16	0.16
Nutrients									
TOC	-	-	8.0	1 U	-	1 U	-	1 U	-
NO3 + NO2	-	-	2.6	1.2	1.1	1.5	1.4	1.4	1.4
NH3 + NH4	-	-	-	0.01 U	0.01 U	0.01 U	0.025 A	0.011 I	0.01 U
TKN	-	-	-	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
P	-	-	0.14	0.042 A	0.044	0.038	0.039	0.037	0.038
PO_4	-	-	0.14	0.03 J	-	0.042 J	-	0.045 J	-
Metals									
Ca	73	68	68	73.3	76.5	68.2 A	70	73	74.3
K	-	1.1	0.2	0.61	0.68	0.65	0.67	0.64	0.68
Na	-	4.0	4.3	5.92	6.87	5.91 A	6.48	6.04	6.39
Mg	9.2	9.6	9.3	10.7	11.1	11.3 A	11.4	12	12.2
As	-	-	-	3U	3U	3U	3U	3U	3U
Al	-	-	-	-	75 U	-	-	-	75 U
B	-	-	0	25 U	-	25 U	-	25 U	-
Cd	-	-	0	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	0	0.75 U	-	0.75 U	-	0.75 U	-
Cr	-	-	0	2U	2 U	2 U	2 U	2 U	2 U
Cu	-	-	0	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Fe	-	-	20	35 U	35 U	35 U	35 U	35 U	35 U
Mn	-	-	0	1U	1 U	1 U	1 U	1 U	1 U
Ni	-	-	-	2U	2 U	2 U	2 U	2 U	2 U
Pb	-	-	2	5U	4 U	5 U	4 U	5 U	4 U
Se	-	-	-	4U	4 U	4 U	4 U	4 U	4 U
Sn	-	-	-	10 U	-	10 U	-	10 U	-
Sr	-	-	500	693	-	676 A	-	782	-
Zn	-	-	1	5 U	5 U	5 U	5 U	12 I	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

ORANGE COUNTY

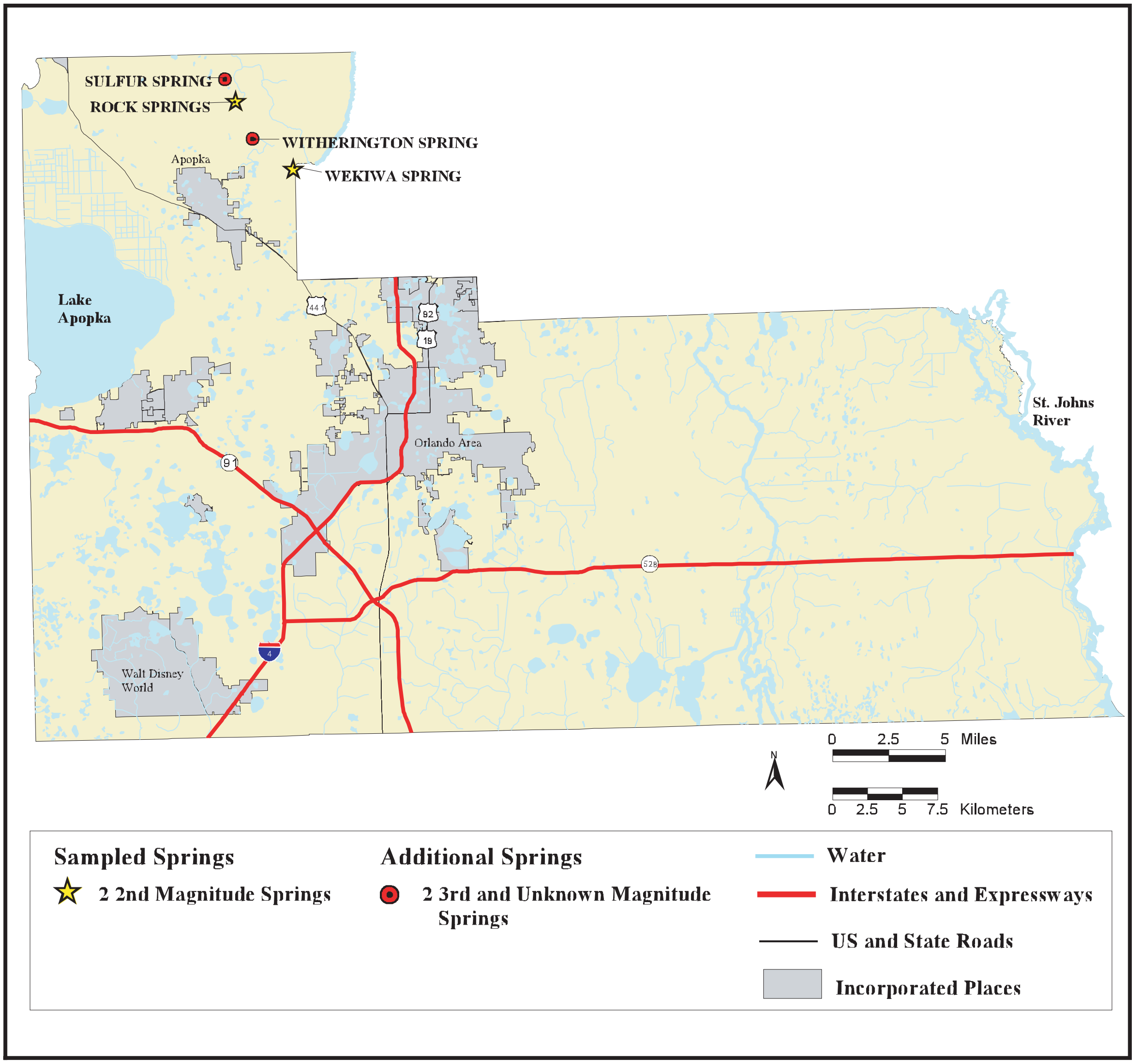

Figure 126. Springs visited by FGS in Orange County.

Rock Springs

Figure 127. Rock Springs (photo by T. Scott)

Location – Lat. 28° 45' 23.20" N., Long. 81° 30' 06.25" W. (NE ¼ NE ¼ NW ¼ sec. 15, T. 20 S., R. 28 E.). Rock Springs is located within Dr. Howard A. Kelly County Park, approximately 6 miles (9.7 km) north of Apopka. From the junction of US 441 and SR 435 in Apopka, travel 5.9 miles (9.5 km) north on SR 435. Turn east (right) on Bay Bridge/Rock Springs Road and travel 0.3 miles (0.5 km) to the park entrance and parking lot. The spring is southeast of the parking area.

Description – Rock Springs emerges from a horizontal cave at the base of a 20 ft (6.1 m) high vertical limestone and sand bluff. The water is clear and bluish. For a few hundred feet (approximately one hundred meters), the stream cuts into limestone, and its bottom has sand and marine fossil shells that eroded out of the limestone. There is no vegetation and only minor algal growth. Lush ferns and moss blanket the bluff and upper stream banks. The upper part of the run averages 15 – 20 ft (4.5 – 6.1 m) wide and 5 ft (1.5 m) deep. Rock Springs Run flows north, east, and south, eventually into the Wekiva River approximately 8.6 miles (13.8 km) downstream. Approximately 120 ft (36.6 m) downstream, a boardwalk arches over the stream. About 1,000 ft (304.8 m) downstream from the springhead, the run has been pooled for swimming. The cave and immediate vicinity are closed to use, but the rest of the run serves as a swimming, snorkeling and tubing hotspot. A dense cabbage palm and oak hammock occupies lands adjacent to the cave and upper part of the run. The spring is bordered on all sides by high, rolling sand hills that are owned and maintained as a county park.

Table 152. Rock Springs water quality analysis.

Analytes	1946	1971	2002	
			Dissolved	Total
Field Measures				
Temperature	23.9	23.0	23.82	
DO	-	-	1.02	
pH	7.3	6.4	7.13	
Sp. Cond.	222.0	240.0	256	
Lab Analytes				
BOD	-	-	-	0.2U
Turbidity	-	-	-	0.05U
Color	4.0	0.0	-	5U
Alkalinity	-	86.0	-	95A
Sp. Cond.	-	-	250.0	-
TDS	128.0	146.0	-	154.0
TSS	-	-	-	4U
Cl	6.1	7.5	-	8.1
SO_4	17.0	19.0	-	19.0
F	0.1	0.2	-	0.14A
Nutrients				
TOC	-	-	-	1U
$NO_3 + NO_2$ as N	0.07	1.1	-	1.30
$NH_3 + NH_4$	-	-	-	0.01U
TKN	-	-	0.06U	0.06U
P	-	-	0.082	0.082
PO_4	-	-	0.09	-
NO_3	0.3	4.7	-	-
Metals				
Ca	29	29	30	31.5A
K	0.6	0.9	1.2	1.3A
Na	4.3	4.8	4.6	4.8A
Mg	8.4	8.2	9	9.7A
Al	-	-	-	50U
As	-	-	3U	3U
B	-	-	-	12I
Cd	-	-	0.5U	0.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3U	3U
Fe	70	-	25U	25U
Mn	-	-	0.5U	0.5U
Ni	-	-	4U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	0.5
Ra-228	-	-	-	0.9U
Se	-	-	4U	4U
Sn	-	-	-	7U
Sr	-	240	-	177A
Zn	-	-	2U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** The spring is developed into a park with swimming, picnicing and camping facilities.

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1931-1975	64.6[1] (68 measurements)
Min (March 8, 1932)	52[1]
Min (June 7, 1945)	52[1]
Max (October 17, 1960)	83[1]
Annual Mean 1985	57.54[6] (6 measurements)
Annual Mean 1990	47.85[6] (6 measurements)
Annual Mean 1995	62.94[6] (5 measurements)
Annual Mean 2000	51.4[7]
Mean 1931-2000	59.6[6] (249 measurements)
Annual Mean 2001	46.38[7]

Table 153. Rock Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	2Q
Fecal Coliform	1KQ

Wekiwa Spring

Figure 128. Wekiwa Spring (photo by T. Scott).

Location – Lat. 28° 42' 42.79" N., Long. 81° 27' 37.52" W. (NE ¼ NE ¼ NE ¼ sec. 36, T. 20 S., R. 28 E.). Wekiwa Spring is located within Wekiwa Springs State Park approximately 4 miles (6.4 km) northeast the town of Apopka. From the intersection of US 441 and SR 436 in Apopka, travel 1.5 miles (2.4 km) east on SR 436 (Semoran Boulevard.). Turn north (left) on Wekiva Springs Road and travel approximately 2.5 miles (4 km) to a 90 degree bend to the east. Continue on Wekiva Springs Road approximately 0.4 mile (0.6 km) to the park entrance on the north (left) side of the road.

Description – The spring pool is roughly circular and measures 105 ft (32 m) in diameter. The primary vent is in the southeast portion of the pool and is a 35 ft (11 m) long fissure in the limestone oriented east to west. The spring bottom is sand and averages 5 ft (1.5 m) deep. Limestone is exposed near the vent. The depth over the vent measures 13.7 ft (4.2 m). The water is clear bluish green. The boil over the vent is voluminous. A retaining wall 2-3 ft (0.6-0.9 m) high with access steps encloses the pool and extends a short distance down the run. There is no aquatic vegetation in the spring pool, but the Wekiva River supports a rich aquatic plant community but has exotic species present. A sidewalk surrounds the pool and a wooden footbridge crosses the run about 200 ft (61 m) downstream from the pool. Wekiwa Spring is situated at the base of a northeast-sloping, grassy, hillside maintained for sunbathing and picnicking. Wekiwa Spring gives rise to the Wekiva River, which flows northeast through state land approximately 17 miles (27.4 km) into the St. Johns River.

Table 154. Wekiwa Spring water quality analysis.

Analytes	1924	1971	1972	2002	
				Dissolved	Total
Field Measures					
Temperature	-	23	-	23.38	
DO	-	-	-	0.39	
pH	-	7.9	-	7.32	
Sp. Cond.	-	-	-	340	
Lab Analytes					
BOD	-	-	0.2	-	0.2U
Turbidity	-	-	-	-	0.2
Color	-	5	-	-	5U
Alkalinity	-	98	-	-	130.0
Sp. Cond.	-	250	-	337.0	-
TDS	122	150	-	-	193.0
TSS	-	-	-	-	4U
Cl	8	10	-	-	16.0
SO_4	5.3	13	-	-	20.0
F	-	0.2	-	-	0.17
Nutrients					
TOC	-	-	0	-	1.2I
$NO_3 + NO_2$ as N	-	0.8	0.71	-	0.29
$NH_3 + NH_4$	-	-	-	-	0.012I
TKN	-	-	-	0.12I	0.12I
P	-	-	-	0.12	0.120
PO_4	-	-	0.1	0.12	-
NO_3	-	3.4	-	-	-
Metals					
Ca	28	30	-	41.6A	39.8
K	-	1.1	-	1.7	1.70
Na	4.0	6.2	-	9.32	10.2
Mg	7.1	9.2	-	11.5	11.3
Al	-	-	-	-	10U
As	-	-	0	3U	3U
B	-	-	-	-	44.0
Cd	-	-	0	0.5U	0.5U
Co	-	-	0	-	1U
Cr	-	-	0	2U	2U
Cu	-	-	10	2U	4U
Fe	-	-	30	5U	7.4I
Mn	-	-	10	1.23	1.9I
Ni	-	-	-	1U	2U
Pb	-	-	0	5U	5U
Ra-226	-	-	-	-	0.9
Ra-228	-	-	-	-	1U
Se	-	-	-	5U	7U
Sn	-	-	-	-	22U
Sr	-	170		-	143.0
Zn	-	-	10	2.1I	6U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization **-** Wekiwa Springs State Park is heavily used for swimming, canoeing and camping. The Wekiva River basin is part of a state conservation land called the Wekiva Springs Geopark comprising 110 square miles (285 square kilometers).

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1932-1975	74.2[1] (60 measurements)
Min (April 27, 1956)	62[1]
Max (October 17, 1960)	92[1]
Annual Mean 1985	61.18[6] (6 measurements)
Annual Mean 1990	62.23[6] (6 measurements)
Annual Mean 1995	74.91[6] (5 measurements)
Annual Mean 2000	68.93[6] (4 measurements)
Mean 1932-2000	68.51[6] (239 measurements)
October 17, 2002	66.46[2]

Table 155. Wekiwa Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

PASCO COUNTY

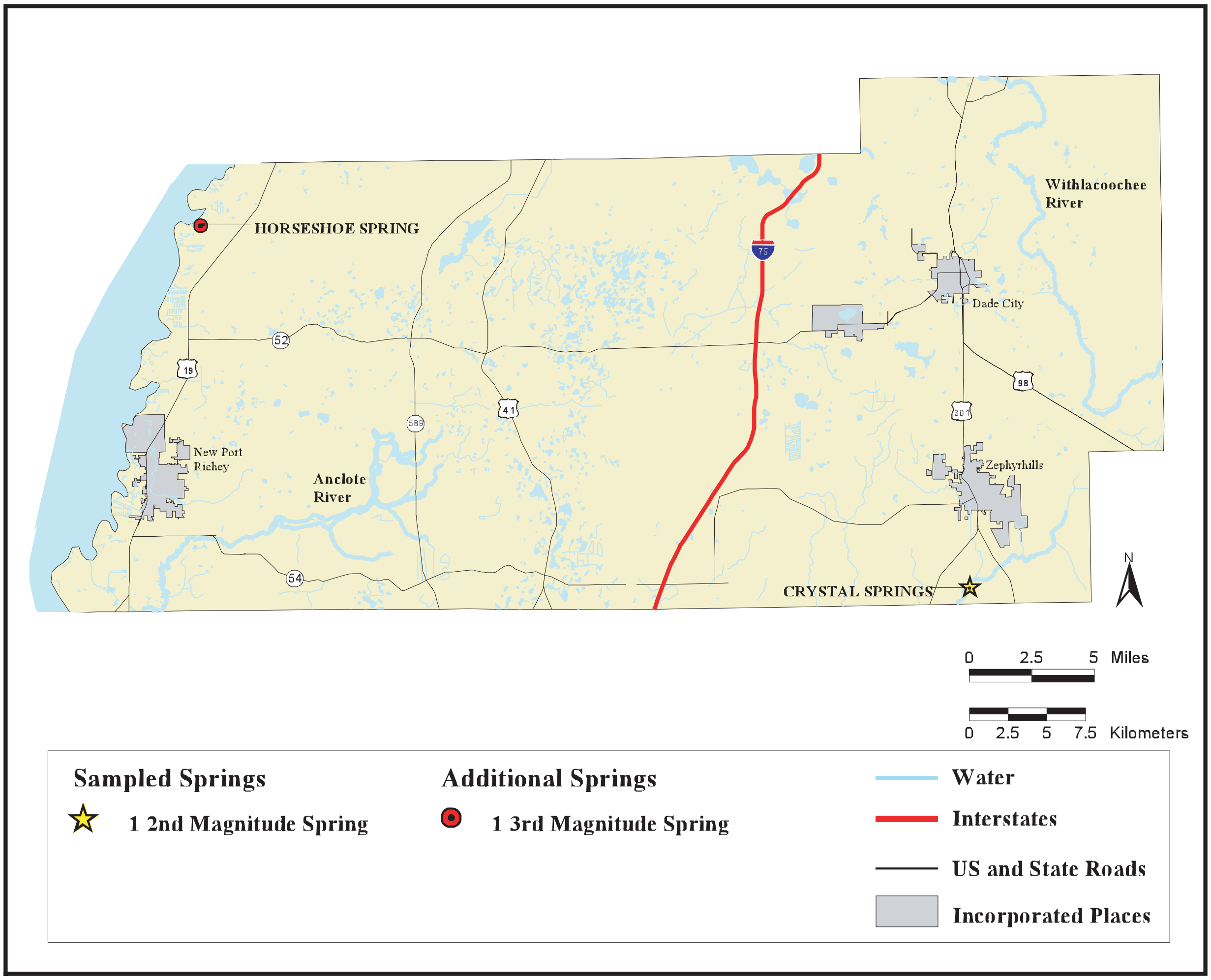

Figure 129. Springs visited by FGS in Pasco County.

Crystal Springs

Figure 130. Crystal Springs (photo by H. Means).

Location – Lat. 28° 10' 55.92" N., Long. 82° 11' 06.53" W. (NE ¼ SW ¼ NW ¼ sec. 35, T. 26 S., R. 21 E.). Crystal Springs flows into the Hillsborough River approximately 3 miles (4.8 km) south of Zephyrhills. The spring is located on private land and access from the river is blocked by a weir/dam structure.

Description – Crystal Springs sits in a pool formed by a dam on the southeast side of the Hillsborough River. The pool measures 135 ft (41.1 m) north to south and 276 ft (84.1 m) northwest to southeast. The depth is generally shallow, ranging from 4 to 10 ft (1.2-3 m). There are multiple vents and sand boils scattered about the pool. The main vent sampled for water quality has a stainless steel water extraction pipe and is located in the southeastern portion of the pool. The bottom of the spring pool is limestone and sand with abundant aquatic grass and algae. The water is clear and light blue. The pool edges are entirely enclosed by a sandbag retaining wall that is approximately 5 ft (1.5 m) tall. On the southeast banks of the pool, construction is underway to make an observation platform. The weir/dam on the northwest side of the pool has a boardwalk over it, and water discharges through a culvert into the adjacent Hillsborough River. The clear bluish water from the spring contrasts sharply with the tannic water of the river. The river is approximately 100 ft (30.5 m) wide at the confluence with Crystal Springs. To the southeast, the ground rises gently to approximately 8 ft (2.4 m) above the spring, and the hillside is open and grassy. A residence is located a few hundred feet upslope. The lowlands along the river harbor an intact floodplain forest.

Table 156. Crystal Springs water quality analysis.

Analytes	7/19/1923	7/1/1946	5/1/1968	4/20/1972	10/11/1972	2002	
						Dissolved	Total
Field Measures							
Temperature	-	24	24	24	-	24.16	
DO	-	-	4	3.5	-	1.69	
pH	-	7.7	7.7	7.6	8	6.98	
Sp. Cond.	-	289	289	291	302	368	
Lab Analytes							
BOD	-	-	-	0.3	-	-	0.2AU
Turbidity	-	-	-	0	-	-	0.1
Color	-	5	0	0	5	-	5U
Alkalinity	-	-	140	130	140	-	154.0
Sp. Cond.	-	-	-	-	-	343.0	-
TDS	-	-	176	166	171	-	200.0
TSS	-	-	-		-	-	4U
Cl	5.5	5.4	7	6	6	-	10.0
SO_4	9.3	7.8	6.2	6.4	8	-	10.0
F	-	0.1	0.2	0.2	0.2	-	0.11
Nutrients							
TOC	-	-	-	-	-	-	1U
$NO_3 + NO_2$ as N	0.09	0.18	0.97	1	1.3	-	2.10
$NH_3 + NH_4$	-	-	-	-	-	-	0.01U
TKN	-	-	-	-	-	0.06U	0.06U
P	-	-	-	0.03	-	0.042	0.050
PO_4	-	-	-	-	-	0.048	-
NO_3	0.4	0.8	4.3	4.4	5.8	-	-
Metals							
Ca	53	52	49	52	49	62	63.2
K	-	0.4	0.3	0.2	0.6	0.38	0.41
Na	-	4	3.6	3.5	4.5	5.52	5.18A
Mg	5	4	3.7	3.4	4.2	4.2	4A
Al	-	-	-	-	-	-	32U
As	-	-	-	0	-	3U	3U
B	-	-	-	120	-	-	18I
Cd	-	-	-	0	-	0.5U	0.5U
Co	-	-	-	0	-	-	1U
Cr	-	-	-	0	-	2U	2U
Cu	-	-	-	10	-	3.6U	2U
Fe	-	-	10	10	-	5U	26I
Mn	-	-	0	0	-	0.25U	0.5U
Ni	-	-	-	-	-	1U	1.5U
Pb	-	-	-	0	-	5U	5U
Ra-226	-	-	-	-	-	-	0.8
Ra-228	-	-	-	-	-	-	0.9U
Se	-	-	-	-	-	12U	7U
Sn	-	-	-	-	-	-	28U
Sr	-	-	240	280	280	-	227A
Zn	-	-	-	0	-	4.4U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization – Previously run as a private recreation area, the spring is now being restored to more natural conditions. It is scheduled to reopen as Crystal Springs Preserve, a learning laboratory and environmental education facility. A portion of the spring flow is extracted by Zephyrhills water bottling company.

Discharge –All discharge rates are measured in ft^3/s.

Average for 1923 - 1974	60[1]
Min (July 1, 1946)	20[1]
Max (July 19, 1946)	147[1]

Table 157. Crystal Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

PINELLAS COUNTY

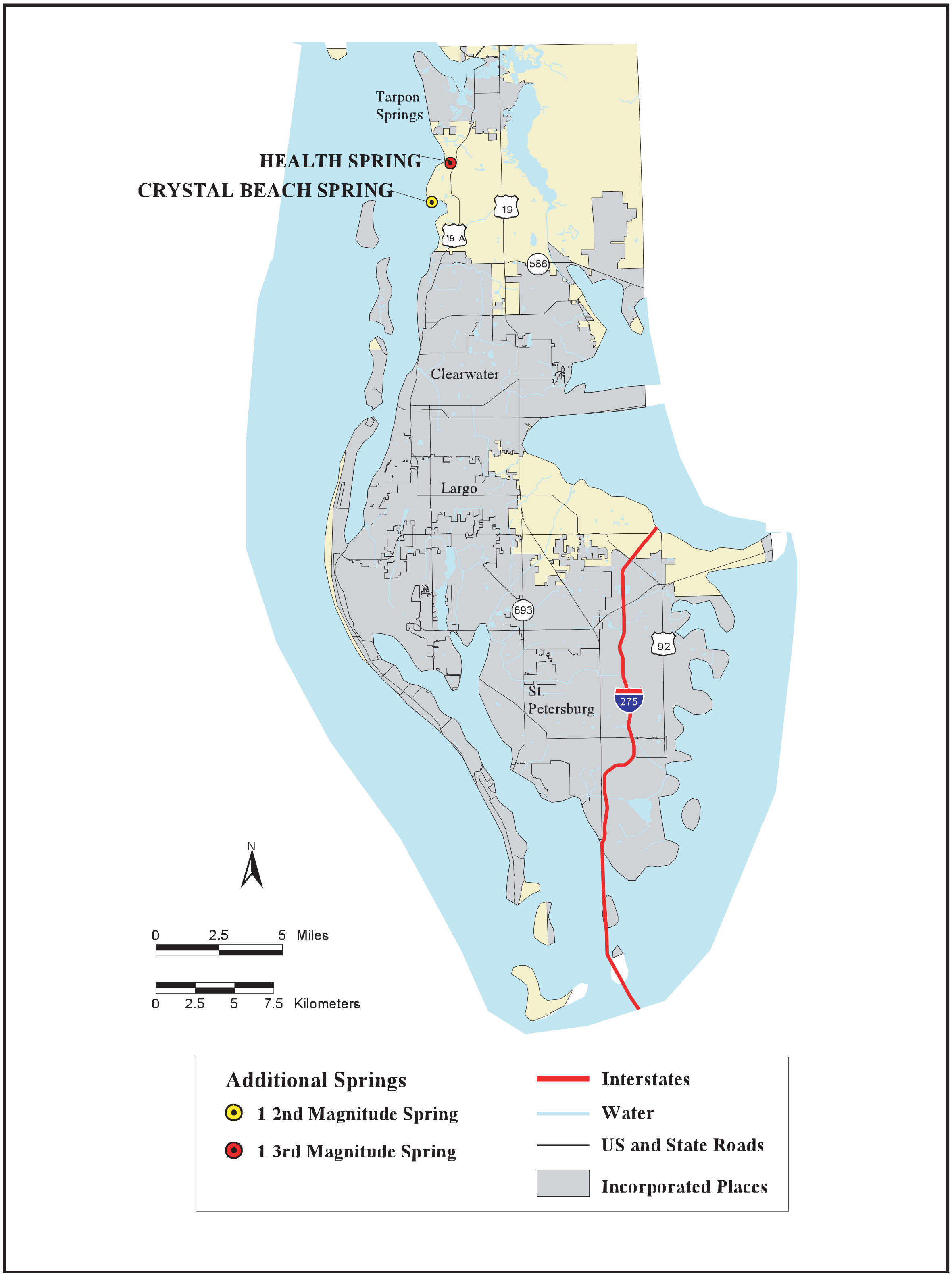

Figure 131. Springs visited by FGS in Pinellas County. Spring descriptions provided on enclosed CD.

PUTNAM COUNTY

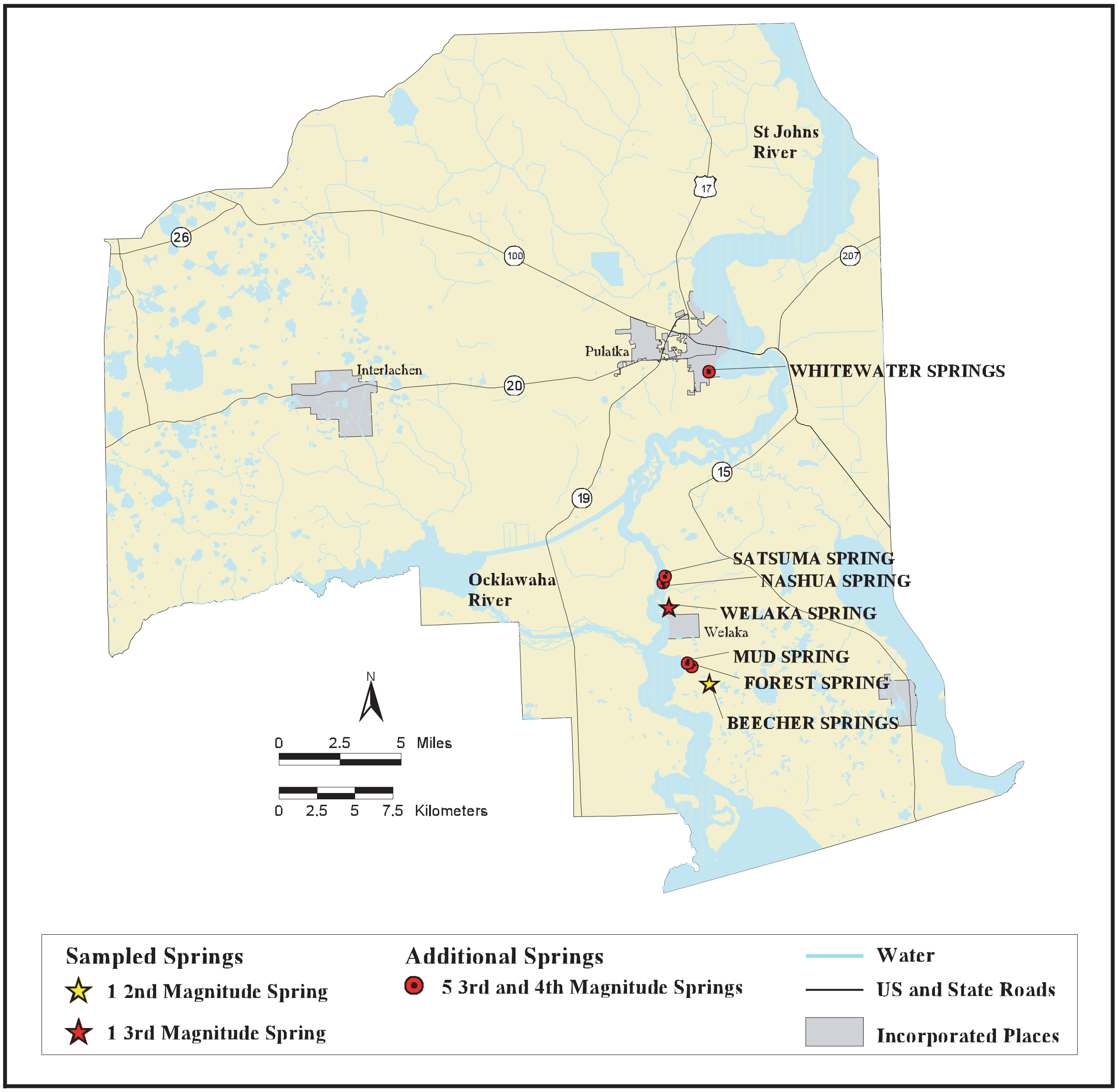

Figure 132. Springs visited by FGS in Putnam County.

Beecher Spring

Figure 133. Beecher Spring (photo by R. Means).

Location – Lat. 29° 26’ 55.17” N., Long. 81° 38’ 48.71” W. (NW ¼ SE ¼ SW ¼ sec. 14, T. 12 S., R. 26 E.). Beecher Spring is located within the Welaka National Fish Hatchery. From the east end of the US 17 bridge over the St. Johns River, travel approximately 11.1 miles (17.9 km) east then south and southwest to the junction of US 17 with CR 309. Turn southwest (right) on CR 309 and drive approximately 5.5 miles (8.8 km) to Welaka. The spring is approximately 2.5 miles (4 km) southeast of the community of Welaka on the east side of CR 309.

Description – Beecher Spring pool is square-shaped, measuring 129 ft (39.3 m) north to south and 147 ft (44.8 m) east to west. The depth over the vent measures 18 ft (5.5 m). It is bordered on its north and west sides with a concrete retaining wall. The spring bottom is uniform with a soft, organic layer over sand with limestone exposed at the vent. The spring vent is in the northwest side of the pool and issues slightly murky, bluish water, creating a modest sized boil on the pool surface. Algae are abundant. There is an elevated remnant section of pipeline suspended above the pool surface near the vent. The outflow channel flows south for at least 2,500 ft (762 m). Along its course, it is channeled into numerous man-made holding ponds utilized by the U.S. Fish and Wildlife Service as fish hatcheries. The holding ponds occupy a large open field. The spring run eventually enters the St. Johns River. To the north and east of Beecher Spring, forested sand hills rise to approximately 15 ft (4.6 m) higher than the spring surface. The south and west sides are forested swampy lowlands.

Utilization – Water from the spring is used for fish hatchery operations. The spring is not open to the public.

Discharge **-** All discharge rates are measured in ft^3/s.

November 23, 1960	12.4(1)
April 20, 1972	9.02(1)

Table 158. Beecher Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	23.5	22.82	
DO	-	0.29	
pH	7.9	6.68	
Sp. Cond.	-	501	
Lab Analytes			
BOD	-	-	3.2A
Turbidity	-	-	1.9
Color	10	-	5.0
Alkalinity	92	-	130
Sp. Cond.	446	480.0	-
TDS	242	-	226.0
TSS	-	-	4U
Cl	74.0	-	69
SO_4	11	-	12
F	0.2	-	0.13
Nutrients			
TOC	-	-	1.8I
$NO_3 + NO_2$ as N	0.00	-	0.004U
$NH_3 + NH_4$	-	-	5.3
TKN	-	5.4	5.7A
P	-	0.74	0.83A
PO_4	-	0.79	-
NO_3	0.00	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	33	35.6	37.7A
K	1.4	2.1	2.1A
Na	41	34.2	37.1A
Mg	8.3	8.9	9.1A
Al	-	-	20U
As	-	3U	3U
B	-	-	25I
Cd	-	0.5U	0.5U
Co	-	-	1U
Cr	-	2U	2U
Cu	-	2U	4U
Fe	-	34	47AJ
Mn	-	6.69	7.2A
Ni	-	1U	2U
Pb	-	5U	5U
Ra-226	-	-	0.9
Ra-228	-	-	0.8U
Se	-	5U	7U
Sn	-	-	8.3I
Sr	280	-	207A
Zn	-	1U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 159. Beecher Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	2Q

Welaka Spring

Figure 134. Welaka Spring (photo by H. Means).

Location – Lat. 29° 29' 40.39" N., Long. 81° 40' 23.70" W. (SW ¼ NE ¼ SE ¼ sec. 33, T. 11 S., R. 26 E.). Welaka Spring is located on the east bank of the St. Johns River approximately 1 mile (1.6 km) north of Welaka. From the east end of the US 17 bridge over the St. Johns River, travel approximately 11.1 miles (17.9 km) east then south and southwest to the junction of US 17 with CR 309. Turn southwest (right) on CR 309 and drive approximately 5.5 miles (8.8 km) to Welaka. The spring can be accessed by boating one mile downstream on the St. Johns River from the Welaka public boat ramp or by driving 1.2 miles (1.9 km) north on SR 309 from the junction with SR 308B; turn west (left) on a sand trail and bear north for 0.1 mile to the spring pool.

Description – The Welaka Spring pool measures 60 ft (18.3 m) north to south and 90 ft (27.4 m) east to west. The spring pool area is relatively shallow, averaging 5 ft (1.5 m) deep. A sizeable double boil can be seen over the spring vent. The bottom is sand with increased organic particle deposition downstream. The water is clear near the spring boil, but dark water from the St. Johns River mixes with spring water a short distance downstream from the spring. This spring emits an odor of hydrogen sulfide. The pool banks on north and east sides are steep, rising to approximately 15 ft (4.5 m) higher than the spring. There are remains of an old dock or jumping platform on the northeast side of the spring pool. The current in the wide run is very slow. The wide, slow-moving spring run is 1,200 ft (365.7 m) long and up to 200 ft (60.9 m) wide. It is naturally impounded by the nearby St. Johns River. Land around the spring pool and along the northern side of the spring run is undeveloped and forested. Several private residences are located along the south side of the spring run approximately 500 ft (152.4 m) downstream from the spring. There is a large Native American shell midden at the confluence with the river on the north side of the spring mouth.

Utilization – Welaka Spring is privately owned and used for swimming.

Discharge – Not available.

Table 160. Welaka Spring water quality analysis.

Analytes	1972	2003	
		Dissolved	Total
Field Measures			
Temperature	24.0	22.4	
DO	-	1.2	
pH	7.8	7.38	
Sp. Cond.	-	1720	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.6
Color	5	-	5U
Alkalinity	75	-	84
Sp. Cond.	1470	1590.0	-
TDS	849	-	849.0
TSS	-	-	4U
Cl	370	-	450
SO_4	57	-	69
F	0.2	-	0.1U
Nutrients			
TOC	-	-	1.3I
$NO_3 + NO_2$ as N	0.02	-	0.07
$NH_3 + NH_4$	-	-	0.024
TKN	-	0.094I	0.21
P	-	0.07	0.079
PO_4	-	0.074	-
NO_3	0.09	-	-

Analytes	1972	2003	
		Dissolved	Total
Metals			
Ca	44	50.1	52.6
K	6.4	6.8	7.1
Na	200	244	252
Mg	24	26.4	27.4
Al	-	-	10U
As	-	3U	3U
B	-	-	72
Cd	-	1U	1U
Co	-	-	1U
Cr	-	2U	2U
Cu	-	3.5U	4U
Fe	-	24U	31
Mn	-	1.59	1.9I
Ni	-	2U	2U
Pb	-	5U	5U
Ra-226	-	-	0.8
Ra-228	-	-	0.9U
Se	-	8U	8U
Sn	-	-	19
Sr	1000	-	941
Zn	-	2.5U	10I

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 161. Welaka Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

SARASOTA COUNTY

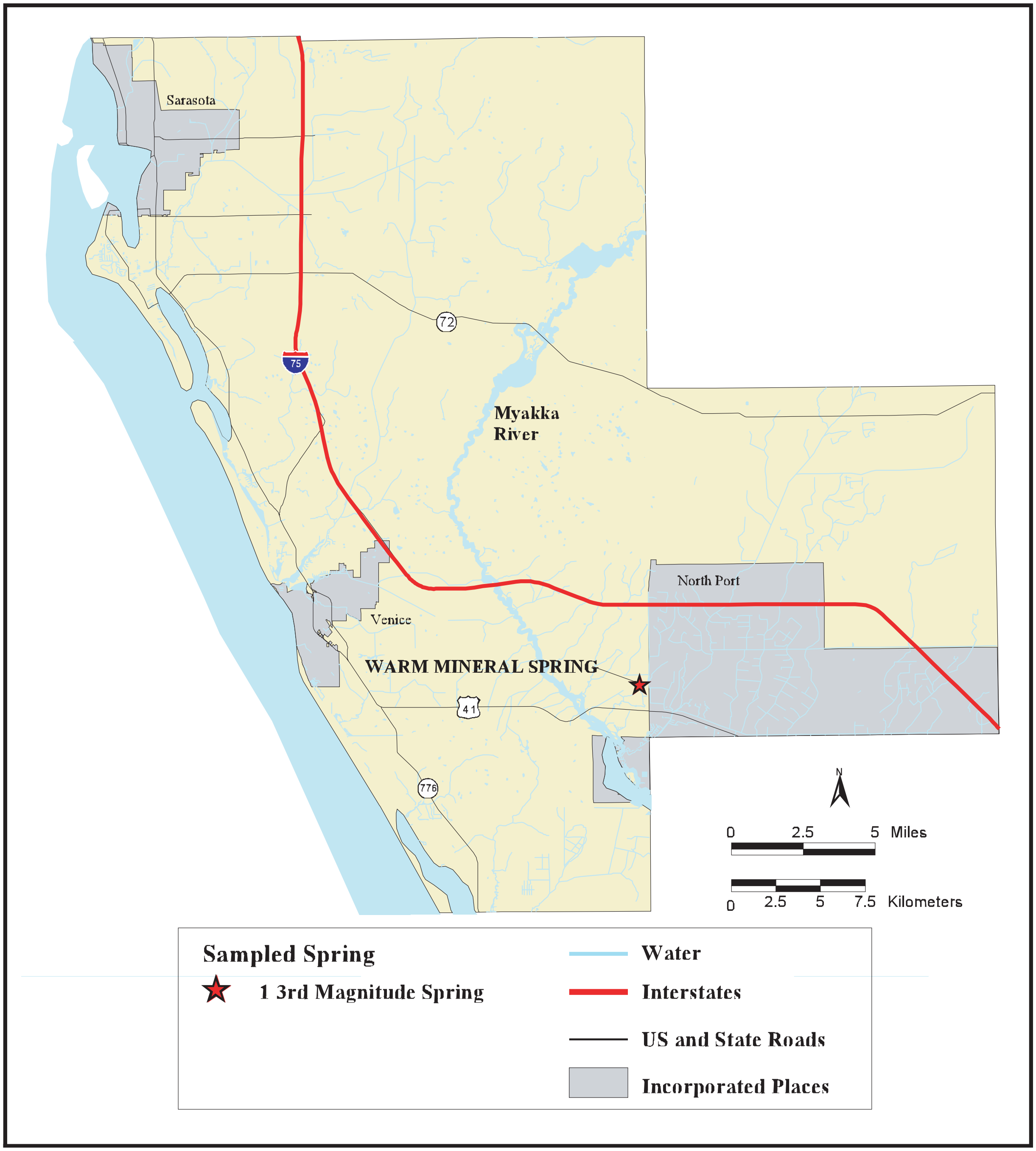

Figure 135. Springs visited by FGS in Sarasota County.

Warm Mineral Spring

Figure 136. Warm Mineral Spring (photo by R. Means)

Location – Lat. 27° 03' 35.65" N., Long. 82° 15' 35.83" W. (SE ¼ NW ¼ NE ¼ sec. 25, T. 39 S., R. 20 E.). Warm Mineral Spring is located within the town of North Port approximately 11 miles (18 km) east of Venice. From the River Road exit on I-75, travel 5.7 miles (9.2 km) southeast to the intersection of US 41 and River Road west of North Port. Turn northeast (left) on US 41and travel 2.5 miles (4.0 km) to Ortiz Road. Turn north (left) on Ortiz and go 1.0 mile (1.6 km) to The Springs Spa and Resort.

Description – Warm Mineral Spring is within a large sinkhole that measures 252 ft (76.8 m) north to south and 315 ft (96 m) east to west. The bottom of the pool slopes gently to a depth of 17 ft (5.2 m) at about 40 ft (12.2 m) from the shore where it drops off precipitously (Rosenau et al., 1977). Spring depths are reported to reach 230 ft (70 m). Rupert (1994) provides a description of the sinkhole profile. The vent is at the base of the north wall of the sink. The spring has a debris cone of dolostone, limestone and sand on the bottom. The debris cone rises as much as 100 ft (30.5 m) above the deepest part of the sinkhole. The water is yellow-greenish, slightly murky and often has a hydrogen sulfide odor. There is no boil on the water surface. Very little aquatic vegetation or algae live in the spring. A small, narrow spring run exits on the west side and flows southwest approximately 2.3 miles (3.7 km) into the Myaka River. A circular swimming rope on the spring surface keeps the interior deepest water demarcated. Grassy lawn and palm trees cover the surroundings, and

Table 162. Warm Mineral Spring water quality analysis.

Analytes	1927	1930	1943	1962	1972	2003	
						Dissolved	Total
Field Measures							
Temperature	-	-	30.0	28.9	29.5	30.21	
DO	-	-	-	-	1	0.37	
pH	-	-	7.0	7.2	7.3	7.06	
Sp. Cond.	-	-	-	-	-	28700	
Lab Analytes							
BOD	-	-	-	-	-	-	1.4A
Turbidity	-	-	-	-	-	-	0.9
Color	-	-	6	5	-	-	5.0
Alkalinity	-	-	-	130	130	-	131
Sp. Cond.	-	-	-	26000	27000	28900.0	-
TDS	-	-	-	19000	-	-	17800.0
TSS	-	-	-	-	-	-	7IQ
Cl	9400	9600	9400	9200	9500.0	-	10000
SO_4	1700	1700	1700	1600	1700	-	1700
F	-	-	-	2.0	1.9	-	1.4
Nutrients							
TOC	-	-	-	-	3.0	-	2.8IQ
$NO_3 + NO_2$ as N	-	-	-	-	-	-	0.013
$NH_3 + NH_4$	-	-	-	-	-	-	0.34
TKN	-	-	-	-	-	0.57	0.56
P	-	-	-	-	0.01	0.027I	0.019I
PO_4	-	-	-	0.40	-	0.004U	-
NO_3	-	-	-	1.7	-	-	-
Metals							
Ca	770	510	640	720	500	493	512
K	-	-	-	180	150	185	191
Na	-	-	-	4900	5200	5520	5260
Mg	470	630	540	480	580	579	616
Al	-	-	-	-	-	-	64U
As	-	-	-	-	10	6U	4U
B	-	-	-	-	-	-	1710
Cd	-	-	-	-	0	0.5U	0.5U
Co	-	-	-	-	0	-	2.4U
Cr	-	-	-	-	6	4.3I	5.7I
Cu	-	-	-	-	20	3.5U	15U
Fe	-	-	-	-	40	5U	7U
Mn	-	-	-	-	20	2.77	2.9
Ni	-	-	-	-	-	20U	20U
Pb	-	-	-	-	0	16U	22U
Ra-226	-	-	-	-	-	-	16.1
Ra-228	-	-	-	-	-	-	1.5
Se	-	-	-	-	-	16U	24U
Sn	-	-	-	-	-	-	22U
Sr	-	-	-	-	31000	-	35900
Zn	-	-	-	-	20	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

there are abundant chairs and picnic tables. There is an underwater cave that has been explored and mapped.

Utilization – Warm Mineral Spring is located within a private spa and resort. It is a popular tourist destination. The spring is developed into a healing and wellness swimming park.

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1942 – 1974	9.7[(1)] (10 measurements)
March 4, 2003	8.46[(2)]

Table 163. Warm Mineral Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

SEMINOLE COUNTY

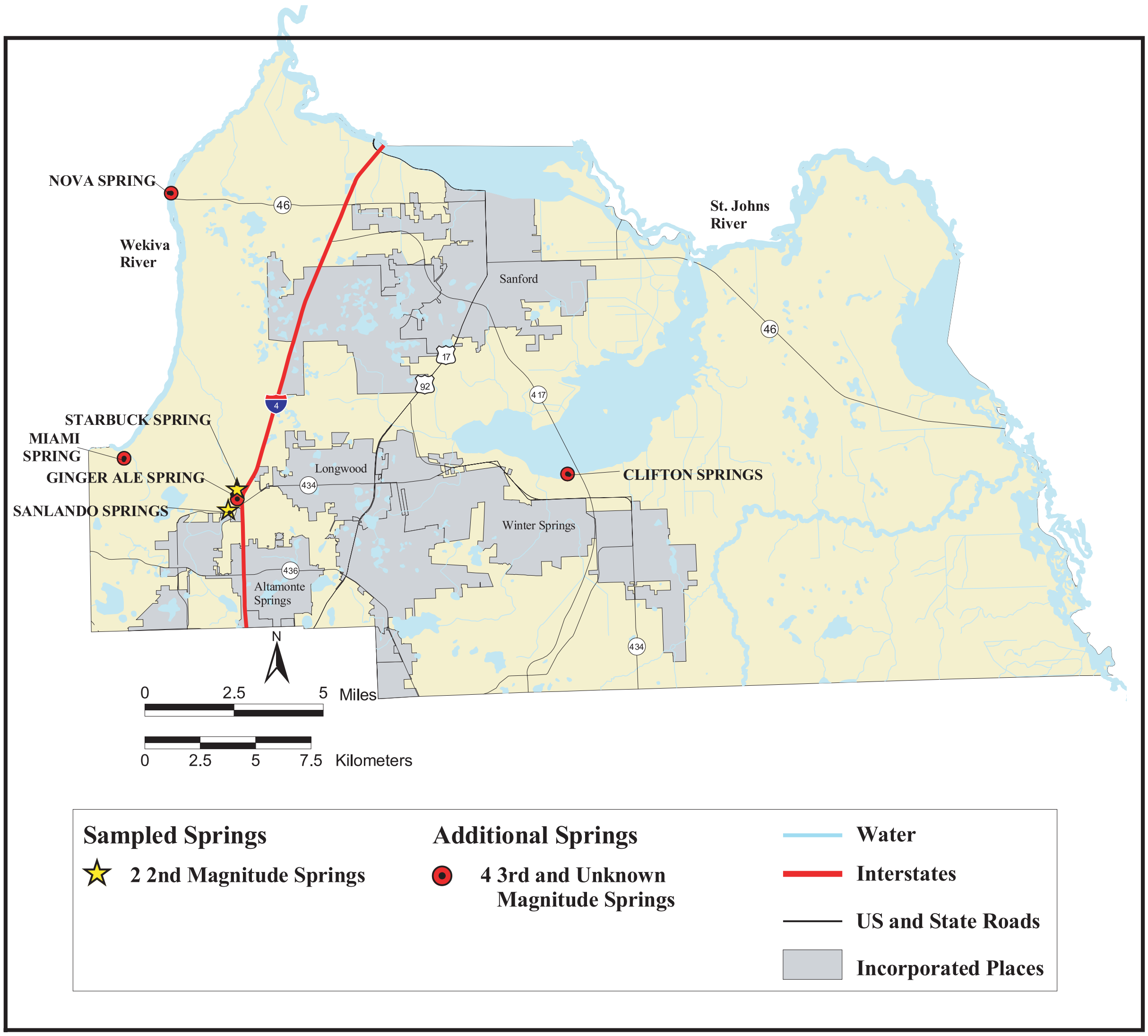

Figure 137. Springs visited by FGS in Seminole County.

Sanlando Springs

Figure 138. Sanlando Springs (photo by R. Means)

***Location* -** Lat. 28° 41' 19.32" N., Long. 81° 23' 43.07" W. (SE ¼ NE ¼ SE ¼ sec. 3, T. 21 S., R. 29 E.). Sanlando Springs is located on private property within "The Springs," gated community 3 miles (5 km) southwest of Longwood on SR 427. The spring run flows into the east side of the Little Wekiva River 0.4 miles (0.6 km) downstream from the SR 427 bridge over the river.

Description – Sanlando Springs sits in a circular, bowl shaped depression that is submerged on the southeast side of a larger, man-made lake that is dammed for swimming. The spring pool is reported to be about 30 ft (9.1 m) in diameter (Rosenau et al., 1977). The depth over the vent measures 14.8 ft (4.5 m). The spring-fed lake measures 200 ft (61 m) north to south and 180 ft (54.9 m) east to west. Limestone is exposed at the vent. The rest of the pool bottom is sand. Algae are abundant on the sandy lake bottom. There was a very slight boil over the vent in May 2002. The vent is surrounded on three sides by a concrete retaining wall, and there is a platform for swimmers use on the east side. The Little Wekiva River flows into the lake on the west side, then the combined flow of the spring and river discharges over a weir on the north side of the lake. The surrounding land rises to approximately 30 ft (9.1 m) above the spring level. Palm trees, sandy beaches, and a concrete retaining wall surround the majority of the lake. The spring is surrounded by suburban development.

***Utilization* -** The spring is developed into a private recreation area for residents and is not open to the general public.

Table 164. Sanlando Spring water quality analysis.

Analytes	1946	1972	2002	
			Dissolved	Total
Field Measures				
Temperature	23.3	24.0	24.65	
DO	-	-	0.25	
pH	7.2	7.2	6.64	
Sp. Cond.	-	-	373	
Lab Analytes				
BOD	-	-	-	0.2AU
Turbidity	-	0	-	-
Color	6	0	-	5.0
Alkalinity	-	100	-	145.0
Sp. Cond.	228	255	360.0	-
TDS	123	154	-	200.0
TSS	-	-	-	4U
Cl	7.8	10.0	-	21.0
SO_4	3.3	9.8	-	13.0
F	0.2	0.3	-	0.15
Nutrients				
TOC	-	-	-	1.5I
$NO_3 + NO_2$ as N	-	0.43	-	0.48
$NH_3 + NH_4$	-	-	-	0.190
TKN	-	-	0.24	0.24
P	-	0.16	0.19	0.19A
PO_4	-	0.16	0.2	-
NO_3	0.1	-	-	-
Metals				
Ca	29	30	43A	44.3A
K	0.6	1	1.6A	1.6A
Na	5.8	6.7	10.5A	10.9A
Mg	7.9	8.7	11.6A	12A
Al	-	-	-	50U
As	-	-	3U	3U
B	-	-	-	29I
Cd	-	-	0.5U	0.5U
Co	-	-	-	0.75U
Cr	-	-	2U	2U
Cu	-	-	3U	3U
Fe	90	-	25U	25U
Mn	-	-	4.8A	5A
Ni	-	-	4U	2U
Pb	-	-	3U	5U
Ra-226	-	-	-	0.7
Ra-228	-	-	-	1U
Se	-	-	4U	4U
Sn	-	-	-	7U
Sr	-	150	-	86.1A
Zn	-	-	2U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1942-1975	19.0[1] (32 measurements)
Min (September 12, 1973)	4.3[1]
Max (October 18, 1960)	33[1]
Max (June 24, 1975)	33[1]
November 14, 2000	8.99[6]
Mean 1941-2000	19.82[6] (115 measurements)
Annual Mean 2001	13.13[6] (3 measurements)

Table 165. Sanlando Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Starbuck Spring

Figure 139. Starbuck Spring (photo by R. Means).

***Location* -** Lat. 28° 41’ 49.25” N., Long. 81° 23’ 28.22” W. (NE ¼ NW ¼ NW ¼ sec. 2, T. 21 S., R. 29 E.). Starbuck Spring is located on private property within “The Springs” gated community 3 miles (5 km) west of Longwood on SR 427.

Description – Starbuck Spring pool is circular with a diameter of 66 ft (20.1 m). The depth in the center measures 7.2 ft (2.1 m). The bottom is sand with limestone exposed in the vent. Milky blue water discharges from an opening in limestone producing a boil on the spring surface. Algae are abundant on the bottom and as floating mats. The pool is enclosed by a sand bag retaining wall. A swift flowing, shallow spring run exits the pool over a weir on the northeast side. The spring run flows 500 ft (152 m) into the Little Wekiva River from the east 1 mile (1.6 km) upstream from the SR 427 bridge over the river. The spring harbors little aquatic vegetation. There are two houses adjacent to the spring pool, and their grassy lawns meet the pool’s edge. Two pvc pipes lead into the pool from each house. Land around the pool is low-lying, but a sandy slope to the west rises to approximately 20 ft (6.1 m) above the lowlands forming the western edge of the Little Wekiva River.

***Utilization* -** The spring is surrounded by private property and developed for private recreation and water extraction.

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1944-1975	16.6[(1)] (28 measurements)
Min (May 30, 1974)	12[(1)]
Min (May 1, 1975)	12[(1)]
Max (October 18, 1960)	21.4[(1)]
Mean 1944-2000	14.50[(6)] (109 measurements)

Table 166. Starbuck Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	24.0	24.48	
DO	-	1.82	
pH	7.5	6.70	
Sp. Cond.	270	370	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	1	-	0.35
Color	0	-	5U
Alkalinity	100	-	127.0
Sp. Cond.	-	361.0	-
TDS	155	-	203.0
TSS	-	-	4U
Cl	13.0	-	22.0
SO_4	15	-	26.0
F	0.3	-	0.18
Nutrients			
TOC	-	-	1.3I
$NO_3 + NO_2$ as N	0.06	-	0.36
$NH_3 + NH_4$	-	-	0.030
TKN	-	0.082I	0.065I
P	0.14	0.17	0.170
PO_4	0.14	0.17	-
NO_3	-	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	32	42.3	43.8
K	0.8	1.3	1.40
Na	8.2	11.8	12.1
Mg	9.3	11.9	12.4
Al	-	-	50U
As	-	3U	3U
B	-	-	28I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	25U
Mn	-	2.5	2.6
Ni	-	4U	2U
Pb	-	3U	5U
Ra-226	-	-	0.4
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	7U
Sr	330	-	350.0
Zn	-	2U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 167. Starbuck Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

SUMTER COUNTY

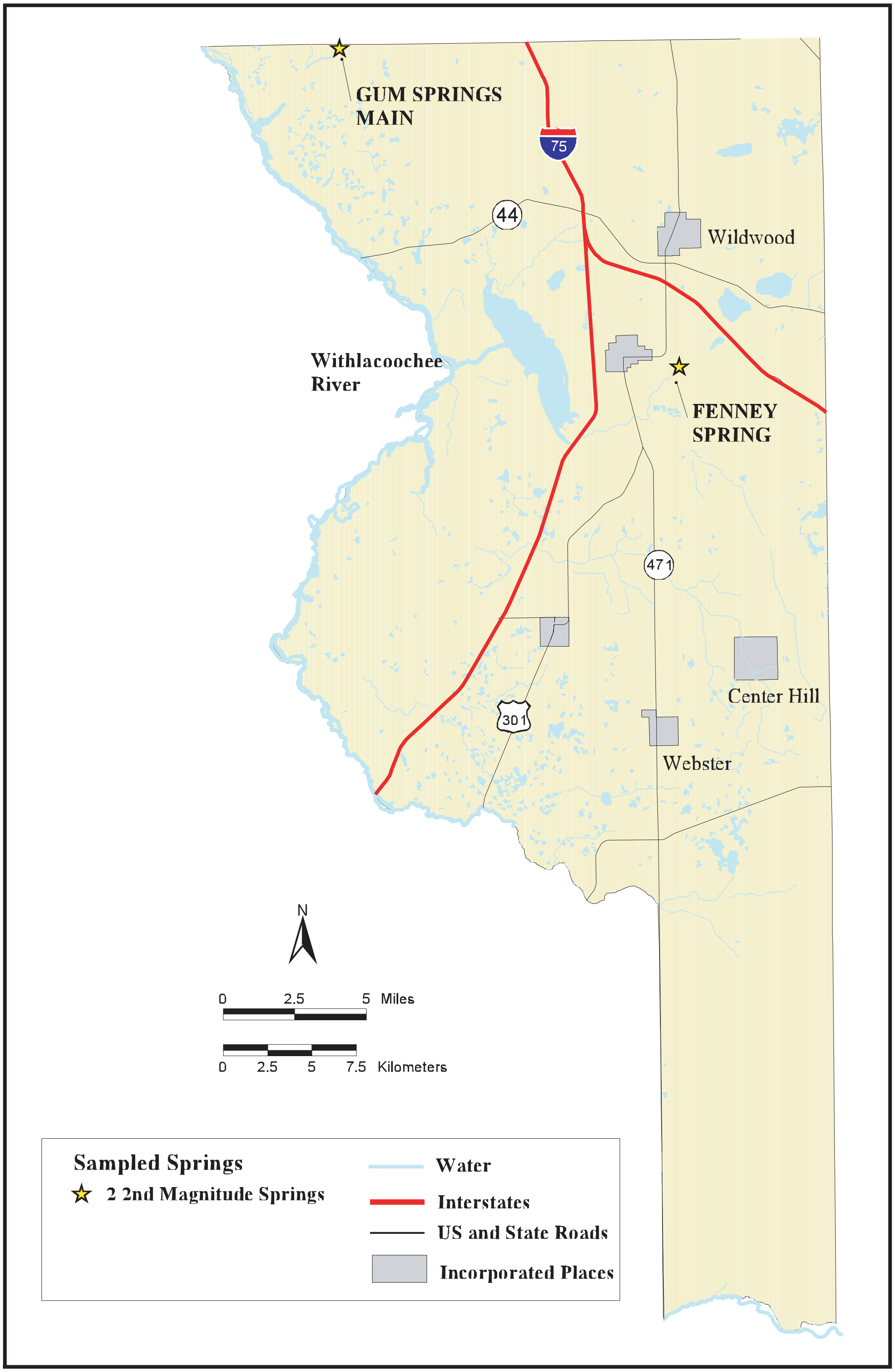

Figure 140. Springs visited by FGS in Sumter County.

Fenney Spring

Figure 141. Fenney Spring (photo by R. Means).

Location – Lat. 28° 47' 41.99" N., Long. 82° 02' 17.21" W. (NE ¼ SE ¼ NE ¼ sec. 31, T. 19 S., R. 23 E.). The spring is located on private property approximately 2 miles (3.2 km) west of Coleman.

Description – Fenney Spring is situated in a cow pasture with abundant live oaks. The spring pool measures 84 ft (25.6 m) north to south and 54 ft (16.5 m) east to west. On the south side of the pool beyond a submerged limestone ledge, The depth measures 21.4 ft (6.5 m). The water is clear, but visibility into the spring is limited by a slightly tannic hue and algae-covered substrates. No boil was visible on the pool surface during April 2002. The spring often has dark, tannic water. Steep banks on the south side of the pool are approximately 12 ft (3.7 m) high; the banks along the spring run northward are low-lying. To the west, there is an adjacent water-filled sinkhole roughly the size of Fenney Spring pool. The sink hole measures 27.5 ft (8.4 m) deep. The two water bodies are separated by a 5 ft (1.5 m) wide land bridge. Underneath the land bridge, the two karst features connect. Numerous cow trails run into the spring and along the run. Fenney Spring run is shallow, slow-moving, and slightly narrower than the springhead. It flows north for approximately 150 ft (45.7 m), then turns southwestward, flowing into Shady Brook which eventually flows into Lake Panasoffkee several miles downstream.

***Utilization* -** The spring is privately owned and surrounded by cattle pasture.

Discharge **-** All discharge rates are measured in ft^3/s.

July 26, 1946	21.6[(1)]
April 26, 1956	4.66[(1)]
November 22, 1960	95.5[(1)]
March 16, 1972	13.9[(1)]

Table 168. Fenney Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	20	23.1	
DO	-	0.24	
pH	7.5	7.47	
Sp. Cond.	230	290	
Lab Analytes			
BOD	-	-	0.49I
Turbidity	-	-	0.15
Color	65	-	15.0
Alkalinity	110	-	132
Sp. Cond.	-	280.0	-
TDS	175	-	171
TSS	-	-	4U
Cl	1.2	-	8.4A
SO_4	1.6	-	5.3A
F	0.3	-	0.083I
Nutrients			
TOC	-	-	3.5I
$NO_3 + NO_2$ as N	0.1	-	0.3J
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.19I	0.22
P	-	0.079	0.091
PO_4	-	0.082	-
NO_3	0.26	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	41	47.2	47.6A
K	0.4	0.57	0.59A
Na	6.4	4.1	4.5A
Mg	3.1	2.4	2.5A
Al	-	-	50U
As	-	3U	3U
B	-	-	12I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	40I
Mn	-	3.6	3.8A
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.6
Ra-228	-	-	2.1
Se	-	4U	4U
Sn	-	-	7U
Sr	-	-	70.2A
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 169. Fenney Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	8Q
Fecal Coliform	4Q

Gum Springs Main

Figure 142. Gum Springs Main (photo by R. Means).

Location – Lat. 28° 57’ 31.40” N., Long. 82° 13’ 53.49” W. (NW ¼ NE ¼ NW ¼ sec. 5, T. 18 S., R. 21 E.). Gum Springs Main spring is located approximately 10 miles southwest of Ocala off SR 484. The springs are surrounded by the Marion Oaks subdivision and are not accessible to the public.

Description – Gum Springs Main spring pool measures 69 ft (21 m) north to south and 81 ft (24.7 m) east to west. The depth measured over the vent is 9.8 ft (2.9 m). The vent is located just 5 ft (1.5 m) north of an old wooden dock on the south side of the spring. The water color is bluish green and there are suspended algal mats and particles in the spring pool. Two guest houses are situated on high ground to the south and east of the spring, which rises to approximately 10 ft (3 m) above the water. Gum Springs Main forms the headwaters of Gum Slough, which flows southwest into the Withlacoochee River. There are at least seven individual springs along Gum Slough distributed from the head spring up to .8 miles (1.3 km) downstream (Rosenau et al., 1977). Champion and Starks (2001) call the springs in this area the Gum Slough Springs Group. They recognize Wilson Head Spring, Gum Spring Main, Gum Slough #1-4, and Alligator Spring. In April 2002, Gum Spring was barely flowing, nearly stagnant. Gum Slough was less than 1 ft (0.3 m) deep. All the springs were reportedly at historic low water levels, and some were not flowing during the April 2002 visit.

Utilization – Gum Springs Main is surrounded by private land and is used privately for swimming.

Discharge **-** All discharge rates are measured in ft^3/s.

March 15, 1932	11.1[1]
June 13, 1972	85.8[1] (combined flow from 6 springs)
Average 1999	8.6[5]

Table 170. Gum Springs Main water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	23	23.10	
DO	-	1.81	
pH	8	7.57	
Sp. Cond.	-	318	
Lab Analytes			
BOD	-	-	0.43AI
Turbidity	-	-	0.2
Color	5	-	5U
Alkalinity	110	-	129A
Sp. Cond.	358	310.0	-
TDS	208	-	175
TSS	-	-	4U
Cl	5	-	6.0
SO_4	41	-	23.0
F	0.2	-	0.12
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.5	-	0.9J
$NH_3 + NH_4$	-	-	0.027
TKN	-	.06U	0.06U
P	-	0.027A	0.030
PO_4	-	0.025	-
NO_3	2.2	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	50	46.7	50.1A
K	0.4	0.31	0.33A
Na	3.3	3.3I	3.4I
Mg	6.8	6.3	6.6A
Al	-	-	50U
As	-	3U	3U
B	-	-	6.2I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	25U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	1U
Se	-	4U	4U
Sn	-	-	7U
Sr	430	-	335A
Zn	-	3.4U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 171. Gum Springs Main bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4Q
Fecal Coliform	6Q

SUWANNEE COUNTY

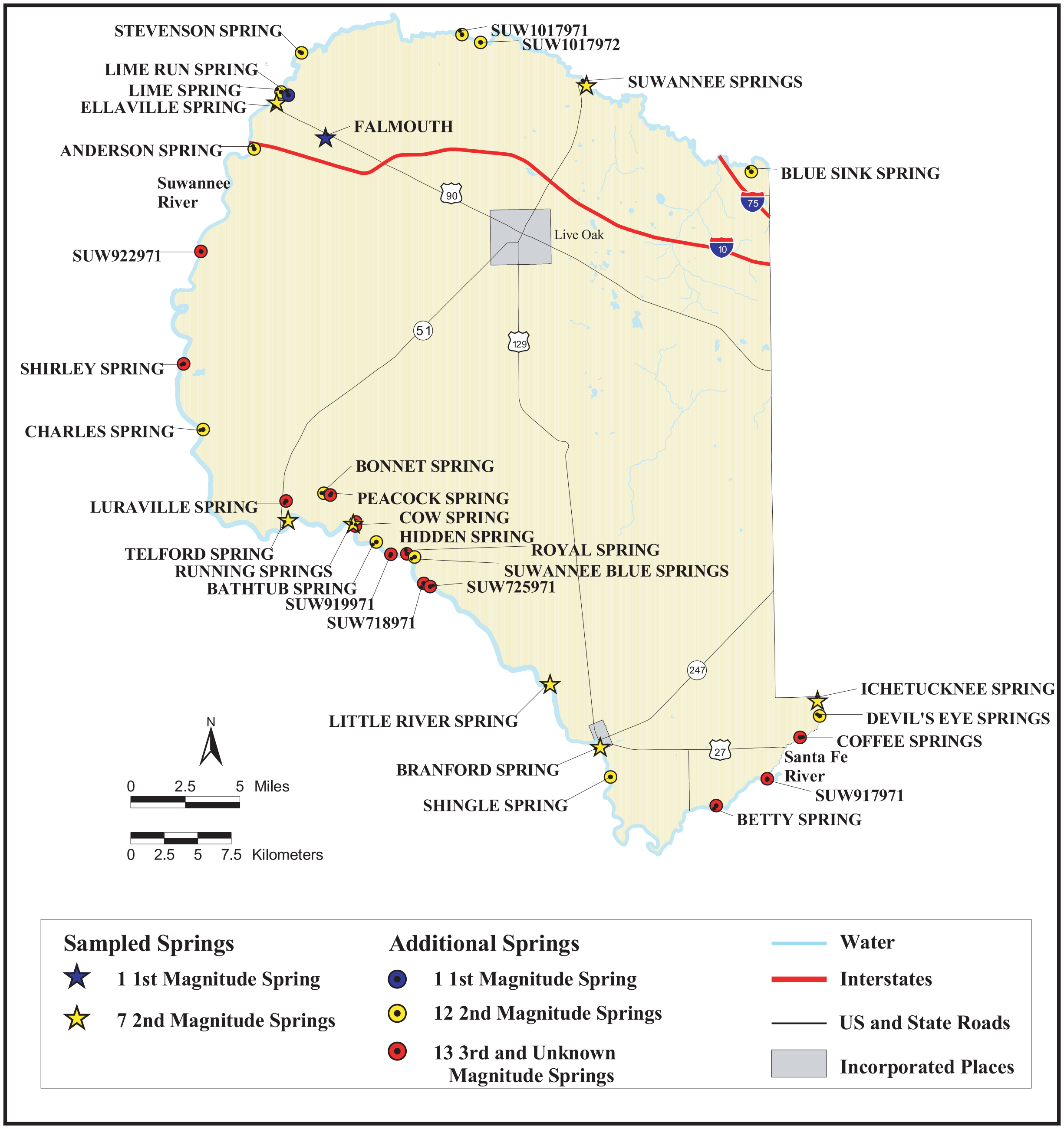

Figure 143. Springs visited by FGS in Suwannee County.

Branford Spring

Figure 144. Branford Spring (photo by T. Scott).

Location – Lat. 29° 57’ 17.53” N., Long. 82° 55’ 42.27” W. (NE ¼ NE ¼ NE ¼ sec. 20, T. 6 S., R. 14 E.). Branford Spring is located within Ivey Memorial Park in the city of Branford, 500 ft (152.4 m) southwest of the junction between US 27 and US 129 on the east side of the Suwannee River. The spring is just east of a dive/bait shop.

Description – Branford Spring is situated in a steep-sided depression along the east side of the Suwannee River. The spring pool is nearly circular and measures 90 ft (27.4m) in diameter north to south and 84 ft (25.6 m) east to west. There are small boils on the surface over at least two vents within the spring pool. The depth at the sampled vent measures 12.5 ft (3.8 m). The water is clear and has a blue-greenish hue. This spring has an abundance of long, filamentous algae covering nearly all substrates and waving in the currents. There is very little other aquatic vegetation. Its banks are nearly vertical, rising to approximately 18 ft (5.5 m) above the water, and limestone is exposed in and around the spring. A wooden platform is built along the south and east banks. The shallow spring run travels approximately 100 ft (30.5 m) northward, then turns sharply west and flows 100 ft (30.5 m) into the Suwannee River. The spring run is sand-bottomed, and spills into the river over three consecutive man-made limestone walls. The walls are presumably intended to maintain water levels in the spring pool for swimming. Land around Branford Spring is developed into a city park.

Utilization – The spring is within a city park and is a popular local swimming hole.

Discharge **-** All discharge rates are measured in ft^3/s.

May 15, 1927	12.4[1]
March 15, 1932	8.85[1]
April 26, 1956	8.52[1]
November 17, 1960	29.8[1]
November 3, 1972	29.2[1]
July 21, 1997	24.53[4]
July 10, 2002	6.63[2]

Table 172. Branford Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	22.0	20.85	
DO	2.7	0.51	
pH	6.8	6.95	
Sp. Cond.	345	425	
Lab Analytes			
BOD	-	-	0.97I
Turbidity	-	-	0.4
Color	0	-	5.0
Alkalinity	150	-	198.0
Sp. Cond.	-	430.0	-
TDS	241	-	241.0
TSS	-	-	4U
Cl	6.0	-	6.1
SO_4	22	-	21.0
F	0.1	-	0.088I
Nutrients			
TOC	-	-	3I
$NO_3 + NO_2$ as N	0.61	-	0.68
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.12I	0.097I
P	-	0.052J	0.054
PO_4	-	0.054	-
NO_3	2.6	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	71	74	74.7A
K	0.3	1.1A	1.1A
Na	2.3	3.9	3.9I
Mg	7	7.6A	7.7A
Al	-	-	26I
As	-	3U	3U
B	-	-	15I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	37I
Mn	-	6.8A	7A
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	3.2
Se	-	4U	4U
Sn	-	-	7U
Sr	320	-	122A
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 173. Branford Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Ellaville Spring

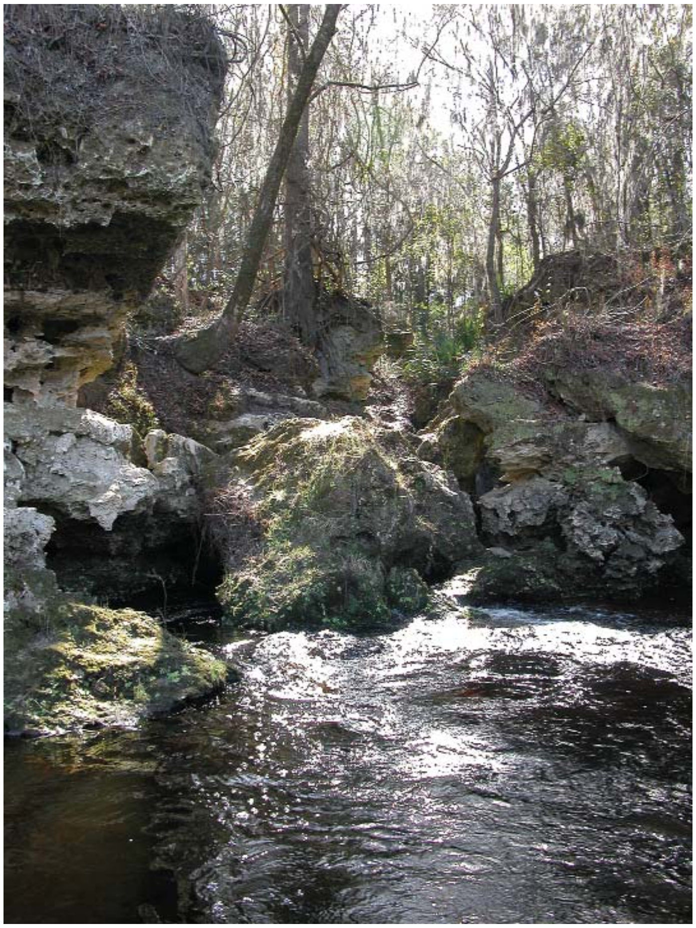

Figure 145. Ellaville Spring (photo by T. Scott).

Location – Lat. 30° 23' 04.08" N., Long. 83° 10' 21.02" W. (SW ¼ SW ¼ NE ¼ sec. 24, T. 1 S., R. 11 E.). Ellaville Spring enters the Suwannee River from the east approximately 13 miles (21 km) northwest of Live Oak. From the intersection of I-10 and US 90 northwest of Live Oak, travel about 5.7 miles (9.2 km) northwest on US 90 to just before the bridge over the Suwannee River. The Springs Fever website gives the following directions for accessing the spring from US 90: "turn right on the dirt road that cuts sharply behind the agricultural inspection station on the north side of Highway 90. Turn left on a dirt/grass path just before the railroad tracks and drive about 150 feet toward the river. The spring will be 100 feet (30.5 m) to the west (left)." It is surrounded by private property and can be accessed by traveling downstream from the boat ramp at the Suwannee River State Park approximately 0.3 miles (0.5 km), to just below the confluence of the Withlacoochee River. The spring run flows in from the east side of the river downstream from the railroad trestle.

Description – Ellaville Spring discharges from a cave system in the limestone banks of the Suwannee River. The small spring pool is approximately 6 ft (1.8 m) in diameter, and it has vertical limestone walls that reach heights of about 15 ft (4.6m) above water level. In April 2002, the spring water was tannic; however, the water normally is clear and bluish. The spring pool is situated about 80 ft (24.4 m) up an enlarged limestone fracture through which the spring run courses. The spring run is approximately 8 ft (2.4 m) wide and averages 8 ft (2.4 m) deep. Divers report that the spring depth reaches 150 ft (45.7 m) within an extensive cave system associated with Ellaville Spring. The cave system reportedly extends underneath the Suwannee River eventually connecting with Suwanacoochee Spring cave system.

Utilization – The spring is undeveloped and located on private property that is adjacent to Suwannee River State Park property. It is a popular cave-diving location.

Discharge **-** All discharge rates are measured in ft^3/s.

December 9, 1942	41.2[1]
November 16, 1960	27.9[1]
November 8, 1973	82[1]
June 2, 1998	40.7[4]

Table 174. Ellaville Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	21.0	22.91	
DO	1.5	0.37	
pH	7.3	6.93	
Sp. Cond.	-	374	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.10
Color	5	-	5U
Alkalinity	170	-	171.0
Sp. Cond.	356	350.0	-
TDS	199	-	215.0
TSS	-	-	4U
Cl	3.5	-	5.1
SO_4	10	-	21.0
F	0.1	-	0.14
Nutrients			
TOC	-	-	1.6I
$NO_3 + NO_2$ as N	-	-	0.39
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.064I	0.06U
P	-	0.059	0.062
PO_4	-	0.059	-
NO_3	-	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	58	60.3	61.4
K	0.5	0.65	0.65
Na	2.5	6.9	7.0
Mg	12	8.7	8.8
Al	-	-	11I
As	-	0.5U	0.75U
B	-	-	16I
Cd	-	0.025U	0.025U
Co	-	-	2U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	22I	40U
Mn	-	22	22.3
Ni	-	3.6U	2U
Pb	-	0.029I	0.1U
Ra-226	-	-	0.4
Ra-228	-	-	1.4U
Se	-	0.84I	1U
Sn	-	-	5U
Sr	-	-	82.0
Zn	-	2U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 175. Ellaville Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Falmouth Spring

Figure 146. Falmouth Spring (photo by T. Scott).

Location-Lat. 30° 21' 40.19" N., Long. 83° 08' 05.97" W. (NW ¼ NW ¼ NE ¼ sec. 32, T. 1 S., R. 12 E.). Falmouth Spring is 10 miles (16 km) northwest of Live Oak. From the intersection of I-10 and US 90 northwest of Live Oak, travel about 2.9 miles (4.7 km) northwest on US 90. Enter the Falmouth Spring Recreation Area at the SRWMD sign on the south (left) side of the road. The spring is west of the parking area and is accessed by an interpretive hiking path.

Description-Falmouth Spring is a karst window. At the head of the karst window, the pool measures 87 ft (26.5 m) north to south and 81 ft (24.7 m) east to west. The depth is 39 ft (11.9 m). The water discharges from a conical depression. The bottom is sand and limestone. Water is fairly clear, greenish with tiny suspended algal particles. The bottom and sides are thickly covered with dark green filamentous algae. There was no visible boil during the October 2001 visit. Limestone is exposed along sides. High sand banks rise steeply along the karst window to 25 to 30 ft (7.6 to 9.1 m) above water level. Surrounding high ground has mixed hardwood and pine forest. The run flows 450 ft (137.2 m) northeast until disappearing into a siphon. The east side of the karst window has a wooden boardwalk leading down to spring and a foot path along the run. Rosenau et al. (1977) report an underwater cave in this karst window.

Utilization—Falmouth Springs is a park owned by SRWMD. Swimming is allowed.

Discharge- All discharge rates are measured in ft^3/s. A high river stage on the Suwannee River caused a reversal of flow at Falmouth Spring in February 1933.

1908	167[(1)]
1913	220[(1)]
February 10, 1933	365[(1)]
December 9, 1942	59.6[(1)]
July 22, 1946	157[(1)]
November 16, 1960	183[(1)]
November 15, 1973	159[(1)]
November 13, 2001	159[(4)]

Table 176. Falmouth Spring water quality analysis.

Analytes	1924	1973	2001	
			Unfilt.	Filter
Field Measures				
Temperature	-	21.0	20.7	-
DO	-	1.6	1.28	-
pH	-	7.3	7.10	-
Sp. Cond.	-	351	373	-
Lab Analytes				
BOD	-	0	0.2 AU	-
Turbidity	-	1	0.3	-
Color	-	5	5U	-
Alkalinity	-	170	187	186
Sp. Cond.	-	-	400 A	-
TDS	-	-	210	-
TSS	-	-	4U	-
Cl	4.0	3.4	4.1	4.1
SO_4	9.5	9.5	11	11
F	-	0.0	0.12	0.12
Nutrients				
TOC	-	5.0	1.8 I	-
NO3 + NO2	-	0.70	0.39	0.41
NH3 + NH4	-	-	0.01 U	0.01 I
TKN	-	-	0.088 I	0.086 IQ
P	-	0.04	0.038 A	0.036
PO_4	-	0.04	0.033	-

Analytes	1924	1973	2001	
			Unfilt.	Filter
Metals				
Ca	65	53	63.1	62.3
K	0.4	0.5	0.36	0.34
Na	3.1	2.2	2.63	2.45
Mg	9.2	12	9.1	8.8
As	-	-	3 U	3 U
Al	-	-	-	75 U
B	-	-	25 U	-
Cd	-	-	0.75 U	0.75 U
Co	-	-	0.75 U	-
Cr	-	-	2 U	0.5 U
Cu	-	-	8.8 I	8.8 I
Fe	-	-	39 I	35 U
Mn	-	-	9.3	7.5
Ni	-	-	1.5 U	1.5 U
Pb	-	-	5 U	4 U
Se	-	-	4 U	4 U
Sn	-	-	20 U	-
Sr	-	0.0	50	-
Zn	-	-	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Table 177. Falmouth Spring bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	90
Enterococci	32
Fecal Coliform	74
Total Coliform	180

Ichetucknee Head Spring

See Ichetucknee Springs Group – Columbia County

Little River Spring

Figure 147. Little River Spring (photo by R. Means)

Location – Lat. 29° 59' 48.71" N., Long. 82° 57' 58.74" W. (SW ¼ NE ¼ NE ¼ sec. 1, T. 6 S., R. 13 E.). Little River Spring is located 3.5 miles (5.5 km) north of Branford. From the intersection of US 27 and US 129 in Branford, travel north on US 129 for 3.1 miles (5 km). Turn west (left) on CR 248 and travel 1.7 miles (2.7 km). The spring is located on the south (left) side of the road.

Description – The Little River Spring pool measures 108 ft (32.9 m) north to south and 93 ft (28.3 m) east to west. The depth over the vent is 11.0 ft (3.3 m). Limestone is exposed in the pool, and there are areas covered by sand. Spring water issues from an elongated fracture in the limestone. The water is clear and greenish blue. Algae cover approximately half the area in the spring and run, and frequent swimming probably keeps the other half cleared. There is a sizeable boil over the vent near the center of the spring pool. The spring discharge flows through a 150 ft (45.7 m) long run southwesterly into the Suwannee River from the east. Steep, sandy banks rise to approximately 18 ft (5.5 m) above the spring, and the land becomes flat on top. A boardwalk leads from a dirt parking area on the northeast side down onto the exposed sandy shores near the spring. Land surrounding the spring is generally forested. An extensive cave system exists below this spring. Cave divers report that the cave system reaches depths of well over 100 ft (30.5 m).

Utilization – Little River Spring is located on SRWMD land and currently is being developed into a recreational area with campground and full facilities. The spring is popular for swimming and cave diving.

Discharge - All discharge rates are measured in ft^3/s.

November 27, 1973	84.4[1]
September 19, 1997	84.89[4]

Table 178. Little River Spring water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	22.0	22.28	
DO	5	1.34	
pH	7.3	7.20	
Sp. Cond.	-	350	
Lab Analytes			
BOD	-	-	2.2A
Turbidity	-	-	0.10
Color	0	-	5U
Alkalinity	160	-	163.0
Sp. Cond.	352	360.0	-
TDS	202	-	197.0
TSS	-	-	4U
Cl	4.1	-	4.8
SO_4	16	-	17.0
F	0	-	0.097I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	0.90
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.023J	0.022A
PO_4	-	-	0.022
NO_3	-	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	56	59A	61.1
K	1	0.51	0.50
Na	2.4	2.5A	2.3I
Mg	9.5	7.2	7.5
Al	-	-	10U
As	-	3U	3U
B	-	-	11I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.5
Ra-228	-	-	2.1
Se	-	4U	4U
Sn	-	-	7U
Sr	0	-	141.0
Zn	-	1.5U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 179. Little River Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Running Springs

Figure 148. East Running Springs (photo by R. Means).

Location – Lat. 30° 06' 16.07" N., Long. 83° 06' 57.32" W. (SW ¼ NE ¼ SE ¼ sec. 28, T. 4 S., R. 12 E.). Running Springs is located on private land, 4.3 miles (6.9 km) northeast of Mayo. From Mayo, drive 3.3 miles (5.3 km) north on SR 51 to the boat ramp. The spring runs flow in from the northeast side of the Suwannee River, 4.3 miles downstream (east) from the boat ramp on SR 51.

Description – Running Springs consist of a pair of separate spring areas (East Running Springs and West Running Springs) that discharge from small cavities at the base of an approximately 20 ft (6.1 m) high limestone bank on the northeastern side of the Suwannee River. The two springs occur in depressions in the river bank that are separated by approximately 150 ft (45.7 m). East Running Springs was sampled for water quality and was approximately 2 ft (0.6 m) above the adjacent Suwannee River during the March 2002 visit. The spring pool is oblong and measures 70 ft (21.3 m) north to south and 50 ft (15.2 m) east to west. Its depth ranges from 2 to 6 ft (0.6-1.8 m). The pool bottom is sand and limestone. The water is clear and bluish. There is no aquatic vegetation, and algae occur on portions of the sand and limestone substrates. It has a short southwestward flowing run that is approximately 25 ft (7.6 m) long. The run cascades over a 2 ft (0.6 m) high limestone ledge into the river. East Running Springs has multiple boils within the northeast end of the pool. There are several spring rivulets emerging from the base of the high banks into the northeast end of the pool. There is another spring located in the Suwannee River that creates a prominent boil along the riverbank just 15 ft (4.6 m) upstream of the mouth of East Running Springs. Divers report this spring to be connected to the East Running Springs run through an underwater cavern. West Running Springs is smaller and has a run that is approximately 150 ft (45.7 m) long. The run flows southwestward under a small land bridge then into the river. Rosenau et al. (1977) report steep limestone walls, natural limestone bridges and numerous vents at these springs. The high ground above Running Springs harbors a mixed hardwood and pine forest with some private landscaping intended to reduce erosion.

Utilization **-** The springs are undeveloped and on private property. Land access was recently closed by new landowners who are restoring the natural condition of the uplands surrounding the springs.

Discharge **-** All discharge rates are measured in ft^3/s.

November 27, 1973 (West Spring)	14.2(1)
November 27, 1973 (East Spring)	62.8(1)
July 30, 1997	22.44(4)
July 9, 2002	28.12(2)

Table 180. Running Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Table 181. Running Springs water quality analysis.

Analytes	1973	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	22.10	
DO	2.5	1.23	
pH	7.3	7.12	
Sp. Cond.		376	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.05U
Color	0.0	-	5U
Alkalinity	160.0	-	169.0
Sp. Cond.	351	370.0	-
TDS	181.0	-	204.0
TSS	-	-	4U
Cl	3.3	-	4.7
SO_4	13.0	-	19.0
F	0.1	-	0.17
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	2.30
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.075I	0.06U
P	-	0.04J	0.040
PO_4	-	0.035	-
NO_3	-	-	-

Analytes	1973	2002	
		Dissolved	Total
Metals			
Ca	48	52.1	51.5
K	0.5	0.38	0.36
Na	2.1	2.6	2.6I
Mg	17	14.7	14.5
Al	-	-	10U
As	-	3U	3U
B	-	-	10I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.4
Ra-228	-	-	1.6
Se	-	4U	4U
Sn	-	-	7U
Sr	0	-	56.5
Zn	-	1.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Suwannee Springs

Figure 149. Suwannee Springs (photo by R. Means).

Location – Lat. 30° 23' 40.12" N., Long. 82° 56' 04.34" W. (SE ¼ SW ¼ SE ¼ sec. 17, T. 1 S., R. 14 E.). Suwannee Springs flow into the Suwannee River from the southwest approximately 7.5 miles (12.1 km) northeast of Live Oak. From the I-10 and US 129 intersection north of Live Oak, travel north on US 129 approximately 4.3 miles (6.9 km). Turn northeast (right) on old US 129 at the solid waste collection site. Travel 0.5 miles (0.8 km) and turn east (right) on a graded road that leads to the spring parking area.

Description – At least six springs comprise Suwannee Springs. All are clustered in a sandy 100 ft (30.5 m) stretch at the base of a 35 ft (10.7 m) high bank along the south side of the Suwannee River. The main spring, which was sampled for water quality, is within the rock walls of a late 1800's bath house. The spring pool measures 17 ft (5.2 m) north to south and 25 ft (7.6 m) east to west. The depth near the vent on the south side of the pool is 7.8 ft (2.4 m). Limestone is exposed in the vents and sand covers a large part of the spring pool. Clear, yellow-greenish water is pooled behind the wall and spills out through an opening at the base over algae–covered limestone boulders into the tannic Suwannee River. Algae are abundant in the pool. The spring water exudes a sharp odor of hydrogen sulfide. On the east side of the pool, wooden stairs lead down from a parking lot into the spring. Water levels of both the spring and river were very low in August 2002. The stairs were 10 ft (3 m) above the water level. Remains of the old US 90 bridge over the river are just upstream. Land along the river is forested with hardwoods and pines.

Table 182. Suwannee Springs water quality analysis.

Analytes	1924	1966	1973	2002	
				Dissolved	Total
Field Measures					
Temperature	-	21.5	21.0	21.26	
DO	-	-	4.5	0.35	
pH	-	7.5	7.5	7.03	
Sp. Cond.	-	-	-	306	
Lab Analytes					
BOD	-	-	-	-	0.48I
Turbidity	-	-	-	-	0.45
Color	-	15	10	-	10.0
Alkalinity	-	140	150	-	149
Sp. Cond.	-	330	333	305.0	-
TDS	-	-	199	-	181.0
TSS	-	-	-	-	4U
Cl	7	7	5.3	-	4.6
SO_4	27	18	17	-	7.4
F		0.2	0.1	-	0.170
Nutrients					
TOC	-	-	-	-	3I
$NO_3 + NO_2$ as N	-	-	-	-	0.004U
$NH_3 + NH_4$	-	-	-	-	0.170
TKN	-	-	-	0.2I	0.25
P	-	-	-	0.14A	0.150
PO_4	-	-	-	0.14	-
NO_3	-	-	-	-	-
Metals					
Ca	53	53	48	54.1A	54.2
K	0.6	0.4	1	0.41A	0.44A
Na	5.5	4	4.2	3.12A	3.04
Mg	12	7.2	11	5.3A	5.4
Al	-	-	-	-	5U
As	-	-	-	3U	3U
B	-	-	-	-	9.1I
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	1U
Cr	-	-	-	2U	2U
Cu	-	-	-	1U	2U
Fe	-	-	-	19I	20I
Mn	-	-	-	14.3A	14.2
Ni	-	-	-	1U	1.5U
Pb	-	-	-	5U	5U
Ra-226	-	-	-	-	0.5
Ra-228	-	-	-	-	1U
Se	-	-	-	5U	7U
Sn	-	-	-	-	20U
Sr	-	-	0	-	53.9
Zn	-	-	-	4.6U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization – In the late 1800's the springs were a popular bathing area, health spa and tourist destination. Today, the spring is located on SRWMD land with public recreation and interpretive areas.

Discharge **-** All discharge rates are measured in ft^3/s.

Average for 1906-1973	23.4[(1)] (52 measurements)
Min (April 25, 1956)	2.35[(1)]
Max (June 4, 1964)	71.5[(1)]
June 24, 1997	14.07[(4)]

Table 183. Suwannee Springs bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1AK
Fecal Coliform	1A

Telford Spring

Figure 150. Telford Spring (photo by R. Means).

Location – Lat. 30° 06' 25.38" N., Long. 83° 09' 56.66" W. (NE ¼ NE ¼ SE ¼ sec. 25, T. 4 S., R. 11 E.). Telford Spring is located on the west bank of the Suwannee River, 4 miles (6.4 km) north of Mayo. The spring is surrounded by private land but was open to the public in April 2002. From the intersection of US 27 and SR 51 in Mayo, drive north on SR 51 for 4.8 miles (7.7 km), crossing over the Suwannee River, and turn east (right) at the flashing lights at Luraville Road in Luraville. From Luraville, turn south (right) onto the first graded road and travel 0.9 miles (1.5 km) to a fork in the road, just before the river. At the fork, turn right and travel 0.1 miles (0.2 km) to the spring. The left fork leads to the boat launching ramp.

Description – Telford Spring is situated along the east side of the Suwannee River at the head of a cove surrounded by steep sandy banks. The spring emerges from two caves within scalloped limestone whose passages connect underneath a 5 ft (1.5 m) by 7 ft (2.1 m) wide natural limestone bridge. The natural bridge over the spring was about 1 ft (0.3 m) higher than water level in April 2002. The main pool measures 66 ft (20.1 m) north to south and 51 ft (15.5 m) east to west and has a prominent boil. The maximum depth of the spring pool is 11.3 ft (3.4 m) over the vent. The spring and its run have a sand and limestone bottom. The water color is greenish and clear. Algae are sparse and there is virtually no aquatic vegetation. The short, shallow, 1 ft (0.3 m), spring run flows approximately 75 ft (22.9 m) into the dark, tannic waters of the Suwannee River. Land on the 12-15 ft (3.7-4.6 m) high, eroded banks supports a dense mixed hardwood/pine forest and there is a large unpaved parking area around the perimeter of the spring pool. A sinkhole with a clear water pool is located 150 ft (45.7 m) north of the spring across the sand access road. Spring water levels are directly tied to Suwannee River fluctuations.

Utilization **-** Telford Spring is surrounded by private lands and is a heavily used local recreation area.

Discharge **-** All discharge rates are measured in ft^3/s.

May 14, 1927	35.1[(1)]
December 12, 1941	28.0[(1)]
May 29, 1942	48.2[(1)]
November 17, 1960	53.5 [(1)]

November 21, 1973	33.8 [(1)]
September 17, 1997	31.15[(4)]

Table 184. Telford Spring water quality analysis.

Analytes	1973	2002 Dissolved	2002 Total
Field Measures			
Temperature	21.0	21.22	
DO	3	0.96	
pH	7.4	7.09	
Sp. Cond.	-	428	
Lab Analytes			
BOD	-	-	0.34I
Turbidity	-	-	0.30
Color	5	-	5U
Alkalinity	170	-	171
Sp. Cond.	423	440.0	-
TDS	244	-	244.0
TSS	-	-	4U
Cl	4.0	-	5.7
SO_4	42	-	46.0
F	0	-	0.190
Nutrients			
TOC	-	-	1.9I
$NO_3 + NO_2$ as N	-	-	1.80
$NH_3 + NH_4$	-	-	0.02I
TKN	-	0.09I	0.082I
P	-	0.058	0.063
PO_4	-	0.054	-
NO_3	-	-	-

Analytes	1973	2002 Dissolved	2002 Total
Metals			
Ca	52	57	56.9
K	0.4	0.63	0.61
Na	2.3	3.4I	3.4I
Mg	24	16.7	16.5
Al	-	-	50U
As	-	3U	3U
B	-	-	12I
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3U	3U
Fe	-	25U	25U
Mn	-	4.4	5.0
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.3
Ra-228	-	-	0.9U
Se	-	4U	4U
Sn	-	-	7U
Sr	0	-	205
Zn	-	3.2U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 185. Telford Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1K
Fecal Coliform	1K

TAYLOR COUNTY

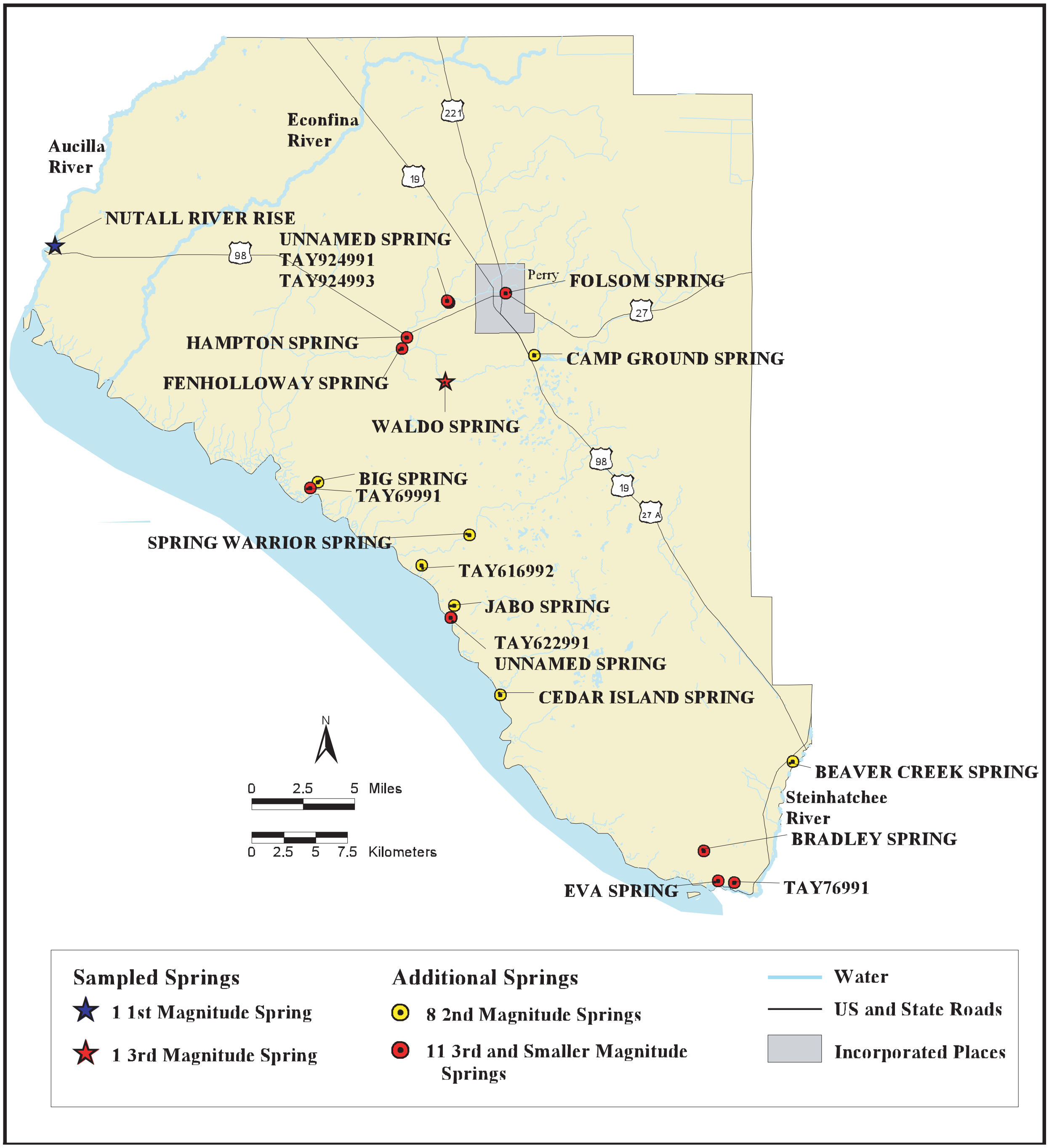

Figure 151. Springs visited by FGS in Taylor County.

Nutall Rise

Figure 152. Nutall Rise (photo by R. Means).

Location—Lat. 30° 09' 01.73" N., Long. 83° 57' 47.82" W. (NE ¼ NW ¼ SE ¼ sec. 7, T. 4 S., R. 4 E.). Nutall River Rise is located on the Aucilla River approximately 28 miles (45.1 km) southeast of Tallahassee. The river rise is surrounded by private property and is best accessed from a public boat ramp off US 98. From the intersection of Capital Circle (US 319) and SR 363 (Woodville Highway) travel south 13.2 miles (21.2 km) to US 98. Head east (left) on US 98 for approximately 16.1 miles (25.9 km) to the bridge over the Aucilla River. Immediately after crossing the Aucilla River, turn north (left) on dirt road marked with a public boat ramp sign. The river rise is located approximately 0.6 miles (1 km) upstream from the boat ramp.

Description-The Aucilla River emerges from underground at Nutall Rise and begins its last stretch unimpeded toward the Gulf of Mexico. The spring pool measures 220 ft (67 m) northwest to southeast and 282 ft (86 m) northeast to southwest. Pool depth is 53 ft (16.2 m) measured near the vent. The water is typically tannic but can become clear during droughts. There is some emergent vegetation around the pool perimeter, including an occasional water hyacinth mat. The surrounding land is relatively low-lying, with live oak and mixed hardwoods. There is a large dolostone quarry located to the north about 0.6 miles (1 km).

Utilization-The entire perimeter of the river rise is bordered by trailers, docks and houses.

Discharge-December 19, 2001: 360 ft^3/s [(2)]

Table 186. Nutall Rise water quality analysis.

Analytes	2001	
	Unfilt.	Filter
Field Measures		
Temperature	21.3	-
DO	6.4	-
pH	7.5	-
Sp. Cond.	338	-
Lab Analytes		
BOD	0.2 AU	-
Turbidity	0.9	-
Color	20	-
Alkalinity	155	154
Sp. Cond.	340	-
TDS	196	-
TSS	4 U	-
Cl	7.6	8.1
SO_4	14	14
F	0.15	0.14
Nutrients		
TOC	5.1	-
NO3 + NO2	0.029	0.028
NH3 + NH4	0.026	0.022
TKN	0.29 J	0.22 A
P	0.047	0.039
PO_4	0.033	-

Analytes	2001	
	Unfilt.	Filter
Metals		
Ca	49.8	49
K	0.5	0.5
Na	4.61	4.65
Mg	11.1	10.9
As	3 U	3 U
Al	-	75 U
B	30 U	-
Cd	0.75 U	0.5 U
Co	0.75 U	-
Cr	0.7 U	0.5 U
Cu	2 U	2 U
Fe	299	193
Mn	33.4	24.5
Ni	1.5 U	1.5 U
Pb	5 U	3 U
Se	3.5 U	3.5 U
Sn	7 U	-
Sr	76.1	-
Zn	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value less than practical quantitation limit J=Estimated value Q=exceeding holding time limit

Table 187. Nutall Rise bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	19AQ
Enterococci	38AQ
Fecal Coliform	23AQ
Total Coliform	225AQ

Waldo Spring

Figure 153. Waldo Spring (photo by R. Means).

Location – Lat. 30° 02' 57.04" N., Long. 83° 37' 47.74" W. (NW ¼ SW ¼ NE ¼ sec. 16, T. 5 S., R. 7 E.). Waldo Spring is 5.2 miles (8.4 km) southeast of Perry. The spring is located behind a locked gate on a road surrounded by private timber company land and is currently not accessible to the public.

Description – Waldo Spring pool measures 60 ft (18.3 m) north-south and 132 ft (40.2 m) east-west. The maximum depth is 8 ft (2.4 m) at a spring vent near the southern shore. Rosenau et al. (1977) report a limestone floor in the spring pool. Murky, blue-greenish water discharges from the spring vent. The pool surface has large floating brown algae mats. Algae-covered aquatic vegetation occurs within the spring pool. The narrow and heavily canopied spring run flows 200 ft (61 m) northeast into the Fenholloway River from the south. The land surrounding the spring is planted pine flatwoods, with some areas recently clearcut. Live oak trees and grassy banks border the south and west sides of the spring pool. Large limestone boulders form a ring around the pool area, preventing cars from driving directly up to the spring banks. A large sand parking area and dirt access road are beyond to the south.

Utilization **-** Waldo Spring is surrounded by privately-owned timber company land. It was until recently a popular local swimming hole, but is currently inaccessible due to a locked gate at the Golf Course Rd. entrance. In addition to logging operations, the land surrounding the spring is leased by a hunt club.

Discharge – No discharge rate is available.

Table 188. Waldo Spring water quality analysis.

Analytes	1946	1972	2003	
			Dissolved	Total
Field Measures				
Temperature	21.0	21.0	21.95	
DO	-	-	0.26	
pH	7.3	7.1	7.09	
Sp. Cond.	-	-	458	
Lab Analytes				
BOD	-	-	-	0.2AU
Turbidity	-	-	-	4.2
Color	-	5	-	20.0
Alkalinity	-	200	-	225
Sp. Cond.	-	415	426.0	-
TDS	-	225	-	238.0
TSS	-	-	-	4U
Cl	5.0	5.0	-	4.9
SO_4	9.6	8.8	-	5.7
F	-	0.3	-	0.21
Nutrients				
TOC	-	-	-	3.2I
$NO_3 + NO_2$ as N	-	0	-	0.007I
$NH_3 + NH_4$	-	-	-	0.089
TKN	-	-	0.14I	0.18I
P	-	-	0.082	0.077
PO_4	-	-	0.08	-
NO_3	-	-	-	-
Metals				
Ca	52	52	60.8	57.4
K	-	0.1	0.14	0.14
Na	-	2.9	3.1	3.61
Mg	20	18	23.9	23.1
Al	-	-	-	10U
As	-	-	8U	7U
B	-	-	-	14I
Cd	-	-	0.5U	0.5U
Co	-	-	-	2U
Cr	-	-	2U	2U
Cu	-	-	5U	3U
Fe	-	-	1180	1170
Mn	-	-	44.2	43.8
Ni	-	-	2U	2U
Pb	-	-	5U	12U
Ra-226	-	-	-	0.5
Ra-228	-	-	-	0.9U
Se	-	-	8U	15U
Sn	-	-	-	11U
Sr	-	50	-	54
Zn	-	-	5.6I	6.2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 189. Waldo Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	4B
Fecal Coliform	1K

UNION COUNTY

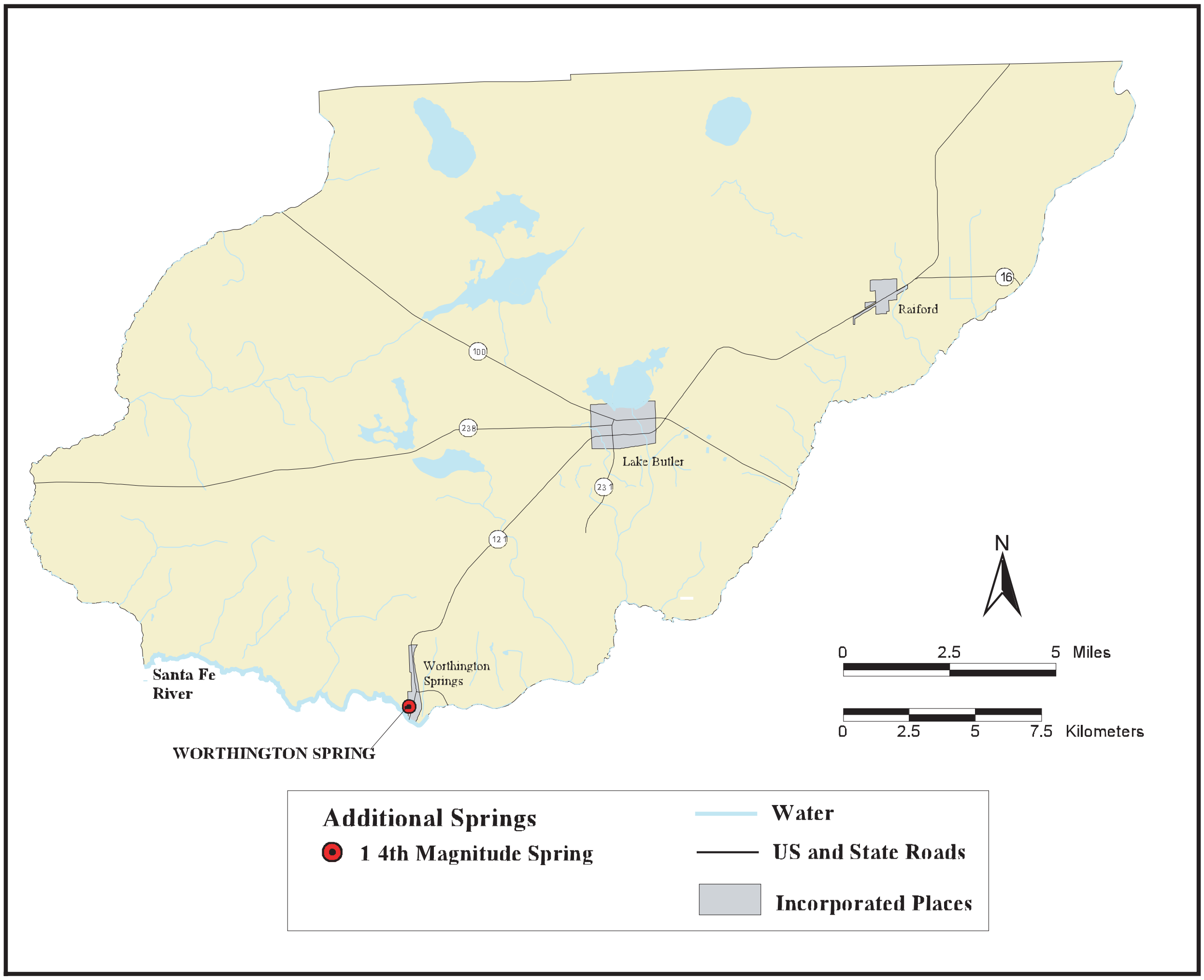

Figure 154. Spring visited by FGS in Union County. Spring description provided on the enclosed CD.

VOLUSIA COUNTY

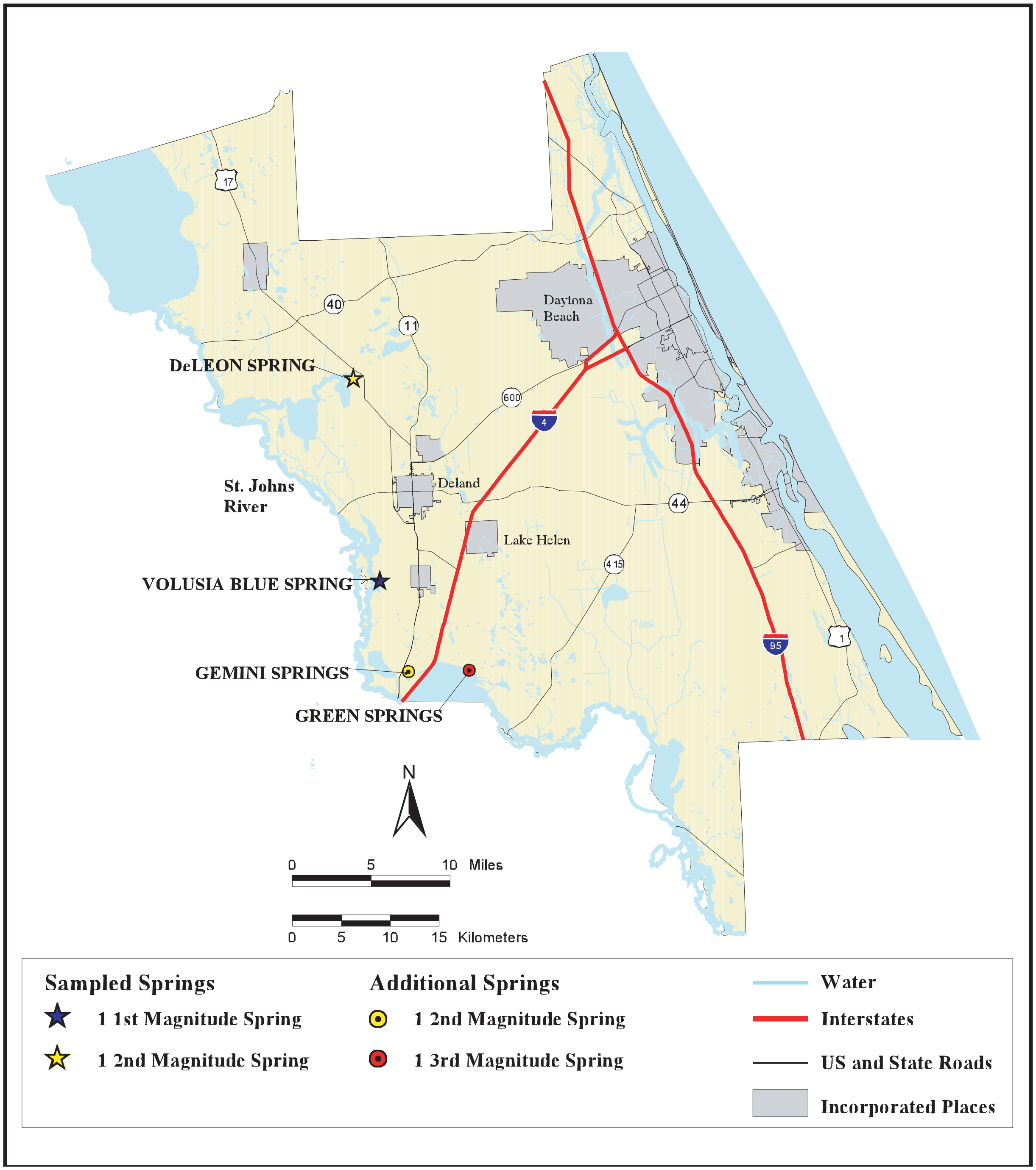

Figure 155. Springs visited by FGS in Volusia County.

DeLeon Spring

Figure 156. DeLeon Spring (photo by T. Scott).

Location – Lat. 29° 08' 03.41" N., Long. 81° 21' 45.89" W. (SW ¼ SE ¼ SW ¼ sec. 16, T. 16 S., R. 29 E.). DeLeon Spring is located within DeLeon Springs State Park, 8 miles (13 km) northeast of Deland. From the junction of US 17 and US 92 in Deland, travel 5.9 miles (9.5 km) north on US 17. Turn west (left) on paved road marked by sign for DeLeon Springs State Park (Ponce DeLeon Boulevard) and travel 1.1 miles (1.8 km) to the park entrance.

Description – DeLeon Spring is situated in a circular, conical depression measuring 189 ft (57.6 m) north to south and 168 ft (51.2 m) east to west. The maximum pool depth measures 28.0 ft (8.5 m) over the vent. The bottom is sand, except at the vent where some limestone is exposed. A single vent issues water from the center of the pool. The water is clear with a light greenish color. There was a visible boil over the vent during January 2002. There are patches of algae on the bottom and suspended algal filaments and particles in the water. No other aquatic vegetation is present in the spring pool. A concrete wall with numerous access ladders and a concrete sidewalk encircle the spring pool. The spring outflow pours through a concrete weir on the west side of the spring pool, then down a 3 ft (0.9 m) drop into the wide, natural spring run. From here, the spring run flows approximately 0.25 miles (0.4 km) westward into Lake Woodruff from the northeast. To the south and east of the spring, high ground gently slopes to approximately 6 to 8 ft (1.8 to 2.4 m) above the spring water level. To the north and west are swampy, forested lowlands of Lake Woodruff and the St. Johns River system. Surrounding land is developed and landscaped as part of the state park. Divers report a small underwater cave at DeLeon Spring (Rosenau et al., 1977).

Table 190. DeLeon Spring water quality analysis.

Analytes	1923	1946	3/2/1972	4/12/1972	2002	
					Dissolved	Total
Field Measures						
Temperature	-	-	23	22	22.93	
DO	-	-	-	-	0.46	
pH	-	7.4	8.1	8	7.14	
Sp. Cond.	-	-	-	-	803	
Lab Analytes						
BOD	-	-	-	0.02	-	-
Turbidity	-	-	-	-	-	0.15
Color	-	0	5	-	-	5U
Alkalinity	-	-	100	-	-	121
Sp. Cond.	-	1030	570	-	790.0	-
TDS	1260	541	326	-	-	415
TSS	-	-	-	-	-	4U
Cl	620	230	110	-	-	150
SO_4	93	35	18	-	-	28
F	-	0	0.2	-	-	0.09I
Nutrients						
TOC	-	-	-	0	-	1.1I
$NO_3 + NO_2$ as N	-	-	-	0.1	-	1.30
$NH_3 + NH_4$	-	-	-	-	-	0.030
TKN	-	-	-	-	0.23	0.28
P	-	-	-	-	0.057	0.065
PO_4	-	-	-	0.04	0.059	-
NO_3	1.1	0.8	-	0.4	-	-
Metals						
Ca	64	44	39	-	49.3	50.8
K	330	4	3	-	4.4	4.40
Na	330	120	60	-	83.9	86.2
Mg	44	17	9.7	-	13.1	13.4
Al	-	-	-	-	-	20U
As	-	-	-	0	3U	3U
B	-	-	-	-	-	48I
Cd	-	-	-	0	0.5U	0.5U
Co	-	-	-	0	-	0.75U
Cr	-	-	-	0	2U	2U
Cu	-	-	-	0	3.5U	3.5U
Fe	150	60	-	0	35U	35U
Mn	-	-	-	10	1.3I	1.4I
Ni	-	-	-	-	2U	2U
Pb	-	-	-	0	3U	5U
Ra-226	-	-	-	-	-	0.5
Ra-228	-	-	-	-	-	0.9U
Se	-	-	-	-	4U	4U
Sn	-	-	-	-	-	10U
Sr	-	-	-	-	-	358.0
Zn	-	-	-	10	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Utilization – The spring is within DeLeon State Park which has full facilities.

Discharge – All discharge rates are measured in ft^3/s.

Average for 1929-1975	30.8 [1] (87 measurements)
Min (March 7, 1932)	20[1]
Max (April 23, 1946)	42[1]
Average for 1990	21.24[6] (6 measurements)
Average for 1995	22.98[6] (4 measurements)
Average for 2000	20.20[6] (5 measurements)
Mean 1929-2000	27.2[6] (244 measurements)

Table 191. DeLeon Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Volusia Blue Spring

Figure 157. Volusia Blue Spring (photo by T. Scott).

Location-Lat. 28° 56' 50.94" N., Long. 81° 20' 22.52" W. (NW ¼ NW ¼ NE ¼ sec. 8, T. 18 S., R. 30 E.). Volusia Blue Spring is 6 miles (9.7 km) southwest of Deland in Blue Spring State Park. From the junction of US 17/92 and SR 44 in Deland, travel 5.3 miles (8.5 km) south on US 17/92. Turn west (right) on CR 4142 (French Avenue) in Orange City and continue 2.5 miles (4.0 km) to Blue Spring State Park. Follow the park road to the spring parking area. The spring is at the head of Blue Spring Run about .25 miles (0.4 km) north of the parking area and is accessed by an elevated wooden boardwalk along the east bank of the spring run.

Description-Volusia Blue Spring has a circular spring pool in a conical depression with a notable boil in the center. The spring pool measures 135 ft (41.1 m) north to south and 105 ft (32 m) east to west. The depth of the spring measured over the vent is 20 ft (6.1 m). The bottom of the spring is limestone and sand. The vent is an elongated fissure in the limestone. The water is clear and blue with a greenish tinge. Algae are ubiquitous in the spring and its run. No other aquatic vegetation was observed during the October 2001 visit. The spring has steep sandy banks that rise to approximately 15 to 20 ft (4.6 to 6.1 m) above water level. The spring run also has steep sandy banks and flows south and west approximately 1,050 ft (320 m) to the St. Johns River through dense hardwood and palm forest. A limited underwater cave system has been mapped at Volusia Blue Spring.

Utilization-The spring and its surroundings are owned and managed by the State of Florida. Manatees frequent the spring run during the winter months. It is an excellent place for nature study, swimming, scuba diving, and canoeing. Camping and hiking also are permitted in the park. Full facilities are available.

Discharge- All discharge rates are measured in ft^3/s.

Average 1932 – 1974	162[1] (360 measurements)
Maximum (November 1, 1960)	214[1]
Minimum (November 6, 1935)	63[1]
November 24, 2001	87[7]

Table 192. Volusia Blue Spring water quality analysis.

Analytes	1946	1960	1972	2001	
				Unfilt.	Filter
Field Measures					
Temperature	23.0	23.0	23.0	23.1	-
DO	-	-	-	0.45	-
pH	7.6	7.5	7.8	7.21	-
Sp. Cond.	2840	1060	1800	1402	-
Lab Analytes					
BOD	-	-	0.3	0.34 I	-
Turbidity	-	-	-	2	-
Color	5	0	0	5U	-
Alkalinity	-	105	121	142	143
Sp. Cond.	-	-	-	1400	-
TDS	-	-	-	744 A	-
TSS	-	-	-	4U	-
Cl	780	245	440	340	340
SO_4	110	37	66	54	52
F	0.0	0.2	0.2	0.077 I	0.074 I
Nutrients					
TOC	-	-		1.7 I	-
NO3 + NO2	-	-	0.05	0.64	0.62
NH3 + NH4	-	-	-	0.027	0.04
TKN	-	-	-	0.14 I	0.2 I
P	-	-	0.07	0.067	0.064
PO_4	-	-	-	0.063	-

Analytes	1946	1960	1972	2001	
				Unfilt.	Filter
Metals					
Ca	76	52	59	63.5 J	63.2
K	13.0	5.5	7.4	6.8	6.9
Na	419	128	260	167	170
Mg	51	20	29	23	23.1
As	-	-	0	3 U	3 U
Al	-	-	-	-	75 U
B	-	-	-	76 I	-
Cd	-	-	2	0.75 U	0.75 U
Co	-	-	0	0.75 U	-
Cr	-	-	-	2U	2U
Cu	-	-	20	2.5 U	2.5 U
Fe	70	-	70	35 U	35 U
Mn	-	-	0	2.1	2
Ni	-	-	-	2U	2U
Pb	-	-	1	5 U	4 U
Se	-	-	-	4U	4U
Sn	-	-	-	10U	-
Sr	-	-	1100	827	-
Zn	-	-	20	5 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than the practical quantitation limit J=Estimated value Q=Exceeding holding time limit

Table 193. Volusia Blue Spring bacteriological analysis.

Bacteria Results (in #/100ml)	
Analyte	**Value**
Escherichia coli	1 KQ
Enterococci	1 KQ
Fecal Coliform	1 KQ
Total Coliform	1 KQ

WAKULLA COUNTY

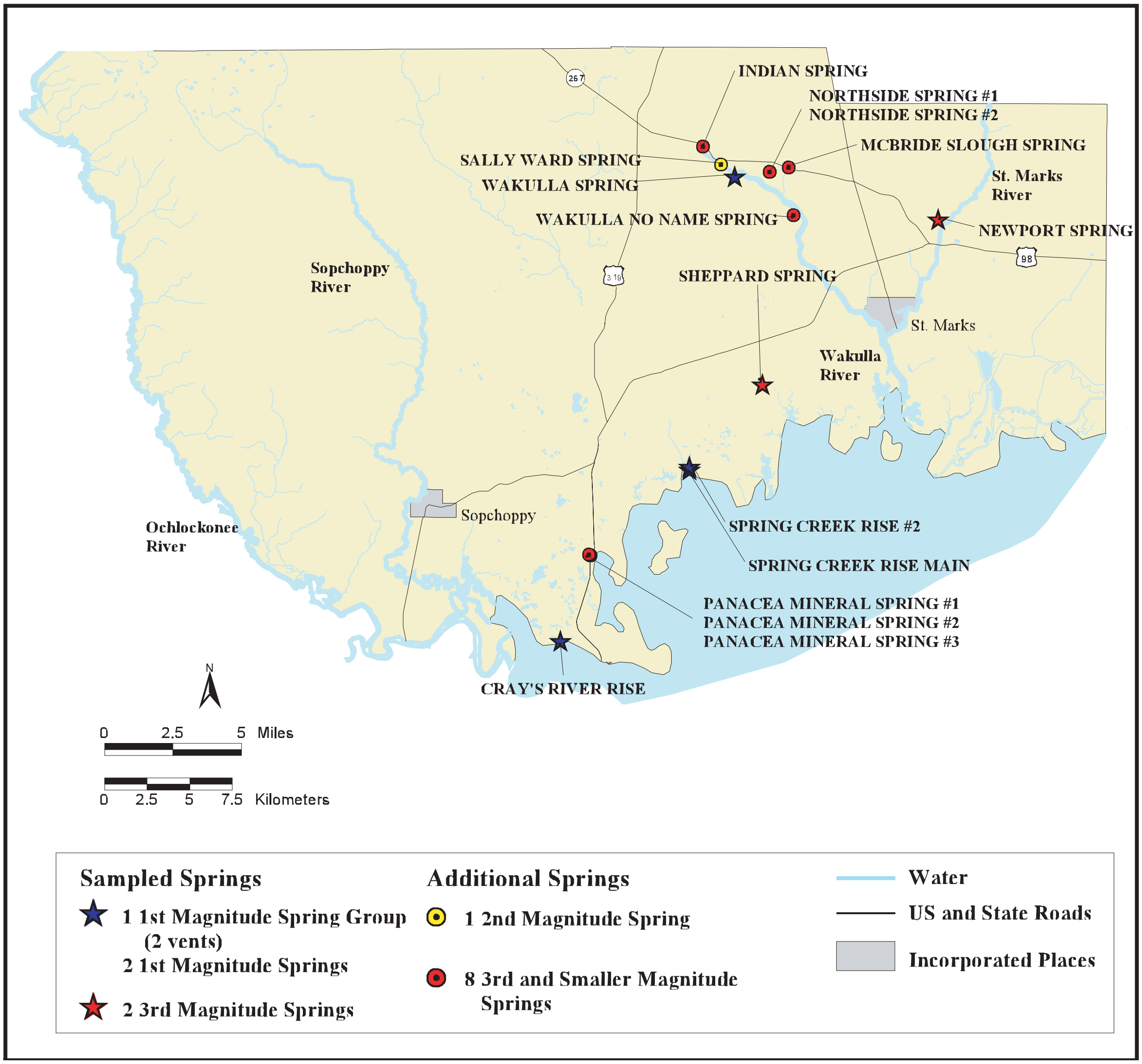

Figure 158. Springs visited by FGS in Wakulla County.

Cray's Rise

Figure 159. Cray's Rise (photo by R. Means).

Location – Lat. 29° 59' 22.20" N., Long. 84° 24' 28.80" W. (SW ¼ SE ¼ NW ¼ sec. 2, T. 6 S., R. 2 W.). Cray's Rise is located within the St. Mark's National Wildlife Refuge and flows into the north side of Ochlocknee Bay approximately 1 mile (1.6 km) downstream from the mouth of the Sopchoppy River. From the intersection of US 98 and CR 372 (Surf Road) drive west 1.7 miles (2.7 km) to a bridge over Cray's Rise run. There is a marina at the bridge. The spring vent is 1,950 feet (594.4 m) upstream from the bridge.

Description – Cray's Rise spring pool measures 225 ft (68.6 m) north to south and 333 ft (101.5 m) east to west. The spring measures 39.0 ft (11.9 m) deep over the center. The depression profile beneath the water surface is steep-sided and deep with some limestone exposed at the bottom. Cray's Rise was tea-colored in March 2002, and a prominent boil was visible on the surface in the center of the pool. A thin strip of black needle rush exists around the pool perimeter, indicating a low-energy, brackish environment. The spring run is comma-shaped and runs east, then south for a total distance of approximately 1,800 ft (548.6 m). Three days before the sampling visit, a regional 8 inch (20 cm) rain resulted in the flooding of the Ocklockonee and Sopchoppy Rivers. The sampling crew visited Cray's Rise twice during February 2002, but could not sample either time. During these prior visits, the spring had only a slightly noticeable boil and murkier water. The surroundings are low-lying pristine pine flatwoods of the St. Marks National Wildlife Refuge. It is suspected that Cray's Rise is the re-emergence of a subterranean portion of either the Ocklockonee or the Sopchoppy River.

Utilization – Cray's Rise is undeveloped and pristine.

Discharge – Discharge rates are measured in ft^3/s.

March 21, 1972	82.1(1)
March 5, 2002	164(2)

Table 194. Cray's Rise water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	21	20.17	
DO	-	0.56	
pH	7.5	6.95	
Sp. Cond.	-	17200	
Lab Analytes			
BOD	-	-	0.2AU
Turbidity	-	-	1.1
Color	65	-	60.0
Alkalinity	85	-	100.0
Sp. Cond.	11200	18000.0	-
TDS	6600	-	10500.0
TSS	-	-	8I
Cl	3600	-	5200.0
SO_4	520	-	790.0
F	0.5	-	0.26
Nutrients			
TOC	-	-	7.1
$NO_3 + NO_2$ as N	0.18	-	0.12
$NH_3 + NH_4$	-	-	0.12
TKN	-	0.47	0.46
P	-	0.086	0.074
PO_4	-	0.075	-
NO_3	-	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	120	167A	157
K	72	118A	116
Na	2000	3140A	3260
Mg	250	391A	391
Al	-	-	100I
As	-	3U	3U
B	-	-	1270
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe		230A	290
Mn	-	20.9A	21.2
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	3.4
Ra-228	-	-	11.6
Se	-	4U	4U
Sn	-	-	10U
Sr	-	-	2290
Zn	-	30U	30U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 195. Cray's Rise bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1K
Fecal Coliform	1K

Newport Spring

Figure 160. Newport Spring (photo by T. Scott).

Location – Lat. 30° 12’ 45.70” N., Long. 84° 10’ 42.56” W. (SE ¼ NE ¼ NE ¼ sec. 24, T. 3 S., R. 1 E.). Newport Spring is located approximately 17 miles (27 km) southeast of Tallahassee near the community of Newport. From the intersection of US 319 (Capital Circle Southeast) and SR 363 (Woodville Highway) in Tallahassee, head south on SR 363 (Woodville Highway) approximately 13.2 miles (21.2 km) to the intersection of US 98 and SR 363 (Woodville Hwy). Head east (left) on US 98 for approximately 2.2 miles (3.5 km) to Newport. From US 98 in Newport, just west of the St. Marks River Bridge, travel north (left) on Old Plank Road 0.9 miles (1.5 km). The spring is on the east (right) side of the road.

Description – Newport Spring emerges from a vent at the base of a concrete wall along the east side of Old Plank Road. The spring pool measures 50 ft (15.2 m) north to south and 100 ft (30.5 m) east to west (Rosenau et al., 1977). The spring is 6 ft (1.8 m) deep near the vent. The bottom is sand and detritus. Limestone is exposed near the vent. The spring water is yellow-greenish and has a sharp odor of hydrogen sulfide. The walls and pool substrates are thickly coated with algae and iron-reducing bacteria. There is a small boil on the spring surface just out from the wall on the west side of the spring, underneath a rope swing. An old abandoned house is situated to the south approximately 300 ft (91.4 m) from the spring. An old water extraction pipe leads into the spring from the house. The spring pool is under a live oak canopy. The spring run flows east approximately 0.5 miles (0.8 km) into the St. Marks River. Approximately 600 ft (182.9 m) downstream from Newport Spring, a small, clear water, limestone-bottomed spring-fed stream comes in on the north side. Newport Spring Run is swift flowing over a sand and limestone bottom with abundant native aquatic vegetation. The spring and run are within forested pine flatwoods and swampy lowlands on the west side of the St. Marks River.

Utilization – The spring is undeveloped and is a popular local swimming spot. Land around the spring is in private ownership.

Discharge - Discharge rates are measured in ft^3/s.

March 2, 1972	8.24(1)
February 20, 2003	8.35(2)

Table 196. Newport Spring water quality analysis.

Analytes	1972	2003	
		Dissolved	Total
Field Measures			
Temperature	19.0	16.58	
DO	-	2.02	
pH	7.8	7.26	
Sp. Cond.	-	434	
Lab Analytes			
BOD	-	-	0.64AI
Turbidity	-	-	1.6
Color	30	-	20.0
Alkalinity	170	-	184
Sp. Cond.	405	438.0	-
TDS	228	-	253.0
TSS	-	-	4U
Cl	6.0	-	10
SO_4	18	-	29
F	0.2	-	0.14
Nutrients			
TOC	-	-	5.5
$NO_3 + NO_2$ as N	1.8	-	0.005I
$NH_3 + NH_4$	-	-	0.027A
TKN	-	0.18I	0.22I
P	0.01	0.016I	0.019I
PO_4	-	0.014	-
NO_3	-	-	-

Analytes	1972	2003	
		Dissolved	Total
Metals			
Ca	64	74.9A	76.4A
K	0.4	0.41A	0.43A
Na	4.8	5A	5A
Mg	7.8	7.6A	7.7A
Al	-	-	29I
As	-	3U	3U
B	-	-	10U
Cd	-	0.5U	0.5U
Co	-	-	1U
Cr	-	2U	2U
Cu	-	3.5U	4U
Fe	-	14I	29A
Mn	-	4.44A	4.5A
Ni	-	2U	2U
Pb	-	5U	5U
Ra-226	-	-	1
Ra-228	-	-	0.9
Se	-	8U	8U
Sn	-	-	7.2I
Sr	-	-	124A
Zn	-	2.5U	4U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 197. Newport Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	50
Fecal Coliform	34

Sheppard Spring

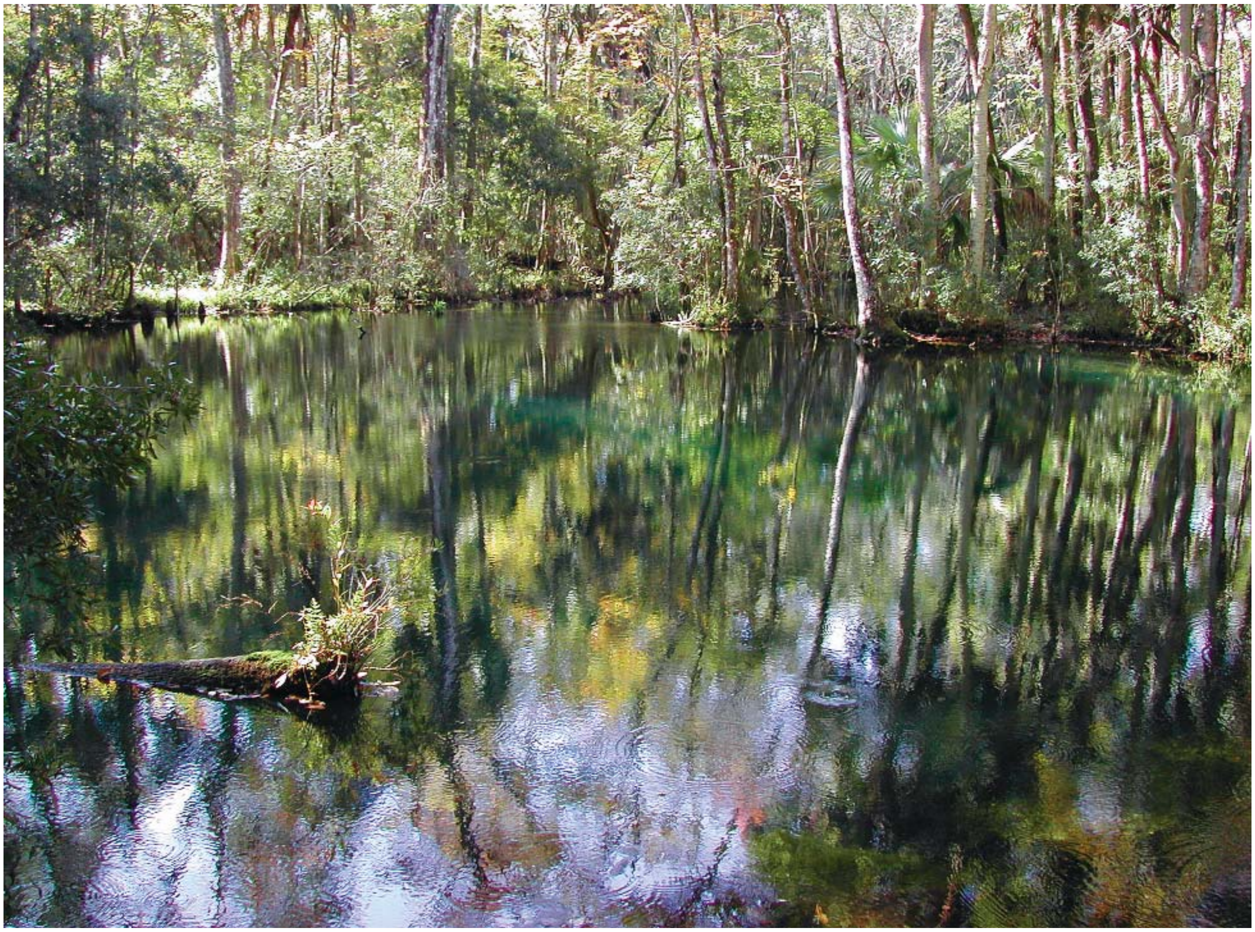

Figure 161. Sheppard Spring (photo by R. Means).

Location – Lat. 30° 07’ 31.08” N., Long. 84° 17’ 07.80” W. (NW ¼ NE ¼ NW ¼ sec. 99, T. 99 S., R. 30 E.). Sheppard Spring is located in the St. Marks National Wildlife Refuge approximately 22 miles (35 km) south of Tallahassee. From the intersection of Capital Circle (US 319) and SR 363 (Woodville Highway), travel south 13.2 miles (21.2 km) to US 98. Turn west (right) and drive 3.4 miles (5.5 km) to Wakulla Beach Road. Turn south (left) and drive approximately 1 mile (1.6 km) to the Florida Trail crossing. Park in the Florida Trail parking area. The spring can be accessed by canoeing/kayaking to the head of Sheppard Spring Creek from Wakulla Beach via Goose Creek Bay. The spring can also be reached by hiking to it on the Florida Trail (access point on Wakulla Beach Road). No roads lead to the spring, however, the Florida National Wild and Scenic Trail system has a spur route leading to the spring from the north. From the Florida Trail parking area along Wakulla Beach Road, walk west on the Florida Trail approximately 3 miles (4.8 km) to the spring.

Description – Sheppard Spring pool is slightly ovoid, measuring 90 ft (27.4 m) east to west and 105 ft (32 m) north to south. It is 25 ft (7.6 m) deep near the center, with steep, sand sides. Two vents have been recognized. The water is clear bluish-green. Long filamentous algae cover the majority of the soft sand bottom. The spring has an abundance of fallen logs and a detritus layer covering most of the bottom. No boil was observed on the spring surface during the November 2002 visit. Plants and trees completely surround the spring pool and its run. The spring run averages 2 to 3 ft (0.6 to 0.9 m) deep, 15 ft (4.6 m) wide, and meanders southward for over a mile (1.6 km). It empties into Goose Creek Bay, approximately 4 miles (6.4 km) west of the mouth of the St. Marks River. Sheppard Spring is a pristine, wild spring situated within the St. Marks National Wildlife Refuge. The surrounding Gulf Coastal lowlands are heavily forested with palm, hardwoods, and pine.

Utilization – The spring is undeveloped and remote, surrounded by National Wildlife Refuge land.

Discharge – November 25, 2002 7.65 ft^3/s(2)

Table 198. Sheppard Spring water quality analysis.

Analytes	2002	
	Dissolved	Total
Field Measures		
Temperature	20.44	
DO	1.60	
pH	7.56	
Sp. Cond.	1088	
Lab Analytes		
BOD	-	0.2AU
Turbidity	-	0.25A
Color	-	5U
Alkalinity	-	143.0
Sp. Cond.	1060.0	-
TDS	-	544.0
TSS	-	4U
Cl	-	230.0
SO_4	-	37.0
F	-	0.14
Nutrients		
TOC	-	1.1I
$NO_3 + NO_2$ as N	-	0.21
$NH_3 + NH_4$	-	0.02I
TKN	0.12I	0.12I
P	0.077	0.074
PO_4	0.074	-
NO_3	-	-

Analytes	2002	
	Dissolved	Total
Metals		
Ca	57A	57.4
K	4.5A	4.50
Na	126A	128.0
Mg	21.6A	21.4
Al	-	10U
As	8U	8U
B	-	57.0
Cd	0.5U	0.5U
Co	-	1U
Cr	2U	2U
Cu	6U	4U
Fe	18U	29.0
Mn	26.2A	26.7
Ni	1.2I	2U
Pb	5U	5U
Ra-226	-	0.8
Ra-228	-	0.8U
Se	11U	7U
Sn	-	4U
Sr	-	209.0
Zn	2.3I	6U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 199. Sheppard Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	17A
Fecal Coliform	1A

Spring Creek Springs Group

Figure 162. Spring Creek Springs Group (photo by J. Stevenson).

Group Location— Lat. 30° 04’ 50” N., Long. 84° 19’ 47” W. (Land Grant sections 114 and 115, Hartfield Survey). The Spring Creek Springs Group is surrounded by private land but can be accessed from Apalachee Bay via boat. Spring Creek is 7 miles (11.3 km) southeast of Crawfordville. From the intersection of US 319 and US 98 south of Crawfordville, cross US 98 to CR 375 and drive south then generally east approximately 3.8 miles (6.1 km) to the intersection with CR 365. Turn south (right) on CR 365 (Spring Creek Road) and go 1.5 miles (2.4 km) to a privately owned boat ramp at end of the road. Spring Creek #1 & #2 are north of the boat ramp.

Group Description- Spring Creek is in a tidal marsh typical of the northeastern Gulf of Mexico. The coast has extensive hardwood hammock and grass-covered sand areas underlain by limestone that is near and occasionally at the surface. There are 14 known springs in the Spring Creek Springs Group (Rosenau et al., 1977). Most, including Spring Creek No. 1 and Spring Creek No. 2, discharge into the widened mouth of Spring Creek as it reaches the Gulf of Mexico. All are tidally influenced. The small fishing community of Spring Creek is situated on the highest available ground on the east side of Spring Creek mouth adjacent to many of the springs. The FGS believes that there is a cave system developed in the Spring Creek Springs Group although it has not been explored. Divers have reported that the flow at some of these springs reverses at high tide. See Lane (2001) for more information on these springs.

Table 200. Spring Creek Springs Group water quality analysis.

Analytes	1972	1973	No. 1 2001 Unfilt.	No. 1 2001 Filter	No. 2 2001 Unfilt.	No. 2 2001 Filter
Field Measures						
Temperature	19.5	22.0	21.7	-	21.6	-
DO	-	-	1.45	-	1.45	-
pH	8.0	7.0	7.07	-	7.23	-
Sp. Cond.	4300	4390	E	-	E	-
Lab Analytes						
BOD	-	-	0.2 AU	-	0.2 U	-
Turbidity	-	2	1	-	0.65	-
Color	60	200	5	-	5	-
Alkalinity	110	67	126	126	125	125
Sp. Cond.	-	-	16000	-	10000 A	-
TDS	-	-	9340 A	-	5650	-
TSS	-	-	10 I	-	5 I	-
Cl	1200	1200	5300	5300	3200	3100
SO_4	200	360	730	730	450	440
F	0.4	0.3	0.32	0.33	0.27	0.26
Nutrients						
TOC	-	13	3.3 I	-	3.7 I	-
NO3 + NO2	0.18	0.06	0.2	0.21 J	0.22	0.22 J
NH3 + NH4	-	-	0.086	0.082 A	0.017 I	0.17
TKN	-	-	0.36	0.32 J	0.27	0.45 J
P	-	0.04	0.044	0.035	0.035	0.03
PO_4	-	0.03	0.035	-	0.03	-
Metals						
Ca	80	55	141	142 A	102	99.8
K	26	40	106	97.6	69.1	59.5
Na	710	730	2770	2660	1880	1660
Mg	92	89	351	331	225	204
Al	-	-	-	75U	-	100I
As	-	6	3U	3U	3U	3U
B	-	220	1270	-	829	-
Cd	-	1	0.75 U	0.75 U	0.75 U	0.75 U
Co	-	-	0.75 U	-	0.75 U	-
Cr	-	0	2 U	0.5 U	2 U	0.5 U
Cu	-	10	3.5 I	2.5 U	2.5 U	2.5 U
Fe	-	300	110 I	35 U	150	35 U
Mn	-	40	11.9	9.5	12.6	3.6
Ni	-	-	2 U	2 U	2 U	2 U
Pb	-	4	5 U	4 U	5 U	4 U
Se	-	-	4 U	4 U	4 U	4 U
Sn	-	-	10 U	-	10 U	-
Sr	-	800	2110	-	1360	-
Zn	-	10	25 U	14 U	25 U	5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=exceeding holding time limit
E=instrument error

SPRING CREEK NO. 1 (MAIN) - Lat. 30° 04' 48.64" N., Long. 84° 19' 47.31" W. Spring Creek No. 1 has a voluminous boil that discharges from a 30 ft (9.1 m) wide cavern in limestone against a seawall northwest of the old Spear's Seafood Warehouse and adjacent to the dock of the ice house. The spring pool measures 153 ft (46.6 m) north to south and 150 ft (45.7 m) east to west. The depth measured over the vent is 43 ft (13.1 m). Water had slight cloudiness and was somewhat tannic during the October 2001 visit. Algae and a thin layer of silt cover the limestone substrate. Bottom of pool and short spring run are sand and limestone. At low tide, the boil is tremendous, and the current leading into the estuary is swift. At high tide, a boil is often not present. There is a conspicuous drainage pipe discharging directly into the spring pool on the northeast side. High ground to northeast harbors Spring Creek community.

SPRING CREEK NO. 2— Lat. 30° 04' 54.43" N., Long. 84° 19' 47.63" W. Spring Creek No. 2 is located approximately halfway up a 1,000 ft (304 m) long channel that empties into the east side of Spring Creek north of Rise No. 1. It also has a voluminous boil. Its pool measures 150 ft (45.7 m) north to south and 120 ft (36.6 m) east to west. The depth over the vertical opening in limestone from which water boils measures 75 ft (22.9 m) deep. Its discharge flows southwest into Spring Creek. Current is greatest at low tide. The water had slight cloudiness and was somewhat tannic during the October 2001 visit. The spring run has a sand and clay-scoured bottom with abundant limestone boulders. Other spring runs enter into the spring pool from the northeast and east. The surrounding land is brackish marsh and coastal hardwood-palm hammock. Spring Creek community borders the south side of pool.

Utilization-Spring Creek and its springs are regularly used fishing sites. Land near the springs is part of the St. Marks National Wildlife Refuge, except for private lands associated with the village of Spring Creek.

Discharge -

May 30, 1974	2000 ft^3/s [1]
Nov. 1, 1996	307 ft^3/s (from Davis, 1996)

Table 201. Spring Creek Springs Group bacteriological analysis.

Bacteria Results (in #/100ml)		
Analyte	**No. 1**	**No. 2**
Escherichia coli	1 KQ	1AQ
Enterococci	1 KQ	1AQ
Fecal Coliform	1 KQ	1AQ
Total Coliform	10Q	10AQ

Wakulla Spring

Figure 163. Wakulla Spring (photo by T. Scott).

Location-Lat. 30° 14' 06.64" N., Long. 84° 18' 09.21" W. (SW ¼ NW ¼ SE ¼ sec. 11, T. 3 S., R. 1 W.). Wakulla Spring is located in Wakulla Springs State Park about 20 miles (32.2 km) south of Tallahassee. From the US 319 (Thomasville Road) exit on I-10 take Capital Circle (US 319) south 12.9 miles (20.8 km). Turn south (right) on US 319/SR 61 (Crawfordville Highway) and travel 1.9 miles (3.1 km). Bear left on SR 61 (Wakulla Springs Road) and go 7.6 miles (12.1 km) to SR 267. Turn east (left) and park entrance is 0.1 miles (0.2 km) on the south side of the road. The spring vent is located below the diving platform, northeast of the parking area.

Description-Wakulla Spring is one of the largest and most dramatic of Florida's springs. The spring pool is roughly circular with a diameter of 315 ft (96 m) north to south. The maximum pool depth is 185 ft (56.4 m). The vent opening is a horizontal ellipse along the south side of the pool bottom and is estimated to measure 50 ft by 82 ft (15.2 m by 25 m). Along with a few smaller springs nearby, including Sally Ward Spring, Wakulla Spring gives rise to the clear Wakulla River. Water clarity of the spring in October 2001 was exceptional and the water was light blue. It should be noted that the water clarity of the spring varies dramatically in response to rainfall. Surface water entering the sinkholes that connect to the Wakulla Spring system greatly reduces the clarity. Exotic aquatic vegetation once covered much of the spring pool and adjacent river bottom, but divers have recently removed large amounts and herbicides have been used in efforts to control it. The Wakulla River remains choked with exotic invasive plants. Many other aquatic and emergent plant species also are present in the spring pool and river. A mixed hardwood, cabbage palm, and cypress forest inhabits lowlands along the north and east shores of the spring and along the river. Uplands along the western shore of the spring are developed into a state park lodge and facilities. Also, there are hardwoods and large loblolly pines scattered about. A major underwater cave system has been mapped at Wakulla Springs.

Utilization — Wakulla Spring is developed into a recreational and wildlife viewing area. The park has a lodge and restaurant. There are regular glass-bottomed riverboat and spring tours, and swimming is allowed in the southeast quadrant of the spring pool. The upper 3 miles (4.8 km) of the Wakulla River is state-owned and is a protected wildlife sanctuary.

Table 202. Wakulla Spring water quality analysis.

Analytes	1924	1946	1972	2001	
				Unfilt.	Filter
Field Measures					
Temperature	-	22.8	20.5	21.2	-
DO	-	-	3.2	2.39	-
pH	-	7.9	7.3	7.2	-
Sp. Cond.	-	277	279	328	-
Lab Analytes					
BOD	-	-	0.4	0.2 AU	-
Turbidity	-	-	1	0.05 U	-
Color	-	0	0	5U	-
Alkalinity	-	-	130	146	148
Sp. Cond.	-	-	-	360	-
TDS	-	-	-	183	-
TSS	-	-	-	4U	-
Cl	8	5.1	3.4	7.8	7.8 A
SO_4	11	9.3	17	9.4	9.5 A
F	-	0.1	0.3	0.13	0.12
Nutrients					
TOC	-	-	0	1U	-
NO3 + NO2	-	-	0.25	0.99 J	0.96
NH3 + NH4	-	-	-	0.01 U	0.01 U
TKN	-	-	-	0.06 U	0.06 U
P	-	-	0.04	0.032	0.03 A
PO_4	-	-	0.03	0.03	-

Analytes	1924	1946	1972	2001	
				Unfilt.	Filter
Metals					
Ca	39	38	39	44.5 A	45.1
K	-	0.5	0.3	0.58 A	0.61
Na	5.7	4.0	3.7	4.99 A	5.01
Mg	9.6	9.5	8.7	10.4 A	10.6
As	-	-	0	3 U	3 U
Al	-	-	-	-	75 U
B	-	-	-	30 U	-
Cd	-	-	0	0.75 U	0.5 U
Co	-	-	0	0.75 U	-
Cr	-	-	0	2 U	2 U
Cu	-	-	0	2 U	2 U
Fe	-	-	10	25 U	20 U
Mn	-	-	10	0.5 U	0.5 U
Ni	-	-	-	2 U	2 U
Pb	-	-	3	5 U	3 U
Se	-	-	-	3.5 U	3.5 U
Sn	-	-	-	7U	-
Sr	-	-	110	83.8 A	-
Zn	-	-	20	4 U	3.5 U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value shown is less than the practical quantitation limit J=Estimated value Q=exceeding holding time limit

Discharge- Wakulla Spring has the greatest known range in discharge among Florida's springs (Rosenau et al., 1977). All discharge rates are measured in ft^3/s.

Average 1907 – 1974	390[1]
Maximum (April 11, 1973)	1910[1]
Minimum (June 18, 1931)	25.2[1]
September 27, 2001	128.9[3]

Table 203.- Wakulla Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Escherichia coli	1 KQ
Enterococci	1 KQ
Fecal Coliform	1 KQ
Total Coliform	1 KQ

WALTON COUNTY

Figure 164. Spring visited by FGS in Walton County.

Morrison Spring

Figure 165. Morrison Spring (photo by R. Means).

Location – Lat. 30° 39' 28.38" N., Long. 85° 54' 14.18" W. (SE ¼ NE ¼ NE ¼ sec. 23, T. 3 N., R. 17 W.). Morrison Spring is approximately 4.9 miles (7.9 km) southeast of Ponce de Leon. From I-10 just south of Ponce de Leon, travel 3.7 miles (6 km) south on SR 81. Turn east (left) on SR 181 and travel 1.7 miles (2.7 km). Turn south (right) on SR 181 A. Travel 0.5 miles then turn east (left) into the park.

Description – Morrison Spring occupies a large, bowl-shaped depression and forms a circular spring pool with a diameter of 300 ft (91.4 m). The vent is near the center of the pool at a depth of 46 ft (14 m). The bottom is sand except near the vent where limestone is exposed. The water is light blue and slightly turbid with a prominent boil on the pool surface. However, cave divers report that the water is crystal clear in the cavern and cave system. There is abundant aquatic vegetation and very little algae. The spring run is 150 ft (45.7 m) wide and slow-moving. It flows approximately 0.7 miles (1.1 km) southeastward into the murky Choctawhatchee River. When the river is in flood stage, river water reportedly backs up into the spring pool. On the south side of the spring run, approximately 300 ft (91.4 m) downstream from the pool, high ground meets the run's shore and rises steeply to 15 ft (4.6 m) above the water. The spring and its run are within the western lowland floodplain of the Choctawhatchee River, in a dense gum and cypress forest. A house and picnic pavilion are east of the spring pool, and a cleared swath leads from the pavilion down to the water's edge. Rosenau et al. (1977) report that there are 3 cavities at the bottom of the spring pool. One of those cavities reaches an eventual depth of 300 ft (91.4 m).

Utilization – The spring is a private park operated primarily for swimming and scuba diving.

Discharge **-** All discharge rates are measured in ft^3/s.

May 27, 1942	121[1] (Measured under poor conditions)
December 9, 1946	89[1]
November 5, 1963	54.9[1]
April 19, 1972	62.2[1]
September 6, 2002	62.85[2]

Table 204. Morrison Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	21	19.90	
DO	3.5	3.00	
pH	7.8	7.51	
Sp. Cond.	-	212	
Lab Analytes			
BOD	0.2	-	0.2AU
Turbidity	1	-	0.05U
Color	0	-	5U
Alkalinity	110	-	114.0
Sp. Cond.	240	200.0	-
TDS	119	-	115.0
TSS	-	-	4U
Cl	2.5	-	2.5
SO_4	2.4	-	3.3
F	0.1	-	0.07I
Nutrients			
TOC	0	-	1U
$NO_3 + NO_2$ as N	0.13	-	0.15
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.025	0.026
PO_4	0.02	0.029Q	-
NO_3	0.13	-	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	30	30.2A	30.8
K	0.4	0.57	0.55
Na	1.8	2.1I	1.7I
Mg	7.4	7.7A	8.1
Al	-	-	75U
As	0	3U	3U
B	60	-	15U
Cd	-	0.5U	0.5U
Co	0	-	0.75U
Cr	0	2U	2U
Cu	10	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	5	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	1.0
Se	-	4U	4U
Sn	-	-	10U
Sr	70	-	57.9
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 205. Morrison Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

WASHINGTON COUNTY

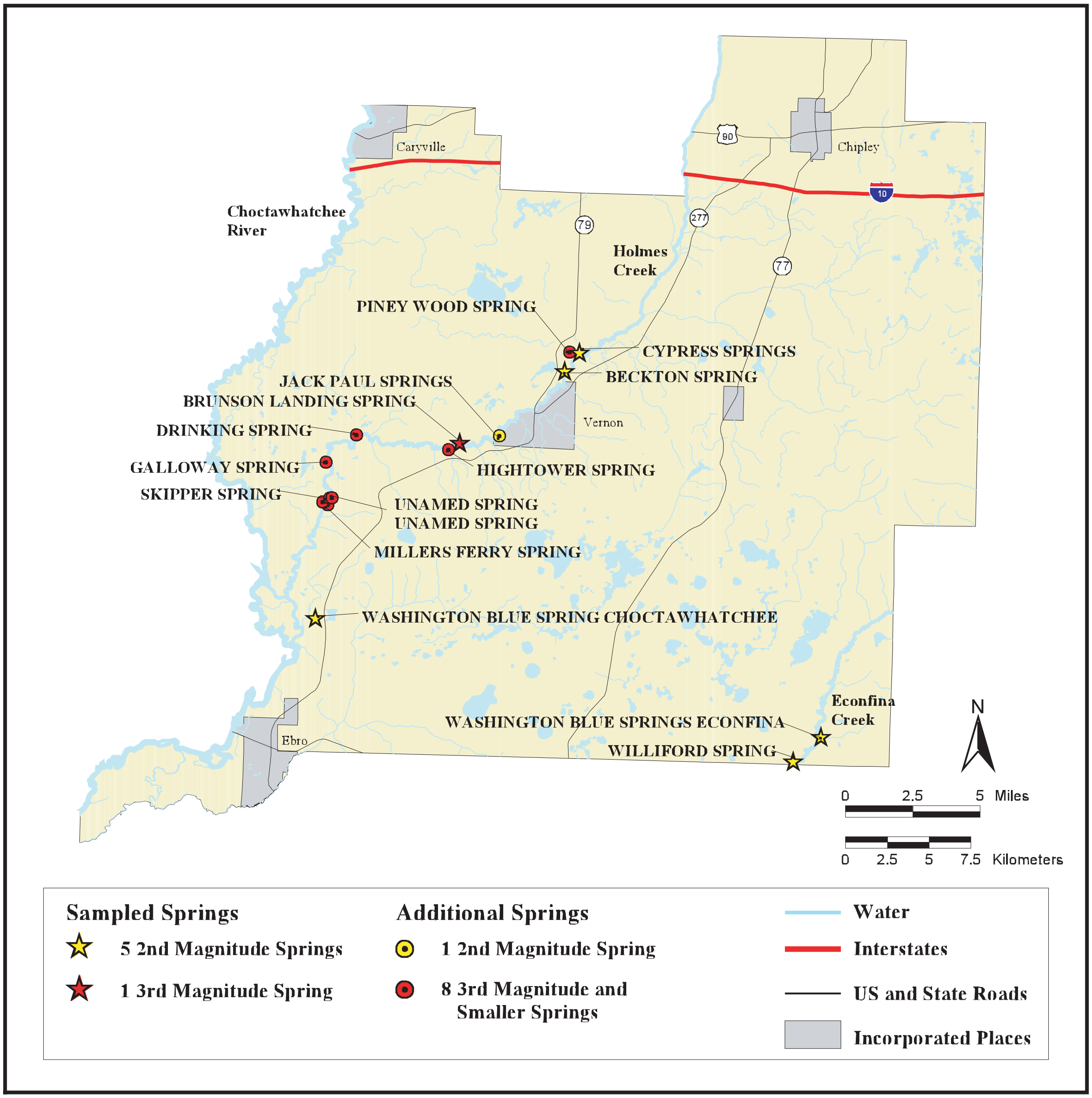

Figure 166. Springs visited by FGS in Washington County.

Beckton Spring

Figure 167. Beckton Spring (photo by H. Means).

Location – Lat. 30° 38’ 55.13” N., Long. 85° 41’ 37.19” W. (NW ¼ NW ¼ SE ¼ sec. 24, T. 3 N., R. 15 W.). Beckton Spring is located approximately 2 miles (3.2 km) northeast of Vernon. From the intersection of SR 79 and SR 277 in Vernon turn east then northeast on SR 277. Drive 2.2 miles (3.5 km) to Culpepper Lane. Turn northwest (left) on Culpepper Lane and go 0.3 miles (0.5 km) to Big Pine Lane. Turn northwest (left) and go 0.2 miles (0.3 km) to the boat landing. The spring run flows 825 ft (251 m) into Holmes Creek from the northwest, 0.4 miles (0.6 km) downstream from the Big Pine Lane boat ramp. The spring is approximately 0.1 miles (0.2 km) up the spring run. Beckton Spring is surrounded by private property.

Description – Beckton Spring has a nearly circular spring pool measuring 180 ft (54.9 m) north to south and 159 ft (48.5 m) east to west. It occupies a bowl shaped depression, and the vent is located in the center of the pool where the depth used to be 20.0 ft (6.1 m). The spring has been deepened to approximately 36 feet (11 m). The bottom is sand with some limestone exposed at the vent. The boil in the center is small, but noticeable. A side channel of Holmes Creek enters the east side of the pool. Holmes Creek is typically darker and more turbid, and the two waters mix into a swirl of clear spring water and cloudy creek water within the spring pool. There is little aquatic vegetation in the spring pool, but grasses and plants are scattered throughout the spring run. There is an old boat ramp on the northwest side of the spring pool. Beckton Spring discharges through a spring run that is clear and shallow, averaging about 2 ft (0.6 m) deep. The run flows south approximately 900 ft (274.3 m) into Holmes Creek. High ground borders the spring and its run along the west side. It rises steeply to 12-15 ft (3.7-4.6 m) above the spring eventually leveling to approximately 20 ft (6.1 m). There is a private residence and yard on the hill. The lowland floodplain of Holmes Creek is along the east side of the spring and its run. It is densely forested with cypress and tupelo.

Utilization – Beckton Spring is surrounded by private land. It is used locally for swimming.

Table 206. Beckton Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	21.5	19.31	
DO	2.5	4.88	
pH	8	7.80	
Sp. Cond.	-	237.0	
Lab Analytes			
BOD	-	-	1.9
Turbidity	-	-	0.65
Color	5	-	5U
Alkalinity	110	-	108.0
Sp. Cond.	275	260.00	-
TDS	192	-	125.0
TSS	-	-	4U
Cl	21	-	11.0
SO_4	-	-	1.5
F	-	-	0.056
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.18	-	0.29
$NH_3 + NH_4$	-	-	0.023
TKN	-	0.06U	.06U
P	-	0.023A	0.024A
PO_4	-	0.024	-

Analytes	1972	2002	
		Dissolved	Total
Metals			
Ca	35	33.2	32.9
K	0.7	0.51	0.52A
Na	10	6.8	6.9A
Mg	6.1	5.2	4.9A
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	36I
Mn	-	2.8	4.5A
Ni	-	2U	2U
Pb	-	3U	2U
Ra226	-	-	0.2
Ra228	-	-	1U
Se	-	0.5U	4U
Sn	-	-	10U
Sr	190	-	81.2A
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s.

May 26, 1942	49.5[1]
June 6, 1972	33.2[1]
October 21, 1987	23.4[3]
October 20, 2000	25.7[3]
October 25, 2001	30.6[3]
June 10, 2002	26.19[2]
May 15, 2003	22.1[3]

Table 207. Beckton Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	14Q
Fecal Coliform	60Q

Brunson Landing Spring

Figure 168. Brunson Landing Spring (photo by R. Means).

Location – Lat. 30° 36' 33.22" N., Long. 85° 45' 30.89" W. (SW ¼ SE ¼ NE ¼ sec. 5, T. 2 N., R. 15 W.). Brunson Landing Spring flows into the north Holmes Creek from the north 3 miles (4.8 km) southwest of Vernon. From the intersection with SR 277 in Vernon, travel 0.4 miles (0.6 km) north on SR 79. Turn west (left) on CR 278 across from the Holmes Creek boat ramp and travel for 3.1 miles (5.0 km). Turn south (left) on Dorch Circle and veer left after 0.1 miles (0.16 km) onto Brunson Landing Road. Follow this road to the boat ramp. The main spring is located 500 ft (152 m) west of the parking area down a small footpath through the woods.

Description – Brunson Landing Springs are a group of three springs (Spring Fever website). Two of the springs are seeps and are very shallow, approximately three to six inches (7.6 to 15.2 cm) deep. The main spring pool is circular with a diameter of approximately 30 ft (9.1 m). The spring occupies a steep-walled, bowl-shaped depression that is 15 ft (4.6 m) deep over the vent. The spring bottom is mostly soft sand with limestone and some organic debris. Spring water is bluish and clear. Two small runs exit the spring pool and flow generally southward approximately 350 ft (106.7 m) into Holmes Creek. There is an abundance of algae in the slow-flowing spring and run. The main spring run averages less than 1 ft (0.3 m) deep and 3 ft (0.9 m) wide. Numerous other small seeps feed into the spring runs. This spring is situated within the heavily forested floodplain of Holmes Creek.

Utilization – Brunson Landing spring is undeveloped and used locally for swimming. There is a platform in a tree over the spring on the south side.

Discharge **-** All discharge rates are measured in ft^3/s

May 21, 2003	5.86(3) combined flow from 3 vents
June 5, 2003	5.55(2) main spring vent only

Table 208. Brunson Landing Spring water quality analysis.

Analytes	2003	
	Dissolved	Total
Field Measures		
Temperature	20.86	
DO	1.25	
pH	7.73	
Sp. Cond.	222	
Lab Analytes		
BOD	-	0.23I
Turbidity	-	0.1
Color	-	5U
Alkalinity	-	107
Sp. Cond.	215.0	-
TDS	-	120.0
TSS	-	4U
Cl	-	3.2A
SO_4	-	2.2A
F	-	0.059I
Nutrients		
TOC	-	1U
$NO_3 + NO_2$ as N	-	0.22
$NH_3 + NH_4$	-	0.01U
TKN	0.06U	0.06U
P	0.027I	0.029I
PO_4	0.024	-
NO_3	-	-

Analytes	2003	
	Dissolved	Total
Metals		
Ca	35.1A	34.1A
K	0.39A	0.39A
Na	2.07A	2.11A
Mg	5.5A	5.6A
Al	-	10U
As	5U	7U
B	-	10U
Cd	0.5U	0.5U
Co	-	2U
Cr	2U	2U
Cu	3U	3U
Fe	10U	28I
Mn	1.1I	1.7I
Ni	1.5U	2U
Pb	12U	12U
Ra-226	-	0.4
Ra-228	-	1U
Se	15U	15U
Sn	-	5U
Sr	-	57A
Zn	2U	3U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Table 209. Brunson Landing Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1K
Fecal Coliform	1K

Cypress Spring

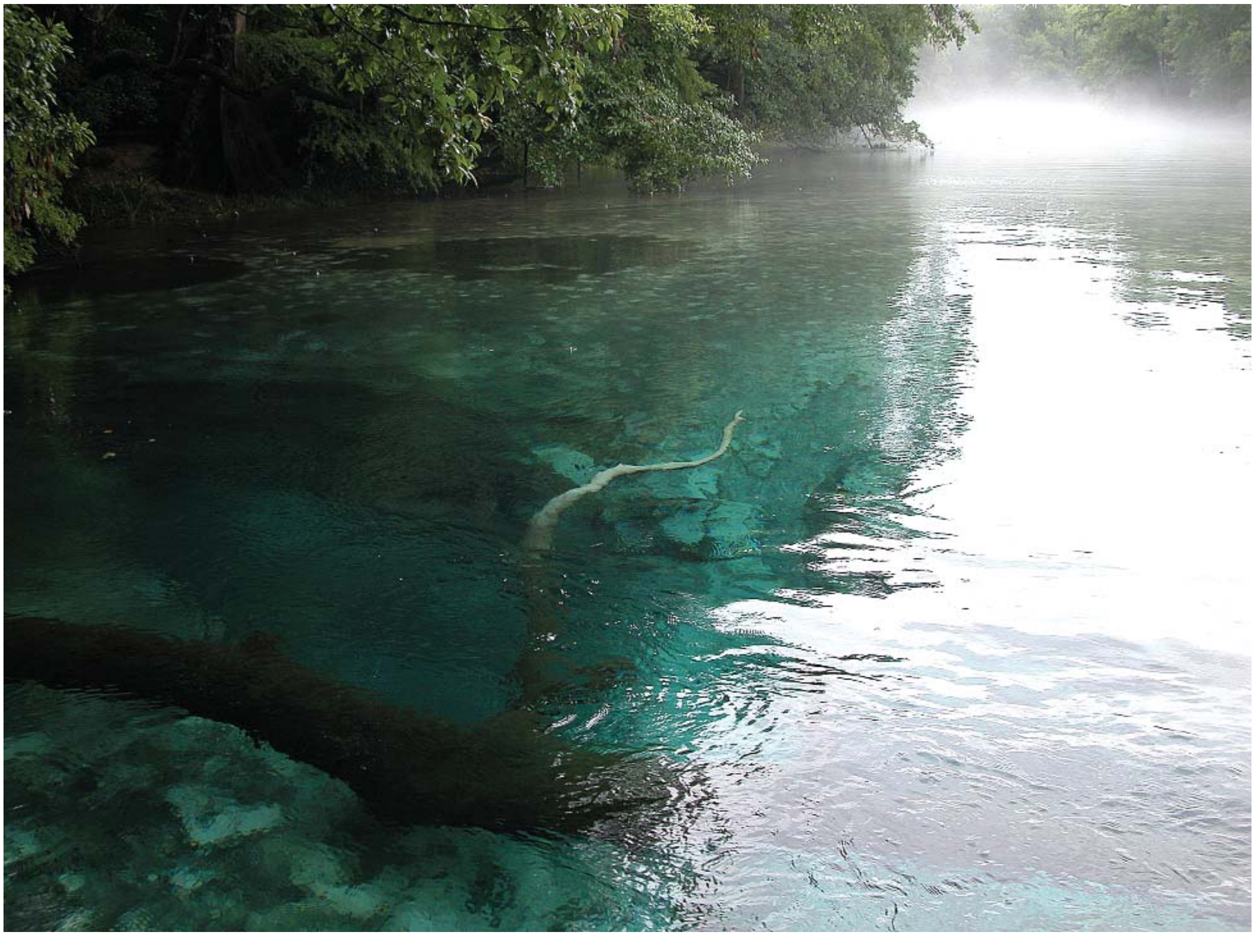

Figure 169. Cypress Spring (photo by T. Scott).

Location – Lat. 30° 39' 31.49" N., Long. 85° 41' 03.74" W. (SW ¼ SW ¼ SW ¼ sec. 18, T. 3 N., R. 14 W.). Cypress Spring is surrounded by private property approximately 3.5 miles (5.6 km) northeast of Vernon. From the intersection of SR 79 and SR 277 in Vernon turn east then northeast on SR 277. Drive 2.2 miles (3.5 km) to Culpepper Lane. Turn northwest (left) on Culpepper Lane and go 0.3 miles (0.5 km) to Big Pine Lane. Turn northwest (left) and go 0.2 miles (0.3 km) to the boat landing. The spring can be accessed by boat. From the Big Pine Lane boat ramp, Cypress Spring run enters Holmes Creek from the northwest approximately 0.5 miles (0.8 km) upstream.

Description – The Cypress Spring pool is roughly circular, measuring 114 ft (34.7 m) north to south and 132 ft (40.2 m) east to west. The main vent is near the center of the pool with a depth of 26 ft (7.9 m). At least one other vent is present just 30 ft (9.1 m) downstream. The spring occupies a conical depression, and limestone is exposed over much of the bottom with areas of sand. The water is clear and has a light blue color and a large boil is directly over the vent. There are a few small patches of native aquatic grasses and small amounts of algae. The spring run flows south approximately 1,400 ft (426.7 m) into Holmes Creek. The run is swift-flowing and shallow, averaging approximately 2 ft (0.6 m) deep, and it often is wider than the spring pool. A semicircular berm was constructed around the northern half of Cypress Springs in order to divert the flow of Piney Woods Spring Run downstream of

Cypress Springs' pool for aesthetic purposes. Before the berm existed, Piney Woods Spring Run entered the northwest side of the spring pool. Now, it enters approximately 30 ft (9.1) below on the west side through a culvert. There are wooden entry platforms for divers and swimmers on the northwest side of the pool. The nearest high ground is 450 ft (137.2 m) to the west and it rises steeply to approximately 25 ft (7.6 m) above the lowlands. A privately-owned swimming and diving recreation area including a residence are to the west. Cypress Springs is located within the lowland floodplain of Holmes Creek. The surroundings are heavily forested with cypress and tupelo. Cave divers report that the cave system reaches depths of at least 65 ft (19.8 m).

Utilization **-** Previously a private diving/swimming concession, the spring is reportedly in the process of changing ownership in 2004.

Table 210. Cypress Spring water quality analysis.

Analytes	1972	2002	
		Dissolved	Total
Field Measures			
Temperature	20.5	19.85	
DO	4.8	4.65	
pH	7.2	7.77	
Sp. Cond.	-	206	
Lab Analytes			
BOD	-	-	1.3
Turbidity	-	-	0.05U
Color	15	-	5U
Alkalinity	94	-	106A
Sp. Cond.	195	230.0	-
TDS	113	-	113
TSS	-	-	4U
Cl	4	-	3.1
SO_4	0.6	-	1.3
F	0.1	-	0.055I
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	0.15	-	0.36
$NH_3 + NH_4$	-	-	0.012I
TKN	-	0.06U	0.06U
P	-	0.026	0.023
PO_4	-	0.025	-
NO_3	-	-	-
Metals			
Ca	30	33.2	30.8
K	0.4	0.34	0.4
Na	4	2.3I	3.8I
Mg	4.3	4.5	4.5
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	-	35U	35U
Mn	-	0.5U	0.5U
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.2
Ra-228	-	-	1.9
Se	-	0.5U	4U
Sn	-	-	10U
Sr	60	-	37.3
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s.

May 26, 1942	85(1)
June 6, 1972	70(1)
June 28, 1987	102(3)
May 24, 1994	79(3)
October 20, 2000	83(3)
October 25, 2001	88(3)
December 9, 2002	104(3)
June 5, 2002	93.26(3)
May 15, 2003	101(3)

Table 211. Cypress Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Washington Blue Spring Choctawhatchee

Figure 170. Washington Blue Spring Choctawhatchee (photo by R. Means).

Location – Lat. 30° 30' 47.73" N., Long. 85° 50' 49.87" W. (NW ¼ NW ¼ NE ¼ sec. 9, T. 1 N., R. 16 W.). Washington Blue Spring Choctawhatchee is surrounded by private land, 5.5 miles (9 km) northwest of Ebro. The spring run enters the Choctawhatchee River from the east side. The spring is accessible by boat. From the intersection of I-10 and SR 79 travel south 17.5 miles (28.2 km) to New Hope. At the intersection of SR 79 and CR 284 in New Hope, drive west (right) on CR 284 for 3.8 miles (6.1 km) and turn south (left) onto CR 284A. Travel 3.6 miles (5.8 km) ending at a boat ramp on Holmes Creek. From the boat landing head downriver approximately 3.5 miles (5.6 km) to the confluence with the Choctawhatchee River. The spring is 0.9 miles (1.4 km) upstream of the confluence.

Description – The Washington Blue Spring Choctawhatchee spring pool is nearly circular and measures 111 ft (33.8 m) in diameter from north to south. The vent is near the center of the pool and discharges from a fissure beneath a limestone ledge. The ledge has prominent bedding planes, and the limestone is soft and chalky. The depth measured near the vent is 22 ft (6.7 m). The water is clear and bluish and there is a large boil on the pool surface. Aquatic plants occur within the spring pool. High ground borders the south side of the pool and rises steeply to approximately 20 ft (6.1 m) above the water surface, forming a bluff face with limestone and clay cropping out. A mixed pine and hardwood forest covers the high ground. This region has changed considerably since the USGS topographic maps were updated. The spring run used to flow into lower Holmes Creek in the 1970's. The Choctawhatchee River has since migrated eastward and captured Boynton Cutoff and lower

Holmes Creek. Holmes Creek's confluence with the Choctawhatchee River is presently farther upstream than the 1982 7 1/2 minute topographic maps depict. The wide spring run flows a total distance of 0.9 miles (1.4 km) southwestward entering the Choctawhatchee River from the east approximately 1.8 miles (2.9 km) downstream from the mouth of Holmes Creek. Deadhead logs, old docks and vessel remains from turn-of-the 19th century logging industry are abundant in and along spring run. Exotic aquatic vegetation is present in the spring run. Apple snails also are common. There may be additional springs along the spring run approximately 500 ft (152.4 m) downstream where the run widens and there are deep circular pools along the run; however, there was no visible flow from these pools in August 2002. The authors also heard reports of a spring approximately 0.25 miles (0.4 km) north of the spring run within Mill Lake. Flow from Mill Lake enters the spring run from the north 0.4 miles (0.6 km) downstream from Washington Blue Spring Choctawhatchee. The spring and its run are within the lowland floodplain of the Choctawhatchee River. This floodplain supports a mature cypress and tupelo forest.

***Utilization* -** The spring is undeveloped and surrounded by private land. It is used locally for swimming.

Table 212. Washington Blue Spring Choctawhatchee water quality analysis.

Analytes	1975	2002	
		Dissolved	Total
Field Measures			
Temperature	21	21.04	
DO	1.4	0.71	
pH	7.9	7.79	
Sp. Cond.	-	132	
Lab Analytes			
BOD	-	-	0.2U
Turbidity	-	-	0.05U
Color	5	-	5U
Alkalinity	60	-	68A
Sp. Cond.	125	130.0	-
TDS	94	-	71
TSS	-	-	4U
Cl	2.4	-	2.1
SO_4	0.4	-	1.5
F	0.1	-	0.05U
Nutrients			
TOC	-	-	1U
$NO_3 + NO_2$ as N	-	-	0.054
$NH_3 + NH_4$	-	-	0.01U
TKN	-	0.06U	0.06U
P	-	0.017	0.016
PO_4	-	0.016	-
NO_3	-	-	-

Analytes	1975	2002	
		Dissolved	Total
Metals			
Ca	20	21.3	21.6
K	0.4	0.26	0.24
Na	1.5	1.9I	1.5I
Mg	2.6	2.6	2.8
Al	-	-	75U
As	-	3U	3U
B	-	-	15U
Cd	-	0.5U	0.5U
Co	-	-	0.75U
Cr	-	2U	2U
Cu	-	3.5U	3.5U
Fe	10	35U	35U
Mn	-	0.5U	0.97I
Ni	-	2U	2U
Pb	-	3U	5U
Ra-226	-	-	0.1U
Ra-228	-	-	1.1
Se	-	4U	4U
Sn	-	-	10U
Sr	40	-	47.2
Zn	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

Discharge **-** All discharge rates are measured in ft^3/s

October 15, 1941	36[1] (estimate)
May 26, 1942	32[1]
December 16, 1946	51[1]
June 7, 1972	44[1]
September 4, 2002	39.62[2]

Table 213. Washington Blue Spring Choctawhatchee bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Washington Blue Springs Econfina

Figure 171. Washington Blue Spring Econfina (photo by R. Means).

Location – Lat. 30° 27' 10.16" N., Long. 85° 31' 49.33" W. (SE ¼ SE ¼ SW ¼ sec. 27, T. 1 N., R. 13 W.). Washington Blue Springs Econfina is located on NWFWMD land 23 miles (37 km) southwest of the US 231 (Cottondale) exit on I-10. The area is managed as a weekend campground and access may be obtained by calling the NWFWMD district office. Travel south approximately 23 miles (37 km) on US 231 from the I-10 exit to the intersection with SR 20. Turn west (right) on SR 20 and travel 5.8 miles (9.3 km). Turn north (right) on Blue Springs Road and travel 1.3 miles to the gated entrance on the left.

Description –Washington Blue Springs Econfina emerges as two small boils from the base of a limestone bluff. Spring water flows southwest into a shallow pool that is 57 ft (17.4 m) north to south and 105 ft (32 m) east to west. The pool averages approximately 2 ft (0.6 m) deep, and is virtually indistinguishable from the upper spring run. Water quality samples were taken at the vent in the northeast end of the pool. The water is clear with a light greenish hue. The spring pool has native aquatic vegetation, a sand bottom, and some algae are present. The northern half of the spring pool area has a concrete retaining wall and steps leading into the water. The run flows generally from northeast to southwest approximately 500 ft (152.4 m) into Econfina Creek. Approximately 150 ft (46 m) downstream from Washington Blue Spring Econfina, another tributary spring, called Washington Blue Spring Econfina No. 2, flows in from the north. The small spring run is 200 ft (61 m) long and flows south into Washington Blue Springs Econfina Run. Spring No. 2 spring emerges as a clear stream from the base of a 15 ft (5 m) high bluff. There is also another spring associated with this cluster of springs called Washington Blue Springs Econfina No. 3, reportedly downstream along Washington Blue Spring Econfina Run, but this was not visited by the authors. *Springs Fever* website has a map of the spring distribution at Washington Blue Springs Econfina. North of Washington Blue Springs Econfina, high ground rises steeply to approximately 15 ft (4.6 m) above the water level. This high ground is developed into a recreation area. Toward the north and east is mixed hardwood and pine forest. Westward toward Econfina Creek is mixed hardwood and cypress swamp forest.

Utilization – The area is managed by NWFWMD as a weekend campground and use area by reservation only.

Table 214. Washington Blue Spring Econfina water quality analysis.

Analytes	1962	1972	1975	2002	
				Dissolved	Total
Field Measures					
Temperature	21	21	21.0	20.55	
DO	-	3	3.3	2.51	
pH	7.5	7.7	7.9	7.94	
Sp. Cond.	-	-	-	117	
Lab Analytes					
BOD	-	-	-	-	0.2U
Turbidity	-	-	-	-	0.2
Color	2	10	5	-	5U
Alkalinity	52		49	-	55.0
Sp. Cond.	95	115	105	120.0	-
TDS	60	75	54	-	62.0
TSS	-	-	-	-	4U
Cl	1.5	2	1.5	-	1.8I
SO_4	2	0	0.8	-	2.1
F	0.1	0.1	0.1	-	0.05U
Nutrients					
TOC	-	-	-	-	1U
$NO_3 + NO_2$ as N	-	0.06	-	-	0.14
$NH_3 + NH_4$	-	-	-	-	0.025
TKN	-	-	-	0.06U	0.06U
P	-	-	-	0.012A	0.014
PO_4	-	-	-	0.014	-
NO_3	0	-	-	-	-
Metals					
Ca	18	17	16	18	16.8A
K	0	0.2	0.3	0.16	0.16A
Na	1.4	1.3	1.2	1.1I	1I
Mg	2.7	2.8	2.9	3	2.9A
Al	-	-	-	-	75U
As	-	-	-	3U	3U
B	-	-	-	-	15U
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	0.75U
Cr	-	-	-	2U	2U
Cu	-	-	-	3.5U	3.5U
Fe	-	-	-	35U	35U
Mn	-	-	-	0.5U	1.3I
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	1.0
Ra-228	-	-	-	-	1.3
Se	-	-	-	4U	4U
Sn	-	-	-	-	10U
Sr	-	70	40	-	54.3A
Zn	-	-	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

***Discharge* -** All discharge rates are measured in ft^3/s.

April 10, 1962	12.3[1]
September 11, 1962	10.8[1]
January 29, 1963	12.7[1]
May 28, 1963	11.1[1]
August 28, 1963	12.6[1]
May 16, 1972	14.2[1]
June 13, 2002	7.0[2]

Table 215. Washington Blue Spring Econfina bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

Williford Spring

Figure 172. Williford Spring (photo by R. Means).

Location – Lat. 30° 26' 22.39" N., Long. 85° 32' 51.29" W. (NE ¼ SE ¼ SW ¼ sec. 33, T. 1 N., R. 13 W.). The spring is located on NFWMD land 23 miles (37 km) southwest of the US 231 (Cottondale) exit on Interstate 10. From I-10, travel south on US 231 approximately 23 miles (37 km) to the intersection with SR 20. Turn west (right) on SR 20 and travel 7.5 miles (12.1 km) to Herman Strickland Rd. Turn north (right) and follow the road 0.8 miles (1.3 km) to the gated spring entrance on the right.

Description – Williford Spring has a circular spring pool in a conical depression whose sand bottom is rippled by issuing spring currents. The pool measures 57 ft (17.4 m) in diameter. The vent is under a limestone ledge roughly in the center of the pool, and the depth measured over the vent is 10.1 ft (3.1 m). There is a sizeable boil over the vent, and the color of the water is light blue-green. There is no aquatic vegetation in the pool, and a thin layer of algae covers less than half of the limestone and sand substrates. A wooden entry stairway is located on the north side of the spring with erosion control concrete bags on either side. Williford Spring discharges through a swiftly flowing spring run that travels south for approximately 443 ft (135 m) into Econfina Creek. There are numerous other smaller springs that feed into Williford Spring run immediately downstream. Some of these springs are small trickles from limestone fissures exposed along the banks of the run. To the north and west of Williford Spring, high ground rises to approximately 15 ft (4.6 m) above the water surface. There is a small, cleared parking and picnic area on the adjacent north side of the spring. A lowland forest of hardwoods, cypress and palms hugs the spring and its run.

Table 216. Williford Spring water quality analysis.

Analytes	4/16/1962	9/11/1962	1972	2002	
				Dissolved	Total
Field Measures					
Temperature	21.1	22.2	22.0	21.26	
DO	-	-	2.9	0.47	
pH	7.2	7.5	7.6	7.88	
Sp. Cond.	-	-	-	135	
Lab Analytes					
BOD	-	-	-	-	0.2U
Turbidity	-	-	-	-	0.05U
Color	0	-	10	-	5U
Alkalinity	-	-	62	-	65
Sp. Cond.	150	128	145	140.0	-
TDS	88	-	73	-	69.0
TSS	-	-	-	-	4U
Cl	3.0	2.0	3.0	-	2.3I
SO_4	0.0	-	0.0	-	1.4
F	0.1	-	0.1	-	0.05U
Nutrients					
TOC	-	-	-	-	1U
$NO_{3} + NO_2$ as N	-	-	0.10	-	0.075
$NH_{3} + NH_4$	-	-	-	-	0.014I
TKN	-	-	-	0.06U	0.06U
P	-	-	-	0.016A	0.019
PO_4	-	-	-	0.014	-
NO_3	0.00	-	0.44	-	-
Metals					
Ca	28	-	21	21.5	20.2
K	0.3	-	0.2	0.28	0.28
Na	1.7	-	1.3	1.3I	1.3I
Mg	2.4	-	2.7	2.9	2.8
Al	-	-	-	-	75U
As	-	-	-	3U	3U
B	-	-	-	-	15U
Cd	-	-	-	0.5U	0.5U
Co	-	-	-	-	0.75U
Cr	-	-	-	2U	2U
Cu	-	-	-	3.5U	3.5U
Fe	-	-	-	35U	35U
Mn	-	-	-	0.5U	0.5U
Ni	-	-	-	2U	2U
Pb	-	-	-	3U	5U
Ra-226	-	-	-	-	0.2
Ra-228	-	-	-	-	1U
Se	-	-	-	4U	4U
Sn	-	-	-	-	10U
Sr	-	-	60	-	43
Zn	-	-	-	1.5U	2U

A=Average value U,K=Compound not detected, value shown is the method detection limit
I=Value is less than practical quantitation limit J=Est value Q=Exceeding holding time limit

The surrounding rolling sand hills terrain supports mixed hardwood and pine uplands. A hiking trail system is along the north side of the spring run.

Utilization – Williford Spring and surrounding uplands are managed by the NWFWMD as a daytime recreation area accessible by permit/reservation only. For information on access to the spring, contact NWFWMD.

Discharge – All discharge rates are measured in ft^3/s.

September 11, 1962	31.1(1)
January 31, 1963	32.3(1)
May 29, 1963	31.9(1)
August 27, 1963	31.2(1)
May 15, 1972	26.4(1)
June 13, 2002	25.46(2)

Table 217. Williford Spring bacteriological analysis.

Bacteria Results (in #/100 mL)	
Analyte	**Value**
Enterococci	1KQ
Fecal Coliform	1KQ

SELECTED SPRINGS INFORMATION RESOURCES ON THE INTERNET

For the interested reader, there are sources of information concerning Florida's springs on the Internet. These include the following:

The Florida Department of Environmental Protection's Springs Website:
http://www.floridasprings.org and **http://www.dep.state.fl.us/springs/**

Springs Fever: A field and recreation guide to more than 500 Florida springs, by Joe Follman and Richard Buchanan. This site includes an excellent listing of web links:
http://www.tfn.net/springs/

Florida State Parks System: **www.dep.state.fl.us/parks/index.asp**

The Public Broadcasting web site: **http://www.pbs.org/wnet/nature/springs/**

The Springs of Florida website from Karst Environmental provides numerous links to more springs information: **http://www.floridasprings.com/**

Sites related to cave diving contain significant amounts of springs information:
http://www.cavediver.net/springs/spring_frm.htm
http://www.floridacaves.com/
http://www.mejeme.com/dive/index.html
http://underwaterflorida.homestead.com/springs.html

Link to Florida Geological Survey's Springs of Florida Bulletin on-line:
http://www.flmnh.ufl.edu/springs_of_fl/aaj7320/content.html

Link to Florida Springs Map and Guide: **http://www.floridasprings.net**

Florida Springs Database: **http://www.thiswaytothe.net/springs/index.shtml**

Links to Water Management District sites:
http://www.state.fl.us/nwfwmd/
http://www.sjrwmd.com/
http://www.srwmd.state.fl.us/
http://www.swfwmd.state.fl.us/
http://www.sfwmd.gov

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APPENDIX A

GLOSSARY

The Florida Springs Nomenclature Committee (FSNC) believes that only a minimum number of terms should be included (see Copeland, 2003). Most definitions used in the glossary were either taken or modified from the following resources: (1) the Lexicon of Cave and Karst Terminology with Special Reference to Environmental Karst Hydrology (Field, 1999), (2) the Dictionary of Geological Terms by the American Geological Institute (AGI) (Bates and Jackson, 1984), (3) the Sinkhole Glossary (SDII Global Corporation, 2002), and (4) Glossary of Karst Terminology (Monroe, 1970). On occasion other sources were used and are noted in the glossary. Often, the FSNC made its own definition, or modified definitions from the other sources. If a definition was generated or significantly modified by the committee, it appears in the glossary as (Copeland, 2003).

The FSNC believes the meanings of key spring terms and an understanding as to how they differ are extremely important for the hydrogeology community in its efforts to better appreciate the dynamics of Florida's springs. These **special terms** (<u>underlined</u> in the glossary) are listed below in alphabetical order:

karst window,
offshore spring, onshore spring,
seep (or spring seep),
spring,
spring group,
spring magnitude,
spring run,
springshed (or spring recharge basin), and
vent (or spring vent).

alluvial sinkhole – An alluvial sinkhole is an ancient or relict sinkhole (paleosinkhole) that has been filled with soil and/or sediment. It may or may not have a surficial expression. See also *paleosinkhole* and *relict sinkhole* (SDII Global Corp., 2002).

artesian – A modifier that describes a condition in which the potentiometric surface is above elevation of the top of the aquifer (Modified from Field, 1999). It is synonymous with *confined*.

aquifer – A body of soil, sediment, or rock that is saturated with water and sufficiently permeable to allow production of water from wells (SDII Global Corp., 2002).

blind valley – A stream valley that terminates abruptly at a sinkhole, swallow hole, or swallet (where the stream disappears underground) (SDII Global Corp., 2002).

caliche – See *duricrust*.

cave – A natural underground opening or series of openings and passages large enough to be entered by an adult person (Modified from Monroe, 1970).

cavern – A cave or conduit system with larger than average size that has been created by the dissolution of limestone or other soluble rock (SDII Global Corp., 2002).

cavernous porosity – A pore system having large, cavernous openings; the lower size limit, for field analysis, is practically set at approximately the smallest opening that an adult person may enter (Field, 1999).

chert – limestone replaced by quartz (silica). Used by Native Americans for a variety of implements including knives and projectile points. Also known as flint.

“chimney” sink – A cover-collapse sinkhole that forms near a vertical shaft or “chimney,” typically developing where bedrock is near land surface. These features are common in the Gainesville area of Florida (Modified from SDII Global Corp., 2002).

collapse sinkhole – A type of sinkhole formed by collapse of the cover materials (soil, sediment, or rock) into an underground void created by the dissolution of limestone or dolostone. See *rock- collapse sinkhole* and *cover-collapse sinkhole* (SDII Global Corp., 2002).

conduit; karst conduit – Large dissolutional voids, including enlarged fissures and tabular tunnels. In some usage, the term is restricted to voids that are water-filled. Conduits may include all voids greater than 10 mm (one cm) in diameter, but another classification scheme places them between arbitrary limits of 100 mm to 10 m. Whichever value is accepted in a particular context, smaller voids are commonly termed subconduits (Field, 1999).

conduit flow; karst conduit flow – Underground water flow within conduits. Conduit flow is generally turbulent, but can also be laminar (Field, 1999).

confined – See *artesian*.

cover – Materials consisting of soil, sediment, or rock that overlies the soluble rock (limestone, dolostone, etc.) in a karst terrane. In Florida, the cover includes the sand and clay deposits that overlie the limestone (Modified from SDII Global Corp., 2002).

cover-collapse sinkhole – A sinkhole formed by cover materials (sand, clay, etc.) raveling into a void in the underlying limestone (Modified from SDII Global Corp., 2002).

cover-subsidence sinkhole – A collapse sinkhole that forms when the upper surface of the limestone is dissolved away, and the cover materials slowly subside to occupy the space once occupied by limestone. Voids may not be well developed in cover-subsidence sinkholes because of the continued downward movement of cover materials. See also *solution sinkhole* and *sag depressions* (SDII Global Corp., 2002).

diffuse flow – Ground-water flow conditions that are generally slow-moving, may be laminar (Reynolds number much less than 1.0), have uniform discharge, and a slow response to storms (Modified from Field, 1999).

discharge – The rate of flow at a given instant in terms of volume per unit of time (Modified from Bates and Jackson, 1984). It is synonymous with flux.

doline – A bowl- or funnel-shaped hollow in limestone topography, ranging in diameter from a few meters to a kilometer, and in depth up to several hundred meters (Modified from Monroe, 1970). A doline is synonymous with *sinkhole*.

dolostone – A sedimentary rock composed predominantly of the mineral dolomite ($Ca,Mg(CO_3)_2$). While soluble, dolostone is less likely to contain well developed karst features than limestone (Modified from SDII Global Corp., 2002).

duricrust – A deposit of precipitated minerals, mainly calcite, formed in the soil or near-surface layers in arid or semi-arid zones at the horizon where ascendant capillary water evaporates and salts held in solution are deposited. In Florida, seasonal rainfall and intense evaporation may form similar semi-concreted soils within the epikarst (Modified from Field, 1999).

epikarst – **1**. The zone of weathering that penetrates the upper surface of a limestone stratum. Weathering of limestone results in development of rubble, fine-grained, carbonate-rich silt, clay, and karren (including pinnacles and valleys in the limestone rock surface) (Modified from SDII Global Corp., 2002). **2**. An intensely dissolved zone consisting of an intricate network of intersecting roofless, dissolution-widened fissures, cavities, and tubes dissolved into the uppermost part of the carbonate bedrock.

The dissolution features in the epikarst zone are organized to move infiltrating water laterally to down-gradient seeps and springs or to collector structures such as shafts that conduct the water farther into the subsurface (Huntoon, 1995).

estavelle – **1**. A spring that reverses flow because of relative changes in the elevation of ground-water potentials and stream stage (SDII Global Corp., 2002). **2**. An intermittent spring resurgence or exsurgence, active only in wet seasons (Modified from Field, 1999). Generally, an estavelle is located near streams or rivers. When the water level of the stream is high (e.g., during flood stage), surface water directly recharges the aquifer.

exsurgence – A spring or seep in karstic terrane not clearly connected with swallets (or *ponors*) at a higher level (Field, 1999).

fissure – Any discontinuity within the rock mass that is either initially open or capable of being opened by dissolution to provide a route for water movement. Fissures in this sense, applied generally in karst, therefore include the primary sedimentary bedding planes as well as tectonic faults and joints. More specifically, the term has been used to describe voids with an average width dimension of 10 to 100 mm (Modified from Field, 1999).

fracture – Cracks formed in soils, sediment or rocks by natural stresses. In Florida, many fractures have been developed to relieve stress caused by Earth tides (SDII Global Corp., 2002). It is synonymous with *joint*.

fracture trace – A confirmed pattern observed through remote sensing (aerial photography or satellite imagery) that owes its origin to jointing or fracturing in the underlying soils, sediments or bedrock. See *photolineament* (SDII Global Corp., 2002).

groundwater level – the measurement, in feet, of the elevation of the top of an aquifer, as measured in a network of groundwater monitoring wells and/or supply wells. The level can fluctuate in response to aquifer recharge and groundwater withdrawals.

grotto – A cave chamber or room preceded by a narrower passage (Modified from Field, 1999).

Hydrilla **–** an invasive, exotic, aquatic plant that is growing rampant in many springs and rivers.

hydrogeology – the study of subsurface waters in their geologic context.

impermeable – not permitting the passage of fluids. In the case of geologic formations, an impermeable layer of earth is one through which groundwater cannot pass.

joint – See *fracture*.

karren – Features that develop on the upper surface of a limestone or other soluble rock as it is weathered. These features are prevalent in the Quilin area in China and in western Ireland. In Ireland they are sometimes referred to as burren. In Florida, karren are usually buried under the cover materials and consist of pinnacles and depressions in the rock surface. The depressions may or may not be related to sinkhole activity (Modified from SDII Global Corp., 2002).

karst – A term describing landforms that have been modified by dissolution of soluble rock (limestone or dolostone) (Modified from SDII Global Corp., 2002).

karst terrane – A terrane, generally underlain by limestone or dolostone, in which the topography is chiefly formed by the dissolution of rocks, and which may be characterized by springs, sinkholes, sinking streams, closed depressions, subterranean drainage, and caves.

karst window – **1**. A depression opening that reveals portions of a subterranean flow, or the unroofed portion of a cave (a vertical window). **2**. An opening in natural limestone walls, formed by the joining of subterranean karst grottos as a result of dissolution processes (a horizontal window). Both terms are modified from Field (1999). Note also that the FSNC believes that flow through an exposed conduit in the aquifer is different from flow onto the Earth's surface. For this reason, the FSNC does not consider a karst window to be a spring. It is an exception to the definition of a spring (See *spring*).

karstic aquifer – An aquifer containing soluble rocks with a permeability structure that includes abundant interconnected conduits dissolved from the host rock. The interconnected conduits are organized and facilitate the circulation of fluid in the down-gradient direction, wherein the permeability structure evolved as a consequence of dissolution by fluid (Modified from Huntoon, 1995).

laminar flow – Flow in which the head loss is proportional to the first power of velocity. Water flowing in a laminar manner will have streamlines that remain distinct and the flow direction at every point remains unchanged with time. Darcy's Law strictly applies under laminar flow conditions only (Modified from Field, 1999).

limestone – A sedimentary rock primarily composed of the mineral calcite ($CaCO_3$). Limestone is soluble and often develops karst features when weathered (Modified from SDII Global Corp., 2002).

magnitude – See *Spring magnitude*.

nonartesian - A condition in which the upper surface of the zone of saturation forms a water table under atmospheric pressure. The term is synonymous with *unconfined* (Field, 1999).

offshore spring – The point of discharge of the spring is seaward of the mean low-tide level.

onshore spring – The point of discharge of the spring is landward of the mean low-tide level.

overflow stream – A stream valley that is down-gradient of a swallow hole, swallet, or blind valley and that carries water only when the recharge capacity of the swallow hole is exceeded. In Florida, the term is sometimes used to identify an overflow, or paleo-overflow, stream valley (Modified from SDII Global Corp., 2002).

paleokarst – This term describes either an ancient karst terrane or the presence of features associated with an ancient karst terrane. The term is used to describe old sinkholes and other karst features that are no longer actively forming. In west-central Florida, the term is used to refer to sinkholes that formed decades to millions of years ago and are no longer active (Modified from SDII Global Corp., 2002).

paleosinkhole – An ancient sinkhole that is no longer active. See *relict sinkhole* and *alluvial sinkhole* (SDII Global Corp., 2002).

photolineament – A natural linear feature on the land surface that has been identified from aerial photographs or other images. Photolineaments are identified by alignments within or between lakes and wetlands, sinkholes, stream segments, soils, and vegetation patterns. Photolineaments are also known as photolinears**.** Note that photolinears may or may not represent geologic features, so the term is not synonymous with fracture trace. See *fracture trace* (Modified from SDII Global Corp., 2002).

pipe – In karst terminology, a semi-circular conduit through which water and soil can pass. Pipes are often nearly vertical and have steep (nearly vertical) sides (SDII Global Corp., 2002).

polje – A large flat-bottom sinkhole complex formed by the coalescence of several smaller sinkholes. Poljes are flat-bottomed because of subsequent sedimentation, usually by a lake. Payne's Prairie in Alachua County is an example (Modified from SDII Global Corp., 2002).

ponor – Hole in the bottom or side of a closed depression through which water passes to or from an underground channel (Field, 1999). It is synonymous with *swallow hole*.

raveling –The process by which water transports soil particles downward into cavities in the underlying strata. Because sand is typically damp and the grains are angular, in Florida they do not easily ravel without moving water. Because of their cohesiveness, clay-rich strata are more difficult to ravel than sandy soils (SDII Global Corp., 2002).

relict sinkhole – A relict (or relic) sinkhole is an ancient sinkhole that is no longer active. It may be expressed as a sinkhole lake, depression in the land surface, or loose soils in the subsurface. See *paleosinkhole* and *alluvial sinkhole* (Modified from SDII Global Corp., 2002).

resurgence – re-emergence of groundwater through a karst feature, a part or all of whose waters are derived from surface inflow into ponors at higher levels (Modified from Field, 1999).

river rise – see *resurgence* (Field, 1999).

rock-collapse sinkhole – A collapse sinkhole formed when the limestone, or other soluble rock, cavern ceiling fails and collapses into a void (Modified from SDII Global Corp., 2002).

rubble – In the context of karst, rubble describes the gravel-like debris that forms as limestone is weathered (Modified from SDII Global Corp., 2002).

sag depression – A sag depression is often the surficial manifestation of a solution or cover subsidence sinkhole. As the underlying bedrock is dissolved away, the cover materials slowly sag, creating a depression. Owing to the shallow water table, sags often become small, circular wetlands (SDII Global Corp., 2002).

sand boil – A spring in which the vent has been filled in with sand. Spring discharge continuously suspends the sand particles that cover the spring. Thus the spring has a "boiling" appearance.

seep – **1**. To move slowly through small openings of a porous material (Field, 1999). **2**. With regard to springs in Florida, a seep is also a noun that infers one or more small openings in which water discharges diffusely ("oozes") from the ground-water environment. Discharge is from intergranular pore spaces in the matrix and flow is typically laminar.

seepage – The infiltration or percolation of water through rock or soil to or from the Earth's surface and is usually restricted to the very slow movement of groundwater (Field, 1999).

sink – See *sinkhole*.

sinkhole – A landform created by subsidence of soil, sediment, or rock as underlying strata are dissolved by groundwater. Sinkholes can form by collapse into subterranean voids created by dissolution of limestone or dolostone or by subsidence as these strata are slowly dissolved away (Modified from SDII Global Corp., 2002).

siphon – **1**. In speleology, a cave passage in which the ceiling dips below a water surface (Monroe, 1970). **2**. A flooded cave passage. A gallery (conduit) in the form of a "U" with water moving only under pressure when the siphon is completely filled (Field, 1999). **3**. Site and origin of an intermittent spring; section of a flooded cave or sump flooded passage (Field, 1999).

soil piping – Laterally limited, vertical areas of loose soil often caused by downward vertical movement of the soil (raveling). See *pipe* (Modified from SDII Global Corp., 2002).

solution sinkhole – Sinkhole formed by the slow subsidence of soil or sediment as the upper surface of the underlying, water-soluble sediment or rock is removed by dissolution. See *cover-subsidence sinkhole* (SDII Global Corp., 2002).

source aquifer – The aquifer from which the water in a spring originates.

spring – A point where underground water emerges onto the Earth's surface (including the bottom of the ocean). The image of a trickle of water springing from a hillside hardly matches that of a vast cave pouring forth a river, but both are called springs. Springs may be exsurgences or resurgences, depending upon the source of their water. They may also be part-time exsurgences and part-time resurgences. In some usages "spring" is restricted to the water that outflows, in other usages the word can refer to the water, the outlet, or the locality of the outflow (Field, 1999). Note that the FSNC believes that flow through an exposed conduit in an aquifer is different from flow onto the earth's surface. For this reason, the FSNC does not consider a karst window to be a spring. It is an exception to the definition of a spring.

spring boil – Variable discharge from a spring in which hydrostatic pressure is great enough to cause a turbulent discharge that is visible at the water surface (modified from Field, 1999).

spring complex – See *Spring Group*. The FSNC encourages the use of *spring group* and discourages the use of this term.

spring group – A collection of individual spring vents and seeps that lie within a discrete spring recharge basin (or springshed). The individual vents and seeps of onshore spring groups almost always share a common spring run, or a tributary to the run. Spring group vents and seeps are often spread over an area of several square miles. It should be emphasized that the term spring group will be restricted to those vents and seeps that discharge a well-defined spring recharge basin. The spring vents or seeps within a springshed may be referred to as springs. As an example, the Rainbow Springs Group will include several spring vents that drain the Rainbow Springs Group basin, and discharge into the Rainbow River spring run. Note that a spring recharge basin is defined only by potentiometric data and not by chemical or other physical characteristics of the spring discharge. However, chemical and additional physical data can, and should, be used to better define individual spring vent basins within a spring group basin. This type of mapping was conducted for the Rainbow Springs Group in Marion County by Jones et al. (1996). Not all springsheds have been mapped. Therefore, if a springshed is not mapped, then it is acceptable to use the term "springs" to refer to multiple vents discharging into a common spring run.

spring magnitude – A category based on the volume of flow from a spring per unit time. *Notes regarding magnitude* – One discharge measurement is enough to place a spring into one of the eight magnitude categories. However, springs have dynamic flows. A spring categorized as being a first-magnitude spring at one moment in time may not continue to remain in the same category. Therefore, the magnitude of the spring is to be based on the median value of all discharge measurements for the period of record. The median of a set of scores is the middle value when the scores are arranged in increasing (or decreasing) order (Modified from Triola, 1998).

It is recognized that historically, many springs in Florida have kept one magnitude category, even though the discharge may have changed considerably from when it was first assigned a magnitude. For this reason, a historical category is acceptable in the Florida Springs Classification System. For example, the discharge of a spring may have been taken in 1946. At that time it was classified as a first-magnitude spring. No other measurement was taken until 2001. During that year, three discharge measurements were taken. The median value of all four measurements reveals that the spring should be re-classified to a second-magnitude spring in 2001. Nevertheless, it can still be considered a historical first-magnitude spring. The term "historical" refers to the period of time prior to the adoption of the Florida Springs Classification System (2003).

The location of a discharge measurement is critical for defining the magnitude of a spring. Whenever possible, a discharge measurement should be restricted to a vent or seep. However, this is often impractical. For example, the only place to take a measurement may be in a spring run downstream where multiple springs have discharged into the run. For this reason, whenever a discharge measurement or water sample is taken, the springs (vents or seeps) included in the measurement need to be reported. The exact location of the discharge measurement (using a Global Positioning System with approved locational specifications) and a standardized locational reference point for each measurement is encouraged.

spring pool – A small body of water, either artificially impounded or naturally occurring, that encompasses one or more spring vents. It contains spring discharge that flows into a spring run.

spring recharge basin – Those areas within ground- and surface-water basins that contribute to the discharge of the spring. The position of the divide is orthogonal to isopotential lines. It is synonymous with *springshed*. Note that the position of the recharge basin boundary is time-dependent. That is, the boundary is representative of a "snapshot" in time, rather than permanent. Thus, the boundaries of springsheds are dynamic and vary as a result of a changing potentiometric surface. If a spring is found to drain one springshed during times of high potentiometry, and another basin during low times, then the spring should be connected with two spring basins in the spring database.

Whenever practical, descriptive aspects of the recharge basin should be noted in the spring database. The following are examples. The relative recharge to groundwater within the basin should be noted. Those portions of the basin where confined and unconfined groundwater conditions exist should also be recorded. Finally, groundwater vulnerability within the springshed should be noted if possible. A potential tool to predict vulnerability is the Florida Aquifer Vulnerability Assessment (FAVA) model (Baker et al., 2002).

spring run – **1**. A body of flowing water that originates from a karst spring (Field, 1999). **2**. A stream (river, creek, etc.) whose primary (>50%) source of water is from a spring, springs, or spring group. For example, the Wakulla River, where the predominant source of water is from Wakulla Spring, is a spring run. However, farther down stream, where surface water tributaries, contribute 50% or greater of the flow, the Wakulla River is no longer considered a spring run. A detailed hydrogeologic (e.g., the collection of discharge and seepage data) study may be needed in order to identify boundaries of a spring run.

spring seep – See *seep*.

spring vent – See *vent*.

Springs – Multiple spring vents or seeps located in proximity to each other.

The usage of this term is discouraged, but for pragmatic reasons, it cannot be entirely dropped. For example, several vents may discharge into a common spring run and the collection of scientific data (e.g. water samples or discharge measurements) cannot be obtained from individual vents located in the run. However, it may be practical to obtain a composite water sample or composite flow measurement representing several vents. Under this situation, the term springs is acceptable. However, a list of each vent or seep represented by the composite sample should be recorded by the sampler, and ultimately placed into the spring database.

steephead – A deeply cut valley, generally short, terminating at its upslope end in an amphitheater, at the foot of which a stream may emerge (e.g., ocean, lake, river, or stream) (Field, 1999) .

springshed – See *spring recharge basin*.

subaqueous spring – A spring that discharges below the surface of a water body (Field, 1999). The term infers a pre-existing receiving surface-water body and is synonymous with *submerged*.

submerged – See *subaqueous*.

submarine spring – See *offshore spring*.

swallet – See *swallow hole*.

swallow hole – A place where water disappears underground in a limestone region. A swallow hole generally implies water loss in a closed depression or blind valley, whereas a swallet may refer to water loss into alluvium at a streambed, even though there is no depression (Field, 1999).

tidal spring – A spring whose discharge is controlled by tidal cycles.

Near the coast, tidal springs may alternately discharge saline and fresh water. Inland, the pattern of fresh water discharge may simply reflect tidal changes in the potentiometric surface (SDII Global Corp., 2002).

turbulent flow – The flow conditions in which inertial forces predominate over viscous forces and in which head loss is not linearly related to velocity. It is typical of flow in surface-water bodies and subsurface conduits in karst terranes, provided that the conduits have a minimum diameter of approximately 2-5 mm, although some research suggests that 5-15 mm may be more appropriate (Modified from Field, 1999).

trace – See *overflow stream* (SDII Global Corp., 2002).

uvala – Large, complex sinkholes with irregular bottoms, formed by the coalescence of several smaller closed depressions. The bottom of an uvala is characterized by multiple sinkholes and an irregular bottom (Modified from SDII Global Corp., 2002).

unconfined – See *nonartesian*.

vent – An opening that concentrates ground-water discharge at the Earth's surface, including the bottom of the ocean. The spring point of discharge is significantly larger than that of the average pore space in the surrounding rock and is often considered a cave or fissure. Flow from the opening is mostly turbulent.

APPENDIX B
FLORIDA SPRINGS LOCATIONS

Appendix B 1
Springs visited by FGS springs teams.

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
ALA930971	Spring	Alachua	29 49 40.59404	82 38 27.00683
ALA930972	Spring	Alachua	29 50 40.78446	82 37 51.08023
BOULWARE SPRINGS	Spring	Alachua	29 37 15.20674	82 18 25.90535
DARBY SPRING	Spring	Alachua	29 51 09.41767	82 36 21.46651
GLEN SPRINGS	Spring	Alachua	29 40 30.04208	82 20 52.43622
HORNSBY SPRING	Spring	Alachua	29 51 01.27940	82 35 35.52436
MAGNESIA SPRINGS	Spring	Alachua	29 35 00.26351	82 08 58.53592
POE SPRING	Spring	Alachua	29 49 32.57677	82 38 56.30233
SANTA FE RIVER RISE	River Rise	Alachua	29 52 26.01811	82 35 29.89039
TREEHOUSE SPRING	Spring	Alachua	29 51 17.58982	82 36 10.35691
BLUFF SPRINGS	Spring	Bay	30 25 30.95551	85 32 54.19590
ECONFINA UNNAMED SPRING	Spring	Bay	30 25 53.46073	85 32 50.76532
GAINER SPRING #1C	Spring	Bay	30 25 39.62276	85 32 45.82853
GAINER SPRING #2	Spring	Bay	30 25 38.61221	85 32 53.95200
GAINER SPRING #3	Spring	Bay	30 25 44.30302	85 32 55.63252
PITT SPRING	Spring	Bay	30 25 58.67918	85 32 47.14062
SYLVAN SPRINGS	Spring	Bay	30 25 54.33622	85 32 53.60107
SYLVAN SPRINGS #2	Spring	Bay	30 25 53.79535	85 32 50.33000
GROTTO SPRINGS	Spring	Calhoun	30 35 57.88414	85 09 51.27854
HAMILTON SPRING	Spring	Calhoun	30 31 09.30846	85 09 47.51557
SALLY SPRING	Spring	Calhoun	30 34 13.08407	85 10 24.31085
ALLIGATOR SPRING	Spring	Citrus	28 48 01.61737	82 35 16.71295
BAIRD SPRING	Spring	Citrus	28 42 26.91486	82 34 41.51827
BAIRD SPRING #2	Spring	Citrus	28 42 29.88288	82 34 42.80038
BAIRD SPRING #3	Spring	Citrus	28 42 32.85551	82 34 46.71905
BAIRD SPRING #4	Spring	Citrus	28 42 33.33298	82 34 48.98521
BANANA SPRING	Spring	Citrus	28 48 03.63542	82 35 17.43986
BEAR SPRING	Spring	Citrus	28 48 06.46985	82 35 14.12002
BLACK SPRINGS	Spring	Citrus	28 52 38.27996	82 35 56.40000
BLUE HOLE SPRING	Spring	Citrus	28 47 55.63428	82 35 22.33820
BLUEBIRD SPRINGS	Spring	Citrus	28 47 20.38027	82 34 46.25807
CATFISH SPRING	Spring	Citrus	28 53 52.79993	82 35 56.40000
CHASSAHOWITZKA SPRING #1	Spring	Citrus	28 42 58.24206	82 34 30.31907
CHASSAHOWITZKA SPRING #2	Spring	Citrus	28 42 57.66401	82 34 31.62518
CHASSAHOWITZKA SPRING MAIN	Spring	Citrus	28 42 55.86505	82 34 34.33253
CITRUS BLUE SPRING	Spring	Citrus	28 58 09.60157	82 18 52.34350
CRAB SPRING	Spring	Citrus	28 43 01.91694	82 34 33.06893
HALLS RIVER SPRING #2	Spring	Citrus	28 49 35.68181	82 34 59.62634
HOMASASSA UNNAMED SPRING #1	Spring	Citrus	28 47 53.86830	82 35 23.74112
HOMASASSA UNNAMED SPRING #2	Spring	Citrus	28 47 52.92319	82 35 22.74140
HOMOSASSA SPRING #1	Spring	Citrus	28 47 56.66734	82 35 18.69090
HOMOSASSA SPRING #2	Spring	Citrus	28 47 56.64696	82 35 18.78832
HOMOSASSA SPRING #3	Spring	Citrus	28 47 56.63299	82 35 18.67376
HOUSE SPRING	Spring	Citrus	28 53 50.27996	82 35 27.60000
HUNTER SPRING	Spring	Citrus	28 53 39.94721	82 35 32.93340
IDIOTS DELIGHT SPRING	Spring	Citrus	28 53 16.62662	82 35 22.03278
JURASSIC SPRING	Spring	Citrus	28 53 42.27223	82 35 23.71117
KING SPRING	Spring	Citrus	28 52 54.19171	82 35 42.17575
KINGS BAY SPRING #1	Spring	Citrus	28 53 17.33734	82 35 23.06303
LITTLE HIDDEN SPRING	Spring	Citrus	28 53 08.81344	82 35 38.62216

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
LITTLE SPRINGS	Spring	Citrus	28 54 01.19048	82 35 43.33308
MANATEE SANCTUARY SPRING	Spring	Citrus	28 53 26.86286	82 35 33.37429
MILLERS CREEK SPRING	Spring	Citrus	28 54 03.95996	82 36 13.68000
POTTER SPRING	Spring	Citrus	28 43 53.76119	82 35 47.56254
PUMPHOUSE SPRINGS	Spring	Citrus	28 47 47.38366	82 35 17.85628
RUTH SPRING	Spring	Citrus	28 43 56.87501	82 35 42.21258
TARPON HOLE SPRING	Spring	Citrus	28 52 54.63844	82 35 41.33285
THREE SISTERS SPRINGS	Spring	Citrus	28 53 19.41119	82 35 21.08767
TROTTER MAIN SPRING	Spring	Citrus	28 47 47.31958	82 35 11.02787
UNNAMED SPRING	Spring	Citrus	28 53 01.37159	82 35 43.25219
GOLD HEAD BRANCH	Seeps	Clay	29 50 30.11996	81 57 14.40000
GREEN COVE SPRING	Spring	Clay	29 59 36.24158	81 40 40.47755
LAKE LOWERY EAST	Seep	Clay	29 51 40.12380	81 58 48.40561
LAKE LOWERY NORTH	Seep	Clay	29 52 17.71784	81 59 17.63200
LAKE LOWRY WEST	Seep	Clay	29 51 57.68345	81 59 44.23546
WADESBORO SPRING	Spring	Clay	30 09 26.99993	81 43 21.36000
WW GAY 1 SPRING	Spring	Clay	30 09 14.46664	81 43 41.50567
WW GAY 2 SPRING	Spring	Clay	30 09 14.09724	81 43 42.76178
BLUE HOLE SPRING	Spring	Columbia	29 58 49.90703	82 45 30.37914
CEDAR HEAD SPRING	Spring	Columbia	29 58 59.87993	82 45 31.32000
COL1012971	Spring	Columbia	29 51 24.88338	82 43 47.98160
COL1012972	Spring	Columbia	29 51 23.37869	82 43 54.11730
COL101971	Spring	Columbia	29 49 55.96126	82 40 09.71116
COL101974	Spring	Columbia	29 50 02.39359	82 40 36.04462
COL428981	Spring	Columbia	29 51 12.72895	82 36 19.87571
COL522981	Spring	Columbia	30 19 15.75973	82 45 21.29422
COL522982	Spring	Columbia	30 19 17.26457	82 45 23.50213
COL917971	Spring	Columbia	29 55 29.37914	82 46 19.16566
COL928971	Spring	Columbia	29 53 10.18590	82 45 05.50717
COL930971	Spring	Columbia	29 49 52.19216	82 39 24.26238
COLUMBIA SPRING	Spring	Columbia	29 51 14.79924	82 36 43.03174
JONATHAN SPRING	Spring	Columbia	29 50 01.64220	82 40 31.49836
JULY SPRING	Spring	Columbia	29 50 10.22827	82 41 47.02639
MILL POND SPRINGS	Spring	Columbia	29 57 59.98198	82 45 35.91104
ROARING SPRING	Spring	Columbia	29 58 34.37278	82 45 28.35706
RUM ISLAND SPRING	Spring	Columbia	29 50 00.67261	82 40 47.39167
SANTA FE SPRING	Spring	Columbia	29 56 05.29573	82 31 49.51351
SAWDUST SPRING	Spring	Columbia	29 50 24.05018	82 42 12.63676
SUNBEAM SPRING	Spring	Columbia	29 55 41.13995	82 46 11.33000
WILSON SPRING	Spring	Columbia	29 54 00.18166	82 45 30.77006
COPPER SPRING	Spring	Dixie	29 36 50.45069	82 58 25.89046
DIX95971	Spring	Dixie	29 42 15.83410	82 57 09.87250
GUARANTO SPRING	Spring	Dixie	29 46 47.26884	82 56 23.84945
LITTLE COPPER SPRING	Spring	Dixie	29 38 01.36291	82 58 00.64657
MCCRABB SPRING	Spring	Dixie	29 41 07.75853	82 57 36.73483
POT HOLE SPRING	Spring	Dixie	29 48 38.45340	82 56 09.08124
STEINHATCHEE RIVER RISE	River Rise	Dixie	29 46 11.68370	83 19 30.12578
UNNAMED SPRING	Spring	Dixie	29 41 10.52030	82 57 35.41763
UNNAMED SPRING	Spring	Dixie	29 49 09.98	82 56 00.35
POTTSBURG SPRING	Spring	Duval	30 17 23.99996	81 34 15.24000

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
MYSTIC	Artesian Well	Escambia	30 51 29.23726	87 18 49.32000
BEAR CREEK RISE	River Rise	Franklin	29 58 54.30176	84 27 47.41686
CHATTAHOOCHEE SPRING	Spring	Gadsden	30 41 50.67820	84 50 55.82004
BELL SPRING	Spring	Gilchrist	29 35 50.79905	82 56 28.21751
CAMPGROUND SPRING	Spring	Gilchrist	29 53 57.44378	82 51 57.94092
DEER SPRING	Spring	Gilchrist	29 50 28.19260	82 42 26.36683
DEVIL'S EYE SPRING	Spring	Gilchrist	29 50 06.57413	82 41 47.72224
DEVILS EAR SPRING	Spring	Gilchrist	29 50 07.25618	82 41 47.76176
DOGWOOD SPRING	Spring	Gilchrist	29 50 17.00300	82 42 06.45613
GIL1012971	Spring	Gilchrist	29 51 21.24493	82 43 55.88224
GIL1012972	Spring	Gilchrist	29 51 21.77982	82 43 57.75409
GIL1012973	Spring	Gilchrist	29 51 22.27194	82 43 58.42096
GIL84971	Spring	Gilchrist	29 49 47.50374	82 53 29.18497
GIL928971	Spring	Gilchrist	29 52 32.15183	82 45 06.81066
GIL99972	Spring	Gilchrist	29 55 51.30746	82 48 08.69692
GILCHRIST BLUE SPRING	Spring	Gilchrist	29 49 47.64094	82 40 58.26536
GINNIE SPRING	Spring	Gilchrist	29 50 10.82130	82 42 00.43704
HART SPRINGS	Spring	Gilchrist	29 40 32.66692	82 57 06.16075
JOHNSON SPRING	Spring	Gilchrist	29 49 53.39302	82 40 46.95758
LILLY SPRING	Spring	Gilchrist	29 49 46.98134	82 39 40.36496
LITTLE BLUE SPRING	Spring	Gilchrist	29 49 49.14570	82 41 01.78264
LITTLE DEVIL SPRING	Spring	Gilchrist	29 50 04.42810	82 41 49.31750
LITTLE OTTER SPRING	Spring	Gilchrist	29 38 11.10199	82 57 30.33850
LUMBERCAMP SPRINGS	Spring	Gilchrist	29 42 23.69995	82 56 17.00002
NAKED SPRING	Spring	Gilchrist	29 49 47.70631	82 40 52.58593
OASIS SPRING	Spring	Gilchrist	29 55 32.81873	82 46 49.34863
OTTER SPRING	Spring	Gilchrist	29 38 41.28799	82 56 33.90968
PICKARD SPRING	Spring	Gilchrist	29 49 49.92287	82 39 43.51370
ROCK BLUFF SPRINGS	Spring	Gilchrist	29 47 56.70244	82 55 07.10573
SIPHON CREEK RISE	River Rise	Gilchrist	29 51 22.28796	82 43 58.98266
SUN SPRINGS	Spring	Gilchrist	29 42 17.05266	82 56 00.69796
TRAIL SPRING	Spring	Gilchrist	29 53 54.08930	82 52 00.16615
TWIN SPRING	Spring	Gilchrist	29 50 25.63336	82 42 21.10921
UNNAMED SPRING	Spring	Gilchrist	29 53 48.59192	82 46 01.67347
ALAPAHA RIVER RISE	River Rise	Hamilton	30 26 20.28890	83 05 22.42421
HAM1017974	Spring	Hamilton	30 25 03.78192	82 57 57.46288
HAM610982	Dry	Hamilton	30 25 02.76226	83 12 26.66790
HAM610983	Spring	Hamilton	30 25 13.47193	83 12 51.37945
HAM610984	Spring	Hamilton	30 26 25.51546	83 13 10.50028
HAM612982	Spring	Hamilton	30 28 29.08715	83 14 36.17819
HAM923973	Spring	Hamilton	30 25 08.13997	83 08 56.64998
HOLTON CREEK RISE	River Rise	Hamilton	30 26 16.51193	83 03 27.41134
MORGAN SPRING	Spring	Hamilton	30 25 12.79996	83 12 26.50000
POT SPRING	Spring	Hamilton	30 28 14.88900	83 14 03.83680
ROSSETER SPRING	Spring	Hamilton	30 32 40.78378	83 15 00.20466
SEVEN SISTERS SPRING	Spring	Hamilton	30 25 02.99993	83 09 19.19002
TANNER SPRING	Spring	Hamilton	30 27 52.46996	83 13 03.83999
ARIPEKA SPRING #1	Spring	Hernando	28 26 18.71084	82 39 31.62071
ARIPEKA SPRING #2	Spring	Hernando	28 26 07.06175	82 39 32.15603
BLIND SPRING	River Rise	Hernando	28 39 28.32178	82 38 04.62095

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
BOAT SPRING	Spring	Hernando	28 26 11.57852	82 39 23.43618
GATOR SPRING	Spring	Hernando	28 26 02.75456	82 39 05.61341
LITTLE SPRING	Spring	Hernando	28 30 48.47083	82 34 51.69968
MAGNOLIA SPRING	Spring	Hernando	28 26 01.93348	82 39 08.95630
RITA MARIE SPRINGS	Spring	Hernando	28 41 24.53773	82 35 20.10944
RYLES SPRING	Spring	Hernando	28 41 13.79555	82 36 50.82444
SALT SPRING	Spring	Hernando	28 32 46.74908	82 37 08.27512
WEEKI WACHEE SPRING	Spring	Hernando	28 31 01.88591	82 34 23.39828
BUCKHORN SPRING MAIN	Spring	Hillsborough	27 53 21.81080	82 18 09.79690
CANAL SPRING	Spring	Hillsborough	28 02 05.22798	82 20 34.88255
DOUBLE SPRING	Spring	Hillsborough	28 02 10.43941	82 20 37.52772
EUREKA SPRING	Man Made	Hillsborough	28 00 21.44066	82 20 45.15040
EUREKA UNNAMED SPRING	Man Made	Hillsborough	28 00 26.72676	82 20 38.59778
LAST SPRING	Spring	Hillsborough	28 02 02.78866	82 20 33.30366
LETTUCE LAKE SPRING	Spring	Hillsborough	28 01 05.52659	82 21 00.25600
LITHIA SPRINGS MAJOR	Spring	Hillsborough	27 51 58.60184	82 13 53.29394
PALMA CEIA SPRING	Spring	Hillsborough	27 55 18.73560	82 29 17.93494
SULPHUR SPRING	Spring	Hillsborough	28 01 16.08143	82 27 05.88568
HOLMES BLUE SPRING	Spring	Holmes	30 51 06.03450	85 53 09.04751
JACKSON SPRING	Spring	Holmes	30 42 42.03410	85 55 41.01654
PONCE DE LEON SPRINGS	Spring	Holmes	30 43 16.32590	85 55 50.46575
THUNDERING SPRINGS	Spring	Holmes	30 55 14.73953	85 53 27.13902
VORTEX SPRING	Spring	Holmes	30 46 13.98785	85 56 54.50546
BALTZELL SPRING	Spring	Jackson	30 49 50.15996	85 14 03.84000
BARREL SPRING	Spring	Jackson	30 35 32.75884	85 10 14.44800
BLACK SPRING	Spring	Jackson	30 41 55.40302	85 17 40.07576
BLUE HOLE SPRING	Spring	Jackson	30 49 12.52348	85 14 41.62272
DOUBLE SPRING	Spring	Jackson	30 42 13.67996	85 18 11.16000
GADSEN SPRING	Spring	Jackson	30 42 12.08682	85 17 18.42259
GATOR SPRING	Spring	Jackson	30 46 40.32732	85 10 01.73597
HAYS SPRING	Spring	Jackson	30 53 42.33124	85 13 28.14546
HIDDEN SPRING	Spring	Jackson	30 42 20.19996	85 18 26.08999
HILL SPRINGS	Spring	Jackson	30 39 51.62947	84 55 34.62006
HOLE-IN-THE-ROCK SPRING	Spring	Jackson	30 47 00.19622	85 09 22.11250
JACKSON BLUE SPRING	Spring	Jackson	30 47 25.85360	85 08 24.31806
JACKSON BLUE SPRING APALACHICOLA	Spring	Jackson	30 36 59.28347	84 55 19.37320
KING SPRING	Spring	Jackson	30 38 11.52064	84 55 10.24882
LITTLE LAGOON SPRING	Spring	Jackson	30 37 14.50376	85 10 02.87490
MAUND SPRING	Spring	Jackson	30 44 46.71532	85 12 55.79978
MILL POND SPRING	Spring	Jackson	30 42 13.31996	85 18 27.00000
RACOON SPRING	Spring	Jackson	30 42 24.56996	85 18 14.87002
ROCKY CREEK SPRING	Spring	Jackson	30 40 31.24114	85 07 55.38263
ROOKS SPRINGS	Spring	Jackson	30 41 16.43658	85 14 03.79594
SANDBAG SPRING	Spring	Jackson	30 47 19.39445	85 13 18.90707
SHANGRI-LA SPRINGS	Spring	Jackson	30 47 24.59713	85 08 34.38618
SINAI SPRING	Spring	Jackson	30 39 52.54999	84 54 37.65690
SPRINGBOARD SPRING	Spring	Jackson	30 42 26.63996	85 18 23.76000
TANNER SPRINGS	Spring	Jackson	30 49 29.83667	85 19 30.68040
TWIN CAVES SPRING	Spring	Jackson	30 47 12.88262	85 08 41.77590

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
WADELL MILL POND SPRING	Spring	Jackson	30 52 38.28439	85 20 41.64000
WEBBVILLE SPRINGS	Spring	Jackson	30 50 21.21000	85 20 04.32910
WHITE CAVE SPRING	Spring	Jackson	30 37 51.86035	84 55 21.86472
BIG BLUE SPRING	Spring	Jefferson	30 19 39.84154	83 59 05.37889
BRUMBLEY SPRING	Spring	Jefferson	30 20 41.38685	83 58 51.63330
BUZZARD LOG SPRING	Spring	Jefferson	30 19 48.49867	83 59 12.80159
CASSIDY SPRINGS	Spring	Jefferson	30 19 57.79618	83 59 20.53169
GARNER SPRING	Spring	Jefferson	30 19 49.11654	83 58 59.21861
HORSEHEAD SPRING	Spring	Jefferson	30 20 41.50061	83 59 40.35473
LITTLE BLUE SPRING	Spring	Jefferson	30 19 51.03001	83 59 20.53162
LOG SPRING	Spring	Jefferson	30 20 25.92060	83 59 34.81300
MAGGIE SPRINGS	Spring	Jefferson	30 20 24.28436	83 58 57.68033
MINNOW SPRING	Spring	Jefferson	30 19 53.52348	83 59 11.73419
THOMAS SPRING	Spring	Jefferson	30 20 22.96831	83 59 32.36658
WACISSA SPRING #4	Spring	Jefferson	30 20 25.49767	83 59 25.92294
WACISSA SPRING #1	Spring	Jefferson	30 20 22.12573	83 59 30.39677
WACISSA SPRING #2	Spring	Jefferson	30 20 23.58924	83 59 29.33542
WACISSA SPRING #3	Spring	Jefferson	30 20 26.13379	83 59 26.67959
WACISSA UNNAMED SPRING	Spring	Jefferson	30 18 08.21520	83 58 46.62692
ALLEN MILL POND SPRING	Spring	Lafayette	30 09 46.22782	83 14 35.05582
CONVICT SPRING	Spring	Lafayette	30 05 18.02483	83 05 45.48203
LAF57982	Spring	Lafayette	30 03 40.23209	83 03 26.53031
LAF718971	Spring	Lafayette	29 57 34.11421	82 57 11.94293
LAF718972	Spring	Lafayette	30 00 41.85806	83 00 15.33938
LAF919972	Spring	Lafayette	30 05 31.72952	83 06 48.07465
LAF922976	Spring	Lafayette	30 15 38.05693	83 14 58.86251
LAF924971	Spring	Lafayette	30 06 07.96039	83 09 57.99049
LAF929971	Spring	Lafayette	30 12 40.60735	83 14 43.44263
LAF929972	Spring	Lafayette	30 11 24.34132	83 15 01.50696
LAF929973	Spring	Lafayette	30 10 48.03586	83 14 51.87034
LAFAYETTE BLUE SPRING	Spring	Lafayette	30 07 33.00334	83 13 34.08020
MEARSON SPRING	Spring	Lafayette	30 02 28.83595	83 01 30.10127
OWENS SPRING	Spring	Lafayette	30 02 45.39289	83 02 28.06919
PERRY SPRING	Spring	Lafayette	30 05 47.06556	83 11 17.70104
RUTH SPRING	Spring	Lafayette	29 59 44.78154	82 58 36.50272
STEINHATCHEE SPRING	Spring	Lafayette	29 50 28.54568	83 18 29.04944
TROY SPRING	Spring	Lafayette	30 00 21.69385	82 59 51.00914
TURTLE SPRING	Spring	Lafayette	29 50 50.61469	82 53 25.02992
UNNAMED SPRING	Spring	Lafayette	29 53 40.41316	83 14 38.92344
ALEXANDER SPRINGS	Spring	Lake	29 04 52.68292	81 34 33.18089
APOPKA SPRING	Spring	Lake	28 33 59.76522	81 40 50.40768
BEAR SPRING	Seep	Lake	28 39 06.13933	81 43 00.77887
BLACKWATER SPRINGS	Spring	Lake	28 53 17.12548	81 29 50.83508
BLUE ALGAE BOIL SPRING	Spring	Lake	28 52 30.37652	81 26 26.32506
BLUEBERRY SPRING	Spring	Lake	28 51 02.63448	81 26 41.48441
BOULDER SPRINGS	Spring	Lake	28 52 17.96837	81 27 00.35546
BUGG SPRING	Spring	Lake	28 45 07.15223	81 54 05.46221
CAMP LE NO CHE SPRING	Spring	Lake	28 57 08.71600	81 32 31.88220
DROTY SPRING	Spring	Lake	28 49 41.03508	81 30 37.29701
GREEN ALGAE BOIL SPRING	Spring	Lake	28 52 32.87694	81 26 24.73411

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
HOLIDAY SPRING	Spring	Lake	28 44 25.44860	81 49 04.68854
LAKE BLUE SPRINGS	Spring	Lake	28 44 55.14115	81 49 40.11391
MARKEE SPRING	Spring	Lake	28 52 14.15240	81 27 09.83128
MOCCASIN SPRINGS	Spring	Lake	28 51 08.20548	81 26 34.45814
MOORING COVE SPRINGS	Spring	Lake	28 45 00.42131	81 50 01.22777
MOSQUITO SPRINGS	Spring	Lake	29 02 11.32973	81 26 04.99063
PALM SPRINGS	Spring	Lake	28 50 37.57891	81 27 00.34247
SANDYS SPRINGS	Spring	Lake	28 44 42.10472	81 48 35.94629
SHARKS TOOTH SPRING	Spring	Lake	28 52 23.72635	81 26 24.09781
SNAIL SPRINGS	Spring	Lake	28 49 25.84384	81 29 11.31756
SUN EDEN SPRING	Spring	Lake	28 44 39.97698	81 49 11.59727
WOLF HEAD SPRING	Seep	Lake	28 38 41.86741	81 42 23.74373
HORN SPRING	Spring	Leon	30 19 08.88884	84 07 43.44719
LEON UNNAMED SPRING #2	Spring	Leon	30 16 51.53736	84 08 50.38638
NATURAL BRIDGE SPRING	Spring	Leon	30 17 06.66470	84 08 49.64183
RHODES SPRING #1	Karst Window	Leon	30 17 01.78994	84 09 18.55663
RHODES SPRING #2	Karst Window	Leon	30 17 11.25902	84 09 35.83872
RHODES SPRING #4	Karst Window	Leon	30 17 00.71419	84 09 26.17790
ST MARKS RIVER RISE	River Rise	Leon	30 16 33.77096	84 08 56.15862
BIG KING SPRING	Spring	Levy	29 06 59.12338	82 38 32.13899
FANNING SPRINGS	Spring	Levy	29 35 15.32191	82 56 07.09559
LANCASTER SPRING	Spring	Levy	29 11 26.52115	82 59 17.41960
LEV719991	Spring	Levy	29 27 03.69954	82 41 43.31526
LEVY BLUE SPRING	Spring	Levy	29 27 02.68632	82 41 56.27890
LITTLE FANNING SPRING	Spring	Levy	29 35 11.02801	82 56 07.69423
LITTLE KING SPRING	Spring	Levy	29 06 39.04787	82 38 52.13515
MANATEE SPRING	Spring	Levy	29 29 22.20119	82 58 36.73866
WEKIVA SPRINGS	Spring	Levy	29 16 49.49425	82 39 21.89729
FARA SPRING	Spring	Madison	30 16 34.43992	83 14 08.94790
LAF922975	Spring	Madison	30 15 40.19908	83 14 47.69736
LIVINGSTON SPRING	Seep	Madison	30 28 34.21996	83 24 39.80891
MAD610981	Spring	Madison	30 24 53.86241	83 12 05.32220
MADISON BLUE SPRING	Spring	Madison	30 28 49.56870	83 14 39.70763
SUWANACOOCHEE SPRING	Spring	Madison	30 23 12.01740	83 10 18.35922
MANATEE MINERAL SPRING	Spring	Manatee	27 29 51.40802	82 32 57.03590
BLUE GROTTO SPRING	Spring	Marion	29 12 54.90590	82 02 59.59133
BUBBLING SPRING	Spring	Marion	29 06 04.45568	82 26 05.45136
CAMP SEMINOLE SPRINGS	Well Augmented	Marion	29 30 21.79253	81 57 05.23206
FERN HAMMOCK SPRINGS	Spring	Marion	29 11 00.86384	81 42 29.50128
INDIAN CREEK SPRING #2	Spring	Marion	29 05 35.59200	82 25 15.83720
INDIAN CREEK SPRING #3	Spring	Marion	29 05 34.63847	82 25 15.20821
INDIAN CREEK SPRING #4	Spring	Marion	29 05 34.81609	82 25 16.22651
JACOBS WELL SPRING	Spring	Marion	29 12 53.91616	82 03 06.56150
JUNIPER SPRINGS	Spring	Marion	29 11 01.34171	81 42 44.68090
MORMAN BRANCH SPRING	Spring	Marion	29 11 32.83310	81 39 27.86598
ORANGE SPRING	Spring	Marion	29 30 38.34216	81 56 38.65956
RAINBOW BRIDGE SEEPS	Seep	Marion	29 06 06.93691	82 26 15.79805
RAINBOW CAVE SPRING	Spring	Marion	29 05 24.88474	82 25 35.23602
RAINBOW EAST SEEP	Seep	Marion	29 06 09.72821	82 26 14.29706
RAINBOW SEEP #1	Seep	Marion	29 06 09.75326	82 26 15.04144

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
RAINBOW SPRING #1	Spring	Marion	29 06 08.91328	82 26 14.87918
RAINBOW SPRING #2	Spring	Marion	29 06 08.34505	82 26 14.18438
RAINBOW SPRING #3	Spring	Marion	29 06 07.54517	82 26 13.97962
RAINBOW SPRING #4	Spring	Marion	29 06 06.86693	82 26 13.77319
RAINBOW SPRING #5	Spring	Marion	29 05 54.60688	82 26 10.93715
RAINBOW SPRING #6	Spring	Marion	29 05 34.11042	82 25 42.83152
RAINBOW SPRING #7	Spring	Marion	29 05 32.12585	82 25 36.36966
RAINBOW SPRING NORTH	Spring	Marion	29 06 09.70546	82 26 16.36307
RAINBOW UNNAMED SWAMP SPRING	Spring	Marion	29 05 36.49985	82 25 44.31486
RECEPTION HALL SPRING	Spring	Marion	29 12 52.60666	82 03 05.05098
SALT SPRINGS	Spring	Marion	29 21 02.35728	81 43 58.05199
SILVER GLEN SPRINGS	Spring	Marion	29 14 45.03815	81 38 36.50111
SILVER SPRING #1	Spring	Marion	29 12 53.50633	82 03 04.73569
SILVER SPRING #10	Spring	Marion	29 12 55.49720	82 02 42.52348
SILVER SPRING #11	Spring	Marion	29 12 55.58936	82 02 38.06164
SILVER SPRING #12	Spring	Marion	29 12 56.97245	82 02 42.01152
SILVER SPRING #2	Spring	Marion	29 12 54.42959	82 03 03.41323
SILVER SPRING #3	Spring	Marion	29 12 55.39442	82 03 00.69887
SILVER SPRING #4	Spring	Marion	29 12 58.17215	82 02 57.09494
SILVER SPRING #5	Spring	Marion	29 12 58.00187	82 02 54.58020
SILVER SPRING #6	Spring	Marion	29 12 56.03980	82 02 50.67046
SILVER SPRING #7	Spring	Marion	29 12 56.14427	82 02 46.91695
SILVER SPRING #8	Spring	Marion	29 12 57.73619	82 02 44.98739
SILVER SPRING #9	Spring	Marion	29 12 56.16346	82 02 43.83229
SILVER SPRINGS MAIN	Spring	Marion	29 12 58.34214	82 03 09.47239
SWEETWATER SPRINGS	Spring	Marion	29 13 07.60094	81 39 35.52840
TOBACCO PATCH SPRINGS	Spring	Marion	29 25 42.72740	81 55 26.08666
WATERFALL SPRINGS	Spring	Marion	29 06 05.25528	82 26 08.39040
WELLS LANDING SPRINGS	Spring	Marion	29 25 15.65587	81 55 10.85120
WILSON HEAD SPRING	Spring	Marion	28 58 47.14367	82 19 17.27814
SU-NO-WA SPRING	Seep	Nassau	30 26 17.16518	81 52 59.30782
EGLIN BLUE SPRING	Seep	Okaloosa	30 38 45.81445	86 27 06.63498
ROCK SPRINGS	Spring	Orange	28 45 23.20358	81 30 06.24503
SULFUR SPRING	Spring	Orange	28 46 12.65160	81 30 33.06002
UNNAMED SPRING	Seep	Orange	28 40 50.29345	81 33 21.42540
WEKIWA SPRING	Spring	Orange	28 42 42.79147	81 27 37.51506
WITHERINGTON SPRING	Spring	Orange	28 43 53.72944	81 29 23.66520
CRYSTAL SPRINGS	Spring	Pasco	28 10 55.92310	82 11 06.53075
HORSESHOE SPRING	Spring	Pasco	28 23 51.18317	82 41 23.82767
CRYSTAL BEACH SPRING	Submarine Spring	Pinellas	28 05 03.96406	82 47 05.10911
HEALTH SPRING	Spring	Pinellas	28 06 23.08536	82 46 20.08888
BEECHER SPRINGS	Spring	Putnam	29 26 55.16801	81 38 48.70601
FOREST SPRING	Spring	Putnam	29 27 31.67993	81 39 30.60000
MUD SPRING	Spring	Putnam	29 27 39.59996	81 39 41.40000
NASHUA SPRING	Spring	Putnam	29 30 32.75996	81 40 37.20000
SATSUMA SPRING	Spring	Putnam	29 30 45.35996	81 40 31.79996
WELAKA SPRING	Spring	Putnam	29 29 40.39415	81 40 23.69773
WHITEWATER SPRINGS	Seeps	Putnam	29 38 01.31996	81 38 34.44000
WARM MINERAL SPRING	Spring	Sarasota	27 03 35.64500	82 15 35.83390

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
CLIFTON SPRINGS	Spring	Seminole	28 41 59.53978	81 14 17.22397
ELDER SPRING	Seep	Seminole	28 44 27.78490	81 17 28.75769
GINGER ALE SPRING	Spring	Seminole	28 41 33.56891	81 23 27.89736
HARDEN SPRING	Man Made	Seminole	28 49 16.99759	81 25 00.73049
HEATH SPRING	Seep	Seminole	28 44 42.69725	81 07 41.34605
LAKE JESSUP SPRING	Man Made	Seminole	28 42 36.79920	81 16 04.76468
MIAMI SPRINGS	Spring	Seminole	28 42 36.59591	81 26 34.91135
NOVA SPRING	Spring	Seminole	28 49 03.02	81 25 06.65
SANLANDO SPRINGS	Spring	Seminole	28 41 19.32374	81 23 43.06664
STARBUCK SPRING	Spring	Seminole	28 41 49.24784	81 23 28.21542
FENNEY SPRING	Spring	Sumter	28 47 41.99129	82 02 17.21058
GUM SPRINGS MAIN	Spring	Sumter	28 57 31.39798	82 13 53.49317
ANDERSON SPRING	Spring	Suwannee	30 21 12.27474	83 11 23.01403
BAPTIZING	Karst Window	Suwannee	30 08 01.90540	83 08 02.96300
BATHTUB SPRING	Spring	Suwannee	30 05 30.21454	83 05 54.01471
BETTY SPRING	Spring	Suwannee	29 54 53.19652	82 50 23.84185
BLUE SINK SPRING	Spring	Suwannee	30 20 08.48569	82 48 30.39404
BONNET SPRING	Spring	Suwannee	30 07 27.56312	83 08 17.45945
BRANFORD SPRING	Spring	Suwannee	29 57 17.52527	82 55 42.27175
CHARLES SPRING	Spring	Suwannee	30 10 02.50997	83 13 49.27001
COFFEE SPRINGS	Spring	Suwannee	29 57 34.04671	82 46 31.17828
COW SPRING	Spring	Suwannee	30 06 19.01995	83 06 49.70999
DEVIL'S EYE SPRINGS	Spring	Suwannee	29 58 25.22532	82 45 36.03208
ELLAVILLE SPRING	Spring	Suwannee	30 23 04.07800	83 10 21.01832
FALMOUTH	Karst Window	Suwannee	30 21 40.18723	83 08 05.97030
HIDDEN SPRING	Spring	Suwannee	30 06 09.37386	83 06 50.39762
ICHETUCKNEE SPRING	Spring	Suwannee	29 59 03.09750	82 45 42.72664
LIME RUN SPRING	Spring	Suwannee	30 23 20.38942	83 09 48.11936
LIME SPRING	Spring	Suwannee	30 23 28.38764	83 10 07.31993
LITTLE RIVER SPRING	Spring	Suwannee	29 59 48.71054	82 57 58.74329
LURAVILLE SPRING	Spring	Suwannee	30 07 10.40095	83 10 01.64914
ORANGE GROVE	Karst Window	Suwannee	30 07 38.13488	83 07 50.74802
PEACOCK SPRING	Spring	Suwannee	30 07 23.61518	83 07 59.35274
PUMP	Sinkhole	Suwannee	30 08 19.63928	83 08 06.97474
ROYAL SPRING	Spring	Suwannee	30 05 01.36334	83 04 29.20753
RUNNING SPRINGS	Spring	Suwannee	30 06 16.07076	83 06 57.32302
SHINGLE SPRING	Spring	Suwannee	29 56 03.81646	82 55 13.62360
SHIRLEY SPRING	Spring	Suwannee	30 12 39.62995	83 14 41.34998
STEVENSON SPRING	Spring	Suwannee	30 25 01.51997	83 09 10.62000
SUW1017971	Dry	Suwannee	30 25 42.43584	83 01 46.56536
SUW1017972	Spring	Suwannee	30 25 22.95073	83 00 55.52798
SUW718971	Spring	Suwannee	30 03 50.56466	83 03 43.18801
SUW725971	Spring	Suwannee	30 03 43.25576	83 03 26.30311
SUW917971	Spring	Suwannee	29 55 56.60828	82 48 02.70324
SUW919971	Spring	Suwannee	30 05 01.09014	83 05 13.40473
SUW922971	Spring	Suwannee	30 17 08.68996	83 13 51.70001
SUWANNEE BLUE SPRING	Spring	Suwannee	30 04 53.29805	83 04 08.47682
SUWANNEE SPRINGS	Spring	Suwannee	30 23 40.11979	82 56 04.33547
TELFORD SPRING	Spring	Suwannee	30 06 25.37824	83 09 56.66105
WALKER	Sinkhole	Suwannee	30 08 00.64820	83 07 47.22877

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
BEAVER CREEK SPRING	Spring	Taylor	29 45 57.41093	83 20 06.17885
BIG SPRING	Spring	Taylor	29 58 27.36930	83 44 19.79621
BRADLEY SPRING	Spring	Taylor	29 42 00.16996	83 24 40.06998
CAMP GROUND SPRING	Spring	Taylor	30 04 04.26511	83 33 13.76330
CEDAR ISLAND SPRING	Spring	Taylor	29 48 58.72961	83 35 01.97444
EVA SPRING	Spring	Taylor	29 40 39.76997	83 23 57.31001
FENHOLLOWAY SPRING	Spring	Taylor	30 04 23.40127	83 40 00.32376
FOLSOM SPRING	Spring	Taylor	30 06 49.85996	83 34 41.32999
HAMPTON SPRING	Spring	Taylor	30 04 53.35975	83 39 46.24549
JABO SPRING	Spring	Taylor	29 52 57.31039	83 37 22.50797
NUTALL RIVER RISE	River Rise	Taylor	30 09 01.72447	83 57 47.82391
SPRING WARRIOR SPRING	Spring	Taylor	29 56 06.06628	83 36 35.15659
TAY616992	Spring	Taylor	29 54 45.11268	83 39 02.94174
TAY622991	Spring	Taylor	29 52 24.79994	83 37 32.59999
TAY69991	Spring	Taylor	29 58 11.67114	83 44 43.47150
TAY76991	Spring	Taylor	29 40 34.90997	83 23 07.27001
TAY924991	Spring	Taylor	30 06 28.64660	83 37 38.61797
TAY924993	Spring	Taylor	30 06 29.97432	83 37 41.43925
UNNAMED SPRING	Spring	Taylor	30 06 25.85866	83 37 35.92492
UNNAMED SPRING	Spring	Taylor	29 52 24.89995	83 37 33.80002
WALDO SPRING	Spring	Taylor	30 02 57.04282	83 37 47.73504
WORTHINGTON SPRING	Spring	Union	29 55 35.78552	82 25 33.30311
DeLEON SPRING	Spring	Volusia	29 08 03.40811	81 21 45.89417
GEMINI SPRINGS	Spring	Volusia	28 51 45.97816	81 18 41.05552
GREEN SPRINGS	Spring	Volusia	28 51 46.03925	81 14 50.92382
SEMINOLE SPRING	Well	Volusia	28 50 43.78862	81 14 02.65409
VOLUSIA BLUE SPRING	Spring	Volusia	28 56 50.94154	81 20 22.51824
CRAY'S RIVER RISE	River Rise	Wakulla	29 59 22.19996	84 24 28.80000
INDIAN SPRING	Spring	Wakulla	30 15 02.87863	84 19 19.50193
MCBRIDE SLOUGH SPRING	Spring	Wakulla	30 14 23.93959	84 16 10.43450
NEWPORT SPRING	Spring	Wakulla	30 12 45.70142	84 10 42.56281
NORTHSIDE SPRING #1	Spring	Wakulla	30 14 15.10638	84 16 52.31978
NORTHSIDE SPRING #2	Spring	Wakulla	30 14 15.30334	84 16 52.48625
PANACEA MINERAL SPRING #1	Spring	Wakulla	30 02 04.85228	84 23 23.63903
PANACEA MINERAL SPRING #2	Spring	Wakulla	30 02 04.97922	84 23 24.29398
PANACEA MINERAL SPRING #3	Spring	Wakulla	30 02 06.12996	84 23 26.28935
SALLY WARD SPRING	Spring	Wakulla	30 14 29.08982	84 18 38.87953
SHEPHERD SPRING	Spring	Wakulla	30 07 31.07993	84 17 07.80000
SPRING CREEK RISE #2	Submarine Spring	Wakulla	30 04 54.42470	84 19 47.62675
SPRING CREEK RISE MAIN	Submarine Spring	Wakulla	30 04 48.63742	84 19 47.30992
WAKULLA NO NAME SPRING	Spring	Wakulla	30 12 53.33224	84 15 59.41858
WAKULLA SPRING	Spring	Wakulla	30 14 06.64382	84 18 09.21445
ECUCHEE	Seep	Walton	30 44 13.63769	86 11 36.57512
EUCHEE	Seep	Walton	30 44 20.18904	86 12 16.94930
MORRISON SPRING	Spring	Walton	30 39 28.38082	85 54 14.17759
BECKTON SPRING	Spring	Washington	30 38 55.12913	85 41 37.18691
BRUNSON LANDING SPRING	Spring	Washington	30 36 33.22386	85 45 30.88955
CLEMMONS SPRING	Seep	Washington	30 38 29.09602	85 41 34.67252
CYPRESS SPRINGS	Spring	Washington	30 39 31.48618	85 41 03.74010
DRINKING SPRING	Spring	Washington	30 36 44.82670	85 49 23.58433

SPRING NAME	TYPE	COUNTY	LATITUDE	LONGITUDE
GALLOWAY SPRING	Spring	Washington	30 35 50.85632	85 50 31.25684
HIGHTOWER SPRING	Spring	Washington	30 36 18.18864	85 45 55.50811
JACK PAUL SPRINGS	Spring	Washington	30 36 46.29344	85 44 01.46141
MILLERS FERRY SPRING	Spring	Washington	30 34 27.77538	85 50 25.72832
PINEY WOOD SPRING	Spring	Washington	30 39 30.78500	85 41 26.30076
SHELL CRACKER	Seep	Washington	30 39 04.37544	85 41 14.65876
SKIPPER SPRING	Spring	Washington	30 34 32.92918	85 50 37.58482
UNNAMED SPRING	Seep	Washington	30 40 09.90959	85 39 19.72148
UNNAMED SPRING	Seep	Washington	30 40 07.62715	85 39 20.89912
UNNAMED SPRING	Spring	Washington	30 34 41.56356	85 50 16.77052
UNNAMED SPRING	Spring	Washington	30 34 40.58346	85 50 21.17558
WASHINGTON BLUE SPRING CHOCTAWHATCHEE	Spring	Washington	30 30 47.73215	85 50 49.86766
WASHINGTON BLUE SPRINGS ECONFINA	Spring	Washington	30 27 10.16100	85 31 49.32757
WILLIFORD SPRING	Spring	Washington	30 26 22.38644	85 32 51.29221

Appendix B2
Location of additional known or reported springs in Florida not visited by FGS spring teams.

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
ALA112971	Alachua	29 51 16.94	82 36 10.59	SRWMD
DEEP SPRINGS	Bay	30 30 57.45	85 27 09.86	NWFWMD
GAINER SPRINGS #1A	Bay	30 25 43.11	85 32 46.11	NWFWMD
GAINER SPRINGS #1B	Bay	30 25 43.09	85 32 47.34	NWFWMD
GAINER SPRINGS #1D	Bay	30 25 43.09	85 32 46.5	NWFWMD
GAINER SPRINGS #1E	Bay	30 25 43.15	85 32 47.30	NWFWMD
GAINER SPRINGS #1F	Bay	30 25 43.20	85 32 48.22	NWFWMD
GAINER SPRINGS #1G	Bay	30 25 38.61	85 32 48.47	NWFWMD
GAINER SPRINGS #1H	Bay	30 25 38.59	85 32 49.09	NWFWMD
GAINER SPRINGS #1I	Bay	30 25 38.55	85 32 51.68	NWFWMD
GAINER SPRINGS #4	Bay	30 25 31.48	85 32 54.42	NWFWMD
GAINER SPRINGS #5	Bay	30 25 37.00	85 32 53.96	NWFWMD
SYLVAN SPRINGS #2	Bay	30 26 02.24	85 32 55.13	NWFWMD
SYLVAN SPRINGS #3	Bay	30 25 56.77	85 32 55.77	NWFWMD
HEILBRONN SPRING	Bradford	30 01 25.73	82 09 19.99	
CRUMBLY SPRING	Calhoun	30 35 29.10	85 10 15.77	NWFWMD
PEACOCK SPRING	Calhoun	30 32 12.65	85 09 58.77	NWFWMD
WINDOW SPRING	Calhoun	30 32 49.18	85 10 05.87	NWFWMD
ABDONEY SPRING	Citrus	28 47 48.69	82 35 10.05	SWFWMD
BELCHER SPRING	Citrus	28 47 48.29	82 35 10.63	SWFWMD
HALLS RIVER #1 SPRING	Citrus	28 49 20.88	82 35 38.21	SWFWMD
HALLS RIVER HEAD SPRING	Citrus	28 49 36.51	82 34 49.18	SWFWMD
HIDDEN RIVER #2 SPRING	Citrus	28 46 07.01	82 35 03.63	SWFWMD
HIDDEN RIVER HEAD SPRING	Citrus	28 46 07.36	82 34 59.69	SWFWMD
MCCLAIN SPRING	Citrus	28 47 46.57	82 35 13.90	SWFWMD
TARPON HOLE #2 SPRING	Citrus	28 52 53.92	82 35 37.36	SWFWMD
THREE SISTERS #2 SPRING	Citrus	28 53 17.20	82 35 23.11	SWFWMD
THREE SISTERS RUN SPRING	Citrus	28 53 17.12	82 35 22.30	SWFWMD
TROTTER #1 SPRING	Citrus	28 47 46.89	82 35 10.83	SWFWMD
COL101975	Columbia	29 50 01.76	82 40 41.55	SRWMD
COL428982	Columbia	29 49 38.16	82 38 45.68	SRWMD
COL61981	Columbia	29 56 04.00	82 31 49.99	SRWMD
COL61982	Columbia	29 56 17.90	82 31 49.33	SRWMD
GRASSY HOLE	Columbia	29 58 05.00	82 45 35.36	SRWMD
JAMISON SPRINGS	Columbia	29 55 32.97	82 46 12.44	SRWMD
DIX625991	Dixie	29 43 36.81	83 20 40.73	SRWMD
DIX625992	Dixie	29 43 08.56	83 20 46.36	SRWMD
DIX625993	Dixie	29 40 37.18	83 21 38.96	SRWMD
DIX625994	Dixie	29 40 35.61	83 21 50.51	SRWMD
IRON SPRINGS	Dixie	29 40 25.05	82 57 27.33	SRWMD
ROCK SINK SPRING	Dixie	29 43 40.45	82 56 57.4	SRWMD
GIL1012974	Gilchrist	29 51 52.13	82 44 24.26	SRWMD
GIL101971	Gilchrist	29 49 56.43	82 40 42.25	SRWMD
GIL107971	Gilchrist	29 53 27.62	82 52 27.00	SRWMD
GIL107971	Gilchrist	29 53 27.62	82 52 27.00	SRWMD
GIL107972	Gilchrist	29 53 56.39	82 51 58.52	SRWMD
GIL729971	Gilchrist	29 53 21.67	82 52 29.88	SRWMD
GIL729972	Gilchrist	29 54 45.95	82 50 12.43	SRWMD
GIL729973	Gilchrist	29 54 48.25	82 50 12.08	SRWMD
GIL917971	Gilchrist	29 54 41.08	82 50 32.46	SRWMD

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
GIL917972	Gilchrist	29 51 36.98	82 52 46.32	SRWMD
GIL917973	Gilchrist	29 51 31.85	82 52 51.07	SRWMD
GIL928972	Gilchrist	29 52 49.65	82 45 11.91	SRWMD
GIL99971	Gilchrist	29 55 16.79	82 49 26.77	SRWMD
GIL99974	Gilchrist	29 55 06.96	82 46 18.26	SRWMD
HAM1017971	Hamilton	30 25 33.80	83 01 20.89	SRWMD
HAM1017972	Hamilton	30 25 40.47	83 01 40.50	SRWMD
HAM1017973	Hamilton	30 25 23.64	83 00 38.32	SRWMD
HAM1019971	Hamilton	30 23 24.62	82 55 36.60	SRWMD
HAM1019972	Hamilton	30 24 01.29	82 56 36.34	SRWMD
HAM1023971	Hamilton	30 23 10.12	82 54 22.87	SRWMD
HAM522981	Hamilton	30 20 35.32	82 50 29.11	SRWMD
HAM610981	Hamilton	30 24 56.43	83 11 57.74	SRWMD
HAM923972	Hamilton	30 25 08.23	83 08 42.53	SRWMD
LOUISE SPRINGS	Hamilton	30 20 47.37	82 49 54.20	SRWMD
WHITE SPRINGS	Hamilton	30 19 46.88	82 45 40.06	SRWMD
BEAUFORD SPRING	Hernando	28 38 09.82	82 35 47.24	SWFWMD
BETTY JAY SPRING	Hernando	28 41 25.39	82 35 29.41	SWFWMD
BLUE RUN SPRING	Hernando	28 41 12.50	82 36 05.17	SWFWMD
BOBHILL SPRING	Hernando	28 26 04.96	82 38 27.98	SWFWMD
JENKINS CREEK SPRING	Hernando	28 31 19.31	82 38 02.64	SWFWMD
MUD SPRING	Hernando	28 32 46.98	82 37 29.35	SWFWMD
BOYETTE SPRING	Hillsborough	27 51 13.20	82 16 26.52	SWFWMD
BUCKHORN EAST SPRING	Hillsborough	27 53 20.67	82 18 05.19	SWFWMD
BUCKHORN SOUTH SPRING	Hillsborough	27 53 12.85	82 18 18.76	SWFWMD
BUCKHORN WEST SPRING	Hillsborough	27 53 21.14	82 18 16.82	SWFWMD
GREEN SINK	Hillsborough	27 52 02.93	82 17 00.84	SWFWMD
LITHIA MINOR SPRING	Hillsborough	27 51 55.14	82 13 51.58	SWFWMD
BOSEL #1	Jackson	30 49 50.60	85 14 02.91	NWFWMD
BOSEL #2	Jackson	30 49 50.31	85 14 03.42	NWFWMD
COFFIN SPRING	Jackson	30 42 27.52	85 18 23.34	NWFWMD
DANIEL SPRING #1	Jackson	30 56 55.32	85 18 57.74	NWFWMD
DANIEL SPRING #2	Jackson	30 56 56.90	85 18 56.18	NWFWMD
DANIEL SPRING #3	Jackson	30 56 55.61	85 18 53.18	NWFWMD
DANIEL SPRING #4	Jackson	30 56 51.89	85 18 54.51	NWFWMD
DANIEL SPRING #5	Jackson	30 56 50.99	85 18 51.45	NWFWMD
DANIEL SPRING #6	Jackson	30 56 43.75	85 18 46.34	NWFWMD
DANIEL SPRING #7	Jackson	30 56 43.72	85 18 46.09	NWFWMD
DRY CREEK RISE	Jackson	30 41 19.07	85 17 27.96	NWFWMD
HAYS SPRING #1	Jackson	30 53 44.79	85 13 30.35	NWFWMD
HAYS SPRING #2	Jackson	30 53 43.66	85 13 29.19	NWFWMD
HELLER SPRING #1	Jackson	30 49 53.13	85 19 37.16	NWFWMD
INDIAN WASHTUB	Jackson	30 47 17.02	85 08 42.46	NWFWMD
JORDAN SPRING	Jackson	30 46 10.5	85 11 57.31	NWFWMD
MCRAE SPRING #1	Jackson	30 34 09.59	85 10 33.72	NWFWMD
MCRAE SPRING #2	Jackson	30 34 09.59	85 10 33.72	NWFWMD
MCRAE SPRING #3	Jackson	30 34 10.83	85 10 33.89	NWFWMD
MCRAE SPRING #4	Jackson	30 34 12.54	85 10 34.36	NWFWMD
MCRAE SPRING #5	Jackson	30 34 12.54	85 10 34.36	NWFWMD
MCRAE SPRING RESURGENCE	Jackson	30 34 10.40	85 10 25.57	NWFWMD

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
ROOKS SPRING #2	Jackson	30 41 17.37	85 14 03.13	NWFWMD
SIMMS SPRING	Jackson	30 42 39.09	85 12 24.80	NWFWMD
THE CRACK	Jackson	30 42 25.86	85 18 26.48	NWFWMD
UNNAMED SPRING	Jackson	30 49 48.90	85 14 11.25	NWFWMD
UNNAMED SPRING	Jackson	30 49 47.94	85 14 12.66	NWFWMD
JEF312991	Jefferson	30 20 41.82	83 59 45.06	SRWMD
JEF63991	Jefferson	30 19 29.81	83 59 09.11	SRWMD
JEF63992	Jefferson	30 19 23.51	83 59 12.09	SRWMD
JEF64991	Jefferson	30 20 38.88	83 58 49.49	SRWMD
FLETCHER SPRINGS	Lafayette	29 50 48	82 53 34	SRWMD
IRON SPRING	Lafayette	29 49 35.50	83 18 28.96	SRWMD
LAF1024001	Lafayette	30 00 27.06	82 58 56.10	SRWMD
LAF710981	Lafayette	30 02 42.36	83 02 01.91	SRWMD
LAF919971	Lafayette	30 06 11.58	83 08 51.53	SRWMD
LAF922977	Lafayette	30 15 34.87	83 15 05.40	SRWMD
LAF924972	Lafayette	30 06 17.30	83 12 14.10	SRWMD
LAF929971	Lafayette	30 12 37.25	83 14 45.71	SRWMD
LAF93971	Lafayette	29 57 40.88	82 57 16.51	SRWMD
BLACKWATER MINOR #1	Lake	28 53 17.54	81 29 48.99	Seminole S.F.
BLACKWATER MINOR #2	Lake	28 53 18.30	81 29 50.15	Seminole S.F.
BLACKWATER MINOR #3	Lake	28 53 18.00	81 29 52.00	Seminole S.F.
BLACKWATER MINOR #4	Lake	28 53 17.29	81 29 52.60	Seminole S.F.
BOULDER MINOR #1	Lake	28 52 18.53	81 27 01.73	Seminole S.F.
DOUBLE RUN SPRING	Lake	29 40 47	81 44 32	SJRWMD
MARKEE MINOR #1	Lake	28 52 16.29	81 27 10.36	Seminole S.F.
MESSANT SPRING	Lake	28 51 21	81 29 56	SJRWMD
SEMINOLE SPRING	Lake	28 50 44	81 31 22	SJRWMD
UNNAMED SPRING	Lake	28 52 28.30	81 26 42.17	Seminole S.F.
LN-UNK SPRING #1	Leon	30 16 58	84 09 04	NWFWMD
LEV97991	Levy	29 11 30.40	82 59 19.41	SRWMD
MAD610982	Madison	30 24 54.24	83 12 07.05	SRWMD
MAD612981	Madison	30 27 02.96	83 13 23.83	SRWMD
MAD612982	Madison	30 28 20.95	83 14 35.67	SRWMD
MAD922971	Madison	30 18 24.17	83 12 53.62	SRWMD
MAD922972	Madison	30 18 12.34	83 13 20.80	SRWMD
MAD922973	Madison	30 18 08.54	83 13 29.34	SRWMD
MAD922974	Madison	30 18 08.27	83 13 29.82	SRWMD
MAD922975	Madison	30 17 36.63	83 13 57.21	SRWMD
MAD922976	Madison	30 16 56.92	83 13 57.55	SRWMD
BLUE	Marion	29 30 51	81 51 25	SJRWMD
NICHOLS SPRING	Marion	28 50 22	82 12 10	USGS
RAINBOW #8 SPRING	Marion	29 05 04.63	82 25 44.08	SWFWMD
RAINBOW SWAMP #4 SPRING	Marion	29 05 34.78	82 25 16.42	SWFWMD
RIVERSITES	Marion	29 26 29	81 55 25	SJRWMD
BARREL SPRING	Orange	28 42 41	81 28 18	SJRWMD
CRYSTAL #1 SPRING	Pasco	28 10 56.58	82 11 06.55	SWFWMD
CRYSTAL #2 SPRING	Pasco	28 10 56.58	82 11 06.67	SWFWMD
CRYSTAL #3 SPRING	Pasco	28 10 56.71	82 11 06.58	SWFWMD
CRYSTAL #4 SPRING	Pasco	28 10 56.67	82 11 08.52	SWFWMD
CRYSTAL #5 SPRING	Pasco	28 10 58.24	82 11 08.53	SWFWMD

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
CRYSTAL #6 SPRING	Pasco	28 10 58.78	82 11 07.76	SWFWMD
CRYSTAL COMPOSITE	Pasco	28 10 57.83	82 11 08.17	SWFWMD
CRYSTAL SWAMP #1 SPRING	Pasco	28 11 13	82 10 52	SWFWMD
CRYSTAL SWAMP #2 SPRING	Pasco	28 11 06	82 10 48	SWFWMD
CRYSTAL SWAMP #3 SPRING	Pasco	28 11 07	82 11 34	SWFWMD
SALT SPRING 2	Pasco	28 17 35.51	82 43 04.42	SWFWMD
CROAKER HOLE	Putnam	29 26 18	81 21 41	SJRWMD
CHUMUCKLA SPRINGS	Santa Rosa	30 50 00.90	87 17 48.76	NWFWMD
ISLAND SPRING	Seminole	28 49 24.40	81 25 01.80	FDEP
PALM SPRING	Seminole	28 41 28.03	81 23 34.23	FDEP
UNNAMED SPRING	Seminole	28 49 03.20	81 25 07.00	FDEP
CRESCENT BEACH SPRING	St. Johns	29 46 06	81 12 30	SJRWMD
SHANDS BRIDGE SPRING	St. Johns	29 59 16	81 37 28	SJRWMD
A. WAYNE LEE SPRING	Sumter	28 51 34.91	82 05 15.71	SWFWMD
ALLIGATOR SPRING	Sumter	28 57 36.82	82 13 45.68	SWFWMD
BELTONS MILLPOND HEAD SPRING 1	Sumter	28 45 26.56	82 03 44.60	SWFWMD
BELTONS MILLPOND HEAD SPRING 2	Sumter	28 45 27.49	82 03 43.57	SWFWMD
BELTONS MILLPOND HEAD SPRING 2A	Sumter	28 45 28.39	82 03 48.28	SWFWMD
BELTONS MILLPOND HEAD SPRING 2B	Sumter	28 45 29.20	82 03 45.05	SWFWMD
BELTONS MILLPOND HEAD SPRING 3 -MAIN BOIL	Sumter	28 45 29.67	82 03 45.31	SWFWMD
BELTONS MILLPOND HEAD SPRING 4 -BLUE HOLE	Sumter	28 45 30.37	82 03 47.50	SWFWMD
BELTONS MILLPOND MAINTENANCE SPRING	Sumter	28 45 24.39	82 04 05.36	SWFWMD
BELTONS MILLPOND MAINTENANCE SPRING	Sumter	28 45 25.16	82 04 06.25	SWFWMD
BIG HOLE (Dead Spring)	Sumter	28 45 33.05	82 05 54.94	SWFWMD
CANAL 485 SPRING 5	Sumter	28 46 07.50	82 07 01.24	SWFWMD
CANAL 485A SPRING 1B	Sumter	28 46 10.60	82 07 04.80	SWFWMD
CANAL 485A SPRING 2	Sumter	28 46 12.94	82 07 03.38	SWFWMD
DIXIE LIME & STONE CO. SPRING	Sumter	28 45 16.17	82 03 18.66	SWFWMD
GUM SPRINGS NO. 1	Sumter	28 57 33.49	82 13 50.83	SWFWMD
GUM SPRINGS NO. 2	Sumter	28 57 13.84	82 14 12.69	SWFWMD
GUM SPRINGS NO. 3	Sumter	28 57 13.21	82 14 14.50	SWFWMD
GUM SPRINGS NO. 4	Sumter	28 57 10.8	82 14 26.50	SWFWMD
HENRY GREEN SPRING	Sumter	28 52 09.46	82 05 40.93	SWFWMD
SHADY BROOK HEAD SPRING 2	Sumter	28 47 08.96	82 02 44.13	SWFWMD
SHADY BROOK HEAD SPRING 3	Sumter	28 46 46.96	82 02 36.30	SWFWMD
SHADY BROOK HEAD SPRING 4	Sumter	28 45 15.96	82 04 59.30	SWFWMD
SUMTER BLUE	Sumter	28 47 08.96	82 02 44.13	SWFWMD
MATTAIR SPRINGS	Suwannee	30 22 41.05	82 53 28.03	SRWMD
PEACOCK SLOUGH	Suwannee	30 09 24	83 09 56	SRWMD
SUW1019971	Suwannee	30 22 58.03	82 54 54.59	SRWMD
SUW1023971	Suwannee	30 23 47.29	82 56 13.93	SRWMD
SUW107971	Suwannee	29 54 46.34	82 50 42.54	SRWMD
SUW917972	Suwannee	30 01 57.66	83 00 48.62	SRWMD
SUW919972	Suwannee	30 05 27.21	83 05 50.46	SRWMD
SUW919974	Suwannee	30 06 19.32	83 07 16.75	SRWMD
SUW922972	Suwannee	30 18 46.40	83 12 35.11	SRWMD
SUW922973	Suwannee	30 18 47.59	83 12 35.31	SRWMD
SUW922974	Suwannee	30 18 48.19	83 12 35.48	SRWMD
SUW923971	Suwannee	30 23 31.01	83 10 01.04	SRWMD
SUW923972	Suwannee	30 24 15.92	83 09 27.76	SRWMD

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
SUW925971	Suwannee	30 25 39.81	83 03 03.81	SRWMD
SUW925972	Suwannee	30 25 39.85	83 03 33.49	SRWMD
SUW925973	Suwannee	30 25 27.19	83 04 08.44	SRWMD
SUW925974	Suwannee	30 26 12.08	83 04 43.79	SRWMD
SUW925975	Suwannee	30 26 13.45	83 05 13.01	SRWMD
UNNAMED SPRING	Suwannee	29 53 48.16	82 52 22.18	SRWMD
BLUE CREEK SPRING	Taylor	29 50 41.01	83 33 28.04	SRWMD
CARLTON SPRING	Taylor	30 03 28	83 35 15	SRWMD
EWING SPRINGS	Taylor	30 04 26	83 39 57	SRWMD
TAY616991	Taylor	29 55 09.46	83 40 56.15	SRWMD
TAY625991	Taylor	29 44 38.54	83 20 42.25	SRWMD
TAY625993	Taylor	29 43 53.12	83 20 47.93	SRWMD
TAY625995	Taylor	29 44 02.45	83 20 49.70	SRWMD
TAY69992	Taylor	29 58 14.68	83 44 47.73	SRWMD
TAY730991	Taylor	30 09 12.68	83 51 20.63	SRWMD
TAY76992	Taylor	29 45 41	83 20 06	SRWMD
TAY819991	Taylor	29 50 47.65	83 36 33.07	SRWMD
WOODS CK RISE	Taylor	30 07 26.70	83 37 27.26	SRWMD
SPRING CREEK #1	Wakulla	30 04 48.91	84 19 47.46	FGS
SPRING CREEK #10	Wakulla	30 04 28.38	84 19 39.80	FGS
SPRING CREEK #11	Wakulla	30 04 26.41	84 19 41.41	FGS
SPRING CREEK #12	Wakulla	30 04 34.35	84 19 26.39	FGS
SPRING CREEK #13	Wakulla	30 04 33.08	84 19 24.89	FGS
SPRING CREEK #3	Wakulla	30 04 54.07	84 19 45.90	FGS
SPRING CREEK #4	Wakulla	30 04 47.97	84 19 50.55	FGS
SPRING CREEK #5	Wakulla	30 04 43.06	84 19 48.76	FGS
SPRING CREEK #6	Wakulla	30 04 30.37	84 19 43.60	FGS
SPRING CREEK #7	Wakulla	30 04 33.13	84 19 46.52	FGS
SPRING CREEK #8	Wakulla	30 04 27.10	84 19 36.44	FGS
SPRING CREEK #9	Wakulla	30 04 48.06	84 19 54.69	FGS
BARKING SPRING	Washington	30 26 59.05	85 31 53.86	NWFWMD
BATHTUB SPRING	Washington	30 27 21.86	85 31 58.62	NWFWMD
BURNT OUT SPRING	Washington	30 40 55.32	85 38 45.66	NWFWMD
ECONFINA BLUE SPRING #2	Washington	30 27 11.16	85 31 52.50	NWFWMD
ECONFINA BLUE SPRING #3	Washington	30 27 05.55	85 31 52.19	NWFWMD
GLOWING SPRING	Washington	30 27 22.25	85 31 55.96	NWFWMD
STRICKLAND SPRING #1	Washington	30 26 28.87	85 32 38.84	NWFWMD
STRICKLAND SPRING #2	Washington	30 26 26.64	85 32 41.63	NWFWMD
SURNT SOCK SPRING	Washington	30 40 01.14	85 39 48.29	NWFWMD
UNNAMED SPRING	Washington	30 34 40.44	85 50 21.36	W. Shirling
UNNAMED SPRING	Washington	30 36 32.16	85 46 31.98	W. Shirling
UNNAMED SPRING	Washington	30 36 32.16	85 46 31.98	W. Shirling
UNNAMED SPRING	Washington	30 36 32.4	85 46 33.96	W. Shirling
UNNAMED SPRING	Washington	30 36 43.56	85 49 23.52	W. Shirling
UNNAMED SPRING	Washington	30 39 48.96	85 40 14.16	W. Shirling
UNNAMED SPRING	Washington	30 39 54.72	85 39 55.08	W. Shirling
UNNAMED SPRING	Washington	30 40 14.4	85 39 17.28	W. Shirling
UNNAMED SPRING	Washington	30 40 22.5	85 39 09.84	W. Shirling
UNNAMED SPRING	Washington	30 40 22.5	85 39 09.84	W. Shirling
UNNAMED SPRING	Washington	30 40 26.4	85 39 01.08	W. Shirling

SPRING	COUNTY	LATITUDE	LONGITUDE	SOURCE
UNNAMED SPRING	Washington	30 40 27.48	85 38 52.8	W. Shirling
UNNAMED SPRING	Washington	30 40 26.76	85 38 58.92	W. Shirling
UNNAMED SPRING	Washington	30 40 28.68	85 38 59.1	W. Shirling
UNNAMED SPRING	Washington	30 40 30	85 38 52.08	W. Shirling
UNNAMED SPRING	Washington	30 40 29.88	85 38 52.5	W. Shirling
UNNAMED SPRING	Washington	30 40 31.08	85 38 51.72	W. Shirling
UNNAMED SPRING	Washington	30 40 32.16	85 38 50.88	W. Shirling
UNNAMED SPRING	Washington	30 40 32.16	85 38 50.88	W. Shirling
UNNAMED SPRING	Washington	30 40 32.16	85 38 51.36	W. Shirling
UNNAMED SPRING	Washington	30 40 39.12	85 38 45.24	W. Shirling
UNNAMED-303913085411701	Washington	30 39 13.26	85 41 16.51	NWFWMD
UNNAMED-303934085403401	Washington	30 39 34	85 40 34.2	NWFWMD
UNNAMED-303935085402901	Washington	30 39 34.93	85 40 29.07	NWFWMD
UNNAMED-303937085402901	Washington	30 39 36.51	85 40 28.62	NWFWMD
UNNAMED-303937085404001	Washington	30 39 36.53	85 40 39.58	NWFWMD
UNNAMED-303938085401801	Washington	30 39 37.75	85 40 17.84	NWFWMD
UNNAMED-303938085404301	Washington	30 39 37.89	85 40 43.21	NWFWMD
UNNAMED-303939085401901	Washington	30 39 39.23	85 40 18.79	NWFWMD
UNNAMED-303939085402501	Washington	30 39 39.15	85 40 24.57	NWFWMD
UNNAMED-303940085404001	Washington	30 39 39.57	85 40 40.00	NWFWMD
UNNAMED-303941085401701	Washington	30 39 41.16	85 40 17.06	NWFWMD
UNNAMED-303941085401901	Washington	30 39 40.77	85 40 18.75	NWFWMD
UNNAMED-303942085402401	Washington	30 39 41.79	85 40 24.32	NWFWMD
UNNAMED-303946085401901	Washington	30 39 46.23	85 40 19.24	NWFWMD
UNNAMED-303949085401701	Washington	30 39 49.37	85 40 16.67	NWFWMD
UNNAMED-303949085401702	Washington	30 39 49.37	85 40 17.44	NWFWMD
UNNAMED-303950085400901	Washington	30 39 50.25.	85 40 09.18	NWFWMD
UNNAMED-303953085400201	Washington	30 39 53.34	85 40 02.19	NWFWMD
UNNAMED-303955085401001	Washington	30 39 54.57	85 40 10.22	NWFWMD
UNNAMED-303956085394801	Washington	30 39 55.86	85 39 47.72	NWFWMD
UNNAMED-303956085401001	Washington	30 39 55.77	85 40 10.07	NWFWMD
UNNAMED-303957085400201	Washington	30 39 57.48	85 40 01.61	NWFWMD
UNNAMED-303959085395301	Washington	30 39 58.62	85 39 53.15	NWFWMD
UNNAMED-304002085394901	Washington	30 40 01.96	85 39 48.55	NWFWMD
UNNAMED-304002085395001	Washington	30 40 01.86	85 39 49.95	NWFWMD
WILLIFORD RUN #2	Washington	30 26 22.45	85 32 52.39	NWFWMD
WILLIFORD RUN #3	Washington	30 26 22.04	85 32 53.42	NWFWMD
WILLIFORD RUN #4	Washington	30 26 21.99	85 32 54.11	NWFWMD
WILLIFORD RUN #5	Washington	30 26 21.16	85 32 54.41	NWFWMD
WILLIFORD RUN #6	Washington	30 26 21.16	85 32 54.41	NWFWMD
WILLIFORD RUN #7	Washington	30 26 20.73	85 32 54.81	NWFWMD
WILLIFORD RUN SPRING #1	Washington	30 26 22.46	85 32 52.39	NWFWMD

APPENDIX C

Descriptions of additional springs visited by FGS springs teams.

APPENDIX C - TABLE OF CONTENTS

DESCRIPTIONS OF ADDITIONAL SPRINGS VISITED BY FGS SPRINGS TEAMS

***Note*: Descriptions include data from Springs Fever Internet site, Rosenau et al (1977) and various springs publications by the Water Management Districts.**

During the nearly three years that FGS springs teams visited and described Florida's springs, water levels were low due to an extended drought. Because of the low water levels, the springs appeared differently and had different depths than the springs had during normal water levels.

ALACHUA COUNTY

ALA930971

Figure 1. ALA930971 (photo by D. Hornsby).

Location – Lat. 29° 49' 40.59" N, Long. 82° 38' 27.01" W (NW¼ NW¼ NW¼ sec. 5, T. 8 S, R. 17 E). ALA930971 is located on the Santa Fe River 2.5 miles (4 km) west of High Springs. From the junction of US 441 and US 41 in High Springs, drive southwest on US 41 for 0.8 miles (1.3 km). Turn west (right) on SR 340 (Poe Springs Road) and travel 2.5 miles (4 km). Turn north (right) into Poe Spring County Park at the park sign. Once inside the park, follow signs to the boat ramp on the river. The spring is along the south bank of the Santa Fe River 0.8 miles (1.3 km) upstream from the county park boat ramp.

Description – ALA930971 vent is in the riverbed and feeds directly into the Santa Fe River. No spring boil was visible in February 2003 and the spring was barely detectable. Minimal aquatic vegetation can be seen growing in the tannic river water. Two large cypress trees growing along the bank denote the spring's location. To the east is swampy lowland characterized by soft soils, cypress trees, and cypress knees giving way to a hardwood forest. Hornsby and Ceryak (1998) reported that the spring had a 10 ft (3.1 m) wide boil with a maximum depth-to-vent of 6.5 ft (2.0 m). The land surrounding the spring is owned by the Suwannee River Water Management District.

ALA930972

Figure 2. ALA930972 (photo by D. Hornsby).

Location - Lat. 29° 50' 40.49" N, Long. 82° 37' 51.08" W (SE¼ SW¼ SE¼ sec. 29, T. 7 S, R. 17 E). ALA930972 is located approximately 2 miles (3.2 km) northwest of the town of High Springs. From the intersection of US 27 and SR 45 in High Springs, travel 2.3 miles (3.7 km) northwest on US 27 to the Santa Fe River. Go 0.1 miles (0.16 km) past the river and turn north (right) into the River Rise Preserve State Park boat ramp parking area. The spring is across the Santa Fe River from the boat ramp.

Description – ALA930972 is in the riverbed and flows into the Santa Fe River. The depth to the spring vent is 15.0 ft (4.6 m) and the water clarity in the vicinity is excellent. Flow out of the vent produces a prominent boil that is approximately 2.0 ft (0.6 m) in diameter. The riverbank rises 6.0 ft (1.8 m) high from the surface of the spring and consists of limestone covered by a thin soil horizon. Forests along the riverbank are dominated by cypress, oak, and palmetto. A rope swing and a large oak branch hang over the river directly beside the spring vent. The land surrounding the spring is owned by the Suwannee River Water Management District.

Boulware Spring

Figure 3. Boulware Spring (photo by T. Roberts).

Location – Lat 29° 37' 15.21" N, Long. 82° 18' 25.91" W (NE¼ NE¼ SE¼ sec. 16, T. 10 S, R. 20 E). Boulware Spring is located about 1.5 miles (2.4 km) miles southeast of Gainesville. From the intersection of SR 331(Williston Rd) and CR 329 (4th Street) in southeast Gainesville, travel 1.5 miles (2.4 km) southeast on 4th Street until reaching Boulware Springs Park on the west (right) side of the road. Turn into the park, and follow signs to the spring.

Description – Boulware Spring has been completely altered from its original state. Gainesville built a water treatment plant around it. Spring water flows from the base of a semicircular brick wall measuring 18 ft (5.5 m) in radius, and is contained within a cistern. Water exits the vent area and flows into a deeper part of the cistern, where *Hydrilla* and algae growth are extensive. Clear water flows south into the first of two 12 ft (3.7 m) by 20 ft (6.1 m) concrete retaining pools, both of which are covered with duckweed. Sand and aquatic plants cover the northwest ledge near where spring water issues. The spring discharges into a stream, eventually entering into Payne's Prairie. East of the cistern is an adjacent two story building that was once used for water treatment and distribution. Historically, this site was used as the city's source of drinking water. Boulware Spring is now a city park.

Darby Spring

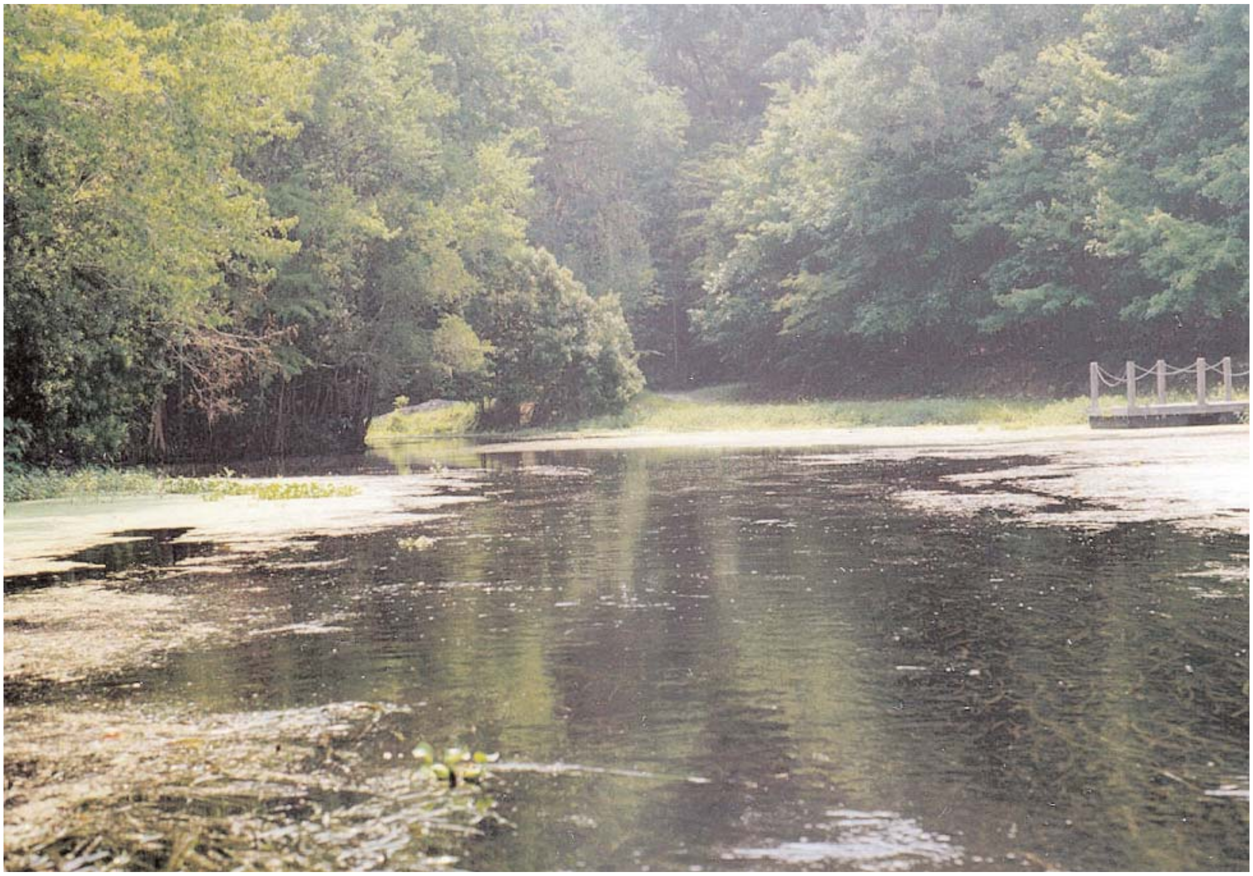

Figure 4. Darby Spring (photo by D. Hornsby).

Location – Lat. 29° 51' 09.42" N, Long. 82° 36' 21.48" W (NE¼ SW¼ NW¼ sec. 27, T. 7 S, R. 17 E). Darby Spring is located approximately 1.8 miles (2.9 km) north of High Springs. From the intersection of US 441 and CR 236 (Main Street) in High Springs, travel 1.8 miles (2.9 km) northwest on US 441 to the Santa Fe River. The spring is approximately 0.1 miles (0.16 km) upstream from the public boat ramp off SR 441 along the south bank of the Santa Fe River.

Description – The Darby Spring pool has a diameter of 40 ft (12.2 m) and a depth of 10 ft (3.1 m). In December 2002, the spring pool had an abundance of aquatic vegetation and was covered with duckweed. The bottom of the pool and the spring vent were not discernable. During the December 2002 visit, the spring was no longer flowing and its run contained stagnant water. The run is 150 ft (45.7 m) long, 4.0 ft (1.2 m) wide and 0.5 ft (0.15 m) deep. The run bottom is soft detritus and is covered with leaves and tree branches. High ground surrounding the spring gently slopes upward to 7.0 ft (2.1 m). To the east, there is a large, grassy pasture. Darby Spring is located on wooded private property.

Glen Spring

Figure 5A. Glen Spring (photo by B. Osburn).

Figure 5B. Glen Spring (photo by B. Osburn).

Location – Lat. 29° 40’ 30.04” N, Long. 82° 20’ 52.44” W (SE¼ SE¼ SW¼ sec. 30, T. 9 S, R. 20 E). Glen Spring is located in Gainesville. From the intersection of US 441 (NW 13th St.) and Glen Springs Road, travel west on Glen Springs Road for approximately 0.5 miles (0.8 km). The spring is at the head of a ravine approximately 250 ft (76.2 m) southwest of the road.

Description – Glen Spring has been altered into a series of adjoining swimming pools enclosed in concrete walls. The first pool contains the spring vent. It is 18 ft (5.5 m) long, 10 ft (3.1 m) wide, 4 ft (1.2 m) deep, and has exposed limestone near the vent. The spring pool has clear, blue-green water and a sand bottom. Water flows from the first pool into a larger swimming pool where green algae are abundant. The spring run is 500 ft (152.4 m) long, 2.5 ft (0.8 m) wide, 0.2 ft (0.06 m) deep. It flows southeast in a steep ravine into Hogtown Creek. The land around the spring slopes gently to 10 ft (3.1 m) above the water surface. Apartments and residences are visible nearby just north of the spring. A dense hardwood forest inhabits land adjacent to the spring and its run. The spring is located on private property, and appears to be in a state of disuse. Discharge on April 17, 2000, was 0.13 cfs (SJRWMD).

Magnesia Spring

Figure 6. Magnesia Spring (photo by A. Willet).

Location – Lat. 29° 35’ 00.26” N, Long. 82° 08’ 58.54” W (SW¼ NE¼ NW¼ sec. 31, T. 10 S, R. 22 E). The spring is located approximately 4.0 miles (6.4 km) west of Hawthorne. From the intersection of SR 20 (Hawthorne Road) and US 301/200 (Main St.) in Hawthorne, travel 0.4 miles (0.6 km) south on Main St. Turn west (right) onto CR 2082 and go 3.8 miles (6.1 km). Turn south (left) onto SE 161st Terrace and proceed 0.4 miles (0.6 km) to the park containing Magnesia Spring.

Description – The spring vent is at the bottom of a 25 ft (7.6 m) deep oval, 60 ft. (18.3 m) by 75 ft. (22.9 m), concrete swimming pool filled with aquatic vegetation, green algae, and a variety of small fish. The spring water is slightly murky. Two artesian wells on either side of the pool supplement the flow of this spring. A small spring run, 4.0 ft (1.2 m) wide and 0.4 ft (0.1 m) deep, flows west 800 ft (243.8 m) into Lochloosa Creek. There are also two recreational swimming pools that can be filled by spring water. The spring is on private property.

BAY COUNTY

Bluff Springs

Figure 7. Bluff Springs (photo by R. Meegan).

Location – Lat. 30° 25’ 30.96” N, Long. 85° 32’ 54.20” W (NE¼ SE¼ SW¼ sec. 4, T. 1 S, R. 13 W). Bluff Springs are located approximately 18 miles (29 km) north of Panama City. From the intersection of US 231 and SR 20, travel west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek. Put in at the canoe launch on the north side of the highway just east of the creek. Bluff Springs are located along the west bank of Econfina Creek approximately 0.7 miles (1.1 km) downstream from the canoe launch or about 750 ft (228.6 m) downstream from the Gainer Springs Group.

Description – Bluff Springs is a cluster of at least four springs emerging from fissures at the base of 20 ft (6.1 m) high limestone and sand bluffs. The largest spring vent issues into a 10 ft (3.1 m) diameter pool that measures 2.7 ft (0.8 m) in depth. A second and third vent are 25 ft (7.6 m) and 35 ft (10.7 m) to the north, respectively, and a fourth vent is 20 ft (6.1 m) to the south (downstream) of the main vent, all along the base of the bluff. The springs have clear water and sand bottoms. The springs flow 30 ft (9.1 m) due east through a shallow run into Econfina Creek. The bluff is covered with lush vegetation and exposed limestone is heavily scalloped. Surrounding lands are heavily forested in the lowlands along the creek and in the uplands to the west. Bluff Springs is surrounded by NWFWMD land.

Econfina Unnamed Spring

Location – Lat. 30° 25' 53.46" N, Long. 85° 32' 50.77" W (SE¼ SE¼ NW¼ sec. 4, T. 1 S, R. 13 W). Econfina Unnamed Spring is located approximately 18 miles (29 km) north of Panama City. From the intersection of US 231 and SR 20 travel west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek. Just past the creek on the north (right) side of the road is Pitt Springs Recreation Area. From inside the recreation area, the spring can be accessed by following a hiking trail on the northwest side of the parking lot. It is the second spring encountered on this trail before reaching Sylvan Springs and is 30 ft (9.1 m) south of the trail.

Figure 8. Econfina Unnamed Spring (photo by R. Means).

Description – Econfina Unnamed Spring is a small spring with an irregular shaped spring pool measuring 15 ft (4.6 m) north to south and 10 ft (3.1 m) east to west. The spring pool is approximately 1 ft (0.3 m) deep, and it has a sand and detritus bottom. Clear water issues from a small limestone opening; however, no flow was evident in June 2003. The narrow spring run flows southward through a hardwood forest and flows through a pipe under SR 20. The spring is underneath a dense forest canopy within Northwest Florida Water Management District lands.

Pitt Spring

Figure 9. Pitt Spring (photo by R. Meegan).

Location – Lat. 30° 25' 58.68" N, Long. 85° 32' 47.14" W (NW¼ SW¼ NE¼ sec. 4, T. 1 S, R. 13 W). Pitt Spring is located approximately 18 miles (29 km) north of Panama City. From the intersection of US 231 and SR 20 travel west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek. Just past the creek on the north (right) side of the road is Pitt Springs Recreation Area. The spring is inside the recreation area.

Description – The entire spring pool is enclosed by a 5 ft (1.5 m) high stone retaining wall with wooden access walkways. Pitt Spring pool is 60 ft (18.3 m) in diameter. Depth over the vent is estimated at 8 ft (2.4 m). No vegetation grows in the spring pool and the bottom is bare white sand. The water is clear and blue. Stairs lead into the pool from the south side. The 1.5 ft (0.5 m) deep spring run flows 50 ft (15.2 m) east into the Econfina River, approximately 700 ft (213.4 m) north of the SR 20 bridge. A parking area is just east and north of the spring. The rest of the surrounding land is upland hardwood forest to the west and forested lowlands along Econfina Creek to the east. The spring has been developed by the Northwest Florida Water Management District into a popular recreation park featuring the spring, hiking trails, and access to Econfina Creek.

Sylvan Springs No. 1

Figure 10. Sylvan Springs No. 1 (photo by R. Meegan).

Location – Lat. 30° 25' 54.33" N, Long. 85° 32' 53.60" W (SE¼ SE¼ NW¼ sec. 4, T. 1 S, R. 13 W). Sylvan Springs No. 1 is located approximately 18 miles (29 km) north of Panama City. From the intersection of US 231 and SR 20 travel west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek. Just past the creek on the north (right) side of the road is Pitt Springs Recreation Area. Park inside the recreation area. A hiking trail beginning at the north side of the parking lot leads to Sylvan Springs. It is the first spring encountered along the north (right) side of the trail.

Description – Sylvan Springs is comprised of as many as eight spring vents that are situated along a limestone fissure near the west side of a large, approximately 125 ft. (38.1 m) diameter, shallow spring pool. The spring pool averages 1 ft (0.3 m) deep with a maximum depth of 2 ft (0.6 m) over one of the vents. Sylvan Springs No. 1 has a sand and scalloped limestone bottom with some algae. The water is light blue and clear. The springhead is a wide, shallow, oval with two forested islands. Its spring run flows approximately 0.1 miles (0.16 km) north where it joins Econfina Creek. Eight feet (2.4 m) high vertical banks meet the pool's edge on the south and west sides. Lands to the east and north are low-lying along Econfina Creek. All surroundings are heavily forested. A path and wooden bench are along the southwest side of the pool. Sylvan Springs No. 1 is pristine and within Northwest Florida Water Management District lands.

Sylvan Springs No. 2

Figure 11. Sylvan Springs No. 2 (photo by R. Meegan).

Location – Lat. 30° 25' 53.80" N, Long. 85° 32' 50.33" W (SE¼ SE¼ NW¼ sec. 4, T. 1 S, R. 13 W). Sylvan Springs No. 2 is located approximately 18 miles (29 km) north of Panama City. From the intersection of US 231 and SR 20 travel west on SR 20 approximately 7 miles (11.3 km) to Econfina Creek. Just past the creek on the north (right) side of the road is Pitt Springs Recreation Area. Park inside the recreation area. A hiking trail beginning at the north side of the parking lot leads to Sylvan Spring No. 2. It is the second spring encountered along the north (right) side of the trail.

Description – Sylvan Spring No. 2 forms a circular pool directly adjacent to the hiking trail and about 600 ft (183 m) from the parking lot. The spring pool is 20 ft (6.1 m) in diameter with a sand and detritus bottom. In June 2003, the spring was stagnant, greenish, and barely flowing. The spring vent is located in a noticeably deeper spot in the center of the pool. Depth over the vent is estimated at 5 ft (1.6 m). The spring pool and spring run average 2 ft (0.6 m) deep. The spring run is as wide as the pool and flows northwest into Sylvan Spring Run. All surrounding lands are heavily forested. Sylvan Spring No. 2 is within Northwest Florida Water Management District lands.

BRADFORD COUNTY

Heilbronn Spring

Location - Lat. 30° 1’ 25.75” N, Long. 82° 9’ 22.06” W (sec. 30, T. 5 S, R. 12 E). Drive 5.8 miles (9.3 km) northwest of Starke on SR 16, from the junction with SR 301. Turn left on a dirt road just before the bridge. Drive 0.2 miles (0.3 km) to the spring

Description – A concrete wall encircles the spring pool of this private spring, therefore access was not permitted on the day of visit in February of 2003. Three homes are in close vicinity to the spring, as well as a dense forest of cypress trees and palmettos. Scattered sweet gum trees also surround the spring. North of the spring is Water Oak Creek, which is fed by seeps in the same general area as the spring pool. Spring Fever claims that this spring is 14.5 ft (4.4 m) deep and 10.0 ft (3.0 m) in diameter.

CALHOUN COUNTY

Grotto Springs

Figure 12. Grotto Springs No. 1 (photo by R. Meegan).

Location – Lat. 30° 35’ 57.88” N, Long. 85° 09’ 51.28” W (NW¼ NW¼ SW¼ sec. 5, T. 2 N, R. 9 W). Grotto Springs are located along the Chipola River approximately 9.3 miles (15 km) southwest of I-10 and are accessible by boat. From the intersection of I-10 and SR 71 travel south on SR 71 6.8 miles (10.9 km) to the intersection with CR 278 (Peacock Bridge Road).

Turn west (right) onto CR 278 and drive 0.6 miles (1.0 km) to the boat ramp on the east side of the Chipola River. By boat, travel approximately 2.3 miles (3.7 km) downstream from the CR 278 boat ramp to the mouth of the spring run on the east (left) side of the river. The springs are about 0.2 miles (0.3 km) upstream at the head of the run. Access to the springs is by walking up the shallow spring run to its head.

Description – Grotto Springs consists of a cluster of at least four spring vents. The springs are situated at the head of an elongated and impounded portion of the uppermost part of the spring run. The impoundment at the head of the spring run is approximately 30 ft (9.1 m) wide and 150 ft (45.7 m) long. The main vent discharging the most flow emerges from a cave in 6 ft (1.8 m) high limestone bank on the northeast side of the impoundment. A second vent, composed of at least three shallow boils, is 20 ft (6.1 m) southeast and downstream of the main vent. The third spring vent issues from an orifice in limestone downstream from the first two vents. A fourth spring vent discharges from a square-shaped, man-made cut in limestone. Grotto Springs Run flows underneath a forest canopy about 1000 ft (304.8 m) southwest into the Chipola River. It has a limestone, sand, and gravel bottom. Surrounding lands are privately owned and heavily forested. Several sink depressions, caves, and karst windows are scattered throughout the uplands north and east of Grotto Springs.

Hamilton Spring

Figure 13. Hamilton Spring (photo by R. Means).

Location – Lat. 30° 31’ 09.30” N, Long. 85° 09’ 47.52” W (NE¼ NW¼ NW¼ sec. 5, T. 1 N, R. 9 W). Hamilton Spring is located along the Chipola River approximately 4 miles (6.4 km) southwest of Altha and is accessible by boat. From Altha, drive west 2.3 miles (3.7 km) on

CR 274 (Chipola Street). Turn north (right) onto a dirt road indicated by a public boat ramp sign. Follow the road 0.8 miles (1.3 km) to the boat ramp on the Chipola River. The spring is located just below Bullet Bend on the west bank of the Chipola River approximately 3.4 miles (5.5 km) south (downstream) of the boat ramp.

Description – Hamilton Spring pool is approximately 30 ft (9.1 m) north to south and 20 ft (6.1 m) east to west. The spring vent is in the south end of the oval shaped pool and issues clear, bluish water. Spring depth averages 3 ft (0.9 m). Hamilton Spring Run averages 3 ft (0.9 m) deep and 25 ft (7.6 m) wide. Both the spring and run have sand and limestone bottoms. The run travels 210 ft (64 m) north where it flows under a 20 ft (6.1 m) wide land bridge. Spring water reemerges on the other (north) side of the land bridge in what appears to be a separate spring pool with a slight boil on the water surface. Gentle flow in the pool travels northeast about 30 ft (9.1 m) toward a 4 ft (1.2 m) high berm that separates the spring waters from the adjacent Chipola River. Spring flow enters the river presumably underneath the berm. Hamilton Spring is within a forested lowland along the Chipola River bordered on the west by a steep 30 ft (9.1 m) high bluff and on the east by the river. Two houses are visible in the distance to the southwest and northwest of the spring on top of the bluffs. Two narrow PVC pipes lead down into the spring from the direction of the high ground.

Sally Spring

Figure 14. Sally Spring (photo by A. Chelette).

Location – Lat. 30° 34' 13.08" N, Long. 85° 10' 24.31" W (NW¼ NW¼ SE¼ sec. 18, T. 2 N, R. 9 W). Sally Spring is located on the Chipola River approximately 2.8 miles (4.5 km) northwest of Altha and is accessible by boat. From Altha, drive west 2.3 miles (3.7 km) on CR 274 (Chipola Street). Turn north (right) onto a dirt road indicated by a public boat ramp sign. Follow the road 0.8 miles (1.3 km) to the boat ramp on the Chipola River. Sally Spring is on the east side of the river 1.8 miles (3.0 km) upstream from the boat ramp.

Description – Sally Spring sits in a semicircular cove along the banks of the Chipola River. The spring pool is 16 ft (4.9 m) in diameter and 4 ft (1.2 m) deep with a sand and limestone bottom. Spring water is clear and slightly bluish. A gentle boil is observed on the pool surface. The spring emerges from a cave at the base of 15 ft (4.6 m) high limestone river banks. The riparian corridor in the vicinity of the spring is forested, and planted pines grow in the uplands to the east. Sally Spring has virtually no spring run but there is a distinct interface between clear spring water and the darker, murky water of the Chipola River.

CITRUS COUNTY

Alligator Spring

Location – Lat. 28° 48' 01.62" N, Long. 82° 35' 16.71" W (SE¼ NW¼ NE¼ sec. 28, T. 19 S, R. 17 E). Alligator Spring is located within the Homosassa Springs Wildlife State Park. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park. Alligator Spring is within the park on the northeast side of the enclosed pool that contains live, captive alligators.

Description – Alligator Spring occupies a man-made spring pool measuring 150 ft (45.7 m) by 100 ft (30.5 m). Spring depth was estimated at 5 ft (1.5 m) to 8 ft (2.4 m) over the vent. A gentle spring boil was visible during the November 2003 visit. Water is clear near the spring vent; however, the rest of the spring pool has slightly murky water. The spring has a dark, detritus-covered sand bottom. There are approximately 25 captive alligators within the enclosed spring pool, which is a popular visitor attraction. The pool is fenced off and surrounded by a foot path. A footbridge and weir are located on the south side of the spring. Water flows from the spring pool through the weir and into an adjacent water-filled enclosure containing a captive hippopotamus. The spring run then flows 350 ft (106.7 m) southwest into the Homosassa River just below the head springs. The land surrounding Alligator Spring is part of the Homosassa Springs Wildlife State Park and contains trails, animal enclosures, and wildlife interpretive displays.

Baird Springs

Baird Springs consists of at least four different springs near the head of Baird Creek 0.5 miles (0.8 km) southwest of Chassahowitzka. From the intersection of US 98 and CR 480 in Chassahowitzka travel west 1.8 miles (2.9 km) on CR 480 to a boat ramp on the Chassahowitzka River. Baird Creek flows into the river from the south 0.55 miles (0.9 km) downstream from the Chassahowitzka boat ramp. Baird Springs and Creek are within the Chassahowitzka National Wildlife Refuge, inside the large, heavily forested Chassahowitzka Swamp basin.

Baird Spring No. 1

Figure 15. Baird Spring No. 1 (photo by SWFWMD).

Location – Lat. 28° 42' 26.91" N, Long. 82° 34' 41.52" W (NW¼ NE¼ NW¼ sec. 35, T. 20 S, R. 17 E). Baird Spring No. 1 is located at the head of Baird Creek approximately 0.7 miles (1.1 km) upstream from the mouth of the creek.

Description – Baird Spring No. 1, forming the headwaters of Baird Creek, discharges from an elongated limestone fissure 3 ft (0.9 m) to 5 ft. (1.5 m) wide, 20 ft. (6.1 m) long and 6 ft (1.8 m) deep. During the April 2003 visit, there was very little flow and no visible boil. The water is clear and light blue. The spring has a sand bottom with limestone near the vent. Baird Creek initially averages 1 ft (0.3 m) deep and 5 ft (1.5 m) wide then widens and deepens downstream several hundred feet (one hundred meters). Baird Creek has a sand bottom. The spring is within a swamp forest.

Baird Spring No. 2

Location – Lat. 28° 42' 29.88" N, Long. 82° 34' 42.80" W (NW¼ NE¼ NW¼ sec. 35, T. 20 S, R. 17 E). Baird Spring No. 2 is located in a small cove off the east bank of Baird Creek approximately 400 ft (121.9 m) downstream from Baird Spring.

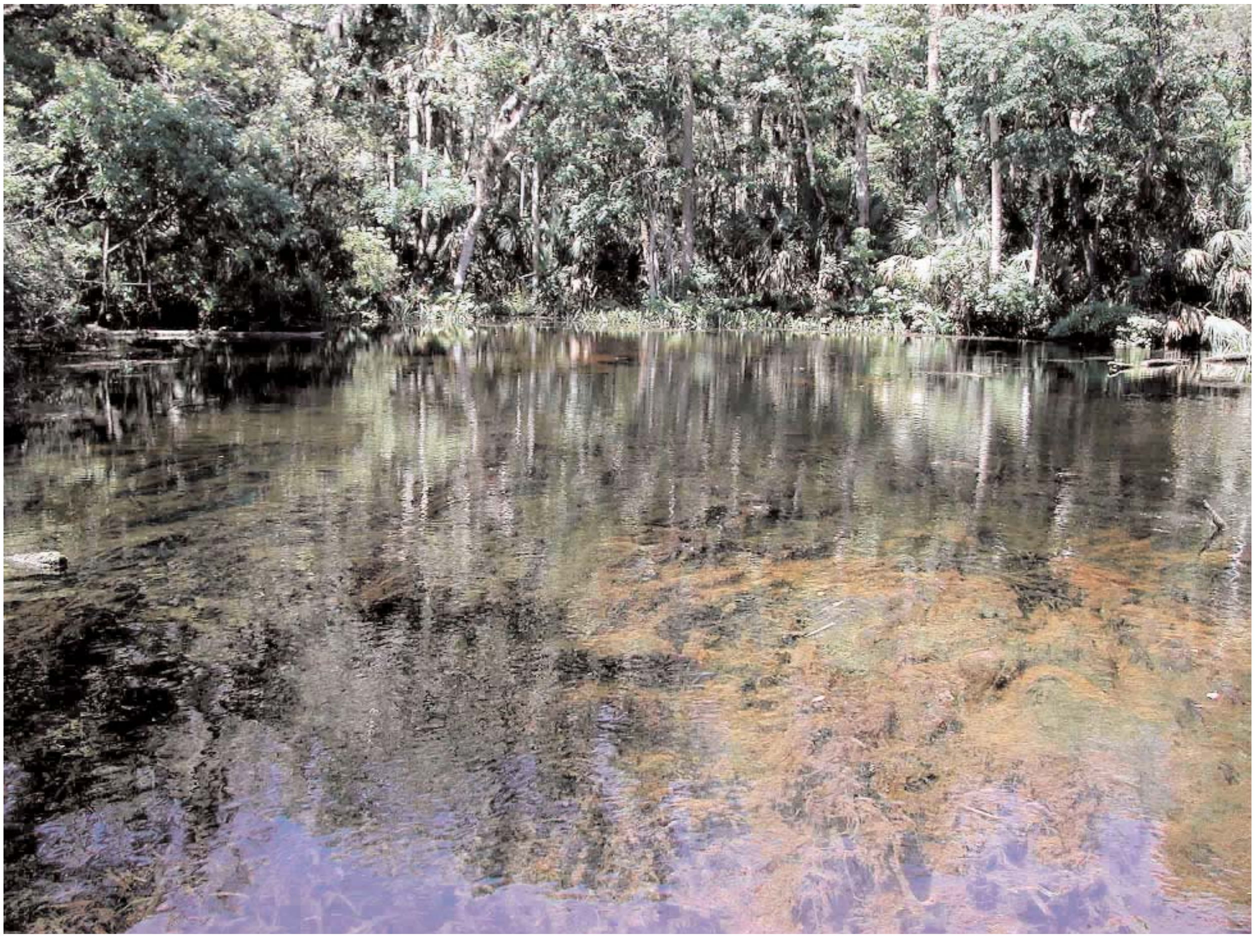

Figure 16. Baird Spring No. 2 (photo by R. Means).

Description – Baird Spring No. 2 has a maximum depth of 11 ft (3.4 m). No boil was observed on the spring surface in April 2003. The spring is clear and has a sand bottom. The spring is within a forested swamp.

Baird Spring No. 3

Location – Lat. 28° 42’ 32.86” N, Long. 82° 34’ 46.72” W (NE¼ NW¼ NW¼ sec. 35, T. 20 S, R. 17 E). Baird Spring No. 3 is located approximately 450 ft (137.2 m) downstream from Baird Spring No. 2.

Description – Baird Spring No. 3 occupies a large bowl-shaped depression on the east side of Baird Creek. Depth in the center of the spring measures 15.8 ft (4.8 m). The spring water is clear. No boil was observed in April 2003. Baird Spring No. 3 has a sand bottom. Surrounding land is heavily forested swampy lowlands.

Baird Spring No. 4

Location – Lat. 28° 42’ 33.33” N, Long. 82° 34’ 48.99” W (NE¼ NW¼ NW¼ sec. 35, T. 20 S, R. 17 E). Baird Spring No. 4 is located in a cove on the west side of Baird Creek 150 ft (45.7 m) downstream from Baird Spring No. 3.

Description – Baird Spring No. 4 was slightly tannic in April 2003. The spring depression has a deep center with a maximum measured depth of 62 ft (18.9 m). No boil was visible during the April 2003 visit. Although the bottom could not be seen, the spring is believed to have steep limestone ledges. Baird Spring No. 4 is within heavily forested swampy lowlands.

Banana Spring

Figure 17. Banana Spring (photo by R. Meegan).

Location – Lat. 28° 48’ 03.64” N, Long. 82° 35’ 17.44” W (SE¼ NW¼ NE¼ sec. 28, T. 19 S, R. 17 E). Banana Spring is located southeast of the reptile house in a man-made pool within the Homosassa Springs Wildlife State Park. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park. Park officials report that the spring vent is beneath the overhanging banana trees on the north side of the pool.

Description – Banana Spring pool measures 60 ft (18.3 m) by 40 ft (12.2 m). There are two fountains within the spring pool. No spring boil was visible on the pool surface in November 2003, and the water was dark and murky. The spring run flows under a footbridge at the south end of the pool and into Alligator Spring. The combined flow enters the Homosassa River just downstream from Homosassa Springs. A gate across one of the Park’s bridges blocks entrance to the spring run from the Homosassa River. Access to the spring is not permitted; however, the spring may be viewed from adjacent boardwalks.

Bear Spring

Figure 18. Bear Spring (photo by R. Means).

Location – Lat. 28° 48’ 06.47” N, Long. 82° 35’ 14.12” W (NW¼ NE¼ NE¼ sec. 28, T. 19 S, R. 17 E). Bear Spring is located within the Homosassa Springs Wildlife State Park at the head of a spring run that, combined with Banana and Alligator Springs, flows southwesterly and joins the main Homosassa Springs, forming the head of the Homosassa River. Bear Spring is behind the black bear enclosure and aviary at the north end of the park. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park.

Description – Bear Spring pool is elongated, measuring 60 ft (18.3 m) north-south and 20 ft (6.1 m) east-west. There are two small vents in the northern and eastern sections of the pool. Depth of the spring pool is estimated to be 5 ft (1.5 m). There were slight boils over each vent. In November 2003, the spring had clear water. The pool had a dark appearance because the spring bottom consisted of dark-colored detritus and some exposed sand. *Hydrilla* is present in the pool. A pipe from the aviary drains into the south side of Bear Spring pool. Bear Spring is within dense woods on the northeast side of Homosassa Springs Wildlife State Park. Nearby there are boardwalks and animal enclosures to the south and west.

Blue Hole Spring

Figure 19. Blue Hole Spring (photo by R. Means).

Location – Lat. 28° 47' 55.63" N, Long. 82° 35' 22.34" W (NE¼ SW¼ NE¼ sec. 28, T. 19 S, R. 17 E). This spring is located within the Homosassa Springs Wildlife State Park just west of the education center. It is located on the south side of the Homosassa River 300 ft (91.4 m) downstream from a footbridge/barricade over Homosassa River. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park.

Description – Blue Hole Spring occupies a 75 ft (22.9 m) by 25 ft (7.6 m) cove off of the upper Homosassa River. The steep-sided spring vent issues blue water from under a wooden walk bridge. Limestone is exposed surrounding the vent, which is estimated at 15 ft (4.6 m) deep. No boil was visible during the November 2003 visit; however, the spring was observed flowing. The spring water flows north, directly into the Homosassa River. Blue Hole Spring is surrounded by a mixture of trees and grassy lawn. An education center is west of the spring, and a boardwalk passes over the spring along the Homosassa River. The spring can only be observed from the boardwalk.

Bluebird Springs

Location – Lat. 28° 47' 20.38" N, Long. 82° 34' 46.26" W (NE¼ NW¼ NW¼ sec. 34, T. 19 S, R. 17 E). Bluebird Spring is located in a municipal park off CR 490 (Yulee Drive) 0.9 mi (1.5 km) southeast of Homosassa Springs. From the intersection of US 19/98 and CR 490 head southwest on CR 490 approximately 0.7 miles (1.1 km) to the intersection with Bluebird

Figure 20. Bluebird Springs (photo by R. Means).

Springs Lane. Head south (left) on Bluebird Springs Lane approximately 0.2 miles (0.3 km) to the springs.

Description – Bluebird Springs has been enhanced with concrete walls creating a square-shaped spring pool near the vent. This portion of the spring pool measures 75 ft (22.9 m) east to west. The overall spring pool is approximately 120 ft (36.6 m) wide and 225 ft (68.6 m) long. Water issues from a limestone fissure. Depth over the fissure is 15 ft (4.6 m). The spring bottom consists of sand, detritus, and limestone. The spring water is clear with a greenish hue. Algae are abundant on all substrates in the slow-moving spring. Another spring vent is approximately 150 ft (45.7 m) east of the main vent, up a short, narrow run which converges with flow from the main vent. Limestone crops out near spring vents, otherwise, the bottom is sandy with aquatic vegetation common. Their combined flow travels south and west 280 ft (85.3 m) through a 100 ft (30.5 m) wide run with grassy lawn along its banks. It narrows to about 15 ft (4.6 m) wide and 3 ft (0.9 m) deep then enters low, swampy woodlands and flows under a dense forest canopy. From this point, the spring run travels an unknown distance westward virtually parallel to the Homosassa River and is presumed to eventually enter the river. The area is a developed county park with facilities and picnic tables; however, no swimming is allowed in the springs. There was not enough flow to create boils on the spring surface in March 2003.

Chassahowitzka Spring No. 2

Figure 21. Chassahowitzka Spring No. 2 (photo by R. Meegan).

Location – Lat. 28° 42' 57.66" N, Long. 82° 34' 31.63" W (NW¼ NW¼ SE¼ sec. 26, T. 20 S, R. 17 E). From Homosassa Springs Wildlife State Park, drive south on US 19/98 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive about 1.8 miles (2.9 km) to the public boat access area. Chassahowitzka Spring No. 2 flows into the north side of the Chassahowitzka River 575 ft (175.3 m) upstream from the Chassahowitzka boat ramp.

Description – The Chassahowitzka Spring No. 2 spring pool measures 30 ft (9.1 m) from north to south and 20 ft (6.1 m) from east to west. The spring consists of at least five spring vents clustered on the bottom of Chassahowitzka Spring No. 1 spring run. Slight boils are visible over two of the vents. The deepest vent measures 9.7 ft (3.0 m). *Hydrilla* is abundant near the spring. A rusty, water-extraction pipe runs into one of the spring vents. The spring pool has a sand and limestone bottom. The spring water is clear and light blue. At least three of the spring vents tap into a single conduit. It is possible for a swimmer to enter one vent and exit through a different vent. Chassahowitzka Spring No. 2 is located approximately 175 ft (53.3 m) downstream from Chassahowitzka Spring No. 1. Spring water from Chassahowitzka Spring No. 2 discharges into the Chassahowitzka Spring No. 1 Run. From this point, their combined flow travels approximately 100 ft (30.5 m) southwest down a shallow, limestone and sand-bottomed run into the upper Chassahowitzka River. Adjacent lands north, east and west are densely forested lowlands associated with the

Chassahowitzka River, owned by the Chassahowitzka National Wildlife Refuge. A private residence is visible 150 ft (45.7 m) southwest across the Chassahowitzka River.

Crab Spring (Crab Creek Spring)

Figure 22. Crab Spring (photo by R. Means).

Location – Lat. 28° 43’ 01.92” N, Long. 82° 34’ 33.07” W (SE¼ SE¼ NW¼ sec. 26, T. 20 S, R. 17 E). From Homosassa Springs Wildlife State Park, drive south on US 19/98 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive about 1.8 miles (2.9 km) to the public boat access area. Crab Spring Run enters the north side of the Chassahowitzka River 400 ft (121.9 m) downstream from the Chassahowitzka boat ramp. Crab Spring is at the head of the run near a private residence.

Description – The Crab Spring pool measures 75 ft (22.9 m) in diameter and it consists of at least four separate spring vents. The largest vent is on the east side of the spring pool with a depth of 8 ft (2.4 m). The water is bluish and slightly murky. Prominent boils occur over each vent. The spring pool bottom is sand and limestone near the vents but the rest of the pool is covered by aquatic grasses and exotic aquatic plants that have a thick brown algal coating. A private estate occupies the northern side of the spring pool with lowland forest surrounding the rest of the area. The spring flows 700 ft (213.4 m) southwest to the Chassahowitzka River.

Hall's River Spring No. 2

Figure 23. Hall's River Spring No. 2 (photo by R. Means).

Location – Lat. 28° 49' 35.68" N, Long. 82° 34' 59.63" W (SW¼ SW¼ NW¼ sec. 15, T. 19 S, R. 17 E). This spring sits in the heavily vegetated channel of Hall's River Head Spring Run approximately 0.2 miles (0.3 km) east of US 19, north of Homosassa Springs. The spring must be accessed by boat from the Homosassa River. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park. There are several public and private boat landings in the vicinity.

Description – The Hall's River Spring No. 2 spring pool measures 40 ft (12.2 m) north to south and 30 ft (9.1 m) east to west. The spring occupies a widening of Hall's River Head Spring Run. Hall's River Spring No. 2 discharges from a 1.5 ft (0.5 m) diameter opening in limestone. Several additional small sand boils issue from the pool bottom. The bottom is soft sand and detritus. The spring water is clear and light blue. Emergent and submerged vegetation are abundant along the spring run. Combined flow from Hall's River Head Spring and Hall's River Spring No. 2 travels west approximately 300 ft (91.4 m) through a 2 ft (0.6 m) deep, 8 ft (2.4 m) wide spring run that enters the uppermost portion of Hall's River from the east. An extensive canal system exists upstream from where the spring enters Hall's River. Residences are scattered along the modified banks of Hall's River approximately 400 ft (121.9 m) to the northeast of the Hall's River Spring No. 2, but the spring itself is surrounded by forested lowlands. Hall's River Head Spring is located approximately 900 ft (274.3 m) upstream from Hall's River Spring No. 2. The head spring is difficult to reach.

Homosassa Unnamed Spring No. 1

Location – Lat. 28° 47’ 53.87” N, Long. 82° 35’ 23.74” W (NW¼ SW¼ NE¼ sec. 28, T. 19 S, R. 17 E). From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the Homosassa Springs Wildlife State Park. Homosassa Unnamed Spring No. 1 is located immediately west of the wooden observation deck off the bank of the Homosassa River within the state park.

Description – Homosassa Unnamed Spring No. 1 occupies a bowl-shaped depression in a widened section of the upper Homosassa River. The underwater depression is estimated to be 25 ft (7.6 m) in diameter. Depth over the vent measured 13.7 ft (4.2 m) with the surrounding river averaging 5 ft (1.5 m) deep. Water is clear and light blue-green. The spring has a sand bottom. This spring was not flowing appreciably during the November 2003 visit.

Homosassa Unnamed Spring No. 2

Figure 24. Homosassa Unnamed Spring No. 2 (photo by R. Means).

Location – Lat. 28° 47’ 52.92” N, Long. 82° 35’ 22.74” W (SE¼ SW¼ NE¼ sec. 28, T. 19 S, R. 17 E). From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park. This small spring occupies a cove adjacent to the Homosassa Springs Wildlife State Park education pavilion. It is approximately 100 ft (30.5 m) south of the park’s wooden observation deck overlooking the Homosassa River.

Description – The spring pool measures 25 ft (7.6 m) in diameter and is 3.1 ft (0.9 m) deep. The spring water is clear and greenish. A short, shallow spring run flows 30 ft (9.1 m) north into the Homosassa River. The spring and its run are stagnant. The bottom is sand with abundant algae and detritus. During the November 2003 visit, the spring was not flowing appreciably.

House Spring

Location – Lat. 28° 53' 50.28 " N, Long. 82° 35'27.60" W (NW¼ NW¼ SE¼ sec. 21, T. 18 S, R. 17 E). The spring is located within the city of Crystal River. From the intersection of US 98 and NE 3rd street head west on NE 3rd street for approximately 0.3 mile (0.5 km). The spring is situated behind a row of houses on the north side of NE 3rd Street.

Description – House Spring has an oval shaped spring pool. In January 2003, the spring was stagnant, and no boil was observed on the spring surface. The spring pool bottom had an abundance of tree debris and leaves. House Spring is surrounded by private residences, and is under a tree and plant canopy. During the January 2003 visit, House Spring was not flowing.

Kings Bay Springs Group

Group Location-Lat. 28° 53" N., Long. 82° 35" W. (sections 20, 21 and 28, T. 18 S., R. 17 E.). The Kings Bay Springs Group is located in Kings Bay west of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay.

Group Description- There are about 30 known springs, including Tarpon Hole and Hunter Spring, that either issue from the bottom of Kings Bay or flow into the bay from side creeks. Their combined flow feeds Crystal River, which flows approximately 7 miles (11.3 km) northwest to the Gulf of Mexico. Surrounding land is coastal lowlands with brackish marsh and hardwood-palm hammock to the west and the City of Crystal River to the east. The whole system is tidally influenced, and Kings Bay is brackish. Rosenau et al. (1977) referred to these springs as the Crystal River Springs Group.

BLACK SPRINGS - Lat. 28° 52' 38.28 " N, Long. 82° 35' 56.40" W (SW¼ SW¼ SW¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. The spring is located in a small cove on the south end of Kings Bay approximately 1.5 miles (2.4 km) southeast of Crystal River. Black Springs occupies an oval spring pool that measures 35 ft (10.7 m) by 60 ft (18.3 m). Several spring vents and a fissure feed into the spring pool. Prominent boils can be seen on the spring surface over the vents. The spring water is clear with a lightly tannic hue. The spring bottom consists of sand, algae-covered limestone, fine silt, and tree debris. The spring pool flows in a northwesterly direction, into a canal, which, in turn, leads into Kings Bay. The banks of the spring are heavily vegetated. Residential properties encircle the spring pool and nearby canal system.

CATFISH CORNER SPRING - Lat. 28° 53’ 52.80” N, Long. 82° 35’ 56.40” W (NE¼ NW¼ SW¼ sec. 21, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King’s Bay can be accessed via numerous boat landings north and south of the Bay. Catfish Corner Spring is at the end of a dock in Kings Bay, just west of the boat ramp at the Best Western Hotel in Crystal River (off US 19/98). Catfish Corner Spring flows from a vent directly into Kings Bay. The vent appears to be approximately 3 ft (0.9 m) in diameter. Water depth at the spring vent is approximately 18 ft (5.5 m). The vent was not visible from the water surface in January 2003 because of turbid conditions; however, the spring produced a prominent boil on the water surface. Catfish Corner Spring is surrounded by private residences and commercial property. There is a boat dock within 50 ft (15.2 m) of the spring.

Figure 25. Kings Bay Springs Group, Catfish Corner Spring (photo by Springs Fever).

IDIOT’S DELIGHT SPRING - Lat. 28° 53’ 16.63” N, Long. 82° 35’ 22.03” W (SE¼ NW¼ NE¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King’s Bay can be accessed via numerous boat landings north and south of the Bay. Idiot’s Delight Spring is located along a canal in Kings Bay 0.4 miles (0.6 km) northeast of Paradise Point. Rosenau et al (1977) indicate that Idiot’s Delight Spring issues from a group of three vertical shafts the largest of which is five feet (1.5 m) in diameter. The spring is in a canal created by the channelization of natural tidal creeks and spring runs and by canal construction which occurred as development surrounded Kings Bay. The spring waters are clear and blue-greenish. A slight boil is visible on the surface of the canal over the vent. Depth over the vent measures 6.0 ft (1.8 m). The bottom is algae laden and sandy with some exposed limestone. Three Sisters Springs mouth is situated approximately 30 ft (9.1 m) north of this spring. This spring is a snorkeling and diving hot spot.

Figure 26. Kings Bay Springs Group, Idiots Delight Spring (photo by SWFWMD).

JURASSIC SPRING - Lat. 28° 53' 42.27" N, Long. 82° 35' 23.71" W (SE¼ NW¼ SE¼ sec. 21, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. Jurassic Spring is located in a cove along the east side of Hunter Spring Run, approximately 800 ft (243.8 m) east of Hunter Spring. Jurassic Spring occupies a cove opening that is blocked off by a floating PVC pipe. The spring cove mouth measures 100 ft (30.5 m) wide north to south. Depth of the spring is estimated at 10-12 ft (3.1-3.7 m). The spring bottom consists of sand and silt. The water is clear and greenish. No boil was seen in November 2003. There are private residences on the north and south sides of the spring. The south side has private docks. There are a few cedar and palm trees around the banks. This spring appears to be a swimming area for local residents. Discharge from Jurassic Spring flows directly into Hunter Spring Run. Hunter Spring Run appears to have been heavily channelized to accommodate boat traffic. Hunter Spring Run has heavy development on both sides.

KING SPRING - Lat. 28° 52' 54.19" N, Long. 82° 35' 42.18" W (SW¼ NE¼ SW¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. King Spring is located on the south side of Banana Island in Kings Bay, just outside Crystal River. King Spring is situated 85 ft (25.9 m) southwest of Tarpon Hole Spring. King Spring's boil is visible on the bay surface. The spring bottom around the vent is sand and limestone. Depth over the vent is estimated at 15 ft (4.6 m). The spring water typically is clear, but bay water influence sometimes causes limited visibility. King Spring occupies a spring alcove on the south side of Banana Island in Kings Bay. Banana Island is completely forested. Other springs in the same alcove include Tarpon Hole and Mullet's Gullet. King Spring, along with Tarpon Hole,

Figure 27. Kings Bay Springs Group, Jurassic Spring (photo by R. Means).

is one of the most popular snorkeling and scuba diving destinations in the area as encounters with manatees are frequent. However, the area surrounding these springs is closed off during certain months for manatee protection. King Spring is within the Crystal River National Wildlife Refuge.

KINGS BAY SPRING NO. 1 - Lat. 28° 53' 17.34" N, Long. 82° 35' 23.06" W (SE¼ NW¼ NE¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. The spring is located along a canal in Kings Bay 0.4 miles (0.6 km) northeast of Paradise Point, approximately 50 ft (15.2 m) northwest of the mouth of Three Sisters Springs. Kings Bay Spring No. 1 occupies a cove on the north side of an east-west trending canal on the east side of Kings Bay. The spring pool is roughly circular with a diameter of approximately 20 ft (6.1 m). Water depth measures 6.4 ft (2.0 m) over the vent. Clear, bluish water issues from the small, circular vent. The bottom is sand with some dark silt and detritus. Limestone is exposed inside the vent opening. A thick layer of dark green algae covers the majority of the bottom. The land immediately surrounding the spring, on the north side of the canal, is private and undeveloped and supports a hardwood and palm forest and some open marsh land. The south side of the canal is developed with dense housing. This spring is a swimming and snorkeling hot spot.

Figure 28. Kings Bay Springs Group, King Spring (photo by R. Meegan).

LITTLE HIDDEN SPRING - Lat. 28° 53' 08.81" N, Long. 82° 35' 38.62" W (NE¼ SE¼ NW¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. Little Hidden Spring is located on the north side of Parker Island within Kings Bay just west of Crystal River. Little Hidden Spring occupies a spring pool that measures 35 ft (11 m) east to west and 25 ft (7.6 m) north to south. There are two separate spring vents within the pool, an east and a west vent. Depths in the spring range from 2 ft to 4 ft (0.6 and 1.2 m) over the east and west vents, respectively. The spring pool has a sand bottom with some aquatic vegetation. The spring water is clear and colorless. Both spring vents produce slight boils on the spring surface. Little Hidden Spring is underneath a forest canopy. Its short spring run is 10 ft (3.1 m) wide, 1 ft (0.3 m) deep, and flows 50 ft (15 m) north into a narrow passage between Parker Island and the mainland. Parker Island is a forested island within the Crystal River National Wildlife Refuge.

LITTLE SPRING (INDEPENDENCE SPRING) - Lat. 28° 54' 01.19" N, Long. 82° 35'43.33" W (NW¼ SE¼ NW¼ sec. 21, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. This spring is located in Bicentennial Park in Crystal River. It is 50 ft (15.2 m) north of the Crystal River Police Station and City Hall. Little Spring is surrounded by a 4 ft (1.2 m) high retaining wall. It has an oval-shaped spring pool that measures 80 ft (24.4 m) by 70 ft (21.3 m). The depth is estimated to be approximately 3 ft (0.9 m). Several spring vents

Figure 29. Kings Bay Springs Group, Little Hidden Spring (photo by R. Meegan).

Figure 30. Kings Bay Springs Group, Little Spring (photo by R. Meegan).

are reported to be within the spring pool. There is a 20 ft (6.1 m) high water fountain in the center of the pool. Due to the turbulence caused by the fountain, no visible boil or vent could be seen during the October 2003 visit. The spring water is slightly murky and light blue. The pool is filled with exotic aquatic vegetation. The spring run flows north approximately 30 ft (9.1 m) through a narrow cut in the wall and underneath a green wooden foot bridge. It then joins with another clear stream that has been channelized. The combined flow heads east under US 19 and into Kings Bay. The spring is part of a city picnic area and is surrounded by grassy lawns and buildings. Swimming is not allowed.

MANATEE SANCTUARY SPRING - Lat. 28° 53' 26.86" N, Long. 82° 35' 33.37" W (NW¼ NW¼ NE¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. Manatee Sanctuary Spring is located on the bottom of a north-south trending canal off of the east side of Kings Bay. The canal entrance is northeast of the northern tip of Buzzard Island. The Manatee Sanctuary Spring pool is beneath canal waters and is denoted by a deeper section of the canal along its east side. The bowl shaped depression is 24.9 ft (7.6 m) deep. Sand, mud, and limestone are exposed on the spring bottom. Canal and spring water are blue and clear. The spring discharges from a small vent in the bottom of the depression. No boil on the water surface was visible during the November 2003 visit. The east side of the spring is undeveloped with a line of cedar trees at the waters edge. Residences are present along the canal's west side.

Figure 31. Kings Bay Springs Group, Manatee Sanctuary Spring (photo by R. Means).

MILLER'S CREEK SPRING - Lat. 28° 54' 03.96 " N, Long. 82° 36'13.68" W (NW¼ SE¼ NE¼ sec. 20, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of the city of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. Miller's Creek Spring is located east of Crystal River at the head of Miller Creek. Miller's Creek Spring discharges from beneath a mud bank at a depth of 1.0 ft (0.3 m), with no distinct spring pool. The spring produces a prominent turbulence underneath a dense covering of vegetation around the spring edge. The water is clear with a light yellowish-brown hue. The spring discharges straight into a spring run which feeds into Millers Creek, a tributary of the Crystal River. It is 32 ft (9.8 m) long, 3 ft (0.9 m) wide, and approximately 4 ft (1.2 m) in depth. The run has a mud and detritus bottom. Miller's Creek Spring is situated on private land that is forested with pines, palmetto, and some saw grass.

Potter Spring

Location – Lat. 28° 43' 53.76" N, Long. 82° 35' 47.56" W (SE¼ SW¼ NW¼ sec. 22, T. 20 S, R. 17 E). The spring is located 2 miles (3.2 km) northwest of Chassahowitzka at the head of Potter Creek. From Homosassa Springs Wildlife State Park, drive south on US 19/98 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive about 1.8 miles (2.9 km) to the public boat access area. Potter Creek enters the north side of the Chassahowitzka River 1.5 miles (2.4 km) downstream from the Chassahowitzka boat ramp.

Description – The Potter Spring pool measures 50 ft (15.2 m) in diameter. Depth over the vent is 15.2 ft (4.6 m); however the rest of the pool is shallow, averaging 2ft (0.6 m) deep. Some limestone is present at the vent but the rest of the area has a soft sand bottom. The water is clear, light yellow-greenish. There is an abundance of aquatic vegetation that is coated with brown algae. During the April 2003 visit, there was very little flow from this spring and no boil was visible on the spring surface. The narrow spring run of Ruth Spring enters Potter Spring pool from the northeast. Combined flow from Ruth and Potter Springs forms Potter Creek which travels south 0.75 miles (1.2 km) down a 50 ft (15.2 m) wide run that is thick with aquatic vegetation. It has an average depth of 2 ft (0.6 m). There are numerous limestone boulders in the run that make portages necessary when canoeing. Native aquatic grasses are abundant in the sand and limestone-bottomed spring run. The run empties into the north side of the middle Chassahowitzka River. Potter Spring is within the Chassahowitzka National Wildlife Refuge and surrounded by dense palm and hardwood forest.

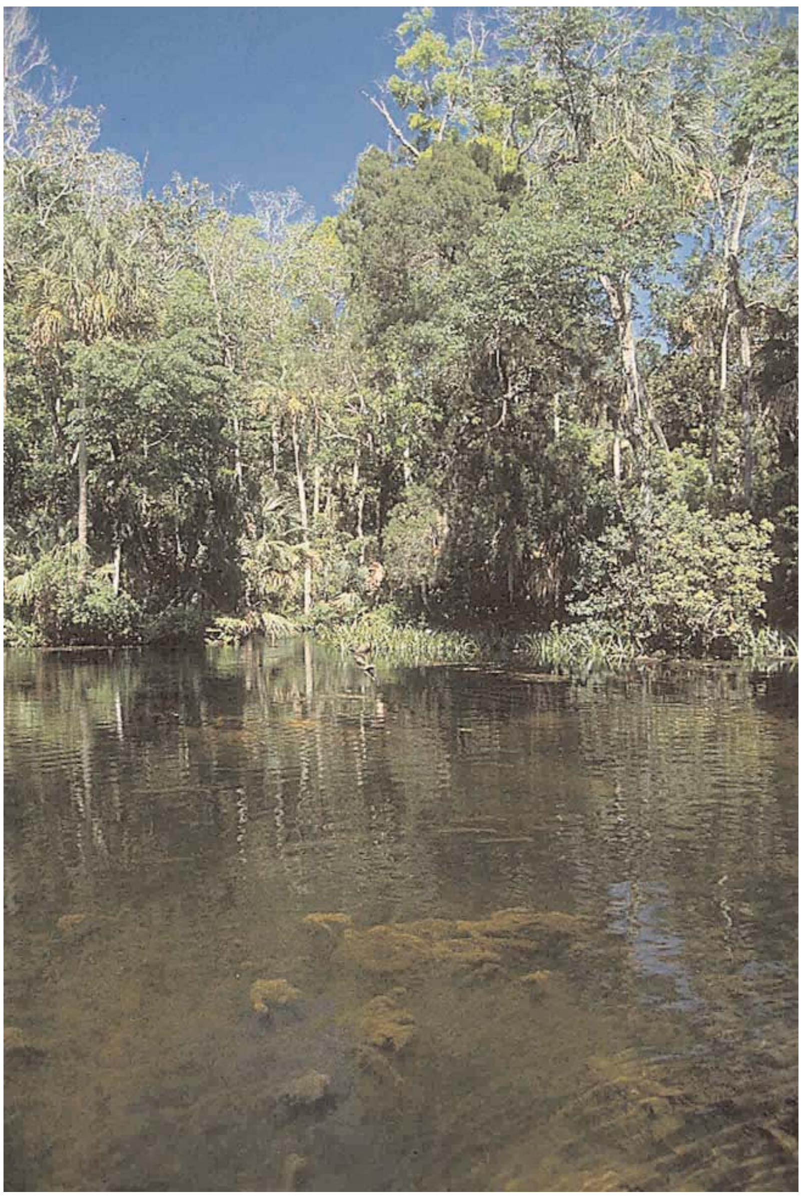

Figure 32. Potter Spring (photo by R. Means).

Pumphouse Springs

Figure 33a. Pumphouse Springs (photo by R. Meegan).

Location – Lat. 28° 47' 47.38" N, Long. 82° 35' 17.86" W (SE¼ SW¼ NE¼ sec. 28, T. 19 S, R. 17 E). The spring is located on private property approximately 1 mile (1.6 km) southwest of Homosassa Springs. It is at the head of a cove on the south side of a tributary of the Homosassa River. Spring Cove Road is approximately 30 ft (9.1 m) south of the spring which is enclosed by a chain link fence.

Description – Pumphouse Springs has a 2 ft (0.6 m) high concrete retaining wall on its east bank. The spring consists of at least 3 separate small vents, each producing a small boil on the pool surface. The spring pool is 15 ft (4.6 m) to 20 ft (6.1 m) in diameter and is shallow, averaging 3 ft (0.9 m) deep. The water is clear and has a hydrogen sulfide odor. Large, algae-covered limestone boulders are exposed throughout the spring bottom. An old building is next to the spring. The sand and limestone-bottomed run from Pumphouse Springs flows northwest approximately 200 ft (61m) and joins Trotter Spring Run. Their combined flow travels northwest into the Homosassa River.

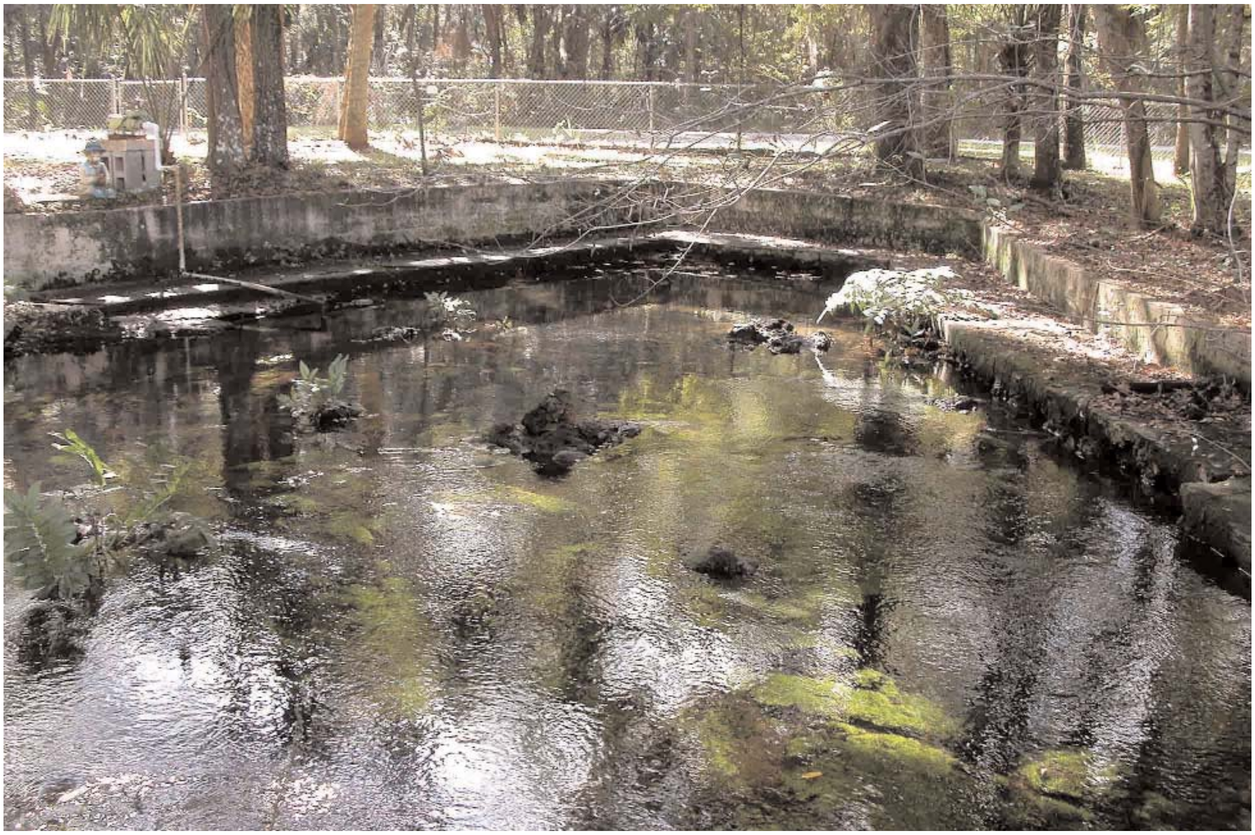

Figure 33b. Pumphouse Springs (photo by R. Meegan).

Ruth Spring

Location – Lat. 28° 43' 56.88" N, Long. 82° 35' 42.21" W (SW¼ SE¼ NW¼ sec. 22, T. 20 S, R. 17 E). Ruth Spring is located 2 miles (3.2 km) northwest of the community of Chassahowitzka. Ruth Spring feeds into the north side of Potter Creek. The spring is up a 0.1 mile (0.2 km) narrow, winding spring run that enters Potter Spring pool from the northeast. Potter Creek enters from the north into the Chassahowitzka River 1.5 miles (2.4 km) downstream from the Chassahowitzka boat ramp. From Homosassa Springs Wildlife State Park, drive south on US 19/98 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive about 1.8 miles (2.9 km) to the public boat access area.

Description – Ruth Spring is composed of two or three separate spring vents. The head spring measures 25 ft (7.6 m) north to south and 17 ft (5.2 m) east to west and is 6.6 ft (2 m) deep. It has no visible boil and has a sand and limestone rubble bottom with abundant logs and detritus. There are areas of thick muck accumulation. Forty feet (12.2 m) downstream from the head spring, the second spring vent discharges out of an elongated crack in limestone measuring 20 ft (6.1 m) long, with depths reaching 12 ft (3.7 m). A third small vent occurs near this vent but is not easily reached. From here, Ruth Spring Run travels approximately 0.1 miles (0.16 km) south and west down a swift narrow run that averages 6 ft (1.8 m) wide and 3 ft (0.9 m) deep. Ruth Spring and Run are under a hardwood and palm forest canopy. All surrounding land consists of heavily forested lowland owned by the Chassahowitzka National Wildlife Refuge.

Figure 34. Ruth Spring (photo by R. Means).

Three Sisters Springs

Location – Lat. 28° 53' 19.41" N, Long. 82° 35' 21.09" W (SE¼ NW¼ NE¼ sec. 28, T. 18 S, R. 17 E). The Kings Bay Springs Group is located in Kings Bay west of Crystal River. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay. This grouping of secluded spring vents is hidden up a small spring run on a tributary of Kings Bay in Crystal River. The tributary enters the east side of Kings Bay 0.1 miles (0.2 km) south of Pete's Pier; a bridge crosses over the mouth. Three Sisters Springs Run flows into the north side of a canal that accesses eastern Kings Bay, 0.4 miles (0.6 km) east of the bridge over the mouth of the canal.

Description – Three Sisters Springs consists of three main spring vents in separate spring pools at the head of a short spring run. The east spring averages 13 ft (4 m) deep with 2 adjoining conical depressions in sand and a spring pool up to 100 ft (30.5 m) wide. The north vent is approximately 40 ft (12.2 m) by 30 ft (9.1 m) wide and 15 ft (4.6 m) deep. It occupies a conical depression in sand. The west vent is approximately 8 ft (2.4 m) deep and the pool is approximately 45 ft (13.7 m) across. Flow from the three springs converges in a centralized, shallow, sand-bottomed pool containing additional sand boils. The spring water is clear and light bluish. Some algae are present on submerged logs within the spring system.

Figure 35. Three Sisters Springs (photo by R. Means).

Three Sisters Springs Run flows 150 ft (45.7 m) southwest before joining an east-west running canal that accesses eastern Kings Bay. The springs' mouth has a piling barricade at the entrance. No boats are allowed in the springs run, but swimming up the springs run into the springs is allowed. Adjoining lands are privately owned and forested. Land on the south side of the canal has residential housing with many boat docks. Idiot's Delight Spring is located in the canal 40 ft (12.2 m) southeast of the mouth of Three Sisters Springs.

Trotter Main Spring

Location – Lat. 28° 47' 47.32" N, Long. 82° 35' 11.03" W (SW¼ SE¼ NE¼ sec. 28, T. 19 S, R. 17 E). This spring forms the head of a tributary to the Homosassa River, which enters the River just south of the observation deck for Homosassa Springs Wildlife State Park. Fishbowl Drive crosses over the mouth of the tributary. From the intersection of US 98 and CR 490A in Homosassa Springs, travel west on CR 490A for 0.6 miles (1.0 km). Turn south (left) on Fishbowl Drive and travel 0.3 miles (0.5 km) to the State Wildlife Park.

Description – Trotter Main Spring issues from a 2 ft long (0.6 m) limestone fissure 5 ft (1.5 m) downstream from a private footbridge over the spring. Depth measured over the vent is 10.1 ft (3.1 m). The spring pool averages 2 ft (0.6 m) deep and has an abundance of algae. Some limestone is exposed around the vent and along the run. The spring is on privately-owned property. The spring run travels 0.25 miles (0.4 km) northwest, joining the east side of the upper Homosassa River. Approximately 0.15 miles (0.24 km) downstream, Pumphouse Spring enters from the south.

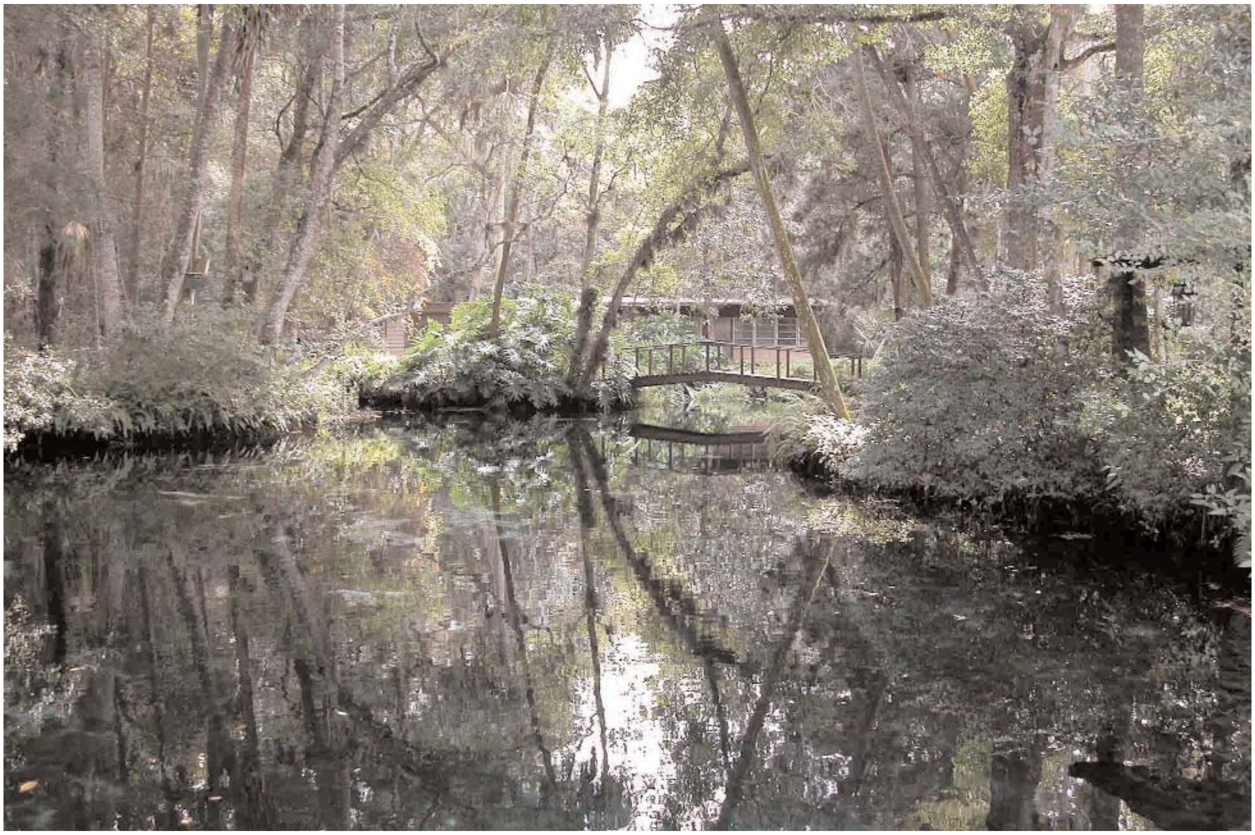

Figure 36. Trotter Main Spring (photo by R. Meegan).

Unnamed Spring

Location – Lat. 28° 53' 01.37" N, Long. 82° 35' 43.25" W (SW¼ SE¼ NW¼ sec. 28, T. 18 S, R. 17 E). This unnamed spring occupies a small cove on the north side of Banana Island in Kings Bay. The cove is 250 ft (76.2 m) southwest of Parker Island. Coming into Crystal River from the north on US 19/98, King's Bay can be accessed via numerous boat landings north and south of the Bay.

Description – The unnamed spring pool measures 20 ft (6.1 m) in diameter. The vent in the center of the pool is 1 ft (0.3 m) in diameter. Depth is 1.5 ft (0.5 m) at low tide. A small boil on the water surface can be seen at low tide. The spring has clear water, and the pool bottom is soft sand and mud. Abundant exotic aquatic vegetation and algae are present. Additional springs within a 100 ft (30.5 m) radius northward consist of small sand boils that discharge clear water into a tidally influenced, sand and mud bottomed portion of Kings Bay on the north side of Banana Island. Sawgrass flats border the unnamed spring on the south, east, and west sides; Kings Bay is to the north. The island is forested in its interior and owned by the Crystal River National Wildlife Refuge.

CLAY COUNTY

Wadesboro Spring

Location – Lat. 30° 09' 27.00" N, Long. 81° 43' 21.36" W (sec. 41 (irregular section), T. 4 S, R. 26 E). The spring is located in Orange Park just north of Doctor's Lake. From the intersection of US 17 and CR 224 in Orange Park drive west on CR 224 (Kingsley Avenue) approximately 0.6 mi (1 km) to the intersection with CR 224A. Turn south (left) onto CR 224A and drive approximately 0.9 miles (1.4 km). The spring is on the south (left) side of the road and discharges to Doctor's Lake. The spring is privately owned and access is restricted.

Description – Wadesboro Spring is within a 4 ft (1.2 m) high concrete enclosure at the head of a ravine. The rectangular spring pool is approximately 25 ft (7.6 m) long, 15 ft (4.6 m) wide, and averages 2 ft (0.6 m) deep. The spring vent consists of a sand boil at the base of the southwest side of the pool. The water is clear and light greenish. The spring bottom is sand. Copper colored iron-reducing bacteria and brown algae cover the spring wall and parts of the bottom. The run is 5 ft (1.5 m) wide, 0.5 ft (0.15 m) deep, and flows approximately 0.25 miles (0.4 km) southeast through a ravine into the northeastern portion of Doctor's Lake. The spring and run lie within a sparsely wooded corridor surrounded by developed lands. Private residences surround the spring, and access is restricted. Wadesboro Spring apparently was once used for swimming; however, the spring is no longer used. The mean discharge of Wadesboro Spring between 1972 and 2000 was 0.99 ft^3/s [6].

W.W. Gay Spring No. 1

Figure 37. W. W. Gay Spring No. 1 (photo by T. Roberts).

Location – Lat. 30° 09'14.47" N, Long. 81° 43' 41.51" W (sec. 41 (irregular section), T. 4 S, R. 26 E). The spring is located within Lake Echokotee Boy Scout Camp, which located at 2513 Doctors Lake Drive in Orange Park, south of Jacksonville. From the intersection of Kingsley Drive and Doctors Lake Drive in Orange Park, travel southwest on Doctors Lake Drive approximately 0.9 miles (1.4 km) and the Boy Scout Camp entrance will be on the south (left) side of the road. The spring is on private property and access is restricted.

Description – W.W. Gay Spring No. 1 has a diameter of 12.0 ft (3.7 m). It is surrounded by a wooden platform which has stairs going down into the spring pool. The spring reaches depths of 3.0 ft (0.9 m). No boil was present on the spring surface during the March 2003 visit. At the time of visit, the spring pool was covered in duckweed, preventing observation of the spring bottom. The spring water is clear. Water exits the spring pool through a pipe that drains into lowlands to the southeast toward Doctor's Lake. The spring run disappears into lowlands to the southeast. The ravine corridor stretches southeast approximately 0.3 miles (0.5 km) toward Doctor's Lake. A wooden shelter and fire pit utilized by the Lake Echokotee Boy Scout Camp are located approximately 50 ft (15.2 m) northeast of the spring pool. High ground surrounds the spring and rises to about 10 ft (3.1 m). An additional spring, known as W.W. Gay Spring No.2, is located about 100 ft (30.5 m) west of W.W. Gay Spring No. 1. The springs are within a heavily wooded area. Discharge measured 0.14 ft^3/s[(6)] in 1993.

W.W. Gay Spring No. 2

Figure 38. W.W. Gay Spring No. 2 (photo by T. Roberts).

Location - Lat. 30° 09'14.10" N, Long. 81° 43' 42.76" W (sec. 41 (irregular section), T. 4 S, R. 26 E). The spring is located within Lake Echokotee Boy Scout Camp, which located at 2513 Doctors Lake Drive in Orange Park, south of Jacksonville. From the intersection of Kingsley Drive and Doctors Lake Drive in Orange Park, travel southwest on Doctors Lake Drive approximately 0.9 miles (1.4 km) and the Boy Scout Camp entrance will be on the south (left) side of the road. The spring is on private property and access is restricted.

Description – W.W Gay Spring No. 2 discharges from a wooded hillside. The spring is composed of three small vents: two sand boils and one trickling seep. Limestone is exposed around the vents. Clear water issues prominently from both sand boils. The spring run is about 4.0 ft (1.2 m) wide and flows southeast approximately 50 ft (15.2 m) towards Doctor's Lake through a ravine corridor before disappearing into the adjacent floodplain. The lake is approximately 0.3 miles (0.5 km) to the southeast of the spring. The bottom of the spring run is sand with thick mats of orange iron-reducing bacteria. A drainage canal introduces runoff into the spring run. High ground on the west side of the spring gently slopes to about 6.0 ft (1.8 m) above the spring level. W.W. Gay Spring No. 1 is located 100 ft (30.5 m) east of W.W. Gay Spring No. 2. The surrounding land is heavily wooded.

COLUMBIA COUNTY

COL101971

Figure 39. COL101971 (photo by D. Hornsby).

Location – Lat. 29° 49' 55.96" N, Long. 82° 40' 09.71" W (SW¼ NE¼ SW¼ sec. 36, T. 7 S, R. 16 E). COL101971 is located approximately 0.4 miles (0.6 km) upriver from Rum Island, on the north bank of the Santa Fe River. From High Springs, drive northwest on US 27/SR 20 approximately 4.0 mi (6.4 km). Turn west (left) onto SR 138 and drive approximately 2.0 mi (3.2 km) and turn south (left) at sign for Rum Island. Follow dirt road about 1.5 mi (2.4 km) to boat ramp.

Description – COL101971 has a circular spring pool 12 ft (3.7 m) in diameter and 5 ft (1.5 m) deep. The silt pool bottom is covered with green algae and tree debris. During the December 2002 visit the spring was not flowing and the water was clear and stagnant. No aquatic plants grow in the spring pool. The dry spring run is 3 ft (0.9 m) wide, 220 ft (67.1 m) long, and flows into the Santa Fe River. A house is situated to the north of the spring pool and there are several oak and cypress trees in the immediate vicinity. A forest begins 100 ft (30.5 m) to the east and west of the spring pool. Discharge was measured in October 1997 was 2.56 ft^3/s[4].

COL101974

Figure 40. COL101974 (photo by T. Roberts).

Location – Lat. 29° 50' 02.39" N, Long. 82° 40' 36.05" W (NE¼ NE¼ SE¼ sec. 35, T. 7 S, R. 16 E). COL101974 is located on the north bank of the Santa Fe River about 0.1 mi (0.2 km) east of the Rum Island boat ramp. From High Springs drive northwest on U.S. 27/SR 20 approximately 4.0 miles (6.4 km). Turn west (left) onto SR 138 and drive about 2.0 miles

(3.2 km) and turn south (left) at sign for Rum Island. Follow dirt road about 1.5 miles (2.4 km) to river. The spring is to the east of the boat ramp.

Description – COL101974 has a circular spring pool 6 ft (1.8 m) in diameter and 4.5 ft (1.4 m) deep. Aquatic vegetation covers the pool bottom obstructing the view of the the spring vent. The water is clear blue and a prominent boil is visible at the water surface. Two runs flow from this spring into the Santa Fe River. The southern run is 3 ft (0.9 m) wide, 1 ft (0.3 m) deep and flows south for approximately 12 ft (3.7 m). A small footbridge crosses the run where it converges with the Santa Fe River. The second run is 15 ft (4.6 m) wide and 1 ft (0.3 m) deep, and flows west 60 ft (18.3 m). The spring is surrounded by a forested floodplain. Discharge estimated on October 1, 1997 was 10 ft^3/s[4].

COL428981

Figure 41. COL428981 (photo by D. Hornsby).

Location – Lat. 29° 51' 12.73" N, Long. 82° 36' 19.88" W (NE¼ SW¼ NW¼ sec. 27, T. 7 S, R. 17 E). The spring is located 1.5 miles (2.4 km) north of High Springs on the north bank of the Santa Fe River. It is approximately 0.3 miles (0.5 km) upstream from the US 441/41 public boat ramp. From the junction of US 441/41 and CR 236 in High Springs, drive north on US 441/41 approximately 1.2 miles (1.9 km). Turn west (left) at public access boat ramp sign just before the Santa Fe River bridge.

Description – COL428981 occupies a circular depression with a diameter of 35.0 ft (10.7 m). Depth of the spring pool averages 2.0 ft (0.6 m). The spring pool surface is covered in duckweed and contains clear, stagnant water. The spring was not flowing in December 2002. The dried up spring run contains grass and shrubs. The run trends southeast-ward 15 ft (4.6 m) and enters the Santa Fe River from the north. The spring is within forested lowlands along the Santa Fe River. Discharge on April 28, 1998 measured 2.41 ft^3/s[(4)].

COL522981

Figure 42. COL522981 (photo by T. Roberts).

Location – Lat. 30° 19' 15.76" N, Long. 82° 45' 21.29" W (NW¼ NE¼ NW¼ sec. 18, T. 2 S, R. 16 E). The spring is located less than 1 mile (1.6 km) south of White Springs on the southwest side of the Suwannee River. It is approximately 1.5 miles (2.4 km) downstream from the US 41 bridge park just southeast of White Springs.

Description – COL522981 was not flowing at the time of visit in December of 2002. The dry spring orifice was evident at the base of the exposed, moss-covered limestone banks of the Suwannee River. Hornsby and Ceryak (1998) reported that COL522981 was located at the base of limestone riverbanks and was flowing. They also noted a strong hydrogen sulfide odor from the spring. When flowing, COL522981 flows directly into the Suwannee River from the south. Higher ground around the spring rises steeply to about 3.0 ft (0.9 m). The spring is within the forested riparian corridor associated with the Suwannee River. Discharge on May 22, 1998 measured 2.15 ft^3/s[(4)].

COL522982

Figure 43. COL522982 (photo by T. Roberts).

Location – Lat. 30° 19' 17.27" N, Long. 82° 45' 23.50" W (NW¼ NE¼ NW¼ sec. 18, T. 2 S, R. 16 E). The spring is located less than 1 mile south of White Springs and vents from the bottom of the riverbed of the Suwannee River. It is just past COL0522981. From the US 41 boat landing on the Suwannee River, travel downriver approximately 1.5 miles (2.4 km).

Description – COL522982 discharges from the riverbed of the Suwannee River. In December 2002, a slight boil was observed on the surface of the river directly above the spring vent location; however, dark river water obscured view of the spring. COL522982 is within a forested section of the Suwannee River. Discharge on May 22, 1998 was estimated at 3 ft^3/s[4].

COL917971

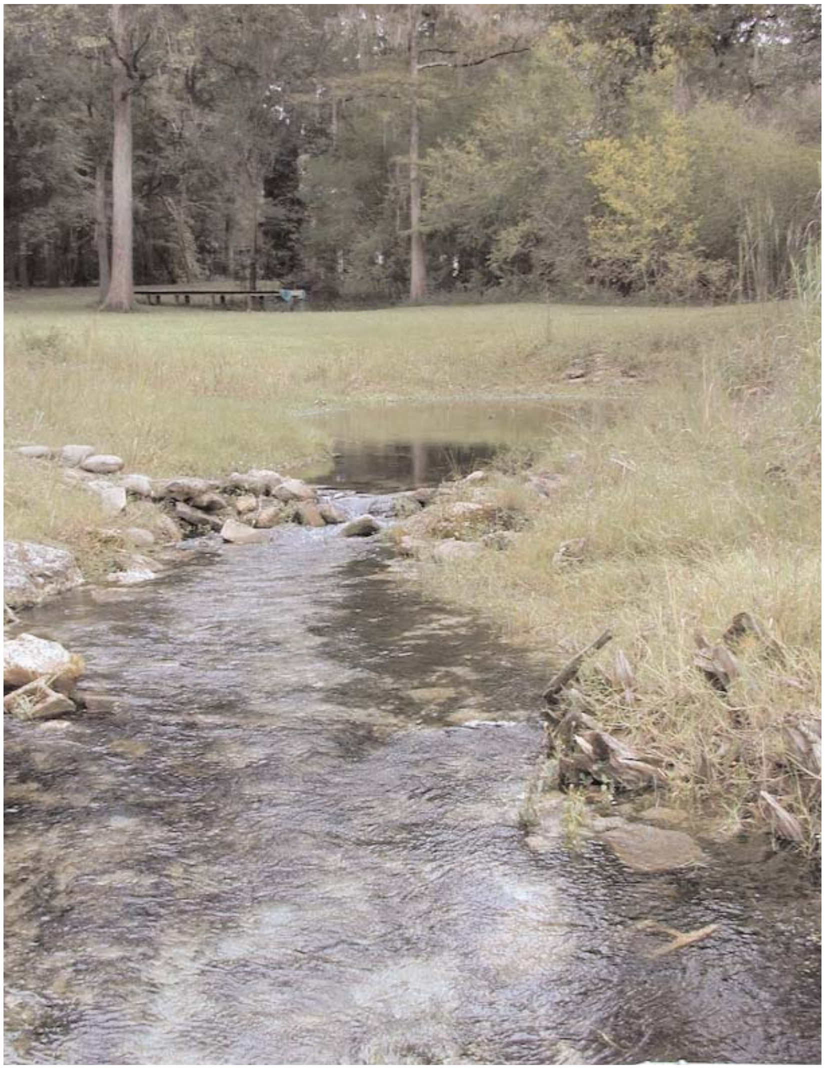

Figure 44. COL917971 (photo by T. Roberts).

Location – Lat. 29° 55' 29.38" N, Long. 82° 46' 19.17" W (SW¼ NE¼ NW¼ sec. 36, T. 6 S, R. 15 E). COL917971 is located along the east bank of the Santa Fe River. From the east side of the bridge over the Suwannee River at Branford, travel east on US 27/129 and SR 20 for approximately 4.1 miles (6.6 km) to the intersection with US 129. Turn south (right) onto US 129 and travel 4.2 miles (6.8 km) to the intersection with CR 138. Turn east (left) onto CR 138 and travel approximately 3.3 miles (5.3 km) to the intersection with NE 2nd Way. Turn northeast (left) onto NE 2nd Way and travel approximately 2.5 miles (4 km) to the boat landing. Boat approximately 0.8 mile (1.3 km) downriver to the spring.

Description – COL917971 occupies a nearly circular spring pool that measures 58.5 ft (17.8 m) long and 52 ft (15.8 m) wide. The spring pool is created by a man-made, limestone dam. The spring vent discharges from a limestone fissure that measures approximately 6.0 ft (1.8 m) long, located in the south end of the spring pool. Depth averages 1 to 2 ft (0.3 to 0.6 m). The spring water was clear and slightly tannic in September 2002. A prominent boil is formed on the pool surface. The spring bottom consists of sand and dark fine sediments. Its short spring run flows approximately 12 ft (3.7 m) into the Santa Fe River from the east. The surrounding high ground gently slopes to approximately 7 ft (2.1 m) above the spring surface. The spring is within a heavily forested section of the Santa Fe River. Discharge on September 17, 1997 measured 6.83 ft^3/s[4].

COL930971

Figure 45. COL930971 (photo by D. Hornsby).

Location – Lat. 29° 49’ 52.19” N, Long. 82° 39’ 24.26” W (NW¼ SW¼ SW¼ sec. 31, T. 7 S, R. 17 E). This spring is located 3.5 miles (5.6 km) west of High Springs on the north bank of the Santa Fe River. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for 0.6 miles (1 km). Turn west (right) on SR 340 (Poe Springs Road) and travel 2.9 miles (4.7 km) then turn north (right) into Poe Springs Park at the sign. The spring is 0.5 miles (0.8 km) downstream from the boat ramp in Poe Springs Park.

Description – COL930971 consists of a cluster of at least five distinct spring vents in separate pools. The depths of each spring pool range from 1.0-2.0 ft (0.3-0.6 m). The spring pools are of various sizes and shapes. Only one spring vent had an appreciable flow, displaying a slight boil. All spring pools had an abundance of aquatic vegetation, and the majority of each spring pool surface was covered by duckweed. The spring run averages 4 ft (1.3 m) wide, and is characterized by puddles and dry sections. It is approximately 800 ft (243.8 m) long and enters the Santa Fe River from the north. A 1 ft (0.3 m) high, man-made limestone dam is constructed across the spring mouth near the river’s edge. The spring is within heavily forested lowlands associated with the Santa Fe River. During higher water levels, COL930971 would become a single spring pool, fed by 5 spring vents. The spring pool is surrounded by private property. Discharge on September 30, 1997 measured 13.34 ft^3/s[4].

COL1012971

Figure 46. COL1012971 (photo by D. Hornsby).

Location – Lat. 29° 51' 24.88" N, Long. 82° 43' 47.98" W (SE¼ SW¼ SE¼ sec. 20, T. 7 S, R. 16 E). COL1012971 is located along the north bank of the Santa Fe River. From the intersection of US 27 and SR 47 in Fort White drive south on SR 47 for approximately 4.3 miles (6.9 km) to the bridge over the Santa Fe River. The spring is located approximately 1.3 miles (2.1 km) upriver from the boat landing at SR 47.

Description – This spring has an oval-shaped depression that measures 69 ft (21.0 m) wide and 90.0 ft (27.4 m) long. Its depth, when visited, was 2 ft (0.6 m). Hornsby and Ceryak (1998) report the water flow came from a 15 ft (4.6 m) long fracture with a maximum depth of 7 ft (2.1 m). The water is dark brown with poor clarity and no boil can be seen. The spring pool bottom is muddy with a thin layer of algae and a large amount of *Hydrilla* and tree debris. Duckweed and leaves cover the surface of the spring pool around its edge. Limestone crops out at the vent, on the northern side of the spring pool. Two spring runs are associated with this spring. Both flow west into the Santa Fe River and are about 36 ft (11.0 m) long, 15 ft (4.6 m) wide and about 1 ft (0.3 m) deep. The bottom of these runs is muddy with abundant debris, including tree branches and leaves, algae, and *Hydrilla*. High ground surrounding the spring pool and its run ranges up to 4 ft (1.2 m) above the water level. Private property surrounds this spring, and is forested by cypress and oak trees, cypress knees, and tall grass. Discharge on September 30, 1997 was estimated at 15 ft^3/s[4].

COL1012972

Location – Lat. 29° 51' 23.38" N, Long. 82° 43' 54.12" W (SW¼ SW¼ SE¼ sec. 20, T. 7 S, R. 16 E). From the intersection of US 27 and SR 47 in Fort White drive south on SR 47 for approximately 4.3 miles (6.9 km) to the bridge over the Santa Fe River. The spring is approximately 0.5 miles (0.8 km) upriver from the boat ramp, on the northeast side, and upriver from Myrtle's Fissure.

Description – COL1012972 creates an oval-shaped pool that measures 70 ft (21.3 m) by 12 ft (3.7 m). A 70 ft (21.3 m) long fissure is located on the south side of the pool. Depth measured by Hornsby and Ceryak (1998) is 47 ft (14.3 m). During the visit, the water in the pool was dark and tannic. The run averages 15 ft (4.6 m) wide and 0.5 ft (0.15 m) deep, and flows 220 ft (67.1 m) into Santa Fe River from the north. The pool is surrounded by a dense floodplain forest that is privately owned. Discharge on October 12, 1997 measured 10.28 ft^3/s[4].

Jonathan Spring (COL101972)

Figure 47 Jonathan Spring (photo by D. Hornsby).

Location – Lat. 29° 50' 01.64" N, Long. 82° 40' 31.50" W (NE¼ NE¼ SE¼ sec. 35, T. 7 S, R. 16 E). Jonathan Spring is located at the eastern end of Rum Island County Park. From the intersection of US 27 and Main Street in High Springs, drive northwest on US 27 approximately 3.3 miles (5.3 km) to the intersection with CR 138. Turn west (left) onto CR 138 and drive about 2.0 miles (3.2 km) to the intersection with Rum Island Road. Turn south (left) at sign for Rum Island and travel approximately 1.5 mi to the boat ramp. Put in boat and go upriver about 0.3 miles (0.5 km) to spring.

Description – Jonathan Spring, referred to as COL101972 by Hornsby and Ceryak (1998), has an elongated pool 55 ft (16.8 m) by 10 ft (3.1 m). Two sand boils are located on the pool bottom at a depth of 1.5 ft (0.5 m). The pool has a sand bottom, the majority of which is covered with algae. The water is clear blue and various aquatic plants are present. The shallow spring run is 10 ft (3.1 m) wide, 0.7 ft (0.2 m) deep, and flows 35 ft (10.7 m) west to the Santa Fe River. The run bottom is sand and does not have as much vegetation as the spring pool. The land around the pool gently slopes up to 4 ft (1.2 m) above the water surface. The spring is surrounded by a dense hardwood forest with thick grass patches and some palmetto. There are remnants of an old cement wall where the run meets the river. Rum Island County Park surrounds the spring. Discharge measured October 1, 1997 was 6.07 ft^3/s[4].

July Spring

Figure 48. July Spring (photo by T. Scott).

Location – Lat. 29° 50' 10.23" N, Long. 82° 41' 47.03" W (SE¼ SW¼ NE¼ sec. 34, T. 7 S, R. 16 E). July Spring is located across from the Ginnie Springs Complex. From the junction of US 441/41 and US 27 in High Springs, drive south on U.S. 41/27 approximately 0.8 miles (1.3 km). Turn west (right) onto SR 340 (Poe Springs Road) and drive about 6.6 miles (10.6 km) and then turn north (right) onto graded road at sign for Ginnie Springs. Follow the graded road another mile (1.6 km) to the Ginnie Springs entrance. A canoe must be used to visit July Spring. The easiest access is from Ginnie Springs Complex. Canoe directly across the river from Devil's Ear Spring.

***Description* -** July Spring occupies a circular cove on the northeast side of the Santa Fe River that is 90 ft (27.4 m) in diameter. Spring water issues from a 40 ft (12.2 m) long limestone fissure approximately 8 ft (2.4 m) deep. The water in the pool is clear bluish green and most of the pool is covered with exotic aquatic vegetation. The fissure creates several boils at the pool surface. Privately owned, dense hardwood forest surrounds the spring and it is a popular swimming hole. Discharge measured November 4, 1997 was 117 ft^3/s[(4)].

Mill Pond Springs

Figure 49. Mill Pond Springs (photo by R. Means).

Location – Lat. 29° 57' 59.98" N, Long. 82° 45' 35.91" W (NW¼ SW¼ NW¼ sec. 13, T. 6 S, R. 15 E). From Branford, drive southeast on US 27 for approximately 10.0 miles (16.1 km) to the intersection with CR 137 (Sand Hill Road). Turn north (left) at park sign onto CR 137 (Sand Hill Road) and travel approximately 4.5 miles (7.2 km) to the first paved road on the right. Take first paved road on the right (CR 238) and travel to the park entrance on the right. The spring is 1.3 miles (2.1 km) below Ichetucknee Main Spring on the east side of the river.

Description – Mill Pond Springs form an oval spring pool 20 ft (6.1 m) by 140 ft (42.7 m). Two vents are located on the pool bottom and two seeps flow from the adjacent riverbank, one to the southeast and one to the southwest of the pool. Maximum depth of the spring pool is 3.8 ft (1.2 m). The pool's mud bottom is coated with algae, leaves, and eel grass. Limestone is exposed around the vents. The water is light brown in color, but clear, and a prominent boil is visible on the surface. The spring run flows 150 ft (45.7 m) north into the Ichetucknee River. The run has a mud bottom that is covered with algae and eel grass. An old mill is situated along the spring run and the run is surrounded by a dense forest of live oaks, cypress and palm trees. High ground gently slopes up from the spring pool and run to 6.5 ft (2 m). Discharge rate on June 16, 1998 measured 23.05 ft^3/s[(4)].

Rum Island Spring

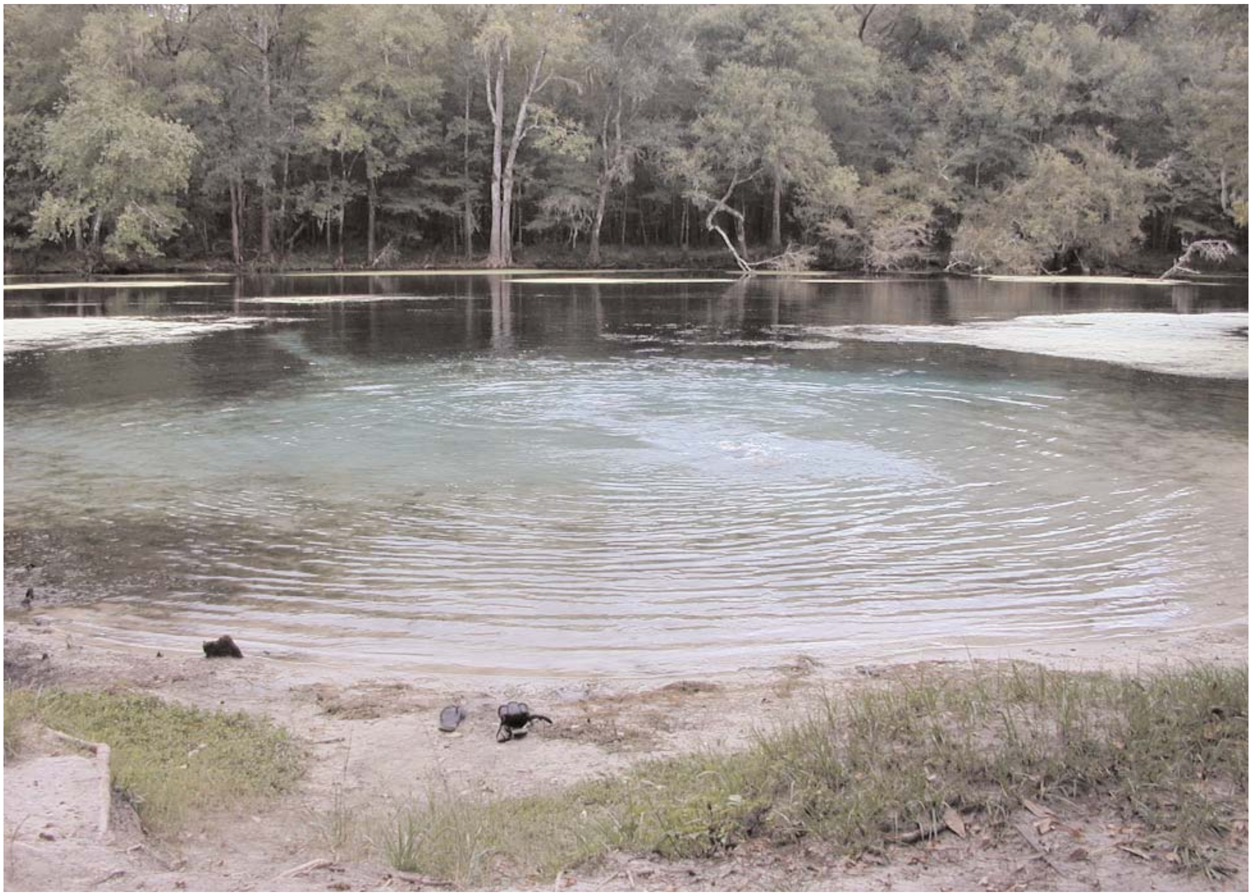

Figure 50. Rum Island Spring (photo by T. Roberts).

Location – Lat. 29° 50' 00.67" N, Long. 82° 40' 47.39" W (NE¼ NW¼ SE¼ sec. 35, T. 7 S, R. 16 E). Rum Island Spring is located within Rum Island County Park. From the intersection of US 27 and Main Street in High Springs, drive northwest on US 27 approximately 3.3 miles (5.3 km) to the intersection with CR 138. Turn west (left) onto CR 138 and drive about 2.0 miles (3.2 km) to the intersection with Rum Island Road. Turn south (left) at sign for Rum Island and travel approximately 1.5 miles (2.4 km) to the boat ramp. The spring discharges to a large pool just west of the parking area.

Description – Rum Island Spring occupies a 200 ft (61 m) wide cove along the north bank of the Santa Fe River. Spring water issues from a 19 ft (5.8 m) long and 3-4 ft (0.9-1.2 m) wide fissure. The pool bottom is sand and is covered with algae. The spring water is clear blue and contrasts with the slightly tannic river where the two meet. A boil is visible on the spring pool surface. There is an abundance of *Hydrilla* in the spring pool. The pool is surrounded by grass banks. A few picnic tables are to the north and a parking lot is located to the east associated with Rum Island County Park. The spring is a local swimming hole. Discharge measured on October 1, 1997 was 60.8 ft^3/s[(4)].

Sawdust Spring

Figure 51. Sawdust Spring (photo by T. Roberts).

Location – Lat. 29° 50’ 24.05” N, Long. 82° 42’ 12.64” W (SW¼ NE¼ NW¼ sec. 34, T. 7 S, R. 16 E). Sawdust Spring is located across from the Ginnie Springs Complex. From the junction of US 441/41 and US 27 in High Springs, drive south on U.S. 41/27 approximately 0.8 miles (1.3 km). Turn west (right) onto SR 340 (Poe Springs Road) and drive about 6.6 miles (10.6 km) and then turn north (right) onto graded road at sign for Ginnie Springs. Follow another mile to the Ginnie Springs entrance. A canoe must be used to visit Sawdust Spring. The easiest access is from Ginnie Springs Complex. Canoe downriver and Sawdust will be on the right approximately 0.5 miles (0.8 km) below Ginnie Springs and just before Twin Spring on the left.

Description – Sawdust Spring has a circular pool measuring 58 ft (17.7 m) in diameter. The spring bottom is sand and completely covered with aquatic vegetation. Clear blue water issues with enough force to create a boil on the east side of the spring pool. The spring run averages 20 ft (6.1 m) wide and 3 ft (0.9 m) deep and flows 100 ft (30.1 m) to the Santa Fe River. Logs lie across the intersection of the spring run and the Santa Fe River. The spring is surrounded by privately-owned, dense lowland forest. Discharge measured on October 1, 1997 was 6.83 ft^3/s[4].

Sunbeam Spring

Figure 52. Sunbeam Spring (photo by T. Roberts).

Location – Lat. 29° 55' 41.14" N, Long. 82° 46' 11.33" W (SE¼ SE¼ SW¼ sec. 25, T. 6 S, R. 15 E). From the junction of U.S. 27 and Wilson Springs Road in Ft. White, take Wilson Springs Road west approximately 3.8 miles (6.1 km) to the boat ramp on the Santa Fe River. Go downriver on the Santa Fe approximately 0.9 mile (1.5 km), past 2 sets of small shoals and a hairpin turn. The spring is a five minute paddle past COL917971 and lies in the riverbed a little toward the north (Columbia County) side of the river.

Description – Sunbeam Spring flows from two vents in a riverbed fracture. During the September 2002 visit, a fissure near the north bank of the Santa Fe River was exposed, measuring 7 ft (2.1 m) long and up to 1 ft (0.3 m) wide. The water flowing from this vent has excellent clarity. The second vent is located to the north of the first and was inundated by the river during the visit. The clarity of the water coming from the second vent is poor and the color is brownish green. Each of the vents produces a prominent boil on the water surface. The adjacent riverbank rises gently to 3 ft (0.9 m) above the water surface and there is a wooden deck 100 ft (30.5 m) northwest of the two vents. A forested riparian corridor surrounds the river at the spring. Discharge measured September 9, 1997 was 45.6 ft^3/s[(4)].

Wilson Spring

Location – Lat. 29° 54' 0.18" N, Long. 82° 45' 30.77" W (SW¼ SW¼ SW¼ sec. 6, T. 7 S, R. 16 E). The spring is located 3 miles (4.8 km) southwest of Fort White and flows into the Santa Fe River from the east bank. From the junction of U.S. 27 and Wilson Springs Road in Fort White, take Wilson Springs Road west approximately 3.8 miles (6.1 km) to the boat ramp on the Santa Fe River. The spring run is adjacent to the Wilson Spring Road boat ramp on the east side.

Figure 53. Wilson Spring (photo by T. Roberts).

Description – Wilson Spring has an oval spring pool that measures 108 ft (32.9 m) long and 81 ft (24.7 m) wide with a depth of 21.7 ft (6.6 m). The spring vent is likely located on the east side of the spring pool where a prominent spring boil is observed; however, the vent could not be observed due to dark water conditions. Some limestone is exposed in the spring. A strong hydrogen sulfide odor is associated with this spring. Wilson Spring Run flows approximately 275 ft (83.8 m) into the Santa Fe River from the north. The run has a dark sand and mud bottom with a thin algal coating. Wilson Spring and its run are surrounded by privately-owned, heavily forested lowlands. Discharge on September 28, 1997 measured 39.0 ft^3/s[4].

DIXIE COUNTY

DIX95971

Location – Lat. 29° 42’ 15.83” N, Long. 82° 57’ 09.87” W (SW¼ NE¼ NW¼ sec. 18, T. 9 S, R. 14 E). DIX95971 is located approximately 8 miles (12.9 km) north of Fanning Springs. From the intersection of US 19/98 and SR 26 in Fanning Springs, travel north on SR 26 approximately 1.4 miles (2.2 km) toWilcox. In Wilcox, CR 232 intersects SR 26 as SR 26 makes a 90 degree bend to the east (right). Continue north (straight) onto CR 232 and travel approximately 6.2 miles (10.0 km) to the intersection with SW 25th Street. Turn west (left) onto SW 25th Street and travel approximately 0.8 miles (1.3 km) to the boat landing. DIX 95971 is located approximately 0.9 miles (1.4 km) downriver on the north bank.

Figure 54. DIX95971 (photo by D. Hornsby).

Description – DIX95971 issues into a spring pool 20 ft (6.1 m) wide and 25 ft (7.6 m) long. Maximum depth is 1.5 ft (0.5 m). The pool bottom is sand and silt. During the December 2002 visit, the spring was not flowing. The aquatic plants in the spring pool are covered with algae and the water in the pool is tannic with poor clarity. The spring run averages 15 ft (4.6 m) wide, 1.5 ft (0.5 m) deep and flows 70 ft (21.3 m) to the Suwannee River. The run bottom is similar to that of the spring pool. A dock is located on the west side of the spring pool and houses are to the southwest. Dense grasses and shrubs as well as oak and cypress trees surround the spring pool. The property surrounding the spring is privately owned. Discharge on August 26, 1998 was estimated as 45.6 ft^3/s[(4)].

Little Copper Spring

Location – Lat. 29° 38' 01.36" N, Long. 82° 58' 00.65" W (sec. 12 (irregular section), T. 10 S, R. 13 E). From the intersection of CR 232 and SR 26 in Wilcox, drive north on CR 232 approximately 1.7 miles (2.7 km) to the intersection with CR 334. Turn west (left) onto CR 334 and drive approximately 2.3 miles (3.7 km) to boat landing. The spring flows into the Suwannee River from the west approximately 0.25 mile (0.4 km) downstream from the boat ramp.

Description – Little Copper Spring occupies an oval shaped depression that measures 20 ft (6.1 m) wide and 32 ft (9.7 m) long. Spring depth is 4 ft (1.2 m). The spring water is clear

Figure 55. Little Copper Spring (photo by D. Hornsby).

and the pool bottom is muddy and covered with brown algae. An area of small trees and cypress knees are growing in the middle of the spring pool. Little Copper Spring run is 3 ft (0.9 m) wide and 1 ft (0.3 m) deep, and it flows about 300 ft (91.4 m) into the Suwannee River from the west. The bottom of the spring and run is predominantly mud, although some limestone is exposed at the vent. Approximately 250 ft (76.2 m) downstream from Little Copper Spring, there is a pool that has no spring boil on the surface; however, it appears to be an additional spring that is flowing into Little Copper Spring Run. An abundance of copper-colored, iron-reducing bacteria inhabits the spring and run. The bank and trees that surround the spring are stained with a copper color due to iron deposition from the water. This spring is surrounded by private lands and is within forested lowlands associated with the Suwannee River. Discharge on September 22, 1997 measured 6.35 ft^3/s[4].

McCrabb Spring

Location – Lat. 29° 41' 07.76" N, Long. 82° 57' 36.74" W (NE¼ NE¼ SE¼ sec. 24, T. 9 S, R. 13 E). McCrabb Spring flows into the Suwannee River from the west approximately 0.8 mile (1.3 km) upriver from Hart Spring. From the intersection of SR 26 and CR 232 in Wilcox, drive north on CR 232 for approximately 4.1 miles (6.6 km) to the intersection with CR 344. Turn west (left) onto CR 344 and drive 1.6 miles (2.6 km) to the Suwannee River. Launch boat and travel upriver approximately 0.8 miles (1.3 km).

Description – McCrabb Spring has an elliptical spring pool 25 ft (7.6 m) wide, 40 ft (12.2

Figure 56. McCrabb Spring (photo by D. Hornsby).

m) long, and 6 ft (1.8 m) deep. The spring vent is located on the west side of the pool. A layer of algae coats the sand bottom of the spring pool and aquatic vegetation is present. Two distinct boils are visible on the surface created by water issuing from the singular vent. There is a hydrogen sulfide odor and iron deposition has stained the bottom and banks. The spring run averages 10 ft (3.1 m) wide, 1.5 ft (0.5 m) deep and flows 20 ft (6.1 m) east into the Suwannee River. The privately owned high ground surrounding the pool rises gently 3 - 5 ft (0.9-1.5 m) to an open cypress, oak, and cedar forest. Private residences are nearby. Discharge on September 19, 1997 measured 5.44 ft^3/s[4].

Pothole Spring

Location – Lat. 29° 48' 38.48" N., 82° 56' 09.14" W (SE¼ SE¼ SW¼ sec. 5, T.8 S., R. 14 E.). Pothole Spring is located on the west bank of the Suwannee River approximately 6 miles northwest of Bell. The spring is approximately 1.7 miles (2.7 km) upstream from the CR 340 (Rock Bluff Landing) boat ramp on the Suwannee River.

Description – Pothole Spring pool measures 10 ft (3.1 m) wide and 25 ft (7.6 m) long. Depth is approximately 15 ft (4.6 m). The spring water is clear and is light yellow-green. Limestone is exposed within the circular spring vent and is covered with algae. Spring discharge creates a turbulent boil on the water surface above the vent. A brief spring run flows east 20 ft (6.1 m) into the west side of the Suwannee River. The spring run has an exposed sand bottom. The river banks rise steeply to approximately 8 ft (2.4 m) above the spring sur-

Figure 57. Pothole Spring (photo by T. Roberts).

face southwest of Pothole Spring. The land bordering the spring is privately owned on the down-stream side and owned by SRWMD on the upstream side. Discharge on August 4, 1997 measured 31.64 ft^3/s[(4)].

Unnamed Spring

Location – Lat. 29° 49' 09.98" N, Long. 82° 56' 00.35" W (NW¼ SW¼ NE¼ sec. 5, T. 8 S, R. 14 E). From I-10 E, take US 221 south to US 27. Just before reaching Branford, turn south (right) onto SR 349 and drive approximately 9.0 miles (14.5 km) to the intersection with CR 340 E. Turn east (right) and drive approximately 3.2 miles (5.2 km) to the boat landing. Launch boat and go downriver about 3.5 miles (5.6 km); the spring is on the west (right) side of the Suwannee River.

Description – This unnamed spring is composed of three interconnected spring pools. The first pool is 35 ft (10.7 m) in diameter and 6.5 ft (2.0 m) deep. The second pool is oval-shaped 22 ft (6.7 m) wide, 55 ft (16.8 m) long and 4 ft (1.2 m) deep. The last pool is 50 ft (15.2 m) downstream from the second pool and measures 25 ft (7.6 m) by 60 ft (18.3 m) and 3.5 ft (1.1 m) deep. The combined flow travels 500 ft (152.4 m) to the Suwannee River. No aquatic vegetation or algae is observable in the pools and the water in the pools and run is tannic. No boil was visible in the first pool but the second and third pools have distinct boils on the water surface. A dense hardwood forest surrounds this spring complex.

Unnamed Spring

Location – Lat. 29° 41' 10.52" N, Long. 82° 57' 35.42" W (SE¼ SE¼ NE¼ sec. 24, T. 9 S, R. 13 E) This unnamed spring is just north of McCrabb Spring. From the intersection of SR 26 and CR 232 in Wilcox, drive north on CR 232 for approximately 4.1 miles (6.6 km) to the intersection with CR 344. Turn west (left) onto CR 344 and drive 1.6 miles (2.6 km) to the Suwannee River. Put in boat and go upriver to spring. The spring is approximately 100 ft (30.5 m) upriver from McCrabb Spring.

Description – This unnamed spring issues from the riverbed directly into the west side of the Suwannee River. The vent opening is 1.3 ft (0.4 m) deep and is surrounded by limestone. Orange, iron-reducing algae surround the vent and the water has excellent clarity. Aquatic vegetation, covered in orange algae, covers roughly 85% of the river bottom in the vicinity of the spring vent. The bottom of the river surrounding the vent is algae covered silt. There is a wooden dock to the southwest of the vent and a house to the west. Cypress, oak, cedars, and grasses line the banks of the river near the spring.

DUVAL COUNTY

Pottsburg Creek Spring

Location – Lat. 30° 17' 24.00" N, Long. 81° 34' 15.24" W (sec. 52 (irregular section), T. 2 S, R. 27 E). From Jacksonville, take I-95 south to US 90 E (Beach Blvd.). Turn east (right) from the exit ramp, and the spring is approximately 600 ft (182.9 m) southeast on the southwest (right) side of the boulevard. The spring vent is located beneath a tree in the bank of a small tributary of Pottsburg Creek.

Description – Pottsburg Creek Spring pool is approximately 4 ft (1.2 m) in diameter and discharges through a tangle of tree roots. Spring water is murky and brownish. A strong hydrogen sulfide odor is associated with this spring. Pottsburg Spring Run flows 0.3 miles (0.5 km) southwest into Pottsburg Creek. The spring and run bottoms are soft sand and detritus. The run averages 8 ft (2.4 m) wide and 1.6 ft (0.5 m) deep. The spring is within a swampy, forested lowland. Discharge measured 1.29 ft^3/s [6] in 1996.

FRANKLIN COUNTY

Bear Creek Rise

Location – Lat. 29° 58' 54.30" N, Long. 84° 27' 47.42" W (SW¼ SW¼ SW¼ sec. 5, T. 6 S., R. 2 E.). This tidally influenced spring is located on the east side of Bear Creek, a tributary to the lower Ochlocknee River. It can be accessed by boat. Put in at the boat landing on the north side of US 98 just west of the bridge over Ochlocknee Bay. The spring is approximately 7.3 miles (11.8 km) upriver from the boat landing.

Figure 58. Bear Creek Rise (photo by R. Meegan).

Description – Bear Creek Rise occupies a large circular pool 300 ft (91.4 m) in diameter. The spring vent is located within the east side of the pool, and spring depths drop sharply to 47 ft (14.3 m) over the vent. The rest of the spring pool averages about 10 ft (3.1 m) deep. Spring water was tea colored and turbid in March 2003. Local fishermen report that Bear Creek Rise becomes clear during drier conditions. The northwest side of the pool is connected to Bear Creek. Bear Creek Rise is an isolated spring within the St. Marks National Wildlife Refuge. It is surrounded by open brackish marsh dominated by black needle rush.

GADSDEN COUNTY

Chattahoochee Spring

Location – Lat. 30º 41’ 50.68” N, Long. 84º 50’ 55.82” W (SE¼ NW¼ SW¼ sec. 33, T. 4 N, R. 6 W). Chattahoochee Spring is located within the Augus K. Gholson City Park, 0.5 mile (0.8 km) south of the intersection of Boliver Road and US 90 in Chattahoochee.

Description – Chattahoochee Spring discharges from the base of a 10 ft (3.1 m) high limestone outcrop. The small spring vent is 0.5 ft (0.15 m) in diameter. The spring has clear water and a sand bottom. No spring pool is formed around the spring vent. The spring run

Figure 59. Chattahoochee Spring (photo by A. Willet).

averages 3 ft (0.9 m) wide, and 2 inches (0.05 m) deep. It flows 60 ft (18.3 m) southwest into a 20 ft (6.1 m) by 30 ft (9.1 m) pool enclosed by a concrete wall. Water exits the concrete enclosure and flows west 0.7 miles (1.1 km) where it joins the Apalachicola River from the east. The spring run is clear and has a sand bottom. The surrounding environment is hardwood forest with undergrowth containing an abundance of ferns. The enclosed pool was once used for swimming; however, it currently appears to be in a state of disuse.

GILCHRIST COUNTY

Bell Spring

Figure 60. Bell Spring (photo by D. Hornsby).

Location – Lat. 29° 35' 50.80" N, Long. 82° 56' 28.21"W (NE¼ NE¼ SE¼ sec. 19, T. 10 S, R. 14 E). Bell Spring is located behind a fence on private property 1 mile (1.6 km) northeast of Fanning Springs. The spring run flows into the Suwannee River from the east approximately 0.2 miles (0.3 km) upstream from the US 98/27A bridge.

Description – In December 2002 access to Bell Spring was restricted. Observation of the spring was made from a distance. Bell Spring occupies an oval shaped spring pool that is estimated to be 50 ft (15.2 m) by 100 ft (30.5 m). Hornsby and Ceryak (1998) measured a depth of 12 ft (3.7 m) and reported that spring water discharged from six different sand boils. At the time of visit in December 2002, the spring pool surface was completely covered by floating vegetation. The spring run flows approximately 1000 ft (304.8 m) southeast into the Suwannee River. The spring run also was covered by floating vegetation. The surrounding area has abundant live oaks, grassy pasture, multiple purpose building, swing set, and a picnic table. Bell Spring is surrounded by private land. Discharge on September 4, 1997 measured 8.89 ft^3/s[4].

Campground Spring

Figure 61. Campground Spring (photo by T. Roberts).

Location – Lat. 29° 53’ 57.44”, Long. 82° 51’ 57.94” W (SE¼ SW¼ SE¼ sec. 1, T. 7 S, R. 14 E). From Branford, drive southeast on U.S. 27 about 4.0 miles (6.4 km) to junction with U.S. 129. Drive south on U.S. 129 for about 4.0 miles (6.4 km), and turn west (right) at sign for Elly Ray’s Campground on graded road about 1.0 miles (1.6 km) below the bridge over the Santa Fe River. Follow the graded road to the campground and river. The spring is about 150 feet (45.7 m) upriver on the east (right) bank.

Description – Campground Spring occupies a cove on the southeastern side of the Santa Fe River that measures 65 ft (19.8 m) in diameter. The vent is at the center of a conical depression 21 ft (6.4 m) deep. Exposed limestone is visible on the bottom of the pool and half the pool bottom and water surface is covered by aquatic plants. The water was slightly milky and light blue. Low lying grass covered banks surround the spring pool. A floating wooden walkway on the north side of the pool provides land access to a docked boat.

Deer Spring

Figure 62. Deer Spring (photo by T. Roberts).

Location – Lat. 29° 50' 28.19" N, Long. 82° 42' 26.37" W (NW¼ NW¼ NW¼ sec. 34, T. 7 S, R. 16 E) From High Springs, drive south on U.S. 27/41 about 1.0 miles (1.6 km). Turn west (right) onto State Road 340 (Poe Springs Road) and drive about 6.6 miles (10.6 km) and then turn right onto the graded road at the sign for Ginnie Springs. Follow the road another mile (1.6 km) to the entrance. Deer Spring is the most downstream spring in the Ginnie Springs complex.

Description – Deer Spring discharges from a limestone fissure into a circular pool 75 ft (2.9 m) in diameter. The vent is located on the south side of the pool approximately 4.5 ft (1.4 m) deep. The pool bottom is sand and the water is clear blue. Aquatic vegetation and algae grow along the pool bottom. The spring run averages 6.5 ft (2.0 m) wide and 2 ft (0.6 m) deep and flows 200 ft (61 m) northeast to the Santa Fe River. The entire run is covered with exotic vegetation and duckweed. Land rises to 3 ft (0.9 m) above the water surface and levels to a picnic area with barbeque pits and oak trees. There is a wooden swim platform on the north side of the pool. The spring is located within Ginnie Springs Outdoors, a private campground and outdoor recreation concession. Discharge on November 4, 1997 measured 4.99 ft^3/s[4].

Devil's Eye Spring

Figure 63. Devil's Eye Spring (photo by T. Roberts).

Location – Lat. 29° 50' 06.57" N, Long. 82° 41' 47.72" W (SE¼ SW¼ NE¼ sec. 34, T. 7 S, R. 16 E). From High Springs, drive south on U.S. 27/41 about 1.0 miles (1.6 km). Turn west (right) onto State Road 340 (Poe Springs Road) and drive approximately 6.6 miles (10.6 km) and then turn north (right) onto a graded road at the sign for Ginnie Springs. Follow the road another mile (1.6 km) to the entrance. Devil's Eye Spring is upstream of Ginnie Spring, in the Ginnie Springs complex.

Description – Devil's Eye Spring issues into a spring pool 60 ft (18.3 m) by 30 ft (9.1 m). The vent is a 20 ft (6.1 m) in diameter and 27.4 ft (8.4 m) deep, vertical shaft in the center of the spring pool. The pool bottom is sand with exposed limestone and aquatic vegetation. The clear blue water flowing out of the vent produces a prominent boil on the water's surface. The conduit system is connected with Devil's Ear Spring 50 ft (15.2 m) to the north. The spring run from Little Devil, whose pool is 250 ft (76.2 m) to the southwest, flows over Devil's Eye Spring and enters the Santa Fe River from the south. The area surrounding the pool is forested with cypress and oak trees. Wooden stairs enter the water on the east and west sides of the spring pool. The Santa Fe River flows past Devil's Eye Spring 50 ft (15.2 m) to the northwest. The spring is located within Ginnie Springs Outdoors, a private campground and outdoor recreation concession. The cave system is a popular dive destination with over 30,000 ft (9,144 m) of mapped passageway. Discharge on November 4, 1997 measured 41.48 ft^3/s[4].

Dogwood Spring

Figure 64. Dogwood Spring (photo by T. Roberts).

Location – Lat. 29° 50' 17.00" N, Long. 82° 42' 06.46" W (NE¼ SE¼ NW¼ sec. 34, T. 7 S, R. 16 E). From High Springs, drive south on U.S. 27/41 about 1.0 miles (1.6 km). Turn west (right) onto State Road 340 (Poe Springs Road) and drive approximately 6.6 miles (10.6 km) and then turn right onto a graded road at the sign for Ginnie Springs. Follow the road another mile (1.6 km) to the entrance. Dogwood Spring is the third most downstream spring in the Ginnie Springs complex.

Description – Dogwood Spring has a circular pool 47 ft (14.3 m) in diameter. Water flows from a cavity on the east side of the pool. Depth over the vent measures 17.8 ft (5.4 m). The sand pool bottom has exposed limestone around the vent and is half covered with *Hydrilla*. The water is blue with excellent clarity. The spring run averages 20 ft (6.2 m) wide, 5 ft (1.6 m) deep, and flows 250 ft (76.2 m) northwest to the Santa Fe River. *Hydrilla* is abundant in the run. Stairs on the east side of the spring pool lead up to a campground surrounded by large hardwoods. The spring is located within Ginnie Springs Outdoors, a private campground and outdoor recreation concession. Discharge on November 4, 1997 measured 20.47 ft^3/s[4].

GIL84971

Figure 65. GIL84971 (photo by D. Hornsby).

Location – Lat. 29° 49' 47.50" N, Long. 82° 53' 29.19" W (SW¼ NW¼ SW¼ sec. 35, T. 7 S, R. 14 E). The spring is located along the east bank of the Suwannee River approximately 5 miles (8.1 km) northwest of Bell. From the Rock Bluff boat landing at CR 340, launch boat and head upriver for approximately 5 miles (8 km).

Description – GIL84971 occupies an oval shaped spring pool that measures 20 ft (6.1 m) by 25 ft (7.6 m). Spring depth is 8.5 ft (2.6 m). The bottom of the pool is exposed limestone with areas of sand and algae. Spring water is clear and bluish. A prominent boil was observed on the spring surface. GIL84971 flows directly into the Suwannee River through a 9 ft (2.7 m) long run. The run is 5 ft (1.5 m) wide and 3 ft (0.9 m) deep with a limestone and sand bottom. Large rocks and sand bags are stacked along the spring run. To the north, high ground slopes to 6 ft (1.8 m) above the water level. To the west and south, land slopes upward to 3 ft (0.9 m). An abandoned house lies 125 ft (38.1 m) east of the spring. The immediate surroundings are privately owned, open grass pasture with some nearby cypress and oaks. Discharge on August 4, 1997 measured 13.96 ft^3/s[4].

GIL99972

Figure 66. GIL99972 (photo by D. Hornsby).

Location – Lat. 29° 55’ 51.31” N, Long. 82° 48’ 08.70” W (NE¼ SE¼ SW¼ sec. 27, T. 6 S, R. 15 E). The spring is located 5 miles (8.1 km) west of Ft. White along the south bank of the Santa Fe River. The spring flows into the river 0.2 miles (0.3 km) downstream from the confluence with Ichetucknee River. From the boat landing off Wilson Springs Road, west of Ft. White, boat approximately 4 miles (6.4 km) downriver to the spring.

Description – GIL99972 has an oval-shaped spring pool that measures 12 ft (3.6 m) by 16 ft (4.9 m). Spring depth is 2.5 ft (0.8 m). The water is clear and a slight boil was observed on the pool surface. The spring bottom is exposed limestone and sand with areas of algal growth. Limestone is exposed at the vent and around the edges of the spring pool. A short limestone-bottomed spring run flows north 12 ft (3.7 m) into the Santa Fe River. The run is 1.9 ft (0.6 m) deep and 7 ft (2.1 m) wide. Private land adjoins the spring. The riverbanks rise to approximately 2 ft (0.6m) above the spring. A house is located to the southeast about 300 ft (91.4 m). The spring has cypress and hardwood trees nearby. Discharge on September 9, 1997 measured 7.15 ft^3/s [4].

GIL928971

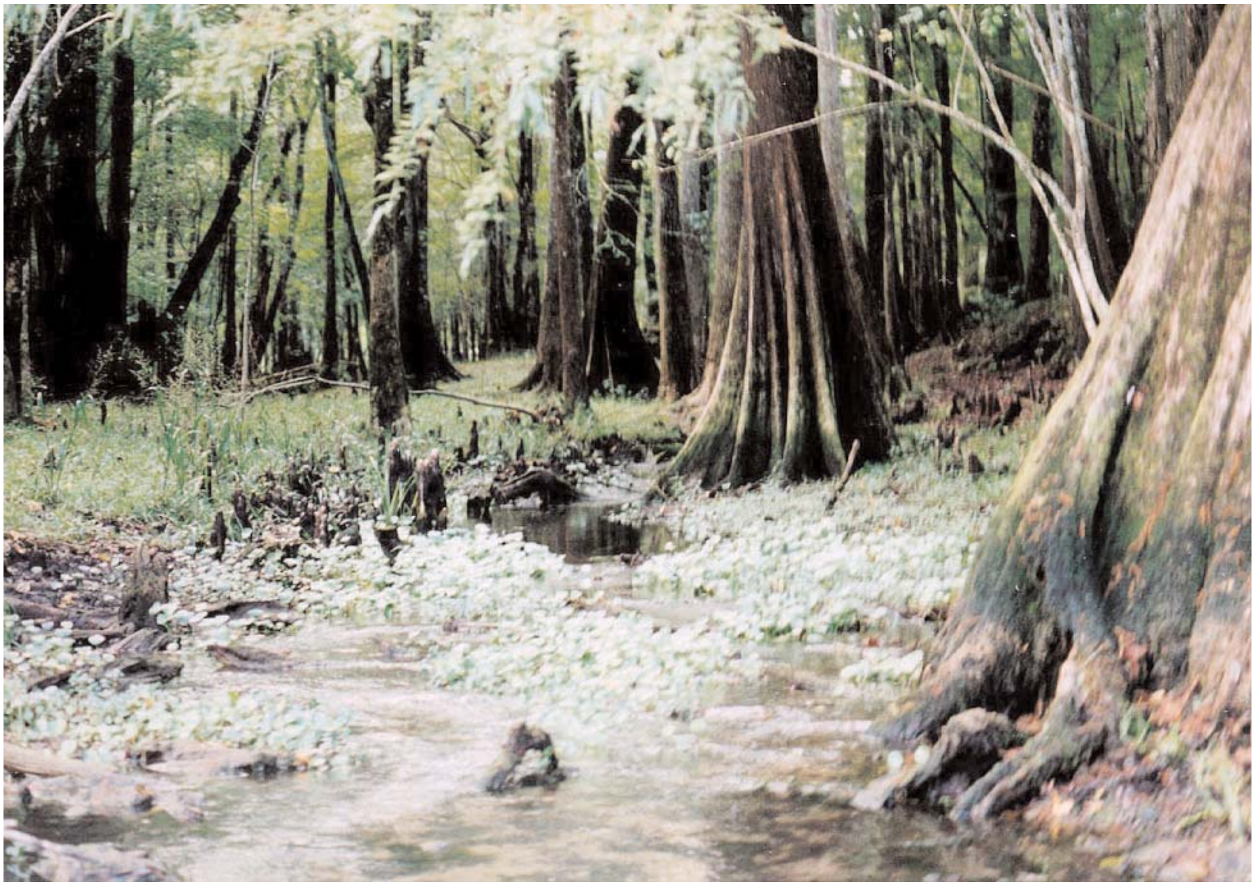

Figure 67. GIL928971 (photo by D. Hornsby).

Location – Lat. 29° 52' 32.15" N, Long. 82° 45' 06.81" W (NE¼ NE¼ SW¼ sec. 18, T. 7 S, R. 16 E). The spring is located on private land approximately 4 miles (6.4 km) southwest of Ft. White. The run flows into the Santa Fe River from the west approximately 1 mile (1.6 km) downstream from the SR 47 bridge over the River.

Description – GIL928971 has an oval shaped spring pool that measures 75 ft (22.9 m) by 90 ft (27.4 m). Depth near the center is 2.5 ft (0.8 m). The spring bottom is soft sand and mud. Spring water is murky and brownish. No boil is visible on the spring surface. Parts of the spring surface are covered in duckweed. Exposed limestone is present around the spring perimeter. The spring run averages 6 ft (1.8 m) wide and flows northeast 0.2 miles (0.3 km) through floodplain into the Santa Fe River. Depth of the run averages 1.5 ft (0.4 m) and its bottom is limestone, sand, and detritus with an abundance of algae. Land surrounding the spring and run rises to 3 ft (0.9 m) above the water surface. GIL928971 is surrounded by private property that has a cypress and hardwood forest and grassy cattle pastures. Discharge on September 28, 1997 measured 1.10 ft^3/s [4].

GIL1012971

Figure 68. GIL1012971 (photo by D. Hornsby).

Location – Lat. 29° 51' 21.24" N, Long. 82° 43' 55.88" W (NW¼ NW¼ NE¼ sec. 29, T. 7 S, R. 16 E). The spring is located on private land approximately 4.5 miles (7.2 km) south of Ft. White. The spring flows into the Santa Fe River from the south 0.9 miles (1.5 km) upstream from the SR 47 bridge.

Description – GIL1012971 has an oval-shaped spring pool that measures 75 ft (22.9 m) by 105 ft (32 m). Depth measures 26.0 ft (7.9 m). At the time of visit in December 2002, the Santa Fe River had flooded into the spring, and visibility was poor. No boil was observed on the spring surface. The spring run flows 50 ft (15.2 m) into the Santa Fe River from the south. The run is 25 ft (7.6 m) wide and 2 ft (0.6 m) deep. *Hydrilla* is present in the pool and run. The spring and spring run are within the forested Santa Fe River floodplain and surrounded by SRWMD property. Discharge on October 12th 1997 was estimated at 20 ft^3/s [4].

GIL1012972

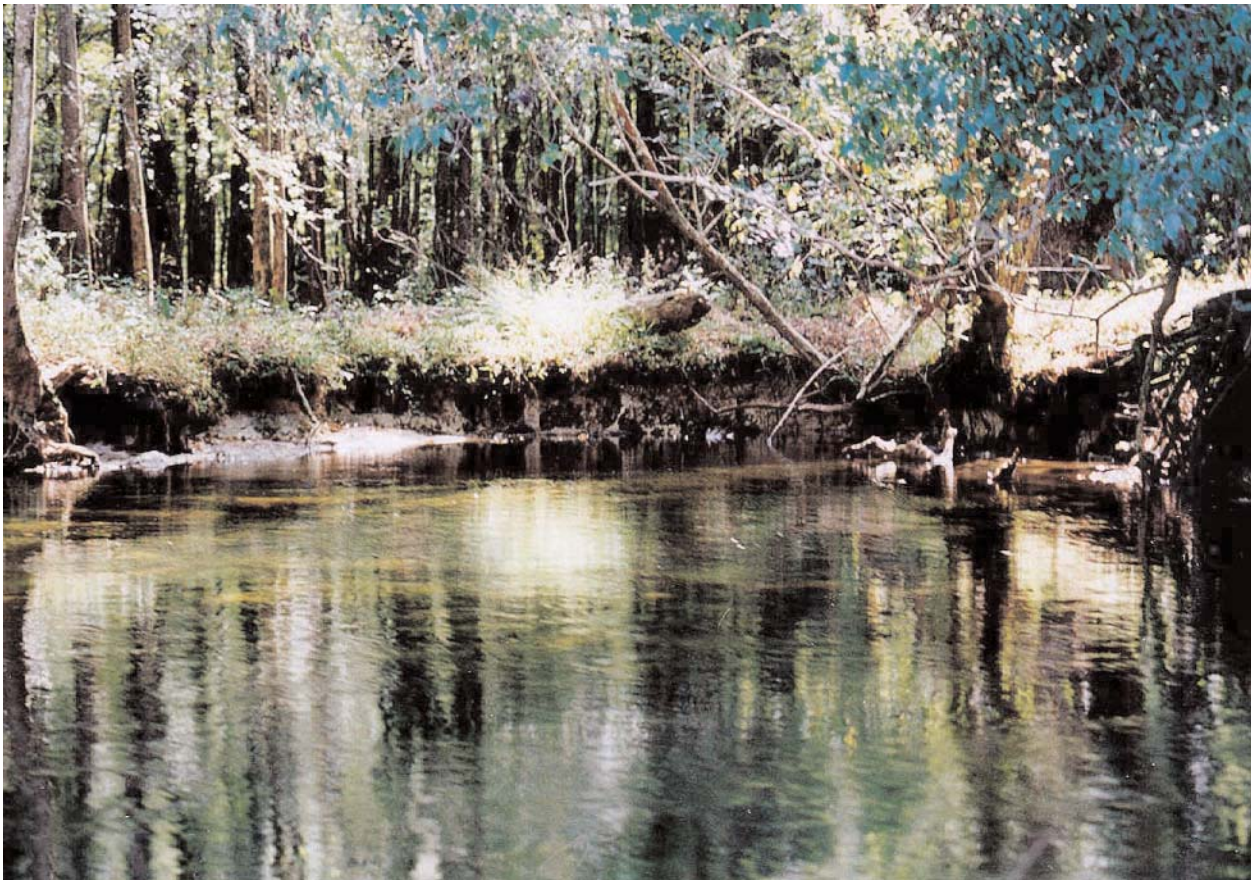

Figure 69. GIL1012972 (photo by D. Hornsby).

Location – Lat. 29° 51' 21.77" N, Long. 82° 43' 57.75" W (SW¼ SW¼ SE¼ sec. 20, T. 7 S, R. 16 E). From the intersection of US 27/SR 20 and SR 47 in Ft. White, drive south on SR 47 approximately 4.4 miles (7.1 km) to the bridge over the Santa Fe River. GIL1012972 is located along the south bank approximately 0.9 miles (1.4 km) upriver from the boat landing at the SR 47 bridge.

Description – GIL1012972 occupies a cove along the southwestern bank of the Santa Fe River. It measures 8 ft (2.4 m) by 10 ft (3.1 m) and approximately 2 ft (0.6 m) deep. The pool bottom is limestone and sand. During the December 2002 visit the water was clear and slightly tannic. No vegetation grows in the pool but algae cover over half the pool bottom. A slight boil is visible over the vent on the north side of the pool. Vegetated banks rise 3 ft (0.9 m) above the pool surface to the hardwood forest that surrounds the spring. The spring is located on SRWMD land. Discharge on October 12, 1997 measured 8.07 ft^3/s[4].

GIL1012973

Figure 70. GIL1012973 (photo by D. Hornsby).

Location – Lat. 29° 51' 22.27" N, Long. 82° 43' 58.42" W (SW¼ SW¼ SE¼ sec. 29, T. 7 S, R. 16 E). From the intersection of US 27/SR 20 and SR 47 in Fort White drive south on SR 47 approximately 4.4 miles (7.1 km) to the bridge over the Santa Fe River. From the boat landing at this bridge, GIL1012972 is located approximately 0.9 mile (1.4 km) upriver along the south bank.

Description – GIL1012973 is located in the riverbed and has no distinct spring pool. The spring discharges through multiple vents on the bottom of the south side of the Santa Fe River. Several prominent boils are seen on the river surface above the vents. Depth measured over the vents is 20 ft (6.1 m). The riverbed in the vicinity of the spring appears to be limestone with some mud and algae cover. The spring is just east (upstream) of the uppermost tip of a 0.25 mile (0.4 km) long, 200 ft (61 m) wide island in the river. Riverbanks near the spring on the south side of the river rise to 3 ft (0.9 m) above water level. The spring is within a heavily forested section of the Santa Fe River. Discharge on October 12th 1997 was estimated to be 370 ft^3/s [4].

Johnson Spring (GIL101971)

Figure 71. Johnson Spring (photo by T. Roberts).

Location – Lat. 29° 49’ 53.39” N, Long. 82° 40’ 46.96” W (SE¼ NW¼ SE¼ sec. 32, T. 7 S, R. 16 E). The spring flows into the Santa Fe River from the south, directly across from the Rum Island boat ramp, approximately 5 miles (8.1 km) west of High Springs. From the intersection of US 27 and Main Street in High Springs, drive NW on US 27/20 approximately 3.3 miles (5.3 km) to the intersection with CR 138. Turn west (left) onto CR 138 and drive about 2.0 miles (3.2 km) to the intersection with Rum Island Road. Turn south (left) at sign for Rum Island and travel approximately 1.5 miles (2.4 km) to the boat ramp.

Description – Johnson Spring, also known as GIL101971 (Hornsby and Ceryak, 1998), has an elongated spring pool that measures 35 ft (11 m) by 70 ft (21 m). The spring vent is located on the south side of the pool. Depth measures 4.0 ft (1.2 m). Limestone is exposed at the vent, and there is an abundance of aquatic vegetation on the spring bottom. The spring water is clear and bluish. Duckweed covers the surface of the pool along its edges. A double spring boil is observed on the spring surface over the vent. The spring run is 13.5 ft (4.1 m) wide, 850 ft (259 m) long and 1.5 ft (0.4 m) deep. The run bottom consists of soft sand and mud with abundant algae. It flows southward into the north side of the Santa Fe River. Johnson Spring is surrounded by private property. A private access road leads to the spring from the north. The spring is within forested lowlands along the Santa Fe River. A discharge of 8.25 ft^3/s [(4)] was measured on October 1, 1997.

Lily Spring

Figure 72. Lily Spring (photo by T. Roberts).

Location - Lat. 29° 49' 46.98" N, Long. 82° 39' 40.36" W (SW¼ SE¼ SE¼ sec. 36, T. 7 S, R. 16 E). From the intersection of US 27 and Main Street in High Springs, drive northwest on US 27 approximately 3.3 miles (5.3 km) to the intersection with CR 138. Turn west (left) onto CR 138 and drive about 2.0 miles (3.2 km) to the intersection with Rum Island Road. Turn south (left) at sign for Rum Island and travel approximately 1.5 miles (2.4 km) to the boat ramp. Launch boat and head approximately 1.1 miles (1.8 km) upriver. Lily Spring enters the Santa Fe River from the south.

Description – Lily Spring has an oval-shaped spring pool 132 ft (40.2 m) by 25 ft (7.6 m) with an average depth of 6 ft (1.8 m). The pool is fed by a series of six vents. Flow is from three fissures on the northeast side of the pool. A bowl shaped depression is located near the center, and two seeps in the limestone bank. The spring pool has a limestone bottom. The water was turbid and slightly tannic during October 2002, though locals report the spring is usually clear with a blue-green hue. The spring run averages 10 ft (3.1 m) wide and 3.5 ft (1.1 m) deep and flows 200 ft (61 m) to enter Santa Fe River from the south. A private residence is situated on the north bank of the pool and a picnic area is to the west. The private land surrounding the spring run and the pool is wooded. Discharge on September 30, 1997 measured 39.69 ft^3/s[4].

Little Blue Spring

Figure 73. Little Blue Spring (photo by T. Roberts).

Location – Lat. 29° 49' 49.15" N, Long. 82° 41' 01.78" W (NE¼ SE¼ SW¼ sec. 35, T. 7 S, R. 16 E). Little Blue Spring is located within Blue Springs Park and Campground, a privately run facility 3.5 miles (5.6 km) west of High Springs. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for approximately 1.0 miles (1.6 km). Turn west (right) onto SR 340 (Poe Springs Road) and travel 4.6 miles (7.4 km). Turn north (right) onto Blue Spring Road and continue 1.1 miles (1.8 km) to the parking area. Little Blue Spring is west of Blue Spring, beneath the trees near the parking area.

Description – Little Blue Spring has a circular spring pool 57 ft (18 m) in diameter and 9.9 ft (3.1 m) deep. During November 2002, the water was tannic with poor clarity but often is clear blue. The spring run flows northeast for approximately 150 ft (45.7 m) and converges with Blue Spring Run. The combined flow enters the Santa Fe River from the south. A floating platform with a bench and railings is located on the west side of the pool. The spring is surrounded by a dense cypress and hardwood forest.

Little Devil Spring

Figure 74. Little Devil Spring (photo by T. Roberts).

Location – Lat. 29° 50' 04.43" N, Long. 82° 41' 07.78" W (NE¼ NW¼ SE¼ sec. 35, T. 7 S, R. 16 E) From High Springs, drive south on U.S. 27/41 about 1.0 mile (1.6 km). Turn west (right) onto State Road 340 (Poe Springs Road) and drive about 6.6 miles (10.6 km) and then turn north (right) onto a graded road at the sign for Ginnie Springs. Follow the road another mile (1.6 km) to the entrance. Little Devil Spring is upstream of Ginnie Spring.

Description – Little Devil Spring issues into an oval-shaped pool that measures 65 ft (19.8 m) north to south and 30 ft (9.1 m) east to west. The vent is a limestone fissure in the center of the pool 21 ft (6.5 m) deep. The spring water is clear blue and there is little aquatic vegetation. The spring run is 20 ft (6.1 m) wide and 8 ft (2.4 m) deep with aquatic vegetation on both sides. The run flows northeast 225 ft (68.6 m), passing Devil's Eye and Devil's Ear Springs before entering the Santa Fe River from the south. The spring pool, which is ringed by grass and cypress trees, is used for swimming, scuba diving, and snorkeling. Picnic facilities and a gravel parking lot are adjacent to the spring pool to the west and southwest. The spring is located within Ginnie Springs Outdoors, a private campground and outdoor recreation concession. Discharge on November 4, 1997 measured 2.06 ft^3/s[4].

Little Otter Spring (GIL94972)

Location – Lat. 29° 38' 11.10" N, Long. 82° 57' 30.34" W (sec. 6 (irregular section), T. 10 S, R. 14 E). At the junction of US 26 and CR 232 in Wilcox, drive north on CR 232 for approximately 1.7 miles (2.7 km) to the intersection with CR 334. Turn west (left) onto CR 334 and drive approximately 2.3 miles (3.7 km) to the boat landing. The spring is located along the east side of the Suwannee River approximately 0.3 miles (0.5 km) downstream from the Otter Spring Run mouth.

Description – Little Otter Spring, also known as GIL94972, has a circular spring pool with an 87 ft (26.5 m) diameter. The vent is located in the center of the pool, and depth over the vent is 24.0 ft (7.3 m). The bottom is soft sand and mud with a thick layer of algae and tree debris around the pool edge. Spring water is bluish and slightly turbid.
The spring run is 6 ft (1.8 m) wide, 3 ft (0.9 m) deep and flows west approximately 150 ft (45.7 m) into the east side of the Suwannee River. The run bottom has some exposed limestone; however, it is mostly soft sand and detritus with a thin layer of algae. Higher ground gently slopes to 3 ft (0.9 m) above water level around the spring pool. Little Otter Spring is surrounded by privately-owned, forested floodplain of the Suwannee River. Discharge on September 4, 1997 was 15.3 ft^3/s [(4)].

Lumbercamp Springs

Figure 75. Lumbercamp Springs (photo by T. Roberts).

Location – Lat. 29? 42’ 23.70” N, Long. 82? 56’ 17.00” W (NE¼ NW¼ NW¼ sec. 17, T. 9 S, R. 14 E). From the intersection of SR 26 and CR 232 in Wilcox, travel north on CR 232 approximately 6.2 miles (10.0 km) to the intersection with SW 25th Street. Turn west (left) onto SW 25th Street and drive approximately 0.8 miles (1.3 km) to the boat landing on the Suwannee River. The spring run, which is the combination of both Sun and Lumbercamp Springs, is 0.25 miles (0.4 km) upstream from the SW 25th Street boat ramp. Lumbercamp Springs is at the head of the left (northern most) fork.

Description – Lumbercamp Springs contains multiple vents in a spring pool that measures 28 ft (8.5 m) in diameter. It is composed of two circular spring vents that are 2 to 3 ft (0.6 to 0.9 m) in diameter and a small sand boil that is approximately 3 ft (0.9 m) in diameter and east of the other two vents. The two spring vents discharge from a forested hillside. The depth of the largest vent is 0.8 ft (0.3 m). The water is fairly clear with a slight murkiness. The pool bottom is soft sand and finer particles. The spring run flows generally south approximately 275 ft (84 m) until it joins Sun Spring Run from the north. Combined flow from Lumbercamp and Sun Springs flows 150 ft (45.7 m) into the Suwannee River from the northeast. Algae and *Hydrilla* are abundant in the sand bottomed spring runs. Lumbercamp Springs is surrounded by privately-owned, forested floodplain of the Suwannee River.

Naked Spring

Figure 76. Naked Spring (photo by T. Roberts).

Location – Lat. 29° 49’ 47.71” N, Long. 82° 40’ 52.59” W (NW¼ SW¼ SE¼ sec. 35, T. 7 S, R. 16 E) Naked Spring is located within Blue Springs Park and Campground, a privately-run facility 3.5 miles (5.6 km) west of High Springs. From the junction of US 441/41 and US 27 in High Springs, drive southwest on US 41/27 for approximately 1.0 miles (1.6 km). Turn west (right) onto SR 340 (Poe Springs Road) and travel 4.6 miles (7.4 km). Turn north (right) onto Blue Spring Road and continue 1.1 miles (1.8 km) to the parking area. Naked Spring is east of Blue Spring down a marked trail.

Description – Naked Spring consists of two spring pools. The main spring pool is oval shaped and measures 99.0 ft (30.2 m) north to south, 77.0 ft (23.5 m) east to west and 14.3 ft (4.4 m) deep. Water flows from a limestone fissure near a floating dock on the west side of the pool. There was a slight boil over the vent on the day of visit in November 2002. Aquatic vegetation, including *Hydrilla* and aquatic grass, covers 85-95% of the pool’s bottom. There is a second pool to the southeast of the main pool. This circular pool has a diameter of approximately 20.0 ft (6.1 m). The bottom of the pool is 90-95% covered by aquatic vegetation, which obstructed the view of the vent. Both pools have excellent water clarity, and are a blue-green color. The bottom of both spring pools is composed of limestone covered in a veneer of sand and silt. The spring is a popular swimming area and is surrounded by a dense floodplain forest.

Oasis Spring

Figure 77. Oasis Spring (photo by D. Hornsby).

Location – Lat. 29° 55' 32.82" N, Long. 83° 46' 49.35" W (SW¼ NE¼ NE¼ sec. 35, T. 6 S, R. 15 E). Oasis Spring is located 4 miles (6.4 km) west of Ft. White along the Santa Fe River. The spring run flows the Santa Fe River from the south 1.8 miles (2.9 km) downstream from the NE 2nd Way boat ramp off SR 138 in Gilchrist County.

Description – Oasis Spring has a clover-shaped pool that measures 20 ft (6.1 m) wide and 22 ft (6.7 m) long. Its depth is 9.1 ft (2.8 m). The spring has cloudy water and no boil was present on the water surface in March 2003. It has a limestone bottom with some sand and sparse amounts of algae. Oasis Spring is on the riverbank of the Santa Fe River. A short spring run flows northwest about 4 ft (1.2 m) before entering the river. The spring run is 6 ft (1.8 m) wide and 1.1 ft (0.3 m) deep. The high ground surrounding this spring ranges from 1 to 8 ft (0.3 to 2.4 m) above the water level. The area to the southeast appears to be an old run that is now filled in with grass and shrubs. Hornsby and Ceryak (1998) mention that the spring may have been dredged in the past. Oasis Spring is surrounded by forested private property. Discharge on September 9, 1997 measured 1.02 ft^3/s [(4)].

Pickard Spring

Figure 78. Pickard Spring (photo by T. Roberts).

Location – Lat. 29° 49’ 49.92” N, Long. 82° 39’ 43.51” W (NW¼ SE¼ SE¼ sec. 36, T. 7 S, R. 16 E). The spring is located along the Santa Fe River 3.7 miles (6.0 km) west of High Springs. From the intersection of US 27 and Main Street in High Springs, drive northwest on US 27 approximately 3.3 miles (5.3 km) to the intersection with CR 138. Turn west (left) onto CR 138 and drive about 2.0 miles (3.2 km) to the intersection with Rum Island Road. Turn south (left) at sign for Rum Island and travel approximately 1.5 miles (2.4 km) to the boat ramp. The spring is located on private property and flows into the Santa Fe River from the south approximately 0.4 miles (0.6 km) upstream of the Rum Island boat ramp. A sign “Pickard Spring” is on a tree at the mouth of the spring.

Description – Pickard Spring has an oval shaped spring pool that measures 24 ft (7.3 m) by 45 ft (13.7 m). The spring is enclosed by a sandbag retaining wall. Depth near the center measures 8 ft (2.4 m). The spring water is fairly clear; however the water was tannic during the March 2003 visit. Aquatic vegetation including exotics and algae are present but sparse in the spring. A prominent boil is present on the water surface. Pickard Spring has a limestone-bottomed spring run that flows approximately 36 ft (11 m) into the Santa Fe River from the south. Pickard Spring is surrounded by private property within the heavily forested Santa Fe River floodplain. Discharge on October 1, 1997 measured 11.52 ft^3/s [(4)].

Trail Spring

Figure 79. Trail Spring (photo by T. Roberts).

Location – Lat. 29° 53' 54.09" N, Long. 82° 52' 00.17" W (SW¼ SW¼ SE¼ sec. 1, T. 7 S, R. 14 E) From the east bank of the Suwannee River at the bridge in Branford, drive east on US 27 approximately 4.1 miles (6.6 km) to junction with U.S. 129. Turn south (right) on U.S. 129 and drive approximately 4 miles (6.4 km), and turn west (right) at sign for Elly Ray's Campground on graded road about one mile (1.6 km) south of the bridge over the Santa Fe River. Follow the graded road to the campground, turn left and drive to river. The spring is located down by the river.

Description – Trail Spring is a nearly circular pool that measures 35 ft (10.7 m) north to south and 25 ft (7.6 m) east to west. The vent is located on the northeast side of the pool. It is a 6 ft (1.8 m) wide elongated fissure in the exposed limestone. Depth to the vent is 12.9 ft (3.9 m). Limestone is exposed along the pool bottom and along the northeast and southeast sides of the pool. The water in the pool is clear and blue-green in color. About 35% of the pool bottom is covered by aquatic vegetation. A small run 20 ft (6.1 m) long flows southwest from the vent to the Santa Fe River. The run is shallow, approximately 0.5 ft (0.1 m) deep with no aquatic vegetation. The spring is located in Ellie May's Campground, a private swimming and camping concession. A cement and wood deck is located on the north side of the pool and a cement platform is on the northeast side of the pool. A set of wooden steps lead down to the pool from the northwest. The spring is also known as Pleasant Grove Spring. Discharge on September 16, 1997 measured 9.48 ft^3/s[4].

Twin Spring

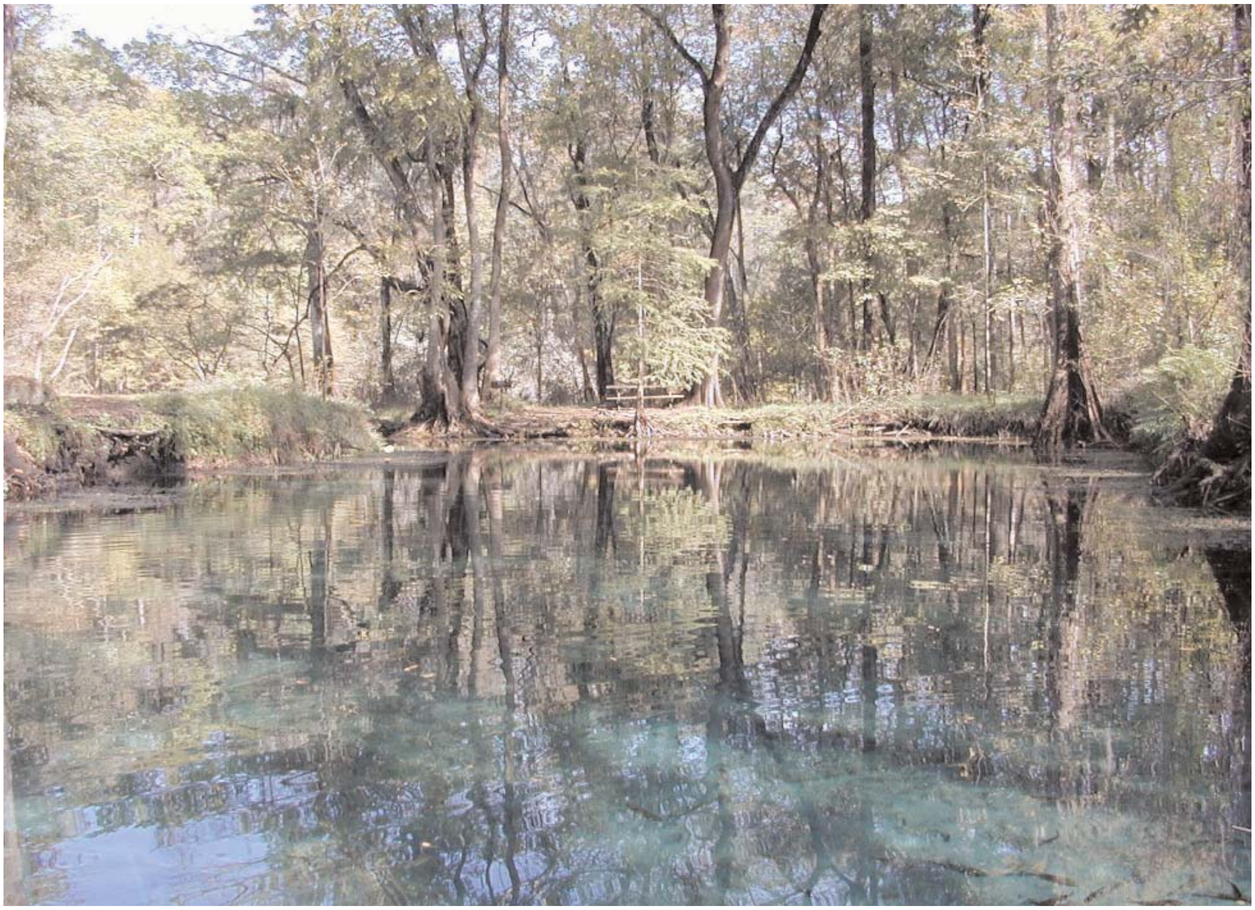

Figure 80. Twin Spring (photo by T. Roberts).

Location – Lat. 29° 50’ 25.63” N, Long. 82° 42’ 21.11” W (NE¼ NW¼ NW¼ sec. 34, T. 7 S, R. 16 E) From High Springs, drive south on U.S. 27/41 about 1.0 mile (1.6 km). Turn west (right) onto State Road 340 (Poe Springs Road) and drive about 6.6 miles (10.6 km) and then turn north (right) onto a graded road at the sign for Ginnie Springs. Follow the road another mile (1.6 km) to the entrance of Ginnie Springs. Twin Spring is the second most downstream spring in the Ginnie Springs complex.

Description – Twin Spring occupies an oval-shaped pool that measures 130 ft (39.6 m) east to west and 36 ft (11 m) north to south. The vent is a fissure in the limestone bottom near the center of the pool. The pool bottom is sand with some limestone and abundant *Hydrilla*. The water is clear and bluish. The 200 ft (61 m) long spring run flows north to the Santa Fe River. The run averages 10 ft (3.1 m) wide, 4 ft (1.2 m) deep and is completely covered with aquatic vegetation. The spring is located within Ginnie Springs Outdoors, a private campground and outdoor recreation concession and the pool is a take-out point for people tubing in the spring run. A wooden platform is located on the north side of the pool. To the west is a picnic area with tables and barbecue pits. A mixed hardwood forest surrounds the spring area. Discharge on November 4, 1997 measured 19.55 ft^3/s[4].

HAMILTON COUNTY

HAM610982

Figure 81. HAM610982 (photo by D. Hornsby).

Location – Lat. 30° 25’ 02.76” N, Long. 83° 12’ 26.67” W (SW¼ NW¼ NE¼ sec. 10, T. 1 S, R. 11 E) HAM610982 is located approximately 2.3 miles (3.7 km) north (upriver) from the SR 141 bridge over the northern Withlacoochee River.

Description – HAM610982 was not flowing during the November 2002 visit. There was no evidence of a spring pool or run, however two solution channels were visible at the base of the riverbank. Limestone was exposed up to 5 ft (1.6 m) above the water surface. The spring is surrounded by a mixed hardwood forest. A dock is located directly across from the spring on the opposite side of the Withlacoochee River. Discharge estimated on June 10, 1998 was 10 ft^3/s[4].

HAM610983

Figure 82. HAM610983 (photo by T. Roberts).

Location – Lat. 30° 25' 13.47" N, Long. 83° 12' 51.38" W (NW¼ NW¼ NW¼ sec. 10, T. 1 S, R. 11 E). The spring is located 5 miles (8.1 km) east of Lee along the east bank of the Withlacoochee River. It is 0.5 miles (0.8 km) downstream from the boat ramp off SR 143 and SW 64th Way.

Description – In November 2002, no flow was observed from HAM610983. The spring consists of two caves at the base of the riverbank, encompassing an area of about 18 ft (5.5 m) on the north side of the Withlacoochee River. The first cave is about 6 ft (1.8 m) wide and 3 ft (0.9 m) high, while the second cave is approximately 2 ft (0.6 m) wide and 4 ft (1.2 m) high. Stagnant, dark water with very poor visibility can be seen at the base of these caverns. Hornsby and Ceryak (1998) reported this spring as flowing from two caverns at the base of the riverbank, with prominent boils observed at the back of the caverns. When flowing, HAM610983 discharges directly into the Withlacoochee River. The riverbanks above the spring rise steeply to approximately 10 ft (3.1 m) above the pool, supporting a dense mixed hardwood forest. Discharge estimated on June 10, 1998 was 30 ft^3/s[4].

HAM610984

Figure 83. HAM610984 (photo by T. Roberts).

Location – Lat. 30° 26' 25.51" N, Long. 83° 13' 10.50" W (SW¼ NE¼ SE¼ sec. 33, T. 1 N, R. 11 E). The spring is located 5 miles (8.1 km) northeast of Lee on the east bank of the Withlacoochee River. It is 4.6 miles (7.4 km) downstream from the SR 6 bridge over the Withlacoochee River.

Description – HAM610984 occupies a small cove in the high riverbanks along the east side of the Withlacoochee River. The spring vent produces a prominent boil, and spring water discharges directly into the Withlacoochee River from the east. Moss and fern-covered limestone is exposed along both sides of the river, and the riverbanks reach heights of approximately 12 ft (3.7 m) above current water level. The spring is surrounded by heavily-forested state lands.

HAM612982

Figure 84. HAM612982 (photo by D. Hornsby).

Location – Lat. 30° 28' 29.09" N, Long. 83° 14' 36.18" W (NW¼ SE¼ NW¼ sec. 20, T. 1 S, R. 11 E). The spring is located along the Withlacoochee River 10 miles (16.1 km) east of Madison. Travel west on SR 6 from Madison approximately 10 miles (16.1 km) to the bridge over the Withlacoochee River. The spring run flows into the eastern bank of the River 0.6 miles (1.0 km) downstream from the SR 6 Bridge.

Description – HAM612982 has an oval shaped spring pool that measures 8 ft (2.4 m) by 4 ft (1.2 m). A limestone wall encompasses the spring and impounds spring flow from the pool, presumably raising water levels for swimming. The spring vent is located in the northern portion of the pool. Depth near the vent is 2.6 ft (0.8 m). The spring pool has an exposed limestone and sand bottom. The spring water is clear and bluish. There is very little aquatic vegetation, and algae are sparse throughout the spring pool. A prominent boil is present over the vent. The spring discharges approximately 25 ft (7.6 m) into the Withlacoochee River from the east. Along the spring and run is high ground that steeply rises to approximately 10 ft (3.1 m) above the water level. The surrounding environment is heavily wooded and privately-owned. Discharge on June 12, 1998 measured 6.01 ft^3/s [(4)].

HAM923973

Figure 85. HAM923973 (photo by D. Hornsby).

Location – Lat. 30° 25' 08.14" N, Long. 83° 08' 56.65" W (SE¼ NE¼ NE¼ sec. 7, T. 1 S, R. 12 E). The spring is located within the Suwannee River State Park, 9 miles (14.5 km) east of Lee. It is 3.1 miles (5.0 km) upstream from the State Park boat ramp on the northwestern bank of the Suwannee River.

Description – HAM923973 was not flowing during the October 2003 visit. At that time, the dried spring depression was approximately 10 ft (3.1 m) in diameter and had abundant grass and shrubs growing within it. The dried spring run trends west 55 ft (16.8 m) into the Suwannee River. Higher ground gently slopes to about 6.0 ft (1.8 m) above the spring perimeter, and runs along both sides of the dried spring run bed. The spring is surrounded by publicly-owned, forested Suwannee River floodplain. Discharge on June 9, 1998 measured 9.16 ft^3/s [(4)].

HAM1017974

Location – Lat. 30° 25' 03.78" N, Long. 82° 57' 57.46" W (NW¼ SE¼ NE¼ sec. 12, T. 1 S, R. 13 E). The spring is located along the northern bank of the Suwannee River, 8 miles (12.9 km) north of Live Oak. The spring is 3.1 miles (5 km) downstream from the US 129 bridge over the Suwannee River in Suwannee Springs.

Description – HAM1017974 discharges from beneath 8 ft (2.4 m) high limestone banks of the Suwannee River. Spring water issues from fissures and openings along an area that is approximately 25 ft (7.6 m) long. Clear spring water flows directly into the dark Suwannee River and there is a noticeable hydrogen sulfide odor. Prominent boils can be seen at the surface of the river along the banks. The spring is marked by a large oak tree on top of the adjacent river bank. The surrounding area is forested. The Suwannee River in this vicinity is incised into a limestone channel. Discharge on October 17, 1997 was estimated at 5.0 ft^3/s [(4)].

Morgan Spring

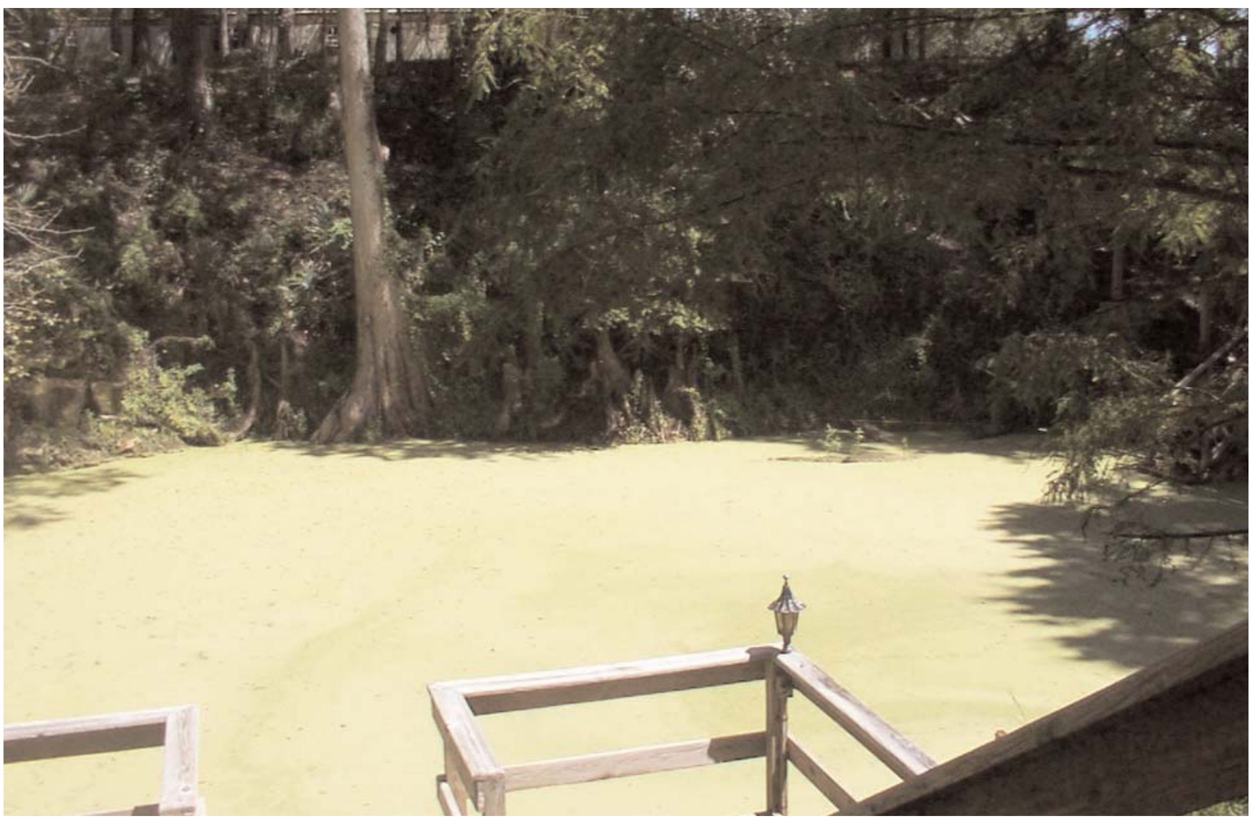

Figure 86. Morgan Spring (photo by T. Roberts).

Location – Lat. 30° 25' 12.8" N, Long. 83° 12' 26.5" W (NW¼ NW¼ NE¼ sec. 10, T. 1 S, R. 11 E). Morgan Spring is located approximately 3.2 miles (5.1 km) northwest of Ellaville on the northern Withlacoochee River. From the intersection of US 90 and CR 141 just north of Ellaville, travel east on CR 141 approximately 1.8 miles (2.9 km) to the bridge over the Withlacoochee River. Morgan Spring is located on the east bank approximately 2.5 miles (4 km) north of the SR 141 bridge.

Description – Morgan Spring has a man-made dam about 9.0 ft (3.0 m) long which impounds the spring and creates the spring pool. There is a large wooden deck around the spring pool. The vent is located roughly in the center of the pool. The spring pool is oval shaped and measures 81.0 ft (24.7 m) long and 66.0 ft (20.1 m) wide. The depth is 19.2 ft (5.8 m); however, Hornsby and Ceryak (1998) reported a maximum depth of 80 ft (24.4 m). During the September 2002 visit, the water was dark with poor visibility. The spring pool was completely covered with duckweed, and no boil was visible on the spring surface. The spring run flows northwest about 400 ft (121.9 m) into the Withlacoochee River. The run has large limestone boulders and contains slow-moving water that is covered with duckweed. The surroundings are densely forested. High ground surrounding the spring varies from 3 ft (0.9 m) to the east to 25 ft (7.6 m) to the northeast above the pool. A house is situated 150 ft (45.7 m) southwest of the spring, and Morgan Spring is surrounded by private land. Discharge on June 10, 1998 measured 17.59 ft^3/s [4]. An aquatic cave system is present at this spring and has been explored by divers.

Pot Spring

Figure 87. Pot Spring (photo by T. Roberts).

Location – Lat. 30° 28' 14.89" N, Long. 83° 14' 03.84" W (NE¼ NE¼ SE¼ sec. 19, T. 1 N, R. 11 E). Pot Spring is located approximately 1.3 miles (2.1 km) south of the SR 6 bridge over the Withlacoochee River. It is also accessible via land by following the signs just east of the SR 6 bridge.

Description – Pot Spring was not flowing during the November 2002 visit and the spring pool was filled by the tannic Withlacoochee River. The pool is oval shaped, measuring 30 ft

(9.1 m) northeast to southwest by 22 ft (6.7 m) northwest to southeast. Depth measures 14 ft (4.3 m). When the spring is flowing, the water is clear and bluish-green. A wooden platform borders the southeast section of the pool. On the northeast side, stairs lead from the spring up to a picnic area and parking lot. SRWMD land surrounds the pool and rises to 15 ft (4.6 m) above the water surface. Vegetation on the sides of the pool is sparse and includes grasses, palmettos, and cypress trees. The spring is used as a local swimming hole. Discharge on June 15, 1998 measured 38.19 ft^3/s[4].

Seven Sisters Spring (HAM923971)

Figure 88. Seven Sisters Spring (photo by D. Hornsby).

Location – Lat. 30° 25’ 03” N, Long. 83° 09’ 19.19” W (SW¼ NW¼ NE¼ sec. 7, T. 1 S, R. 12 E). The spring is 8.5 miles (13.7 km) east of Lee along the northwestern bank of the Suwannee River. It is 2.7 miles (4.3 km) upstream from the Suwannee River State Park boat ramp.

Description – Seven Sisters Spring, also referred to as HAM923971 (Hornsby and Ceryak, 1998), is situated in a large cave that is 6.0 ft (1.8 m) high and 15.0 ft (4.6 m) wide. The cave lies beneath a 12 ft (3.7 m) high limestone wall and overhang of the Suwannee River bank. The oval spring pool in front of the cave is 5 ft (1.5 m) wide and 7 ft (2.1m) long, with a depth of about 1 ft (0.3m). The spring water is yellowish-brown and clear. A slight boil is visible on the spring surface. The spring bottom is sand with a thin layer of brown and green algae. The spring run is 1.5 ft (0.4 m) wide, 0.2 ft (0.1m) deep and flows 6 ft (1.8 m) southeast into the Suwannee River. Large limestone boulders, covered by green moss, are situated near the cave entrance. Several sinkholes are nearby. Discharge on September 23, 1997 measured 9.61 ft^3/s [4].

Tanner Springs (HAM612981)

Figure 89. Tanner Springs (photo by D. Hornsby).

Location – Lat. 30° 27' 52.47" N, Long. 83° 13' 03.84" W (NE¼ NE¼ NE¼ sec. 28, T.1 N., R.11 E.). Tanner Spring is located approximately 2.5 miles (4 km) south (downstream) from the SR 6 bridge over the Withlacoochee River. The spring is located along the northeast bank of the river.

Description – Tanner Spring, also known as HAM612981 (Hornsby and Ceryak, 1998), issues into a 30 ft (9.1 m) diameter spring pool from a circular vent 24 ft (7.3 m) deep located in the center of the pool. Exposed limestone is present along the pool bottom along with a thin layer of algae and sparse aquatic vegetation. The water is brown with poor clarity and a prominent boil is visible above the vent. The spring run has a limestone bottom and flows south 50 ft (15.2 m) into the Withlacoochee River. Sparse amounts of vegetation and algae are present in the spring run. Private land gently slopes 8 ft (2.4 m) above the spring and run water surface. The spring is surrounded by a mixed hardwood and pine forest. Discharge on June 12, 1998 measured 92.5 ft^3/s[4].

White Springs

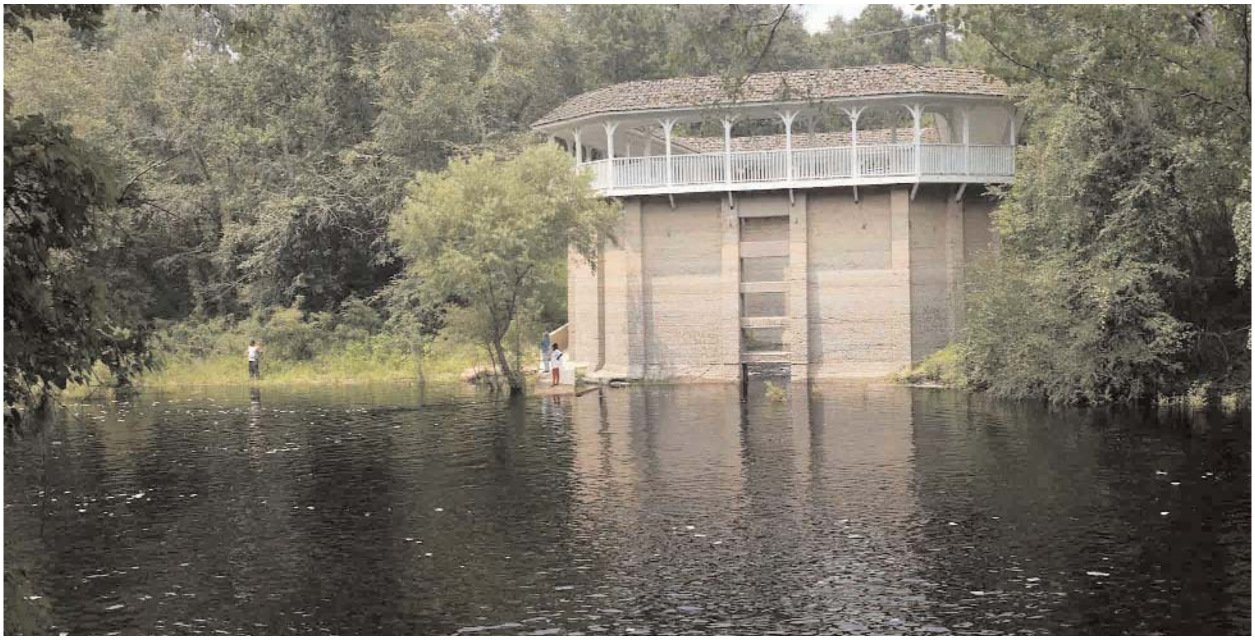

Figure 90. White Springs (photo by T. Scott).

Figure 91. White Springs (anonymous).

Location – Lat. 30° 19’ 47” N, Long. 82° 45’ 40” W (SW¼ NW¼ SW¼ sec. 7, T. 2S, R. 16 E.). In White Springs at the intersection of SR 136 and US 41, drive west on US 41 0.1 miles (0.2 km) to the entrance of Stephen Foster Folk Cultural Center State Park. The spring is on the north bank of the Suwannee River just before entering the park.

Description – Rosenau et al (1977) describe White Springs as follows: “The spring is enclosed by the concrete foundation of a former bathhouse that was known as the Spring House. The foundation is about 90 ft (27.4 m) by 50 ft (15.2 m) and the spring water discharges to the Suwannee River through a wooden gate weir in the foundation wall on the south end of the pool. Records indicate that spring flow is from a limestone cavern 39 ft (11.9 m) or more deep at the north end of the pool. Three ledges have been reported at depths of 4.5 ft (1.4 m), 18 ft (5.5 m) and 39 ft (11.9 m).” Springs Fever reports that the water has a hydrogen sulfide odor and is slightly tannic in color. Discharge has been reported as ranging from a maximum of 72 ft^3/s(1) in 1907 to a minimum of 7.6 ft^3/s(4) in 1956. Rangers at the state park reported that the flow had stopped for years but has now resumed. Hornsby and Ceryak (1998) reported a discharge of 69.7 ft^3/s(4) on September 25, 1997.

HERNANDO COUNTY

Aripeka Spring No. 1

Figure 92. Aripeka Spring No. 1 (photo by R. Meegan).

Location – Lat. 28° 26' 18.71" N, Long. 82° 39' 31.62" W (SE¼ NE¼ SW¼ sec. 36, T. 23 S, R. 16 E). Heading south on US 19, travel approximately 1.4 miles (2.3 km) south of the Hernando/Pasco County line to the intersection with CR 595 (Aripeka Road). Turn west (right) and travel approximately 2 miles (3.2 km) to the town of Aripeka. Launch a boat on Hammock Creek. The spring lies on the bottom of upper Hammock Creek, 0.5 miles (0.8 km) northeast of the town of Aripeka.

Description – Aripeka Spring No. 1 occupies a 15 ft (4.6 m) diameter depression on the bottom of Hammock Creek. Depth over the spring vent is 6.2 ft (1.9 m) at high tide. A small boil is present on the spring surface over the vent. Spring water is murky and greenish, and the spring bottom is soft sand and mud. Hammock Creek in the vicinity of Aripeka Spring No. 1 is within a brackish marsh habitat. Beyond the spring, northward up the run, several small tidal creeks branch off. A palm-hardwood hammock is located at the head of Hammock Creek 250 ft (76.2 m) north of the spring. The discharge is estimated at less than 5 ft^3/s[5].

Aripeka Spring No. 2

Figure 93. Aripeka Spring No. 2 (photo by R. Meegan).

Location – Lat. 28° 26' 07.06" N, Long. 82° 39' 32.16" W (SE¼ SE¼ SW¼ sec. 36, T. 23 S, R. 16 E). Heading south on US 19, travel approximately 1.4 miles (2.3 km) south of the Hernando/Pasco County line to the intersection with CR 595 (Aripeka Road). Turn west (right) and travel approximately 2 miles (3.2 km) to the town of Aripeka. Launch a boat on Hammock Creek. The spring is located 300 ft (91.4 m) upstream from the mouth of the southern most tributary of upper Hammock Creek, 0.3 miles (0.5 km) northeast of the town of Aripeka.

Description – Aripeka Spring No. 2 occupies a small circular cove along the north side of Hammock Creek. The spring is 6 ft (1.8 m) deep at high tide, and issues slightly murky water. A small boil is present over the vent. The spring bottom is soft mud and sand. Aripeka Spring No. 2 is next to a 5 ft (1.5 m) tall fern thicket surrounding the northern half of the spring cove. The fern thicket is an island of larger vegetation within a wide open expanse of brackish marsh. The discharge is estimated at less than 5 ft^3/s[5].

Blind Spring

Figure 94. Blind Spring (photo by R. Meegan).

Location – Lat. 28° 39' 28.32" N, Long. 82° 38' 4.62" W (SE¼ SE¼ NE¼ sec. 18, T. 21 S, R. 17 E). Blind Spring is located 5.2 mi (8.4 km) southwest of the town of Chassahowitzka at the head of Blind Creek, which flows west into the Gulf of Mexico. Access to the spring is by water only. The spring can be reached by boating out the mouth of the Chassahowitzka River and south approximately 1.8 miles (2.9 km) to Blind Creek.

Description – Blind Spring has a roughly circular spring pool measuring 90 ft (27.4 m) in diameter. Depths near the center reach 55 ft (16.8 m). There are submerged limestone shelves along the north side of the pool. Algae and dark silt deposits are common along the bottom and sides of the spring. In March 2003, during a period of heavy rain, there was a large boil on the spring surface, and the water was extremely tannic and murky. The water reportedly becomes clear and bluish during drier periods. Blind Spring is the reemergence of a subterranean section of Blind Creek. Blind Creek forms in the eastern edge of the

Chassahowitzka Swamp. Beauford Spring is near the head waters of Blind Creek. From Beauford Spring, Blind Creek travels approximately 2.8 miles (4.5 km) northwest and into a siphon. The siphon is approximately 0.7 miles (1.1 km) southeast of Blind Spring. The creek flows underground toward Blind Spring and reemerges as Blind Spring. From Blind Spring, the creek travels another 1.8 miles (2.9 km) north and west through open brackish and salt marsh to the Gulf of Mexico. Blind Spring and lower Blind Creek are tidally influenced. Swift tidal currents have scoured the limestone bottom for a few hundred feet (100 m) below Blind Spring. There are numerous limestone fissures and vent openings in and along the first 400 ft (121.9 m) of Blind Creek below Blind Spring. A private fishing cabin on stilts is along the east side of Blind Creek approximately 500 ft (152.4 m) downstream from the spring. Blind Spring is situated on the west side of the Chassahowitzka National Wildlife Refuge, at the ecological boundary between coastal palm-hardwood-cedar hammock and open salt marsh.

Boat Spring

Figure 95. Boat Spring (photo by R. Meegan).

Location – Lat. 28° 26’ 11.58” N, Long. 82° 39’ 23.44” W (NW¼ SW¼ SE¼ sec. 36, T. 23 S, R. 16 E). Heading south on US 19, travel approximately 1.4 miles (2.3 km) south of the Hernando/Pasco County line to the intersection with CR 595 (Aripeka Road). Turn west (right) and travel approximately 2 miles (3.2 km) to the town of Aripeka. Launch boat on Hammock Creek. The spring is located at the head of the middle tributary to Hammock Creek, 0.5 miles (0.8 km) northeast of the north of the town of Aripeka.

Description – Boat Spring occupies an elongated spring pool near the head of a tidal tributary creek to Hammock Creek. The pool is 40 ft (12.2 m) long by 20 ft (6.1 m) wide and has five vents (Champion and Starks, 2001). The spring measures 3.7 ft (1.1 m) deep over the vent at high tide and the water is murky and greenish. Limestone is exposed along the pool edges and bottom along with dark mud. No spring boil was visible during the November 2003 visit, most likely because of high tide conditions. There is a small house/shack 150 ft (45.7 m) south of the spring pool. Channel modification or canal digging appears to have altered the tidal creek approximately 200 ft (61 m) downstream from the spring. Boat Spring discharges through a 0.2 mile long tidal creek that feeds into the east side of Hammock Creek, approximately 700 ft (213.4 m) downstream from Aripeka Spring No. 1. Boat Spring is surrounded by privately owned, dense palm-hardwood-cedar hammock lands. Discharge during 1998-99 averaged 1.25 ft^3/s[(5)].

Ryles Spring

Figure 96. Ryles Spring (photo by R. Means).

Location - Lat. 28° 41' 13.80" N, Long. 82° 36' 50.82" W (SW¼ SW¼ NW¼ sec. 4, T. 21 S, R. 17 E). From the Homosassa Springs Wildlife State Park, drive south on US 19/98 5.8 miles (9.3 km). Turn west (right) on CR 480 and drive approximately 1.8 miles (2.9 km) to the public boat access area on the Chassahowitzka River. Launch boat and head down river approximately 3.5 miles (5.6 km) to the confluence with Ryle Creek. Ryles Spring is located approximately 1.3 miles (2.1 km) up Ryle Creek.

Description – Ryles Spring discharges from a small, narrow orifice in limestone measuring approximately 2 ft (0.6 m) in diameter. A spring boil is present over the vent. The spring pool around the vent measures 40 ft (12.2 m) in diameter. Depth directly over the vent is estimated at 20 ft (6.1 m); however, the rest of the spring pool averages 2-3 ft (0.6-0.9 m) deep. The water was slightly turbid and tea colored in March 2003. Ryles Spring is at the head of Ryle Creek, which meanders approximately 1.4 miles (2.3 km) northwest through open brackish and salt marsh on its way to the lower Chassahowitzka River. Ryle Creek is sand and mud bottomed, with occasional exposed limestone. The spring is situated at the tree line boundary between vast open salt marsh and palm-hardwood-cedar hammock on the west side of the Chassahowitzka Swamp.

Rita Marie Springs

Location – Lat. 28° 41' 24.54" N, Long. 82° 35' 20.11" W (NE¼ SW¼ NE¼ sec. 3, T. 21 S, R. 17 E). Rita Marie Springs is privately owned and is located at the head of Crawford Creek, a tributary to the south side of the lower Chassahowitzka River. The springs are approximately 0.2 miles (0.3 km) upstream from a large private residence that is built over the spring run.

Description – Rita Marie Springs consists of a single, elongated spring pool measuring 40 ft (12.2 m) north to south that contains two vents. One of the vents is located in the north end of the pool, and the other is in the south end. The south vent is the largest, and depth here measures 6.9 ft (2.1 m). Both vents produce small boils on the water surface. Spring water is clear. The spring pool has a sand and dark detritus covered bottom. From the springs, Crawford Creek travels a total distance of approximately 2.1 miles (3.4 km) northwest into the lower Chassahowitzka River. Another spring called Betteejay Spring is located on Crawford Creek approximately 0.2 miles (0.3 km) downstream from Rita Marie Springs. Large private residences are situated on both sides of Crawford Creek at Betteejay Spring. The creek is tidally influenced. Rita Marie Springs is situated within a dense palm-hardwood forest inside the Chassahowitzka Swamp.

HILLSBOROUGH COUNTY

Canal Spring

Figure 97. Canal Spring (photo by R. Means).

Location – Lat. 28° 02’ 05.23” N, Long. 82° 20’ 34.88” W (NW¼ SW¼ NE¼ sec. 19, T. 28 S, R. 20 E). Canal Spring is located on the bottom of the Tampa Bypass Canal. It is 0.4 miles (0.64 km) upstream, or north, of the I-75 bridge. The spring is closer to the west side of the canal, near a constricted area where there is a weir. It is approximately 150 ft (45.7 m) northwest or inside of a barrier cable that prevents boat access through the bypass canal shallow area constriction.

Description – Canal Spring creates a circular boil approximately 10 ft (3.1 m) in diameter on the surface of the Tampa Bypass Canal. Depth measured over the vent is 15 ft (4.6 m). The spring appears as a circular slick spot on the surface of the canal waters. Clear spring water mixes with tannic canal water. The spring bottom cannot be seen. A boat can approach the spring from the south; however, there is no boat access past a cable barrier that is 150 ft (45.7 m) south of Double Spring. The spring was easily observed from a boat near the barrier or from the grassy banks of the canal during March 2003. The Tampa Bypass Canal was constructed to divert flood waters of the Hillsborough River around Tampa. Canal construction appears to have broken into underground conduits and tapped into the Floridan Aquifer System. At least three new springs were created during canal building - Canal Spring, Double Spring, and Last Spring. Each of these springs is visible as slick circular boils on the surface of the dark waters of the canal.

Double Spring

Figure 98. Double Spring (photo by R. Means).

Location – Lat. 28° 02' 10.44" N, Long. 82° 20' 37.53" W (SW¼ NW¼ NE¼ sec. 19, T. 28 S, R. 20 E). Double Spring is located on the bottom of the Tampa Bypass Canal approximately 100 ft (30.5 m) south of the Harney Road bridge over the canal or approximately 600 ft (182.9 m) northwest of Canal Spring.

Description – Double Spring creates a circular boil approximately 10 ft (3.1 m) in diameter on the surface of the Tampa Bypass Canal. In the vicinity of the spring, the canal averages 15 ft (4.6 m) deep. Clear spring water mixes with the darker waters of the canal. The bottom cannot be seen. The spring boil appears as a round slick spot on the surface of the canal waters and was easily observed during March 2003 from the grassy banks of the canal at a distance of nearly 300 ft (91.4 m) to the southwest. A boat can approach the spring from the south; however, there is no boat access past a cable barrier that is a few hundred feet south of Double Spring. The Tampa Bypass Canal was constructed to divert flood waters of the Hillsborough River around Tampa. Canal construction appears to have broken into underground conduits and tapped into the Floridan Aquifer System. At least three new springs were created during canal building - Canal Spring, Double Spring, and Last Spring. Each of these springs is visible as slick circular boils on the surface of the dark waters of the canal.

Eureka Springs

Location – Lat. 28° 00' 21.44" N, Long. 82° 20' 45.15" W (NE¼ SE¼ NW¼ sec. 31, T. 28 S, R. 20 E). Eureka Springs are situated within Eureka Springs Park in northeast Tampa. In Tampa heading west on I-4, take the Hillsborough Avenue exit and head east on Hillsborough Avenue. Immediately after exiting I-4 onto Hillsborough Road turn north (left) onto Eureka Springs Road and travel approximately 0.8 miles (1.3 km) to Eureka Springs County Park on the west (left) side of the road.

Description – Eureka Springs were inadvertently created in the mid 1900's by the process of blasting for stump removal. At least 5 springs are within Eureka Springs Park. In August 2002, none of the springs were flowing. At that time, two stagnant spring pools were located within park grounds. The first spring is located approximately 150 ft (45.7 m) north-northwest of the parking area. This spring occupies a man-made pool encircled by a shell-covered foot path. The spring pool is 100 ft in (30.5 m) diameter and was entirely covered in duck weed. During the time of visit, water in the spring pool was tea-colored. The spring run flows north into a canal and then through a culvert, eventually into the Tampa Bypass Canal. Another spring is situated along a boardwalk on the southwest side of the park, approximately 750 ft (228.6 m) southwest of the parking area. The park had its origins as a botanical garden of rare and exotic plants. Now it is operated as a county park with trails, including a 0.32 miles (0.52 km) boardwalk, a green house display, screened pavilion, and picnic area. In August 2002, park personnel reported that the springs had not been flowing regularly since the building of the Tampa Bypass Canal. Park personnel also report that Eureka Springs flow only during the summer rainy season.

Last Spring

Figure 99. Last Spring (photo by R. Meegan).

Location – Lat. 28° 02’ 02.78” N, Long. 82° 20’ 33.30” W (SW¼ SW¼ NE¼ sec. 19, T. 28 S, R. 20 E). Last Spring is located on the bottom of the Tampa Bypass Canal near the center of the canal. It is approximately 0.35 miles (.56 km) north of the I-75 bridge and just 150 ft (45.7 m) southeast of the boat access barrier cable across the canal. Last Spring can be reached by boat from the south.

Description – Last Spring discharges from the bottom of the Tampa Bypass Canal. Clear spring water mixes with tannic canal water over the vent. Turbulence from spring discharge creates a circular slick spot on the surface of the canal waters. Canal depths near the spring average 15 ft (4.6 m), but depth measured over the vent is 20 ft (6.1 m). The Tampa Bypass Canal was constructed to divert flood waters of the Hillsborough River around Tampa. Canal construction appears to have broken into underground conduits and tapped into the Floridan Aquifer System. At least three new springs were created during canal building - Canal Spring, Double Spring, and Last Spring. Each of these springs is visible as slick circular boils on the surface of the dark waters of the canal.

Lettuce Lake Spring

Figure 100. Lettuce Lake Spring (photo by R. Meegan).

Location – Lat. 28° 01’ 05.53” N, Long. 82° 21’ 00.26” W (SE¼ SW¼ NW¼ sec. 30, T. 28 S, R. 20 E). From the intersection of Harney Road and US 301 in Tampa, drive south on US 301 approximately 1.1 mile (1.8 km) to the junction with a small access road on the east side of US 301. Turn east (left) onto this road and Lettuce Lake is approximately 500 ft (152.4 m) north of the SWFWMD office complex along US 301 in Tampa. The spring is located on the bottom of the lake.

Description – Lettuce Lake Spring is within Lettuce Lake. Lettuce Lake is a shallow, clear water lake that has a dark detritus covered bottom. The lake has a diameter of 150 ft (45.7 m). The spring vent is located in the center of the lake, where depth measures 8.8 ft (2.7 m). At the time of visit in March 2003, the spring apparently was not flowing and no boil was observed on the spring surface. A 6 ft (1.8 m) high berm runs along the south side of the lake. The natural spring run evidently used to run southward out of the lake prior to canal construction, but the berm now prevents the natural outflow. Instead, water exits the pool southwestward through a 200 ft (61 m) canal that is 1 ft (0.3 m) deep and 6 ft (1.8 m) wide. This canal enters another slightly larger canal that runs an additional 650 ft (198.1 m) south until entering the Tampa Bypass Canal.

Palma Ceia Spring

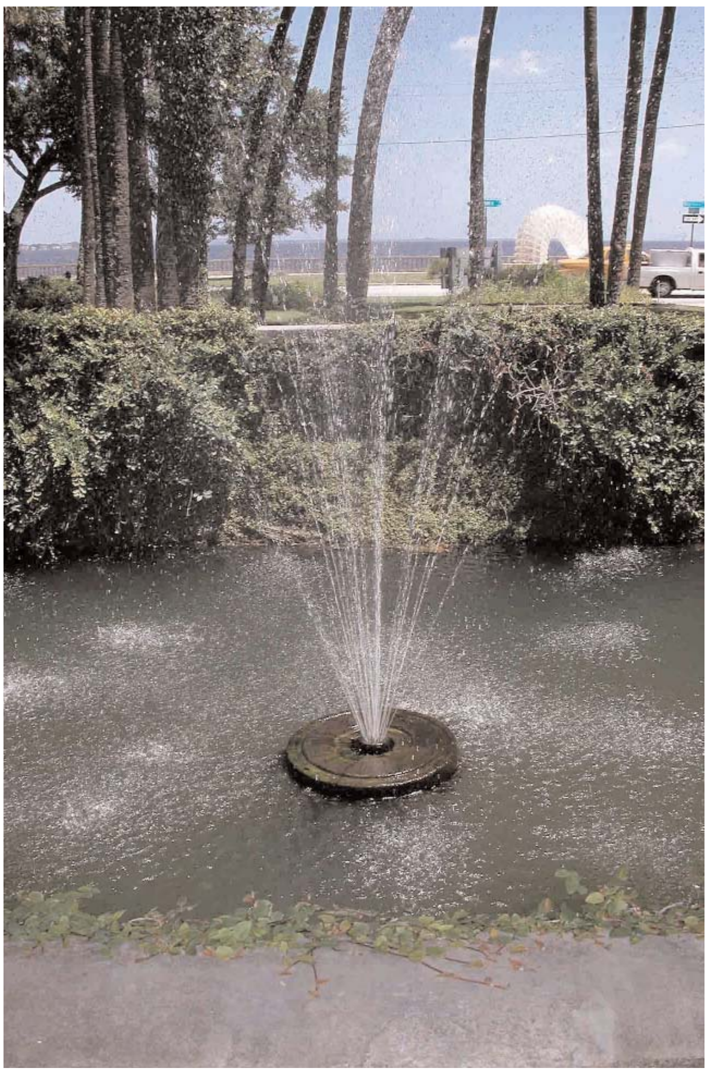

Figure 101. Palma Ceia Spring (photo by R. Meegan).

Location – Lat. 27° 55' 18.74" N, Long. 82° 29' 17.94" W (sec. 34 (irregular section), T. 29 S, R. 18 E). Palma Ceia Spring is located within Tampa on the northeast corner of the intersection of Bay Shore Boulevard and Rubideaux Street. The spring is within Fred Ball City Park.

Description – Palma Ceia Spring is encircled by an old cement wall that bears the engraving: "Palma Ceia Spring 1906." The spring pool measures 20 ft (6.1 m) north to south and 30 ft (9.1 m) east to west. The spring has no above ground outflow, but there is a subterranean canal system that channels water under Bay Shore Boulevard. out to nearby Tampa Bay, 250 ft (76.2 m) southeast. There is a large water fountain in the center of the spring. The water color is murky green, and the spring wall is enshrouded by landscaped vegetation.

HOLMES COUNTY

Jackson Spring

Figure 102. Jackson Spring (photo by A. Willet).

Location – Lat. 30° 42' 42.03" N, Lat. 85° 55' 41.02" W (SE¼ SE¼ NW¼ sec. 34, T. 3 N, R. 17 W). Jackson Spring is located 1 mile (1.6 km) south of Ponce de Leon, 450 ft (137 m) southeast of the rest area at the intersection of SR 81 and I-10.

Description – The Jackson Spring pool is approximately 300 ft (91.4 m) by 100 ft (30.5 m) with an estimated depth of 6 ft (1.8 m). There were no visible vents but small sand boils could be seen adjacent to the run and pool. The spring water was greenish and very cloudy during the October 2003 visit. The spring apparently receives storm water runoff from the adjacent rest area. Water exits the spring through a run that is 2.5 ft (0.8 m) wide, 3 inches (7.6 cm) deep, and flows east for about 100 ft (30.5 m) where it enters the west side of Sandy Creek. The spring is within a forested low lying area. Discharge on June 8th, 1972 measured 2.0 ft^3/s [1].

Thundering Springs

Figure 103. Thundering Springs (photo by A. Willet).

Location – Lat. 30° 55’ 14.74” N, Long. 85º 53’ 27.14” W (NW¼ NW¼ NE¼ sec. 24, T. 6 N, R. 17 W). This spring is located on private land approximately 14 miles (22.5 km) northeast of Ponce de Leon Springs off of Otis Road.

Description – Thundering Springs consists of a cluster of small white sand boils that issue clear water into a circular pool 5 ft (1.5 m) in diameter and 0.6 ft (0.2 m) deep. A small spring run 15 ft (4.5 m) long, 2 ft (0.6 m) wide, and 0.4 ft (0.1 m) deep, flows southeast into Dead Creek. Dead Creek is impounded by a beaver dam, causing water to back up slightly into Thundering Springs. The spring and its run have sand and detritus bottoms. A steep gully that encompasses both pool and run has been created by erosion. The owner reports that spring flow has diminished over the years.

Vortex Spring

Figure 104. Vortex Spring (photo by R. Means).

Location – Lat.30° 46' 13.99" N, Long. 85° 56' 54.51" W (SE¼ SW¼ NW¼ sec. 9, T. 4 N, R. 17 W). The spring is located approximately 3.5 miles (5.6 km) north of the town of Ponce de Leon in a privately operated park. From the intersection of US 90 and SR 81 in Ponce de Leon drive north on SR 81 approximately 3.8 miles (6.1 km) to the intersection with Vortex Spring Road. Turn east (right) on Vortex Spring Road and travel approximately 0.7 miles (1.1 km) to the private park entrance.

Description – Vortex Spring pool is nearly circular and measures 225 ft (68.6 m) in diameter. The depth near the pool center is 48 ft (14.6 m). Clear, sky-blue water fills the large bowl-shaped depression. No spring boil was observed November 2002. The bottom is generally sandy with limestone near the vent. A relatively small spring run, called Blue Creek, exits on the east side of the pool and flows generally southward into Sandy Creek, which in turn flows into the Choctawhatchee River. There are multiple wooden swimming and diving platforms around the pool edge. The surrounding land is grassy and slopes upward to approximately 10 ft (3.1 m) above the spring pool. The park is developed into a swimming and scuba diving recreational area. There is an extensive cave system associated with this spring that is frequented by cave divers. Discharge on August 18, 1972 measured 6.92 ft^3/s [(1)].

JACKSON COUNTY

Barrel Spring

Figure 105. Barrel Spring (photo by R. Means).

Location – Lat. 30° 35' 32.76" N, Long. 85° 10' 14.45" W (NE¼ NW¼ NE¼ sec. 7, T. 2 N, R. 9 W). From the intersection of SR 71 and CR 278 drive west on CR 278 approximately 0.7 miles (1.1 km) to the boat landing on the east side of the Chipola River. Barrel Spring Run flows into the Chipola River from the west approximately 2.8 miles (4.5 km) downstream from the CR 278 boat ramp.

Description – Barrel Spring pool measures 25 ft (7.6 m) in diameter. The conical depression is 10 ft (3.1 m) deep in the center over the vent. Many logs and branches within the spring are coated with brown algae. No boil was visible during the August 2003 visit. A 55 gallon drum rests in the bottom of the spring, and is visible from the surface. A shallow, rocky spring run exits southward and flows 600 ft (182.9 m) into the Chipola River from the west. Young planted pines grow on the west side of the spring. Barrel Spring is within the forested riparian corridor associated with the Chipola River.

Jackson Blue Spring Apalachicola

Figure 106. Jackson Blue Spring Apalachicola (photo by A. Willet).

Location – Lat. 30° 36’ 59.28” N, Long. 84º 55’ 19.37” W (sec. 34 (irregular section), T. 3 N, R. 7 W). The spring is located approximately 1.8 miles (2.9 km) downstream of the I-10 bridge near the west bank of the Apalachicola River. The spring can be accessed by boat, then by walking up the spring run. There are several boat landings north and south of the I-10 bridge including the Chattahoochee Landing, Gadsden Trail Landing (west bank) and Aspalaga Landing.

Description – Jackson Blue Spring Apalachicola consists of a pool that measures 240 ft (73.2 m) wide and 300 ft (91.4 m) long. The water is greenish-brown and turbid. Poor water clarity prevents viewing of the spring pool’s bottom. No spring boil was observed at the time of the visit in June 2003. The spring run is 6 ft (1.8 m) wide, 1.5 ft (0.5 m) deep, and 800 ft (243.8 m) long, and flows southeast into the west side of the Apalachicola River. The spring run has steep, 5-10 ft (1.5-3.1 m) high clay banks. The spring is surrounded by forested floodplain on the west side of the Apalachicola River.

Gator Spring

Figure 107. Gator Spring (photo by R. Means).

Location – Lat. 30° 46' 40.33" N, Long. 85° 10' 01.74" W (NE¼ SW¼ NE¼ sec. 6, T. 4 N, R. 9 W). From the intersection of SR 71 and CR 164 north of Marianna, travel east on CR 164 approximately 1.7 miles (2.7 km) to the intersection with Hunter Fish Camp Road. Turn south (right) onto Hunter Fish Camp Road and travel approximately 0.5 miles (0.8 km) to the intersection with Lamar Drive. Turn west (right) onto Lamar Drive and travel approximately 0.17 miles (0.27 km) to the boat ramp. Gator Spring is located on the east side of Merritt's Mill Pond, across the lake from the boat ramp.

Description – Gator Spring discharges from a vertical fissure at the base of a 15 ft (4.6 m) high limestone wall along the east side of Merritt's Mill Pond. The bottom half of the fissure is inundated with clear waters of Merritt's Mill Pond. A slight flow can be seen coming from the fissure. No spring pool exists, and spring water discharges directly into Merritt's Mill Pond. In the vicinity of the fissure, the mill pond has a sand bottom with some aquatic vegetation. Above the fissure on the limestone wall are lush green ferns and other plants, all under a dense hardwood canopy. Land above the spring on the east side of the mill pond rises steeply to elevations up to 50 ft (15.2 m) above the pond. Merritt's Mill Pond is a 5 mile (8.1 km) long, 500 ft (152.4 m) wide impounded spring run.

Hill Springs

Figure 108A. Hill Springs (photo by A. Willet).

Figure 108B. Hill Springs (photo by A. Willet).

Location – Lat. 30° 39' 51.63" N, Long. 84° 55' 34.62" W (NW¼ NW¼ NW¼ sec. 15, T. 3 N, R. 7 W). Hill Springs is located on private land 0.5 miles (0.8 km) east of the intersection of SR 286 and Hill Farm Road and is approximately 3 miles (4.8 km) south of Sneads.

Description – Hill Springs consists of two small springs 20 ft (6.1 m) apart at the base of two separate limestone outcrops. Each vent is 0.6 ft (0.20 m) wide by 0.3 ft (0.10 m) in height and produce a clear run about 0.2 ft (0.06 m) deep. The runs combine with waters from adjacent seeps to form a single run that is 2.5 ft (0.8 m) wide, 0.25 ft (0.075 m) deep and flows southward for 350 ft (106.7 m) where it enters a small pond. The area surrounding the springs is hardwood forest and private pasture land used for livestock grazing.

Hole-in-the-Rock Spring

Figure 109. Hole-in-the-Rock Spring (photo by R. Means).

Location – Lat. 30° 47' 00.20" N, Long. 85° 09' 22.11" W (SW¼ SE¼ SW¼ sec. 32, T. 5 N, R. 9 W). From the intersection of SR 71 and CR 164 north of Marianna, travel east on CR 164 approximately 1.7 miles (2.7 km) to the intersection with Hunter Fish Camp Road. Turn south (right) onto Hunter Fish Camp Road and travel approximately 0.5 miles (0.8 km) to the intersection with Lamar Drive. Turn west (right) onto Lamar Drive and travel approximately 0.17 mile (0.27 km) to the boat ramp. Hole-in-the-Rock spring is located along the southeastern edge of Merritt's Mill Pond approximately 0.7 mile (1.1 km) downstream from Blue Springs Recreation Area.

Description – Hole-in-the-Rock Spring consists of a spring depression at the base of a limestone cliff. Merritt's Mill Pond waters inundate the spring depression. A 10 ft (3.1 m) wide spring vent is situated on the southeast side of the depression. The vent consists of a cavern leading into a cave system. Clear spring water discharges from this limestone opening at barely detectable rates. The oval spring depression measures 30 ft (9.1 m) east to west and 20 ft (6.1 m) north to south with a depth of 13.6 ft (4.2 m) near the center. A limestone ledge juts out over the vent about 15 ft (4.6 m) from the cliff face. The spring is bordered by the clear water mill pond to the north, west, and east. To the south rise steep, vegetation covered banks, reaching 25 to 50 ft (7.6 - 15.2 m) above the spring. Hole-in-the-Rock Spring is a swimming and cave diving hotspot. A small wooden platform for swimming and diving access is on the northwest side of the pool. In June 2003, very little flow from the spring was detected.

King Spring

Figure 110. King Spring (photo by A. Willet).

Location – Lat. 30° 38' 11.52" N, Long. 84° 55' 10.25" W (SE¼ SE¼ SW¼ sec. 22, T. 3 N, R. 7 W). King Spring is located on private property about 5 miles (8 km) south of Sneads and 0.9 miles (1.5 km) southwest of the I-10 bridge over the Apalachicola River.

Description – Spring water issues from a cavity in a limestone outcrop at the base of a 17 ft (5.2 m) high hillside. The open air cavity is 3.5 ft (1.1 m) wide and from it water flows into a small adjacent spring pool. The pool gives way to a sand bottomed spring run 1.5 ft (0.5 m) wide, 0.2 ft (0.06 m) deep, and flows 150 ft (45.7 m) east into the floodplain of the Apalachicola River. Fragments of limestone containing fossilized coral and foraminifera can be found in the spring pool and run. This spring is located on the western boundary of the heavily forested Apalachicola River floodplain.

Little Lagoon Spring

Figure 111. Little Lagoon Spring (photo by R. Means).

Location – Lat. 30° 37' 14.50" N, Long. 85° 10' 02.87" W (SW¼ NE¼ NE¼ sec. 31, T. 3 N, R. 9 W). From the intersection of SR 71 and CR 278, drive west on CR 278 approximately 0.7 miles (1.1 km) to the boat landing on the east side of the Chipola River. The spring enters the east side of the Chipola River approximately 0.6 miles (1 km) downstream from the CR 278 boat ramp.

Description – Little Lagoon Spring occupies a circular, bowl-shaped depression with a diameter of approximately 60 ft (18.3 m). The spring depth varies from 3 ft (0.9 m) to 15 ft (4.6 m). The water is clear and slightly blue. The spring has 12 ft (3.7 m) high banks. An 8 ft (2.4 m) wide, 1 ft (0.3 m) deep spring run flows southwest approximately 125 ft (38.1 m) until it enters into a small siphon in a limestone fissure. A 15 ft (4.6 m) wide land bridge separates the siphon from the adjacent Chipola River. The spring and run are sand and limestone bottomed. During higher river levels, the land bridge would become inundated and the spring would connect directly with the river. The spring and run are surrounded by private land within a pristine forested area along the Chipola River.

Maund Spring

Figure 112. Maund Spring (photo by R. Meegan).

Location – Lat. 30° 44' 46.72" N, Long. 85° 12' 55.80" W (NW¼ NE¼ SE¼ sec. 15, T. 4 N, R. 10 W). From the SR 71 exit off I-10, head south on SR 71 approximately 0.5 miles (0.8 km) to the intersection with CR 280A. Turn west (right) onto CR 280A and drive approximately 0.9 miles (1.5 km) to the boat landing on the Chipola River. Launch boat and travel approximately 4 miles (6.4 km) upriver (north). Maund Spring is located on the east side of the Chipola River.

Description – Maund Spring has a 30 ft (9.1 m) diameter spring pool. Clear, bluish water issues from a steep-sided limestone fissure near the center of the pool that is approximately 10 ft (3.1 m) in length. Depth measured over the fissure is 29.6 ft (9.0 m). Many tree limbs have collected within the spring. There was a very slight boil over the fissure in September 2003. The bottom is sand and limestone, and it is laden with algae. Maund Spring has 5 to 8 ft (1.5 to 2.4 m) high clay banks. The spring run flows 200 ft (61 m) west into the Chipola River. It averages 1.5 ft (0.5 m) deep and 12 ft (3.7 m) wide, but its width constricts to 5 ft (1.5 m) down near the river. There is an old, overgrown field to the northeast a short distance from the spring. The spring is surrounded by heavily forested private property.

Rocky Creek Spring

Figure 113. Rocky Creek Spring (photo by A. Willet).

Location – Lat. 30° 40' 31.24" N, Long. 85° 07' 55.38" W (NW¼ SE¼ NE¼ sec. 9, T 3 N, R. 9 W). This spring is located on private land 9.5 miles (15.3 km) southeast of Marianna off CR 280 and 0.7 miles (1.1 km) northwest of Logan Cemetery.

Description – Rocky Creek Spring has a circular spring pool that is approximately 20 ft (6.1 m) in diameter, formed at the base of an 18 ft (5.5 m) vertical clay bank. A small spring boil is observed on the pool surface in the center of the pool. Spring water is turbid and greenish, preventing a clear view of the spring bottom; however, the spring appears to have a sand and limestone bottom. No aquatic vegetation can be found in the spring, but a reddish iron-rich deposit occurs within Rocky Creek Spring. A metal pipe extends into the center of the pool near the vent. There are two smaller vents to the southeast contributing slightly murky water to the spring run. Rocky Creek Spring Run is 20 ft (6.1 m) wide, 0.6 ft (0.2 m) deep, and flows north 250 ft (76.2 m) in to upper Rocky Creek. The spring is near the head of Rocky Creek. From the spring, Rocky Creek flows southwest approximately 4 miles (6.4 km) into the east side of the Chipola River. Open farmland is visible through a forested buffer south of Rocky Creek Spring. Rocky Creek Spring is surrounded by private land, and the spring apparently is used for irrigation.

Rooks Springs

Figure 114. Rooks Springs (photo by A. Willet).

Location – Lat. 30° 41' 16.44" N, Long. 85° 14' 3.80" W (NW¼ NE¼ SE¼ sec. 4, T. 3 N, R. 10 W). Rooks Springs is located on private land 0.23 miles (0.37 km) east of the bridge on SR 73 that crosses Dry Creek and is 6 miles (9.7 km) south of Marianna.

Description – Rooks Springs form a pool 110 ft (33.5 m) long, 45 ft (13.7 m) wide, 1 ft (0.3 m) deep. It contains several small sand boils and at least 1 small seep. The main spring vent is 3 ft (0.9 m) wide, 1 ft (0.3 m) tall and flows from beneath a large oak tree at the southern end of the pool. A slight boil is visible near the vent. The spring run is 30 ft (9.1 m) wide, 1.5 ft (0.5 m) deep and flows north for 60 ft (18.3 m) where it joins Dry Creek from the south. Rooks Springs is within the forested riparian corridor associated with Dry Creek.

Sandbag Spring

Figure 115. Sandbag Spring (photo by R. Meegan).

Location – Lat. 30° 47' 19.39" N, Long. 85° 13' 18.91" W (SE¼ NE¼ SW¼ sec. 34, T. 5 N, R. 10 W). Sandbag Spring is located on the Chipola River just northeast of Marianna, 0.3 miles (0.5 km) downstream from the SR 166 (Caverns Road) boat ramp along the west bank of the Chipola River.

Description – Sandbag Spring has a 19.8 ft (6.0 m) deep elongated spring pool that measures 20 ft (6.1 m) north to south and 15 ft (4.6 m) east to west. The spring vent is located on the north side of the pool, and the cave entrance can be viewed through the clear, bluish waters. The vent opening is estimated to be 8 ft (2.4 m) long and 4 ft (1.2 m) wide. Scoured limestone in the pool suggests that the spring has been subjected to debris removal with the use of heavy machinery. The spring bottom consists of sand and bare limestone. A very slight boil on the pool surface was observed in October 2003, and the spring was flowing noticeably. Sandbag Spring is aptly named because the spring pool has sandbag and cinder block retaining walls on three sides. A short spring run flows approximately 100 ft (30.5 m) southeast into the west side of the Chipola River. A house on stilts sits on the southeast side of the spring at the mouth of the spring run, and land surrounding the spring is privately owned. Sandbag Spring is immediately surrounded by grassy lawn with picnic tables, all within the forested floodplain of the Chipola River.

Sinai Spring

Figure 116. Sinai Spring (photo by A. Willet).

Location – Lat. 30° 39’ 52.55” N, Long. 84° 54’ 37.66” W (NE¼ NE¼ NE¼ sec. 15, T. 3 N, R. 7 W). This spring is located about 3 miles (4.8 km) south of Sneads on private property, adjacent to Sinai Road.

Description – Sinai Spring forms a circular spring pool with a 15 ft (4.6 m) diameter. Spring water gently discharges from underneath plant roots exposed on the sand bottom. Thin deposits of orange, brown and green algae or iron-reducing bacteria grow in the slightly turbid spring pool. The run is 0.6 ft (0.1 m) deep, 4 ft (1.2 m) wide, and flows west underneath Sinai Road, approximately 600 ft (182.9 m), into a nearby pond. To the east of this spring is a dense hardwood forest. Local residents say that Sinai Spring was a source of drinking water many years ago; however, it currently is unused.

Tanner Springs

Figure 117. Tanner Springs (photo by A. Willet).

Location – Lat. 30° 49' 29.84" N, Long 85° 19' 30.68" W (SE¼ NW¼ NW¼ sec. 22, T. 5 N, R. 11 W). Tanner Springs is located on private land 4.5 miles (7.2 km) north of Marianna along State Road 73.

Description – Tanner Springs consists of several seeps, sand boils and springs. The area containing the springs covers about 1-2 acres (0.4-0.8 hectares). The largest concentration of springs discharges from several openings along the base of an 8 ft (2.4 m) high limestone exposure. Spring water is clear. The vents are small, 4 - 8 inches (10-20 cm) in diameter, and the flow forms runs that are generally 1-2 ft (0.3-0.6 m) wide and about 2 in (5 cm) deep. The runs combine with waters from nearby seeps and continue southward for 0.8 miles (1.3 km) where they form the southern fork of Baker Creek. The area surrounding the springs consists of hardwood forest, swampy lowland and cultivated fields.

Twin Caves Spring

Figure 118. Twin Caves Spring (photo by R. Means).

Location – Lat. 30° 47' 12.88" N, Long. 85° 08' 41.78" W (SW¼ NW¼ SW¼ sec. 33, T. 5 N, R. 9 W). From the intersection of SR 71 and CR 164 north of Marianna, travel east on CR 164 approximately 2.6 miles (4.2 km) to the intersection with Camp Road. Turn south (right) onto Camp Road and travel approximately 0.4 miles (0.6 km) to the boat landing on Merritt's Mill Pond. Twin Caves are located on the bottom of Merritt's Mill Pond approximately 0.3 miles (0.5 km) upstream from the boat landing on the southeast side of the lake. The two caves are 88.6 feet (27 m) northwest of a newly constructed swim platform between three cypress trees and even with a string of five white buoys.

Description – Twin Caves Spring consists of two vents, oriented north-south. The north vent is 18.5 ft (5.6 m) deep and is deeper than the south vent. Both vents are within a gentle depression on the mill pond bottom that is approximately 50 ft (15.2 m) north to south and 25 ft (7.6 m) east to west. Clear, light blue water of Merritt's Mill Pond covers the vents. There is very little vegetation surrounding the vents and the bottom is bare sand and limestone. Two logs lay across the north vent at a depth of about 8 ft (2.4 m). The area around the spring is open water with widely scattered cypress trees. Blue Springs Recreation Area is visible approximately 0.4 miles (0.6 km) to the northeast. The spring is east of five white caution buoys associated with the recreation area. During the June 2003 visit, the spring did not appear to be flowing. Twin Caves Spring appears to be a popular swimming and diving location. There is a newly constructed platform 90 ft (27.4 m) to the southeast of Twin Caves Spring.

Waddell Mill Pond Spring

Figure 119. Waddell Mill Pond Spring (photo by A. Willet).

Location – Lat. 30° 52' 38.28" N, Long. 85° 20' 41.64" W (SW¼ NW¼ SW¼ sec. 33, T. 6 N, 11 W). Waddell Mill Pond Spring is located on private property at the northwestern end of Waddell Mill Pond and forms the head waters of Waddell Mill Creek. The spring is 1.5 miles (2.4 km) southeast of the intersection of CR 162 and SR 231, 12.5 miles (20.1 km) northeast of Chipley.

Description – Waddell Mill Pond Spring flows from several locations beneath what appears to be the remains of a large collapsed cavern. The rubble from the collapsed limestone overhang is approximately 300 ft (91.4 m) long and 20 ft (6.1 m) high and contains large limestone boulders. Several small vents can be seen in the area in front of the breakdown but there is no apparent single flow path. The area surrounding Waddell Mill Pond Spring is a hardwood forest with planted pines and nearby land is used for cattle grazing and farming.

Webbville Springs

Figure 120. Webbville Springs (photo by A. Willet).

Location – Lat. 30° 50' 21.21" N, Long. 85° 20' 04.33" W (NE¼ SW¼ NE¼ sec. 16, T. 5 N, R. 11 W). This spring is located approximately 6.25 miles (10.1 km) northwest of Mariana and 0.7 miles (1.1 km) east southeast of the US 231 and SR 73 intersection on private land.

Description – Webbville Springs consists of a small vent 0.6 ft (0.2 m) in diameter, and a collection of small seeps and sand boils at the base of a 12 ft (3.7 m) high wooded hill. Clear water flows southeast from the springs in a dendritic pattern forming a single spring run 4 ft (1.2 m) wide, 0.5 ft (0.15 m) deep, and 0.7 miles (1.1 km) long. Webbville Springs Run joins Tanner Springs Run and their union forms Baker Creek. The area around the spring is forested and privately owned.

White Cave Spring

Location – Lat. 30° 37' 51.86" N, Long. 84° 55' 21.87" W (NW¼ SE¼ NW¼ sec. 27, T. 3 N, R. 7 W). White Cave Spring is located on private property 5 miles (8.1 km) south of Sneads. The spring is 1.5 miles (2.4 km) east of the intersection of I-10 and SR 286.

Description – White Cave Spring flows from the mouth of White Cave, which is an opening 6 ft (1.8 m) tall, 15 ft (4.6 m) wide and extends approximately 15 ft (4.6 m) into the outcrop. The spring emerges as a rivulet along the cave floor from the north. Flow from White

Figure 121. White Cave Spring (photo by A. Willet).

Cave Spring travels east for 0.75 miles (1.2 km) where it flows into a marshy area along the west banks of the Apalachicola River. The area surrounding the spring contains hardwood and pine forest and is utilized by a local hunting club.

JEFFERSON COUNTY

Wacissa River Springs Group

The Wacissa River originates approximately 19 miles (30.6 km) southeast of the city of Tallahassee. The fifteen known springs that form the Wacissa River are scattered along the uppermost 2.75 miles (4.4 km) of the river. Most of these springs must be accessed by boat. From the intersection of CR 259 and SR 59 in Wacissa, travel south on SR 59 approximately 0.7 miles (1.1 km) to where SR 59 makes a 90 degree turn to the west. Continue south (straight) onto River Road and a public boat ramp is located at the end of River Road approximately 0.6 miles (1 km) from SR 59. All but one of the springs is within one mile of the boat ramp.

Brumbley Spring (JEF64991)

Figure 122. Wacissa River Springs Group, Brumbley Spring (photo by A. Willet).

Location – Lat. 30° 20’ 41.39” N, Long. 83° 58’ 51.63” W (SW¼ NW¼ NE¼ sec. 1, T. 2 S, R. 3 E). Brumbley Spring is located on Little River, 0.7 mile (1.1 km) northeast of its confluence with the Wacissa River (see Wacissa River Springs paragraph above).

Description – Brumbley Spring (also known as JEF64991) issues from the bottom of Little

River, a tributary to the upper Wacissa River. At the time of visit in June 2003, thick exotic and native aquatic vegetation on the river bottom prevented a good view of the spring. A slight boil was observed near the western bank of Little River, but there was no visible vent. The water is clear with a depth of approximately 1 ft (0.3 m). The bottom near the spring was muddy and covered with detritus. Brumbley Spring is within densely forested lowlands associated with the Wacissa River and its tributaries. Land around the spring is state owned and undeveloped. Discharge was estimated to be 40 ft^3/sec[4] on June 4, 1999.

Buzzard Log Spring

Figure 123. Wacissa River Springs Group, Buzzard Log Spring (photo by D. Hornsby).

Location – Lat. 30° 19' 53.52" N, Long. 83° 59' 11.73" W (SE¼ NW¼ NW¼ sec. 12, T. 2 S, R. 3 E). Buzzard Log Spring is located 0.7 miles (1.1 km) downstream from the public boat landing (see Wacissa River Springs paragraph above) along the east side of the Wacissa River. Buzzard Log Spring is situated in the center of the mouth of Garner Spring run and is directly across the river from Little Blue Spring Run.

Description – Buzzard Log Spring (also know as Buzzer's Log Spring) forms a 25 ft (7.6 m) diameter spring pool along the east bank of the Wacissa River. Depth over the spring vent was 6.2 ft (1.9 m). During the August 2002 visit, the bottom of the spring was dark and detritus-covered due to low-flow conditions; however, some limestone rubble was observed around the vent. Emergent exotic and native vegetation was abundant in the spring except on the side adjacent to the Wacissa River. Buzzard Log Spring is within the heavily forested lowlands associated with the Wacissa River. Land around the spring is state owned and undeveloped. Discharge on March 19, 1999 was estimated at 15 ft^3/sec[4].

Cassidy Springs

Figure 124. Wacissa River Springs Group, Cassidy Springs (photo by R. Means).

Location – Lat. 30° 19' 57.80" N, Long. 83° 59' 20.53" W (SW¼ SW¼ SW¼ sec. 1, T. 2 S, R. 3 E). Cassidy Springs is located in a small cove on the west bank of the Wacissa River, 0.5 miles (0.8 km) downstream from the public park (see Wacissa River Springs paragraph above).

Description – Cassidy Springs (also know as Cassida Springs) is on a short, 100 ft (30.5 m) side channel and forms a spring pool that is 45 ft (13.7 m) in diameter. Water issues from a vertical limestone shaft 27 ft (8.2 m) deep and 6 ft (1.8 m) in diameter. Two additional vents are within 10 ft (3.1 m) of the main vent to the northwest and northeast. The average depth of the spring pool is 1.5 ft (0.5 m). All three vents create prominent spring boils on the water surface. The spring bottom is sand with some exposed limestone. The shallow spring run is choked with *Hydrilla* and flows 90 ft (27.4 m) southeast into the 300 ft (91.4 m) wide Wacissa River from the west. Cassidy Springs is surrounded by a thick hardwood and palm hammock that rises gently to 5 ft (1.5 m) above the water level to the west. Land around the spring is state owned and undeveloped. Discharge measured June 4, 1999 was 44.36 ft^3/sec[4].

Garner Spring

Figure 125. Wacissa River Springs Group, Garner Spring (photo by R. Means).

Location – Lat. 30° 19' 49.12" N, Long. 83° 58' 59.22" W (SE¼ NE¼ NW¼ sec. 12, T. 2 S, R. 3 E). Garner Spring is located at the end of a spring run that flows into the east bank of the Wacissa River. The spring run enters the river 0.7 miles (1.1 km) downstream from the public boat landing (see Wacissa River Springs paragraph above). Buzzard Log Spring sits at the mouth of this spring run.

Description – Garner Spring forms a 35 ft (11 m) diameter spring pool. Depth of the spring vent measures 14.7 ft (4.5 m). The spring has clear blue water. During the August 2002 visit, the spring vent was covered with *Hydrilla* and had very little flow. No spring boil was observable. Other vents are reported in the area but were not observed on this trip. There are many downed cypress logs within the spring and an old wooden platform sits on the north side of the spring pool. Its spring run flows approximately 0.25 miles (0.4 km) to the Wacissa River from the east and averages 8 ft (2.4 m) deep with a narrow channel, kept open by river otter and alligator activity. Garner Spring is underneath a dense canopy within the heavily forested lowlands associated with the Wacissa River. Land around the spring is state owned and undeveloped. Discharge on July 16, 1942 measured 17.0 ft^3/s[1] and estimated at 10 ft^3/sec[4] on March 19, 1999.

Horsehead Spring

Figure 126. Wacissa River Springs Group, Horsehead Spring (photo by D. Hornsby).

Location – Lat. 30° 20' 41.50" N, Long. 83° 59' 40.36" W (SW¼ NE¼ NE¼ sec. 2, T. 2 S, R. 3 E). This spring is located in a circular pool 0.4 miles (0.64 km) upstream from the Wacissa boat ramp (see Wacissa River Springs paragraph above).

Description – Horsehead Spring pool is approximately 120 ft (36.6 m) in diameter and has an average depth of 13 ft (4.0 m). On the northeast side a small vent is denoted by an opening in thick *Hydrilla*. A tributary stream with tannic water enters the spring pool from the west. The spring run is 35 ft (10.7 m) wide, 3 ft (0.9 m) deep, and flows south 0.3 miles (0.5 km) into the head of the Wacissa River. The run has abundant *Hydrilla* and other aquatic vegetation. Horsehead Spring is used as a swimming area with two wooden docks on its northern bank. No recent swimming use was apparent in June 2003. Area around the spring is forested and private property is nearby. Discharge was estimated at 15 ft^3/sec[4] on March 12, 1999.

Little Blue Spring

Figure 127. Wacissa River Springs Group, Little Blue Spring (photo by A. Willet).

Location – Lat. 30° 19' 51.03" N, Long. 83° 59' 20.53" W (NW¼ NW¼ NW¼ sec.12, T. 2 S, R. 3 E). Little Blue Spring is located 0.7 miles (1.1 km) downstream of the public boat ramp (see Wacissa River Springs paragraph above) and head springs on the west side of the Wacissa River.

Description – Little Blue Spring forms a circular spring pool that is approximately 100 ft (30.5 m) in diameter. Spring water is clear and bluish with a maximum depth of 14 ft (4.3 m) near the vent. The spring vent consists of a 2.5 ft (0.8 m) long limestone fissure located near the center of the pool. A small spring boil is observed on the water surface over the vent. The bottom is sand and limestone. The water surface is almost completely covered by floating aquatic vegetation. The spring run is 50 ft (15.2 m) to 70 ft (21.3 m) wide and flows southeast 450 ft (137.2 m) where it joins the Wacissa River. The run is choked with aquatic vegetation dominated by *Hydrilla*. Little Blue Spring is situated within the heavily forested lowlands associated with the Wacissa River. Land around the spring is state owned and undeveloped. Discharge was estimated at 10 ft^3/sec[4] on March 19, 1999.

Log Spring

Figure 128. Wacissa River Springs Group, Log Spring (photo by R. Means).

Location – Lat. 30° 20’ 25.92” N, Long. 83° 59’ 34.81” W (SW¼ SE¼ NE¼ sec. 2, T. 2 S, R. 3 E). Log Spring is located 660 ft (201 m) northwest of the public boat ramp along the east bank of Horsehead Spring Run (see Wacissa River Springs paragraph above).

Description – Log Spring discharges in the riverbed from an elongated, north-south, limestone fissure that is 85 ft (25.9 m) long and up to 7 ft (2.1 m) wide. The spring is 25.2 ft (7.7 m) deep over the fissure. The spring water is clear; however, in August 2002, tea-colored water was entering the spring from the north via Horsehead Run. At that time, a slight boil was visible on the water surface above the middle section of the fissure. Algae-coated *Hydrilla* and *Vallisneria* grow along the edges of the vent. The area surrounding the spring is forested lowland associated with the Wacissa River. A private fish camp is to the west across Horsehead Run. Discharge was estimated at 50 ft^3/sec[4] on March 19, 1999.

Maggie Springs

Location – Lat. 30° 20’ 24.28” N, Long. 83° 58’ 57.68” W (SW¼ SW¼ NE¼ sec. 1, T 2 S, R. 3 E). Maggie Springs is located along Little River, a small tributary on the eastern side of the Wacissa River 0.4 miles (0.6 km) south of the boat ramp (see Wacissa River Springs paragraph above). Maggie Springs is approximately 0.5 miles (0.8 km) upstream on Little River from its confluence with the Wacissa River.

Description – Maggie Springs is in a considerably deeper area in the normally shallow Little River. The spring vent is along the west side of the Little River, where an average depth of 3 ft (0.9 m) increases to 11 ft (3.4 m). Clear water permits a view of criss-crossing logs overlying two limestone vents. Combined flow of these two vents is minimal. Maggie Springs remains undisturbed within the heavily forested area associated with the Wacissa River. Land around the spring is state owned and undeveloped.

Minnow Spring

Figure 129. Wacissa River Springs Group, Minnow Spring (photo by R. Means).

Location – Lat. 30° 19' 53.52" N, Long. 83° 59' 11.73" W (NE¼ NW¼ NW¼ sec. 12, T. 2 S, R. 3 E). Minnow Spring is located up a spring run that flows 200 ft (61 m) into the east bank of the Wacissa River approximately 0.6 miles (1.0 km) downstream from the public boat landing (see Wacissa River Springs paragraph above).

Description – Minnow Spring issues water out of a small vent in the center of a shallow, circular spring pool approximately 30 ft (9.1 m) in diameter. Depth over the spring vent measures 7 ft (2.1 m). Limestone rubble and dark organic matter cover the bottom. There is abundant *Hydrilla* in the spring and the run. The run is as wide as the spring pool and flows 200 ft (61 m) into the Wacissa River from the east. Minnow Spring is within densely forested lowlands associated with the Wacissa River. Land around the spring is state owned and undeveloped. Discharge was estimated at 15 ft^3/sec[4] on June 3, 1999.

Thomas Spring

Figure 130. Wacissa River Springs Group, Thomas Spring (photo by R. Means).

Location – Lat. 30° 20' 22.97" N, Long. 83° 59' 32.37" W (NE¼ NE¼ SE¼ sec. 2, T. 2 S, R. 3 E). Thomas Spring is located 375 ft (114.3 m) southwest of the public park dive platform at the end of River Road (see Wacissa River Springs paragraph above). The spring is approximately 360 ft (109.7 m) downstream from Log Spring on the northwestern bank of the main spring pool.

Description – Thomas Spring discharges from a 20 ft (6.1 m) long fissure within the southwest portion of the head of the Wacissa River. The spring depth is 7.9 ft (2.4 m) over the fissure. Thomas Spring fissure is oriented north-south, and may connect to Log Spring fissure, which is located 360 ft (109.7 m) upstream. The spring has a sand and limestone bottom with algae-coated *Hydrilla* common around the edges. During the August 2002 visit, enough current was flowing to produce a slight, elongated boil. A public park with dive platform, parking area, and boat ramp is about 300 ft (91.4 m) to the east, across the open waters of the Wacissa River. Land to the east of Thomas Spring is state owned and undeveloped. Discharge was estimated at 30 ft^3/sec[4] on March 19, 1999.

Wacissa Spring No. 1

Location – Lat. 30° 20’ 22.13” N, Long. 83° 59’ 30.40” W (NE¼ NE¼ SE¼ sec. 2, T. 2 S, R. 3 E). The spring is located 400 ft (121.9 m) southwest of the public boat ramp on the west side of the large open water head springs area (see Wacissa River Springs paragraph above).

Description – Wacissa Spring No. 1 occupies a 30 ft (9.1 m) diameter depression on the bottom of the Wacissa River. Spring water gently discharges from a 1.5 ft (0.5 m) diameter circular vent in limestone. The spring depth is 9.6 ft (2.9 m) over the vent. A limestone ledge is exposed on the southern edge of the vent. The area immediately surrounding the spring vent is choked with algae-coated *Hydrilla*. Land surrounding the spring is densely forested swampland, except on the northeast side, where the public park with boat ramp, diving platform, and parking area are located.

Wacissa Spring No. 3

Figure 131. Wacissa River Springs Group, Wacissa Spring No. 3 (photo by R. Means).

Location – Lat. 30° 20’ 26.13” N, Long. 83° 59’ 26.68” W (SW¼ SW¼ NW¼ sec. 1, T. 2 S, R. 3 E). The spring is located directly east of the public park and is due south of a small picnic area on the northeast side of the park (see Wacissa River Springs paragraph above).

Description – Wacissa Spring No. 3 issues from at least eight small, sand boils within an oval shaped pool measuring 30 ft (9.1 m) north to south and 20 ft (6.1 m) east to west. During the August 2002 visit, very little flow was detected. The spring pool is shallow with an average depth of 1.5 ft (0.5 m) and a maximum depth of 2 ft (0.6 m). The spring water is clear, and the bottom is sand with few aquatic plants. The spring run flows 50 ft (15.2) south before joining with Wacissa Spring No. 4. The combined flow from both springs flows another 200 ft (61 m) past the boat ramp and into the east side of the main body of the uppermost Wacissa River. The spring is bordered by the public boat ramp parking area on the west side and dense swamp forest on the east.

Wacissa Spring No. 4

Location – Lat. 30° 20' 25.50" N, Long. 83° 59' 25.92" W (SW¼ SW¼ NW¼ sec. 1, T. 2 S, R. 3 E). Wacissa Spring No. 4 is located 175 ft (53.3 m) east of the boat ramp parking area, up a small spring run that flows towards the boat ramp from the northeast (see Wacissa River Springs paragraph above). The spring is 90 ft (27.4 m) southeast of Wacissa Spring No. 3.

Description – Wacissa Spring No. 4 occupies a pool that is roughly 25 ft (7.6 m) in diameter. Depth over the spring vent measures 4.2 ft (1.3 m). The spring issues clear, slightly blue water. The spring bottom is exposed limestone and sand. During the August 2002 visit, only a slight flow was noticeable as a slight boil on the spring surface. At that time, thick green patches of algae and *Hydrilla* occupied the majority of the spring pool. The 25 ft (7.6 m) spring run flows southwest and converges with flow from Wacissa Spring No. 3 at a point just upstream from the boat ramp. The combined runs then flow into the east side of the main body of the uppermost Wacissa River. Dense lowland swamp forest surrounds and canopies the spring.

Wacissa Unnamed Spring

Location – Lat. 30° 18' 08.22" N, Long. 83° 58' 46.63" W (NE¼ NW¼ NE¼ sec. 24, T. 2 S, R. 3 E). Wacissa Unnamed Spring is located at the head of a 100 ft (30.5 m) spring run that enters the east bank of the Wacissa River 2.75 miles (4.4 km) downstream from the public boat ramp (see Wacissa River Springs paragraph above). The spring run is 0.1 miles (0.16 km) upstream from a large tree island.

Description – Wacissa Unnamed Spring consists of multiple spring vents flowing into a roughly circular 30 ft (9.1 m) diameter spring pool. Two small vents are on the north end of the pool and a larger vent is on the south end. Small spring boils can be seen on the water surface over each vent. In April 2002, a dark layer of organic particulate matter was deposited on the pool bottom. The run flows 100 ft (30.5 m) west directly into the Wacissa River from the east. Densely forested lowlands surround this spring. Land around the spring is state owned and undeveloped.

LAFAYETTE COUNTY

Convict Spring

Figure 132. Convict Spring (photo by T. Roberts).

Location – Lat. 30° 5' 18.02" N, Long. 83° 5' 45.48" W (NW¼ SW¼ SW¼ sec. 35, T. 4 S, R. 12 E). Convict Spring flows into Suwannee River from the south 5.5 miles (8.9 km) northeast of Mayo. From the intersection with SR 51 in Mayo, drive 4.7 miles (7.6 km) east on US 27. Turn north (left) on Convict Springs Road and follow 2.4 miles (3.9 km). The spring is located within a park, Jim Hollis River Rendezvous, at the end of this road.

Description – Convict Spring has an oval shaped pool framed by a concrete retaining wall. Concrete steps and a slide lead down into the pool and there are two access ladders. The pool measures 60 ft (18.3 m) long and 18 ft (5.5 m) wide. The spring was not flowing during the November 2002 visit and neither the vent nor the pool bottom could be seen due to the stagnant water. Maximum depth of the pool measures 24 ft (7.3 m). The water is greenish-brown and murky, with a thin green algae layer. Limestone crops out along the spring pool edge. The dry, narrow spring run is only a few inches deep and runs 150 ft (45.7 m) east to the Suwannee River. On one side of the spring pool, high ground rises to a picnic area. On the other side, a wooden boardwalk leads down to the spring. The spring is surrounded by grass and trees in a private recreation area developed for scuba diving, camping, and other recreational activities. Discharge on July 7, 1997 measured 6.31 ft^3/sec[4].

LAF57982

Figure 133. LAF57982 (photo by T. Roberts).

Location – Lat. 30° 03' 40.23" N, Long. 83° 03' 26.53" W (SW¼ NE¼ SW¼ sec. 7, T. 5 S, R. 13 E). LAF57982 is located along the Suwannee River 7 miles (11.3 km) east of Mayo. From the intersection with SR 51 in Mayo, drive 6.6 miles (10.6 km) southeast on US 27. Turn east (left) on CR 251 and follow the road 2.8 miles (4.5 km) to the boat ramp at the end. The spring is 1.7 miles (2.7 km) upstream from the boat ramp behind a small island on the southwest side of the river.

Description – LAF57982 emerges from beneath the scalloped limestone riverbank. This small spring has no spring pool. The spring run is 2 ft (0.6 m) wide, 18 ft (5.5 m) long, 0.2 ft (0.06 m) deep, and flows north into the Suwannee River. The bottom is sand and covered in leaves and organic matter. In some areas, shrubs and grass are growing in the run. High ground slopes steeply to 3 ft (0.9 m) above the spring and run. The surrounding area is private land forested with cypress near the river and live oak and palmetto on higher, drier land. Discharge on May 7, 1998 measured 3.83 ft^3/sec[4].

LAF718971

Figure 134. LAF718971 (photo by D. Hornsby).

Location – Lat. 29° 57' 34.11" N, Long. 82° 57' 11.94" W (SE¼ NE¼ SW¼ sec. 18, T. 6 S, R. 14 E) LAF718971 is located approximately 1.6 miles (2.6 km) northwest (up river) from the US 27 bridge over the Suwannee River at Branford. The spring flows into the Suwannee River from the south bank.

Description – LAF718971 (also known locally as Coopers Spring) consists of two spring pools, separated by a land bridge. One pool measures 25 ft (7.8 m) long, 4.5 ft (1.4 m) wide, and 5.1 ft (1.6 m) deep. The pool is fed by several seeps flowing from small cavities in the adjacent exposed limestone. The spring flows directly into the river. The second pool is located to the east of the first pool and measures 10 ft (3.1 m) north to south, 8 ft (2.5 m) east to west, and 5 ft (1.6 m) deep. The spring run is 40 ft (12 m) long and averages 2 ft (0.6 m) wide and 1 ft (0.3 m) deep. There is very little aquatic vegetation in either pool, though algae cover 90% of the limestone around the pools. The water in both pools is murky green and a strong hydrogen sulfide odor is present. Limestone is exposed along the edges and rises 6 ft (1.9 m) above the water surface to a dense hardwood forest. There are a few tiki torches around the pool, as well as remnants of stairs or a platform. Discharge on July 18, 1997 measured 10.84 ft^3/sec[4].

LAF718972

Figure 135. LAF718972 (photo by T. Roberts).

Location – Lat. 30° 00' 41.86" N, Long. 83° 00' 15.34" W (SE¼ NE¼ NW¼ sec. 34, T. 5 S, R. 13 E). LAF718972 is located along the Suwannee River 5.7 miles (9.2 km) northwest of Branford. From the intersection with US 129 in Branford, drive 3.4 miles (5.5 km) northwest on US 27. Turn east (right) on Patrician Oaks Drive and follow 1.5 miles (2.4 km) to the boat ramp at the end of the road. The spring is along the west bank 4.3 miles (6.9 km) upstream from the boat ramp. It is 0.6 miles (1.0 km) upstream from Troy Spring Run on the same side of the river.

Description – LAF718972 issues into the Suwannee River through a fissure along the riverbank. During the November 2002 visit, the spring was exposed; however, when river levels are higher, the fissure easily becomes inundated and is not discernable (Hornsby and Ceryak, 1998). The vent is algae-covered and measures 25 ft (7.6 m) long, 1 ft (0.3 m) wide and 3.2 ft (1.0 m) deep. The spring water has excellent clarity. Just south of the spring, the riverbank rises to approximately 10 ft (3.1 m) above water level. A dense cypress forest occupies lowlands along the river in the vicinity of the spring. Discharge on July 18, 1997 measured 10.6 ft^3/sec[(4)].

LAF919972

Figure 136. LAF919972 (photo by D. Hornsby).

Location – Lat. 30° 05' 31.73" N, Long. 83° 06' 48.07" W (NE¼ NE¼ SE¼ sec. 33, T. 4 S, R. 12 E). LAF919972 is located along the Suwannee River 4.5 miles (7.2 km) northeast of Mayo. From the intersection with SR51 in Mayo, drive 3.7 miles (6 km) east on US 27. Turn north (left) on CR 354-B and follow 2.6 miles (4.2 km) to the boat ramp at the end of the road. The spring is on the southwest side of the river approximately 700 feet (213.4 m) upstream from the boat ramp.

Description – LAF919972 discharges from between two limestone bedding planes along the base of the riverbank. Algae coat the limestone surrounding the spring vent. The spring was slightly tannic in November 2002, with excellent clarity and a prominent flow. A short spring run flows east and cuts a channel within the limestone that is approximately 1.5 ft (0.5 m) wide, 0.2 ft (0.06 m) deep, and nearly 10 ft (3.1 m) long. The limestone bank directly above the spring is approximately 4 ft (1.2 m) high and is covered with grass, small shrubs, and live oak trees. Discharge on August 19, 1997 measured 3.80 ft^3/sec[(4)].

LAF922975

Figure 137. LAF922975 (photo by D. Hornsby).

Location – Lat. 30° 15’ 40.20” N, Long. 83° 14’ 47.70” W (SE¼ SW¼ SW¼ sec. 32, T. 2 S, R. 11 E). LAF922975 is located 16 miles (25.7 km) west southwest of Live Oak along the west side of the Suwannee River. From the public boat ramp in Dowling Park off CR 136, launch boat and travel approximately 1.9 miles (3.1 km) upriver to the spring on the west bank of the Suwannee River.

Description – LAF922975 emerges from the base of the limestone riverbank into an elongated pool that is 1.5 ft (0.5 m) wide and 2 ft (0.6 m) long. Two small vents feed the pool with prominent boils visible. Depth measures 3.1 ft (1.0 m). The spring pool has a limestone bottom with a thin layer of algae. Fallen tree limbs and debris cover the pool bottom and spring run. The water is blue-green with excellent clarity. The spring run has a limestone bottom and flows 10 ft (3.1 m) southeast into the Suwannee River. The run cuts through the riverbank, possibly running along a limestone fissure. Vertical limestone walls approximately 3 ft (0.9 m) high surround the spring and run. The surrounding environment is a sparse mixed hardwood forest with cypress near the river. Discharge on September 22, 1997 measured 3.58 $ft^3/sec^{(4)}$.

LAF922976

Figure 138. LAF922976 (photo by D. Hornsby).

Location – Lat. 30° 15' 38.06" N, Long. 83° 14' 58.86" W (SW¼ SW¼ SW¼ sec. 32, T. 2 S, R. 11 E). LAF922976 is located 16 miles (25.7 km) west southwest of Live Oak along the west side of the Suwannee River. From the public boat ramp in Dowling Park off CR 136, launch boat and travel approximately 1.6 miles (2.6 km) north (upstream) to the spring on the west bank of the Suwannee River.

Description – LAF922976 has an oval shaped pool measuring 4 ft (1.2 m) wide and 7 ft (2.1 m) long. The vent is a 1.5 ft wide (0.5 m) fracture in the moss-covered limestone on the northwest side of the pool. Depth is 1.9 ft (0.6 m). The bottom of the pool is limestone with a thin algal coating and tree debris. The water is slightly tannic and clear and a prominent boil is visible. The run is approximately 4 ft (1.2 m) deep and 4 ft (1.2 m) wide and flows southeast 5 ft (1.5 m) into the Suwannee River. The bottom is limestone and sand. Massive limestone boulders are situated from 2-6 ft (0.6-1.8 m) above the spring pool. Land along the river near the spring supports a mixed hardwood forest with cypress in low areas along the river. Discharge on September 22, 1997 measured 1.09 ft^3/sec[4].

LAF924971

Location – Lat. 30° 06' 07.96" N, Long. 83° 09' 57.99" W (NW¼ SE¼ SE¼ sec. 25, T. 4 S, R. 11 E). From the intersection of US 27 and SR 51 in Mayo, drive north on SR 51 approximately 3.1 miles (5 km) to the bridge over Suwannee River. Just before the bridge turn east (right) into the public park at the bridge (south side of the river), which has a boat ramp. Launch boat and travel downriver approximately 0.4 miles (0.6 km) to the spring on east side of the river.

Description – LAF924971 flows from a limestone cave 4 ft (1.2 m) high and 12 ft (3.7 m) wide. The cave extends back 8 ft (2.4 m), creating the spring pool. A vent is located in a 6 ft (1.8 m) by 5 ft (1.5 m) depression inside the cave. Depth over the vent measures 5 ft (1.5 m). Additional vents discharge water from beneath rocks in the riverbank. The pool bottom is limestone and sand and the water is clear blue-green. The vents in the riverbank produce a prominent boil; the vent inside the cave has no visible boil. Exposed limestone outside the cave and along the river bank is covered with algae. The spring is surrounded by a dense forest and a 12 ft (3.7 m) limestone bluff rises adjacent to the spring. Discharge on September 24, 1997 measured 12.99 ft^3/sec[4].

LAF929971

Figure 139. LAF929971 (photo by T. Roberts).

Location – Lat. 30° 12' 40.61" N, Long. 83° 14' 43.44" W (NW¼ SE¼ NW¼ sec. 20, T. 3 S, R. 11 E). From the bridge over the Suwannee River in Dowling Park, take CR 250 west approximately 0.7 miles (1.1 km) to the intersection with CR 251. Turn south (left) onto CR 251 and travel approximately 1.5 miles (2.4 km) to the intersection with Sand Pond Road. Turn east (left) onto Sand Pond Road and drive approximately 1.1 miles (1.8 km) to Sims Landing. Launch boat and travel south (downstream) from the boat landing approximately 0.7 miles (1.1 km) to the spring which is on the west bank.

Description – LAF929971 flows from a vent beneath a large limestone boulder. The spring bottom is sand with some exposed limestone. The water is clear green-blue and algae cover most of the spring bottom. A prominent boil is visible at the base of the boulder. The spring flows 5 ft (1.5 m) northwest into the Suwannee River. The banks slope up to 15 ft (4.6 m) above the water surface. Discharge estimated on September 29, 1997 was 5.0 ft^3/sec[(4)]. Land along the river is densely forested with mixed hardwoods.

LAF929972

Location – Lat. 30° 11' 24.34" N, Long. 83° 15' 01.51" W (NE¼ SE¼ SE ¼ sec. 30, T. 3 S, R. 11 E) From the bridge over the Suwannee River in Dowling Park, take CR 250 west approximately 0.7 miles (1.1 km) to the intersection with CR 251. Turn south (left) onto CR 251 and travel approximately 1.5 miles (2.4 km) to the intersection with Sand Pond Road. Turn east (left) onto Sand Pond Road and drive approximately 1.1 miles (1.8 km) to Sims Landing. Launch boat and travel south (downstream) approximately 2.3 miles (3.7 km) to the spring along the west bank of the Suwannee River.

Description – The LAF929972 spring pool measures 8 ft (2.4 m) north to south and 6 ft (1.8 m) east to west with an average depth of 0.5 ft (0.2 m). The vent is located on the west side of the spring pool. The bottom of the spring pool is sand with limestone exposed near the vent. The water is clear. Aquatic vegetation and algae are present in the pool, and collectively cover 20-30% of the bottom of the spring pool. The spring run is very shallow, averaging less than 0.5 ft (0.2 m) in depth and 4 ft (1.2 m) wide. The run is 60 ft (18.3 m) long and enters the Suwannee River from the west. Before entering the river, the run flows under a natural limestone land bridge. This land bridge is only exposed when river levels are low, as was the case during the November 2002 visit. The surrounding the pool rises 12 ft (3.7 m) into a dense mixed hardwood forest. Discharge on September 29, 1997 measured 2.4 ft^3/sec[(4)].

LAF929973

Figure 140. LAF929973 (photo by T. Roberts).

Location – Lat. 30° 10' 48.04" N, Long. 83° 14' 51.87" W (NW¼ NW¼ SW¼ sec. 32, T. 3 S, R. 11 E). LAF929973 is located along the west bank of the Suwannee River 9.7 miles (15.6 km) northwest of Mayo. From the intersection of SR 51 and US 27 in Mayo, drive 8.6 miles (13.8 km) north on SR 51. Turn west (left) on Charles Spring Road and follow to the boat ramp. The spring is on the west side of the river 1.3 miles (2.1 km) upstream from the boat ramp.

Description – LAF929973 is composed of at least eight small vents along the base of a 30 ft (9.1 m) section of limestone riverbank. The vents discharge directly into the Suwannee River. Thick mats of green algae cover the vents. Prominent boils are visible. The spring water is clear and slightly tannic. Higher Suwannee River water levels would obscure the spring vents. The adjacent riverbanks reach a height of approximately 12 ft (3.6 m) directly above the springs. Land along the river is densely forested with mixed hardwoods. Discharge on September 29, 1997 was estimated at 10 ft^3/sec[4].

Perry Spring

Figure 141. Perry Spring (photo by T. Roberts).

Location – Lat. 30° 05' 47.06" N, Long. 83° 11' 17.70" W (sec. 35 (irregular section), T. 4 S., R. 11 E.). Perry Spring is located on private property on the south bank of the Suwannee River approximately 1.3 miles (2.1 km) upriver from the SR 51 bridge over the Suwannee River north of Mayo.

Description – Perry Spring has an oval shaped spring pool measuring 52 ft (15.9 m) north to south and 66 ft (20.1 m) east to west. The vent is located on the southeast side of the pool and water flows from beneath a limestone overhang. Depth to the vent measures 9.5 ft (2.9 m). The bottom of the pool is sand with sparse amounts of algae. The spring water is clear blue-green and no boil is visible. The grass banks surrounding the pool rise approximately 12 ft (3.7 m) above the water's surface and stairs lead down to the spring pool from the adjacent high ground. At the north end of the pool, where the spring meets the Suwannee River, cement bags form a dam. The dam has a hole in the center that allows water to flow out of the pool and into the river. The spring is located on private property and is surrounded by dense forest. Discharge on September 24, 1997 measured 37.8 ft^3/sec[4].

Steinhatchee Spring

Figure 142. Steinhatchee Spring (photo by R. Jones).

Location – Lat. 29° 50' 28.55" N, Long. 83° 18' 29.05" W (SE¼ NW¼ SE¼ sec. 27, T. 7 S, R. 10 E). Steinhatchee Spring is located in a small park 25 miles (40.2 km) southeast of Perry along the Steinhatchee River. From the intersection of US 19/27 and US 98 in Perry, drive approximately 24 miles (38.6 km) southeast on US 19/98. Turn east (left) on South Canal Road and drive 2.9 miles (4.7 km) to the intersection of SR 51. Turn north (left) on SR 51 and travel almost 1 mile (1.6 km) to Camp Grade Road Turn right (east) on Camp Grade Road and follow to the park approximately 0.3 miles (0.5 km).

Description – Steinhatchee Spring discharges into a 3 ft (0.9 m) square spring pool entirely enclosed by brick. A small limestone vent issues clear water from the north side of the pool. Water flows into an adjacent 6 ft (1.8 m) square brick enclosure. The water levels in each pool are 0.6 ft (0.2 m) deep. Brick steps lead down into the larger pool where dark green algae and white sulfur-reducing bacteria grow in places along the sand bottom. There is a hydrogen sulfide odor. A hole in the brick wall allows water to form a run 0.2 ft (0.1 m) deep, 1.5 ft (0.4 m) wide, and 15 ft (4.6 m) long. The run flows southwest into the Steinhatchee River. Steinhatchee Spring is located in small public park, surrounded by a few homes and a hardwood forest.

Unnamed Spring

Location – Lat. 29° 53' 40.41" N, Long. 83° 14' 38.92" W (SW¼ NW¼ NE¼ sec. 8, T. 7 S, R. 11 E). Unnamed Spring is located 11 miles (17.7 km) south southeast of Mayo and flows into the Steinhatchee River. From the intersection of US 27 and SR 51 in Mayo, drive 10.9 miles (17.5 km) south on SR 51. Turn southeast (left) on CR 357 and continue 3.2 miles (5.2 km). Turn north (left) on the first trail after crossing over the Steinhatchee River. The trail parallels the river north for 0.75 miles (1.2 km) and intersects the clear water spring run. The spring is east of the confluence of the spring run and the Steinhatchee River.

Description – Unnamed Spring issues into a clear pool measuring 45 ft (13.7 m) by 20 ft (6.1 m) and approximately 3 ft (0.9 m) deep. Two small boils are visible. The spring bottom is mud with large amounts of detritus. The spring pool contains ferns, aquatic grasses and light brown algae. The run averages 6 ft (1.8 m) wide, 1.5 ft (0.5 m) deep and travels west for approximately 0.28 miles (0.45 km), entering the Steinhatchee River from the west. The spring is surrounded by privately-owned forested floodplain and is utilized by a local hunting club.

LAKE COUNTY

Blackwater Springs

Figure 143. Blackwater Springs (photo by T. Roberts).

Location – Lat. 28° 53' 17.13" N, Long. 81° 29' 50.84" W (SE¼ SW¼ SE¼ sec. 27, T. 18 S, R. 28 E). Blackwater Springs is located within the Seminole State Forest about 12 miles (19.3 km) east of Eustis near the junction of SR 44A and SR 44. The spring is located approximately 1.1 miles (1.8 km) north of the SR 44A bridge over Blackwater Creek.

Description – Blackwater Springs is comprised of seven spring pools. The largest spring discharges into an elongated pool, measuring 95 ft (29 m) long and 80 ft (24.4 m) wide, with an average depth of 12 ft (3.7 m). North of the largest spring pool is a smaller, oval pool 35 ft (10.7 m) long, 20 ft (6.1 m) wide, and 1 ft (0.3 m) deep. All spring pools are filled with detritus and white sulfur-reducing bacteria. There is a hydrogen sulfide odor. The main spring run is 30 ft (9.1 m) wide and 0.8 ft (0.2 m) deep and flows 250 ft (76 m) west into Blackwater Creek. All of the additional runs flow southwest to join the main spring run. Publicly-owned, swampy lowland forest surrounds these springs.

Blue Algae Boil Spring

Figure 144. Blue Algae Boil Spring (FGS photo archives).

Location – Lat. 28º 52' 30.38" N, Long. 81º 26' 26.33" W (NE¼ SW¼ SW¼ sec.32, T.18 S, R.29 E). Blue Algae Boil Spring is located within the Seminole State Forest approximately 1.8 miles (2.9 km) southeast of Cassia off SR 44. The spring flows into Sulphur Run of Blackwater Creek. Permission and driving directions may be obtained from the Seminole State Forest main office in Leesburg.

Description – Blue Algae Boil Spring has a slightly elongated natural spring pool that measures 15 ft. (4.6 m) long, 10 ft. (3.0 m) wide, and 0.4 ft. (0.12 m) deep. During the June 2003 visit, no vent was visible due to the large amount of organic material, including dark bluish-green algae, covering the spring bottom. The water is clear with a slight hydrogen sulfide odor. The spring run measures 5 ft (1.5 m) wide, 0.3 ft (0.06 m) deep and flows 75 ft (22.9 m) south, joining Sulphur Run from the east. The area surrounding the spring is publicly-owned, hardwood forest with palmetto understory.

Blueberry Spring

Figure 145. Blueberry Spring (photo by T. Roberts).

Location – Lat. 28° 51' 02.64" N, Long. 81° 26' 41.48" W (NE¼ NE¼ SE¼ sec. 7, T. 19 S, R. 29 E). Blueberry Spring is located 7 miles (11.3 km) west of Sanford within the Seminole State Forest. Permission and driving directions may be obtained from the Seminole State Forest main office in Leesburg.

Description – Blueberry Spring has a circular pool 5 ft (1.5 m) in diameter, with a small sand boil. Depth is 0.2 ft (0.1 m). A thin layer of white sulfur-reducing bacteria coats the leaves and organic debris covering the pool bottom. The water is clear. There is a hydrogen sulfide odor. A spring run 5 ft (1.5 m) wide and 0.3 ft (0.1 m) deep meanders east into Blackwater Creek. To the west, a forested hillside slopes 10 ft (3.1 m) up towards the State Forest road. The spring is surrounded by public land.

Boulder Springs

Figure 146. Boulder Springs (FGS photo archives).

Location – Lat. 28° 52' 17.97" N, Long. 81° 27' 00.36" W (NW¼ NW¼ NE¼ sec. 6, T. 19 S, R. 29 E). Boulder Spring is located approximately 7 miles (11.3 km) west of Sanford within the Seminole State Forest. Permission and driving directions may be obtained from the Seminole State Forest main office in Leesburg.

Description – Boulder Spring is a collection of four small vents issuing clear water from limestone at the base of a hillside. Large angular boulders covered with green moss are in the spring pool and the spring run. The run is 0.3 miles (0.5 km) long, 10 ft (3.1 m) wide, 0.3 ft (0.1 m) deep, and flows northwest into Sulphur Run. The area around the spring slopes steeply up a forested hill known as Sulphur Island. Multiple springs are located around the perimeter of this "island". The spring is surrounded by public land.

Camp Le No Che Spring

Figure 147. Camp Le No Che Spring (photo by SJRWMD).

Location – Lat. 28° 57' 08.72" N, Long. 81° 32' 31.88" W (NW¼ NW¼ SW¼ sec. 5, T. 18 S, R. 28 E). Camp Le No Che Spring is located 8 miles (12.9 km) east of Altoona within the Boy Scouts of America Camp Le No Che. From the Junction of SR 19 and CR 42 in Altoona, travel east on CR 42 approximately 7.1 miles (11.4 km) to the intersection with Boy Scout Road. Turn south (right) onto Boy Scout Road and travel to the entrance of Camp Le No Che approximately 1.6 miles (2.6 km). Permission must be obtained from the camp office.

Description – Camp Le No Che Spring has a circular, shallow pool measuring 25 ft (7.6 m) in diameter. Spring water issues from a small crevice in the limestone that is covered with sand and debris. Depth measures 1 ft (0.3 m). Detritus, green algae, and white sulfur-reducing bacteria cover the pool bottom. A very strong hydrogen sulfide odor comes from the spring and a prominent boil is visible on the east side of the pool. The spring run flows 200 ft (61 m) southeast into Lake Norris. The run is 15 ft (4.6 m) wide, and 0.8 ft (0.2 m) deep. The spring pool is ringed with cypress knees and the surrounding hardwood and palm forest is fairly dense. An average discharge of 0.75 ft^3/s was measured in January 1997 [6].

Droty Spring

Figure 148. Droty Spring (FGS photo archives).

Location – Lat. 28° 49' 41.04" N, Long. 81° 30' 37.30" W (NW¼ NW¼ NW¼ sec. 22, T. 19 S, R. 28 E). Droty Spring is located 10 miles (16.1 km) east of Eustis within the Seminole State Forest. From the intersection with SR 19 in Eustis, drive 9.3 miles (15 km) east on SR 44. Turn south (right) on CR 46 A and travel approximately 2.3 miles (3.7 km). The spring is 150 ft (45.7 m) north of the road.

Description – Droty Spring issues clear water from a sandy, circular vent at the base of a 10 ft (3.1 m) deep ravine. The meandering spring run is 4 ft (1.2 m) wide, 500 ft (152.4 m) long, and flows northeast into Seminole Creek. The spring run is sand with dark green algae and tree debris throughout. The private land surrounding the spring is thickly foliated with oaks, pines, banana trees, and palms.

Green Algae Boil Spring

Location – Lat. 28° 52' 32.88" N, Long. 81° 26' 24.73" W (NE¼ SW¼ SW¼ sec. 32, T. 18 S, R. 29 E). Green Algae Boil Spring is located within the Seminole State Forest approximately 1.8 miles (2.9 km) southeast of Cassia off SR 44. Green Algae Boil Spring is located adjacent to Blue Algae Boil Spring. The spring flows into Sulphur Run of Blackwater Creek. Permission and driving directions may be obtained from the Seminole State Forest main office in Leesburg.

Description – Green Algae Boil Spring has a circular pool 25 ft (7.6 m) in diameter and 0.4 ft (0.1 m) deep. During the June 2003 visit, there was no vent visible due to the large amount of organic material covering the spring bottom. The water is clear with a slight hydrogen sulfide odor. The spring run is approximately 6 ft (1.8 m) wide, 0.3 ft (0.1 m) deep and flows south 150 ft (45.7 m) to Sulphur Run. The public land surrounding the spring is a hardwood forest with palmetto understory.

Holiday Spring

Figure 149. Holiday Spring (photo by SJRWMD).

Location – Lat. 28° 44’ 25.45” N, Long. 81° 49’ 04.69” W (SE¼ SW¼ SW¼ sec. 16, T. 20 S., R. 25 E). Holiday Spring is located on private land 6 miles (9.7 km) southeast of Leesburg. From the intersection with SR 44 in Leesburg, drive 3.9 miles (6.3 km) south on SR 25. Turn east (left) on CR 48 and drive 3.7 miles (6 km). Turn north (left) on Robertson Road and travel 450 feet (137.2 m). The spring is in a wooded area on the east side of the road.

Description – Holiday Springs is situated in a small ravine and forms a circular spring pool 5 ft (1.5 m) in diameter. A small sand-filled cavity 2 ft (0.6 m) below the water surface runs horizontally into a gently-sloping hillside to the south. The spring run is 2.5 ft (0.7 m) wide, 0.3 ft (0.1 m) deep, and has many small sand boils. It meanders 0.2 miles (0.3 km) north through a hardwood forest into Lake Harris. The spring is sometimes used to fill a private swimming pool. The average discharge between 1991 and 1999 was 3.42 ft^3/s [6]. The spring is surrounded by private land.

Lake Blue Spring

Location – Lat. 28° 44' 55.14" N, Long. 81° 49' 40.11" W (NW¼ SW¼ NE¼ sec. 17, T. 20 S., R. 25 E.). Lake Blue Spring is located on private land 4.5 miles (7.2 km) southeast of the city of Leesburg. The spring is within "The Springs" residential community on the south side of Lake Harris. It is not publicly accessible.

Description – Lake Blue Spring is surrounded by a concrete retaining wall that forms a residential swimming pool. The pool is L-shaped with a deep end of 5.7 ft (1.7 m) and a shallow end of 3.4 ft (1.0 m). A series of at least nine sandy boils feed the pool. The pool bottom is sand with sparse algae. The spring run is 28 ft (8.5 m) wide and 2 ft (0.6 m) deep with tree debris and some algae along the sand bottom. The spring run flows 100 ft (30.5 m) east and enters the south side of Lake Harris. Sparse palmettos, sable palms, and oak trees surround the spring pool. The spring is used as a swimming area for local residents. The average discharge measurement during the period of 1991-99 was 2.25 ft^3/s [6]. The spring is surrounded by private land.

Markee Spring

Figure 150. Markee Spring (photo by SJRWMD).

Location – Lat. 28° 52'14.15" N, Long. 81° 27' 09.83" W (SW¼ NE¼ NW¼ sec. 6, T. 19 S, R. 29 E). Markee Spring is located within Seminole State Forest approximately 1.5 miles (2.4 km) southeast of Cassia off SR 44 along Sulphur Run. Access to this spring is limited and permission must be obtained from the Seminole State Forest offices in Leesburg.

Description – Markee Spring, also known as Mud Stone Spring, has an oval-shaped pool 22 ft (6.7 m) long and 10 ft (3.1 m) wide. Depth measures 2.1 ft (0.6 m). There is a slight cone-like depression at the center of the pool. The vent is not discernable due to mud, leaves, and organic debris covering the pool bottom. The water is tannic but clear. No aquatic vegetation or algae are present and no boil is visible. The run is 500 ft long (157.4 m), 10 ft (3.1 m) wide and 1 ft (0.3 m) deep. It splits and meanders as it flows north into the surrounding floodplain and ultimately into the Sulphur Run. Like the spring pool, its bottom is covered with mud and an abundance of debris. The area surrounding the spring is a publicly-owned lowland hardwood forest.

Moccasin Spring

Figure 151. Moccasin Spring (FGS photo archives).

Location – Lat. 28° 51’ 08.21” N, Long. 81° 26’ 34.46” W (NW¼ NW¼ SW¼ sec. 8 T. 19 S, R. 29 E). Moccasin Spring is located within the Seminole State Forest approximately 7 miles (11.3 km) west of Sanford. The spring is located along Seminole Creek and permission to visit the spring can be obtained from the Seminole State Forest main offices in Leesburg.

Description – Moccasin Spring forms a pool of clear water 40 ft (12.2 m) long, 30 ft (9.1 m) wide, and 3 ft (0.9 m) deep. The pebble strewn vent is roughly 1 ft (0.3 m) in diameter. The pool bottom is sand and a prominent boil is visible. Abundant detritus is in and around the spring pool and run. The run is approximately 9 ft (2.7 m) wide, 1 ft (0.3 m) deep, and flows east into Blackwater Creek. The surrounding environment is heavily forested with hardwoods, palms, and palmettos. Nearby is a camping area for visitors of the Seminole State Forest. The discharge of Moccasin Spring is 0.29 ft^3/s [(6)]. It is surrounded by public land.

Mooring Cove Spring

Figure 152. Mooring Cove Spring (photo by T. Roberts).

Location – Lat. 28° 45' 00.42" N, Long. 81° 50' 01.23" W (NE¼ SW¼ NW¼ sec. 17 T. 20 S, R. 25 E). Mooring Cove Spring is located on private land within the Lake and Springs Estate, 6 miles (9.7 km) southeast of Leesburg. The area is currently under development.

Description – Mooring Cove Spring has a circular spring pool 200 ft (61 m) in diameter and 4.5 ft (1.4 m) deep. Clear water issues from a few small sand boils in the algae-covered bottom. During the April 2003 visit, a mass of floating green algae nearly covered the spring pool's surface. Concrete steps lead down a steep grass bank to the spring. The spring run is 3.5 ft (1.1 m) wide, 0.6 ft (0.1 m) deep, and flows north approximately 170 ft (51.8 m) into a man-made canal that feeds into Lake Harris from the south. The spring is surrounded by private land.

Mosquito Spring

Figure 153. Mosquito Spring (photo by A. Willet).

Location – Lat. 29° 02' 11.33" N, Long. 81° 26' 04.99" W (NE¼ NE¼ SW¼ sec. 37, T. 17 S, R. 29 E). Mosquito Spring is located within the Ocala National Forest approximately 8 miles (12.9 km) west of Deland. From the SR 44 bridge over the St. Johns River, drive west on SR 44 approximately 0.3 miles (0.5 km) to the junction with SR 42. Turn north (right) onto SR 42 and drive approximately 0.3 miles (0.5 km) to the junction with Crow's Bluff Road. Turn east (right) onto Crow's Bluff Road and travel approximately 0.2 miles (0.3 km) to the boat landing on the St. Johns River. Launch boat and travel north (downriver) approximately 5.6 miles (9 km). The spring run enters the St. Johns River from the west near Deadman's Bend.

Description – Mosquito Spring discharges into an elongated pool 22 ft (6.7 m) long, 12 ft (3.6 m) wide, and 2 ft (0.6 m) deep. Two limestone vents issue clear water creating separate boils at the surface. Dark green algae intermingle with white sulfur-reducing bacteria along the pool bottom, where fossil shell fragments can be found. There is a hydrogen sulfide odor. There are two smaller sand boils downstream and one upstream of the spring pool. A run 4 ft (1.2 m) wide, 0.8 ft (0.2 m) deep, and 0.5 miles (0.8 km) long flows northeast into the St. Johns River. The ravine around the pool and run slopes upward 8 ft (2.4 m) into a hardwood forest. It is surrounded by public land.

Palm Spring

Figure 154. Palm Spring (photo by T. Roberts).

Location – Lat. 28° 50’ 37.58” N, Long. 81° 27’ 00.34” W (NE¼ NW¼ NE¼ sec. 18, T. 19 S, R. 29 E). Palm Spring is located within the Seminole State Forest 7 miles (11.3 km) west of Sanford. The spring flows into Blackwater Creek. Permission to visit this spring may be obtained by visiting the Seminole State Forest offices in Leesburg.

Description – Palm Spring has no spring pool; it is composed of five or six sand boils that flow from different points into one run. Water is clear and there is white sulphur-reducing bacteria surrounding the entire area. The spring has a strong hydrogen sulfide odor. The multiple boils form a run that is 4.5 ft (1.4 m) wide, 0.3 ft (0.1 m) deep, and flows east for 0.3 miles (0.5 km) into Blackwater Creek. The run has a sand bottom covered in a thin layer of dark brown mud and various colored algae. For decades this spring was dammed into a lake; however recently the dam was removed and the once-submerged terrain is now exposed. As the ecology in the area changes, new grass and shrubs are growing in areas that were once underwater. The surrounding publicly-owned land is a dense forest filled with an array of trees, including sweet gums and palms. High ground rises 6 ft (1.8 m) above the spring.

Sandy's Spring

Figure 155. Sandy's Spring (photo by SJRWMD).

Location – Lat. 28° 44' 42.11" N, Long. 81° 48' 35.95" W (NE¼ NW¼ SE¼ sec. 16, T. 20 S, R. 25 E). Sandy's Spring is located behind a private residence 6 miles (9.7 km) southeast of Leesburg. The spring run flows into Lake Harris from the south approximately 0.2 miles (0.3 km) west of the intersection of Yalaha Cutoff and Lakeshore Drive, within the community of Yalaha.

Description – Sandy's Spring pool is oval-shaped measuring 18 ft (5.5 m) long, 7 ft (2.1 m) wide, and 4 ft (1.2 m) deep. The pool has a mud bottom with tree debris and other detritus. The cloudy water is tinted greenish-brown. The spring run is 2 ft (0.6 m) deep, 3 ft (0.9 m) wide, and approximately 150 ft (45.7 m) long. The run, which is 1 ft (0.3 m) deep, has a bottom similar to that of the spring pool. It flows in a northwestern direction, meanders to the northeast, flows under Lakeshore Drive, and empties into Lake Harris. The ground slopes down 2 ft (0.6 m) to meet the surface of the spring pool. A grassy area surrounds the spring pool, while the run is bordered by dense palmettos and cypress trees. A private residence lies 50 ft (15.2 m) to the north of the spring pool and private property surrounds the spring and run.

Sharks Tooth Spring

Figure 156. Sharks Tooth Spring (photo by T. Roberts).

Location – Lat. 28° 52' 23.73" N, Long. 81° 26' 24.10" W (SE¼ SW¼ SW¼ sec. 32, T 18 S, R. 29 E). Sharks Tooth Spring is located within the Seminole State Forest 7.0 miles (11.3 km) west of Sanford. Permission to visit and directions may be obtained from the Seminole State Forest main offices in Leesburg.

Description – Sharks Tooth Spring begins at the base of a hillside and flows from weathered limestone and clay. Clear spring water creates a run 2 ft (0.6 m) wide and 0.2 ft (0.1 m) deep that flows northeast 800 ft (243.8 m) into Sulphur Run. The run has a sand and pebble bottom. A hardwood forest with hiking and equestrian trails surrounds the spring. There is also a primitive campsite nearby. It is within publicly owned land.

Snail Springs

Figure 157. Snail Springs (photo by SJRWMD).

Location – Lat. 28° 49’ 25.84” N, Long. 81° 29’ 11.32” W (NE¼ SE¼ NW¼ sec. 23, T. 19 S, R. 28 E). Snail Springs are located in the Seminole State Forest about 7 miles (11.3 km) west of Sanford on SR 46A. Permission to visit and directions can be obtained from the Seminole State Forest main office in Leesburg.

Description – Snail Springs consists of three separate springs. The largest spring pool is 12 ft (3.7 m) in diameter and 0.2 ft (0.1 m) deep. Clear water issues from eight sand boils within the pool; the largest of which is 4 ft (1.2 m) in diameter. The main spring run which is 8 ft (2.4 m) wide and 0.2 ft (0.1 m) deep, flows northwest 0.6 miles (1.0 km) into Seminole Creek. The subsequent springs feed this run. The second spring creates a narrow run filled with small sand boils and flows north 65 ft (19.8 m) to the main spring run. The third spring pool is 8 ft (2.4 m) long, 6 ft (1.8 m) wide, and 0.3 ft (0.1 m) deep. Clear water flows from a 1 ft (0.3 m) diameter pipe creating a prominent boil. The two latter springs have a strong hydrogen sulfide odor and white sulfur-reducing bacteria in the water. Hardwood forest surrounds the spring, except for a small clearing to the south with an abandoned homestead. It is surrounded by public land.

Sun Eden Spring

Figure 158. Sun Eden Spring (photo by T. Roberts).

Location – Lat. 28° 44’ 39.98” N, Long. 81° 49’ 11.60” W (sec. 16 (irregular section), T. 20 S, R. 25 E). Sun Eden Spring is located within a private residential area 5.5 miles (8.9 km) southeast of Leesburg on the south side of Lake Harris. The springhead is approximately 300 ft (91.4 m) southwest of the intersection of Lakeside Drive and Orange Avenue in Yalaha.

Description – Sun Eden Spring is comprised of several small sand boils in an oval-shaped spring pool which measures 66 ft (20.1 m) wide and 75 ft (22.9 m) long. Maximum depth is 3.0 ft (0.9 m). The spring pool has a sand bottom with sparse amounts of algae and a thin film of dark organic matter. Water clarity is excellent; however, the surface of the spring pool is covered in a thin layer of algae. The spring run flows west, is diverted under a road, and empties on the other side via a large pipe. The run is impounded by a 2 ft (0.6 m) high retaining wall for almost its entire length. The run is 400 ft (121.9 m) long, 3 ft (0.9 m) wide, and 0.4 ft (0.1 m) deep. The run flows into another man-made channel and travels 0.3 miles (0.5 km) into Lake Harris. The bottom of the spring run is sand and is covered with some leaf debris. Around the spring pool, the land gently rises to 1 ft (0.3 m) above the water surface. The spring is surrounded by a private residential area. The nearest house is 50 ft (15.2 m) to the north and Lake Harris is just beyond another 550 ft (167.6 m). A grass lawn with one palm tree and a few small shrubs and sweet gums surround the spring pool

LEVY COUNTY

Big King Spring

Location – Lat. 29? 06’ 59.12” N., Long. 82? 38’ 32.14” W. (SW¼ NW¼ SE¼ sec. 1, T. 16 S., R. 16 E.). Big King Spring is located on private land 5.5 miles (8.9 km) north of Inglis. It is adjacent to and on the northwest side of the Caruth Sherriff’s Youth Camp property and is not publicly accessible.

Description – Big King Spring pool measures 75 ft (22.9 m) north to south and 45 ft (13.7 m) east to west with an estimated depth of 8 ft (2.4 m). Three small boils with 5 -8 ft (1.5 m – 2.4 m) long rivulets emerge from limestone cracks at the base of a sand hill on the east side of the spring pool. Another small vent with a visible boil issues from the pool center. The spring pool was tannic during the August 2003 visit though water flowing from the spring vents was clear. This wild spring sits in a dense hardwood lowland forest with sand hills rising to 8 ft (2.4 m) on the east side of the spring pool. Flow from Big King and Little King Springs flow through the Gulf Hammock region of the Big Bend into the Gulf of Mexico, in or near Withlacoochee Bay. Other names for this spring are Big Spring or King Spring. This spring is surrounded by private property.

Lancaster Spring (LEV97991)

Figure 159. Lancaster Spring (photo by A. Willet).

Location – Lat. 29º 11' 26.52" N, Long. 82º 59' 17.42" W (SE¼ SE¼ NE¼ sec.10, T. 15 S, R. 13 E). Lancaster Spring, also referred to as LEV97991 (Hornsby and Ceryak, 1998), is located in the Waccasassa Bay State Preserve 4.5 miles (7.2 km) northeast of Cedar Key. This spring forms the headwaters of Spring Creek, which flows into the Gulf of Mexico. It can be accessed by boat.

Description – Lancaster Spring discharges into an elongated pool measuring 90 ft (27.4 m) by 45 ft (13.7 m) with a depth of 8 ft (2.4 m). There were no vents visible during the June 2003 visit but a park official reported that vents are located on the north side and center of the pool area. A slight boil is visible at the pool center. The water is clear with a hydrogen sulfide odor and there are copper-colored stains on the bank and trees surrounding the spring. The spring run is 10 ft (3.1 m) wide, 1 ft (0.3 m) deep and flows south for approximately 500 ft (152.4 m), where it forms the headwaters of Spring Creek. The spring and run are tidally influenced and can become totally submerged. The area adjacent to the spring is a cedar and palm hammock surrounded by marsh grasses. The spring is surrounded by public land. Discharge on September 7, 1999 was estimated at 5 ft^3/sec[(4)].

LEV719991

Figure 160 – LEV 719991 (photo by D. Hornsby).

Location – Lat. 29° 27' 03.70" N, Long. 82º 41' 43.32" W (SE¼ NW¼ SE¼ sec. 10, T. 12 S, R. 16 E). LEV719991 is located near Levy Blue Spring approximately 3.5 miles (5.6 km) west of Bronson in a county park. From the US Alt 27 and SR 24 intersection in Bronson, travel 2.3 miles (3.7 km) northwest on US Alt 27 to CR 339A. Turn west then southwest (left) on CR 339A (NE 94th Place or Blue Springs Road) and follow the road 2 miles (3.2 km) down to the park. LEV719991 is located approximately 0.2 miles (0.3 km) due east of Levy Blue Spring.

Description – LEV719991 has a circular spring pool 65 ft (19.8 m) in diameter and 12 ft (3.7 m) deep. Brown algae and detritus litter the mud bottom. The water is bluish and cloudy and the pool is encircled by lily pads and other aquatic vegetation. A slight boil forms in the middle of the pool. A wooden dock extends halfway over the pool. The spring run is 10 ft (3.1 m) wide, 0.7 ft (0.2 m) deep and flows west 800 ft (243.8 m) into Blue Spring Run. Forested lowlands surround the spring. Discharge on July 19, 1999 was estimated at 15 ft^3/sec[4].

Little Fanning Spring

Figure 161. Little Fanning Spring (photo by D. Hornsby).

Location – Lat. 29° 35’ 11.03” N, Long. 82° 56’ 07.69” W (NW¼ SE¼ NW¼ sec. 29, T. 10 S, R. 14 E). This spring is located near the town of Fanning Springs, in Fanning Springs State Park. The park entrance is located on the east side of the Suwannee River on US19/alt 27/98. It is approximately 0.2 miles (0.3 km) east of the bridge over the Suwannee River. Little Fanning Spring is located approximately 0.1 miles (0.2 km) south of Fanning Spring.

Description – Little Fanning Spring was not flowing during the December 2002 visit. The spring pool measures 75 ft (22.9 m) east to west and 25 ft (7.6 m) north to south and is 2 ft (0.6 m) deep. Exposed limestone on the northeastern side of the pool may signify the location of the spring vent. The pool bottom is almost completely covered with algae and aquatic vegetation is present. The water is tinted green. The 350 ft (106.7 m) long spring run is completely covered by aquatic vegetation. The banks rise 4 ft (1.2 m) above the surface of the spring into mixed hardwood forest. The spring is located within Fanning Springs State Recreation Area, a popular swimming area with picnic pavilions, restrooms, and concessions. The larger Fanning Springs, the focal point of this recreation area, is located 400 ft (121.9 m) to the north. Discharge on August 18, 1997 measured 14.25 ft^3/sec[(4)].

Little King Spring

Figure 162. Little King Spring (photo by Springs Fever).

Location – Lat. 29° 06' 39.05" N., Long. 82° 38' 52.14" W. (NW¼ NE¼ NW¼ sec. 12, T. 16 S., R. 16 E.). Little King Spring is located within a dense hardwood swamp on the western side of Caruth Camp, a Sherriff's Youth Ranch. The property is on the west side of US 19/98 approximately 5 miles (8.1 km) north of Inglis. Permission to visit this spring must be obtained from the camp office.

Description – Little King Spring sits in a low banked bowl-shaped depression surrounded by a wooden boardwalk. The spring pool is approximately 35 ft (10.7 m) in diameter. There are two vents, one east and one on the west side of the pool with estimated depths of 15 to 20 ft (4.6 to 6.1 m). Limestone is present near each of the vents. The spring was tannic during the August 2003 visit but is reported to flow clear during drier times. The run averages 2 ft (0.6 m) deep and 10 ft (3.1 m) wide and flows west through the swamp, eventually reaching the Gulf of Mexico in or near Withlacoochee Bay. Wooden bleachers are built on the east side of the spring for presentations. This spring is also known as Caruth Spring or Little Spring. The spring is surrounded by the Florida Sheriff's Youth Ranch.

Wekiva Springs

Figure 163. Wekiva Spring (photo by A. Willet).

Location – Lat. 29° 16' 49.49" N, Long. 82° 39' 21.90" W (NW¼ NW¼ SW¼ sec. 7, T. 14 S, R. 17 E). Wekiva Springs are located 2 miles (3.2 km) east of the intersection of CR 343 and SR 326, approximately 11 miles (17.7 km) south of Bronson, adjacent to Goethe State Forest. The springs are located on private property.

Description –Wekiva Springs consists of three irregularly shaped pools in a complex of limestone solution cavities. The southern-most pool contains the main spring vent and measures 120 ft (36.6 m) by 60 ft (18.3 m) with a reported depth of 30 ft (9.1 m). Boils are visible at the northeast and southwest sides of the pool. The elongated pool 120 ft (36.6 m) northeast of the main pool measures 40 ft (12.2 m) by 20 ft (6.1 m) and is 8 ft (2.4 m) deep. Two small vents with small boils are observed at the north and south sides of the second pool. The third pool area is 75 ft (22.9 m) north of the main pool. It is 60 ft (18.3 m) by 80 ft (24.4 m) and contains several large boils. There are also several boils present in the run between the main spring vent and the third pool area. The water is clear and bluish. Along the southern side of the pool, a man-made stone wall containing a water wheel partially separates the pool from the spring run. All of the pools are connected by open channels in the limestone and combine to form the headwaters of the Wekiva River. The spring run is approximately 70 ft (21.3 m) long. The Wekiva River flows approximately 7 miles (11.3 km) southwest into the Waccasassa River. The privately-owned area surrounding the spring has a manicured lawn and trees. Discharge on July 30th 1997 was 26.28 ft^3/s [4].

MADISON COUNTY

Fara Spring (MAD922977)

Location – Lat. 30° 16' 34.44" N, Long. 83° 14' 08.95" W (SW¼ SE¼ SE¼ sec. 29, T. 2 S, R. 11 E). From the Dowling Park boat ramp on the Suwannee River, the spring is approximately 3.5 miles (5.6 km) north (upriver) along the west bank.

Description – The Fara Spring (also known as MAD922977) pool measures 8 ft (2.4 m) east to west and 15 ft (4.6 m) north to south. Water flows from a semi-circular gap in the exposed limestone on the northwest side of the pool. The pool bottom is sand with a few exposed rocks. The spring water is clear blue and there is a slight boil on the water surface. Sparse aquatic vegetation and algae are present in the spring pool. The run is 5 ft (1.5 m) long, 3 ft (0.9 m) wide and 1 ft (0.3 m) deep with a limestone bottom. Banks surrounding the spring pool slope up to 15 ft (4.6 m) above the spring pool. Exposed limestone near the vent rises 4 ft (1.2 m) above the water surface. This spring is surrounded by private property. Discharge on September 22, 1997 measured 10.43 ft^3/sec[4].

MAD610981

Figure 164. MAD 610981 (photo by A. Willet).

Location – Lat. 30° 24’ 53.86” N, Long. 83° 12’ 05.32” W (SE¼ SE¼ NE¼ sec. 10, T. 1 S, R. 11 E). MAD610981 is located 3.2 miles (5.2 km) upriver from the Suwannee River State Park on the Withlacoochee River. Private property surrounds this spring.

Description – MAD610981 was completely inundated by the Withlacoochee River during the June 2003 visit. The muddy, tannic river water transformed this spring into a cove 70 ft (21.3 m) long, 30 ft (9.1 m) wide, and 8 ft (2.4 m) deep. Near the end of the inlet is a prominent boil 5 ft (1.5 m) in diameter with limestone exposed around the water’s edge. The ground slopes steeply upward 30 ft (9.1 m) and levels off into a privately-owned hardwood forest. The discharge of this spring measured 5.84 ft^3/s[(4)] on June 10, 1998.

MAD612982

Location – Lat. 30° 28’ 21.93” N, Long. 83° 14’ 36.31” W (SE¼ SE¼ NW¼ sec. 19, T. 1 N, R. 11 E). MAD612982 is located approximately 1.4 miles (2.3 km) north of the CR 141 bridge over the Withlacoochee River. The spring flows in from the west bank and is located just below a power line.

Description – MAD612982 is a multiple spring vent system with at least three vents discharging from the bottom of a limestone bluff approximately 18 ft (5.5 m) high. Hornsby and Ceryak (1998) reported nine discharge points at this spring. The vents range from 2-12 ft (0.6-3.7 m) wide and depths range from 0.5 to 2.8 ft (0.1-0.9 m). Several boils are visible. The water color is light blue with excellent clarity. A moderate amount of blue-green algae covers the spring vents and runs. The spring runs flow southeast 3-4 ft (0.9-1.2 m) into the Withlacoochee River. The spring is surrounded by ferns, moss, live oaks, and pines and is on private land. Discharge on June 12, 1998 was estimated at 15 ft^3/sec[(4)].

MANATEE COUNTY

Manatee Mineral Spring

Figure 165 – Manatee Mineral Spring (photo by R. Means).

Location – Lat. 27° 29' 51.41" N, Long. 82° 32' 57.04" W (NW¼ SE¼ NE¼ sec. 25, T. 34 S, R. 17 E). From the junction of US 41 and Manatee Avenue in Bradenton, head east on Manatee Avenue approximately 0.9 miles (1.4 km) to the intersection with 14th Street. Turn north (left) onto 14th Street and drive approximately 0.2 miles (0.3 km) and the spring will be on the west (left) side of the street.

Description – Manatee Mineral Spring has been extensively altered since the 1940s and the spring pool is currently beneath a 5 ft (1.5 m) diameter concrete slab. Under the concrete slab, the spring is ringed by a concrete retaining wall. This historic mineral spring flows northward entering the Manatee River from the south. The flow has been diverted into the neighborhood storm water drainage system. The spring was recently a city park and playground equipment still remains. The Manatee River is visible through private yards 650 ft (198.1 m) to the north. The new owners plan to restore the spring to its historic condition. A state historical marker is located at the spring.

MARION COUNTY

Camp Seminole Spring

Location – Lat. 29° 30’ 21.79” N, Long. 81° 57’ 05.23” W (NW¼ NW¼ SE¼ sec. 25, T. 11 S, R. 23 E). Camp Seminole Spring is located on private property 0.75 miles (1.2 km) west of Orange Springs off of CR 21.

Description – Camp Seminole Spring has been altered into a heart-shaped concrete pool 90 ft (27.4 m) wide, 114 ft (34.8 m) long, and 3 ft (0.9 m) deep. Clear water issues from a 4 ft (1.2 m) wide sand boil located next to a wooden dock on the west side of the pool. Green algae grows in the spring pool. Adjacent to the pool is a working gristmill which marks the head of the spring run. The run is 5 ft (1.5 m) wide, 0.6 ft (0.2 m) deep, and flows 0.2 miles (0.3 km) north into Orange Creek. The original owners created a resort for honeymooners. The current owners use this property as a Girl Scout camp. The average discharge for 2000 was 0.79 ft^3/s [(6)].

Indian Creek Springs Group

At least four springs form the 0.4 miles (0.6 km) long Indian Creek, which enters the east side of the Rainbow River directly across from Cave Spring. During the April 2003 visit, we were unable to locate Indian Creek Spring No. 1, but SWFWMD has a GPS coordinate for this spring (Lat. 29° 05’ 35.91” N, Long. 82° 25’ 06.35” W). The lowland forest was entirely flooded during April 2003, which prevented locating this spring. Indian Creek Springs Numbers 1-4 formerly were named Rainbow Swamp Springs Nos. 1-4**.** The land surrounding these springs is state-owned.

Indian Creek Spring No. 2

Location – Lat. 29° 05’ 35.59” N, Long. 82° 25’ 15.84” W (NE¼ SE¼ NE¼ sec. 18, T. 16 S, R. 19 E). Indian Creek Spring No. 2 is 85 ft (25.9 m) northeast of Indian Creek Spring No. 4, up a narrow, small spring run. It is in a widened area of the Indian Creek channel.

Description – Indian Creek Spring No. 2 discharges from two connected conical depressions in a widened area of the Indian Creek channel. Each depression is only about 6 ft (1.8 m) in diameter with a maximum depth of 4.2 ft (1.3 m). The 35 ft (10.7 m) diameter spring pool is shallow with a sand bottom and is surrounded by a dense swamp forest. The water flows clear but slightly brown. Indian Creek narrows and continues upstream from this spring, presumably to Indian Creek No. 1 but during the April 2003 the forest upstream was completely flooded. Downstream, the run flows with an average depth of 1.5 ft (0.5 m) and a width of 5 ft (1.5 m) to Indian Creek Spring No. 4.

Figure 166. Indian Creek Springs Group, Indian Creek Spring No. 2 (photo by R. Means).

Indian Creek Spring No. 3

Location – Lat. 29° 05’ 34.64” N, Long. 82° 25’ 15.21” W (NE¼ SE¼ NE¼ sec. 18, T. 16 S, R. 19 E). Indian Creek Spring No. 3 sits in a large cove that drains into the west side of Indian Creek just downstream of where it narrows and flows over Indian Creek Spring No. 4 and No. 2.

Description – Indian Creek Spring No. 3 sits in a circular depression 35 ft (10.7 m) in diameter. Maximum depth is 10.2 ft (3.1 m). The bottom surrounding the vent is sand with fallen logs but detritus covers the rest of the pool. Clear, blue water issues with enough force to create a small boil over the center of the vent. The spring is surrounded by a dense, lowland forest. The short spring run flows 40 ft (12.2 m) west into Indian Creek Spring No. 4 spring pool.

Indian Creek Spring No. 4

Figure 167. Indian Creek Springs Group, Indian Creek Spring No. 4 (photo by R. Means).

Location – Lat. 29° 05' 34.82" N, Long. 82° 25' 16.23" W (NE¼ SE¼ NE¼ sec. 18, T. 16 S, R. 19 E). Indian Creek Spring No. 4 is located at the top of the main channel of Indian Creek where the stream appears to split. Indian Creek Spring No. 3 flows in from the east side and Indian Creek Spring No. 4 is located in a pool to the west. The spring is easily identified by a staff gauge on the northeast side of the spring pool.

Description – Indian Creek Spring No. 4 discharges into a circular bowl-shaped depression 80 ft (24.4 m) in diameter. The spring issues from a 15.5 ft (4.7 m) deep sand vent strewn with limestone boulders. Filamentous algae and detritus coat the pool bottom. During the April 2003 visit, very little flow was discharging and no boil was visible. The spring is surrounded by a dense, lowland forest. A much narrower Indian Creek, with yellowish-green water, flows from the northeast. To the south, Indian Creek Spring No. 4 combines with the flow from Indian Creek Spring No. 3 and travels 0.4 miles (0.6 km) southwest to the Rainbow River.

Morman Branch Spring

Figure 168. Morman Branch Spring (photo by A. Willet).

Location – Lat. 29° 11’ 32.83” N, Long. 81° 39’ 27.87” W (F.M. Arredondo Grant sec. 37, T. 14 S, R. 27 E). Morman Branch Spring is located approximately 4 miles (6.4 km) south of Silver Glen Spring in the Ocala National Forest off of SR 19. From the junction of SR 40 and SR 19 head north on SR 19 approximately 1.8 miles (2.9 km) to where Morman Branch passes under the road. The spring is located approximately 0.2 miles (0.3 km) west (upstream) of SR 19.

Description – Morman Branch Spring consists of many seeps and sand boils. Clear water also issues from a small root filled vent at the base of a tree. The spring run is 0.4 ft (0.1 m) deep and is filled with soft mud and detritus. The average width of the run is 10 ft (3.1 m) and it flows east 500 ft (152.4 m) into the tannic waters of Morman Branch. Another seepage run is nearby. Publicly-owned hardwood forest surrounds the spring and Morman Branch as it flows toward Lake George.

Rainbow Springs Group

Rainbow Springs Group forms the headwaters of the Rainbow River. Several springs are located in the uppermost portion of the river, within the Rainbow River State Park boundary, however, there are also springs downstream from the State Park that issue directly from the limestone river bottom and produce significant boils on the river surface. The park is located 3.5 miles (5.6 km) north of Dunnellon. From the intersection with CR 484 in Dunnellon, drive 3.8 miles (6.1 km) north on US 41 to the large sign indicating the entrance to Rainbow Springs State Park. Turn east (right) onto the access road and continue 0.8 miles (1.3 km) to the parking area near the head of the Rainbow River.

RAINBOW CAVE SPRING - Lat. 29° 05' 24.89" N, Long. 82° 25' 35.24" W (SW¼ SW¼ NE¼ sec. 18, T. 16 S, R. 19 E). Rainbow Cave Spring is located on the west side of Rainbow River less than 0.1 miles (0.2 km) upstream from the Rainbow River State Park Campground. There are grass islands both above and below this spring in the river channel. Indian Creek enters the opposite side of the river approximately 150 ft (45.7 m) due east of the spring. Rainbow Cave Spring issues from a cave on the north side of a bowl shaped depression 50 ft (15.2 m) in diameter. The surrounding limestone bedrock is heavily fractured and small vents and sand boils are numerous. Native aquatic grass surrounds the 15.9 ft (4.9 m) deep vent. The spring flows from the bottom of the Rainbow River and private residences with boat docks are located on the west bank. During the April 2003 visit, Rainbow Cave Spring was issuing the most water of any spring visited on the Rainbow River.

RAINBOW SPRING NO. 2 - Lat. 29° 06' 08.35" N, Long. 82° 26' 14.18" W (SE¼ NE¼ SE¼ sec. 12, T. 16 S, R. 18 E). Rainbow Spring No. 2 is located 85 ft (25.9 m) southeast of Rainbow Spring No. 1, east of the southeast corner of the swim area. Rainbow Spring No. 2 issues from the bottom of Rainbow River into the main head springs pool area. The vent is a bowl-shaped depression 20 ft (6.1 m) in diameter identified by a dark blue hole visible from the surface and measuring 9.5 ft (2.9 m) deep. Natural aquatic vegetation surrounds the sand vent and some exposed limestone is present. A roped-in swim area is 30 ft (9.1 m) to the west and the land surrounding the spring is part of the Rainbow River State Park.

RAINBOW SPRING NO. 3 - Lat. 29° 06' 07.55" N, Long. 82° 26' 13.98" W (SE¼ NE¼ SE¼ sec. 12, T. 16 S, R. 18 E). Rainbow Spring No. 3 is 83 ft (25.3 m) south of Rainbow Spring No. 2. The spring is easily located by a log lying across the vent opening. Rainbow Spring No. 3 issues from a 20 ft (6.1 m) diameter depression at the bottom of the Rainbow River. Depth over the vent measures 11.6 ft (3.5 m) and during the April 2003 visit no boil was visible. The water is clear and blue. A log lies across the vent opening and the bottom is sand and limestone with large boulders and aquatic vegetation. The spring is surrounded by the Rainbow River State Park.

Figure 169. Rainbow Springs Group, Rainbow Spring No. 2 (photo by R. Means).

Figure 170. Rainbow Springs Group, Rainbow Spring No. 3 (photo by R. Meegan).

RAINBOW SPRING NO. 5 - Lat. 29° 05' 54.61" N, Long. 82° 26' 10.94" W (SE¼ SE¼ SE¼ sec. 12, T. 16 S, R. 18 E). Rainbow Spring No. 5 is located farther downstream than the cluster of head springs, issuing from the bottom of the Rainbow River on the west side. The spring is 0.25 miles (0.4 km) downstream from Rainbow Spring No. 4 and 50 ft (15.2 m) upstream from the State Park boundary. Rainbow Spring No.5 discharges from an elongated bowl-shaped depression that is 40 ft (12.2 m) north to south by 20 ft (6.1 m) east to west. The spring issues clear, blue water from many separate boils and vents clustered on the bottom of the Rainbow River. Maximum depth measures 12.6 ft (3.8 m). The vents are surrounded by native aquatic grass and limestone boulders. The spring is located within the Rainbow River State Park. Land to the west is dense with vegetation and there is a walkway maintained by the State Park.

Figure 171. Rainbow Springs Group, Rainbow Spring No. 5 (photo by R. Meegan).

RAINBOW SPRING NO. 7 - Lat. 29° 05' 32.13" N, Long. 82° 25' 36.37" W (NW¼ SW¼ NE¼ sec. 18, T. 16 S, R. 19 E). Rainbow Spring No. 7 flows from the bottom of the riverbed on the north end of a grass island that sits in the center of the Rainbow River. The spring is approximately 0.1 miles downstream from Rainbow Spring No. 6 and 0.25 miles (0.4 km) upstream from the Rainbow River State Park campgrounds. Rainbow Spring No. 7 emerges from a bowl-shaped depression in the bottom of the Rainbow River. The vent is a dark-blue hole 13.3 ft (4.1 m) deep with a visible boil. At least two fractures intersect at the vent. A

Figure 172. Rainbow Springs Group, Rainbow Spring No. 7 (photo by R. Means).

mosaic of limestone boulders, aquatic grass, and white sand surround the vent. Scattered houses are on the west bank of the river and the east bank is completely forested.

RAINBOW SPRING NORTH - Lat. 29° 06’ 09.71” N, Long. 82° 26’ 16.36” W (SE¼ NE¼ SE¼ sec. 12, T. 16 S, R. 18 E). Rainbow Spring North is located at the head spring area of the Rainbow River within Rainbow River State Park. It sits in a small cove in the uppermost spring pool and is just north of the roped swim area. The Rainbow Spring North spring pool is 60 ft (18.3 m) from east to west and 45ft (13.7 m) north to south. The spring is comprised of multiple boils issuing from two small bowl-shaped depressions, the west vent slightly larger than the east vent. Maximum depth measures 5.9 ft (1.8 m). The spring flows directly into the headspring pool area. The land surrounding the spring on the west and north sides is manicured lawn, to the south is the Rainbow River and a roped swim area. A wooden walkway with handrails runs along the west side of the pool and to the north the land rises to a steep, high hill developed as part of the Rainbow River State Park.

RAINBOW UNNAMED SWAMP SPRING - Lat. 29° 05’ 36.50” N, Long. 82° 25’ 44.31” W (NE¼ SE¼ NW¼ sec. 18, T. 16 S, R. 19 E). Rainbow Unnamed Swamp Spring is located up a 150 ft (45.7 m) spring run that enters the Rainbow River across from Rainbow Spring No. 6 and 0.7 miles (1.1 km) downstream from Rainbow Spring No. 5. Rainbow Unnamed Swamp Spring discharges into a 30 ft (9.1 m) diameter pool surrounded by pristine and heavily-canopied swamp land. There are a few old fence posts in and around the pool and the bottom is sand with some black detritus. The spring’s 150 ft (45.7 m) run is the same width as the spring pool and flows into the Rainbow River in a grassy thicket that is over-

Figure 173. Rainbow Springs Group, Rainbow Spring North (photo by R. Means).

Figure 174. Rainbow Springs Group, Rainbow Unnamed Swamp Spring (photo by R. Meegan).

grown due to the low flow conditions. During the April 2003 visit, an almost imperceptible amount of water was emerging from the spring.

WATERFALL SPRINGS - Lat. 29° 06' 52.55" N, Long. 82° 26' 08.39" W (SW¼ NW¼ SW¼ sec. 7, T. 16 S, R. 19 E). The Waterfall Springs are located up a short spring run that enters Rainbow River 400 ft (121.9 m) downstream from Rainbow Spring No. 4. The aquatic area is closed due to the sensitive environment; therefore the springs must be viewed from land only. They are located on the southeast side of Rainbow River State Park, at the foot of the man-made waterfall. Waterfall Springs consists of two spring pools, running in a north-south direction each contain dozens of small sandy boils. The boils are aligned along a straight path 170 ft (51.8 m) long. The spring pool area is canopied by large oaks. Maximum depth of the spring area measures 3.5 ft (1.1 m). The spring run flows 250 ft (76.2 m) southwest into the Rainbow River with an average depth of 2 ft (0.6 m). A clear stream cascades from the north into the north pool and is composed of redirected water from the spring-fed Rainbow River. Before entering the spring pool, the stream flows down a 25 ft (7.6 m) tall man-made waterfall approximately 75 ft (22.9 m) from the pool. A walkway runs in and around the stream and waterfall. The spring is located within Rainbow River State Park. Uplands surrounding the spring pool are steep sloped and covered by hardwoods and palms.

Silver Springs Group

At least 16 springs give rise to the Silver River within the upper 0.6 mile (1.0 km) stretch. The Silver River flows eastward from the Main Spring approximately 5 miles (8 km) into the Ocklawaha River. The entire Silver River and its springs are owned by the Silver River State Park. Some land around the head springs is leased to Silver Springs Adventure Theme Park and is heavily developed. The rest of the Silver River basin is heavily forested and protected. Glass-bottom boat tours occur daily along the upper Silver River. The river system is a canoeing, kayaking, and wildlife viewing hotspot. Clear water and bluish water color is characteristic of the entire Silver River and its contributing springs. All the springs can be accessed by boating 4.5 – 5 miles (7.2 – 8.0 km) upstream on the Silver River from a boat ramp that provides access to the Silver and Ocklawaha Rivers. The boat ramp is located off SR 40, 4 miles (6.4 km) east of the intersection of 58th Ave and SR 40 in Silver Springs. The access road is just before the bridge over the Ocklawaha River on the south side of the road.

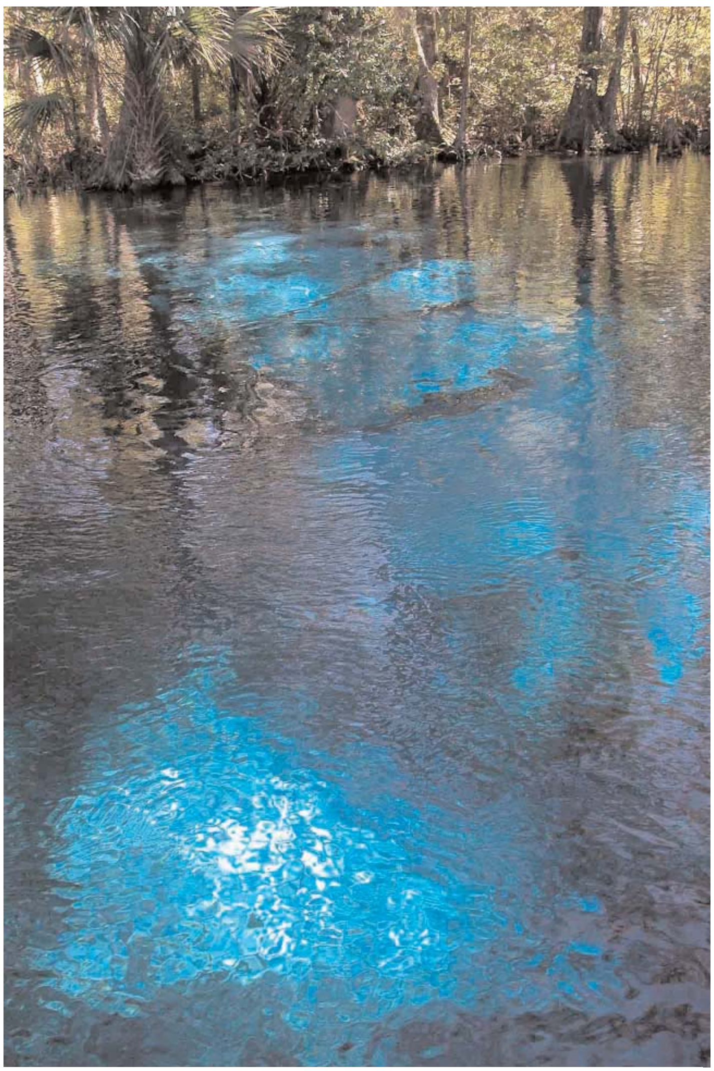

Figure 175. Silver Springs Group, Jacob's Well Spring (photo by R. Meegan).

JACOB'S WELL SPRING - Lat. 29° 12' 53.92" N, Long. 82° 03' 06.56" W (NW¼ NW¼ SW¼ sec. 6, T. 15 S, R. 23 E). Jacob's Well Spring is located on the south side of the upper Silver River approximately 500 ft (152.4 m) downstream from the head (Main) spring. It is the first spring encountered downstream from the main boil. Jacob's Well also is known as Spring of the Stars. Jacob's Well Spring occupies a conical depression with sand slopes and is inundated by the Silver River. Limestone is exposed around the vent. Estimated depth is 20 ft (6.1 m). The spring has a sand bottom and the water is clear and bluish. A slight boil on the river's surface is visible. Jacob's Well Spring is visited daily by glass-bottom boat tours from the surrounding Silver Springs Park.

SILVER SPRING NO. 1 - Lat. 29° 12' 53.51" N, Long. 82° 03' 47.74" W (NE¼ NW¼ SW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 1 is located along the upper Silver River approximately 100 ft (30.5 m) north of Reception Hall Spring. It is located on the bottom of the river in a circular, bowl-shaped depression. Silver Spring No. 1 is a small spring with a circular, bowl-shaped depression. Depth measures 20.3 ft (6.2 m) over the vent. The spring bottom is sand with some aquatic grass. Flow from the spring suspends sand and debris in the water column. The spring also is known as Bridal Chamber (Odum, 1957).

SILVER SPRING NO. 2 - Lat. 29° 12' 54.43" N, Long. 82° 03' 03.41" W (NE¼ NW¼ SW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 2 is located along the upper Silver River approximately 150 ft (45.7 m) northeast of Silver Spring No. 1 on the south side of the river. Silver Spring No. 2 occupies a circular, bowl-shaped depression measuring 17.2 ft (5.2 m) deep. The water is clear and bluish and aquatic grasses are abundant on the sand and limestone bottom. This spring also may be known as Devil's Kitchen or Alligator Hole (Odum, 1957).

SILVER SPRING NO. 3 - Lat. 29° 12' 55.39" N, Long. 82° 03' 00.70" W (SE¼ SW¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 3 is located along the upper Silver River approximately 250 ft (76.2 m) east or downstream of Silver Spring No. 2, on the south side of the river. There is a small spit of land between Silver Springs No. 2 and No. 3. It is also located approximately 100 ft (30.5 m) northwest of Blue Grotto. Silver Spring No. 3 issues from the bottom of Silver River in a roughly circular depression. Several sand boils discharge clear blue water from a depth of 18.0 ft (5.5 m). Aquatic vegetation surrounds the exposed sand boils. Along the southern shore is a thin strip of hardwood and cypress trees and a man-made channel beyond. The channel parallels the Silver River and is used for cruises associated with Silver Springs Adventure Park. High ground rises beyond the channel up to 15 ft (4.5 m) about the water surface. An exotic animal zoo is located on this hill. The spring also is called Geyser Spring (Odum, 1957).

SILVER SPRING NO. 4 - Lat. 29° 12' 58.17" N, Long. 82° 02' 57.10" W (SW¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 4 is located along the upper Silver River approximately 400 ft (121.9 m) northeast of Blue Grotto, within a cove on the north side of the Silver River channel. Silver Spring No. 4 has at least three separate vents that discharge into a small cove on the north side of the Silver River. Depth over the center of the spring measures 15.7 ft (4.8 m). The bottom is sand with exposed limestone around the vent with abundant aquatic vegetation and algae along the edges of the spring. The water is clear and bluish. The spring produced a sizeable boil on the water surface in October 2003. There is a sunken boat within the spring depression. A grass lawn and buildings associated with Silver River Adventure Park are northwest of the spring. Odum (1957) refers to this spring as Christmas Tree Springs

SILVER SPRING NO. 5 - Lat. 29° 12' 58.00" N, Long. 82° 02' 54.58" W (SW¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 5 is located along the upper Silver River approximately 200 ft (61 m) east or downstream from Silver Spring No. 4, within a cove on the north side of the Silver River channel. This spring is immediately east of the jungle cruise docks. Silver Spring No. 5 discharges into a cove on the north side of the Silver River. Depth over the vent measures 17 ft (5.2 m). The spring has a sand bottom with exposed limestone near the vent. Aquatic grass and algae are abundant in the spring pool. The water is clear and bluish, and a boil was visible over the spring vent in October 2004. The spring is surrounded by Silver Springs Adventure Park.

Figure 176. Silver Springs Group, Silver Spring No. 4 (photo by R. Meegan).

Figure 177. Silver Springs Group, Silver Spring No. 5 (photo by R. Meegan).

SILVER SPRING NO. 6 - Lat. 29° 12' 56.04" N, Long. 82° 02' 50.67" W (SW¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 6 is located on the upper Silver River approximately 350 ft (106.7 m) east or downstream from Silver Spring No. 5. It is situated on the south side of the Silver River on the river bottom. Silver Spring No. 6 occupies a roughly circular depression on the bottom of the Silver River. Maximum depth is 23.9 ft (7.3 m) deep. The spring bottom consists of sand, limestone, and aquatic grasses. Dark brown and green filamentous algae cover most aquatic substrates in the spring and surrounding Silver River. Odum (1957) refers to this spring as Sunfish Shelf.

SILVER SPRING NO. 7 - Lat. 29° 12' 56.14" N, Long. 82° 02' 46.92" W (SE¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 7 is located along the south side of the upper Silver River approximately 320 ft (97.5 m) east or downstream from Silver Spring No. 6. Silver Spring No. 7 occupies what Odum (1957) called No Name Cove. The spring pool within the cove is circular and measures 14.2 ft (4.3 m) deep. The bottom is sand at the vent and covered with detritus elsewhere because of low energy flow conditions within the spring cove. No boil was visible during the October 2003 visit. The spring is surrounded by forested floodplain to the east, south, and west that is part of the Silver River State Park.

SILVER SPRING NO. 8 - Lat. 29° 12' 57.74" N, Long. 82° 02' 44.99" W (SE¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 8 is located along the upper Silver River approximately 250 ft (76.2 m) northeast of Silver Spring No. 7. It is situated on the river bottom on the north side of the river channel. Silver Spring No. 8 issues from the bottom of the Silver River. Limestone boulders are exposed around the vent. The clear, bluish spring is 16.3 ft (5.0 m) deep. There is a white pipe visible in the spring originating from land on the north side of the spring. A fence is also present on the north side of the spring. Land around the spring is forested floodplain. Odum (1957) refers to Silver Spring No. 8 as Second Fisherman's Paradise.

SILVER SPRING NO. 9 - Lat. 29° 12' 56.16" N, Long. 82° 02' 43.83" W (SE¼ SE¼ NW¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 9 is located on the upper Silver River approximately 200 ft (61 m) southeast of Silver Spring No. 8. Silver Spring No. 9 flows from the bottom of the Silver River. The spring vent is 19.6 ft (6.0 m) deep and there is limestone exposed in the depression. The river and spring are clear and distinctly bluish. Aquatic vegetation and algae are common in the area. The spring is located in the middle of the river channel and is surrounded on all sides by the Silver River. A lowland forest extends along the river banks. Odum (1957) refers to this spring as Catfish Hotel.

SILVER SPRING NO. 10 - Lat. 29° 12' 55.50" N, Long. 82° 02' 42.52" W (SW¼ SW¼ NE¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 10 is located on the upper Silver River approximately 100 ft (30.5 m) southeast of Silver Spring No. 9, south of the western tip of a 250 ft (76.2 m) long forested island. Silver Spring No. 10 issues from a rocky depression on the bottom of the Silver River. Maximum depth is 23.3 ft (7.1 m) and the spring and river waters are clear and sky blue. Aquatic grass and algae abound in the area. A turbulent boil is produced on the river surface above the vent. The turbulence is caused by both spring flow and river current deflection over limestone boulders located in the spring depression. Silver Spring No. 10 occupies what Odum (1957) refers to as Paradise Park.

SILVER SPRING NO. 11 - Lat. 29° 12' 55.59" N, Long. 82° 02' 38.06" W (SW¼ SW¼ NE¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 11 is located on the upper Silver River approximately 450 ft (137.2 m) east of Silver Spring No. 10 or about 150 ft (45.7 m) east of the eastern end of a 250 ft (76.2 m) long island in the river. Silver Spring No. 11 occupies a depression in the bottom of the Silver River. A sand boil issues from 17.9 ft (5.5 m) deep. Aquatic vegetation surrounds the sand vent. Directly upstream from this spring there is a larger, deeper section of the Silver River within which sits a sunken boat. This deep, blue section of the river harboring the sunken boat is an attraction that is frequented by the glass bottom boat tours. Forested floodplain extends on both sides of the river. Silver Spring No. 11 is referred to by Odum (1957) as Catfish Convention Hall.

SILVER SPRING NO. 12 - Lat. 29° 12' 56.97" N, Long. 82° 02' 42.01" W (SW¼ SW¼ NE¼ sec. 6, T. 15 S, R. 23 E). Silver Spring No. 12 is located on the northwest side of the forested island approximately 150 ft (45.7 m) north of Silver Spring No. 10. It is situated on the bottom of the northern fork of the river channel that goes around the 250 ft (76.2 m) long island. Silver Spring No. 12 discharges into a depression from the bottom of the Silver River. Maximum depth is 20.2 ft (6.2 m). The spring bottom is sand with sticks and mollusk shells littered across the depression. Water is clear blue and aquatic vegetation is abundant. A forested floodplain extends on both sides of the river. The spring also is called Turtle Hook (Odum, 1957).

Sweetwater Springs

Figure 178A. Sweetwater Springs (photo by T. Roberts).

Location – Lat. 29° 13’ 7.60” N, Long. 81° 39’ 35.53” W (F.M. Arredondo Grant sec. 37, T. 14 S, R. 27 E). Take SR 19 south from Silver Glen approximately 3.0 miles (4.8 km). The road to Sweetwater Springs is on the right just before crossing Juniper Creek.

Description – Sweetwater Springs consists of two vents issuing into a spring pool 70 ft (21.3 m) long and 60 ft (18.3 m) wide. Each vent is oval-shaped, 4 to 5 ft (1.2 m to 1.5 m) long and 3 ft (0.9 m) wide. The pool bottom is sand with exposed limestone around the spring vents and sparse aquatic vegetation. The vents produce two large boils, approximately 5 ft (1.5 m) across. The pool feeds into an 80 ft (24.4 m) long run, which flows northwest into Juniper Creek. The run averages 5 ft (1.5 m) wide and 2 ft (0.6 m) deep, and has a bottom similar to that of the spring pool. The water in the pool and run is clear, light blue. The banks of the spring pool are steep and ground level is 2 ft (0.6 m) above the surface of the water. A moderately dense forest of oak trees, palm trees, and palmettos encircle the spring pool. The spring, as well as a small rental cottage that is located on the bank of the spring pool, is part of the Ocala National Forest. The average discharge between 1980 and 2000 was 12.70 ft^3/s [6].

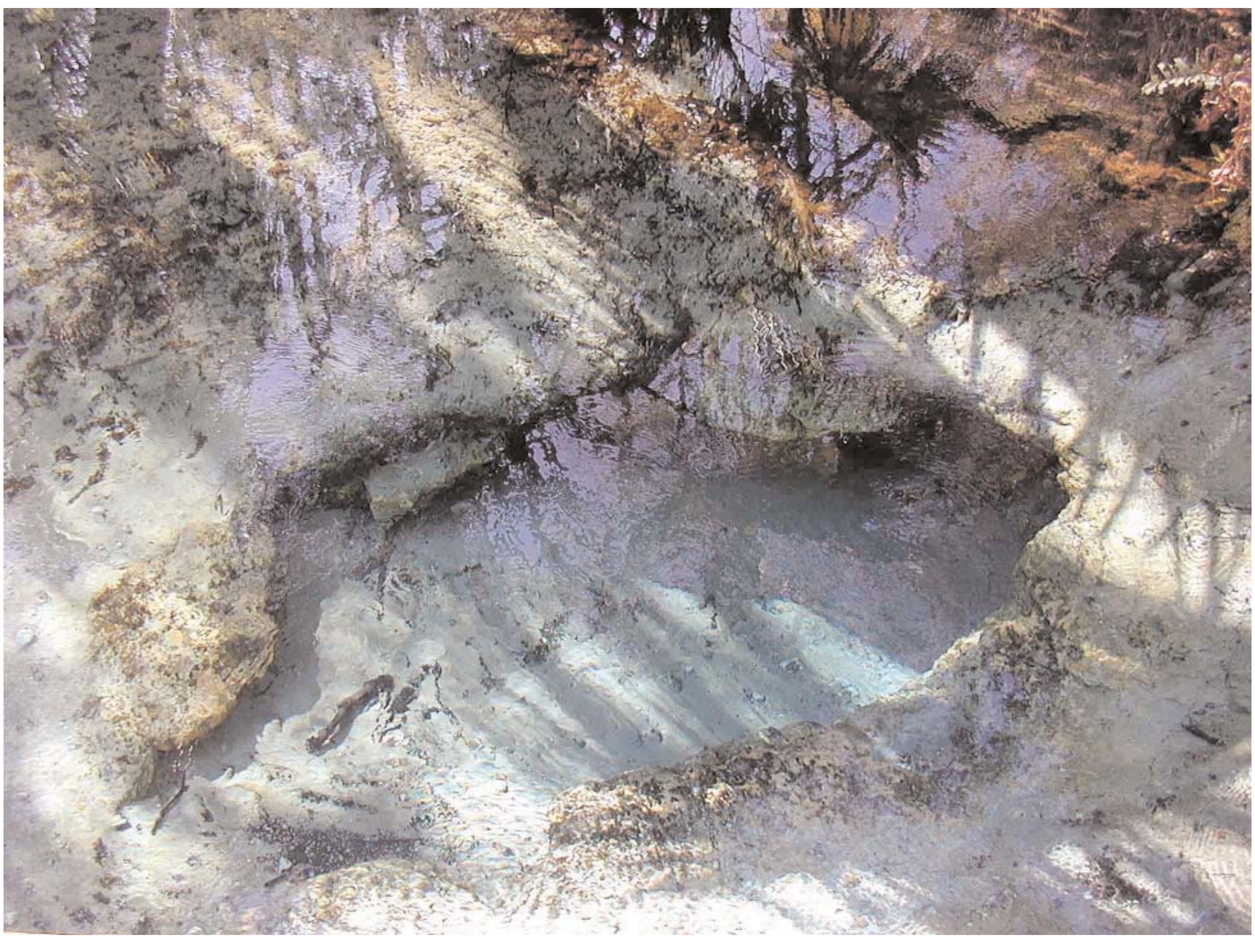

Figure 178B. Sweetwater Springs (photo by T. Roberts).

Tobacco Patch Landing Springs

Figure 179. Tobacco Patch Landing Springs (photo by T. Roberts).

Location – Lat. 29° 25' 42.73" N, Long. 81° 55' 26.09"W (NW¼ SW¼ SW¼ sec. 20, T. 12 S, R. 24 E). From Salt Spring, take SR 316 west to Eureka Dam boat ramp. From the ramp, go down river (north) about 4 miles (6.4 km) and spring is on the east side of Lake Ocklawaha.

Description – Tobacco Patch Landing Springs, also known as a member of the Cannon Springs Group, was flooded by the Rodman Reservoir at the time of visit in April of 2003. Neither the spring pool nor the vent was discernible. SJRWMD reports that the vent is 12 – 15 ft (3.7 – 4.6 m) across; steep sided, with a limestone ledge exposed. The spring run is 650 ft (198.1 m) long, 25 ft (7.6 m) wide, and 4.4 ft (1.3 m) deep and flows southwest into Ocklawaha Lake. Dollar Weed is abundant in the run. Floodplain forest surrounds the spring pool and its run. Approximately 200 ft (61 m) to the southeast, high ground gently rises to 30 ft (9.1 m) above the spring water level. According to the SJRWMD, all springs within the group are exposed only when there is a draw-down in the reservoir. When the spring was exposed in March 1999, the discharge measured 2.80 ft^3/s [(6)].

Wells Landing Spring

Figure 180. Wells Landing Spring (photo by T. Roberts).

Location – Lat. 29° 25' 15.66" N, Long. 81° 55' 10.85" W (NW¼ SE¼ NW¼ sec. 29, T. 12 S, R. 24 E). From Eureka, drive east on CR 316 approximately 1.2 miles (1.9 km) to the intersection with 160th Avenue. Turn north (left) onto 160th Avenue and travel approximately 3.4 miles (5.5 km) to the intersection with 187th Lane. Turn west (left) onto 187th Lane and travel 0.4 miles (0.6 km). The spring is located directly offshore beneath Ocklawaha Lake.

Description – Wells Landing Spring belongs to a group of springs called Cannon Springs Group. These springs have all been inundated by Rodman Reservoir, which was created by Eureka Dam on the Oklawaha River. Depth of the spring measures 9.3 ft (2.8 m). Some aquatic vegetation grows around the edges of the tannic water, with cypress knees and willow trees growing on the bank. The ground gently slopes 2 ft (0.6 m) to the northwest into a fairly dense upland hardwood forest. The spring is a local swimming hole.

Wilson Head Spring

Figure 181. Wilson Head Spring (photo by R. Means).

Location – Lat. 28° 58' 47.14" N, Long. 82° 19' 17.28" W (SW¼ NE¼ SE¼ sec. 29, T. 17 S, R. 20 E). Wilson Head Spring is located 8 miles (12.9 km) southeast of Dunnellon. It flows into the Withlachoochee River approximately 2 miles (3.2 km) upstream from the bridge in Stokes Ferry. The spring is located on private property and is not accessible to the public.

Description – Wilson Head Spring pool is surrounded by an earthen berm 96 ft (29.3m) north to south and 72 ft (21.9 m) east to west. Depth on the west side of the pool near the vent is approximately 10 ft (3 m). A thick layer of algae covers approximately 90% of the sand and limestone bottom. The water is slightly blue, and there are a few aquatic and emergent plants along edge of the pool. A very slight boil is visible. A small, narrow spring run flows from the south side of the pool through an old weir. It then flows generally southward through the privately-owned, forested floodplain into the Withlacoochee River. Discharge on June 5th 1972 measured 2.40 ft^3/s [(1)].

ORANGE COUNTY

Sulfur Spring

Figure 182A. Sulfur Spring (photo by T. Roberts).

Location – Lat. 28° 46'12.66" N, Long. 81° 30' 33.06" W (NE¼ NE¼ NE¼ sec. 9, T. 20 S, R. 28 E). Sulfur Spring is located approximately 1 mile (1.6 km) northwest of Rock Springs. From the intersection of SR 414 and Wekiva Springs Road in Altamonte Springs, travel northwest on Wekiva Springs Road approximately 3.9 miles (6.3 km) to the Wekiwa Springs State Park. Contact on-site state park rangers for assistance and further directions to spring.

Description – Sulfur Spring, also known as Kittridge Spring, has a peanut-shaped spring pool that measures 70 ft (21.3 m) long and 15 ft (4.6 m) wide. Depth is 2.0 ft (0.6 m). The pool has a sand bottom that is completely covered with a thin layer of dark green algae. The water in the spring pool is clear and has a hydrogen sulfide odor. Tree debris is present in the pool but no aquatic vegetation. An orange film coats the spring pool's edge. A 5 ft (1.5 m) wide sand boil is visible in the center of the spring pool. The spring run is 5 ft (1.5 m) wide, 0.2 ft (0.1 m) deep, and flows northwest 0.25 miles (0.4 km) into Rock Spring Run. The run bottom is sand and void of algae and aquatic vegetation. The state-owned land surrounding the spring slopes up to 3 ft (0.9 m) above the water surface. The nearby sand hills are forested with mixed hardwoods.

Figure 182B. Sulfur Spring (photo by T. Roberts).

Witherington Spring

Location – Lat. 28° 43' 53.73" N, Long. 81° 29' 23.67" W (NE¼ SW¼ SW¼ sec. 23, T. 20 S, R. 28 E). From the intersection of SR 414 and Wekiva Springs Road in Altamonte Springs, travel northwest on Wekiva Springs Road approximately 3.9 miles (6.3 km) to the Wekiwa Springs State Park. Witherington Spring is located approximately 800 ft (243.8 m) north of a ranger residence within the state park boundary.

Description – Witherington Spring occupies an elongated pool 130 ft (39.6 m) long, 110 ft (33.5 m) wide, with an average depth of 7 ft (2.1 m). A number of sand boils feed this spring, but they were not discernible during the March 2003 visit due to poor water clarity. Witherington Spring run is 1 ft (0.3 m) deep with an average width of 12 ft (3.7 m). The run flows east forming the head of Mill Creek. A state-owned, dense hardwood forest surrounds the spring. According to park rangers, two more springs are nearby. The average discharge between 1972 and 1995 was 2.28 ft^3/s [6].

Figure 183. Witherington Spring (photo by T. Roberts).

PASCO COUNTY

Horseshoe Spring

Figure 184. Horseshoe Spring (photo by R. Means).

Location – Lat. 28° 23' 51.18" N, Long. 82° 41' 23.83" W (SW¼ SW¼ NE¼ sec. 15, T. 24 S, R. 16 E). Horseshoe Spring is located on private property approximately 2.8 miles (4.5 km) southwest of the town of Aripeka on central Florida's Gulf Coast. It is approximately 0.8 miles (1.3 km) due east (inland) from Horse Island.

Description – Horseshoe Spring is so named because of its distinct horseshoe-shaped spring pool and upper spring run section. The spring emerges from an elongated, curved fissure in the limestone that measures 16.6 ft (5.1 m) deep and is 100 ft (30.5 m) long. The spring bottom is limestone with a thin layer of dark silt. The water was tannic and slightly turbid in March 2003. The spring run begins flowing eastward, then it curves around and flows northwest, creating a narrow peninsula of land between the upper spring run section and the spring pool. There are numerous karst features along the bottom of the uppermost portion of the spring run. The spring run meanders northwest through marsh 0.8 miles (1.3 km) into Fillman Bayou. Land east of the spring is heavily forested, and land to the west is open marsh.

PINELLAS COUNTY

Crystal Beach Spring

Figure 185. Crystal Beach Spring (photo by R. Meegan).

Location – Lat. 28° 05' 03.96" N, Long. 82° 47' 05.11" W. From the intersection of US Alt 19 and Crystal Beach Avenue in Crystal Beach, head west on Crystal Beach Avenue approximately 0.5 miles (0.8 km) to the intersection with Mayo Street. Turn south (left) onto Mayo Street and travel approximately 0.4 miles (0.6 km) to the intersection with Florida Boulevard. Turn west (right) onto Florida Boulevard and travel approximately 0.1 miles (0.2 km) to a 90 degree bend in the road to the south. This road becomes Point Seaside Drive. Drive south on Point Seaside Drive approximately 0.1 miles (0.2 km) and the submarine spring is located just 0.1 miles (0.2 km) offshore in St. Joseph Sound. It is directly offshore from some private homes.

Description – Crystal Beach Spring occupies a roughly circular, bowl-shaped depression 40 ft (12.2 m) in diameter. Maximum depth is 25 ft (7.6 m). Some sea grass grows along the edges. The bottom is sand with limestone and barnacles. The water at the vent opening is clear but is surrounded by cloudy bay water and therefore the spring is only discernible by the large boil visible on the surface. The spring is located off shore and has no associated run. The developed coastline is directly east of the spring and the rest is surrounded by open water associated with St. Joseph Sound. Discharge was estimated at 5 to 10 ft^3/sec[1].

Health Spring

Figure 186. Health Spring (photo by R. Means).

Location – Lat. 28° 06’ 23.09” N, Long. 82° 46’ 20.09” W (NW¼ NW¼ SE¼ sec. 26, T. 27 S., R. 15 E.). From the intersection of US 19 (Alt) and Oceanside Court in Wall Springs, drive north on US Alt 19 approximately 0.3 miles (0.5 km) to the intersection with Brevard Street. Turn west (left) onto Brevard Street and Health Spring is located within Wall Springs County Park on the west side of US Alt 19.

Description – Health Spring is encircled by a 2 ft (0.6 m) high concrete wall. The wall creates a spring pool 30 ft (9.1 m) in diameter and has a 3 ft (0.9 m) wide gap on the north side of the pool that lets out the spring flow. In addition to the retaining wall, the spring is surrounded by double chain-linked fences. The water is murky-green. The spring run travels north 60 ft (18 m) into a tidal creek inlet, eventually flowing into Boggy Bayou. Land surrounding the spring is developed into Wall Springs County Park with a large picnic pavilion. The spring also is known as Wall Spring. Discharge measured ranged from 0 $ft^3/sec^{(1)}$ in 1946 to 16.5 $ft^3/sec^{(1)}$ in 1949.

POLK COUNTY

Kissengen Spring

Figure 187. Kissengen Spring old photo (anonymous).

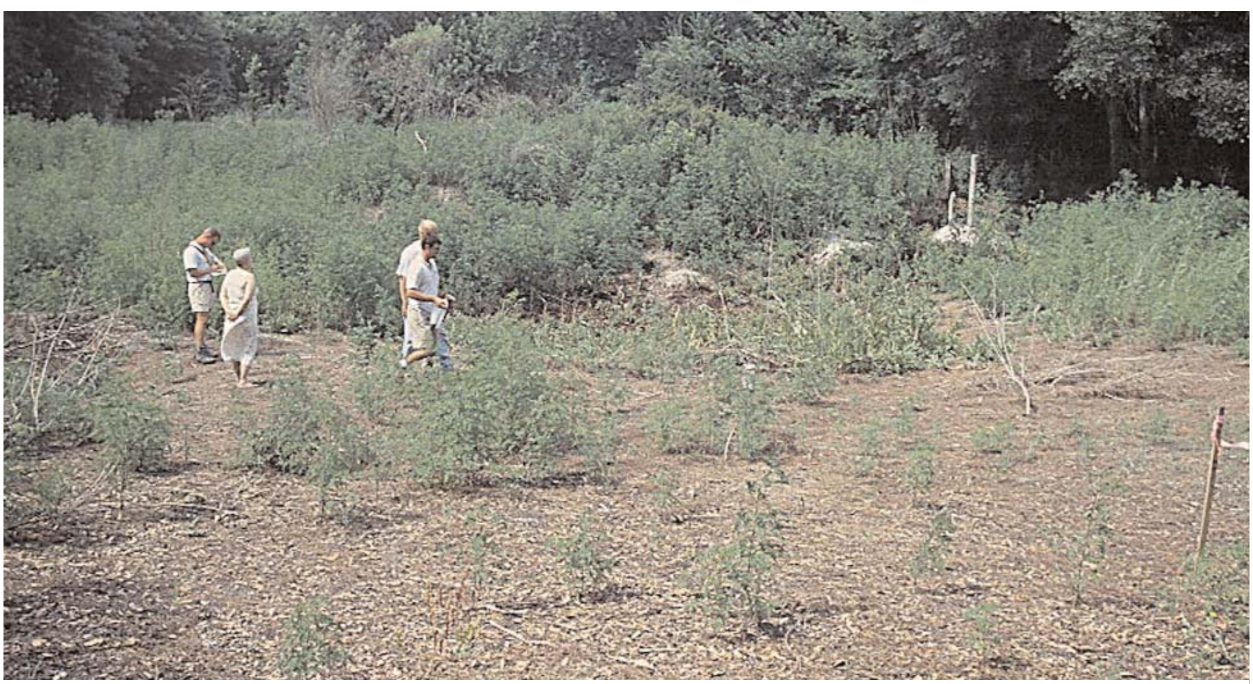

Figure 188. Kissengen Spring (photo by T. Scott).

Location – Lat. 27° 50' 33.50" N, Long. 81° 48' 39.92" W (SE¼ SE¼ NE¼ sec. 28, T. 30S., R 25 E.) Kissengen Spring is located approximately 4 miles (6.4 km) southeast of Bartow along the western side of the Peace River. From the intersection of SR 60 (Main Street) and US 98 in Bartow, drive south on US 98 approximately 3.5 miles (5.6 km) to the intersection of a small, unnamed road on the east (left) side of the road. The spring is surrounded by private property and land access is restricted.

Description - Kissengen Spring ceased flowing regularly in February, 1950. Cessation of flow at Kissengen Spring was primarily due to over pumping of the aquifer systems within the springshed which lowered the potentiometric surface such that flow stopped. Prior to that, Kissengen Spring was a popular recreational area known to have been the site of political rallies and gatherings that were attended by thousands of people. Today the spring basin is overgrown with dog fennel and other encroaching plants and its original dimensions are hard to discern. When the spring flowed, it discharged into a spring pool that was approximately 200 ft (61 m) in diameter and discharged from a cavern located in the center of the pool. The depth recorded over the pool was 17.6 ft (5.4 m) on December 27, 1946. The springhead was partially walled and contained a control weir. Large oak trees once surrounded the spring pool (Ferguson, et al, 1947). Discharge at Kissengen Spring averaged approximately 20 million gallons per day (mgd) from the late 1890's to the mid-1930's (Jackson, in prep). The maximum known discharge was recorded at 43.6 ft^3/s[1] in October 1933.

PUTNAM COUNTY

Forest Springs

Figure 189. Forest Springs (photo by SJRWMD).

Location – Lat. 29° 27’ 31.68” N, Long. 81° 39’ 30.60” W (Land Grant section 40, T. 12 S, R. 26 E). From the intersection of CR 309 and State Forest Trail just south of Welaka, head south on State Forest Trail approximately 1.3 miles (2.1 km). Forest Springs is located just east of the road.

Description – Forest Springs, also known as Sulfur Spring, has an elongated spring pool 35 ft (10.7 m) by 7 ft (2.1 m). There are at least two vents. One of the vents is 2.5 ft (0.9 m) in diameter and is on the northeast side of the pool. Spring depth is 1.9 ft (0.6 m). The pool bottom is mud with tree debris and white film covering some of the debris. The water is clear with a very notable hydrogen sulfide odor and a slight boil is visible. The spring run meanders 2.5 miles (4.0 km) west and flows into the St. Johns River. The run is 1 ft (0.3 m) deep and 3 ft (0.9 m) wide and has a mud bottom with tree debris, green algae, and a similar white film coating. The spring is located on state land amid a mixed forested wetland. The average discharge between 1972 and 2000 measured 0.29 ft^3/s [6].

Mud Spring

Figure 190. Mud Spring (photo by SJRWMD).

Location – Lat. 29° 27' 39.60" N, Long. 81° 39' 41.40" W (Land Grant section 40, T. 12 S, R. 26 E). From the intersection of CR 309 and State Forest Trail just south of Welaka, head south on State Forest Trail approximately 1.1 miles (1.8 km). Mud Spring is located approximately 0.2 miles (0.3 km) west of the road and forms the head of Mud Creek.

Description – Mud Spring has an oval shaped pool 84 ft (25.6 m) long and 66 ft (20.1 m) wide with an average depth of 3.5 ft (1.1 m). There is a retaining wall and drain on the southwest side of the spring which impounds the natural flow of the spring. Aquatic plants and green algae cover 80% of the spring's sand bottom. The water was cloudy during the January 2003 visit. Lily pads create an outer ring around a prominent boil in the center of the pool. The spring run has an average width of 3 ft (0.9 m) and depth of 0.6 ft (0.2 m) as it travels 1 mile (1.6 km) southwest into the St. Johns River. A grass bank around the spring gives way to a dense, mixed forest. This spring is along a designated hiking trail and is a popular picnic area within the State Forest. Between 1995 and 2000 the average discharge was 1.22 ft^3/s [6].

Nashua Spring

Figure 191. Nashua Spring (photo by SJRWMD).

Location – Lat. 29° 30' 32.76" N, Long. 81° 40' 37.20" W (sec. 11 (irregular section), T. 11 S, R. 26 E). Nashua Spring is located along the St. Johns River. From the intersection of CR 309 and Gatlings Lane in Nashua, drive west on Gatlings Lane approximately 0.3 miles (0.5 km) to its end near the St. Johns River. The spring is located approximately 0.1 miles (0.2 km) southwest of the end of Gatlings Lane.

Description – Nashua Spring has an elongated spring pool measuring 84 ft (25.6 m) long and 18 ft (5.5 m) wide, with an average depth of 2.5 ft (0.8 m). The water was murky during the January 2003 visit and the pool bottom could not be seen. Rosenau et al. (1977) reported a salty taste and a hydrogen sulfide odor to the water. Green algae and various aquatic plants grow in the spring. The run is 3 ft (0.9 m) wide, 0.4 ft (0.1 m) deep and flows 300 ft (91.4 m) west through dense shrubs and trees into the St. Johns River. The grassy area around the spring gently slopes up towards a private residence. Fruit trees, palms, and small shrubs grow around the spring. The average discharge between 1972 and 2000 measured 0.12 ft^3/s [6].

Satsuma Spring

Figure 192. Satsuma Spring (photo by SJRWMD).

Location – Lat. 29° 30' 45.36" N, Long. 81° 40' 31.80" W (sec. 28 (irregular section), T. 11 S, R. 26 E). Satsuma Spring is located along the St. Johns River. From the intersection of CR 309 and Norton's Fish Camp Road in Nashua, drive approximately 0.4 miles (0.6 km) to the end of the road.

Description – Satsuma Spring occupies a cone-like depression 22 ft (6.7 m) in diameter. Depth over the vent is 1.2 ft (0.4 m). The sand bottom is covered in a layer of leaves and reddish-brown algae. The water is clear blue. A prominent boil is visible and there is a strong hydrogen sulfide odor. The spring run flows 0.2 miles (0.3 km) northwest into the St. Johns River. The run has a sand bottom and is covered by a thin layer of leaves and algae, very similar to the spring pool. A dense mixed forest of palms and oaks surrounds the spring. The average discharge between 1993 and 2000 measured 1.12 ft^3/s [6].

SEMINOLE COUNTY

Clifton Springs

Figure 193. Clifton Springs (photo by T. Roberts).

Location – Lat. 28° 41'59.54" N, Long. 81° 14' 17.22" W (Land Grant 37, T. 20 S, R. 31 E). Clifton Springs is located on the southeastern side of Lake Jessup. From the intersection of CR 419 (Oviedo Road) and Spring Avenue, northwest of Oviedo, travel north on Spring Avenue approximately 0.6 miles (1 km). The spring is located at the end of the road on the left-hand side, behind a green house.

Description – Clifton Springs is composed of multiple vents that feed two separate spring runs. The main spring pool is roughly circular with a diameter of 150 ft (45.7 m). Depth is 3 ft (0.9 m). The pool bottom is mud with algae coated leaves and tree branches. The water is turbid and a prominent surface boil is visible. The run is 10 ft (3.1 m) wide and 4 ft (1.2 m) deep with bottom characteristics similar to the spring pool. The run flows northwest 250 ft (76.2 m) into Lake Jessup. The land surrounding the spring rises upward to a height of 3.5 ft (1.1 m) above the spring pool. East of the main pool, on the other side of Spring Avenue, there are several more boils which feed a narrow spring run. The run flows 0.2 miles (0.3 km) northwest into Lake Jessup. The springs are located on a designated State Historic Site surrounded by several homes, sable palms, and moss-covered oaks. The average discharge between 1972 and 1995 was 1.55 ft^3/s [(6)].

Ginger Ale Spring

Figure 194. Ginger Ale Spring (photo by A. Willet).

Location – Lat. 28° 41' 33.57" N, Long. 81° 23' 27.90" W (NE¼ SW¼ NW¼ sec. 2, T. 21 S, R. 29 E). From the junction of SR 414 and Markham Woods Road in northern Altamonte Springs, drive north on Markham Woods Road approximately 0.3 miles (0.5 km) and the spring will be in a wooded area on the west (left) side of the road.

Description – Ginger Ale Spring occupies a man-made spring pool surrounded by a 3.5 ft (1.1 m) high concrete retaining wall. The pool is circular, 8 ft (2.4 m) in diameter, 3.5 ft (1.1 m) deep, with at least nine small sand boils. The pool bottom is sand near the boils but otherwise covered by thick brown algae, tree debris, and sulfur-reducing bacteria. The spring water is clear, has a hydrogen sulfide odor and a large, prominent boil is visible. The spring run is 0.3 ft (0.1 m) deep, 2 to 3 ft (0.6 m to 0.9 m) wide with 0.5 ft (0.1 m) high banks. It flows 550 ft (167.6 m) northwest into the Little Wekiva River. Sparse algae and tree debris are scattered along the bottom of the mostly sand spring run. White, sulfurous residue is present on some of the algae mats. On the opposite side of the narrow river are small sand boils and a small sand vent associated with Ginger Ale Springs. The spring is on county-owned property and ringed by seven palm trees. A thick forest of sable palms, palmettos, oaks, and ferns surrounds the spring.

Harden Spring

Figure 195. Harden Spring (photo by A. Willet).

Location – Lat. 28° 49' 17.00" N, Long. 81° 25' 00.73" W (sec. 39 (irregular section), T. 19 S, R. 29 E). Harden Spring flows into the Wekiva River and is approximately 8 miles (12.9 km) west of Sanford. From the intersection of SR 46 and Wekiva Park Drive, just east of the SR 46 bridge over the Wekiva River, drive north on Wekiva Park Drive approximately 0.4 miles (0.6 km) and the spring is located due west of the road near the Wekiva River.

Description – Harden Spring pool is encircled by cement blocks. The elongated spring pool is 65 ft (19.8 m) by 50 ft (15.2 m), with an approximate depth of 6 ft (1.8 m). A small vent on the west side of the pool issues clear water. Sulphur-reducing bacteria are present in the pool and a hydrogen sulfide odor is detectable. The spring run is 3 ft (0.9 m) wide, 0.4 ft (0.1 m) deep, and flows 75 ft (22.8 m) into the Wekiva River. The spring owners report that the spring pool becomes milky white during the late evening, night, and early morning hours. After exposure to direct sunlight the spring water gradually turns clear again, presumably due to the activity of the sulfur-reducing bacteria. It is surrounded by private property.

Miami Spring

Figure 196. Miami Spring (photo by T. Roberts).

Location – Lat. 28° 42' 36.60" N, Long. 81° 26' 34.91" W (SE¼ NE¼ NE¼ sec. 31, T. 20 S, R. 29 E). This spring is located on private property within a gated community 6 miles (9.7 km) northwest of Altamonte Springs off of SR 434.

Description – Miami Spring forms an elongated pool measuring 69 ft (21 m) by 27 ft (8.2 m), with an average depth of 3 ft (0.9 m). Three prominent boils are located on the west side of the pool. The largest boil comes from a 5 ft (1.5 m) diameter vent that narrows as it deepens. Green algae and aquatic grass cover most of the white, sand bottom. The spring water is clear and has a hydrogen sulfide odor. The spring run is 40 ft (12.2 m) wide, 2 ft (0.6 m) deep, and flows 0.2 miles (0.3 km) north into the Wekiva River. Manicured lawns with an occasional palm or hardwood tree surround the spring. The average discharge for Miami Spring between 1945 and 2000 was 4.93 ft^3/s [6].

Nova Spring

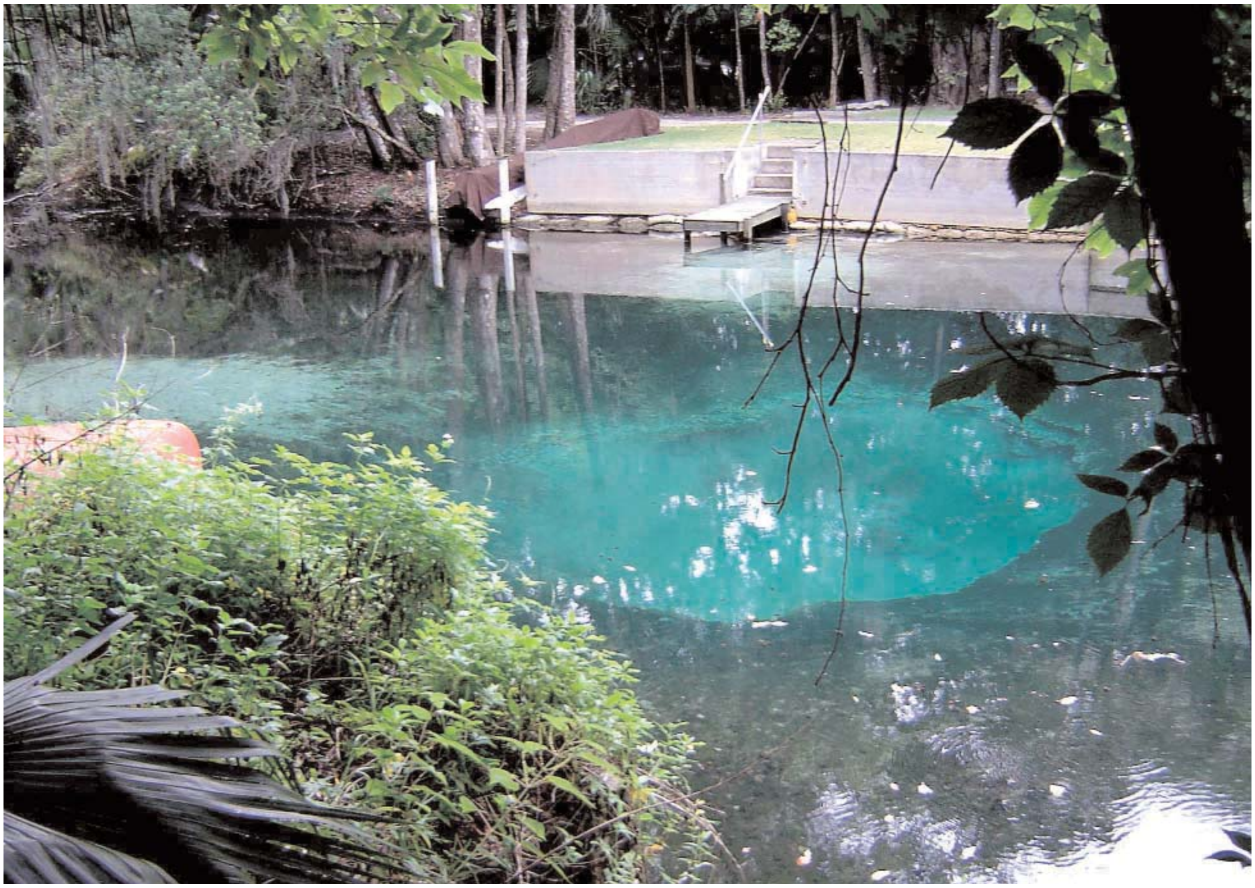

Figure 197. Nova Spring (FGS photo archives).

Location – Lat. 28° 49' 03.02" N, Long. 81° 25' 06.65" W (sec. 32 (irregular section), T. 18 S, R. 29). Nova Spring flows into the Wekiva River and is approximately 8 miles (12.9 km) west of Sanford. From the intersection of SR 46 and Wekiva Park Drive, just east of the SR 46 bridge over the Wekiva River, drive north on Wekiva Park Drive approximately 0.15 miles (0.2 km) and the spring is located due west of the road along the Wekiva River.

Description – Nova spring is situated at the bottom of an 8 ft (2 m) deep man-made canal. Coarse particulate organic matter is suspended in the water column. Residents report that when the canal was created, water began to flow from the large sand boil. The canal flows into the Wekiva River and has sulfur-reducing bacteria and sparse aquatic vegetation growing along the sides. The canal banks gently slope up 2 ft (0.6 m) into a flat residential area with hardwoods and pines. The canal is surrounded by private property and is used for swimming and canoeing.

SUWANNEE COUNTY

Anderson Spring

Figure 198. Anderson Spring (photo by T. Roberts).

Location – Lat. 30° 21’ 12.27” N, Long. 83° 11’ 23.01”W (SW¼ NW¼ SE¼ sec. 35, T. 1 S, R. 11 E). From the intersection of US 90 and River Road in Ellaville, drive south on River Road approximately 2.2 miles (3.5 km) to the intersection with the first road on the west side (right) past the I-10 overpass. Turn west (right) and travel approximately 0.3 miles (0.5 km) to a dirt parking area. The spring is located north (right) of the parking area.

Description – Anderson Spring forms an oval spring pool that is 6 ft (1.8 m) long and 3 ft (0.9 m) wide. Its depth is 3 ft (0.9 m). The spring vent discharges water directly into the Suwannee River. The vent is located about 10 ft (3.1 m) down on the river’s bottom. Spring water is clear and yellow-greenish. Limestone is exposed at the vent. There are variable amounts of algae within the vent and the surrounding depression; however, there is no other aquatic vegetation present. The state-owned area surrounding the spring is comprised of limestone outcrops covered with lush ferns and moss. High ground rises to about 25 ft (7.6 m) above the spring. Discharge on September 22, 1997 was estimated to be 15 ft^3/sec[4].

Bathtub Spring

Figure 199. Bathtub Spring (photo by T. Roberts).

Location – Lat. 30° 05' 30.22" N, Long. 83° 05' 54.02" W (NE¼ NE¼ SE¼ sec. 34, T. 4 S, R. 12 E) From the boat landing at the SR 51 bridge over the Suwannee River south of Luraville, travel downstream approximately 6.1 miles (9.8 km). The spring will be along the north bank.

Description – Bathtub Spring has an oval-shaped pool measuring 12 ft (3.7 m) east to west and 7 ft (2.2 m) north to south with a maximum depth of 4 ft (1.2 m). A single vent discharges from exposed limestone on the north side of the pool. The limestone pool bottom is covered with algae in some places. The spring water is clear blue. The spring run averages 6 ft (1.9 m) wide, 1.5 ft (0.5 m) deep, and flows 10 ft (3.1 m) southwest, under a land bridge, to the Suwannee River. Exposed limestone rises 8 ft (2.5 m) above the pool surface and the privately-owned surrounding area is forested. At the intersection of the spring run and the Suwannee River, a concrete retaining wall impedes the natural flow of the spring run. Discharge on July 30, 1997 measured 11.5 ft^3/sec[4].

Betty Spring

Figure 200. Betty Spring (photo by T. Roberts).

Location – Lat. 29° 54' 53.20" N, Long. 82° 50' 23.84"W (NE¼ SW¼ SW¼ sec. 32, T. 6 S, R. 15 E). From the bridge over the Suwannee River in Branford, drive east on US 27 approximately 4.2 miles (6.8 km) to the intersection with US 129. Turn south (right) onto US 129 and travel approximately 2.7 miles (4.3 km) to the bridge over the Santa Fe River. Launch boat at the county boat ramp at the bridge and boat upriver approximately 1.4 miles (2.3 km). The spring is on the north (left) side, just past the site of an old bridge across the river.

Description – Betty Spring forms an oval shaped pool that measures 19.4 ft (5.9 m) wide and 34.5 ft (10.5 m) long and is enclosed by a limestone wall. Depth is 7 ft (2.1 m). Water is clear with a greyish-brown color. No spring boil was observed in October 2002; however, the spring was discharging water. The sand-bottomed spring flows about 4 ft (1.2 m) into the Santa Fe River from the south. *Hydrilla* and algae are abundant within the spring. The privately-owned surrounding land is a swampy, forested lowland associated with the Santa Fe River. Discharge on September 17, 1997 measured 2.50 ft^3/s[4].

Blue Sink Spring

Figure 201. Blue Sink Spring (photo by T. Roberts).

Location – Lat. 30° 20' 08.49" N, Long. 82° 48' 30.39" W (NE¼ NW¼ NW¼ sec. 10, T. 2 S, R. 15 E). From the intersection of I-75 and CR 136, travel east on CR 136 approximately 0.5 miles (0.8 km) to the intersection with McClurg Lane. Turn north (left) onto McClurg Lane and travel approximately 1.1 miles (1.8 km) to the intersection with 64th Terrace. Turn west (left) onto 64th Terrace and travel approximately 0.6 miles (1 km). The spring will be located on the north side of the road.

Description – Blue Sink Spring forms an oval-shaped pool measuring 135 ft (41.2 m) northeast to southeast and 87 ft (26.5 m) northeast to southwest. A maximum depth of 60 ft (18.3 m) was measured from the side of the pool, although locals report a depth of 250 ft (76.2 m). The surface of the pool is entirely covered by duckweed. No boil is visible. No run was observed during the September 2002 visit; however, Hornsby and Ceryak (1998) report a 0.23 mile (0.4 km) spring run. On the east side of the pool, the banks rise approximately 40 ft (12.2 m) above the water surface. To the southwest, the land gently slopes 20 ft (6.1) above the water surface. A two-level wooden observation deck is located on the northeast side of the pool. The spring is within a dense forest on SRWMD land. Discharge on May 28, 1998 measured 43.87 ft^3/sec[4].

Coffee Springs

Figure 202. Coffee Springs (photo by T. Roberts).

Location – Lat. 29° 57’ 34.05” N, Long. 82° 46’ 31.18” W (NW¼ SW¼ SW¼ sec. 13, T. 6 S, R. 15 E.) Coffee Springs are located approximately 1 mile (1.6 km) downriver from Mill Pond Spring or 0.8 mile (1.3 km) below the midpoint tube launch on the Ichetucknee River. Access to this spring is restricted.

Description - Coffee Springs form a semi-circular spring pool that measures 60 ft (18.6 m) from north to south. The spring consists of two limestone seeps, one on the north end of the spring pool and one on the east side. The pool has a sand bottom covered with aquatic vegetation and algae. The water is clear. The spring is a protected snail habitat area within Ichetucknee Springs State Park. Access is prohibited and a fence runs across the spring run where it meets the Ichetucknee River. The land surface surrounding the pool rises 8 ft (2.4 m) above the water level to a mixed hardwood forest.

Cow Spring

Figure 203. Cow Spring (photo by T. Roberts).

Location – Lat. 30° 06'19.02" N, Long. 83° 06' 49.71" W (SE¼ NE¼ SE¼ sec. 28, T. 4 S, R. 12 E). From the intersection of SR 51 and 180th Street in Luraville, drive south on SR 51 approximately 1.6 miles (2.6 km) to the bridge over the Suwannee River. Launch boat at the bridge boat landing and boat approximately 4.4 miles (7.1 km) downriver. Cow Spring is located inland from Running Springs approximately 0.1 miles (0.2 km) northeast.

Description – Cow Spring has an oval shaped pool 66 ft (20.1 m) long and 18 ft (5.5 m) wide. The circular vent is in the center of the spring pool and is approximately 25 ft (7.6 m) deep. The pool bottom is limestone with aquatic vegetation and a small amount of algae. There is no boil present on the blue-green water surface. The spring is currently flooded by the Suwannee River, however a discernable dry spring run bed leads 0.1 miles (0.2 km) southwest to the Suwannee River. The run has abundant vegetation including shrubs and small trees growing in its dry bed. The northwest, northeast and southeast banks of the pool have exposed limestone extending up to 6 ft (1.8 m) above the water surface. The southwest side of the pool slopes gently up into the surrounding woodlands. The spring is owned by the National Speleological Society and has an extensive, mapped cave system.

Devil's Eye Springs

Figure 204. Devil's Eye Springs (photo by T. Roberts).

Location – Lat. 29° 58' 25.23" N, Long. 82° 45' 36.03" W (SW¼ SW¼ SW¼ sec. 7, T. 6 S, R. 16 E) From Branford, drive southeast on US 27 approximately 10 miles (16.1 km) to the intersection with SR 137. Turn north (left) onto SR 137 and take the first paved road on right (CR 238) to the Ichetucknee Springs State Park entrance on the right. A canoe launching area is available, and the springs are on the west bank about 850 feet (259.1 m) downstream (about a three minute paddle) from Mission Springs.

Description – Devil's Eye Springs is composed of two, attached spring pools. One pool is 200 ft (61 m) north to south and 160 ft (48.8 m) east to west, with an average depth of 12.4 ft (3.8 m). The bottom of the pool is limestone with some sand areas and has abundant aquatic grass. The water is clear blue and a large boil is visible. The second spring vent is located 120 ft (36.6 m) northwest of the first vent in a slightly smaller pool. Water issues from a series of seeps along a nearly vertical limestone exposure in the spring pool. The water is clear and light blue. The spring run is 30 ft wide (9.1 m), 2 ft (0.6 m) deep, and flows 20 ft (6.1 m) south to the Ichetucknee River. The spring is located within the Ichetucknee Springs State Park in the densely forested riparian zone associated with the Ichetucknee River. The spring is accessible from the river, but swimming and landfall are not permitted. This spring is also known as Boiling Spring.

Hidden Spring

Figure 205. Hidden Spring (photo by T. Roberts).

Location – Lat. 30° 06' 09.37" N, Long. 83° 06' 50.40" W (NE¼ SE¼ SE¼ sec. 28, T. 4 S, R. 12 E) From the junction of SR 51 and 180th Street in Luraville, drive south on SR 51 approximately 1.6 miles (2.6 km) to the boat landing at the bridge over the Suwannee River. Launch boat and travel downriver approximately 4.6 miles (7.4 km) to the spring. It is located along the east bank approximately 0.2 miles (0.3 km) below the southern most Running Spring.

Description – Hidden Spring (also known as SUW919971) is a system of seeps that span a horizontal distance of 15 ft (4.7 m) along the riverbank. The river bottom in front of these seeps is composed of limestone with some overlying sand and is mostly covered by aquatic vegetation and algae. The spring water is clear with a greenish hue. A distinct mixing zone between the spring water and the tannic river water is visible near the vents. Exposed limestone rises 6 ft (1.8 m) above the surface of the spring, topped by approximately 5.5 ft (1.7 m) of mostly organic overburden. A dense mixed hardwood forest surrounds the spring. Discharge on September 19, 1997 measured 2.62 ft^3/sec[4].

Lime Run Spring (or Sink)

Figure 206. Lime Run Spring (photo by T. Roberts).

Location – Lat. 30° 23' 20.39" N, Long. 83° 09' 48.12" W (SW¼ NW¼ NW¼ sec. 19, T. 1 S., R. 12 E.) From the boat landing in the Suwannee River State Park, follow the trail marked "Dry Run" 0.7 miles (1.1 km) to the spring pool.

Description - Lime Run Spring, also known as Dry Run Spring, has a circular spring pool 129 ft (39.3 m) in diameter. The water is tannic and some aquatic vegetation grows around the edges of the pool. The spring was not flowing during the November 2002 visit and the spring run was dry. The run averages 20 ft (6.2 m) wide and is approximately 0.6 miles (1 km) long. Banks around the spring pool rise steeply 60 ft (18.3 m) from the water surface. The spring is surrounded by private property but the run passes through the Suwannee River State Park. The spring is surrounded by a dense hardwood forest. A trail leads to the spring, crosses a bridge over the spring run, and continues through the park. Discharge on May 14, 1998 measured 173.25 ft^3/sec[(4)].

Lime Spring

Figure 207. Lime Spring (photo by T. Roberts).

Location – Lat. 30° 23' 28.39" N, Long. 83° 10' 07.32" W (NW¼ NE¼ NE¼ sec. 24, T. 1 S., R. 11 E.) From the boat landing in the Suwannee River State Park, cross over the wooden bridge and follow to the riverside trail and the spring is on the left, approximately 250 feet (76.2 m) west of the boat landing.

Description – Lime Spring, also known as Little Gem, forms an oval pool that measures 13 ft (3.9 m) by 16 ft (5.0 m). Depth of the pool is 12 ft (3.7 m). The spring flow was reversed during the November 2002 visit and water was siphoning into the vent. The river water flowing into the siphon was tannic. Duckweed was present on the pool surface. Limestone bluffs rise approximately 25 ft (7.6 m) above the pool to an access trail. Wooden steps lead down the eastern bank of the spring pool. Grasses, shrubs, and mixed hardwoods sparsely cover the surrounding hillside. Behind the trail above the spring the hardwood forest becomes denser. The spring is located within the Suwannee River State Park. Discharge on September 23, 1997 measured 20.30 ft^3/sec[4].

Luraville Spring

Figure 208. Luraville Spring (photo by T. Roberts).

Location – Lat. 30° 07' 10.40" N, Long. 83° 10' 01.65" W (SW¼ NE¼ SE¼ sec. 24, T. 4 S., R. 11 E.). From the junction of SR 51 and Luraville Road in Luraville, drive east on on Luraville Road to the dive shop about 0.25 miles (0.4 km) on the right. The spring is on private property to the right and behind the dive shop. It is about 600 feet (182.9 m) southeast of the junction of CR 51 and Luraville Road.

Description – Luraville Spring has an oval-shaped spring pool that is approximately 10 ft (3.1 m) wide and 20 ft (6.1 m) long. It discharges from the base of an overhanging limestone bank that is about 8.0 ft (2.4 m) high. The spring depth at the vent is 23.1 ft (7.0 m), but the rest of the spring pool averages about 0.5 ft (0.1 m) deep. The water is clear and bluish. The spring bottom is exposed sand with a thin layer of algae. No spring boil is observed. The spring is surrounded by a privately-owned, densely-forested land. Limestone and sand banks directly above the vent rise to about 20 ft (9.1 m) above the spring. Luraville Spring is connected to the Peacock Spring underwater cave system, which has been mapped for several miles underground. Discharge on May 7, 1998 measured 6.74 ft^3/s[4]. Rosenau et al. (1977) reported two springs. Hornsby and Ceryak (1998) report only one spring.

Orange Grove Spring

Figure 209. Orange Grove Spring (photo by T. Roberts).

Location – Lat. 30? 07' 38.14" N, Long. 83? 07' 50.75" W (SE¼ NE¼ NE¼ sec. 20, T. 4 S., R. 12 E.). From the junction of SR 51 and Luraville Road in Luraville, drive east on Luraville Road and Orange Grove Spring is located about 3.0 miles (4.8 km) in Peacock Springs State Park.

Description – Orange Grove Spring is a karst window. Its spring pool measures about 44 ft (13.4 m) wide and 80 ft (24.4 m) long. Depth is approximately 45 ft (13.7 m). The spring water had relatively poor visibility of about 4 ft (1.2 m) and the water was greenish colored. A slight boil was observed on the water surface in July 2003. Thin layers of algae are along the spring bottom and a sparse layer covers the spring pool. Orange Grove Spring apparently flows into a nearby sinkhole during times of higher water levels. Scalloped limestone crops out around the spring. The spring is within a forested area, and private land to the north rises gently to15 ft (4.6 m) above the water.

Peacock Springs

Figure 210. Peacock Springs (photo by A. Willet).

Location – Lat. 30° 07' 23.62" N, Long. 83° 07' 59.35" W (SW¼ SE¼ NE¼ sec. 20, T. 4 S, R. 12 E). Peacock Springs is located 2 miles (3.2 km) east of Luraville in Peacock Springs State Park and is a popular place for cave diving. From the junction of SR 51 and Luraville Road in Luraville, drive east on Luraville Road approximately 2 miles (3.2 km) to the Peacock Spring State Park entrance.

Description – Peacock Springs has three vents in a pool that measures 150 ft (45.7 m) long and 90 ft (27.4 m) wide. Depth of the spring is variable, averaging 5 ft (1.5 m) deep in much of the pool but reaching depths of 40 ft (12.2 m). The cave entrance, near the north end of the pool, is distinguished by wooden steps leading to a limestone shelf where the water is 20 ft (6.1 m) deep. The spring water is clear and blue. The elongated pool gives way to a run 15 ft (4.6 m) wide, 1 ft (0.3 m) deep, and flows south approximately 1.5 miles (2.4 km) into the Suwannee River. A steep 5 ft (1.5 m) limestone ledge surrounds the pool, and levels out into a state-owned hardwood forest where a number of sinkholes can be found. Peacock Spring has an extensive cave network that connects to nearby sinkholes and springs. Discharge on July 30, 1997 measured 8.87 ft^3/s[4].

Royal Spring

Figure 211. Royal Spring (photo by T. Roberts).

Location – Lat. 30° 05' 01.36" N, Long. 83° 04' 29.21" W (SW¼ NE¼ NW¼ sec. 1, T. 5 S, R. 12 E). From the junction of US 129 and CR 349 in O'Brien, drive northwest on CR 349 approximately 8.9 miles (14.3 km) to the intersection with 198th Terrace. Turn west (left) onto 198th Terrace and travel approximately 0.7 miles (1.1 km) to the intersection with 157th Lane. Turn south (left) onto 157th Lane and travel approximately 0.3 miles (0.5 km) to the spring.

Description – Royal Spring forms a spring pool 160 ft (48.8 m) northwest to southeast and 105 ft (32 m) northeast to southwest. The maximum depth is approximately 42 ft (12.8 m). The spring was not flowing during the September 2002 visit and the entire pool surface was covered with duckweed. The dry spring run forms on the northeast side of the spring pool, travels approximately 200 ft (61 m) and enters the Suwannee River from the north. On the north and east sides of the pool, limestone and clayey sand walls rise 25 ft (7.6 m) above the water surface. A set of wooden stairs leads down to the water on the north side of the pool. To the east are the remnants of an old cement retaining wall. The spring is surrounded by county-owned forested riparian corridor associated with the Suwannee River. Discharge on September 17, 1997 measured 6.23 ft^3/s[4].

Shingle Spring

Figure 212. Shingle Spring (photo by D. Hornsby).

Location – Lat. 29° 56' 03.82" N, Long. 82° 55' 13.62" W (SE¼ SE¼ NW¼ sec. 28, T. 6 S., R. 14 E.). From the US 27 bridge over the Suwannee River in Branford, drive east on US 27 approximately 1.4 miles (2.3 km) to the intersection with 79th Road. Turn south (right) onto 79th Road and travel approximately 1.8 miles (2.9 km) to the intersection with 288th Street. Turn west (right) onto 288th Street and travel approximately 1.2 miles (1.9 km) to the boat landing on the Suwannee River. Launch boat and travel approximately 0.9 miles (1.4 km) north (upriver) to the spring run which enters the river from the east side.

Description – Shingle Spring forms a circular pool 22 ft (6.7 m) in diameter. The depth reported by Hornsby and Ceryak (1998) is 60 ft (18.3 m). The spring was barely flowing during the December 2002 visit and the water was tannic. The run averages 9 ft (0.3 m) wide and 2 ft (0.6 m) deep and travels 500 ft (152.4 m) to enter the Suwannee River from the east. The land around the pool is privately owned and gently rises 25 ft (7.6 m) above the water surface to a dense hardwood forest. Discharge on July 21, 1997 measured 12.13 ft^3/s[4].

Shirley Spring

Figure 213. Shirley Spring (photo by T. Roberts).

Location – Lat. 30° 12’ 39.63” N, Long. 83° 14’ 41.35” W (SW¼ SE¼ NW¼ sec. 20, T. 3 S., R. 11 E.). From the bridge over the Suwannee River in Dowling Park, take CR 250 west approximately 0.7 miles (1.1 km) to the intersection with CR 251. Turn south (left) onto CR 251 and travel approximately 1.5 miles (2.4 km) to the intersection with Sand Pond Road. Turn east (left) onto Sand Pond Road and drive approximately 1.1 miles (1.8 km) to Sims Landing. Travel south (downstream) approximately 0.7 miles (1.1 km) to the spring which is on the east bank.

Description – Shirley Spring has an oval shaped spring pool that measures 10 ft (3.1 m) wide and 12 ft (3.7 m) long. Spring depth is 8.9 ft (2.7 m). The spring is impounded by a limestone retaining wall. The water is brown and murky. No spring boil was observed on the spring surface in December 2002. At this time, the spring was not flowing, and there was a dry rocky area about 5 ft (0.6 m) wide separating the spring from the Suwannee River. When flowing, the spring would discharge into the Suwannee River. Limestone crops out at the edge of the spring pool. The pool is full of aquatic vegetation. Shirley Spring is within the forested riparian corridor associated with the Suwannee River. River banks above the spring rise to about 15.0 ft (4.5 m) above current water level. Discharge on September 29, 1997 measured 1.67 ft^3/s[4].

Stevenson Spring (SUW 923973)

Figure 214. Stevenson Spring (SUW 923973) (photo by T. Roberts).

Location – Lat. 30° 25' 01.52" N, Long. 83° 09' 10.62" W (NE¼ SE¼ NE¼ sec. 34, T. 7 S., R. 16 E.) From intersection of U.S. 27 and State Road 51 in Mayo, drive north on SR 51 approximately 3 miles (4.8 km) to the bridge over Suwannee River. Turn right (east) into the public park at the bridge (on the southeast side), which is equipped with launching facilities. Boat down river approximately 0.25 miles (0.4 km) to the spring on the right (east) side of the river. (Looking back upriver from the spring, the boat ramp and edge of the highway are visible, but not the bridge structure.)

Description – SUW 923973 occupies a small, circular cove along the south side of Suwannee River that measures 15 ft (4.7 m) in diameter. The pool bottom slopes downward to a 10 ft (3.1 m) wide cave opening on the south side of the pool. Maximum depth is 5.1 ft (1.6 m). The limestone bottom of the pool has some algae present while the surface of the water is completely clear of algae and aquatic vegetation. The water is clear blue and a prominent boil is visible. Exposed limestone rises 3 ft (0.9 m) above the pool surface. The spring is surrounded by private property. The pool banks slope up to 12.0 ft (3.7 m) into a dense mixed hardwood forest. Discharge on September 23, 1997 measured 92.81 ft^3/s[4]. This spring has an extensive cave system that is mapped and is called Line Eater Cave by cave divers.

Suwannee Blue Springs

Figure 215. Suwannee Blue Springs (photo by T. Roberts).

Location – Lat. 30° 04’ 53.30” N, Long. 83° 04’ 08.48” W (NW¼SW¼ NE¼ sec. 1, T. 5 S., R. 12 E.). From the junction of US 129 and CR 349 in O’Brien, drive northwest on CR 349 approximately 8.9 miles (14.3 km) to the intersection with 198th Terrace. Turn west (left) onto 198th Terrace and travel approximately 0.7 miles (1.2 km) to the intersection with 157th Lane. Turn south (left) onto 157th Lane and travel approximately 0.3 miles (0.5 km) to the boat landing at Royal Spring. Launch boat at Royal Spring and go downstream approximately 0.25 miles (0.4 km), and the spring is located on the northeast side of the river.

Description – Suwannee Blue Springs is a system of interconnected vents and pools spanning over 160 ft (47.8 m) in length. Natural limestone bridges separate the pools. The pool furthest north measures 13.5 ft (4.1 m) north to south, 4.0 ft (1.2 m) east to west and 6.5 ft (2.0 m) deep. Water flows from a limestone outcrop on the north edge of the pool. The pool bottom is limestone and the water is clear green. Algae and algae-coated aquatic vegetation are abundant in the pool. The spring water flows into the second pool, due south of the first pool. The second pool is oval and measures 23 ft (7.0 m) north to south and 6 ft (1.8 m) east to west. Water flows from various small cavities in the limestone around the pool. The water is clear blue and the pool does not have as much algae or aquatic vegetation as the first pool. The third pool, due south of the second pool, measures 32 ft (9.8 m) by 15 ft (4.6

m). Water flows from cavities in the limestone on the east and west sides of the pool. The sand bottom pool has aquatic vegetation and sparse algae. The fourth and largest pool, measures 93 ft (28.3 m) north to south and averages 7 ft (2.1 m) wide. This pool appears to be discharging the most water though no boils are visible on any of the pool surfaces. Water from this last pool passes underground and feeds into the river by three different runs. The most significant run measures 10 ft (3.1 m) long and averages 5 ft (1.6 m) wide and 3 ft (0.9 m) deep. High ground slopes up 4 ft (1.2 m) above the spring pool surfaces and trails run along side the spring. The spring is surrounded by private land with a dense hardwood forest. Discharge on September 17, 1997 measured 35.46 ft^3/s[(4)].

SUW718971

Figure 216. SUW718971 (photo by T. Roberts).

Location – Lat. 30° 03’ 50.56” N, Long. 83° 03’ 43.19” W (NW¼ NW¼ SW¼ sec. 7, T. 5 S., R. 13 E.) From the junction of US 129 and CR 349 in O’Brien, drive northwest on CR 349 approximately 8.9 miles (14.3 km) to the intersection with 198th Terrace. Turn west (left) onto 198th Terrace and travel approximately 0.7 miles (1.1 km) to the intersection with 157th Lane. Turn south (left) onto 157th Lane and travel approximately 0.3 miles (0.5 km) to the boat landing at Royal Spring. Launch boat at Royal Spring and go downstream approximately 1.8 miles (2.9 km) and the spring is located along the northeast bank.

Description – SUW718971 has an oval shaped spring pool that measures 10 ft (3.1 m) wide and 12 ft (3.7 m) long. Depth is 3.1 ft (0.9 m). The water is a light, yellowish-brown with excellent clarity. The spring pool has a sand bottom with sparse amounts of algae and some tree debris. Limestone is exposed at the vent, which is located on the north side of the pool where a prominent boil can be seen. The sand-bottomed spring run is canopied by low tree branches. The run is 1.1 ft (0.3 m) deep, 8 ft (2.4 m) wide, and flows south about 35 ft (10.7 m) into the Suwannee River. The private land around the spring is generally low and the spring is within the heavily forested Suwannee River floodplain. Discharge on July 18, 1997 was measured at 7.27 ft^3/s[4].

SUW725971

Figure 217. SUW725971 (photo by T. Roberts).

Location – Lat. 30° 03’ 43.26” N, Long. 83° 03’ 26.30” W (SW¼ NE¼ SW¼ sec. 7, T. 5 S., R. 13 E.) From the junction of US 129 and CR 349 in O’Brien, drive northwest on CR 349 approximately 8.9 miles (14.3 km) to the intersection with 198th Terrace. Turn west (left) onto 198th Terrace and travel approximately 0.7 miles (1.1 km) to the intersection with 157th Lane. Turn south (left) onto 157th Lane and travel approximately 0.3 miles (0.5 km) to the boat landing at Royal Spring. Launch boat at Royal Spring and go downstream approximately 2.1 miles (3.4 km) and the spring vents from the west bank.

Description – SUW725971 forms a semi-circular pool 8 ft (2.4 m) northeast to southwest and averages 7 ft (2.1 m) wide. The vent is a submerged limestone dissolution feature on the north side of the pool approximately 2.7 ft (0.8 m) deep. The limestone bottomed pool has sparse aquatic vegetation but is covered with algae. The water is clear with a slight blue hue and a prominent boil is visible. Exposed limestone surrounds the pool. The banks rise up to 10 ft (3.1 m) above the pool surface to a densely wooded area. Limestone crops out around the pool. A man-made limestone wall dams the spring pool at its confluence with the Suwannee River. Discharge on July 25, 1997 measured 8.65 ft^3/s[(4)].

SUW917971

Figure 218. SUW917971 (photo by D. Hornsby).

Location – Lat. 29° 55' 56.61" N, Long. 82° 48' 02.70" W (SW¼ NW¼ SE¼ sec. 27, T. 6 S., R. 15 E.) From the US 129 bridge over the Santa Fe River, put in at Sandy Point landing (at the bridge) and travel upriver approximately 4.6 miles (7.4 km). The spring is located on the north side of the river just before the confluence of the Ichetucknee and Santa Fe Rivers.

Description – SUW917971 forms a circular spring pool 18 ft (5.6 m) in diameter and 1.9 ft (0.6 m) deep. The spring was not flowing during the December 2002 visit though the water was clear. Aquatic plants cover most of the pool bottom and algae are present. The small spring run is 1 ft (0.3 m) wide, 0.3 ft (0.1 m) deep, 12 ft (3.7 m) long and enters the Santa Fe River from the north. The banks of the spring pool rise 3.0 ft (0.9 m) above the water surface to a forested floodplain. Discharge on September 17, 1997 was estimated at 3.0 ft^3/s[(4)].

SUW922971

Figure 219. SUW922971 (photo by D. Hornsby).

Location – Lat. 30° 17' 08.69" N, Long. 83° 13' 51.70" W (NW¼ SW¼ NW¼ sec. 28, T. 2 S., R. 11 E.). From the Dowling Park boat landing on the Suwannee River, boat upriver approximately 4.2 miles (6.8 km) and the spring will be on the east (right) bank of the river.

Description – SUW922971 discharges from a 5.0 ft wide (1.5 m) vent located beneath the south Suwannee River bank. Clear blue spring water flows directly into the tea-colored river. Limestone is exposed at the vent and is covered with a thin layer of algae. Very little flow was noted. Directly above the vent, a steep, limestone bluff rises to approximately 5.5 ft (1.7 m) above current water levels. The surrounding environment consists of the Suwannee River and its forested riparian corridor. Discharge on September 22, 1997 was estimated at 1.0 ft^3/s[4].

SUW1017971

Figure 220. SUW1017971 (photo by T. Roberts).

Location – Lat. 30° 25' 42.44" N, Long. 83° 01' 46.57" W (NW¼ NW¼ SW¼ sec. 4, T. 1 S., R. 13 E.). From the junction of CR 249 and CR 795 (Boy's Ranch Road) northeast of Live Oak, drive east then north on CR 795 approximately 7.2 miles (11.6 km) to the canoe launch at the Florida Sheriff Boy's Ranch on the Suwannee River. Launch canoe (during low water periods this area is accessible only by canoe) and boat downriver approximately 1 mile (1.6 km) and the spring will be on the south (left) bank.

Description – SUW1017971 occupies a small cave at the base of the bank on the Suwannee River. The cave is approximately 6 ft (1.8 m) long. There was no boil present during the September 2002 visit and the spring was not flowing. Exposed limestone is present 4 ft (1.2 m) above the vent and forms an 8 ft (2.4 m) high vegetated bluff. A dense hardwood forest surrounds the spring. Discharge on October 17, 1997 measured 4.0 ft^3/s[4].

SUW1017972

Figure 221. SUW1017972 (photo by D. Hornsby).

Location – Lat. 30° 25' 22.95" N, Long. 83° 00' 55.53" W (SE¼ SE¼ SE¼ sec. 4, T. 1 S., R. 13 E.). From the junction of CR 249 and CR 795 (Boy's Ranch Road) northeast of Live Oak, drive east then north on CR 795 approximately 7.2 miles (11.6 km) to the canoe launch at the Florida Sheriff Boys Ranch on the Suwannee River. Launch canoe (during low water periods this area is accessible only by canoe) and the spring is just upriver from the canoe launch on the south side of the river.

Description – SUW1017972 has an oval shaped spring pool that measures 16.0 ft (4.9 m) wide and 29.4 ft (9.0 m) long. Its depth measures 0.8 ft (0.2 m). Spring water is yellowish-brown and is slightly turbid. The spring bottom is limestone with a thin dark silt deposit. The spring was not flowing during the December 2002 visit. Moss-covered limestone crops out around the edge of the spring pool. A mud-bottomed, 10 ft (3.1 m) long spring run leads west to the Suwannee River. Land rises around the spring up to 14.0-16.0 ft (4.3-4.9 m) above the present water level. The area around the spring is owned by the Florida Sheriff's Youth Ranch and consists of the Suwannee River and its forested riparian corridor.

TAYLOR COUNTY

Beaver Creek Spring (TAY76992)

Figure 222. Beaver Creek Spring (photo by A. Willet).

Location – Lat. 29° 45' 57.41" N, Long. 83° 20' 06.18" W (NW¼ SW¼ SW¼ sec. 21, T. 8 S., R. 10 E.). Beaver Creek Spring is located 0.8 miles (1.2 km) south of Tennille on private property off of SR 51. From the intersection of US 27 and SR 51 in Tennille, drive southwest on SR 51 approximately 0.8 miles (1.3 km) to the intersection with CR 491. Turn south (left) onto CR 491 and drive approximately 0.2 miles (0.3 km) to a T junction. The spring is located approximately 230 feet (70 m) due south of this junction.

Description – Beaver Creek Spring forms an oval-shaped pool 120 ft (36.7 m) by 80 ft (24.4 m), and 6 ft (1.8 m) deep. Two small vents are located in the center of the sand bottom spring pool. Detritus and brown algae also coat the bottom and the spring water is slightly cloudy. Two small boils are visible in the center of the pool. The spring run is 10 ft (3 m) wide, 3 ft (0.9 m) deep, and flows 0.3 miles (0.5 km) south into the Steinhatchee River. The SRWMD property around this spring is a lowland hardwood forest. Evidence of beavers is apparent around the spring pool and run. Discharge of Beaver Creek Spring measured on July 6, 1999 was 74.98 ft^3/s [(4)].

Big Spring

Figure 223. Big Spring (photo by A. Willet).

Location – Lat. 29° 58' 27.37" N, Long. 83° 44' 19.80" W (SW¼ SW¼ NW¼ sec. 9, T. 6 S., R. 6 E). Big Spring is located at the head of Big Spring Creek in the Big Spring Creek Wildlife Management Area and is 11 miles (17.7 km) southwest of Perry. Access is by boat. From the boat landing off CR 361A, boat northwest to the mouth of Big Spring Creek approximately 5 miles (8.1 km).

Description – Big Spring occupies a circular pool 110 ft (33.5 m) in diameter with an estimated depth of 30 ft (9.1 m). During the June 2003 visit, the spring vent was not visible but water depths indicate it is located near the center of the pool. Brown, blue-green, and orange algae grow along the bottom of the pool. The water is clear but tannic with no visible boil. The spring run is 15 ft (4.6 m) wide, 2 ft (0.6 m) deep and flows approximately 0.9 miles (1.5 km) south to the Gulf of Mexico. Algae also occurs in the run. The publicly-owned area surrounding the spring is a hardwood forest mixed with palms, sawgrass and marsh. Discharge on June 9th 1999 measured 18.42 ft^3/s [4].

Bradley Spring

Figure 224. Bradley Spring (photo by D. Hornsby).

Location – Lat. 29° 42'00.17" N, Long. 83° 24' 40.07" W (NE¼ SE¼ NW¼ sec. 15, T. 9 S., R. 9 E.). From the intersection of Beach Road and 5th Avenue in Steinhatchee, drive north on Beach Road approximately 1.7 miles (2.7 km) to the intersection with an unnamed road on the west (left) side of the road just past a solid waste facility on the left. Turn west (left) just past the facility, and then fork to the right and follow the road directly to the spring.

Description – Bradley Spring is enclosed on three sides by a brick wall, creating a rectangular-shaped spring pool 8 ft (2.4 m) long and 7 ft (2.1 m) wide. Clear water issues from a small sand boil at the base of the wall. The pool bottom is sand with a depth of 2.5 ft (0.8 m). No aquatic vegetation or algae are present. A prominent boil is visible at the water's surface. Limestone is exposed around the edge of the spring pool. There is a hydrogen sulfide odor from the water. The spring run is 6 ft (1.8 m) wide, 0.4 ft (0.1 m) deep, and flows 200 ft (61 m) west into the nearby floodplain. The run bottom is sand with green algae along its edges. Bradley Spring was once a county recreational park; however, during the March 2003 visit the park was closed. There are a few picnic tables nearby and a 4 ft (1.2 m) diameter sinkhole 6 ft (1.8 m) to the east of the spring. To the northeast of the spring pool, there is an open, gravel parking lot. The entire area is surrounded by a dense pine and palmetto forest. Discharge on June 22, 1999 measured 5.47 ft^3/s [4].

Camp Ground Spring

Location – Lat. 30° 04' 04.27" N, Long. 83° 33' 13.76" W (SW¼ NW¼ NW¼ sec. 8, T. 5 S, R. 8 E). Camp Ground Spring is located on private property about 3 miles (4.8 km) south of Perry on SR 30, between the Perry-Foley Airport and the Foley plant of Buckeye Cellulose Corporation.

Description – Camp Ground Spring occupies a circular spring pool 90 ft (27.4 m) in diameter with an estimated depth of 10 ft (3.1 m). During the June 2003 visit, the spring vent was not visible. Brown algae grow on the numerous branches in the pool. The water is clear and a slight boil is visible in the center of the pool. The spring run is 5 ft (1.5 m) wide, 2 ft (0.6 m) deep and flows 50 ft (15.2 m) south to the Fenholloway River. Trash and litter are abundant in the privately-owned hardwood forest surrounding the spring.

Cedar Island Spring

Figure 225. Cedar Island Spring (photo by A. Willet).

Location – Lat. 29° 48' 58.73" N, Long. 83° 35' 01.97" W (SE¼ NW¼ NW¼ sec. 1, T. 8 S., R. 7 E.). Cedar Island Spring is located approximately 1 mile (1.6 km) southeast of Keaton Beach in the community of Cedar Island. From the intersection of CR 361 (Beach Road) and Cedar Island Road just east of Cedar Island, drive west on Cedar Island Road approximately 0.3 miles (0.5 km) to the intersection with Sand Piper Road. Turn north (right) onto Sand Piper Road and drive approximately 0.2 miles (0.3 km). The spring will be on the west side adjacent to the road.

Description – Cedar Island Spring, also known as Sandpiper Spring, issues directly into a tidal salt marsh. The pool is reported to be 80 ft by 125 ft (24.4 by 38.1 m). The spring is approximately 14 ft (4.2 m) deep. The water is tannic and a prominent boil is visible. The spring is nearly hidden by the salt marsh grasses growing around it and is roughly 110 ft (33.5 m) away from the shoreline. Discharge was estimated at 15 ft^3/s[(4)] on June 22, 1999.

Eva Spring

Figure 226. Eva Spring (photo by T. Roberts).

Location – Lat. 29° 40'39.77" N, Long. 83° 23' 57.31" W (SE¼ SW¼ SW¼ sec. 23, T. 9 S., R. 9 E.). From the junction of CR 361 (Beach Road) and 3rd Avenue in Steinhatchee, travel west on 3rd Avenue approximately 0.16 miles (0.26 km). The spring is located on the west side of the road.

Description – Eva Spring is encircled by concrete bags creating an oval-shaped pool 57 ft (17.4 m) wide and 75 ft (22.9 m) long. Depth is 6.0 ft (1.8 m). The water in the spring is not very clear and is dark green. The bottom of the spring pool cannot be seen due to the poor water clarity. Exposed limestone, covered with a thin layer of algae, is discernable along the spring pool edge. A slight boil is visible at the center of the pool. The spring run is 4 ft (1.2 m) wide, 2 ft (0.6 m) deep and flows 300 ft (91.4 m) west into the Steinhatchee River. The run bottom is limestone and covered with a thin layer of sand and algae. Land surrounding the spring pool rises to 4 ft (1.2 m) and along the spring run the land is 2-4 ft (0.6-1.2 m) higher than the water surface. Private residences are located 100-150 ft (30.5-45.7 m) to the north and south. A privately-owned sparse forest of pines, palmettos and grass surrounds the spring. Discharge on June 25, 1999 measured 1.72 ft^3/s [(4)].

Fenholloway Spring

Figure 227. Fenholloway Spring (photo by A. Willet).

Location – Lat. 30° 04' 23.40" N, Long. 83° 40' 00.32" W (SW¼ NE¼ SW¼ sec. 6, T. 5 S., R. 7 E.). Fenholloway Spring is located 5.5 miles (8.9 km) west of Perry near the confluence of the Fenholloway River and Spring Creek along the southern bank of the Fenholloway River. It is also approximately 0.4 miles (0.6 km) downriver from the CR 356 bridge over the Fenholloway River.

Description – Fenholloway Spring discharges from the base of a large oak tree. The water is clear and contains large amounts of greenish algae. The run is 4 ft (1.6 m) wide, 0.2 ft (0.1 m) deep and flows north 100 ft (30.5 m) to the Fenholloway River. The area surrounding the spring is a hardwood and palmetto thicket with abundant cypress knees in the lowlands. The spring is on private timber company land and is leased to a local hunting club.

Folsom Spring

Figure 228. Folsom Spring (photo by T. Roberts).

Location – Lat. 30° 06' 49.86" N, Long. 83° 34' 41.33" W (SW¼ SW¼ SE¼ sec. 24, T 4 S, R. 7 E). Folsom Spring is located in Folsom Spring Recreation Park in Perry. From the junction of US 27 (San Pedro Avenue) and South Center Street, drive north on South Center Street approximately 0.1 miles (0.2 km) and the park will be on the east (right) side of the road.

Description – Folsom Spring occupies an oval-shaped spring pool 140 ft (42.7 m) long, and 72 ft (22 m) wide. Water flows from ten fissures, each of which are less than 1 ft (0.3 m) long and 0.3 ft (0.1 m) wide, on the northwest side of the pool. There are also three prominent boils on the northeast side of the pool indicating more limestone vents on the pool bottom. Maximum depth is 6 ft (1.8 m). Limestone is exposed around the pool edge and is visible through the tannic water. The run is 18 ft (5.4 m) wide, 4 ft (1.2 m) deep and flows 350 ft (106.7 m) west to Spring Creek. The public land around the spring is grass, exposed soil and mixed hardwood trees. Folsom Spring is open to the public as a recreational park but swimming is prohibited. The estimated discharge on September 24, 1999 was 2 ft^3/s[4].

Hampton Spring

Figure 229. Hampton Spring (photo by R. Means).

Location – Lat. 30° 04' 53.36" N, Long. 83° 39' 46.25" W (SW¼ NW¼ NE¼ sec. 6, T. 5 S, R. 7 E). Hampton Spring is located 4.4 miles (7.1 km) west of Perry off of US 98. From the intersection of US 98 and CR 356 (Hampton Spring Road), travel southwest on CR 356 approximately 0.7 miles (1.1 km) to the intersection with an unnamed road on the west (right) side of the road. Turn west (right) here and drive approximately 0.1 miles (0.2 km) to the bridge over Spring Creek. Hampton Spring is located approximately 0.1 miles (0.2 km) upstream along the east bank of Spring Creek.

Description – Hampton Spring discharges from the foundation of the historic Hampton Springs Hotel. The spring was surrounded by concrete to create a bathing area and swimming pool for the hotel. Water from a 2 ft (0.6 m) concrete pipe is diverted first into a semicircular concrete pool 10 ft (3.1 m) in diameter. Steps lead down to the pool along the semicircle on the east side. The spring flows west into a 6 ft (1.8 m) square pool surrounded on three sides by a retaining wall. The water then flows along a concrete canal into a larger rectangular pool. The largest pool is 45 ft (13.7 m) long, 12 ft (3.7 m) wide, and 4 ft (1.2 m) deep. Water from this pool is released into Spring Creek through a pipe in the foundation. The spring water is clear with a strong hydrogen sulfide smell and has large amounts of dark green algae. All three pools have crumbling foundations. A hardwood forest is encroaching on the old foundation and spring. The hotel was a popular destination during the early 20th century and the county is currently renovating the property with plans to reopen the spring to the public. Discharge rate on June 9, 1999 measured 0.213 ft^3/s [4].

Jabo Spring

Figure 230. Jabo Spring (photo by A. Willet).

Location – Lat. 29º 52' 57.31" N, Long. 83º 37' 22.51" W (SE¼ NE¼ SE¼ sec. 9, T. 7 S, R. 7 E). Jabo Spring is located on private land 10 miles (16.1 km) south of U.S. 19 off of CR 361 (Beach Road). From the intersection of US 19 and CR 361 (Beach Road) drive south on CR 361 approximately 13.2 miles (21.2 km) to Adams Beach. The spring is approximately 0.5 miles (0.8 km) southeast of the intersection of CR 361 and Jabo Road.

Description – Jabo Spring has a small circular pool 25 ft (7.6 m) in diameter with an average depth of 1 ft (0.3 m). Clear water issues from a small sand vent creating a prominent boil at the surface. Detritus and thick mats of orange algae cover the bottom. The pool is connected to a pond roughly 200 ft (61 m) in diameter. A 10 ft (3.1 m) wide run flows from this pond 450 ft (137.2 m) southwest. Average depth of the run is 0.7 ft (0.2 m). The run connects with one of the many tidal creeks that flow into the Gulf of Mexico. Dense lowland forested private land surrounds the spring pool and run. Discharge on June 22, 1999 was 10.50 ft^3/s [(4)].

Spring Warrior Spring

Figure 231. Spring Warrior Spring (photo by A. Willet).

Location – Lat. 29° 56' 6.07" N, Long. 83° 36' 35.16" W (NE¼ NW¼ NE¼ sec. 27, T. 6 S, R. 7 E). Spring Warrior Spring is located along the western bank of Spring Warrior Creek. From the intersection of CR 361 (Keaton Beach Road) and Dennis Howell Road, travel southwest on Dennis Howell road approximately 1.5 miles (2.4 km) and the spring will be on the north (right) side of the road.

Description – Spring Warrior Spring discharges directly into Spring Warrior Creek from a 1 ft (0.3 m) diameter vent. The vent is 1 ft (0.3 m) deep. The clear water flows with enough force to form a very pronounced boil and provides a striking contrast to the tannic, dark water of the creek. A slight hydrogen sulfide odor is detectable. The area surrounding the spring is private property with hardwood forest and a palmetto understory. Discharge on July 6, 1999 measured 23.16 ft^3/s[4].

TAY616992

Figure 232. TAY616992 (photo by A. WIllet).

Location – Lat. 29° 54’ 45.11” N, Long. 83° 39’ 02.94” W (SW¼ NE¼ SW¼ sec. 32, T. 6 S., R. 7 E.). TAY616992 is located approximately 15 miles (24 km) south of Perry. It is accessible by boat. It forms the head of Little Spring Creek. From the junction of US 19 and CR 361 (Beach Road) just south of Perry, travel approximately 12 miles (19 km) on CR 361 to the intersection with Yates Creek Road. Turn west (right) onto Yates Creek Road and follow it to its terminus approximately 2.3 miles (3.7 km) at Yates Camp on Yates Creek. Launch boat and travel north out the mouth of Yates Creek to Little Spring Creek (approximately 1 mile (1.6 km)). The spring is located approximately 1.3 miles (2.1 km) up the middle fork of Little Spring Creek.

Description – TAY616992 has a circular spring pool 60 ft (18.3 m) in diameter and 11 ft (3.4 m) deep. During the October 2003 visit, the pool bottom was not visible due to poor water clarity. Large logs and detritus are discernable beneath the surface. The spring flow creates two very strong boils. The run averages 9 ft (2.7 m) wide and 1 ft (0.3 m) deep and flows 0.8 miles (1.3 km) through swampland to the Gulf of Mexico. The run becomes braided as it flows through the lowlands. Orange algae are prolific in the spring run. The spring is within the forested Big Bend Wildlife Management Area. Discharge on June 16, 1999 measured 33.36 ft^3/s [4].

TAY69991

Figure 233. TAY69991 (photo by T. Roberts).

Location – Lat. 29° 58' 11.67" N, Long. 83° 44' 43.47" W (SE¼ NW¼ SE¼ sec. 8, T. 6 S, R. 6 E). From the boat landing at CR 356 on the Fenhollaway River, follow the main tidal channel from the boat ramp out into the Gulf of Mexico. Upon reaching the mouth of the tidal channel, travel southeast along the coast for 2.0 miles (3.2 km) to the entrance of Big Spring Creek. Head north (left) up Big Spring Creek. The spring is located 0.6 miles (1.0 km) upstream on Big Spring Creek on the east (right) side of the creek.

Description – TAY69991 is comprised of two separate vents 30 ft (9.1 m) apart that feed directly into Big Spring Creek. Depth of the vents is 3.3 ft (1.0 m) and the bottom has a layer of fine sediments, organic matter and some exposed limestone. The clear spring water is surrounded by greenish-brown, brackish water of Big Spring Creek. Two prominent spring boils are visible. Scattered palms and other small trees and tall marsh grass surround the spring. The banks of the tidal creek rise approximately 1.5 ft (0.5 m) above the spring to level ground. Discharge on June 9, 1999 was estimated at 5 ft^3/s[4].

TAY622991

Figure 234. TAY622991 (photo by T. Roberts).

Location – Lat. 29° 52'24.80" N, Long. 83° 37' 32.60" W (NE¼ SW¼ NE¼ sec. 16, T. 7 S, R. 7 E). From the intersection of CR 361 (Beach Road) and Jabo Road near Adams Beach, travel on Jabo Road approximately 0.5 miles (0.8 km) to Jabo Camp. The spring is located approximately 0.2 miles (0.3 km) southeast of the camp along Island Creek.

Description – TAY622991 flows directly into Island Creek and has no pool or run. The spring is 5.2 ft (1.6 m) deep with exposed limestone around the vent. The clear water forms a prominent boil at the surface. This tidally influenced spring is surrounded by a brackish marsh with private residences on the north side. Discharge on June 22, 1999 was estimated at 50 ft^3/s[4].

TAY76991

Figure 235. TAY76991 (photo by T. Roberts).

Location – Lat. 29° 40’ 34.91” N, Long. 83° 23’ 07.27” W (SW¼ SW¼ SW¼ sec. 24, T. 9 S, R. 9 E). From the intersection of 6th Street East and 1st Avenue in Steinhatchee, travel north on 6th Street East approximately 0.25 miles (0.4 km). The spring is located on the east side of the road on private property.

Description – TAY76991 has a 13 ft (4.0 m) diameter spring pool with an approximate depth of 1 ft (0.3 m). A small vent at the northwest side issues clear water and produces a slight boil. Detritus covers the pool bottom. The spring run is 3 ft (0.9 m) wide, 0.5 ft (0.1 m) deep, and flows 500 ft (152.4 m) to the Steinhatchee River. North of the spring, land rises to 0.7 ft (0.2 m) then levels to coastal flatlands. The spring is hidden in a privately-owned, densely-wooded area of assorted hardwood and pines and is a local fishing hole. The estimated discharge of this spring on July 6, 1999 was 4 ft^3/s (4).

TAY924991

Figure 236. TAY924991 (photo by A. Willet).

Location – Lat. 30º 06' 28.65" N, Long. 83º 37' 38.62" W (NE¼ SW¼ NE¼ sec. 28, T. 4 S, R. 7 E). From the intersection of US 98 and O'Steen Road southwest of Perry, drive north on O'Steen Road approximately 0.8 miles (1.3 km) to the bridge over Spring Creek. The spring is located approximately 0.1 mile (0.2 km) north of the bridge.

Description – TAY924991 discharges from the bottom of an unnamed tributary to Spring Creek. Each of the seven small vents are 0.5 to 0.8 ft (0.2-0.3 m) in diameter and produce a slight boil. The water is clear and contains both brownish orange and bluish green algae. The spring run is 20 ft (6.1 m) wide, 2 ft (0.6 m) deep and flows 300 ft (91.4 m) north to Spring Creek. The privately-owned area surrounding the springs supports a dense hardwood and palmetto forest. Discharge on September 24, 1999 was estimated at 1.0 ft^3/s[4].

TAY924993

Location – Lat. 30° 06' 29.97" N, Long. 83° 37' 41.44" W (NW¼ SW¼ NE¼ sec. 28, T. 4 S, R. 7 E). From the intersection of US 98 and O'Steen Road southwest of Perry, drive north on O'Steen Road approximately 0.8 miles (1.3 km) to the bridge over Spring Creek. The spring is located approximately 0.1 miles (0.2 km) north of the bridge.

Description – TAY924993 discharges from the bottom of Spring Creek at the base of the Osteen Road Bridge. The two small circular vents are 8 ft (2.4 m) apart and approximately 2 ft (0.6 m) deep. The spring discharges clear water, producing two prominent boils. The water has a hydrogen sulfide odor. The creek bottom is sand with algae-coated *Hydrilla* and other aquatic vegetation. The dense hardwood forest surrounding the spring is bisected by Osteen Rd and its associated right-of-way. Discharge on September 24, 1999 was estimated at 3 ft^3/s[4].

Figure 237. TAY924993 (photo by A. Willet).

Unnamed Spring

Location – Lat. 30° 06' 25.86" N, Long. 83° 37' 35.92" W (SE¼ SW¼ NE¼ sec. 28, T. 4 S, R. 7 E). Unnamed Spring is located on an unnamed tributary to Spring Creek and is to the west of Perry, 0.75 miles (1.2 km) north of the intersection of US 98 and CR 359B.

Description –Unnamed Spring has an elongated pool measuring 60 ft (18.3 m) by 30 ft (9.1 m). The spring vent is located in the center of the pool approximately 10 ft (3.1 m) deep. The pool bottom is mud and covered with detritus and algae coated limbs. The water is clear and produces a visible boil. The spring run is 20 ft (6.1 m) wide, 2 ft (0.6 m) deep and flows 600 ft (182.9 m) north to Spring Creek. A cleared powerline right-of-way cuts through the mixed hardwood and pine forest surrounding the spring.

UNION COUNTY

Worthington Spring

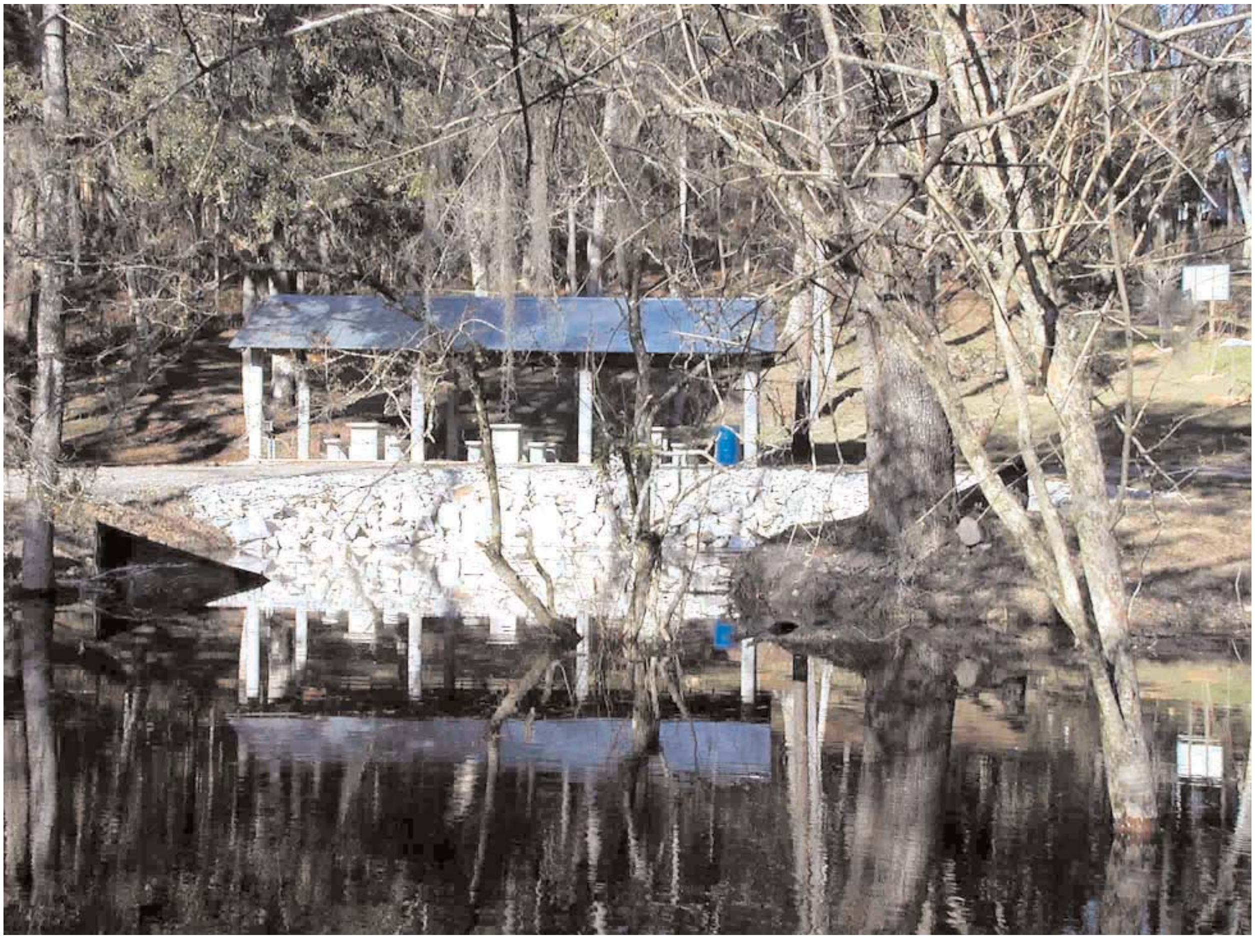

Figure 238. Worthington Spring (photo by T. Roberts).

Location – Lat. 29° 55’ 35.79” N, Long. 82° 25’ 33.30” W. (NW¼ SE¼ NE¼ sec. 32, T. 6 S., R. 19 E). Worthington Springs is located in the town of Worthington Springs along the Santa Fe River. The spring is the centerpiece of Chastain-Seay Park just off SR 121 on the north side of the Santa Fe River.

Description – Worthington Spring has a circular pool 60 ft (18.3 m) in diameter surrounded by an earthen berm. The east bank of the pool is a steep, man-made slope of limestone boulders. The north bank is grass with an asphalt parking lot at the top of the rise. The spring run averages 2 ft (0.6 m) deep and flows 300 ft (91.4 m) southwest into a backwater slough of the Santa Fe River. A picnic pavilion with a wooded hill behind is situated northeast of the spring pool. The spring is located within Chastain-Seay City Park and is developed with wooden walkways and picnic areas. Historically, the spring pool was enclosed by a 12-ft square concrete wall and the spring was a popular destination with a hotel, bathhouse, and swimming area (Rosenau et al. 1977). The town recently restored the spring back to a more natural state. Discharge in April of 1972 measured 0.36 ft^3/s [1].

VOLUSIA COUNTY

Gemini Springs

Figure 239. Gemini Springs (photo by SJRWMD).

Location – Lat. 28° 51' 45.98" N, Long. 81° 18' 41.06" W (NE¼ SW¼ SW¼ sec. 3, T. 19 S, R. 30 E). From the intersection of Dirksen Drive and US 17/92 travel east on Dirksen Drive 0.2 miles (0.3 km) to DeBary Creek Boulevard. Travel south on DeBary Creek Boulevard approximately 0.4 miles (0.6 km). These springs are located in Gemini Springs County Park.

Description – Gemini Springs is composed of three springs that create two separate elongated pools and flows into an impounded reservoir. Rosenau et al. (1977) described the springs as originating in "sharp little ravines or clefts at the base of a higher surrounding area…" An eight inch diameter well was drilled to augment the flow from the springs (Rosenau et al., 1977). One pool is completely inundated by tannic reservoir water and measures 32 ft (9.8 m) long and 10 ft (3.1 m) wide. No boil or flow is detectable. The run is also inundated. The second pool is 100 ft (30.5 m) to the east and is situated on slightly higher ground than the first pool. This pool is 17 ft (5.2 m) long, 12 ft (3.7 m) wide, and 2 ft (0.6 m) deep. Clear water prominently boils from a small hole in the exposed limestone. Clumps of green and brown algae cover most of the sand spring pool bottom. Water also seeps from the hillside. The spring run is 6 ft (1.8 m) wide and 0.4 ft (0.1 m) deep. Algae, similar to that in the spring pool, grow in the spring run. The run flows 150 ft (45.7 m) east under a wooden bridge and joins the first spring's inundated run. From the reservoir, spring water flows 1.5

miles (2.4 km) east into Lake Monroe. The surrounding higher ground rises west and north to more than 20 ft (6.1 m) above the water level. The springs are located within a Gemini Springs County Park with trails and playgrounds. During the February 2003 visit, swimming was prohibited due to high bacteria levels in the water. The average discharge between 1966 and 2000 was 10.1 ft^3/s [(6)].

Green Spring

Figure 240. Green Spring (photo by SJRWMD).

Location – Lat. 28° 51' 46.04" N, Long. 81° 14' 50.92" W (NW¼ SW¼ SW¼ sec. 5, T. 19 S, R. 31 E). Green Spring is located 5.0 miles (8.1 km) northwest of Osteen. From the intersection of Enterprise Osteen Road and Green Spring Road, drive north on Green Spring Road approximately 0.1 miles (0.2 km). The spring lies within a county park.

Description – Green Spring is roughly circular, 93 ft (28.4 m) in diameter, and enclosed by concrete on the southwestern side. The spring pool depth averages 3.7 ft (1.1 m). Rosenau et al. (1977) reported the depth in a conical depression in the north-central part of the pool to be about 125 ft (38.1 m). Exposed limestone lines the pool edges and a set of stairs leads down to the spring on the southwest side. Land rises 5 ft (1.5 m) above the water surface to a grassy area with palms and oaks. The milky green water has poor visibility of less than 0.5 ft (0.1 m). The spring pool feeds several runs that branch and meander through the adjacent floodplain. Average width of the runs is 3 ft (0.9 m) and average depth is 0.3 ft (0.9 m). The spring flows 0.3 miles (0.5 km) northeast to Lake Monroe. The spring is being developed into a county park. The average discharge between 1932 and 2000 was 1.10 ft^3/s [(6)].

WAKULLA COUNTY

Indian Spring

Figure 241. Indian Spring (photo by A. Willet).

Location – Lat. 30º 15' 02.88" N, Long. 84º 19' 19.50" W (NE¼ NE¼ SW¼ sec. 3, T. 3 S, R. 1 W). Indian Spring is located on private property 13 miles (20.9 km) south of Tallahassee near the Bethel Community. The YMCA of Tallahassee, who owns Indian Spring, constructed a summer camp around the pool.

Description – Indian Spring has a circular spring pool 185 ft (56.4 m) in diameter and 30 ft (9.1 m) deep. A large, semicircular limestone cave is located on the north side of the sand bottom pool. Depths in the cave are reported to reach 60 ft (18.3 m) (Rosenau et al., 1977). The spring water is clear with a greenish tint. Green algae float in clumps around the spring pool and run. The spring run is 50 ft (15.2 m) wide, 2 ft (0.6 m) deep, and flows 0.7 miles (1.1 km) southeast into Sally Ward Spring at the headwaters of the Wakulla River. The spring has been developed as a recreation area associated with YMCA's Camp Indian Springs. Platforms, observation decks, water slides, and canoes surround the spring pool. The camp is in a densely forested area. Discharge on October 31, 1972 measured 0.11 ft^3/s [(1)].

McBride Slough Spring

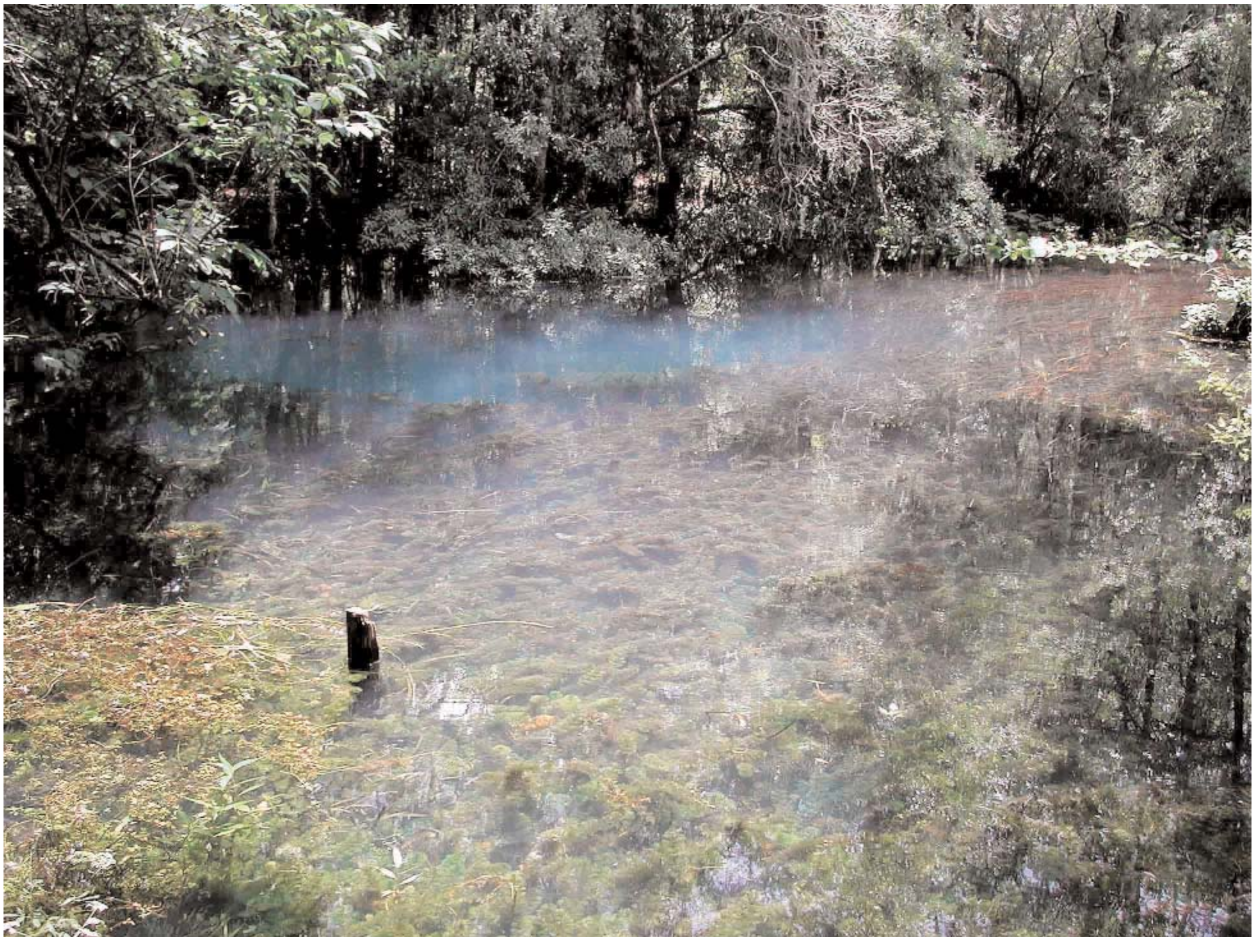

Figure 242. McBride Slough Spring (photo by R. Meegan).

Location – Lat. 30° 14’ 23.94” N, Long. 84° 16’ 10.43” W (NW¼ SW¼ NE¼ sec. 7, T. 3 S., R. 1 E.). McBride Slough Spring is located on private land 6 miles (9.7 km) northwest of the town of St. Marks, north of the CR 267 (Bloxham Cutoff Road) bridge over McBride Slough.

Description – McBride Slough Spring discharges into a circular pool 50 ft (15.2 m) in diameter. The pool has a maximum depth of 7 ft (2.1 km) with a sand and limestone bottom. The milky blue spring pool has an abundance of exotic vegetation. The spring flows 100 ft (30.5 m) southeast to McBride Slough, contributing a majority of the flow of this slough. McBride Slough flows south to pass under the CR 267 Bridge, continues approximately 1 mile (1.6 km), and enters the Wakulla River from the north. The run is approximately 3 ft (0.9 m) deep. The spring is located on private property with an old wooden boardwalk and an open-walled hunter’s shack on the northwest side. It appears to be situated along a karst subsidence corridor that is dotted with sinkholes along its upper reaches.

Northside Spring No. 1

Figure 243. Northside Spring No. 1 (photo by R. Meegan).

Location – Lat. 30° 14' 15.11" N, Long. 84° 16' 52.32" W (SW¼ SE¼ NE¼ sec. 12, T. 3 S., R. 1 W.). Northside Spring No. 1 is located within Wakulla Springs State Park approximately 1.25 miles (2.0 km) north of the lodge. See park officials for permission and directions.

Description – Northside Spring No. 1 issues into a pool measuring 45 ft (13.7 m) north to south and 30 ft (9.1 m) east to west. The conical depression has a depth of 10 ft (3.1 m). The bottom is sand with some detritus and, on the north side, old bricks are hidden in the leaf litter indicating an old house or mill site. Milky blue water issues with enough force to create a slight boil at the water's surface. Northside Spring No. 2 is 50 ft (15 m) to the west. Flow from Northside Spring No. 1 combines with the flow from Northside Spring No. 2 and travels 0.8 miles (1.3 km) southeast to the Wakulla River.

Northside Spring No. 2

Figure 244. Northside Spring No. 2 (photo by R. Meegan).

Location – Lat. 30° 14' 15.30" N, Long. 84° 16' 52.49" W (SW¼ SE¼ NE¼ sec. 12, T. 3 S., R. 1 W.). Northside Spring Number 2 is located within Wakulla Springs State Park approximately 1.25 miles (2.0 km) northeast of the lodge. Northside Spring Number 2 is 50 ft (15.2 m) west of Northside Spring Number 1. See park officials for directions and permission.

Description – Northside Spring No. 2 occupies a small pool approximately 10 ft (3.1 m) in diameter. The spring pool is 3 ft (0.9 m) deep and has a sand bottom. Fallen branches and detritus cover the soft pool bottom. The water is blue and somewhat cloudy. This undeveloped spring is surrounded by a dense lowland forest. Northside Spring No. 1 is 50 ft (15.2 m) to the east. Flow from Northside Spring No. 2 combines with the flow from Northside Spring No. 1 and travels 0.8 miles (1.3 km) southeast to the Wakulla River.

Sally Ward Spring

Location – Lat. 30° 14' 29.09" N, Long. 84° 18' 38.88" W (NW¼ SW¼ NW¼ sec. 11, T. 3 S., R. 1 W.). Sally Ward Spring is an undeveloped spring along the east side of the entrance road into Wakulla Springs State Park. It can be accessed by a short trail from the east side of Wakulla Spring Drive, less than 0.2 miles (0.3 km) from the Park's Bloxham Cutoff Road entrance.

Figure 245. Sally Ward Spring (photo by R. Meegan).

Description – Sally Ward Spring discharges into the center of a pool 120 ft (36.6 m) in diameter and surrounded by dense swamp forest. Access to the spring pool is limited therefore no depth or vent descriptions were obtained. *Hydrilla* and other aquatic vegetation are abundant in the pool. The spring run flows almost 0.75 miles (1.2 km) southwest into a braided channel due north of Wakulla Spring. Sally Ward Spring is within Wakulla Springs State Park and the entrance road runs along the northwest side of the pool. Indian Spring Run flows under a bridge and into the spring pool from the northwest. Swimming is prohibited but there are short trails leading from a grassy area on the roadside down to the spring. The spring's extensive cave system has been mapped and the conduit system reaches depths of over 250 ft (76.2 m).

Wakulla No Name Spring

Location – Lat. 30° 12' 53.33" N, Long. 84° 15' 59.42" W (sec. RS1 (irregular section), T. 3 S., R. 1 W.). Wakulla No Name Spring is located within Wakulla Springs State Park and is remote and not accessible to the public. The spring flows into the Wakulla River from the west 2.8 miles (4.5 km) downstream from the headwaters or 0.2 miles (0.3 km) upstream from the Shadeville Road bridge.

Description – Wakulla No Name Spring discharges into a circular pool 25 ft (7.6 m) in diameter. Maximum depth is 16 ft (4.9 m). The pool bottom is sand with fallen branches and detritus. Clear blue water issues from the spring vent creating a boil. Little aquatic vegetation grows in the pool or the run. The spring run flows 0.2 miles (0.3 km) northeast into the Wakulla River with an average depth of 1.5 ft (0.5 m). A heavily- forested lowland swamp surrounds the natural and wild spring. The exotic aquatic plant *Hydrilla* is abundant in this section of the Wakulla River, but this spring has not been affected.

WASHINGTON COUNTY

Drinking Spring

Location – Lat. 30° 36' 44.83" N, Long. 85° 49' 23.58" W (SE¼ NE¼ NE¼ sec. 3, T. 2 N, R. 16W). Drinking Spring is approximately 6.7 miles (10.8 km) west of Vernon. Drinking Spring flows into the west bank of Holmes Creek 3.8 miles (6.1 km) upstream from the Live Oak Landing Road boat ramp. From the intersection of SR 79 (Main Street) and CR 279 (Moss Hill Road) in Vernon, travel south on SR 79 approximately 7.1 miles (11.4 km) to the intersection with River Road in New Hope. Turn west (right) onto River Road and travel approximately 1.5 miles (2.4 km) to the intersection with Hammack Road. Turn north (right) onto Hammack Road and travel approximately 1.4 miles (2.3 km) to Live Oak Landing on Holmes Creek. Hammack Road merges into Live Oak Road just before the boat landing.

Description – Drinking Spring is a very small spring with a circular pool approximately 2 ft (0.6 m) in diameter. Depth is 1.5 ft (0.5 m). The pool bottom is sand and silt and a slight boil is visible. Two small seepage streams enter into the pool. The spring run flows approximately 120 ft (36.6 m) and enters the west side of Holmes Creek. Drinking Spring is within the heavily forested Holmes Creek floodplain.

Galloway Spring

Figure 246. Galloway Spring (photo by A. Chelette).

Location – Lat. 30° 35’ 50.86” N, Long. 85° 50’ 31.26” W (NW¼ SE¼ NE¼ sec. 9, T. 2 N., R. 16 W.). The mouth of Galloway Spring is 2.5 miles (4.0 km) upstream from the bridge at Miller’s Ferry on Holmes Creek. It enters Holmes Creek on the outside or west side of a large bend in the river on the west side of Holmes Creek. It is also located approximately 0.8 miles (1.3 km) north (upriver) from the Live Oak Landing Road boat landing. From the intersection of SR 79 (Main Street) and CR 279 (Moss Hill Road) in Vernon, travel south on SR 79 approximately 7.1 miles (11.4 km) to the intersection with River Road in New Hope. Turn west (right) onto River Road and travel approximately 1.5 miles (2.4 km) to the intersection with Hammack Road. Turn north (right) onto Hammack Road and travel approximately 1.4 miles (2.3 km) to Live Oak Landing on Holmes Creek. Hammack Road merges into Live Oak Road just before the boat landing.

Description – Galloway Spring occupies a bowl-shaped depression with a steep slope on the west side of the pool. Depth is 15-20 ft (4.6-6.1 m) and the water is greenish blue. The spring run flows 0.2 miles (0.3 km) to Holmes Creek with many obstructions and little current. The spring and its surroundings are wild and undeveloped. An obscure dirt track leads through the densely forested floodplain to the spring pool on the west side. An old, wooden platform floats near the middle of the pool. Land rises approximately 10 ft (3.1 m) above the water surface on the west side.

Hightower Springs

Figure 247. Hightower Springs (photo by A. Chelette).

Location – Lat. 30° 36' 18.19" N, Long. 85° 45' 55.51" W (SE¼ NE¼ SW¼ sec. 5, T. 2N, R. 15W). Hightower Spring is located at the end of a small road 3.7 miles (6.0 km) south of Vernon on SR 79. From the intersection of SR 79 and CR 279 (Moss Hill Road) in Vernon, travel approximately 3.7 miles (6.0 km) to the intersection with Hightowers Road. Turn north (right) onto Hightower Road and travel approximately 0.4 miles (0.6 km) to the boat landing on Holmes Creek. The spring is located on the west side of the boat landing.

Description – Hightower Springs occupies a shallow spring pool 135 ft (41.2 m) north to south and 25 ft (7.6 m) east to west and up to 8 ft (2.4 m) deep. Numerous sand boils are scattered throughout the spring pool. The water is clear and slightly green and no boil disrupts the water surface. Considerable amounts of algae cover the spring bottom. The small spring run, 6-15 ft (1.8-4.6 m) wide and 1 ft (0.3 m) deep, flows 200 ft (61 m) north into Holmes Creek. A parking lot and boat ramp are on the east side of the spring. The surrounding lowlands harbor a dense cypress and gum forest. Discharge on May 21, 2003 measured 2.52 ft^3/s [(3)].

Jack Paul Springs

Figure 248. Jack Paul Springs (photo by A. Chelette).

Location – Lat. 30° 36' 46.29" N, Long. 85° 44' 01.46" W (NE¼ NE¼ NW¼ sec. 3, T. 2N, R. 15W). Jack Paul Springs run enters the south bank of Holmes Creek 2.6 miles (4.2 km) downstream from the bridge over Holmes Creek in Vernon.

Description – Jack Paul Springs consists of three spring vents. Two vents are located within the 40 ft (12.2 m) diameter spring pool at depths of approximately 10 ft (3.1 m). One vent is on the west side and the other on the east side of the pool. The pool has a sand bottom with limestone exposed around the vents. The western vent produces a prominent boil but little flow issues from the eastern vent. The third vent is located in the middle of the spring run channel approximately 300 ft (91.4 m) downstream from the head springs. The springs are clear and slightly greenish. Average depth and width of the spring run are 3 ft (0.9 m) and 30 ft (9.1 m), respectively. The spring run flows approximately 0.3 miles (0.5 km) southwest into Holmes Creek. An access dike follows along the east side of the run to the head springs. This earthen berm also acts to divert a small channel of Holmes Creek away from the head spring pool to a point farther downstream from the springs. Discharge on May 21, 2003 measured 12.75 ft^3/s [(3)].

Miller's Ferry Spring

Figure 249. Miller's Ferry Spring (photo by A. Chelette).

Location – Lat. 30° 34’ 27.78” N, Long. 85° 50’ 25.73” W (NE¼ SE¼ SE¼ sec. 16, T. 2 N, R. 16 W). Miller’s Ferry Spring emerges from the river bottom on the east side of Holmes Creek 0.25 miles(0.4 km) upstream from the boat ramp in Miller’s Ferry. From the intersection of SR 79 (Main Street) and CR 279 (Moss Hill Road) in Vernon, travel south on SR 79 approximately 7.1 miles (11.4 km) to the intersection with River Road in New Hope. Turn west (right) onto River Road and travel approximately 2.2 miles (3.5 km) to the bridge over Holmes Creek at Miller’s Ferry. The boat landing is located on the southwest side of Holmes Creek.

Description – Miller’s Ferry Spring, also known locally as Blue Spring, is a deep opening, approximately 50 ft (15.2 m) in diameter, on the bottom of Holmes Creek. Maximum depth over the vent is 33.4 ft (10.2 m) and the water is milky blue-green. No spring boil was visible during the February 2002 visit. Both sides of the creek are heavily-forested. To the east of the spring, a bluff along Holmes Creek rises steeply approximately 40 ft (12.2 m), and to the west is lowland floodplain.

Piney Wood Spring

Figure 250. Piney Wood Spring (photo by A. Chelette).

Location – Lat. 30° 39’ 30.79” N, Long. 85° 41’ 26.30” W (SW¼ SE¼ SE¼ sec. 13, T. 3 N, R. 15 W). Piney Wood Spring is located on private property 2 miles (3.2 km) north of the town of Vernon. It is 0.4 miles (0.6 km) due west of Cypress Spring.

Description – Piney Wood Spring occupies a conical depression with a circular pool approximately 25 ft (7.6 m) in diameter. The spring was not flowing during the February 2002 visit. During a subsequent visit in June 2003 however, the debris had been removed and the flow restored. Murky brown water in the spring pool before debris removal became clear and slightly bluish afterward. The spring run averages 20 ft (6.1 m) wide and flows west 0.5 miles (0.8 km) into the uppermost part of Cypress Spring Run, just below the head spring. Historically, Piney Wood Spring flowed into Cypress Spring pool, but the prior landowner diverted the natural flow. The run was channeled and enters Cypress Spring Run approximately 100 ft (30.5 m) downstream from the spring pool on the west side of the run. The area surrounding Piney Wood Spring is heavily- forested with planted pines near the spring. The spring run travels through the swamp forest associated with the floodplain of Holmes Creek. Discharge on May 28, 2003 was 0.67 ft^3/s [(3)].

Skipper Spring

Figure 251. Skipper Spring (photo by A. Chelette).

Location – Lat. 30° 34’ 32.93” N, Long. 85° 50’ 37.58” W (SW¼ NE¼ SE¼ sec. 16, T. 2 N, R. 16 W). Skipper Spring is located approximately 1000 ft (304.8 m) upstream from Miller’s Ferry Spring and approximately 0.4 miles (0.6 km) upstream fro the Miller’s Ferry boat landing. It flows from the west into Holmes Creek. From the intersection of SR 79 (Main Street) and CR 279 (Moss Hill Road) in Vernon, travel south on SR 79 approximately 7.1 miles (11.4 km) to the intersection with River Road in New Hope. Turn west (right) onto River Road and travel approximately 2.2 miles (3.5 km) to the bridge over Holmes Creek at Miller's Ferry. The boat landing is located on the southwest side of Holmes Creek.

Description – Skipper Spring has a roughly circular-shaped spring pool in a bowl-shaped depression with an approximate diameter of 120 ft (36.6 m). The pool is 17 ft (5.2 m) deep and the pool edge is entirely ringed by cypress trees. The water color is murky blue-greenish. No boil was observed in February 2002. The pool and run are entirely within the densely wooded floodplain of Holmes Creek. There is a dilapidated dock on the north side of the pool and the south side has slightly higher ground nearby.

Unnamed Spring

Figure 252. Unnamed Spring (photo by A. Chelette).

Location - Lat. 30° 34' 41.56" N, Long. 85° 50' 16.77" W (NW¼ NW¼ SW¼ sec. 15, T. 2 N., R. 16 W.). Unnamed Spring is located approximately 0.6 miles (1 km) upstream from Miller's Ferry on Holmes Creek. The mouth of the small spring run enters the east side of Holmes Creek approximately 600 ft (182.9 m) downstream from a bluff along the east side of the creek. From the intersection of SR 79 (Main Street) and CR 279 (Moss Hill Road) in Vernon, travel south on SR 79 approximately 7.1 miles (11.4 km) to the intersection with

River Road in New Hope. Turn west (right) onto River Road and travel approximately 2.2 miles (3.5 km) to the bridge over Holmes Creek at Miller's Ferry. The boat landing is located on the southwest side of Holmes Creek.

Description – Unnamed Spring occupies a bowl-shaped depression with a ledge on the north side. The pool is approximately 40 ft (12.2 m) in diameter and at least 10 ft (3.1 m) deep. The water color is murky green and there was no visible spring boil on the pool surface during the February 2002 visit. The spring run is narrow, shallow, and filled with sticks and logs. It is approximately 400 ft (121.9 m) long, entering into Holmes Creek from the east. Higher ground rises from Holmes Creek 150 ft (45.7 m) to the south along the edge of the floodplain. Unnamed Spring and its run are situated entirely within the heavily-forested Holmes Creek floodplain.