

INDIAN RIVER COUNTY, FLORIDA
MEMORANDUM

DEPARTMENTAL

TO: Jason E. Brown, County Administrator

THROUGH: Richard B. Szpyrka P.E., Public Works Director
Vincent Burke, P.E., Utilities Director

FROM: W. Keith McCully, P.E., Stormwater Engineer
Eric Charest, Environmental Compliance Specialist

SUBJECT: **Results of Phase 1 Water Quality Study of Nutrients in the Indian River Farms Water Control District's 8th Street Canal**

DATE: March 2, 2018

DESCRIPTION AND CONDITIONS

The following summarizes staff's investigation of nutrients in Indian River Farms Water Control District's (IRFWCD) 8th Street Canal between 90th Avenue and 74th Avenue, as requested by the County Commission. The primary purpose of the study was to determine if suspected seepage from the County's West Regional Wastewater Treatment Facility's (WRWWTF) wetland system/deep settling pond or nearby artesian wells may be entering the canal and adding nutrients, contributing to reported excessive aquatic plant growth in the canal. The secondary purpose was to identify the source of any excessive nutrient loading in the canal. As discussed below, results are inconclusive.

Initially, six sample locations were identified and nine water quality samples were taken from each location between September 13, 2016 and November 1, 2016. These samples (Sample Group 1) were tested for Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN), Nitrite-Nitrate Nitrogen (NO_x), and Total Phosphorus (TP). Results are shown in Table 1. Because the results of the original sample sets did not allow concrete conclusions as to the source of nutrients, two additional sample sets were taken on July 20, 2017 and August 11, 2017. The second group of samples (Sample Group 2) were taken from the original sample locations and two new locations: the WRWWTF's Deep Settling Pond and a pipe discharging from private property into the canal. Figure 1 shows sample locations for both sample groups. Sample Group 2 was analyzed for NO_x, Ammonia Nitrogen (NH₃), and Ortho-Phosphate (OP) and results are presented in Tables 2, 3, and 4. These three parameters were investigated because they are nitrogen and phosphorus components of TN and TP that are readily assimilated by plants. The analysis of Sample Group 2 is also inconclusive with respect to nutrient source, but it does indicate that WRWWTF's Deep Settling Pond / wetland system is not contributing significant quantities of nutrients to the 8th Street Canal.

A summary of the entire investigation is presented in Exhibit 1, a memo titled "Results of the Phase 1 Water Quality Study of the IRFWCD 8th Street Canal Between 90th Avenue and 74th Avenue"

Project costs to date are \$3,598 for laboratory analysis.

Results of Phase 1 Water Quality Study of Nutrients in the Indian River Farms Water Control District's 8th Street Canal
 BCC Agenda Item for April 10, 2018

Table 1 – Sample Group 1 Results

TABLE 1 - 8th Street Canal Water Quality - Phase 1 Study																								
SAMPLE DATE	SAMPLE POINT A				SAMPLE POINT B				SAMPLE POINT C				SAMPLE POINT D				SAMPLE POINT E				SAMPLE POINT F			
	NITROGEN (mg/l)			TP (mg/l)	NITROGEN (mg/l)			TP (mg/l)	NITROGEN (mg/l)			TP (mg/l)	NITROGEN (mg/l)			TP (mg/l)	NITROGEN (mg/l)			TP (mg/l)	NITROGEN (mg/l)			
	NO _x -N	TKN	TN (PACE)		NO _x -N	TKN	TN (PACE)		NO _x -N	TKN	TN (PACE)		NO _x -N	TKN	TN (PACE)		NO _x -N	TKN	TN (PACE)		NO _x -N	TKN	TN (PACE)	
9/13/2016	0.03	1.70	1.70	0.19	0.03	2.40	2.40	0.26	0.03	2.40	2.40	0.25	0.09	1.60	1.70	0.16	0.27	1.30	1.50	0.14	0.06	0.73	0.80	0.14
9/20/2016	0.03	1.20	1.30	0.12	0.03	2.50	2.50	0.22	0.06	2.30	2.40	0.25	0.14	1.50	1.60	0.14	0.45	1.20	1.60	0.15	0.09	0.64	0.73	0.12
9/27/2016	0.10	2.30	2.40	0.26	0.04	2.20	2.30	0.24	0.03	2.40	2.40	0.24	0.13	1.60	1.80	0.20	0.31	1.10	1.40	0.17	0.14	0.96	1.10	0.20
9/30/2016	0.19	1.20	1.40	0.07	0.03	2.50	2.50	0.24	0.03	2.30	2.30	0.25	0.08	1.50	1.60	0.15	0.32	1.20	1.50	0.14	0.12	0.90	1.00	0.13
10/4/2016	0.08	0.88	0.96	0.06	0.03	2.50	2.50	0.25	0.03	2.10	2.10	0.25	0.08	1.50	1.60	0.16	0.34	1.00	1.40	0.14	0.14	0.99	1.10	0.19
10/11/2016	--	1.10	1.70	0.05	0.03	2.40	2.40	0.24	0.03	2.10	2.20	0.29	0.08	1.50	1.60	0.19	0.17	1.10	1.30	0.19	0.03	1.20	1.20	0.46
10/18/2016	0.03	1.20	1.20	0.08	0.03	2.20	2.20	0.21	0.03	2.00	2.00	0.20	0.11	1.50	1.60	0.15	0.53	0.92	1.50	0.13	0.15	0.78	0.93	0.18
10/25/2016	0.01	0.92	0.93	0.06	0.01	2.30	2.30	0.20	0.02	2.20	2.20	0.22	0.17	1.40	1.60	0.13	0.60	0.80	1.40	0.15	0.11	0.67	0.78	0.14
11/1/2016	0.01	1.00	1.00	0.10	0.01	3.90	3.90	0.29	0.02	2.30	2.30	0.22	0.13	1.70	1.80	0.14	0.79	0.80	1.60	0.11	0.14	0.57	0.71	0.07
COUNT	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
AVERAGE	0.06	1.28	1.40	0.11	0.02	2.54	2.56	0.24	0.03	2.23	2.26	0.24	0.11	1.53	1.66	0.16	0.42	1.05	1.47	0.15	0.11	0.83	0.93	0.18

NO_x-N = Nitrite + Nitrate Nitrogen
 TKN = Total Kjeldahl Nitrogen
 = rain event

Results of Phase 1 Water Quality Study of Nutrients in the Indian River Farms Water Control District's 8th Street Canal
 BCC Agenda Item for April 10, 2018

Figure 1 – Sample Location Map



Note: PSP = Pipe discharging into canal from private property.
 DSP = IRCDUS West Regional Treatment Facility Deep Settling Pond

Table 2 – Sample Group 2 NOx Nitrogen Results (mg/l)

SAMPLE DATE	A	PSP	B	DSP	C	D	E	F
7/20/2017	0.025	0.025	0.025	0.025	0.025	0.095	0.130	0.054
8/11/2017	0.025	0.025	0.025	0.025	0.025	0.085	0.240	0.025
AVERAGE	0.025	0.025	0.025	0.025	0.025	0.090	0.185	0.040

Table 3 – Sample Group 2 Ammonia Nitrogen Results (mg/l)

SAMPLE DATE	A	PSP	B	DSP	C	D	E	F
7/20/2017	0.140	0.081	0.860	0.053	1.000	0.450	0.280	0.033
8/11/2017	0.027	0.044	0.990	0.049	0.960	0.480	0.160	0.023
AVERAGE	0.084	0.063	0.925	0.051	0.980	0.465	0.220	0.028

Table 4 – Sample Group 2 Orthophosphate as P Results (mg/l)

SAMPLE DATE	A	PSP	B	DSP	C	D	E	F
7/20/2017	0.038	0.026	0.073	0.008	0.110	0.069	0.140	0.099
8/11/2017	0.088	0.034	0.160	0.013	0.180	0.120	0.110	0.130
AVERAGE	0.063	0.030	0.117	0.011	0.145	0.095	0.125	0.115

**Results of Phase 1 Water Quality Study of Nutrients in the Indian River Farms Water Control District's
8th Street Canal
BCC Agenda Item for April 10, 2018**

FUNDING

The project's cost to date is \$3,598 which includes billings from Pace Analytical Laboratory. Staff time is not included. Funding was from Transportation Fund/Stormwater/ Other Professional Services Acct# 11128138-033190. Staff estimates laboratory analysis costs to continue investigations will exceed \$3,000 assuming minimal additional water sample collection and analyzing only basic parameters. Further, staff personnel resources are not available for additional staff input into this study, requiring the services of outside consultants. Stormwater Division has no existing funding available for the above. However, a budget amendment from the Transportation Fund/Reserve for Contingency can fund this expenditure.

RECOMMENDATIONS

Because study results show the County's West Regional Wastewater Treatment Facility's wetland system/deep settling pond is not contributing significant nutrients into the 8th Street Canal, staff recommends this study be concluded and the attached report approved.

ATTACHMENTS

Exhibit 1 (Memo)

Exhibit 2 (Copy of PowerPoint slides)

DISTRIBUTION

Public Works Stormwater Division

Department of Utility Services

APPROVED AGENDA ITEM

FOR: April 10, 2018