CHIPOLA RIVER SPRING INVENTORY JACKSON AND CALHOUN COUNTIES, FL

Water Resources Special Report 04-01



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INTRODUCTION

Purpose and Scope

In 2001, the Florida Legislature funded the first phase of the Florida Springs Initiative (FSI) to study and preserve the quality of Florida's springs. The Florida Department of Environmental Protection (FDEP), administrator of FSI funding, has contracted with the Northwest Florida Water Management District (NWFWMD) to monitor first magnitude springs within the District, delineate springsheds and perform other research regarding spring water quality and distribution. The 2003 Florida Legislature continued funding and FDEP requested project proposals for additional work. The NWFWMD proposed completion of a thorough spring inventory located in the Chipola River watershed. Although the basin was visited in the Florida Bureau of Geology (now the Florida Geological Survey) Bulletin 31 "Springs of Florida" (revised, 1977), local sources and the experience of NWFWMD and Florida Geological Survey (FGS) staff indicated the presence of many more springs discharging to the Chipola River.

The Chipola Springs inventory was performed under FDEP contract WM232 (amended June 2003) during the period of September 2003 through June 2004. The scope of work included researching a variety of sources for spring locations then visiting each spring to collect photographs, differentially corrected GPS position and field water quality measurements. NWFMWD staff also measured discharge at springs appearing second magnitude or larger. Project deliverables consist of this report.

Area of Investigation

The Chipola River Basin extends from Houston County in southeast Alabama to just south of the Dead Lakes area in central Gulf County, FL. The Chipola River itself begins at the confluence of Marshall Creek and Cowarts Creek in Jackson County, FL nine miles north of Marianna. The surface water drainage basin of the Chipola River covers approximately 1,287 square miles (822,858 acres). The study area for this spring inventory was the portion of the drainage basin in Florida located in the Dougherty Karst Region (**Figures 1 and 2**). This includes one of the District's five first magnitude springs — Jackson Blue Spring.

Hydrologic Setting

The Chipola River flows through the Dougherty Karst Plain District which encompasses the northern portions of Bay and Calhoun Counties, all of Jackson County and most of Washington and Holmes Counties. The Floridan Aquifer is recharged through the leaky confinement of the Intermediate System and discharges to springs and rivers throughout the Dougherty Karst Plain. The semi-confined condition of the Floridan Aquifer across the Dougherty Karst Plain allows for large amounts of local recharge, but also makes the Floridan Aquifer especially vulnerable to contamination from activities occurring on the land surface. The Apalachicola River, Choctawhatchee River, Chipola River, Holmes Creek and Econfina Creek all gain water from the portion of the Floridan Aquifer that is recharged through the Dougherty Karst Plain District (Pratt et al. 1996).

In Jackson and Calhoun Counties, the Floridan Aquifer is comprised of the Chattahoochee Formation, the undifferentiated Marianna/Suwannee Limestone, and the Ocala Limestone (Scott

1993 and Campbell 1993). The region is characterized by a thin and inconsistent confining Intermediate System. Contained within the Intermediate System may be a thin, minimally water-bearing surficial aquifer or minor, confined water-bearing zones. In this region the Floridan Aquifer itself is relatively thin, with a thickness of approximately 100 feet in north Jackson County, where it is composed of the Ocala Limestone only (Moore 1955). Continuing south, the Floridan plunges to approximately 700 feet in thickness with the addition of the younger Marianna, Suwannee, and Chattahootchee formations. The Floridan Aquifer, though relatively thin and only semi-confined in this area, is the primary source of water for consumptive use (i.e. public supply, domestic supply, irrigation, etc.). The intermediate system generally thickens from north to south as well (Pratt et al. 1996).

In the study area along the Chipola River, the top of the Floridan Aquifer lies approximately 100 to 50 feet above mean sea level and is thinly confined, if at all. Carbonates comprising the Floridan System are frequently exposed in the channel of the Chipola River. The Floridan Aquifer potentiometric surface elevation drops from approximately 120 feet above sea level near the northern-most springs to approximately 50 feet above sea level at southern extent of the study area near Altha (Peterson 1999). It is logical to expect a ground water contribution to the Chipola as the potentiometric surface elevation is fairly commensurate with topographic elevations in the Chipola River floodplain.

A ground water contribution zone for the springs located in the Chipola River basin interpreted from the 1991 NWFWMD potentiometric surface map (**Figure 3**) has an area of approximately 940 square miles (~601,000 acres) but is subject to change under different hydrologic conditions. It is bounded by ground water contribution zones for the Choctawhatchee River to the west, Econfina Creek to the southwest, and the Apalachicola River to the east (Richards 1997).

CHIPOLA RIVER BASIN SPRINGS

Precipitation and Discharge

During the period of the spring inventory along the Chipola River, surface water flow conditions played a significant role. During times of even moderately elevated stage, the springs located within or adjacent to the river channel were difficult to locate. Part of the purpose of the inventory was to provide accurate position data so springs can be relocated, even under unfavorable conditions. The study period (9/1/2003 to 6/4/2004) was a period of relatively low precipitation and low stage conditions. **Figure 4** illustrates this point by showing the precipitation at the NWFWMD Fourmile Creek station in the Chipola River surface water drainage basin, and the stage of the Choctawhatchee River at the USGS gauging station at Altha.

Discharge measurements recorded during the study period show that the Chipola River discharge increased from a base flow of approximately 300 cubic feet per second (cfs) at US Highway 90 to 800 cfs at County Road 274 to the south (**Figures 5a and 5b**). There are small surface water drainage streams entering the Chipola River between US90 and CR274. However, their input cannot account for the dramatic increase in discharge. The vast majority of the increase in flow is attributable to the 63 Floridan Aquifer springs that discharge to the Chipola River. The major tributaries to the Chipola along this section are Rocky Creek, Dry Creek and Spring Creek – the spring runs for first and second magnitude spring groups. The remaining sources for ground water contribution are most likely diffuse, non-point sources such as seeps and sand boils located in the Chipola River channel.

A total of 63 springs were identified in the Chipola River basin. Thirty springs were identified north of I-10 in northern Jackson County (**Appendix B, Figure B-1**), twenty-eight were identified south of I-10 in southern Jackson County (**Appendix B, Figure B-2**), and five more were identified in Calhoun County (**Appendix B, Figure B-3**). Springs in the Chipola River basin include those with typical fissure-type vents and those that incorporate areas of diffuse, upward percolation of ground water into pools and runs. Springs discharging via diffuse percolation are termed seep springs (Copeland 2003). Specific data, photographs and descriptions of individual springs are provided in **Appendix B**.

The District made site visits to the 63 springs and made discharge and field water quality measurements where possible. The discharge measurements are presented in **Table 1**.

Table 1 – Spring Discharge Measurements.

Spring	Date	Discharge (cfs)
Jackson Blue Spring	median value	133
Lower Dry Creek (composite)	8/14/2002	70.10
Black Hole Spring	3/17/2004	65.19
Baltzell Spring Group (composite)	10/01/2003	51.78
Evergreen Spring	3/4/2004	32.53
Rocky Creek Spring	3/4/2004	29.13
Gadsen Spring	10/28/2002	26.64
Blue Hole Spring	10/29/2003	19.66
Mill Pond Spring	8/14/2002	19.50

Hays Spring Group (composite)	10/29/2003	17.34
Daniel Springs Group (composite)	10/14/2003	13.34
Maund Spring	10/30/2003	8.24
Springboard Spring	10/28/2002	5.95
McRae Spring Group (composite)	1/14/2004	4.16
Sally Spring	1/14/2004	3.10
Grotto Spring	11/5/2003	2.24
Sandbag Spring	10/30/2003	1.61
Rooks Spring #1	11/13/2003	1.59
Barrel Spring	11/5/2003	0.95
Simms Spring	10/30/2003	0.64
Webbville Spring	12/10/2003	0.50
Crumbly Spring	11/5/2003	0.35
School Bus Spring	3/8/2004	0.27
Jordan Spring	10/29/2003	0.08

The system has one first magnitude spring (>100 cfs discharge), Jackson Blue Spring. Nine springs or spring groups are classed as second magnitude (>10 to 100 cfs) and seven are classified as third magnitude (>1 to 10 cfs). Five springs measured are classified as fourth magnitude (>0.22 to 1 cfs). Some of the springs not measured may also fall into the third or fourth magnitude category. Bud Mathis Spring was influenced by wetland sheet flow and was not measured. Hole in the Wall, Shangri-La, Indian Washtub and Twin Caves Springs all discharge directly into Merritt's Mill Pond and could not be measured. Waddell's Mill Pond Spring discharges directly into Waddell's Mill Pond and could not be measured. Leaf Spring and Crack-In-The-Woods discharge directly into the Chipola River and could not be measured. Future discharge measurements may have some effect on the ratings of individual springs.

Quarterly discharge measurements were collected by the NWFWMD at Jackson Blue Spring from January 2002 through April 2004 as part of the effort of first magnitude spring monitoring for the Florida Springs Initiative. The median value for Jackson Blue discharge during the study period is 133 cfs. Spring discharges measured during this inventory are plotted in relation to Jackson Blue discharge in **Figure 6**. The estimated total discharge for springs inventoried in the Chipola River basin is 366 cfs.

Water Quality

As part of the spring inventory process, field water quality measurements were made during site visits where possible. Measurements were made for water temperature (degrees C), dissolved oxygen (mg/L), pH (standard units), and specific conductivity (umhos/cm). The results of these measurements are presented in **Table 2**.

Table 2 – Field Water Quality Measurements of Springs in the Chipola River Basin.

Spring Name	Date Sampled	Temperature (degrees C)	Specific Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	pH (standard units)
BALTZELL SPRING #1	10/1/2003	20.5	319	6.34	7.54
BALTZELL SPRING #2	10/1/2003	20.5	319	6.39	7.54
BALTZELL SPRING #3	10/1/2003	20.5	319	6.37	7.56

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BARREL SPRING	11/5/2003	20.56	190	5.52	7.73
BLUE HOLE SPRING	10/1/2003	19.89	306	5.42	7.44
BUD MATHIS SPRING	2/23/2004	19.29	246	5.74	7.25
BUZZARD SPRING	6/11/2004	20.72	212	4.14	7.57
CRUMBLY SPRING	10/1/2003	20.65	193	5.5	7.82
DANIEL SPRING #1	11/5/2003	20.03	232	5.63	7.44
DANIEL SPRING #2	10/14/2003	19.94	232	3.82	7.28
DANIEL SPRING #3	10/14/2003	19.84	238	4.07	7.29
DANIEL SPRING #4	10/14/2003	19.73	231	5.87	7.36
DANIEL SPRING #5	10/14/2003	19.61	236	5.58	7.41
DANIEL SPRING #6	10/14/2003	19.88	240	3.96	7.11
DANIEL SPRING #7	10/14/2003	19.86	240	3.22	7.08
EVERGREEN SPRING #2	10/14/2003	18.37	147	5.45	7.59
EVERGREEN SPRING #3	3/4/2004	18.37	148	5.38	7.41
GROTTO SPRING	3/4/2004	20.57	217	5.37	7.67
HAMILTON SPRING	11/5/2003	20.75	127	8.32	7.95
HAYS SPRING #1	6/11/2004	20.41	266	6.96	7.46
HAYS SPRING #2	10/14/2003	20.41	265	6.67	7.34
HAYS SPRING #3	10/14/2003	20.41	265	7.05	7.38
HELLER SPRING #1	10/14/2003	17.67	337	4.01	6.93
HOGPEN SPRING	12/10/2003	20.65	157	7.4	7.73
HOLE-IN-THE-WALL SPRING	3/8/2004	19.57	269	7.09	7.62
INDIAN WASHTUB SPRING	10/1/2003	20.03	264	0.29	7.18
JACKSON BLUE SPRING	10/1/2003	20.56	250	7.58	8.06
JORDAN SPRING	1/5/2004	21.75	347	4.15	7.19
LITTLE ROCKY CREEK SPRING	11/5/2003	20.46	210	7.5	7.84
MAUND SPRING	10/1/2003	20.31	280	2.32	7.27
MCRAE SPRING #1	3/4/2004	19.76	170	4.3	7.73
MCRAE SPRING #3	10/30/2003	18.48	156	4.19	7.63
MCRAE SPRING #5	1/14/2004	18.48	158	4.16	7.6
MCRAE SPRING RESURGENCE	1/14/2004	19.71	170	4.71	7.74
PEACOCK SPRING	1/14/2004	20.82	173	4.07	7.9
ROCKY CREEK SPRING	1/14/2004	18.43	149	5.62	7.63
ROOKS SPRING #1	1/14/2004	20.64	232	5.82	7.67
ROOKS SPRING #2	3/4/2004	20.6	232	5.87	7.66
SALLY SPRING	11/13/2003	20.51	262	0.99	7.7
SANDBAG SPRING	11/13/2003	19.97	347	5.04	7.11
SCHOOLBUS SPRING	1/14/2004	20.34	208	6.89	7.62
SHANGRI LA SPRING	10/30/2003	20.54	270	7.86	7.58
SIMMS SPRING	3/8/2004	21.05	271	6.35	7.26
SPELMAN SPRING	10/1/2003	21.74	146	4.79	7.27
TANNER SPRING #1	10/30/2003	19.84	311	7.38	7.05
TANNER SPRING #2	6/11/2004	19.04	359	6.58	7.09
TWIN CAVES SPRING	12/10/2003	20.22	307	3.49	7.09
LEAF SPRING	12/10/2003	20.22	319	6.66	7.51
CRACK IN THE WOODS	10/1/2003	20.53	319	6.66	7.31
WADDELLS MILL POND SPRING	12/10/2003	19.85	307	6.24	7.46
WEBBVILLE SPRING	12/10/2003	20.11	283	4.36	7.07

WINDOW SPRING	1/14/2004	20.33	236	4.86	7.4
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Temperature can be highly variable in surface water dependent on atmospheric conditions. Ground water temperatures tend to be much more stable. For instance, long-term water temperature readings at Wakulla Springs — a first magnitude Floridan Aquifer spring in Wakulla County—reveal that the temperature typically has a median value of 20.79 degrees C (n=4120, mean=20.77, stdev=0.11). The median temperature of the Chipola River springs, 20.22 degrees C (n=49, mean=20.07, stdev=0.81) compares well with this typical Floridan Aquifer value.

A surface water body with a dissolved oxygen (DO) value of less than 5.0 mg/L is considered impaired. The longer ground water remains in the aquifer, however, the lower the DO concentration becomes due to oxidation reactions with the matrix material. DO values in Floridan Aquifer wells recently sampled in this area have a median value of 0.16 mg/L (n=30, mean=1.76, stdev=2.39). The median DO value for the Chipola River Springs is 5.58 mg/L (n=48, mean=5.36, stdev=1.62). The higher DO values measured for the springs indicate a much shorter average residence time in the aquifer for the spring discharge compared to ground water in the Floridan Aquifer wells.

The spring pH values indicate that the water is well buffered. This is typical of water that has remained in the Floridan Aquifer for any length of time. The dissolution of limestone by acidic rain water raises the pH of the water and creates the characteristic karst topography of the Dougherty Karst Plain. The median pH value for Floridan Aquifer wells recently sampled in this area is 7.79 standard units (n=30, mean=7.76, stdev=0.68). The median value of the Chipola River Springs is 7.46 standard units (n=49, mean=7.46, stdev=0.26).

Specific conductivity is a measure of the ion content of water. Rain water and surface water not influenced by ground water input usually have a specific conductivity value of less than 50 μ mhos/cm. The median specific conductivity value for Floridan Aquifer wells recently sampled in this area is 256 μ mhos/cm (n=30, mean=333, stdev=223). The median specific conductivity of the Chipola River Springs is 246 μ mhos/cm (n=49, mean=249, stdev=59).

The high DO values and lower pH and specific conductivity values are probably the result of an influx of lower residence time, less mineralized and more acidic ground water into the Floridan Aquifer before it discharges from the springs. Because of this high local recharge and the significant surface water – ground water interaction within this highly karstic environment, the springs along the Chipola River are particularly vulnerable to proximate land use activities. There is no doubt, however, that these springs discharge Floridan Aquifer water.

Conclusion

- Under moderate-flow conditions, ground water makes up the majority of the Chipola River's discharge and the quality of water discharged from the Chipola River springs is predominantly determined by the quality of ground water in the Floridan Aquifer.
- Under high-flow conditions, the Chipola River contains more surface water and the ground water component is diluted.
- The ground water contribution zone in Florida for the Chipola River springs is large and encompasses most of the River's surface water basin in Florida. The Chipola River discharge increases greatly as it passes through the springs area.
- Water quality in the Floridan Aquifer and the springs' discharge is vulnerable to land use activities in the contribution zone. The springs are particularly vulnerable to those activities proximal to them.
- There are at least 63 springs located in the Jackson County and northern Calhoun County portion of the basin. There may be more springs that could be distinguished under lower stage conditions.

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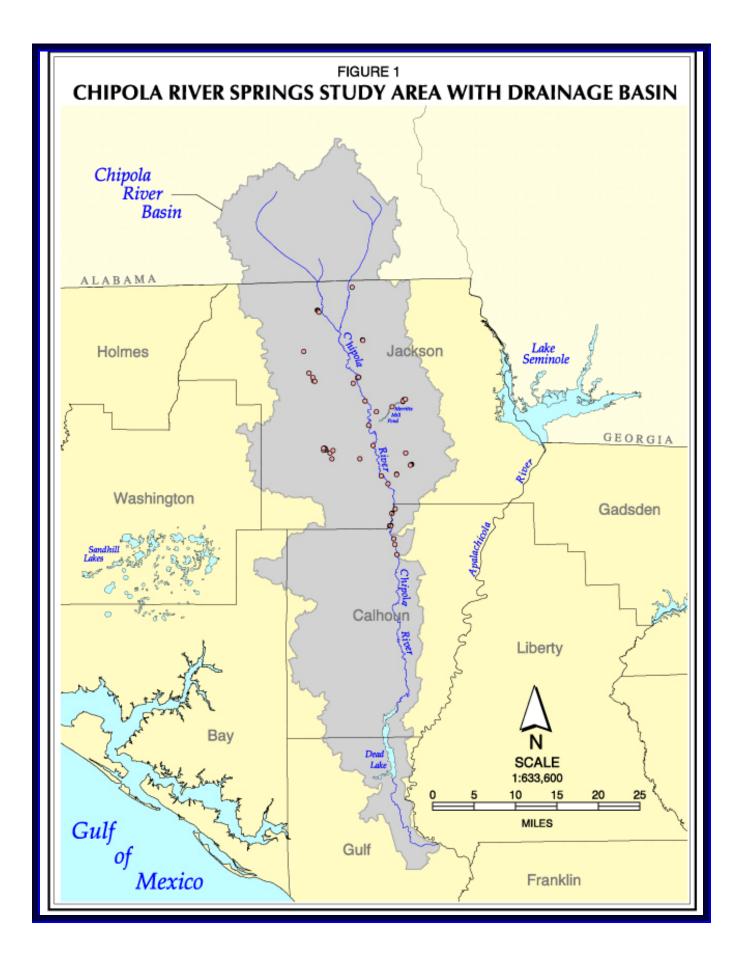
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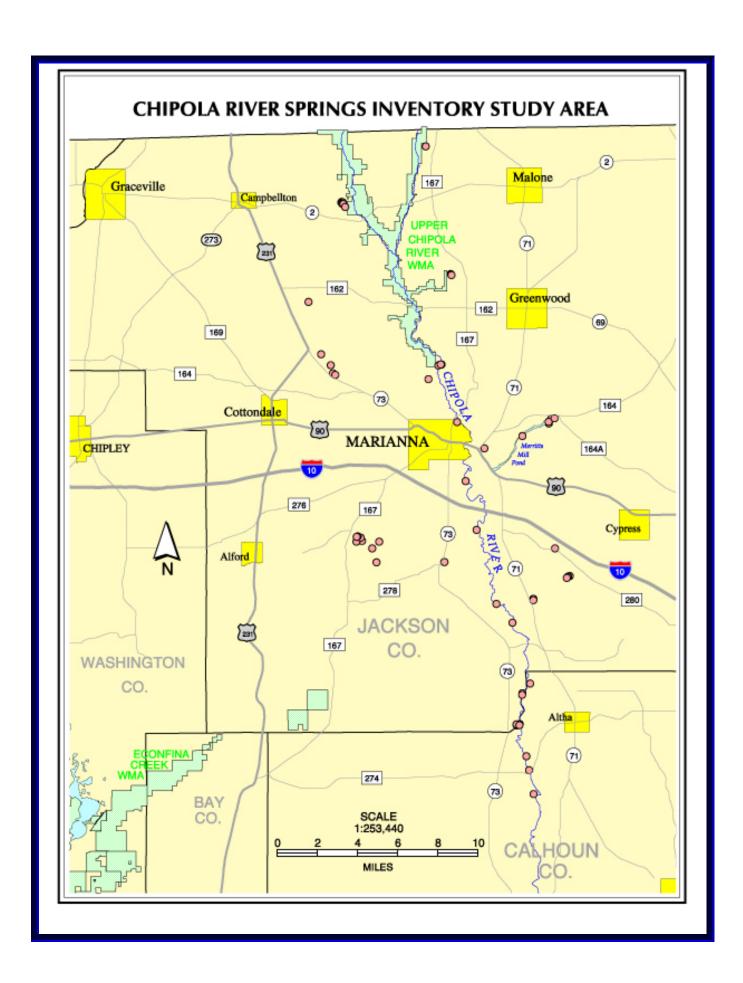
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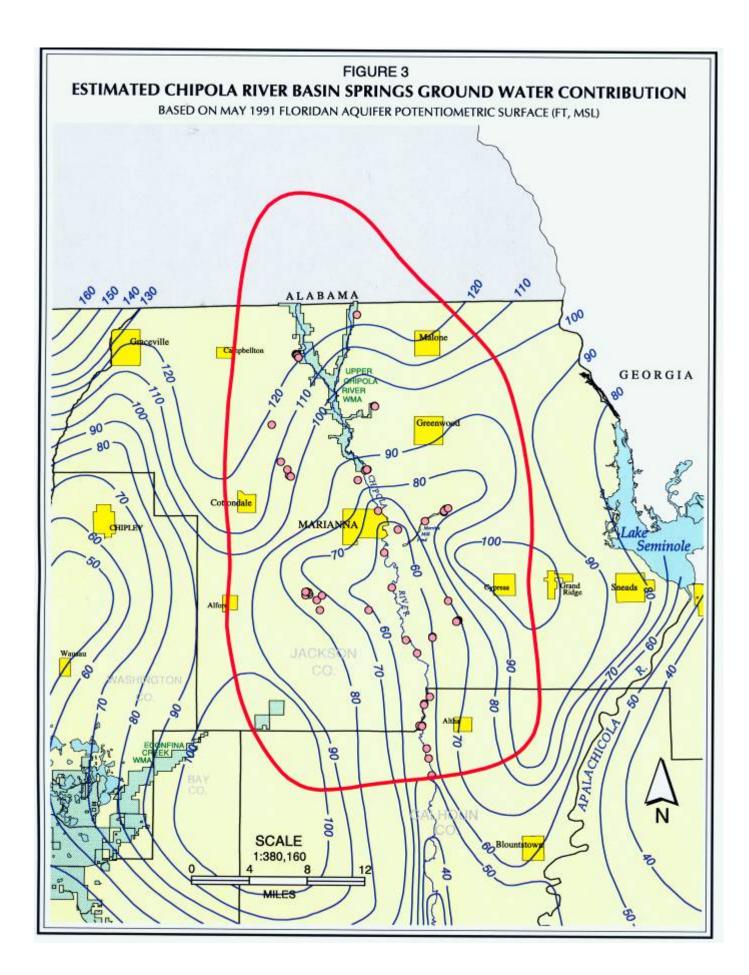
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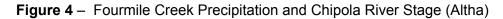
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APPENDIX A FIGURES









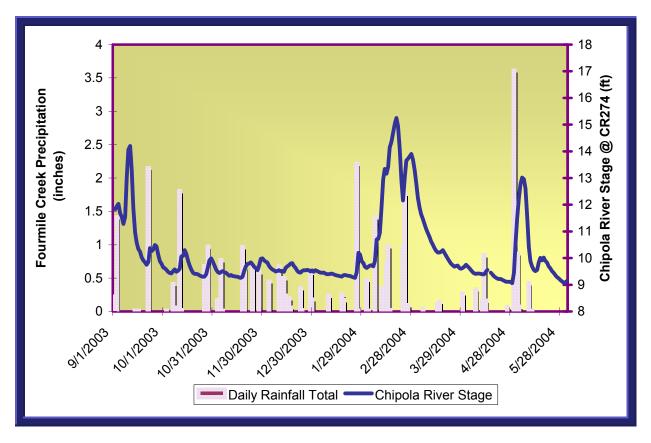


Figure 5a — Chipola River Discharge @ US90 (USGS)

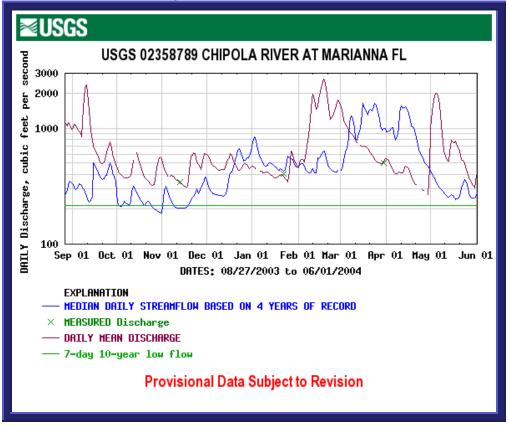


Figure 5b — Chipola River Discharge @ CR274 – Altha (USGS)

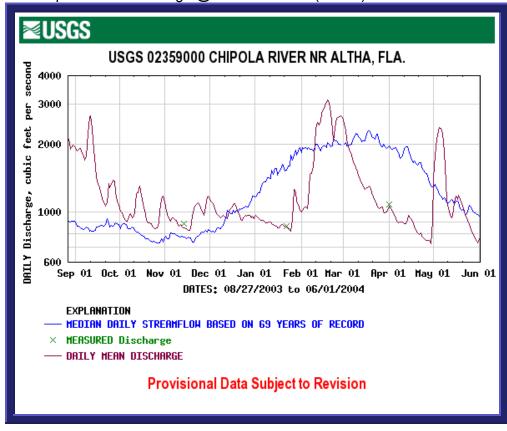
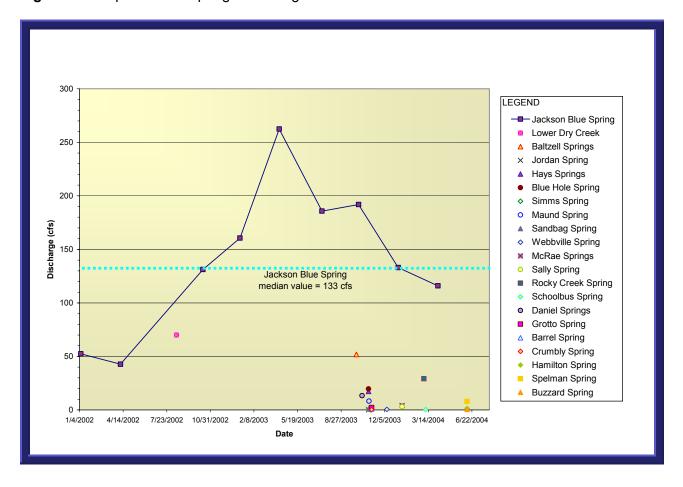


Figure 6 – Chipola Basin Springs Discharge Measurements



APPENDIX B SPRINGS

FIGURE B-1 – Spring Locations in Northern Jackson County

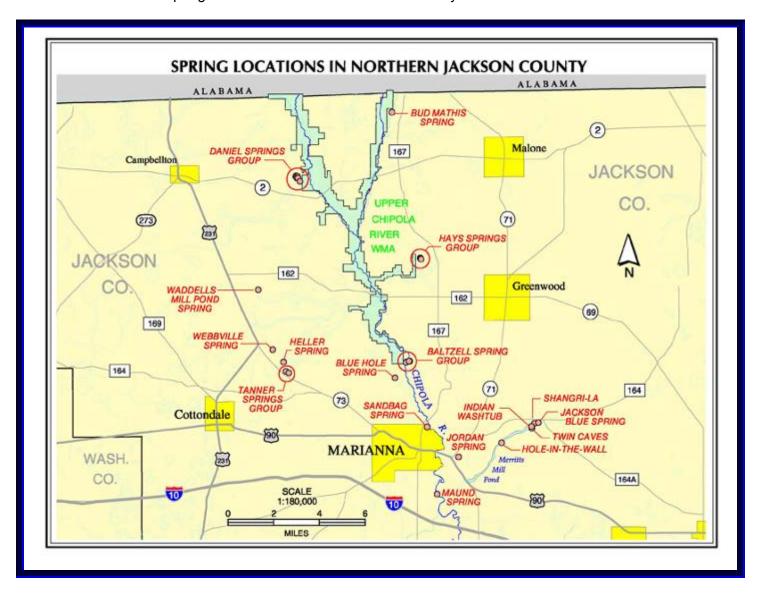


FIGURE B-2 – Spring Locations in Southern Jackson County

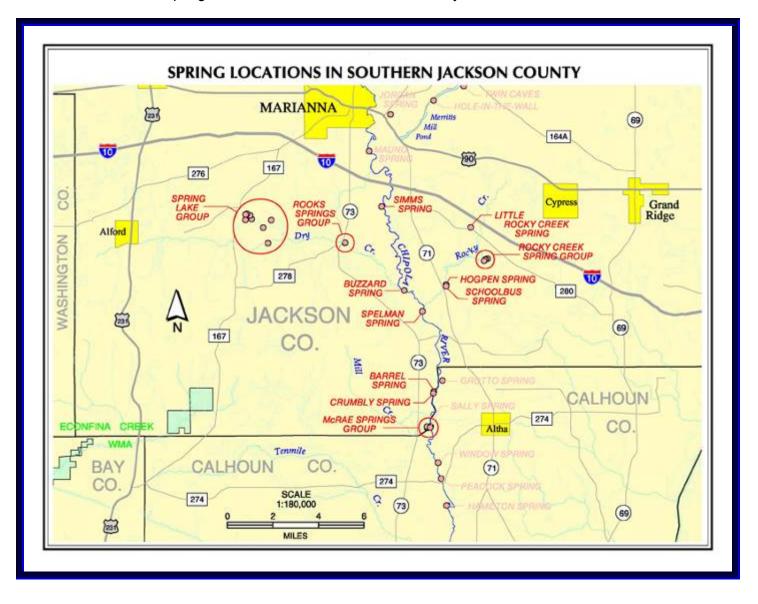


FIGURE B-3 – Spring Locations in Calhoun County

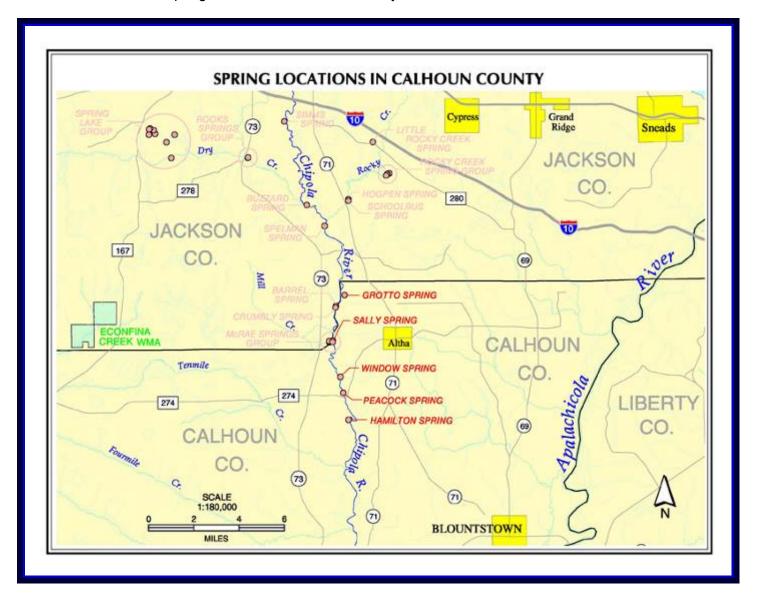


Table 3 – Springs Inventory for the Chipola River Basin

SPRING NAME	County	DESCRIPTION	LATITUDE	LONGITUDE
BARREL SPRING	Calhoun	Barrel Spring is located at the head of its 570 foot run. The mouth of the run is on the west side of the river approximately 3.52 miles north of the Hollis Creek boat ramp. Approximately 25 feet before the Chipola River the run disappears into a swallet and resurges from the limestone bank next to the Chipola River. Ground water enters the 25 foot diameter pool through a large area of diffuse inflow in the bottom. There is no surface boil and the vent is crossed by many trees and branches. The vent is on private property.	303532.78	851014.45
BLUE HOLE SPRING	Jackson	Blue Hole Spring is located in an 80 foot diameter pool in Florida Caverns State Park at the head of a 0.45 mile run to Carters Mill Branch, a tributary to the Chipola River. Carters Mill Branch joins the Chipola River approximately 0.51 miles south of the Chipola River Rise. Turbid water conditions obscured the vent geometry. The maximum depth is approximately 38.5 feet at the vent. There is no surface boil apparent.	304912.93	851442.437
BUD MATHIS SPRING	Jackson	This spring is located in the Cowarts Creek tributary to the Chipola River. At the time, the water was too tannic to allow observation of the spring vent. From the 35-foot diameter spring pool the run flows approximately 0.25 mile to Cowarts Creek. Depth at the estimated vent area is approximately 11 feet. The east side of the spring run is typically low swampland while the west side is bordered by a stable 12 foot high clay bluff. The spring is located on private property and appears to be used for irrigation.	305917.637	851439.527
BUZZARD SPRING	Jackson	Buzzard Spring is located 80 feet east of the Chipola River at the head of a run that descends across a terraced limestone shelf. Throughout its length, the run remains shallow, approx. 0.25 feet deep. The spring consists of a 6'x10' cavity in the limestone shelf with the vent issuing laterally at the bottom of the south side. From the vent, the depth decreases from 10.3' to 4' along the sand bottom. The end of the run falls from a low limestone bluff into a set of shoals on the Chipola River.	303926.171	851129.146
CRACK-IN-THE- WOODS	Jackson	This spring is located in the Chipola River watershed. The vent is at the head of an 80-foot run. The mouth of the run is on the west side of the river approximately 1.1 miles north of the Florida Caverns State Park boat ramp. The vent is a large crack in the limestone bottom of an oblong pool approximately 20 by 40 feet. The maximum depth is approximately 10 feet at the vent. There is no surface boil apparent. The vent is on private property.	304947.944	851412.659
CRUMBLY SPRING	Calhoun	Crumbly Spring is located approximately 160 feet up the Barrel Spring run, the mouth of which is on the west side of the river approximately 3.52 miles north of the Hollis Creek boat ramp. There is a small vent with a surface boil and several lateral discharge areas from a partially collapsed limestone wall. The pool is approximately five feet in diameter and discharges in two directions, into the Barrel Spring run and directly into the Chipola river. The spring is on private property.	303529.102	851015.767
DRY CREEK RISE	Jackson	Dry Creek Rise is a lowland floodplain spring with a pool approx. 25-30 feet in diameter. The discharge flows northwest approx. 0.1 miles to Dry Creek swallet and is typically very tannic. Flow from discharge has been traced to Black Hole and Gadsen springs.	304119.065	851727.963
GROTTO SPRING	Calhoun	This collection of four vents is at the head of a 988 foot run to the Chipola River. The mouth of the run is on the west side of the river approximately 4.16 miles north of the Hollis Creek boat ramp. Vent #1 is an opening approximately three feet wide under a ledge. Ground water discharges laterally from vent #2. Vent #3 and #4 are in a second, 35 foot diameter pool directly below the pool containing the #1 and #2 vents. Vent #4 appears to have been modified in that there is a square cut from the ledge that overhangs the conduit. This spring is on private property.	303557.57	850951.05

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HAMILTON SPRING	Calhoun	Hamilton Spring is in the floodplain on the west side of the river approximately 1.81 miles south of the Highway 274 bridge. The vent is a crack in the limestone bottom of a pool approximately 15 feet in diameter with a maximum depth of four feet at the vent. The run extends for approximately 150 feet before entering a swallet and resurging into another pool approximately 15 feet away. The spring pool is approximately 25 feet across with a swallet on the side next to the river. Water that enters this swallet appears to discharge diffusely into the river across a 25 foot wide beam. The vent and resurgence are on private property.	303109.328	850947.072
HELLER SPRING #1	Jackson	This spring is located in the Waddell's Mill Creek tributary to the Chipola River. Ground water discharges diffusely over a large swampy area. The discharge coalesces into a spring run that widens from one foot to over four feet over the 900 feet before it joins the Webbville Spring run. The spring is on private property.	304953.125	851937.16
. ILLELIX OF KINO #1	JUSTICOTT	higherit.	55 1555.125	551557.10
HOGPEN SPRING	Jackson	This spring is located on the Rocky Creek tributary to the Chipola River. It consists of several small sand boils in a 12 foot diameter pool that empties directly into Rocky Creek. It is located approximately 1.6 miles from the mouth of Rocky Creek. There is no visible surface boil. The land surrounding the vent is privately owned.	303937.589	850936.911
HOLE-IN-THE-WALL	laakaan	This spring is located in Merritts Mill Pond, a tributary to the Chipola River. The vent is approximately 1900 feet downstream from the county park at Jackson Blue Spring. Ground water discharges from a vertical crack in the limestone of a 25 foot limestone bluff. The opening extends approximately 10 feet above the water line and the maximum depth is 7.5 feet. The conduits have been explored for approximately 300 feet by cave	204640.050	951002 267
SPRING	Jackson	divers. The shore here is private property.	304640.959	851002.367
INDIAN WASHTUB SPRING	Jackson	This spring is located in Merritts Mill Pond, a tributary to the Chipola River. The vent is approximately 1,700 feet downstream from the county park at Jackson Blue Spring. Ground water discharges from a crack beneath a limestone ledge. Maximum depth in the vent is 20 feet and there is no discernable surface boil. The shore here is private property.	304717.018	850842.457
JACKSON BLUE SPRING	Jackson	Blue Springs is located at the head of Merrits Mill Pond, a four mile long impounded spring run and tributary to the Chipola River. The vent is a large conduit opening under a limestone ledge. Maximum depth in the vent is 17 feet but the conduit continues down and to the north beneath the surface. The spring pool is approximately 200 feet in diameter and the banks have been artificially stabilized with concrete walls. The park surrounding the spring is operated by Jackson County and is heavily utilized for swimming and recreation. The conduits feeding Jackson Blue Spring are also popular with cave divers and have been explored for hundreds of feet.	304725.2	850824.63
JORDAN SPRING	Jackson	This spring is beneath a 12 foot limestone bluff and discharges laterally into a four foot diameter pool. The run is approximately two feet wide and enters the Chipola River approximately 0.9 mile from the spring. The mouth of the run enters the Chipola approximately 0.9 mile north of the Highway 90 bridge. The land surrounding the vent is owned by the District.	304610.5	851157.311
LEAF SPRING	Jackson	This spring is located in the bottom of the Chipola River approximately 1.16 miles north of the Florida Caverns State Park boat ramp. The vent is a large crack in the bottom of a wallowed out area in the west bank. There is a significant surface boil though the vent is crossed by several large tree trunks.	304948.904	851411.248
MAUND SPRING	Jackson	Maund Spring is located on the east side of the Chipola River at the beginning of a 230 foot run approximately 3.4 miles north of the Interstate 10 bridge. The vent is a crevasse approximately 10 feet wide in the bottom of a 40 foot diameter pool. Maximum depth is 40 feet in the vent. There is no visible surface boil. The spring is surrounded by private property.	304446.712	851255.686

SALLY SPRING	Calhoun	Sally Spring is an opening in limestone approximately six feet wide under a 15 foot high bluff. It is located on the east side of the river approximately 1.8 miles north of Hollis Creek boat ramp. The pool associated with this spring is approximately 15 feet in diameter and discharges directly into the Chipola River. There is a visible surface boil and there are numerous discharge areas in the fractured limestone of the riverbank near the vent. The land surrounding the vent is privately owned.	303413	851024.151
SANDBAG SPRING	Jackson	Sandbag Spring is at the head of a 40 foot run on the west side of the Chipola River approximately 1.9 miles north of the Highway 90 bridge. The vent is an opening approximately four feet wide in the bottom of a steep-sided limestone pool approximately 20 feet in diameter and 10 feet deep. The vent and pool appear to have been artificially enlarged. There is no visible surface boil. The spring is on private property very close to a private residence. The banks have been modified with concrete to resemble a swimming pool deck with a dive platform directly over the vent.	304719.474	851318.992
SCHOOLBUS SPRING	Jackson	This spring is located on the Rocky Creek tributary to the Chipola River. The vent is an opening beneath a limestone ledge and a 15 foot bluff. It is located approximately 1.5 miles from the mouth of Rocky Creek. The pool associated with this spring is approximately 25 feet in diameter and seven feet deep at the vent. The run is approximately 75 foot long. There is no visible surface boil. The land surrounding the vent is privately owned.	303934.251	850936.987
SHANGRI LA SPRING	Jackson	This spring is located in Merritts Mill Pond, which is tributary to the Chipola River. The vent is approximately 800 feet downstream from the county park at Jackson Blue Spring. Ground water discharges from a large crack in the limestone below a 20 foot limestone bluff. Maximum depth in the vent is 10.5 feet and there is a strong surface boil. The shore here is private property.	304724.67	850834.383
SIMMS SPRING	Jackson	Simms Spring is a large diffuse discharge area that coalesces into a run approximately four feet wide. The run travels for a distance of approximately 300 feet before entering a rectangular cement pool that appears to have been used for swimming at one time. The run drains from the pool through a corrugated metal pipe into the Chipola River. The spring is on private property.	304239.088	851224.801
SPELMAN SPRING	Jackson	Spelman Spring is located at the head of a 0.2-mile run to the Chipola River. The spring pool, approx. 20'x70' across, consists of a weathered limestone shelf and, at the time of visitation, was very shallow. The spring vent is a vertical 8-foot wide by 20-foot deep opening at the northern end of the pool. The spring discharge appears tannic, possibly influenced by surface water inflow up gradient of the system.	303838.166	851046.463
TWIN CAVES SPRING	Jackson	Twin Caves Spring is located in Merritts Mill Pond, a tributary to the Chipola River. The vent is approximately 1,900 feet downstream from the county park at Jackson Blue Spring. Ground water discharges from two circular openings in the limestone bottom. Maximum depth in the vent is 15.5 feet and there is no discernable surface boil. The shore here is private property.	304713.025	850841.57
WADDELLS MILL POND SPRING	Jackson	Waddell's Mill Pond Spring is located in the Waddell's Mill Creek tributary to the Chipola River. Ground water discharges laterally from limestone rubble beneath a 25 foot high bluff. There are limestone outcrops, karst windows and caves in the area around this spring. It appears that the limestone over the conduit is collapsing in an up gradient direction over time. The spring is at the head of Waddell's Mill Pond which is 1.4 miles long. There are reported to be other spring vents under the impounded waters but no boils were detected during the site visit. From the outfall of the impoundment, the spring run flows east for five miles before entering the Chipola River. The spring is on private property.	305237.986	852041.003

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		Webbville Spring is located in the Waddell's Mill Creek tributary to the Chipola River. The spring consists of a number of lateral discharge areas, diffuse discharge areas and sand boils contained in a 85 foot diameter, 15 foot deep, steep-sided depression. The ground water discharge coalesces into an eight-foot wide run that extends southeast 1.4 miles before joining Tanner Spring run to form Baker Creek. Baker Creek travels another 4.5 miles before entering Waddell's Mill Creek.		
WEBBVILLE SPRING	Jackson	The spring is on private property.	305021.668	852005.17
WINDOW SPRING		Window Spring is in the floodplain on the east side of the river approximately 0.48 miles south of the Hollis Creek boat ramp. Ground water discharges laterally from beneath a 20 foot high bluff into a seven foot diameter pool. There are two large karst windows in the bluff above this spring. The land around this vent	303249.175	
WINDOW SPRING	Calhoun	is private property.	303249.175	851005.87
BALTZELL SPRING GROUP	Jackson	This spring group is located in the Chipola River watershed. The three vents and their associated pools are in line on a 1,000 foot run with the #1 vent being the headspring. The mouth of the run is on the east side of the river approximately 1.2 miles north of the Florida Caverns State Park boat ramp. The spring is on private property.		
BALTZELL SPRING	laakaan	This vent is a crack in the limestone bottom of a 40 foot diameter pool at the head the run. The maximum depth in the vent is 17 feet and there is no surface boil apparent.	304950.599	851402.906
BALTZELL SPRING	Jackson	This vent is a crack in the limestone bottom and side of a 40 foot diameter pool. The maximum depth in the vent is 15 feet and there is no surface boil apparent. The pool is in line between		
#2	Jackson	Baltzell Spring #1 and Baltzell Spring #3.	304950.309	851403.418
BALTZELL SPRING #3	Jackson	This vent consists of two perpendicular cracks in the limestone bottom of a 30 foot diameter pool. The maximum depth in the vent is 30 feet and there is a strong surface boil.	304949.87	851404.881
DANIEL SPRINGS GROUP	Jackson	This spring group is located on the Marshall Creek tributary to the Chipola River. The seven vents and their associated pools are in or adjacent to a 0.8 mile run with the #1 vent being the headspring. The spring run enters Spring Branch 1,500 feet from its confluence with Marshall Creek. Spring Branch enters Marshall Creek from the west approximately three miles north of where it joins Cowarts Creek to form the Chipola River. The property surrounding this springs group is privately owned.		
DANIEL SPRING #1	Jackson	This vent was obscured by turbid water during the site visit. The 90 foot diameter spring pool lays at the head the run. The maximum depth in the vent is eight feet and there is no surface boil apparent. The vent is on private property.	305655.315	851857.743
DANIEL SPRING #2	Jackson	A single vent is not apparent. It appears that there is a diffuse discharge of ground water from the bottom of the 35 foot diameter spring pool to the east of the run. The maximum depth in the vent is six feet and there is no surface boil apparent.	305656.902	851856.183
DANIEL SPRING #3	Jackson	Daniel Spring #3 is located within a 100 foot diameter spring pool east side of the spring group run. The vent was obscured by turbid water during the site visit and there was no surface boil apparent. The maximum depth in the pool is 12 feet.	305655.614	851853.182
DANIEL SPRING #4	Jackson	This vent in the run is marked by a surface boil. A single vent is not apparent. It appears that ground water discharges from extremely porous limestone composing the run bottom. The run is 35 foot wide at the vent with a maximum depth of 12 feet.	305651.885	851854.513
DANIEL SPRING #5	Jackson	A single vent is not apparent. There are several small sand boils in the bottom and it appears that there is diffuse discharge of ground water. The 55 foot diameter spring pool lies to the east of the run. The maximum depth is 10 feet and there is no surface boil visible.	305650.989	851851.452
DANIEL SPRING #6	Jackson	A single vent is not apparent. There seems to be a diffuse discharge of ground water from the bottom of the 25 foot diameter spring pool to the east of the run. The maximum depth in the vent is nine feet and there is no visible surface boil.	305643.747	851846.336

DANIEL SPRING #7	Jackson	A single vent is not apparent. There is a small sand boil in the bottom and it appears that there is diffuse discharge of ground water. The 20 foot diameter spring pool lies to the east of the run. The maximum depth is 12.5 feet and there is no surface boil apparent.	305643.721	851846.093
HAYS SPRINGS GROUP	Jackson	This spring group is located in the Chipola River watershed. The three vents and their associated pools are in line on a 3.5 mile spring run with the #1 vent being the headspring. The mouth of the run is on the east side of the river approximately 0.3 miles north of the State Road 162 bridge. The property surrounding this springs group is privately owned.		
HAYS SPRING #1	Jackson	This vent is a crack beneath a limestone ledge in a 45 foot diameter pool at the head the run. The maximum depth in the vent is 16 feet and there is no surface boil apparent.	305344.788	851330.354
HAYS SPRING #2	Jackson	This vent is a 10 foot by 50 foot crevasse in the limestone bottom of a 65 foot diameter pool. The maximum depth in the vent is 33 feet and there is no surface boil apparent. The pool is in line between Hays Spring #1 and Hays Spring #3.	305343.662	851329.188
HAYS SPRING #3	Jackson	This vent consists of a 30 foot long and 10 foot high opening beneath a limestone ledge in a 75 foot diameter pool. The maximum depth in the vent is 16 feet and there is no surface boil.	305342.459	851328.112
MCRAE SPRING GROUP	Jackson	This collection of spring vents is located on the Chipola floodplain on the west side of the river approximately 1.75 miles north of the Hollis Creek boat ramp. McRae #1 and #2 are in a run which enters a swallet and is not connected to the surface flow of the other vents. McRae #5 is at the head of a run that combines with the discharge from McRae #4 and McRae #3 before entering two swallets. The swallets are approximately 350 feet from the river bank where at least a portion of the spring discharge resurges through fractured limestone into the Chipola. The associated vents and swallets are on private property.		
MCRAE SPRING #1	Jackson	McRae Spring #1 emerges from beneath a limestone ledge into a pool approximately 6 feet in diameter with a maximum depth of 2.5 feet at the vent. The run widens and extends for approximately 150 feet before entering a swallet. There is a visible surface boil.	303409.587	851033.72
MCRAE SPRING #2	Jackson	McRae Spring #2 emerges from beneath a limestone ledge in the run of McRae Spring #1. The run is approximately 15 feet wide at the vent with a maximum depth of four feet. There is a visible surface boil above the vent. The run enters a swallet approximately 100 feet downstream.	303409.587	851033.72
MCRAE SPRING #3	Jackson	Ground water discharges laterally from fractured limestone in the bank of a small run approximately two feet wide with a maximum depth of one-half foot at the vent. The run extends for approximately 120 feet before joining the larger run from McRae #4 and McRae #5.	303410.834	851033.894
MCRAE SPRING #4	Jackson	McRae Spring #4 is a crack in the limestone bottom of a pool approximately four feet in diameter with a maximum depth of two feet in the vent. There is a surface boil visible and a suspended sand column in the vent. There is also an area of lateral discharge into the pool from fractured limestone beneath a 25-foot high bluff. Water from the pool immediately enters the run of McRae #5.	303412.542	851034.362
MCRAE SPRING #5	Jackson	McRae Spring #5 is under a limestone ledge and discharges into a pool approximately eight feet in diameter with a maximum depth of 3.5 feet at the vent. There is a visible surface boil over the vent. The run combines with the discharge from McRae #4 then extends for approximately 200 feet before entering a culvert pipe. Approximately 150 feet beyond the culvert outfall, the discharge from McRae #3 joins the run. The combined flow travels approximately 200 feet before diverging and entering a pool which acts as a swallet. The remaining flow travels another 250 feet into a swallet in a steep-sided ravine.	303412.542	851034.362

MCRAE SPRING RESURGENCE ON CHIPOLA	Jackson	The resurgence is on the west side of the river approximately 1.75 miles north of the Hollis Creek boat ramp. Ground water discharges diffusely through cracks and pores in the limestone of the river bank. There is no pool or real surface boil evident at the resurgence area but small boils from the cracks can be seen during times of low river stage. Peacock Spring is located in the bottom of the Chipola River with	303410.401	851025.566
PEACOCK SPRING	Calhoun	a visible surface boil over the vent when the river is under normal stage conditions. The vent is an opening approximately six feet wide under a ledge on the west side of the river approximately 0.2 miles north of the Highway 274 bridge. The surface boil was not detected during high stage periods.	303212.654	850958.772
ROCKY CREEK SPRING GROUP	Jackson	This collection of spring vents is located on the Rocky Creek tributary to the Chipola River. Rocky Creek and the vents are on the east side of the river just south of the City of Marianna. Evergreen Spring #1, #2 and #3 are linear karst windows in which ground water emerges from a spring, travels a short distance then enters a swallet. It appears that ground water that travels through these windows then emerges as Rocky Creek Spring at the head of Rocky Creek and remains as surface water. The vents appear to be influenced by outflow from Williams Slough which enters a swallet approximately one mile northeast of Evergreen #1. The land surrounding the spring group is privately owned.		
EVERGREEN SPRING #1	Jackson	Evergreen Spring #1 emerges from beneath a limestone ledge into a pool approximately 60 feet in diameter. The run extends for approximately 400 feet before entering a swallet. There is a visible surface boil over the vent. Both the vent and swallet are on private property.	304035.842	850746.227
EVERGREEN SPRING #2	Jackson	The Evergreen Spring #2 vent and swallet are both contained in the same 30 foot diameter pool. The vent is beneath a limestone ledge and approximately six feet deep. There is a visible surface boil over the vent.	304034.122	850751.393
EVERGREEN SPRING #3	Jackson	Evergreen Spring #3 emerges from beneath a limestone ledge into a pool approximately 30 feet in diameter. The run extends for approximately 150 feet before entering a swallet. There is a visible surface boil over the vent. Both the vent and swallet are on private property.	304033.582	850751.869
LITTLE ROCKY CREEK SPRING	Jackson	This spring is located on the Rocky Creek tributary to the Chipola River. It consists of several small sand boils spread along an approximate 40 foot area at the bottom of a collapsed bluff. Discharge coalesces into a run approximately three feet wide and 50 feet long which enters Little Rocky Creek. It is located approximately 0.8 miles from the confluence of Little Rocky Creek and Rocky Creek. There are small surface boils above some of the sand boils. The land surrounding the spring is privately owned.	304148.218	850829.158
ROCKY CREEK SPRING	Jackson	Rocky Creek Spring is an opening in the limestone approximately six feet wide beneath a 20 foot bluff. It is the head of Rocky Creek which enters the Chipola River approximately 4.5 miles downstream. The pool associated with this spring is approximately 30 feet in diameter. There is a visible surface boil and there is an associated swallet that has silted in approximately 60 feet from the vent.	304030.975	850755.094
ROOKS SPRING GROUP	Jackson	This collection of spring vents is located on the Dry Creek tributary to the Chipola River. Dry Creek and the vents are on the west side of the river south of the City of Marianna. The vents are 720 feet downstream from the Highway 73 bridge over Dry Creek. The land surrounding the spring group is privately owned.		

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ROOKS SPRING #1	Jackson	Rooks Spring #1 consists of a large crevasse in the limestone, two smaller laterally discharging vents, and several sand boils all discharging into a 20 foot diameter pool. The site is surrounded on two sides by a 10 foot high limestone bluff. There is a visible surface boil above the main vent.	304116.896	851403.745
ROOKS SPRING #2	Jackson	Rooks Spring #2 consists of a crevasse in the limestone bottom discharging into a 15 foot diameter pool that empties directly into Dry Creek. There is a visible surface boil.	304117.37	851403.127
SPRING LAKE SPRINGS (compiled)	Jackson	This collection of springs is located in the Chipola River watershedspecifically on the Dry Creek tributary to the Chipola River. Spring Lake and its constituent springs form the headwaters of Dry Creek. Spring Lake is not really a lake, but a wide and shallow spring run formed by the discharge of seven named springs. The western extent of Spring Lake contains the majority of the springs, including Mill Pond, The Crack, Coffin, Springboard, and Double Springs. At the time of observation the springs of this portion of Spring Lake were less turbid and tannic than the springs issuing down line, Black Spring and Gadsen Spring. This part of the Spring Lake run also contains three swallets; two between Coffin Spring and Springboard and one down flow from Double Spring. Spring Lake is located approximately six miles southwest of Marianna, FL. The property surrounding Spring Lake is privately owned.		
BLACK SPRING	Jackson	Black Spring is located within a 90-foot pool diverging into two runs. The northern run continues for 200 feet and the eastern run 1000 feet before joining Spring Lake. There is no visible surface boil visible at the time and the water was too tannic to allow observation of the spring vent. However, a maximum depth at the spring of 42 feet was determined with a depth meter.	304155.285	851740.312
COFFIN SPRING	Jackson	Coffin Spring is located in an approximately 120 foot wide pool at the edge of Spring Lake. The vent is located beneath the ledge at the narrow north end of a 10 foot wide "coffin" shaped limestone fissure. The depth observed at the vent was 20 feet. No surface boil was evident at the time of visit, but the discharge from the spring was observed pushing limnophilia stalks away from the vent. A portion of the discharge from this spring sinks into two swallets to the east.	304227.522	851823.341
THE CRACK	Jackson	The Crack is located approximately 200 feet up an eight foot wide shallow run in the northwestern area of Spring Lake. The vent consists of an approximate 30 foot by 12 foot oblate fissure in limestone with a maximum depth of 12 feet. The spring discharges from underneath the limestone ledge on the southern side of the vent. A light surface boil is evident above the vent. The limestone surface on the north side of the spring is lightly dusted with sand falling from the discharge sediment plume.	304225.863	851826.483
DOUBLE SPRING	Jackson	Double Spring is located in a pool on the west edge of a small secondary channel of Spring Lake. The vent is a five foot wide mouth in a six foot high limestone ledge at the bottom of a sand and shell covered bowl shaped depression approximately 130 feet from Spring Lake. The observed depth at the vent was 33 feet. Discharge from the vent emerges at a shallow angle, pushes up the side of the depression, and creates a prominent boil 30 horizontal feet from the vent. A steady sediment plume may also be observed at the vent. The discharge from the spring combines with a portion of the Spring Lake flow to sink into the Double Spring swallet, located approximately 300 feet southeast of Double Spring. The property owner's yard extends to the edge of the bank on the south side of the spring.	304215.4	851810.7
GADSEN SPRING	Jackson	Gadsen Spring is located at the beginning of a 0.2 mile run south to Spring Lake. There is no visible surface boil visible in the 80' wide pool and, at the time visited, the water was too tannic to allow observation of the spring vent. However, a maximum depth at the spring of 33 feet was determined with a depth meter.	304212.305	851718.665

MILL POND SPRING	Jackson	Millpond Spring is located at the southern end of a wide shallow run, approximately 600 feet long, at the westernmost extent of Spring Lake. The spring discharge emerges from a large limestone cave, about 15 feet in diameter, at the bottom of a bowl shaped depression. The observed depth at the vent was 26 feet. A wooden dock extends out to the ledge above the cave. The landowner's home is located near the spring, with the yard forming the western bank of the 80 foot wide pool.	304213.355	851827.25
SPRINGBOARD SPRING	Jackson	The spring is located along the northern edge of Spring Lake. The spring appears to discharge from a vent somewhere along a limestone ledge traversing about half the length of the 50 foot wide pool from northwest to southwest. At the time of observation the spring water was too turbid to be able to discern a specific vent. The maximum depth measured along the length of the ledge was 16 feet.	304223.597	851814.535
TANNER SPRINGS GROUP	Jackson	The Tanner Springs group is located in the Chipola River watershed on the west side of the riverspecifically in the Waddell's Mill Creek tributary to the Chipola River. The spring run for Tanner Spring #2 flows east-northeast approximately 1,000 feet before joining the run from Tanner Spring #1. The spring run then flows east-northeast 0.9 mile before joining the Webbville Spring run to form Baker Creek. Baker Creek travels another 3.5 miles before entering Waddell's Mill Creek. The springs are on private property.		
TANNER SPRING #1	Jackson	Tanner Spring #1 discharges laterally from beneath a seven foot high bluff into a two foot diameter pool. There are limestone outcrops, karst features and caves in the area around this spring.	304931.964	851931.068
TANNER SPRING #2	Jackson	Tanner Spring #2 discharges laterally from beneath a 20 foot high bluff into a five foot diameter pool. There are limestone outcrops, karst features and caves in the area around this spring.	304928.065	851923.895

CHIPOLA RIVER SPRINGS PHOTOGRAPHS



Baltzell Spring #1



Baltzell Spring #2



Baltzell Spring #3



Barrel Spring



Black Spring



Blue Hole Spring



Bud Mathis Spring



Buzzard Spring



Coffin Spring



The Crack



Crack-In-The-Woods Spring



Crumbly Spring



Daniel Spring #1



Daniel Spring #2



Daniel Spring #3



Daniel Spring #4



Daniel Spring #5



Daniel Spring #6



Daniel Spring #7



Double Spring



Evergreen Spring #1



Evergreen Spring #2



Evergreen Spring #3



Gadsen Spring



Grotto Spring



Hamilton Spring



Hays Spring #1



Hays Spring #2



Hays Spring #3



Heller Spring



Hogpen Spring



Hole-In-The-Wall Spring



Jackson Blue Spring



Jordan Spring



Little Rocky Creek Spring



Mill Pond Spring



Maund Spring



McRae Spring #1



McRae Spring #2



McRae Spring #3



McRae Spring #4



McRae Spring #5



McRae Resurgence



Peacock Spring



Rocky Creek Spring



Rooks Spring #1



Rooks Spring #2



Sally Spring



Sandbag Spring



School Bus Spring



Shangri-La Spring



Simms Spring



Spelman Spring



Springboard Spring



Tanner Spring #1



Tanner Spring #2



Twin Caves Spring



Waddell's Mill Pond Spring



Webbville Spring



Window Spring