

Palm Springs

Sampled 2013-2014

Site Information

Palm Springs emerges from the north/west side of Black Water Creek in Seminole State Forest. The spring's flow was measured in 1997 and 2001 by the U.S. Geological Survey, and in 2003, 2005, and 2008 by the St. Johns River Water Management District. The mean and median discharges for the period from 1997 to 2008 are 0.68 cfs and 0.70 cfs, respectively, placing it as a fourth magnitude. Water flows from up to seven vents or sand boils in the run, located at the bottom of a ravine. Prior to April 2003, the spring vents were impounded in a one-acre pond by an earthen dam that has since been removed. The spring run is sandy and dominated by chara algae and sulphur-reducing bacteria closer to the vents, and flows for approximately 0.3 miles before discharging to Black Water Creek. The riparian zone consist of a normal, expected community of native plants, trees, and shrubs including sawgrass, cattails, palmetto, sweetgum, sabal palm, and ferns.

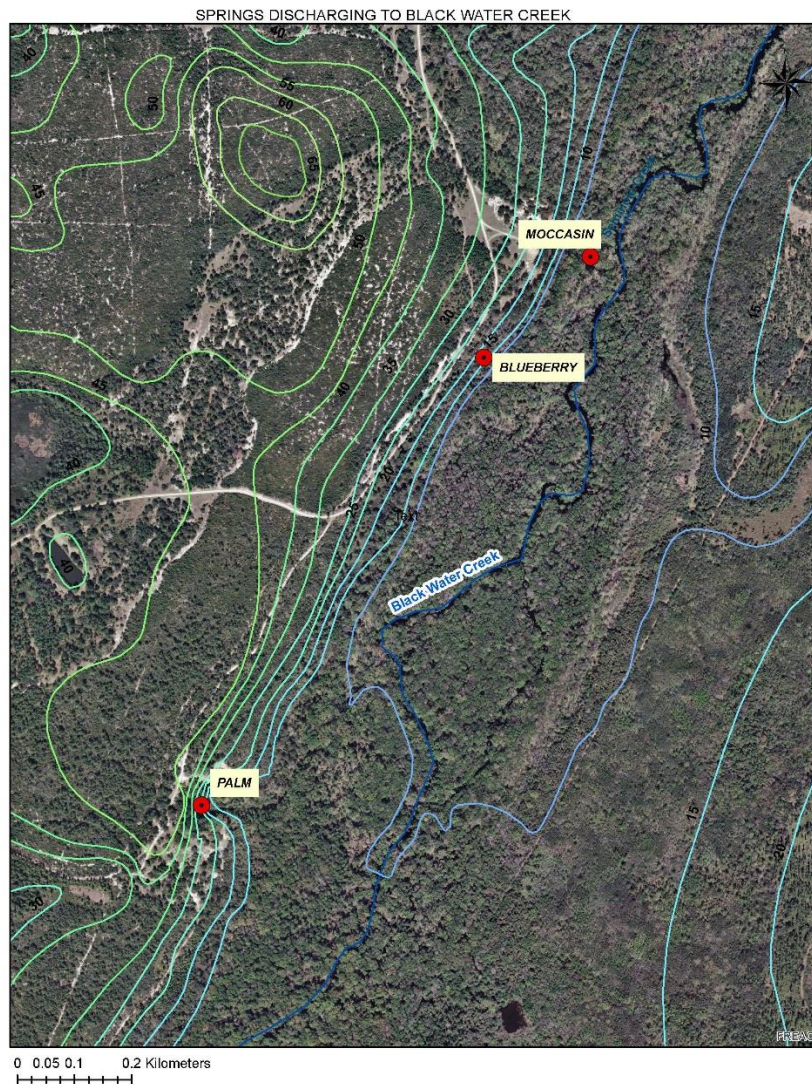


Figure 1-PA. Location of Palm Springs State Forest in Lake County



(A)



(B)

Figure 2-PA. Palm Springs Vent (A) and Spring Run (B)

Results

Water Quality

Water quality was fairly constant throughout all four sampling events (Table 1-BA) and suggest that human activities have minimal impact on water source of the spring. The dissolved oxygen (DO) results were low, but that is a natural condition for ground water. Sucralose was not detected. Boron results were somewhat elevated, however that is due to natural occurrence. Nutrients results were low including nitrate/nitrite (NO_3+NO_2) which were none detect during three sampling events, and barely detected during July 2013 sampling. Even though there is not sufficient data to calculate NO_3+NO_2 annual geometric mean for Palm Springs, the four sample results indicate that NO_3+NO_2 limit is well within the surface 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."

Table 1-PA. Water Quality Results for Palm Springs

Date Sampled	7/18/2013	10/9/2013	1/21/2014	4/16/2014
pH	7.38	7.46	7.5	7.5
DO mg/L	0.29	<0.1	1.15	0.31
DO %	3.6	<0.1	10.2	4
Specific Conductance ($\mu\text{mhos/cm}$)	1968	1990	1960	1978
Water temperature ($^{\circ}\text{C}$)	24.3	24.28	24.2	24.24
Fecal Coliform (cfu/100mL)	2 U	2U	2 U	2 U
Enterococci (cfu/100mL)	n/a	2U	n/a	n/a
Turbidity (NTU)	0.15	0.15	0.15	0.15
Alkalinity (mg CaCO_3/L)	114	116	113	109
Chloride (mg Cl/L)	380	380	350	370
Color true (PCU)	2.5 U	2.8 I	3.7 I	2.5 U
Fluoride (mg/L)	0.27	0.26	0.27	0.29
Sulfate (mg SO_4/L)	340	340	330	330

TDS (mg/L)	1110	1070	1080	1140
TSS (mg/L)	2 U	2 U	2 U	2 U
Ammonia (mg N/L)	0.1	0.11	0.11	0.1
Nitrite/Nitrate (mg N/L)	0.005 I	0.004 U	0.004 U	0.004 U
Total Phosphorous (mg P/L)	0.034	0.036	0.038	0.035
Total Kjeldahl Nitrogen (mg N/L)	0.22	0.24	0.21	0.12 I
Organic Carbon (mg C/L)	0.91 I	1.1	1.2	1.3
Ortho-phosphate (mg P/L)	0.033	0.038	0.036	0.034
Sucralose (µg/L)	0.011 U	n/a	n/a	n/a
Calcium (mg/L)	134	138	134	138
Magnesium (mg/L)	45.3	46.4	44.5	46.1
Potassium (mg/L)	7.4	7.2	7.1	7.3
Sodium (mg/L)	212	208	n/a	n/a
Boron (µg/L)	95	91.6	84.4	88.7

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 full habitat assessment was performed on October 9, 2013. Two major macroinvertebrate habitats were noted: aquatic macrophytes and snags, though both were heavily smothered by sulphur-reducing bacteria and periphyton in most of the run. Smothering lessened the further away from the springs the habitats were located. All secondary parameters reflected optimal conditions, with just one point deducted for bank stability as the bank slope was steep due to the springs being at the bottom of a ravine. The spring run was shallow and mostly sandy, but soft.

Aquatic Macroinvertebrate Community

Aquatic macroinvertebrates were not collected.

Periphyton Survey

Periphyton was present around the spring boils and along the run. A sample was collected on October 9, 2013. The dominant taxon in tube 1 was *Spirogyra* sp., which belongs to Class Chlorophyceae. *Limnothrix* sp. was also present in the sample. The diatoms *Encyonema* sp. and *Mastogloia* sp. were present in the sample.

The dominant taxon in tube 2 was *Vaucheria* sp., which belongs to Class Xanthophyceae. No other algae was observed in tube 2.

Linear Vegetation Survey

A full linear vegetation survey was performed on October 9, 2013. Chara algae was the dominant taxa in most of the stream. Also present in the water were *Cladium jamaicense*, *Hydrocotyle* sp., *Landoltia punctata*, *Typha* sp., *Salix* sp., *Schoenoplectus californicus*, and *Thelypteris* sp. Due to the prevalence of *Chara*, macrophyte coverage was as high as 25-50% in some sections.

Summary

Palm Springs is a fourth 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. Water quality meets surface water criteria specified in Chapter 62.302, F.A.C. The plant and macroinvertebrate community are normal for small springs and spring run systems.