WASTEWATER TREATMENT PLANT INSPECTION PROGRAM

2014 – 2015 DATA REPORT

Prepared By:
Alachua County Environmental Protection Department

July 2018

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

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. The report was prepared by Gregory Owen, Robin Hallbourg and Alexandria Blankenship with help from John Hatchitt and Natalie Volk.

LIST OF ABBREVIATIONS

ACEPD – Alachua County Environmental Protection Department

BNR – Biological Nutrient Removal

CBOD – Carbonaceous Biochemical Oxygen Demand

DMR – Discharge Monitoring Report

FDEP – Florida Department of Environmental Protection

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

RAS – Return Activated Sludge

RZP – Reduced Pressure Zone device (backflow prevention)

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

1.0 REPORT SCOPE

This data report focuses on the results from Alachua County Environmental Protection Department's (ACEPD) inspections of wastewater treatment facilities (WWTFs) within Alachua County. This report concentrates on the data collected in 2014 and 2015 but includes data extending as far back as 2008 for the purpose of demonstrating data trends. Facility-reported nutrient parameters vary by permit; 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. 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 are 17 wastewater treatment facilities (WWTFs) located in Alachua County that were permitted by Florida Department of Environmental Protection Department (FDEP) during 2014 and 2015 (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 on a monthly basis. Facility requirements and the inspection program are presented in the Alachua County Unified Land Development Code Chapter 406 Article 12, Wastewater Treatment Facilities. ACEPD has a wastewater program partially funded by the annual fees paid to the County by the owners of 16 WWTFs. ACEPD does not inspect the University of Florida (UF) WWTF because they are considered a state entity. ACEPD does not permit wastewater facilities but currently conducts inspections and collects 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 wastewater facilities 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 for nutrient species in their monthly sampling, therefore ACEPD effluent grab samples are usually 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 are 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, sprayfields, 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 sprayfields, 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 can also provide the important function of recharging the aquifer. Facilities recharging effluent to groundwater are required to submit groundwater reports to FDEP; this data is included in the following sections.

Nutrient data used for this report include 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 certified laboratory. Some of the FDEP nutrient permit limitations for the larger treatment facilities are based on flow proportioned composite samples, to compensate 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 is in compliance with their permits. However, the data indicate the nutrient concentrations that are being released to the environment at the time of inspection and sampling.

The concentration of nutrients alone can be deceiving because the flow rates vary significantly between the facilities. The maximum permitted capacity ranges 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 were estimated. The monthly average flow rate reported by each facility in their DMRs was used to calculate an average flow value for 2014 and 2015. 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. The mass of sludge is typically an accumulation of the dead microorganisms which are utilized to remove carbon and nutrients from the influent. Wastewater sludge can be further processed and treated to create biosolids. Biosolids that have been treated to the 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 wastes. The following sections will include the mass of wastewater sludge, or biosolids, generated from the municipal facilities (Table 4).

Table 1. Permitted Municipal Wastewater Treatment Facilities in Alachua County (2014 – 2015)

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	12/17/2020*	14,900,000	Underground Injection and Public Re-use (also have a permitted surface water discharge for emergencies)	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	3/18/2020	7,500,000	Surface Water Discharge to Sweetwater Branch and Public Re-use	Total Nitrogen 40,380 lbs/year, Total Phosphorus 37,671 lb/yr, 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	12/8/2020	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	8/3/2021	415,000	Spray Irrigation	Total Nitrogen and Total Phosphorus must be reported
City of High Springs	FLA286095	1/22/2018	240,000	Spray Irrigation	Total Nitrogen, TKN, Nitrate and Total Phosphorus must be reported
City of Hawthorne	FLA011291	10/3/2020	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 Wastewater Treatment Facilities in Alachua County (2014 – 2015)

Owner Name	Facility ID	Permit Expiration	Max Permitted Capacity (gallons/day)	Effluent Disposal Method	Nutrient Effluent Limitations* (mg/L)
Arredondo Farms MHP (The Palms)	FLA011315	4/28/2019	60,000	Rapid Infiltration Basin	Nitrate < 12 mg/L
Brittany Estates MHP	FL0040215	9/8/2021	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
Camp Kulaqua	FLA011302	6/30/2019	20,100	Rapid Infiltration Basin	Nitrate + Nitrite < 12 mg/L, Total Nitrogen and Total Phosphorus must be reported
Micanopy Inn (formerly Knight's Inn and now Welcome Inn)	FLA011317	4/25/2020	15,000	Spray Irrigation	Nitrate + Nitrite must be reported
Florida Welcome Station	FLA011313	3/10/2020	9,000	Rapid Infiltration Basin	Nitrate < 12 mg/L
Archer Homes	FLA011298	10/13/2020	8,300	Absorption Field	Nitrate < 12 mg/L and Total Nitrogen must be reported
Gainesville Raceway	FLA011312	5/9/2022	8,250	Spray Irrigation	Nitrate must be reported
Camp McConnell YMCA	FLA011293	3/11/2020	7,500	Absorption Field	Nitrate < 12 mg/L
Archer Community School	FLA011281	8/18/2024	5,000	Rapid Infiltration Basin	Nitrate + Nitrite must be reported
Prairie View Apartments	FLA011307	9/9/2020	4,200	Rapid Infiltration Basin	Nitrate <12 mg/L

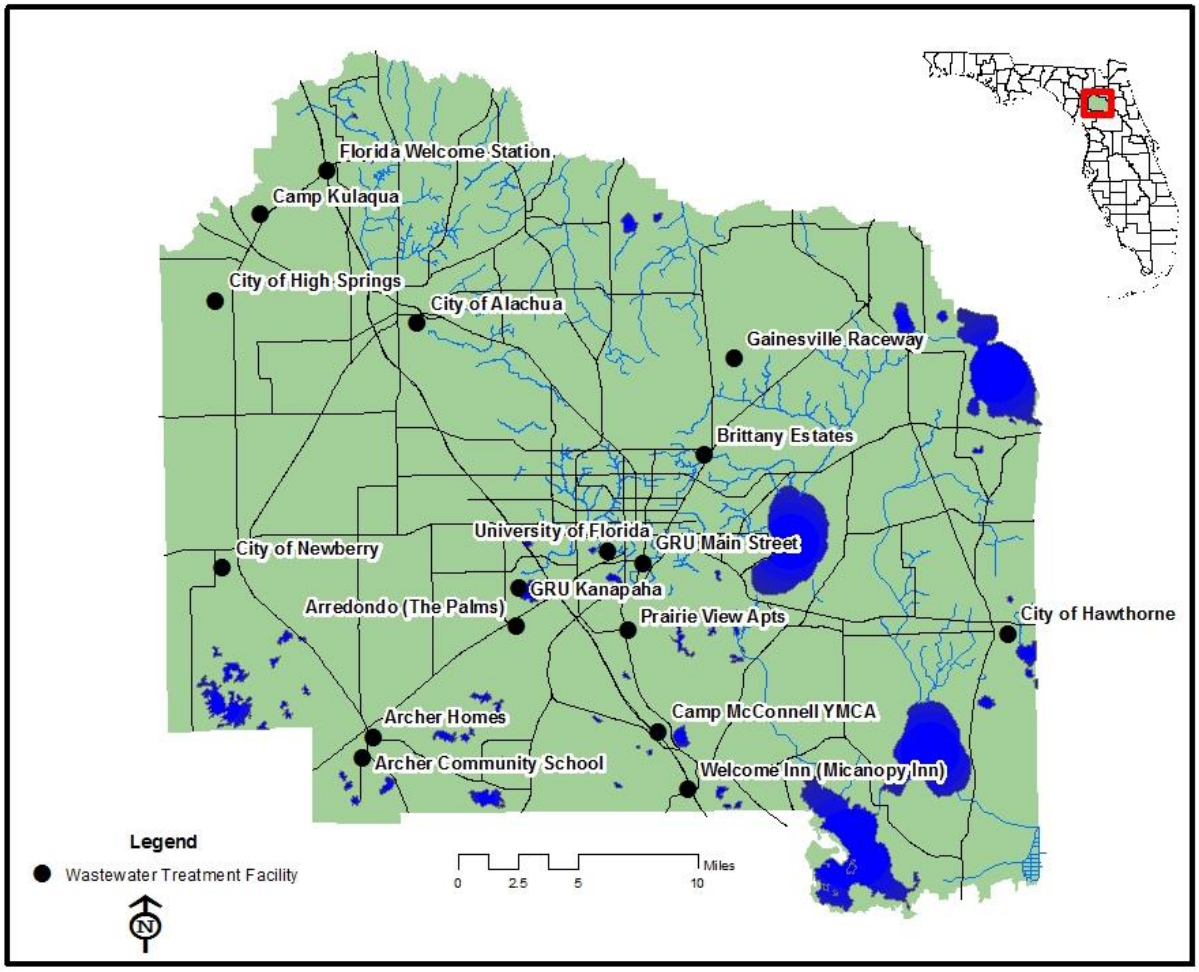


Figure 1. Location of Permitted Wastewater Treatment Facilities in Alachua County (2014 – 2015)

Table 3. Estimated Average Nutrient Loading from Wastewater Treatment Facilities (2014 – 2015)

Facility Name	Total Nitrogen (lb/year)	Total Phosphorus (lb/year)
GRU - Main Street	117,295	15,716
GRU - Kanapaha	97,748	43,771
City of Newberry	10,956	2,167
City of Alachua	7,980	7,368
City of High Springs	4,424	2,859
Arredondo Farms MHP	2,214	468
City of Hawthorne	1,868	1,018
Brittany Estates MHP	458	122
Archer Community School	210	38
Florida Welcome Station	654	102
Archer Homes	194	65
Micanopy Inn (formerly Knight's Inn now Welcome Inn)	162	44
Camp Kulaqua	63	10
Camp McConnell YMCA	93	13
Prairie View Apartments	143	20

3.0 MUNICIPAL FACILITIES

There are six municipal wastewater treatment facilities (WWTF) in Alachua County and one large centralized facility at the University of Florida. Municipal and centralized facilities treat a larger volume of wastewater compared to package plants, and the treatment facility is built on-site. Package plants are typically pre-fabricated and shipped to the site as one unit (WEF, 1985). The plant operators are required to spend more time at the municipal facilities (due to their larger treatment volume), and the facilities tend to utilize more advanced technologies compared to package plants, which tend to reduce nutrient concentrations further. 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 range from 0.20 million gallons per day (MGD) for the City of Hawthorne 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.

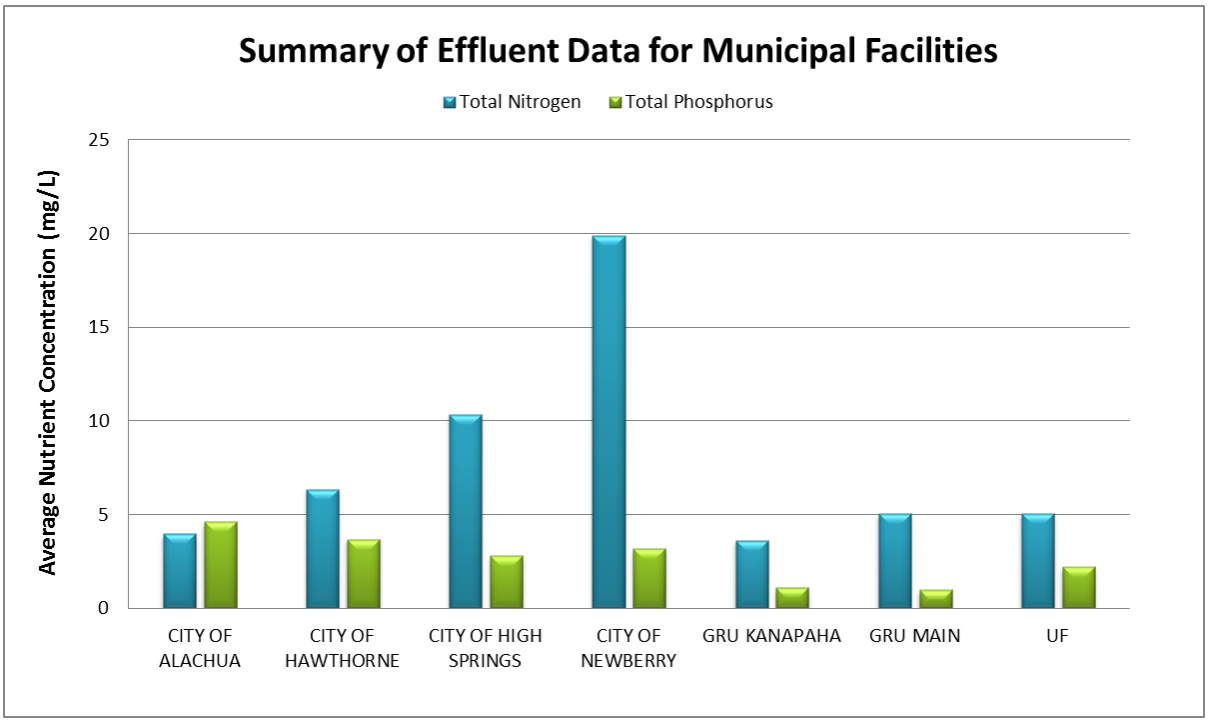


Figure 2. Average Effluent Nutrient Data for Municipal Facilities (2014 – 2015)

The environmental 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 for 2014 and 2015. 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 and almost 100,000 lb, respectively) of Total Nitrogen per year at each facility, since they have the largest flows (average of 7.28 and 8.79 MGD, respectively).

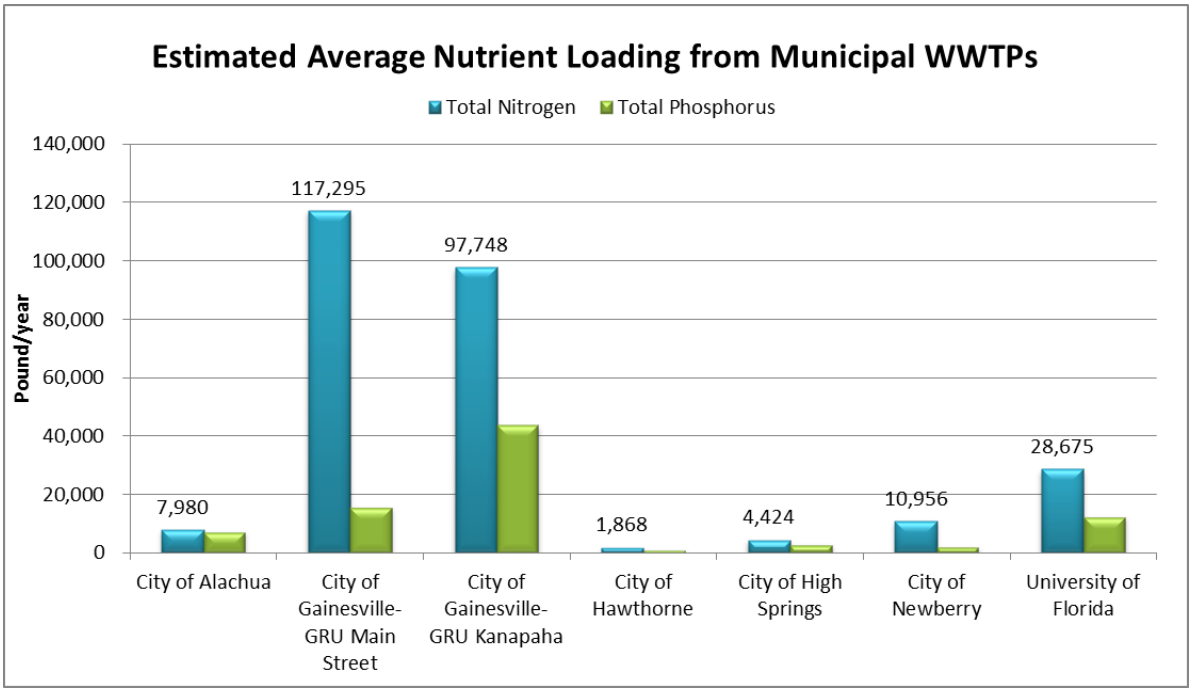


Figure 3. Estimated Nutrient Loading from Municipal Facilities (2014 – 2015)

The quantity of biosolids, or treated wastewater sludge, produced at the five largest municipal facilities during 2014 and 2015 were obtained from the DMRs and is summarized in Table 4. The disposal methods for each facility are discussed in the following sections. Biosolids (Class B) from the GRU Kanapaha and Main Street facilities were land applied at Whistling Pines Ranch, southwest of Archer until 2016. Many of the municipal WWTFs and package treatment plants transport their wastewater sludge to GRU for treatment and land application. With the construction of GRU's new dewatering facility, much of the county's sludge is transported there, dewatered and then hauled to Jacksonville for further treatment.

Table 4. Self-Reported Biosolids/Sludge Disposal Data for Municipal Wastewater Treatment Facilities (2014 – 2015)

Facility Name*	2014 Annual Quantity (dry-ton)	2015 Annual Quantity (dry-ton)	Disposal Method	Final Disposal Location
GRU - Main Street	1,063	976	Land Application	Whistling Pines Ranch
GRU - Kanapaha	2,486	2,461	Land Application	Whistling Pines Ranch
City of Newberry	9.8	14.6	Land Application	City of Newberry Treatment Facility Spray Field Site
City of Alachua	153	324	Land Application	Farms in Columbia and Suwannee Counties
University of Florida	357	217	Land Application	To GRU – Whistling Pines Ranch

NR = Not Reported

*City of High Springs and City of Hawthorne hauled to GRU for final disposal at Whistling Pines Ranch via land application.

3-1 The City of Alachua

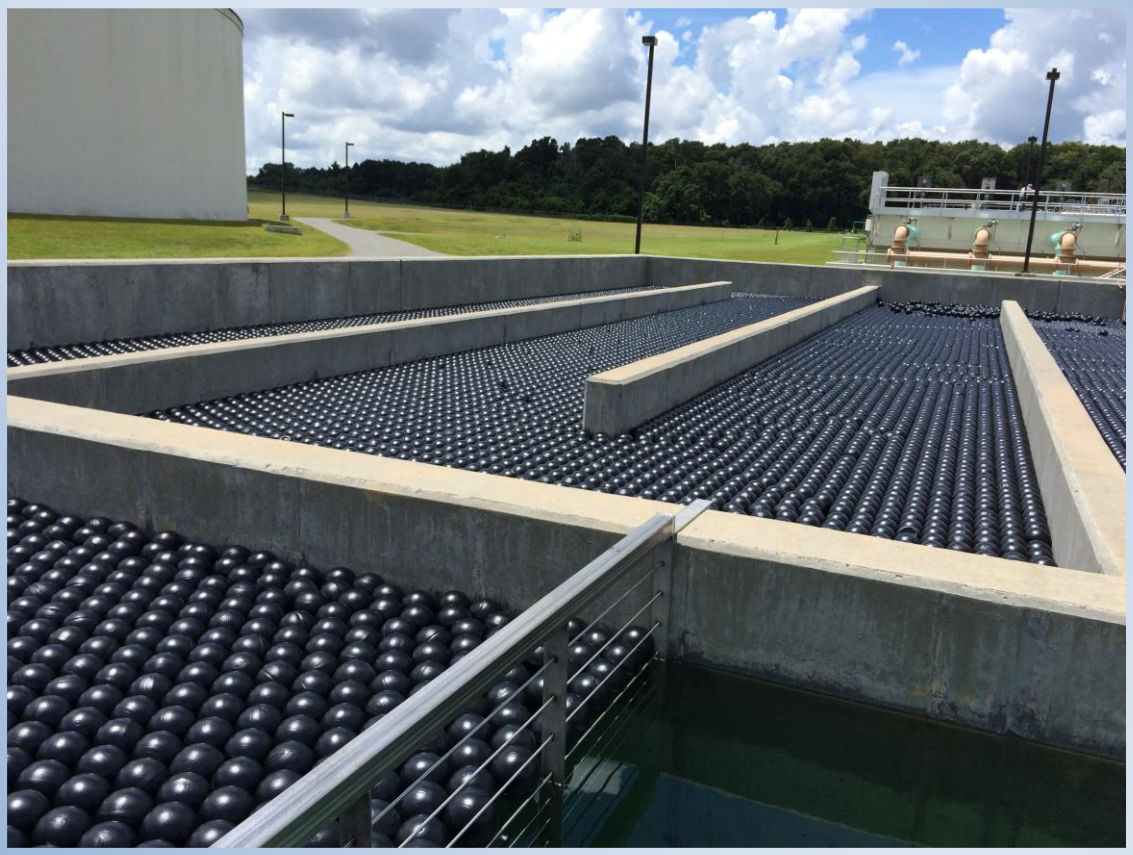
Facility size: 1.50 MGD **Permit expiration date**: 7/19/2026

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. As of October 2013, the effluent is transported via pipeline to the Deerhaven Renewable Generating Station (DHR) for use as cooling water, and the existing spray field is utilized as a backup system when DHR is not operational.

Residuals disposal:

Hauled to Class I landfill, or treated and land applied in Columbia and Suwannee Counties.



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

The City of Alachua domestic wastewater treatment facility 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. This facility was found to be in compliance during the four ACEPD inspections conducted in 2014 and 2015. Since the new plant went into operation, 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. Effluent from this plant should be able to maintain nitrogen concentrations lower than the previous plant.

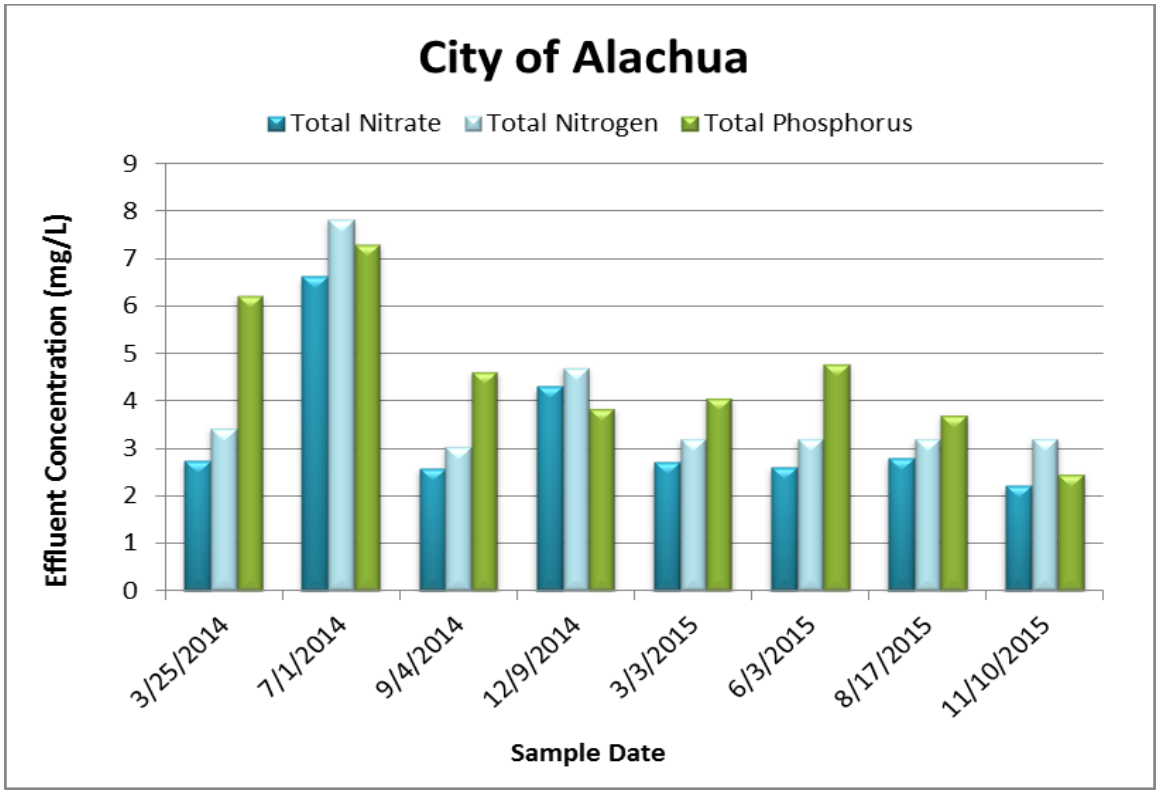


Figure 4. Effluent data from samples collected during ACEPD inspections at the City of Alachua WWTF.

The monthly average flows in 2014 and 2015 (monitoring location EFB-1, monitoring group R-001) were used to calculate an average flow of 0.619 MGD. Nutrient concentrations collected by ACEPD and reported by facility operators were then averaged and used to estimate the nutrient loading rate from this facility. Nitrate data, reported as maximum values observed by the facility, and total nitrate data collected by ACEPD were used to estimate a loading of 7,027 lb/year. The City of Alachua is not required to monitor for total phosphorus or total nitrogen; ACEPD inspection data were used to estimate loadings of 7,980 lb/year and 7,537 lb/year, respectively. There was an increase in both nitrate and total nitrogen values from the last two year period (Figure 5). Table 3 compares these values to those of the other wastewater treatment facilities 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 plant 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 have 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 to keep watch on their total phosphorus loading; even very small amounts of phosphorus in a waterbody can be harmful.

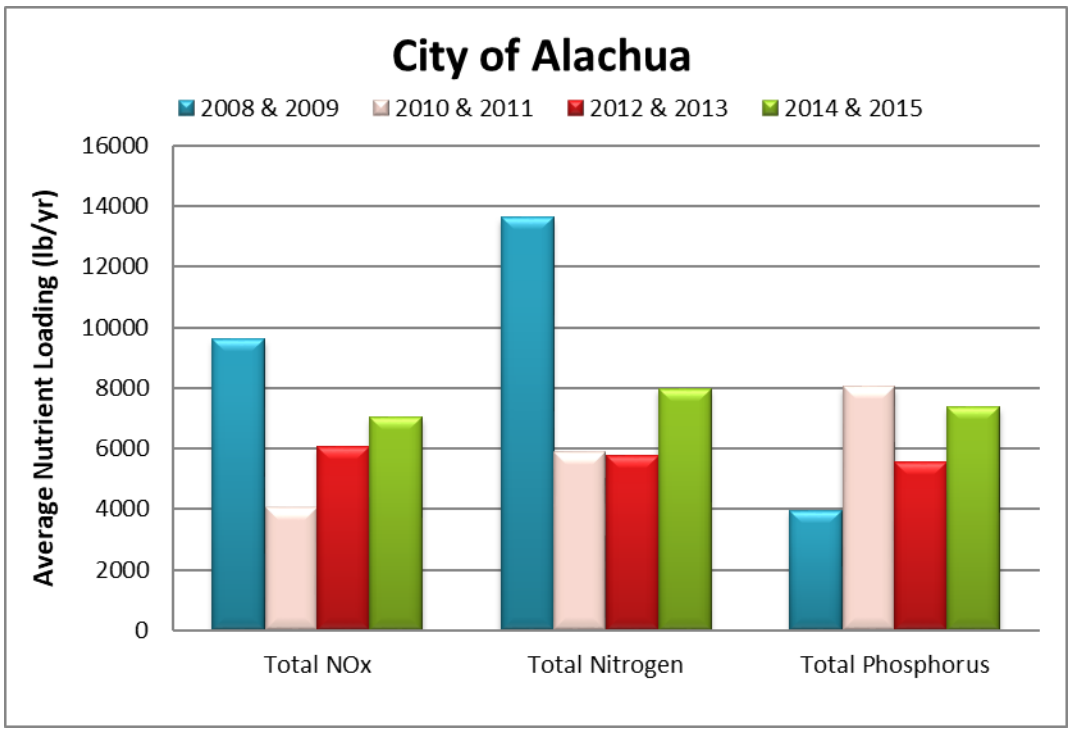


Figure 5. Estimated Nutrient Loading Values for the City of Alachua WWTF (2008 – 2015)

The City of Alachua 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 Compliance 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 which is the former Copeland Sausage Plant (JEA, 1998 and Universal Engineering Sciences, 2010). The concentration of nitrates in the groundwater of this area often exceed the drinking water standard of 10 mg/L. With the expansion of the facility, new compliance wells were installed in 2011 (MWC-7 and MWC-8).

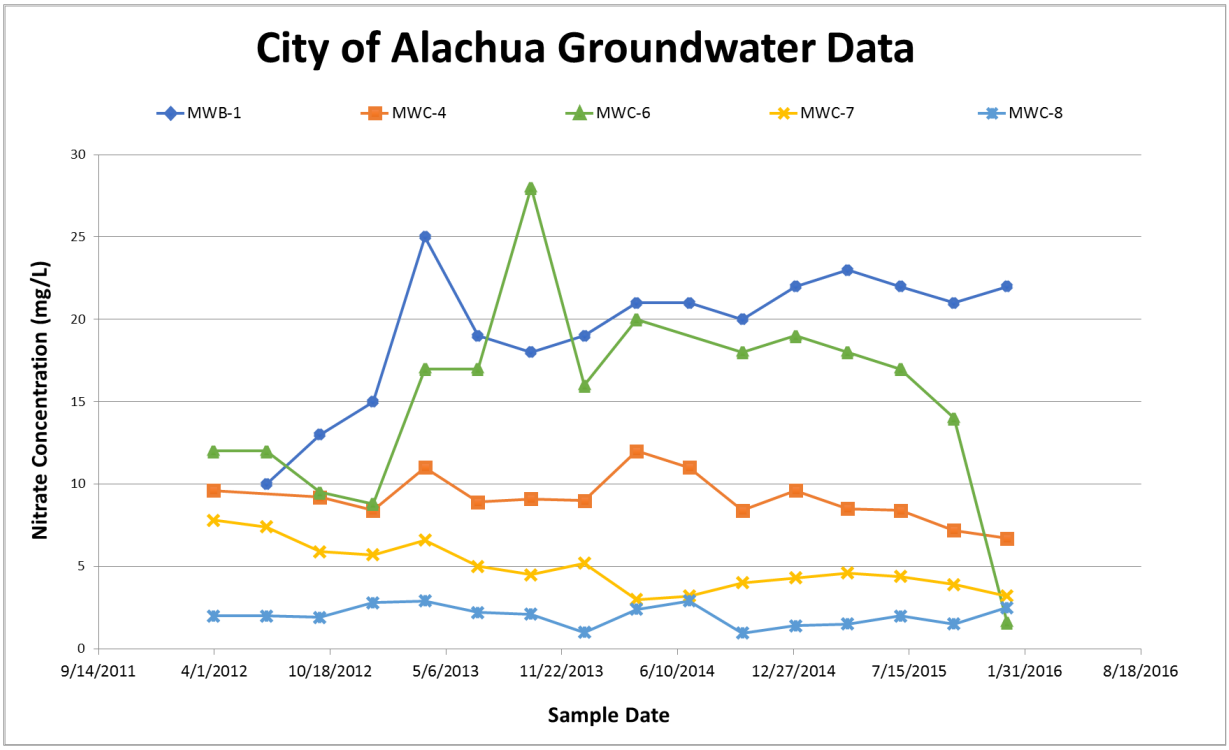


Figure 6. Groundwater Data from the City of Alachua WWTF for Nitrite + Nitrate

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 153 dry tons of biosolids in 2014 and 324 dry tons in 2015 (Table 4). These biosolids are treated and are land applied at the Glenn Farms RAF and Rolling R Ranch RAF in Columbia and Suwannee Counties.

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

Facility Size: 14.9 MGD **Permit expiration date**: 3/18/2020

Permitted effluent disposal:

Underground injection well and 6.89 MGD public access re-use.

Residuals disposal:

Land applied at Whistling Pines Ranch. As of 2016, biosolids are now treated further and hauled to Southern Edge in Jacksonville.

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 plant is inspected annually by ACEPD and was found in compliance during the 2014 and 2015 inspections. The effluent sample results were within the FDEP permit limitations and the nutrient concentrations were relatively low (Figure 7).

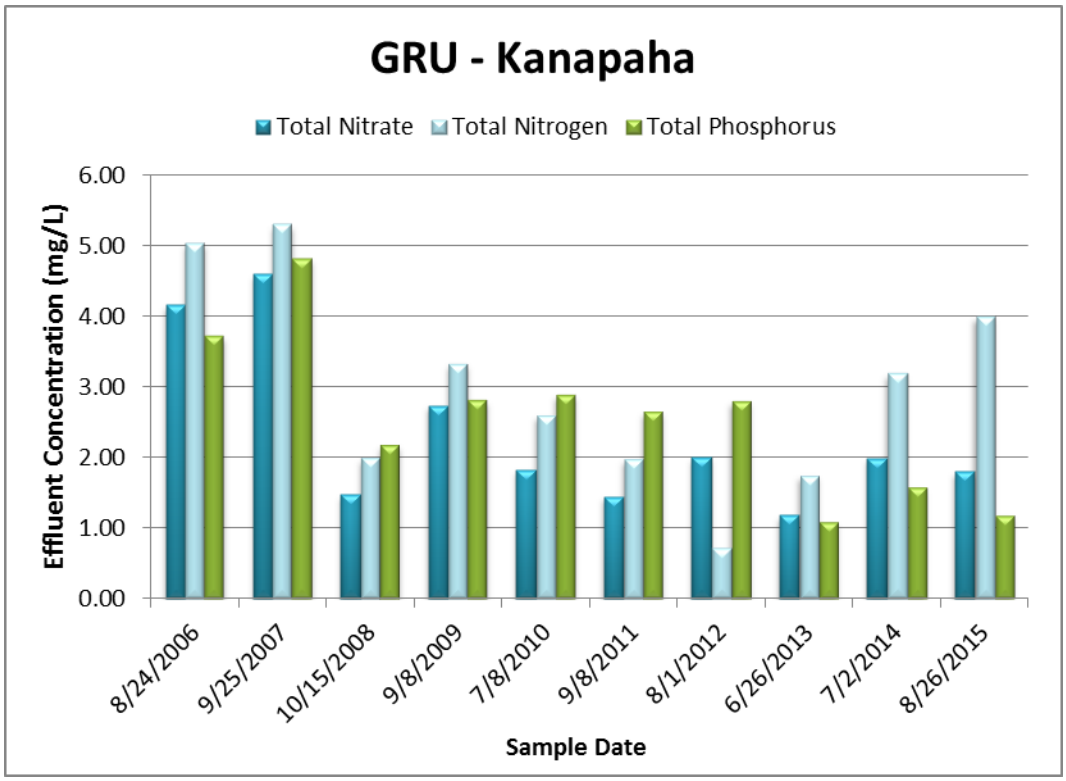


Figure 7. Effluent data from samples collected during ACEPD inspections at the GRU - Kanapaha WWTF

The majority of the Kanapaha effluent is injected into the Floridan aquifer via deep well injection, at a depth interval of 450 – 1200 feet via four wells. Up to 11.94 MGD of Kanapaha effluent is permitted for public access re-use for applications such as irrigating schools, residential lawns, parks, fire protection, Kanapaha Botanical Gardens, and tanker trucks for pesticide application, dust control, and other activities. Effluent data collected by the facility and ACEPD during inspections in 2014 and 2015 were used to determine the average nutrient concentration and estimate nutrient loading values for this facility (Table 5). Data was collected on a fiscal year basis, October through the following September, so weighted averages were used to compile these values for calendar years 2014 – 2015.

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

GRU Kanapaha WWTF	Flow Rate (MGD)	Nitrate (lb/year)	Total Nitrogen (lb/year)	Total Phosphorus (lb/year)
Total Inflow	8.83	59,971	97,748	43,771
Deep Well Injection	8.54	58,018	94,564	42,345
Public Re-Use	2.14	14,538	23,696	10,611

Table 3 compares the total loading values to those of the other wastewater treatment facilities located in Alachua County. Loading from 2014 - 2015 continue to show a decreasing trend when compared to previous year's data (Figure 8). Nitrate results fell, but Total Nitrogen and Total Phosphorus results have risen since 2012 – 2013.

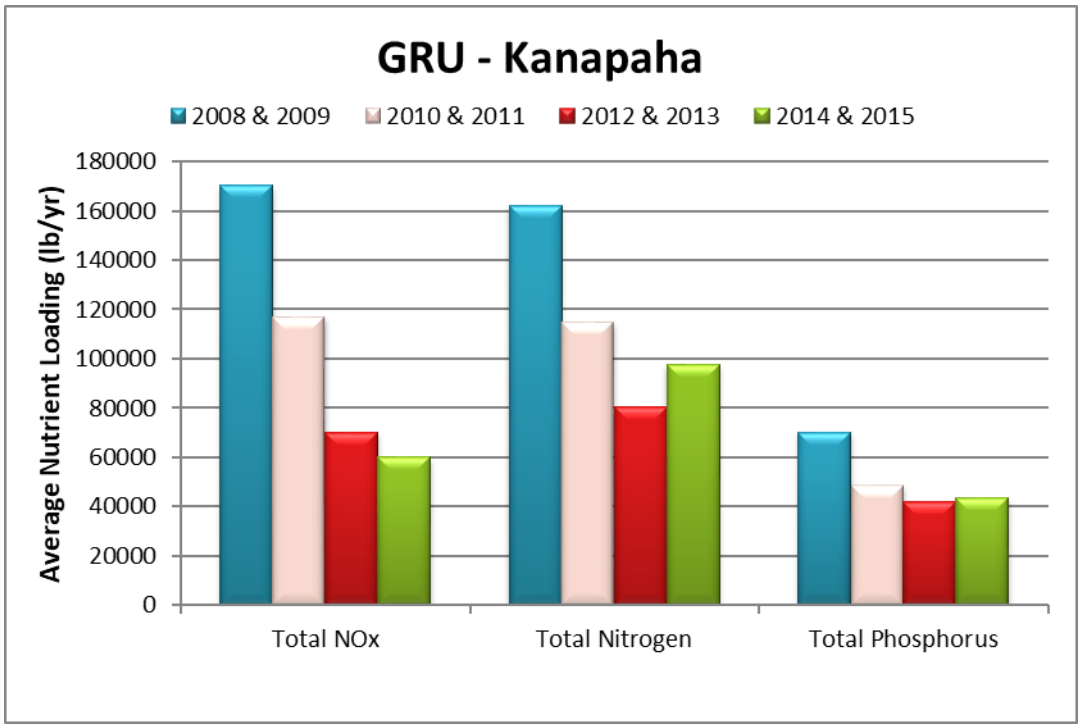


Figure 8. Estimated Nutrient Loading Values for the GRU – Kanapaha WWTF (2008 – 2015)

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 well MWC-2D are not steady, but do appear to be increasing (Figure 9). A longer period of record would be needed to confirm this observation.

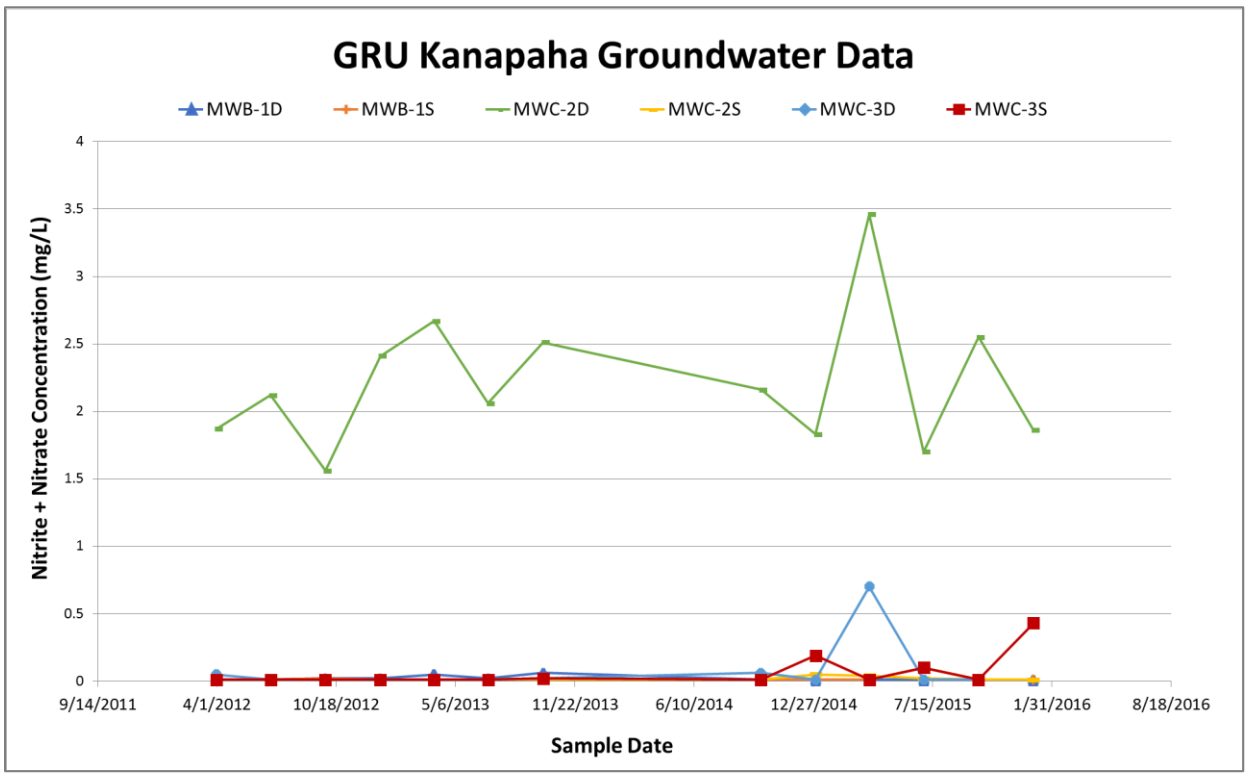


Figure 9. Groundwater Data from the GRU – Kanapaha WWTF for Nitrite + Nitrate

The wastewater residuals (sludge) are treated to Class B standards and then land applied as outlined in the facility's Agriculture Use Plan(s). The disposal site was Roger Williams Farm/Whistling Pines Ranch until 2016. According to FDEP's records, 2,486 dry tons of biosolids were produced in 2014 and 2,461 dry tons were produced in 2015.

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

Facility Size: 7.5 MGD **Permit expiration date**: 3/18/2020

Permitted effluent disposal:

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

Residuals disposal:

Land applied at Whistling Pines Ranch.

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 inspected annually by ACEPD. The plant was found in compliance during the 2014 and 2015 inspections and the effluent was within the FDEP permit limitations (Figure 10). The effluent from the Main Street facility is discharged to Sweetwater Branch that historically was channelized through Paynes Prairie State Preserve, before discharging directly to 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 Sheetflow Restoration Project in 2012 to reduce nutrient loading to Alachua Sink by restoring sheetflow 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. Additional plans to upgrade the facility to further reduce nutrient loading to Sweetwater Branch and Paynes Prairie to meet the TMDL include replacing the headworks within the next five years.

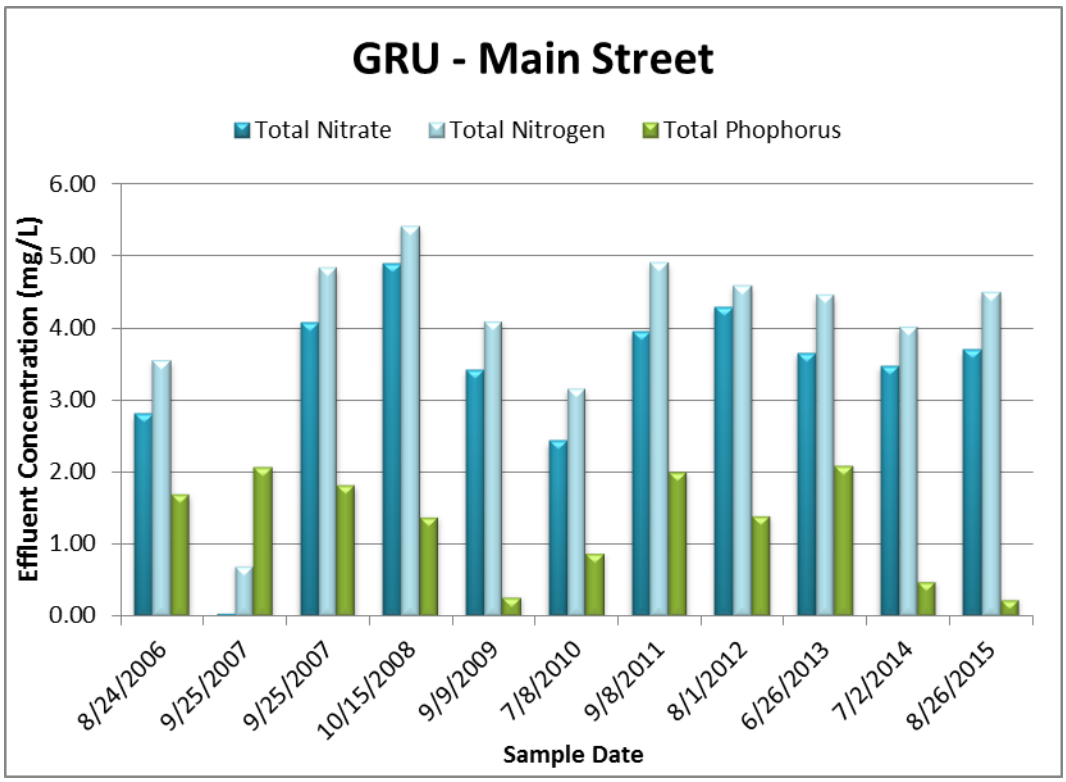


Figure 10. Effluent data from samples collected during ACEPD inspections at the GRU – Main Street WWTF

Monthly average effluent flow data from 2014 and 2015 were used to calculate an average flow of 7.28 MGD. Average nutrient concentrations were then multiplied by this flow rate to estimate the nutrient loading rate from the facility (Figure 11). Monthly average data reported by the facility and ACEPD

inspection data were averaged to estimate loading of 74,463 lb/year of nitrate, 117,295 lb/year of total nitrogen, and 15,716 lb/year of total phosphorus.

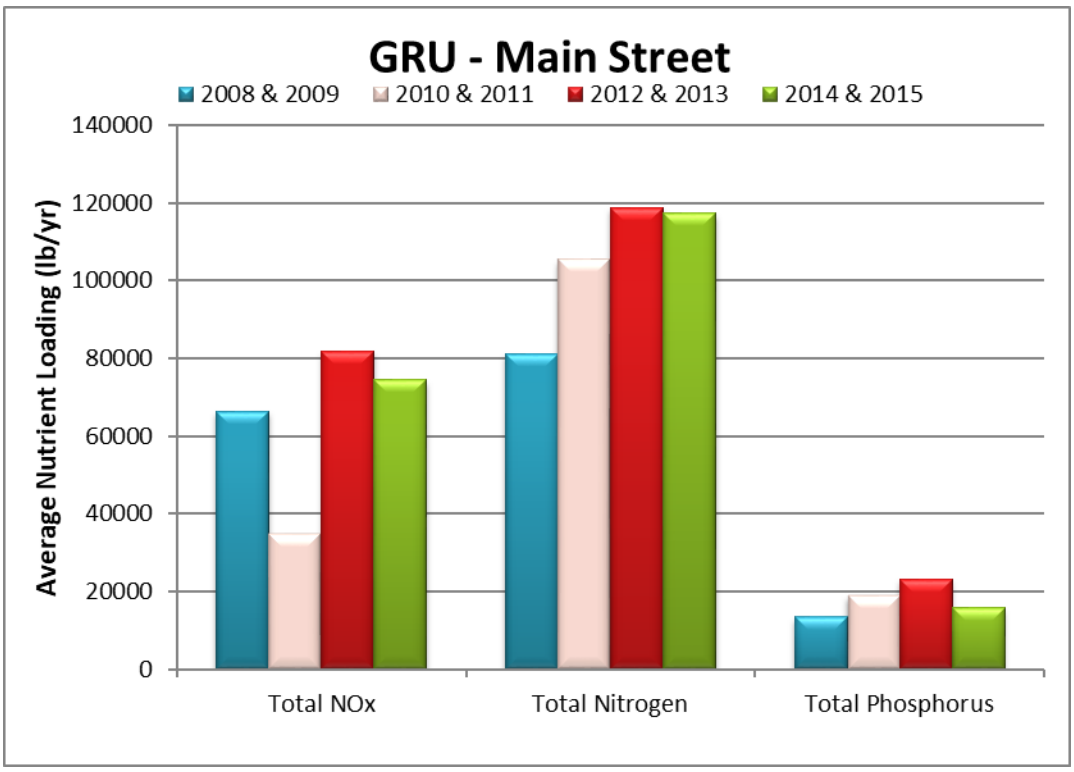


Figure 11. Estimated Nutrient Loading Values for the GRU – Main Street WWTF (2008 – 2015)

The wastewater residuals (sludge) are treated to Class B standards and then land applied as outlined in the facility's Agriculture Use Plans. The disposal site was Roger Williams Farm/Whistling Pines Ranch, and as of 2016 is hauled to Jacksonville. According to FDEP's records, 1,063 dry tons of biosolids were produced in 2014, while 976 dry tons were produced in 2015 at the Main Street Facility.

3-4 The City of Hawthorne

Facility size: existing 0.2 MGD **Permit expiration date**: 10/3/2020

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 municipal wastewater treatment plant is an extended aeration secondary treatment plant. ACEPD conducted nine inspections during 2014 and 2015 and inspectors requested a secondary containment for chlorine during one inspection. The samples collected during the August 2015 inspection resulted in the highest nutrient results since January 2010, with total nitrogen of 24 mg/L and total phosphorus of 6.12 mg/L (Figure 12). Nitrate values stayed low but other forms of nitrogen like ammonia and/or TKN were responsible for driving the Total Nitrogen value upward. Elevated nutrient concentrations levels are a concern with the proximity of Little Orange Lake. However, the effluent was in compliance with the FDEP permit, as this permit does not have numeric limitations for nutrients.

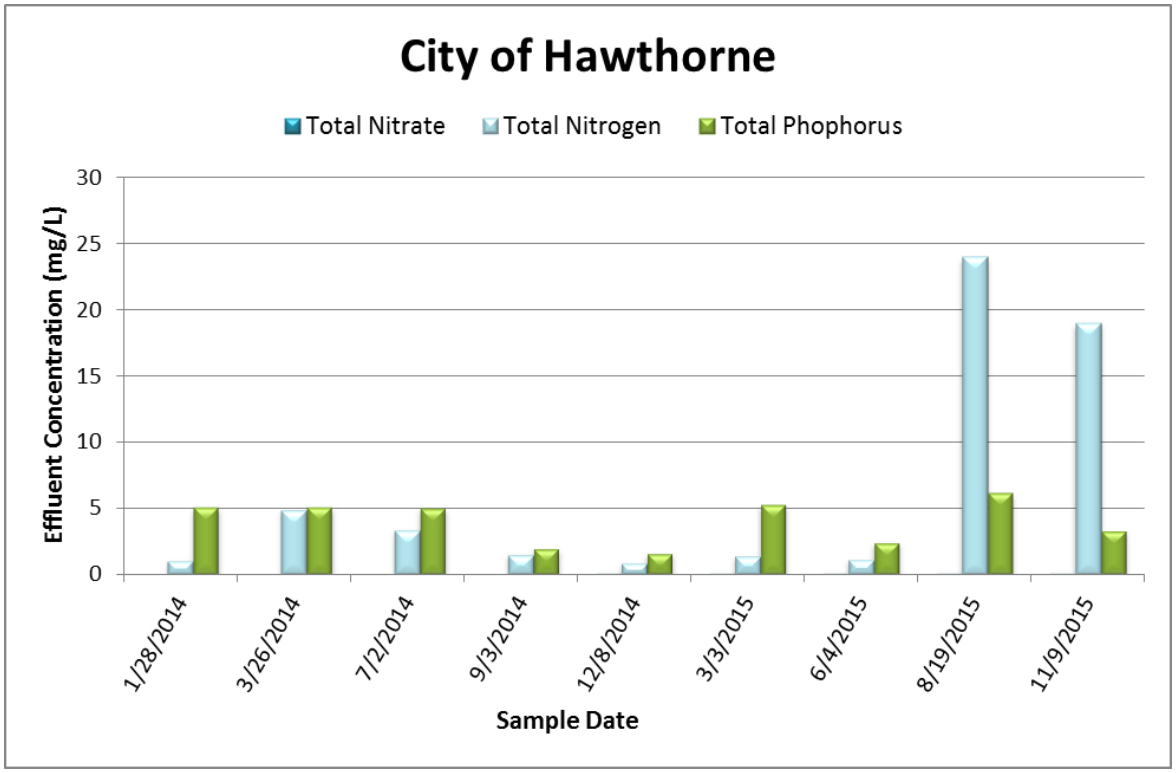


Figure 12. Effluent data from samples collected during ACEPD inspections at the City of Hawthorne WWTF

The monthly average flows of effluent from 2014 and 2015 were used to calculate an average flow of 0.06 MGD. Average nutrient concentrations were then multiplied by this flow rate to estimate a nutrient loading rate from the facility. Monthly maximum nutrient concentrations as reported by DMRs and data collected by ACEPD during 2014 and 2015 were used to calculate a loading of 38 lb/year of nitrate (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 are 1,868 and 1,018 lb/year, respectively. Total nitrogen loading rates are a bit higher than the 2012 – 2013 data, and lower than the 2010 – 2011 data. Table 3 compares these values to those of the other wastewater treatment facilities located in Alachua County.

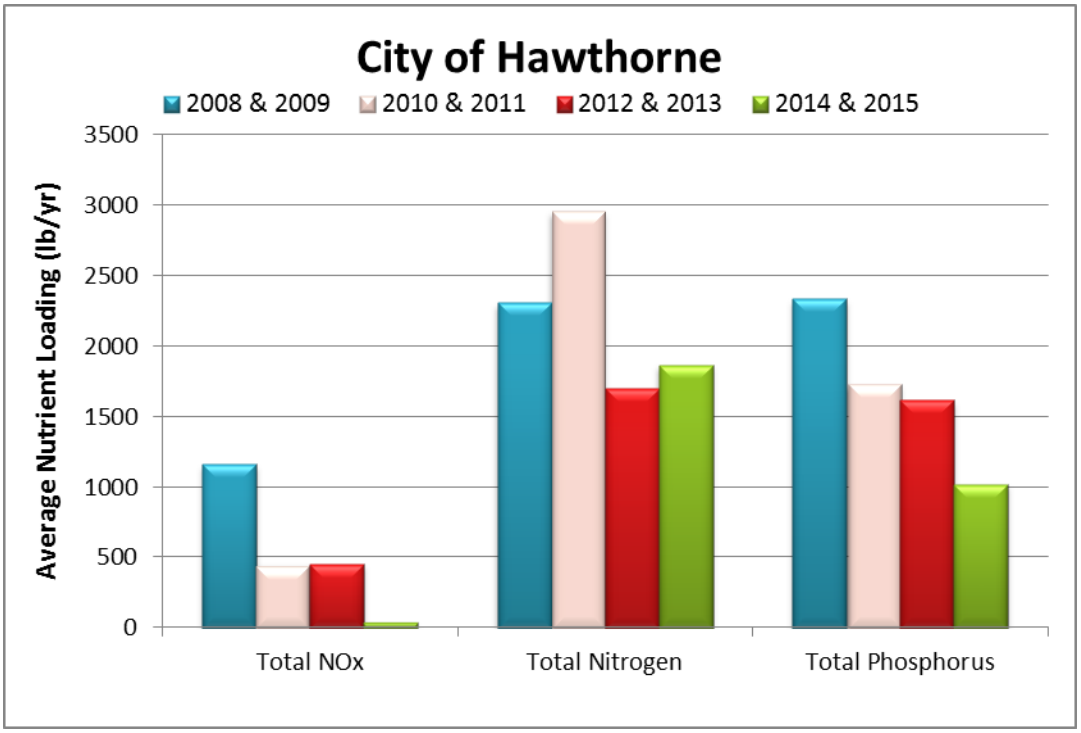


Figure 13. Estimated Nutrient Loading Values for City of Hawthorne WWTF (2008 – 2015)

The City of Hawthorne 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". All of these wells are open to the surficial aquifer. The nitrate concentrations varied among the wells and the sampling events but none exceed the drinking water standard of 10mg/L (Figure 14). In 2012, the facility ceased monitoring at MWC-2, MWC-3, and MWC-4 and initiated monitoring at MWC-5 and MWC-6 when the rapid infiltration basins were expanded.

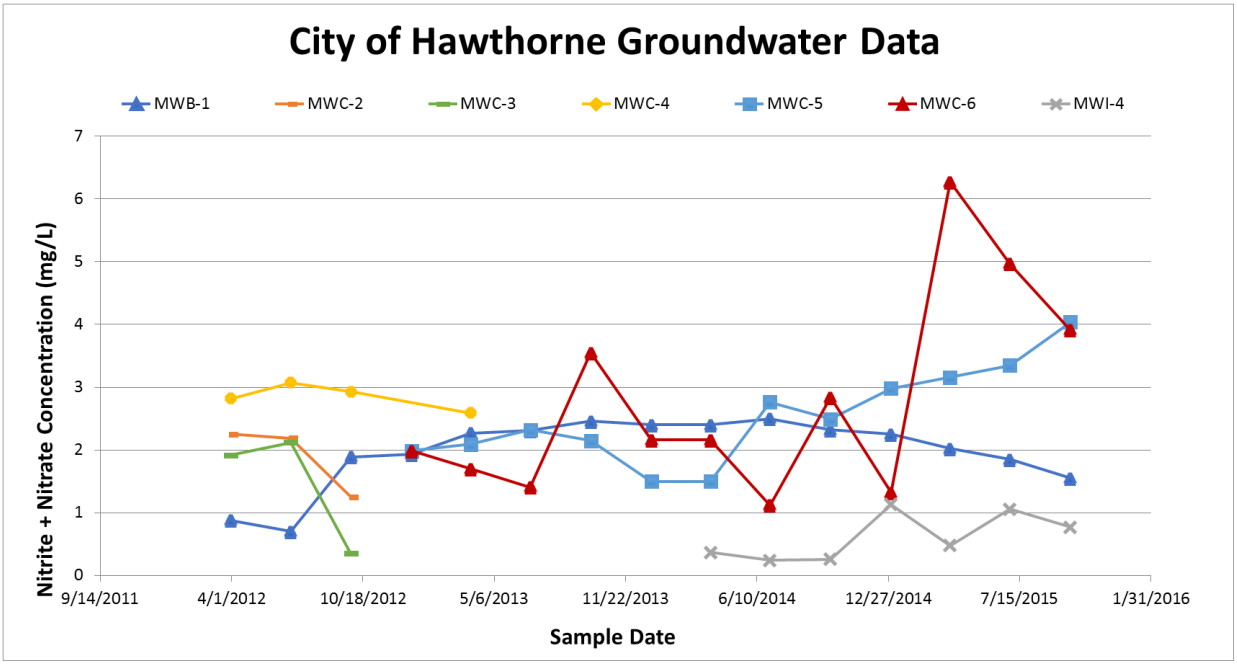


Figure 14. Groundwater Data from the City of Hawthorne WWTF for Nitrite + Nitrate

The City of Hawthorne hires Gainesville Regional Utilities to pump their residuals (sewage sludge) and to haul it for further treatment at one of Gainesville Regional Utilities' treatment facilities.

3-5 The City of High Springs

Facility size: 0.24 MGD **Permit expiration date**: 1/22/2018

Permitted effluent disposal: 16.25 acres of spray field.

Residuals disposal: Transported to GRU.

The City of High Springs aeration basin

The City of High Springs municipal wastewater treatment plant is a Ludzak-Ettinger activated sludge plant. ACEPD found an issue during an inspection conducted December 2014. The clarifier was cloudy, a screening collection bucket was missing a cap and nitrate levels were 14 mg/L. Upon notification the plant corrected the errors. The occasional 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 with its proximity to the Santa Fe River and its springs. FDEP has required The City of High Springs to demonstrate an established cover crop on the existing spray field before the spray field can be expanded as planned in the most recent permit.

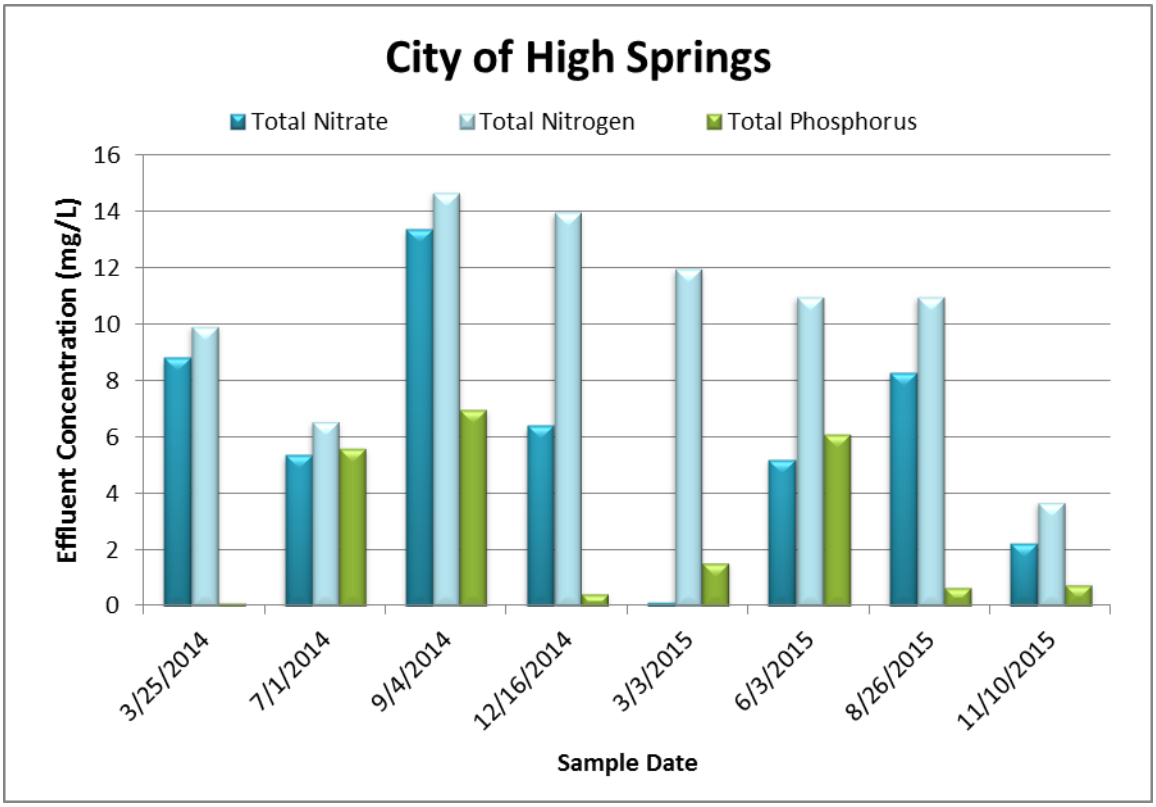


Figure 15. Effluent data from samples collected during ACEPD inspections at the City of High Springs WWTF

The monthly average flow of effluent from 2014 and 2015 were used to calculate an average flow of 0.15 MGD. Average nutrient concentrations were then multiplied by this flow rate to calculate an average loading rate from the facility. Monthly maximum nutrient data reported by the facility and data collected by ACEPD during inspections were combined to estimate loading of 2,863 lb/year of nitrate, 4,424 lb/year of total nitrogen, and 2,859 lb/year of total phosphorus (Figure 16). Total nitrate is lower than previous years, but total nitrogen and total phosphorus have risen since 2012 – 2013 values. The treatment volume to the High Springs WWTF increased after the 2008 – 2009 reporting period causing increased nutrient loading. Table 3 compares these values to those of the other wastewater treatment facilities located in Alachua County.

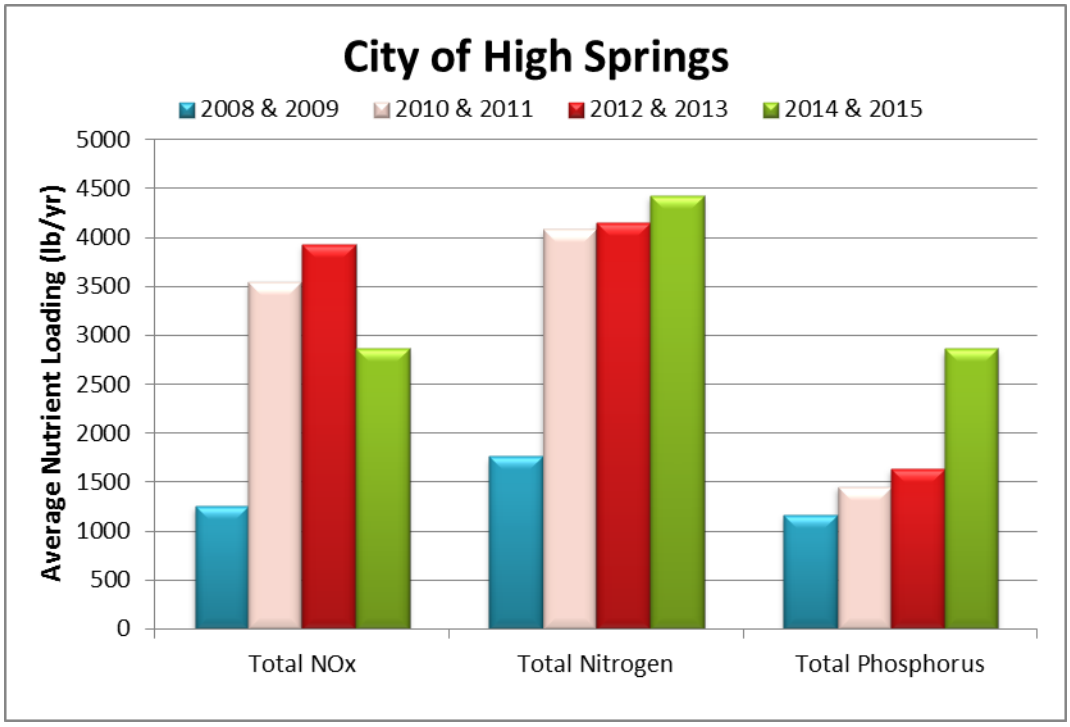


Figure 16. Estimated Nutrient Loading Values for the City of High Springs WWTF (2008 – 2015)

The City of High Springs is required to sample the groundwater monitoring wells and submit the results to FDEP on a quarterly basis, as shown in 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. It seems that nitrate values are low in the background well. Compliance wells have maintained relatively constant concentrations except MWB-1. Concentrations in MWI-2 spiked in September of 2014 but decreased then rose again in January of 2016. Nitrate values at MWI-2 hit a high of 9.8 mg/L in September of 2014 before dropping to 6.6 mg/L 12 months later.

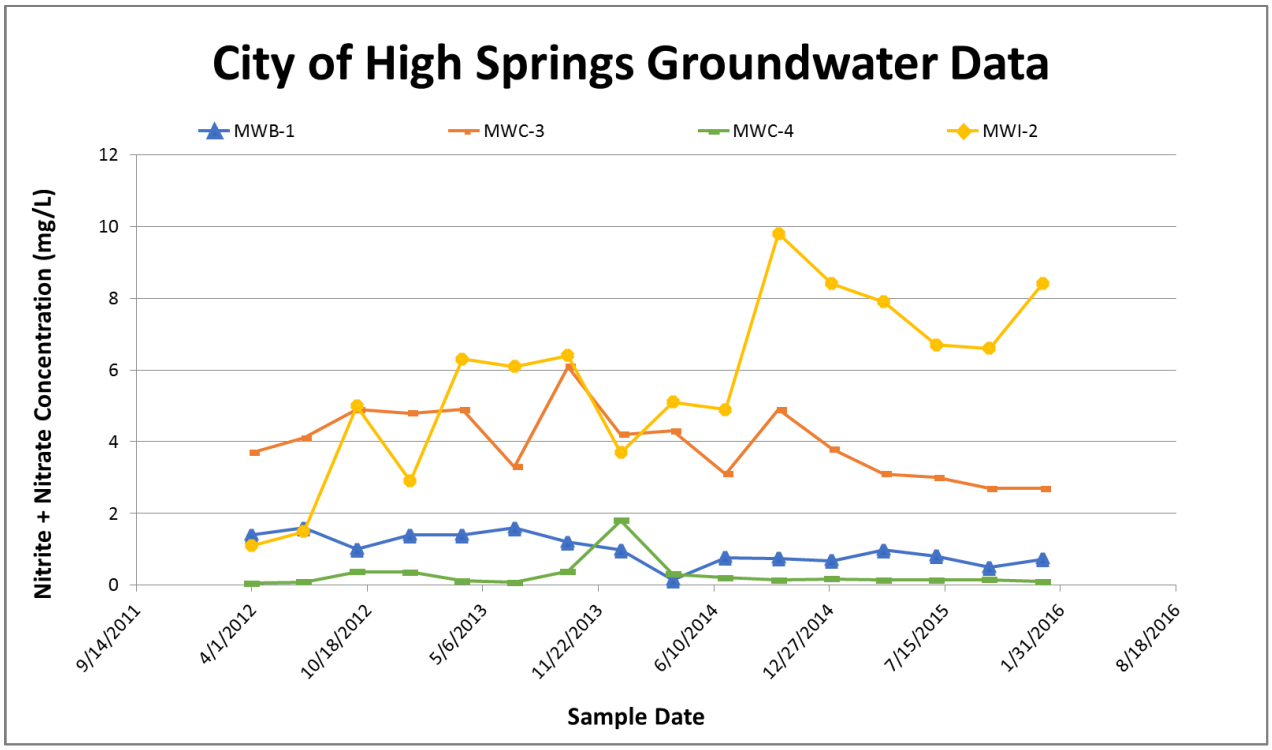


Figure 17. Groundwater Data from the City of High Springs WWTF for Nitrite + Nitrate

The City of High Springs hires Gainesville Regional Utilities to pump their sewage sludge and to haul it for further treatment to one of Gainesville Regional Utilities' treatment facilities.

3-6 The City of Newberry

Facility size: up to 1.059 MGD **Permit expiration date**: 8/3/2021

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's municipal wastewater treatment plant is an activated sludge secondary treatment plant. The facility was expanded in 2013 to accommodate an additional 0.21 MGD in treatment capacity. During three of eight ACEPD inspections, chlorine levels were low. Nitrate and total phosphorus levels are relatively low and consistent with historical data, with nitrate numbers falling even from 2012 – 2013. Nitrate values stayed low but other forms of nitrogen like ammonia and/or TKN were responsible for driving the Total Nitrogen value upward. Total Nitrogen results were considerably higher, ranging from 14 to 37 mg/L (Figure 18).

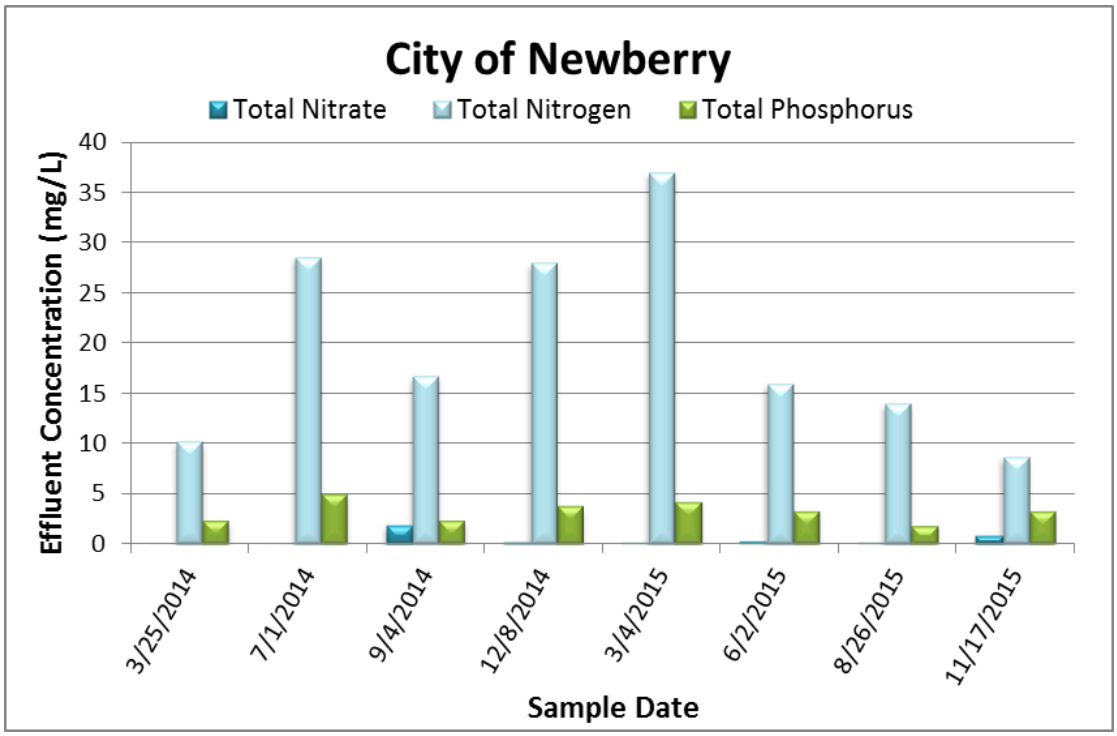


Figure 18. Effluent data from samples collected during ACEPD inspections at the City of Newberry WWTF

The monthly average flow of effluent from 2014 and 2015 were used to calculate an average flow of 0.21 MGD. 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 351 lb/year of nitrate, 12,759 lb/year of total nitrogen, and 2,521 lb/year of total phosphorus (Figure 19). The nitrate loading rate decreased, after observing a considerable spike during 2010 – 2011. The total nitrogen load has fallen since the previous report, even though ACEPD inspections found higher total nitrogen rates than in 2012 – 2013 inspection results. Total phosphorus has fallen since the previous periods. Table 3 compares these values to those of the other wastewater treatment facilities located in Alachua County.

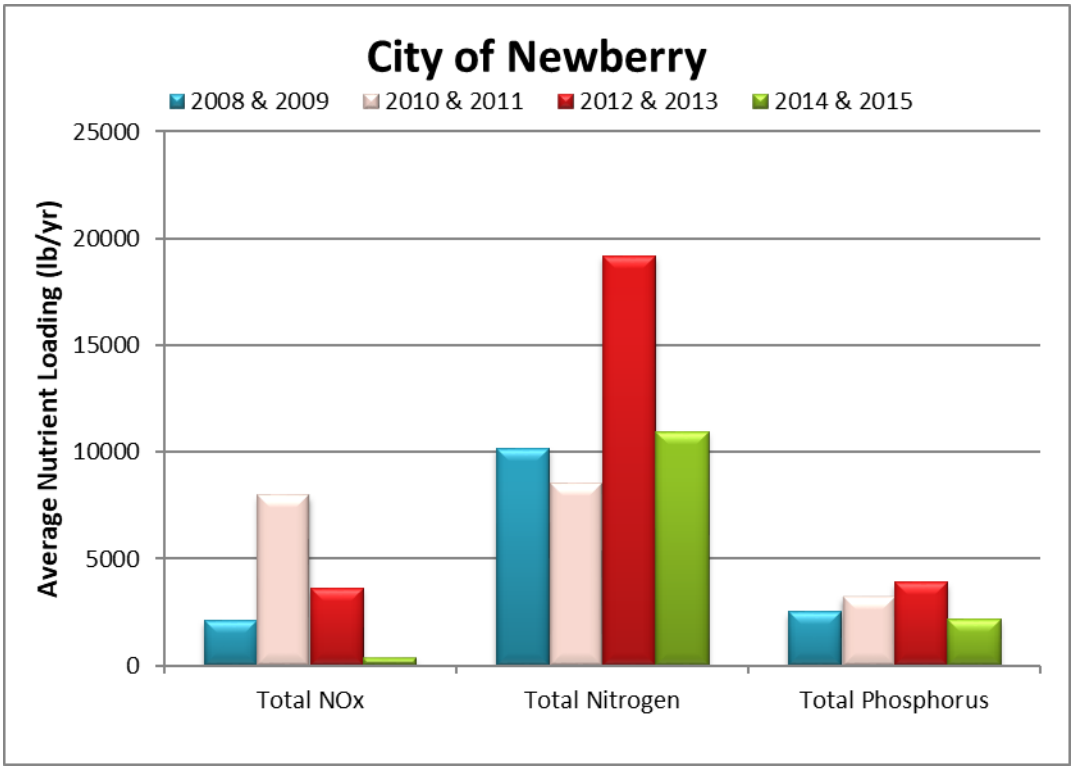


Figure 19. Estimated Nutrient Loading Values for the City of Newberry WWTF (2008 – 2015)

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 Floridan aquifer, which is unconfined in this portion of Alachua County. Nitrate levels are higher at all of the monitoring wells in comparison to the background well (Figure 20). 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. In 2014 one well, MWB-8, reported a value higher than the drinking water standard of 10 mg/L but has dropped since that date.

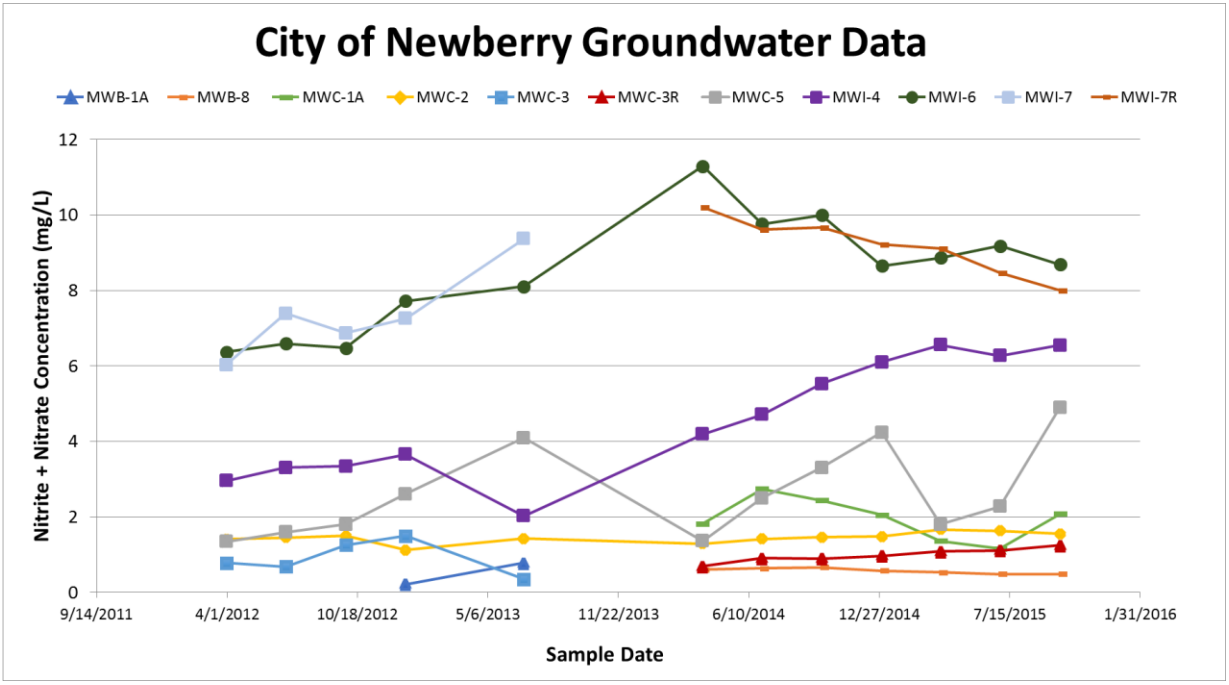


Figure 20. Groundwater Data from the City of Newberry WWTF for Nitrite + Nitrate

The Newberry treatment facility is permitted to land apply biosolids that have achieved class B pathogen reduction. According to FDEP's records, the facility produced 9.8 dry tons of biosolids in 2014 and 14.6 dry tons in 2015. These biosolids are land applied at the City of Newberry wastewater treatment facility spray field site.

3-7 The University of Florida

Facility size: 3.0 MGD **Permit expiration date**: 12/8/2020

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 University of Florida wastewater treatment plant is an advanced treatment Kruger Process (phased isolation oxidation ditch) treatment plant. This facility was inspected for the final time by ACEPD in 2010 and was found to be in compliance during the inspection. The effluent samples showed relatively low nitrogen concentrations that fluctuate with the seasons. Loads of total nitrogen and total phosphorus have risen since the 2012 – 2013 reporting period (Figure 21). Since ACEPD no longer samples or inspects the UF facility, these numbers are obtained and loadings calculated solely from DMRs submitted to FDEP as part of permit compliance.

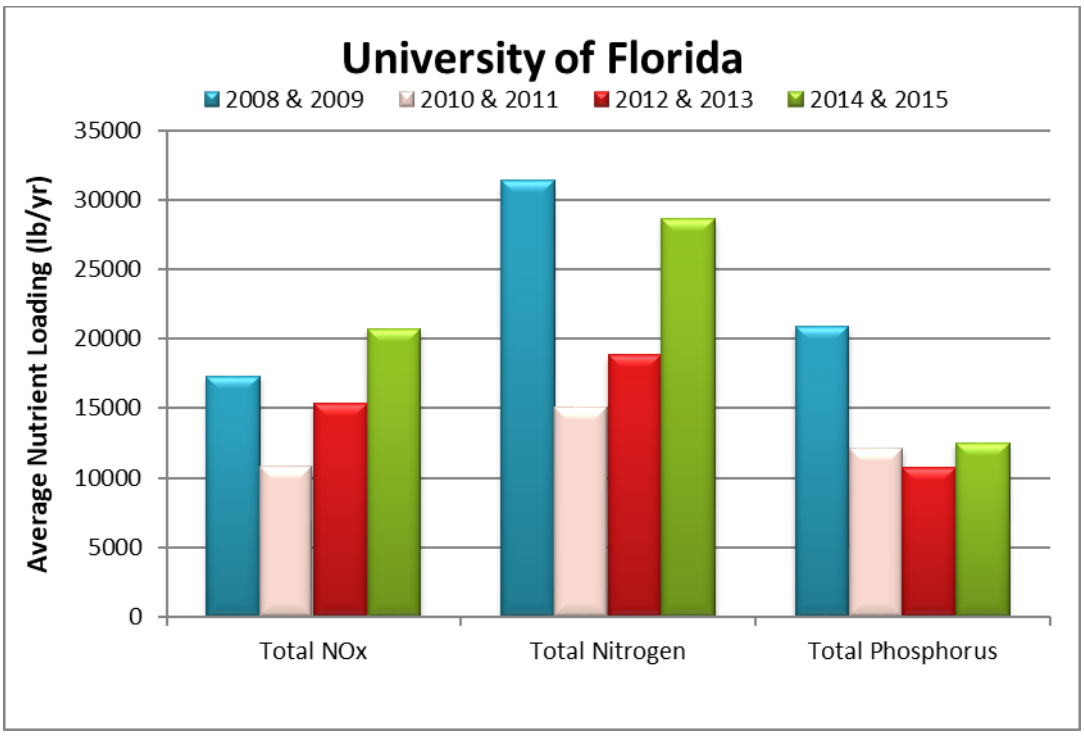


Figure 21. Estimated Nutrient Loading Values for the University of Florida WWTF (2008 – 2015)

The monthly average flow of influent from 2014 and 2015 was used to calculate an average flow of 1.86 MGD. Monthly average nutrient concentrations reported by the facility were averaged and then multiplied by this flow rate to estimate nutrient loading rates. Using the calculated flow and nutrients measured, total nitrate plus nitrate was 20,705 lb/year, total nitrogen was 28,448 lb/year, and total phosphorus was 12,565 lb/year. Table 3 compares these values to those of the other wastewater treatment facilities located in Alachua County.

The University of Florida 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 Floridan 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.

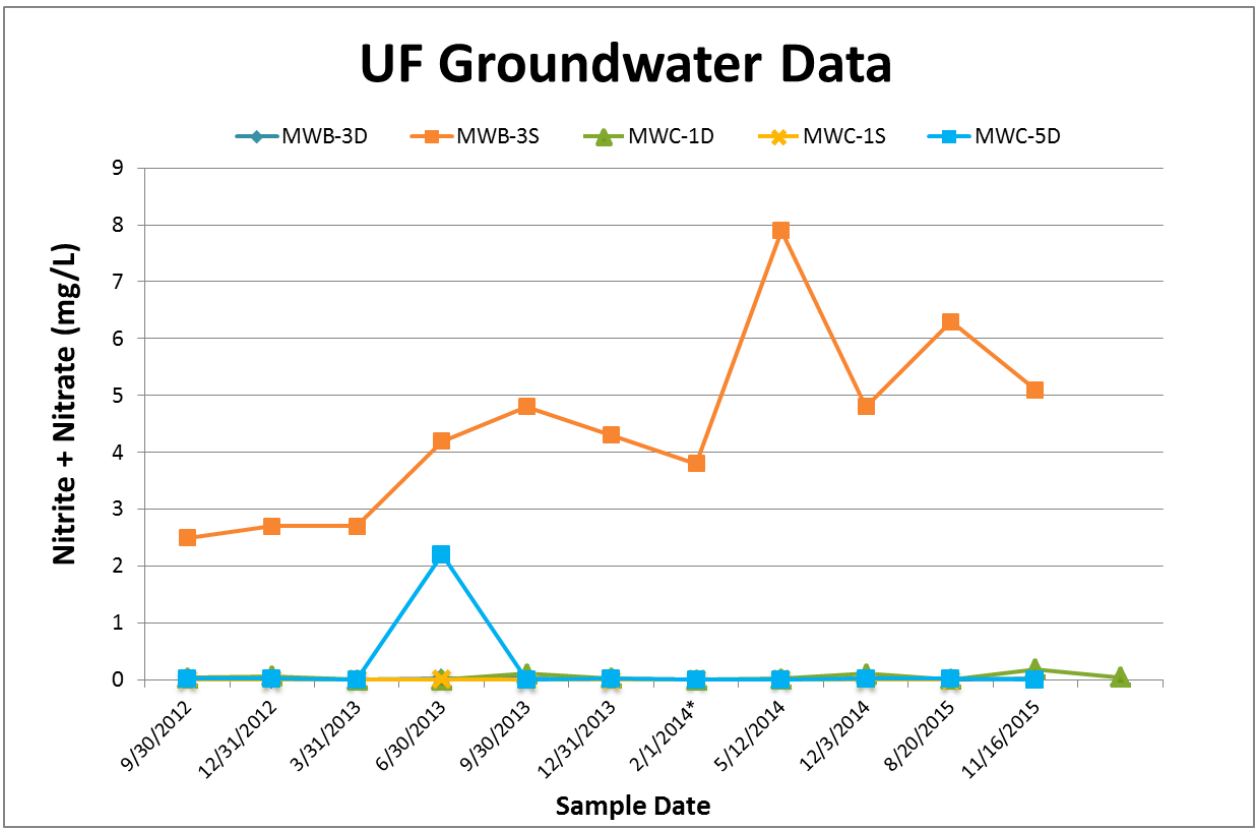


Figure 22. Groundwater Data from the University of Florida WWTF for Nitrite + Nitrate
***Sample date not listed for January – March 2014 sampling period.**

The University of Florida hires Gainesville Regional Utilities to pump their sewage sludge and haul it for further treatment at one of Gainesville Regional Utilities' treatment facilities. According to FDEP's records, 356.3 (two months data missing) dry tons were produced in 2014 and 216.8 dry tons were produced in 2015.

4.0 PACKAGE PLANTS

Package plants are smaller pre-fabricated wastewater treatment facilities designed to treat domestic wastewater for a localized area, such as a mobile home park (MHP) or camp. There were 10 package plants located in Alachua County in 2014 and 2015. There were formerly many more package plants in Alachua County, but the trend has been to abandon 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 Discharge Monitoring Report (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 tends to be less at package plants compared to municipal facilities; however, the volume of effluent is also considerably lower at package plants. 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 and was instead in the 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.

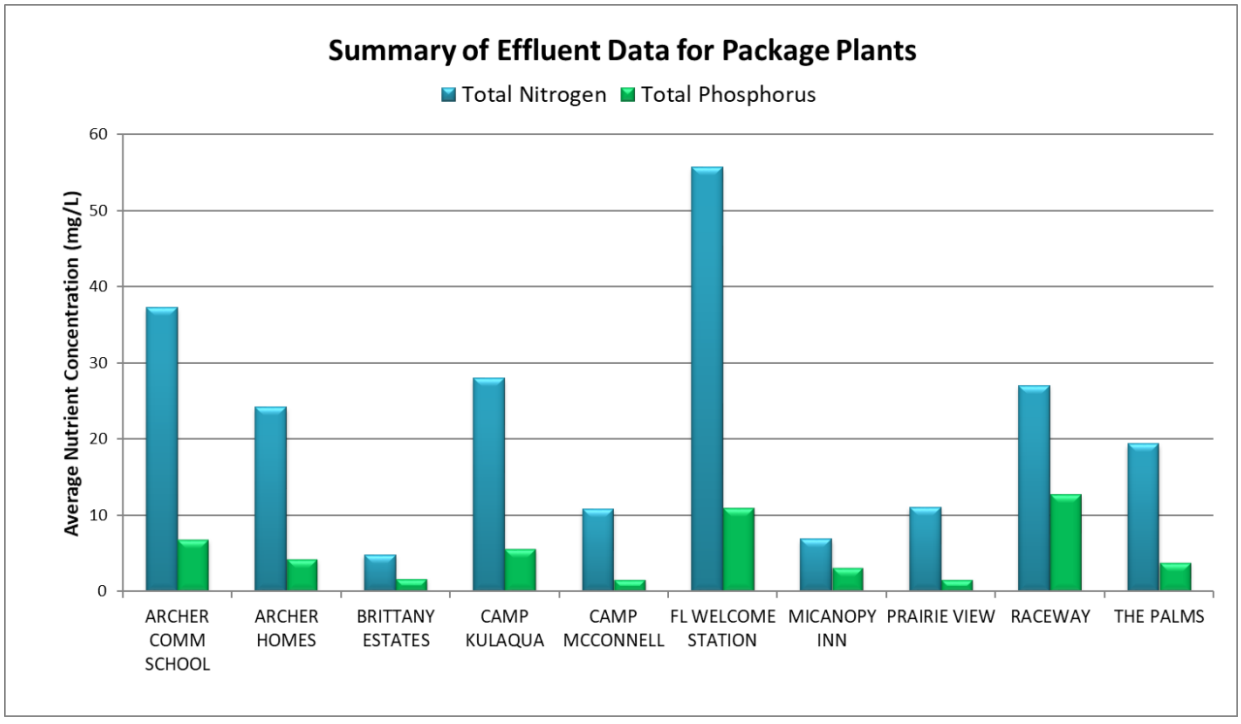


Figure 23. Average Effluent Nutrient Data for Package Plants (2014 – 2015)

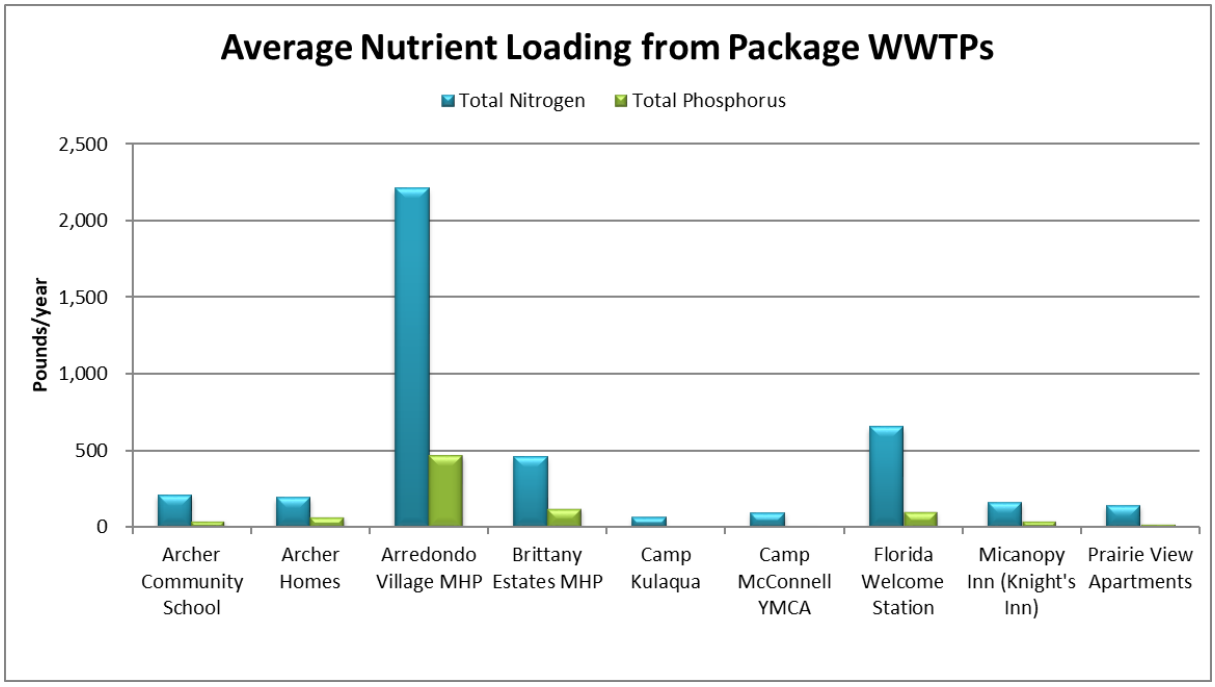


Figure 24. Estimated Nutrient Loading from Package Plants (2014 – 2015)

4-1 Archer Community School

Facility size: 0.005 MGD **Permit expiration date**: 8/18/2024

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 eight times in 2014 and 2015. The total residual chlorine was below the 0.5 mg/L FDEP permit minimum during the June 2015 inspection. Total nitrogen values at this plant were elevated during the sampling events, and the nitrate concentration has ranged from 0.64 and 35 mg/L through the sampling period (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 2014 and 2015 was used to calculate an average flow of 0.002 MGD. Average nutrient concentrations from ACEPD inspection samples were then multiplied by this flow rate to estimate nutrient loading rates. The estimated nitrate loading was 56 lb/year, total nitrogen was 210 lb/year, and total phosphorus was 38 lb/year. The total nitrogen load from 2014 - 2015 has fallen from the 2012 – 2013 results (Figure 26). Table 3 compares loading among wastewater treatment facilities located in Alachua County.

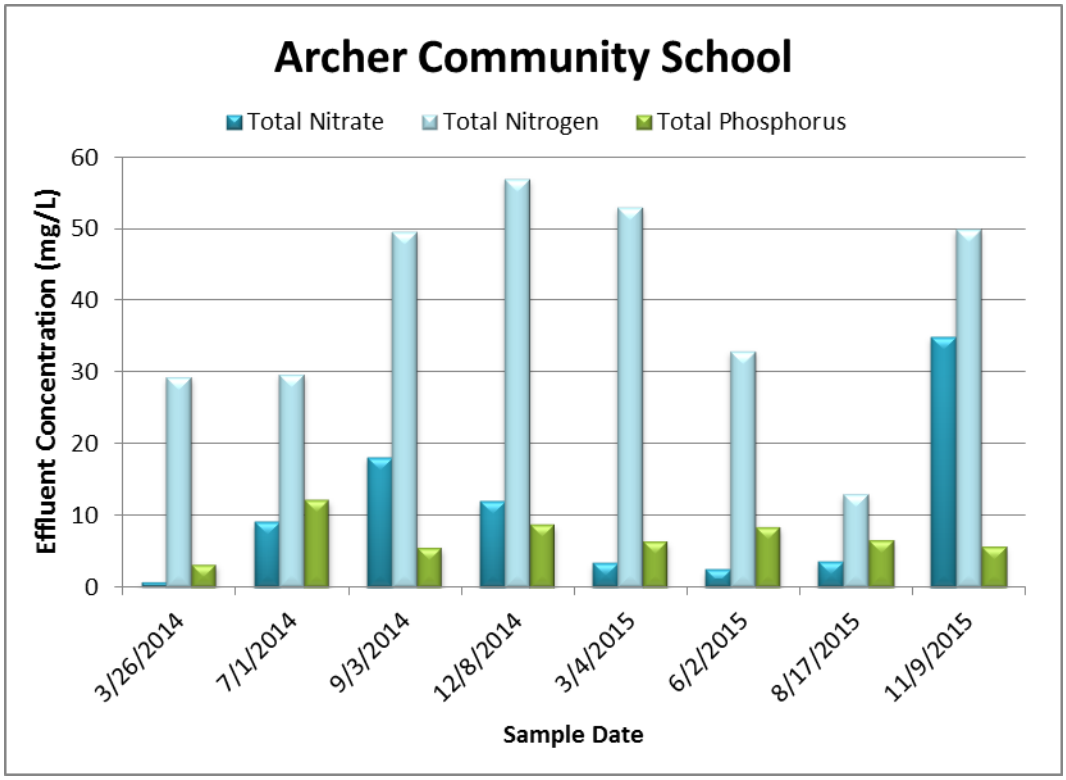


Figure 25. Effluent data from samples collected during ACEPD inspections at the Archer Community School Package Plant

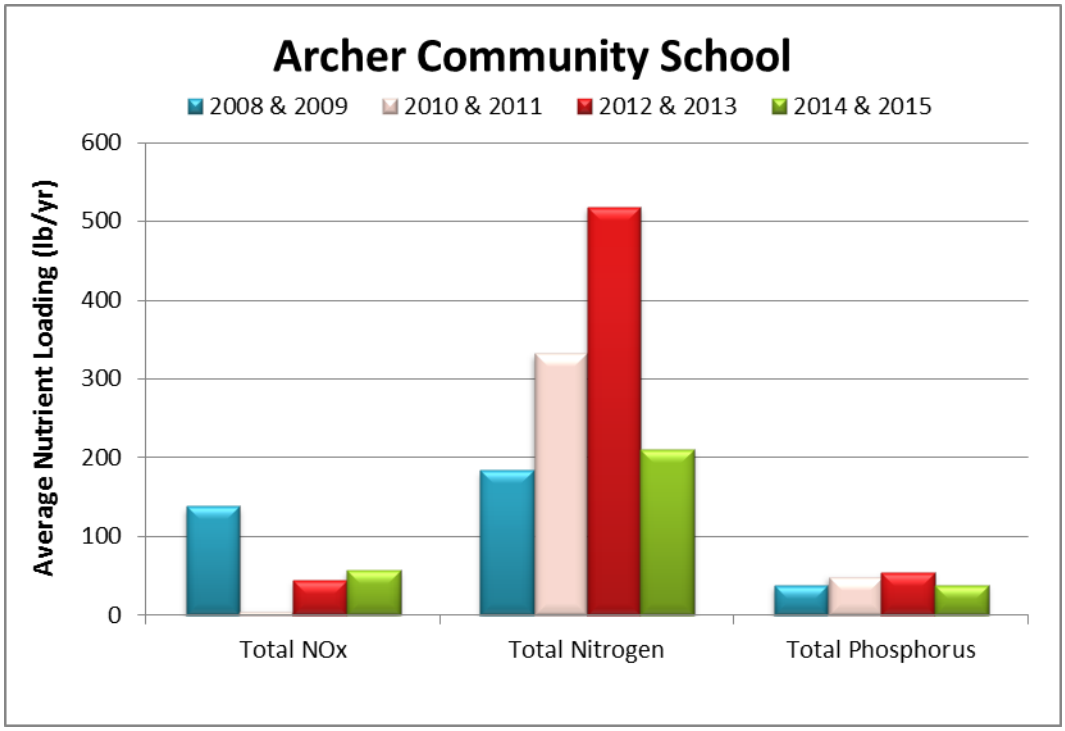


Figure 26. Estimated Nutrient Loading Values for the Archer Community School Package Plant (2008 – 2015)

4-2 Archer Homes

Facility size: 0.0083 MGD **Permit expiration date**: 10/13/2020

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 seven times in 2014 and 2015. In March of 2014, nitrate was reported at 13.4 mg/L, exceeding the permitted value of 12 mg/L. The Total Suspended Solids concentration was sampled in March of 2015 and passed requirements. Results for some of the effluent samples were high in ammonia, indicating the oxygen levels in the plant may not be sufficient to support nitrification. The total nitrogen concentrations have continued to decrease since the 2010 – 2011 report, though total phosphorus rose slightly (Figure 27). High nitrogen values in the effluent are a concern in this area because the Floridan aquifer is unconfined in this portion of the county. Although the nitrogen in the effluent is not in the mobile nitrate form, it is likely to be converted to nitrate under the aerobic conditions in the saturated and unsaturated zone of the unconfined Floridan aquifer.

The monthly average flow of influent from 2014 and 2015 was used to calculate an average flow of 0.0028 MGD. Average nutrient concentrations were then multiplied by this flow rate to estimate nutrient loading rates to the environment. Monthly nitrate data collected by the facility was combined with ACEPD inspection results to calculate a loading rate of 18 lb/year. Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 194 and 65 lb/year, respectively. Total nitrogen loading in 2014 - 2015 has decreased due to the lower concentrations observed when compared to 2010 - 2013 (Figure 28). Table 3 compares loading values among wastewater treatment facilities located in Alachua County.

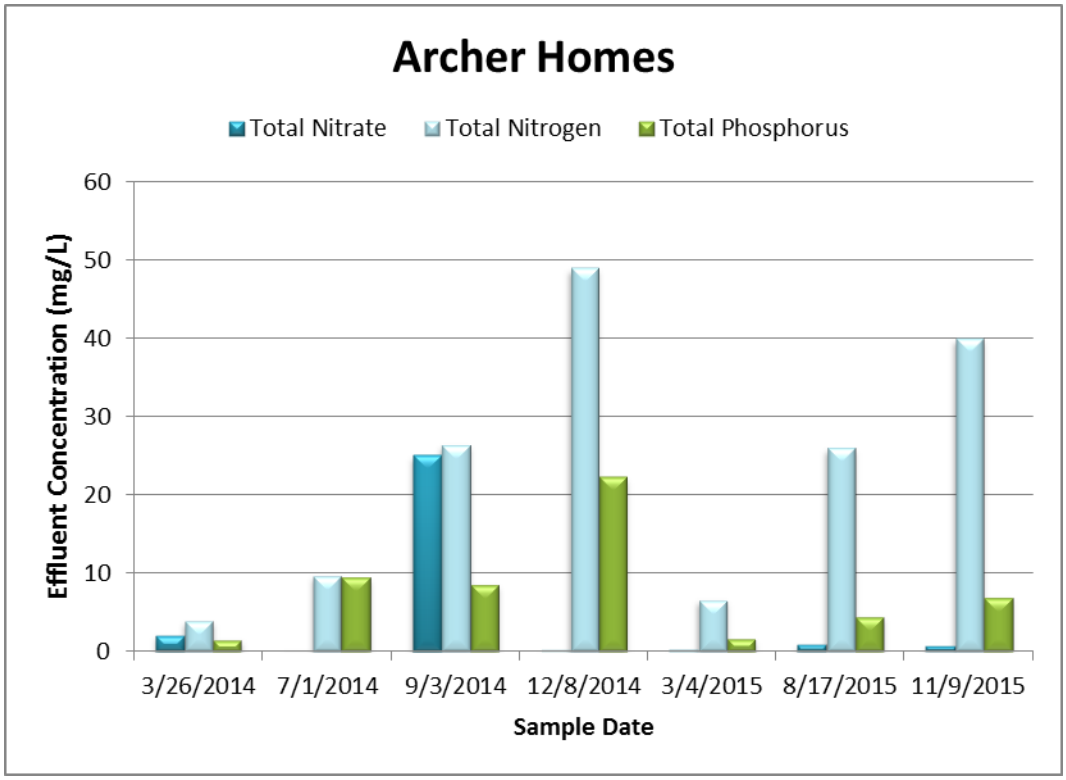


Figure 27. Effluent data from samples collected during ACEPD inspections at the Archer Homes Package Plant

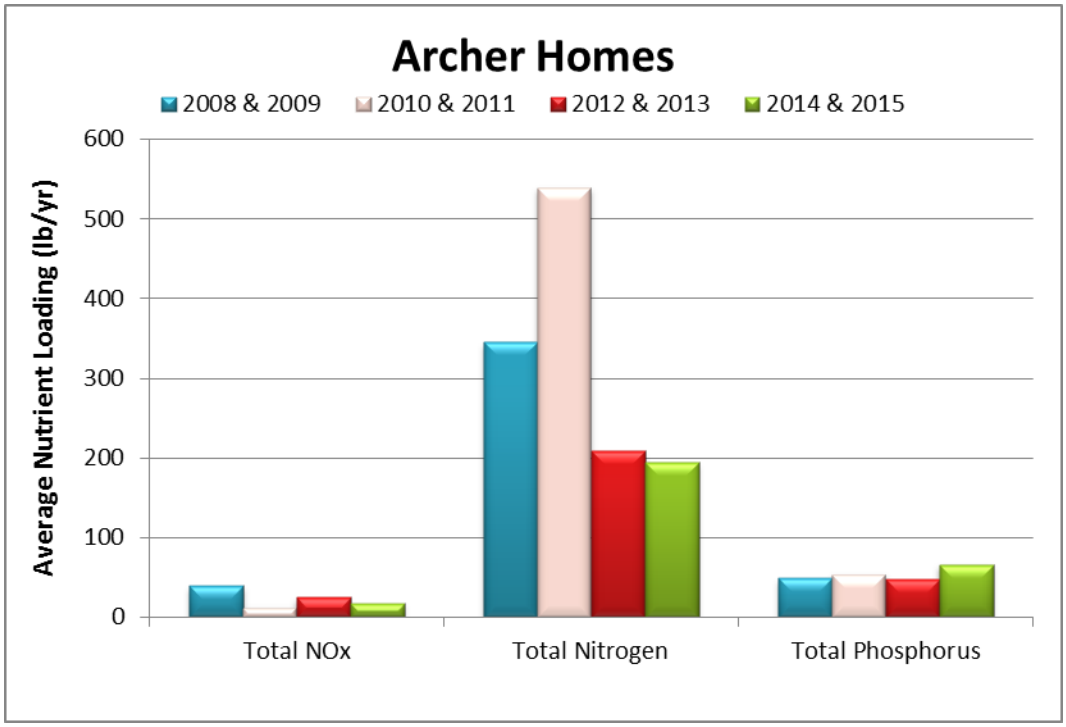


Figure 28. Estimated Nutrient Loading Values for the Archer Homes Package Plant (2008 – 2015)

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

Facility size: 0.06 MGD **Permit expiration date**: 4/28/2019

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 six times during 2014 and 2015. Solids in the rapid infiltration basin were found in the December, March and June 2015 inspections. The nitrate concentration exceeded the permit limitation of 12 mg/L during two inspections in early 2014, but has since been well under the limit (Figure 29). Total nitrogen levels were elevated during six inspections. Modifications were made to this facility in 2010, which improved the effluent quality initially. In 2011 the effluent quality appeared to decline despite the modifications. Sample results from 2014 – 2015 show some improvement in total nitrogen concentrations, but nitrate and total phosphorus concentrations rose slightly.

The monthly average effluent flow from 2014 and 2015 were used to calculate an average flow of 0.043 MGD. Average nutrient concentrations were then multiplied by this flow rate to calculate average 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 359 lb/year (Figure 30). Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 2,214 and 468 lb/year, respectively. The total nitrogen loading has decreased since the previous report due to the lower concentrations observed in the effluent samples. Table 3 compares loading among wastewater treatment facilities located in Alachua County.

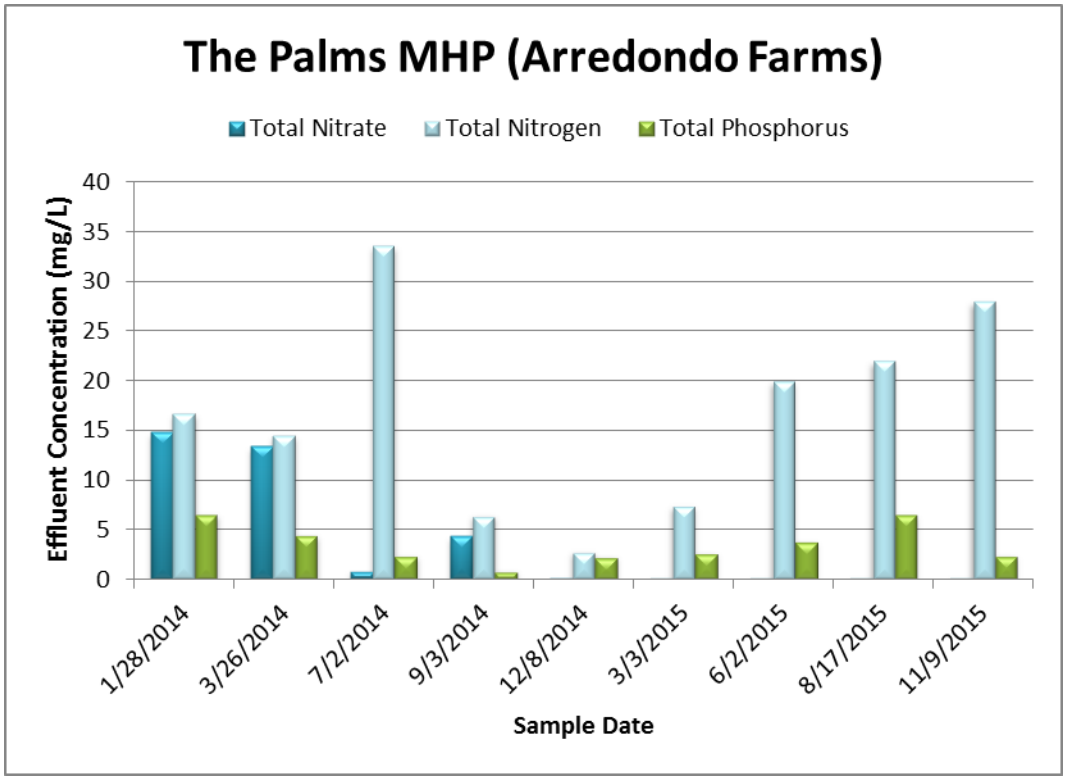


Figure 29. Effluent data from samples collected during ACEPD inspections at the Arredondo Farms Mobile Home Park Package Plant

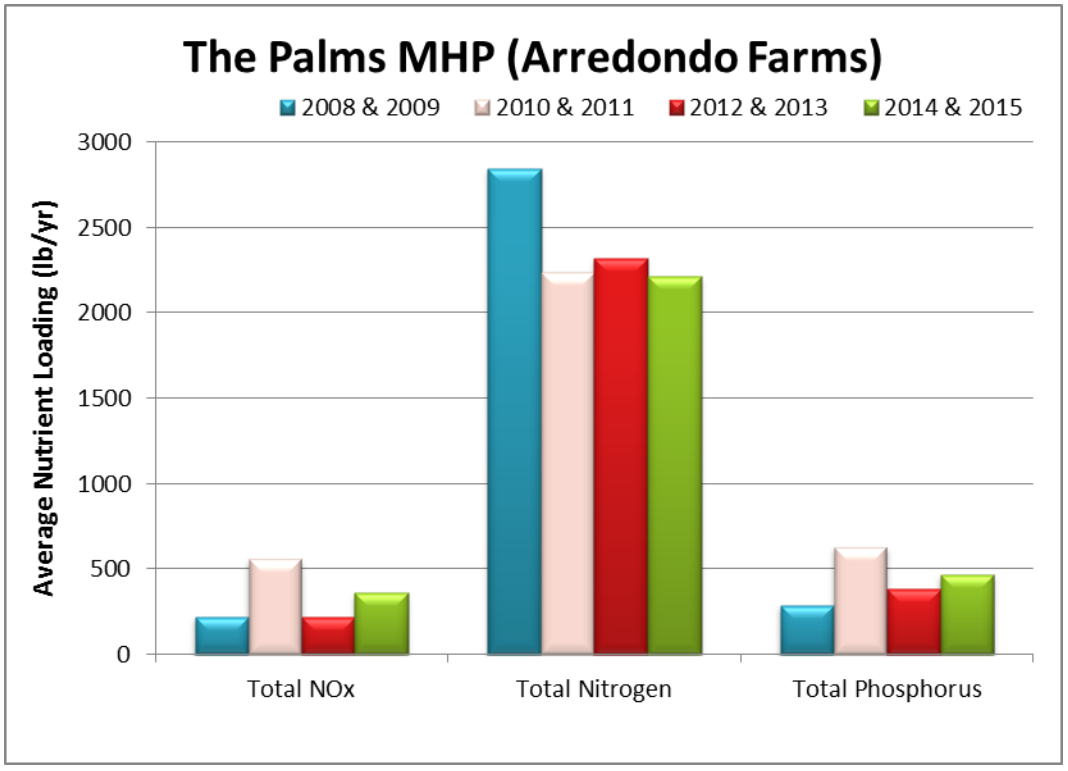


Figure 30. Estimated Nutrient Loading Values for the Arredondo Farms Mobile Home Park Package Plant (2008 – 2015)

4-4 Brittany Estates Mobile Home Park

Facility size: 0.06 MGD **Permit expiration date**: 8/28/2016

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 five times by ACEPD in 2014 and 2015. In general, nitrate and total nitrogen levels observed during ACEPD inspections have decreased since 2011 (Figure 31). Elevated nitrogen levels were observed in January 2013 but none were above the current drinking water standard for nitrogen at 10 mg/L. Chlorine levels were low during two inspections in 2015. During the June 2015 inspection, there was no secondary containment for the sodium bisulfate on site.

The monthly average effluent flow from 2014 and 2015 was used to calculate an average flow of 0.0304 MGD. 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 467 lb/year of nitrate, 480 lb/year of total nitrogen, and 122 lb/year of total phosphorus. Estimated loading of nitrate and total nitrogen have dropped since 2012 – 2013 samplings (Figure 32). Nutrients in effluent from this plant are a concern because they are discharged to a tributary of Little Hatchet Creek. Total Maximum Daily Loads 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 wastewater treatment facilities in Alachua County.

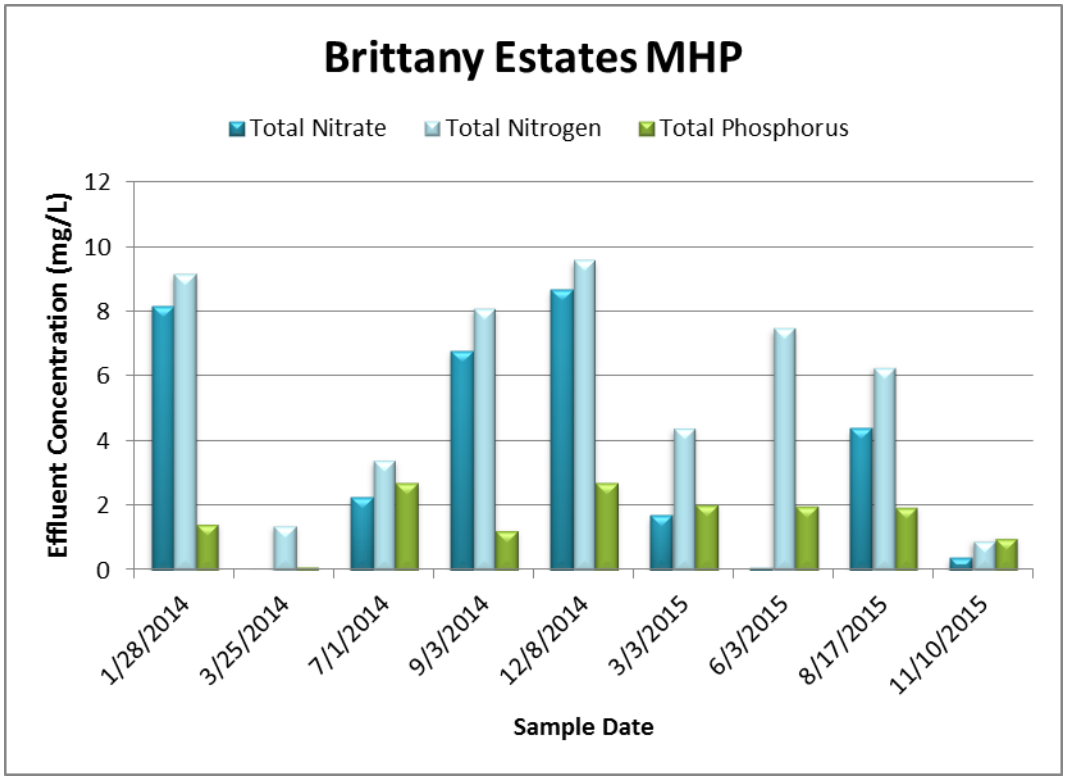


Figure 31. Effluent data from samples collected during ACEPD inspections at the Brittany Estates Mobile Home Park Package Plant

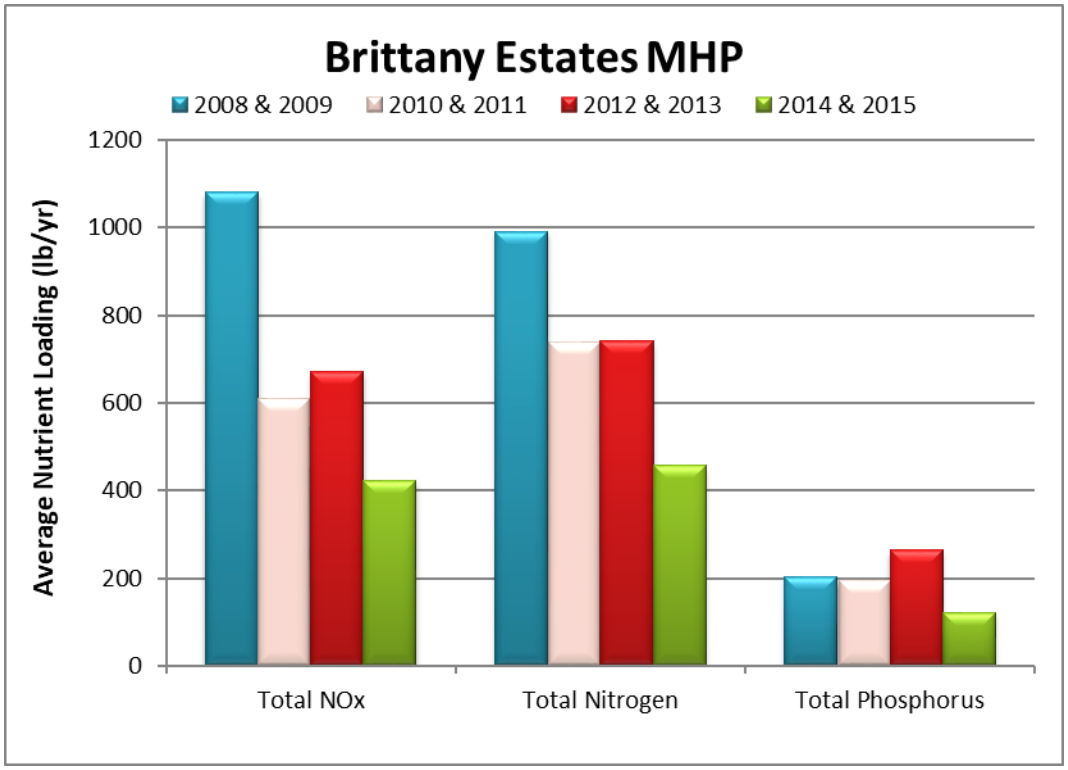


Figure 32. Estimated Nutrient Loading Values for the Brittany Estates Mobile Home Park Package Plant (2008 – 2015)

4-5 Camp Kulaqua

Facility size: 0.0201 MGD **Permit expiration date**: 6/30/2019

Permitted effluent disposal: Two rapid infiltration basins (0.372 acres).

Residuals disposal: Hauled off-site.

Camp Kulaqua clarifier and chlorine contact chamber

The package plant at Camp Kulaqua in High Springs is an extended aeration activated sludge treatment plant. This facility was inspected eight times during 2014 and 2015. Total Residual Chlorine (TRC) was low during the November 2015 inspection. The nitrate effluent concentration approached the 12.0 mg/L FDEP permit limitation during the March 2015 inspection (Figure 33). The nitrate and total nitrogen results have continued to drop since 2010. Nitrogen is a concern with the proximity of Hornsby Springs and the Santa Fe River, especially since the nitrogen in the effluent is often in the mobile nitrate form. During low flows to the plant, operators have to maintain the microbial communities by adding dog food. As of winter 2017, work has begun and progressed to connect this plant to the City of High Springs wastewater plant. The underground pipes have been laid on the camp's property and follow County Road 236 into town.

The monthly average effluent flow from 2014 and 2015 was used to calculate an average flow of 0.0009 MGD. 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 estimate a nitrate loading rate of 12 lb/year (Figure 34). Since the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 63 lb/year and 10 lb/year, respectively. The nitrate loading has decreased and fallen to lower levels than 2010 – 2011 inspections. The total nitrogen and total phosphorus loads have also decreased. Table 3 compares loading among wastewater facilities in Alachua County.

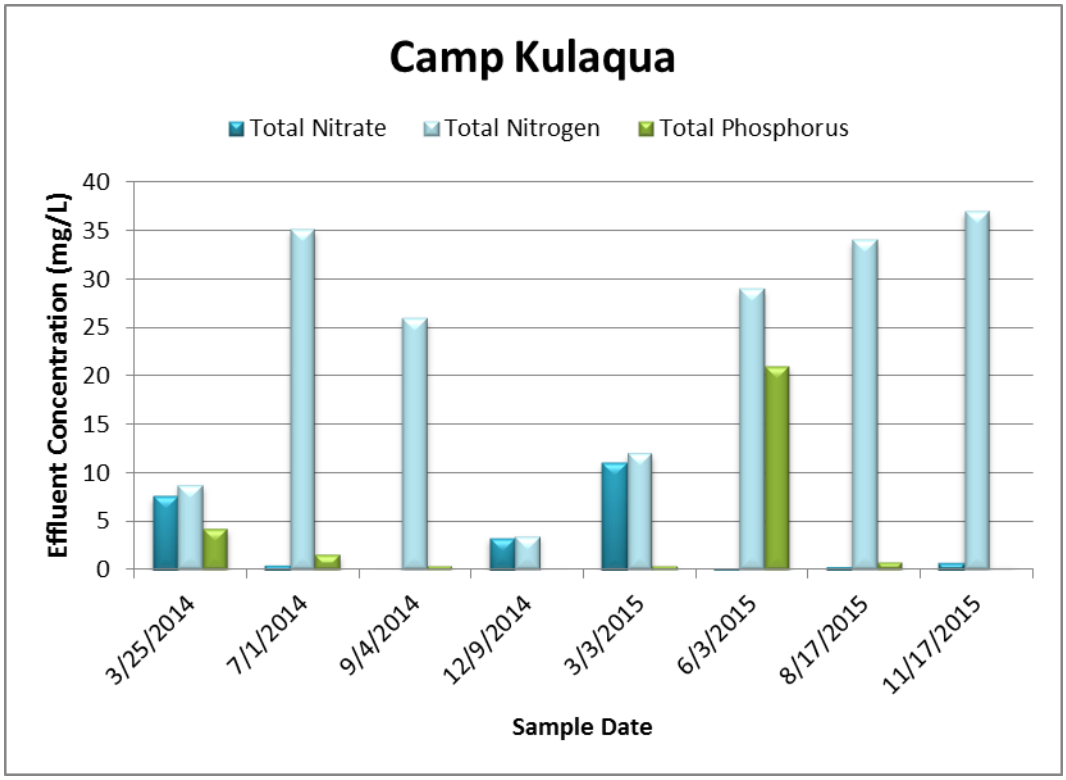


Figure 33. Effluent data from samples collected during ACEPD inspections at the Camp Kulaqua Package Plant

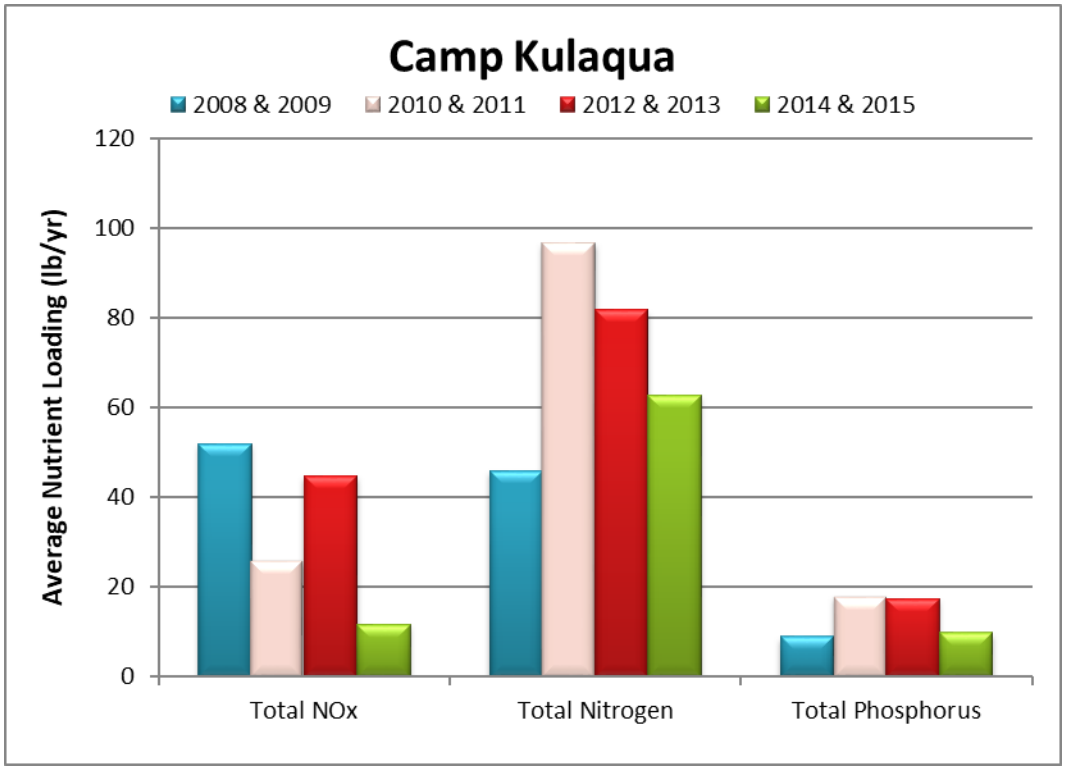


Figure 34. Estimated Nutrient Loading Values for the Camp Kulaqua Package Plant (2008 – 2015)

4-6 Camp McConnell YMCA

Facility Size: 0.0075 MGD **Permit expiration date**: 3/11/2020

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

Residuals disposal: Hauled off-site.

Camp McConnell YMCA aeration basin and clarifier

The package plant at Camp McConnell is an extended aeration plant. This facility was inspected nine times by ACEPD in 2014 and 2015. The RPZ tag was missing during the July 2014 inspection. Electrical wiring was exposed in June of 2015 but was cleaned up by the next inspection two months later. High nutrient concentrations in the effluent are a concern with the proximity to Georges Pond. The flow rate at this facility is intermittent and is dependent on the programming at the camp. During low flows to the plant, operators have to maintain the microbial communities by adding dog food.

The monthly average effluent flows from 2014 and 2015 were used to calculate an average flow of 0.0018 MGD. Average nutrient concentrations (Figure 35) were then multiplied by this flow rate to estimate nutrient loading rates. Monthly maximum nitrate data reported by the facility were combined with ACEPD inspection data to calculate a nitrate loading rate of 39 lb/year (Figure 36). Since the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 93 lb/year and 13 lb/year, respectively. The estimated nutrient load has increased since the last reporting period for total nitrogen and nitrate, but decreased for total phosphorus. Table 3 compares loading rates among wastewater treatment facilities in Alachua County.

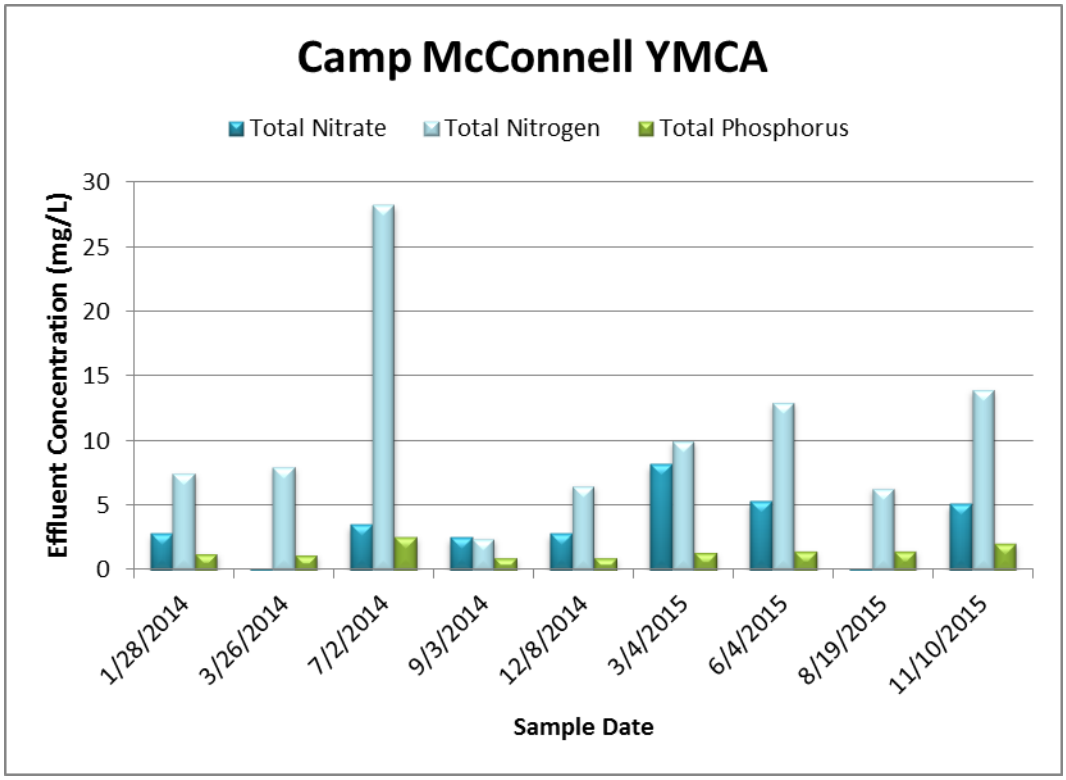


Figure 35. Effluent data from samples collected during ACEPD inspections at the Camp McConnell YMCA Package Plant

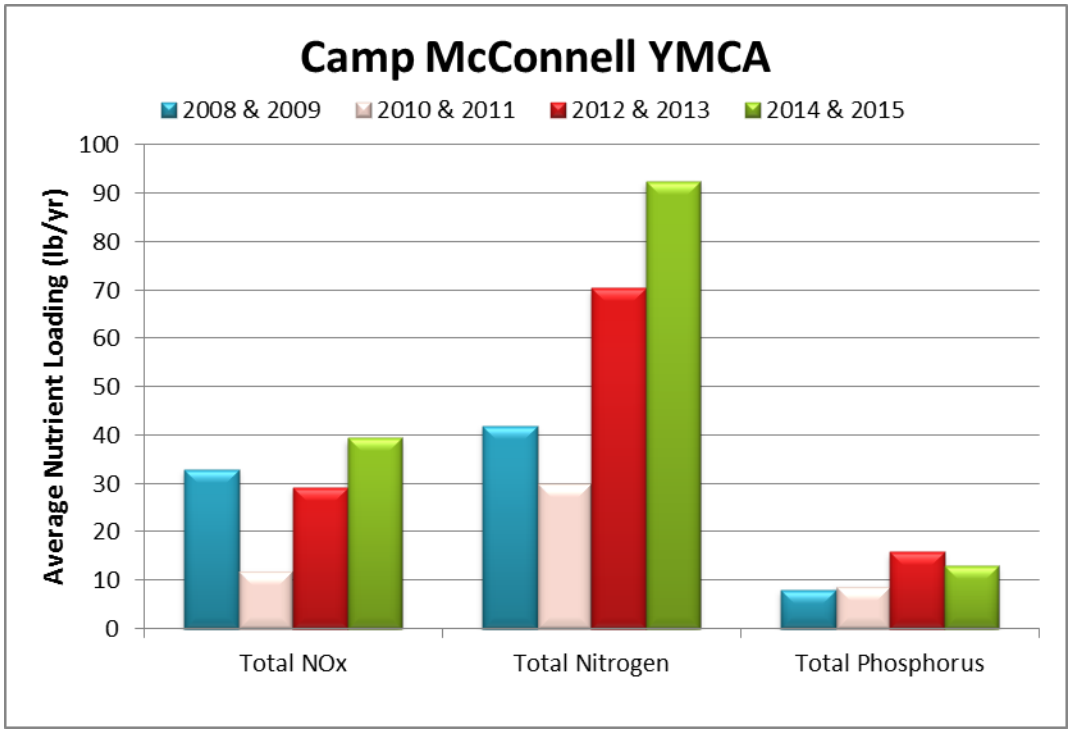


Figure 36. Estimated Nutrient Loading Values for the Camp McConnell YMCA Package Plant (2008 – 2015)

4-7 The Florida Welcome Station

Facility size: 0.009 MGD **Permit expiration date**: 3/10/2020

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 seven inspections at this facility during 2014 and 2015. The RZP tag was missing during three inspections in 2015. Elevated levels of total nitrogen were observed during the December 2014 inspection, however nitrate remained low (Figure 37). The 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 may be easily converted to nitrate once in the environment.

The monthly average influent flow from 2014 and 2015 was used to calculate an average flow of 0.0044 MGD. 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 6 lb/year. Since the facility is not required to monitor for total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 654 lb/year and 102 lb/year, respectively. Estimated loads of total nitrogen and total phosphorus have increased since 2012 – 2013, based on concentrations observed by ACEPD in effluent samples (Figure 38). Table 3 compares loading rates among wastewater treatment facilities located in Alachua County.

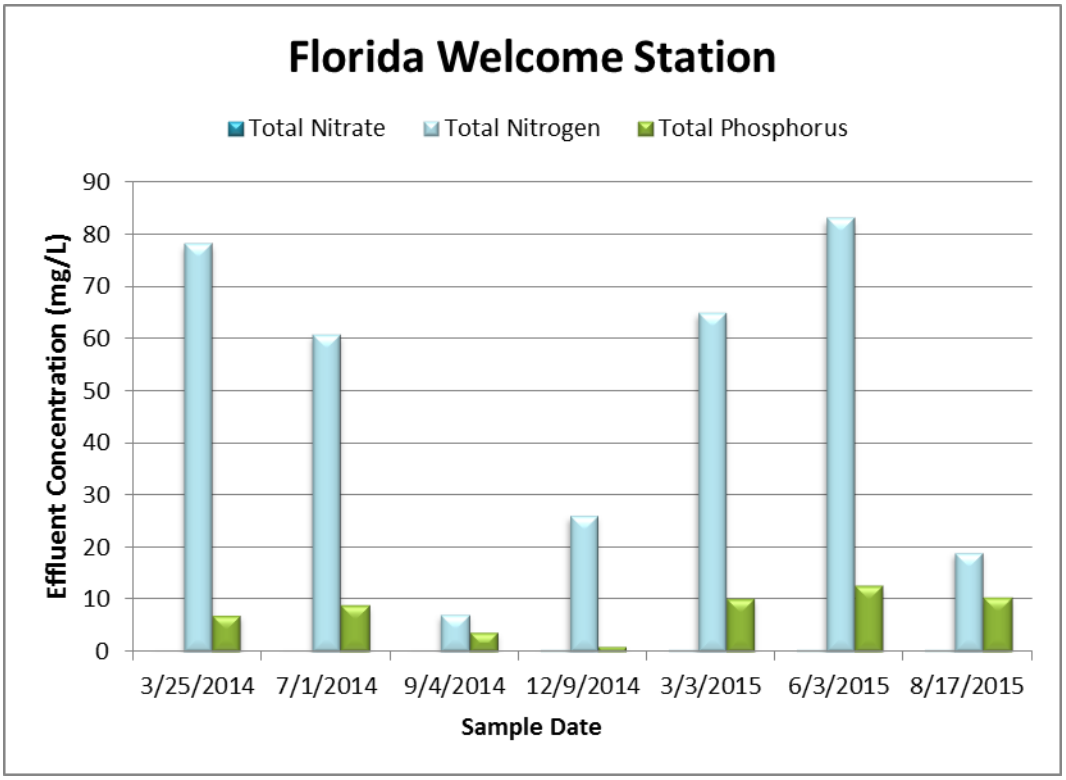


Figure 37. Effluent data from samples collected during ACEPD inspections at the Florida Welcome Station Package Plant

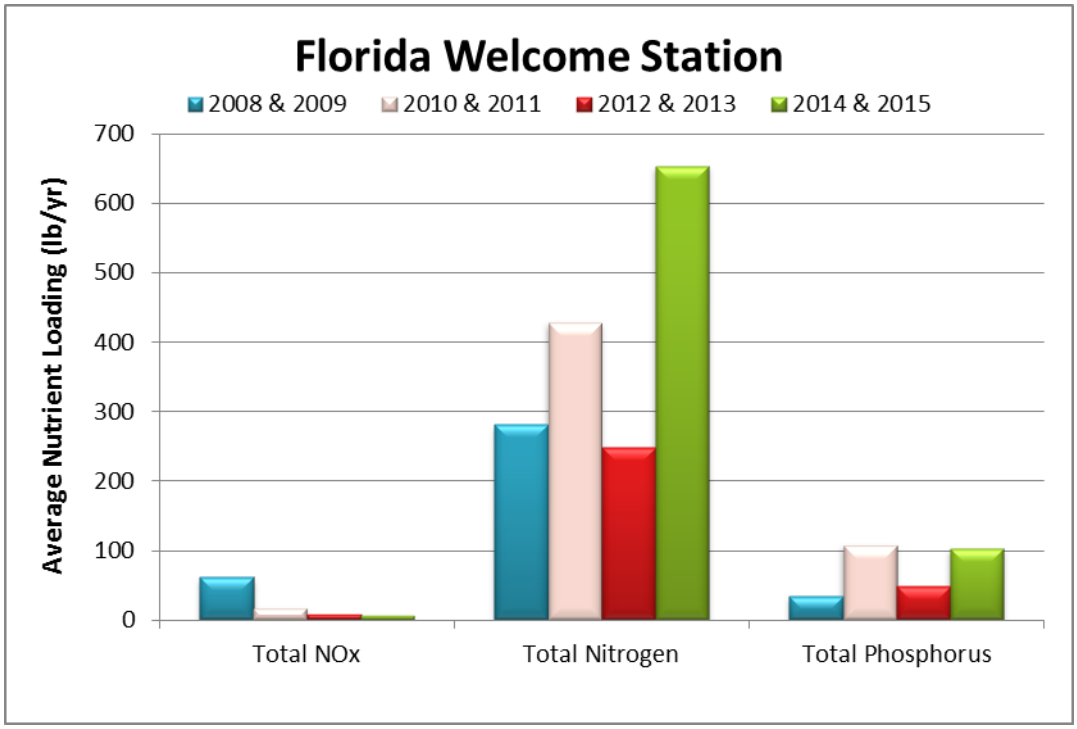


Figure 38. Estimated Nutrient Loading Values for the Florida Welcome Station Package Plant (2008 – 2015)

4-8 The Gainesville Raceway

Facility size: 0.00825 MGD **Permit expiration date**: 5/9/2022

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 that was designed to treat the intermittent flows of the Gainesville Raceway including the extreme flows of Gator Nationals. This facility was last inspected in March 2015, and samples were found to be in compliance but there was grit on the ground around the dumpster. Usually, no effluent is discharged through the sprayfields due to operator management of the aeration basins; therefore no recurring effluent samples were taken. The plant was sampled March 12th, 2015. This plant operates during special events at the Gainesville Raceway and receives and treats wastewater pumped from portable toilets. This plant historically has been found to be in compliance. The facility was an experimental project.

Table 6: Gainesville Raceway sample results

Date	NO_3 (mg/L)	TN (mg/L)	TP (mg/L)	NO_x (mg/L)
3/12/2015	5.3	27	12.8	13

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

Facility size: 0.015 MGD **Permit expiration date**: 4/25/2020

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 nine times by ACEPD during 2014 and 2015. During a period in 2014, there was no plant operator, which was rectified after the March 2014 inspection. The nitrate result during the December 2014 inspection was 16 mg/L, and TRC was low during the March 2015 inspection. In June of 2015 there was a leaking pump to the sprayfield and the clarifier was full of duckweed but the plant was in compliance during the August 2015 inspection. There are no effluent nutrient limitations in the FDEP permit, but nitrate is report only. Results for samples collected by ACEPD show an increase in nitrate, total nitrogen, and total phosphorus concentrations (Figure 39). Elevated nitrogen levels are of concern in this area of the County where the Floridan aquifer is semi-confined to unconfined.

The monthly average flow of influent from 2014 and 2015 were used to calculate an average flow of 0.0057 MGD. Monthly maximum nitrate data provided by the facility were combined with ACEPD inspection results to calculate a nitrate loading rate of 92 lb/year (Figure 40). Since the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data were used to calculate these loadings of 162 lb/year and 44 lb/year, respectively. Table 3 compares loading values among wastewater treatment facilities located in Alachua County.

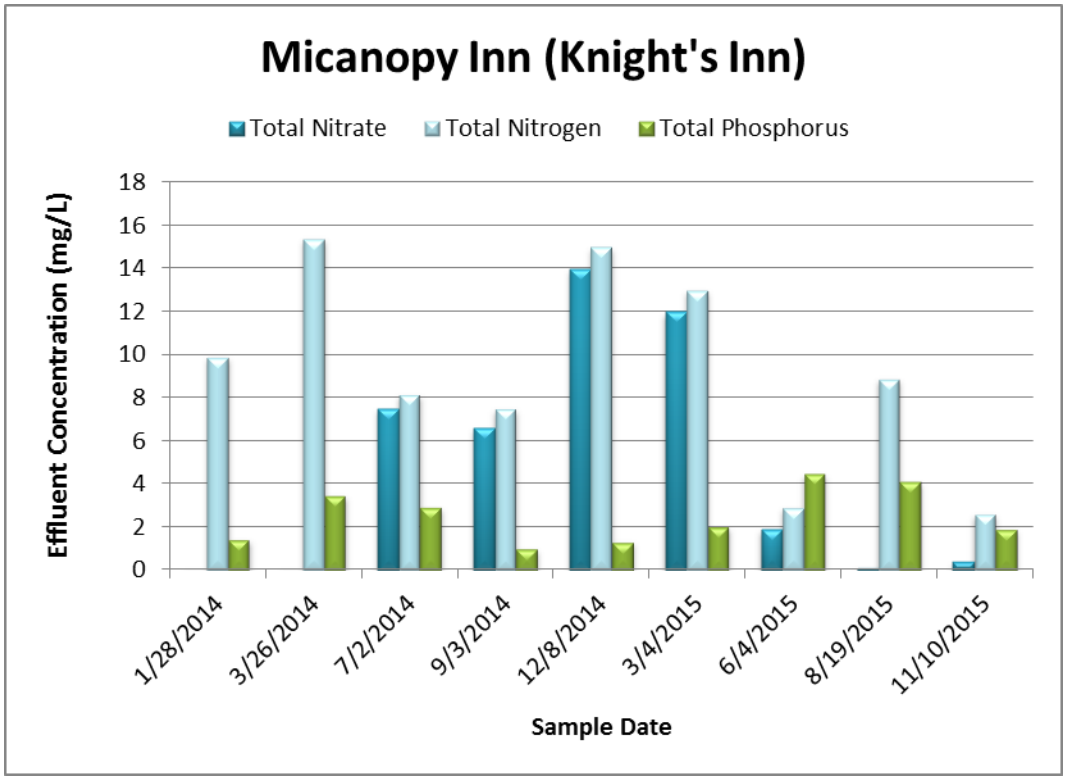


Figure 39. Effluent data from samples collected during ACEPD inspections at the Micanopy Inn Package Plant, formerly Knight's Inn

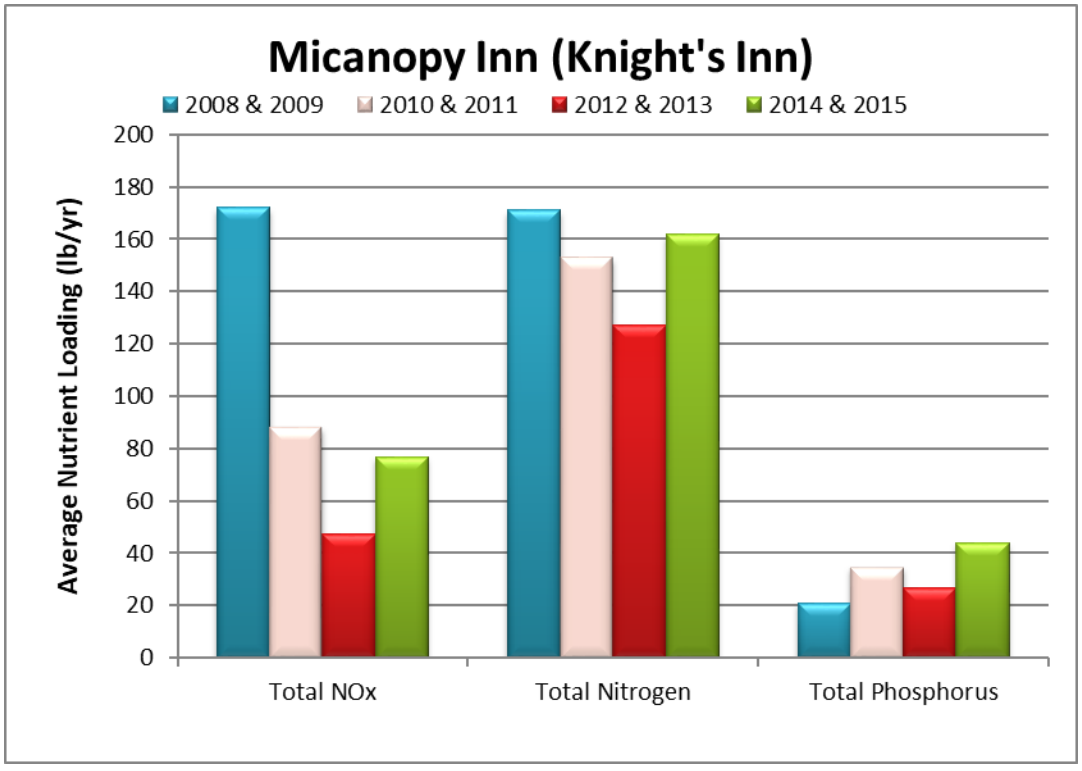


Figure 40. Estimated Nutrient Loading Values for the Micanopy Inn Package Plant, formerly Knight's Inn (2008 – 2015)

4-10 Prairie View Apartments

Facility size: 0.00424 MGD **Permit expiration date**: 9/9/2020

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 eight times during 2014 and 2015. An active release was occurring upon inspection arrival on November 10th, 2015. Solids were noted in the RIB on the July 2014 inspection. The total residual chlorine was below the FDEP permit minimum of 0.5 mg/L during the March 2014 and December 2015 inspections. The sample results collected during 2014 - 2015 for nitrate did not exceed the limit of 12 mg/L; however, elevated levels of nitrate and total nitrogen were observed during several ACEPD inspections (Figure 41). The poor effluent quality is of concern with the proximity of Paynes Prairie Preserve State Park, an Outstanding Florida Water. Extensive maintenance was conducted on the plant in 2010 which has helped to reduce solids in the chlorine contact chamber and overall functioning of the facility.

The monthly average flow reported by the facility for 2014 - 2015 was used to calculate an average flow of 0.0047 MGD. Average nutrient concentrations were then multiplied by this flow rate to estimate the nutrient loading rates from this facility. Monthly maximum nitrate data reported by the facility were combined with ACEPD inspection results to estimate a nitrate loading rate of 39 lb/year (Figure 42). Since the facility is not required to monitor total nitrogen or total phosphorus, ACEPD data were used to calculate loadings of 143 lb/year and 20 lb/year, respectively. Table 3 compares loading rates among wastewater facilities in Alachua County.

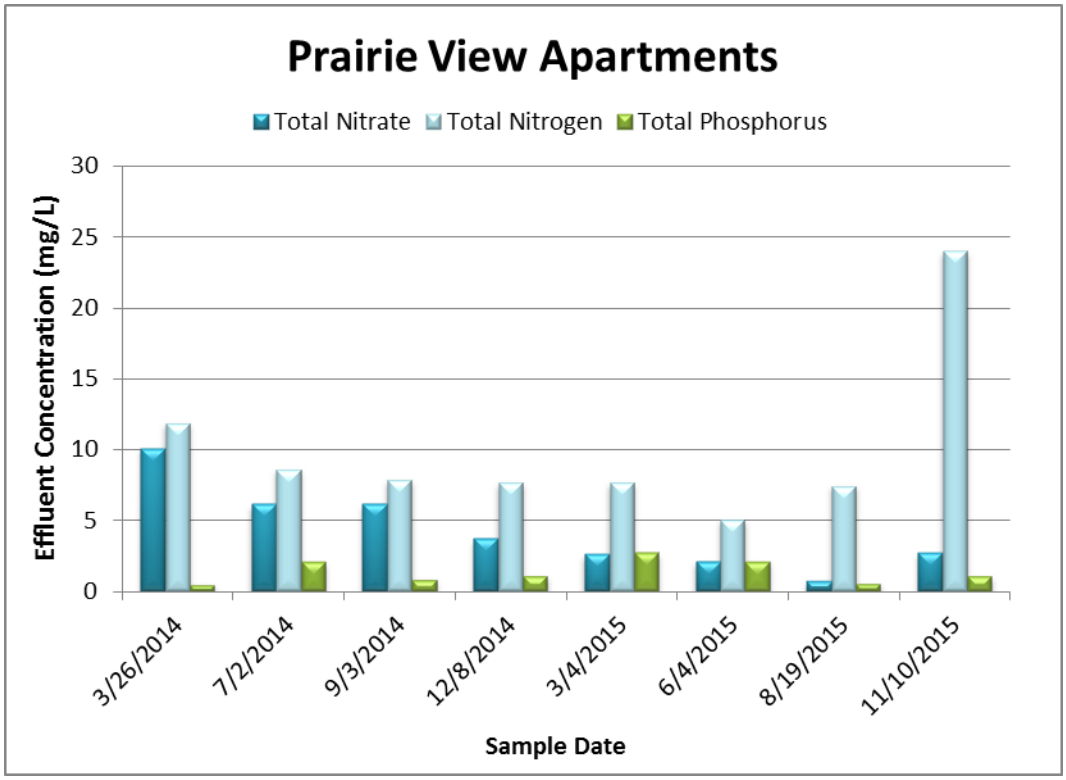


Figure 41. Effluent data from samples collected during ACEPD inspections at the Prairie View Apartments Package Plant

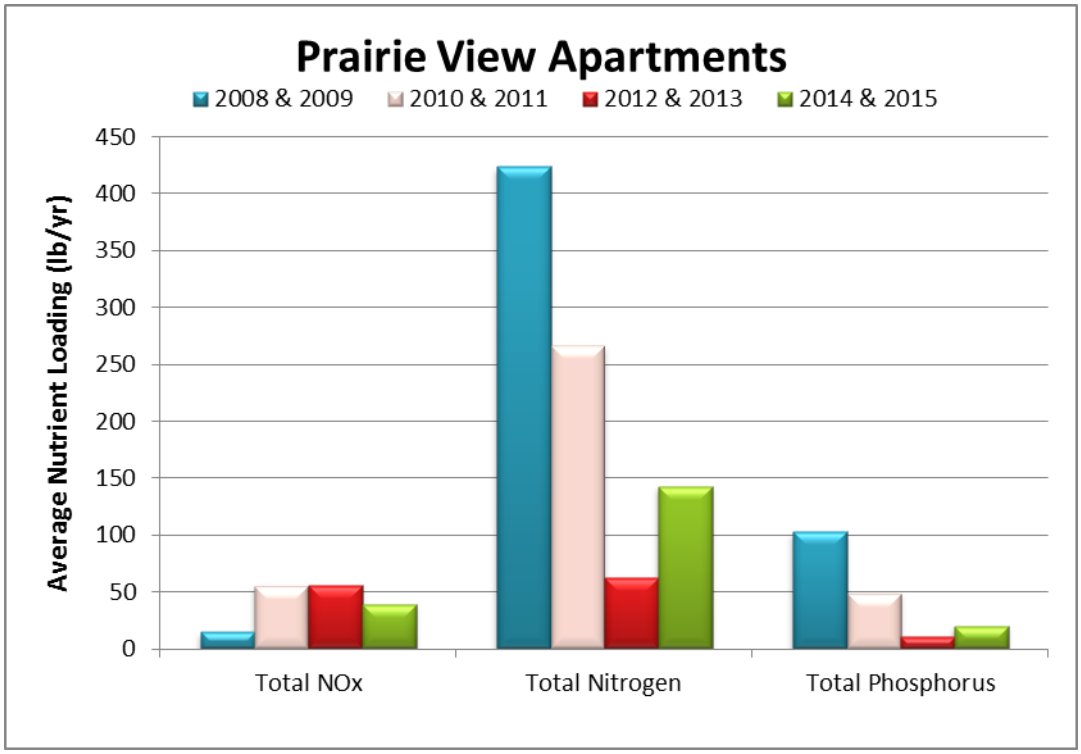


Figure 42. Estimated Nutrient Loading Values for the Prairie View Apartments Package Plant (2008 – 2015)

5.0 SUMMARY AND RECOMMENDATIONS

ACEPD will continue to monitor the Wastewater Treatment Facilities 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, with the exception of the two GRU facilities, and the Gainesville Raceway which are monitored on an annual basis. UF is no longer inspected by the ACEPD.

ACEPD plans to increase communication concerning problematic facilities with the Florida Department of Environmental Protection Domestic Wastewater Compliance staff. It is ACEPD's hopes to assist in keeping all of the WWTFs in compliance with their FDEP permits. In 2013 ACEPD added enforcement capabilities to its wastewater program, which gives 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 of the wastewater treatment facilities 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 the area where the Floridan aquifer is unconfined, within delineated springsheds of the springs of the lower Santa Fe River, and to those in the watersheds of Outstanding Florida Waters or Impaired Waters. By 2018, Camp Kulaqua will be pumping its effluent to the City of High Springs Municipal Wastewater Plant. This is an important step in protecting and improving the water quality of Hornsby Spring, a first magnitude spring on the Santa Fe River.

The Brittany Estates Mobile Home Park wastewater treatment plant 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 dissolved oxygen (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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