ORANGE COUNTY UTILITIES

Wastewater Treatment Plan for BMAPs

TECHNICAL MEMORANDUM

Orange County Wastewater Treatment Plan

DRAFT / January 2024

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200 EAST ROBINSON STREET, SUITE 1400 ▪ ORLANDO, FLORIDA 32801 ▪ P 407-478-4642

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SECTION 1 INTRODUCTION

The Florida Department of Environmental Protection (FDEP) worked with stakeholders to develop basin management action plans (BMAPs) to restore water quality for various impaired waterbodies in the State. BMAPs contain a comprehensive set of solutions, including management activities and improvement projects, designed to achieve pollutant reduction established by adopted water quality restoration targets such as Total Maximum Daily Loads (TMDLs).

Enacted by the Florida Legislature in 2020, the Clean Waterways Act (Chapter 2020-150, Laws of Florida) includes water quality protection provisions intended to reduce the impact of nutrient pollution sources on Florida waters by strengthening certain BMAP requirements.

The Clean Waterways Act, Section 403.067(7)(a)9, Florida Statutes (FS), specifies that local governments within a nutrient BMAP area must develop a wastewater treatment plan if the FDEP has determined that domestic wastewater treatment facilities contribute significantly (e.g., greater than 20 percent) to nutrient pollution. Local government wastewater treatment plans will be reviewed and incorporated by FDEP into updated versions of each relevant BMAP by July 1, 2025.

On June 12, 2023, the FDEP issued a Final Order identifying specific nutrient BMAPs where domestic wastewater treatment facilities were deemed to represent significant contributors to the overall nutrient pollution of impaired waterbodies.

Figure 1 shows the four water reclamation facilities (WRFs) owned and operated by Orange County Utilities (OCU) and the BMAP areas that overlap in Orange County. The following sections document the required information identified in the Final Order for domestic wastewater facilities, as it relates to the following BMAP areas partially located within unincorporated Orange County:

- Lake Jesup BMAP – no wastewater effluent standards for domestic wastewater facilities are listed in the BMAP.
- Lake Okeechobee BMAP – total nitrogen (TN) limits for domestic wastewater facilities are 3 milligrams per liter (mg/L) for surface water discharge and rapid infiltration basins (RIBs) and 10 mg/L for all other disposal methods including reuse; total phosphorus (TP) limits for domestic wastewater facilities are 1 mg/L for surface water discharge and RIBs and 6 mg/L for all other disposal methods including reuse.
- Upper Ocklawaha River BMAP – no wastewater effluent standards are listed for domestic wastewater facilities.
- Wekiwa and Rock Springs BMAP – TN limits for domestic wastewater facilities (with capacities greater than 0.1 mgd) are 3 mg/L for all reuse and disposal methods within the priority focus area (PFA); no TP limits are listed for domestic wastewater facilities.
- Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP – TN limits for domestic wastewater facilities are 10 mg/L for reuse irrigation systems and RIBs used as backup to reuse, 6 mg/L for new and existing RIBs within the secondary protection zone, and 3 mg/L for existing RIBs within the primary protection zone; no TP limits are listed for domestic wastewater facilities.

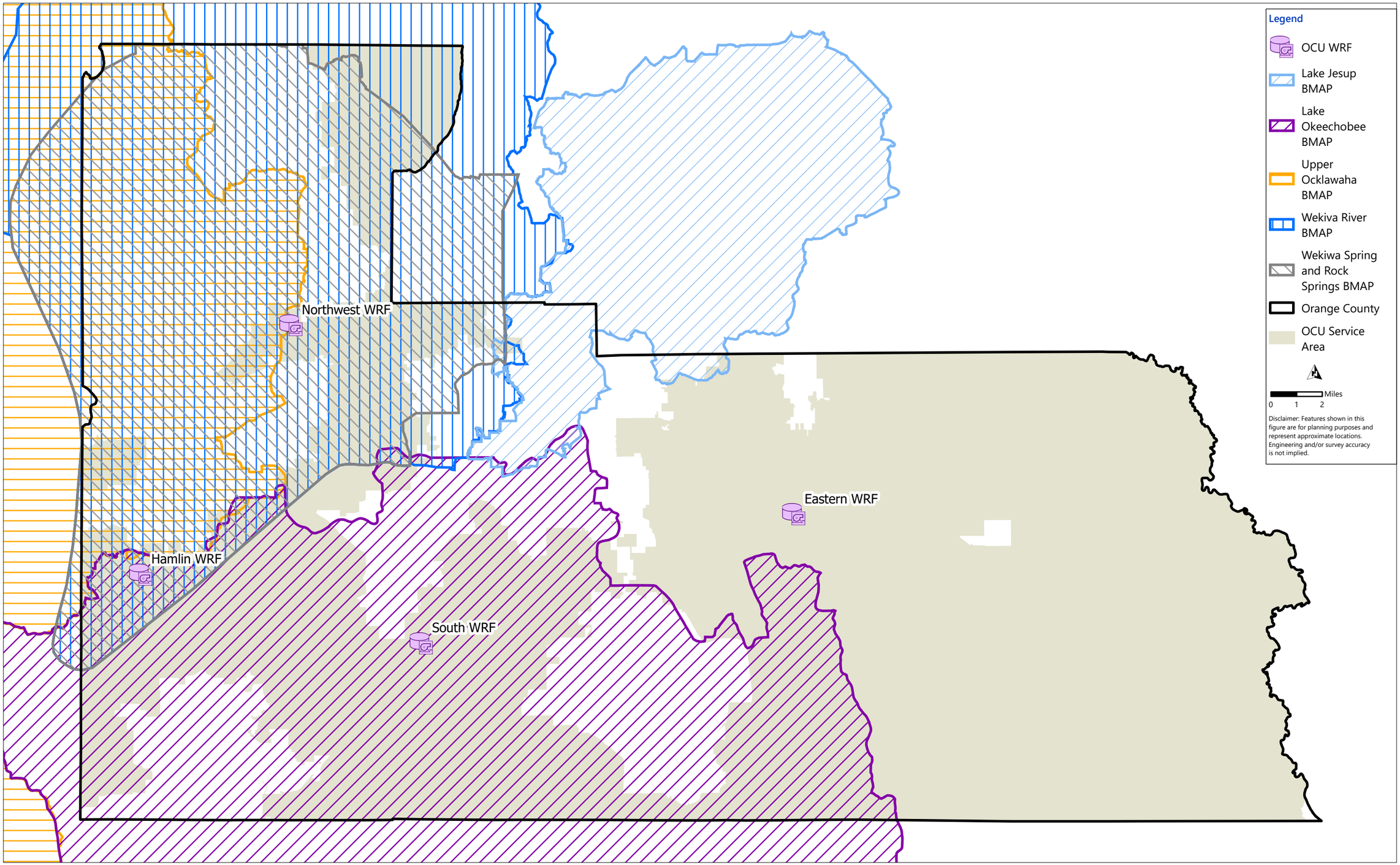

Figure 1 Basin Management Action Plans in Orange County

SECTION 2 NORTHWEST WATER RECLAMATION FACILITY

The Northwest Water Reclamation Facility (NWRF) is located at 701 W McCormick Road, Apopka, Florida. As shown in Figure 2, the facility's wastewater collection service area boundary is located within the following four BMAP areas:

- Lake Okeechobee BMAP.
- Upper Ocklawaha BMAP.
- Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP.
- Wekiwa Spring and Rock Springs BMAP.

The NWRF's reclaimed water distribution service area overlaps with the following three BMAP areas:

- Upper Ocklawaha BMAP.
- Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP.
- Wekiwa Spring and Rock Springs BMAP.

While all BMAPs discuss strategies to limit effluent nutrients from domestic wastewater treatment facilities, only a few BMAPs have clearly defined TN and TP concentration limits. The most stringent BMAP effluent limits potentially applicable to the NWRF are summarized in Table 1.

Table 1 BMAP Effluent TN and TP Concentration Limits for the NWRF

BMAP	Effluent TN Concentration Limit (mg/L)	Effluent TP Concentration Limit (mg/L)
Wekiwa Spring and Rock Springs BMAP	3	N/A
Lake Okeechobee BMAP – surface water discharge and RIBs	3	1
Lake Okeechobee BMAP – all other disposal methods including reuse	10	6

Note that only the wastewater collection infrastructure for the NWRF slightly extends into the Lake Okeechobee BMAP area (Figure 2). With respect to potential nutrient loading within a BMAP watershed, where the treated effluent is sent is more important than where the wastewater is collected from. The NWRF reclaimed water facilities and reuse distribution system do not extend into the Lake Okeechobee BMAP area; therefore, the Wekiwa Spring and Rock Springs BMAP targeted nutrient concentration limits should be the most stringent limits applicable to the NWRF effluent.

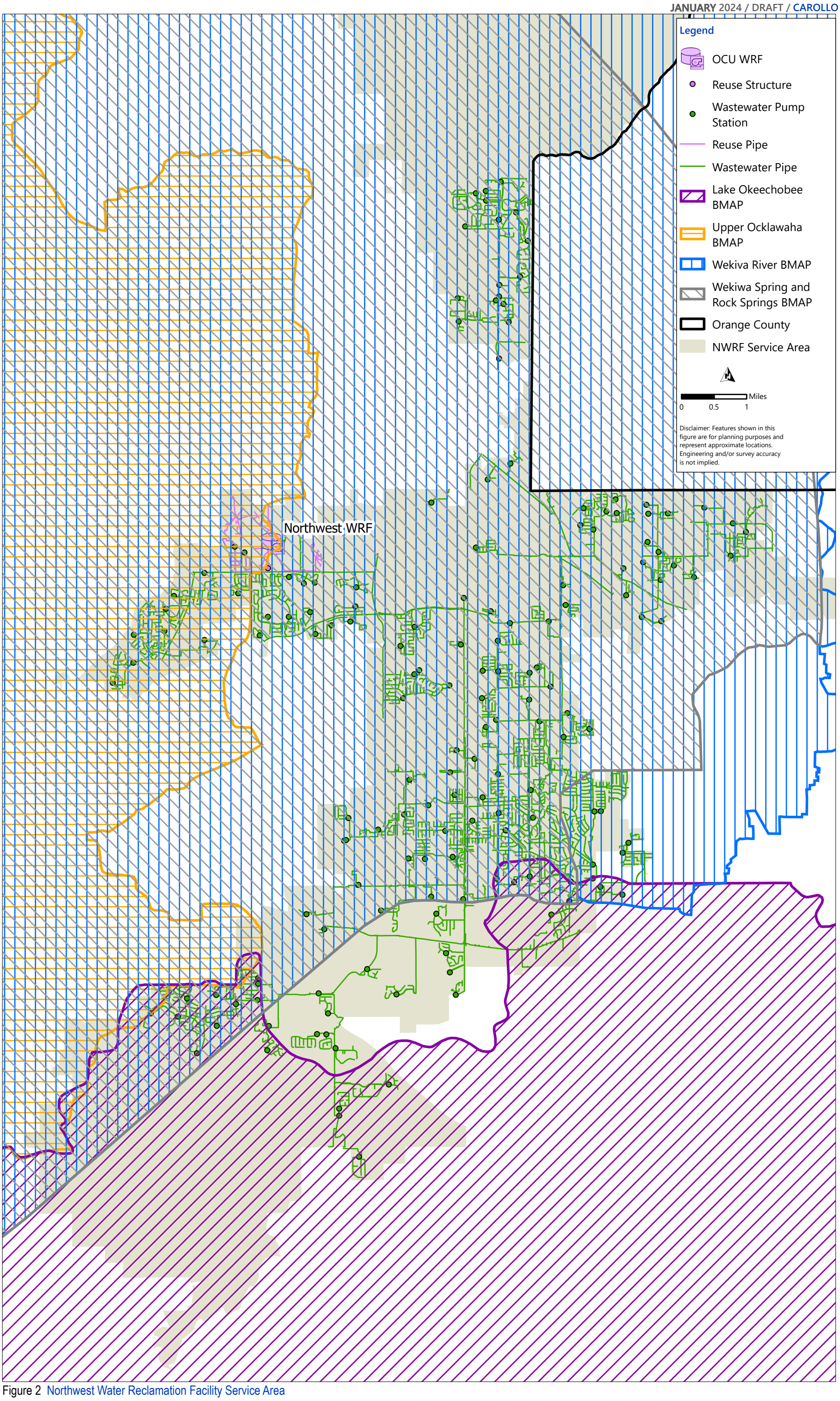

Figure 2 Northwest Water Reclamation Facility Service Area

2.1 Capacity Analysis

The NWRF is currently permitted for an annual average daily flow (AADF) treatment capacity of 11.25 million gallons per day (mgd) under FDEP permit number FLA010798. Annual average flow projections through 2045, shown in Figure 3, were determined using a linear regression analysis of available historical AADF for 2002 to 2021. Future flows through 2045 are not projected to exceed the existing permitted capacity.

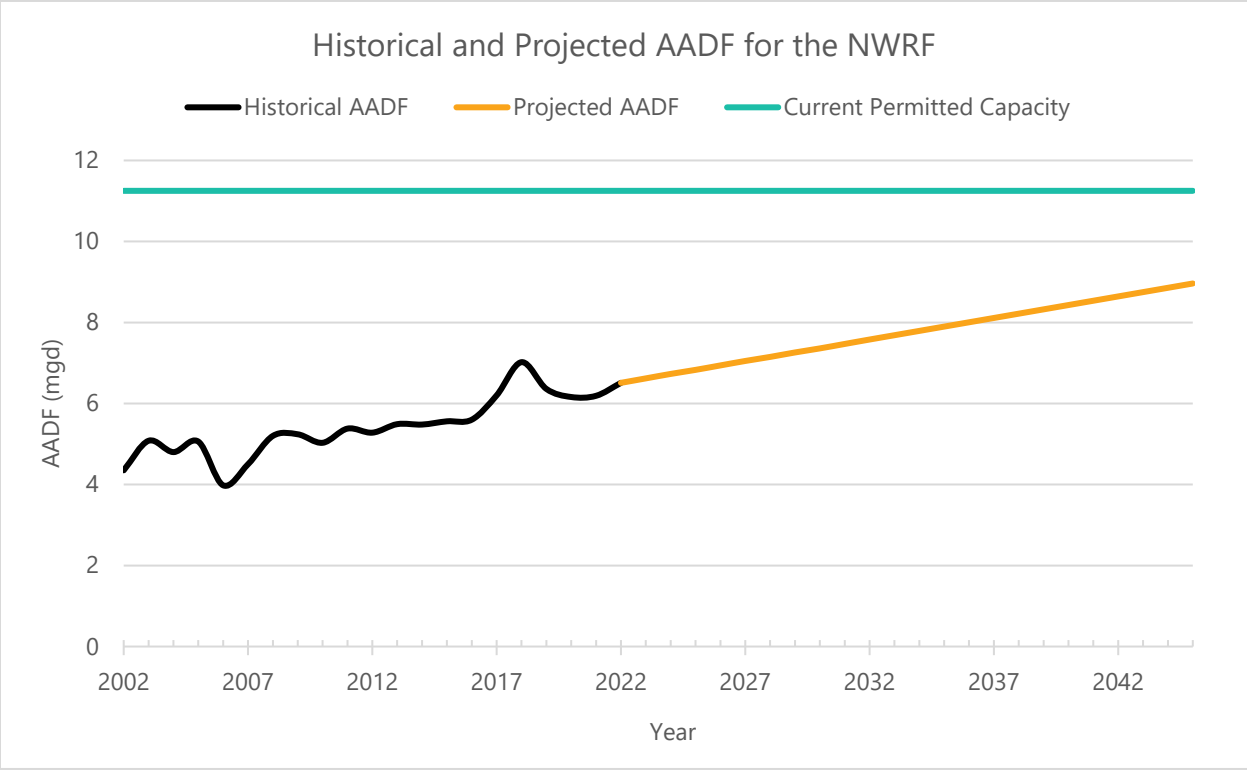

Figure 3 Historical and Projected Annual Average Flows and Permitted Capacity for the NWRF

2.2 Nutrient Concentrations and Loads

The NWRF is designed for advanced waste treatment and is permitted to discharge a total of 16.04 mgd AADF to the following three types of reuse systems:

- RIBs.
- Public access reuse (PAR) system.
- Wetlands/on-site lake augmentation system.

Table 2 summarizes the permitted average annual effluent flows to each of the three reuse systems, along with permitted TN and TP concentration limits per system.

Table 2 FDEP Permitted Discharge Systems with Annual Average Flow Capacities, TN, and TP Limits for the NWRF

Discharge Reuse System	FDEP Permit Land Application System ID	Effluent Flow Capacity (mgd AADF)	Effluent TN Limits (mg/L)	Effluent TP Limits (mg/L)
Rapid infiltration basin (RIB) system	R-001	4.9	3.0	Report(1)
Wetlands/lake augmentation	R-002	3.94	6.0	Report(1)
Public access reuse (PAR) system	R-003	7.2	10.0	Report(1)

Note:
(1) Permit requires monitoring and reporting effluent concentrations.

The NWRF's average annual effluent TN concentration limit is expected to be reduced to 3 mg/L in the future, as its reuse systems are located within the PFA of the Wekiwa Spring and Rock Springs BMAP. New effluent standards for facilities in the PFA will be effective starting July 1, 2028. Facilities must be compliant with new effluent standards no later than July 1, 2038.

The NWRF's current permit requires monitoring and reporting of effluent TP concentrations to evaluate the impact of reclaimed water on ground and surface water in an impaired water basin.

Table 3 summarizes historical annual average effluent flows with TN and TP concentrations and loads for 2018 through part of 2023. Compliance sampling for TN and TP is performed on the total effluent flow prior to the flow split amongst the NWRF's three reuse systems. Since 2018, average annual effluent TN concentrations have remained under permit limits, with TP concentrations averaging 1.75 mg/L. The average values presented for 2023 reflect data collected for January through September only.

Table 3 Historical Annual Average Effluent Flow, TN, and TP Data for the NWRF

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2018	5.83	1.74	31,855	2.36	42,405
2019	6.60	1.60	32,052	1.91	38,459
2020	6.07	2.23	40,564	1.80	32,955
2021	6.09	1.36	25,358	1.29	23,857
2022	6.27	1.84	35,539	1.83	34,410
2023(1)	6.46	2.57	50,327	2.32	45,787

Note:
(1) Based on available data through September 2023. 2023 loading (lbs/yr) estimated based on a projected full 12-month year.

Because the NWRF effluent water quality meets the requirements of the Wekiwa Spring and Rock Springs BMAP (TN<3 mg/L), treatment improvements are not deemed necessary for the facility to help achieve restoration requirements for the relevant BMAPs.

SECTION 3 EASTERN WATER RECLAMATION FACILITY

The Eastern Water Reclamation Facility (EWRF), located at 1621 South Alafaya Trail, Orlando, Florida, is designed for advanced waste treatment to produce effluent concentrations of 3 mg/L for TN and 0.62 mg/L for TP. While sections of the EWRF's wastewater service area to the west and south are located within the Lake Okeechobee BMAP, only a very small section in the northwest overlaps with the Lake Jesup BMAP, as shown in Figure 4. Sections of the EWRF's reclaimed water reuse irrigation distribution service area overlap the Lake Okeechobee BMAP area only. The most stringent BMAP effluent limits applicable to the EWRF are summarized in Table 4.

Table 4 BMAP Effluent TN and TP Concentration Limits for the EWRF

BMAP	Effluent TN Concentration Limit (mg/L)	Effluent TP Concentration Limit (mg/L)
Lake Okeechobee BMAP – all other disposal methods including reuse	10	6

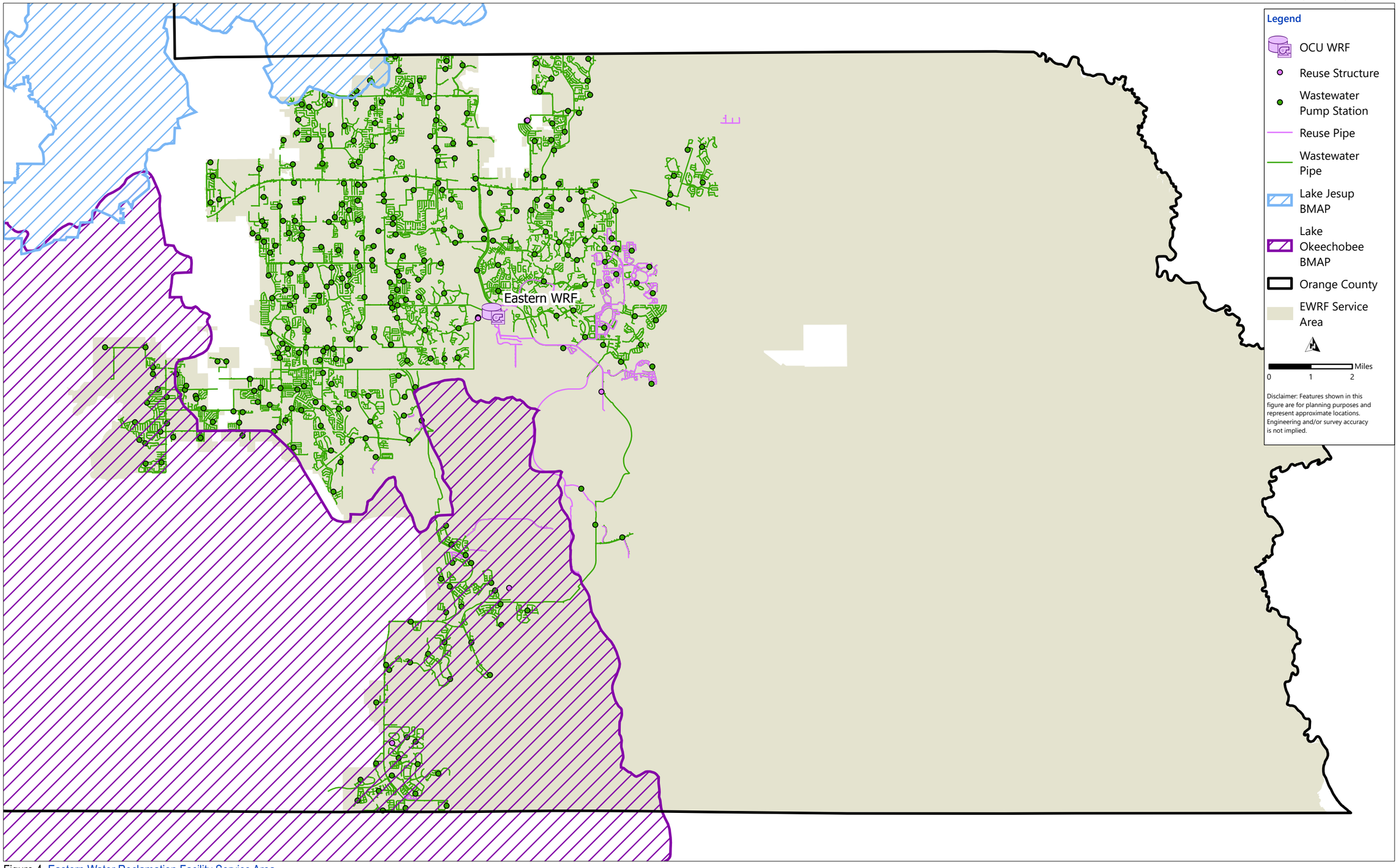

Figure 4 Eastern Water Reclamation Facility Service Area

3.1 Capacity Analysis

The EWRF is currently permitted for 24.0 mgd AADF treatment capacity under FDEP permit number FL0038849, which expires on March 23, 2025. Annual average flow projections through 2045, shown in Figure 5, were determined using a linear regression analysis of available historical AADF for 2007 to 2018. Future flows through 2045 are projected to exceed the existing permitted capacity. However, a facility expansion to 31.0 mgd AADF is anticipated to be completed within approximately 5 years.

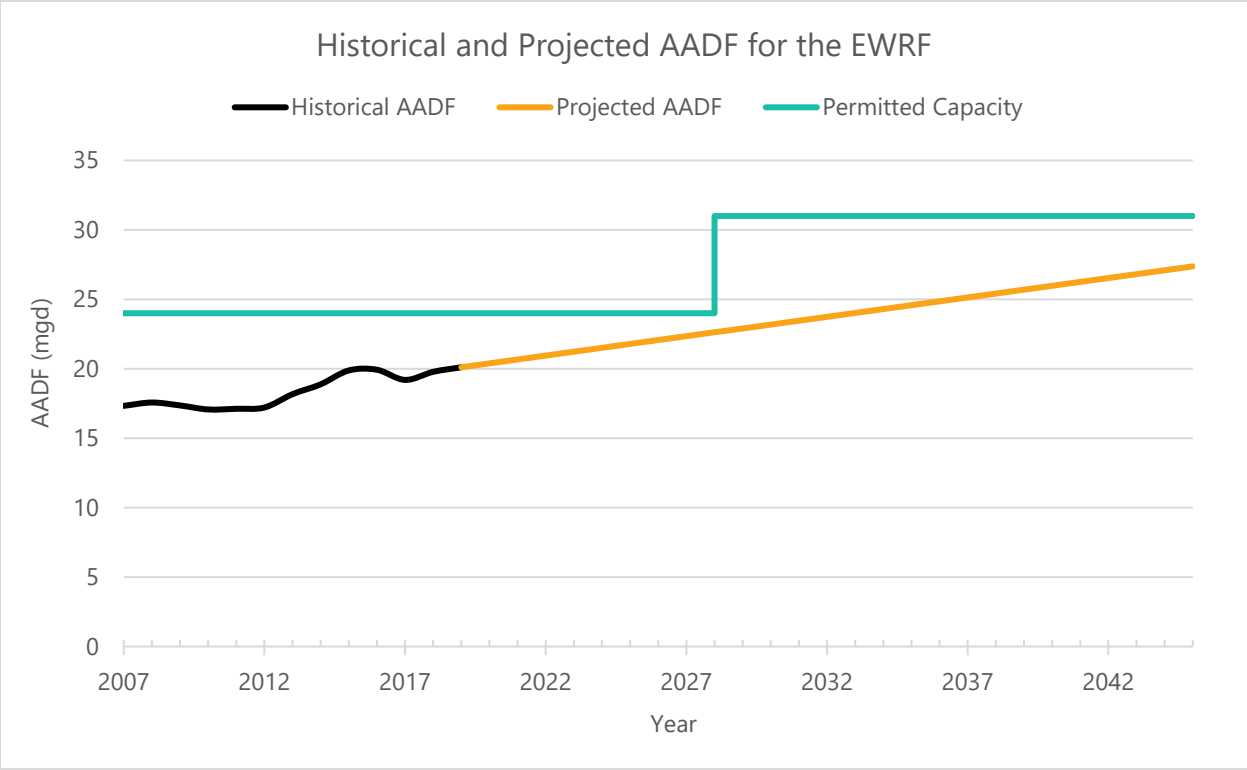

Figure 5 Historical and Projected Annual Average Flows and Permitted Capacity for the EWRF

3.2 Nutrient Concentrations and Loads

The EWRF is permitted to discharge a total of 31.25 mgd AADF of reclaimed water meeting required limits to a combination of the following four reuse systems:

- RIB system.
- Industrial reuse (power plant cooling water).
- Wetlands system, with downstream outfall to the Big Econlockhatchee (Econ) River.
- PAR irrigation system.

Table 5 summarizes the permitted average annual effluent flows to each of the reuse systems, with permitted TN and TP concentration limits per system. The FDEP permits the EWRF to send up to 10.0 mgd AADF to a wetland system (R-003), which subsequently outfalls to an unnamed tributary leading to the Big Econ River (D-001).

Table 5 FDEP Permitted Discharge Systems with Annual Average Flow Capacities, TN, and TP Limits for the EWRF

Discharge Reuse System	FDEP Permit Land Application System ID	Effluent Flow Capacity (mgd AADF)	Effluent TN Limits (mg/L)	Effluent TP Limits (mg/L)
RIB system	R-001	2.5	12.0(1)	N/A
Industrial reuse system	R-002	13.0	N/A	N/A
Wetlands system	R-003	10.0	3.7	0.62
Outfall to Big Econlockhatchee River	D-001	Report(2)	2.2	0.2
PAR system	R-004	5.75	Report(2)	Report(2)

Notes:
(1) Maximum total nitrate (as N) concentration limit on a single sample statistical basis.
(2) Permit requires monitoring and reporting flow or concentration.

It is anticipated that the EWRF PAR system's permitted effluent water quality concentration limits may change in the future (TN<10 mg/L, TP<6 mg/L), as a portion of the reclaimed water distribution service area is located within the Lake Okeechobee BMAP area. Such revised effluent standards would likely be incorporated during the next permit renewal.

OCU monitors effluent compliance at the discharge from each of the Phase I/II and Phase III/IV chlorine contact chambers (CCCs) at the EWRF. While discharge from Phase I/II CCCs is monitored for compliance with effluent limits for the PAR system, Phase III/IV CCCs discharge can be diverted to the wetlands, RIBs, PAR, or industrial reuse systems.

Table 6 summarizes the combined effluent flow and nutrient data for EWRF discharge from the Phase III/IV CCCs to the RIBs, wetlands, and industrial reuse system for 2018 through September 2023. Effluent TN concentrations for 2019 through 2023 were under permitted wetland discharge limits. Effluent TP concentrations met permitted wetland discharge limits for the duration presented.

Table 6 Historical Annual Average Effluent Flow, TN and, TP Data for EWRF Discharge to RIBs, Wetlands, and Industrial Reuse Systems

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2018	15.33	5.03	234,374	0.26	12,543
2019	15.93	3.04	147,808	0.17	8,128
2020	15.07	2.31	106,107	0.16	7,189
2021	15.27	2.76	128,460	0.14	6,416
2022	16.85	3.13	160,818	0.20	10,166
2023(1)	14.08	3.43	146,947	0.27	11,390

Note:
(1) Based on available data through September 2023. Loading (lbs/yr) estimated based on a projected full 12-month year.

Table 7 summarizes effluent flow and nutrient data for the total EWRF discharge to the PAR system from the Phase I/II and Phase III/IV CCCs for 2018 through September 2023. Annual average effluent TN concentrations averaged 3.36 mg/L for 2018 through 2023, while annual average effluent TP concentrations were below 0.3 mg/L.

Table 7 Historical Annual Average Effluent Flow, TN and, TP Data for EWRF Discharge to PAR System

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2018	3.87	4.49	52,082	0.34	4,038
2019	4.02	3.08	39,463	0.26	3,223
2020	4.35	2.79	36,791	0.27	3,607
2021	3.56	3.13	33,995	0.15	1,625
2022	3.03	3.23	29,237	0.24	2,239
2023(1)	4.36	3.44	45,107	0.35	4,945

Note:
(1) Based on available data through September 2023. Loading (lbs/yr) estimated based on a projected full 12-month year.

The EWRF effluent water quality meets the target requirements of the Lake Okeechobee BMAP for discharge to PAR irrigation (TN<10 mg/L, TP<6 mg/L). The EWRF's RIB and wetlands systems are not located within a BMAP area. For the most recent 5-year period (2019 through 2023), the EWRF effluent sent to PAR saw average concentrations of 3.1 mg/L and 0.25 mg/L for TN and TP, respectively. Treatment improvements are therefore not deemed necessary for the facility to help achieve restoration requirements for the relevant BMAPs.

SECTION 4 SOUTH WATER RECLAMATION FACILITY

The South Water Reclamation Facility (SWRF), located at 4760 Sand Lake Road, Orlando, Florida, includes four separate treatment trains: North Plant 1, North Plant 2, Southeast Plant, and Southwest Plant. The four treatment trains at the SWRF are designed for various levels of nutrient removal. Collectively, the facility is currently designed to meet advanced secondary treatment standards. The effluent from all four plants is blended and generally reused for groundwater recharge through irrigation and RIBs.

As shown in Figure 6, the facility's wastewater collection service area is located within the Lake Okeechobee BMAP area. The SWRF's reclaimed water distribution service area is located primarily within the Lake Okeechobee BMAP area, with a very small portion of reuse pipes overlapping the Wekiva River BMAP and the Wekiwa Spring and Rock Springs BMAP areas. However, SWRF reuse distribution piping does not intersect with the Wekiwa Spring and Rock Springs BMAP PFA or the primary or secondary protection zones of the Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP. Thus, the most stringent BMAP effluent limits applicable to the SWRF are summarized in Table 8.

Table 8 BMAP Effluent TN and TP Concentration Limits for the SWRF

BMAP	Effluent TN Concentration Limit (mg/L)	Effluent TP Concentration Limit (mg/L)
Lake Okeechobee BMAP – surface water discharge and RIBs	3	1
Lake Okeechobee BMAP – all other disposal methods including reuse	10	6

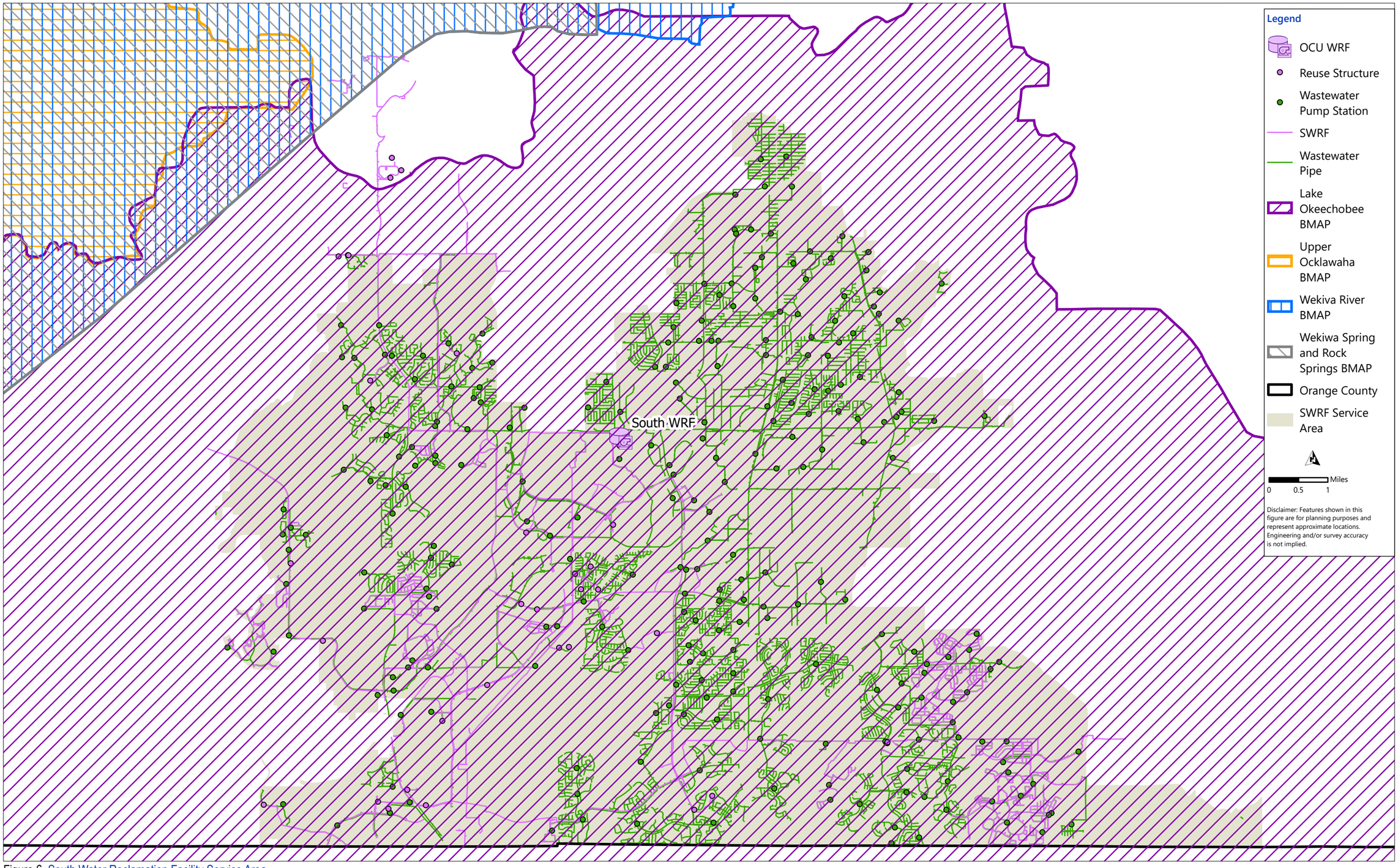

Figure 6 South Water Reclamation Facility Service Area

4.1 Capacity Analysis

The SWRF is currently permitted for 56.0 mgd AADF treatment capacity under FDEP permit number FLA107972, which expires on March 6, 2024. An application to renew the permit has been submitted to the FDEP, and renewal is pending. New permit requirements and water quality limits consistent with the Lake Okeechobee BMAP are being incorporated into the SWRF permit as part of the current renewal.

Annual average flow projections through 2045, shown in Figure 7, were determined using a linear regression analysis of available historical AADF for 2008 to 2022. Future flows through 2045 are not projected to exceed the existing permitted capacity.

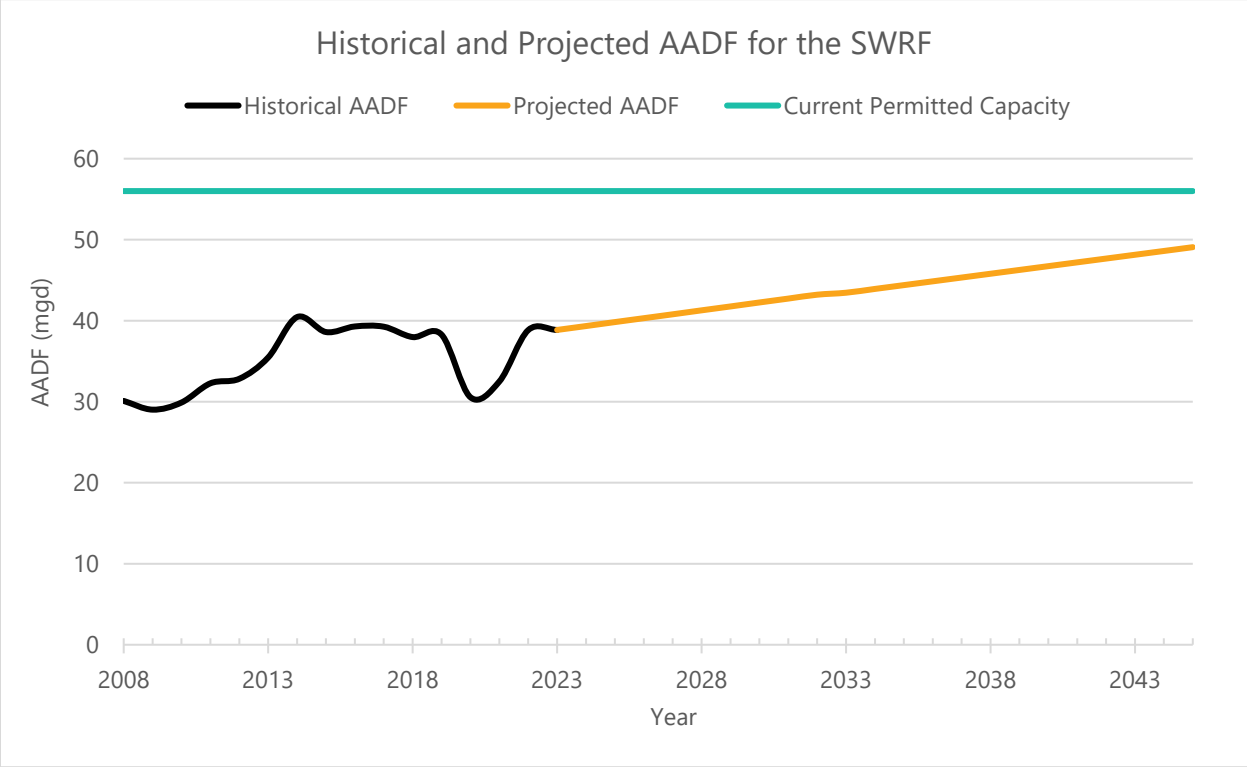

Figure 7 Historical and Projected Annual Average Flows and Permitted Capacity for the SWRF

4.2 Nutrient Concentrations and Loads

The SWRF is designed for advanced secondary treatment and is permitted to discharge a total of 68.11 mgd AADF to the following reuse systems:

- South Service Area (SSA) PAR system.
- Water Conserv II Reuse Distribution Center for PAR irrigation and RIBs recharge.
- Old Winter Garden Road RIBs.

Table 9 summarizes the permitted annual average effluent flows to each of the reuse systems, with TN and TP concentration limits per system. The SWRF's current permit requires monitoring and reporting of effluent TN and TP concentrations, with a 10-mg/L monthly average TN, as nitrate, concentration limit for discharge to the Old Winter Garden Road RIBs. Because reclaimed water from SWRF must flow through

the SSA PAR distribution system pipeline network to reach the Old Winter Garden Road RIBs (R-004), by default the current permit limit of 10 mg/L TN also applies to the SSA PAR system (R-001). SWRF sends a portion of its reclaimed water to Water Conserv II, a regional reuse distribution system in west Orange and east Lake counties that serves PAR irrigation customers and RIBs. The current SWRF permit does not have specific effluent TN or TP concentration limits for discharge sent to Water Conserv II; however, the separate Water Conserv II Distribution Center permit does include a 10-mg/L limit on TN, as shown in Table 9.

Table 9 FDEP Permitted Discharge Systems with Annual Average Flow Capacities, TN, and TP Limits for the SWRF

Discharge Source	FDEP Permit Land Application System ID	Effluent Flow Capacity (mgd AADF)	Effluent TN Limits (mg/L)	Effluent TP Limits (mg/L)
South Service Area PAR system	R-001	27.81	Report(1)	Report(1)
Water Conserv II RIBs	R-002	20.5	10.0(2)	Report(2)
Water Conserv II PAR system	R-003	19.5	10.0(2)	Report(2)
Old Winter Garden Road RIBs	R-004	0.3	10.0(3)	N/A

Notes:
(1) Permit requires monitoring and reporting effluent concentrations.
(2) Annual average concentration limits from separate Water Conserv II Distribution Center permit.
(3) Maximum monthly average total nitrate (as N) effluent concentration limit based on daily monitoring.

Table 10 and Table 11 summarize historical annual average effluent flows with TN and TP concentrations and loads for 2018 through 2023 for reclaimed water supply to the SWRF's SSA PAR system and to Water Conserv II, respectively. Effluent TN and TP concentrations fluctuated over the 5-year period. Effluent TP concentrations across all discharge sources averaged higher than the 1-mg/L limit adopted for the Lake Okeechobee BMAP for the 5-year period. Temporary TN and TP exceedances experienced by SWRF over the past several years are attributed to ongoing facility improvements, construction, and short circuiting in underperforming nutrient removal trains.

Table 10 Historical Annual Average Effluent Flow, TN, and TP Data for SWRF Discharge to the SSA PAR System and Old Winter Garden Road RIBs

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2018	7.07	5.47	124,091	1.95	44,714
2019	10.36	22.48	679,417	2.00	60,594
2020	9.78	7.93	219,284	1.83	55,762
2021	11.31	10.03	349,452	3.01	104,571
2022	11.55	18.99	671,665	1.78	63,372
2023(1)	12.51	17.89	706,233	2.10	81,534

Note:
(1) Based on available data through September 2023. Loading (lbs/yr) estimated based on a projected full 12-month year.

Table 11 Historical Annual Average Effluent Flow, TN, and TP Data for SWRF Discharge to Water Conserv II PAR Irrigation and RIBs

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2018	21.75	11.75	796,550	2.48	168,271
2019	19.58	13.92	825,387	2.71	156,876
2020	14.23	12.11	588,107	3.05	137,843
2021	15.63	8.30	408,833	2.58	125,756
2022	22.44	9.89	665,819	2.71	184,184
2023(1)	18.50	7.85	452,371	3.80	211,659

Note:
(1) Based on available data through September 2023. Loading (lbs/yr) estimated based on a projected full 12-month year.

The SWRF water quality does not currently meet the targeted requirements of the Lake Okeechobee BMAP for discharge to RIBs (TN<3 mg/L, TP<1 mg/L). In addition, it has not consistently met the targeted requirements of the Lake Okeechobee BMAP for TN to reuse irrigation (TN<10 mg/L). Orange County is prioritizing this facility for treatment improvements to help achieve restoration goals for the relevant BMAPs. As mentioned, new effluent water quality limits consistent with the Lake Okeechobee BMAP are being incorporated into the SWRF permit as part of the current renewal.

SECTION 5 HAMLIN WATER RECLAMATION FACILITY

The Hamlin Water Reclamation Facility (HWRF) is located at 16000 Malcolm Road, Winter Garden, Florida. This advanced domestic wastewater treatment facility became operational in October 2022. As shown in Figure 8, the facility's wastewater and reclaimed water service area boundaries are located within the following four BMAP areas:

- Lake Okeechobee BMAP.
- Upper Ocklawaha BMAP.
- Wekiva River BMAP.
- Wekiwa Spring and Rock Springs BMAP.

However, reuse distribution piping and RIBs do not intersect with the Wekiwa Spring and Rock Springs BMAP PFA or the primary or secondary protection zones of the Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP. Thus, the most stringent BMAP effluent limits applicable to the HWRF are summarized in Table 12.

Table 12 BMAP Effluent TN and TP Concentration Limits for the HWRF

BMAP	Effluent TN Concentration Limit (mg/L)	Effluent TP Concentration Limit (mg/L)
Lake Okeechobee BMAP – surface water discharge and RIBs	3	1
Lake Okeechobee BMAP – all other disposal methods including reuse	10	6

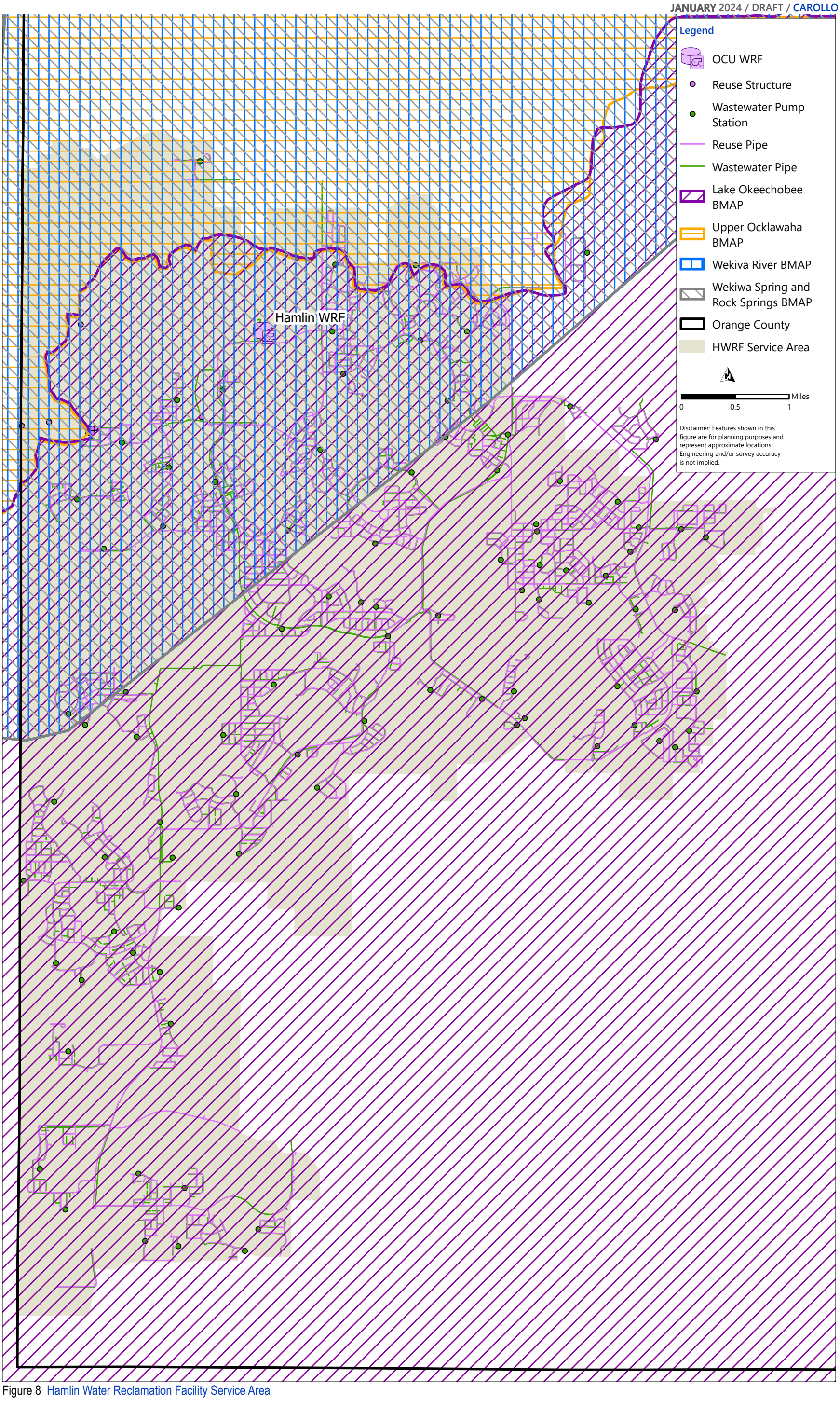

Figure 8 Hamlin Water Reclamation Facility Service Area

5.1 Capacity Analysis

The HWRF is currently permitted for 5.0 mgd AADF treatment capacity under FDEP permit number FLAB07049, which expires on August 18, 2024. Limited historical flows for the HWRF were available since the facility's start-up in October 2022. Figure 7 shows historical flow data for less than three months in 2022 and only January through October in 2023. Linear extrapolation of available monthly flows from November 2022 through October 2023 was used to estimate projected AADF through 2045. A facility expansion to 10 mgd AADF is under design and anticipated to be completed within approximately two years.

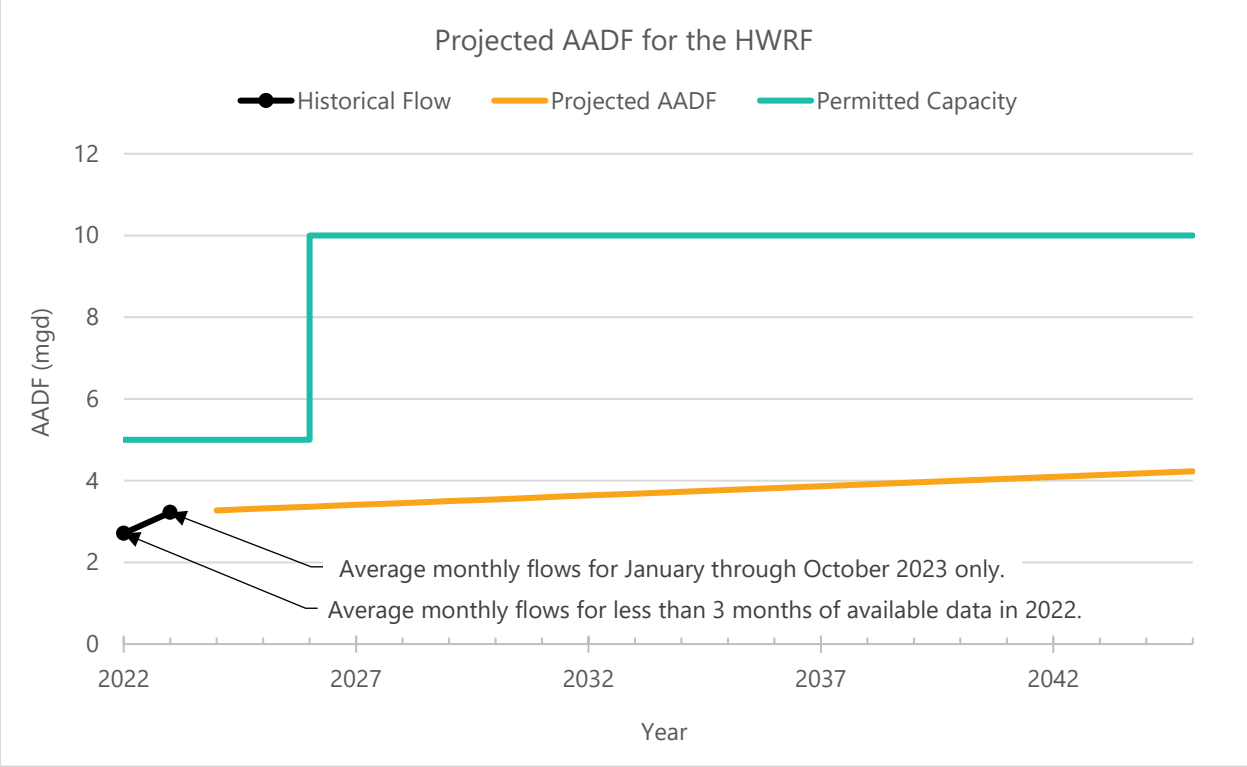

Figure 9 Projected Annual Average Flows and Permitted Capacity for the HWRF

5.2 Nutrient Concentrations and Loads

The HWRF is designed for advanced waste treatment and is currently permitted to discharge up to 5.0 mgd AADF of reclaimed water to the Water Conserv II RIBs system (R-001), or an unlimited volume of flow to the PAR irrigation system. The PAR system served by HWRF is the Orange County Southwest Service Area (SWSA) reclaimed water system, which is interconnected to and can also be served by the Water Conserv II Distribution Center. Table 13 summarizes the effluent limits as stated in the HWRF's current permit.

Table 13 FDEP Permitted Discharge Systems with Annual Average Flow Capacities, TN, and TP Limits for the HWRF

Discharge Reuse System	FDEP Permit Land Application System ID	Effluent Flow Capacity (mgd AADF)	Effluent TN Limits (mg/L)	Effluent TP Limits (mg/L)
Water Conserv II RIBs	R-001	5.0	10.0	N/A
PAR system	R-002	Report(1)	3.0	Report(1)

Note:
(1) Permit requires monitoring and reporting flow or concentration.

It is anticipated that the HWRF permitted effluent water quality concentration limits may change in the future (TN<3 mg/L to RIBs, TP<1 mg/L to RIBs and TP<6 mg/L to PAR), as portions of the reclaimed water service area and RIB sites are located within the Lake Okeechobee BMAP. Such revised effluent standards would likely be incorporated during the next permit renewal.

Table 14 summarizes the data available for effluent flows and TN and TP concentrations and loads for the HWRF since it became operational in October 2022. Compliance monitoring occurs at a single effluent sampling point at the HWRF's effluent transfer station prior to routing flow to the reclaimed water discharge systems. The average effluent TN concentrations for January through September 2023 were below adopted limits for the Lake Okeechobee BMAP. Effluent TP concentrations for the same duration met permit water quality limits but were higher than the targeted requirement for the Lake Okeechobee BMAP for discharge to RIBs.

Table 14 Historical Annual Average Effluent Flow, TN, and TP Data for the HWRF

Year	Total Effluent Flow (mgd AADF)	TN Concentrations (mg/L)	TN Loads (lbs/yr)	TP Concentrations (mg/L)	TP Loads (lbs/yr)
2022(1)	2.01	4.24	14,668	2.04	8,038
2023(2)	3.58	2.65	29,174	2.11	23,141

Notes:
(1) Based on available data for October to December 2022.
(2) Based on available data for January to September 2023.

Because the HWRF treatment system is designed to advanced waste treatment standards, which would meet the most stringent BMAP requirements, significant treatment improvements are not deemed necessary for the facility to help achieve restoration requirements for the relevant BMAPs. While the HWRF is currently meeting its permitted limits for nutrient water quality, it may take some minor adjustments to facility operations (post-startup) to achieve the lower TP concentrations targeted by the Lake Okeechobee BMAP restoration strategy.

SECTION 6 PLANNED PROJECTS AND NUTRIENT REDUCTION

6.1 List of Planned Facility Improvement Projects

OCU maintains a capital improvements program (CIP) with planned improvement projects for their WRFs and other assets. Table 15 lists planned projects to expand treatment capacity and improve nutrient removal to help achieve targeted BMAP restoration goals. The 5-year costs reflect how much OCU anticipates spending per project for fiscal years 2024 through 2028. The total project costs sum the 5-year anticipated and future estimated costs to complete design and construction for each project listed. OCU estimates a total of $282,509,400 will be spent on projects related to BMAP restoration goals.

Table 15 OCU Planned Projects for WRFs Related to BMAPs

Project	5-Year Cost	Future Cost	Total Project Cost
EWRF Phase 6B Expansion to 31 mgd AADF	$7,088,000	$48,000,000	$55,088,000
EWRF Secondary Treatment Improvements Project	$320,900	$5,000,000	$5,320,900
SWRF Advanced Wastewater Treatment Improvements	$36,742,700	$83,257,300	$120,000,000
SWRF Phase 6A Major Facility Improvements	$5,719,200	$29,222,700	$34,941,900
HWRF Phase 2 Expansion to 10 mgd AADF	$46,235,200	$20,923,400	$67,158,600
Total Costs	**$96,106,000**	**$186,403,400**	**$282,509,400**

6.2 Estimated Nutrient Load Reduction

As mentioned, Orange County is prioritizing treatment improvements at the SWRF over the next 5 years to help support BMAP restoration goals. Minor operational improvements will also be implemented by OCU as needed at the other WRFs to meet any updated permit limits for nutrient concentrations, in line with achieving advanced waste treatment effluent quality. When these planned facility improvements are completed, the total loading of nutrients discharged by the WRFs will decrease. For reference, estimates of this nutrient load reduction potential are provided herein.

Potential nutrient load reductions for the SWRF were estimated using the 2022 annual average effluent flow for the facility and the difference between observed 2022 average effluent concentrations and the most stringent adopted BMAP nutrient limits applicable, as identified in previous Section 4. Estimated potential load reductions, displayed in pounds per year (lbs/yr) in Table 16, show how much the loads would be reduced by if SWRF was to meet effluent limits of 3 mg/L for TN and 1 mg/L for TP required for RIBs by the Lake Okeechobee BMAP.

Separate estimates of load reduction potential are displayed in Table 16 for the SWRF's discharge to each of the SSA PAR and Water Conserv II reuse systems. Planned advanced waste treatment improvements are expected to enable the SWRF to meet the targeted Lake Okeechobee BMAP nutrient effluent limits.

Table 16 Estimated Nutrient Load Reduction Potential for the SWRF

	2022 Effluent Concentrations (mg/L)		2022 Effluent Loads (lbs/yr)		Estimated Load Reduction Potential (lbs/yr)	
	PAR System	Water Conserv II	PAR System	Water Conserv II	PAR System	Water Conserv II
TN	18.99	9.89	671,665	665,819	566,106	460,778
TP	1.78	2.71	63,372	184,184	28,185	155,837

Potential load reductions were not estimated for the EWRF, NWRF or HWRF. The EWRF effluent water quality already meets the most stringent BMAP limits anticipated to apply to that facility (i.e., TN<10 mg/L, TP<6 mg/L for flow to reuse irrigation, per the Lake Okeechobee BMAP). The NWRF effluent water quality already meets the most stringent BMAP limits anticipated to apply to that facility (i.e., TN<3 mg/L, per the Wekiwa Spring and Rock Springs BMAP). In addition, the HWRF has only recently started up, and an established long-term record of water quality performance data is not yet available. The HWRF is designed to meet advanced waste treatment standards.

SECTION 7 OTHER FACILITIES IN UNINCORPORATED ORANGE COUNTY

Table 17 lists additional domestic wastewater (DW) or residual (RES) treatment facilities located within unincorporated Orange County, as shown in the map in Figure 10. These facilities are owned and operated by other local governments, special districts, or private wastewater providers that also contribute nutrients to the various BMAP areas within Orange County's boundaries. Sourced from the FDEP's open data portal, the table includes the following details per facility:

- Wastewater Facility Regulation (WAFR) ID used to label the facility location in the Orange County map in Figure 10.
- Location code as provided by FDEP.
- FDEP-assigned permit number.
- Facility name.
- Facility treatment type: domestic wastewater (DW) or residual (RES).
- Yes (Y) or No (N) indication if the facility has a National Pollutant Discharge Elimination System (NPDES) permit.
- Facility design and FDEP-permitted capacities in mgd AADF.

Table 18 lists additional wastewater sites that contribute to the BMAP areas within Orange County's boundaries, including land application sites, percolation ponds, and reuse systems owned and operated by others. The Map ID in Table 18 is used to indicate the domestic wastewater site location on the map in Figure 11. The location code, FDEP permit number, facility name, site code, and site type are included for each site.

Table 17 Additional Domestic Wastewater Treatment Facilities in Unincorporated Orange County Contributing to BMAPs within Orange County's Boundaries

WAFR ID	Location Code	FDEP Permit Number	Facility Name	Facility Type	NPDES	Design Capacity (mgd AADF)	Permitted Capacity (mgd AADF)
10792	15091	FLA010792	Moss Park	DW	N	0.02	0.02
10795	15564	FLA010795	Conserv II Distribution Center	DW	N	80.9	80.9
10796	10423	FLA010796	Clarcona Elementary School	DW	N	0.0125	0.0125
10801	13264	FLA010801	Windermere Elementary School	DW	N	0.01	0.01
10814	3395	FLA010814	Orlando/Conserv II WRF	DW	N	25	25
10815	7256	FLA010815	Ocoee, City of - WWTF	DW	N	3	3
10816	5100	FLA010816	Orlando/Water Conserv - I WRF	DW	N	7.5	7.5

WAFR ID	Location Code	FDEP Permit Number	Facility Name	Facility Type	NPDES	Design Capacity (mgd AADF)	Permitted Capacity (mgd AADF)
10817	16757	FL0020109	Winter Garden WWTF	DW	Y	2	4.75
10818	18332	FLA010818	Apopka WRF - Project Arrow	DW	N	4.5	8
10819	1785	FLA010819	Winter Park Estates WWTF	DW	N	0.75	0.75
10821	338	FLA108219	Reedy Creek Improvement District	DW	N	20	20
10823	16742	FLA010823	Fairways Country Club WWTF	DW	N	0.15	0.15
10831	24376	FLA010831	Lost Lake RV Resort WWTF	DW	N	0.009	0.009
10835	9794	FLA010835	Gulfstream Harbor WWTF	DW	N	0.1	0.1
10851	337	FLA010851	Clarcona Resort WWTF	DW	N	0.08	0.08
10857	3393	FLA010857	Lake Downey WWTF	DW	N	0.015	0.015
10860	23150	FLA010860	University Sun Estates 2 and 3 WWTF	DW	N	0.0093	0.0093
10862	10292	FLA010862	Magnolia Mobile Home Park	DW	N	0.015	0.015
10866	5774	FLA010866	Christmas RV Park WWTF	DW	N	0.015	0.015
10867	27930	FLA010867	Orlando Utilities Commission Stanton Energy Center	DW	N	0.034	0.034
10871	13263	FLA010871	Rock Springs MHP WWTF	DW	N	0.15	0.15
10877	23148	FLA010877	Pine Island MHP WWTF	DW	N	0.01	0.01
10881	23343	FLA010881	Edgewood Children's Ranch	DW	N	0.015	0.015
10887	24349	FLA010887	West Orange Country Club WWTF	DW	N	0.0025	0.0025
10891	18325	FLA010891	Valencia Estates Mobile Home Community	DW	N	0.025	0.0199
10895	5096	FLA010895	Valley WWTF	DW	N	0.025	0.0249
10900	10416	FLA010900	Wedgefield WWTF	DW	N	0.368	0.368
10911	8550	FLA109118	Hidden Valley Mobile Home Community	DW	N	0.09	0.09
10948	8548	FLA010948	Brightwood Manor WWTF	DW	N	0.08	0.08
16177	20569	FLA016177	Shelley's Septic Tanks RMF	RES	N	38	38

WAFR ID	Location Code	FDEP Permit Number	Facility Name	Facility Type	NPDES	Design Capacity (mgd AADF)	Permitted Capacity (mgd AADF)
17457	15587	FLA017457	Orange County National Golf Club LLC	DW	N	0.06	0.06
18510	5729	FLA185108	Select Processing of Orlando RMF	RES	N	0.188	0.188
63560	54455	FLA635600	Space Blvd BTF	RES	N	0	0.441

Table Abbreviation Notes:
WAFR: wastewater facility regulation
WRF: water reclamation facility
WWTF: wastewater treatment facility
MHP: mobile home park
RMF: residual management facility
BTF: biosolids treatment facility
DW: domestic wastewater
RES: residual
Y: yes
N: no

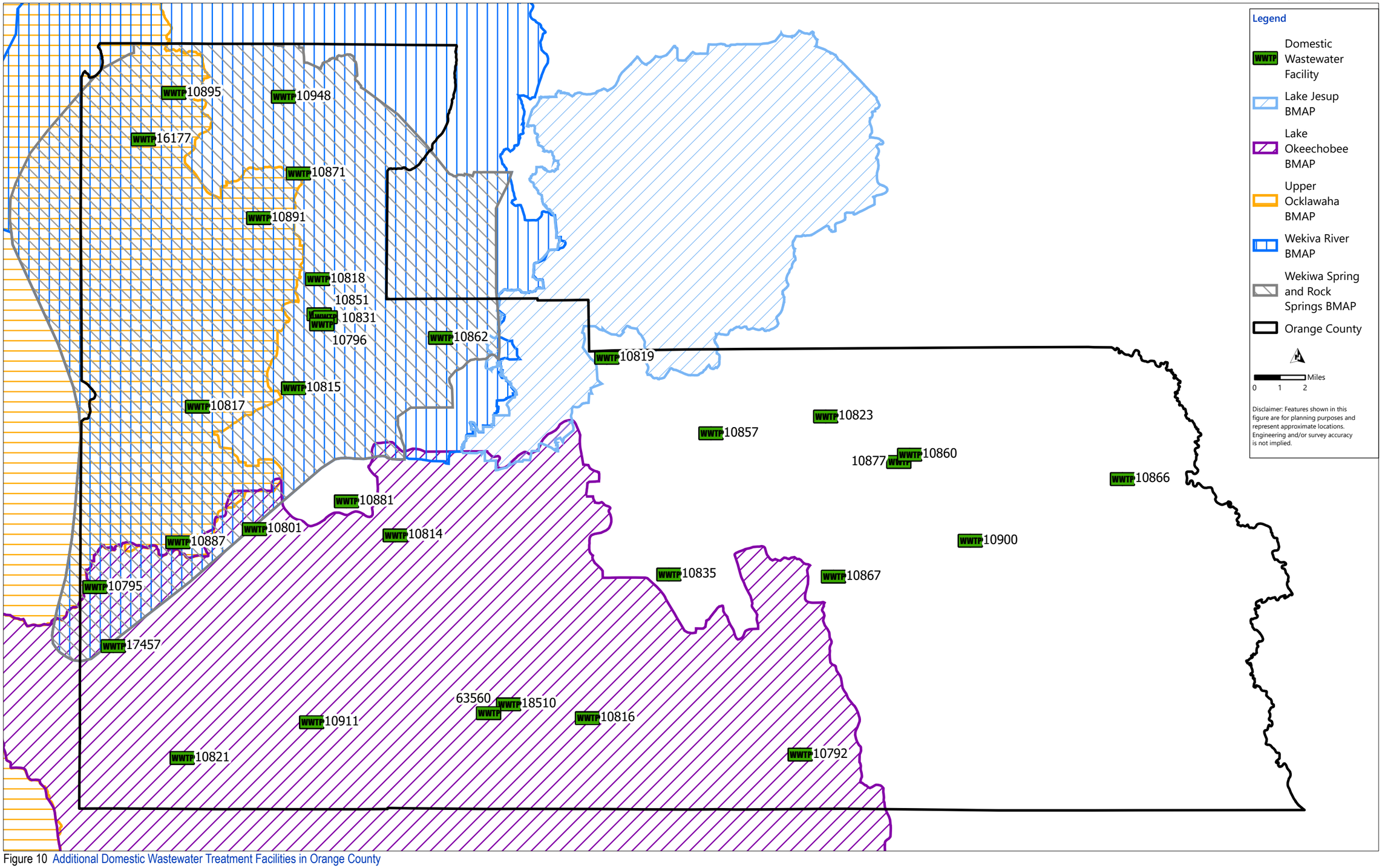

Figure 10 Additional Domestic Wastewater Treatment Facilities in Orange County

Table 18 Additional Wastewater Sites in Unincorporated Orange County Contributing to BMAPs Within Orange County's Boundaries

Map ID	Location Code	FDEP Permit Number	Facility Name	FDEP Site Code	FDEP Site Type
1	5434	FLA010818	Apopka WRF - Project Arrow	R-001	Effluent to Reuse
2	25564	FLA010818	Apopka WRF - Project Arrow	R-002	Effluent to Reuse
3	94914	FLA010818	Apopka WRF - Project Arrow	PAA-001	Land Application Site
4	104336	FLA010818	Apopka WRF - Project Arrow	RAA-001	Land Application Site
5	104337	FLA010818	Apopka WRF - Project Arrow	PAA-002A	Land Application Site
6	104338	FLA010818	Apopka WRF - Project Arrow	PAA-002B	Land Application Site
7	104833	FLA010818	Apopka WRF - Project Arrow	PAA-002C	Land Application Site
8	104834	FLA010818	Apopka WRF - Project Arrow	PAA-002D	Land Application Site
9	104836	FLA010818	Apopka WRF - Project Arrow	PAA-002E	Land Application Site
10	125264	FLA010818	Apopka WRF - Project Arrow	PAA-002F	Land Application Site
11	189524	FLA010818	Apopka WRF - Project Arrow	PAA-003	Land Application Site
12	6111	FLA010948	Brightwood Manor WWTF	R-001	Effluent to Reuse
13	94892	FLA010948	Brightwood Manor WWTF	RIB-001	Percolation Pond
14	5852	FLA010866	Christmas RV Park WWTF	R-001	Effluent to Reuse
15	94902	FLA010866	Christmas RV Park WWTF	RIB-001	Percolation Pond
16	29531	FLA010796	Clarcona Elementary School	R-001	Effluent to Reuse
17	94920	FLA010796	Clarcona Elementary School	RIB-001	Percolation Pond
18	32408	FLA010851	Clarcona Resort WWTF	R-001	Effluent to Reuse
19	94906	FLA010851	Clarcona Resort WWTF	RIB-001	Percolation Pond
20	34674	FLA010795	Conserv II Distribution Center	R-001	Effluent to Reuse
21	34675	FLA010795	Conserv II Distribution Center	R-002	Effluent to Reuse
22	106054	FLA010795	Conserv II Distribution Center	RIB-002G	Percolation Pond
23	143892	FLA010795	Conserv II Distribution Center	RIB-1	Percolation Pond
24	26334	FLA010881	Edgewood Children's Ranch	R-001	Effluent to Reuse
25	94899	FLA010881	Edgewood Children's Ranch	RIB-001	Percolation Pond
26	26948	FLA010823	Fairways Country Club WWTF	R-001	Effluent to Reuse
27	26949	FLA010823	Fairways Country Club WWTF	R-002	Effluent to Reuse
28	105170	FLA010823	Fairways Country Club WWTF	PAA-001	Land Application Site
29	121939	FLA010823	Fairways Country Club WWTF	RIB-001	Percolation Pond
30	36668	FLA010835	Gulfstream Harbor WWTF	R-001	Effluent to Reuse
31	105224	FLA010835	Gulfstream Harbor WWTF	RIB-001	Percolation Pond
32	6052	FLA109118	Hidden Valley Mobile Home Community	R-001	Effluent to Reuse
33	130016	FLA109118	Hidden Valley Mobile Home Community	RIB-001	Percolation Pond
34	32778	FLA010857	Lake Downey WWTF	R-001	Effluent to Reuse
35	94905	FLA010857	Lake Downey WWTF	RIB-001	Percolation Pond
36	27232	FLA010831	Lost Lake RV Resort WWTF	R-001	Effluent to Reuse
37	94907	FLA010831	Lost Lake RV Resort WWTF	RIB-001	Percolation Pond
38	34539	FLA010862	Magnolia Mobile Home Park	R-001	Effluent to Reuse
39	107354	FLA010862	Magnolia Mobile Home Park	RIB-001	Percolation Pond
40	39304	FLA010792	Moss Park	R-001	Effluent to Reuse
41	94921	FLA010792	Moss Park	RIB-001	Percolation Pond
42	5315	FLA010815	Ocoee, City of - WWTF	R-001	Effluent to Reuse
43	5316	FLA010815	Ocoee, City of - WWTF	R-002	Effluent to Reuse
44	131184	FLA010815	Ocoee, City of - WWTF	RIB-001	Percolation Pond
45	131185	FLA010815	Ocoee, City of - WWTF	PAA-001	Land Application Site
46	131186	FLA010815	Ocoee, City of - WWTF	PAA-002	Land Application Site
47	29758	FLA017457	Orange County National Golf Club LLC	R-001	Effluent to Reuse
48	94888	FLA017457	Orange County National Golf Club LLC	RIB-001	Percolation Pond
49	39312	FLA010867	Orlando Utilities Commission Stanton Energy Center	R-001	Effluent to Reuse
50	34880	FLA010814	Orlando/Conserv II WRF	R-001	Effluent to Reuse
51	34881	FLA010814	Orlando/Conserv II WRF	R-002	Effluent to Reuse
52	94917	FLA010814	Orlando/Conserv II WRF	RIB-002	Percolation Pond
53	104947	FLA010814	Orlando/Conserv II WRF	PAA-001A	Land Application Site
54	104948	FLA010814	Orlando/Conserv II WRF	PAA-001B	Land Application Site
55	104952	FLA010814	Orlando/Conserv II WRF	PAA-001D	Land Application Site
56	104953	FLA010814	Orlando/Conserv II WRF	PAA-001E	Land Application Site
57	104954	FLA010814	Orlando/Conserv II WRF	PAA-001F	Land Application Site
58	154410	FLA010814	Orlando/Conserv II WRF	PAA-003	Land Application Site
59	154411	FLA010814	Orlando/Conserv II WRF	PAA-004	Land Application Site
60	154412	FLA010814	Orlando/Conserv II WRF	PAA-005	Land Application Site
61	154413	FLA010814	Orlando/Conserv II WRF	PAA-006	Land Application Site
62	154414	FLA010814	Orlando/Conserv II WRF	PAA-007	Land Application Site

Map ID	Location Code	FDEP Permit Number	Facility Name	FDEP Site Code	FDEP Site Type
63	191674	FLA010814	Orlando/Conserv II WRF	PAA-009	Land Application Site
64	191675	FLA010814	Orlando/Conserv II WRF	PAA-011	Land Application Site
65	191676	FLA010814	Orlando/Conserv II WRF	PAA-008	Land Application Site
66	191677	FLA010814	Orlando/Conserv II WRF	PAA-010	Land Application Site
67	45796	FLA010816	Orlando/Water Conserv - I WRF	R-001	Effluent to Reuse
68	45797	FLA010816	Orlando/Water Conserv - I WRF	R-002	Effluent to Reuse
69	94916	FLA010816	Orlando/Water Conserv - I WRF	RIB-001	Percolation Pond
70	149800	FLA010816	Orlando/Water Conserv - I WRF	PAA-005	Land Application Site
71	149801	FLA010816	Orlando/Water Conserv - I WRF	PAA-003	Land Application Site
72	149802	FLA010816	Orlando/Water Conserv - I WRF	PAA-004	Land Application Site
73	34446	FLA010877	Pine Island MHP WWTF	R-001	Effluent to Reuse
74	102194	FLA010877	Pine Island MHP WWTF	RIB-1	Percolation Pond
75	5490	FLA108219	Reedy Creek Improvement District	R-001	Effluent to Reuse
76	5491	FLA108219	Reedy Creek Improvement District	R-002	Effluent to Reuse
77	94796	FLA108219	Reedy Creek Improvement District	RIB-001	Percolation Pond
78	26142	FLA010871	Rock Springs MHP WWTF	R-001	Effluent to Reuse
79	104360	FLA010871	Rock Springs MHP WWTF	RIB-001	Percolation Pond
80	151171	FLA016177	Shelley's Septic Tanks RMF	R-001	Effluent to Reuse
81	151172	FLA016177	Shelley's Septic Tanks RMF	IRU-01	Effluent to Reuse
82	5825	FLA010860	University Sun Estates 2 and 3 WWTF	R-001	Effluent to Reuse
83	94904	FLA010860	University Sun Estates 2 and 3 WWTF	RIB-001	Percolation Pond
84	47777	FLA010891	Valencia Estates Mobile Home Community	R-001	Effluent to Reuse
85	105200	FLA010891	Valencia Estates Mobile Home Community	RIB-001	Percolation Pond
86	5965	FLA010895	Valley WWTF	R-001	Effluent to Reuse
87	94894	FLA010895	Valley WWTF	RIB-001	Percolation Pond
88	33554	FLA010900	Wedgefield WWTF	R-001	Effluent to Reuse
89	105256	FLA010900	Wedgefield WWTF	PAA-001A	Land Application Site
90	105258	FLA010900	Wedgefield WWTF	PAA-001B	Land Application Site
91	107300	FLA010900	Wedgefield WWTF	PAA-001C	Land Application Site
92	107301	FLA010900	Wedgefield WWTF	PAA-001D	Land Application Site
93	30917	FLA010887	West Orange Country Club WWTF	R-001	Effluent to Reuse
94	94897	FLA010887	West Orange Country Club WWTF	RIB-001	Percolation Pond
95	26372	FLA010801	Windermere Elementary School	R-001	Effluent to Reuse
96	94918	FLA010801	Windermere Elementary School	RIB-001	Percolation Pond
97	5391	FL0020109	Winter Garden WWTF	R-001	Effluent to Reuse
98	5392	FL0020109	Winter Garden WWTF	D-001	Outfall
99	34949	FL0020109	Winter Garden WWTF	R-002	Effluent to Reuse
100	94762	FL0020109	Winter Garden WWTF	PAA-002	Land Application Site
101	130043	FL0020109	Winter Garden WWTF	RIB-001	Percolation Pond
102	167474	FL0020109	Winter Garden WWTF	PAA-003	Land Application Site
103	5458	FLA010819	Winter Park Estates WWTF	R-001	Effluent to Reuse
104	104967	FLA010819	Winter Park Estates WWTF	PAA-001A	Land Application Site
105	104971	FLA010819	Winter Park Estates WWTF	PAA-001B	Land Application Site
106	104973	FLA010819	Winter Park Estates WWTF	PAA-001C	Land Application Site
107	104974	FLA010819	Winter Park Estates WWTF	PAA-001D	Land Application Site

Table Abbreviation Notes:
WRF: water reclamation facility
WWTF: wastewater treatment facility
RMF: residual management facility

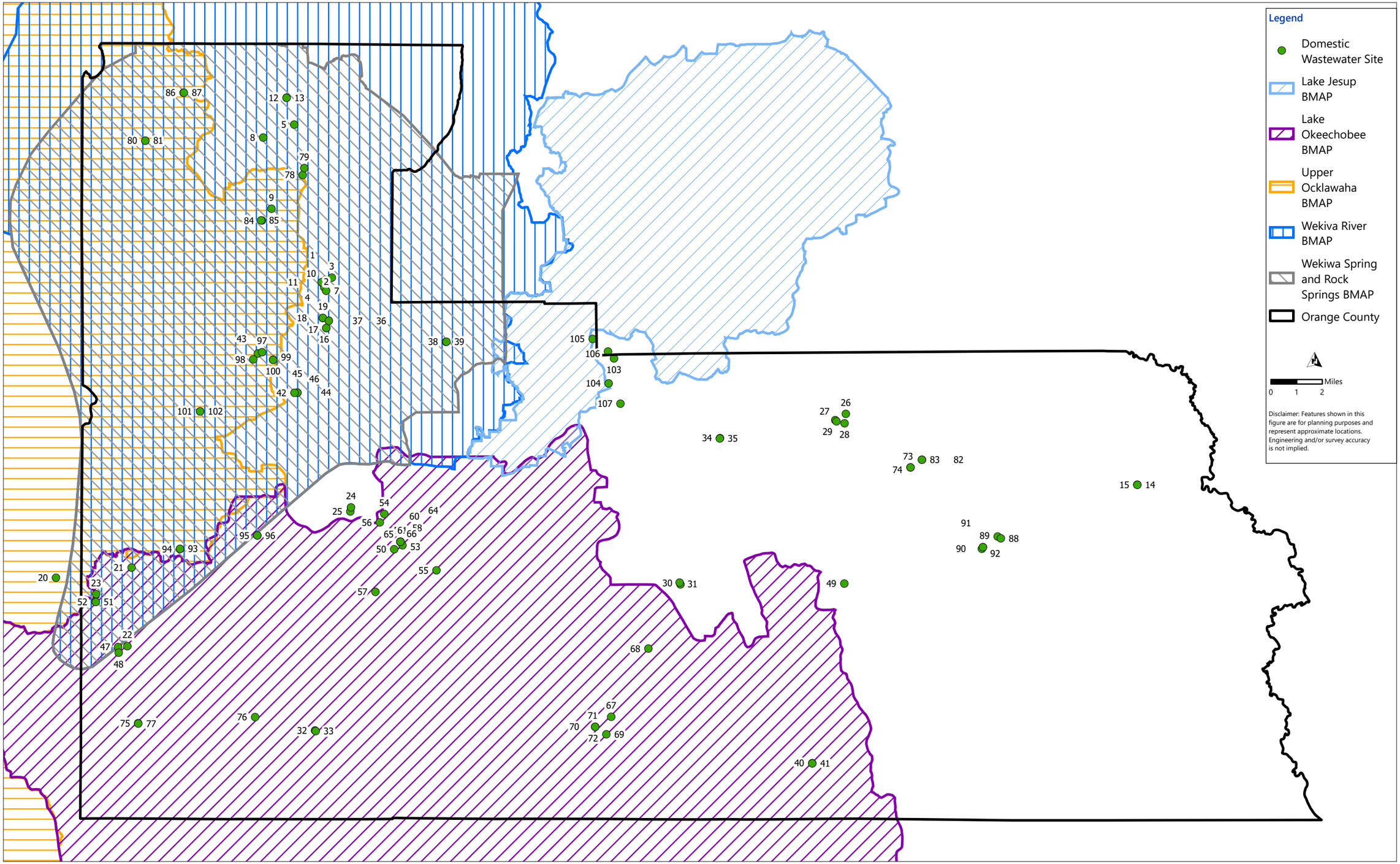

Figure 11 Additional Domestic Wastewater Treatment Sites in Orange County