



## **Putnam County**

# **COMPREHENSIVE PLAN INFRASTRUCTURE ELEMENT**

(Sanitary Sewer, Potable Water, Solid Waste, Stormwater Management, and Natural  
Groundwater Aquifer Recharge)

### ***EAR-based Amendments***

Putnam County  
2509 Crill Avenue, Suite 300  
Palatka, FL 32178

**Infrastructure Element  
(Sanitary Sewer, Potable Water, Solid Waste,  
Stormwater Management, and Natural Groundwater Aquifer Recharge)**

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**Evaluation and Appraisal Report Based Amendments  
Infrastructure Element  
Data and Analysis**

## **I. INTRODUCTION**

The Infrastructure Element and its sub-elements present an overview of potable water and sanitary sewage treatment, stormwater management, solid waste facilities, and areas of aquifer recharge in Putnam County.

The purpose of this Element is to identify demand for the necessary public facilities and services correlated with future growth projections. Design capacities and levels of service are established for sanitary sewer, potable water, solid waste, and stormwater management. This Element emphasizes the general performance of existing facilities, the facilities' general condition, and the impact these facilities have on adjacent natural resources. An analysis of the problems and opportunities for sanitary sewer, solid waste, stormwater management, potable water, and natural groundwater aquifer recharge is included. Included also are existing regulations and programs which govern land use and development of stormwater management features.

In 2009, Putnam County adopted its Evaluation and Appraisal Report (EAR). The data and analysis for the Infrastructure Element is being updated to address the EAR recommendations and to update the short term and long range planning timeframes to 2015 and 2025, respectively. The EAR recommendations for the Infrastructure Element are as follows:

- Revise the element to provide separate goals, objectives, and policies for each sub-element.
- Review and establish levels of service for Putnam County's new water treatment plant and wastewater treatment plant.
- Revise element to address revisions to Florida Statutes regarding surface and groundwater resources and the St. Johns River Water Management District's Regional Water Supply Plan.
- Revise element to address the Putnam County Water Supply Plan.
- Amend element to implement energy conservation regulations contained in HB 697.
- Amend element to require consultation with water suppliers prior to issuing building permits.
- Amend element to allow sanitary sewer concurrency to be met by onsite sewage treatment and disposal systems approved by the Department of Health, pursuant to Section 163.3180(2)(a), F.S.

## **II. SANITARY SEWER SUB-ELEMENT**

### **A. Existing Conditions**

The two agencies responsible for regulating wastewater treatment facilities in the State are the Florida Department of Environmental Protection (FDEP) and the Florida Department of Health (DOH). FDEP has promulgated rules regulating wastewater treatment facilities under Chapter 62-

600, FAC. As stated in Chapter 62-600.120 FAC, FDEP regulates domestic waste facilities that generate wastewater flows exceeding 10,000 GPD (gallons per day) of domestic wastewater and 5,000 GPD for commercial establishments. FDEP also regulates wastewater that contains industrial or toxic or hazardous chemical wastes.

Table D-1 provides a description of existing municipal and package domestic wastewater treatment facilities and Figure D-1 depicts their locations. The table lists the plants by name and includes the location and type of facility.

### ***1. Centralized Municipal Systems***

According to the cities in Putnam County and FDEP, there are three operating municipal wastewater treatment facilities: the City of Palatka, the City of Crescent City, and the Town of Welaka. According to Putnam County's Public Works Department, approximately 20 percent of Putnam County's population is connected to a central municipal wastewater treatment plant regulated by FDEP.

- The City of Palatka's plant is rated as a 3.0 MGD (million gallons per day) activated sludge wastewater treatment plant (WWTP) that discharges effluent to the St. Johns River. The WWTP has tertiary filters and is permitted to generate 0.854 MGD of reuse water for the Palatka Municipal Golf Course. The City has plans to have the plant re-rated to 3.5 MGD. The adopted level of service (LOS) is 125 gallons per capita per day (gpcd) for residential customers and 110 gallons per acre per day for commercial/institutional/industrial customers.
- In 2001, Crescent City built a 0.35 MGD capacity wastewater treatment plant with two sequencing batch reactors (SBRs) and three rapid infiltration basins for treated effluent that are rated at 0.143 MGD. This facility replaced the City's old extended aeration WWTP. The facility has a complete reuse system, including a 2.0 MG reuse storage tank. The adopted LOS is 92 gpcd for average day flow.
- The Town of Welaka has a 0.099 MGD activated sludge extended aeration wastewater treatment plant. The plant's effluent is discharged to evaporation and percolation ponds. According to FDEP the facility is operating at 90 percent capacity. The adopted LOS is 90 gpcd.

### ***2. Package Treatment Systems***

According to FDEP, 29 domestic wastewater package plants exist in the County. Of these, one is owned and operated by the State (Putnam Correctional Institute), six are owned and operated by the Putnam County School Board and two are operated by Putnam County. Port Buena Vista Mobile Home Park (MHP) and Paradise Point Subdivision were taken over by Putnam County when the operators defaulted. The remainder of the package plants are private facilities. As of the date of this document, Putnam County has entered into negotiations with a private developer with the intent of divesting itself of the Port Buena Vista facility.

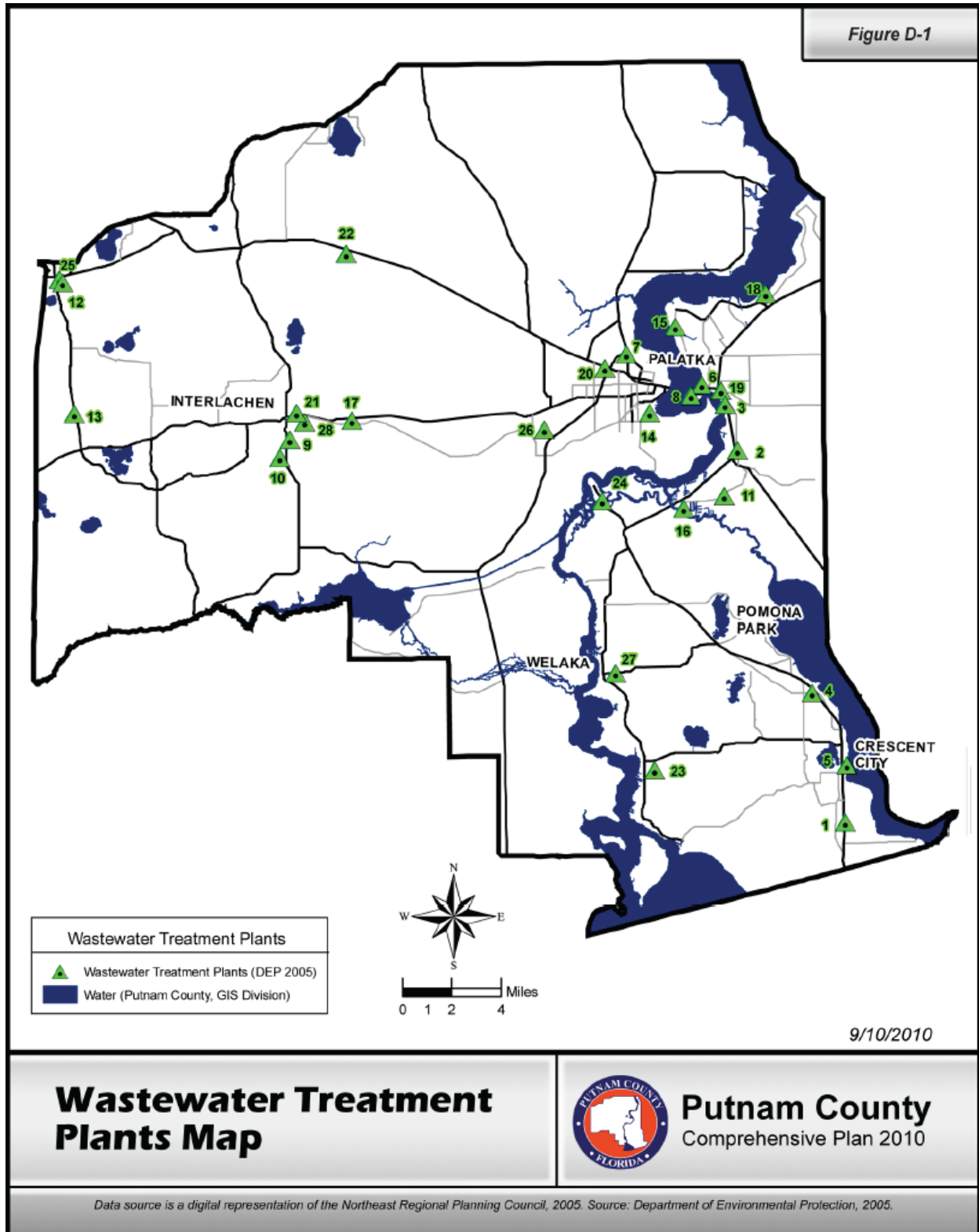
Table D-1 PUTNAM COUNTY FDEP REGULATORY DOMESTIC WASTEWATER TREATMENT FACILITIES

ID	NAME	STREET ADDRESS	LOCATION	STATE	ZIP	TYPE
1	BASS CAPITAL MOBILE HOME PARK	US-17, 2 MILES SOUTH OF >	CRESCENT CITY	FL		WWTP
2	BROWNING PEARCE ELEMENTARY	100 BEAR BOULEVARD	SAN MATEO	FL	32187	WWTP
3	CAPTAIN JOE'S	712 ST JOHNS AVE	PALATKA	FL	32177	WWTP
4	CRESCENT CITY CAMPGROUND	US-17, NORTH OF >	CRESCENT CITY	FL		WWTP
5	CRESCENT CITY, CITY OF	LAKE AND CYPRESS STREETS	CRESCENT CITY	FL		WWTP
6	EASTGATE SHOPPING CENTER WWTP	US-17 NORTH OF SR-100	EAST PALATKA	FL		WWTP
7	ECONOMY INN	US-17 NORTH	PALATKA	FL		WWTP
8	HIAWATHA & HART POINT	APT 116 HIAWATHA COURT	PALATKA	FL	32131	WWTP
9	INTERLACHEN ELEMENTARY SCHOOL "A"	SR-315 @ STRICKLAND ROAD	INTERLACHEN	FL	32148	WWTP
10	INTERLACHEN HIGH & PRICE MIDDLE SCHOOL	126 NORTH SR-315	INTERLACHEN	FL	32148	WWTP
11	JAN'S MOBILE HOME PARK	471 SAN MATEO RD	SAN MATEO	FL	32187	WWTP
12	MELROSE COMMUNITY SCHOOL	SR-21 AT SR-26	MELROSE	FL		WWTP
13	OCHWILLA ELEMENTARY	269 N SR 21	HAWTHORNE	FL		WWTP
14	PALATKA, CITY OF	LUNDY ROAD	PALATKA	FL		WWTP
15	PALM PORT SUBDIVISION	OFF CR-208A, W ON EAST RIVR RD	EAST PALATKA	FL		WWTP
16	PARADISE POINT	PARADISE POINT	PALATKA	FL		WWTP
17	PARK MANOR SUBDIVISION	SOUTH OF SR-20 ON PARK ROAD	INTERLACHEN	FL	32148	WWTP
18	PORT BUENA VISTA MOBILE HOME PARK	DANCY AVE & FEDERAL POINT ROAD	EAST PALATKA	FL		WWTP
19	PUTNAM CORRECTIONAL INSTITUTION WWTF	YELVINGTON ROAD AT US-17	EAST PALATKA	FL	32131	WWTP
20	PUTNAM LAKES	SR-100	PALATKA	FL		WWTP
21	PUTNAM SHOPPING CENTER	1900 THE EXCHANGE SUITE 180	ATLANTA	GA	30339	WWTP
22	Q.I. ROBERT'S MIDDLE SCHOOL	901 SR 100	FLORAHOME	FL		WWTP
23	RIVER PARK MOBILE HOME PARK	SR-309, 5 MILE SOUTH OF SR-308	FRUITLAND	FL		WWTP
24	RIVER VILLAS	6960 PROFESSIONAL PKWY E SUITE 400	SARASOTA	FL	34240	WWTP
25	SANDHILL FOREST TWO APTS	SR21, SR26	MELROSE	FL		WWTP
26	SILVER LAKE OAKS MOBILE HOME PARK	SILVER LAKE DRIVE, SOUTH	PALATKA	FL		WWTP
27	WELAKA, TOWN OF	11TH AVENUE	WELAKA	FL		WWTP
28	WESTWOOD VILLAGE APTS WWTP	SR 315 AND SR 20	INTERLACHEN	FL	32048	WWTP
29	WILLIAMS	LAKE SUSAN RD	HAWTHORNE	FL		RAF
30	BUDD'S HAYFIELD	ROUTE 1 BOX 3400	PALATKA	FL		RAF
31	KUMMER RANCH	ROUTE BOX 6895	PALATKA	FL		RAF
32	MEDLOCK RANCH	ROUTE 1 BOX 7110	PALATKA	FL		RAF
33	VAUSE FARM	HWY 20 AND GORDON CHAPEL RD	HAWTHORNE	FL		RAF
34	VAUSE FARM #3	HWY 20 AND GORDON CHAPEL RD	HAWTHORNE	FL		RAF
35	VAUSE FARMS	117 VAUSE TRAIL	HAWTHORNE	FL		RMF

TYPE
RAF = Residual Application Facility
RMF = Residual Management Facility
WWTP = Wastewater Treatment Plant

Source: FDEP Northeast District 2005

Figure D-1



### 3. *Septic Tanks*

Septic tanks are used throughout the County and in all municipalities, although central sewer systems exist in Crescent City, Palatka, and Welaka. The DOH regulates the installation of septic tanks and drainfields according to rules adopted in Chapter 64E-6 FAC. According to the DOH, 39,732 septic tanks had been installed in Putnam County up to the end of 2009.

In East Palatka a small gravity wastewater collection system serves 100 residents south of the Putnam County Public Works facility. Wastewater flows to the Public Works facility where it is treated by a large septic tank-type drainfield. The future service area for the East Putnam Regional Wastewater Treatment Plant will include these residents.

Article 7, Section 7.02.03 of the Putnam County Land Development Code (LDC) requires lots to be at least one acre to allow for a septic tank and drainfield along with an on-site well. For lots with central water and private septic tank, the requirement is ½-acre minimum. Lots platted before January 1, 1972 are allowed certain exemptions to the minimum lot size depending on various factors, including when the lot was platted and the types of soils on the site. Other criteria must also be met, including the requirement from Chapter 64E-6.006 (2) FAC that the water table elevation at the wettest season of the year be at least 24 inches below the bottom surface of the drainfield. This requirement has resulted in the mounding of many newer drainfields to meet the minimum separation of drainfield and high water tables.

#### (a) **Soil Suitability for Septic Tanks**

Septic tanks function best in well-drained sandy soils. In Putnam County these soils include the Candler-Apopka, Millhopper-Spar Tavares-Centenary-Zolfo, Astatula-Tavares, Candler-Tavares-Adamsville, and Orsina-Astatula-Paola soil groups. These soils occur primarily in the western and southeastern portions of the County (Figure D-2).

The Astatula-Tavares and Tavares-Centenary-Zolfo soil groups in the southeastern section of the County make up the “Crescent City Ridge,” which is a high aquifer recharge area within the County. The Candler-Apopka soil group in western Putnam County provides an area of moderate aquifer recharge.

Both locations, while being ideal sites for the use of septic tanks for sanitary sewage disposal, must be developed at controlled densities to protect the aquifer recharge characteristics of the land. Figure D-3 shows those soils that are best suited for and have the fewest limitations to septic tank effluent absorption fields in the County.

The County has indicated that septic tanks are a problem in certain areas where water tables are high due either to the tanks’ proximity to surface water bodies or where the tanks are in low areas, or a combination of both. This results in the drainfield being too close to the water table and an inadequate depth of unsaturated soil to treat the effluent. This is especially a problem where septic tanks are old and drainfields have not been mounded in accordance with more recent State requirements. One area in particular that has septic tank problems is in the vicinity of Dunns Creek. This area also experiences flooding, which contributes to the septic tank problem. This area is a priority for wastewater service for the County’s proposed regional system.



#### **4.     *Residual Application Sites***

When domestic wastewater is treated, a solid material accumulates in the wastewater treatment plant and must be removed periodically to keep the plant operating properly. The collected material, called “residuals,” “biosolids,” or more commonly “sewage sludge,” is high in organic content and contains moderate amounts of nutrients that are needed by plants. These characteristics make residuals valuable as a soil conditioner and fertilizer.

Properly treated residuals may be used as a fertilizer supplement or soil amendment, subject to regulatory requirements that have been established to protect public health and the environment. These requirements (found in Chapter 62-640, FAC) include pollutant limits, treatment to destroy harmful microorganisms, and management practices for land application sites. Residuals may be used by application to land in farming and ranching operations, forest lands, and public areas such as parks, or in land reclamation projects such as restoration of mining properties. The highest quality of residuals, known in Florida as “Class AA,” are distributed and marketed like other commercial fertilizers.

According to FDEP, there are five permitted residual application facilities (RAFs) and one residual management facility (RMF) in Putnam County. They are: (1) Williams RAF, which includes a 753-acre land application site on Lake Susan Road in Hawthorne; (2) Budd’s Hayfield RAF, which is a 199-acre land application site at Route 1, Box 3400 in Palatka; (3) Kummer Ranch RAF, a 163.2-acre land application site at Route 1, Box 6895; (4) Medlock Ranch RAF, which is a 84.1-acre land application site at Route 1, Box 7110 in Palatka; and (5) Vause Farms #3 RAF, an 85-acre site at Highway 20 and Gordon Chapel Road in Hawthorne. The Vause Farms RMF is a permitted residuals aeration system at 117 Vause Trail in Hawthorne.

Figure D-2

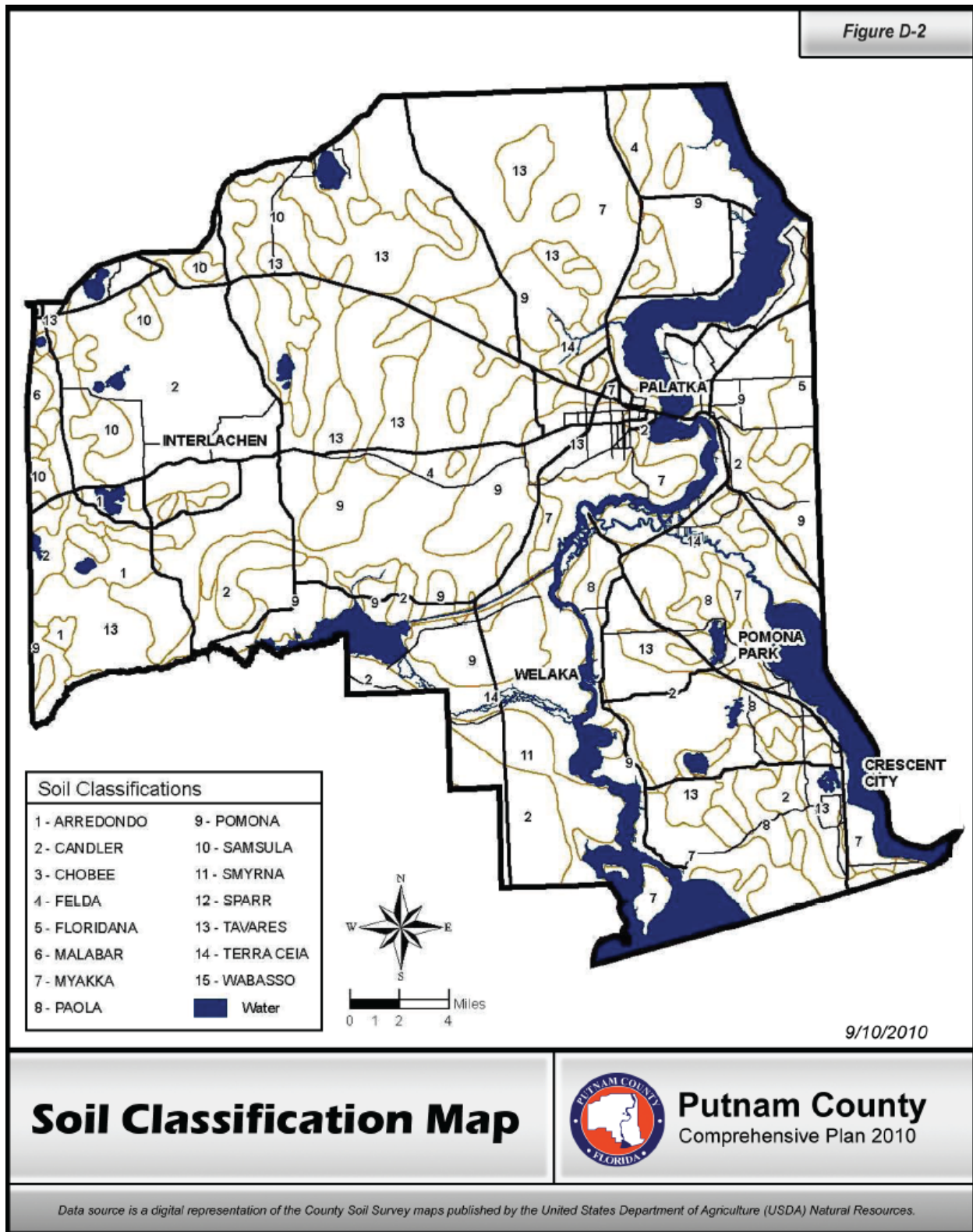
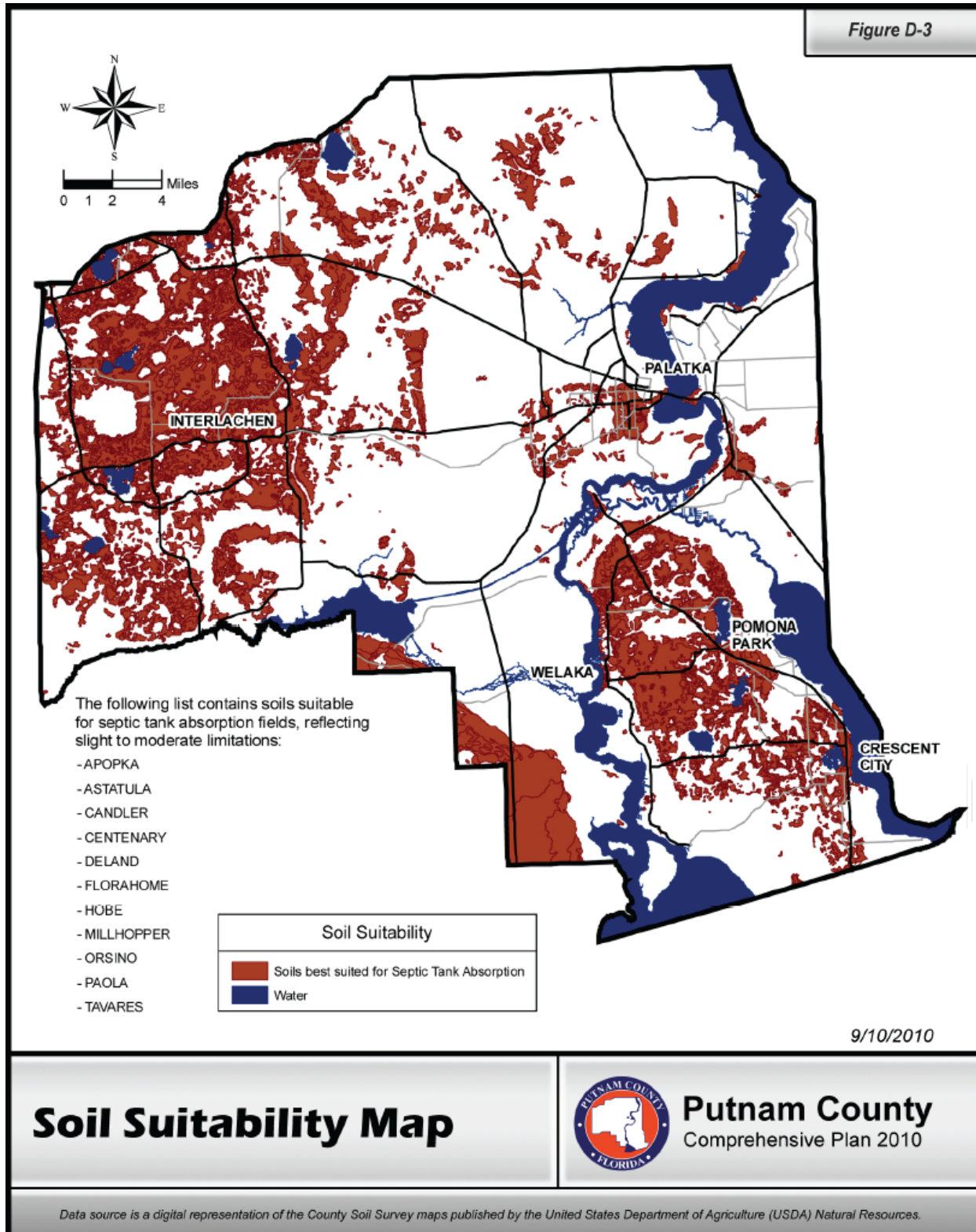


Figure D-3



## **B. Analysis of Need**

Putnam County is planning to construct the East Putnam County Regional Wastewater Project in the East Palatka area. This project will provide a central wastewater system to a large area and is anticipated to reduce pollutant loading into area waters including the St. Johns River. The project consists of three phases, as detailed below.

The East Putnam County Regional WWTF will be constructed by the County to serve the unincorporated portion of East Palatka and, in the future, the north San Mateo area. Infrastructure for the proposed WWTF will treat 0.30 MGD at capacity on an annual average daily flow (AADF) basis. However, process and ancillary equipment will be installed as capacity comes on line. The initial equipment installation will be for flows of up to 150,000 GPD AADF, with maximum daily flows of 225,000 GPD and peak hour flows of 600,000 GPD. Phase II will increase the flow capacity to 0.30 MGD, and Phase III will increase it further to 0.45 MGD with the possible addition of reuse for effluent disposal.

An element of the project is that Putnam County is planning to work with the Department of Corrections (DC) to take over the operation and maintenance of the Putnam Correction Institution's WWTF and its related effluent disposal site. The existing effluent disposal site consists of approximately 35 acres of woodlands, 15 acres of which is a permitted restricted access reuse system (sprayfield). As part of this agreement, DC will allow Putnam County to make improvements to the Putnam Correction Institution's WWTF, including the effluent disposal system, and build a new WWTF on the unused portion of the sprayfield site. The sprayfield is located south of Yelvington Road on Gilbert Road, which is currently unpaved. It is anticipated that the final design will be completed in the first quarter of 2009 with construction completed in the third quarter of 2010.

The unincorporated areas north of the East Palatka area and areas to the south including Dunns Creek will be served by a Phase II expansion of the proposed Phase I system. The Phase II system will extend wastewater service to an additional 6,432 persons and generate an additional 0.48-MGD annual average daily flow for a total future system flow of 0.96-MGD annual average daily flow.

The City of Palatka is planning to have its wastewater treatment plant upgraded to 3.5 MGD capacity. (According to FDEP the plant is currently operating at 90 percent capacity.) A future expansion is also under evaluation that would increase the wastewater plant capacity up to six MGD in a two-phase process over the next five to seven years.

According to FDEP the Town of Welaka WWTP is operating near 90 percent capacity. Welaka would need to upgrade its plant for any future connections but there is no plan for expansion at this time.

Along with the East Putnam County Regional Wastewater Project, the County should consider other areas where expansion of centralized services may alleviate malfunctioning septic systems, especially where there is the potential for health problems from contaminated private wells. The County is currently working with Horizon Capital, LLC on the proposed River Bend development project as one alternative to providing additional centralized wastewater services to its citizens.

The County has taken steps to alleviate the problem of pollution related to the proliferation of septic tanks. For instance, the County adopted Section 6.03.03, LDC, which specifies that lots within 500

feet of any surface water body which have not been developed must be a minimum of ½-acre in size and have a setback of at least of 100 feet for a septic tank or septic tank drainfield. Figure D-3 identifies areas with soils that are best suited for septic systems. Septic systems outside of the identified areas may be problematic. Areas in Putnam County with historic small lot development patterns are being inventoried to identify specific areas of special concern.

### **III. POTABLE WATER SUB-ELEMENT**

#### **A. Existing Conditions**

Potable water is defined as water that is safe for drinking, cooking, and other domestic uses. In Putnam County individual water supply wells and public water systems are the principal means of providing potable water. According to Chapter 62-555, FAC, individual water supply wells are defined as a well, pump, and piping on a residential lot that delivers water to only a single home or family. Community water systems are defined by Chapter 62-521, FAC as those that have at least 15 service connections serving year-round residents or regularly serve 25 persons year round.

FDEP is responsible for implementing the Florida Safe Drinking Water Act (Section 403.850 - 403.864 FS). FDEP has promulgated rules regulating public water systems under Chapter 62-555, FAC. These rules establish drinking water quality standards, designate minimum monitoring requirements, list acceptable sampling and analytical methods, and set construction standards for public water supply wells.

The Water Management Districts (WMDs) are responsible for conserving and promoting the efficient use of Florida's water supply to meet existing and future demands. The WMDs regulate consumptive uses of water through a permitting system. The St. Johns River Water Management District (SJRWMD) require permits for uses which exceed 100,000 gallons per day average annual daily withdrawal, for withdrawals from facilities which have a withdrawal capacity of more than 1,000,000 gallons per day, or from withdrawal from wells which are six inches in diameter or greater.

#### ***1. Centralized Municipal Systems***

According to information from FDEP, seven permitted municipally-owned and operated WTPs serve incorporated communities in Putnam County. According to FDEP all seven of the municipal systems are operating at acceptable levels with maximum daily flows in 2005. The municipal and private facilities are inventoried on Table D-2 and their locations are depicted in Figures D-4, D-4A, and D-4B.

- The City of Palatka owns and operates the R.C. Willis plant, a 5.7 MGD aeration and chlorination WTP. The facility has eight production wells. According to the WTP operator, the WTP will be changing treatment processes from aeration with chlorination to ultrafiltration within the next year to improve water quality. Based on the City's Comprehensive Plan, the adopted LOS is 130 gallons per capita per day (gpcd) for residential and 110 gallons per acre per day (gpad) for commercial/industrial. WTPs are shown in Figure D-4A.
- The Town of Interlachen owns and operates three WTPs under two permits. The Interlachen

WTP is rated at 1.87 MGD (includes the Tremont Plant and the Strickland Plant under one permit) and the Grassy Lake WTP which is rated at 0.374 MGD. The Interlachen WTP has one eight inch well, one 60,000-gallon elevated storage tank, and one four inch auxiliary backup well at the Tremont location and one eight inch well and two 10,000-gallon hydropneumatic tanks at the Strickland location. The Grassy Lake Plant has one eight inch well, one 88,000-gallon ground storage tank, and one 10,000-gallon hydropneumatic tank. Based on the City's Comprehensive Plan, the adopted LOS is 100 gpcd. WTPs are shown in Figure D-4B.

- The City of Crescent City owns and operates a 0.99-MGD WTP, with two 800-GPM wells, one 100,000-gallon ground storage tank, four high-service pumps, one 100,000-gallon main elevated storage tank, and one secondary 75,000-gallon elevated tank. There are 1,070 customer meter connections, all within the City limits. Population served is 1,800 according to EPA Safe Drinking Water Information System. Based on the City's Comprehensive Plan, the adopted LOS is 116 gpcd.
- The Town of Welaka Water Treatment Plant is a 0.454-MGD plant. The plant includes three production wells and two auxiliary backup wells. Based on the Town's Comprehensive Plan, the LOS is 102 gpcd.
- The unincorporated Town of Melrose operates a 0.403-MGD water treatment plant. Although the facility is located within Putnam County, most of the customers are outside the County limits.



Table D-2 Potable Water Treatment Plants in Putnam County

TABLE D-2 PUTNAM COUNTY FDEP REGULATED POTABLE WATER TREATMENT FACILITIES

ID	FIGURE	NAME	MAILING STREET	CITY	POP.	CAP. (GPD)
1	D-4	ACOSTA CREEK MARINA	125 ACOSTA CREEK DRIVE	SATSUMA	25	28,000
2	D-4	ADVANCED AUTO PARTS #9202	241 HIGHWAY 17 SOUTH	EAST PALATKA	25	2,880
3	D-4	APPLE HOUSE I	422 PLEASANT STREET	POMONA PARK	30	3,072
4	INSET 4-B	BADEN POWELL SCOUT RESERVATION	1453 BADEN POWELL ROAD	MEI ROSE	300	288,000
5	D-4	BARDIN GROCERY STORE	BARDIN ROAD	PALATKA	25	4,032
6	D-4	BASS CAPITAL MHP	HWY 17, SOUTH	CRESCENT CITY	98	64,000
7	D-4	BEECHERS POINT S/D	BEECHER POINT DRIVE	WELAKA	98	173,000
8	INSET 4-A	BEST WESTERN INN OF PALATKA	119 HIGHWAY 17 SOUTH	EAST PALATKA	150	28,800
9	INSET 4-A	BLO FOOD STORE	PO BOX 1940	BUNNELL	25	4,030
10	INSET 4-A	BROWNING PIERCE ELEMENTARY	HWY 17 S. @ OLD SAN MATEO RD.	EAST PALATKA	1,100	144,000
11	INSET 4-A	BURGER KING	3305 GRILL AVENUE	PALATKA	50	10,560
12	INSET 4-A	CALVARY BAPTIST CHURCH	3005 SOUTH PALM AVENUE	PALATKA	120	4,000
13	INSET 4-A	CAPTAIN JOE'S	117 ELISE DRIVE	EAST PALATKA	25	14,400
14	INSET 4-B	CARIBBEAN PLAZA	103 CHEYENNE AVE	INTERLACHEN	25	5,760
15	D-4	CHEYENNE SALOON	1103 HIGHWAY 17 NORTH	BOSTWICK	50	3,900
16	INSET 4-A	CHEYENNE SALOON	SOUTH HIGHWAY 17	EAST PALATKA	50	4,500
17	INSET 4-A	CHICO'S MEXICAN RESTAURANT	HCR 3, BOX 13508	SATSUMA	36	14,400
18	INSET 4-A	CHRIST IND. METHODIST CHURCH	4078 SILVER LAKE DRIVE	PALATKA	200	18,240
19	D-4	CHURCH OF THE NAZARENE	179 MILLER SQUARE	INTERLACHEN	160	10,560
20	INSET 4-B	COOPER LAKE MHP	1488 HIGHWAY 20	INTERLACHEN	100	36,000
21	D-4	COW CATCHER LOUNGE	1712 HIGHWAY 17 SOUTH	POMONA PARK	25	26,000
22	D-4	CRESCENT CITY CAMPGROUND	2359 SOUTH HWY 17	CRESCENT CITY	150	58,000
23	D-4	CRESCENT CITY WTP	115 N SUMMIT ST	CRESCENT CITY	3,000	1,070,000
24	D-4	CRESCENT CITY CONG OF JEHOVAH'S	118 EWEERS ROAD	CRESCENT CITY	84	14,400
25	INSET 4-A	CRESCENT HILLS SD	P.O. BOX 1453	PALATKA	50	58,000
26	D-4	CSX CONFERENCE CENTER	248 WHITNEY STREET	SATSUMA	50	43,000
27	INSET 4-A	EAST PALATKA WATER SYSTEM	POST OFFICE BOX 310	EAST PALATKA	210	66,000
28	INSET 4-A	EASTGATE SQUARE SHOPPING CENT.	U.S. 17	EAST PALATKA	80	72,000
29	INSET 4-A	ECONOMY INN	HWY 17, SOUTH	PALATKA	25	15,000
30	INSET 4-A	EVANS LABOR CAMP	STEWART ROAD	EAST PALATKA	40	6,120
31	INSET 4-A	FAITH BAPTIST CHURCH	3920 WEAVER ROAD	PALATKA	160	20,000
32	INSET 4-B	FAST TRACK FOOD STORE #313	SR 315 & SILVER LAKE ROAD	INTERLACHEN	25	28,800
33	INSET 4-B	FAST TRACK FOOD STORE #325	932 EAST HWY 20 AT SUN AVE	INTERLACHEN	25	28,800
34	D-4	FLORIDA POWER & LIGHT COMPANY	392 US HIGHWAY 17 SOUTH	EAST PALATKA	45	36,000
35	D-4	GATEWAY FISHING CAMP	228 FORT GATES FERRY ROAD	FRUITLAND	25	14,400
36	D-4	GIRL SCOUT CAMP KATERI	1031 CR 21	ORANGE SPRINGS	150	180,000
37	D-4	GEORGETOWN MARINA & LODGE	1633 CR 309 (HC 1, BOX 514)	GEORGETOWN	25	5,760
38	INSET 4-A	GEORGIA PACIFIC - HAWTHORNE	223 GORDON CHAPEL ROAD	JOHNSON	355	11,520
39	INSET 4-A	GEORGIA PACIFIC - PAPER MILL	C.R. 216	PALATKA	1,300	360,000
40	INSET 4-A	GEORGIA PACIFIC CHIP MILL	C.R. 216	PALATKA	31	23,000

Source: DEP 2005

TABLE D-2 PUTNAM COUNTY FDEP REGULATED POTABLE WATER TREATMENT FACILITIES

ID	FIGURE	NAME	MAILING STREET	CITY	POP	CAP (GPD)
41	INSET 4-B	GRASSY LAKE WTP	HWY 20	INTERLACHEN	140	374,000
42	D-4	WRIGHTWOOD APARTMENTS	MOODY ROAD AT HWY 20	PALATKA	20	21,120
43	D-4	HALF SHELL RESORTS	132 ROBERTS RD (FRIENDSHIP LN)	SAN MATEO	50	28,800
44	D-4	HALL'S SUPERETTE	POST OFFICE BOX 579	BOSTWICK	25	2,000
45	D-4	HANDY WAY # 2053 - SATSUMA	1117 HIGHWAY 17 SOUTH	SATSUMA	25	17,280
46	INSET 4-A	HANDY WAY # 2109 - PALATKA	1205 HWY 19	PALATKA	25	14,400
47	INSET 4-A	HANDY WAY # 2235 - PALATKA	HWY 100 @ SR 19	PALATKA	25	28,800
48	D-4	HANDY WAY # 2272 - FRUITLAND	CR 309 AT CR 308	FRUITLAND	25	28,800
49	INSET 4-A	HANDY WAY # 2307 - E. PALATKA	SR 207 @ MCCORMICK RD	EAST PALATKA	25	14,400
50	INSET 4-B	HANDY WAY # 2329 - MANNVILLE	901 HWY 20 EAST, AT TWIN LKS R	JOHNSON	25	14,400
51	D-4	HANDY WAY # 2428 - N. PALATKA	HWY 17 N. AT CNTY LANDFILL RD	PALATKA	25	14,000
52	INSET 4-B	HANDY WAY # 2478 - INTERLACHEN	1420 SR 20 WEST (@ LAKEVIEW TRAIL)	INTERLACHEN	25	5,280
53	D-4	HANDY WAY # 2478 - INTERLACHEN	1886 HWY 20 WEST, AT SR 21	JOHNSON	25	28,800
54	D-4	HANDY WAY # 3006 - HAWTHORNE	2110 17S, AT PARADISE SHRES RD	CRESCENT CITY	25	7,200
55	INSET 4-A	HANDY WAY #2117 - EAST PALATKA	HWY 17 AT CR 207, E	EAST PALATKA	25	19,392
56	D-4	HARLEY PAULTE'S CAMPING VILLAGE	1269 CR 309	FRUITLAND	25	17,280
57	INSET 4-A	HERMIT'S COVE WATER SYSTEM			641	130,000
58	INSET 4-A	HIAMATHA CONDOMINIUMS	116 HIAMATHA COURT	EAST PALATKA	138	75,000
59	INSET 4-B	HIDE-A-WAY ACRES	RURAL ROUTE 2, BOX 362	JOHNSON	87	37,800
60	INSET 4-B	HOLLISTER CHRISTIAN ACADEMY	107 HOLLISTER CHURCH RD @ SR20	HOLLISTER	100	5,760
61	INSET 4-B	INTERLACHEN LAKE ESTATES	1000 COLOR PLACE	INTERLACHEN	560	145,600
62	INSET 4-B	INTERLACHEN WTP	PO BOX 90	INTERLACHEN	1,260	1,870,000
63	INSET 4-B	ISLAND FOOD STORE - PALATKA	??	PALATKA	25	5,760
64	INSET 4-A	LAN'S MODULAR ESTATES	OLD SAN MATEO ROAD	SAN MATEO	65	57,600
65	D-4	LAKE COMO WATER ASSOCIATION	118 PALMER STREET	LAKE COMO	450	246,000
66	D-4	LAKE SWAN CAMP	647 STATE ROAD 28	MELROSE	275	115,200
67	INSET 4-A	LIL CHAMP #15	7450 ORILL AVE (SR 20)	FRANCIS	25	4,032
68	INSET 4-A	LIL CHAMP #289	744 HWY 17 S @ HORSELANDING RD	SAN MATEO	25	4,032
69	INSET 4-B	LIL CHAMP #36	310 SOUTH CR 21	JOHNSON	25	2,016
70	INSET 4-A	LIL CHAMP #6272	543 HWY 17 SOUTH	SAN MATEO	25	14,400
71	INSET 4-B	LIL CHAMP #68	HWY 20	HOLLISTER	25	24,400
72	D-4	LIL CHAMP #69	WEST RIVER ROAD	SATSUMA	100	14,400
73	INSET 4-B	LITL CAESARS	806 HIGHWAY 20	INTERLACHEN	25	4,032
74	D-4	LIVE OAK GOLF & COUNTRY CLUB	COUNTY ROAD 309	FRUITLAND	100	2,700
75	INSET 4-A	LOVELY FOOD MART	336 SOUTH HWY 17	EAST PALATKA	25	7,872
76	D-4	LUNKER LODGE/GEORGETOWN SPORTSMANS	130 LUNKER LODGE ROAD	GEORGETOWN	27	10,560
77	D-4	LUTHER SPRINGS	LAKE VAUSE ROAD	ORANGE SPRINGS	25	50,000
78	D-4	MARANATHA ASSEMBLY OF GOD	HWY 100 AT WAHOO AVE	FLORAHOME	90	38,000
79	INSET 4-A	MARC'S VILLA	50 HWY 17 NORTH	SAN MATEO	50	43,000
80	INSET 4-B	MCCAULEY'S TAVERN	ROUTE 2, BOX 19	INTERLACHEN	25	14,000

Source: DEP 2005



TABLE D-2 PUTNAM COUNTY FDEP REGULATED POTABLE WATER TREATMENT FACILITIES

ID	FIGURE	NAME	MAILING STREET	CITY	POP	CAP. (GPD)
81	INSET 4-A	MELROSE WTP	RICHARDSON LN OFF S.R. 26	MELROSE	1,050	403,200
82	D-4	MEEMA & CO.	1147 HWY. 17 SOUTH	SATSUMA	25	5,952
83	INSET 4-A	NE FLA EDUCATIONAL CONSORTIUM	3841 REID STREET	PALATKA	80	14,400
84	INSET 4-A	NICOLE DRIVE SID	3400 GRILL AVE, SUITE 1	PALATKA	40	20,000
85	D-4	IOCHWILLA ELEMENTARY SCHOOL	SR 21 SOUTH	JOHNSON	1,200	72,000
86	INSET 4-A	OPEN BIBLE BAPTIST CHURCH	124 OLD SAN MATEO ROAD	PALATKA	25	7,872
87	INSET 4-A	PALATKA BAPTIST TEMPLE SCHOOL	HIGHWAY 19, NORTH	PALATKA	65	28,000
88	INSET 4-A	PALM PORT SUBDIVISION	OFF EAST RIVER ROAD	EAST PALATKA	357	37,100
89	D-4	PARADISE VIEW ESTATES	128 MAGNOLIA AVENUE	JOHNSON	73	86,000
90	INSET 4-A	PENIEL BAPTIST ACADEMY	6227 SILVER LAKE DRIVE	PALATKA	305	48,000
91	INSET 4-B	PHILIPS FISH FARM	ROUTE 2, BOX 482-P	INTERLACHEN	25	2,000
92	D-4	POMONA PARK WATER SYSTEM	CHURCH STREET	POMONA PARK	475	170,000
93	D-4	PORKY'S LANDING AND MARINA	120 GEORGETOWN LANDING RD	GEORGETOWN	25	15,000
94	D-4	PORT BUENA VISTA	EAST WARREN DRIVE	EAST PALATKA	76	50,400
95	INSET 4-A	PUTNAM CO. MAINTENANCE YARD	POST OFFICE BOX 310	EAST PALATKA	80	21,600
96	INSET 4-A	PUTNAM CO. SCHOOL BD. MAINT.	124 W. LOUIS BROER ROAD	PALATKA	26	4,032
97	D-4	PUTNAM CORRECTONAL INSTITUTE	YELVINGTON ROAD	EAST PALATKA	420	297,150
98	INSET 4-A	PUTNAM COUNTY AGRICULTURAL CEN	20 YELVINGTON ROAD	PALATKA	25	14,400
99	INSET 4-A	PUTNAM COUNTY SHRINE CLUB	POST OFFICE BOX 291	PALATKA	25	14,000
100	D-4	PUTNAM LANES	3334 REID STREET	PALATKA	25	50,000
101	D-4	O.L. ROBERTS MIDDLE SCHOOL	910 STATE ROAD 100	FLORAHOME	500	230,400
102	INSET 4-A	R. C. WILLIS WTP	320 NORTH MOODY RD	PALATKA	0	4,193,000
103	D-4	RIVER PARK TWP	POST OFFICE BOX 426	WELAKA	500	210,000
104	INSET 4-A	RIVERCREST TRAILER PARK	238 BUFFALO BLUFF ROAD	SATSUMA	26	38,880
105	INSET 4-A	RIVERGROVE SUBDIVISION WTP	POST OFFICE BOX 1109	EAST PALATKA	30	30,000
106	INSET 4-A	RIVERWOOD RV VILLAGE	RIVERWOOD VILLAGE ROAD	GEORGETOWN	371	90,000
107	D-4	RODEHEAVER BOYS RANCH	HWY 19 SOUTH TO BOYS RANCH RD	PALATKA	25	17,280
108	D-4	RODMAN CAMPGROUND	410 RODMAN DAM RD (BRAD MERRY)	PALATKA	70	36,000
109	D-4	RYANS TRAILER PARK	CARTER ROAD	PALATKA	25	19,680
110	INSET 4-A	SAN MATEO RESTAURANT	ROUTE 3, BOX 161	PALATKA	95	21,600
111	D-4	SARATOGA HARBOR (MR. THOMPSON)	POST OFFICE BOX 336	EAST PALATKA	30	25,200
112	INSET 4-A	SEARS PLAZA	GIBBS RD AT HAMILTON RD.	SAN MATEO	25	8,000
113	D-4	SEMINOLE ELECTRIC (POWER PLANT)	816 HIGHWAY 19 SOUTH	SATSUMA	191	158,400
114	INSET 4-A	SHELL HARBOR	890 N. HWY 17	PALATKA	32	36,000
115	INSET 4-B	SILVER LAKE OAKS MHV	140 SHELL HARBOR ROAD	PALATKA	400	216,000
116	D-4	SKINNERS WHOLESALE NURSERY	SILVER LAKE DR AT LAKE SHORE D	SATSUMA	25	21,600
117	INSET 4-A	SOUTHSIDE BAPTIST CHURCH	330 CLIFTON ROAD	PALATKA	88	57,600
118	D-4	ST. JOHNS HARBOR WTP	2920 BROWNS LANDING ROAD	CRESCENT CITY	80	18,000
119	INSET 4-A			PALATKA	175	14,000
120	D-4		146 BASIN DRIVE	PALATKA	327	130,000

Source: DEP 2005

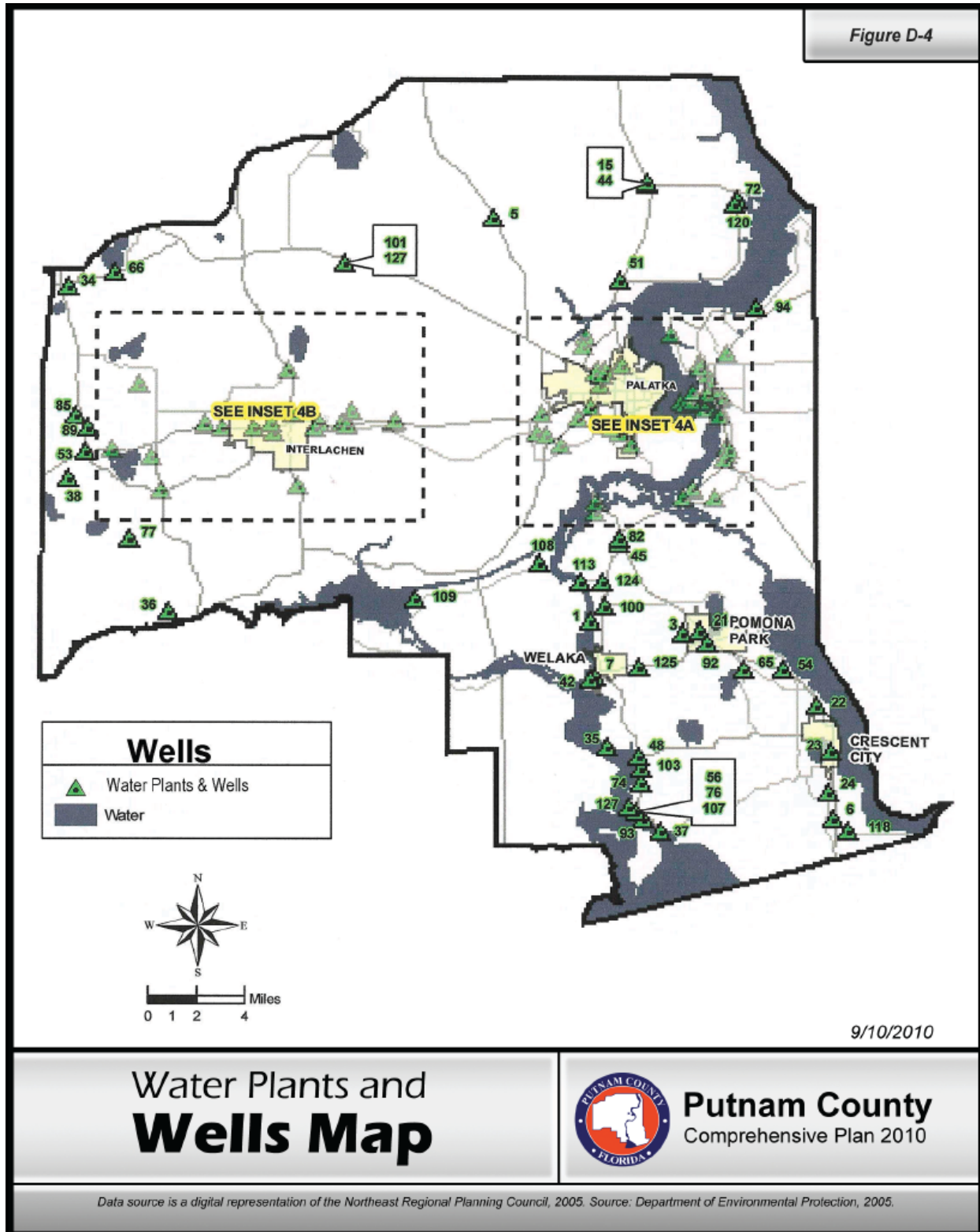
TABLE D-2 PUTNAM COUNTY FDEP REGULATED POTABLE WATER TREATMENT FACILITIES

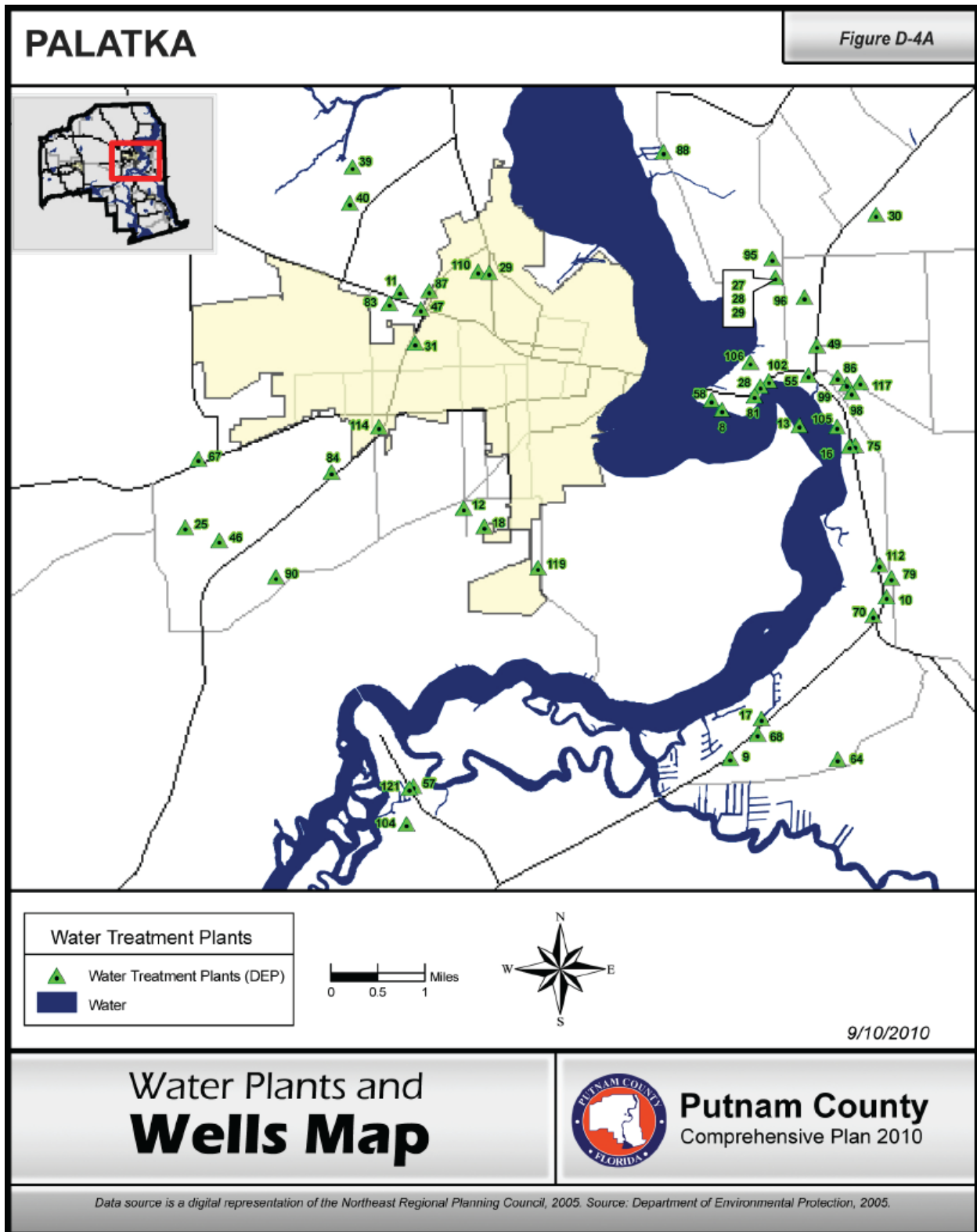
ID	FIGURE	NAME	MAILING STREET	CITY	POP	CAP. (GPD)
121	INSET 4-A	ST. JOHNS RIVER CLUB UTILITIES	BUFFALO BLUFF RD. AT BAYOU DR.	SATSUMA	145	52,500
122	D-4	THE GATEWAY SCHOOL	141 FERRY ROAD	EAST PALATKA	200	108,000
123	INSET 4-B	WALKER HEAD START CENTER	157 SOUTH CR 21	JOHNSON	51	2,100
124	D-4	WELAKA MHP		WELAKA	357	86,000
125	D-4	WELAKA WTP		WELAKA	1,800	453,800
126	INSET 4-B	WESTWOOD VILLAGE APARTMENTS	CITRUS CIRCLE N ON CR 315 TO WESTWOOD ROAD	INTERLACHEN	100	48,000
127	D-4	WOOTEN'S MHP	1343 NE 17TH ROAD	OCALA	29	36,000
128		* ABUNDANT LIFE MINISTRIES	890 HIGHWAY 19 NORTH	PALATKA	25	3,750
129		* AGAPE LAND DAYCARE	737 HIGHWAY 20	HOLLISTER	25	14,400
130		* ANZUAL DA MIGRANT LABOR CAMP	171 EAST CRACKER SWAMP RD.	EAST PALATKA	25	2,400
131		* CAMPBELL'S MIGRANT LABOR CAMP	ROUTE 1 BOX 167	HASTINGS	40	0
132		* CRESCENT CITY LAKE CAMPERS	130 SMITH LANE	CRESCENT CITY	50	14,400
133		* DOLLAR GENERAL STORE	264 HIGHWAY 17 SOUTH	EAST PALATKA	25	1,250
134		* DUNNS CREEK BAPTIST CHURCH	666 HIGHWAY 17 SOUTH	SAN MATEO	150	1,500
135		* FAT BOYS	HWY 17 SOUTH @ CR 209	PALATKA	25	14,400
136		* FELDSPAR CORPORATION	KEUKA ROAD PO BOX 8	EDGAR	45	3,600
137		* GATOR LANDING RESTAURANT	165 HWY 17 SOUTH	EAST PALATKA	120	43,200
138		* HANDY WAY # 2577 - FLORAHOME	1119 STATE ROAD 100	FLORAHOME	25	10,000
139		* HI LEVEL LOUNGE	3821 REID STREET (SR 100)	PALATKA	25	999
140		* LAFARGE GYPSUM MANUFACTURING FACILITY	866 NORTH HIGHWAY 17	PALATKA	140	29,750
141		* LEARNING TREE DAY CARE	461 OLD HIGHWAY 17	CRESCENT CITY	50	0
142		* NEWFRONTIER SALOON	2392 HIGHWAY 19 SOUTH	FORT MCCOY	25	28,000
143		* LYNCH'S LANDING (FORMERLY FULL MOON)	129 TROUPE ROAD	SAN MATEO	25	14,400
144		* MOUNT ROYAL S/D	P.O. BOX 297	WELAKA	25	24,150
145		* PALATKA MOOSE LODGE	1050 SOUTH HIGHWAY 19	PALATKA	25	11,520
146		* QUICK MART # 2	1722 HIGHWAY 17 SOUTH	EAST PALATKA	25	13,392
147		* RIVER PUB	1148 CR 309	GEORGETOWN	25	14,400
148		* RODRIGUEZ MHP	POST OFFICE BOX 290	INTERLACHEN	68	36,000
149		* SIMMONS LABOR CAMP	120 GREENVILLE ROAD	POMONA PARK	25	21,000
150		* SUNOCO # 2431	276 S. HWY 17 (AT YELVINGTON)	EAST PALATKA	25	14,400
151		* SUNOCO # 2450	203 S FALKENBERG ROAD	TAMPA	25	14,400
152		* TRINITY BAPTIST CHURCH	5021 SILVER LAKE DRIVE	PALATKA	25	14,400
153		* BASS WORLD LODGE AND MARINA	POST OFFICE BOX 430	GEORGETOWN	25	1,900
154		* FLORIDA RACING OF PUTNAM COUNTY	1039 HIGHWAY 17 SOUTH	SATSUMA	500	

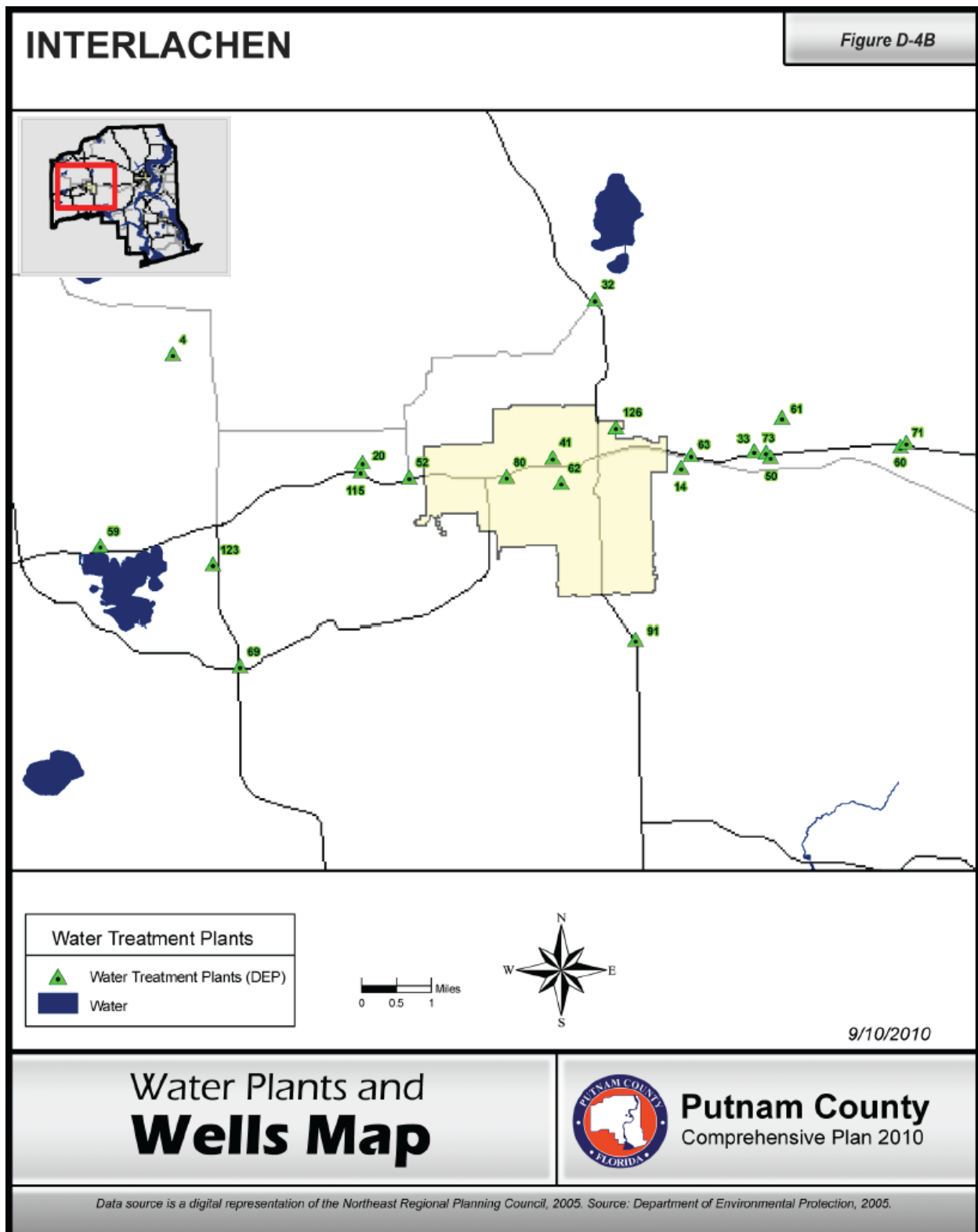
\* Water Plant not shown on Figure D-4

Source: DEP 2005

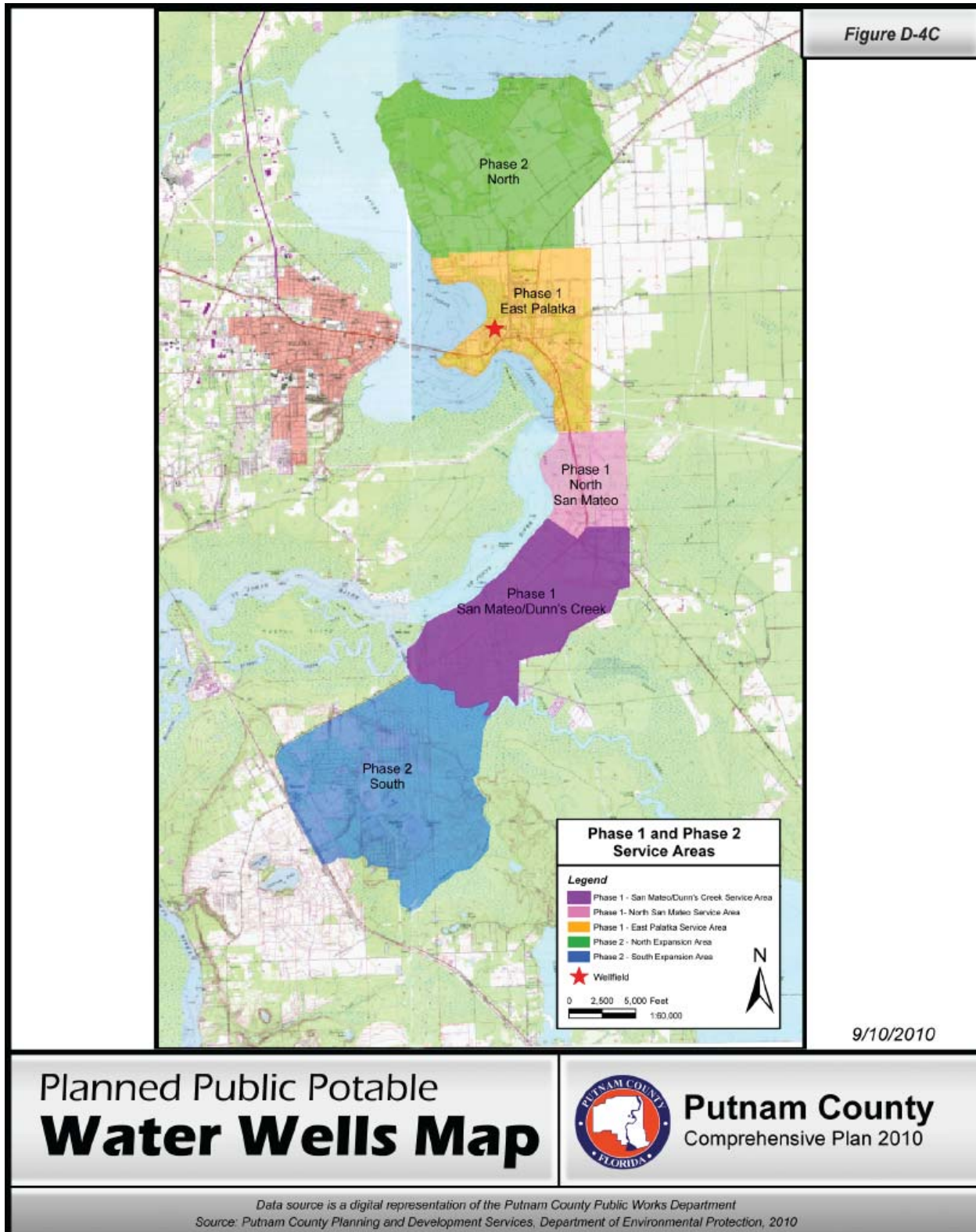
Figure D-4











## 2. *County Systems*

According to FDEP, there are five County-owned and operated WTPs, including East Palatka, Putnam County Maintenance Yard, Putnam County Agricultural Center, Port Buena Vista MHP, and Paradise View Estates. There are also six WTPs owned and operated by the Putnam County School Board and one WTP owned and operated by the State at the Putnam Corrections Institute. The East Putnam Regional Water System serves East Palatka, San Mateo, and surrounding areas. This facility replaces the existing East Palatka WTP, and is operated by Putnam County. The facility is a 0.93-MGD Reverse Osmosis WTP with two 900-gallon-per-minute Floridan Aquifer production wells. The East Putnam Regional WTP reduces the burden on the freshwater aquifer by using reverse osmosis to treat brackish groundwater. The facility is located at the Putnam County Public Works site (233 Putnam County Boulevard in East Palatka) and includes a new 250,000 gallon ground storage tank, a 100,000 gallon elevated storage tank, and a distribution system consisting of 27 miles of water main.

The new system meets the drinking water needs of the residents and provides fire flow of 500 gpm for two hours. Phase I (completed) serves approximately 4,000 persons and the Putnam Correctional Institute with a maximum of 550 inmates. As of June 2009, the County has issued approximately 900 permits to install water meters. Phase II (5 to 10 years away) will increase capacity of the plant to 2 MGD and include additional water mains to be installed. The combined Phase I and Phase II service area is approximately 25 square miles. The Putnam County combined Phase I and Phase II service areas are depicted on Future Land Use Series Map 7 “Planned Public Potable Water Wells Map” and in Map D-4C on page D-21.

The Putnam County Maintenance Yard WTP is a 0.022-MGD capacity plant on East Cracker Swamp Road in East Palatka. The system has one well and four service connections. Eighty people are being served, according to the EPA Safe Drinking Water Information System.

The Port Buena Vista MHP WTP is a 0.050-MGD capacity plant on East Warren Drive in East Palatka. The system has three wells and 54 service connections. The population served is 135, according to the EPA Safe Drinking Water Information System.

The Paradise View Estates WTP is a 0.086-MGD capacity plant on Magnolia Ave in Ochwilla. The system has one well and 15 service connections. Fifteen people are being served, according to the EPA Safe Drinking Water Information System.

The Putnam County Maintenance Yard, the Port Buena Vista MHP, and the Paradise View Estates WTPs were taken over by the County due to the operators’ defaulting.

Because of the paucity of reliable information and the fragmented nature of the available public water service, it is impossible to determine a reasonable level of service based upon existing water service facilities. Therefore, Putnam County has adopted the standards contained in the application standards of the FDEP and DOH potable water system regulations as the level of service standards for planning and concurrency management purposes. If the situation changes during the first planning period (2010 – 2015), the next Evaluation and Appraisal Report will evaluate historical data, changing public needs and offer an opportunity to redress any problems.

### **3. *Private Package Systems***

In addition to municipal and County-owned systems, there are 134 small private package water systems serving residents living in subdivisions, unincorporated communities, condominiums, mobile home parks, and RV parks and also serving non-residential users, including schools, resorts, businesses, industry, and public facilities.

In January 2008, FDEP looked at systems that were over 75 percent capacity. Hide-A-Way Acres was the only community system above this threshold. Hide-A-Way Acres has operated at over 90 percent capacity from December 2006 through June 2007 and again in August 2007. The FDEP and DOH notify the County of problems with County-owned facilities and have direct contact with other system providers if problems occur in those systems.

### **4. *Private Wells***

According to the FDEP, 35,807 people (48.1 percent of the population) in Putnam County are connected to a public or private water system and 38,609 people (51.9 percent) use private potable water wells.

Potable water wells are required to draw from the Floridan Aquifer in accordance with County Ordinance 87-2. Almost the entire County east of the St. Johns River from East Palatka south to the Volusia County line is affected by this Ordinance, which is intended to protect private wells from running dry during the winter months when ferneries and other agricultural interest use tremendous amounts of water to protect plants from freezing. Private wells and private central water systems will continue to be the principal means of potable water supply throughout the long range planning period.

#### **B. *Cones of Influence***

The “Cone of Influence” refers to the conical shaped depression that develops in the water table around a well when water is pumped from it. The concern is that pollutants may enter the aquifer as a result of this drawdown. The area around a well that must be protected to prevent potential pollutants from entering the aquifer is called the “Wellfield Protection Zone.”

There are several ways to define a wellhead protection zone, ranging from a simple arbitrary fixed radius to a very sophisticated numerical flow/transport model which is based upon well pumping rate, porosity of the aquifer, slope of the topography, and other parameters. The FDEP defines the wellhead protection zone as a 500-foot radial setback distance around a potable water wellhead. Given the rural character and the generally simple hydrogeology of Putnam County, the arbitrary-fixed-radius approach will suffice for the County in providing wellfield protection.

Article 6, Section 6.06.03 of the LDC sets forth regulations to safeguard potable water supplies by regulating the storage, handling, use, or protection of hazardous substances around the public potable water supply wells. This section controls development in and adjacent to designated wellheads to protect water supplies from potential contamination by regulating or prohibiting polluting uses. Also included are standards for protecting the quality and quantity of the groundwater supply from defined public wellheads.



### **C. Analysis of Need**

The East Putnam Regional Water System serves East Palatka, San Mateo, and surrounding areas. This facility replaces the existing East Palatka WTP and is operated by Putnam County. The facility is a 0.93-MGD Reverse Osmosis WTP with two 900-gallon-per-minute Floridan Aquifer production wells. The East Putnam Regional WTP reduces the burden on the freshwater aquifer by using reverse osmosis to treat brackish groundwater. The facility is located at the Putnam County Public Works site (233 Putnam County Boulevard in East Palatka) and also includes a new 250,000 gallon ground storage tank, a 100,000 gallon elevated storage tank, and a distribution system consisting of 27 miles of water main.

The new system meets the drinking water needs of the residents and provides fire flow of 500 gpm for two hours. Phase I (completed) serves approximately 4,000 persons and the Putnam Correctional Institute with a maximum of 550 inmates. As of June 2009, the County has issued approximately 900 permits to install water meters. Phase II (5 to 10 years away) will increase capacity of the plant to 2 MGD and include additional water mains to be installed. The combined Phase I and Phase II service area is approximately 25 square miles. The Putnam County combined Phase I and Phase II service areas are depicted on Future Land Use Series Map 7 “Planned Public Potable Water Wells Map” and in Map D-4C on page D-21.

The ability of existing municipal potable water systems to meet the demand of Putnam County residents appears to be sufficient. The quantity of water available from the surficial and Floridan aquifers substantially exceeds current and projected use within most areas of the County. Putnam County does not currently have an adopted level of service. It is anticipated that a level of service will be adopted after the East Putnam Regional Water System has been in operation for a sufficient amount of time to provide the data needed to establish an appropriate LOS. Based on SJRWMD 2003 Water Supply Assessment water use data and population projection data for 2025, the projected public and domestic self-supply water use will be 14.35 MGD.

The SJRWMD has identified areas within its jurisdiction where water supply problems have become critical or are projected to become critical by 2025. The areas are known as Priority Water Resource Caution Areas (PWRCA). PWRCA are areas where existing and reasonably anticipated sources of water and conservation efforts may not be adequate to supply water for all existing legal uses and reasonably anticipated future needs to sustain the water resources and related natural systems. Putnam County has been identified as a potential PWRCA.

As specified in the Putnam County LDC, developers must provide centralized water and sewer services in new subdivisions that have less than half-acre lots. It will be important for the County and the SJRWMD to cooperate to manage the available water resources, thus ensuring an adequate supply of potable water and maintaining appropriate wellhead protection measures for all potable water wells in the County that are serving the public.

FDEP monitors small private package water treatment systems to ensure they have adequate capacity to serve their intended uses. FDEP advises the County of any major problems.

**D. Putnam County Water Supply Plan**

In 2008, SJRWMD, together with Putnam County and its municipalities, prepared a Water Supply Plan – Special Publication SJ2008-SP27. Putnam County is including the Water Supply Plan Appendix A, in addition to other information in the Future Land Use, Conservation, and Infrastructure elements, for the purposes of implementing Sections 163.3177(6)(d), F.S.

**IV. SOLID WASTE SUB-ELEMENT****A. Landfill Disposal Definitions**

The following is a compilation of definitions of the terms used to describe the facilities and operating procedures discussed in this section:

*Putrescible Refuse:* Refuse subject to decay (i.e., garbage, food waste, dead animals, agricultural waste, certain organic industrial wastes, sewage sludge, etc.)

*Class I Landfill:* Landfill receiving solid waste, which is not hazardous waste, some putrescible waste or garbage with total disposal in excess of 20 tons or 50 cubic yards (compacted) per day. Daily cover is required.

*Class III Landfill:* Landfill disposing of non-putrescible household waste only (i.e., yard trash, construction and demolition debris, furniture other than appliances, etc.). Minimum cover requirement is once per week.

**B. Existing Conditions**

Putnam County is responsible for operating a Class I Landfill, shown in Figure D-5, at the Central Landfill facility four miles north of Palatka (140 County Landfill Road). The Central Class I Landfill has scales and 195 groundwater monitoring wells on site.

The Central Landfill contains 28.5 permitted acres for Class I disposal, and the property spans approximately 1,000 acres.

The County operates the Central Class I Landfill; however, refuse collection is franchised out, currently to Waste Pro. Their contract to collect trash began on October 1, 2009 and will continue through September 30, 2015. Waste Pro collects trash for the entire County as a homogeneous geographic service area including Crescent City, Interlachen, Welaka, and Pomona Park, except for the City of Palatka, which operates its own refuse collection system. The solid waste collected by Palatka is disposed of at the Central Landfill.

In 2008, the solid waste generation rate for the County was approximately 5.40 pounds per capita per day. This is a reduction from 6.00 pounds per capita per day in 2007. The 2008 capacity analysis report for the Central Landfill has projected population and waste generation through 2015. The report shows that per capita waste generation per day will reduce from 5.86 pounds per capita per day to 5.84 pounds per capita per day.

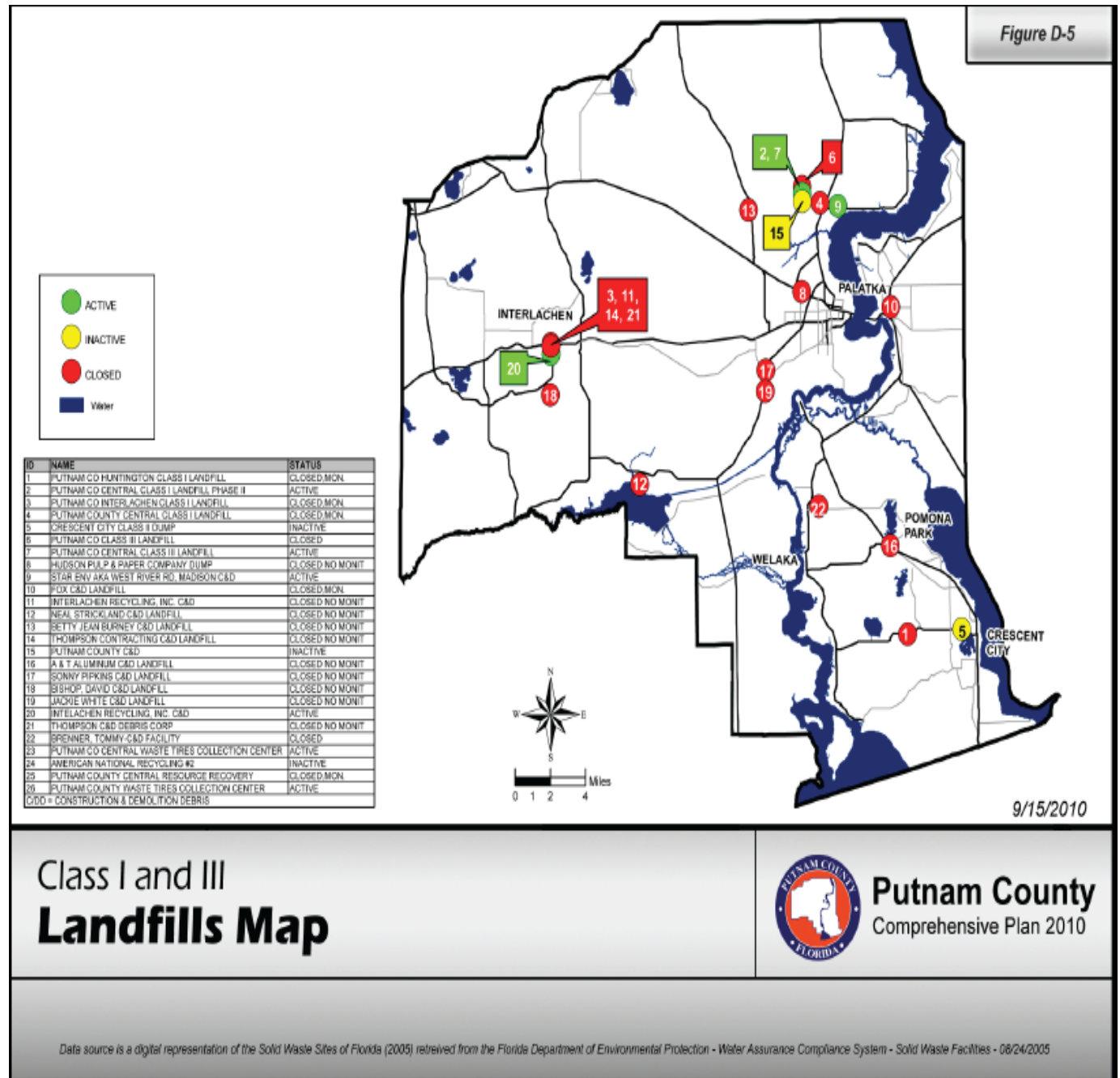
**Table D-3. Projected Solid Waste Landfilled, 2010 – 2025**

<u>Year</u>	<u>Population</u>	<u>Average Annual Waste Generation [tons/yr]</u>	<u>Per Capita Waste Generation (lbs/capita/ day)</u>
2010	76,259	81,496	5.86
2011	76,598	81,858	5.86
2012	77,117	82,221	5.84
2013	77,638	82,778	5.84
2014	78,164	83,338	5.84
2015	78,693	83,902	5.84
2016	79,225	84,470	5.84
2020*	80,800	86,117	5.84
2025*	83,100	88,585	5.84

**Sources:**

Putnam County Central Landfill Capacity Analysis, 2010

Figure D-5



Thus, Putnam County is under its adopted level of service of 6.4 pounds per capita per day. Level of service (LOS) as defined by 9J-5 Florida Administrative Code is an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service shall indicate the capacity per unit of demand for each public facility. The current LOS standard for Putnam County solid waste does not take into consideration the County's recycling program. The projected 5.86 pounds per capita per day currently going to the County's landfill is well within the 6.4 pounds per capita per day LOS.

The County will continue in its mandated role of providing a space in the Landfill to accommodate the solid waste generated by municipalities within the County. As previously stated, the projected landfill need through 2015 is shown in Table 2. Because the landfill serves the entire County, the population figures expressed in Table 2 are for total County population. The Central Landfill, which is operating under an FDEP permit, has more than 829,289 cubic yards of capacity left, including Cell 3. Cell 3 is the final cell in Phase II of the Central Landfill, and is expected to reach capacity in 2017. The County is planning for Phase III of the Central Landfill, and has programmed engineering for Phase II in FY 2012/13 of the Five-Year Schedule of Capital Improvements.

### **C. Recycling Efforts**

Putnam County is currently recycling 38.1 percent of the total waste stream. Total solid waste recycled on a countywide basis during the 12-month period ending December 31, 2005 was as follows:

Of the 62,796 tons of solid waste generated, 38,893 tons were landfilled and 23,903 were recycled. Recycled materials included 838 tons of newspaper, 33 tons of glass, 81 tons of aluminum, 2,176 tons of corrugated paper, 356 tons of office paper, 14,217 tons of yard trash, 49 tons of plastics, 3,793 tons of ferrous metals, 128 tons of white goods, 391 tons of non-ferrous metals, 175 tons of miscellaneous, and 903 tons of tires. Approximately 32,400 single-family units and 330 multi-family units participated in recycling. The County estimates two residents per unit; therefore, residents participating represent 90 percent of the County population.

### **D. Intergovernmental Coordination**

The County has a Solid Waste Management Board that includes representation from all municipalities via inter-local agreements. This representation affords the County ample opportunity to join with and to support the Putnam municipalities in all efforts to meet the requirements of Chapter 403.706, FS.

### **E. Analysis of Need**

Putnam County is expected to continue to operate the landfill disposal. The County plans to construct another landfill before Cells 1, 2, and 3 are full. It is incumbent upon the County and each municipality to maintain a mutual agreement whereby the County will continue the commitment to provide the disposal capacity necessary to meet reasonable generation rates that each municipality projects through 2025.

## **V. STORMWATER MANAGEMENT SUB-ELEMENT**

### **A. Existing Conditions**

#### **1. Topography**

Putnam County has two major physiographic divisions. The eastern two-thirds of the County lies within the Coastal Lowlands. This lowland area parallels the coast of Florida and extends inland for some 30 to 60 miles. It consists of ancient marine terraces that were cut by ocean erosion during times when sea levels were higher.

The western one-third of the County lies within the Central Highlands. This area is characterized by rolling hills (relic beach dunes) and numerous lakes formed as a result of karst topography (limestone sinks).

The St. Johns River cuts through the eastern quarter of the County, stretching from the northeast corner to the south-southeast sector of the County line. The County land area along the St. Johns River generally is low. The elevations increase rapidly as one moves away from the river, eastward or westward. The City of Palatka, for instance, has elevations that range from less than five feet above mean sea level (MSL) at the St. Johns River to over 80 feet above MSL in the central and southern areas of the City. Rolling hills in western Putnam County, particularly in the Central Highlands, range in elevations from 42 to 220 feet above MSL. The County has a wide band of hills in the southeastern sector between Crescent City and the St. Johns River.

#### **2. Natural Drainage Features**

Drainage in Putnam County is divided into three major drainage basins, which are in turn further divided into sub-drainage basins. Each sub-basin represents a geographic area developed around a central drainage feature such as a stream or lake.

The northern and eastern halves of Putnam County lie within the Lower St. Johns River drainage basin, with those areas west of the St. Johns draining generally south and east towards the river. The areas east of the St. Johns drain generally towards the west with the exception of those areas of the Fruitland peninsula that drain east into Dunns Creek and Crescent Lake. Sub-basins within the St. Johns River Basin are Crescent Lake, Etonia Creek (the largest sub-basin in the County), Deep Creek, and the St. Johns River.

A portion of southwest Putnam County - roughly that area south of S.R. 20 and west of S.R. 19 - is within the Oklawaha River Basin that drains south and east. Sub-basins within the Ocklawaha Basin are Sweetwater Creek, Rodman Reservoir, and Orange Creek. Extreme southeast Putnam County drains south towards Lake George.

The Hastings Drainage District, headquartered in the Town of Hastings in St. Johns County, encompasses the extreme northeast corner of Putnam County in the farmland near Hastings. Drainage districts have taxing authority and were formed under Chapter 298, Florida Statue, primarily with the intention of alleviating flooding problems through the creation of and maintenance of drainage ditches or the channelization of streambeds. The Hastings Drainage District performs a valuable function and plays an important role in the continued success of the Hastings

agricultural area where potatoes, cabbage, sod and other agricultural products are grown which are important to the local economy.

### **3. *Manmade Stormwater Management Features***

The Putnam County Public Works Department is responsible for County-maintained roads and associated stormwater management facilities such as roadside ditches and swales. The Public Works Department also maintains stormwater improvements (drainage ditches, swales, stormwater sewers, and culverts) developed, approved, and accepted by the County.

The Florida Department of Transportation maintains the stormwater management systems for State-maintained roads. Ditches drain most of these roads, but some urbanized areas have stormwater sewer systems.

### **4. *Areas of Flooding***

Flooding is a natural occurrence and only becomes a hazard when the natural floodplains have been altered through urbanization and development. As urbanization increases in the low-lying areas, property damage and loss of life increase due to flooding. Flooding is a problem in several areas of Putnam County where development has occurred within floodplains. The extent of the 100-year floodplain is shown in Figure D-6.

The stormwater drainage system within Putnam County consists of over 700 miles of primary drainage canals and ditches that are tributaries to the St. Johns River. The County does not have jurisdiction over all drainage systems within its boundaries, but does have responsibility for the drainage systems associated with County roads. Over 200 miles of County roads intersect with streams at 65 locations. These stream crossings may be comprised of bridge structures or single/multiple culverts. (Source: Final Stormwater Master Plan, dated September 2006, prepared by Ayres & Assoc.)

Periodic flooding has been documented in numerous locations in Putnam County. Some areas of flooding identified in the Stormwater Master Plan (SMP) are detailed below.

- Palmetto Bluff Road and Millican Road experience periodically flooding. Palmetto Bluff Road floods in three locations in the vicinity of its intersection with Millican Road in Bostwick. Millican Road floods beginning one-half mile south of the Millican/Palmetto Bluff Road intersection and extends south for approximately one-half mile. There is also an erosion problem at the Millican/Palmetto Bluff Road intersection.
- Frequent flooding occurs in River Park when Lake Laverne, Lake Maxine, and a third unnamed lake stage up and flow west through an undersized ditch and culvert crossing at Lake Drive. The outlet system for River Park is significantly undersized in proportion to the areas of the lakes and surrounding drainage basin. As a result, the banks overtop and site flooding occurs.
- Another area which experiences periodic flooding is around Mud Lake. Flooding occurred on Red Fox Trail immediately north of S.R. 19, Karen Place, and Karen Court south of S.R. 19. Karen Place and Karen Court are in the Fox Trail Subdivision. At least one home in the Fox Trail subdivision flooded during the hurricanes of 2004, and numerous other homes

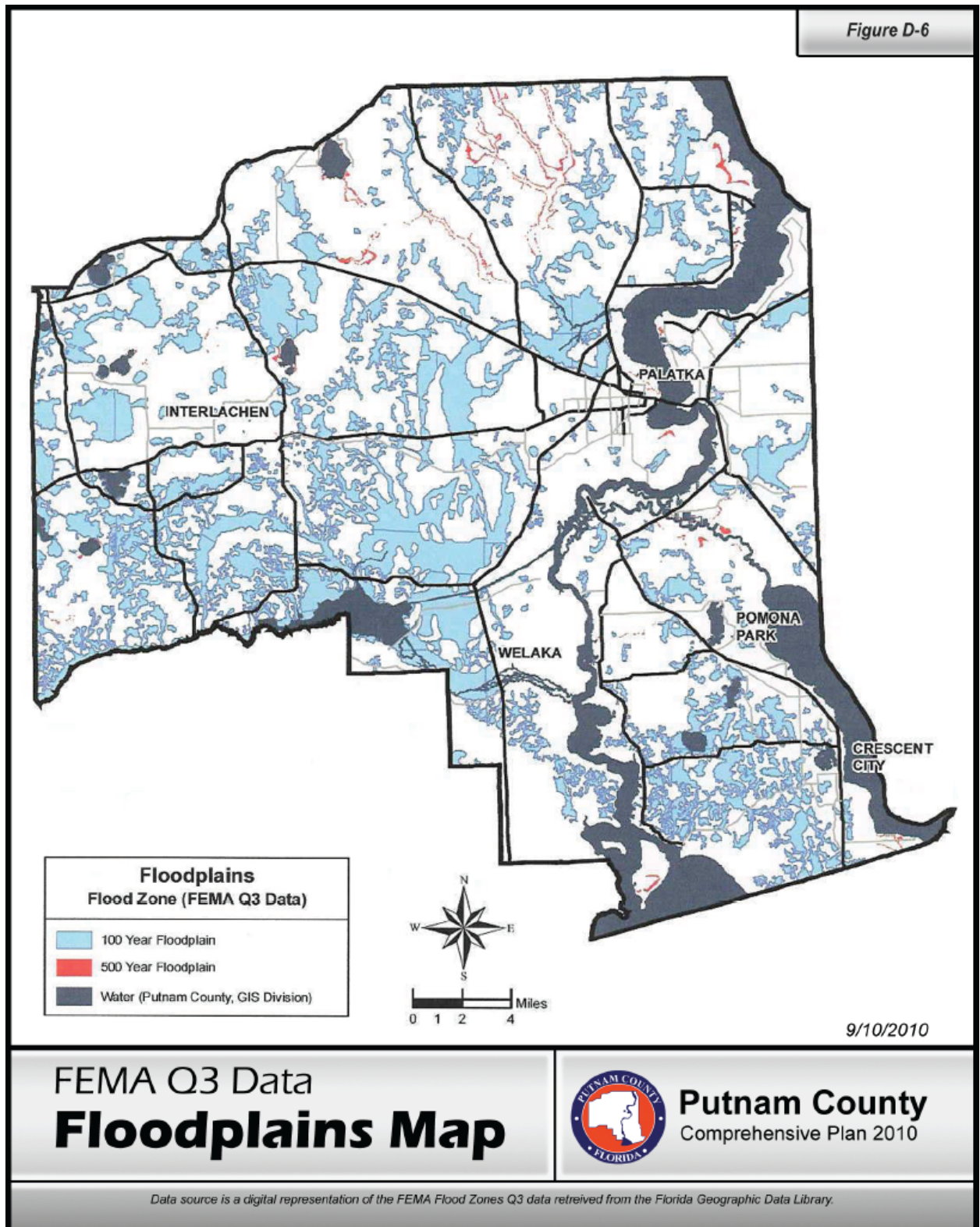
experienced yard flooding. There were more than six inches of standing water over the road.

- Local flooding has been reported in the Whispering Pines subdivision. Roads and occasional yard flooding occurs even during moderate rainfall events, predominantly from erosion of dirt roads.
- CR 315 floods near the intersection with 64<sup>th</sup> Street. There is a drop in elevation where the road curves to the right around Mariner Lake. Dirt roads draining to CR 315 cause sediment to clog roadside swales along CR 315, which is a major cause of flooding at this location.
- Another area with flooding problems is known locally as the Mondex Subdivision, which is south of Palatka and north of the Barge Canal between SR 19 and Stokes Landing Road. This area consists of low-density residential development with numerous privately owned dirt roads and flooding is a recurring problem here. Roads, yards, and structures have flooded annually in this subdivision.
- Flooding in East Palatka occurs where S.R. 207 crosses Dog Branch. Large deposits of sediment accumulate at this location which causes severe loss of conveyance capacity and the water has been seen at the edge of the highway pavement.
- Flooding at the County Public Works Facilities on Putnam County Boulevard and various low areas have been reported by the County. The parking lots, the clay and limerock stockpile area, and the maintenance garage are flooded on average twice a year. Flooding occurs due to a relatively large watershed discharging through an undersized outlet under East River Road. No residential flooding has been reported.

Article 6, Section 6.05 of the LDC, establishes standards for construction in areas of special flood hazard. The areas of special flood hazard are those areas identified as category A, AO, AH, A1 through A30, AE, and A-99 of the on the latest available Flood Insurance Rate Map.



Figure D-6



## 5. *Surface Water Quality*

Several tributaries along the east bank of the St. Johns north and east of Palatka appear to be potential contributors to pollution loads in the river. Among these are Dog Branch, Mill Branch, and Cracker Swamp Branch, which drain large areas of agricultural lands. The Putnam County Soil and Water Conservation District (SWCD) in cooperation with the SJRWMD completed a special water quality study of these three watersheds. The study revealed that all three tributaries draining their respective watersheds had poor water quality. The SWCD report stated that based on “Trophic State Indices” (Baker et al, 1981), the St. Johns River is eutrophic (over-enriched) within this area. Nutrient loads were very high and were seen as a potential threat to the St. Johns. A primary contributor to high nutrient loads appears to be the vast network of drainage ditches and canals, which conveys runoff directly into the river. This runoff contains fertilizers from cropland in addition to organic nutrients from forest lands.

The Environmental Protection Agency (EPA) has also published a list of water bodies identified by the State as not meeting water quality standards for their designated uses. Some of these water bodies have been targeted by the EPA for total maximum daily load (TMDL) development. TMDL is a calculation of the maximum amount of a pollutant that a water body can receive from point and non-point sources and still meet water quality standards and an allocation of that amount to the pollutants’ sources. The calculation of a TMDL must include a margin of safety to ensure that the water body can be used for the purposes the State has designated. It is the responsibility of each State to develop lists of impaired surface water bodies and to recommend water bodies for TMDL designation through approval by EPA. These lists must also be priority ranked by each State, taking into account the severity of pollution and uses to be made of the water such as fishing, swimming, or drinking. TMDLs have been required by the Clean Water Act since 1972, which also established the water quality standards.

Once a water body has been designated for TMDL development, the State must develop a plan for implementing the maximum pollutant loads for the water body. This may involve individual land owners as well as enterprises engaged in agricultural operations, forestry, and urban development. Implementation is achieved primarily through State non-point source pollution programs.

According to the 2006 FDEP Integrated Water Quality Assessment for Florida: 305B Report, Mill Branch still does not meet conventional FDEP water quality standards and has problems with low dissolved oxygen, fecal coliform, and phosphorus levels. The FDEP water quality indicator is 63 with 60 to 90 considered poor. The EPA has established TMDLs for impairments including coliforms, biochemical oxygen demand, nutrients, and dissolved oxygen. The TMDLs were established for Mill Branch in April and May of 2004.

Dog Branch partially meets FDEP water quality standards but has problems with low dissolved oxygen and phosphorus and lead levels. The FDEP water quality indicator is 58 with 45 to 59 considered fair. EPA has targeted Dog Branch as a low priority for TMDLs development but has indicated that the parameters of concern include lead, nutrients, turbidity, and dissolved oxygen.

Cracker Swamp Branch also does not meet all FDEP water quality standards and has problems with low dissolved oxygen. The FDEP water quality indicator is 63, which, as noted above, is considered

poor. The EPA has established TMDLs for impairments including biochemical oxygen demand, nutrients, and dissolved oxygen. The TMDLs were established for Cracker Swamp Branch in May of 2004.

Deep Creek, which originates in St. Johns County but discharges into the St. Johns River at the north end of Putnam County, has been identified by FDEP as only partially meeting FDEP water quality standards. Problems include biochemical oxygen demand; phosphorus; low dissolved oxygen; and metals including cadmium, copper, iron, lead, and silver. The FDEP water quality indicator is 62, a poor rating. The EPA has established TMDLs for impairments, including biochemical oxygen demand, nutrients, dissolved oxygen, and metals including iron and silver. The TMDLs were established for Mill Branch in April and May of 2004.

The St. Johns River was rated by FDEP as having good water quality for most of its length in Putnam County and meets most water quality standards, although there are some variations depending on where the sampling is conducted. This is partially attributable to the flushing effect of the river which, in Putnam County, includes a significant tidal flow. Potential sources of pollution to the river include treated sewage effluent, septic tank seepage, stormwater runoff, and industrial and agricultural runoff. A Putnam County ordinance prohibits any new discharges of wastewater effluent into the St. Johns River.

Samples taken at Federal Point in East Palatka indicate that the river meets FDEP water quality standards for conventionals but that these standards for metals including lead, silver, cadmium, and copper are not being fully met. Water quality at this station has been given a poor Water Quality Index by FDEP of 60. The EPA has established a TMDL for the impairment of the metal Silver. The TMDL was established for the Lower St. Johns River in April of 2004.

Some of the numerous lakes in western and southeastern Putnam County are vulnerable to pollution due to increasing urban development around their shorelines. Erosion of dirt roads and the resulting sedimentation of lakes are a problem in many areas of western Putnam County. Slopes are quite steep in some of these areas, and roads usually consist of easily eroded sand. As a result, rainfall causes erosion into adjacent ditches and in some cases into adjacent water bodies, causing turbidity, sedimentation, and pollution problems. Other sources of pollution include leachate from septic tanks located too close to the shorelines, stormwater runoff, and use of pesticides and fertilizers for lawns and gardens.

Lake Broward, in southeastern Putnam County, and Silver Lake, immediately outside the city limits of Palatka, have high levels of pollution following heavy rainfall.

Putnam County has adopted Article 6, Section 6.03 of the LDC, which increases the setback requirement for septic tanks located near water bodies.

## **B. Analysis of Need**

The development and the construction of roads have modified the natural drainage patterns of Putnam County. As is the case with most counties and municipalities in North Florida, growth came slowly and structures and roads were located without concern for the impact of development on stormwater. These communities now must identify needs, implement a comprehensive program to correct the stormwater problems caused by past development, and set in place a master plan for

managing stormwater to accommodate projected growth.

### ***1. Stormwater Master Plan***

The Stormwater Master Plan (SMP), dated September 2006, performed by Ayres and Assoc., identifies priority sites which exhibit flooding problems during periods of rainfall, gives site-specific causes of flooding problems, recommends solutions to alleviate each problem, and provides a rationale for prioritizing implementation of the plan based upon the County's financial resources. Only sites that are not included in paving and drainage projects were identified and ranked. The SMP is implemented through projects contained in the Five-Year Schedule of Capital Improvements.

### ***2. Level of Service***

Level of service (LOS) defines the degree or extent of service that must be provided to satisfy a particular demand or need. LOS is expressed in capacity of unit of demand. For stormwater management, LOS should be expressed in terms of the carrying capacity required by various components of the system to carry away stormwater at various intensities of rainfall with minimum polluting impact on receiving waters or sites.

The County has adopted general guidelines as its drainage LOS. The standard that is commonly accepted in designing drainage facilities is the design storm event. This standard specifies the intensity (rate of rainfall) and duration of the rainfall event.

Generally, it is assumed that greater damage to private property will occur due to flooding of the open channel facilities. Consequently, these major stormwater maintenance facilities are designed and should be evaluated on a LOS design criteria based on a design storm of 25-year frequency, 24-hour duration. Minor stormwater maintenance facilities are designed and should be evaluated on a LOS design criteria based on a design storm of 10-year, 24-hour duration with swales.

Permitting for stormwater discharges to groundwater are regulated under the provisions of Rule 62.528 FAC. New stormwater discharge facilities must be built in accordance with performance and design standards specified in Rule 62-528 FAC and meet water quality standards specified in Chapter 62-520, FAC. The construction of new stormwater discharge facilities must meet the permitting requirements specified in Rule 40C-42 F.A.C.

### **C. Existing Regulations and Programs.**

Regulations and programs that govern land use and development of natural drainage features and groundwater recharge areas are identified and addressed in this section. These regulations and programs are implemented by the Federal Emergency Management Agency (FEMA), the U.S. Army Corps. of Engineers (USACE), the Florida Department of Environmental Protection (FDEP), the St. Johns River Water Management District (SJRWMD), and Putnam County.

## **1. FEMA**

FEMA administers the National Flood Insurance Program (NFIP). The NFIP was established by Title XIII of the Housing and Urban Development Act of 1968 to provide previously unavailable flood insurance protection to property owners in flood prone areas. In return for the federally subsidized insurance, local governments that are members of the program must implement flood plain management measures to protect lives and new construction from flooding.

The major strength of the NFIP program is the requirement of participating local governments to adopt floodplain management ordinances. This requirement requires local governments to assess flood hazards in the area and implement a mediation program. The national program is deficient in that it only requires local governments to establish minimum criteria. Although counties may exceed these criteria in their individual ordinances, there is no incentive for them to do so. Furthermore, the national program is primarily interested in the economic impacts of floods rather than the environmental impacts. This program is really designed to protect structures, not natural drainage systems.

## **2. USACE**

Under the provisions of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act, the USACE regulates dredge and fill activities in waters of the United States, including wetlands. The primary functions of the USACE programs are to restore and maintain navigability of waterways and to regulate activities in jurisdictional wetlands that are hydrologically connected to United States waters.

The USACE has broad jurisdiction for activities and dredge and fill permitting. The USACE permits everything from major channelization projects to individual docks; however, the USACE exempts many agricultural activities that can impact wetlands and water quality from its programs.

## **3. FDEP**

The FDEP regulates dredge and fill activities in Florida in accordance with Chapter 403 F.S. and Chapters 62-312 and 62-330 FAC. FDEP is primarily concerned with maintaining and, where appropriate, improving the quality of the waters of the State as well as protecting and preserving wetlands, including fish and wildlife which use these areas.

FDEP issues Environmental Resource Permits (ERP) that are required for any dredge or fill activities in any waters of the State, except for a water body owned by one person that does not discharge onto other property or waters or those waters within an artificially constructed stormwater system. The FDEP, in a joint agreement with the Water Management Districts, primarily issues ERPs for solid waste facilities, WWTPs, mines, and single-family residences.

Under Chapter 40C-42 FAC, the SJRWMD has been delegated dredge and fill permitting (wetland resource management) for certain projects which require a stormwater permit. This includes projects which may also require an ERP under Chapter 40C-4 FAC. This is explained further in the following section.

#### **4. SJRWMD and SRWMD**

As mandated by Chapter 373 Florida Statutes, the water management districts are responsible for managing water and related land resources in Florida. The SJRWMD has jurisdiction over all or part of 18 counties in Northeast Florida. Through research and regulation, the SJRWMD promotes the conservation, development, and proper use of surface and groundwater.

The SJRWMD ERP permitting programs are regulated by Chapter 40C-1 FAC (Procedural Rule), Chapter 40C-4 FAC (ERP), Chapter 40C-40 FAC (General Surface Water Management Permits), and Chapter 40C-41 FAC (Surface Water Management Basin Criteria). The SJRWMD require permits for any dredge or fill activities in wetlands or surface waters, well construction, management and storage of waters, stormwater discharge, consumptive use, works of the District, and wells for artificial recharge. In addition, the District has the authority to declare and implement water shortage warnings, water shortages, and water use restrictions and to set minimum flows and levels for surface waters. The SJRWMD also acquires land for flood control; water storage; water management; and preservation of wetlands, streams, and lakes.

In addition to the ERP program, the SJRWMD was authorized in 1986 to regulate stormwater discharge. Formally Chapter 62-25 FAC, under FDEP jurisdiction Chapter 40C-42 FAC governs this program, which is designed to prevent pollution of the waters of the State by discharges of stormwater. The purpose of this program is to ensure that water resources are protected, as prescribed by Chapter 62-25 FAC.

Notices for general, standard general, and individual ERP permits are issued, with specific criteria for each. The thresholds for each of these permits limit the type and size of development projects which the District reviews.

A small portion of the northwest area of the County, near Melrose, is in the Suwannee River Water Management District (SRWMD). The County coordinates with the SRWMD in the same manner as it coordinates with the SJRWMD.

#### **5. *Surface Water Improvement and Management Act (SWIM)***

In 1987 the Florida legislature adopted Chapter 87-97 of the Florida Statutes, called the Surface Water Improvement and Management Act (SWIM). This act requires each WMD to design and implement plans and programs for the improvement and management of surface waters. In addition, the SWIM act identified several areas within the state that are especially in need of restoration. One of these areas is the Lower St. Johns River Basin that runs from the confluence of the Ocklawaha River with the St. Johns River near Welaka to its mouth at Mayport.

#### **6. *Local Regulations***

Two of the most important local regulations that protect drainage and surface water quality are Article 6: Resource Protection Standards, and Article 7: Design Development and Improvement Standards, of the Putnam County LDC. Article 6 includes surface water protection requirements for waterfront developments and requirements for development in flood hazard areas. Article 7 includes requirements for stormwater management and subdivision design standards and guidelines.

Article 7, Section 7.08 of the LDC requires a permit from the Public Works Department for installing or altering a drainage structure, developing a new drainage channel, or undertaking any work that would modify drainage basin characteristics. This section of the LDC requires a stormwater management permit to be obtained before all other development permits are issued. One exemption is when clearing land that is to be used solely for agriculture, silviculture, floriculture, or horticulture provided the property owner provides for construction, maintenance, and operation of self-contained agricultural drainage systems to prevent off-site diversion of any runoff. This exemption does not apply where clearing and drainage may directly or indirectly impact County or State rights-of-way or areas defined as “Conservation Areas” by the Putnam County Conservation Plan. A second exemption is the construction, alteration, and maintenance of a single-family residence and accessory structures, provided this activity does not change the natural grade of the land in an area of special flood hazard. The exemption does not apply where such activity would result in the addition of impervious surfaces or changes in the natural grade of the soils in an area of flood hazard.

## **VI. NATURAL GROUNDWATER RECHARGE AREA SUB-ELEMENT**

Groundwater recharge is the addition of water to the saturated zone and the downward movement of the water into aquifer systems. As defined by Chapter 9J-5.003 FAC, natural groundwater aquifer recharge areas are areas that provide volumes of water that contribute to the storage or regional flow of an aquifer.

### **A. Aquifers**

Three primary aquifer systems have been identified in Putnam County: the surficial aquifer, the secondary artesian aquifer, and the Floridan aquifer.

The surficial aquifer is a water table aquifer that extends from land surface to approximately 150 feet below land surface (Bermes et al., 1963). This aquifer is primarily composed of sand with thin layers of clay and shell. The surficial aquifer is recharged locally by direct infiltration of rainfall and by upward leakage from underlying aquifers. The aquifer is underlain by a confining layer composed of the clay or marl of the Hawthorn group or upper Miocene or Pliocene deposits.

Thin discontinuous lenses of limestone, shell, and sand occur within the confining layer underlying the surficial aquifer and form the secondary artesian aquifer. The secondary artesian aquifer occurs in the more permeable units of the Hawthorn group and the upper Miocene or Pliocene deposits. These units generally occur as thin discontinuous lenses and range from less than one foot to about 15 feet thick (Bermes et al., 1963). The secondary aquifer is recharged by leakage from the overlying surficial aquifer and from upward leakage of the Floridan aquifer.

The Floridan aquifer consists of limestone formations of Eocene age and permeable beds in the lower part of the Hawthorn Group that are hydrologically connected to the rest of the aquifer. The Floridan aquifer is the major source of water for irrigation, public supply, and industry in the area (Bermes et al., 1963). The Floridan aquifer is recharged in western and southeastern Putnam County in areas where the upper confining layer is breached by sinkholes. The aquifer is also recharged in areas where the upper confining layer is thin or absent. The amount of recharge depends on the head difference between the water table aquifer and the piezometric surface and the permeability of the confining layer. Water is discharged from the Floridan aquifer through springs, wells, and upward percolation to overlying aquifers.

## **B. Aquifer Recharge Classification Scheme**

Recharge rates to the Floridan aquifer are based on hydraulic pressure differences between the water table of the surficial aquifer and the potentiometric surface of the Floridan aquifer (in May of 1990) and on leakage of the upper confining unit separating the aquifers. Recharge rates were mapped at a four-inch per year contour interval. Recharge areas of the Floridan aquifer in the SJRWMD were mapped using a geographic information system to analyze the geologic and hydrologic factors that affect recharge (Source: SJRWMD, *Mapping Recharge to the Floridan Aquifer Using a Geographic Information System*, Boniol, 1993).

Section 6.07.02 of the County's LDC defines areas of high aquifer recharge as areas where recharge is more than eight inches per year.

## **C. Existing Conditions**

Nearly all of the water recharging the Floridan aquifer in the SJRWMD and SRWMD is derived from rainfall in the districts. Rainfall percolating downward from land surface to the Floridan aquifer must move through the unsaturated soil zone, the surficial aquifer, and the semi-confining layers to recharge the Floridan aquifer. The amount of water stored in the aquifer systems is determined by a balance between recharge, evapotranspiration, runoff, leakage to or from adjacent aquifers, natural discharge, and withdrawals from water wells. The movement of water through sink holes or lakes of probable sinkhole origin that breach the semi-confining layer can be a significant conduit for recharge, depending on the degree of hydraulic connection to the Floridan aquifer.

### **(1) Areas of Aquifer Recharge in Putnam County**

The SJRWMD recently updated GIS data regarding recharge to the Floridan aquifer. As Figure D-7 shows, the largest area of aquifer recharge in excess of eight inches/year in Putnam County is in the southern part of the County between Pomona Park and Welaka. Other areas of high recharge occur in the northwestern portion of the County near Interlachen.

Areas with high recharge rates (as defined and adopted by the Putnam County Comprehensive Plan as greater than eight inches/year) encompass approximately 49,200 acres. Moderate recharge areas (four to eight inches/year) cover approximately 81,230 acres. Low recharge areas (0 to four inches/year) encompass approximately 175,830 acres. While the recharge rate per unit area is less in the moderate recharge areas than the high recharge areas, the moderate areas encompass more acreage and contribute a significant volume or proportion of the total recharge to the Floridan aquifer.

### **(2) Impact of Development on Aquifer Recharge**

Population growth and land development can significantly impact high recharge areas of the Floridan aquifer. Development increases impervious surfaces, which can reduce the amount of available natural groundwater recharge. Soils and topography that provide high aquifer recharge are also locations in which septic tanks function most effectively. Land use planning in Putnam County must consider the trade-off between protecting the groundwater resources of the County and encouraging growth/development to locate in areas of most efficient septic tank sanitary sewage disposal.



Furthermore, as additional demand for water is placed on the Floridan aquifer, saltwater intrusion into the aquifer could become a serious problem. The County and the WMDs should monitor water quantity and quality within the Floridan aquifer and plan to implement conservation measures when necessary to conserve and protect the County's water resources.

**D. Existing Regulations and Programs that Govern Land Use and Development to Protect Aquifer Recharge**

The two functions of aquifer recharge that must be protected are the ability of water to percolate downward to the aquifer and the need to protect water quality. The ability of the land surface to absorb water is related to, among other parameters, the amount of permeable surface areas. Covering the surface with streets, parking areas, and structures decreases the available permeable surface. The County LDC is the principal regulatory device to protect permeable surface area. Article 6, Section 6.07 established an Aquifer Protection Zone consisting of all property located in areas of high aquifer recharge (greater than eight inches per year) and includes development restrictions within the zone of protection.

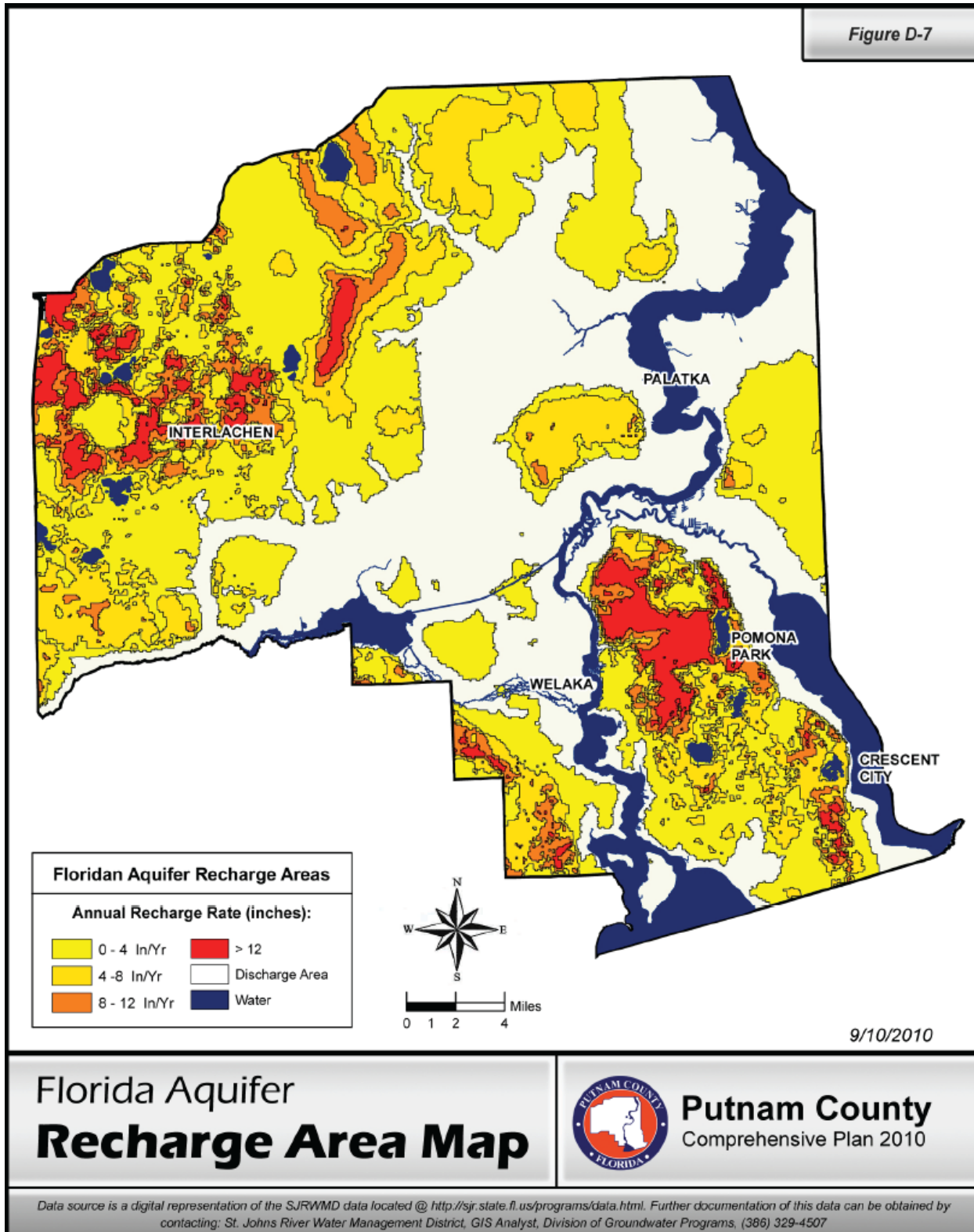
The DOH and FDEP promulgate regulations that protect aquifer water quality. Chapter 62-528 FAC controls the permitting of underground injection wells. Chapter 62-522 regulates discharges to groundwater and Chapter 62-550 regulates the source and quality of drinking water supplies.

These regulations provide minimum protection of groundwater resources. Each community must plan carefully to ensure that growth does not adversely impact groundwater quantity or quality.

**E. Analysis of Need**

The County has adopted policies in its Comprehensive Plan regarding the protection of high recharge areas to the Floridan aquifer through limits on impervious areas and hazardous materials and through requirements for onsite retention and subsequent recharge of treated stormwater runoff. These policies are implemented through the adopted LDC. The County will need to ensure that these LDCs are being implemented properly and consistently for development orders issued in high recharge areas.

Figure D-7



## APPENDIX “A”

### Putnam County Water Supply Plan 2008