



# St. Johns River

## Water Management District

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### Technical Memorandum

#### Methodology for Generating Utility Level Projections and Buildout Estimates Using Parcel Data

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### Background

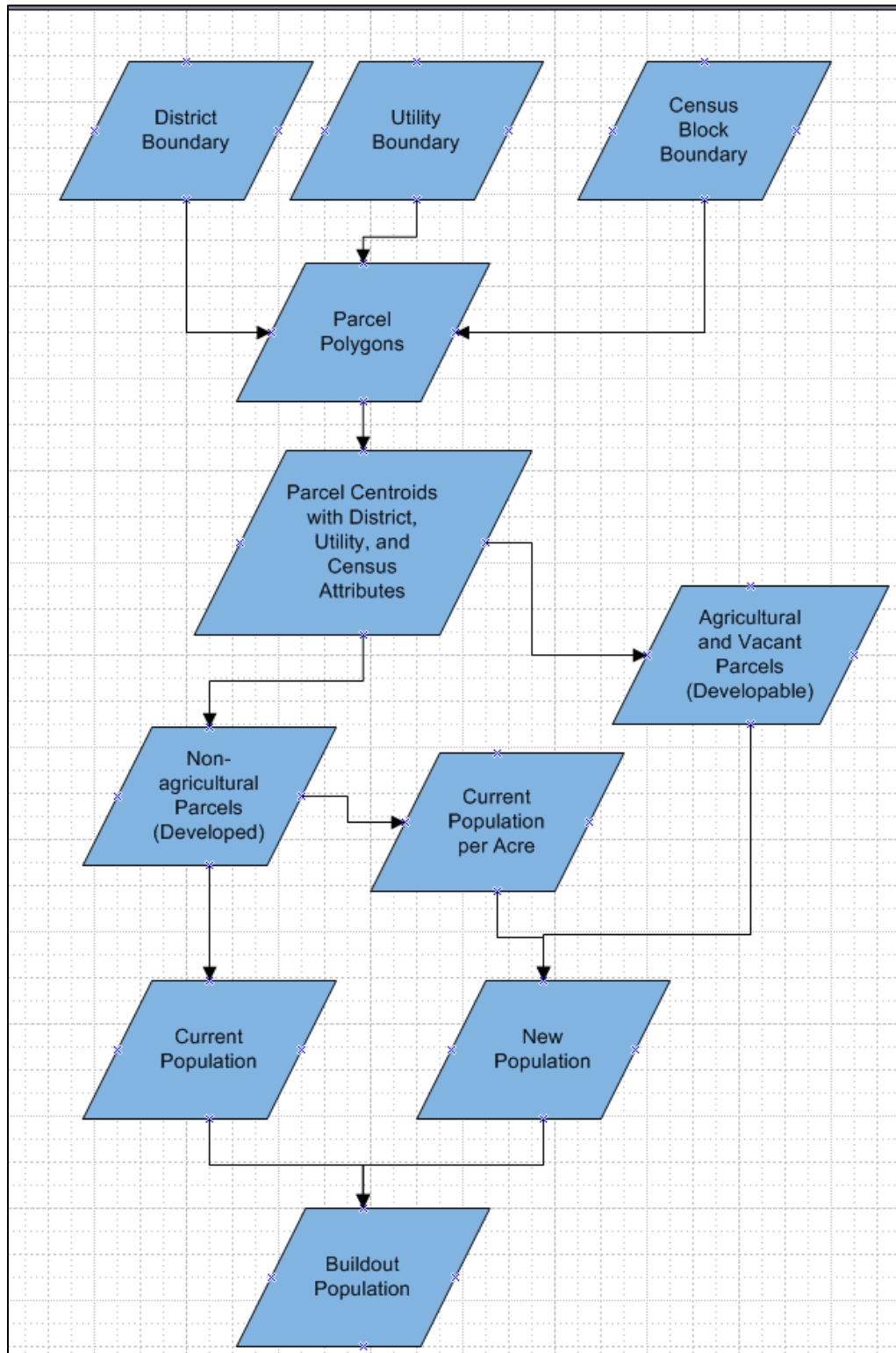
The earliest St. Johns River Water Management District's (District) efforts to distribute the Bureau of Economic and Business Research (BEER) population estimates and projections to parcels were led by Dr. Nitesh Tripathi and Dr. Eugene Agyei and used Visual Basic software. The current model, refined by Yassert Gonzalez and James Walters, uses Python to distribute BEER estimates and projections to parcels. The land use parcel layer is compiled by Panda Consultants and contains data from tax property appraiser databases. The data in the parcel layer relevant to this project are as follows: use class designations for all parcels (e.g., which parcels are considered single family or multi-family), year built, and residential unit counts. If there were null or zero values in necessary fields of this layer, estimations were made (described below). All examples of calculations in this technical memorandum were derived in 2019 and do not reflect the most recent data.

### Overview

The tasks described in this memorandum are as follows:

- 1) Added district, utility, and census attributes to parcel centroids
- 2) Identified developed and developable parcels
- 3) Distributed current population to developed residential parcels
- 4) Calculated persons per acre from developed acreage
- 5) Generated buildout estimates
- 6) Ranked developable parcels
- 7) Generated projections for the period 2020 through 2045

The above tasks were performed using python scripts written in PyCharm. See Figure 1 for a simplified graphical.



**Figure 1.** Overview of the buildout population estimation process

## Data Sources

The datasets used were:

- 1) Parcel centroids generated from the land use parcel polygon dataset provided by Panda Consulting. Water management district, planning region, utility, and census block information were assigned to these centroids.
- 2) Utility-level served population estimates (if available)
- 3) BEBR's countywide population estimates
- 4) BEBR's countywide medium projections (2020-2045)
- 5) Parcel development rank table
- 6) Public Supply service area boundaries (PSABs)

## Parcel Classification for Historical Data

Assumptions:

- 1) Parcels classified as "CENTRALLY ASSESSED (098)" were excluded from "developable" parcels. These are parcels owned by railroads and other large industrial businesses.
- 2) Developed residential parcels were classified as follows:
  - a. Single Family
    - i. Customer class category is comprised of Single Family and Mobile Homes
    - ii. Zero or null values were replaced with the consumptive use permit (CUP) level average residential units for single family residences.
      1. Through conducting QA/QC of the data, single family parcels were reviewed using basemap imagery in ArcMap to verify if there were residential units present despite the null or zero values in the property appraiser data.
  - b. Multi-Family
    - i. Customer class category includes condominiums, cooperatives, multi-family, mobile home parks, and undefined (see 3.h. definition below for undefined).
    - ii. Zero or null values were replaced with the CUP-level average residential units for multi-family residences.
      1. If CUP-level data was not available, county-level data was used.
      2. Through conducting QA/QC of the data, multi-family parcels were reviewed using basemap imagery in ArcMap to verify if there were residential units present despite the null or zero values in the property appraiser data.
- 3) Parcel use types and codes for Single Family and Multi-Family residential parcels:
  - a. CONDOMINIA (004) – Condominium developments. The units are owned individually. Classified as Multi-Family.
  - b. COOPERATIVES (005) – Condominium developments. The units are owned cooperatively. Classified as Multi-Family.
  - c. MOBILE HOMES (002) – Individual mobile homes. Classified as Single Family.
  - d. MULTI-FAMILY - 10 UNITS OR MORE (003) – Large apartment complexes with at least 10 residential units. Classified as Multi-Family.
  - e. MULTI-FAMILY - LESS THAN 10 UNITS (008) – Smaller apartment complexes with less than 10 residential units. Classified as Multi-Family.
  - f. PARKING LOTS (COMMERCIAL OR PATRON) MOBILE HOME PARKS (028) – Mobile home parks. Classified as Multi-Family.
  - g. SINGLE FAMILY (001) – Single family homes. Classified as Single Family.
  - h. UNDEFINED - RESERVED FOR USE BY DEPARTMENT OF REVENUE (009) –

Condominium developments. The units are owned cooperatively. Classified as Multi-Family.

- 4) It was assumed that the persons per acre ratio does not change over the planning horizon.
- 5) The buildout figures only apply to the current public service area boundary. If PSAB changes occur, the buildout analysis needs to be redone.

### **Calculating Residential Unit Share**

The data provided in the property appraiser layer contained missing or zero values for some single family and multi-family parcels. Therefore, the original residential unit counts were modified by replacing the nulls and zeroes where applicable. The residential unit share for each utility was derived by dividing the number of residential units within a given PSAB by the total for the county. The non-served population outside PSABs was also derived in this manner: the residential units that did not fall within a service area were divided by the countywide total number of residential units.

### **Estimating Served and Non-Served Population**

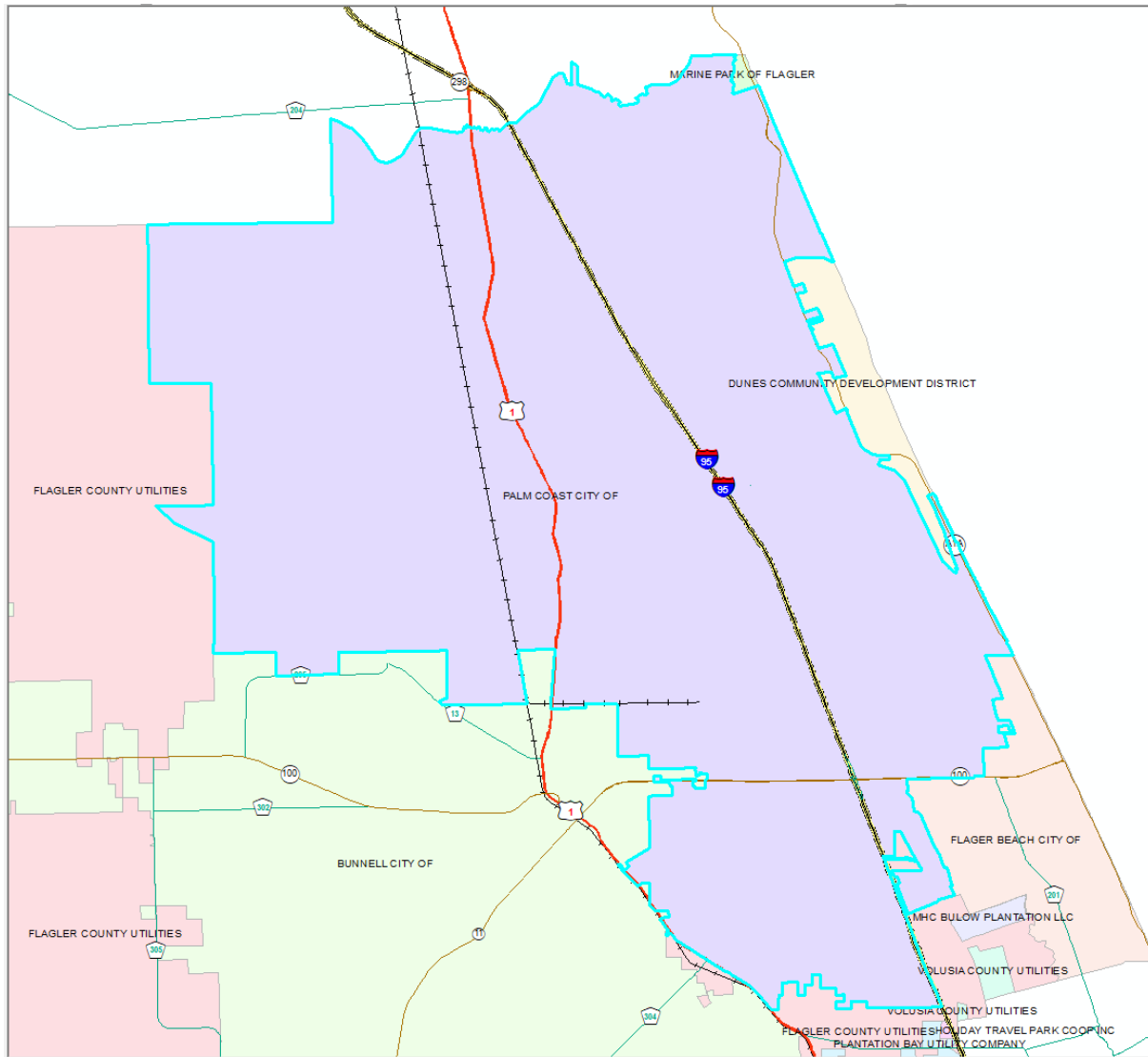
The total population within each PSAB was estimated by multiplying the countywide BEBR population by the share of residential units. If the population estimated from the share of residential units was greater than the reported served population, the difference was assumed to be the non-served population within the public service area boundary. If the utility did not report a population estimate, it was assumed that the entire population estimated by the share of residential units was served. For areas outside PSABs, the population was calculated by multiplying the residential unit share by the countywide BEBR population estimate. Historical population was distributed to residential parcels evenly by dividing the population by the number of single family/multi-family residential units.

### **Population Calculation Example Using Palm Coast (CUP# 1947)**

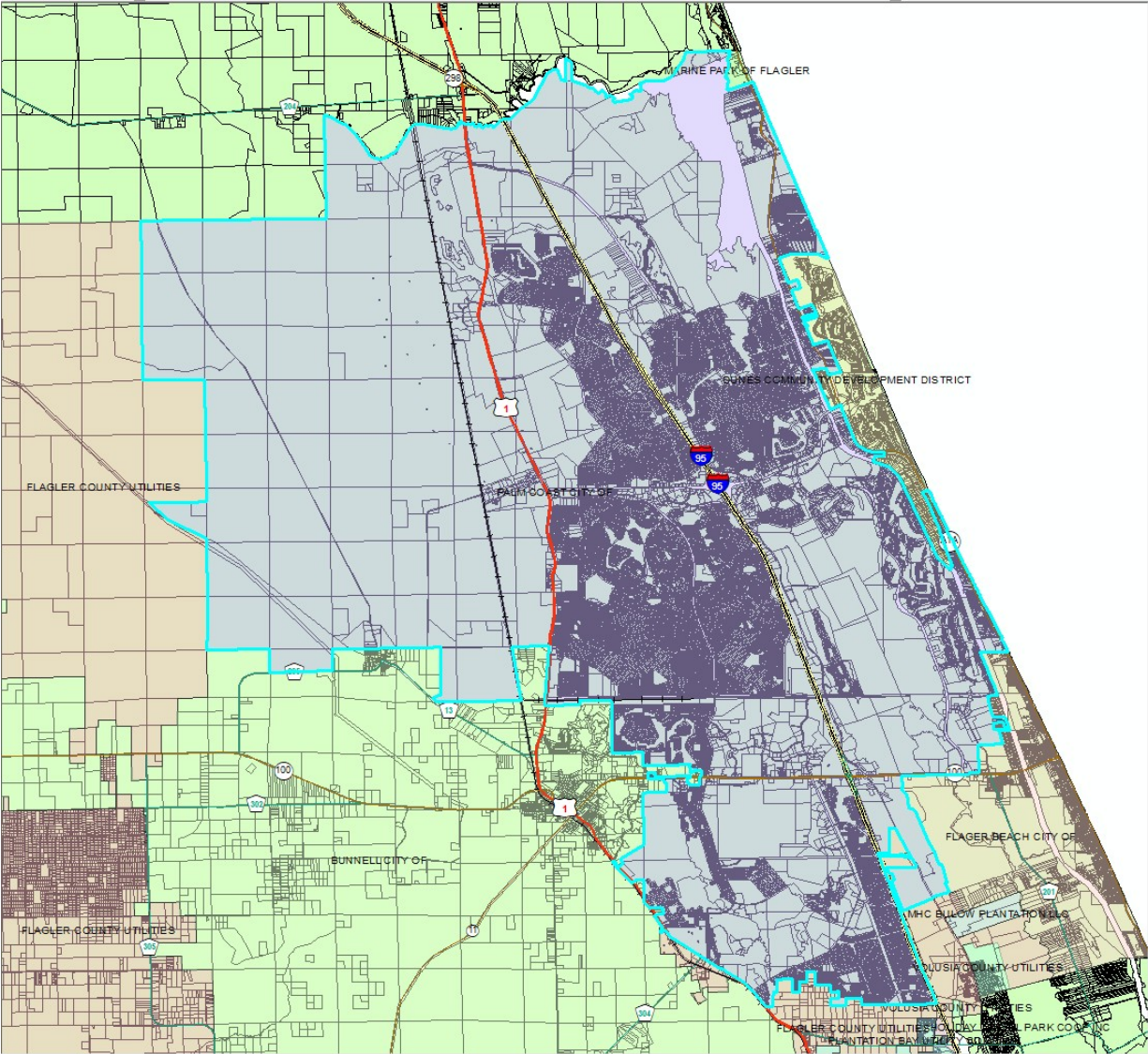
After infilling null and missing values in the residential unit counts from the original layer, residential units for single and multi-family homes in Palm Coast increased 6.52% (Table 1). There were 40,357 single and multi-family residential units in Palm Coast in 2019. There were 51,170 single and multi-family residential units in Flagler County. Thus, the share of residential units inside the Palm Coast's PSAB was approximately 78.87% (i.e.,  $40,357/51,170$ ). The BEBR 2017 countywide population for Flagler County was 105,157 persons, which was used to calculate the total population for each served and non-served region. Therefore, in Palm Coast the total population was 82,936 persons (i.e.,  $105,157 * 78.87\%$ ). The estimated 2017 served population for Palm Coast was 82,137 persons. Therefore, the non-served population within Palm Coast's service area was 799 persons (i.e.,  $82,936 - 82,137$ ). Due to multiple public supply utilities exceeding their residential share (i.e., CUPs 1982, 1979, 1953, 8932, and Flagler County Utilities), the Flagler countywide total population for 2017 exceeds the published BEBR county estimate ( $108,309 > 105,157$ ).

### **Calculating Buildout Population**

Once the served and non-served populations were determined for the historical period, the buildout value for the public service area boundary was calculated. The buildout is a theoretical maximum population that a PSAB can contain if all developable land is developed for residential uses. The average person per acre was calculated and then multiplied by the sum of developed and developable acres. The following sections and figures use Palm Coast (CUP# 1947) as an example for how the Python script works and applies the buildout concept to a public supply utility. The PSAB and the parcels intersecting the PSAB are shown in Figures 2 and 3, below.



**Figure 2.** Public service area boundary served by Palm Coast (Consumptive Use Permit 1947)



**Figure 3.** Parcels intersecting the public service area boundary served by Palm Coast (Consumptive Use Permit 1947)

### **Estimating Buildout Population for Palm Coast (CUP# 1947)**

For Palm Coast, the average person per acre in 2017 was 6.87 (i.e., 82,936 persons/12,079 residential acres). The average served and non-served persons per acre were calculated by dividing the served or non-served populations by the residential acreage. Therefore, the served persons per acre was 6.8 (82,136 persons/12,079 residential acres), and the non-served persons per acre was 0.07 (799 persons/12,079 residential acres).

Palm Coast is comprised of 81,412 acres (Table 2). There were 40,912 acres zoned agricultural or vacant residential, which were considered developable in the future.

The buildout population was 360,787 persons (Table 3). This theoretical number is the sum of the current population in developed parcels (82,136 persons) and the potential population in developable parcels 278,651 persons (i.e., 6.8 persons/acre \* 40,912 developable acres).

### **Parcel Classification for Projections**

Parcel centroids were classified as follows:

- 1) Unavailable
  - a. CAMPS (036) – Campgrounds
  - b. CENTRALLY ASSESSED (098) – Acreage owned by railroad and other large industrialists. At some point in the future these parcels may be developed, however, the present analysis excludes them.
  - c. FOREST, PARKS, RECREATIONAL AREAS (082)
  - d. STATE, OTHER THAN MILITARY, FORESTS, PARKS, RECREATIONAL AREAS (087)
- 2) Developed – Parcels that have already been developed (e.g., “SINGLE FAMILY (001)”, “STORES, ONE STORY (011)”, and “SUPERMARKETS (014)”).
- 3) Developable – Acres that are most likely to be developed in future.
  - a. Residential
    - i. VACANT RESIDENTIAL (000)
    - ii. MISCELLANEOUS RESIDENTIAL (MIGRANT CAMPS, BOARDING HOMES, ETC.) (007)
  - b. Agricultural
    - i. IMPROVED AGRICULTURAL (050)
    - ii. CROPLAND SOIL CAPABILITY CLASS I (051)
    - iii. CROPLAND SOIL CAPABILITY CLASS II (052)
    - iv. CROPLAND SOIL CAPABILITY CLASS III (053)
    - v. TIMBERLAND - SITE INDEX 90 AND ABOVE (054)
    - vi. TIMBERLAND - SITE INDEX 80 TO 89 (055)
    - vii. TIMBERLAND - SITE INDEX 70 TO 79 (056)
    - viii. TIMBERLAND - SITE INDEX 60 TO 69 (057)
    - ix. TIMBERLAND - SITE INDEX 50 TO 59 (058)
    - x. TIMBERLAND NOT CLASSIFIED BY SITE INDEX TO PINES (059)
    - xi. GRAZING LAND SOIL CAPABILITY CLASS I (060)
    - xii. GRAZING LAND SOIL CAPABILITY CLASS II (061)
    - xiii. GRAZING LAND SOIL CAPABILITY CLASS III (062)
    - xiv. GRAZING LAND SOIL CAPABILITY CLASS IV (063)
    - xv. GRAZING LAND SOIL CAPABILITY CLASS V (064)
    - xvi. GRAZING LAND SOIL CAPABILITY CLASS VI (065)
    - xvii. ORCHARD GROVES, CITRUS, ETC. (066)

- xviii. POULTRY, BEES, TROPICAL FISH, RABBITS, ETC. (067)
- xix. DAIRIES, FEED LOTS (068)
- xx. ORNAMENTALS, MISCELLANEOUS AGRICULTURAL (069)
- c. Miscellaneous
  - i. MINING LANDS, PETROLEUM LANDS, OR GAS LANDS (092)
- d. Non-Agricultural Acreage
  - i. ACREAGE NOT ZONED AGRICULTURAL (099)



**Table 1.** Residential units by parcel type for Palm Coast (consumptive use permit 1947) using 2019 parcels.

Parcel Use Description (PARUSEDESC)	Parcels	Percent of Total Parcels	Original Residential Units	Corrected Residential Units	Percent of Total Residential Units	Percent Change in Residential Units
CONDOMINIA	2,422	6.27%	2,418	2,443	6.05%	1.04%
COOPERATIVES	234	0.61%	0	468	1.16%	N/A
MOBILE HOMES	205	0.53%	74	211	0.52%	185.14%
MULTI-FAMILY - 10 UNITS OR MORE	7	0.02%	43	524	1.30%	1,118.99%
MULTI-FAMILY - LESS THAN 10 UNITS	820	2.12%	824	1,145	2.84%	38.95%
PARKING LOTS (COMMERCIAL OR PATRON) MOBILE HOME PARKS	14	0.04%	25	124	0.31%	397.37%
SINGLE FAMILY	34,485	89.22%	34,499	34,502	85.49%	0.01%
UNDEFINED - RESERVED FOR USE BY DEPARTMENT OF REVENUE	465	1.20%	4	940	2.33%	23,380.55%
<b>Total</b>	<b>38,652</b>	<b>100.00</b>	<b>37,887</b>	<b>40,357</b>	<b>100.00%</b>	<b>6.52%</b>

Note: Nominal discrepancies accounted for by rounding anomalies.

**Table 2.** Acreage by parcel use code for Palm Coast (consumptive use permit 1947) using 2019 parcels.

Parcel Use Description (PARUSEDESC)	Parcels	Percent of Total Parcels	Acreage	Percent of Total Acreage
NONE	446	0.74%	318.27	0.39%
ACREAGE NOT ZONED AGRICULTURAL	32	0.05%	4,079.61	5.01%
AIRPORTS (PRIVATE OR COMMERCIAL),BUS TERMINALS,MARINE TERMINALS,PIERS,MARINAS	2	0.00%	14.42	0.02%
AUTO SALES,AUTO REPAIR AND STORAGE,AUTO SERVICE SHOPS,BODY AND FENDER SHOPS,COMMERCIAL GARAGES	19	0.03%	53.74	0.07%
BOWLING ALLEYS,SKATING RINKS,POOL HALLS,ENCLOSED ARENAS	2	0.00%	7.97	0.01%
CENTRALLY ASSESSED	1	0.00%	207.81	0.26%
CHURCHES	27	0.04%	165.93	0.20%
CLUBS,LODGES,UNION HALLS	7	0.01%	28.23	0.03%
COLLEGES	1	0.00%	98.57	0.12%
COMMUNITY SHOPPING CENTERS	39	0.06%	152.16	0.19%
CONDOMINIA	2,422	4.03%	447.49	0.55%
COOPERATIVES	234	0.39%	18.90	0.02%
COUNTIES (OTHER THAN PUBLIC SCHOOLS,COLLEGES,HOSPITALS) INCLUDING NON-MUNICIPAL GOVERNMENT	190	0.32%	8,517.41	10.46%
DEPARTMENT STORES	2	0.00%	17.24	0.02%
DRIVE-IN RESTAURANTS	15	0.02%	19.03	0.02%
ENCLOSED THEATERS,ENCLOSED AUDITORIUMS	1	0.00%	18.48	0.02%
FEDERAL,OTHER THAN MILITARY,FORESTS,PARKS,RECREATIONAL AREAS	10	0.02%	83.86	0.10%
FINANCIAL INSTITUTIONS (BANKS,SAVING AND LOAN COMPANIES,MORTGAGE COMPANIES,CREDIT SERVICES)	19	0.03%	26.66	0.03%
FLORIST,GREENHOUSES	2	0.00%	3.06	0.00%
FOREST,PARKS,RECREATIONAL AREAS	11	0.02%	440.94	0.54%
GOLF COURSES,DRIVING RANGES	7	0.01%	1,595.03	1.96%
GRAZING LAND SOIL CAPABILITY CLASS I	7	0.01%	548.39	0.67%
GRAZING LAND SOIL CAPABILITY CLASS IV	3	0.00%	44.48	0.05%
HEAVY INDUSTRIAL,HEAVY EQUIPMENT MANUFACTURING,LARGE MACHINE SHOPS,FOUNDRIES,STEEL FABRICATING PLANT	2	0.00%	43.87	0.05%
HOMES FOR THE AGED	67	0.11%	80.56	0.10%
HOSPITALS	1	0.00%	93.96	0.12%
HOTELS,MOTELS	11	0.02%	38.99	0.05%

Parcel Use Description (PARUSEDESC)	Parcels	Percent of Total Parcels	Acreage	Percent of Total Acreage
IMPROVED AGRICULTURAL	6	0.01%	163.30	0.20%
LIGHT MANUFACTURING,SMALL EQUIPMENT MANUFACTURING PLANTS,SMALL MACHINE	28	0.05%	95.11	0.12%
MISCELLANEOUS RESIDENTIAL (MIGRANT CAMPS,BOARDING HOMES,ETC.)	188	0.31%	104.21	0.13%
MIXED USE - STORE AND OFFICE OR STORE AND RESIDENTIAL OR RESIDENTIAL COMBINATION	18	0.03%	25.66	0.03%
MOBILE HOMES	205	0.34%	56.80	0.07%
MORTUARIES,CEMETERIES,CREMATORIUMS	5	0.01%	17.01	0.02%
MULTI-FAMILY - 10 UNITS OR MORE	7	0.01%	162.00	0.20%
MULTI-FAMILY - LESS THAN 10 UNITS	820	1.36%	216.46	0.27%
MUNICIPAL,OTHER THAN PARKS,RECREATIONAL AREAS,COLLEGES,HOSPITALS	830	1.38%	4,653.59	5.72%
OFFICE BUILDINGS,NON-PROFESSIONAL SERVICE BUILDINGS,MULTI-STORY	17	0.03%	28.65	0.04%
OFFICE BUILDINGS,NON-PROFESSIONAL SERVICE BUILDINGS,ONE STORY	492	0.82%	70.12	0.09%
OPEN STORAGE,NEW AND USED BUILDING SUPPLIES,JUNK YARDS,AUTO WRECKING,FUEL STORAGE	13	0.02%	20.83	0.03%
ORPHANAGES,OTHER NON-PROFIT OR CHARITABLE SERVICES	1	0.00%	19.46	0.02%
PARKING LOTS (COMMERCIAL OR PATRON) MOBILE HOME PARKS	14	0.02%	71.71	0.09%
PRIVATE SCHOOLS AND COLLEGES	2	0.00%	4.54	0.01%
PROFESSIONAL SERVICE BUILDINGS	70	0.12%	44.80	0.06%
PUBLIC COUNTY SCHOOLS - INCLUDE ALL PROPERTY OF BOARD OF PUBLIC INSTRUCTION	21	0.03%	586.02	0.72%
REPAIR SERVICE SHOPS (EXCLUDING AUTOMOTIVE),RADIO AND T.V. REPAIR,REFRIGERATION SERVICE,ELECTRIC REP	2	0.00%	0.85	0.00%
RESTAURANTS,CAFETERIAS	11	0.02%	14.22	0.02%
RIGHT-OF-WAY,STREETS,ROADS,IRRIGATION CHANNEL,DITCH	161	0.27%	416.20	0.51%
RIVERS AND LAKES,SUBMERGED LANDS	56	0.09%	483.65	0.59%
SEWAGE DISPOSAL,SOLID WASTE,BORROW PITS,DRAINAGE RESERVOIRS,WASTE LAND	20	0.03%	174.46	0.21%
SINGLE FAMILY	34,485	57.34%	9,293.39	11.42%
STATE,OTHER THAN MILITARY,FORESTS,PARKS,RECREATIONAL AREAS	60	0.10%	3,901.99	4.79%
STORES,ONE STORY	48	0.08%	152.56	0.19%
SUPERMARKETS	2	0.00%	9.50	0.01%
TIMBERLAND - SITE INDEX 70 TO 79	36	0.06%	7,100.02	8.72%
TIMBERLAND - SITE INDEX 80 TO 89	117	0.19%	22,384.60	27.50%
TIMBERLAND - SITE INDEX 90 AND ABOVE	1	0.00%	79.47	0.10%
TIMBERLAND NOT CLASSIFIED BY SITE INDEX TO PINES	9	0.01%	1,090.98	1.34%
TOURIST ATTRACTIONS,PERMANENT EXHIBITS,OTHER ENTERTAINMENT FACILITIES,FAIRGROUNDS (PRIVATELY OWNED)	3	0.00%	113.07	0.14%
UNDEFINED - RESERVED FOR USE BY DEPARTMENT OF REVENUE	465	0.77%	1,812.48	2.23%
UTILITY,GAS AND ELECTRICITY,TELEPHONE AND TELEGRAPH,LOCALLY ASSESSED RAILROADS,WATER AND SEWER SERVICE	32	0.05%	318.68	0.39%
VACANT	3	0.00%	8.59	0.01%
VACANT COMMERCIAL	400	0.67%	4,740.54	5.82%
VACANT INDUSTRIAL	52	0.09%	369.63	0.45%
VACANT RESIDENTIAL	17,839	29.66%	5,316.81	6.53%
WAREHOUSING,DISTRIBUTION TERMINALS,TRUCKING TERMINALS,VAN AND STORAGE WAREHOUSING	26	0.04%	124.51	0.15%
<b>Total</b>	<b>60,145</b>	<b>100.00%</b>	<b>81,412</b>	<b>100.00%</b>

Parcel Use Description (PARUSEDESC)	Parcels	Percent of Total Parcels	Acreage	Percent of Total Acreage
<b>Total Developable</b>	<b>18,238</b>	<b>30.32%</b>	<b>40,912</b>	<b>50.25%</b>

Note: Nominal discrepancies accounted for by rounding anomalies.

**Table 3.** Current population estimates and buildout population served and non-served areas in Flagler County.

Utility Name	Consumptive Use Permit	Number of Residential Parcels	Heated Square Footage	Number of Residential Buildings	Number of Residential Units	Served Buildout Population	Non-Served Buildout Population	Total Buildout Population	2015 Served Population Estimate	2015 Non-Served Population Estimate	2015 Total Population Estimate	2017 Served Population Estimate	2017 Non-Served Population Estimate	2017 Total Population Estimate
BUNNELL CITY OF	1982	3,082	5,304,353	1,783	1,338	137,733	0	137,733	2,875	0	2,875	2,934	0	2,934
DUNES COMMUNITY DEVELOPMENT	51136	3,303	7,310,078	2,576	2,860	4,548	1,780	6,329	4,017	1,476	5,493	4,091	1,601	5,692
FLAGLER BEACH CITY OF	59	4,824	7,440,260	3,568	3,523	8,616	4,622	13,238	4,621	2,382	7,003	4,677	2,509	7,186
FLAGLER COUNTY UTILITIES	UtilityID_43	6,389	4,045,638	2,112	1,988	84,524	0	84,254	4,577	0	4,577	4,772	0	4,772
HOLIDAY TRAVEL PARK COOP INC	1979	1	9,786	6	5	380	0	380	380	0	380	380	0	380
MARINE PARK OF FLAGLER	1953	13	105,505	23	9	13	0	17	17	0	17	17	0	17
MHC BULOW PLANTATION LLC	2002	3	50,426	16	24	1,284	0	1,284	1,284	0	1,284	1,284	0	1,284
ORMOND BEACH CITY OF	8932	285	237,146	92	138	4,314	0	4,314	239	0	239	316	0	316
OUTSIDE SERVICE AREA BOUNDARY	NO_CUP	15	115,119	18	21	0	43	43	0	43	43	0	43	43
PALM COAST CITY OF	1947	60,145	99,618,193	40,340	40,992	360,787	3,508	364,295	79,819	216	80,035	82,137	799	82,936
PLANTATION BAY UTILITY COMPANY	1960	1,446	2,770,059	1,027	1,121	4,226	1,794	6,020	1,532	588	2,120	1,617	686	2,304
ST. JOHNS COUNTY UTILITIES	1198	25	0	0	0	0	0	0	0	0	0	0	0	0
VOLUSIA COUNTY UTILITIES	50157	239	683,724	200	217	512	17	528	430	10	440	432	14	446
<b>Total</b>		<b>79,770</b>	<b>127,690,287</b>	<b>51,761</b>	<b>52,235</b>	<b>606,940</b>	<b>11,764</b>	<b>618,704</b>	<b>99,791</b>	<b>4,715</b>	<b>104,506</b>	<b>102,656</b>	<b>5,653</b>	<b>108,309</b>

## **Population Projections for Flagler County Example**

After calculating buildout, the BEBR population projection growth was distributed to the developable parcels in Flagler County. The development was prioritized using a ranking system. Each developable parcel was assigned a rank based on parcel use type, ZIP Code population density, and the built-year of the newest-built parcel in each ZIP Code. As seen in Table 4, Vacant Residential parcels (Rank = 27) were considered more readily developable than Timberland Not Classified by Site Index to Pines parcels (Rank = 2). The other two components of the ranking system were ZIP Code density and the ZIP Code newest year built. The highest ranked developable parcel in Flagler County was a vacant residential parcel in a ZIP Code with a density of 2.02 persons per acre and the newest year built was 2017. Thus, the development priority for this parcel is 2,046.02 (i.e.,  $27+2017+2.02$ ). Alternatively, the lowest ranked parcel was improved agricultural. It was in a ZIP Code with a low population density and the built year of the most recently developed parcel is 2005. Thus, the development priority for this parcel is 2,015.00 (i.e.,  $10+2,005+0.00$ ). As noted, vacant residential parcels in densely populated ZIP Codes will have the highest development priority score. There were 18,238 developable parcels inside Palm Coast (CUP# 1947) that comprised 40,912 acres (Table 5).

After ranking all the parcels in a county, BEBR's medium projected growth was distributed in 5-year increments through 2045. As seen in Table 6 below, BEBR expected 4,989 people would move to Flagler County by 2020. With parcels sorted by development priority rank, the first parcels were selected whose combined population was less than or equal to 4,989. In the specific case of Palm Coast (CUP# 1947), 2,638 vacant residential parcels (724 acres) would be developed by 2020 to house 4,934 new residents. The next group of sorted parcels whose total population was less than or equal to 11,400 was selected, etc. See Table 7 for projections and buildout for all PSABs in Flagler County. The future growth was distributed to developable parcels based on the buildout population calculated in the previous step. In the case of Palm Coast (CUP# 1947), the served and non-served persons per acre (6.8 and 0.07, respectively) were multiplied by the acreage of the parcel to determine the parcel-level persons per household. The most recent year's calculated persons per household for single family and multi-family parcels were kept constant through the planning horizon. See Table 8 using Palm Coast (CUP# 1947) as an example of the historical and projected population distribution at the parcel level.

## **Parcel Projection Methodology and BEBR Considerations**

The SJRWMD considers published BEBR population estimates and medium population projections. In many cases, since the method takes into account residential units at the parcel layer for the base year, the base year estimates of population and projected population for the planning horizon may differ than the actual published BEBR values. It should be noted that the parcel projection method does grow population using the additional population growth from BEBR medium population projections.

### **Additional Methodology Considerations:**

- 1) Used in SJRWMD Public Supply CUP reviews.
- 2) Provides for incorporation of utility feedback in currently served population.
  - a. Never results in negative DSS
  - b. Leads to more consistent DSS estimates from year to year, because DSS does not need to be modified as a direct result of served population reported.
- 3) Allows utilities to grow at different rates due to population density and recent parcel development (i.e., development rank).
  - a. For example, in the case of Flagler County, all growth was attributed to Palm Coast

and Bunnell in 2020 because they had the highest ranked parcels. In 2030, Dunes Community Development, the City of Flagler Beach, Flagler County Utilities, and Volusia County Utilities also had population distributed to their areas, as they had the next-highest ranked parcels.

- 4) Approach allows for and incorporates buildout/real world “on the ground” look at residential parcels and units built.
- 5) Transparent and documented methodology
  - a. Similar methods have been used in the approved Central Florida Water Initiative Regional Water Supply Plan (BEER/Rich Doty parcel method) and Central Springs/East Coast Regional Water Supply Plan (SJRWMD parcel methodology).
  - b. The Southwest Florida Water Management District hires BEER/Rich Doty every year to develop parcel-level projections that vary from published BEER estimates (includes functional population cohorts and utility served data). 2020 Regional Water Supply Plan, Appendix 3-3: Demand Projections for Public Supply [Appendix 3 3 PS Demands Tech Memo \(state.fl.us\)](#).
    - i. “In the case of Manatee and Pinellas counties, the sum of the projections for all utilities exceeds the projected county population. Thus, the county population was increased enough to cover the deficit plus allow for self-supplied population.”

**Table 4.** Parcels ranked according to likelihood of development. Higher rank equals increased likelihood of development.

Parcel Use Description	Parcel Use Code	Rank
VACANT RESIDENTIAL	000	27
CROPLAND SOIL CAPABILITY CLASS III	053	26
CROPLAND SOIL CAPABILITY CLASS II	052	25
CROPLAND SOIL CAPABILITY CLASS I	051	24
GRAZING LAND SOIL CAPABILITY CLASS VI	065	23
GRAZING LAND SOIL CAPABILITY CLASS V	064	22
GRAZING LAND SOIL CAPABILITY CLASS IV	063	21
GRAZING LAND SOIL CAPABILITY CLASS III	062	20
GRAZING LAND SOIL CAPABILITY CLASS II	061	19
GRAZING LAND SOIL CAPABILITY CLASS I	060	18
TIMBERLAND - SITE INDEX 90 AND ABOVE	054	17
TIMBERLAND - SITE INDEX 80 TO 89	055	16
TIMBERLAND - SITE INDEX 70 TO 79	056	15
TIMBERLAND - SITE INDEX 60 TO 69	057	14
TIMBERLAND - SITE INDEX 50 TO 59	058	13
ACREAGE NOT ZONED AGRICULTURAL	099	12
DAIRIES,FEED LOTS	068	11
IMPROVED AGRICULTURAL	050	10
LUMBER YARDS,SAWMILLS,PLANING MILLS	043	9
MINERAL PROCESSING,PHOSPHATE PROCESSING,CEMENT PLANTS,REFINERIES,CLAY PLANTS	047	8
MINING LANDS,PETROLEUM LANDS,OR GAS LANDS	092	7
MISCELLANEOUS RESIDENTIAL (MIGRANT CAMPS,BOARDING HOMES,ETC.)	007	6
ORCHARD GROVES,CITRUS,ETC.	066	5
ORNAMENTALS,MISCELLANEOUS AGRICULTURAL	069	4
POULTRY, BEES, TROPICAL FISH, RABBITS, ETC.	067	3
TIMBERLAND NOT CLASSIFIED BY SITE INDEX TO PINES	059	2
UNDEFINED - RESERVED FOR FUTURE USE	080	1

**Table 5.** Developable acreage by parcel use code description for Palm Coast, consumptive use permit 1947.

Parcel Use Description (PARUSEDESC)	Parcels	Percent of Total Parcels	Acreage	Percent of Total Acreage
ACREAGE NOT ZONED AGRICULTURAL	32	0.18%	4,080	9.97%
GRAZING LAND SOIL CAPABILITY CLASS I	7	0.04%	548	1.34%
GRAZING LAND SOIL CAPABILITY CLASS IV	3	0.02%	44	0.11%
IMPROVED AGRICULTURAL	6	0.03%	163	0.40%
MISCELLANEOUS RESIDENTIAL (MIGRANT CAMPS,BOARDING HOMES, ETC.)	188	1.03%	104	0.25%
TIMBERLAND - SITE INDEX 70 TO 79	36	0.20%	7,100	17.25%
TIMBERLAND - SITE INDEX 80 TO 89	117	0.64%	22,385	54.71%
TIMBERLAND - SITE INDEX 90 AND ABOVE	1	0.01%	79	0.19%
TIMBERLAND NOT CLASSIFIED BY SITE INDEX TO PINES	9	0.05%	1,091	2.67%
VACANT RESIDENTIAL	17,839	97.81%	5,317	13.00%
<b>Total</b>	<b>18,238</b>	<b>100.00%</b>	<b>40,912</b>	<b>100.00%</b>

Note: Nominal discrepancies accounted for by rounding anomalies.

**Table 6.** New population expected in Flagler County from BEBR’s medium projections published in 2019.

Year	2018	2020	2025	2030	2035	2040	2045
Population	107,511	112,500	123,900	134,400	143,600	151,600	159,000
Increase in Population	0	4,989	11,400	10,500	9,200	8,000	7,400

Note: Population projections source: Bureau of Economic and Business Research. Volume 52, Bulletin 183, April 2019.

**Table 7.** Population estimates, projections, and buildout for Flagler County.

Utility	Consumptive Use Permit	Number of Parcels	Buildout	2015	2017	2020	2025	2030	2035	2040	2045
BUNNELL CITY OF	1982	3,082	137,733	2,875	2,934	2,940	2,955	2,961	2,961	2,961	6,386
DUNES COMMUNITY DEVELOPMENT	51136	3,303	6,329	5,493	5,692	5,692	5,733	6,036	6,302	6,302	6,302
FLAGLER BEACH CITY OF	59	4,824	13,238	7,003	7,186	7,186	7,186	10,998	10,998	10,998	10,998
FLAGLER COUNTY UTILITIES	UtilityID_43	6,389	84,254	4,577	4,772	4,772	4,772	5,086	6,224	7,418	11,207
HOLIDAY TRAVEL PARK COOP INC	1979	1	380	380	380	380	380	380	380	380	380
MARINE PARK OF FLAGLER	1953	13	17	17	17	17	17	17	17	17	17
MHC BULOW PLANTATION LLC	2002	3	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284
ORMOND BEACH CITY OF	8932	285	4,314	239	316	316	316	316	316	603	636
OUTSIDE SERVICE AREA BOUNDARY	NO_CUP	15	43	43	43	43	43	43	43	43	43
PALM COAST CITY OF	1947	60,145	364,295	80,030	82,936	87,918	99,276	105,604	113,281	119,446	119,459
PLANTATION BAY UTILITY COMPANY	1960	1,446	6,020	2,120	2,304	2,304	2,304	2,304	2,304	2,456	2,585
ST. JOHNS COUNTY UTILITIES	1198	25	0	0	0	0	0	0	0	0	0
VOLUSIA COUNTY UTILITIES	50157	239	528	440	446	446	446	490	490	490	490
<b>Total</b>		<b>79,770</b>	<b>618,705</b>	<b>104,506</b>	<b>108,310</b>	<b>113,298</b>	<b>124,671</b>	<b>135,198</b>	<b>144,334</b>	<b>152,398</b>	<b>159,787</b>

**Table 8.** Distribution of population estimates and projections at the parcel level for Palm Coast, consumptive use permit 1947.

Parcel Number	CUSTCLASS	Number of Residential Units on Parcel	Number of SF_MF Residential Units in PSAB	2017 Served Population Estimate for PSAB	2017 Served for Parcel	2017 Non-Served Population Estimate for PSAB	2017 Non-Served for Parcel	Parcel Acreage	2017 Served Persons Per Acre	2017 Non-Served Persons Per Acre	Build-out Served for Parcel	Build-out Non-Served for Parcel	2020 Served for Parcel	2020 Non-Served for Parcel
07-11-31-7033-00480-0020	Single Family	1	40,356	82,137	2.04	799	0.02	0.24	-	-	2.04	0.02	2.04	0.02
05-11-31-4075-00000-0002	Multi-Family	2	40,356	82,137	4.07	799	0.04	0.60	-	-	4.07	0.04	4.07	0.04
07-11-31-7032-00880-0040	Vacant Residential	Null	40,356	82,137	0.00	0	0.00	0.23	6.79	0.07	1.56	0.02	1.56	0.02

Notes: PSAB – public supply service area boundary.

2017 Served for Parcel is based on served persons per residential unit:  $(82,137/40,356) = 2.04$ ; for Multi-Family, it is multiplied by the Number of Residential Units on Parcel:  $(82,137/40,356) = 2.04 * 2 = 4.07$

2017 Non-Served for Parcel is based on non-served persons per residential unit  $(799/40,356) = 0.02$ ; for Multi-Family, it is multiplied by the Number of Residential Units on Parcel:  $(799/40,356) = 0.02 * 2 = 0.04$