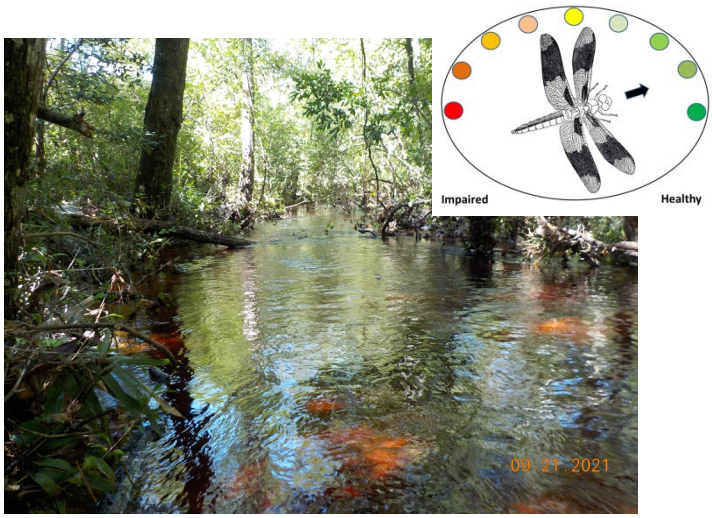
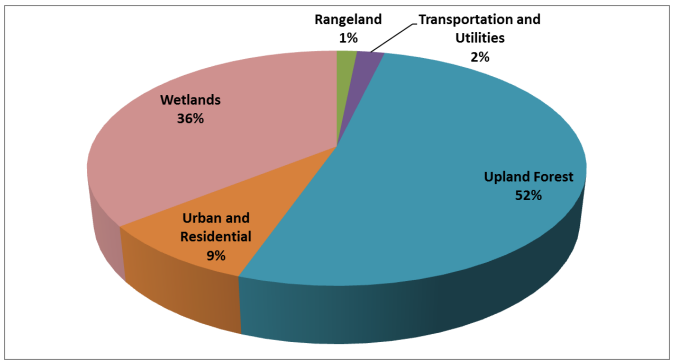
Waterbody: Polk Creek



Basin: Ochlockonee River

Polk Creek is a minimally disturbed, slightly tannic stream located in western Leon County. The stream flows west, eventually reaching Lake Talquin.

As the following pie chart shows, urban and residential, transportation and utilities land uses make up approximately 12% of the 2,328-acre watershed upstream of the sample station. Increases in stormwater runoff and waterbody nutrient loads can often be attributed to this type of land use.



Background

Healthy, well-balanced stream communities may be maintained with some level of human activity, but excessive human disturbance may result in waterbody degradation. Human stressors may include increased inputs of nutrients, sediments, and/or other contaminants from watershed runoff, adverse hydrologic alterations, undesirable removal of habitat or riparian buffer vegetation, and introduction of exotic plants and animals. Water quality standards are designed to protect designated uses of the waters of the state (e.g., recreation, aquatic life, fish consumption), and exceedances of these standards are associated with interference of the designated use.

Methods

Surface water sampling was conducted to determine the health of Polk Creek and met the collection and analysis requirements of Florida Department of Environmental Protection (FDEP).

Results

Escherichia coli (E. coli)

E. coli levels exceeded the Class III water quality standard several times over the sampling period. Since the watershed is relatively undeveloped, it was thought that elevated bacteria levels could be the result of wildlife in the area. FDEP, through their own sampling, have determined that anthropogenic sources have been identified using genetic marker and tracer data. To better track potential sources of *E. coli*, Leon County added additional water quality stations to the watershed in 2021 (Figure 1). The latest *E. coli* exceedances were noted during the 4th quarter of 2021 at both stations.

Nutrients

According to FDEP requirements, Numeric Nutrient Criteria for phosphorus and nitrogen (expressed as an annual geometric mean) cannot be exceeded more than once in a three-year period. The nutrient thresholds and results are found in Table 1. While the State criteria were not exceeded for either parameter, nutrient levels have been slowly increasing over time.

Habitat Assessment and Stream Condition Index (SCI)

The habitat assessment and SCI sampling are not performed every year, so the following results are from 2019.

The results of the Habitat Assessment (HA) score for Polk Creek characterize the overall stream habitat in the Optimal category (Table 2). Habitat availability, (a component of the HA) was sub-optimal, especially roots, and to a lesser extent snags, although high quality leaf packs were present. Channel characteristics were very natural with the expected pools, bends, and stable streambanks.

Table 1. FDEP's total nitrogen criteria for streams applied to Polk Creek. Due to low water levels, the Numeric Nutrient Criteria data requirements could not be calculated for 2011.

Polk Creek	Instream Protection Criteria TN (1.03 mg/L)	Instream Protection Criteria TP (0.18 mg/L)
Year		
2007	0.44	0.02
2008	0.42	0.03
2009	0.22	0.04
2010	0.48	0.04
2011	-	-
2012	0.46	0.04
2013	0.78	0.04
2014	0.54	0.04
2015	0.48	0.06
2016	0.56	0.05
2017	0.73	0.05
2018	0.63	0.05
2019	0.43	0.08
2020	0.54	0.06
2021	0.44	0.05

In keeping with the habitat assessment and the water quality that exhibited a high dissolved oxygen concentration, low conductivity and low turbidity, the Stream Condition Index score was Healthy (Table 3).

The macroinvertebrate community present at the monitoring site consisted of 47 taxa including 12 sensitive (per FDEP) taxa and four FDEP very tolerant taxa. No single group or taxon numerically dominated the community. The stoneflies of the *Perlesta placida* complex were the most abundant single taxon followed by tanytarsini chironomids of the *Rheotanytarsus exiguus* grp. Sensitive taxa were well represented in the SCI sample with 25.5% of total richness. Only a single long-lived taxon was recovered from the SCI subsampling although both *Procambarus* sp. and *Progomphus obscurus* are present in the total sample.

Table 2. Polk Creek Habitat Assessment Score.

Polk Creek	Score	Category
Substrate Diversity	14	Suboptimal
Substrate Availability	10	Marginal
Water Velocity	19	Optimal
Habitat Smothering	18	Optimal
Artificial Channelization	20	Optimal
Bank Stability	9, 9	Optimal, Optimal
Riparian Zone Width	10, 10	Optimal, Optimal
Riparian Vegetation Quality	10, 10	Optimal, Optimal
Final Habitat Assessment Score	**139**	
Interpretation	**Optimal**	

Included in the sensitive taxa are a single taxa each of both ephemeroptera (mayflies) and plecoptera (stoneflies). No FDEP listed sensitive trichoptera (caddisflies) were recovered. These three EPT taxa are widely regarded as the groups of aquatic insects that contain a large number of pollution sensitive taxa. In total, four EPT taxa, were recovered in the SCI; one ephemeropteran taxa, one plecopteran taxa and two trichopteran taxa.

For more information about the SCI and Habitat Assessment, click Here.

Table 3. Polk Creek Stream Condition Index Score.

Polk Creek	Rep 1	Rep 2
Stream Condition Index Metrics Scores		
Total Taxa	5.71	4.64
Ephemeroptera Taxa	1.25	1.25
Trichoptera Taxa	1.11	0
% Filter Feeder	3.25	3.53
Long-lived Score	2	2
Clinger Taxa	7	5
% Dominance	7.65	7.65
% Tanytarsini Taxa	8.80	9.03
Sensitive Taxa	5.33	4
% Tolerant Taxa	1.59	3.18
SCI Vial Score	48.55	44.75
Stream Condition Index Score	**46.65**	
Score Interpretation	**Healthy**	

Metals

Polk Creek's (station PK1) lead levels exceeded Class III water quality criteria during the 3rd quarter of 2021. Relict anthropogenic sources such as leaded gasoline are most likely to be the cause of the elevated levels of lead in these systems.

Click here for more information on metal levels in Leon County waterbodies.

Other Parameters

Other water quality parameters appear to be normal for the area and no other impairments were noted.

Conclusions

Additional water quality sampling in 2021 showed *E. coli* exceedances occurring at both stations. Nutrient thresholds were met for the Big Bend Bioregion. The results of the Habitat Assessment score characterize the stream habitat in the Optimal category. In keeping with the habitat assessment and the water quality, the Stream Condition Index score was Healthy. Station PK1 lead levels exceeded Class III water quality criteria during the 3rd quarter of 2021. Other water quality parameters appear to be normal.

Thank you for your interest in maintaining the quality of Leon County's water resources. Please feel free to contact us if you have any questions.

Contact and resources for more information

www.LeonCountyWater.org

Click here to access the results for all water quality stations sampled in 2021.

Click here for a map of the watershed – Sample Sites 38 and PK1.

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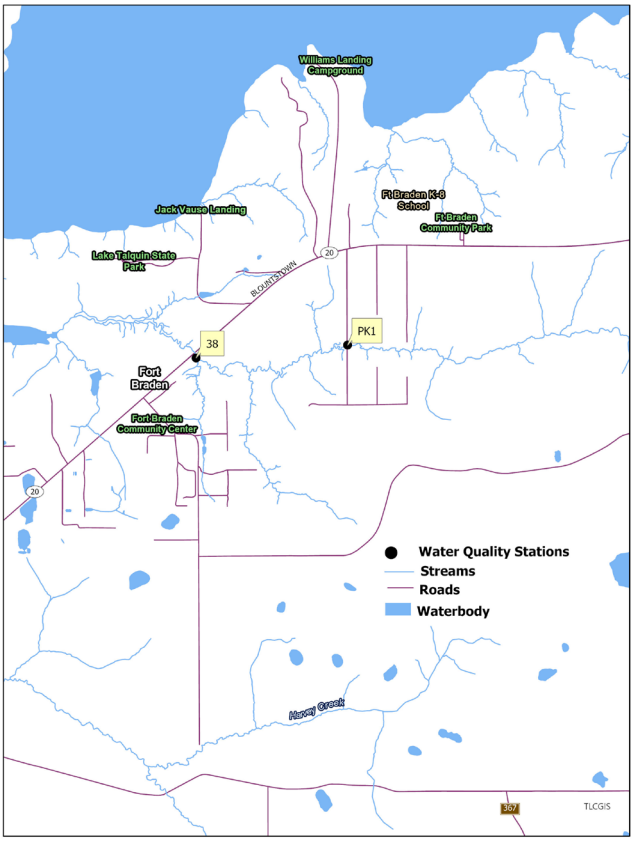

Figure 1. Locations of the water quality station 38 and the newly established PK1 on Polk Creek.

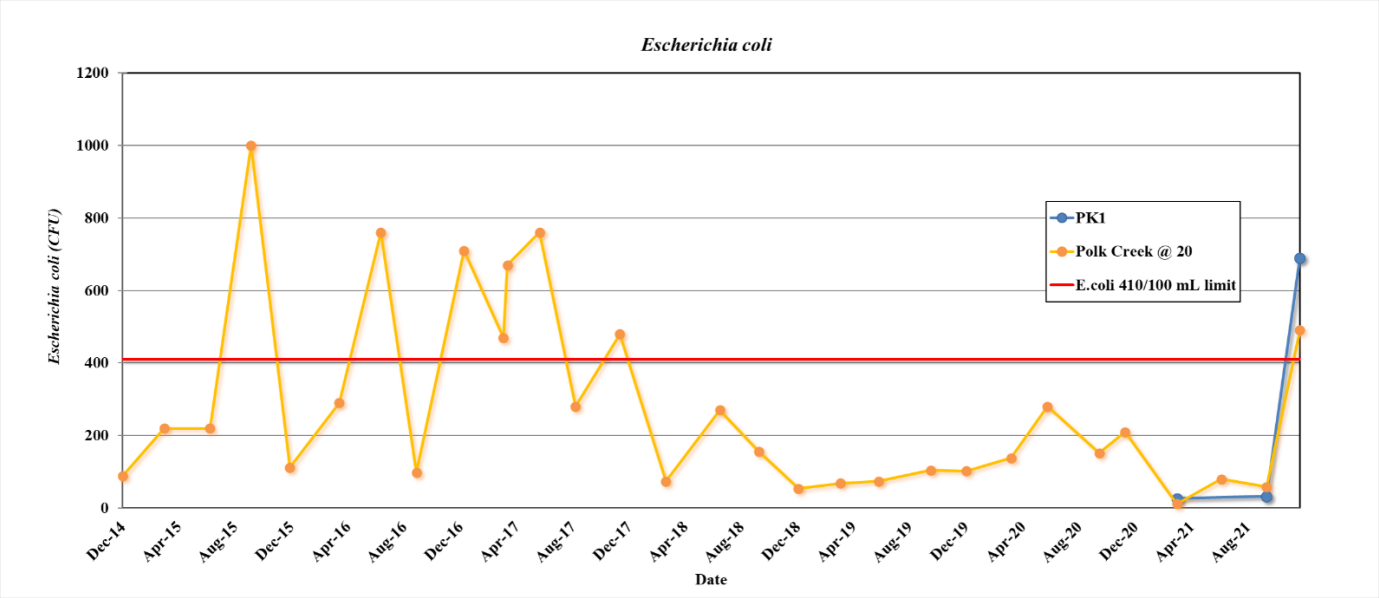

Figure 2. *E. coli* levels for Polk Creek.