

Waterbody: Gum Creek



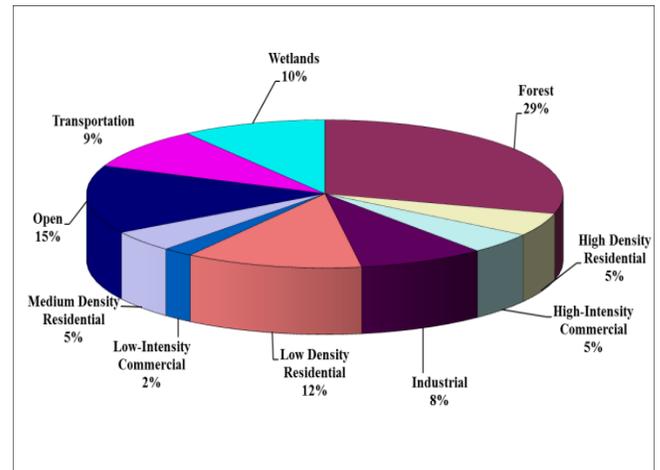
Basin: Lake Munson

The urbanized Gum Creek system is located in central Leon County. Gum Creek meanders south through several wetlands, and eventually flows into Munson Slough.

As shown in the following pie chart, approximately 46% of the land uses in the 5,407 acre watershed are residential, commercial, industrial or transportation. Increases in stormwater runoff and waterbody nutrient loads can often be attributed to these types of land uses.

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. State 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.



The Florida Department of Environmental Protection (FDEP) issued a fecal coliform TMDL for portions of Gum Creek in September 2008. The TMDL establishes the allowable loadings to the creek that would restore the creek to applicable water quality thresholds. In this case, fecal coliforms would have to be reduced by 32% to meet the criterion of fecal coliforms not exceeding 400/100 mL Most Probable Number (MPN) in 10 percent of the samples. However, there are no longer standards for fecal coliforms in Florida; the standard has been supplanted by standards developed for *Escherichia coli* as an indicator of bacterial contamination. Staff is unsure how the TMDL will be implemented.

Methods

Surface water samples were collected to determine the health of Gum Creek and meet the requirements of the Florida Department of Environmental Protection (FDEP).

Results

Nutrients

Tables 1 and 2 represent Gum Creek's annual geometric means of total phosphorus and total nitrogen. According to FDEP requirements, Numeric Nutrient Criteria (NNC) (expressed as an annual geometric mean) cannot be exceeded more than once in a three year period. Due to low water conditions and

recent construction activity related to the Capital Circle southwest widening, the required amount of samples could not always be collected from the Gum Creek stations. The lack of data means that FDEP requirements for determining numeric nutrient criteria for some stations for several years could not be calculated. Due to low water conditions and construction activity, four temporally independent samples per year were only collected from Station GC2T in 2015. As shown in Tables 1 and 2, Station GC2T's total nitrogen and phosphorus levels did not exceed the state criteria in 2015. Results from other stations showed similar total nitrogen and phosphorus results and would meet the NNC, if sampling requirements could be met.

Table 1. FDEP's total nitrogen criteria for streams applied to Gum Creek. Results in bold signify exceedances of the State criteria.

Gum Creek	Instream Protection Criteria				
	TN (1.03 mg/L)				
Year	GC1	GC2	GC3	GC4	GC2T
2005	0.69	0.63	0.53	0.69	-
2006	1.10	0.89	-	0.57	-
2007-2008	-	-	-	-	-
2009	0.66	-	0.53	0.77	0.59
2010	0.93	-	0.82	1.03	0.75
2011-2012	-	-	-	-	-
2013	0.68	-	0.66	-	-
2014	-	-	-	-	-
2015	-	-	-	-	0.71

Table 2. FDEP's total phosphorus criteria for streams applied to Gum Creek. All results were within the State criteria.

Gum Creek	Instream Protection Criteria				
	TP (0.18 mg/L)				
Year	GC1	GC2	GC3	GC4	GC2T
2005	0.05	0.05	0.10	0.15	-
2006	0.11	0.13	0.08	0.09	-
2007-2008	-	-	-	-	-
2009	0.06	-	0.05	0.08	0.05
2010	0.05	-	0.05	0.07	0.04
2011-2012	-	-	-	-	-
2013	0.04	-	0.06	-	-
2014	-	-	-	-	-
2015	-	-	-	-	0.05

Fecal Coliforms

While values historically exceeded the Class III criterion of fecal coliforms (not exceeding the 400/100 mL Most Probable Number (MPN) in 10% of the samples), there were no exceedances in 2014. As mentioned previously, *E. coli* standards recently supplanted fecal coliform standards in Florida as an indicator of bacterial contamination. Unfortunately, the recently adopted *E. coli* water quality limit of > 126 in 10% of samples collected over a 30 day period were exceeded several times in 2015 (Figure 1).

Dissolved Oxygen (DO)

As Figure 2 shows, Gum Creek station GC2T periodically failed to meet to meet the Class III criteria for DO. Station GC4 failed to meet the limit once over the period of record. Due to beaver activity, the flow at station GC2T is often stagnant or flowing very slowly, leading to low DO levels.

Conclusions

With the exception of Station GC1's total nitrogen levels exceeding the state criteria in 2006, Gum Creek met the nutrient thresholds in the East Panhandle Region. Station GC2T periodically failed to meet the Class III criteria for DO. Station GC4 failed to meet the limit once over the period of record. The recently adopted *E. coli* water quality limit of > 126 in 10% of samples collected over a 30 day period were exceeded several times in 2015. Other water quality parameters appear to be normal for the area and no other impairments were noted.

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.LeonCountyFL.gov/WaterResources

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[Click here to access the results for all water quality stations sampled in 2015.](#)

[Click here for map of watershed – Sample sites GC-1, GC-2T, GC-3 and GC 4.](#)

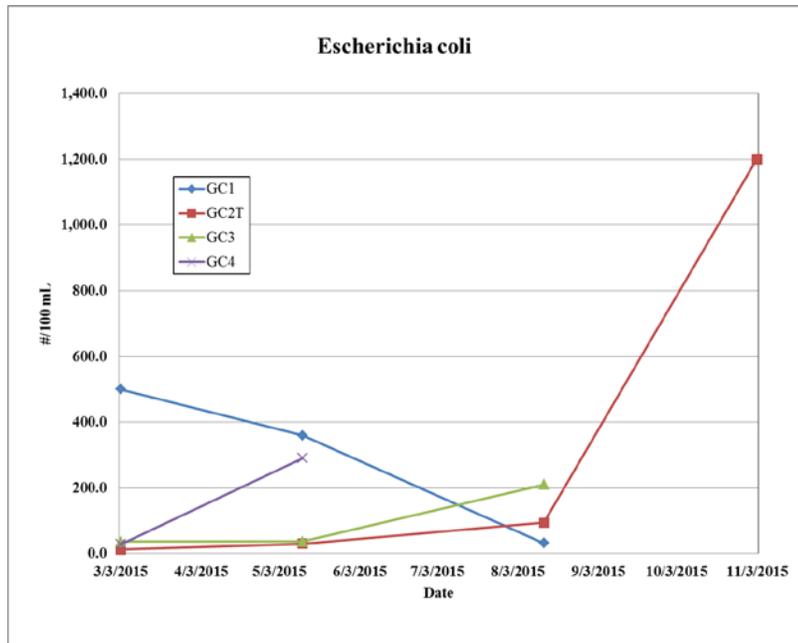


Figure 1. Escherichia coli results for Gum Creek.

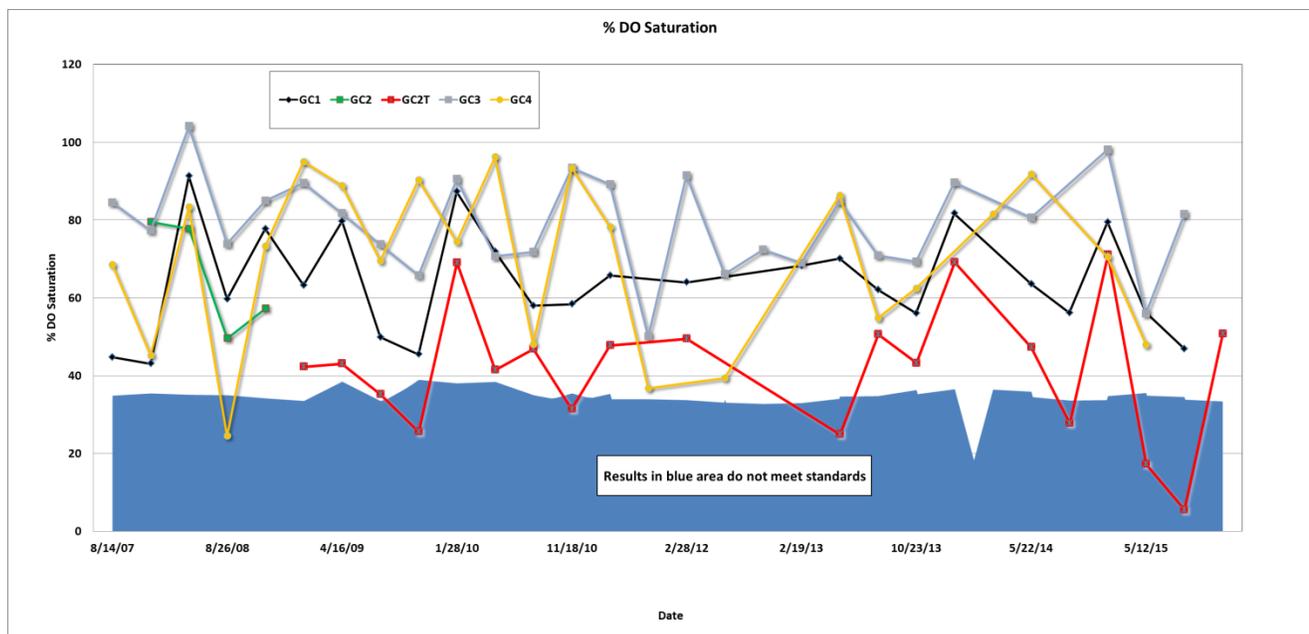


Figure 2. Dissolved Oxygen Percent Saturation results for Gum Creek.