

Northeast Drainage Ditch EcoSummary



The Northeast Drainage Ditch (NEDD) is a heavily urbanized stream located within the City of Tallahassee. The stream flows east and eventually enters Upper Lake Lafayette. Directly upstream of the water quality sampling station is a stormwater facility known as Weems Pond Regional Stormwater Treatment Facility (Weems Pond). The City of Tallahassee converted Weems Pond into an alum-injection facility that was brought online in October 2015. The retrofit of the facility reduces pollutant loads leaving the pond, flowing downstream through the Northeast Drainage Ditch and into Upper Lake Lafayette.

As part of the Weems Road Pedestrian and Street Safety (PASS) project, the drainage system, pedestrian, and bicycle transportation were all improved. Upgrades to the stormwater and roadway drainage system will help alleviate flooding that has historically occurred in the area. The project began in June 2019 and was completed in September of 2020. Water quality sampling resumed in October 2020.

Portions of the NEDD that are located west of Weems Road were historically altered for mosquito control and/or drainage purposes. The greatly altered flow conditions create channel scour during storms and contribute to low base flow east of Weems Road. In comparison, the

area east of Weems Road is relatively unaltered beyond the Weems Road right of way; the effects of upstream channelization extend only a short distance downstream of Weems Road. However, effects of the upstream modifications are reflected in the altered flow conditions of the stream.

Approximately 82% of land use in the 7,851-acre NEDD watershed upstream of the sample station is agriculture, transportation, utilities, urban and residential (as shown in **Figure 1**). These types of land uses are often attributed to increases in stormwater runoff and higher nutrient loads.

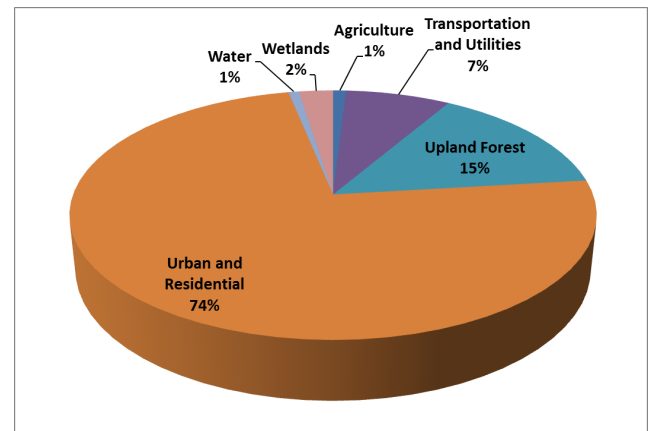


Figure 1. Northeast Drainage Ditch watershed land use.

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. Stressors can also include 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.

In late 2006, the U.S. Environmental Protection Agency (EPA) set a Total Maximum Daily Load (TMDL) target for fecal and total coliforms. 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 63% to meet the criterion of fecal coliforms not exceeding 400/100 mL Most Probable Number (MPN) in 10 percent of the samples. When the TMDL was established, the EPA expected a reduction of 52% to meet the criterion for total coliform. However, the fecal coliform standard in Florida has been supplanted by standards developed for *Escherichia coli* as an indicator of bacterial contamination.

Methods

Surface water samples are collected quarterly (as field conditions allow). Leon County also conducted a biological survey in 2021 to evaluate the health of aquatic invertebrate communities in the system. This information is used to determine the health of the NEDD and meets the requirements of the Florida Department of Environmental Protection (FDEP).

Results

Nutrients

The State of Florida uses Numeric Nutrient Criteria (NNC) to evaluate nutrients in waterbodies. NNC thresholds are set based on waterbody-specific characteristics and are used to determine if a waterbody meets water quality standards. The results of the four quarterly samples from a single year are used to calculate

the annual geometric mean. According to FDEP requirements, the NNC threshold cannot be exceeded more than once in a three-year period.

The nutrient thresholds and results are found in **Table 1**. When the NNC requirements were met, nutrient values did not exceed the state criteria.

For illustrative purposes, individual data points were plotted to determine any possible trends (**Figures 2 and 3**). With very few exceptions, individual values did not exceed the instream criteria for Total Nitrogen or Total Phosphorus.

Table 1. NNC Thresholds and results for NEDD.

Northeast Drainage Ditch	Total Nitrogen Threshold 1.03 mg/L	Total Phosphorus Threshold 0.18 mg/L
2006- 2008	-	-
2009	0.17	0.07
2010- 2011*	-	-
2012	0.81	0.10
2013	0.30	0.09
2014	-	-
2015	0.35	0.11
2016	0.27	0.03
2017	0.23	0.02
2018-2020*	-	-
2021	0.20	0.02
2022*	-	-

* Due to low water conditions or road work, staff could not collect the appropriate number of samples and thus could not determine the NNC.

Fecal coliforms and *Escherichia coli*

As mentioned previously, the EPA set a fecal coliform TMDL for the Northeast Drainage Ditch. While fecal coliforms were elevated above the 400/100 mL Class III limit in 12.9% of the samples for Class III waters, there has only been two exceedances since December 2009, with the latest being the June 11, 2015 event (530/100 mL). The adopted *E. coli* water quality limit of > 410 in 10% of samples collected over a

30-day period was also exceeded (490/100 mL) during the June 2015 sampling event (**Figure 4**).

Stream Condition Index and Habitat Assessment

The results of the Habitat Assessment scoring (90), characterize the stream habitat in the high Marginal to low Suboptimal category. A review of historical aerial photography starting in 1937 shows that what is now called NEDD was originally a natural stream that has been repurposed for stormwater management. Weems Pond was constructed in the 1960-1966 period with associated stream canalization extending only a short distance below (downstream of) Weems Road. In 2019, construction began on Weems Road to address flooding concerns in the area. Extensive improvements to the discharge structures below the roadway and surrounding riparian zone around the bridge were completed by September of 2020. In response to these changes, the station transect was moved approximately 25 meters downstream past a bend. The upper 10-20 meters of the SCI transect appears to have been historically altered. However, erosion caused by high stormwater flow is evident throughout the transect. For example, there are areas in which large portions of the root wads of the riparian trees are exposed to the air with soils having been washed away. Additionally, the channel bed is comprised primarily of exposed clay. Most of these zones of clay are covered by a thick layer of fine silt.

The 2021 SCI collected at this sample station achieved a score of 29 which equates to the high end of the FDEP Impaired category. The previous SCI collected on this station was completed two years prior to the Weems Road reconstruction and received a score of 38 which is on the low end of the Healthy category. The macroinvertebrate community during the 2021 event was strongly dominated by two mollusks: the freshwater snail *Physa* sp. and the exotic

Asian clam *Corbicula fluminea*. Between both samples, a total of 291 macroinvertebrates were sorted. Of those 291 macroinvertebrates, 124 (42.6%) were *Physa* sp. and 78 (26.8%) were *Corbicula fluminea*. Looking at the EPT species, no Plecoptera (stoneflies) or Ephemeroptera (mayflies) were collected in the SCI. Three species of Trichoptera (caddisflies) were collected in the SCI. Two are micro-caddisflies (Hydroptilidae), *Oxyethira* sp. (both vials) and *Hydroptila* sp. (vial two only). Two specimens of the Polycentropodidae caddisfly, *Cernotina* sp. were recovered from vial one.

Other Parameters

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

Conclusions

Based on ongoing sampling, the Northeast Drainage Ditch met the nutrient thresholds for the East Panhandle Region. The greatly altered flow conditions continue to create channel scour during storms and contribute to low base flow east of Weems Road. The results of the Habitat Assessment scoring characterize the stream habitat in the high Marginal to low Suboptimal category. The 2021 SCI achieved a score of 29 which equates to the high end of the FDEP Impaired category. 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.LeonCountyWater.org

[Click here to access the results for all water quality stations sampled in 2022.](#)

[Click here for a map of the watershed – Sample Site NE Ditch at Weems.](#)

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Table 2. NEDD Habitat Assessment Score.

Northeast Drainage Ditch	Score	Category
Substrate Diversity	8	Marginal
Substrate Availability	6	Marginal
Water Velocity	7	Marginal
Habitat Smothering	11	Suboptimal
Artificial Channelization	13	Suboptimal
Bank Stability	6, 6	Poor, Poor
Riparian Zone Width	9, 9	Optimal, Optimal
Riparian Vegetation Quality	8, 7	Suboptimal, Suboptimal
Final Habitat Assessment Score	90	
Interpretation	Marginal/Suboptimal	

Table 3. NEDD Stream Condition Index Score.

Northeast Drainage Ditch	Vial 1	Vial 2
Stream Condition Index Metrics Scores		
Total Taxa	3.48	2.61
Ephemeroptera Taxa	0	0
Trichoptera Taxa	2.86	2.86
% Filter Feeder	6.01	4.87
Long-lived Score	6.67	3.33
Clinger Taxa	1.25	1.25
% Dominance	5.17	3.73
% Tanytarsini Taxa	2.86	1.64
Sensitive Taxa	1	2
% Tolerant Taxa	0.91	0.49
SCI Vial Score	33.56	25.31
Stream Condition Index Score	29	
Score Interpretation	Impaired	

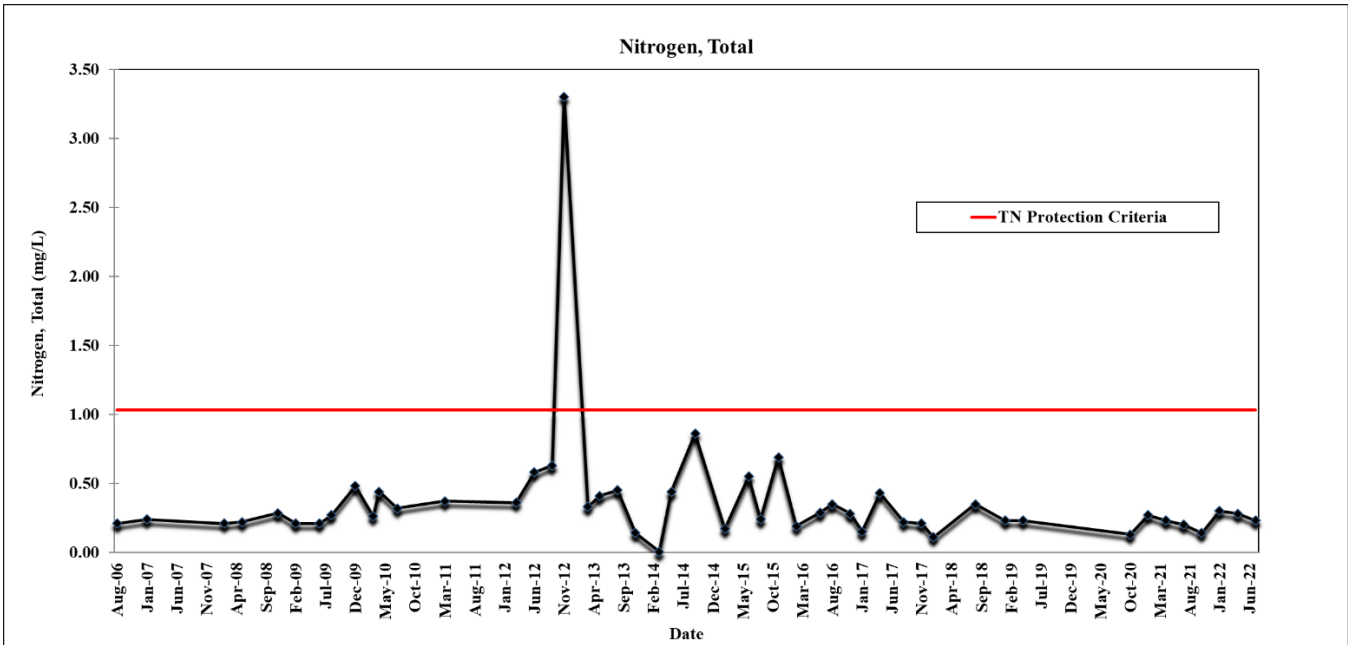


Figure 2. Total Nitrogen results for Northeast Drainage Ditch.

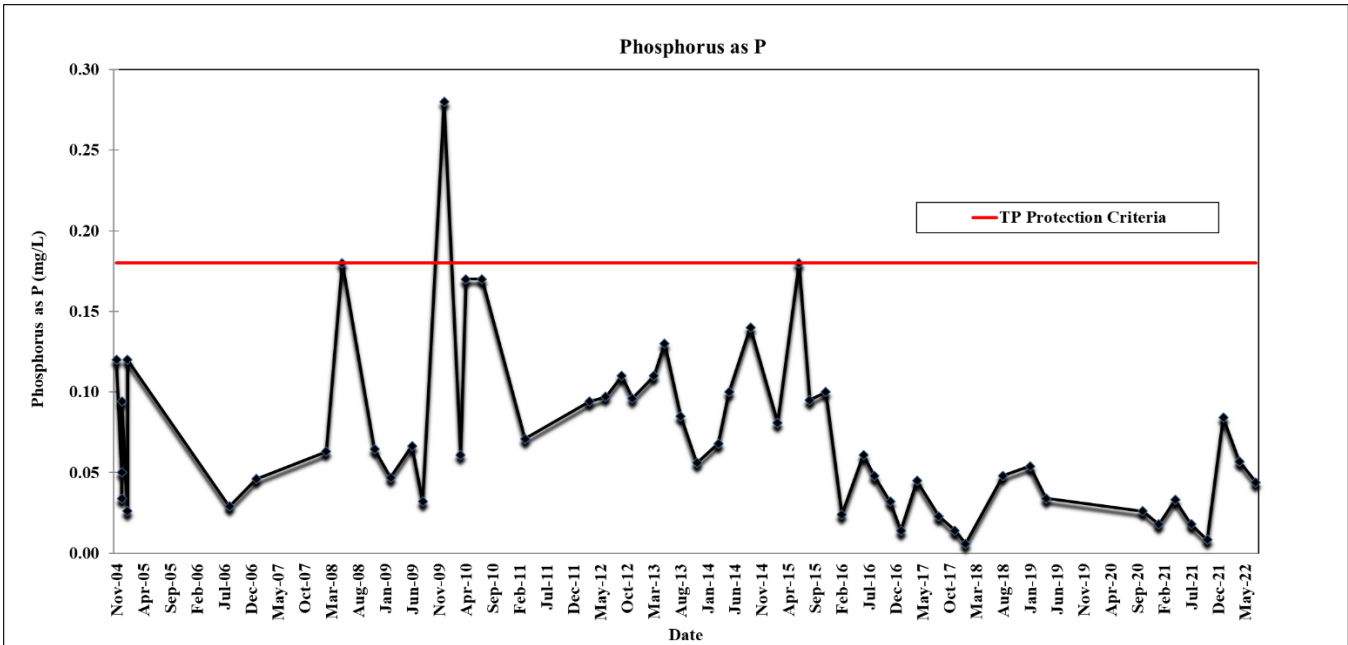


Figure 3. Total Phosphorus results for Northeast Drainage Ditch.

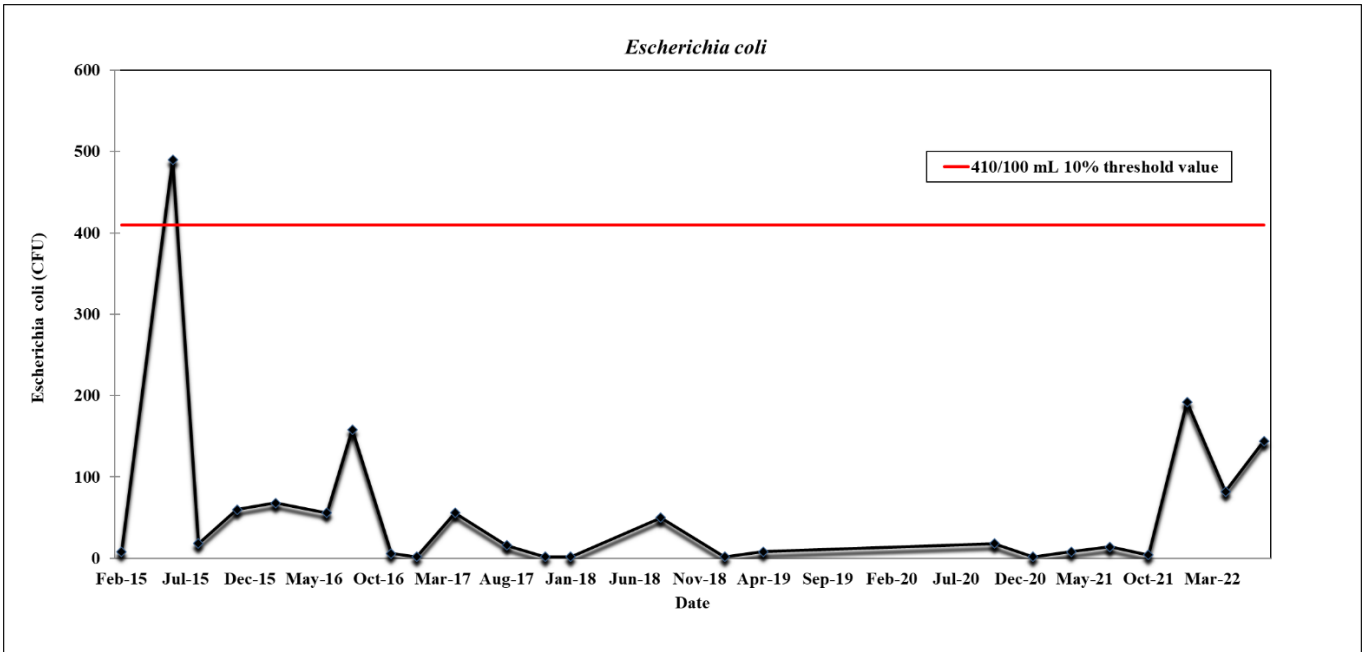


Figure 4. *E. coli* results for Northeast Drainage Ditch.