

Blueberry Spring Sampled 2013-2014

Site Information

Blueberry Spring emerges from the south side of Sulphur Island and the west side of Black Water Creek in Seminole State Forest (SSF). The discharge has only been measured once, in 1997, by USGS. The discharge at that time was 0.07 cubic feet per second (cfs) putting it in category as a fifth magnitude spring. Water flows from a small sand boil in the hillside and a circular pool approximately 5 feet in diameter. Several more sand boils are present along the run contributing to its flow before discharging into Black Water Creek. The riparian zone consists of a normal, expected community comprising of native plants, trees, and shrubs with minimal human disturbance. The spring run flows through heavily shaded woods, with a bottom comprised of sand and organic debris.

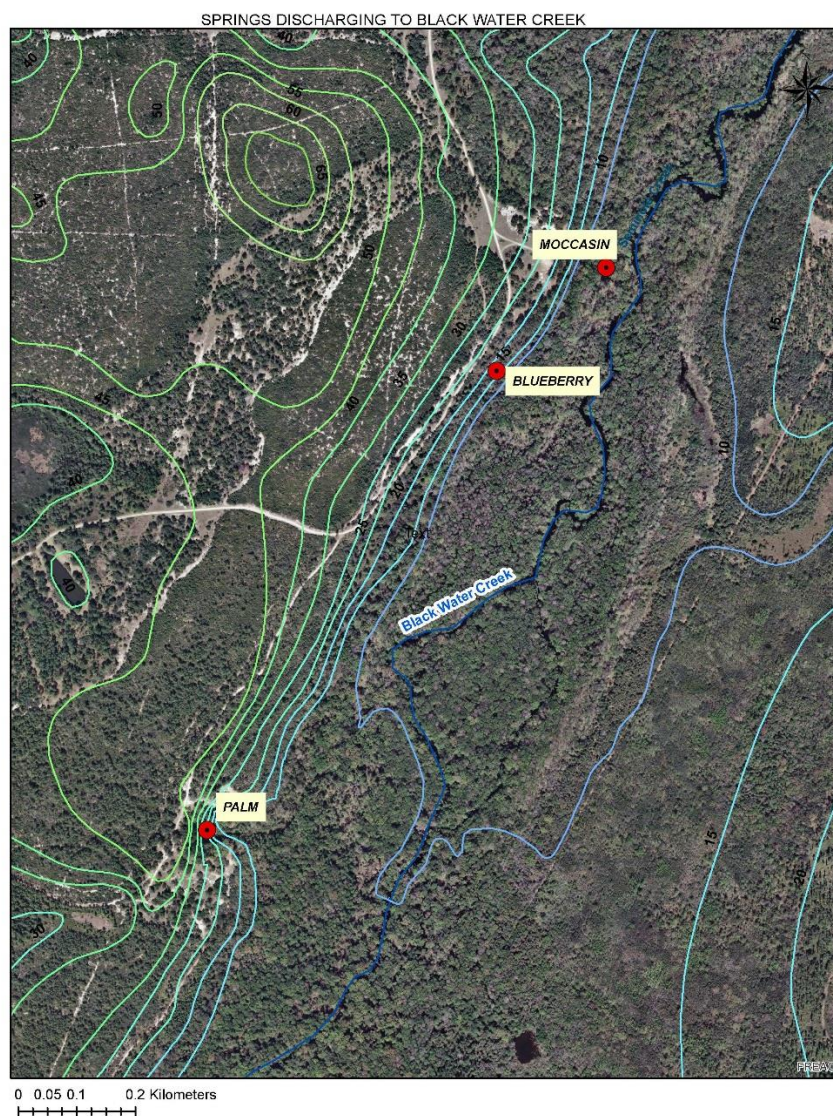


Figure 1-Bb. Location of Blueberry Spring in State Forest in Lake County



Figure 2-Bb. Blueberry Spring Run (A) and Spring Vents (B)

Results

Water Quality

Water quality varied slightly between quarterly results. (Table 1-Bb). Color and TSS were slightly higher during the first sampling event (7/18/13) most likely due to influx of surface water. Nitrate/nitrite (NO_{3+2}) results were not detectable during the first sampling in July 2013 and barely detected during October 2013 sampling. In January 2014, NO_{3+2} were much higher (although still well within surface water criteria rule). Ammonia and TOC were also slightly higher in January. It is not clear what contributed to the change. There were no major rain events during week preceding this sampling event. Boron results were elevated but that is due to natural occurrence. The data suggest that human activities might have very slight impact on water source of the spring. There is not sufficient data to calculate annual geometric means for nitrate/nitrite for Blueberry Spring, however, all four sample results indicate that NO_{3+2} limit is well within the springs water criteria rule 62-302.531(2)(b)2 which states: "For spring vents, the applicable numeric interpretation of the narrative nutrient criterion ...is 0.35 mg/L of nitrate/nitrite as an annual geometric mean, not to be exceeded more than once in any three calendar year period." All other nutrients were also low. Water quality results are comparable to the data collected by Lake County in 2004.

Table 1-Bb. Water Quality Results for Blueberry Spring

Date Sampled	7/18/2013	10/9/2013	1/21/2014	4/16/2014
pH	7.33	7.45	7.52	7.5
DO mg/L	0.85	0.32	1.59	0.38
DO %	10.7	4.7	18	4
Specific Conductance ($\mu\text{mhos/cm}$)	2001	1997	2024	2022
Water temperature ($^{\circ}\text{C}$)	23.7	23.4	23.2	23.4
Fecal Coliform (cfu/100mL)	3 B	2 U	2 B	10 B
Enterococci (cfu/100mL)	n/a	2 U	n/a	n/a
Turbidity (NTU)	1.3	0.4	0.2	0.3
Alkalinity (mg CaCO_3/L)	121	125	124	118
Chloride (mg Cl/L)	390	400	390	410

Color true (PCU)	15	2.5 U	4.5 I	2.5 U
Fluoride (mg/L)	0.26	0.26	0.26	0.28
Sulfate (mg SO ₄ /L)	290	300	300	300
TDS (mg/L)	1050	1110	1100	1100
TSS (mg/L)	16	2 U	2 I	2 U
Ammonia (mg N/L)	0.083	0.086	0.11	0.086
Nitrite/Nitrate (mg N/L)	0.004 U	0.004 I	0.03	0.012
Total Phosphorous (mg P/L)	0.032	0.032	0.03	0.029
Total Kjeldahl Nitrogen (mg N/L)	0.26	0.2	0.2	0.17 I
Organic Carbon (mg C/L)	1.1	0.95 I	1.5	1.4
Ortho-phosphate (mg P/L)	0.028	0.029	0.03	0.03
Sucralose (µg/L)	0.010 U	n/a	n/a	n/a
Calcium (mg/L)	125	126	123	129
Magnesium (mg/L)	43.9	46.2	43.9	45.8
Potassium (mg/L)	7.2	7.1	7.2	7.3
Sodium (mg/L)	220	221	n/a	n/a
Boron (µg/L)	91	86.9	81.9	86.5

B- Results based on colony counts outside the acceptable range

I- The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

U - Indicates that the compound was analyzed for but not detected.

n/a -not collected or not reported due to data quality concerns

Habitat Assessment

A Habitat Assessment was not performed due to accessibility issues of the spring run and low flow.

Aquatic Macroinvertebrate Community

Aquatic macroinvertebrates were not collected from Blueberry Spring run.

Periphyton Survey

Periphyton was abundant in the spring pool and was collected during sampling on January 21, 2014. The dominant taxon was *Cladophora glomerata*, which belongs to the Class Chlorophyceae. Other filamentous algae was present in the sample, including *Jaaginema gracile*, *Oscillatoria* sp., *Oedogonium* sp. (Cyanophyceae), and *Rhizoclonium heiroglypticum* (Chlorophyceae). Diatoms present in the sample included *Pinnularia* sp., *Eunotia* sp., and *Gomphonema* sp.

Linear Vegetation Survey

A Linear Vegetation Survey was not performed due to accessibility issues of the spring run and low flow.

Summary

Blueberry Spring is a fifth magnitude spring located within Seminole State Forest. It is surrounded by natural area with minimal human disturbance. The spring's discharge and water quality are consistent throughout a year except nitrate/nitrite concentration which showed fluctuation. Water quality meets surface water criteria specified in Chapter 62.302, F.A.C.