WASTEWATER TREATMENT PLANT INSPECTION PROGRAM

2020–2023 DATA REPORT

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Alachua County Environmental Protection Department

February 2025

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ACKNOWLEDGMENTS

The Alachua County Environmental Protection Department provided funding for wastewater inspections and report preparation. Additional data for facility self-compliance monitoring were provided by the Florida Department of Environmental Protection. Gregory Owen and Efrain Tavarez prepared this report.

LIST OF ABBREVIATIONS

ACEPD – Alachua County Environmental Protection Department

BMAP – Basin Management Action Plan

BNR – Biological Nutrient Removal

CBOD – Carbonaceous Biochemical Oxygen Demand

DHR – Deerhaven Renewable Generating Station

DMR – Discharge Monitoring Report

DO – Dissolved Oxygen

FDEP – Florida Department of Environmental Protection

FDOH – Florida Department of Health

GREC – Gainesville Renewable Energy Center

GRU – Gainesville Regional Utilities

MGD – Million Gallons per Day

MHP – Mobile Home Park

MW – Groundwater Monitoring Well

NOx – Nitrate plus Nitrite

OFW – Outstanding Florida Water

RAS – Return Activated Sludge

RPZ – Reduced Pressure Zone device

SSO – Sanitary Sewer Overflow

TKN – Total Kjeldahl Nitrogen

TMDL – Total Maximum Daily Load

TN – Total Nitrogen

TP – Total Phosphorus

TRC – Total Residual Chlorine

TSS – Total Suspended Solids

UF – University of Florida

WAS – Waste Activated Sludge

WWTF – Wastewater Treatment Facility

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1.0 REPORT SCOPE

This data report presents data from Alachua County Environmental Protection Department's (ACEPD) inspections of wastewater treatment facilities (WWTFs) within Alachua County. It focuses on the data collected between 2020 and 2023 while incorporating historical data dating back to 2014 to illustrate trends over time. Data summaries are provided in two-year intervals for consistency with previous reports. Facility-reported nutrient parameters vary by permit and the data were obtained from the Florida Department of Environmental Protection Department (FDEP). Effluent data collected during inspections conducted by ACEPD were also utilized. Nutrient loading rates were estimated by multiplying self-reported flow data and average effluent nutrient concentrations for each facility over two year periods. Groundwater monitoring data were provided by FDEP for those treatment facilities that are required to submit this information, generally the larger municipal facilities. FDEP also provided data on biosolids/sludge disposal.

2.0 BACKGROUND AND INTRODUCTION

There were 16 wastewater treatment facilities (WWTFs) located in Alachua County, permitted by the Florida Department of Environmental Protection Department (FDEP) between 2020 and 2023 (Table 1, Table 2, and Figure 1). The operators or owners of the WWTFs are required by their FDEP permit to self-monitor the quality of the effluent and to report the results to FDEP monthly. ACEPD has a wastewater program partially funded by annual fees paid to the County by the owners of the WWTFs. Facility requirements and the County's inspection program are outlined in the Alachua County Unified Land Development Code Chapter 406 Article 12, Wastewater Treatment Facilities. ACEPD does not inspect the University of Florida (UF) WWTF because they are considered a State entity. ACEPD does not permit WWTFs but does conduct inspections and collect effluent samples at most facilities on a quarterly basis. After each inspection, ACEPD staff writes a letter communicating inspection results, noted concerns, and any compliance issues. The inspection form, the effluent data, and the summary letter are sent to the plant owner, plant operator, and FDEP's Northeast District Office Domestic Wastewater staff.

The WWTFs are inspected by ACEPD to ensure that they are operating properly with an emphasis on nutrient removal. The FDEP permit does not require all facilities to sample the various nutrient species in their monthly sampling. ACEPD collects effluent grab samples which are typically analyzed for nitrate + nitrite, Total Kjeldahl Nitrogen (TKN), ammonia, total nitrogen (TN), and total phosphorus (TP). This report will focus on nitrate (as it is the most mobile and environmentally sensitive form of nitrogen), total nitrogen, and total phosphorus. Nitrate + nitrite data is used as a surrogate for nitrate in situations where data is not available. The nitrite portion in wastewater effluent is normally low, with nitrate and ammonia typically composing the dominant forms of nitrogen.

Treated wastewater effluent is disposed of in various permitted ways including public access re-use, treatment wetlands, spray fields, injection wells, surface water discharges, absorption fields, and percolation ponds (also called rapid infiltration basins). The permitted effluent disposal methods for each facility are listed in Tables 1 and 2 and are included in the following summary sections. FDEP considers all effluent disposal methods that recharge groundwater (including spray fields) as re-use. However, for this report re-use refers to effluent that is treated to

public access re-use standards and used in place of potable water, such as landscape irrigation. Regardless of disposal method, treated wastewater eventually becomes groundwater or surface water and can contribute to environmental degradation if it has high concentrations of nitrogen and/or phosphorus. Excessive nutrients can cause algal blooms, prolific plant growth, and fish kills in springs and surface waters. However, this water also serves the important function of recharging the aquifer. Facilities recharging effluent directly to groundwater are required to submit groundwater reports to FDEP, and this data is included in the following sections.

Nutrient data used for this report includes ACEPD's effluent sampling results and the facility's Discharge Monitoring Reports (DMR) obtained from FDEP. Effluent samples are collected by ACEPD as grab samples and are analyzed by a Florida Department of Health (FDOH) certified laboratory. Some of the FDEP nutrient permit limitations for the larger treatment facilities are based on flow proportioned composite samples to account for variability of flow throughout the day. Since samples collected during ACEPD inspections are grab samples, the data collected by ACEPD for these parameters cannot be used to verify that the effluent at the larger facilities meets their permit requirements. However, the data does indicate the nutrient concentrations being released to the environment at the time of inspection.

The concentration of nutrients alone can be deceiving because the flow rates vary significantly between the facilities. The maximum permitted capacities of the facilities range from 4,200 gallons per day to 14.9 million gallons per day (MGD). To gain perspective on possible environmental impacts from treated effluent, nutrient loading rates from WWTFs were estimated. The monthly average flow rate reported by each facility in their DMRs was used to calculate an average flow value between 2020 and 2023. The average effluent nutrient concentrations incorporated data collected by the facilities and ACEPD inspectors. The estimated nutrient loading rates are summarized in Table 3 and discussed for each facility in the following sections.

Wastewater sludge is a semi-solid byproduct material that is created as a residual during the wastewater treatment process. Wastewater sludge can be further processed and treated to create biosolids. Biosolids that have been treated to applicable standards can be land applied to dispose of the material while adding nutrients to the soil. The small package plants in Alachua County do not have the technology to process sewage sludge into biosolids, so they pay to have the sludge hauled to larger facilities for treatment and disposal. These smaller facilities generate less sludge, since they treat lower volumes of waste. The following sections will include the mass of wastewater sludge, or biosolids, generated from the municipal facilities (Table 4).

Table 1. Permitted Municipal WWTFs in Alachua County (2020 – 2023)

Owner Name	Facility ID	Permit Expiration	Max Permitted Capacity (gallons/day)	Effluent Disposal Method	Nutrient Effluent Limitations* (mg/L)
City of Gainesville GRU - Kanapaha	FL0112895	6/2/2026	14,900,000	Underground Injection and Public Re-use (also have a permitted surface water discharge for emergencies)	Total Nitrogen 29,619 lbs./yr, Total Phosphorus 1,461.2 lbs./yr Nitrite + Nitrate < 10 mg/L, Unionized Ammonia <0.02 mg/L, Total Organic Nitrogen, Ammonia, TKN, Total Phosphorus, and Orthophosphate must be reported.
City of Gainesville GRU - Main Street	FL0027251	4/15/2025	7,500,000	Surface Water Discharge to Sweetwater Branch and Public Re-use	Total Nitrogen 40,380 lbs./year and 1.87 mg/L Annual Geometric Mean, Total Phosphorus 37,671 lb./yr and 0.3 mg/L Annual Geometric Mean, Total Organic Nitrogen < 3.5 mg/L, Ammonia < 4.87 or 3.64 mg/L (depending on season), Unionized Ammonia <0.02, Total Nitrogen, TKN, Total Phosphorus, Orthophosphate must be reported.
University of Florida	FLA011322	6/8/2026	3,000,000	Underground Injection and Public Re-use	Nitrate + Nitrite <10 mg/L, Total Nitrogen, TKN, and Total Phosphorus must be reported
City of Alachua	FLA011290	7/19/2026	1,500,000	Spray, Irrigation and Public Re-use	Nitrate + Nitrite, Total Nitrogen, TKN, and Total Phosphorus must be reported
City of Newberry	FLA011292	8/3/2026	560,000	Spray Irrigation	Total Nitrogen Annual Average < 3.0 mg/L Total Nitrogen and Total Phosphorus must be reported
City of High Springs	FLA286095	1/12/2028	240,000	Spray Irrigation	Total Nitrogen, TKN, Nitrate and Total Phosphorus must be reported
City of Hawthorne	FLA011291	11/17/2025	200,000	Rapid Infiltration Basin	Total Nitrogen, Nitrate + Nitrite, TKN, Total Organic N and Total Phosphorus must be reported

*** Facilities with groundwater effluent disposal do not have phosphorus permit limitations.**

Table 2. Permitted Package Plant Treatment Facilities in Alachua County (2020 – 2023)

Owner Name	Facility ID	Permit Expiration	Max Permitted Capacity (gallons/day)	Effluent Disposal Method	Nutrient Effluent Limitations* (mg/L)
The Palms MHP (Arredondo Farms)	FLA011315	9/14/2029	99,000	Rapid Infiltration Basin	Nitrate < 12 mg/L Total Nitrogen and Total Phosphorus must be reported
Brittany Estates MHP	FL0040215	6/7/2028	60,000	Surface Water Discharge to Little Hatchet Creek	Total Nitrogen 3,104 lb./yr., Total Phosphorus 386 lb./yr., Nitrate < 12 mg/L, Ammonia <4.8, Total Organic Nitrogen <6.4, and Total Nitrogen and Phosphorus must be reported
Micanopy Inn (formerly Knight's Inn and now Welcome Inn)	FLA011317	6/15/2028	15,000	Spray Irrigation	Nitrate + Nitrite must be reported
Florida Welcome Station	FLA011313	3 9/2025	9,000	Rapid Infiltration Basin	Nitrate < 12 mg/L Total Nitrogen Annual Average < 6.0 mg/L, monthly average must be reported
Archer Homes	FLA011298	10/13/ 2025	8,300	Absorption Field	Nitrate < 12 mg/L and Total Nitrogen Annual Average < 6.0 mg/L, monthly average must be reported
Gainesville Raceway	FLA011312	2/7/2029	8,250	Spray Irrigation	Nitrate must be reported
Cuscowilla (formally Camp McConnell YMCA)	FLA011293	10/14/2025	7,500	Absorption Field	Nitrate < 12 mg/L
Archer Community School	FLA011281	12/17/2029	5,000	Rapid Infiltration Basin	Nitrate + Nitrite must be reported
Prairie View Apartments	FLA011307	4/27/2028	4,240	Rapid Infiltration Basin	Nitrate <12 mg/L

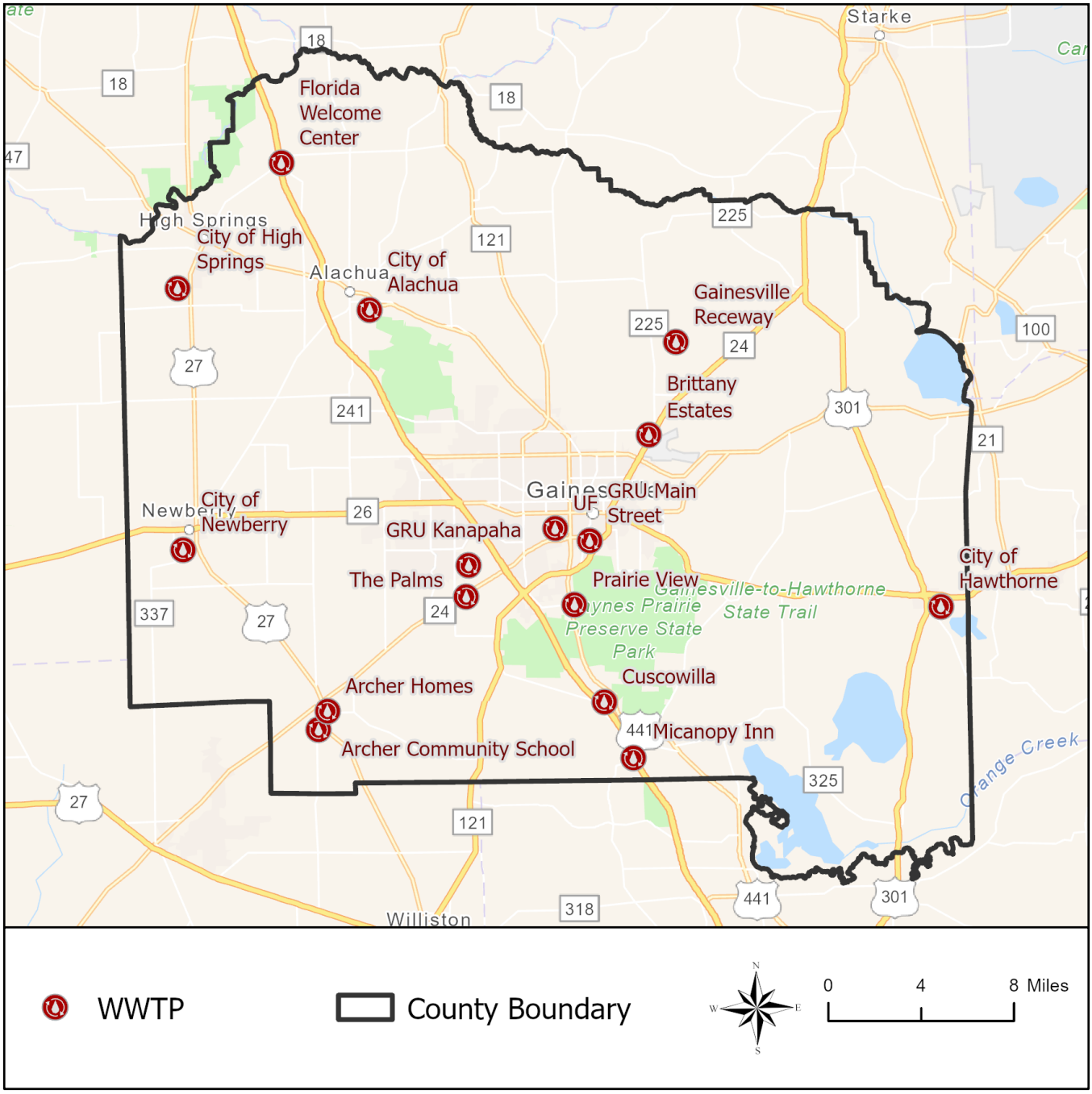


Figure 1. Location of Permitted WWTFs in Alachua County (2020-2023)

Table 3. Estimated Average Nutrient Loading from WWTFs (2020 – 2023)

Facility Name	Total Nitrogen (lb./year) 2020-2021	Total Phosphorus (lb./year) 2020-2021	Total Nitrogen (lb./year 2022-2023	Total Phosphorus (lb./year) 2022-2023
GRU - Main Street	86,683	3,836	108,450	3,239
GRU - Kanapaha	117,439	31,171	127,733	27,328
City of Newberry	15,499	2,171	23,621	4,291
City of Alachua	8,164	8,532	9,493	7,653
City of High Springs	6858	1686	8287	2317
The Palms (formerly Arredondo)	5016	416	1534	390
City of Hawthorne	2,672	763	4,676	924
Brittany Estates MHP	547	66	149	49
Archer Community School*	248	35	254	38
Florida Welcome Station	257	23	193	22
Archer Homes	174	34	85	19
Micanopy Inn	58	20	108	31
Cuscowilla (formerly Camp McConnell YMCA)**	7.1	0.2	16	0.9
Prairie View Apartments	198	18	102	28

*Flow rates from previous years used as an estimate

**Cuscowilla/Camp McConnell was not receiving effluent during this period

3.0 MUNICIPAL FACILITIES

There are six municipal WWTFs in Alachua County and one large, centralized facility at UF. Municipal and centralized facilities treat a larger volume of wastewater compared to package plants and include a treatment facility built on-site. The plant operators are required to spend more time at the larger facilities due to their larger treatment volume, and the facilities tend to utilize more advanced technologies which tend to reduce nutrient concentrations. The municipal facilities treat and discharge large volumes of effluent which increases their potential to degrade water quality. The maximum permitted capacity for municipal facilities in Alachua County ranges from 0.2 million gallons per day (MGD) for the City of Hawthorne WWTF to 14.9 MGD for the Gainesville Regional Utilities (GRU) - Kanapaha WWTF.

The average total nitrogen and total phosphorus concentrations include reported nutrient data from each facility's Discharge Monitoring Report (DMR) and effluent sampling data from the ACEPD inspections (Figure 2). Effluent quality varied among the sampling events and among the various facilities. Some facilities were sampled more frequently than others and some have different reporting requirements for their DMRs. Each municipal facility is discussed in the following sections.

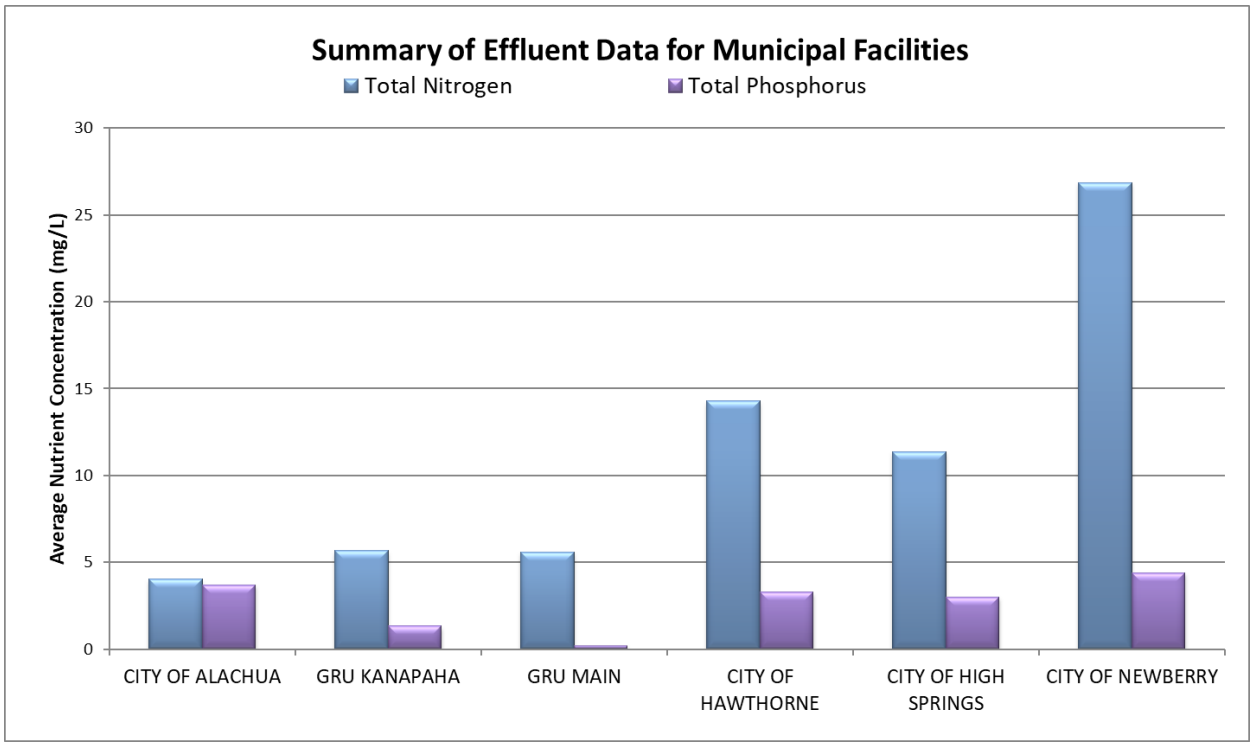


Figure 2. Average Effluent Nutrient Data for Municipal Facilities (2020 – 2023)

Nutrient loading rates were estimated for each facility (Figure 3). The nutrient loading rates were estimated based on average flow rates and average nutrient concentrations, broken into two years periods of 2020 to 2021 and 2022 to 2023. Nutrient loading is largely driven by flow rates and the largest loading values are produced by the Gainesville Regional Utilities (GRU) Main Street and Kanapaha WWTFs (greater than 100,000 lb.) of Total Nitrogen per year at each facility since they have the largest flows (average of 6.55 MGD and 7.95 MGD, respectively).

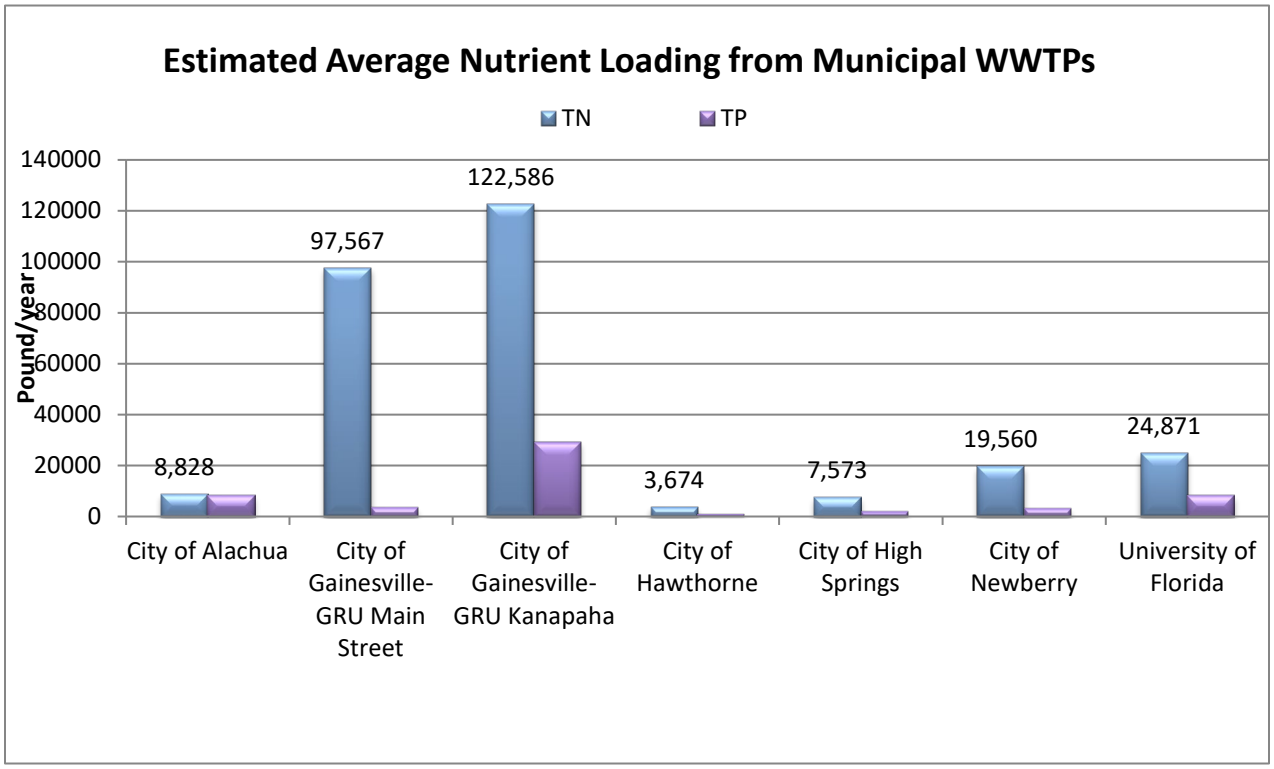


Figure 3. Estimated Nutrient Loading from Municipal Facilities (2020– 2023)

The quantity of biosolids, or treated wastewater sludge, produced at the municipal facilities and University of Florida between 2020 and 2023 was obtained from DMRs and is summarized in Table 4. The disposal methods for each facility are discussed in the following sections. Biosolids from GRU are processed at the Kanapaha Dewatering Facility before being sent to GreenEdge where the biosolids are further processed and packaged as fertilizer products. Many of the municipal WWTFs and package treatment plants transport their wastewater sludge to GRU for treatment.

Table 4. Self-Reported Biosolids/Sludge Disposal Data for Municipal WWTFs (2020 – 2023)

Facility Name*	2020 Annual Quantity (Dry-ton)	2021 Annual Quantity (Dry-ton)	2022 Annual Quantity (Dry-ton	2023 Annual Quantity (Dry-ton	Final Disposal Location
GRU - Main Street	1184	1142	1256	1249	GreenEdge Technology
GRU - Kanapaha	3494	3023	3765	3838	GreenEdge Technology
City of Newberry	32	36	10	5	City of Newberry Treatment Facility Spray Field Site
City of Alachua	175	174	176	194	Farms in Columbia and Suwannee Counties
University of Florida	189	181	157	195	To GRU – GreenEdge Technology
City of High Springs	50	31	57	70	To GRU – GreenEdge Technology
City of Hawthorne	0	5	2	2	To GRU – GreenEdge Technology

3-1 The City of Alachua

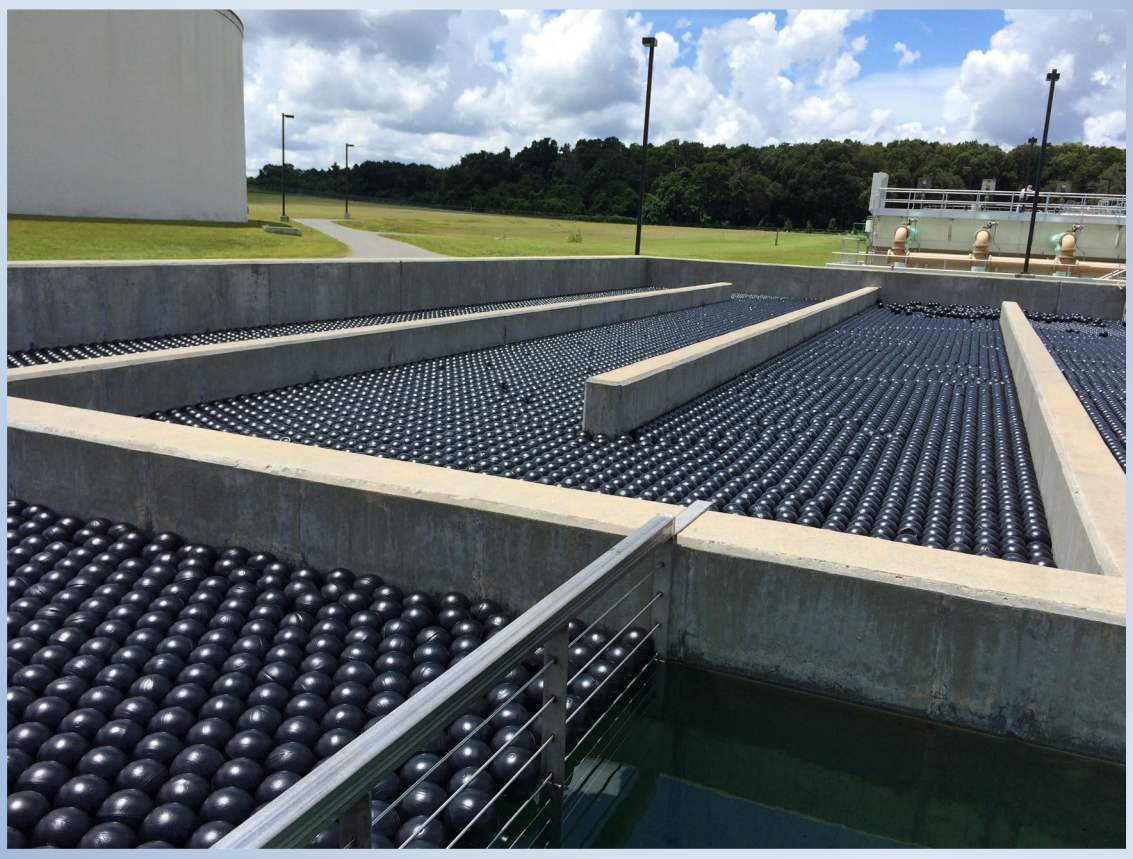
Facility size: 1.50 MGD **Permit expiration date**: 7/19/2026

Permitted effluent disposal:

105-acre spray field, 244-acre area for re-use irrigation, and 197-acre golf course (public access re-use); course is currently inactive. Effluent is additionally permitted for reuse at the Deerhaven Renewable Generating Station (DHR) as cooling water when in operation.

Residuals disposal:

Hauled to Class I landfill or treated and land applied in Columbia County.



The chlorine contact chamber at the City of Alachua facility; plastic balls are used to reduce evaporation and reduce disinfection costs.

The City of Alachua's WWTF was upgraded in March 2011. The plant consists of two 0.75-MGD oxidation ditches for biological nutrient removal (BNR) using a Modified-Ludzack-Ettinger process configuration, two secondary clarifier basins, return/waste activated sludge (RAS/WAS) pumping stations, sand filter, and two chlorine contact chambers. Effluent sampling results indicate the upgraded plant is providing consistent nutrient removal (Figure 4). The current plant has two oxidation ditches which create zones of aerobic and anaerobic activity allowing microbes to breakdown nitrogen species into nitrogen gas which is released into the atmosphere. This facility was found to be in compliance during the 15 ACEPD inspections conducted between 2020 and 2023.

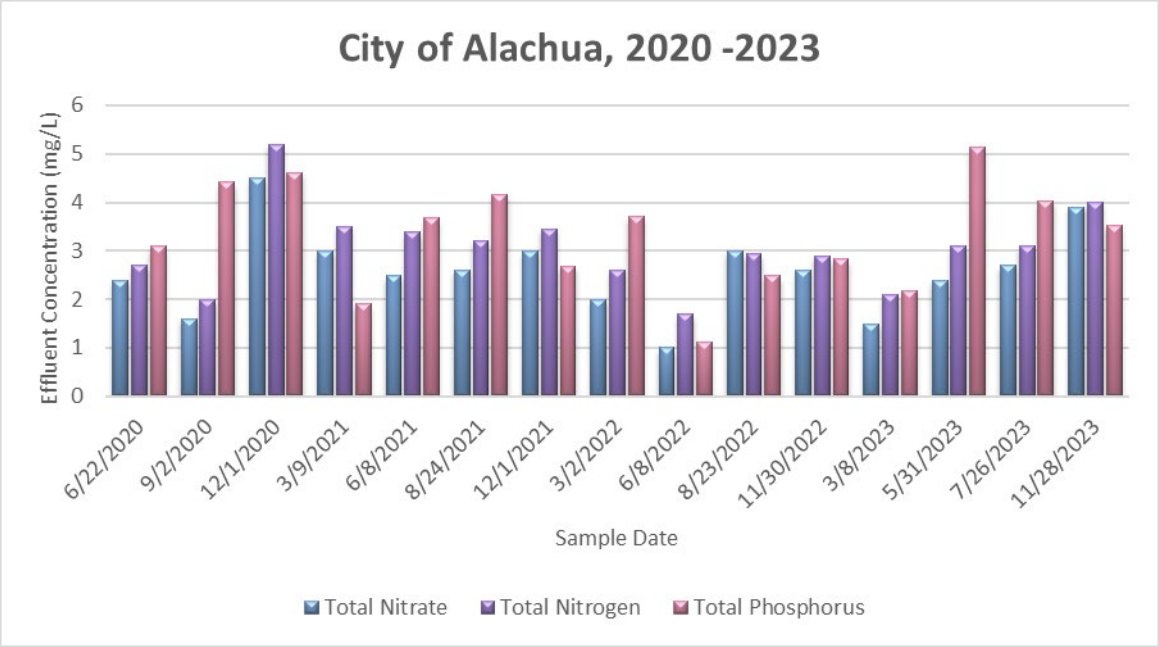


Figure 4. Effluent data from samples collected during ACEPD inspections at the City of Alachua WWTF.

The monthly average flows in 2020 and 2021, and 2021 and 2023 (monitoring location EFB-1, monitoring group R-001) were used to calculate an average flow of 0.712 and 0.728 MGD respectively. Nutrient concentrations collected by ACEPD and reported by facility operators in the DMRs were then averaged and used to estimate the nutrient loading rate from this facility. Nitrate data, reported as nitrate plus nitrite by the facility, and total nitrate data collected by ACEPD were used to estimate a nitrate plus nitrite (NOx) loading of 6,770 lb./year for 2020 and 2021, and 7,164 lb./year for 2022 and 2023. The City of Alachua WWTF is required to monitor for total nitrogen and total phosphorus; ACEPD inspection data were used in combination with monitoring data provided by the City of Alachua WWTF to estimate loadings of 8,164 lb./year (TN) and 8,532 lb./year (TP), for 2020 and 2021, and 9,493 lb./year (TN) and 7,653 lb./year (TP) for 2022 and 2023. Total nitrogen concentrations decreased between 2020 to 2023 period when compared to loading from 2018 to 2019 for Total Nitrogen and Total NOx, but not for Total Phosphorus (Figure 5). Table 3 compares these values to those of the other WWTFs located in Alachua County.

Large nitrate loads, regardless of the source, are a concern in such proximity to the Santa Fe River and springs system. A dye trace study conducted by Karst Environmental Services for ACEPD found a

connection from nearby Lee Sink and the Mill Creek Sink to Hornsby Springs, a first magnitude spring on the Santa Fe River (Butt et al., 2006). When the City of Alachua upgraded their WWTF, it was designed to maximize de-nitrification with a new oxidation ditch treatment facility. If effluent concentrations remain constant, the new facility may be able to double its treatment volume and maintain the same total nitrogen loading rate as the previous WWTF. Loading rates for total phosphorus indicate that the new plant and its larger volumes are discharging more phosphorus than the previous facility. Typically, wastewater treatment does not focus on phosphorus removal; however, it may be important for the City of Alachua WWTF to monitor their total phosphorus loading because even small amounts of phosphorus in a waterbody can be harmful.

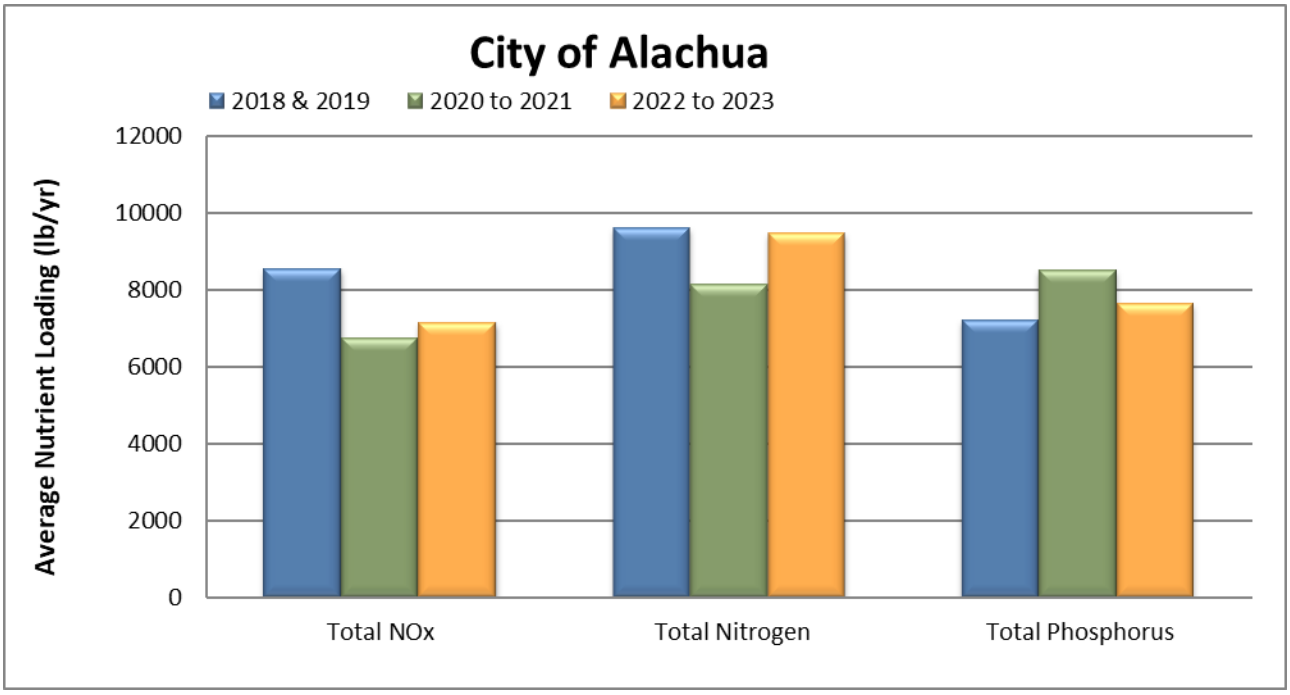


Figure 5. Estimated Nutrient Loading Values for the City of Alachua WWTF (2018 – 2023)

The City of Alachua WWTF is required by FDEP to sample their groundwater monitoring wells on a quarterly basis. The background wells are labeled with a "B", compliance wells are labeled with a "C", and intermediate wells are labeled with an "I". High nitrate values were consistently measured at Well MWB-1 (Figure 6) and the City of Alachua argued in 2006 that this well is up-gradient of their effluent disposal. The high nitrate values detected at this well are thought to be influenced by the groundwater contamination at the adjacent site, the former Copeland Sausage Plant (JEA, 1998 and Universal Engineering Sciences, 2010). The concentration of nitrates in the groundwater of this area often exceeds the drinking water standard of 10 mg/L. Results from MWC-6 show nitrate concentrations above the drinking water standard between the years of 2020 - 2023. Results from MWC-6 may be influenced by the former Copeland Sausage Plant as it is located adjacent to the former meat processing plant. With the expansion of the facility, new compliance wells were installed in 2011 (MWC-7 and MWC-8). Besides the two monitoring wells discussed above, all other compliance wells have remained below the drinking water standard of 10 mg/L since 2018.

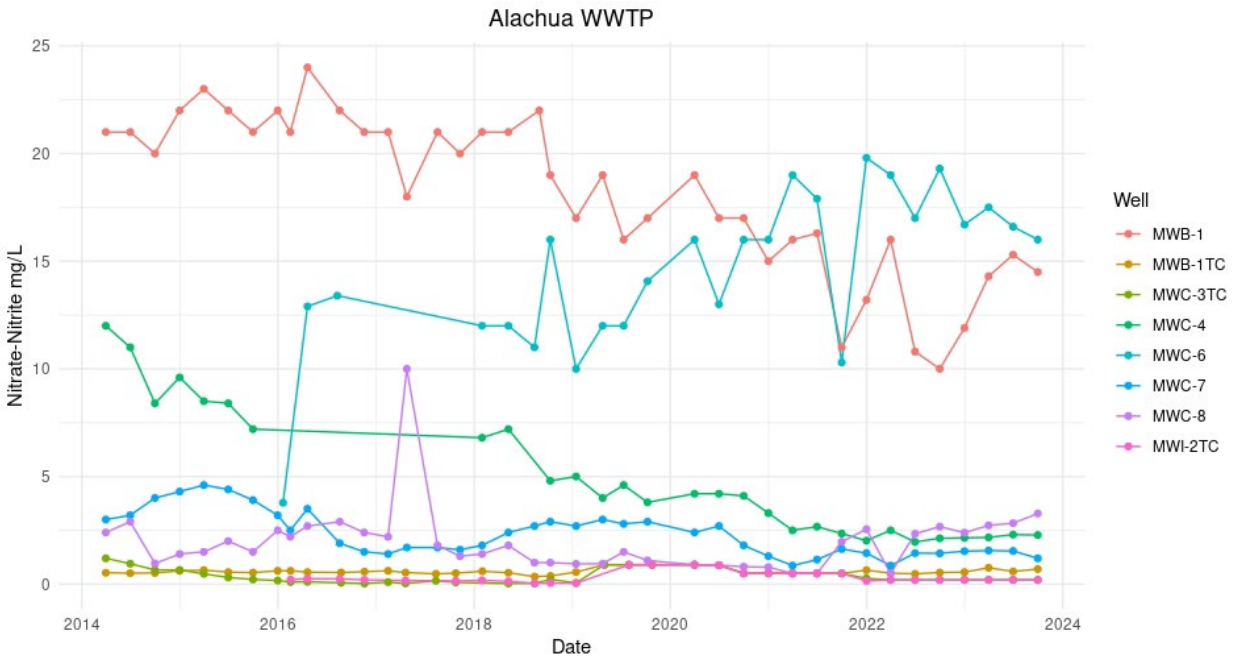


Figure 6. Groundwater Data from the City of Alachua WWTF for Nitrite + Nitrate

The domestic wastewater biosolids for this facility are classified as Class B and are hauled to Glenn Farms (FLA485578) for disposal in Columbia County. The treatment facility is permitted to land apply biosolids that have achieved class B pathogen reduction. According to data provided by FDEP, the facility produced 175 dry tons of biosolids in 2020, 174 tons in 2021, 176 tons in 2022 and 194 dry tons in 2023 (Table 4).

3-2 The City of Gainesville, GRU – Kanapaha Facility

Facility Size: 14.9 MGD **Permit expiration date**: 3/18/2026

Permitted effluent disposal:

10.00 MGD to underground injection well, 14.2 MGD re-use and 10.00 MGD to Lake Kanapaha

Residuals disposal:

As of 2016 biosolids are now treated further and hauled by GreenEdge Technology.

The clarifiers at the GRU Kanapaha facility

The Gainesville Regional Utilities Kanapaha WWTF includes a 10 MGD Modified Ludzak-Ettinger extended aeration activated sludge system and a 4.9 MGD oxidation ditch system with pre-denitrification biological nutrient removal. The GRU facilities (Main and Kanapaha) were not inspected between 2018 - 2021 due to concerns associated with exposure to COVID-19. The effluent results between 2022 and 2023 within the FDEP permit limitations with 2017 results for comparison (Figure 7).

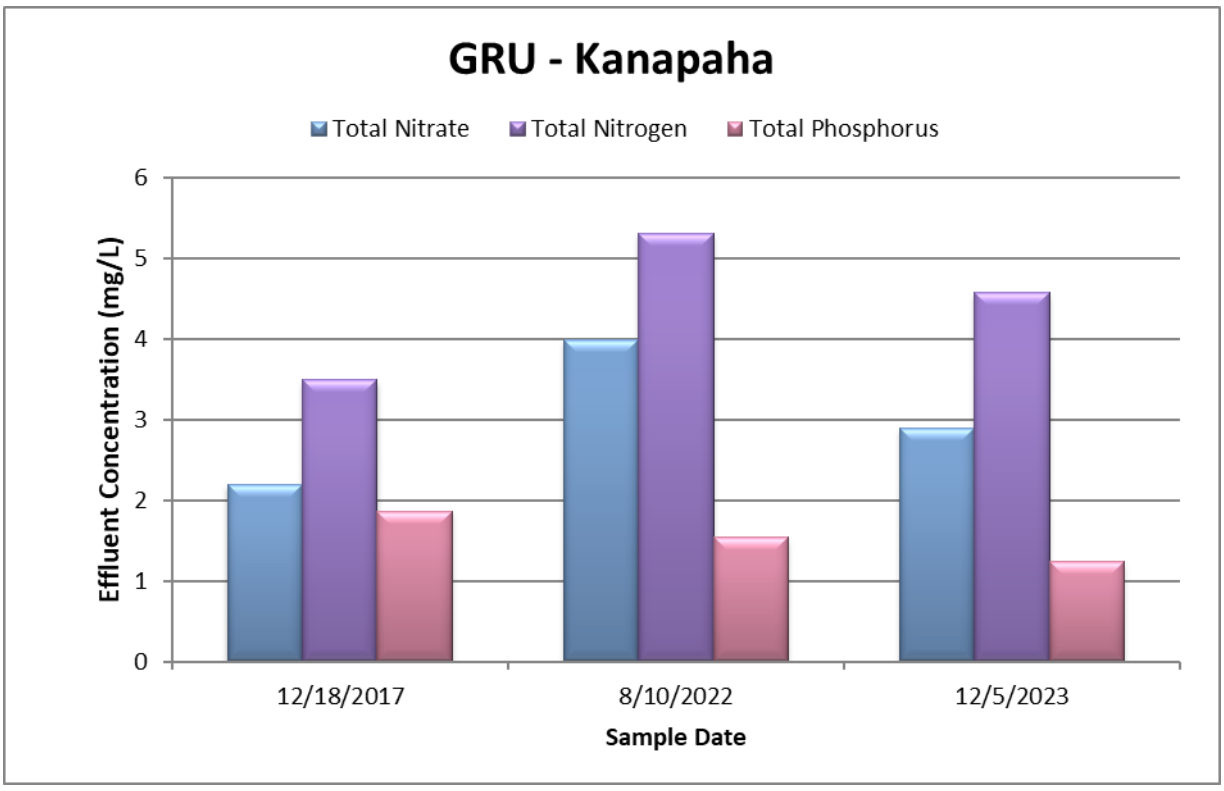


Figure 7. Effluent data from grab samples collected during ACEPD inspections at the GRU - Kanapaha WWTF

The majority of the Kanapaha effluent is injected into the Floridan aquifer via deep well injection at a depth interval of 450 – 1,200 feet via four wells, up to 10 MGD. Up to 14.2 MGD of Kanapaha effluent is permitted for public access re-use for applications such as landscape irrigation, fire protection, aesthetic uses, and industrial use (tanker trucks for pesticide application, dust control, and other activities). Emergency discharge is permitted up to 10MGD to Lake Kanapaha. Effluent data collected by the facility and ACEPD during inspections and information from DMRs were used to determine the average nutrient concentration and estimated nutrient loading values for this facility between 2020 and 2023 (Table 5). Monthly averages from the DMR at the deep-well injection location were used for yearly flow and nutrient averages to calculate the annual loading to the groundwater. The estimated average flow for 2020 and 2021 was 7.4 MGD and the average flow of 6.8 MGD. Monthly average nutrient calculations were then used in combination with the average flows to estimate an annual loading of 78,096 lb./year of nitrate and nitrite, 117,439 lb./year of total nitrogen, and 31,171 lb./year of total phosphorus for 2020 and 2021 and 81,758 lb./year of nitrate plus nitrite, 127,733 lb./year of total nitrogen, and 27,328 lb./year of total phosphorus for 2022 and 2023 (Figure 8).

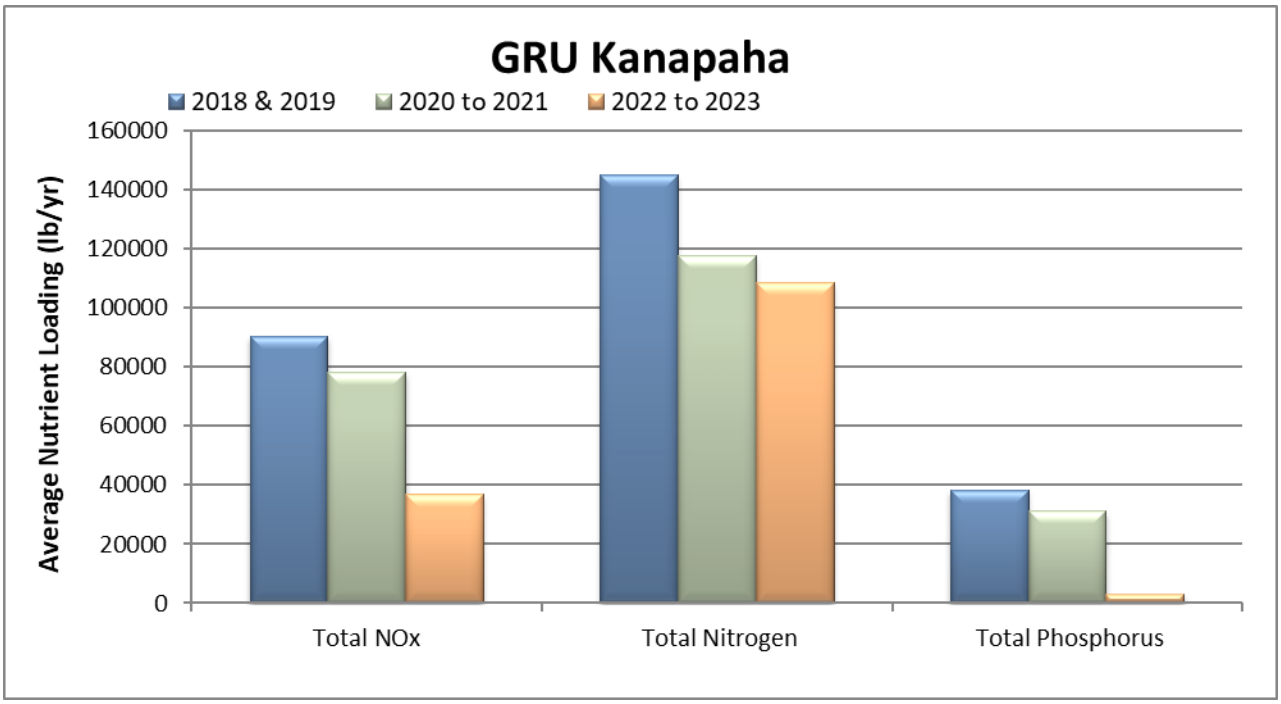


Figure 8 Estimated Nutrient Loading Values for the GRU - Main Street WWTF (2018-2023)

Table 5. Calculated average effluent loading rates at the GRU Kanapaha facility

GRU Kanapaha WWTF	Flow Rate 2020-2021 (MGD)	Flow 2022-2023 Rate 2020-2021 (MGD)	Nitrate 2020-2021 (lb./year)	Nitrate 2022-2023 (lb./year)	Total Nitrogen 2020-2021 (lb./year)	Total Nitrogen 2022-2023 (lb./year)	Total Phosphorus 2020-2021 (lb./year)	Total Phosphorus 2022-2023 (lb./year)
Average Inflow	19.9	7.95	90,236	90,236	144,741	144,741	38,358	38,358
Deep Well Injection	8.54	8.54	96,882	96,882	143,168	143,168	41,249	41,249
Public Re-Use	2.14	2.14	24,277	24,277	35,876	35,876	10,336	10,336

GRU is required to sample their groundwater monitoring wells at the Kanapaha facility and submit the results to FDEP. The background wells are labeled with a "B" and the compliance wells are labeled with a "C." Two specific conductive zones are monitored by the wells, a shallow zone above 250 feet below the land surface (labeled with a "S") and a deeper zone 450 feet below land surface (labeled with a "D"). The MWC-2 wells are located less than one-tenth of a mile west of the facility. The nitrate concentrations at monitoring MWC-2D well are not steady but do appear to be increasing (Figure 9).

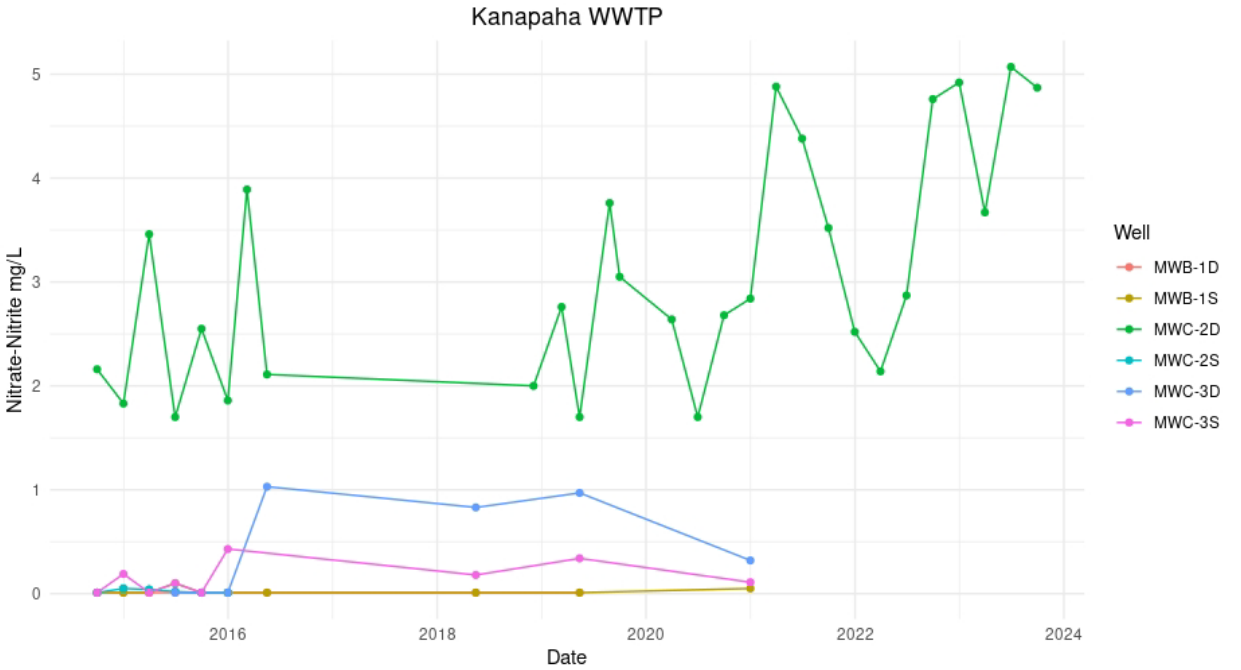


Figure 9 Groundwater Data from the GRU – Kanapaha WWTF for Nitrite + Nitrate

The wastewater residuals (sludge) are treated to Class B standards and then sent to GreenEdge and turned into fertilizer. According to calculations using compiled DMR reports, GRU Kanapaha generated 1,184 tons in 2020, 1,142 tons in 2021, 1,256 tons in 2022, and 1,249 tons in 2023.

3-2 The City of Gainesville, GRU – Main Street Facility

Facility Size: 7.5 MGD **Permit expiration date**: 4/15/2025

Permitted effluent disposal:

7.5 MGD discharge to Sweetwater Branch and 3.309 MGD public re-use.

Residuals disposal:

Biosolids are now treated and hauled to GreenEdge in Jacksonville.

The aeration basin at the GRU Main St. Facility

The Gainesville Regional Utilities Main Street facility is an advanced secondary activated sludge plant and is typically inspected annually by ACEPD. The plant was not inspected by ACEPD between 2020 and 2021 in part due to COVID-19, however inspections conducted in 2022 and 2023 found in the plant in compliance and the effluent was within the FDEP permit limitations (Figure 10). The effluent from the Main Street facility is discharged to Sweetwater Branch and eventually the Paynes Prairie Sheetflow Restoration Project before entering the Floridan aquifer via Alachua Sink. There are no groundwater monitoring wells associated with the Main Street facility since this plant discharges to surface waters.

Alachua Sink has a Total Maximum Daily Load (TMDL) requiring a 45% reduction in nitrogen inputs (FDEP 2014). Construction started on the Paynes Prairie Sheet flow Restoration Project in 2012 to reduce nutrient loading to Alachua Sink by restoring sheet flow and eliminating the direct discharge of water from Sweetwater Branch to Alachua Sink. This project, completed in 2015, includes constructed treatment wetlands to reduce nutrients and to recharge Paynes Prairie. In 2014 the Main Street WWTF began adding aluminum sulfate to meet phosphorus loading reduction requirements for the newly constructed wetland.

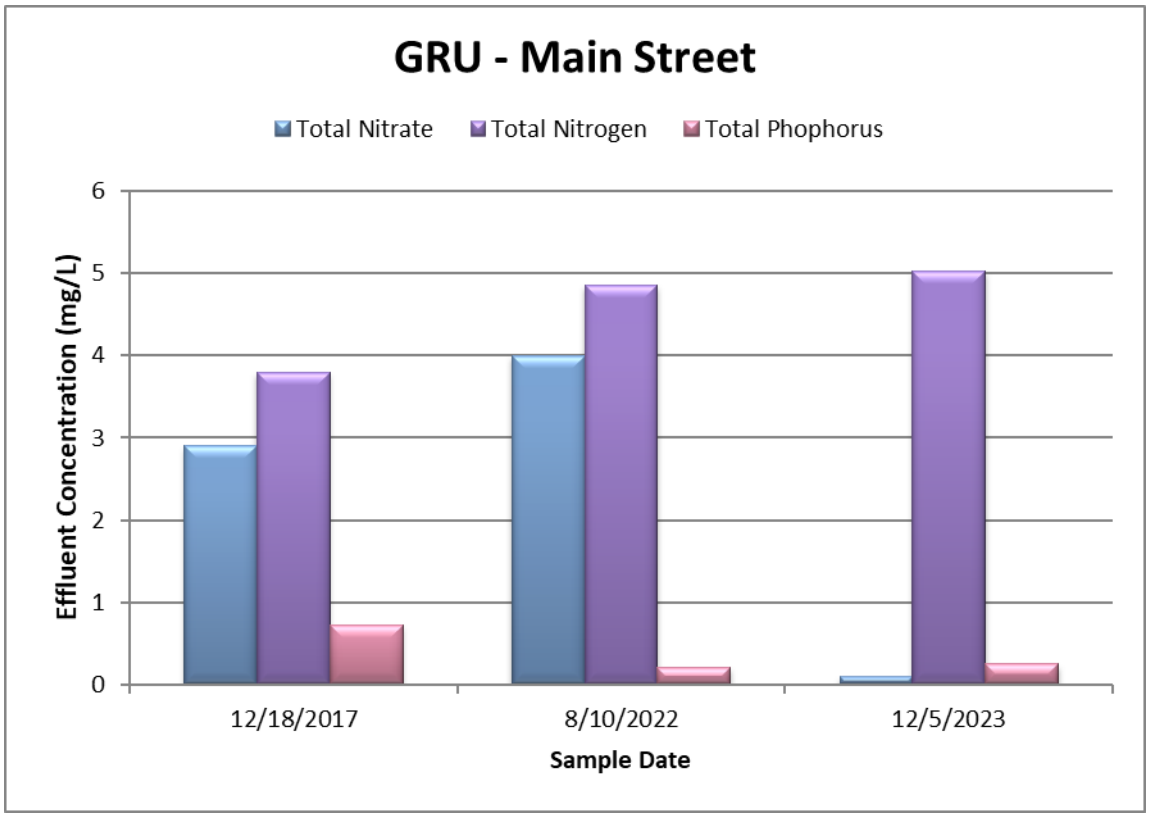


Figure 10. Effluent data from grab samples collected during ACEPD inspections at the GRU – Main Street WWTF

Monthly average effluent flow data from 2020 and 2021 were used to calculate an average flow of 5.98 MGD. For 2022 and 2023 monthly averages were again used to calculate an average flow of 5.87 MGD. Monthly average data reported by the facility and ACEPD inspection data were averaged to estimate loading 86,683 lb./year of total nitrogen, and 3,836 lb./year of total phosphorus for 2020 and 2021 and 108,450 lb./year of total nitrogen, and 3,239 lb./year of total phosphorus for 2022 and 2023 (Figure 10). The GRU Main Street Facility is not required to monitor nitrate, so only ACEPD data were used to calculate

nitrate concentrations. There were only two ACEPD samples resulting in an estimated loading of 36,704 lb./year for nitrate, however this data is limited by the assumptions made from two sample points.

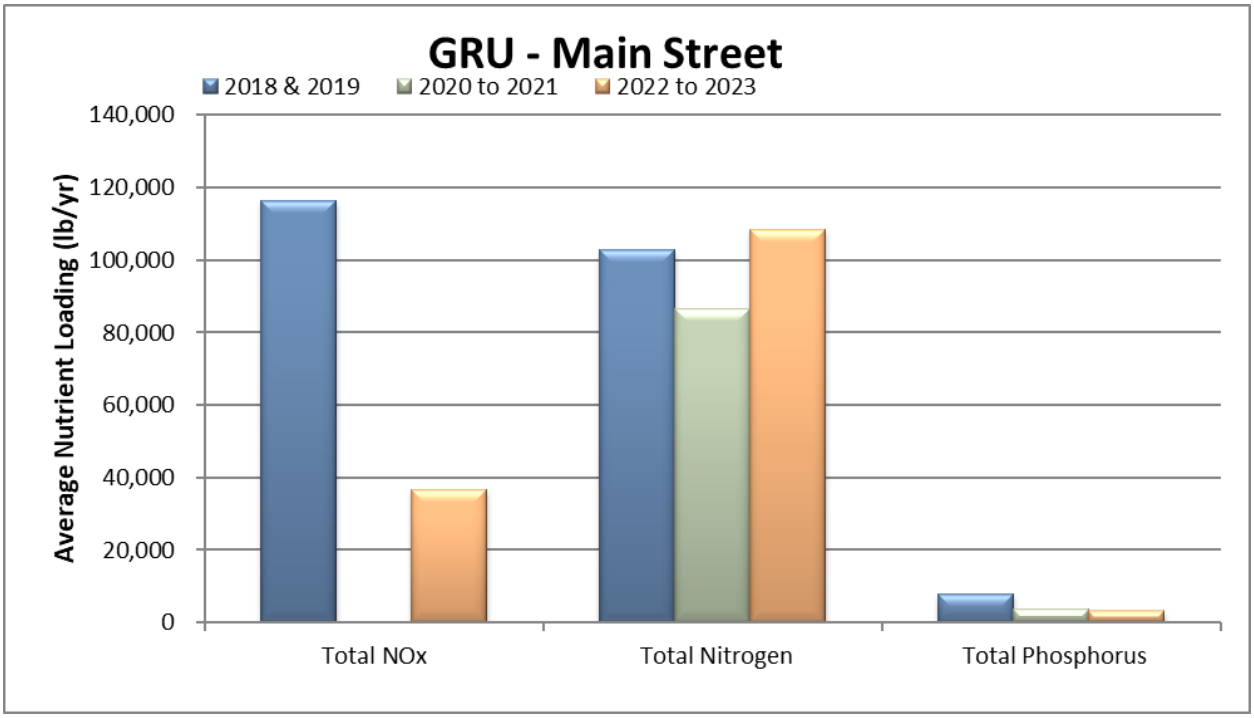


Figure 11. Estimated Nutrient Loading Values for the GRU – Main Street WWTF (2018 – 2023)

The wastewater residuals (sludge) are treated to Class B standards and then sent to Green Edge and turned into fertilizer. According to FDEP's records 1,184 dry tons of biosolids were produced in 2020, 1,142 dry tons in 2021, 1,256 dry tons in 2022, and 1,249 dry tons of biosolids were produced in 2023 at the Main Street Facility.

3-4 The City of Hawthorne

Facility size: Existing 0.2 MGD **Permit expiration date**: 11/17/2025

Facility to be expanded to 0.50 MGD

Permitted effluent disposal:

1.79-acres of rapid infiltration basins to be expanded to 4.77-acres.

Residuals disposal:

Transported to GRU.

The City of Hawthorne Wastewater Treatment Facility

The City of Hawthorne WWTF is an extended aeration secondary treatment plant. ACEPD conducted 15 inspections between 2020 and 2023. During the June 29, 2020 inspection, the total residual chlorine was found to be out of compliance with a concentration below the minimum allowed value. In all the subsequent visits the total residual chlorine was in compliance. The samples collected during the July 2023 inspection resulted in the highest total nitrogen concentration with a value of 43.3 mg/L. Subsequently, a sample collected in November had the highest concentration of nitrate with a value of 31 mg/L. Samples of total phosphorus peaked during August 2022, with a concentration of 10 mg/L. The grab sample results from ACEPD inspections are summarized below in Figure 12. Elevated nutrient concentrations levels are a concern with the proximity of Little Orange Lake. Despite the high nutrient concentration, effluent results were in compliance with the FDEP permit, as this permit does not have numeric limitations for nutrients.

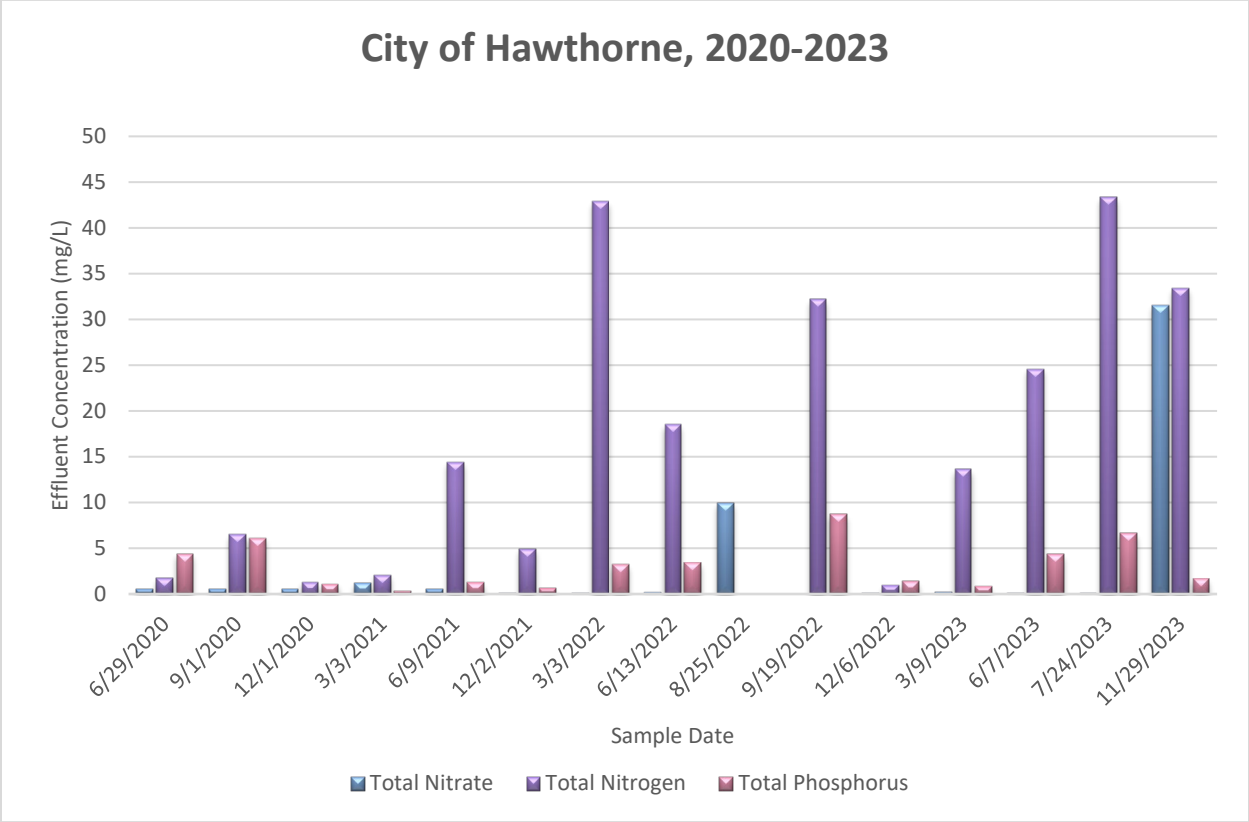


Figure 12. Effluent data from grab samples collected during ACEPD inspections at the City of Hawthorne WWTF

The monthly average flows of effluent from 2020 and 2021 and for 2022 and 2023 were used to calculate an average flow of 0.0.8 MGD for both periods. Average nutrient concentrations were then multiplied by this flow rate to estimate a nutrient loading rate from the facility for the two time periods. Monthly maximum nutrient concentrations as reported by DMRs and data collected by ACEPD between 2020 and 2021, and 2022 and 2023 to calculate a loading of 233 lb./year of nitrate and 536 lb./year of nitrate respectively (Figure 13). Although the facility does not have a numeric limitation for total nitrogen and total phosphorus, they are required to report the concentrations in their effluent. The estimated loading rates for total nitrogen and total phosphorus for 2020 and 2021 was estimated as 2,627 lb./year

and 763 lb./year, respectively. For 2022 and 2023 the estimated loading rates for total nitrogen and total phosphorus were estimated as 4,676 lb./year and 924 lb./year,respectively. Total nitrogen loading rates have decreased from the 2018 and 2019 period of record (Figure 13). Table 3 compares these values to those of the other WWTFs located in Alachua County.

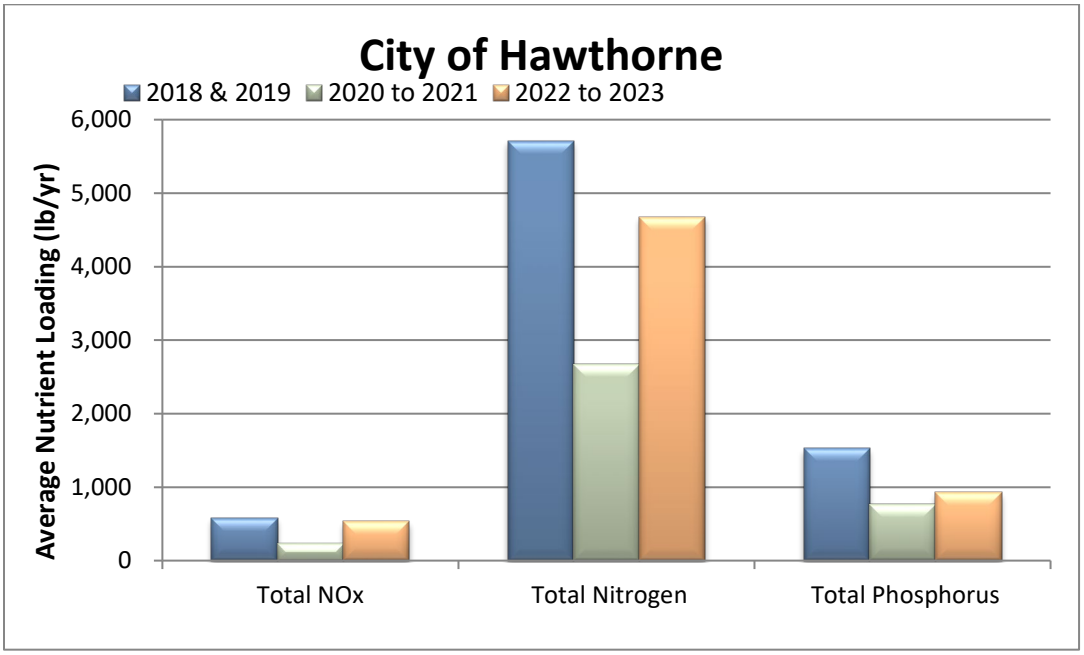


Figure 13. Estimated Nutrient Loading Values for City of Hawthorne WWTF (2018 – 2023)

The City of Hawthorne WWTF is required to sample their groundwater monitoring wells and submit the results to FDEP on a quarterly basis. The background well is labeled with a "B", and the compliance wells are labeled with a "C". (Figure 14). There have been four nitrate exceedances in the compliance wells during the period of record between 2020 and 2023, with the most concerning nitrate concentration reported in December of 2023 at a concentration of 29.5 mg/L. The background well MWB-1, has also exhibited some fluctuations in nitrate concentrations and exceeded the limit of 10 mg/L during four sample events between 2020 and 2023 (Figure 14).

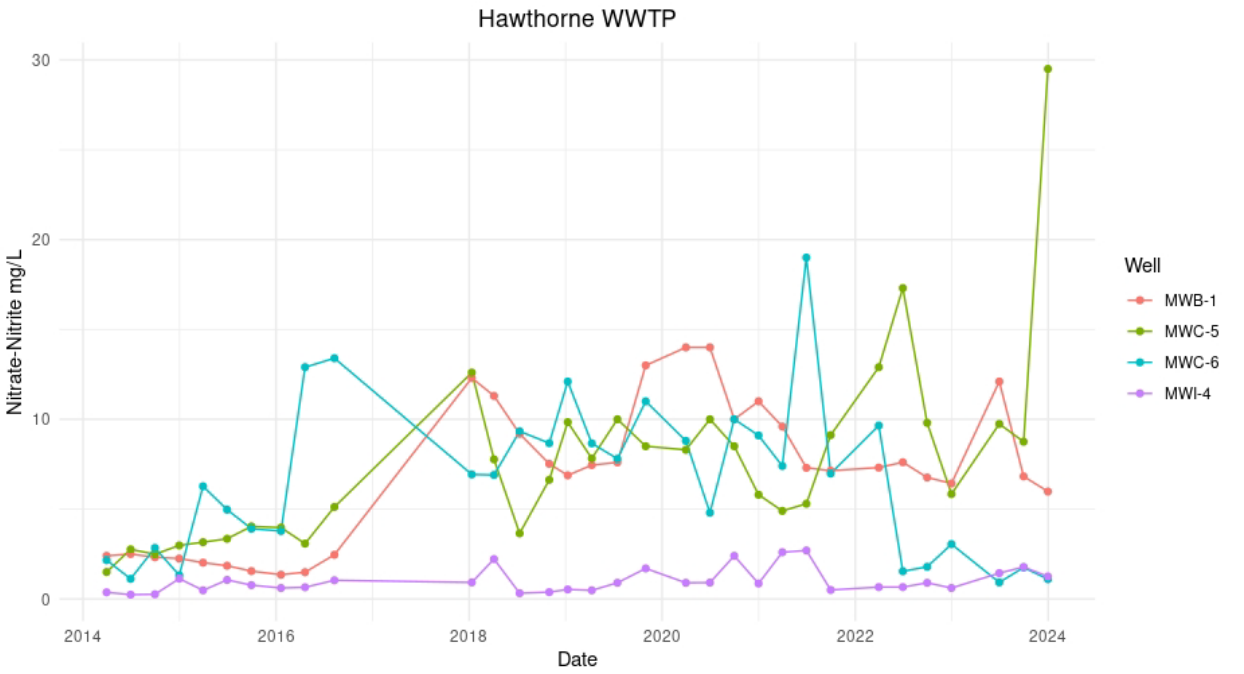


Figure 14. Groundwater Data from the City of Hawthorne WWTF for Nitrite + Nitrate

The City of Hawthorne WWTF hires GRU to pump their biosolids and to haul it for further treatment at one of GRU treatment facilities. Tons of biosolids reported as being hauled from Hawthorne WWTP annually were as follows: five tons in 2021, 1.8 tons in 2022, and two tons of biosolids in 2023. No biosolids were reported during the 2020 period of record.

3-5 The City of High Springs

Facility size: 0.24 MGD **Permit expiration date**: 1/22/2028

Permitted effluent disposal: 16.25-acre spray field.

Residuals disposal: Applied to permitted land application sites or transferred to Watson Composting Facility.

The City of High Springs aeration basin

The City of High Springs WWTF is a Ludzak-Ettinger activated sludge plant. The City of High Springs has approved plans and permits to expand the existing facility with a parallel setup and the addition of infiltrating wetlands. Elevated nitrogen and phosphorus concentrations in the treated effluent (Figure 15) are of concern in the karst setting of the plant's spray field and due to its proximity to the Santa Fe River and its springs. ACEPD conducted 15 inspections between 2020 and 2023.

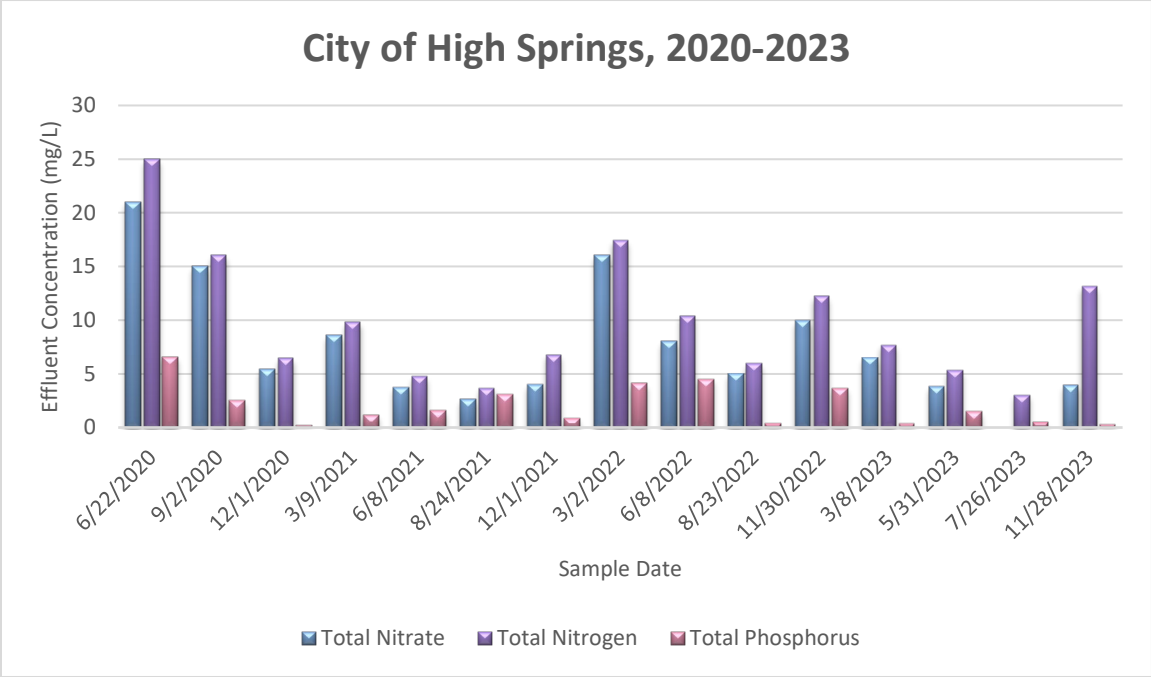


Figure 15. Effluent data from grab samples collected during ACEPD inspections at the City of High Springs WWTF

The monthly average flow of effluent was used to calculate an average flow of 0.19 MGD from 2020 and 2021 and 0.24 MGD from 2022 and 2023. Average nutrient concentrations were then multiplied by this flow rate to calculate an average loading rate from the facility. Monthly nutrient data for total nitrogen and total phosphorus reported by the facility and data collected by ACEPD during inspections were combined to estimate loading of 5,090 lb./year of nitrate, 6,858 lb./year of total nitrogen, and 1,686 lb./year of total phosphorus for 2020 and 2021 and an estimated loading of 5,648 lb./year of nitrate, 8,287 lb./year of total nitrogen, and 2,317 lb./year of total phosphorus for 2022 and 2023 (Figure 16). Total nitrate, total nitrogen, and total phosphorus were higher than the previous period of record between 2018 and 2019. The treatment volume to the City of High Springs WWTF has increased each year since 2018 causing the increased nutrient loading. Table 3 compares these values to those of the other WWTFs located in Alachua County.

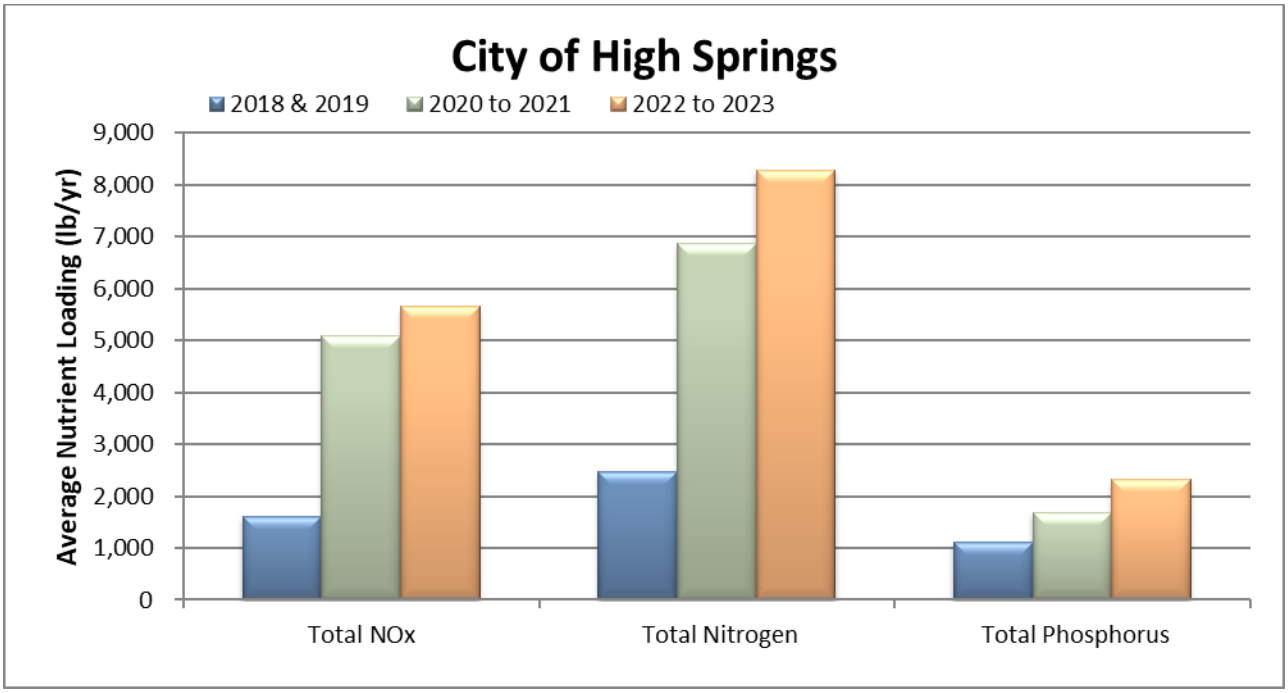


Figure 16. Estimated Nutrient Loading Values for the City of High Springs WWTF (2018 – 2023)

The City of High Springs WWTP is required to sample the groundwater monitoring wells and submit the results to FDEP on a quarterly basis (Figure 17). The background well is labeled with a "B", intermediate wells are labeled with an "I", and the compliance wells are labeled with a "C". These monitoring wells are open to the Floridan aquifer, which is unconfined in this portion of Alachua County. Nitrate and nitrite concentrations from these monitoring wells from 2014 to 2023 are shown in Figure 17. There was one exceedance in nitrate concentrations greater than 10mg/L on 6/30/21 with a concentration of 10.4 mg/L at the monitoring well MWI-2. This monitoring well is located between the compliance well and background well and has shown to have a greater range in values when compared to the background and compliance wells (Figure 17).

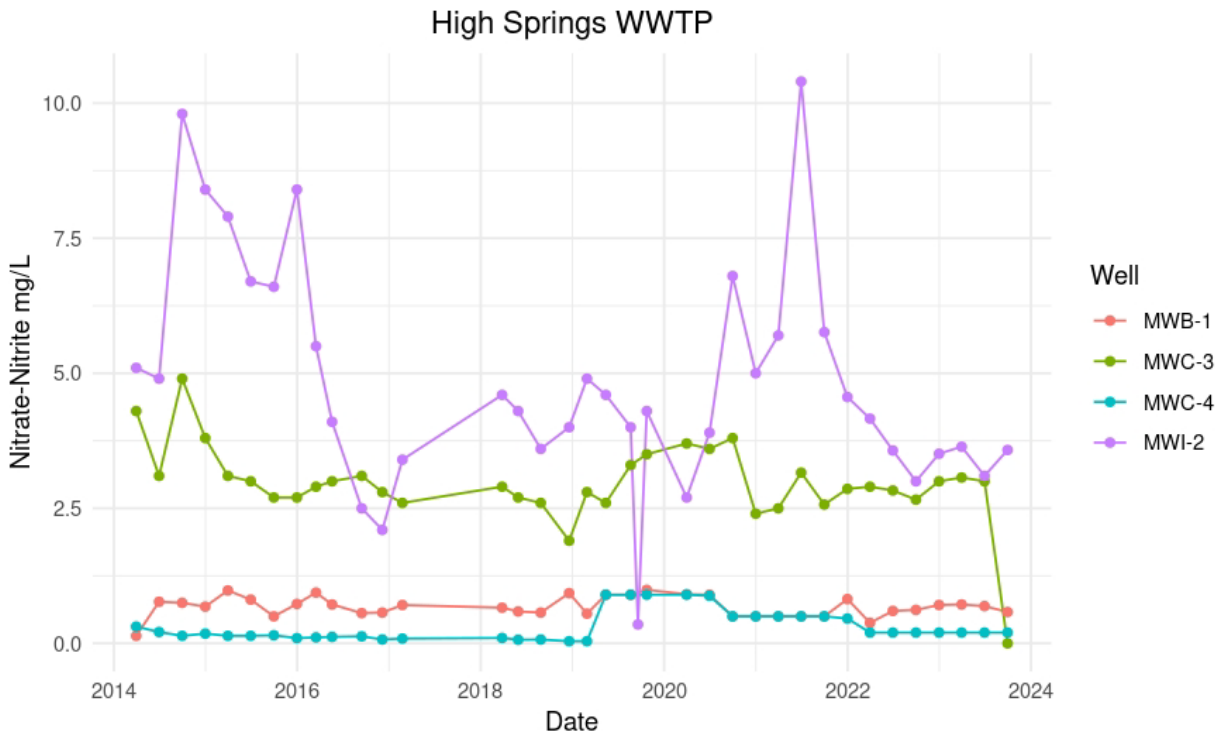


Figure 17. Groundwater Data from the City of High Springs WWTF for Nitrite + Nitrate

The City of High Springs WWTF hauls their sewage sludge to GRU for further treatment. According to FDEP's records, 50 dry tons of biosolids were produced in 2020, 31 dry tons in 2021, 57 dry tons in 2022, and 70 dry tons were produced 2023.

3-6 The City of Newberry

Facility size: up to 1.059 MGD **Permit expiration date**: 8/3/2026

Permitted effluent disposal: 40-acres of spray field.

Residuals disposal: Land applied to spray field on site.

The City of Newberry Plant 1

The City of Newberry WWTF is an activated sludge secondary treatment plant. The facility was expanded in 2013 to accommodate an additional 0.21 MGD in treatment capacity. ACEPD completed 15 inspections of the City of Newberry WWTF between 2020 and 2023. No plant deficiencies were noted during the plant inspections. Samples of the effluent were collected for nutrient analysis and are summarized in Figure 18. Nitrate concentrations ranged from 0.1 mg/L to 23.6 mg/L, total phosphorus ranged from 0.303 mg/L to 5.81 mg/L and total nitrogen concentrations ranged from 48.7 mg/L to 0.5 mg/L (Figure 18). High nutrient concentrations are a concern, since this facility is within the Santa Fe River Springshed.

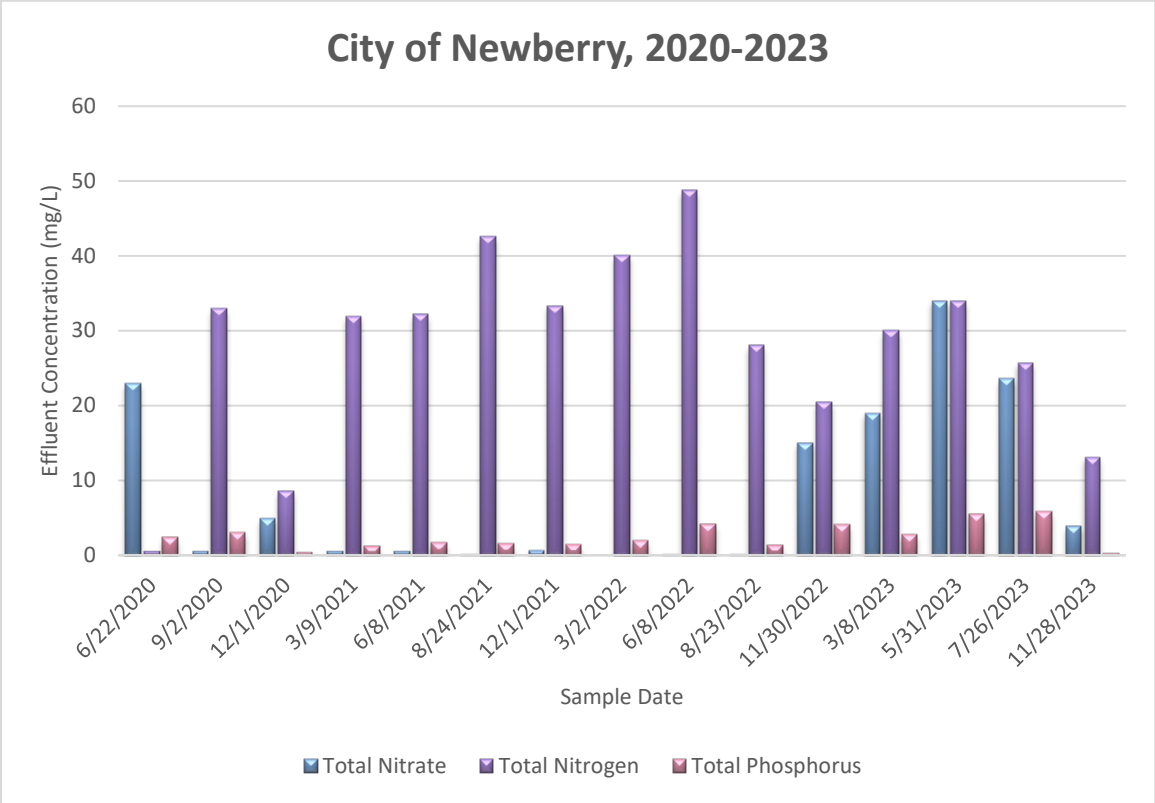


Figure 18. Effluent data from grab samples collected during ACEPD inspections at the City of Newberry WWTF

The monthly average flows of effluent were used to calculate an average flow of 0.22 MGD in 2020 and 2021, and 0.26 mg/L in 2022 and 2023. Average nutrient concentrations were then multiplied by this flow rate to estimate nutrient loading rates from the facility. Monthly maximum nutrient concentrations as reported by the facility and data collected by ACEPD were combined to estimate the annual loading rates at 2,842 lb./year of nitrate, 15,499 lb./year of total nitrogen, and 2,171 lb./year of total phosphorus in 2020 and 2021, and 9,445 lb./year of nitrate, 23,621 lb./year of total nitrogen, and 4,291 lb./year of total phosphorus for the 2022/2023 period of record (Figure 19). The City of Newberry WWTF does not report nitrate results, so nitrate loading was calculated using only ACEPD sample results ($n < 10$). Table 3 compares these values to those of the other WWTFs located in Alachua County. The loading of nutrients from the City of Newberry WWTF has been increasing due to a combination of increased reported flows and increased concentrations of nutrient constituents.

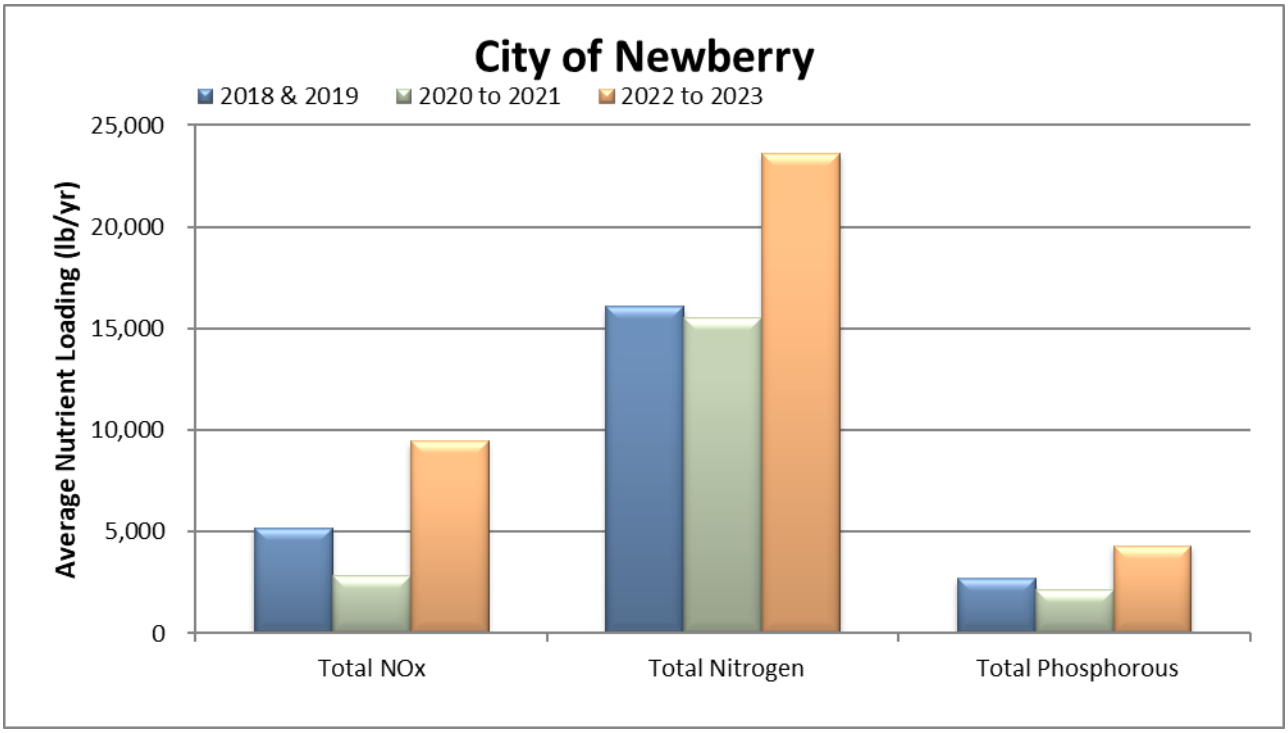


Figure 19. Estimated Nutrient Loading Values for the City of Newberry WWTF (2018-2023)

The city is required to sample their groundwater monitoring wells and submit the results to FDEP on a quarterly basis. The background wells are labeled with a "B", compliance wells are labeled with a "C", and intermediate wells are labeled with an "I". These wells are open to the Florida aquifer, which is unconfined in this portion of Alachua County. Nitrate levels are higher at all the monitoring wells in comparison to the background well (Figure 20). Monitoring well MWI-7R and MWI-4 appear to be increasing. Compliance well MWC5 also appears to be increasing with the latest two sample results in excess of the minimum contamination level of 10 mg/L. Elevated nutrient concentrations in the effluent and the groundwater monitoring wells are of concern in the karst setting of the plant's spray field for the Santa Fe River and springs system.

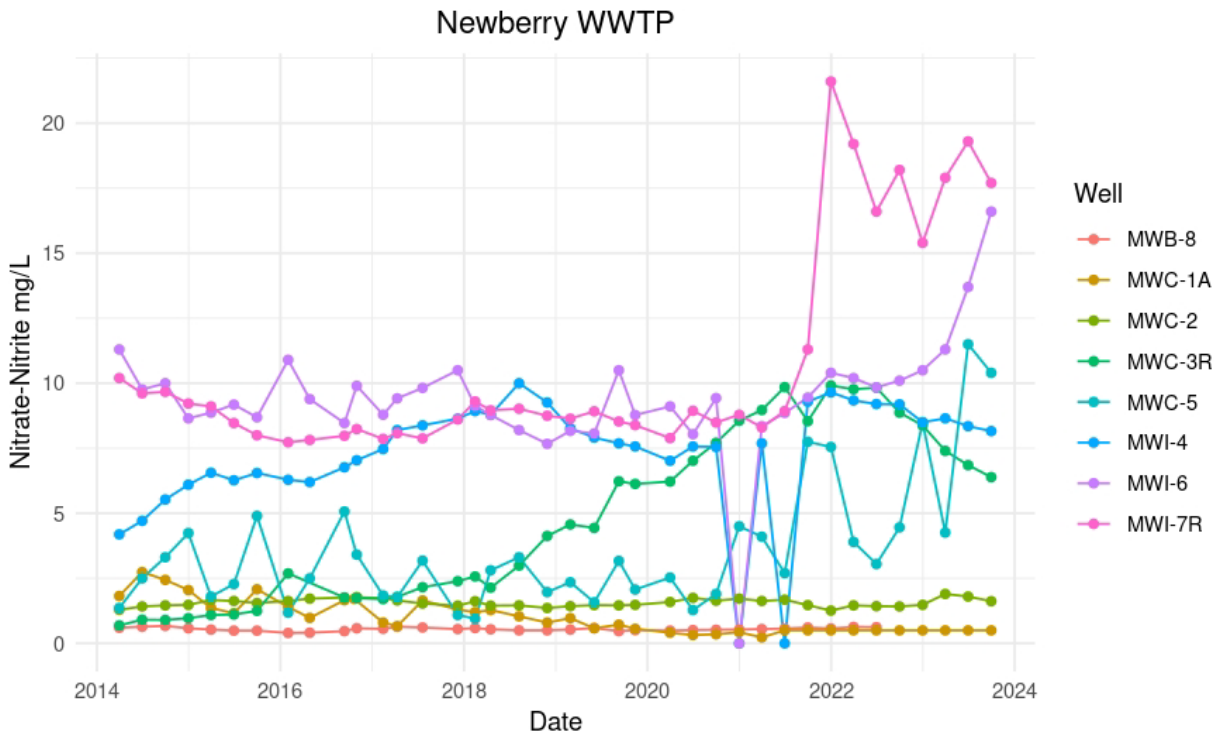


Figure 20. Groundwater Data from the City of Newberry WWTF for Nitrite + Nitrate

The City of Newberry WWTF is permitted to land apply biosolids that have achieved class B pathogen reduction. According to FDEP's records, the facility produced 32 dry tons of biosolids in 2020, 36 dry tons in 2021, 10 dry tons in 2022, and 5.34 dry tons in 2023. These biosolids are land applied at the City of Newberry WWTF spray field site.

3-7 The University of Florida

Facility size: 3.0 MGD **Permit expiration date**: 6/8/2026

Permitted effluent disposal:

3.0 MGD underground injection and 0.96 MGD public access re-use.

Residuals disposal: Hauled to GRU.

University of Florida WWTF

The UF WWTF is an advanced treatment Kruger Process (phased isolation oxidation ditch) treatment plant. This facility is no longer inspected by ACEPD, with the last inspection completed in 2010. Without any data from ACEPD inspections, ACEPD used DMR reports to calculate average nutrient concentration and estimate nutrient loading (Figure 21).

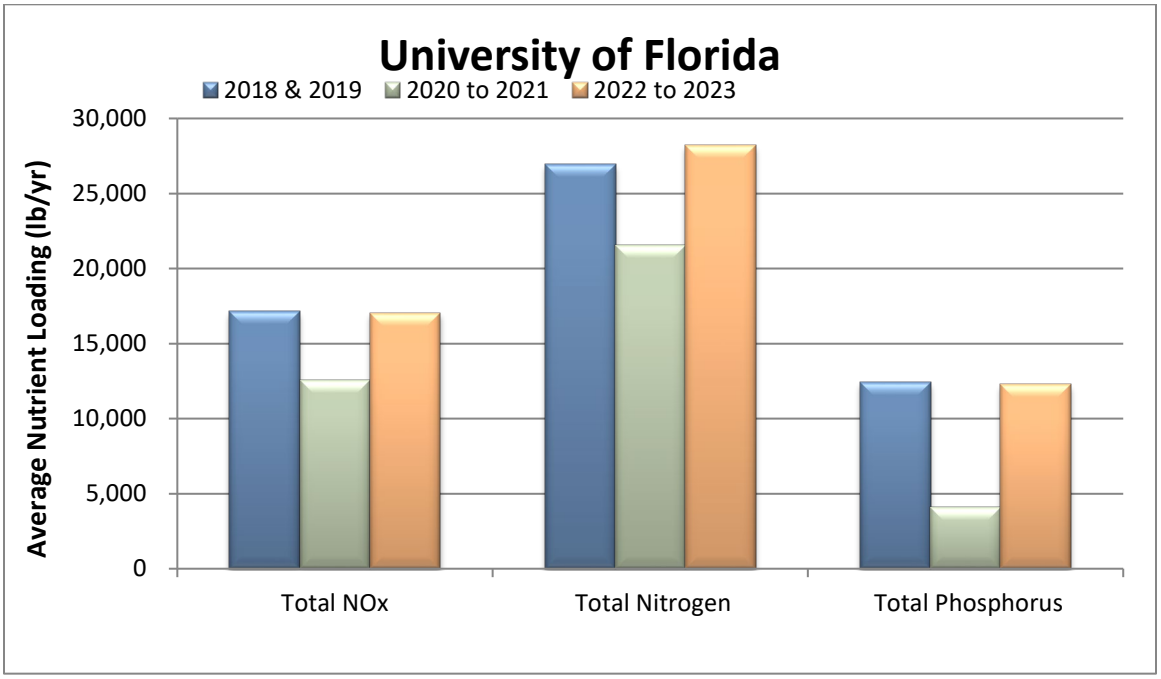


Figure 21. Estimated Nutrient Loading Values for the UF WWTF (2018 – 2023)

The monthly average flow of influent is estimated as 1.52 MGD for 2020 and 2021, and 1.87 MGD for 2022 and 2023. Monthly average nutrient concentrations reported by the facility were averaged and then multiplied by this flow rate to estimate nutrient loading rates for the two-year periods. Using the calculated flow and nutrients measured, total nitrate plus nitrite was 12,519 lb./year, total nitrogen was 21,569 lb./year, and total phosphorus was 4,070 lb./year for 2020 and 2021, and an estimated loading of 17,036 lb./year of nitrate plus nitrite, 28,173 lb./year of total nitrogen, and 12,277 lb./year of total phosphorus. Table 3 compares these values to those of the other WWTFs located in Alachua County.

UF is required to sample groundwater monitoring wells and submit the results to FDEP. However, monitoring well data is only required when the treated water is discharged into the injection well system; groundwater data is not reported when the effluent is utilized for public access re-use. The background wells are labeled with a “B” and compliance wells are labeled with a “C”. The monitoring wells are open to the Florida aquifer, which is semi-confined in this area and are located within two different zones of the aquifer. Wells designated with a “D” (for deep) are between 250 and 300 feet in total depth. Shallow monitoring wells, designated with an “S”, are 60 to 65 feet in total depth. Nitrate levels appear to be elevated in background well MWB-3S (Figure 22). However, a larger period of record would be needed to verify any trends and none of the results exceeded drinking water standards for nitrate.

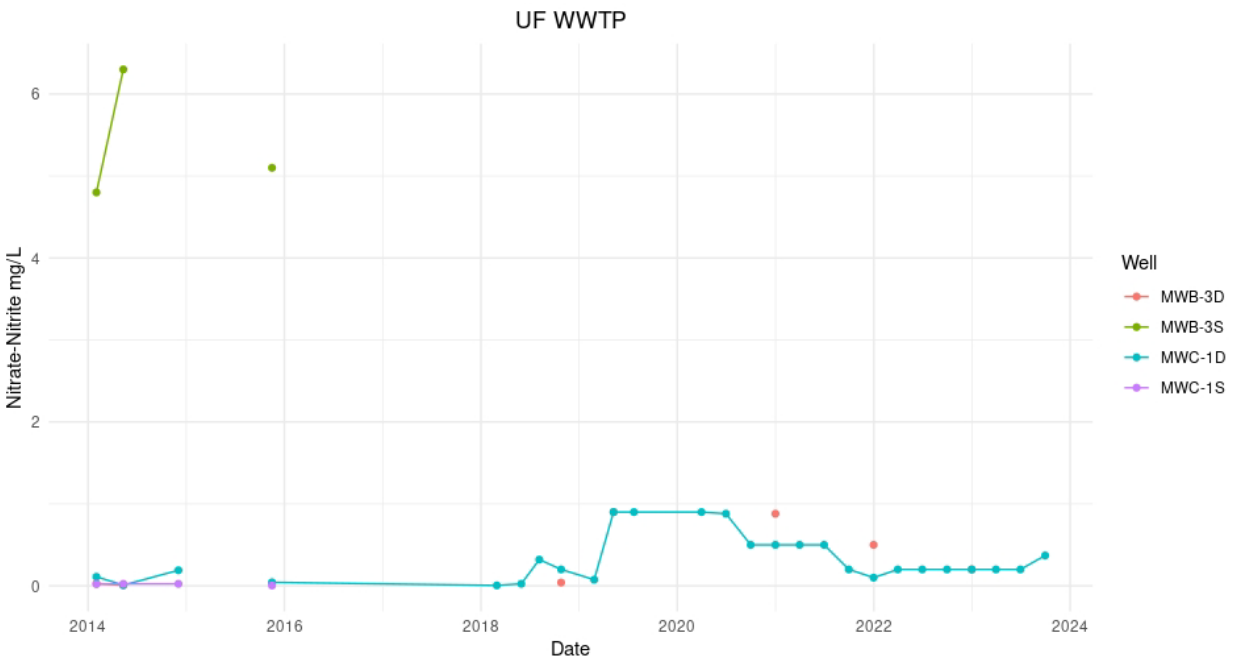


Figure 22. Groundwater Data from the UF WWTF for Nitrite + Nitrate

UF hires GRU to pump their sewage sludge and haul it for further treatment at one of GRU's treatment facilities. According to FDEP's records, 189 tons were hauled in 2020, 181 tons in 2021, 157 tons in 2022, and 195 tons were hauled in 2023.

4.0 PACKAGE PLANTS

Package plants are smaller prefabricated WWTFs designed to treat domestic wastewater for a localized area such as a mobile home park (MHP) or camp. There were nine permitted package plants located in Alachua County between 2020 to 2023. Previously there were more package plants in Alachua County, but the recent trend has been to close package plants as they are able to connect to the centralized municipal wastewater collection systems.

The average total nitrogen and total phosphorus concentrations include reported nutrient data from each facility's DMR and effluent sampling data from the ACEPD inspections. Effluent quality varied among the package plants (Figure 26). The level of treatment and nutrient removal is typically lower at package plants compared to municipal facilities; however, the volume of effluent produced by package plants is also significantly less. The high total nitrogen concentrations observed at many of the package plants are concerning. Most of the nitrogen was not in the mobile nitrate form but instead was in ammonia form, which is likely converted to nitrate once released to the environment. The nutrient loading rates to the environment were calculated for each plant by multiplying the average flow by the average nutrient concentrations (Figure 27). The individual package plants are discussed in the following sections of this

report. These facilities contract to transport and process their sludge. Facilities which are operating below capacity do not generate enough sludge to haul annually.

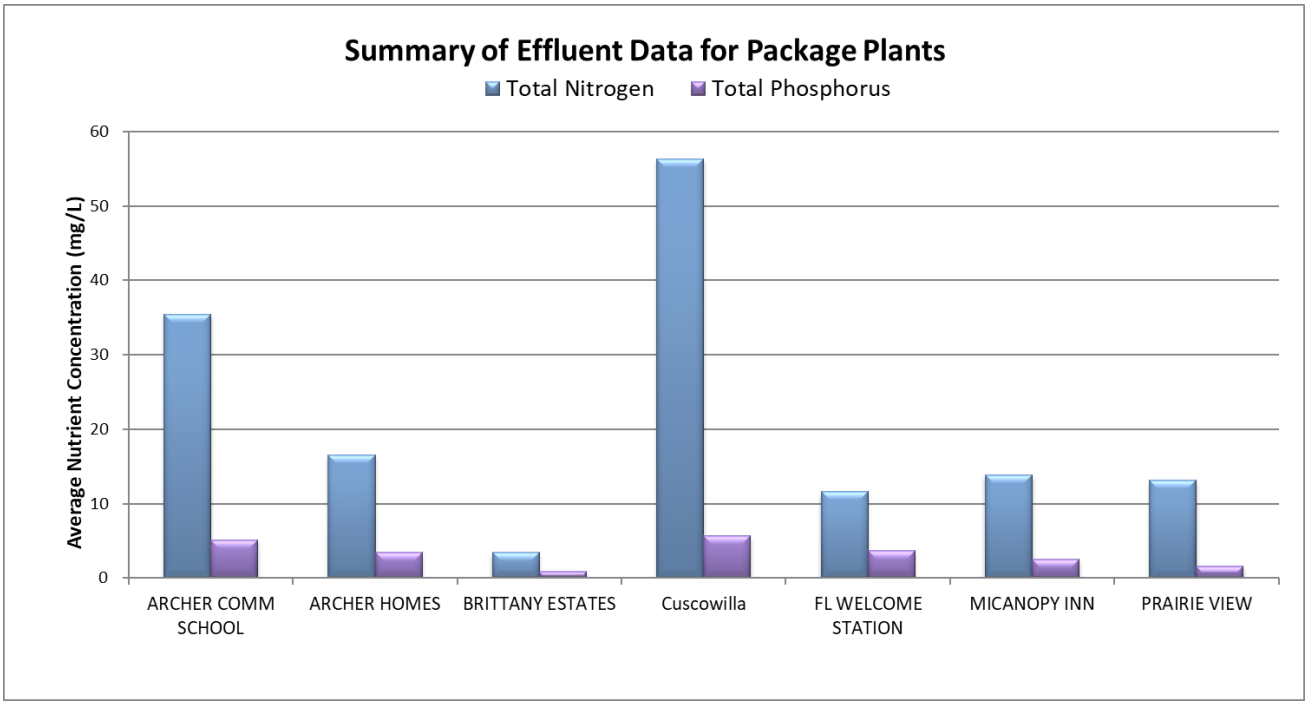


Figure 23. Average Effluent Nutrient Data for Package Plants (2020 – 2023)

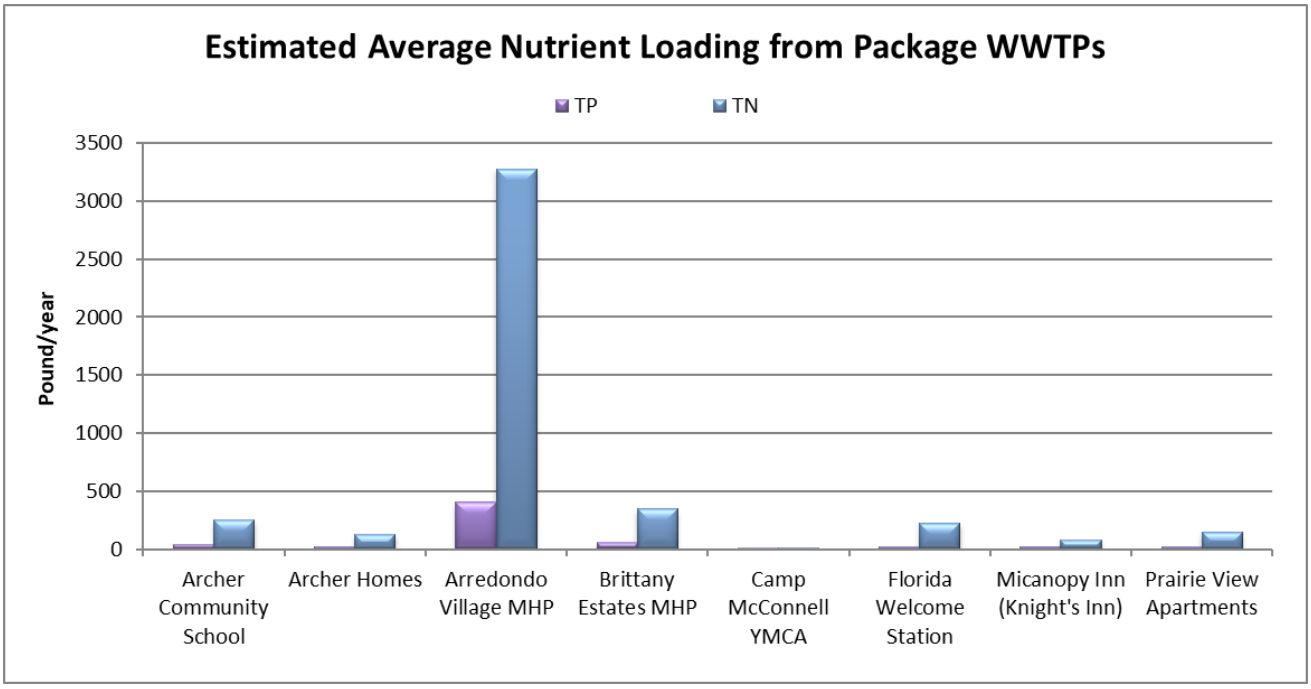


Figure 24. Estimated Average Nutrient Loading from Package Plants (2020 – 2023)

4-1 Archer Community School

Facility size: 0.005 MGD **Permit expiration date**: 12/17/2029

Permitted effluent disposal: three rapid infiltration basins (0.124-acres).

Residuals disposal: Hauled off-site.

The Archer Community School WWTF

The package plant at the Archer Community School is an extended aeration activated sludge plant. This facility was inspected 15 times between 2020 and 2023. The total residual chlorine was below the 0.5 mg/L FDEP permit minimum during the June and August 2021 and June 2022 inspections. Total nitrogen values at this plant were elevated during the ACEPD sampling events, ranging from 82 mg/L to 25 mg/L, nitrate ranged from 0.1 mg/L to 15 mg/L and total phosphorus ranged from 0.28 mg/L to 12.4 mg/L (Figure 25). In the state permit, the plant has a report-only requirement for nitrate with no max limit, and no reporting requirements for total nitrogen and total phosphorus. High concentrations of total nitrogen with low concentrations of nitrate indicate that ammonia is the dominant form of nitrogen present in the effluent. Ammonia can be converted to nitrate in the environment and is of concern in this part of the county where the Floridan aquifer is unconfined and vulnerable to pollution.

The monthly average flows from 2020 to 2021 and 2022 to 2023 were used to calculate an average flow of 0.002 MGD and 0.0025 respectively. Average nutrient concentrations from ACEPD inspection samples and DMR were then multiplied by the estimated flow rate to calculate nutrient loading rates. The estimated loading from 2020 to 2021 was 14 lb./year of nitrate, total nitrogen was 248 lb./year, and total phosphorus was 35 lb./year. The estimated nitrate loading from 2022 to 2023 was 33 lb./year, total nitrogen was 254 lb./year, and total phosphorus was 38 lb./year. The total nitrogen and total phosphorus load from 2020 - 2023 have are similar to loading rates between 2018 – 2019. (Figure 26). Table 3 compares loading among WWTFs located in Alachua County.

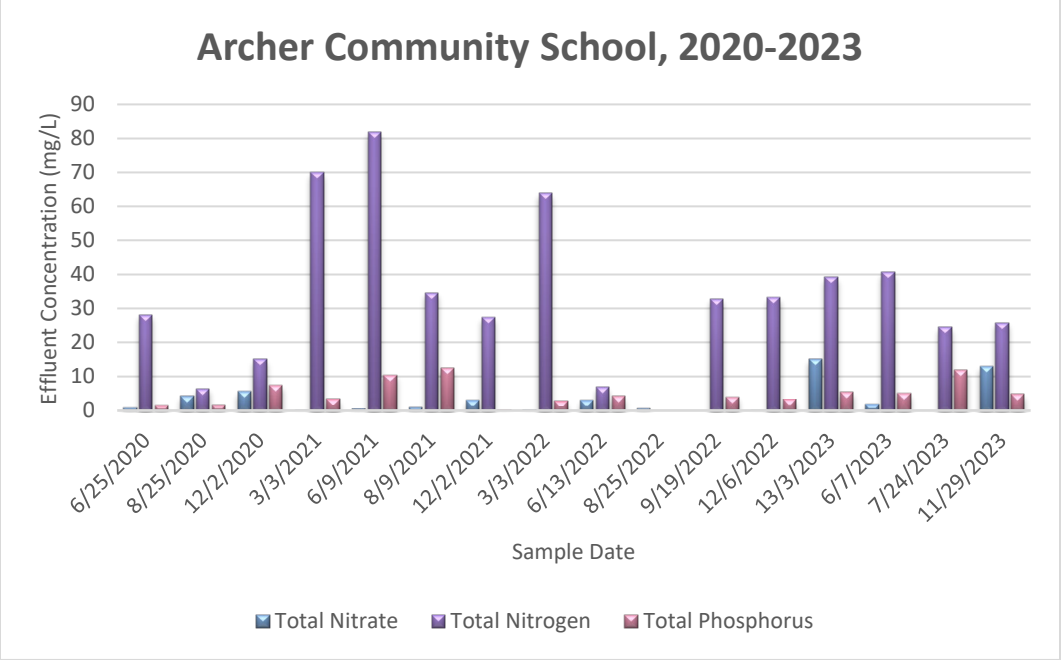


Figure 25. Effluent data from samples collected during ACEPD inspections at the Archer Community School Package Plant

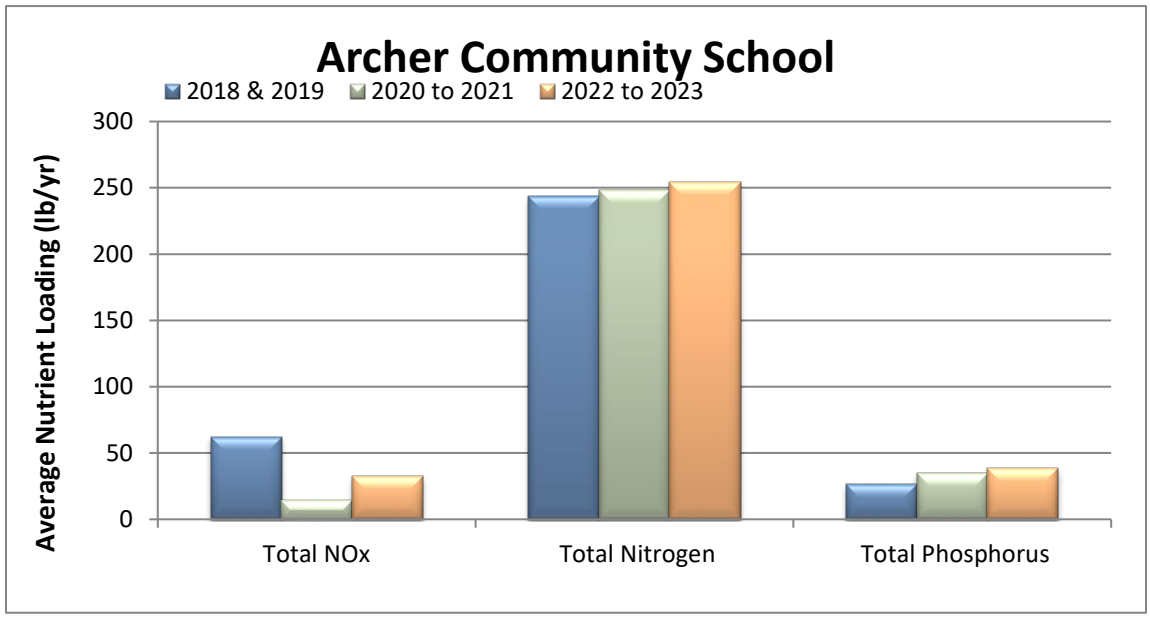


Figure 26. Estimated Nutrient Loading Values for the Archer Community School Package Plant (2018 – 2023)

4-2 Archer Homes

Facility size: 0.0083 MGD **Permit expiration date**: 10/13/2025

Permitted effluent disposal: 0.22-acre absorption field.

Residuals disposal: Hauled off-site.

The Archer Homes WWTF

The package plant at Archer Homes is an extended aeration treatment plant. This facility was inspected 15 times between 2020 and 2023. The total residual chlorine was below the 0.5 mg/L FDEP permit minimum during the June 2021 inspection but was resolved during the next inspection date. Total nitrogen values at this plant were elevated during the sampling events, and concentrations ranged from 2.23 mg/L and 87 mg/L through the sampling period. Nitrate ranged from 0.1 mg/L to 17 mg/L, and total phosphorus ranged from 1.24 mg/L to 5.45 mg/L (Figure 25). In the state permit, the plant has a report-only NO_x requirement but no reporting requirement for nitrate, total nitrogen, or total phosphorus. High concentrations of total nitrogen with low concentrations of nitrate indicate that ammonia is the dominant form of nitrogen present in the effluent, which can be converted back to nitrate in the environment. High nitrogen concentrations are of concern in this part of the county where the Floridan aquifer is unconfined and vulnerable to pollution.

The monthly average flow of influent from 2020 to 2021 and 2022 to 2023 was used to calculate an average flow of 0.003 and 0.002 MGD, respectively. Average nutrient concentrations from ACEPD inspection and DMR reported samples were then multiplied by the flow rate to estimate nutrient loading rates. The calculated nitrate loading for 2020 and 2021 was 14 lb./year, total nitrogen was 174 lb./year, and total phosphorus was 34 lb./year. The estimated nitrate loading for 2022 and 2023 was 10 lb./year, total nitrogen was 85 lb./year, and total phosphorus was 19 lb./year The total nitrogen load from 2018 -

2019 was significantly higher than results from 2020 -2023 (Figure 28). Table 3 compares loading values among WWTFs located in Alachua County.

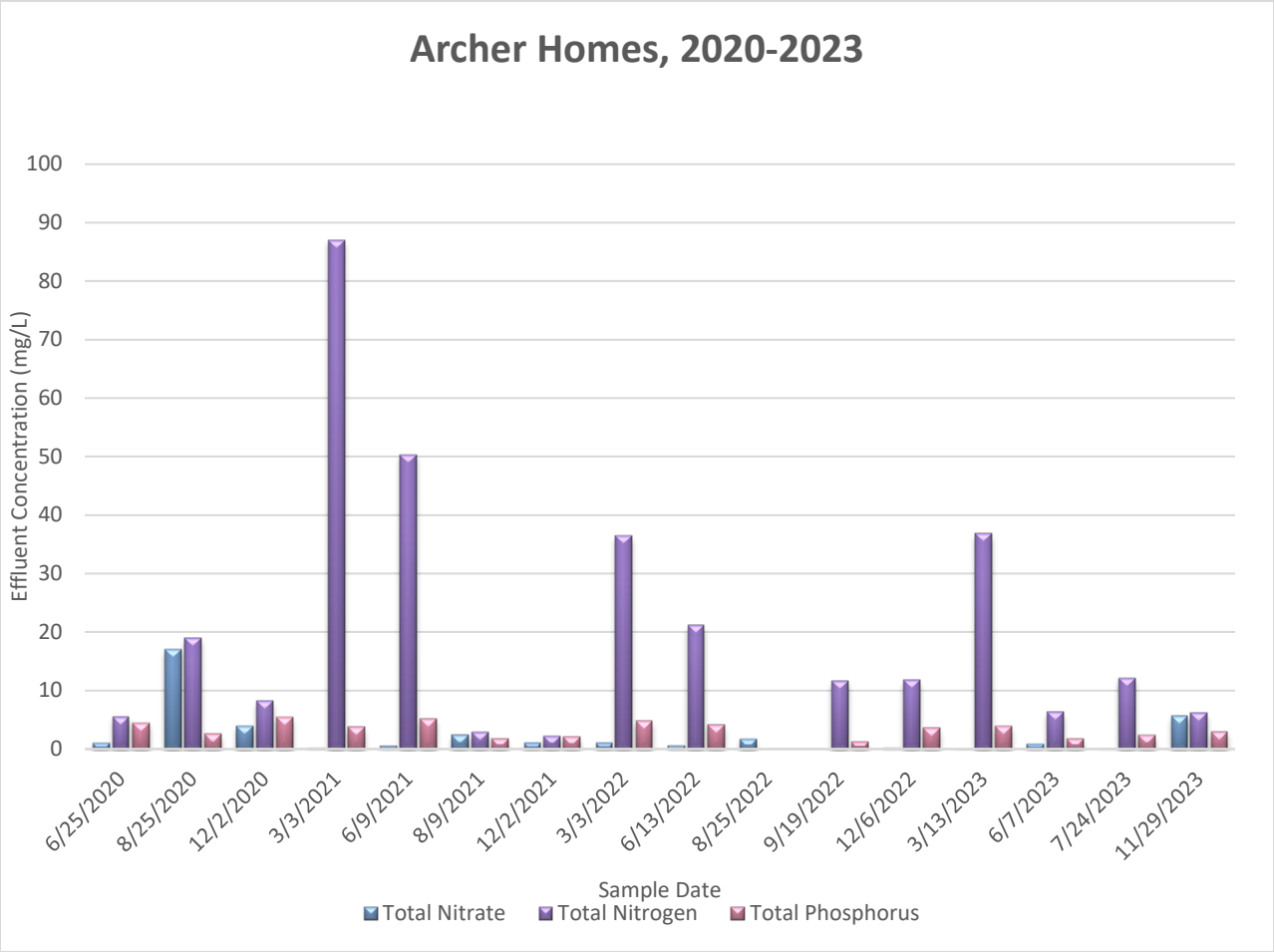


Figure 27. Effluent data from samples collected during ACEPD inspections at the Archer Homes Package Plant

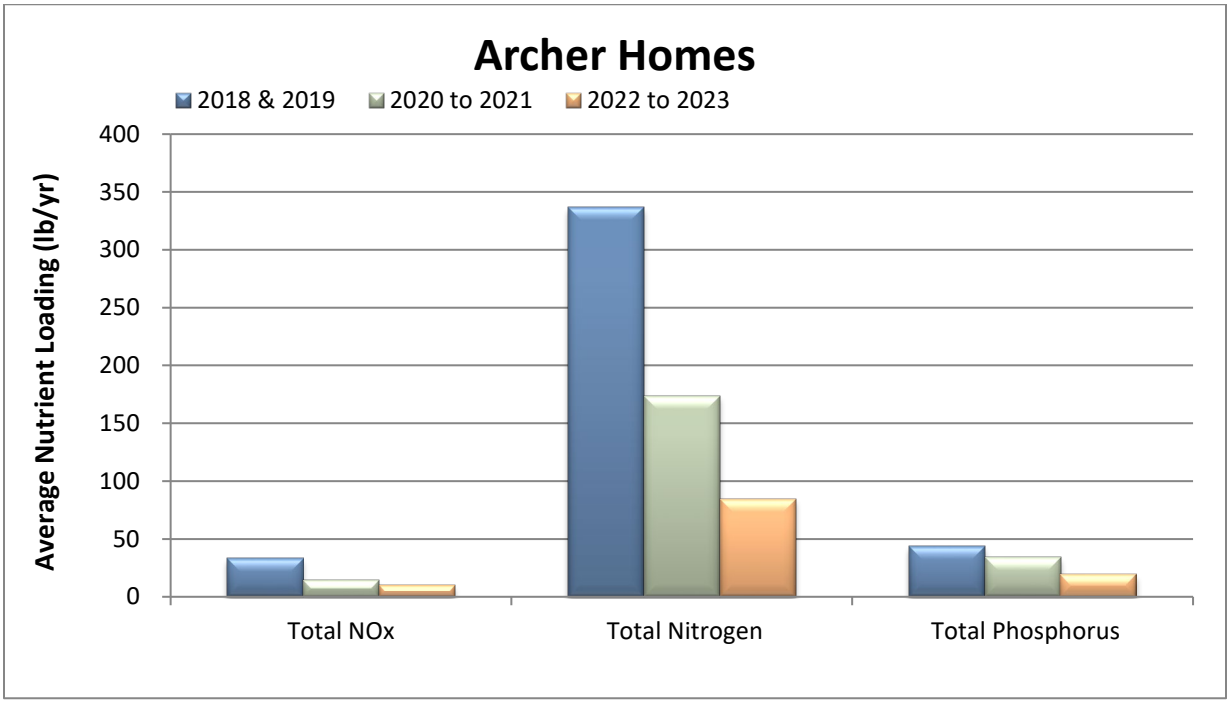


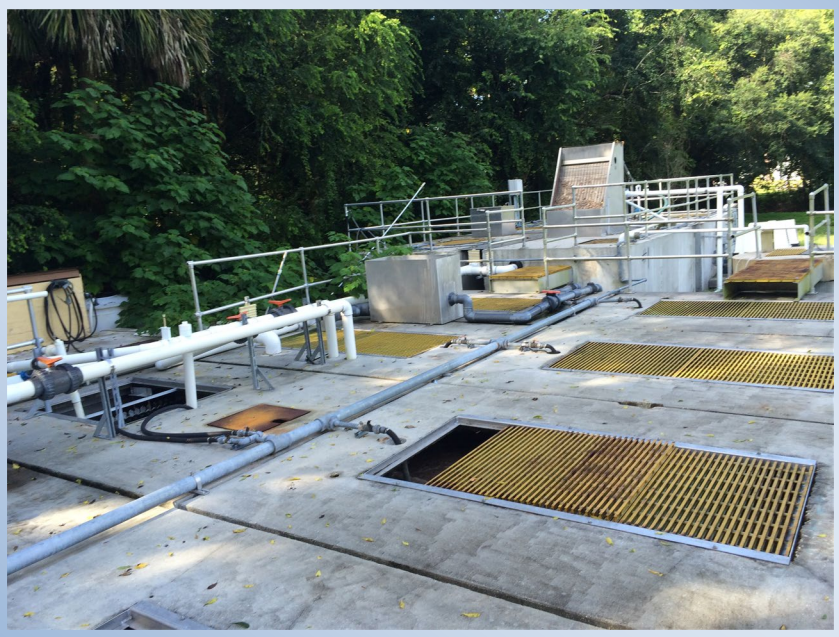
Figure 28. Estimated Nutrient Loading Values for the Archer Homes Package Plant (2018 – 2023)

4-3 The Palms Mobile Home Park (formerly Arredondo Farms)

Facility size: 0.099 MGD **Permit expiration date**: 9/14/2029

Permitted effluent disposal: Two rapid infiltration basins.

Residuals disposal: Hauled off-site.



The Palms WWTF

The package plant at The Palms MHP (formerly Arredondo Farms) is an extended aeration treatment plant. This facility was inspected 15 times during 2020 to 2023. The chlorine values were within compliance during all inspection visits. Total nitrogen concentrations were elevated during four visits between June 2020 and March 2021 with concentrations ranging from 30 mg/L to 21 mg/L, however, total nitrogen concentrations were lower between June 2021 to November 2023 with concentrations ranging from 11.8 mg/L and 4.6 mg/L. The reduction in total nitrogen coincides with the upgrade of their package WWTP. Nitrate ranged from 0.2 mg/L to 0.4 mg/L and total phosphorus ranged from 0.38 mg/L to 3.49 mg/L (Figure 29).

The monthly average effluent flow from 2020 to 2021 and 2022 to 2023 were used to calculate an average flow of 0.08 MGD for both periods. Average nutrient concentrations were then multiplied by this flow rate to calculate loading rates to the environment. Monthly maximum values for nitrate samples collected by the facility were combined with ACEPD inspection data to calculate a loading rate of 309 lb./year for 2020 to 2021 period and 522 lb./year for 2022 of 2023 period. (Figure 30). Because monthly maximums were used in the calculation, this calculation may be an overestimate of the true nitrate loading. Because the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data was solely used to calculate these loadings. Total nitrogen loading for periods 2020 to 2021 and 2022 to 2023 were 5,016 lb./year and 1,534 lb./year, respectively. Total phosphorous loadings for periods 2020 to 2021 and 2022 to 2023 were 416 lb./year and 390 lb./year, respectively. Table 3 compares loading at this facility between 2018 to 2023 period.

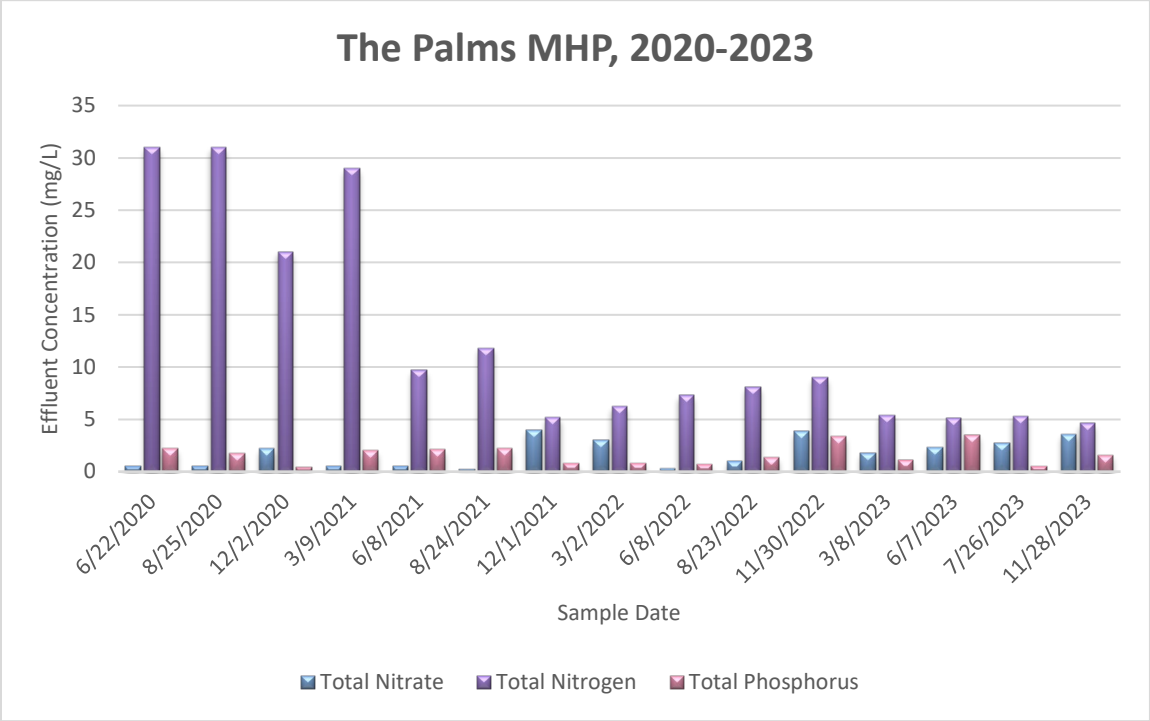


Figure 29. Effluent data from samples collected during ACEPD inspections at The Palms Mobile Home Park Package Plant (2020 – 2023)

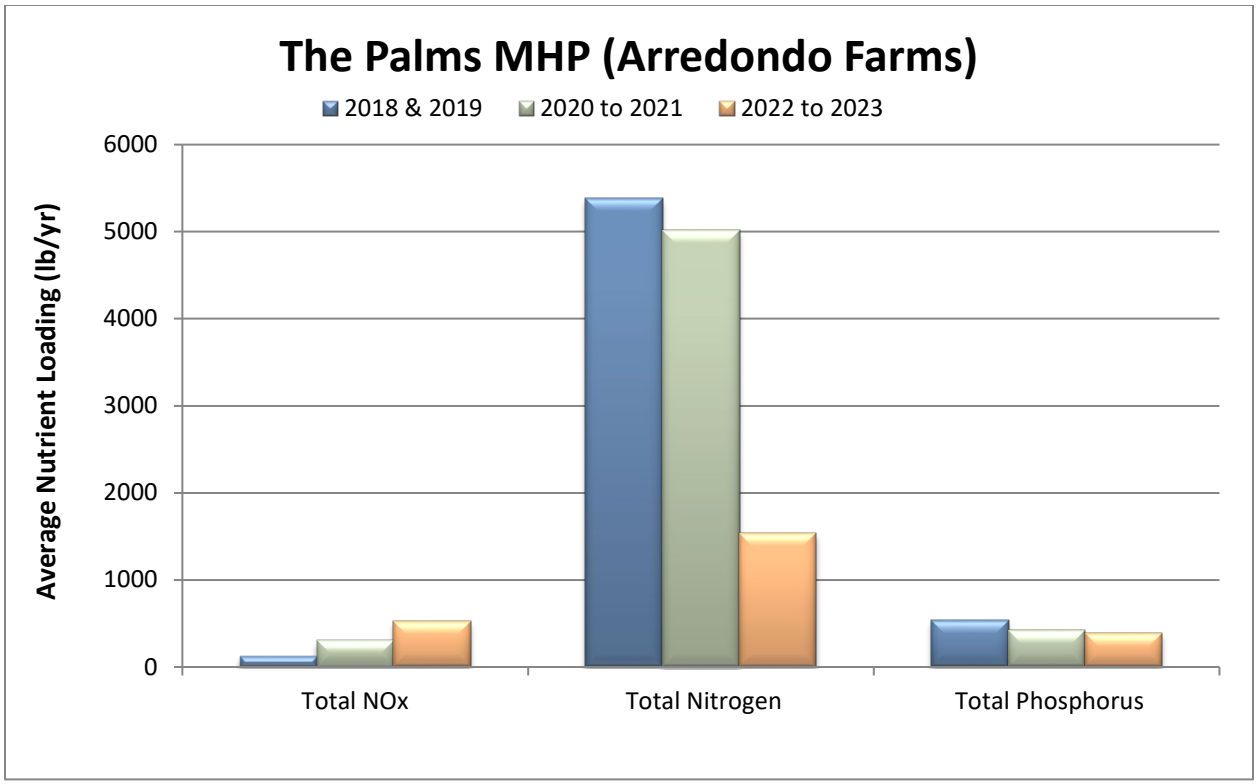


Figure 30. Estimated Nutrient Loading Values for The Palms Mobile Home Park Package Plant (2018 – 2023)

4-4 Brittany Estates Mobile Home Park

Facility size: 0.06 MGD **Permit expiration date**: 6/7/2028

Permitted effluent disposal: Little Hatchet Creek.

Residuals disposal: Hauled off-site.

Brittany Estates WWTF

The package plant at Brittany Estates MHP can be operated as an activated sludge extended aeration or contact stabilization plant. This facility was inspected 15 times by ACEPD between 2020 and 2023. No exceedances or violations were found during this period. Grab samples for nutrient analysis collected by ACEPD are summarized in Figure 31. Total nitrogen ranged from 0.54 mg/L to 16.1 mg/L, nitrate ranged between 0.1 mg/L and 0.5 mg/L, and total phosphorus concentrations ranged from 0.0.504 mg /L to 2.63 mg/L (Figure 31).

The monthly average effluent flow from 2020 to 2021 and 2022 to 2023 was used to calculate an average flow of 0.034 and 0.02 MGD, respectively. Average nutrient concentrations were then multiplied by this flow rate to estimate nutrient loading rates. Monthly average values reported by the facility were combined with ACEPD inspection data to calculate a loading of 154 lb./year of nitrate, 547 lb./year of total nitrogen, and 66 lb./year of total phosphorus for the 2020 to 2021 period. Loading of 14 lb./year of nitrate, 149 lb./year of total nitrogen, and 49 lb./year of total phosphorus for the 2022 to 2023 period. Estimated loading of nitrate and total nitrogen dropped since the 2018 to 2019 sampling period. Total phosphorus loading estimates have remained similar to the previous sampling period.

Nutrients in effluent from this plant are a concern because they are discharged directly to a tributary of Little Hatchet Creek. Total Maximum Daily Loads (TMDL) for total nitrogen and total phosphorus were developed for Newnans Lake, the downstream receiving water body, to address water quality issues in the watershed (FDEP 2014). Table 3 compares loading rates among WWTFs in Alachua County.

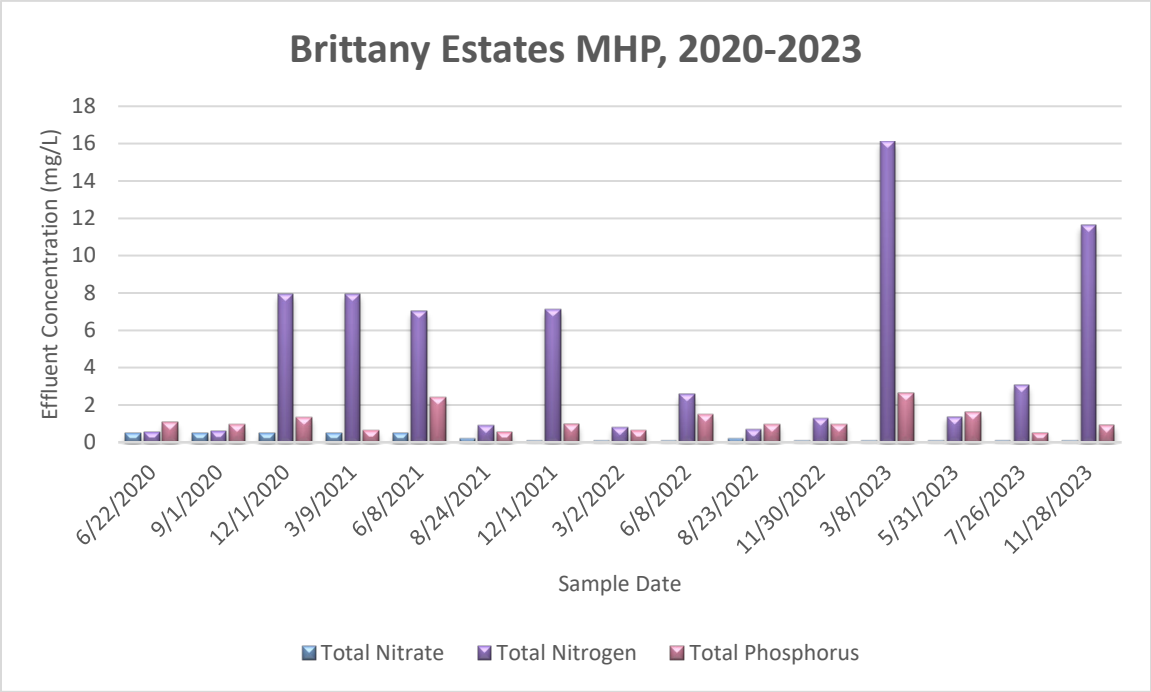


Figure 31. Effluent data from samples collected during ACEPD inspections at the Brittany Estates Mobile Home Park Package Plant

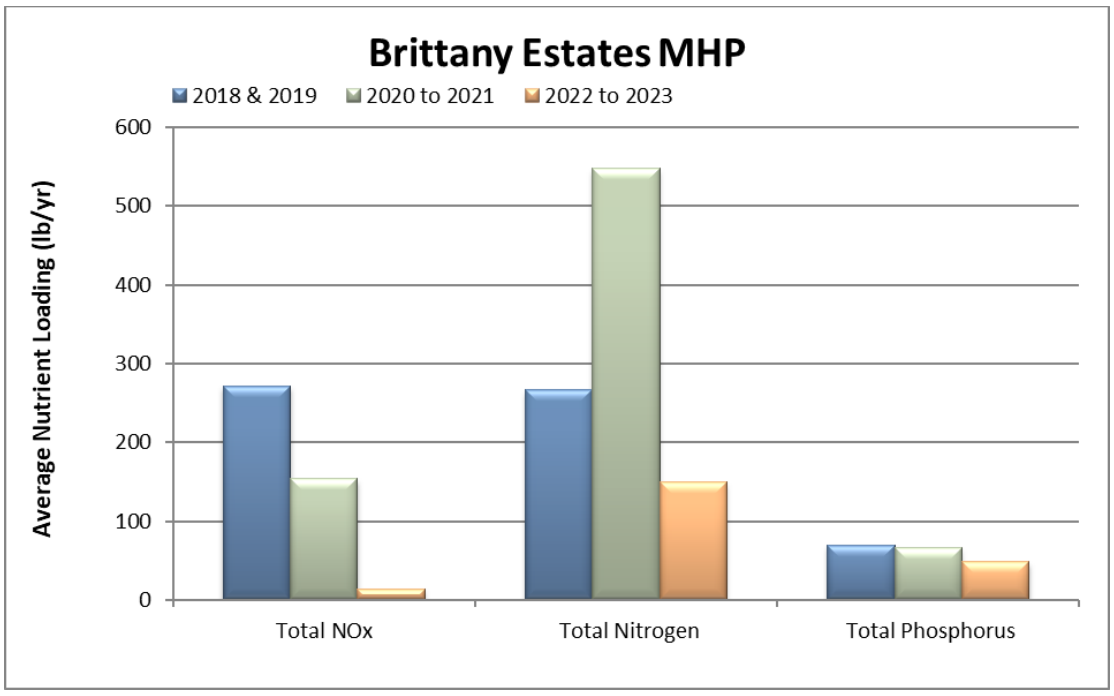


Figure 32. Estimated Nutrient Loading Values for the Brittany Estates Mobile Home Park Package Plant (2018 – 2023)

4-6 Cuscowilla (formerly Camp McConnell)

Facility Size: 0.0075 MGD **Permit expiration date**: 10/14/2025

Permitted effluent disposal: Two absorption fields (0.0388 acres).

Residuals disposal: Hauled off-site.

Camp McConnell/Cuscowilla aeration basin and clarifier

The package plant at Camp McConnell is an extended aeration plant. This facility was inspected 15 times by ACEPD between 2020 and 2023. Nitrate levels were above permitted levels at 18 mg/L during the November 2023 visit. The flow rate at this facility is intermittent and is dependent on the programming at the camp. During low flows to the plant, operators must maintain the microbial communities by adding dog food.

The monthly average effluent flows from 2020 to 2023 were used to calculate an average flow of 0.0001 MGD. Average nutrient concentrations (Figure 35) were then multiplied by this flow rate to estimate nutrient loading rates. Monthly maximum nitrate plus nitrite data reported by the facility were combined with ACEPD inspection data to calculate a nitrate loading rate of 0.57 lb./year and 1.5 lb./year between 2020 to 2021 and 2022 to 2023, respectively (Figure 36). Since the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings. During 2020 to2021 and 2022 to 2023 periods, the total nitrogen loadings were at 7.1 lb./year and 16 lb./year respectively. Total phosphorus between 2020 to 2021 and 2022 to 2023 were 0.2 lb./year and 0.9 lb./year respectively. The estimated nutrient load has increased since the 2018 to 2019 record, most likely due to increase usage and flows after an uptick in park activities. Table 3 compares loading rates among WWTFs in Alachua County.

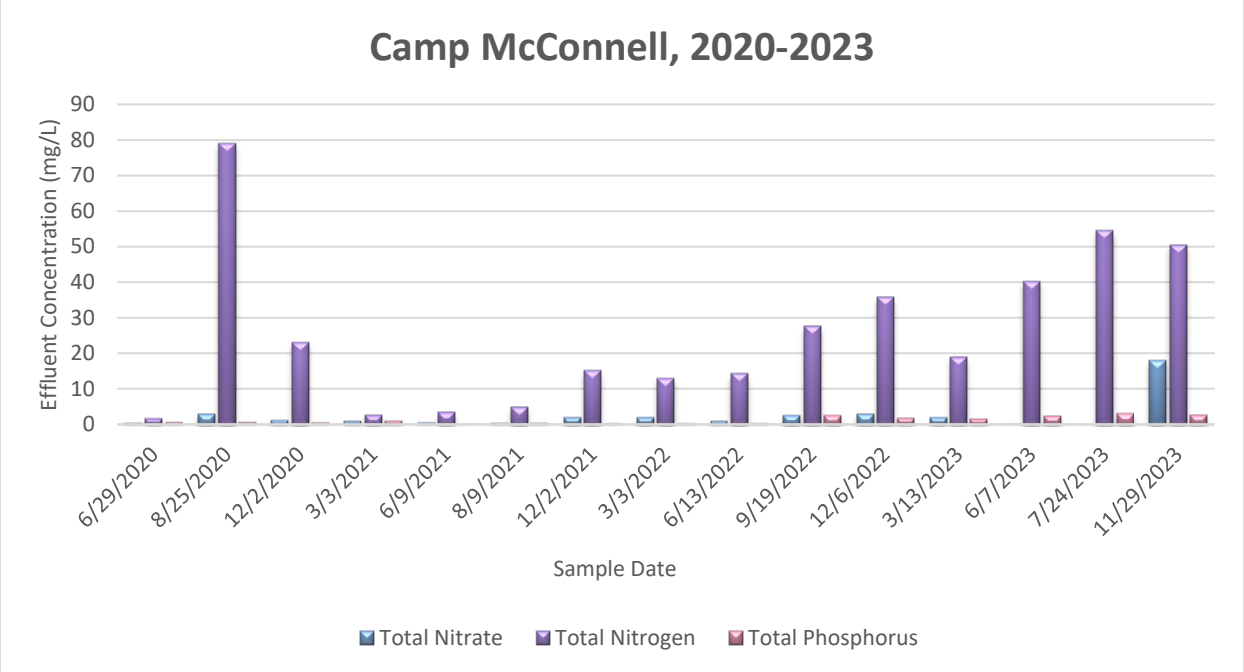


Figure 33. Effluent data from samples collected during ACEPD inspections at the Camp McConnell YMCA Package Plant

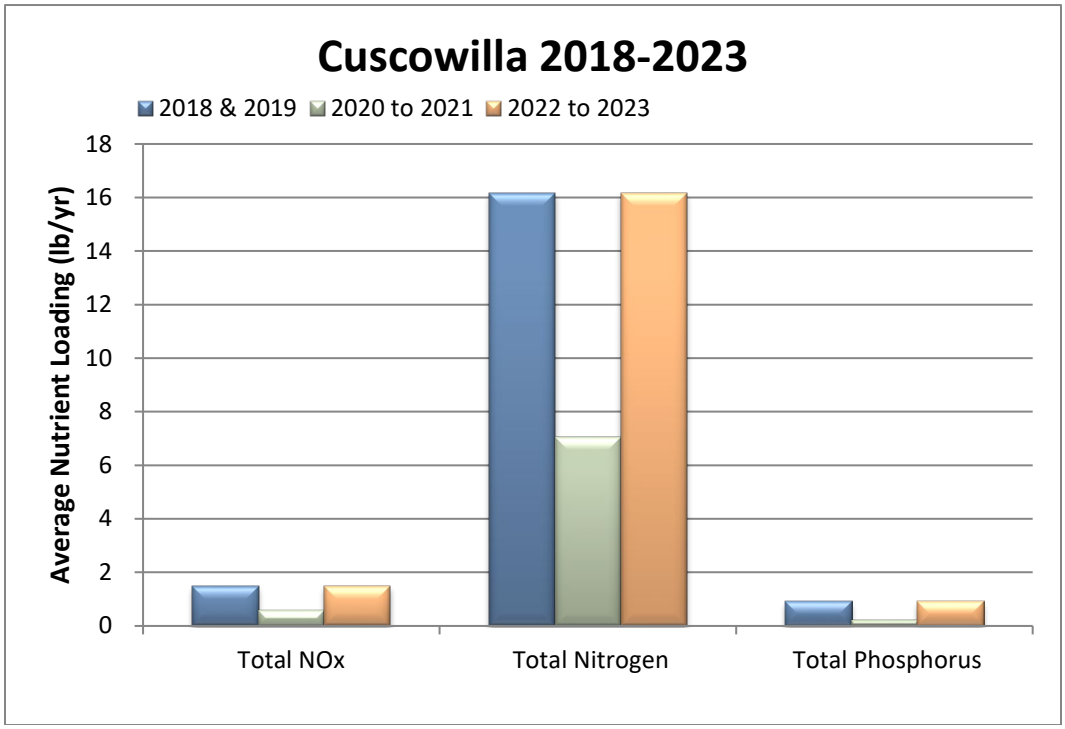


Figure 34. Estimated Nutrient Loading Values for the Camp McConnell YMCA Package Plant (2018 – 2023)

4-7 The Florida Welcome Station

Facility size: 0.009 MGD **Permit expiration date**: 3/92025

Permitted effluent disposal: Rapid infiltration basin (0.25-acres).

Residuals disposal: Hauled off-site.

The Florida Welcome Station WWTF

The package plant at the Florida Welcome Station is an extended aeration plant. ACEPD conducted 15 inspections at this facility between 2020 and 2023. Nitrate concentrations were above permitted maximum concentration of 12 mg/L during four inspection visits (March 2021- 59 mg/L, November 2022- 55mg/L, March 2023- 75 mg/L, and May 2023- 40mg/L). Results from grab samples collected during ACEPD inspections are summarized below in Figure 37. During 2020 to 2023 total nitrogen concentrations ranged from 4.3 mg/L to 146 mg/L, nitrate ranged from 0.1 mg/L to 75 mg/L, and total phosphorus ranged from 1.19 mg/L to 15.7 mg/L (Figure 37). High nitrogen concentrations are of concern in proximity to the Santa Fe River and its springs. The Floridan aquifer is semi-confined in this area which is on the edge of the Cody Scarp. Although the nitrogen in the effluent is not always dominated by the mobile nitrate form, ammonia can be converted to nitrate once in the environment.

The monthly average effluent flow from 2020 to 2021 was 0.0015 MGD, and 0.0015 MGD for 2022 to 2023. Average nutrient concentrations were multiplied by this flow rate to estimate nutrient loading rates. Monthly maximum nitrate data reported by the facility were combined with ACEPD inspection results to calculate a nitrate loading rate of 24 lb./year for 2020 to 2021 and 85 lb./year for 2022 to 2023. Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings. Estimated loads for total nitrogen were 257 lb./year for 2020 to 2021 and 193 lb./year for 2022 to 2023. Estimated loads for total phosphorus were 23 lb./year for 2020 to 2021 and 22 lb./year for 2022 to 2023. Estimated loads of total nitrogen and total phosphorus have decreased since the 2018 to 2019 (Figure 38). The decrease was likely due to low usage when this facility was closed for

an extended period during the COVID-19 pandemic. Table 3 compares loading rates among WWTFs located in Alachua County.

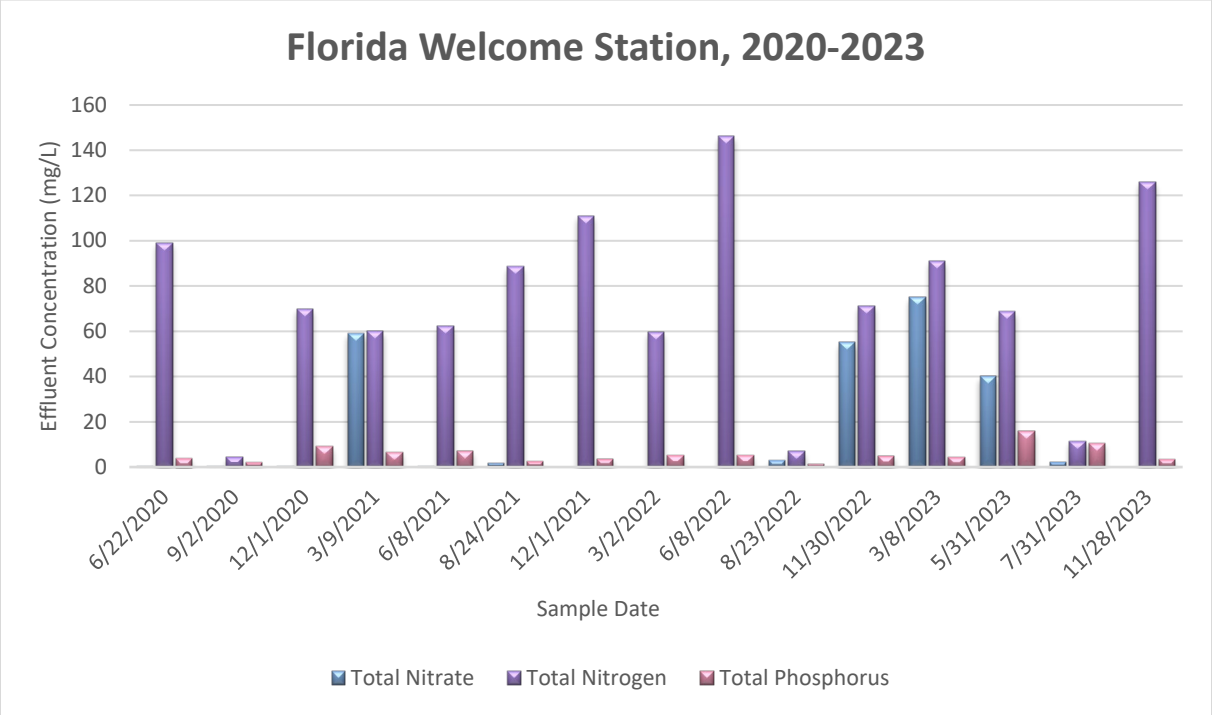


Figure 35. Effluent data from samples collected during ACEPD inspections at the Florida Welcome Station Package Plant

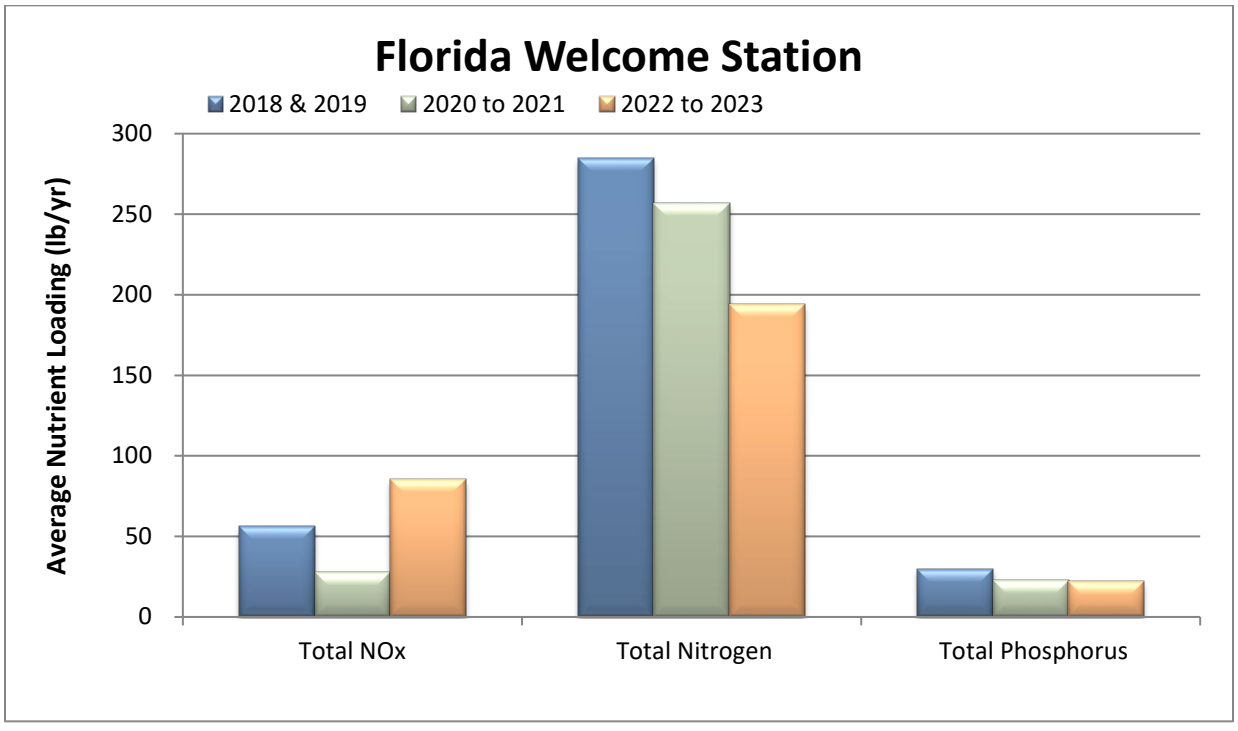


Figure 36. Estimated Nutrient Loading Values for the Florida Welcome Station Package Plant (2018 – 2023)

4-8 The Gainesville Raceway

Facility size: 0.00825 MGD **Permit expiration date**: 2/7/2029

Permitted effluent disposal: Spray irrigation (3.25 acres).

Residuals disposal: None produced.

The Gainesville Raceway aeration treatment system

The Gainesville Raceway plant is an extended aeration batch treatment system designed to treat the intermittent flows of the Gainesville Raceway between times of low usage to high usage flows of the annual Gatornationals event. This facility was inspected three times during the 2020 to 2023 period. Samples were found to be in compliance during each inspection and no plant deficiencies were noted. Effluent is discharged through the spray fields infrequently; therefore, no recurring effluent samples are reported as part of the DMR. ACEPD sampled the holding basins after the aeration ponds during Gatornationals when the plant is operating at max capacity. In between Gatornational events the plant receives and treats wastewater pumped from portable toilets. This plant has historically been found in compliance.

Table 6: Gainesville Raceway sample results

Date	NH_3 (mg/L)	TN (mg/L)	TP (mg/L)	NO_x (mg/L)
3/11/2021	2.2	28	10.9	17
3/14/2022	6.0	20.1	5.75	6.0
3/9/2023 (Before Event)	5.3	12.2	3.62	0.10
3/13/2023 (After Event)	9.9	18.3	4.11	0.46

4-9 Micanopy Inn (formerly Knight's Inn)

Facility size: 0.015 MGD **Permit expiration date**: 6/15/2028

Permitted effluent disposal: 1.26-acre spray field.

Residuals disposal: Hauled off-site.

The Micanopy Inn aeration basin

The package plant at the Micanopy Inn (formerly Knight's Inn) is an extended aeration plant. This facility was inspected fourteen times by ACEPD between 2020 and 2023. Multiple plant deficiencies were noted during these inspections, including low chlorine residual in June of 2020, March and August of 2021 and July of 2023. An active Sanitary Sewage Overflow (SSO) was discovered during an inspection in June of 2020. In April of 2021, the operator of Micanopy Inn changed over to Two Fold Engineering. The plant improved following this operator change. There are no effluent nutrient limitations in the FDEP permit, only a requirement to report monthly maximum nitrate concentrations. Results for samples collected by ACEPD between 2020 to 2023 showed total nitrogen ranging from 1.71 mg/L to 36.8 mg/L, nitrate ranging from 0.1 mg/L to 18 mg/L, and total phosphorus ranging from 1.65 mg/L to 5.92 mg/L (Figure 39). Elevated nitrogen levels are of concern in this area of the County where the Floridan aquifer is semi-confined.

The monthly average effluent flow from 2020 to 2021 was 0.0017 MGD and 0.003 MGD for 2022 to 2023. Average nutrient concentrations were then multiplied by this flow rate to estimate nutrient loading rates from this facility. Monthly maximum nitrate data reported by the facility were combined with ACEPD inspection results to calculate a nitrate loading rate of 14 lb./year for 2020 -2021 and 41 lb./year for 2022 to 2023. Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings. Estimated loads for total nitrogen were 58 lb./year for 2020 to 2021 and 108 lb./year for 2022 to 2023. Estimated loads for total phosphorus were 20 lb./year for 2020 to 2021 and 31 lb./year for 2022 to 2023. Estimated loads of total nitrogen and total phosphorus have decreased since the 2018 to 2019 reporting period (Figure 38). This decrease was

probably due to low usage when this facility was closed for an extended period during the COVID-19 pandemic. Table 3 compares loading rates among WWTFs located in Alachua County.

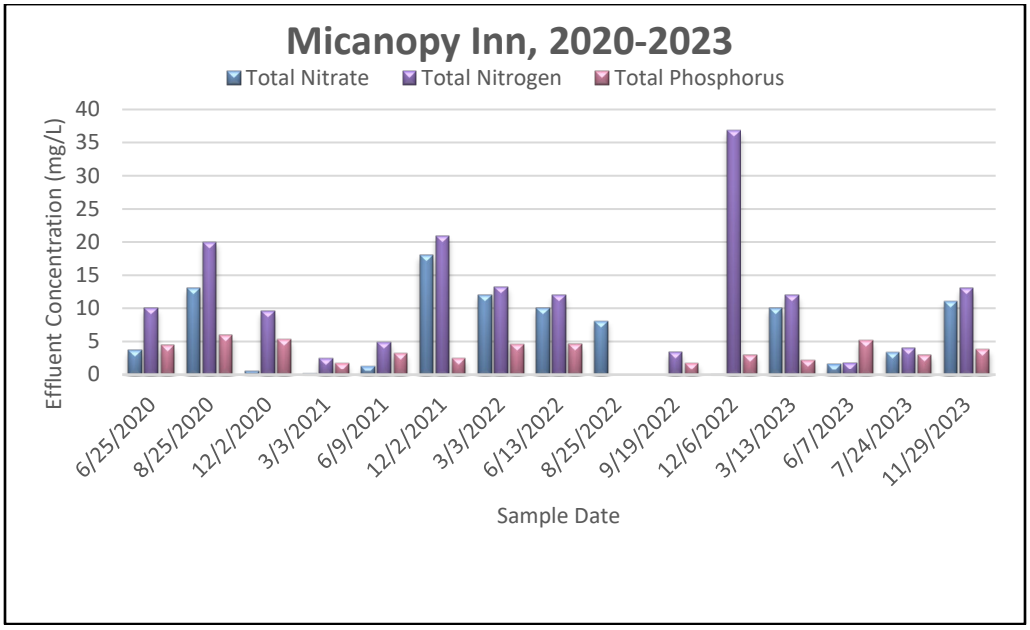


Figure 37. Effluent data from samples collected during ACEPD inspections at the Micanopy Inn Package Plant, formerly Knight's Inn

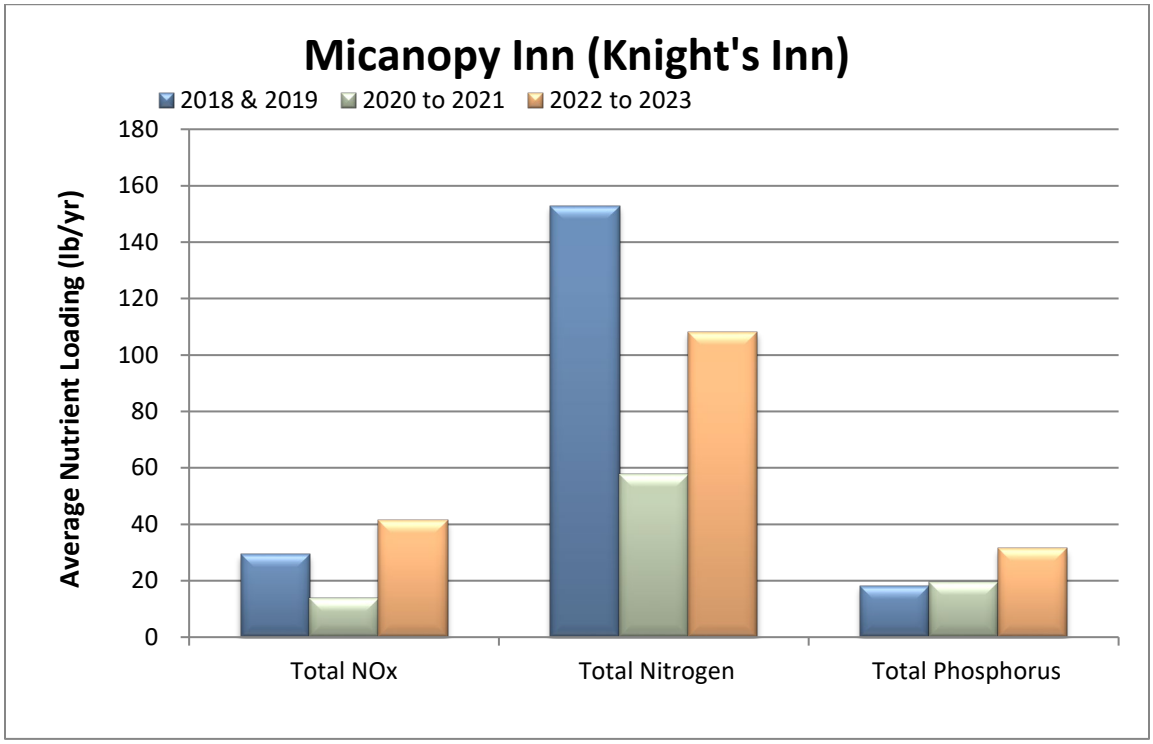


Figure 38. Estimated Nutrient Loading Values for the Micanopy Inn Package Plant, formerly Knight's Inn (2018 – 2023)

4-10 Prairie View Apartments

Facility size: 0.00424 MGD **Permit expiration date**: 4/27/2028

Permitted effluent disposal: Percolation pond (6,608 square feet).

Residuals disposal: Hauled off-site.

The Prairie View Apartments WWTF

The package plant at Prairie View Apartments is an activated sludge secondary treatment plant. This facility was inspected fourteen times between 2020 and 2023. The total residual chlorine was not detected during the June 2020 inspection. Nitrate concentrations were above permitted levels in November of 2023 with a value of 26 mg/L. In June 2020 ACEPD discovered an active SSO at this plant and noted that Prairie View was without a plant operator. The Florida Department of Health and FDEP were alerted to the issue. ACEPD issued a citation to Prairie View for failure to comply with the wastewater County Ordinance requirements and FDEP issued a consent order against Prairie View Apartments for the violation. An operator was hired by Prairie View Apartments following the consent order.

Sample results collected during by ACEPD between 2020 to 2021 for total nitrogen ranged from 1.71 mg/L to 47.7 mg/L, nitrate ranged from 0.1 mg/L to 16 mg/L, and total phosphorus ranged from 0.47 mg/L to 5.13 mg/L (Figure 39). The poor effluent quality is of concern because of the plant's proximity to Paynes Prairie which is a designated Outstanding Florida Water (OFW).

Prairie View did not submit any DMR's between January 2020 and July 2020. US Waters was hired by the plant owner to operate the plant in August of 2020. The monthly average flows from 2020 to 2021 was 0.0047 MGD and 0.0024 MGD for 2022 to 2023. Average nutrient concentrations were multiplied by this flow rate to estimate nutrient loading rates. Monthly maximum nitrate data reported by the facility were combined with ACEPD inspection results to calculate a nitrate loading rate of 16 lb./year for 2020 to 2021 and 26 lb./year for 2022 to 2023. Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings. Estimated loads for total nitrogen

were 198 lb./year for 2020 to 2021 and 102 lb./year for 2022 to 2023. Estimated loads for total phosphorus were 18 lb./year for 2020 to 2021 and 28 lb./year for 2022 to 2023. Estimated loads of total nitrogen have decreased since the 2018 to 2019 period (Figure 40). Table 3 compares loading rates among WWTFs located in Alachua County.

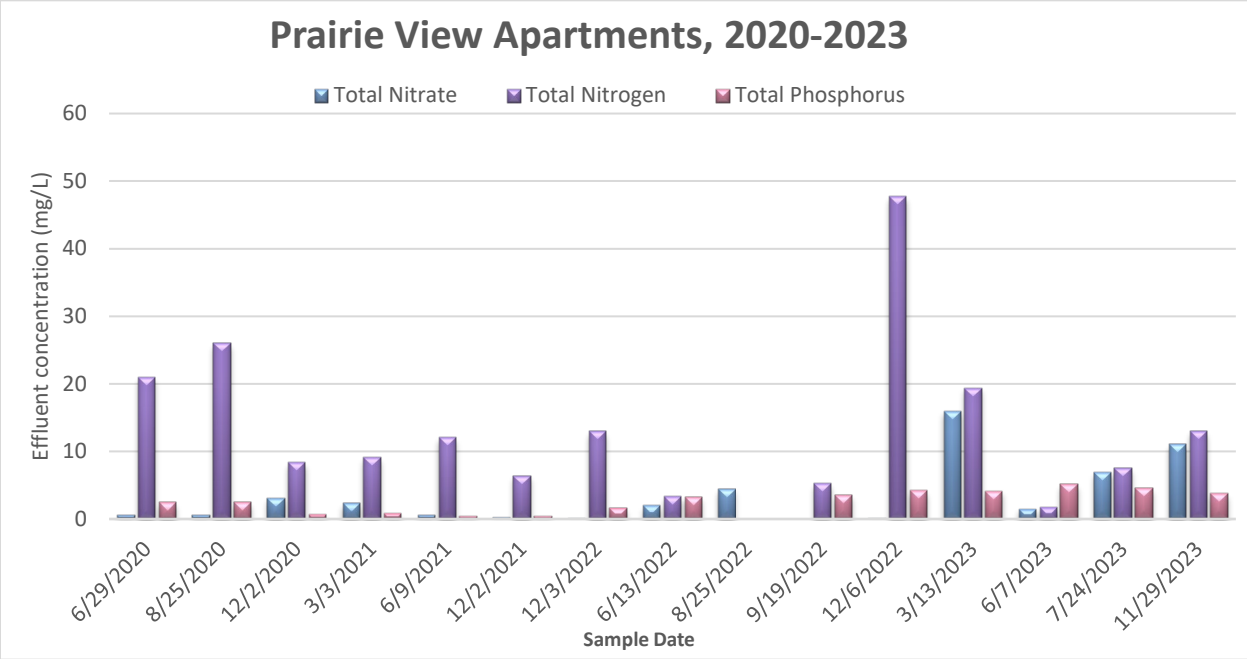


Figure 39. Effluent data from samples collected during ACEPD inspections at the Prairie View Apartments Package Plant

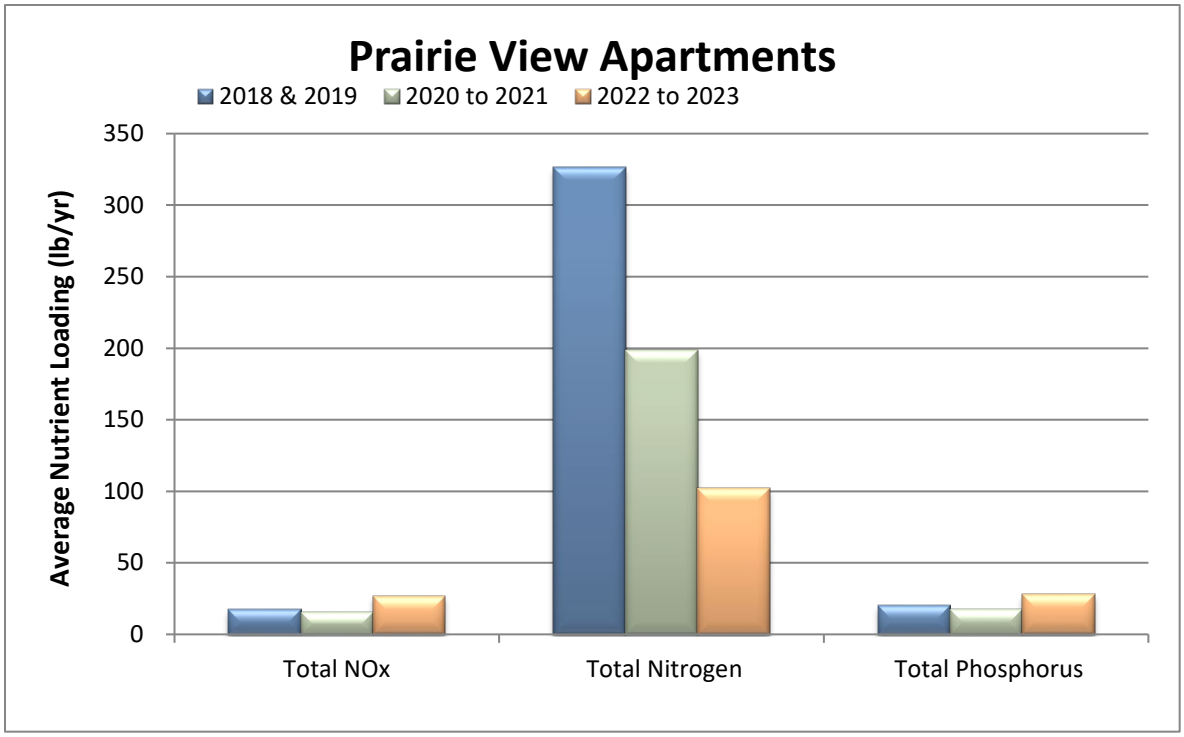


Figure 40. Estimated Nutrient Loading Values for the Prairie View Apartments Package Plant (2018 – 2023)

5.0 SUMMARY AND RECOMMENDATIONS

ACEPD will continue to monitor the WWTFs in Alachua County. Effluent will be analyzed for nutrient species (nitrate, nitrate + nitrite, ammonia, total nitrogen, and total phosphorus). If the effluent is discolored and appears to be out of compliance with its FDEP permit limitations, parameters such as Fecal Coliform, Carbonaceous Biochemical Oxygen Demand (CBOD), and Total Suspended Solids (TSS) may be monitored to assist FDEP in enforcing permit limitations. ACEPD intends to inspect all facilities at least three times a year, apart from the two GRU facilities and the Gainesville Raceway, which are monitored on an annual basis. UF is no longer inspected by ACEPD.

ACEPD plans to increase communication concerning problematic facilities with the FDEP Domestic Wastewater Compliance staff. ACEPD schedules semi-annual meetings with FDEP to review inspection results and concerns. ACEPD's inspection program assists in keeping the WWTFs in compliance with their FDEP permits. In 2013, ACEPD added enforcement capabilities to its wastewater program giving ACEPD the authority to issue civil citations for effluent and reporting violations. County Ordinance 13-11 adopted August 27, 2013, amended Chapter 24 of the Alachua County Code to provide citation authority for failure to comply with disposal standards, inspection requirements, record keeping standards, discharge requirements, temporary non-compliance requirements, and FDEP wastewater regulations.

ACEPD will continue to encourage all the WWTFs to upgrade to more advanced treatment with the goal of reducing nutrient concentrations in treated effluent. An emphasis will be placed on treatment facilities within areas where the Floridan aquifer is unconfined, delineated springsheds of the lower Santa Fe River, and to those in the watersheds of Outstanding Florida Waters or Impaired Waters. Camp Kulaqua has abandoned their package plant and now pumps effluent to the City of High Springs WWTF. This is an important step in protecting and improving the water quality of Hornsby Spring which is a first magnitude spring on the Santa Fe River.

The Brittany Estates Mobile Home Park WWTF discharge to Little Hatchet Creek is one source of external loading to Little Hatchet Creek and its downstream receiving waterbody Newnans Lake, which is being further evaluated.

ACEPD will promote additional nutrient monitoring (nitrogen species and total phosphorus) requirements for inclusion in FDEP permits. Some of the Alachua County waterbodies, including Lake Santa Fe (an Outstanding Florida Water) are phosphorus limited. Newnans Lake, Lochloosa Lake and Lake Wauberg have TMDLs set for TN and TP. Orange Lake has a TMDL for TP, Alachua Sink has a TMDL for TN, and the Santa Fe River has a TMDL for nitrate and DO. Basin management action plans (BMAPs) covering the lakes in the Orange Creek Basin and the Santa Fe River have been adopted by FDEP and are being implemented.

6.0 REFERENCES

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