

Phase 1: Regional AWS Feasibility – Cedar Key, Bronson, Otter Creek, and Unincorporated Areas in Levy County

Task 1 – Evaluation of Current & Future Water Supply Challenges, Needs, and Limitations (Draft)

Prepared for
Suwannee River Water Management District

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Section 1 Water Supply

1.1 Introduction

The Suwannee River Water Management District (SRWMD) is one of five water management districts tasked with four core mission areas: water supply, water quality, flood control/floodplain management, and natural systems. The SRWMD comprises all or portions of 15 counties and encompasses approximately 7,640 square miles. The SRWMD is responsible for managing the needs of both natural systems and water users. To accomplish this, the SRWMD issues water supply permits for water users and develops minimum flows and minimum levels (MFLs) for natural systems within the SRWMD. These efforts are carried out in conjunction with water supply planning to determine where additional water is needed, identify alternative water supplies (AWSs), and implement cost-effective projects to address identified water challenges or shortages.

Within the Waccasassa Basin the City of Cedar Key, unincorporated Levy County, and the Towns of Otter Creek and Bronson have a variety of water and wastewater challenges that they are attempting to address with assistance from the SRWMD. For both Cedar Key and Otter Creek, these include water quality concerns related to their supply wells and treatment requirements. Additionally, Cedar Key is faced with challenging wastewater treatment issues and loss of treated water to a marine ecosystem where it cannot be beneficially recharged or reused. Bronson and Levy County are concerned with water supply and managing increasing demand in a responsible manner. These disparate challenges present potential opportunities for these entities to collaborate to develop regional projects that can help address these concerns, while also providing a reliable and resilient water supply and employing wastewater treatment and reuse strategies that can benefit the region.

The SRWMD is working with the Florida Department of Environmental Protection (FDEP) and the communities to evaluate this study area and the identified water and wastewater challenges by developing an alternatives analysis for these specific challenges and needs faced by each community. This effort is evaluating not only current needs, but also anticipated growth in the region and potential medium to long-term water supply challenges. The tasks to complete this project include:

- Task 1: Evaluation of current and future water supply challenges, needs, and limitations for Cedar Key, Otter Creek, Bronson, and Unincorporated Levy County.
- Task 2: Alternatives development to address current and future water supply needs.
- Task 3: Evaluation of current and projected wastewater treatment and disposal needs for Cedar Key, Otter Creek, Bronson, and Unincorporated Levy County.
- Task 4: Alternatives development for wastewater reuse and recharge.
- Task 5: Cost estimation and cost-effectiveness calculation for the identified alternatives.

This report is focused on Task 1 of the project including identification and evaluation of current and projected water supply needs and challenges.

1.1.1 Study Area

The study area for this project is the portion of the SRWMD that lies within the Waccasassa River Basin and Levy County. The primary focus of this project is the area between the Town of Bronson and the City of Cedar Key along and within the vicinity of State Road 24 (SR24). This includes the Town of Otter Creek and portions of Unincorporated Levy County along and near SR24 including the unincorporated communities of Rosewood and Sumner. The relevant boundaries and study area are shown in Figure 1.

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Section 2 Data and Methods

This section describes the data that were collected as part of this project. Primary data types included geographic data, water treatment plant data, and population data. The following sections discuss each of these sources and the data evaluated as a part of this study.

2.1 Geographic Data

Geographic data were collected to evaluate the spatial attributes of features of interest. These data were generally in geographic information system (GIS) formats.

2.1.1 Data Sources

Data were collected from a variety of sources including the SRWMD, FDEP, Florida Department of Transportation (FDOT), United States Geological Survey (USGS), and the Florida Geographic Data Library (FGDL). Table 1 shows the data collected, source, and year.

Table 1. Data, Source, and Year

Data	Source	Year
Waccasassa River Basin (HUC8)	USGS	2016
Parcels	FGDL	2019
County Boundaries (Detailed Shoreline)	FGDL	2015
State Roads	FDOT	2022
Water Use Permit Wells	SRWMD	2022
Water Well Construction	SRWMD	2022
SRWMD Boundary	SRWMD	2022
Public Service Area Boundaries	SRWMD	2021
Statewide Land Use Land Cover	FDEP	2022

2.2 Water Facility Data

Water facilities as described in this section are facilities for which the FDEP has issued construction or operational permits for raw potable water treatment and distribution systems following the regulations in Chapter 62-550, Florida Administrative Code (F.A.C.). The following definitions have been excerpted from Chapter 62-550 and characterize public water systems based on the number of service connections and frequency with which finished water is delivered to the end users:

- “Public Water System” or “PWS” means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. Such term includes: any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Such term does not include any “special irrigation district.” A public water system is either a “community water system” or a “non-community water system.” See the Code of Federal Regulations (C.F.R.), title 40, part 141, section 2.*

- *“Community Water System” (CWS) means a public water system that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.*
- *“Non-Community Water System” means a public water system that is not a community water system. A non-community water system is either a “transient non-community water system” (TWS) or a “non-transient non-community water system” (NTNCWS). See the Code of Federal Regulations (C.F.R.), title 40, part 141, section 2. Other public water systems are addressed in Chapter 64E-8, F.A.C.*
- *“Transient Non-Community Water System” or “TWS” means a non-community water system that does not regularly serve at least 25 of the same persons over six months per year. See the Code of Federal Regulations (C.F.R.), title 40, part 141, section 2.*
- *“Non-Transient Non-Community Water System” means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.*

Public water systems do not include individual wells used by homeowners and small businesses to meet their potable water supply needs. These are described and inventoried in Section 2.2.2.

2.2.1 Inventory of Existing Public Water System Facilities

Table 2 summarizes the Public Water Systems located within the study area. Of these 19 systems, 4 are community systems and 15 are non-community systems. The “community” water systems are owned by the larger entities such as the City of Cedar Key, the Towns of Bronson and Otter Creek, and Levy County’s University Oaks facility. The “non-community” systems include commercial establishments, recreational vehicle campgrounds, and some schools and religious facilities. The combined capacity of the community systems is about 0.75 million gallons per day (MGD).

Table 2. Permitted Potable Water Supply Facilities

PERMIT ID	SRMWD CUP	NAME	CITY	CAPACITY (MGD)	FACILITY TYPE
2381178	216830	BRONSON WTP	BRONSON	0.235	COMMUNITY
2381208	220497	UNIVERSITY OAKS MHP	BRONSON	<0.1	COMMUNITY
2381414	220940	LEVY FORESTRY WORK CAMP	BRONSON	<0.1	NONCOMMUNITY
2381416	N/A	BRONSON SPEEDWAY	BRONSON	<0.1	NONCOMMUNITY
2381421	N/A	IMAGINATION STATION I	BRONSON	<0.1	NONTRANSIENT NONCOMMUNITY
2381440	N/A	IMAGINATION STATION CENTER II	BRONSON	<0.1	NONCOMMUNITY
2381451	N/A	FLAMINGO PRODUCE & SEAFOOD	BRONSON	<0.1	NONCOMMUNITY
2381464	N/A	BRONSON RD BAPTIST CHURCH & SCHOOL	BRONSON	<0.1	NONCOMMUNITY
2381472	N/A	TEMPLO DE LA ALABANZA	BRONSON	<0.1	NONCOMMUNITY
2381477	215897	BLACK PRONG EQUESTRIAN VILLAGE WTP	BRONSON	0.0097	NONCOMMUNITY
2380178	216821	CEDAR KEY WTP	CEDAR KEY	0.3026	COMMUNITY
2381415	216321	RAINBOW COUNTRY RV CAMPGROUND	CEDAR KEY	<0.1	NONCOMMUNITY
2381419	217095	CEDAR KEY RV AND STORE	CEDAR KEY	<0.1	NONCOMMUNITY

PERMIT ID	SRMWD CUP	NAME	CITY	CAPACITY (MGD)	FACILITY TYPE
2381426	N/A	THE OTHER PLACE, TOO	CEDAR KEY	<0.1	NONCOMMUNITY
2381457	N/A	ROBINSON'S SEAFOOD & RESTAURANT	CEDAR KEY	<0.1	NONCOMMUNITY
2381468	N/A	SHELLMOUND RV PARK	CEDAR KEY	<0.1	NONCOMMUNITY
2380854	216656	OTTER CREEK	OTTER CREEK	0.108	COMMUNITY
2381379	N/A	ODYSSEY CAMPGROUND	ROSEWOOD	<0.1	NONCOMMUNITY
2381442	N/A	CLAM SHACK, THE	ROSEWOOD	<0.1	NONCOMMUNITY

2.2.2 Inventory of Existing Domestic Self-Supply Facilities

In addition to the public supply systems and associated wells there are many domestic self-supply wells located in the study area. Most of these wells are located outside of the PSAs although some number of wells are shown within the identified PSAs. Well data were provided by the SRWMD and included both water use permit (WUP) wells and water well construction (WWC). Figure 2 shows the known domestic self-supply wells located within the study area. There are 1,467 private wells within the project area and 379 wells associated with water use permits. Most of these wells are in the northeastern portion of the study area between Newberry and Bronson. Within Levy County and the Waccasassa Basin there are 616 private wells and 96 wells associated with WUPs. Within the PSAs there were 19 private wells in Bronson, 3 private wells in Otter Creek, and 20 private wells in Cedar Key.

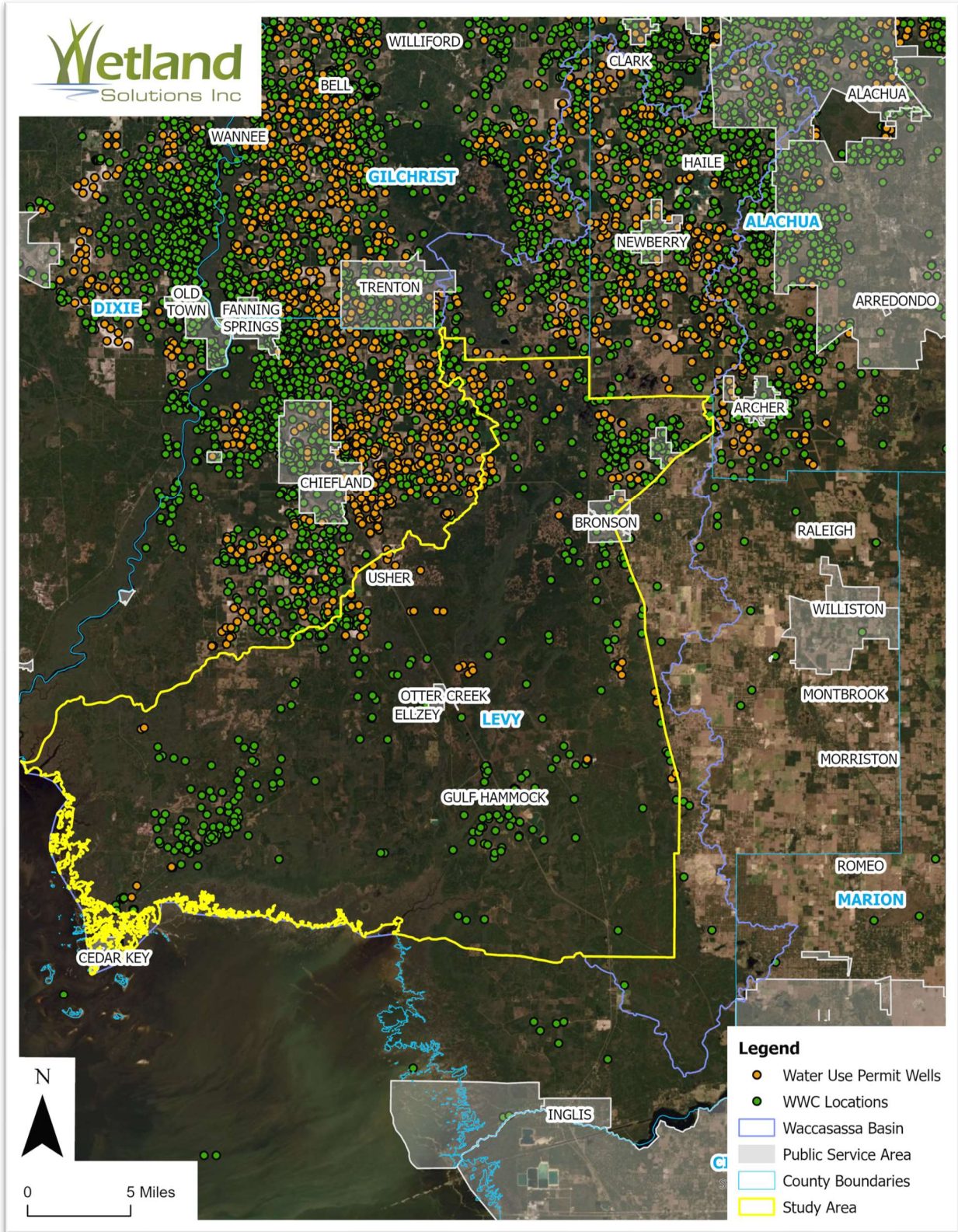


Figure 2. Domestic Self-Supply and Public Supply Wells in the Waccasassa Feasibility Study Area

2.3 Population Growth Projections

This study also considered expected population growth through 2045. The primary sources used for population growth estimates were the Bureau of Economic Research (BEER) at the University of Florida (Rayer and Wang 2021) and population projections developed for the SRWMD for regional water demand projections (Suwannee River Water Management District 2021). BEER population estimates include a low, medium, and high estimate. Population projections were compared between BEER and SRWMD. The SRWMD estimates provide information for evaluating water use for a single water-using entity, while the BEER estimates present county totals. Population projections for each of the entities in this study are discussed in later sections. Population projections for each utility varied between the number reported on the monthly operations report (MOR), number discussed in conversations with the municipalities, and numbers estimated in the SRWMD's water use projections. In all cases, except Cedar Key, the numbers were similar, but not identical. The deviation in Cedar Key's values are believed to be the difference based on permanent versus weekend tourists.

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Section 3 Water Supply Considerations

This project is evaluating water supply considerations for Bronson, Cedar Key, Otter Creek, and Unincorporated Levy County. These entities have a variety of concerns that include water quality, water availability, accommodating growth, operational costs, and future water supplies. WSI met with representatives of the local governments and/or utilities to better understand existing challenges, needs, and limitations for each of the entities. The findings of these meetings and information gathered from existing permits and related documentation are discussed for each of the entities in the following sections.

3.1 Town of Bronson

The Town of Bronson is in the southeast portion of the SRWMD, with a part of the Town's limits lying within the Southwest Florida Water Management District (SWFWMD). As part of the permit renewal for the Town's consumptive use permit (CUP), the SWFWMD legal counsel reviewed the permit and found that an interagency agreement was unnecessary because all supply wells were located within the SRWMD. Bronson's existing CUP is for an average daily rate of 0.235 MGD and was issued January 13, 2013, with an expiration of January 13, 2033. The Town of Bronson, supply wells, and the Public Service Area (PSA) is shown in Figure 3.

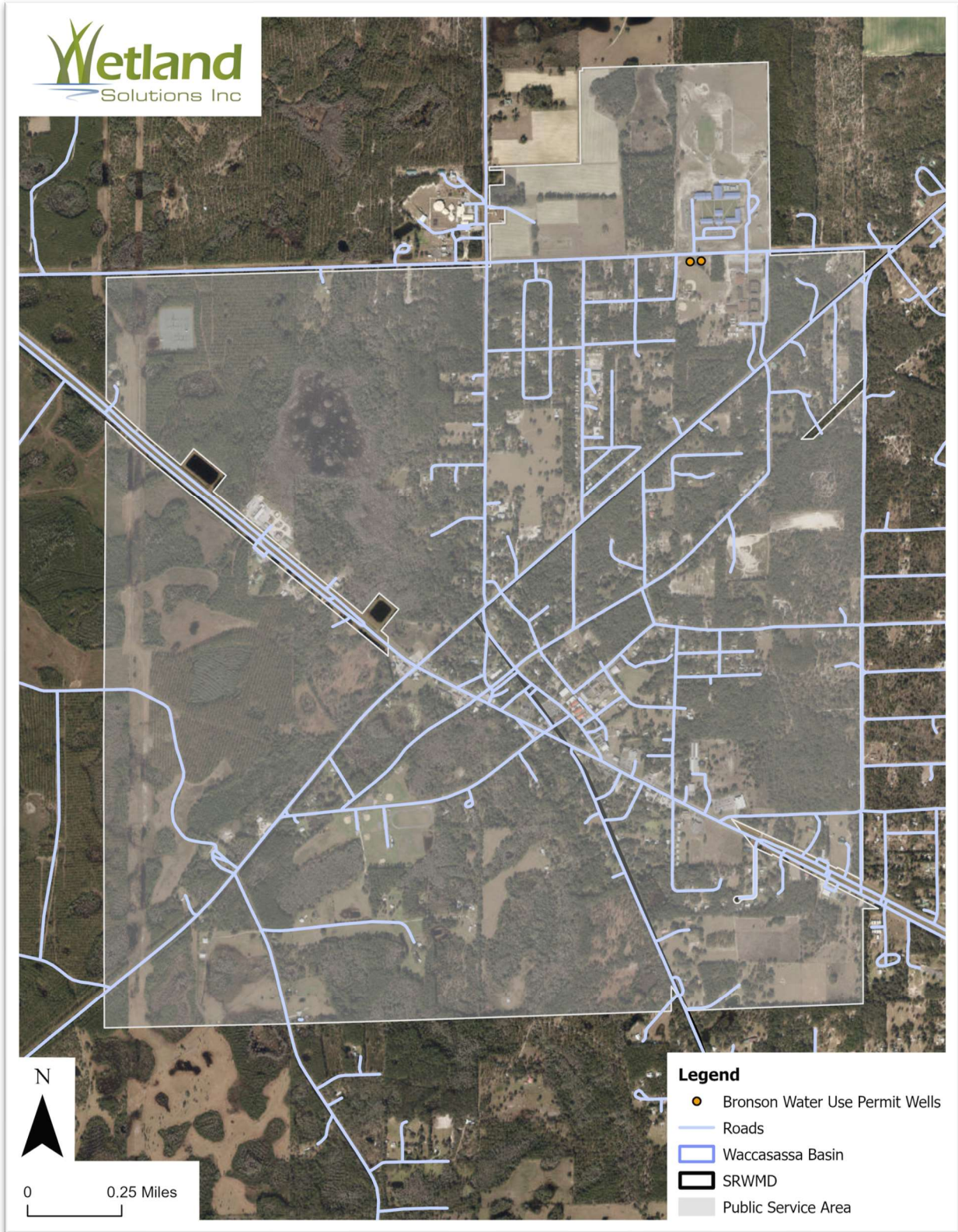


Figure 3. Town of Bronson Public Supply Wells and Public Service Area

3.1.1 Water Infrastructure and Treatment

The Town of Bronson operates PWS 2381178, a community water system with a maximum day capacity of 0.864 MGD. The PWS includes two production wells (Wells 2 and 3) and treatment consisting of chlorination before distribution. Well 2 is an 8" well that was installed in 1987 with a capacity of 320 gpm. Well 3 is a 12" well installed in 1993 with a capacity of 500 gpm. An existing project is rehabilitating the wells to increase the capacity of Well 2 from 320 gpm to 500 gpm.

The distribution system was upgraded in 1994 with many lines converted to 4–6" PVC although portions of the system remain on 2" lines. There are also some remaining asbestos pipes in the system that are replaced as they are identified. Water plant operation is contracted to Water Pro, Inc.

3.1.2 Existing Water Use

Based on data from the January 2022 monthly operation report (MOR), a total of 1,125 people were served through 600 service connections. Average water use during the month was 0.165 MGD. This equates to approximately 147 gallons per person per day.

In the meeting with the Town of Bronson, it was explained that there are 661 accounts with 55 government accounts, 17 church accounts, 66 commercial accounts, and 523 residential accounts. The population is approximately 1,081 people although this number is increasing with current development. The MOR value and Town estimate vary slightly due to minor variations in populations and accounts served. It is expected that the number of accounts is more accurate from the Town than from the MOR since they do the water billing.

The Town has increased rates by 11.5% each of the last two years to increase revenue to offset the Town's costs. Current water rates are structured as an inclining block rate and include a base rate of \$14.19 that includes the first 2,000 gallons per month. Water use beyond the first 2,000 gallons costs \$3.00/1,000 gallons for 2,000–4,000 gallons, \$3.36/1,000 gallons for 4,000–6,000 gallons, \$3.75/1,000 gallons for 6,000–8,000 gallons, \$4.18/1,000 gallons for 8,000–10,000 gallons, and \$4.64/1,000 gallons for use beyond 10,000 gallons.

3.1.3 Water Supply Challenges and Limitations

Bronson water quality tends to be very good requiring minimal treatment with no reported issues. The Bronson WTP has had no reported water quality violations.

Water system challenges primarily relate to providing adequate flow rates for fire flows and concerns with meeting future demands. Currently the system is incapable of maintaining pressure while also delivering fire flows. This results in inadequate pressure for meeting fire flow demands and substantial pressure drops in the system that cause a loss of pressure at residences. Additionally, the Town's new fire station cannot receive adequate flow to meet fire suppression system needs within the building. To address issues at the fire station, Bronson is constructing a \$260,000, 12" well to provide supplemental water and pressure to meet fire flow needs. This new well will be dedicated to the fire station and will not be tied in with the Town's water supply system. During the meeting with the Town, staff indicated that there is variable groundwater quality depending on geography. Groundwater quality on the high and dry east side of town is superior to that in the lower-lying flatwoods areas in the western portion.

The other primary water-related issue facing Bronson is growth related demands. In the past year, Bronson has seen the addition of 20 homes. There are also plans for the addition of 50 more homes over the next several years. These homes will result in additional residents that could increase population by more than 10%. In discussions with the Town, there were concerns that the population could grow by 20% over the next five years. Further complicating population projections are potential toll roads that may be constructed in the area. These roads could drastically increase traffic and the need for businesses to meet traveler’s needs. It is also expected that this kind of infrastructure could result in a large increase in housing demand. The potential effects of this these projects are currently unknown.

3.1.3.1 Water Quality

The Town of Bronson’s water supply wells produce excellent quality water with no parameters above maximum contaminant levels (MCLs). Concentrations of nitrate, which is highly mobile in groundwater, indicate a water that is influenced by some source of enrichment (i.e., fertilizer or wastewater).

Table 3. Town of Bronson Finished Water Quality

Parameter*	Result	MCL	Units	Qualifier
Nitrate+Nitrite (as N)	2.46		mg/L	
Nitrate (as N)	2.46	10	mg/L	
Nitrite (as N)	0.2	1	mg/L	U
Arsenic	0.001	0.01	mg/L	U
Barium	0.002	2	mg/L	U
Cadmium	0.001	0.005	mg/L	U
Chromium	0.0017	0.1	mg/L	I
Cyanide	0.005	0.2	mg/L	U
Fluoride	0.2	4.0	mg/L	U
Lead	0.001	0.015	mg/L	U
Mercury	0.0001	0.002	mg/L	U
Nickel	0.001	N/A	mg/L	U
Selenium	0.002	0.05	mg/L	U
Sodium	3.77	N/A	mg/L	
Antimony	0.001	0.006	mg/L	U
Beryllium	0.0005	0.004	mg/L	U
Thallium	0.001	0.002	mg/L	U
Aluminum	0.01	0.05-0.2	mg/L	U
Chloride	6.43	250	mg/L	J
Copper	0.0012	1.0	mg/L	I
Fluoride	0.2	2.0	mg/L	U
Iron	0.01	0.3	mg/L	U
Manganese	0.01	0.05	mg/L	U
Silver	0.0005	0.1	mg/L	U
Sulfate	2.12	250	mg/L	
Zinc	0.0051	5	mg/L	
Color	5	15	CU	U
Odor	1	3	TON	U, Q
pH	8.13	6.5-8.5	SU	Q
Total Dissolved Solids	136	500	mg/L	

Parameter*	Result	MCL	Units	Qualifier
Foaming Agents	0.2	0.5	mg/L	U
Xylenes	0.00251	10	mg/L	
Total Haloacetic Acids (HAA5)	0.00889	0.06	mg/L	
Total Trihalomethanes (TTHM)	0.00573	0.08	mg/L	

All VOCs and Synthetic Organics except Xylenes were BDL

*All parameters sampled 10/27/2021, except HHA5 and TTHM sampled 8/24/2021

3.1.4 Projected Water Use

The population of Bronson was estimated by the SRWMD, as part of their water use projections, to be 1,133 in 2020 with no change projected in 2045. Water use projections for the town were 0.15 MGD of groundwater use in 2020 with the same projected use of 0.15 MGD in 2045. These estimates were based on available information at the time of water use projections. In the absence of specific information (e.g., development plans), the SRWMD considered the BEBR medium estimate as the most aggressive estimate of future population. In the case of Bronson, no additional population growth was anticipated.

Based on conversations with the Town of Bronson, it appears current SRWMD estimates may underestimate population growth through 2045. BEBR estimates for Levy County include slightly negative population growth in the low estimate (-5% through 2045) while the medium estimate includes approximately 16% growth between 2021 and 2045 (Rayer and Wang 2021). Town staff estimate that they will see at least 20% growth over the next 5 years based on the addition of 20 homes in the past year, a new planned development of 50 homes, and additional interest from developers. The intent of these developments and Town staff would be to connect the homes to both water and sewer.

To consider potential higher growth scenarios, the estimated population of Bronson was calculated based on a base population of 1,133 from the SRWMD and the BEBR medium and high population Levy County estimates. The medium estimate was 1,310 and the high estimate was 1,539 through 2045.

Bronson had a water audit completed by the Florida Rural Water Association (FRWA) in 2012 (Florida Rural Water Association 2012b). This analysis found that corrected annual pumping was 57.58 million gallons, with 49.98 million gallons of water sold. After accounting for authorized unmetered use, 6.04 million gallons was assigned to potential system leakage (10.5%). Based on discussions with the Town, a more recent audit found that unaccounted for water loss has decreased.

3.2 City of Cedar Key

The City of Cedar Key is in the southwestern tip of Levy County on an island in the Gulf of Mexico. The City has a long history and was first developed in the late 1860s. Of historical significance, the City includes one of Florida’s two state museums and the smallest school in Florida. The City is also one of the only coastal areas in Florida that derives a majority of its income from industry (primarily aquaculture) rather than tourism. Figure 4 shows the City of Cedar Key, supply wells, and PSA boundary.

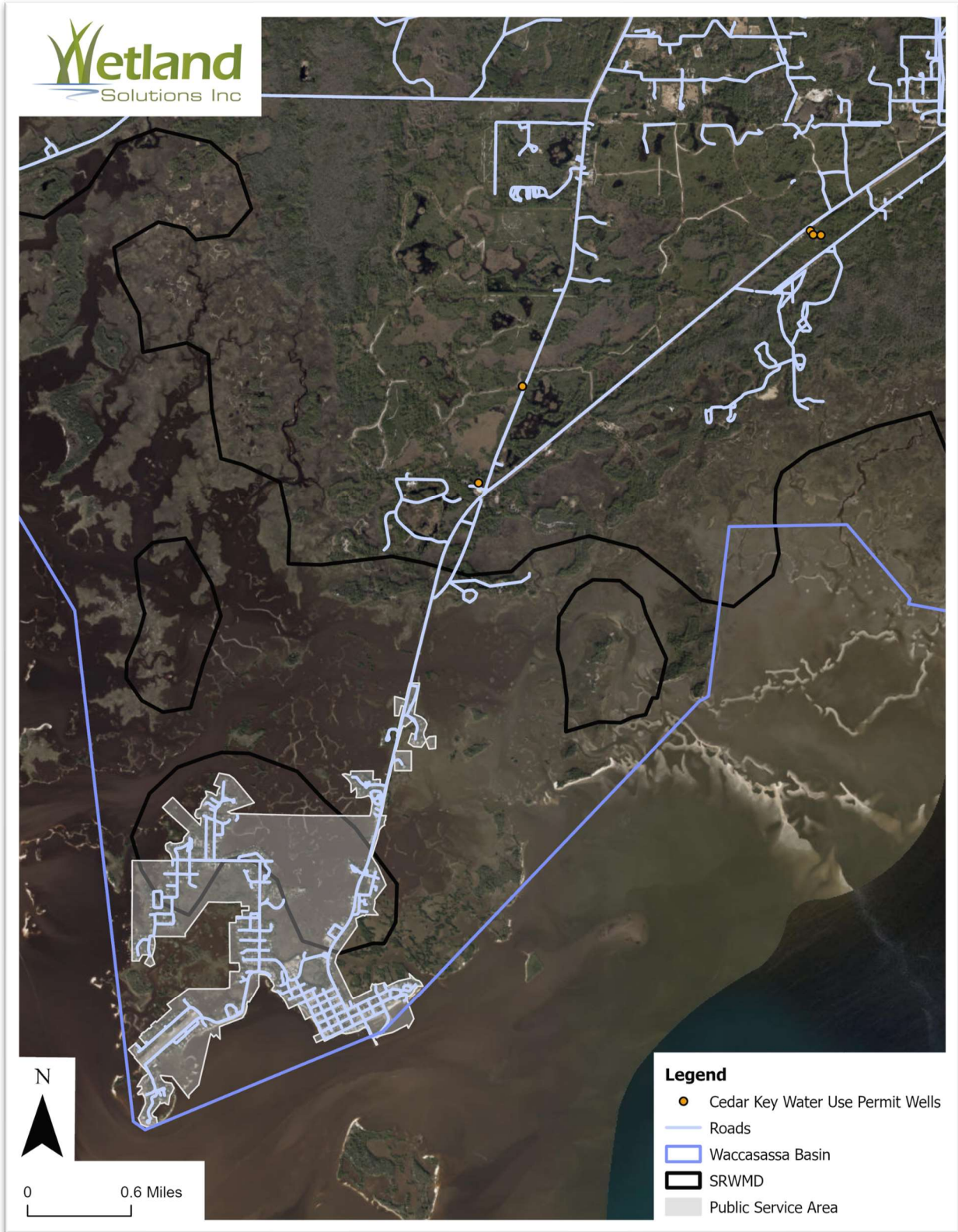


Figure 4. City of Cedar Key Public Supply Wells and Public Service Area

The CKWSD has faced water supply challenges for years. These problems are primarily related to poor source water quality from the CKWSD's water supply wells. The CKWSD has a total of five wells numbered 1-5, although Wells 1-3 are inactive and no longer used for providing drinking water. Wells 4 and 5 provide water with pumping alternated between the wells. Well 4 is constructed to 145 feet and Well 5 is constructed to 186 feet deep.

Following withdrawal, the CKWSD uses a multi-step treatment process to manage high levels of total organic carbon (TOC) and hardness in the source water. This process is briefly outlined below.

- Initial treatment with sodium permanganate,
- Ion exchange,
- Initial chlorination,
- Lime softening,
- Sand filters with aeration,
- Hydrogen peroxide for de-chlorination,
- Carbon filters, and
- Final chlorination (with re-chlorination if the residual is not met).

The CKWSD's current water treatment plant was constructed in 1962 and has been upgraded to continue to provide good quality water, but the plant is reaching the end of its useful lifespan and will need substantial retrofit or replacement to continue to meet the community's needs. The cost for replacement of the water treatment plant was estimated to be between \$13 and \$15 million based on meetings with the CKWSD and the City of Cedar Key. The CKWSD has also completed a study of potential new well construction. Based on exploratory wells drilled and evaluated along SR24, there was no indication of higher quality water until close to Bronson.

3.2.2 Existing Water Use

Based on data from the January 2022 MOR, an estimated 734 people were served through 908 service connections. Average water use during the month was 0.144 MGD. This equates to 196 gallons per person per day, although this average flow is highly impacted by tourism related use on the weekends and likely overestimates use by residents.

The CKWSD has approximately 1,008 water accounts, although this number can vary. The served population is highly variable based on part-time owners and weekend tourism. Current flows are approximately 90,000-100,000 gallons per day Monday through Thursday with flows approximately doubling to tripling on weekends. During the meeting with CKWSD, it was noted that flows may increase to 250,000-280,000 gallons per day on festival weekends.

The CKWSD's water rates have an increasing block rate structure with a \$27/month account charge. Water usage is charged at a rate of \$2.71/1,000 gallons for 0-3,000, \$5.08/1,000 gallons for 3,000-6,000, \$7.17/1,000 gallons for 6,000-9,000 gallons, and \$9.27/1,000 gallons for usage over 9,000 gallons per month. The current water rates in combination, with a portion of ad valorem taxes, allow for the system to generate approximately the amount of revenue that is spent to run the system.

3.2.3 Water Supply Challenges and Limitations

The City of Cedar Key/CKWSD have a variety of water system challenges. These include poor water quality from the supply wells, a treatment plant that is near its end of life, an aquaculture industry that is reliant on extremely high-quality water, increasing treatment costs, and highly variable demands. Resolving all of these problems completely would require either an expensive new water plant with continuing expensive treatment or an alternative water supply with higher source water quality and presumably lower treatment costs. Specific water quality related issues are discussed below.

3.2.3.1 Water Quality

The CKWSD relies on Wells 4 and 5 to provide water supply to the water treatment plant. During water quality testing as part of well completion for Well 5 (Mittauer & Associates, Inc. 2016) results indicated elevated levels of both iron (2.1 milligrams per liter [mg/L] vs. MCL of 0.3 mg/L) and color (60 Platinum-Cobalt Units [PCU] vs MCL of 15 PCU) in the source water.

Water quality following treatment is shown in Table 4. Sampling for disinfection byproducts is completed at two locations within the CKWSD system: Hodgson and Jernigan, and Gulf and Hodges. The most recent sampling in November 2021 for disinfection byproducts found total haloacetic acids (HAA5) with concentrations of 17.61 micrograms per liter (ug/L) and 0.98 ug/L compared to the MCL of 60 ug/L and total trihalomethanes (TTHM) with concentrations of 45.88 ug/L and 2.18 ug/L compared to the MCL of 80 ug/L at Hodgson and Jernigan, and Gulf and Hodges, respectively.

Table 4. City of Cedar Key Finished Water Quality

Parameter*	Result	MCL	Units	Qualifier
Nitrate (as N)	0.5	10	mg/L	U
Nitrite (as N)	0.1	1	mg/L	U
Arsenic	0.00052	0.01	mg/L	I
Barium	0.021	2	mg/L	
Cadmium	0.00025	0.005	mg/L	U
Chromium	0.005	0.1	mg/L	U
Cyanide	0.004	0.2	mg/L	U
Fluoride	0.25	4.0	mg/L	U
Lead	0.003	0.015	mg/L	U
Mercury	0.000071	0.002	mg/L	I
Nickel	0.0012	N/A	mg/L	U
Selenium	0.0012	0.05	mg/L	U
Sodium	15	N/A	mg/L	
Antimony	0.001	0.006	mg/L	U
Beryllium	0.002	0.004	mg/L	U
Thallium	0.00025	0.002	mg/L	U
Aluminum	0.15	0.05-0.2	mg/L	
Chloride	33	250	mg/L	
Copper	0.001	1.0	mg/L	U
Fluoride	0.25	2.0	mg/L	U
Iron	0.0067	0.3	mg/L	U
Manganese	0.001	0.05	mg/L	U

Parameter*	Result	MCL	Units	Qualifier
Silver	0.0005	0.1	mg/L	U
Sulfate	23	250	mg/L	
Zinc	0.05	5	mg/L	U
Color	1	15	CU	U
Odor	1	3	TON	U
pH	7.9	6.5-8.5	SU	
Total Dissolved Solids	240	500	mg/L	
Foaming Agents	0.04	0.5	mg/L	U

All VOCs were BDL

*All parameters sampled 5/18/2021, except HHA5 and TTHM sampled 11/3/2021

3.2.4 Projected Water Use

Population estimates for Cedar Key from the SRWMD provide an estimated population of 2,304 people in 2020 with an unchanged projected population in 2045. These population estimates appear to represent the average population, considering the influence of seasonal residents and tourists. Cedar Key is nearly completely developed, and any additional people could only be accommodated by temporary residents becoming permanent residents or re-development within the City. The SRWMD water projections for Cedar Key estimated 0.13 MGD of groundwater use in 2020 and 0.13 MGD of groundwater use in 2045. The City did not indicate that they anticipate significant growth in population.

Cedar Key had a water audit completed by the Florida Rural Water Association (FRWA) in 2012 (Florida Rural Water Association 2012a). This analysis found that corrected annual pumping was 47.61 million gallons, with 39.16 million gallons of water sold with unaccounted water of 8.46 million gallons (18%). Of this, after accounting for authorized unmetered use, 6.03 million gallons was assigned to potential system leakage (12.7%). Based on meeting with the City and identified system improvements, this previous audit may overestimate system losses.

3.3 Town of Otter Creek

The Town of Otter Creek is located along SR24 between Bronson and Cedar Key just west of the intersection with US19 (Figure 6). Otter Creek’s existing CUP is for 0.108 MGD of water. Otter Creek’s current CUP was issued March 12, 2007 and expires March 12, 2027.



Figure 6. Town of Otter Creek Public Supply Wells and Public Service Area

3.3.1 Water Infrastructure and Treatment

The Town of Otter Creek operates PWS 2380854, a community water system with a maximum day capacity of 0.108 MGD. The Town currently supplies water to approximately 118 people through 75 service connections. Water is supplied by two wells, although only one is currently being used because of better water quality. Well 1 has a depth of approximately 102 feet and Well 2 has a depth of 65 feet (“Otter Creek Construction Permit” 1981). Following withdrawal, water is treated using permanganate and ammonium hydroxide to reduce hardness and improve water quality prior to disinfection with chlorine. The system also includes a storage tank and a pneumatic pressure tank. The distribution system is approximately 20 years old and is primarily 6” PVC pipe. The current system also supplies a network of fire hydrants. The Town is currently having a filtration system installed by a vendor to improve water quality. After one year of use the filters will become the property of the Town.

3.3.2 Existing Water Use

Based on data from the January 2022 monthly operation report (MOR), a total of 120 people were served through 88 service connections. Average water use during the month was 0.0093 MGD. This use equates to 78 gallons per person per day. The water system is currently operated by Water Pro, Inc.

The Town’s water rates are structured as an increasing block rate structure. Current water rates are \$24/month for the first 2,000 gallons of water with the following blocks beyond this first block; 2,000-5,000 gallons are \$6.00/1,000 gallons, 5,000-8,000 gallons are \$6.50/1,000 gallons, and use over 8,000 gallons is charged at \$7.00/1,000 gallons. Meters are read monthly. Rates were previously \$22.50/month for 4,000 gallons of water, but the Town was losing money on operation of the water system. With these rate adjustments it is still expected to take 5 years to have the state required set aside of \$10,000 to cover maintenance.

3.3.3 Water Supply Challenges and Limitations

After treatment the water retains some taste and odor and most residents do not drink the water, but rather use bottled water for consumption. The treatment system is old, and many components are in major need of repair including the storage tank, pneumatic tank, and other components. Several grants have been applied for and received to improve the current water system. The distribution system was upgraded approximately 20 years ago to PVC and is in good repair. Similarly, meters at the service connections are in good repair and have been replaced as needed. The current distribution system includes fire hydrants although the ability of the storage tank (32,000 gallons) to meet prolonged fire demands is limited.

3.3.3.1 Water Quality

Based on sampling data for Well 1 source water from 1966, iron was 2.7 mg/L (MCL of 0.3 mg/L) and color was 50 PCU (MCL of 15 PCU) (“Otter Creek Construction Permit” 1981). Raw water samples in June 1993 reported an iron concentration of 5.5 mg/L for iron, a sample from August 1993 had iron at 6.7 mg/L for Well 1 and at 5.8 mg/L for Well 2, and a third sample from August 1993 had an iron of 7.08 mg/L with a color of 333 PCU (“Otter Creek Pump Documents” 1995). These parameters continue to cause issues with treatment and finished

water quality. Disinfection byproducts data from September 2021 indicated concentrations below the relevant MCLs.

Table 5. Town of Otter Creek Finished Water Quality

Parameter	Result	MCL	Units	Qualifier
Nitrate+Nitrite (as N)	0.318		mg/L	I
Nitrate (as N)	0.318	10	mg/L	I
Nitrite (as N)	0.2	1	mg/L	U
Arsenic	0.001	0.01	mg/L	U
Barium	2	2	mg/L	
Cadmium	0.005	0.005	mg/L	U
Chromium	0.1	0.1	mg/L	
Cyanide	0.2	0.2	mg/L	U
Fluoride	4	4.0	mg/L	U
Lead	0.015	0.015	mg/L	U
Mercury	0.002	0.002	mg/L	U
Nickel	0.1	N/A	mg/L	U
Selenium	0.05	0.05	mg/L	U
Sodium	160	N/A	mg/L	
Antimony	0.006	0.006	mg/L	U
Beryllium	0.004	0.004	mg/L	UJ
Thallium	0.002	0.002	mg/L	U
Aluminum	0.01	0.05-0.2	mg/L	
Chloride	51.1	250	mg/L	
Copper	0.001	1.0	mg/L	U
Fluoride	0.2	2.0	mg/L	U
Iron	0.01	0.3	mg/L	U
Manganese	0.01	0.05	mg/L	U
Silver	0.0005	0.1	mg/L	U
Sulfate	2.17	250	mg/L	
Zinc	0.002	5	mg/L	U
Color	5	15	CU	U
Odor	1	3	TON	U
pH	8.04	6.5-8.5	SU	
Total Dissolved Solids	394	500	mg/L	
Foaming Agents	0.2	0.5	mg/L	U
Total Haloacetic Acids (HAA5)	0.0317	0.06	mg/L	
Total Trihalomethanes (TTHM)	0.0111	0.08	mg/L	

All VOCs and Synthetic Organics were BDL

***All parameters sampled 9/29/2021, except HHA5 and TTHM sampled 9/7/2021**

3.3.4 Projected Water Use

Currently population in Otter Creek is not expected to change. Estimates from the SRWMD were 173 people in 2020 with no projected change in population in 2045. There are several significant unknowns that could have large impacts on population. These include two major toll highways that are expected to divert traffic through the area along US19. It is not currently known what the impacts of these roads might be, but there could be a need for local businesses

to support travelers. In conflict with this potential for growth, development opportunities within the vicinity of the town are limited by low-lying areas prone to flooding and within the 100-year floodplain. The SRWMD groundwater projections for Otter Creek are estimated as 0.01 MGD in 2020 and 0.01 MGD in 2045.

3.4 Unincorporated Levy County

Unincorporated Levy County includes the areas outside of the towns and cities. This includes all of the areas between Bronson and Otter Creek and between Otter Creek and Cedar Key including the community of Rosewood.

3.4.1 Water Infrastructure and Treatment

The County currently operates two water treatment facilities associated with small developments. In both cases the facilities were taken over after the operating entities became insolvent. The County does not serve water to residents outside of these two areas but does have an interest in helping ensure that their residents have a safe and reliable water supply.

3.4.2 Existing Water Use

One of the County's water plants is located at University Oaks (PWS 2381208) in Bronson, while the second system is located at Springside Park Adult Community near Chiefland. The Town of Bronson has considered annexing University Oaks and including it within their water service area. Springside Park is not located within the area of interest for this project.

Based on the January MOR, University Oaks served a population of 369 people through 123 connections. The average daily water use was 49,500 gallons for a per capita water use of 134 gallons per person per day.

3.4.3 Water Supply Challenges and Limitations

Levy County's primary concerns are not with their existing water systems, although these systems have not been profitable for the County. The primary concern for the County is related to users, particularly between Otter Creek and Cedar Key, that are on relatively shallow wells with poor and potentially unsafe water quality. These users either have to tolerate the poor quality or spend money on treatment systems to improve the water quality. There are also significant concerns given the area's flooding, that when there is standing water, bacteria or other pathogens may leach from the adjacent septic systems, mix with the standing water, and contaminate the drinking water wells. The County would like to see these residents transition to a safer and more reliable drinking water supply.

3.4.4 Projected Water Use

Unlike the PSAs, it is challenging to assign a population or population growth to the unincorporated area of Levy County. Within the primary area of interest, there appear to be 574 private wells, although it is unlikely that all of these accounts could be served cost-effectively given their spatial distribution. Growth in these areas is likely to be dependent on the availability of water and the same factors that may influence growth in Otter Creek (i.e., availability of developable land and toll roads).

Section 4 References

- Cedar Key Water & Sewer District. n.d. "Cedar Key Water & Sewer District Service Area." Accessed April 11, 2022. <https://www.ckwater.org/about-us>.
- Florida Rural Water Association. 2012a. "Water Conservation Audit - Cedar Key Water and Sewer District."
- — —. 2012b. "Water Conservation Audit - City of Bronson."
- Mittauer & Associates, Inc. 2016. "Cedar Key Well Permit Documents." Florida Department of Environmental Protection.
- "Otter Creek Construction Permit." 1981. Florida Department of Environmental Protection.
- "Otter Creek Pump Documents." 1995. Sims Design Consultants, Inc.
- Rayer, Stefan, and Ying Wang. 2021. "Projections of Florida Population by County, 2025-2045, with Estimates for 2020." Bulletin BEBR Volume 54, Bulletin 189. Florida Population Studies. University of Florida Bureau of Economic and Business Research.
- Suwannee River Water Management District. 2021. "SRWMD Regional Water Supply Projections 2020-2045." <https://www.northfloridawater.com/watersupplyplan/documents/Projections-20211029.xlsx>.