PUBLIC FACILITIES ELEMENT

Data Inventory Analysis

Lake County, Florida

TABLE OF CONTENTS

SANITARY SEWER SUB-ELEMENT 1
INTRODUCTION 1
Wastewater Facilities 3
Planned Wastewater Facilities 3
Septic Tanks 3
Soil Suitability 4
Package Plants 4
Future Planning 4
POTABLE WATER SUB-ELEMENT 14
INTRODUCTION 14
Current Capacity 14
Potable Water Demand 14
Potable Water Wells 14
Nitrate pollution 15
Water Conservation 15
STORMWATER MANAGEMENT SUB-ELEMENT 18
INTRODUCTION 18
Hydrologic Descriptions 19
Data Types 21
Hydrologic Boundaries 21
Topography 22
Land Use 22
Regional Aquifer Characteristics 22
Stormwater Facilities and Survey 22
Stormwater Management Regulations 22
WATER QUALITY 23
STORMWATER QUALITY RETRO-FIT PRIORITIZATION 24
EXISTING REGULATIONS AND PROGRAMS 25
MAINTENANCE PRACTICES 25
EXISTING WATER QUALITY AND QUANTITY 26
Water Quality 26
Water Quantity 28

Z 28
Water Quality Treatment Standards 29
Recharge Standards 30
Summary 30

SOLID WASTE SUB-ELEMENT 42
INTRODUCTION 42
Solid Waste Collection 42
Active Landfills 43
Residential Drop-Off Facilities 44
Lake County Resource Recovery Facility 44
Recycling Program 45
Waste Tires and White Goods 45
Hazardous Waste 45

SOLID WASTE DISPOSAL CAPACITY PROJECTIONS 45

GROUNDWATER RECHARGE SUB-ELEMENT 48
INTRODUCTION 48
Hydrogeology 48
Priority Water Resource Caution Areas 9 51
Aquifer Characteristics 51
Ground Water Recharge and Discharge 52
Ground Water Contamination 54
Aquifer Vulnerability 55

LIST OF TABLES

Table 1- Lake County Domestic Wastewater Treatment Facilities 5
Table 2 - Lake County Industrial Wastewater Treatment Facilities 11
Table 3 - Municipal Potable & Wastewater Capacity/Demand 16
Table 4 - Lake County Potable Water Providers 18
Table 5 - Stormwater Minimum Design criteria 29
Table 6 - Lake County Stormwater Facilities 30
Table 7 - Lake County Basin Prioritization Based on Total Score 34
Table 8 - Lake County Waste Haulers 42
Table 9 - Lake County Landfills 43
Table 10 - Residential Drop-Off Locations 44

Table 11 - Projected Solid Waste Disposal Tonnage 2004-2030 46

LIST OF FIGURES

Figure 1 - 49
Figure 2 - Hydrogeologic Cross Sections Showing Aquifers in Lake Countyfrom Figure 16 USGS WRI 02-4207 50
Figure 3 – 54
Figure 4 - 56

SANITARY SEWER SUB-ELEMENT

INTRODUCTION

Lake County does not own, operate, or maintain any wastewater systems nor does Lake County have any water or sewer serviced areas. Municipal governments provide sanitary sewer and wastewater treatment within their jurisdictions and in adjacent areas that may be annexed as development in the county continues. Septic systems and private wastewater treatment plants (package plants) treat waste in unincorporated Lake County.

RECLAIMED WATER

Reclaimed water is wastewater that has been treated to remove harmful organisms and substances, such as bacteria, viruses, and heavy metals so that it can be reused.

Florida's population boom in the past several decades has increased the demand for water. Naturally occurring groundwater has been used to meet most of the increasing use, but high-quality groundwater supplies may not be able to meet all future needs.

It has also become more difficult to dispose of increasing quantities of treated wastewater in an environmentally sound manner. Reusing reclaimed water—such as domestic (household) wastewater—addresses both of these problems.

Reclaimed water is commonly used to irrigate golf courses, residential landscapes, corporate grounds, agricultural fields, and sports fields. The nutrients in the water reduce the need for fertilizer. Reclaimed water can also be used for industrial heating and cooling, for car washes, and to replenish wetlands during times of drought. Using reclaimed water where it is appropriate leaves us with greater supplies of fresh, pure drinking water.

Using reclaimed provides a safe, environmentally responsible alternative to wastewater disposal, and delays the need to develop alternative drinking water supplies. In addition to these benefits, reclaimed water offsets the costs of wastewater treatment.

The St. Johns River Water Management District requires water supply utilities to make reclaimed water available to potential users when it is economically, technically, and environmentally feasible.

In 2001, 47 percent of the wastewater treatment facilities in the District provided reclaimed water for reuse. About 46 percent of the 338 million gallons of wastewater treated every day is reused. In Lake County, Clermont, Eustis, Leesburg, and Mount Dora are using reclaimed water.

The East Water Reclamation Facility (WRF) supplies reclaimed water for the City of Clermont's East Service Area. Wastewater effluent produced at the East WRF is reclaimed for ground water recharge (through rapid infiltration basins) or sent to the holding ponds at King's Ridge Subdivision for public access reuse (irrigation). The East WRF has a current capacity of 2.0 MGD.

Clermont also has a project currently under design to combine the city's east and west service areas and direct all of the wastewater flow to the East WRF. The planned capacity of the East WRF after the completion of the project will be 4.0 MGD. Reclaimed water storage tanks will also be constructed at the East WRF as part of the project.

Clermont requires reclaimed water distribution systems for all new subdivisions in the east service area. The City has plans to expand the reclaimed water transmission and distribution network in phases to serve these subdivisions.

The downtown Eustis Wastewater Treatment Facility, with a design capacity of 2.4 MGD, provides reclaimed water for the city. This facility was upgraded and expanded in 1999. The current flow is roughly 1.2 MGD. The City of Eustis does not foresee any near future expansion.

The City of Leesburg's reclaimed water is supplied from both the Canal Street and Turnpike Waste Water Facilities. Spray field application is also being used. The need transmission mains are currently being worked on, and future plans include installation of the needed transmission mains, requiring dual distribution systems where applicable, and use of reclaimed water to offset potable water pumping in the Leesburg service area.

The City of Mount Dora operates a reclaimed water system currently serving approximately 47 commercial and residential customers and select city facilities. Current usage fluctuates between 85% and 100% of production with little having to be sent to the City's spray field.

The current system consists of lined reclaimed storage ponds at WWTP #1 totaling 9.37 MG and a 6.25MG ConVault storage tank at WWTP #2. The combined total physical treatment capacity of both plants is 2.75 MGD with 15.62 MG reclaimed water storage capacity.

The City has significant plans for expansion of the system. A component of the City's Water Facilities plan will include alternative water resources to supplement the Re-use system such as stormwater and surface waters. Use of these resources will lessen the demand on the potable system.

The City of Umatilla conducted a feasibility study that concluded that they have the potential to provide reclaimed water. Currently, all effluent in Umatilla is routed to sprayfields and percolation ponds.

The City of Tavares will not have reclaimed water (reuse) available until 2007. The City has designated a reuse area within the City south of Dead River Road. All new developments within the area required to have reuse capabilities and will be required to use reuse for irrigation purposes beginning in 2007. Currently, there are 964 residential units approved for reuse in the City. In addition to the reuse requirements for residential units, the St. John's River Water Management District (SJRWMD) is requiring the Baytree golf course, the city owned Woodlea Sports Complex, and the Tavares Cemetery to connect to reuse irrigation systems.

The Woodlea Road Wastewater Treatment Facility reuse headwork's is currently under construction and will be generating reclaimed water in 2006. The City's initial plans will call for the disposal of approximately 1 million gallons per day. The infrastructure for distribution will not be in place until 2007-2008. Tavares will pursue grant funding from the DEP and the St. Johns River Water Management District for the distribution network trunk lines. Last year, the City Council adopted a reuse "service area" map that identifies the reuse area on the south side of Tavares only. Tavares will be developing a more detailed map showing specific locations of trunk lines and a distribution network in order to pursue the aforementioned grants.

Source: St Johns River Water Management District: Using Reclaimed Water

Wastewater Facilities

Table 6A-1 below lists the domestic wastewater treatment plants in Lake County and their service information. Table 6A-2 lists service information for industrial wastewater treatment. Both tables are from the Florida Department of Environmental Protection (FDEP). Further information on these systems can be obtained by contacting their respective cities.

Planned Wastewater Facilities

Lake County has no plans to build or operate any sewer system or wastewater treatment plants.

Septic Tanks

Lake County estimates that it has 80,000 septic systems, including approximately 19,000 in the Wekiva River Protection Area. According to Lake County Department of Health, an average of 2,200 new systems are built each year and another 1,000 are repaired. Because Lake County has a relatively high elevation and dry soils, it provides many excellent locations for their use. Most marginal or poor soils in the county can be modified to safely accommodate septic systems as well.

Septic systems are estimated to have an average life expectancy of approximately 15 years (with a general range of 3 to 35 years depending on how the system is used), provided the systems are maintained properly. Failures occur when systems are not pumped every 3 to 5 years or when materials damaging to the system are disposed in it, such as powder detergent and grease. Septic tanks generally provide 100 gallons of waste containment per bedroom, or about 50 gallons per person. Too many people exceed the capacity of the system; many failures are due to over crowding. The Lake County Department of Health is currently planning seminars to educate the public on the proper use of septic systems.

Lake County considers a properly maintained septic system to be an appropriate solution to wastewater treatment in rural areas with low population densities. The major concern over septic systems is their growing prevalence in high-density suburban developments throughout the county. Soil studies are conducted on every parcel where the property owner has applied for a septic tank permit.

Municipal expansion is helping to alleviate this problem by extending sewer lines to suburban areas previously on septic. The expense of sewer connections is sometimes a deterrent for homeowners to move off septic systems, especially in poor communities or in hilly areas that require pumping stations. Some municipal governments, such as Clermont, Groveland, and Tavares, are requiring dry lines on new suburban homes for future connection to municipal sewer.

Soils that are septic tank suitable can be adversely affected by fill dirt, drainage, and steep hills. The Lake County Health Department now requests developers to notify them if any soil altering procedures are used during construction. Soil samples are needed after the final stages of construction to ensure accuracy.

Septic systems produce nutrients and organic matter that can pollute surface and ground water in the event of failure. However, all nutrient pollution in Lake County does not necessarily come from failed septic systems, but may come from green houses, road runoff, and lawn maintenance.

Where nutrient pollution is a problem, environmental factors must be investigated to determine the source. The primary concern with septic system failure is the danger to public health from pathogens entering drinking water supplies. Lake County Department of Health considers a failed septic system to be an emergency and will respond within 24 hours to treat the area with lime.

Soil Suitability

Limitation ratings: There are three soil classification ratings that describe the relative suitability of soils to properly assimilate sewage effluent:

1. Slightly limited—soil materials with favorable properties for the use of a drainfield.

2. Moderately limited—soil materials that have properties moderately favorable for the use of a drainfield.

3. Severely limited—soil materials that have one or more properties unsuitable for the use of a drainfield.

It is difficult to determine which soils will be suitable for the installation of septic tanks without onsite testing. Generally, different soils have characteristics that would or would not warrant septic tank usage. With drainage improvements, ranges in soil type, fill dirt, and other alterations of the terrain, a soil's properties can be changed to accommodate septic tanks. Soil maps are too inaccurate to rely on solely.

Package Plants

A package plant is a small, privately owned and operated wastewater treatment plant that serves, on average, about 300 homes. Package plants can remove up to 95% of waste from sewage, compared to 99% from a public treatment facility and 85% for septic (these numbers vary depending on how the systems are used). Package plants should be considered a viable alternative to high-density septic systems and to be an interim solution until public sewers are in place.

Future Planning

The municipal service area boundaries overlap in some areas while other areas are unserved. This has prompted exploration of combined utility areas to better serve residents and future residents. Wastewater service to areas outside the municipal service boundaries would have to be served by regional wastewater facilities or by temporary treatment facilities. Because Lake County does not intend to own or operate any wastewater treatment facilities, these plans have not left the planning phase.

Table 1- Lake County Domestic Wastewater Treatment Facilities

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Altoona	Lakeview Terrace	Domestic WWTP	331 Raintree Dr.	Private	0.014
Apopka	Benham Ranch	Residuals Application Facility	104 E Ponkan Rd.	Private	
Astatula	Astatula Elementary	Domestic WWTP	CR 48	County	0.01
Astatula	The Meadows	Domestic WWTP	29 Richard Ct.	Private	0.035
Astor	Eagle's Nest S/D	Domestic WWTP	Maxwell ST.	Private	0.03
Astor	Holiday Haven	Domestic WWTP	Pearl St. and Lisa St.	Private	
Astor	Powell's Campground	Domestic WWTP	21516 SR 40	Private	0.082
Astor	St. Johns River Utility	Domestic WWTP	HWY 44	Private	0.03
Bassville Park	Church of God Youth & Retreat Ctr.	Domestic WWTP	SR 473 & Haines Creek Rd.	Private	0.032
Clermont	Arnold Groves and Ranch	Residuals Application Facility	5010 HW 27	Private	0.042
Clermont	B's RV Resort	Domestic WWTP	20260 US HWY 27	Private	0.009
Clermont	Clerbrook RV Resorts	Domestic WWTP	20005 US HWY 27	Private	0.026
Clermont	Clermont/ East	Domestic WWTP	3335 Hancock Rd.	Private	0.0099
Clermont	Clermont/ West WWTF #1	Domestic WWTP	Osceola St. & 12TH St.	Private	
Clermont	Elementary School "F"	Domestic WWTP	CR 561	Private	0.01
Clermont	Hickory Hill Court	Domestic WWTP	14505 Max Hooks Rd.	Private	
Clermont	Highlands MHP	Domestic WWTP	17730 US HWY 27 N	Private	
Clermont	Lake County Correctional	Domestic WWTP	19225 U.S. HWY 27	Private	0.12
Clermont	Lake Groves	Domestic WWTP	2425 US HWY 27 S	City	1.5
Clermont	Oak Lane	Domestic WWTP	14236 Max Hooks Rd.	City	0.75
Clermont	Orange Lake MHC	Domestic WWTP	15840 SR 50	Private	0.02
Clermont	Orlando All Seasons Resort	Domestic WWTP	1411 S HWY 27	Private	0.024

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Clermont	South Lake Utilities	Domestic WWTP	333 US HWY 27	Private	0.025
Clermont	Susan's Landing S/D	Domestic WWTP	Lakeshore Dr. and Kingfisher Dr.	Private	0.01
Clermont	Thousand Trails RV Park	Domestic WWTP	2110 U S HWY 27 S	City	
Clermont	Torchlite Mobile Home Park	Domestic WWTP	10201 US HWY 27 S	Private	0.017
Clermont	Torchlite Mobile Home Park	Domestic WWTP	10201 US HWY 27 S	Private	0.017
Clermont	Vacation Village Condo Assn.	Domestic WWTP	10301 US HWY 27 S	County	0.013
Eustis	Central Florida Bible Camp	Domestic WWTP	23813 CR 44-A	Private	0.3
Eustis	City of Eustis	Domestic WWTP	801 Bates Ave.	Private	0.075
Eustis	Eustis/ Eastern	Domestic WWTP	Cardinal Lane	Private	0.04
Eustis	Seminole Springs Elementary School	Domestic WWTP	26200 W Huff Rd.	Private	0.0099
Fruitland Park	ACA Academy	Domestic WWTP	36540 Via Marcia	Private	0.015
Fruitland Park	Fisherman's Wharf MH & RV Park	Domestic WWTP	15101 Eagles Nest Rd.	Private	0.007
Fruitland Park	Florida Medical Industries	Domestic WWTP	3131 HWY 441 N	Private	0.005
Fruitland Park	Florida United Methodist Camp	Domestic WWTP	4990 Picciola Rd.	Private	0.07
Fruitland Park	Fruitland Acres	Domestic WWTP	303 Urick St.	Private	0.025
Fruitland Park	Fruitland Park Elementary School	Domestic WWTP	304 W Fountain St.	Private	0.095
Fruitland Park	City of Fruitland Park	Domestic WWTP	506 W Berckman St.	Private	0.008
Fruitland Park	Griffwood MHP	Domestic WWTP	3896 Picciola Rd.	County	0.012
Fruitland Park	Harbor Oaks MHP	Domestic WWTP	03990 Picciola Rd.	City	
Fruitland Park	Lake Griffin Isles MHP	Domestic WWTP	SR 466-B	Private	
Fruitland Park	Mirror Lake Manor Apts.	Domestic WWTP	301 E Mirror Lake Dr.	Private	0.035
Fruitland Park	Morgan's Mobile Home Park	Domestic WWTP	04056 Picciola Rd.	City	0.055
Fruitland Park	Valencia Terrace	Domestic WWTP	Black Bass Cr.	Private	0.0075
Grand Island	Grand Island MHP	Domestic WWTP	36121 Plum Ave.	City	0.25
Grand Island	Sunlake Estates	Domestic WWTP	1045 Great Lakes Blvd.	Private	0.04

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Groveland	Central Florida Septic	Domestic WWTP	241 Sampy Rd.	Private	0.035
Groveland	Florida Baptist Encampment	Domestic WWTP	4645 Baptist Island Rd.	Private	0.003
Groveland	Florida Select Citrus	Domestic WWTP	305 W Broad St.	Private	0.02
Groveland	Green Valley	Domestic WWTP	Silver Eagle Rd.	Private	0.0375
Groveland	City of Groveland	Domestic WWTP	1198 Sampy Rd.	Private	0.012
Groveland	Pine Lake Retreat Center	Domestic WWTP	21725 CR 33	Private	0.025
Groveland	South Lake High School	Domestic WWTP	15600 Silver Eagle Rd.	Private	0.095
Groveland	Timber Village	Domestic WWTP	15130-6 Timber Village Rd.	Private	0.055
Groveland	Woodland Heritage	Domestic WWTP	1124 Heritage Dr.	Private	0.027
Howey-in-the-Hills	Frozen Grove	Domestic WWTP	10400 CR 48	State	0.18
Lady Lake	Blue Parrot	Domestic WWTP	4080 CR 25	Private	0.07
Lady Lake	Harbor Hills	Domestic WWTP	38505 Harbor Hills Blvd.	Private	0.325
Lady Lake	Lady Lake	Domestic WWTP	2934 Griffin View Dr.	Private	0.015
Lady Lake	Lake North Apts.	Domestic WWTP	511 CR 466	Private	0.04
Lady Lake	Recreation Plantation RV Park	Domestic WWTP	609 HWY 466	Private	0.055
Lady Lake	Sunshine Mobile Home Park	Domestic WWTP	401 Sunshine Blvd.	Private	0.025
Lady Lake	Villages WWTF	Domestic WWTP	501 Sunbelt Rd.	Private	0.022
Lady Lake	Water Oak Country Club Estates	Domestic WWTP	3 Water Oak Blvd.	Private	0.08
Lake Jem	Venetian Village S/D	Domestic WWTP	SR. 448 & Tammi Dr.	Private	0.008
Leesburg	Bonfire MHP	Domestic WWTP	620 Misti Dr.	City	3.5
Leesburg	Brittany Estates	Domestic WWTP	1000 Mark Rd.	City	3
Leesburg	Camp Horizon	Domestic WWTP	7369 Sunnyside Dr.	Private	0.024
Leesburg	Corley Island Mobile Manor	Domestic WWTP	138 Kings Blvd.	County	0.0075
Leesburg	Hickory Hollow Estates	Domestic WWTP	9705-31 Hickory Hollow Rd.	Private	0.18
Leesburg	Holiday Travel Resort	Domestic WWTP	28229 CR 33	Private	0.01

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Leesburg	King's Cove S/D	Domestic WWTP	Royal Oak Dr.	County	0.005
Leesburg	Lake Yale Baptist Assembly	Domestic WWTP	39034 CR 452	City	
Leesburg	Lake Yale Estates	Domestic WWTP	37802-32 CR 452	Private	0.009
Leesburg	Lakeside Village MHP STP #1	Domestic WWTP	2580 Lakeside Dr.	Private	0.04
Leesburg	Lakeside Village STP #2	Domestic WWTP	2580 Lakeside Dr.	Private	0.023
Leesburg	Leesburg Truck Center	Domestic WWTP	9145 US HWY 441	Private	0.08
Leesburg	Leesburg Canal St.	Domestic WWTP	608 N Canal St.	Private	0.012
Leesburg	Mid-Florida Lakes	Domestic WWTP	201 Forest Dr.	Private	0.02
Leesburg	Midway Manor RV Park	Domestic WWTP	36033 Emeralda Ave.	City	1.5
Leesburg	Molokai Mobile Home Park	Domestic WWTP	Hawaiian Way & SR 473	Private	1
Leesburg	Morning View	Domestic WWTP	1322 English Rd.	City	
Leesburg	Palm Shores MH & RV Park	Domestic WWTP	38137 Florida Ave. (SR 452)	Private	0.007
Leesburg	Pennbrooke Utilities	Domestic WWTP	501 SR 44 W	Private	0.15
Leesburg	Plantation at Leesburg	Domestic WWTP	25201 US HWY 27 S	Private	0.05
Leesburg	Ridgecrest RV Park	Domestic WWTP	26125 S HWY 27	Private	0.06
Leesburg	Scottish Highlands	Domestic WWTP	10244 Bay St.	Private	0.02
Leesburg	Shangri-La by the Lake	Domestic WWTP	100 Shangri-La Blvd.	Private	0.18
Leesburg	Sycamore Mobile Home Park	Domestic WWTP	11100 Sycamore Lane	Private	
Leesburg	Tara Village	Domestic WWTP	10630 SR 44 E	Private	0.011
Leesburg	Treadway Elementary School	Domestic WWTP	10619 Treadway Rd.	Private	0.0075
Leesburg	Roto-Rooter RAF Site	Residuals Application Facility	Goose Prairie Rd.	Private	0.37
Lisbon	Gerald Gamble Site	Residuals Application Facility	Goose Prairie Rd.	Private	0.012
Lisbon	Roto-Rooter RMF	Domestic WWTP	Emeralda Island Rd.	Private	0.16
Mascotte	Mascotte Elementary School	Domestic WWTP	513 Albrook St.	Private	0.085
Minneola	Highland Oaks	Domestic WWTP	N US HWY 27	Private	0.04

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Minneola	Minneola Elementary Schools	Domestic WWTP	300 Pearl St.	Private	0.06
Minneola	City of Minneola	Domestic WWTP	N/A	Private	
Minneola	Quail Valley	Domestic WWTP	N US HWY 27	Private	0.09
Minneola	Sunshine Parkway	Domestic WWTP	US HWY 27 And SR 19	Private	
Montverde	Montverde Academy	Domestic WWTP	17235 7TH St.	County	0.009
Montverde	Montverde Mobile Home S/D	Domestic WWTP	18 Raintree Ct.	Private	0.05
Montverde	Woodlands Lutheran Camp	Domestic WWTP	15749 CR 455	County	0.012
Mount Dora	Baywood Condominiums	Domestic WWTP	500 Baywood Blvd.	City	
Mount Dora	Forester Haven	Domestic WWTP	28334 Churchill Smith Lane	City	
Mount Dora	Mount Dora #1 WWTF	Domestic WWTP	1111 Overhiser Land	County	0.019
Mount Dora	Mount Dora #2/JAMES SNELL	Domestic WWTP	SR 441/SR 46	Private	0.6
Mt. Plymouth	Fairways at Mount Plymouth	Domestic WWTP	CR 435	County	0.009
Okahumpka	East Plant Area, City of Leesburg	Residuals Application Facility	1035 CR 470	Private	0.3
Okahumpka	Leesburg/ Trunpike WWTF	Domestic WWTP	1600 CR 470	Private	0.054
Okahumpka	North/ City of Leesburg	Residuals Application Facility	1035 CR 470	Private	0.058
Okahumpka	Section 8	Residuals Application Facility	1035 CR 470	Private	0.0125
Okahumpka	South, City of Leesburg	Residuals Application Facility	1600 CR 470	Private	0.15
Okahumpka	South Site #2 – City of Leesburg	Residuals Application Facility	1600 CR 470	Private	0.055
Okahumpka	West Platt Area, City of Leesburg	Residuals Application Facility	27649 CR 470	Private	0.006
Paisley	Camp La-No-Chee	Domestic WWTP	41940 Boy Scout Rd.	Private	0.012
Paisley	Country Squire MHV	Domestic WWTP	6 Country Squire Rd.	City	0.75
Paisley	Deer Haven Campground	Domestic WWTP	47924 Ocala National Forest Rd. 540-2	City	1.99
Paisley	Spring Creek Elementary Schools	Domestic WWTP	44440 Spring Creek Rd.	Private	0.025
Sorrento	Easter Seals Camp Challenge	Domestic WWTP	31600 Camp Challenge Rd.	City	
Sorrento	Oak Springs MHP	Domestic WWTP	12 Highland Ave.	Private	0.14

CITY	NAME	FACILITY TYPE	ADDRESS	OWNERSHIP	PERMITTED CAPACITY (MGD)
Sorrento	Sorrento (Round Lake Elementary) "A"	Domestic WWTP	Round Lake Rd.	Private	0.013
Sorrento	Wekiva Falls Resort	Domestic WWTP	30700 Wekiva River Rd.	Private	0.0075
South of Montverde	Pine Island	Domestic WWTP	CR 455	County	0.005
Tavares	City of Tavares/ Caroline St.	Residuals/Septage Management Facility	100 N Disston Ave,	City	0.3
Tavares	City of Tavares/ Woodlea Rd.	Residuals/Septage Management Facility	2770 Woodlea Rd.	Private	0.05
Tavares	Fisherman's Cove Park WWTF	Domestic WWTP	29115 Eichelberger Rd.	Private	0.08
Tavares	Pink Top Motel and Trailer Park	Domestic WWTP	14915 OLD HWY 441	Private	0.036
Tavares	Summitt Chase Villas	Domestic WWTP	Woodlea Rd.	Private	1.64
Tavares	Tavares/ Caroline St.	Domestic WWTP	525 E Caroline St.	Private	0.2
Tavares	Tavares/ Woodlea Rd.	Domestic WWTP	2770 Woodlea Rd.	Private	0.028
The Villages	The Villages Residuals Application Site	Residuals Application Facility	CR 466	Private	0.099
Umatilla	City of Umatilla	Domestic WWTP	700 Golden Gem Dr.	City	
Weirsdale	Leisure Meadows MHP	Domestic WWTP	01920 Marion County Rd.	Private	0.086
Yalaha	Waterwood Community	Domestic WWTP	303 Waterwood Dr.	Private	0.02

Source: FDEP 2004

Table 2 - Lake County Industrial Wastewater Treatment Facilities

CITY	NAME	FACILITY TYPE	OWNERSHIP	PERMITTED CAPACITY (MGD)
Astatula	Florida Rock Ind. / Astatula Mine	Industrial Wastewater	Privately Owned	
Clermont	Bishop & Buttrey Pit 26 Sand/ Limerock Mine	Industrial Wastewater	Privately Owned	
Clermont	Crothall Laundry Service	Industrial Wastewater	Privately Owned	0.06
Clermont	E R Jahna/ SR 474 Sand Mine	Industrial Wastewater	Privately Owned	
Clermont	E R Jahna/ SR 474 Sand Mine Equipment Wash	Industrial Wastewater	Privately Owned	0.0099
Clermont	E R Jahan/ 474 North Sand Mine	Industrial Wastewater	Privately Owned	
Clermont	E R Jahna/ East Clermont Sand Mine	Industrial Wastewater	Privately Owned	
Clermont	FCS/ Tulley Batch Plant	Concrete Batch GP	Privately Owned	
Clermont	Florida Rock Industries/ Lake Sand Plant	Industrial Wastewater	Privately Owned	
Clermont	Florida Rock Ind./ Clermont Concrete Batch Plant	Concrete Batch GP	Privately Owned	0.003
Clermont	Prestige Concrete Batch Plant	Concrete Batch GP	Privately Owned	
Clermont	Rinker Materials/ 474 Sand Mine	Industrial Wastewater	Privately Owned	15.6
Clermont	Sunshine Materials/ Clermont Concrete Batch Plant	Industrial Wastewater	Privately Owned	
Clermont	Tarmac/ Center Sand Mine	Industrial Wastewater	Privately Owned	
Eustis	Cemex/ South Down/ Eustis Plant	Concrete Batch GP	Privately Owned	
Eustis	Florida Food Products/ Sprayfield	Industrial Wastewater	Privately Owned	0.1
Groveland	C&C Pumping Service Facility	Industrial Wastewater	Privately Owned	
Groveland	Cemex/ Groveland CBP	Concrete Batch GP	Privately Owned	
Groveland	Dundee Citrus Growers' CO-OP	Industrial Wastewater	Privately Owned	0.053
Groveland	Florida Select Citrus/ Cooling Water Discharge	Industrial Wastewater	Privately Owned	2.5
Groveland	Florida Select Citrus/ Sprayfield	Industrial Wastewater	Privately Owned	0.065
Groveland	Island Food Store #313	Petroleum Cleanup GP (long term)	Privately Owned	
Groveland Vicinity	Hyponex Peat/ Libby Road Mine	Industrial Wastewater	Privately Owned	

CITY	NAME	FACILITY TYPE	OWNERSHIP	PERMITTED CAPACITY (MGD)
Howey-in-the-Hills	Silver Springs Citrus/ Sprayfields	Industrial Wastewater	Privately Owned	1
Howey-in-the-Hills	Anderson ColumbiaCBP	Concrete Batch GP	Privately Owned	
Lady Lake	Classic Car Wash	Industrial Wastewater	Privately Owned	
Lady Lake	Wonder Wash Car Wash	Industrial Wastewater	Privately Owned	
Leesburg	Amoco Service Station # 1242	Petroleum Cleanup GP (long term)	Privately Owned	
Leesburg	Cemex/ Leesburg Concrete Batch Plant	Concrete Batch GP	Privately Owned	0.053
Leesburg	Cutrale Citrus Sprayfield	Industrial Wastewater	Privately Owned	0.9
Leesburg	Ditch Witch Trencher	Industrial Wastewater	Privately Owned	
Table 6A-2 Lake County Industrial Wastewater Treatment Facilities, continued.				
Leesburg	DOT/ Leesburg Closed Loop Recycling Center	Industrial Wastewater	State Owned	
Leesburg	Dura-Stress Concrete Products	Industrial Wastewater	Privately Owned	0.008
Leesburg	Florida Rock Ind./ Leesburg	Concrete Batch GP	Privately Owned	
Leesburg	Florida Rock Industries/ Turnpike Sand Mine	Industrial Wastewater	Privately Owned	
Leesburg	Florida Soils/ O'Brien Peat Mine	Industrial Wastewater	Privately Owned	0.12
Leesburg	Lester Coggins Trucking Company	Industrial Wastewater	Privately Owned	
Mascotte	C & C Peat Mine	Industrial Wastewater	Privately Owned	4
Mascotte	Mascotte Wash-A-Teria	Industrial Wastewater	Privately Owned	0.008
Minneola	Main Street Lube #2 (IW)	Industrial Wastewater	Privately Owned	
Okahumpka	Lake County Resource Recovery	Industrial Wastewater	Privately Owned	0.057
Okahumpka	Rinker Materials/ Leesburg Concrete Batch Plant	Concrete Batch GP	Privately Owned	
Paisley	Swiss Haven	Animal Feeding Operation	Privately Owned	
Sorrento	Reliable Constructors, Inc.	Industrial Wastewater	Privately Owned	
Sorrento	Sorrento Coin Laundry	Industrial Wastewater	Privately Owned	0.0085
Sorrento	Superior Concrete/ Sorrento CBP	Concrete Batch GP	Privately Owned	
Umatilla	Florida's Natural Growers NPDES	Industrial Wastewater	Privately Owned	0.8

CITY	NAME	FACILITY TYPE	OWNERSHIP	PERMITTED CAPACITY (MGD)
Umatilla	Lake Cogen Recycle System	Industrial Wastewater	Privately Owned	

FDEP, 2004

POTABLE WATER SUB-ELEMENT

INTRODUCTION

Lake County does not own, operate, or maintain any potable water systems. All potable water systems within the County are maintained and operated by the municipalities, private entities, or individual water well systems.

According to the DEP monthly operating report data, as issued by the St. Johns River Water Management District (SJRWMD), 37.5 billion gallons of water were consumed in Lake County in 2001. The average daily flow Countywide in 2000 was 37.5 million gallons per day (MGD), which does not include a small amount from private wells. From 1995 to 2000, annual water consumption increased by approximately 57%. About 2/3 of Lake County water is distributed through municipalities and about 1/3 is through privately owned water systems. The cities of Leesburg, Clermont, Mount Dora, Eustis, and Tavares have the largest public systems. The largest private systems in the County are Village Center, Lake Utility Services, Florida Water Services, and Lake Groves Utilities.

Current Capacity

Table 3 below lists the potable water providers and their capacity information as reported by the providers to consultants Hartman & Associates, Inc. (2003). Table 4 shows that the largest potable water providers in Lake County are the municipal governments. Unincorporated areas adjacent to the municipalities are required to connect to municipal potable water supplies. Unincorporated locations distant from municipal boundaries are supplied by private utilities or individual wells. Central water supplies are preferred because they have higher quality standards, and private suppliers may go bankrupt without an alternative supply for residents.

Potable Water Demand

Potable water use was estimated as the product of the projected County population plus seasonal demand and average per capita daily demand coefficients. Based on the estimates of the consulting firm Post, Buckley, Shuh and Jernigan, per capita consumption is expected to decline through the year 2005. The 1986 SJRWMD per capita value of 189 gallons per day will be proportionately reduced over 5 year increments to 150 gallons per day by 2005 as the County changes from an agricultural setting to an urban/suburban setting. Total average annual potable water demand is projected to reach 17.3 billion gallons by the year 2005.

Potable Water Wells

Lake County estimates that it has 35,000 to 40,000 wells, including both public and private. Since 1999, over 900 well permits have been issued each year. Family wells range in depth from 90 to 200 feet, while municipal wells range from 600 to 1000 feet, with 800 feet being the average. All permitted potable water wells reach the Floridan aquifer, because the surficial aquifer is not considered safe to drink from.

EDB (dibromoethane) is a highly toxic contaminant, dangerous at concentrations of 200 parts per billion, that has reached the Floridan aquifer and many of the county's wells. It was applied by

the State of Florida to treat a nematode infestation of citrus trees, caused by an unlicensed nursery, in the 1980s. Because EDB is a gas, it was expected to rise to the surface and diffuse through the air after being applied to the roots. Instead, the pesticide seeped into the earth and reached the aquifer. It is estimated that 90% of the EDB contamination is in south Lake County, with the remainder distributed around the county's golf courses. Protecting wells in contaminated areas can more than triple the cost of the well. The Florida Department of Environmental Protection (DEP) is extending centralized water to many of these areas to help mitigate the problem.

Lake County and the Florida DEP are working in concert to locate and eliminate hydrocarbon contamination in the county. Hydrocarbon contamination is a result of underground gasoline storage tanks from old gas stations leaking into the surrounding soil and groundwater. Usually the old gas station sites have long since been paved over and developed. Without historical knowledge of where most of these stations were, Lake County Environmental Services Staff depends on homeowner complaints about water quality to identify potential contamination sites. Once detected, Environmental Services and DEP determine the extent of the contamination, and DEP then handles the clean up.

Nitrate pollution

Nitrate Pollution is discussed in the Stormwater Sub-Element of the Public Facilities Element.

Water Conservation

Lake County does not own or operate any utilities and therefore has no water conservation plan in place. Lake County Building Services has low flow plumbing regulations, and Lake County Growth Management has landscaping regulations that encourage Florida Friendly landscaping. The primary responsibility of protecting and conserving water resources, however, lies with the water management districts.

Table 3 - Municipal Potable & Wastewater Capacity/Demand

MUNICIPALITY	FACILITY TYPE	CAPACITY MGD	SUB-TOTAL CAPACITY	DEMAND MGD	SUB-TOTAL DEMAND	WATER CUSTOMERS	WWTF CUSTOMERS
Astatula	N/A	0		0			
Clermont	4th Street Well	1.152		0.499			
Clermont	Seminole Ave Well	1.08		0.527			
Clermont	Grand Highway Well	1.152		0.521			
Clermont	Greater Hills South Well	1.008		0.92			
Clermont	Greater Hills North Well	1.584		0.923			
Clermont	Hancock Well	1.08		0.986			
Clermont	Well #4	2.79		0.928			
Clermont	Sunburst Well	1.3	11.146	0.303	5.607		
Clermont	West WWTF	0.75	0.75	0.758	0.758		10,514
Clermont	East WRF	2	2	1.119	1.119	11,867	
Eustis	3 Water Plants	11.5		3.5			
Eustis	Heathrow Well	1.36		0.5			
Eustis	Sprayfield Well	0.325	13.185	0.1	4.1		
Eustis	Downtown WWTF	2.4		1.4			
Eustis	Heathrow WWTF	0.3	2.7	0.01	1.41		
Fruitland Park	Main System	1.4	1.4	0.55	0.55	1,460	
Groveland	Pomelo Well	0.617		0.129			
Groveland	Sampey Well	1.44		0.519			
Groveland	Sunshine Parkway Well	1.02		0.094			
Groveland	Palisades Well	1.15	4.227	0.155	0.897	2,613	
Groveland	Sampey WWTF	0.25		0.132			
Groveland	Sunshine Parkway WWTF	0.15		0.066			
Groveland	Green Valley West WWTF	0.055	0.455	0.034	0.232		1,098

MUNICIPALITY	FACILITY TYPE	CAPACITY MGD	SUB-TOTAL CAPACITY	DEMAND MGD	SUB-TOTAL DEMAND	WATER CUSTOMERS	WWTF CUSTOMERS
Howey in the Hills	WTP no. 2			0.094			
Howey in the Hills	WTP no. 3		2.88	1.63	1.724		
Lady Lake	Potable Water	0.715	0.715	0.45	0.45		
Lady Lake	WWTF	0.25	0.25	0.08	0.08		
Leesburg	Main System	19.699		Not specified			
Leesburg	East System	2.681		Not specified			
Leesburg	Highland Lakes System	1.656		Not specified			
Leesburg	Royal Highlands System	1.602	25.638	Not specified	5.81		
Leesburg							
Leesburg							
Mascotte	Midway Ave. WTP	.0252					
Mascotte	Knight St. WTP	1.223					
Minneola	Eastridge WTP	3.24		0.85			
Minneola	Oak Valley WTP	3.24		0.9			
Montverde							
Montverde							
Mount Dora	441/46 WWTF	1.25		0			
Mount Dora	Old441/EudoraRd WWTF	1.5	2.75	0.9	0.9		5,340
Mount Dora	Dora Pines WTP	0.396					
Mount Dora	Limit Av/Donnely St WTP	7.5	7.896	3.24	3.24	14,098	
Tavares	WWTP	1.750					
Umatilla	Main System	1	1	0.6	0.6		

Table 4 - Lake County Potable Water Providers

UTILITY PROVIDER	NUMBER OF CUSTOMERS	NUMBER OF CONNECTIONS	NUMBER OF TREATMENT FACILITIES	TOTAL FACILITY CAPACITY (MGD)	NUMBER OF WELLS	TOTAL WELL CAPACITY (MGD)
Astor/ Astor Park Water Association	1500		1	1.0		
City of Clermont		9010				7.0
City of Eustis	8056		3	10.23	6	3.12
City of Fruitland Park	4732	1353			4	2.49
City of Groveland		1882	2		3	
City of Howey-in-the-Hills	472				2	2.52
Town of Lady Lake	1499				3	2.58
City of Leesburg		11575	4	24.48	15	7.94
City of Mascotte	4078	1165	2	1.475	3	2.66
City of Minneola	2323		2	6.48	5	2.37
Town of Montverde	1264			1.26		
City of Mount Dora	15700	8309			6	6.2
Mount Plymouth / Sorrento		731			17	1.8
City of Tavares		6277	4	11.048	5	12.28
City of Umatilla		1250	1	1.0		
The Villages (OMI)	9686				4	4.58
AquaSource Utility, Inc.	641				7	0.26
Lake Utility Company	1675			2.4	3	2.86

Source: Lake County Water Resources Game Plan, prepared by Hartman & Associates, Inc., 2003

STORMWATER MANAGEMENT SUB-ELEMENT

INTRODUCTION

The purpose of this Element is to provide for necessary public facilities and services correlated to future land use projections. In 1997, Lake County initiated a stormwater program to prioritize basins and projects for stormwater quality retro-fits. Program development was in response to anticipated federal requirements and citizen concern about surface water quality degradation. The following list identifies the key elements of the program:

Develop a stormwater management system database and information management system which will inventory, locate and describe existing stormwater management systems, hydrologic basins, and other related hydrologic parameters in Lake County.

Evaluate existing stormwater management system maintenance conditions and practices.

Analyze the capability of the existing stormwater system to provide stormwater quality treatment prior to discharge.

Assess the magnitude of existing and anticipated future stormwater quality and quantity problems within the County and prioritize those problems relative to their need for attention.

Evaluate alternative Best Management Practices to provide stormwater quality treatment where such treatment does not currently exist.

Develop cost estimates and strategies to implement Best Management Practices.

Develop a Stormwater Management System Capital Improvement Plan based on identified system improvement needs and a prioritized implementation schedule.

Utilize the approved and adopted dedicated funding source, the stormwater Municipal Services Taxing Unit (MSTU), to fund basin evaluations and inventories, stormwater management system capital improvements (retro-fits), operations and maintenance and administration.

Hydrologic Descriptions

Lake County is approximately 1,172 square miles in size and includes a portion of the Ocala National Forest. Average rainfall is approximately 51 inches and much of the County provides recharge to the Floridan Aquifer, Florida's prime supply of potable water. The County lies on the central Florida hydrologic divide which causes discharge of surface and intercepted groundwater to both the Atlantic Ocean and the Gulf of Mexico. Elevations range from near sea level along the St. Johns River to over 300 feet at Sugar Loaf Mountain.

The County is aptly named because of the presence of more than 1,300 lakes. Most of these lakes were created by erosion of underlying carbonaceous bedrock causing a karst topography and sinkholes connecting surface waters to the aquifers. Two stream-to-sinkhole systems have been identified: Wolf Branch sink east of Mount Dora, and the Shocklee Heights area sink in the Ocala National Forest northeast of Lake Dora. Portions of the County contain considerable physical relief (e.g., Mount Dora Area) with well drained soils while other portions are flat and comprised of extensive wetlands (e.g., Little Everglades). Surface streams and rivers, such as the Oklawaha and Withlacoochee rivers, convey surface and groundwater discharges out of the County on their way to the Atlantic Ocean and Gulf of Mexico, respectively. The Lake County Conservation and Groundwater Recharge Elements provide further details on conservation and groundwater aspects of the hydrology of Lake County.

The following paragraphs provide brief descriptions of the five major hydrologic basins in Lake County: Oklawaha River, Withlacoochee River, Wekiva River, Kissimmee River, and the St. Johns River. These descriptions provide basic facts about location, size, and stream systems.

Oklawaha River

Approximately 50 percent of the County lies within the Oklawaha River Basin which extends from Polk County to the south and Marion County to the north. The contributing area within Lake

County is approximately 582 square miles and the direction of flow is generally south to north. The Oklawaha River discharges to the St. Johns River, north of Palatka. It also receives flows from portions of Orange and Lake Counties.

The Upper Oklawaha River Basin, as found in Lake County, consists of the majority of major lakes, streams, and rivers in the County. The two main lake chains, the Palatlakaha Chain and the Harris (also referred to as the Apopka Chain) are divided by the Lake Wales Ridge. A series of streams and canals connect the Palatlakaha Chain, which extends from Lake Louisa in southern Lake County to Lake Harris where it connects to Lake Eustis via the Dead River. The most distant water source of the lakes in this chain is the eastern portion of Green Swamp, an Area of Critical State Concern.

The second principal lake chain, the Harris Chain, extends from Lake Apopka in Orange and Lake Counties through Lake Griffin. The major lakes of this chain are connected by canals or channelized waterways. In both lake chains, the flow is regulated by lock and dam structures. Several freshwater springs are located within the Upper Oklawaha River Basin.

Withlacoochee River

Approximately 17 percent of the County lies within the Withlacoochee River Basin which extends from the northwestern part of the County adjacent to the Town of Lady Lake to the southwestern part in the Green Swamp area, which is a large wetland area that serves as the headwaters for several river systems. The basin area within Lake County is approximately 201 square miles and the direction of flow is generally north to south. The river ultimately discharges into the Gulf of Mexico.

Wekiva River

Approximately 18 percent of the County lies within the Wekiva River Basin. Located in the northeastern part of the County, the basin extends from Lake Dorr southeasterly along Blackwater Creek to its confluence with the Wekiva River, near the Lake/Orange County border. At this point, the Wekiva River flows northeast outfalling into the St. Johns River which discharges into the Atlantic Ocean at Jacksonville, Florida. The basin area within Lake County is approximately 205 square miles.

Kissimmee River

Approximately 2 percent of the County lies within the Kissimmee River Basin. Located in the southeastern part of the County, the basin extends from Trout Lake to the Lake/Polk County border. The basin area within Lake County is approximately 21 square miles and generally flows north to south. The Kissimmee River flows south and ultimately discharges to Lake Okeechobee.

St. Johns River

Approximately 14 percent of the County flows directly into the St. Johns River. Located in the northeastern part of the County, the basin extends from the Alexander Springs in the Ocala National Forest to the Town of Astor adjacent to the river. The basin area within Lake County is approximately 166 square miles and generally flows south to north.

Data Types

The following sections provide a summary of data types, how the data are used, and useful data obtained from various sources by data type for subsequent evaluations.

Stage and Discharge

An essential component of any water resources investigation is the availability of measured stages and/or discharges at selected points of interest. These are often used to establish base flows or normal conditions as well as predict extreme flood and/or drought event conditions. Typically, for a stormwater master plan, stages and/or discharges are used in conjunction with known rainfall amounts/distributions and other hydrologic/hydraulic conditions to calibrate and verify models. These calibrated and verified models can then be used in evaluations of present problem area solutions or future conditions planning. It is often desirable to acquire these data in at least hourly intervals such that relatively short term, yet potentially damaging, flood peaks can be predicted and planned for. These data are generally determined on a project site-specific basis or, if available, from the USGS or other websites and/or databases.

Aerial Photography

Aerial photographs aid stormwater evaluations in land use verification, basin delineations, hydraulic facility identification, calculation of overland flow lengths, floodplain storage encroachment, and survey requests. Lake County obtains updated aerial photography every four years with the last update occurring in 2004. Aerial photographs with topography are available for some of the County at a scale of 1"=200'.

Soils

Soils data are used to evaluate stormwater runoff, infiltration, and recharge potential. Specifically, infiltration rates and total soil storage (related to curve number) are used in hydrologic models. Soil types and engineering characteristics, were obtained from soil survey reports produced by the Soil Conservation Service (SCS).

Rainfall

Rainfall data are used to generate the basis for stormwater evaluations. Data are generally characterized by amount (inches), intensity (inches per hour), frequency (years), and duration (hours). Gages for which digital rainfall values were obtained are somewhat evenly distributed throughout Lake County.

Hydrologic Boundaries

Hydrologic boundaries are needed to identify flow directions and schemes as well as contributing area acreages. Hydrologic boundaries for major basins (e.g., Oklawaha River) were derived from SJRWMD, SWFWMD, Lake County Water Authority and County estimates. Sub-basins, and smaller hydrologic units are delineated on basins being evaluated.

Topography

Topographic data are needed to define hydrologic boundaries, overland flow slopes, channel slopes, and stage-area-storage relationships. Topographic data for the entire County came from the USGS on 1:24,000 (7.5 minute series quadrangles with 5-feet contours) and 1:100,000 scale maps (5-feet contours).

Land Use

Land use data are used to estimate imperviousness, runoff, and pollutant load potential in stormwater evaluations. Relative changes in land use are also used to identify areas of high growth for the establishment of priorities for study. Typically, existing land use represents land cover as of 1995.

Regional Aquifer Characteristics

The Groundwater Recharge and Conservation Elements present various data on regional aquifer characteristics; however, it is important to correlate the following issues to surface and stormwater management:

Lake County contains extensive recharge areas for the Floridan Aquifer; therefore, recharge protection is essential for potable water supplies for the area. Discharges to groundwater via sinkholes in Karst areas and discharges via drain wells can adversely impact the quality of water supplies.

Stormwater Facilities and Survey

A key component of Lake County's stormwater program is the location and characterization of all stormwater facilities/structures in the County. Facilities and structures are located via GPS and characterized as to type, size, material and condition. This information is then translated to GIS and added as a layer to the appropriate basin map. Ultimately, this information will be compiled into a database for maintenance and accounting purposes.

Stormwater Management Regulations

This Section provides a description of the regulatory and intergovernmental framework, which influence the implementation of Lake County's stormwater management program.

1. United States Environmental Protection Agency:

The USEPA is ultimately responsible for the implementation of two (2) mandates of the Clean Water Act: National Pollutant Discharge Elimination System (NPDES) and Total Maximum Daily Load (TMDL).

2. Florida Department of Environmental Protection

The FDEP oversees both the NPDES and TMDL programs in the state of Florida. These programs are described in brief as follows:

The NPDES is an unfunded federal mandate and is derived from the Clean Water Act. It requires entities which operate storm sewer systems (termed Municipal Separate Storm Sewer Systems or MS4s) to obtain permit coverage to operate those systems. Permit coverage requires the submission of a Notice of Intent (NOI) to use the permit. The NOI outlines the Best Management Practices (BMPs) an entity will employ, time frames to employment and quantitative goals to determine BMP success. Yearly progress reports to the permitting agency are used to track an entity's success. In the state of Florida, the permitting agency is the Department of Environmental Protection (FDEP).

Total Maximum Daily Load or TMDL is another Clean Water Act-federal mandate that the County, municipalities and other agencies are currently addressing. A TMDL is the scientifically derived maximum amount of a pollutant that can be assimilated by a water body without degrading its intended use. TMDLs have been established for the lakes, and some other surface waters, that comprise the portion of the Upper Oklawaha River Basin (UORB) that exists within the County. TMDL establishment for these water bodies came about pursuant to their being designated as "Impaired" under the Impaired Waters Rule (IWR). County staff is actively involved in the evolving stakeholder process to develop a Basin Management Action Plan or BMAP as required by the TMDL process.

3. St. Johns River and Southwest Florida Water Management Districts

The St Johns River Water Management District (SJRWMD) and the Southwest Florida Water Management District (SWFMD) are responsible for groundwater and stormwater management under FAC Chapters 40C and 40D, respectively

4. Florida Department of Community Affairs

The FDCA is the implementation agency for the State Comprehensive Plan (Chapter 187, Florida Statutes). Chapter 9J-5, FAC, outlines local comprehensive plan elements which are submitted to the FDCA after receiving comments from the local regional planning council (East Central Florida Regional Planning Council). The requirements of Chapter 9J-5 are met or exceeded by the water management district and/or county requirements. Therefore, compliance with SJRWMD and County regulations will ensure compliance with the local and state comprehensive plan requirements.

5. Lake County

The existing Lake County regulations that are contained in Chapter 9 of the County's Land Development Regulations are in the process of revision. Design Standards for new development, formerly referenced by Chapter 9, are being updated and incorporated into the chapter.

WATER QUALITY

Water quality data are needed to document adverse impacts to waterbodies/watercourses and flora/fauna. Stormwater generates non-point source pollutant loads, which can degrade water quality. Traditionally, water quality data are collected in regular intervals (e.g., quarterly) to record ambient conditions in a given location.

The Lake County Department of Environmental Services, Water Resource Management Division, maintains an extensive network of water quality monitoring stations throughout the County. These

lake and river stations are sampled on approximately a quarterly basis. The water quality monitoring data represents ambient conditions in a given location. The majority of the nonpoint pollution loads that are discharged into Lake County lakes are associated with stormwater runoff.

Storm event sampling is being phased in as part of the Lake County watershed monitoring program. Initially, only limited storm event sampling may be feasible (e.g., one or two stations); however, as the Lake County staff gains experience with sampling methods and equipment, the storm event sampling program will be expanded

The occurrence of stormwater runoff in a watershed is a random process, therefore, development of reliable storm event water quality data requires a more sophisticated sampling program design than ambient base flow water quality assessments. When storm events occur, especially in Lake County watersheds with short travel times, the peak loadings of pollutants in stormwater may occur before personnel are able to arrive at a site and begin manual sampling. For this reason, monitoring will be accomplished using automatic flow monitoring and water quality sampling instruments. Manual sampling has the advantages of lower costs, simplicity, and more flexibility. However, these advantages are more than outweighed by the potential for failure to obtain data when storm events occur. In general, a wet weather sampling program incorporating automatic monitoring equipment will have the best chance for success

Lake County is establishing a storm event monitoring program, which will complement the County's existing ambient water quality monitoring programs. The storm event monitoring program will be used to document the effectiveness of the stormwater management plan in improving water quality in Lake County. The primary purpose of the stormwater monitoring program will be to provide baseline data and to evaluate future water quality trends (e.g., improving versus deteriorating conditions).

STORMWATER QUALITY RETRO-FIT PRIORITIZATION

A multi-agency group comprised of staff from Lake County Departments of Public Works and Growth Management, the Lake County Water Authority (LCWA) and the St. Johns River Water Management District (SJRWMD) developed criteria for the prioritization of the basins within Lake County with regard to stormwater and drainage issues. These criteria were “drainage problems”, “flooding potential”, “pollution potential”, “receiving water body”, “natural wildlife” and “population”. All 252 watersheds within the County were assessed based on these criteria and a prioritization schedule for inventory and evaluation was established.

Stormwater management system inventories and drainage evaluations have and are being conducted in the County’s watersheds generally according to the prioritization schedule. Inventories and evaluations have been completed in the basins of Lake Griffin, Lake Apopka, Lakes Louisa, Minnehaha and Minneola, and, in conjunction with Orange County, Johns Lake. Evaluations are underway in the Lake Eustis and Silver Lake Basin and the Lake Harris and Little Lake Harris basin. The inventories have entailed locating all stormwater structures via Global Positioning System (GPS), digitally photographing them and noting, at a minimum, type, size, condition and material(s) of the structures. Outfalls are located and identified as to whether structural (e.g.: a pipe, flume, etc.) or implied (e.g.: an area of sheetflow). GPS data is then translated into a Geographic Information System (GIS) format. The drainage evaluations require an assessment of the conveyance system and delineation of the contributing basin. Conveyance systems are assessed as to whether they are open or closed and whether or not they allow for

any stormwater treatment. The contributing basins are delineated and assessed as to size, Directly Connected Impervious Area (DCIA) and current land use category or categories.

Data from the inventory and evaluation are used to model the potential pollutant load from each outfall within a basin. For the most part, published figures for DCIA and pollutant loading have been used for the specific contributing basin land use categories. The multi-agency group mentioned at the beginning of this section performs review of the modeling results. The modeling results are used to help prioritize outfalls for retro-fit conceptual design based on their pollutant loading potential of a target pollutant or pollutants. Thus far, the target pollutant has been phosphorus.

Conceptual retro-fit stormwater management system designs are developed for several of the top priority outfalls within a basin. The designs are reviewed for potential pollutant load reduction and other considerations which include availability of land for construction, aesthetics, educational opportunities, overall cost, cost per quantity of pollutant removed and future maintenance. Land availability may be a limiting factor in both design and ability to construct a project. Another consideration at this time is permitting. Discussions are held with the permitting agency(ies) to determine "feasibility" of the project from a permitting perspective and whether or what type of permit is required. After due consideration, the conceptual designs are prioritized and the highest priority subset of those are moved into an actual design phase.

EXISTING REGULATIONS AND PROGRAMS

An analysis of the active Federal, State, and County stormwater management regulatory programs indicates that adequate standards and criteria will exist when the following occurs:

- The Basin Management Action Plan (BMAP) for the Upper Oklawaha River Basin is completed, adopted and implemented by all parties in the basin.
- Best Management Practices, structural and non-structural, are in place to achieve all TMDLs.
- The County, and other entities so covered, successfully administer the Minimum Control Measures which are stipulated in respective NPDES Phase II permits.
- State and local rules/design standards regarding stormwater management systems are adhered to and an emphasis is placed on long-term maintenance of the systems.
- Improvement to ambient surface water quality which is directly correlated with improved stormwater quality.

MAINTENANCE PRACTICES

Proper operation and maintenance of stormwater management facilities, whether conveyance, treatment, attenuation or a combination thereof, are crucial to the continued function of the facilities. Maintenance practices are also usually specific to a given county or city.

Currently, County facilities are maintained on an as-needed basis as time and manpower allow. The problem with this approach is that silt, debris, and some harmful vegetation can accumulate to the point where a problem that could have been avoided occurs during a large storm.

A regular maintenance schedule is being established and budgeted. Structure/system information is being collected as part of the stormwater program basin evaluations and as part of maintenance schedule development. All information is being entered into a data base with a GIS component that will allow for a level of visualization of any system in the unincorporated County.

Scheduled maintenance implemented on a regular basis, not only improves consistency of level of service, but also shows citizens that their stormwater fee and other ad valorem taxes are working for them.

EXISTING WATER QUALITY AND QUANTITY

This section presents an evaluation of existing water quality and quantity issues within Lake County.

Water Quality

A previous section made mention of two federal mandates: National Pollutant Discharge Elimination System (NPDES) and Total Maximum Daily Load (TMDL). These mandates are having major impacts on the County's management of stormwater. NPDES is a means by which certain activities associated with the operation of a Municipal Separate Storm Sewer System or MS4 are regulated. A MS4 can be defined as all the components that make up a storm sewer system including roads, swales, ditches, retention/detention ponds, culverts and the like. The TMDL process determines the "assimilative capacity" of a water body for a specific pollutant or pollutants. It also establishes an allocation for each pollutant from each contributing source. As mentioned, these mandates are derived from the Clean Water Act and are unfunded.

NPDES

Lake County's stormwater program was developed, in part, in anticipation of inclusion in Phase II of NPDES (Phase I has been in effect since the early 1990s for "larger" entities). The County's program has been addressing what are termed, "Minimum Control Measures" or MCMs that are the criteria for compliance with Phase II. The MCMs are: Public Education, Public Participation, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post-Construction Stormwater Management and Pollution Prevention/Good Housekeeping for Municipal Operations. Each MCM requires the implementation of Best Management Practices (BMPs). (An example BMP for, say, Public Education might be a brochure on stormwater and its potential impacts that is included in a utility bill mailing.) In Florida, an entity that owns an MS4, like Lake County, must compile existing and proposed BMPs and submit a Notice of Intent or NOI to the Florida Department of Environmental Protection to use, in Lake County's case, a General Permit to operate the MS4. Initial permit coverage lasts for five years during which time all BMPs listed in the NOI must be implemented. Yearly progress reports must be submitted to FDEP with quantifiable results for each BMP implementation.

The County's stormwater program has been addressing MCMs in ways including as follows:

- Public Education: The Lake County Department of Public Works supports, financially, the Watershed Action Volunteer (WAV) program of the St. Johns River Water Management District. The WAV coordinator and volunteers give presentations to school children and others throughout the County about stormwater and its potential effects on lakes and other water bodies. The principle tool used in these presentations is an Enviroscape brand landscape model. The Enviroscape model depicts various land uses within a landscape and allows one to demonstrate runoff scenarios throughout the landscape.
- Public Participation: Citizen volunteers have participated, as WAVs and members of LakeWatch, in the County's surface water quality sampling program for several years. A

new sampling component, prompted by the County's efforts to evaluate all its basins, is sampling individual stormwater outfalls. The purpose of sampling outfalls is to obtain basin-specific data to "fine tune" pollutant load modeling efforts and to provide baseline information. Remote samplers are employed at outfalls for contributing basins with homogeneous land uses. The samplers are maintained and samples are collected and transported to the County's Water Resources Laboratory by volunteers.

- Several stormwater retro-fit projects that have been constructed and others being planned are located in residential areas. A potential issue of concern has been the increase in maintenance created by additional grates and inlets, etc., located in these, generally, heavily treed areas. The WAV coordinator is developing an "Adopt-a-Storm Drain" program where residents will help with maintenance by keeping grates and inlets clear of debris.
- Illicit Discharge Detection and Elimination: Language has been inserted in the Scope of Services which is used to solicit consulting firms to perform the basin inventories and evaluations. This language requires that dry weather flows be documented during efforts in the basin. Any dry weather flows will be investigated as to their source.
- Construction Site Stormwater Runoff Control: A number of Lake County staff including Construction Inspectors, Maintenance Area Supervisors and Code Enforcement personnel are "Qualified Stormwater Management Inspectors" through FDEP's "Stormwater, Erosion, and Sedimentation Control Inspector Training Program". Construction Inspectors are constantly in the field ensuring that sediment and erosion control measures are being used and used correctly at all construction sites within their jurisdictions. Maintenance Area Supervisors ensure that proper measures and techniques are employed on County road maintenance projects. Code Enforcement personnel generally respond to complaints from individuals with concerns over issues such as, for example, erosion and sedimentation from a vacant lot in a subdivision under construction.
- Post-Construction Stormwater Management: While reserving the right to comment, the County currently defers stormwater management system permitting to the appropriate Water Management District. The County will take advantage of District oversight and authority as a "Qualified Alternative Program" for this MCM.
- Pollution Prevention/Good Housekeeping for Municipal Operations: County Departments that may use potentially deleterious materials utilize required protocols for the handling of those materials. There are Standard Operating Procedures (SOPs) in place for petroleum storage and spill prevention. Handlers and applicators of pesticides are certified for their use.

TMDL

Addressing Total Maximum Daily Load or TMDL involves two main steps: developing a Basin Management Action Plan (BMAP) and allocating pollutant load reductions. A TMDL is a scientifically-established load or amount of a given pollutant that a water body can assimilate or "absorb" and not degrade below its intended use. The intended use in the case of water bodies in Lake County is generally described as "fishable and swimmable". Once the TMDL is established, the BMAP is developed and the TMDL is allocated among all contributing sources. Sources may be as obvious as an outfall pipe from a sewage treatment plant to a less obvious, non-point source as stormwater. All sources are taken into account and a margin of safety is factored into the allocation equation. Allocation is the assigning of a proportional amount of the TMDL to each contributing source. All sources may be required to reduce their contribution. In other instances, there may be negotiations among sources whereby, for example, a source above

its allocation may offer to compensate a source below its allocation for the latter's additional allowable load.

The BMAP will detail each source's TMDL allocation and include projects and activities to achieve the allocation. Since the TMDL process is meant to be iterative, a BMAP will also include strategies for monitoring, follow-up and plan revision. As mentioned above, negotiations may take place between sources or, more appropriately, stakeholders within a basin. The development of the BMAP will provide a forum for stakeholders to negotiate as well as cooperate and coordinate on the most effective means of achieving the TMDL. An important aspect of BMAP development is documenting existing plans and projects for each of the stakeholders. If the projects or plans are designed to reduce pollutant loads, they may be credited toward a stakeholder's TMDL allocation.

The Upper Oklawaha River Basin (Harris and Palatlakaha Chains in Lake County) is one of the first basins in the state of Florida for which a BMAP is being developed. County staff is working closely with stakeholders from the municipalities, the FDEP, the St. Johns River Water Management District, the Florida Fish and Wildlife Conservation Commission, the Florida Department of Transportation and many others in the FDEP-facilitated process. Stakeholder meetings are being held regularly and locally and are producing substantive results in developing the components of the BMAP.

Water Quantity

Levels of Service (LOS)

Stormwater management has become a complex community issue. In the past, ditching and draining to convey stormwater away from development was the accepted practice and allowed access to much of Florida. Over the years, adverse impacts to fisheries, scenic areas, and wildlife habitats have altered accepted approaches to manage stormwater. Stormwater management now involves storage, conveyance, recharge, conservation, and treatment aspects along with proper timing, durations, levels of flooding, and nutrient releases for natural areas or wetlands to ensure a comprehensive management approach to what is a local, State, and Federal issue.

Lake County is similar in characteristics to other communities regarding stormwater service. Certain County, City, and private stormwater management systems provide inadequate flood protection of homes and streets and provide little or no treatment of the runoff prior to discharge to receiving waters. These conditions are due mainly to the historic "piece-meal approach" to stormwater management and the aging condition of the existing infrastructure. Proper LOS decisions for water quantity (flooding) and water quality protection are essential for the implementing entity because they establish the intent of public and agency involvement and set the goals for the CIP.

Stormwater Management System Design Criteria

The following minimum design storms, water quality treatment and recharge standards are being proposed in the aforementioned update of Chapter 9 of the County's Land Development Regulations.

Minimum Design Storm

Table 5 - Stormwater Minimum Design criteria

FACILITY	FREQUENCY/DURATION
Bridges	50 year 24 hours
Principal Arterial bridges and Evacuation Routes	100 year 24 hours
Canals, Ditches, Swales or Culverts for Drainage External to the Development	25 Year 24 Hours
Canals, Ditches, Swales or Culverts for Drainage Internal to the Development	10 Year 24 Hours
Detention and Retention Basins Contributory to Land-locked areas with no Positive Outlet	25 Year 96 Hours
Detention/Retention Structures with a Positive Outlet.	25 Year 24 Hours Mean Annual Storm
Houses/Buildings/Garages First Floor Elevation Must be 18" or above the 100-Year Flood Elevation	100 Year 24 Hours
Storm Sewers	10 Year Storm

Water Quality Treatment Standards

Water Quality Treatment Pollution Abatement will be accomplished by:

Retention with percolation, or detention with filtration, of the greater of one half (1/2) inch of runoff from developed sites which consist of less than fifty nine percent (59%) impervious surface with drainage area less than 100 acres of runoff from the first one inch of rainfall (systems using detention with filtration will be limited to tributary areas of less than ten (10) acres);

Detention without filtration (wet detention) of the first inch of runoff or two and a half (2.5) inches times the impervious area, whichever is greater;

Providing an additional level of treatment equal to fifty percent (50%) more than described above and shall provide off-line retention or detention of the greater of one-half inch of runoff from developed sites which consist of less than 100 acres or runoff from the first one (1) inch of rainfall for any areas that discharge to Class I, Class II, or Outstanding Florida Waters (OFW).

Providing for the same level of treatment as required above for Class I Waters for any areas that discharge to stream-to-sinkhole or to drainage wells which are directly connected to the Florida Aquifer.

Monitoring may be required by the County Manager or designee in any stormwater management system in order to provide assurance that the systems are functioning as designed and are not having adverse impacts on water quantity or quality of receiving waterbodies or water courses.

The County shall not permit the use of detention with filtration pollution abatement systems in new development due to their high failure rate and maintenance. Existing systems may be permitted for stormwater retrofit projects.

Recharge Standards

Recharge in designated areas where the soils are compatible (Hydrologic Soils Group A as described by the USDA Soil Conservation Service) will be accomplished by providing for retention of three (3) inches of runoff from all directly connected impervious areas within a project site. As an alternative, developer may demonstrate that the post-development recharge capacity is equal to or greater than the pre-development recharge capacity.

Summary

Non-point sources of pollution continue to be recognized as significant contributors to the pollutant loadings of lakes and other surface waters. Unlike point sources such as sewage treatment plants and certain industries which discharge through single or multiple pipes, non-point sources tend to be less defined in nature. Non-point sources may include aerial deposition, septic tank discharge and urban runoff. Urban runoff or stormwater has garnered much attention in recent years as a source of loading that can be addressed by entities in a number of ways and at reasonable costs. Source control, retro-fit and education are all methods being used to reduce the pollutant loading from stormwater.

Thus far, Lake County's stormwater program has been very successful with a number of accomplishments. The MSTU continues to provide a steady source of funding. Basins are being evaluated with an eye on improving stormwater quality. Projects are being designed and constructed. Easements are being donated by citizens in order to construct on private property. County staff is active in multi-agency efforts to address stormwater issues, including federal mandates. School children are learning first hand about stormwater and its effects through the education component of the program. Citizens are volunteering to aid in water quality sampling and light, routine maintenance of new stormwater quality improvement systems.

Lake County's stormwater program is furthering efforts to improve the water quality of the lakes and other water bodies in the County. The goal is to help restore or maintain water quality so that residents, visitors and wildlife may enjoy the features for which the County is named.

Table 6 - Lake County Stormwater Facilities

NAME	FACILITY TYPE	CITY	OWNERSHIP TYPE
1957 Holdings Incorporated Retail Center	Construction Stormwater GP	Unincorporated	Privately Owned
AAA High School	Construction Stormwater GP	Clermont	Privately Owned
Albertson's No. 44GT at Clermont	Construction Stormwater GP	Clermont	Privately Owned
American Auto and Truck Salvage Inc.	Multi-Sector Stormwater GP	Fruitland Park	Privately Owned
Amsouth Bank – King's Ridge	Construction Stormwater GP	Clermont	Privately Owned
Amsouth Bank – Lady Lake	Construction Stormwater GP	Lady Lake	Privately Owned
Amsouth Bank Leesburg/ Summerville	Construction Stormwater GP	Leesburg	Privately Owned
Arlington Ridge Phase I	Construction Stormwater GP	Leesburg	Privately Owned
Astor/ Astor Park Central Wastewater System, Phase 1	Construction Stormwater GP	Astor	Privately Owned
B&T Auto Parts	Multi-Sector Stormwater GP	Mascotte	Privately Owned

NAME	FACILITY TYPE	CITY	OWNERSHIP TYPE
Bank of America Wal-Mart Super Center (US 27)	Construction Stormwater GP	Clermont	Privately Owned
Bella Collina East	Construction Stormwater GP	Montverde	Privately Owned
Bella Collina West	Construction Stormwater GP	Montverde	Privately Owned
Beverly Shores Elementary School	Construction Stormwater GP	Leesburg	Privately Owned
Carver Heights Drainage Improvement	Construction Stormwater GP	Leesburg	Privately Owned
Chelsea Oaks Subdivision	Construction Stormwater GP	Tavares	Privately Owned
Chick-Fil-A, Clermont	Construction Stormwater GP	Clermont	Privately Owned
Chili's Grill & Bar	Construction Stormwater GP	Lady Lake	Privately Owned
Chili's Grill and Bar	Construction Stormwater GP	Clermont	Privately Owned
Citrus Tower Blvd. and Steve's Road	Construction Stormwater GP	Clermont	Privately Owned
Clermont Auto Mall	Construction Stormwater GP	Clermont	Privately Owned
Clermont Hampton Inn	Construction Stormwater GP	Clermont	Privately Owned
College Station Center	Construction Stormwater GP	Clermont	Privately Owned
CR 470 at Florida Turnpike (SR 91)	Construction Stormwater GP	Okahumpka	Privately Owned
CR 437 Widening & Resurfacing (2004-05)	Construction Stormwater GP	Sorrento	Privately Owned
CR 445-A Widening & Resurfacing	Construction Stormwater GP	Astor Park	Privately Owned
CR-25 Widening and Resurfacing, Phase II (Project No. 2004)-03	Construction Stormwater GP	Lady Lake	Privately Owned
Crooked Lake Estates	Construction Stormwater GP	Eustis	Privately Owned
CUS # 5452	Construction Stormwater GP	Mount Dora	Privately Owned
CUS # 5817	Construction Stormwater GP	Clermont	Privately Owned
Cutrale Citrus Juices USA Inc.	Multi-Sector Stormwater GP	Leesburg	Privately Owned
Dee Auto Sales and Parts, Inc.	Multi-Sector Stormwater GP	Fruitland Park	Privately Owned
Eagle Dunes, Phase 1	Construction Stormwater GP	Eustis	Privately Owned
Ehler's Office Complex	Construction Stormwater GP	Lady Lake	Privately Owned
Elementary School "G"	Construction Stormwater GP	Leesburg	Privately Owned
Eustis High Scholl	Construction Stormwater GP	Eustis	Privately Owned
FDOT Contract T-5046, SR 19	Construction Stormwater GP	Groveland	Privately Owned
Federal Express Corp. LEEA	Multi-Sector Stormwater GP	Leesburg	Privately Owned
FGT Leesburg Lateral Relocation and Removal	Construction Stormwater GP	Leesburg	Privately Owned
FGT Replacement Project 17-2X TO 17-3	Construction Stormwater GP	Mount Plymouth	Privately Owned
Florida Food Products Inc.	Multi-Sector Stormwater GP	Eustis	Privately Owned
Florida Line of Astatula Inc.	Multi-Sector Stormwater GP	Astatula	Privately Owned
Florida Wilbert Inc.	Multi-Sector Stormwater GP	Okahumpka	Privately Owned
FM: 407152 SPN: 11200	Construction Stormwater GP	Clermont	Privately Owned
Foxborough Subdivision	Construction Stormwater GP	Tavares	Privately Owned

NAME	FACILITY TYPE	CITY	OWNERSHIP TYPE
FRS Lake County	Multi-Sector Stormwater GP	Okahumpka	Privately Owned
Fruitland Park Elementary School	Construction Stormwater GP	Fruitland Park	Privately Owned
Golden Gem Growers' Inc.	Multi-Sector Stormwater GP	Umatilla	Privately Owned
Greater Hills Commercial Site	Construction Stormwater GP	Clermont	Privately Owned
Green Valley West	Construction Stormwater GP	Groveland	Privately Owned
Griffin Road Sidewalk Project	Construction Stormwater GP	Leesburg	Privately Owned
Hancock Commons	Construction Stormwater GP	Clermont	Privately Owned
Harbor Federal Bank	Construction Stormwater GP	Clermont	Privately Owned
Heathrow Country Estate Homes, Phase I	Construction Stormwater GP	Sorrento	Privately Owned
Hillcrest at Lake Nettie	Construction Stormwater GP	Eustis	Privately Owned
Lake Cogen	Multi-Sector Stormwater GP	Umatilla	Privately Owned
Lake Louisa State Park Cabin Infrastructure Development	Construction Stormwater GP	Clermont	Privately Owned
Lake Myrtle Shores Subdivision	Construction Stormwater GP	Fruitland Park	Privately Owned
Lakeshore Dr. CR 452 Phase II	Construction Stormwater GP	Tavares	Privately Owned
Lakeview Point (Jack's Lake/ Chatham Park)	Construction Stormwater GP	Clermont	Privately Owned
Lakewood Ranches Subdivision	Construction Stormwater GP	Eustis	Privately Owned
Leesburg Commerce Park Phase I	Construction Stormwater GP	Leesburg	Privately Owned
Leesburg High School	Construction Stormwater GP	Leesburg	Privately Owned
Lester Coggins Trucking Inc.	Multi-Sector Stormwater GP	Okahumpka	Privately Owned
Lost Lake Reserve	Construction Stormwater GP	Clermont	Privately Owned
Lowe's of Mount Dora	Construction Stormwater GP	Mount Dora	Privately Owned
Lowe's of Mount Dora	Construction Stormwater GP	Mount Dora	Privately Owned
McDonald Canal Shad Facility	Construction Stormwater GP	Mount Dora	Privately Owned
Metalplate Galvanizing, Inc.	Multi-Sector Stormwater GP	Jacksonville	Privately Owned
Milling/ Resurfacing/ Pave Shoulders/ Bridge Widening	Construction Stormwater GP	Mount Dora	Privately Owned
Montclair Oaks Apartment Complex	Construction Stormwater GP	Leesburg	Privately Owned
Mount Dora Apartments	Construction Stormwater GP	Mount Dora	Privately Owned
Mount Dora High School	Construction Stormwater GP	Mount Dora	Privately Owned
North East Landfill	Multi-Sector Stormwater GP	Lake Hamilton	Publicly Owned
OLA View Estates	Construction Stormwater GP	Mount Dora	Privately Owned
Orangetree Phase 5	Construction Stormwater GP	Unincorporated	Privately Owned
Palisades Phase 2C & 2D	Construction Stormwater GP	Clermont	Privately Owned
Park Hill Subdivision	Construction Stormwater GP	Leesburg	Privately Owned
Pine Forest Park	Construction Stormwater GP	Deland	Privately Owned
Pine Meadows Rd.	Construction Stormwater GP	Eustis	Privately Owned

NAME	FACILITY TYPE	CITY	OWNERSHIP TYPE
Publix & Citrus Tower Blvd./ Grand Highway	Construction Stormwater GP	Clermont	Privately Owned
Quail Hollow	Construction Stormwater GP	Eustis	Privately Owned
RCD Corporation	Multi-Sector Stormwater GP	Eustis	Privately Owned
Regency Hills - Phase I	Construction Stormwater GP	Clermont	Privately Owned
Regency Hills - Phase 2 & 3	Construction Stormwater GP	Clermont	Privately Owned
Reliant Family of Companies	Construction Stormwater GP	Groveland	Privately Owned
Resurface and Addition of Shoulders on SR 25 from Highland	Construction Stormwater GP	Deland	State Owned
Resurfacing Florida's Turnpike - MI 275 TO 297.833 // 413623	Construction Stormwater GP	Leesburg	Privately Owned
Silver Creek	Construction Stormwater GP	Clermont	Privately Owned
Skyridge Valley	Construction Stormwater GP	Clermont	Privately Owned
Sorrento Hills PD	Construction Stormwater GP	Sorrento	Privately Owned
Sorrento Springs – Amenities Center	Construction Stormwater GP	Sorrento	Privately Owned
Summer Bay Apartments	Construction Stormwater GP	Clermont	Privately Owned
Summer Bay Condominiums	Construction Stormwater GP	Clermont	Privately Owned
Summit Greens Phase 2A	Construction Stormwater GP	Clermont	Privately Owned
Summit Greens Phase 2C	Construction Stormwater GP	Clermont	Privately Owned
Sundev Properties Retail Center	Construction Stormwater GP	Clermont	Privately Owned
Sunrise Lakes	Construction Stormwater GP	Clermont	Privately Owned
Target @ Clermont	Construction Stormwater GP	Clermont	Privately Owned
Tavares High School Additions and Renovations	Construction Stormwater GP	Tavares	Privately Owned
The Home Depot – Lady Lake	Construction Stormwater GP	Lady Lake	Privately Owned
The Overlook at Lake Louisa	Construction Stormwater GP	Clermont	Privately Owned
The Overlook at Mount Dora	Construction Stormwater GP	Mount Dora	Privately Owned
The Pines at Lake Saunders	Construction Stormwater GP	Tavares	Privately Owned
Tool World Inc.	Multi-Sector Stormwater GP	Eustis	Privately Owned
Town and Country Refuse	Multi-Sector Stormwater GP	Leesburg	Privately Owned
Treadway Elementary School	Construction Stormwater GP	Leesburg	Privately Owned
Tuscany Ridge	Construction Stormwater GP	Montverde	Privately Owned
Twin Lake Park	Construction Stormwater GP	Leesburg	Privately Owned
US 27/ SR 44B Development	Construction Stormwater GP	Leesburg	Privately Owned
Umatilla High School	Construction Stormwater GP	Umatilla	Privately Owned
Vista Commerce Center	Construction Stormwater GP	Clermont	Privately Owned
Wal-Mart Super Center #5299 -- Orlando	Construction Stormwater GP	Clermont	Privately Owned
Wal-Mart	Construction Stormwater GP	Clermont	Privately Owned
Warren Pearce and Company	Multi-Sector Stormwater GP	Lake Hamilton	Privately Owned
Weston Hills Phase III	Construction Stormwater GP	Unincorporated	Privately Owned

NAME	FACILITY TYPE	CITY	OWNERSHIP TYPE
Wolf Creek Ridge	Construction Stormwater GP	Mount Dora	Privately Owned
Worth Paint	Multi-Sector Stormwater GP	Lake Worth	Privately Owned

Source: FDEP, 2004

Table 7 - Lake County Basin Prioritization Based on Total Score

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
G 1	Lake Griffin	32,492	7.5	10	10	6	7.5	1	42
L 29	Minnehaha and Whona Lakes	3,799	7.5	2	10	10	7.5	3	40
H 5	Clear, Myrtle, Smith Lakes	4,382	7.5	10	6	10	4.5	1	39
A 1	Lk. Dexter, Sand Hill Pond	27,696	7.5	10	6	6	7.5	1	38
K 1	Lake Harris	37,354	7.5	6	10	6	7.5	1	38
K 4		1,094	1.5	10	10	6	7.5	3	38
L 22		3,504	1.5	6	10	10	7.5	1	36
Q 1	Dychess and Hollywood Lakes	6,415	1.5	10	10	6	7.5	1	36
B 14	Lake Norris	10,102	4.5	10	2	10	7.5	1	35
I 1	Lake Dora, Lake Beauclaire	12,545	7.5	2	10	6	7.5	1	34
B 19	Ground Lake	5,565	1.5	10	2	10	7.5	1	32
B 6	Akron, Chain O Lakes, Blue, Ridge, Bear, Tracy, Manna Lakes, & Spot Pond	14,058	1.5	6	6	10	7.5	1	32
C 1	Lucie and Neighborhood Lakes	9,559	1.5	10	2	10	7.5	1	32
F 1	Lake Yale	14,980	1.5	6	10	6	7.5	1	32
H 1	Lake Eustis, Silver and Cook Lakes	16,775	1.5	6	10	6	7.5	1	32
I 10		1,356	7.5	2	10	6	1.5	5	32
J 1	Lake Apopka	21,496	1.5	6	10	6	7.5	1	32
K 5	Bug Spring and Lake Denham	3,211	1.5	6	10	6	7.5	1	32
K 9	Sop Pond	905	7.5	6	10	6	1.5	1	32

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
A 21	Jack, Wappin Lakes & Dead River	21,184	4.5	10	2	6	7.5	1	31
B 15	Lake Dalhousie	3,995	1.5	6	10	10	1.5	1	30
G 5	Unity Lake	3,014	1.5	2	10	6	7.5	3	30
G 9		691	7.5	2	10	6	1.5	3	30
I 2		2,500	7.5	2	10	6	1.5	3	30
K 17		2,611	7.5	6	2	6	7.5	1	30
L 32	Black, Olsen, and Stewart Lakes	3,208	1.5	6	10	10	1.5	1	30
B 13	Lake Murphy	3,526	4.5	10	2	10	1.5	1	29
F 3	Island, Owen, and Crescent Lakes	1,465	1.5	6	10	6	4.5	1	29
I 4		1,439	1.5	6	10	6	4.5	1	29
A 7	Heron, Mack, and East Lakes	491	1.5	10	2	6	7.5	1	28
B 16		1,285	1.5	6	2	10	7.5	1	28
B 17		2,488	1.5	6	2	10	7.5	1	28
B 18	Bay Lake	7,733	1.5	6	2	10	7.5	1	28
B 2	Lake Jordan & Owens Pond	4,659	1.5	6	2	10	7.5	1	28
B 21	Bear Pond & Mt. Plymouth Lakes	7,915	1.5	6	2	10	7.5	1	28
B 3		1,430	1.5	6	2	10	7.5	1	28
H 3		893	1.5	6	10	6	1.5	3	28
H 4		2,274	1.5	6	10	6	1.5	3	28
Q 2		468	1.5	10	6	6	1.5	3	28
Q 3		1,149	1.5	10	6	6	1.5	3	28
B 26	Island Pond	3,883	4.5	2	2	10	7.5	1	27
G 4		1,276	1.5	2	10	6	4.5	3	27
A 2	Lake Jordan & Owens Pond	1,523	1.5	10	6	6	1.5	1	26
B 1		9,637	1.5	10	2	10	1.5	1	26
B 12		1,169	1.5	10	2	10	1.5	1	26
G 6		1,418	1.5	6	10	6	1.5	1	26
H 11		1,225	1.5	6	10	6	1.5	1	26
H 2		460	1.5	6	10	6	1.5	1	26
I 7		1,844	1.5	6	10	6	1.5	1	26
K 10		1,187	1.5	6	10	6	1.5	1	26

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
K 2		1,657	1.5	6	10	6	1.5	1	26
K 7	Lake Melton	924	1.5	6	10	6	1.5	1	26
L 24	Lake Minneola	4,081	7.5	2	2	10	1.5	3	26
O 7		1,736	7.5	2	6	6	1.5	3	26
B 20		2,832	1.5	6	2	10	4.5	1	25
I 5		1,442	1.5	2	10	6	4.5	1	25
N 1		6,883	1.5	10	2	6	4.5	1	25
N 11		1,467	1.5	10	2	6	4.5	1	25
N 14		3,692	1.5	10	2	6	4.5	1	25
N 15		8,122	1.5	10	2	6	4.5	1	25
N 2	Gator Hole	7,838	1.5	10	2	6	4.5	1	25
N 4		962	1.5	10	2	6	4.5	1	25
N 6	Twin Lake, Mill Pond	5,790	1.5	10	2	6	4.5	1	25
B 11		1,605	7.5	2	2	10	1.5	1	24
B 23		2,377	1.5	2	2	10	7.5	1	24
B 24		1,079	1.5	2	2	10	7.5	1	24
B 4		3,346	1.5	2	2	10	7.5	1	24
G 3		2,563	1.5	2	10	6	1.5	3	24
I 3		1,278	1.5	2	10	6	1.5	3	24
J 2		3,412	1.5	2	6	6	7.5	1	24
J 4	Lake Florence	487	7.5	2	6	6	1.5	1	24
K 8	Birdseye Lake	574	7.5	6	2	6	1.5	1	24
L 23	Vision and Cherry Lakes	3,444	1.5	2	2	10	7.5	1	24
L 39	Louisa and Susan Lakes	6,631	1.5	2	2	10	7.5	1	24
L 45	Brantley Lake, Dudes Lake	1,998	1.5	6	2	6	7.5	1	24
L 53	Hammond And Dixie Lakes	1,679	1.5	6	2	6	7.5	1	24
M 3	Sawgrass Lake	4,057	1.5	6	2	6	7.5	1	24
O 1		2,716	1.5	6	6	6	1.5	3	24
P 11	Catherine, David, Dukes Lakes	2,151	7.5	6	2	6	1.5	1	24
P 13	Knight & Sunset Lakes	2,950	7.5	6	2	6	1.5	1	24
P 3		495	1.5	6	2	6	7.5	1	24
Q 4		35	1.5	10	6	3	1.5	1	23

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
A 11		3,950	1.5	10	2	6	1.5	1	22
A 14		882	1.5	10	2	6	1.5	1	22
A 20		2,129	1.5	10	2	6	1.5	1	22
A 5		899	1.5	10	2	6	1.5	1	22
A 8	Clearwater, Boyd Lakes	2,946	1.5	10	2	6	1.5	1	22
B 7	Heron, Mack, East Lakes	3,953	1.5	6	2	10	1.5	1	22
B 8	Lake Clearwater	1,770	1.5	6	2	10	1.5	1	22
B 9		2,577	1.5	6	2	10	1.5	1	22
F 4	S. Twin, N. Twin, and Cooley Lakes	930	1.5	2	10	6	1.5	1	22
F 5	East, Pearl, Gibson Lakes	1,231	1.5	2	10	6	1.5	1	22
F 6		1,589	1.5	2	10	6	1.5	1	22
G 7		2,144	1.5	2	10	6	1.5	1	22
G 8		321	1.5	2	10	6	1.5	1	22
H 10		1,209	1.5	2	10	6	1.5	1	22
H 6		3,152	1.5	2	10	6	1.5	1	22
H 7	El Dorado Lake	1,249	1.5	2	10	6	1.5	1	22
H 8		789	1.5	2	10	6	1.5	1	22
H 9		997	1.5	2	10	6	1.5	1	22
I 6		1,760	1.5	2	10	6	1.5	1	22
I 9	Lake Jem	2,213	1.5	10	2	6	1.5	1	22
J 11		861	1.5	2	2	6	7.5	3	22
J 5		612	1.5	6	6	6	1.5	1	22
J 6		687	1.5	6	6	6	1.5	1	22
J 7		1,096	1.5	2	2	6	7.5	3	22
K 11		2,147	1.5	2	10	6	1.5	1	22
K 3		444	1.5	2	10	6	1.5	1	22
K 6	Lake Idamere	579	1.5	2	10	6	1.5	1	22
L 11	Lake Nun	880	1.5	10	2	6	1.5	1	22
L 16	Honeycutt and Byrd Lake	1,447	1.5	10	2	6	1.5	1	22
L 17		603	1.5	10	2	6	1.5	1	22
L 25	Grassy Lake	1,250	1.5	2	2	6	7.5	3	22
L 26	Plum Lake	1,354	1.5	2	2	6	7.5	3	22

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
L 28		785	1.5	2	2	6	7.5	3	22
L 31	Summer Lake	1,226	1.5	2	10	6	1.5	1	22
L 36	Pretty Lake	2,370	1.5	10	2	6	1.5	1	22
L 50		6,162	1.5	10	2	6	1.5	1	22
L 54		6,492	1.5	10	2	6	1.5	1	22
N 10	Bay Lake	1,715	1.5	10	2	6	1.5	1	22
N 12		4,258	1.5	10	2	6	1.5	1	22
N 13	Erie lake	5,148	1.5	10	2	6	1.5	1	22
N 16		2,590	1.5	10	2	6	1.5	1	22
N 17		2,889	1.5	10	2	6	1.5	1	22
N 18		6,826	1.5	10	2	6	1.5	1	22
N 5		2,873	1.5	10	2	6	1.5	1	22
N 8	Big, Middle, Little Bear Lakes	4,185	1.5	10	2	6	1.5	1	22
N 9		2,798	1.5	10	2	6	1.5	1	22
P 1		3,132	1.5	10	2	6	1.5	1	22
P 6		2,818	1.5	10	2	6	1.5	1	22
B 27		577	1.5	2	2	10	4.5	1	21
N 3		4,822	1.5	6	2	6	4.5	1	21
P 2		1,629	4.5	6	2	6	1.5	1	21
K 18		1,957	1.5	2	2	6	7.5	1	20
L 30	Hiawatha and Palatlahaka Lakes	3,580	1.5	2	2	6	7.5	1	20
L 41	Flat Lakes	3,231	1.5	2	2	6	7.5	1	20
L 42		2,121	1.5	2	2	6	7.5	1	20
M 2	Lake Needham	815	1.5	2	2	6	7.5	1	20
L 27		1,161	1.5	2	2	6	4.5	3	19
A 12		2,224	1.5	6	2	6	1.5	1	18
A 13		1,632	1.5	6	2	6	1.5	1	18
A 15	Mud Pond	7,352	1.5	6	2	6	1.5	1	18
A 4	Grasshopper, Crooked, Gobbler Lakes	3,021	1.5	6	2	6	1.5	1	18
B 10	Lake Dorr	11,900	1.5	2	2	10	1.5	1	18
B 22		1,947	1.5	2	2	10	1.5	1	18
B 25	Lake Seneca	1,064	1.5	2	2	10	1.5	1	18
B 28	Sand Lake	3,708	1.5	2	2	10	1.5	1	18

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
B 29		1,860	1.5	2	2	10	1.5	1	18
B 30	Lake Amos	1,457	1.5	2	2	10	1.5	1	18
B 31		1,471	1.5	2	2	10	1.5	1	18
B 5	Crystal Lake	838	1.5	2	2	10	1.5	1	18
J 3		1,320	1.5	2	6	6	1.5	1	18
K 13	Montgomery Lake, Little Everglades	1,809	1.5	6	2	6	1.5	1	18
K 19		2,548	1.5	6	2	6	1.5	1	18
K 20	Mulehead Lake	3,488	1.5	6	2	6	1.5	1	18
L 10		1,096	1.5	6	2	6	1.5	1	18
L 13		895	1.5	6	2	6	1.5	1	18
L 14		2,760	1.5	6	2	6	1.5	1	18
L 15		576	1.5	6	2	6	1.5	1	18
L 20		2,054	1.5	6	2	6	1.5	1	18
L 21	Lake Arthur	3,042	1.5	6	2	6	1.5	1	18
L 33	Lake Wash	3,686	1.5	6	2	6	1.5	1	18
L 34		790	1.5	2	2	10	1.5	1	18
L 35	Pine Island lakes	2,161	1.5	6	2	6	1.5	1	18
L 37	Lake Giona	2,164	1.5	6	2	6	1.5	1	18
L 38	Saw Mill Lake	723	1.5	6	2	6	1.5	1	18
L 49		642	1.5	6	2	6	1.5	1	18
L 5	Dillie March Lake	2,276	1.5	6	2	6	1.5	1	18
L 51	Cypress, Oak Lakes	1,601	1.5	6	2	6	1.5	1	18
L 52		2,779	1.5	6	2	6	1.5	1	18
L 6		2,216	1.5	6	2	6	1.5	1	18
L 8		1,296	1.5	6	2	6	1.5	1	18
L 9	Thomas Lake	2,162	1.5	6	2	6	1.5	1	18
M 8		2,433	1.5	6	2	6	1.5	1	18
N 7	Myrtle Lake	2,162	1.5	6	2	6	1.5	1	18
P 10		1,012	1.5	6	2	6	1.5	1	18
P 12	Crescent Lake	2,242	1.5	6	2	6	1.5	1	18
P 14		1,381	1.5	6	2	6	1.5	1	18
P 4		826	1.5	6	2	6	1.5	1	18
P 5		1,141	1.5	6	2	6	1.5	1	18
P 7		844	1.5	6	2	6	1.5	1	18

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
P 8		2,383	1.5	6	2	6	1.5	1	18
R 1	Reed Hammond Pond	2,589	1.5	6	2	6	1.5	1	18
R 2	Wise Hammond Pond	2,330	1.5	6	2	6	1.5	1	18
A 6	Shimmerhorn Lake	1,197	4.5	2	2	6	1.5	1	17
L 2		1,283	1.5	6	1	6	1.5	1	17
D 1		1,819	1.5	2	2	6	1.5	3	16
D 2		3,325	1.5	2	2	6	1.5	3	16
D 3		1,204	1.5	2	2	6	1.5	3	16
E 1		2,100	1.5	2	2	6	1.5	3	16
E 2		466	1.5	2	2	6	1.5	3	16
E 5		863	1.5	2	2	6	1.5	3	16
E 6		34	1.5	2	2	6	1.5	3	16
G 2		782	1.5	2	2	6	1.5	3	16
J 10		1,261	1.5	2	2	2	7.5	1	16
J 13	Johns Lake	3,534	1.5	2	2	2	7.5	1	16
J 8		1,269	1.5	2	2	6	1.5	3	16
J 9		1,587	1.5	2	2	6	1.5	3	16
O 2		1,376	1.5	2	2	6	1.5	3	16
O 3	Lady Lake	664	1.5	2	2	6	1.5	3	16
O 4	Lake Ella	1,019	1.5	2	2	6	1.5	3	16
O 5	Spring Lake	1,036	1.5	2	2	6	1.5	3	16
O 6		275	1.5	2	2	6	1.5	3	16
L 18		952	1.5	6	2	3	1.5	1	15
L 55	Hidden Lake	1,152	1.5	3	2	6	1.5	1	15
A 10	Dillard & Sand Hill Ponds	2,497	1.5	2	2	6	1.5	1	14
A 16		2,611	1.5	2	2	6	1.5	1	14
A 19	Duck & Bunch Ground Ponds	6,040	1.5	2	2	6	1.5	1	14
A 3	Wildcat Lake	1,967	1.5	2	2	6	1.5	1	14
A 9	Sellers Lake	1,989	1.5	2	2	6	1.5	1	14
F 2	Holly, Ella, and Bay Lakes	2,792	1.5	2	2	6	1.5	1	14
I 8		546	1.5	2	2	6	1.5	1	14
J 12		1,973	1.5	2	2	6	1.5	1	14
J 14		183	1.5	2	2	6	1.5	1	14

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
K 12		863	1.5	2	2	6	1.5	1	14
K 14		1,819	1.5	2	2	6	1.5	1	14
K 15		1,169	1.5	2	2	6	1.5	1	14
K 16		2,805	1.5	2	2	6	1.5	1	14
K 21	Lake Arthur	841	1.5	2	2	6	1.5	1	14
K 22	Indianhouse Lake	1,634	1.5	2	2	6	1.5	1	14
K 23		2,077	1.5	2	2	6	1.5	1	14
K 24	Deacon, Sams, Schoolhouse, Shepher Lakes	3,927	1.5	2	2	6	1.5	1	14
K 25		953	1.5	2	2	6	1.5	1	14
K 26		902	1.5	2	2	6	1.5	1	14
K 27	Church Lake	1,114	1.5	2	2	6	1.5	1	14
L 1		2,376	1.5	2	2	6	1.5	1	14
L 12		108	1.5	2	2	6	1.5	1	14
L 19		771	1.5	2	2	6	1.5	1	14
L 3		950	1.5	2	2	6	1.5	1	14
L 4	Pumpkin & Twin Lakes	1,134	1.5	2	2	6	1.5	1	14
L 40		1,422	1.5	2	2	6	1.5	1	14
L 43		1,459	1.5	2	2	6	1.5	1	14
L 44		490	1.5	2	2	6	1.5	1	14
L 46		903	1.5	2	2	6	1.5	1	14
L 47	Lake Nellie	1,840	1.5	2	2	6	1.5	1	14
L 48	Kirkland Lake	710	1.5	2	2	6	1.5	1	14
L 56	Turkey Lake	860	1.5	2	2	6	1.5	1	14
L 7	Lake Bright	449	1.5	2	2	6	1.5	1	14
M 1		677	1.5	2	2	6	1.5	1	14
M 10	Crooked Lake	835	1.5	2	2	6	1.5	1	14
M 4	Pike and Island Lakes	1,246	1.5	2	2	6	1.5	1	14
M 5	Trout Lake	954	1.5	2	2	6	1.5	1	14
M 6		405	1.5	2	2	6	1.5	1	14
M 7		778	1.5	2	2	6	1.5	1	14
M 9	Mancock Lake	1,461	1.5	2	2	6	1.5	1	14
P 9	Big Bear Lake	1,918	1.5	2	2	6	1.5	1	14
R 3	Cool Spring Pond	291	1.5	2	2	6	1.5	1	14
E 3		2,585	1.5	2	2	2	1.5	3	12

			DRAINAGE PROBLEMS	FLOODING POTENTIAL	POLLUTION POTENTIAL	RECEIVING WATER BODY	NATURAL WILDLIFE	POPULATION	TOTAL
E 4	Gator Lake	645	1.5	2	2	2	1.5	3	12
A 17		2,590	1.5	2	2	2	1.5	1	10
A 18		2,981	1.5	2	2	2	1.5	1	10

Source: Lake County Public Works Engineering Division, Stormwater Section

SOLID WASTE SUB-ELEMENT

INTRODUCTION

Proper management of solid and hazardous waste is essential to the quality of life enjoyed by Lake County residents. The purpose of this sub-element is to identify the facilities and management programs that the County will require in order to properly manage its solid and hazardous wastes through the year 2025.

Solid Waste Collection

Lake County has instituted mandatory waste collection to discourage the illegal dumping and burning of solid wastes. Residents have solid waste collection available to them from one of three franchised haulers. Several cities have their own solid waste collection. Residential collection includes household garbage, yard waste, appliances, and furniture. Lake County Solid Waste Management maintains a level of service of 1.3 tons per livable unit per year. County residents generate 230,000 tons of garbage each year.

Table 8 below lists the number, service area and ownership of waster haulers in Lake County.

Table 8 - Lake County Waste Haulers

RESIDENTIAL UNINCORPORATED AREA	HAULER	RESIDENTIAL UNINCORPORATED AREA	HAULER
Alexander Springs	Florida Recycling	Lake Kathryn	Florida Recycling
Altoona	Florida Recycling	Lake Louisa	ONYX
Astatula	Florida Recycling	Lake Mack	Florida Recycling
Astor	Florida Recycling	Lake Norris	Florida Recycling
Astor Park	Florida Recycling	Lake Yale	Waste Management
Cassia	Florida Recycling	Leesburg	Waste Management
Clermont	ONYX	Mascotte	ONYX
Dona Vista	Waste Management	Minneola	Waste Management
Eustis	Florida Recycling	Montverde	Waste Management
Ferndale	Waste Management	Mount Dora	Florida Recycling
Fruitland Park	Waste Management	Mount Plymouth	Florida Recycling

Grand Island	Waste Management	Okahumpka	Waste Management
Green Swamp	ONYX	Paisley	Florida Recycling
Groveland	ONYX	Pine Lakes	Florida Recycling
Howey-in-the-Hills	Call 343-6163	Silver Springs	Florida Recycling
Lady Lake	Waste Management	Sorrento	Florida Recycling
Lake Dorr	Florida Recycling	Tavares	Call 343-6163
Lake Griffin	Waste Management	Umatilla	Call 343-6163
Lake Jem	Florida Recycling	Yalaha	Waste Management

Active Landfills

The Lake County Solid Waste Management Facility Phase I facility, which accepted Class I and III waste, has been closed in accordance with an order from the Florida Department of Environmental Protection. The 80-acre landfill was operated since the 1970s without a bottom liner, which is now required for landfills accepting Class I wastes.

Phase II is made up of 3 cells in the northern part of the landfill: IIA, IIB, and IIC. Phase IIA has been designed to accommodate the ash residues from the resource recovery facility. Both IIB and IIC handle Class I waste. IIB is partially closed on the northeast side. Most of Lake County's Class I waste goes to the Resource Recovery Facility in Okahumpka.

There is a separate disposal area for construction and demolition debris on the northwest side of the property.

Table 9 below lists the active and inactive landfills in Lake County.

Table 9 - Lake County Landfills

FACILITY NAME	STATUS	MONITORED	RESPONSIBLE AUTHORITY NAME
Lake County Solid Waste Management Facility Phase I	Closed	Y	Lake County Environmental Services
Lake County Solid Waste Management Facility Phase II	Active		Lake County Environmental Services
Stucky LF	Closed	N	U.S. Forest Service
Paisley LF	Inactive		U.S. Forest Service
Astor Site	Closed	N	D.L. Harrington
Lake County Solid Waste Management Facility C&D	Inactive		Lake County Environmental Services
Codding Class III Landfill	Active		D.L. Codding
Landfill, City of Leesburg	Closed	Y	James Richards, PE
Danis Ind. West 50 LF & Tire Coll.	Inactive		Danis Industries Corporation
Mount Dora Landfill and Transfer Station	Inactive		City of Mount Dora
Howey-in-the-Hills Landfill	Inactive		Hardwood Padget, Public Works Director
Lady Lake Landfill	Closed	Y	Lake County Environmental Services
Umatilla Landfill	Closed	Y	Lake County Environmental Services

FACILITY NAME	STATUS	MONITORED	RESPONSIBLE AUTHORITY NAME
Clermont Landfill	Inactive		City of Clermont
Log House Road Landfill	Closed	Y	Lake County Environmental Services
Grantham Pit	Active		Robert O. Grantham
Diversified Environmental Mgt. Co.	Active		Gregory L. McCann
Hewitt - CR 33 Pit	Active		Howard Hewitt
Dream Poultry Ranches	Inactive		
Tri City Landfill	Closed		City of Eustis
Montverde	Closed		Suntrust Bank Trustee et al. c/o Trust Real Estate Department
Professional Dirt Service Inc.	Active		Dan Cordle
Groveland	Closed		Lake County Public Works
Bateman's Pit	Closed		Ronald & Lisa Bateman

Source: Lake County Environmental Services, 2004

Residential Drop-Off Facilities

Lake County maintains and operates 5 residential drop-off (RDO) facilities throughout the county and a Citizen Convenience Center at the Astatula Landfill where residents can self-haul their solid, hazardous, recycling materials and special wastes. Special wastes consist of used motor oil, furniture, waste tires, white goods, and electronic wastes. Each RDO handles different amounts and types of waste depending on its size and location. Collectively, they receive on average 3,000 tons per year. The locations of the sites are listed in Table 10.

Table 10 - Residential Drop-Off Locations

SITE	ADDRESS	LOCATION
Citizen Convenience Center	13130 County Landfill Rd.	Astatula
RDO #1	54500Astor Transfer Rd.	Astor
RDO #2	10435 Loghouse Transfer Station Rd.	Clermont
RDO #3	1200 Jackson St.	Lady Lake
RDO #4	44410 Spring Creek Rd.	Paisley
RDO #5	32520 SR 44	Pine Lakes (Deland)

Source: Lake County Solid Waste, 2004

Lake County Resource Recovery Facility

The Lake County Resource Recovery Facility, or Waste-to-Energy (WTE) facility, converts an average of 150,000 tons per year of solid waste into electricity by incineration and sells it to Progress Energy. Revenues from energy sales provide revenue for the Landfill Capital Enterprises Fund, the operating fund for Lake County's Solid Waste Division.

Lake County has settled its litigation with Covanta Energy, formerly called Ogden-Martin, and initiated a new Waste Disposal Agreement in November 2004. The new agreement will obligate Lake County to deliver the full capacity of waste to the facility, which is 163,000 tons per year.

Recycling Program

In September 1989, the Lake County Board of County Commissioners approved a recycling plan to reduce waste volumes. The current program includes residential curbside collection or drop-off at all of the RDO's. Lake County recycles about 24% of its solid waste each year. SP Recycling Corporation of Orlando, a private company, has been contracted to assume recycling operations.

Waste Tires and White Goods

Neither whole tires nor white goods (appliances such as refrigerators, washers, and stoves) may be disposed of in landfills. Lake County disposes of waste tires at an incinerator permitted for tire incineration and a Class III landfill. White goods have their freon removed at the Astatula landfill and a recycling contractor recycles them for their steel. The freon is recycled separately.

Hazardous Waste

Hazardous wastes are corrosive, toxic, flammable, or reactive substances that may harm public health and the environment. Some examples of hazardous wastes are motor oil, paints, pesticides, fluorescent light bulbs, and pool chemicals. Hazardous wastes are collected at the Household Chemical Collection Center, near the Phase II landfill, or at the RDO's. Lake County also operates a mobile hazardous waste disposal unit.

At least 1,200 businesses in the County have been identified as having the potential of being a small quantity generator (SQG). SQGs are businesses that generate between 100 to 1,000 kilograms of hazardous waste per month. Conditionally exempt SQGs are businesses that generate less than 100 kilograms per month of hazardous waste. The County has determined that 240 of the 1,200 potential SQGs require yearly inspection. The County has not had the manpower to monitor these businesses or to assist them in the proper storage and disposal of hazardous waste. The Board of County Commissioners has approved a program to provide the manpower needed to institute a monitoring and reporting system.

SOLID WASTE DISPOSAL CAPACITY PROJECTIONS

The data in the tables below assume the most probable “build out” of the County will be around the 500,000 population level. To graphically show this dimension the growth rate was moderated approaching that level and then driven to zero when reached.

Table 11 - Projected Solid Waste Disposal Tonnage 2004-2030

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Population Projection	259,273	269,932	280,723	291,513	302,304	313,094	323,885	331,600	339,315
Solid Waste Disposal Tonnage									
Residences: Unincorporated and Municipal	110,800	115,356	119,967	124,578	129,190	133,801	138,412	141,709	145,006
Residential Tons Annually	144,041	149,962	155,957	161,952	167,947	173,941	179,936	184,222	188,508
Commercial Tons Annually	71,170	80,832	91,806	104,269	118,424	134,501	152,760	173,499	197,053
Total Cubic Yards Annually	120,905	129,660	139,192	149,562	160,882	173,282	186,908	200,967	216,607
Cumulative Requirement: Cubic Yards	129,905	250,564	389,757	539,319	700,201	873,484	1,060,392	1,261,359	1,477,966
Less Covanta Lake II Capacity	74,719	91,573	91,573	91,573	91,573	91,573	91,573	91,573	91,573
Net Cumulative Capacity Required	46,186	158,991	298,184	447,746	608,628	781,911	968,819	1,169,786	1,386,393
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Population Projection	347,030	354,745	362,460	371,444	380,428	389,413	398,397	407,381	417,925
Solid Waste Disposal Tonnage									
Residences: Unincorporated and Municipal	148,303	151,600	154,897	158,737	162,576	166,416	170,255	174,094	178,601
Residential Tons Annually	192,794	197,081	201,367	206,358	211,349	216,340	221,332	226,323	232,181
Commercial Tons Annually	223,804	254,187	288,695	327,887	372,400	422,956	480,376	545,590	619,658
Total Cubic Yards Annually	234,044	253,521	275,315	300,138	327,949	359,155	394,217	433,659	478,561
Cumulative Requirement: Cubic Yards	1,712,010	1,965,531	2,240,846	2,540,984	2,868,933	3,228,088	3,622,306	4,055,965	4,534,526
Less Covanta Lake II Capacity	91,573	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Net	1,620,43	1,965,53	2,240,84	2,540,98	2,868,93	3,228,08	3,622,30	4,055,96	4,534,526

Cumulative Capacity Required	7	1	6	4	3	8	6	5	
	2022	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Population Projection	428,470	439,014	449,559	460,103	469,305	478,691	488,265	498,030	507,991
Solid Waste Disposal Tonnage									
Residences: Unincorporated and Municipal	183,107	187,613	192,119	196,625	200,558	204,569	208,660	212,833	217,090
Residential Tons Annually	238,039	243,897	249,755	255,613	260,725	265,940	271,258	276,683	282,217
Commercial Tons Annually	703,781	799,324	907,838	1,031,084	1,171,061	1,330,041	1,510,604	1,715,680	1,948,596
Total Cubic Yards Annually	529,112	586,079	650,333	722,863	804,374	896,619	1,001,046	155,440	158,549
Cumulative Requirement: Cubic Yards	5,063,638	5,649,717	6,300,050	7,022,914	7,827,288	8,723,907	9,724,953	9,880,393	10,038,942
Less Covanta Lake II Capacity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Net Cumulative Capacity Required	5,063,638	5,649,717	6,300,050	7,022,914	7,827,288	8,723,907	9,724,953	9,880,393	10,038,942

Source: Lake County Solid Waste, 2004
Empirical data from DES database covering FY1996-1997 through FY2003-2004 to establish trend; last 5 displayed. U.S. Census Bureau population for 2000 and 2003 used to extrapolate mid-years 2001, 2002;
Population per residence factor supplied by Demographics Team; Number of residences = Total population / population per residence;
Annual Tons generated per residence = Total Residential tons / # of Residences; Validated with empirical data for Unincorporated Lake County (Total Unincorporated Res. Tons / Assessed Res. Units);
Capacity in cubic yards determined by engineering surveys conducted August 2003 and October 2004; Achieved compaction rate = Volume filled in Cubic Yards / Actual tons buried (includes daily cover material);
Combustor ash totals over 5-year WTE maintenance cycle to determine average increase per year between major overhaul; Projected ash tonnage repeats in 5-year cycles coincident to maintenance cycles;
Projections:
Commercial Tons = Previous Year total commercial tons + (Previous Year total commercial tons X average percent change empirical commercial tons recorded);
Total Tons = Tons Annually (Unincorp & Municipal) + Commercial Tons; Cubic Yards Required per year = Total Tons / Compaction rate;
Cumulative capacity = total current year requirement + total of previous years requirements; Disposal capacity depletion reached when cumulative capacity = total landfill design capacity.

GROUNDWATER RECHARGE SUB-ELEMENT

INTRODUCTION

Hydrogeology

The geology in Lake County is similar to other areas in Central Florida. At the surface are deposits of sands. These sands grade to finer materials and contain more silts and clays with depth. These surficial deposits range in thickness from a few feet to hundreds of feet. Underlying the sands in most areas of the county is a confining bed of clay. These clays are generally considered a part of the Hawthorn formation. Below the clay are thick sequences of carbonate rocks -- limestone, dolomitic limestones, and dolomite. A table showing these geologic units along with several hydrogeologic cross sections from the USGS WRI Report 02-4207 are attached below.

The following definitions related to this discussion are summarized or paraphrased from the Dictionary of Geological Terms8. In some cases, additional information has been added to the definition from the various USGS publications referenced below.

Ground water is the water found below land surface in the zone of saturation. (It is not moisture present in unsaturated soil.)

An aquifer is a formation that contains ground water that can conduct ground water and yield economically significant quantities of water to wells and springs.

A surficial aquifer or water table aquifer is an aquifer where the ground water is at atmospheric pressure, i.e. not confined.

A confining unit is a formation that does not conduct readily water and/or is less permeable than the aquifers above or below it. When a confining unit is above an aquifer, recharge to or discharge from that aquifer is restricted by that confining layer.

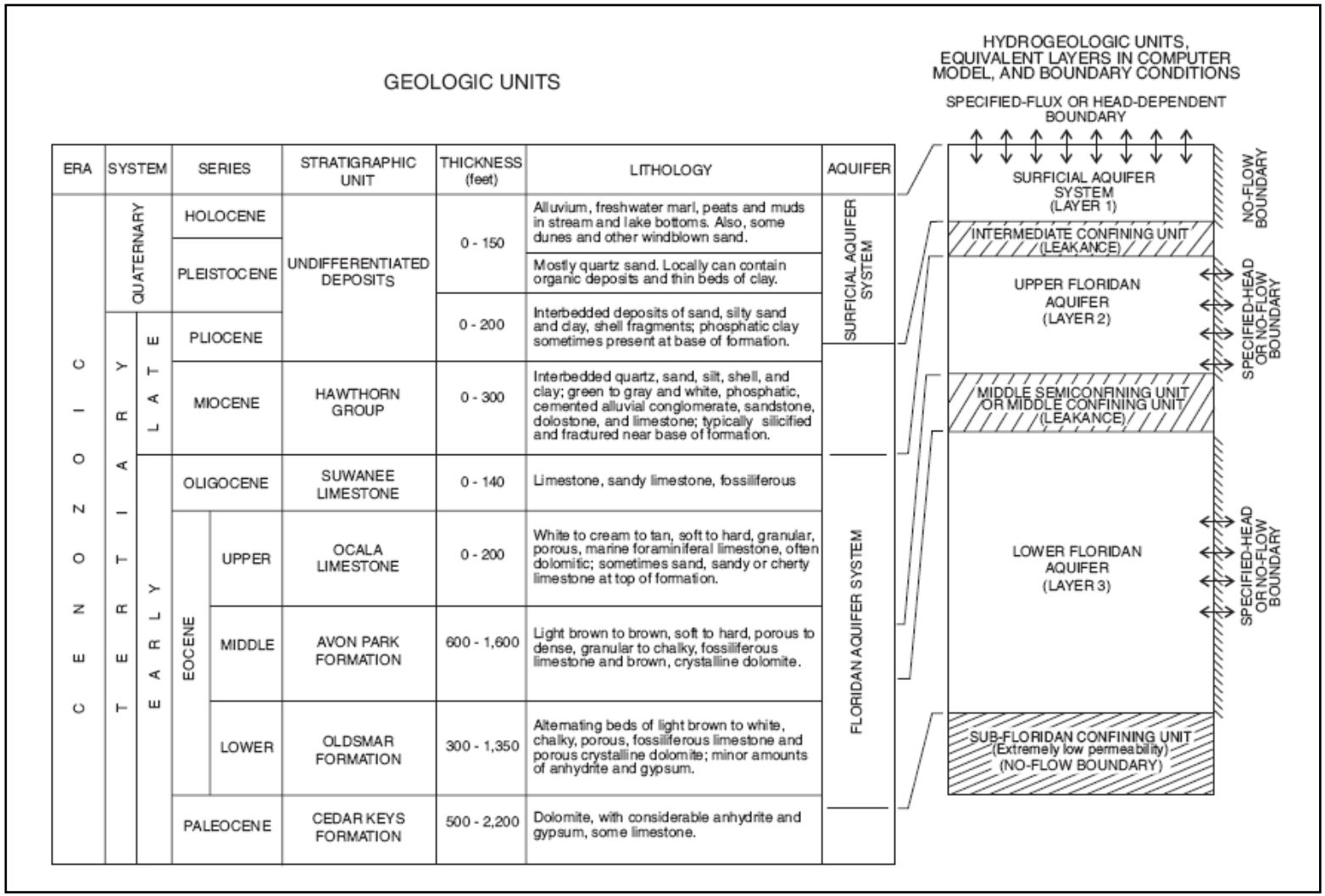
Recharge is the process of adding water to the zone of saturation. Recharge is commonly described in inches per year. Recharge can be influenced by development. Increasing the rate of stormwater runoff and building impervious surfaces—such as roads, parking lots, and buildings — can alter both the rate and volume of recharge and reduce the area available for rainfall percolation. The quality of the water being recharged can also be influenced by development.

Permeability is the capacity of a formation or soil for transmitting water.

A permeable formation allows water to move through it at an appreciable rate. The rate of recharge to an aquifer varies by location depending on geology (permeability) and climate (rainfall and evapo-transpiration).

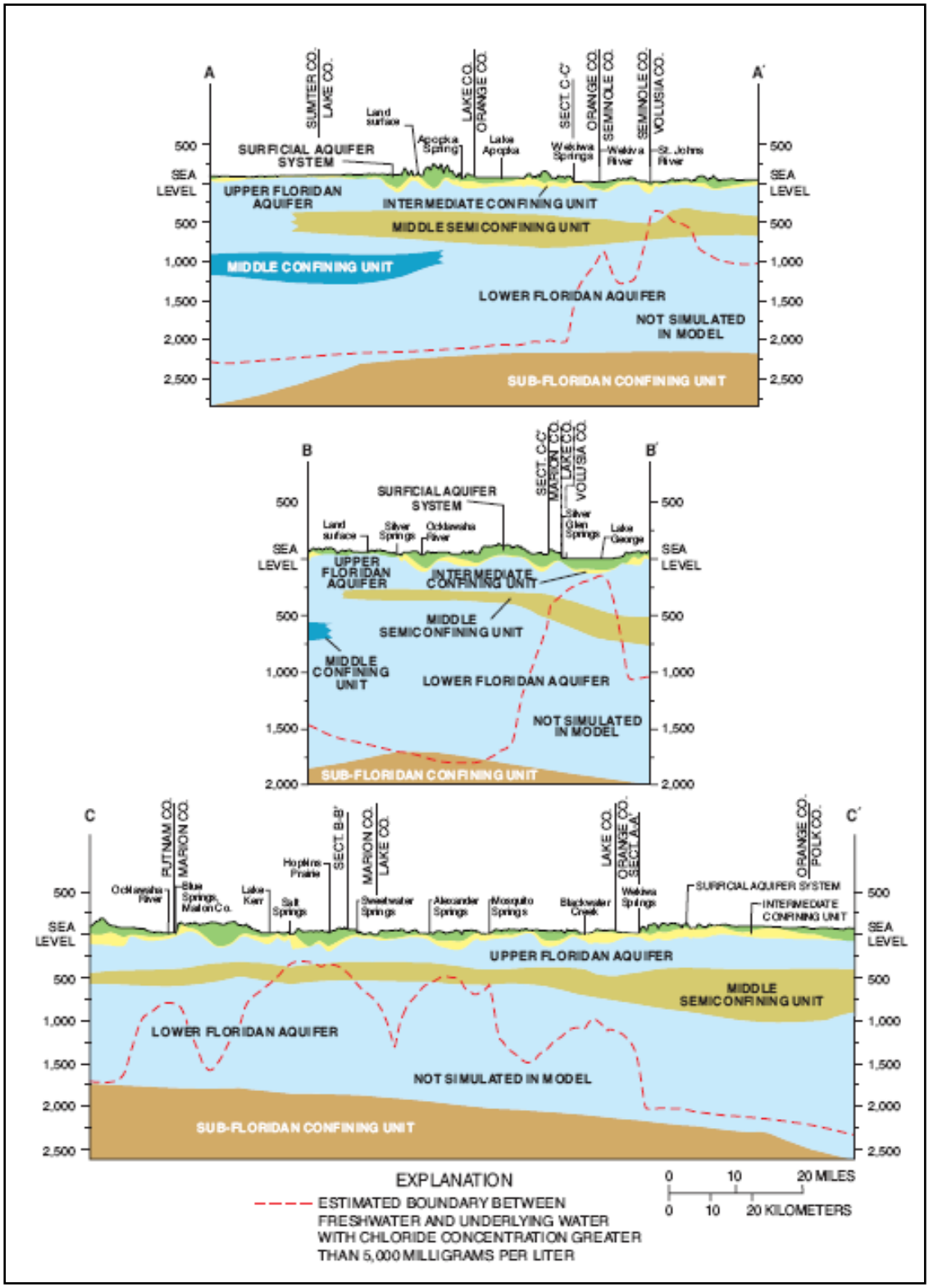
Discharge is water leaving an aquifer. It may be natural, such as seepage into lakes and streams, spring flow, uptake by plants, evaporation from the soil; or artificial, such as water withdrawals from wells. It can also be upward, downward or laterally to another aquifer.

Figure 1 -



Geologic units, hydrogeologic units and equivalent layers and boundary conditions used in the ground-water flow model. From Figure 8 USGS WRI 02-4207

Figure 2 - Hydrogeologic Cross Sections Showing Aquifers in Lake County from Figure 16 USGS WRI 02-4207



Priority Water Resource Caution Areas 9

The St Johns River Water Management District has designated a large portion of Lake County as a "Priority Water Resource Caution Areas". These are areas where existing and reasonably anticipated sources of water and conservation efforts may not be adequate (1) to supply water for all existing legal uses and reasonably anticipated future needs and (2) to sustain the water resources and related natural systems.

The five constraints established for identifying PWRCAs are impacts to native vegetation, primarily wetlands; impacts to minimum flows and levels, primarily spring flows; impacts to groundwater quality in terms of increased saltwater intrusion; impacts to existing legal users; and failure to identify a source of supply for future development.

Aquifer Characteristics

There are two aquifers of general interest in Lake County: the clastic unit in the surficial deposits and the carbonate unit.

The surficial or water table aquifer consists of the surficial sands, silts and clays. In much of Lake County it is underlain by the clay confining unit. The surficial aquifer system (SAS) generally is more permeable at the surface becoming less permeable with depth. In some areas there may be discontinuous beds of silty and or clayey sands that divide the surficial aquifer into sub-units or create a perched water table. In much of the county it is at least partially separated hydraulically from the underlying carbonate aquifer by the confining unit made up of less permeable silts, clayey sands, sandy clays and clay beds. The SAS has little potential as a major source of ground water compared to the Floridan aquifer. The surficial aquifer acts as a reservoir, collecting and storing rainfall, and is generally only tapped by very small-capacity wells. It does not have the capacity to deliver public water demands for centralized systems. It primarily serves as a filter bed and reservoir for storing precipitation that eventually recharges the underlying Florida aquifer system. 1

Below the surficial aquifer are the Hawthorne clays of the confining unit. They clays are present in most of the county and separate the surficial aquifer from the Floridan aquifer. While they retard the downward movement of water, in many areas the clays are breached by karst activity or discontinuous. This allows water to move more freely between aquifers. Along the part western portion of Lake County the confining unit tends to be thinner or absent and the limestones close to the surface.

1. [1] USGS Water-Resources Investigation Report 02-4207, Hydrogeology and Simulated Effects of Ground-Water Withdrawals from the Floridan Aquifer System in lake County and in the Ocala National Forest and Vicinity, North-Central Florida, 2002.

The Floridan aquifer system (FAS) is contained within the limestones and dolomites of the carbonate unit below the deep clays.2 The Floridan aquifer underlies all of Lake County and is the principal source of the water used in Lake County. It is composed of thick sequences of carbonate rocks (limestone, dolomitic limestones, and dolomite) of Eocene to Oligocene age that are generally high in permeability and hydraulically connected to each other in varying degrees. The FAS has two major water-bearing zones; the Upper Floridan and Lower Floridan zones. These zones are separated by a lower permeability limestone, dolomite and anhydrite formation.1 The Lower Floridan zone has been utilized for many years in Orange County as it is less subject to contamination due to depth. Currently almost all of the ground water pumped in Lake County comes from the Upper Floridan but the potential for utilizing the lower Florida aquifer is just beginning to be explored in Lake County. The Lower Floridan wells in Orange County are 1100 to 1400 feet deep.

Because of the confining unit between the Floridan and surficial aquifer limits the vertical transmission of water, water in the Floridan is under pressure. When tapped by a tightly cased well the ground water in the Floridan rises above the aquifer that contains it. The level to which the water rises is the potentiometric surface (or pot surface). The potentiometric surface in the Upper Floridan aquifer is mapped by the US Geological survey in May and September each year. These maps provide a tool to view the effects of climate, pumping, recharge and other factor that influence the water in the aquifer. Water levels in the FAS respond to seasonal variations in rainfall on a regional scale and to pumping on a local scale. Generally, the potentiometric surface of the FAS in the study area is lowest during May or June, the end of the dry season. It is highest in September or October, the end of the rainy season. Widely spaced - surface contours on the potentiometric maps can indicate highly transmissive areas. In contrast, closely spaced contours can indicate low transmissivity areas. 1

Where the confining unit is absent, the surficial and Floridan aquifer are connected and unconfined.

Ground Water Recharge and Discharge

The surficial aquifer system (SAS) is recharged by rainfall. Recharge is augmented locally by artificial recharge — wastewater or reuse water land application, rapid-infiltration basins, and septic systems.

In areas where the water level in the surficial aquifer is higher than the potentiometric surface of the Floridan aquifer, the Floridan aquifer system (FAS) is recharged by the SAS. These areas include much of the county. There are also two locations where the FAS receives direct recharge from surface runoff through sinkholes. These areas are Shockley Heights in the Ocala National Forest and Wolf Sink just east of Mt. Dora.

---

2. [2] Technical Report for the Lake County Astatula Solid Waste Management Facility Period of July 2001 – June 2003, May 2003, Walter D. Wood, PG.

3.

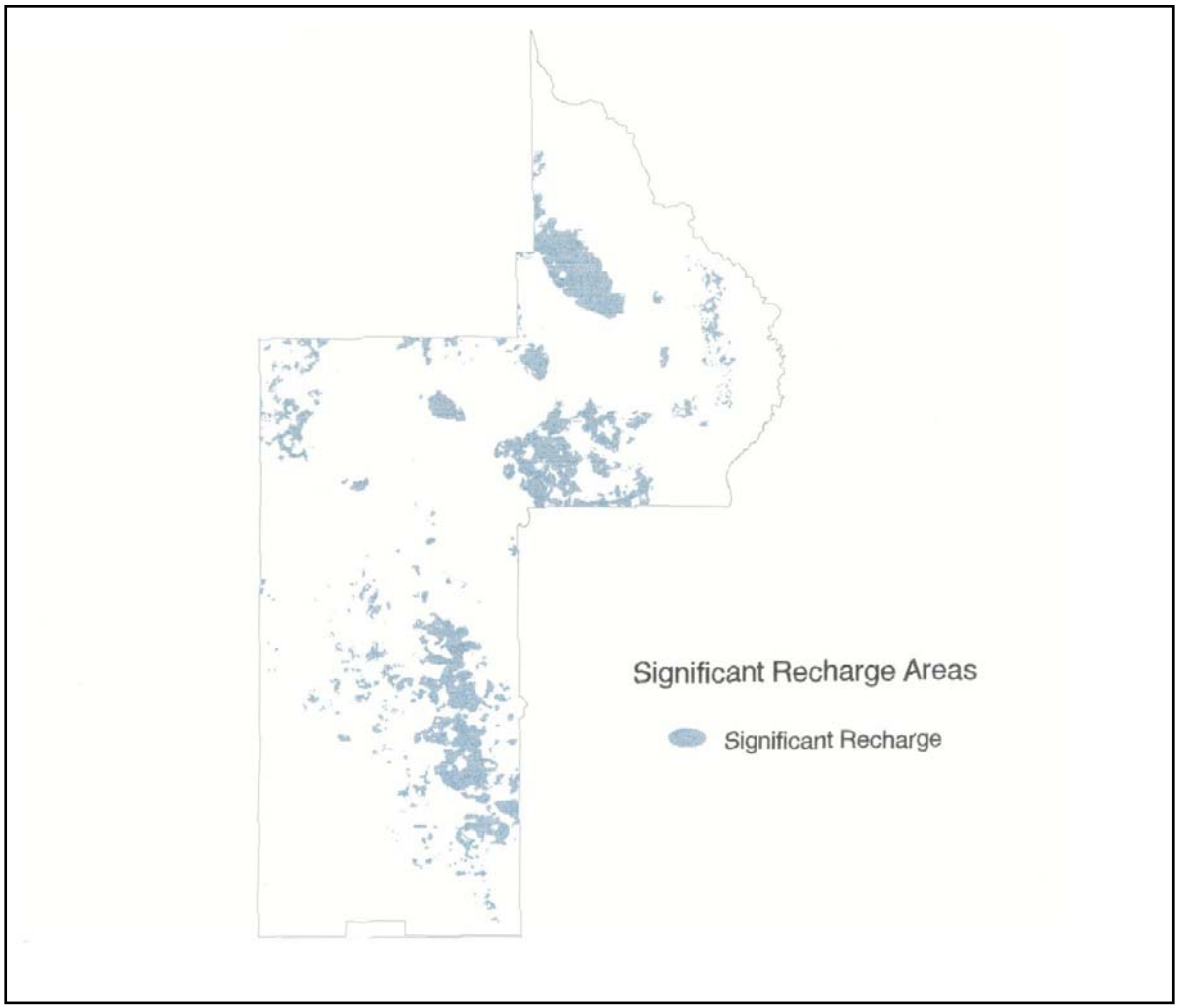
The rate of recharge varies with the vertical hydraulic conductivity, thickness of the SAS and the confining unit, and the downward gradient. The annual recharge rate to the FAS averages about 7 inches per year (in/yr) in Lake County (Knochenmus and Hughes, 1976). Recharge rates range from as high as 20-30 in/yr or greater on the Lake Wales and Mount Dora Ridges to 0 in/yr in the area along the St. Johns River and the Ocala National Forest (O'Reilly, 1998; Murray and Halford, 1996). Less than 1 in/yr of lateral ground-water inflow is estimated to enter the FAS in Lake County from Polk County (Knochenmus and Hughes, 1976). An indeterminate amount of additional lateral ground-water inflow enters the FAS in the Ocala National Forest from western Marion. Additional recharge also occurs through drainage wells drilled into the FAS to dispose of excess surface water in Ocala and western Orange County. Recharge to the SAS, and consequently to the FAS, is augmented locally by artificial recharge—wastewater land application, rapid-infiltration basins, and septic systems.2

Discharge from the FAS to the SAS occurs where the potentiometric surface of the FAS is higher than the water table of the SAS. In some areas, the potentiometric surface of the FAS is above land surface. Wells that tap the FAS in these areas are known as flowing artesian wells. Discharge from the FAS in Lake County, the Ocala National Forest, and vicinity generally occurs through numerous springs, a few flowing wells, and as diffuse ground-water discharge along the St. Johns River, Wekiva River, the south shore of Lake Harris, and the western shore of Lake Apopka. Spring flow from the FAS in the study area for 1998 was estimated at nearly 1,300 Mgal/d (6 in/yr), of which 236 Mgal/d (4.3 in/yr) was from Lake County. 1

The ground water in the FAS in the southern half of Lake County moves east into Orange County. A decrease in ground water recharge or an increase in ground water withdrawals from Lake County will decrease available ground water in counties to the east. Conversely an increase in pumpage or a reduction of recharge in the eastern counties will decrease available ground water in Lake County.

The St. Johns River Water Management District prepared a report and map showing Significant Recharge Areas in Lake County. This map was prepared using GIS mapping the rapid soil permeabilities grid overlaid on the grid of areas with recharge rates greater than 13 in/yr. Those areas having both rapid soil permeabilities and high recharge rates were identified as "significant" recharge areas.7 This map is used primarily to implement voluntary tax assessment programs (Bluebelt Act) that protect high-water recharge areas. There have been no properties enrolled under the Bluebelt act. The objections have been the expense to the property owner and the more beneficial agricultural exemption is generally available for qualifying parcels.

Figure 3 –



Ground Water Contamination

USGS studies indicate that the surficial aquifer system and Upper Floridan aquifer are susceptible to surface contamination and that rapid ground water recharge can allow the aquifer to be susceptible to surface contamination.4 They also determined that "ground-water quality in central Florida is affected by land-use practices, such as the urbanization of karstic terrain with accompanying stormwater disposal through drainage wells, citrus cultivation with accompanying application of large quantities of fertilizers and pesticides, and mining and processing of phosphate ores into fertilizers… Leachate from fertilizers and pesticides … are most likely to affect the surficial aquifer system. Although water from the surficial aquifer system is not used extensively as a source of public water supply, it does ultimately recharge the Floridan aquifer system."5

The USGS also indicates4 that water quality of the Upper Floridan aquifer appears to be affected by land use. The maximum nitrate concentration in sample from wells in the Ocala national Forest is only 0.20 mg/L. These are the results of the pristine forested land use in the

Forest area. In contrast, nitrate concentrations were greater than 1.0 mg/L in 24 percent of the samples from wells in Lake County outside the Forest. They conclude that these nitrate concentrations in the Upper Floridan aquifer appear to be related to land use.

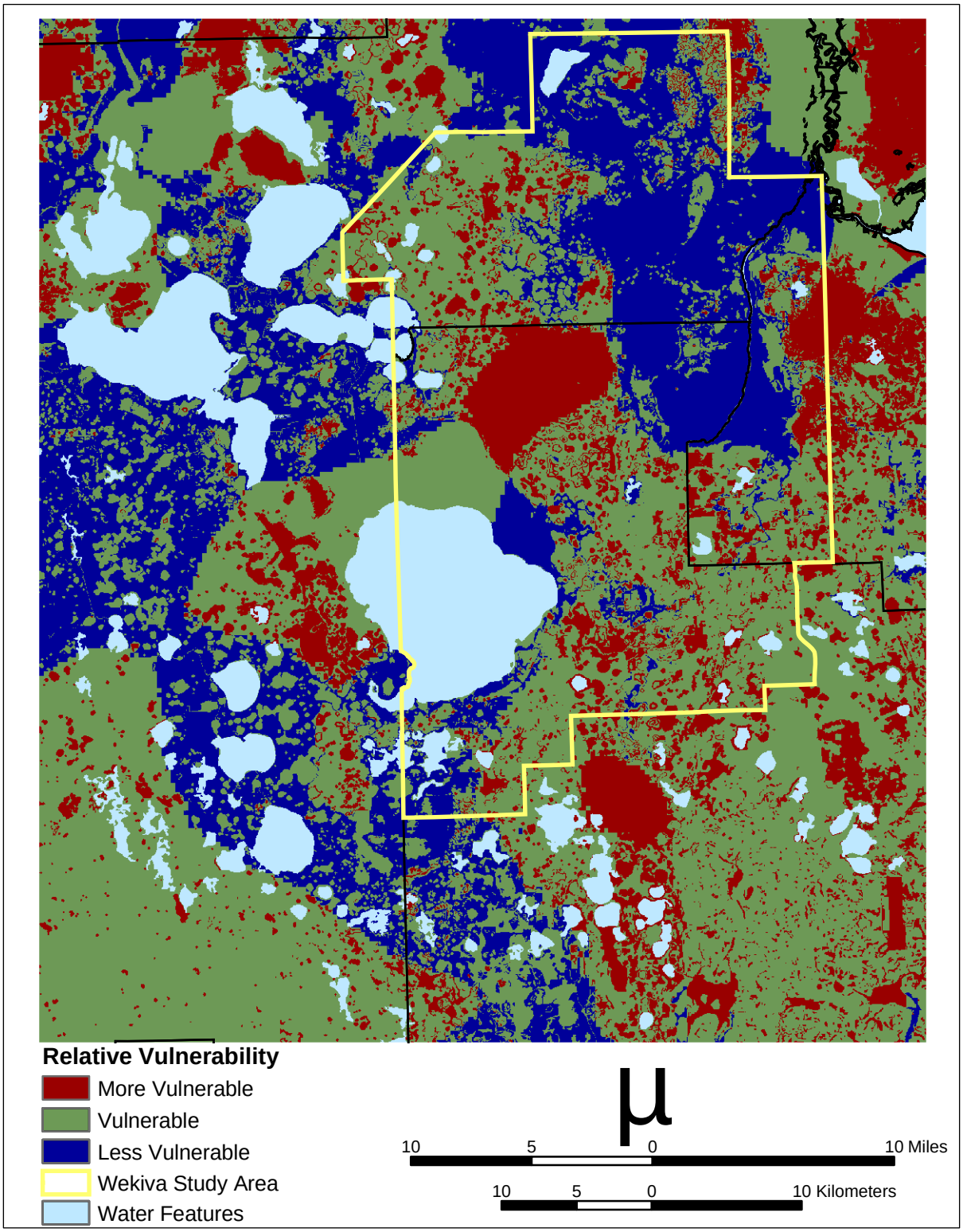
A nematicide (Ethylene dibromide or EDB) that was applied to groves years ago has also found its way into the Upper Floridan aquifer. Both nitrate and EDB concentrations have been detected in excess of the primary drinking water standards in many potable wells. Because nitrate and EDB can remain in ground water for many years, elevated concentrations do not necessarily indicate the effects of present land use.

In areas along the St. Johns and Wekiva Rivers in east Lake County, sodium-chloride is found in ground water in high concentrations. This is not the result of land use activities but rather from relic sea water remaining from when the Florida Peninsula was covered by the sea in the geologic past. Developing a potable water supply from ground water is problematic in these areas.

Aquifer Vulnerability

The Florida Geological Survey (FGS) has prepared two studies showing the vulnerability of the Floridan aquifer to surface contamination. One study is specific to the Wekiva Study area while the other one was state-wide. While the Wekiva Aquifer Vulnerability Assessment (WAVA) map (shown below) does not cover the entire county and the state-wide map was completed to a broad scale, both maps show that the much of the Floridan aquifer within Lake County is "vulnerable" or "more vulnerable" to contamination. The FGS has adopted a definition of aquifer vulnerability as "the tendency or likelihood for contaminants to reach the top of the specified aquifer system after introduction at land surface based on existing knowledge of natural hydrogeologic conditions."

Figure 4 -



Relative vulnerability predicted by the WAVA model showing more vulnerable, vulnerable and less vulnerable areas of the FAS. Figure 15 from FGS RI-104.

If there are pollutant sources in these vulnerable areas that are not managed properly, those pollutants could result in contamination of the aquifer. The sources of potential contamination could include but not be limited to municipal wastewater treatment plants, private wastewater treatment plants (package plants), stormwater ponds, landfills, pollutant storage tanks, fertilizers and herbicides, improper disposal of hazardous wastes and various point source pollutant discharges to surface waters. Once an aquifer is contaminated, the logistics of clean up are often expensive and ineffective, both in the short and long term.

The USGS states: "Present and (or) past land uses in parts of Lake County could have affected the ground water quality as indicated by elevated concentrations of nitrate. Further studies to better quantify the effects of land use on ground water quality, particularly with respect to the rapid urbanization of parts of the study area would be beneficial." 4

The Floridan Geological Survey study indicates that relative vulnerability zones identified in the WAVA model may be applied to facilitate designation of "protection zones" by regulatory agencies. These "protection zones," however, would likely include other physical and chemical (i.e., water quality) factors affecting the hydrologic system, including ground-water flow rates and patterns and proximity to impacted areas.5 Their reports provide specific recommendation for restrictions on development within the different zones. A Lake County-specific aquifer vulnerability map would be required to implement their recommendations.

References used for the GROUNDWATER RECHARGE SUB-ELEMENT include

1 - USGS Water-Resources Investigation Report 02-4207, Hydrogeology and Simulated Effects of Ground-Water Withdrawals from the Floridan Aquifer System in lake County and in the Ocala National Forest and Vicinity, North-Central Florida, L. Knowles, Jr., A. M O'Reilly and J. C. Adamski, 2002.
2 - Technical Report for the Lake County Astatula Solid Waste Management Facility Period of July 2001 – June 2003, May 2003, Walter D. Wood, PG.
3 - USGS Hydrology of Lake County, Florida, Water Resources Investigation 76-72, D. D. Knochenmus and G. H. Hughes, 1976.
4 – Ground Water Quality of the Surficial Aquifer System and the Upper Floridan Aquifer, Ocala National Forest and Lake County, Florida, 1990-99, USGS Water Resource Investigations Report 01-4008, J. C. Adamski and L Knowles, Jr., 2001.
5 – Analysis of Nonpoint-Source Ground-Water Contamination in Relation to Land Use: Assessment of Nonpoint-Source Contamination in Central Florida, USGS Water-Supply Paper 2381, E. R. German, 1996.
6 - Wekiva Aquifer Vulnerability Assessment, Florida Geological Survey Report of Investigation 104, J. R. Cichon, A. E. Baker, A. R. Wood, and J. D. Arthur, 2005.
7 - Designation of Significant Groundwater Recharge Areas (Draft), Don Boniol, P.G., SJRWMD, undated.
8 – Dictionary of Geological Terms, Third Edition, American Geological Institute, 1984.
9 - Water Resource Atlas, SJRWMD, 2003.