Conservation

CONSERVATION ELEMENT DATA, INVENTORY & ANALYSIS

This section addresses the data inventory requirements of Chapter 163, supportive to the development of goals, objectives, policies, and implementation programs for the Conservation Element.

Introduction

The purpose of the Conservation Element is to provide a plan and policy direction for the preservation, conservation and management of natural resources occurring in the City of Winter Park. The element will identify and analyze our existing air, land, water and living resources, and will be used to establish objectives and policies for the protection and enhancement of these resources.

INVENTORY OF NATURAL RESOURCES & CONSERVATION ACTIVITIES

This section identifies and inventories air and water quality, floodplains, wetlands, soil conditions, valuable mineral deposits, vegetative communities, and endangered species. The physical natural resources are presented first and followed by the biological natural resources.

Inventory & Analysis of Physical Natural Resources Physical natural resources discussed within this subsection include air, water, floodplains, wetlands, soils, and minerals. Map 5-3 illustrates the location of identifiable natural resources in Winter Park such as wetlands and conservation areas.

A. Air Quality The U.S. Clean Air Act requires the U.S. Environmental Protection Agency (U.S. EPA) to establish and enforce national ambient air quality standards (NAAQS) for pollutants identified as harmful to public health or the environment. As required by the U.S. EPA, the FDEP administers an air quality monitoring program to measure outdoor concentration of those pollutants for which ambient air quality standards have been established. Under the provisions of the FEPA 150 grant program, the Orange County Department of Community and Environmental Resources performs air quality monitoring for the five major air contaminants -- carbon monoxide, nitrogen dioxide, ozone, particulates, and sulfur dioxide.[1]

Pollution levels are monitored at six sites within Orange County. The primary station is located in Winter Park at Morse and Denning Avenues, is in a stable and developed area, which means the data collected at this station is most reliable for monitoring air quality trends. The City of Winter Park participates in the air monitoring program by providing space for the Martin Luther King Jr. Park monitoring station.

FDEP has adopted air quality standards consistent with national standards. The U.S. EPA uses an air quality index (AQI) to summarize conditions on a regional basis. Based on measured levels of five pollutants, the AQI grades air quality as good, moderate, unhealthy for sensitive groups, and unhealthy according to a numerical indicators. Five pollutants -- carbon monoxide, nitrogen dioxide, ozone, particulates, and sulfur dioxide –

[1] Orange County Department of Community and Environmental Resources.

are evaluated by the U.S. EPA and the FDEP for concentration levels in Central Florida. Using the FDEP Air Quality Index, air quality generally ranges from good to moderate in central Florida.

Winter Park should continue to promote development and land use patterns that promotes the use of bicycles and walking rather than reliance on the automobile. The City should also consider promoting construction and landscaping techniques that reduce electricity consumption used to accommodate indoor heating and cooling systems. Construction techniques should also accommodate application of solar energy technology.

B. Regional Surface Water Hydrology The City's entire geographical area lies within the Middle St. Johns River basin. All but the eastern edge of the City lies within the Lake Jesup subbasin. The eastern City edge, generally defined as that area east of Phelps Avenue, lies within the Econlockhatchee River subbasin. Surface water within all but the eastern edge of the City drains north-northeastward to Lake Jesup, which is located approximately ten miles north-northeast of the City in Seminole County. Surface water within the area bordering the eastern edge of the city migrates eastward toward the Econlockhatchee River, approximately six miles away. Surface water within both subbasins ultimately reaches the St. Johns River. The Econlockhatchee River is one of several rivers throughout Florida designated by the State of Florida as an Outstanding Florida Water.

C. Floodplains The floodplains in Winter Park consist of lowlands adjacent to lakes or next to streams connecting the local lake system. The National Flood Insurance Program administered by the Federal Emergency Management Agency has determined that most areas along lake shorelines within Winter Park are within the 100-year flood zone. Map 1-8 illustrates the boundaries of the 100-year flood zone.

Winter Park lies completely within the Howell Creek Drainage Basin and Orange County's Primary Drainage System. Floodwaters and surface waters draining into Lake Virginia, Lake Osceola, and Lake Maitland are headwaters for surface waters flowing northeastward to Lake Jesup, located in northern Seminole County. Surface waters draining into Lake Maitland from connecting lakes flow~~s~~ into Howell Branch Creek, move~~s~~ into Lake Howell, and ultimately drain~~s~~ into Lake Jesup.

Floods usually result from prolonged heavy rainfall that is compounded by previous rainfall, which has saturated the ground, thereby reducing infiltration significantly. Under these conditions the lakes and streams can overflow their banks causing property damage. Floods can occur in Winter Park at any time during a year, but are more likely to occur during the June to October rain and hurricane seasons.

1. **Flood Protection Infrastructure** Winter Park has several flood protection devices installed to limit the degree to which severe flooding can occur. Foremost is the weir at the dam for Lake Maitland, located at Horatio Avenue, which controls the level of water throughout the Chain of Lakes. The City also has seven drainage wells that in times of flooding can divert storm water directly into subsurface aquifers.
2. **Floodplain Regulations & Programs** Winter Park is a participant in the National Flood Insurance Program that provides flood insurance to homeowners and businesses. The U. S. Army Corps of Engineers has prepared 100-year floodplain elevations to determine locations susceptible to flooding

associated with a 100-year storm event. Winter Park has adopted general regulations discouraging development within floodplains and has established specific regulations for limited development activities within floodplains associated with streams connecting the Chain of Lakes.

The general floodplain regulations require that new construction have the lowest floor above the 100-year flood elevation, and places restrictions on the materials and types of construction permitted. In addition to floodplain regulation, the City also has a minimum fifty-foot lakefront setback and site plan review for all lakefront construction.

The City's stream floodplain regulations address surface water management along streams connecting lakes as well as Howell Branch Creek north of Lake Maitland. The regulations prohibit destruction of wetlands with fill material, and require a conditional use approval subject to satisfactory addressing established criteria. A conditional use must be approved by the City Commission. The criteria used to evaluate conditional use applications include the effects development will place on flood storage capacity, environmental impacts on wetlands, and the loss of environmentally sensitive areas. In addition, no encroachment, fill or other new development is allowed in the floodway areas directly adjacent to the streams.

Floodplains and wetlands offer a variety of benefits, which include floodwater storage, aquifer recharge, preservation of wildlife habitat, open and recreational space, and maintenance of water quality. The City's regulations are meant to protect flood prone areas, to protect the safety of citizens, and to minimize public and private loss from flood conditions. Winter Park is fortunate to have minimal amount of land area within flood hazard areas (i.e., 100-year floodplain). The regulations currently in effect are sufficient to provide for both environmental and property value protections.

D. Lake Resources & Water Quality Nineteen lakes, amounting to 947.1 acres of surface water, are located within the City limits. These waters are shallow, natural lakes that vary in depth from thirty feet to just a few feet in some of the smaller lakes. Navigable canals link Lakes Mizell, Virginia, Osceola and Maitland in Winter Park, and Lakes Nina and Minnehaha in Maitland; thus creating the "Chain of Lakes". These lakes are all within the Howell Creek drainage basin, which is part of the Lake Jesup subbasin. A description of Winter Park's lakes and canals is presented in Tables 5-1 and 5-2.

The lakes of Winter Park are among the greatest assets of the City. The preservation and conservation of these water resources is of paramount concern to residents of Winter Park. As a result, the City of Winter Park is involved in a pro-active lakes management program. The components of this program are aquatic plant management, shoreline protection, and water quality management. To implement the City’s lake management program, the City Commission has established the Lakes Division of the Public Works Department and the Lakes & Waterways Advisory Board.

Table 5-1: Dimensions of Winter Park's Lakes

LAKE	SURFACE AREA (acres)	ORDINARY HIGH WATER ELEVATION 88 DATUM (ft.)	100-YEAR FLOOD ELEVATION 88 DATUM (ft.)
Maitland	274.8*	65.7	68.0
Virginia	235.6	65.7	68.9
Osceola	163.9	65.7	68.8
Berry	79.4	69.4	70.3
Mizell	66.5	65.7	68.9
Sue	42.9*	70.7	75.7
Killarney	35.6*	82.0	84.4
Sylvan	16.3	71.2	73.7
Knowles	8.0	77.3	79.7
Baldwin	5.6*	90.7	93.2
Chelton	4.7	80.3	83.3
Forrest	3.9	N/A	N/A
Rose	2.3	N/A	N/A
Spier	2.0	89.7	94.3
Temple	1.2	66.6	67.7
Francis	1.2	85.2	87.6
Mendsen	1.2	82.2	83.6
Wilbar	1.1	83.7	85.1
Midget	0.9	85.8	87.7
TOTAL	**947.1**	-	-

*Includes water area within the City limits only.
Sources: Winter Park Engineering Division (lake area calculations); Winter Parks Lakes Division (average high water elevations; Federal Insurance Administration (100-year flood elevations).

Table 5-2: Dimensions of Winter Park's Canals in Feet

Canal Name	Lake Connections	Length	Depth	Width	Bridge Clearance
Genius Canal	Mizell-Virginia	160	2-3	7-8	3
Fern Canal	Virginia-Osceola	680	2-4	7-8	4
Venetian Canal	Osceola-Maitland	1,550	2-4	7-8	8

Source: Winter Park Lakes Division.

1. **Aquatic Plant Management** Aquatic plants of the proper type and number are essential to the environmental health of Winter Park's lakes. In proper balance, aquatic plants provide a variety of environmental benefits. They provide food and habitat for fish and waterfowl, and control shoreline erosion and loss of property. Water quality is enhanced by the plants, which use up excess nutrients that are dissolved in lake water,

limiting the degree and severity of algae blooms, and filter debris at the lake's edge, which reduces the amount of sediment in the water.

2. **Shoreline Protection & Enhancement** Lake shorelines serve as important natural resources that Winter Park desires to preserve. Vegetation along shorelines protects them from erosion, reduces fluvial sediment and silt from entering lake waters, and promotes a natural aesthetic character along shoreline areas by protecting desired littoral vegetation. The City administers two programs to promote the protection of lake shoreline areas – the shoreline protection program and the shoreline enhancement program.
3. **Surface Water Quality Managemen** Maintaining acceptable water quality within the Chain of Lakes and all the other lakes in Winter Park is a primary objective for the City. Lakes are an important natural resource for Winter Park, providing ample opportunities for aquatic recreation and fishing as well as contributing to the City's natural aesthetics and general open space. Maintaining and improving water quality will be a continuing challenge for the future but a priority for public response.

   Maintaining acceptable surface water quality within Winter Park's lakes is also a regional issue. Except for properties generally located east of Phelps Avenue, all of Winter Park's jurisdictional area lies within the Lake Jesup subbasin of the middle basin of the St. Johns River. Surface and ground waters received by the Chain of Lakes collects in Lake Maitland and flows northeast through Howell Branch Creek, into Lake Howell, and finally flowing into Lake Jesup. Surface water quality emerging in Winter Park contributes to surface water quality within the Lake Jesup subbasin.

   Winter Park's lakes do not have significant water pollution in the classic sense of water polluted with chemicals, toxic agents, oil, sewage, etceteras that are dumped by industrial, manufacturing or sewage treatment plants. Within the lakes of Winter Park the various ecological communities of fish, reptiles and birds are flourishing.

   The water quality issues with the City's lakes are algae blooms that turn the water clarity to a green or brown color and periods of hydrilla growth. These two problems occur concurrently and are not unique to Winter Park's lakes. What is unique is that the City of Winter Park decided to remedy these common conditions because they are too frequent and far too long in duration for the City and its citizens to accept.

E. Current Water Quality Monitoring Activities Several government agencies monitor surface water quality conditions within Winter Park's lakes. Agencies that regularly conduct water quality monitoring include the LAKEWATCH program sponsored by the State of Florida and administered by the University of Florida, and the City's Lake Division. Water quality monitoring may also be conducted on City lakes by the SJRWMD and FDEP in conjunction with special environmental studies.

F. Past Water Quality Evaluation & History The history of surface water quality management in Winter Park was originally focused on aquatic plant control. In the mid 80's, the City increased its water quality management efforts. The Save Our Lakes Program, at that time, was established by the State of Florida and provided a funding source dedicated to water quality improvement projects. Studies of the lakes have conducted to analyze biological, bacteriological and water quality parameters, storm sewer inflow, bottom sediments and the impact of septic tanks. The Lakes Division of

the Public Works Department administers a monitoring program to record water quality conditions within lakes and ponds within the City.

Major conclusions documented in water quality studies or identified from the City's monitoring program are as follows:

- Storm drain flow is a primary cause of water quality problems. Other causes are internal loading (levels of pollutants historically present), rainfall, groundwater, and boaters.
- Cross-connected sewer pipes were located and corrected. This action has reduced the bacteria concentrations in the lakes that sometimes would reach levels requiring bans on swimming or fishing.
- There are a few isolated septic tanks still servicing single family lakefront homes. The degree of septic tank leachate pollution is insignificant to the overall conditions.
- The sand bottom of the lakes have been covered with muck, which comes from stormwater and internal loading to include dead hydrilla and algae that settle to the bottom and decompose. The rate of eutrophication or the rate of buildup of the muck layer is extremely modest and does not represent a threat to the lakes.
- Water flow from the upstream Lakes Sue, Rowena, Formosa, and others contributes approximately one-quarter off the nutrient pollutants received by the City's lakes.

G. City Surface Water Quality Improvement Projects & Programs Information gathered from water quality studies has been used to determine priorities for City water improvement projects. As stormwater runoff contains leaves, dirt, debris, and dissolved nitrogen, phosphorous and bacteria at higher levels than lake water, projects to correct the direct flow of stormwater into lakes have been a major priority. These projects include retention and detention areas to collect and filter stormwater before it enters the lakes.

1. **Stormwater Utility Fee** In 1989, the Stormwater Utility Fee was imposed and became the primary funding source for stormwater capital improvement projects. From 1993 to current times, the City of Winter Park uses storm water utility fee revenue to build storm water management systems to address the most critical pollutant sources. The City of Winter Park bases its five-year Storm Water Capital Improvements program to address problems and is updated annually.
2. **Reduction of Debris & Sediments** A major component of the stormwater management plan is a proactive program that removes fallen leaves and debris before entering the lakes. This is accomplished through street cleaning, storm drain inlet cleaning, sediment trap cleaning and public awareness.

   An aggressive street-sweeping program is used to reduce the amount of leaves and debris entering the storm drain system and the lakes. The City currently owns vacuum street sweepers and a leaf packer. The leaf packer reduces the amount of downtime spent traveling to the dump. This gain in man-hours plus the equipment allow for a weekly cleaning of city streets and extra concentration on the downtown business streets.

   The City is also concentrating on the regular cleaning of storm drain inlets to reduce the conditions of stagnant water and debris that lead to bacteriological

contamination. The City has one Vactor truck that is dedicated to storm inlet and line cleaning.

Sediment traps have been constructed at many storm drain outflow pipes. The City currently has over a hundred traps that collect leaves and debris. These traps are constantly monitored and cleaned. The City has a floating excavator to assist in construction and cleaning of the traps in addition to other lake maintenance. Some of the initially built traps have been removed because the velocity of stormwater in the larger pipes breaks through the traps.

3. **Environmental Awareness Programs** Public awareness is an important final piece of this program. The City has programs to inform residents about the water quality management programs and how they can support them, such as keeping leaves and other debris out of the storm drains. The City has also identified storm drains that drain directly to lakes with small signs placed at the opening. Public understanding of these projects and why they are pursued make the water quality a community issue and not just a misunderstood City expenditure.
4. **Storm Water Best Management Practices/Innovative Technologies** Innovative technologies developed for surface water or storm water management are periodically tested to determine their potential for routine use in Winter Park. A periphyton filter, and a bio-remediation process using natural enzymes have been tested, but are not currently in routine use. A combination of aeration/low dose alum pilot project is currently underway in Lake Sylvan and Lake Mizell and custom designed baffle boxes with leaf screens are currently under construction for installation in the Lake Chelton basin.
5. **City Stormwater Utility Ordinance** Funding for the Save Our Lakes Program was originally provided each year as a general fund set aside that competed with the other capital improvement needs of the City in its annual budget process. The City recognized in 1989 that a long term funding method was needed that would guarantee funding for this program. Funding was needed for new stormwater improvements projects, capital equipment purchases, repairs and replacements. Funding was also needed for the manpower to sweep the streets, clean the inlets, clean the traps, and repair the stormwater system.

   The quest for a permanent committed source of annual funding for Water Quality Management was realized in 1989 with the adoption of the stormwater utility ordinance. This ordinance created funding for the stormwater and drainage improvement projects, maintenance projects, personnel costs and related expenses much like that conducted for a water, sewer or electric utility. The ordinance established monthly utility bill charges for all developed properties within the City of Winter Park. These monthly charges are based on the amount of impervious surface on a property and thus, its contribution to the stormwater drainage system. The adoption of this stormwater utility has placed Winter Park in a leadership role in responding to the need for drainage and stormwater improvements.

6. **Stormwater Management Ordinance** The water quality management program of the City of Winter Park was also enhanced in 1989 by the adoption of a revised comprehensive stormwater management ordinance. These regulations establish stormwater retention performance requirements, technical standards, and such that are similar to those enforced by other jurisdictions in Orange County and by the St. Johns Water Management District.
   In many ways, however, Winter Park's stormwater management ordinance is state-of-the-art. The ordinance, like most, is triggered by construction projects, but the City's ordinance applies to renovations and redevelopment, in addition to new construction. It does not grandfather in existing impervious surfaces. It requires that properties undergoing redevelopment or renovation must retrofit their sites to accomplish stormwater retention. The ordinance contains stormwater retention requirements for all development including single family residential. Thus, the application of stormwater management is far broader and more comprehensive than in most jurisdictions.
   Winter Park's storm water regulations also permit underground storm water retention and infiltration systems but subject to recorded maintenance agreements. As dirt and debris is carried underground it tends to clog the infiltration system and reduce its effectiveness. When the underground system does not drain, it does not accomplish the retention or recharge that is intended. Thus, regular maintenance is required.
   The City of Winter Park's regulations recognize that situations will arise where the retrofit for stormwater retention is physically or practically impossible. For example, many properties in the Central Business District are completely covered by buildings. In other instances, the only option would be to sacrifice required parking or mature landscaping. For these situations involving non-economic hardships, the City may permit a variance from the requirement for stormwater retention contingent upon the payment of a fee-in-lieu of stormwater management. The fee-in-lieu is a financial compensation paid to the City that is roughly equivalent to the cost of the land and the facilities that would be required to meet the code. This fee is another technique of generating revenue for the City's water quality management improvement projects. In this case, fees-in-lieu must be used for stormwater retention and treatment projects off-site that meet the one-inch retention and treatment standards set forth in the State Statutes and administrative code provisions referenced previously.
7. **Regional Surface Water Quality Management Activities** Surface water quality within the City's lakes impacts water quality within the middle basin of the St. Johns River, particularly the Lake Jesup subbasin. Before 1983, streams and lakes in the middle basin received significant effluent discharges from wastewater treatment plants. Water quality has improved once the discharges were given advanced waste treatment. Water quality within the middle basin is still affected by stormwater runoff. Lake Jesup, which is connected to Howell Creek, receives stormwater runoff and wastewater discharges from Orlando,

Winter Park, Casselberry and Maitland, as well as agricultural runoff from adjacent farms.

To improve water quality received from water sources flowing into Lake Jesup, the SJRWMD has adopted a Surface Water Improvement and Management plan for the middle basin. This plan gives priority to water bodies in the basin needing restoration or preservation. Current SJRWMD activities for the middle basin that affect Winter Park include the St. Johns Retrofits project and the Pollution Load Reduction Goal (PLRG) projects. The City is listed as a project partner by the SJRWMD for both initiatives.[1]

H. Wetlands Only two significant wetland areas remain within the City. One of these two wetlands exists adjacent to the Howell Branch Creek north of Lake Maitland. The other exists in the stream area between Lakes Sue and Virginia. Other small wetlands or wetland vegetation occur within narrow littoral zones along lake shorelines. The total combined area of these two wetlands is estimated at approximately 40.6 acres. Smaller clusters of wetlands occur within the littoral zones of lakes. Wetlands within the City of Winter Park are delineated on Map CE-5-04.

1. **Wetland Classification** Winter Park's wetlands function primarily as hydric hammock wetland areas. They are only occasionally inundated by floodwaters, but have saturated soils during most of the year. The City's wetlands, from a qualitative or functional perspective, are very capable of performing their natural functions. These functions include providing wetland habitat and location for propagation and flood storage. As the land uses surrounding these wetland areas are predominantly single family residential, and as public access to these areas is limited to residents of homes on adjacent parcels, these wetlands tend to function as secure and safe habitats and qualify as preservation areas for native species including plants, birds and animals.
2. **Wetland Protection** Currently, both of these wetland conservation areas are approximately half in public ownership and half in private ownership. All of the wetlands that exist in the City are included in the conservation areas and identified on the Future Land Use Map in the Comprehensive Plan. These wetland areas are flood prone areas and subject to those regulations of the Land Development Code. In addition, development is prohibited within a 50 foot buffer zone from any wetland area. The only construction permitted within the City's wetlands are recreational gazebos or boardwalks.

   Filling of wetlands within the City of Winter Park is prohibited by the wetland protection regulations within the City's Land Development Code. The City has successfully pursued state grant funds to purchase remaining lands within these conservation areas and that process is underway.
3. **Protection of Environmentally Sensitive Lands.** The City's protection of environmentally sensitive lands shall be to prohibit all development within 50 feet of all designated wetlands, any stream, canal, or lake and within 50 feet of

[1] SJRWMD, Middle St. Johns River Initiative Report Fiscal Year 2003-2004; published 2002.

any wildlife habitat containing endangered or threatened species as detailed on Map 5-5.

I. **Commercially Valuable Mineral Deposits** The City has very little vacant land and nearly all of the City's area is built-out. As an existing, developed urban oriented city, the mining of commercially valuable minerals does not exist in Winter Park. Even in the early years of Winter Park when farming was the principal economy and occupation, there were no reported mining or mineral extraction ventures. Based on this condition, this element does not contain goals, objectives and policies for mineral extraction and its effect on the environment.

K. **Soil Erosion & Preservation** Soils indigenous to Winter Park are a natural resource that has been an important factor in the development of the City. In earlier times, when agriculture was a major occupation, soil properties were a crucial determinant of the success of a farm or grove. Other development occurred, given the right location, on soils having the least limitations and requiring the least amount of corrective measures. Under the economics of land development today, the choice of land for a specified use is more often determined by factors such as location rather than the kind of soil. However, knowledge of the types of soil present in Winter Park is still important in assessing the limitations or reclamation that must be done to develop a site.

The Orange County Soil Survey prepared by the Soil Conservation Service and revised in May 1985 gives details of the twelve different soil types that exist in Winter Park. The soil classifications are made based upon the water table, slope, erosion potential, permeability, subsidence and organic (muck/peat) content. The soils are also rated as to their potential for development based upon those limiting properties.

Generally, the soils in Winter Park are predominately those that are categorized as offering a high and medium potential for development. These are the Candler Fine Sand, St. Lucie Fine Sand, Tavares Fine Sand, Orlando Fine Sand, Ona Fine Sand, Pomello Fine Sand, Zolfo Fine Sand, and Millhopper Fine Sand. Winter Park also contains isolated areas of soils that are not suitable for development and place major constraints on development. These soils include the Symrna, Samsula, Hontoon, Basinger, and Arents varieties. Based on the Soil Survey of Orange County (U.S. Soil Conservation Service), these soils, as well as Pomello fine sand, have severe limitation for use as septic absorption fields. Development occurring on parcels with this soil type should connect to central sewer systems. Soil types covering the City are illustrated in Map 5-4.

Inventory and Analysis of Biological Natural Resources[1] Biological natural resources within Winter Park include vegetative communities, dominant species, and endangered species.

L. **Vegetative Communities** Undisturbed vegetative communities other than in City parks or the Genius Preserve occur in small pockets within littoral zones adjacent to lakes, particularly where City right-of-way terminates near the shoreline; at wetlands along Howell Branch Creek and between Lakes Sue and Virginia; and at City some City parks, including Mead Garden.

[1] Sources used for this subsection include: Florida Natural Areas Inventory; Florida Fish and Wildlife Conservation Commission; and Soil Survey of Orange County, U.S. Dept. of Agriculture, Natural Resources Conservation Service.

1. **Natural History of Winter Park** When the earliest residents came to Winter Park in the 1870's and 1880's, they found an area of sandy soil which supported the native vegetative communities that were dominated by Longleaf Pine, Saw Palmetto, Turkey Oak and Live Oak trees. Near the lakes, streams, and wet lowlands, they found organic mucky soils, which supported Cypress trees and other freshwater marsh vegetation. The subsequent development of the upland areas of Winter Park changed the vegetative communities in several ways. Farming and citrus production were some of the dominant occupations in the early years. Much of Winter Park was cleared for farm and citrus production.
   Another major change came with the introduction and continual annual plantings of Laurel Oak trees. If new residents from northern states were to be enticed to purchase lots and move to Winter Park, then the look and feel of the northern oaks was needed, in addition to the valuable shade. Citrus trees were an attraction and a means of some income, but the current extensive oak tree canopy of Winter Park was introduced and fostered to set the City apart from most of Florida, which is dominated by pine and palmetto trees
2. **City Arbor Program** The City is proud of its successful history preserving and planting trees within the community. Nearly all streets within the City are lined with canopy trees. Dedicated to protecting its historic trees and promoting tree canopy along roadways throughout Winter Park, the City has been a member of Tree City USA since 1980.
   To maintain and protect its canopy trees, the City established the Urban Forestry Division. The Urban Forestry Division is responsible for maintaining existing trees within street right-of-ways and City owned-property. It also manages the tree planting program. Management of the City's arbor program includes a tree inventory, which maintains records on status and condition of existing trees in the right-of-way, pruning and maintenance of trees, raising new trees to replace existing trees in City property and right-of-way that must be removed.
   The City's arbor program is further supported by a tree protection ordinance that establishes procedures and criteria for tree removal, and that also requires application of tree protection techniques for trees exposed to potential harm from construction activity.
3. **Conservation Areas** The three primary conservation areas within the City are the two significant Howell Creek wetlands and Mead Garden. The City has established conservation areas over the combined acres, not in city ownership. Mead Garden covers 47.60 acres in native vegetation and trees. As part of the City's park system, Mead Garden contains walking paths and a community building. Vegetative communities primarily represent live oak hammock with a transition to wetland hammock near Lake Sue. The two Howell Creek conservation areas occur on the north side of the City along Howell Branch Creek, and along Howell Creek between Lakes Sue and Virginia in the vicinity of northeast of Pennsylvania Avenue and south of Sterling Avenue. While both areas contain wetland vegetative communities, Howell Branch Conservation

Area is the larger of the two areas with 32.5 acres compared to 8.1 acres at the Lake Sue/Virginia Conservation Area. Land comprising the Lake Sue/Virginia Conservation Area is located within private property while the area comprising Howell Branch Conservation Area is comprised of public and private owned property.

M. Wildlife & Listed Species Most wildlife species indigenous to Winter Park are those commonly appearing in developed urban and suburban areas in central Florida. Typical species occurring in Winter Park include raccoons, opossums, squirrels, skunks, alligators, snakes, rats and mice. In or near the City's lakes and streams, typical species include water snakes, cottonmouth moccasins, frogs, largemouth bass, catfish, sunfish, gar and shiners. The sunshine bass was introduced and also occurs here.

Winter Park is the occasional seasonal home to a large number of migratory bird species as well as numerous permanent species. Depending upon the species, they are attracted to the natural lakes, streams and wetland environment or they co-exist in the urban and suburban environment. Listed species refer to those living creatures and plants that are classified by the State or Federal government as endangered, threatened, or another special protection classification. The Florida Natural Areas Inventory (FNAI), a non-profit research company affiliated with Florida State University through the Florida Resources and Environmental Analysis Center, maintains records on observed habitat and nesting locations of rare species in Florida.

Based on records of the FNAI, a pair of American bald eagles nested and raised young at the southwest corner of Lake Osceola, at or near Alexander Place Park, up until 1995. Map 5-3 illustrates the location of the bald eagle nest.

FNAI also identifies sites that could serve as habitat for rare species. Map 5-3 delineates areas within Winter Park that have the potential to serve as habitat for endangered and threatened species.

Throughout Florida the population of certain plant and animal species has been adversely impacted by the reduction of habitat, food sources, pollution, or other changes to their natural environment. As populations of certain species have declined to levels that threaten their existence, the State of Florida and the federal government have established laws and programs to protect them and improve survival capabilities. As delegated by Florida law, the Florida Fish and Wildlife Conservation Commission (FFWCC) have responsibility for designating the survival status of fauna species (mammals, birds, reptiles, fish, amphibians, insects, crustaceans, corals, and mollusks). Species warranting protection are classified by the FFWCC according to one of three categories – endangered, threatened or species of special concern. A definition for each classification appears below as defined in Section 68A-1.004, F.S.

- **Endangered species** – As designated by the FFWCC, a species, subspecies, or isolated population of a species or subspecies which is so few or depleted in number or so restricted in range or habitat due to any man-made or natural factors that it is in imminent danger of extinction (Section. 68A-1.004 (26), F.S.). The FFWCC has established criteria under Florida Statutes to determine if a species may be in imminent danger of extinction.

- **Threatened species** – As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a very high risk of extinction in the future (Section 68A-1.004 (77), F.S.). The FFWCC has established criteria under Florida Statutes to determine if a species is exposed to a very high risk of extinction in the future.
- **Species of special concern** – As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a moderate risk of extinction in the future (Section 68A-1.004 (73), F.S.). The FFWCC has established criteria under Florida Statutes to determine conditions when a species may be at a moderate risk of extinction in the future.

Protected fauna species that may appear in Winter Park -- as identified in Orange County's Comprehensive Plan or by the Florida Natural Areas Inventory – are listed in Table 5-3. The FNAI database does not contain records of all listed species that may occur in a given area. Therefore, an absence of occurrences in the FNAI database does not indicate that species of significance do not occur in the area.

The Florida Department of Agriculture and Consumer Services (FDACS) is responsible for the protection of Florida's vast plant industries and native plant life. Among its responsibilities include the designation of the status of native plant flora species that are in risk of extinction and the eradication and control of injurious plant pests and disease. Native plants at potential threat for extinction are classified by FDACS as threatened, endangered or commercially exploited.

Table 5-3: Protected Species Known to Occur in Winter Park Vicinity		
COMMON NAME	**SCIENTIFIC NAME**	**SPECIES**
FAUNA (ANIMALS/REPTILES)		
American Alligator	Alligator Mississippiensis	reptile
Limpkin	Aramus Guarauna	bird
Eastern Indigo Snake	Drymarchan Corais Couperi	reptile
Little Blue Heron	Egretta Caerulea	bird
White Ibis	Eudocimus Albus	bird
Southeastern American Kestrel	Falco Sparverius Paulus	bird
Gopher Tortoise	Gopherus Polyphemus	reptile
Florida Sandhill Crane	Grus Canadensis Pratensis	bird
American Bald Eagle	Haliaeetus Leucocephalus	bird
Wood Stork	Mycteria Americana	bird
Florida Pine Snake	Pituophis Melanoleucus Mugitus	reptile
Sherman's Fox Squirrel	Sciuris Niger Shermanii	mammal
FAUNA (PLANTS)		
Needle Palm	Rhapidophyllum Hystrix	

Source: Florida Fish and Wildlife Conservation Commission, Florida Natural Areas Inventory and Orange County Comprehensive Plan, Florida Department of Agriculture and Consumer Affairs.
[1] Frequency of occurrence determined by Natural Analysts, Inc., within Winter Park.

Table 5-3b: Protected Species Known to Occur in Winter Park Vicinity				
COMMON NAME	**FREQUENCY OF OCCURRENCE[1]**	**STATUS**		**ID SOURCE**
		GFC	**FWC**	
FAUNA (ANIMALS/REPTILES)				
American Alligator	Existing Regularly[1]	SSC	T/SA	
Limpkin	Existing Regularly[1]	SSC	nc	Orange County
Eastern Indigo Snake	Existing Regularly[1]	T	T	Orange County
Little Blue Heron	Existing Regularly[1]	SSC	nc	Orange County
White Ibis	Existing Occasionally[1]	SSC	nc	Orange County
Southeastern American Kestrel	Existing Occasionally[1]	T	nc	Orange County
Gopher Tortoise	Existing Regularly[1]	SSC	nc	Orange County
Florida Sandhill Crane	Existing Occasionally[1]	T	nc	Orange County
American Bald Eagle	Existing Regularly[1]	T	T	FNAI & Orange County
Wood Stork	Existing Occasionally[1]	E	E	Orange County
Florida Pine Snake	Existing Occasionally[1]	SSC	nc	Orange County
Sherman's Fox Squirrel	Existing Occasionally[1]	SSC	nc	Orange County
FAUNA (PLANTS)		**FDA**	**FWC**	
Needle Palm	Existing Occasionally[1]	C	nc	Orange County

Source: Florida Fish and Wildlife Conservation Commission, Florida Natural Areas Inventory and Orange County Comprehensive Plan, Florida Department of Agriculture and Consumer Affairs.
1 Frequency of occurrence determined by Natural Analysts, Inc., within Winter Park.

State = Florida Fish and Wildlife Conservation Commission (formerly Florida Game and Fresh Water Fish Commission)
Federal = United States Fish and Wildlife Service
E = Endangered Species
SSC = Species of Special Concern
T = Threatened Species
T/SA = Threatened/Similarity of Appearance

IMPACTS AFFECTING NATURAL RESOURCES

This section provides a description of existing commercial, recreational and conservation uses for the physical and biological natural resources endemic to Winter Park. Known pollution problems and local hazardous waste management practices are also reviewed as well as the potential for preservation, conservation, and utilization of available lands within the City.

Existing Commercial & Recreational Uses The only commercial use of natural resources within Winter Park is a scenic boat tour of the Chain of Lakes. Located at the east end of Morse Boulevard on Lake Osceola, the boat tour operates seasonally and is open to the public. The boat tour company operates from a city-owned dock.

The larger lakes within or adjacent to the City are used for recreation activities, primarily boating, water skiing, swimming and fishing. Public access to lakes is limited to City lakefront parks and public boat ramps. A public boat launching facility at Dinky Dock Park on Lake Sue allows recreational boaters and anglers access to the Chain of Lakes.

Natural vegetative communities are conserved at several of the City's parks and opens space sites along lakes. Native vegetative communities are preserved in Mead Garden, which contains 55 acres of trees and plants, including wetlands along Lake Sue. More detailed description of Mead Garden as well as city-owned open space left in their natural state can be found in the Recreation and Open Space Element.

Wetlands and floodplains primarily occur adjacent to lakes. No substantial development, then, is located within wetland and floodplains. The only structures that occur within floodplains are water-related facilities such as boat docks and shoreline walls.

Groundwater The primary source for potable water in Central Florida, including Winter Park, is the Floridan Aquifer. Rapid growth and development in central Florida has forced greater demand on available groundwater supplies, creating a situation where future potable water demands cannot be met solely through groundwater supplies. Growth and development in Central Florida has reached a point where groundwater supplies are becoming seriously limited to meet additional withdrawal demands. For this reason, the SJRWMD has designated areas of Central Florida as a Priority Water Resource Caution Area, meaning that all future water supply needs may not be able to be met from current and anticipated sources without causing unacceptable impacts to water resources and related natural systems. As reported by SJRWMD, a serious shortfall of groundwater may occur based on estimated future water demand in the east-central Florida region. Current water supply conditions have led the SJRWMD to implement East-Central Florida Water Supply Planning Initiative (WSPI). As cited in the WSPI Fact Sheet report, "the Floridan aquifer provides almost all of the region's existing public water supply and a large part of the agricultural water supply. This source will likely not be able to meet all future needs without unacceptable impacts to wetlands, lake levels, spring flows and groundwater quality."

Known Pollution Problems Air quality within Winter Park has not experienced any problems based on data presented in this element. Surface water quality from nutrient loading within lakes and streams has been an issue~~s~~ that necessitates regular monitoring and corrective actions by the City.

A. Point Source Pollution No major industry is located within Winter Park that produces substantial emission levels or hazardous waste. Based on records maintained by the U.S. EPA, no large quantity generators of hazardous waste are located within the City. However, a number of small businesses or industrial uses are listed with the FDEP and the U.S DEP as small quantity generators or users of hazardous waste or materials. The number of these businesses and the type of waste they produced changes from time-to time as new business locate in the City and former businesses relocate outside Winter Park. The type of businesses or industries range from light industrial activities, dry cleaners, gasoline storage, or vehicle maintenance facilities. The Florida Department of Environment Protection and the U.S. EPA each maintain a list of businesses qualifying as small quantity generators of hazardous waste, toxic release or other pollution generators.

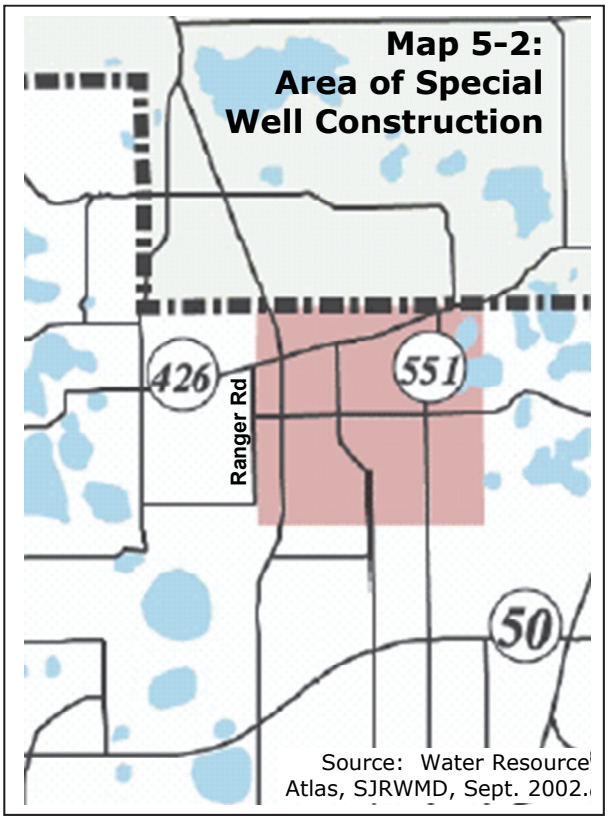
B. Non-Point Source Pollution Vehicle emission is the most common non-point source for air pollution generation. However, air quality in Winter Park has attained acceptable status with FDEP. Non-point pollution sources have the greatest adverse impact to water quality within Winter Park and Central Florida. The primary source of pollution entering surface waters is stormwater run-off. The City has an actively managed stormwater management program to collect run-off volumes and reduce pollutants entering surface and groundwater.

C. Hazardous Waste Management The Orange County Environmental Protection Division is the local environmental regulatory agency responsible for monitoring the use and disposal of hazardous materials. This department also implements applicable Federal and State legislation providing for the use and proper disposal of hazardous materials. Through its Environmental Protection Division (EPD), Orange County administers a hazardous waste management program, which includes monitoring and inspecting small quality generators of hazardous waste. Small quantity generators are business that may generate 220 to 2,200 pounds of hazardous waste per month. Within Winter Park, businesses qualifying as SQG are concentrated in areas zoned for commercial or light industrial uses. Based on FDEP and U.S. EPA records, the greatest concentration of SQG business is along U.S. 17/92.

The City of Winter Park constructed the Special Collection Facility (SCF) that receives household hazardous waste such as paint, pesticides, fertilizers, lead acid batteries, gasoline, lead, tires, motor oils, pool chemicals, solvents and thinners. This facility is free to residents who in the past had to take household hazardous waste to the Orange County landfill or wait for a mobile collection site to be announced. The SCF is located at the Central Utilities Complex and is open periodically throughout the year on a quarterly basis. There are some businesses located within the city limits, which generate and use small quantities of materials hazardous to the environment. These businesses include dry cleaners, auto body and repair shops, photo labs, print shops and other commercial and industrial businesses. Potential environmental pollution problems can occur when these and household hazardous materials are improperly handled and disposed. The business

hazardous waste is collected and stored at the Orange County Landfill. Location of businesses and enterprises classified as small quantity generators of hazardous waste are identified via listing with Orange County EPD.v

Hazardous materials are also a concern beyond the environmental implications, because many can increase fire hazards. State regulations require businesses to notify the local fire department of any hazardous materials they use.



Map 5-2: Area of Special Well Construction

Source: Water Resource Atlas, SJRWMD, Sept. 2002.

Improved public education, more accessible disposal sites for businesses, and stricter enforcement are the recommended actions that would increase the proper disposal of hazardous materials. The City provides the public with current information regarding the SCF and keeps them informed on the importance of proper hazardous waste disposal through newsletters and on the City's website.

1. **Ground Water Contamination Sites** Bordering the eastern edge of the City is an area designated by the SJRWMD as an Area of Special Well Construction (ASWC), as delineated in Map 5-2. The southwest corner of the ASWC, based on this map, appears to extend into the Winter Pines community. Lands receiving such designation are areas containing ground water contamination. Contamination is defined as the presence of one or more substances in quantities exceeding primary drinking water standards or presenting an imminent hazard. SJRWMD has delineated areas with groundwater contamination to prevent pollution of potable water wells and groundwater by applying special well location and construction criteria.[2]
2. **Large Quantity Generators & Contamination Sites** The federal Resource, Conservation, and Recovery Act requires that generators, transporters, treaters, storers, and disposers of hazardous waste provide information concerning their activities to state environmental agencies, which is the FDEP. Based on the U.S. EPA records provided at their website, no large quantity generators of hazardous waste are located within the City of Winter Park.2 Large quantity generators produce or use 2,200 pounds or more of hazardous waste per month or 2.2 pounds or more of acute hazardous waste per month.[3]

[2] Source: Water Resource Atlas, St. Johns River Water Management District.
[2] Source: U.S. EPA.
[3] Source: Florida Department of Environmental Protection.

Based on the records maintained by the Bureau of Waste Cleanup at FDEP, no properties within the City are known to be contaminated with hazardous wastes or toxic releases.[1]

Potential for Preservation, Conservation & Utilization of Natural Resources

A. Potential for Preservation Preservation areas have been defined by the FDEP as those areas within a municipality having major ecological, hydrological, physiological, historical or socio-economic importance to the public at large. These areas are already subject to various State regulatory programs. Areas within Winter Park included in this classification are historical and archaeological sites, lakes, wetlands, and City botanical gardens.

B. Potential for Conservation Conservation areas have been defined by the FDEP as land and waters of the municipality having certain natural or institutional use limitations requiring special precautions prior to conversion to development. Such precautions could entail extensive design and construction measures required in order to adapt such land for urban development.

New development is subject to the City regulations addressing stormwater management, minimum open space, landscaping, tree protection and planting, shoreline (littoral zone) vegetation protection and lake access, and floodplain protection. Regulations are currently in place and enforced to conserve resources important to the City and the State of Florida.

Potential for conservation of natural resources can be enhanced through the following activities:

1. Water Conservation

- Actively participate in the SJRWMD's East-Central Florida Water Supply Planning Initiative
- Review and evaluate construction, landscaping, irrigation, site design and land development standards for means to reduce water demand;
- Evaluate long-term water demand within the City's service area and identify water source, including evaluation of sources other than the Floridan aquifer.
- Regularly evaluate utility water pricing methods to determine need to modify rate schedule to discourage overuse.

2. Surface Water Quality

- Continue implementation of current storm water improvement program.
- Review construction standards and Land Development Code for modifications that reduce volume of pollutants and nutrients in stormwater runoff entering lakes.
- Coordinate with the cities of Maitland and Orlando regarding potential for joint surface water quality monitoring and improvement projects.
- Continue protection of floodplain areas and use of land development regulations to discourage encroachment into such areas.
- Continue management of access points to lakes through boat dock and ramp

[1] Source: Bureau of Waste Cleanup, FDEP, phone conversation with Tammy Sterling, FDEP.

standards and regulations.

- Coordinate with adjacent local governments, SJRWMD, FDEP, and LAKEWATCH regarding exchange of water quality data and potential to eliminate duplication of water quality monitoring conducted by several government programs.

3. Wildlife & Habitat

- Review and evaluate the City's Land Development Code for sufficient standards addressing protection or relocation of endangered and threatened species.
- As redevelopment of neighborhoods and large tracts of land occur, vegetative open space and parks can be designed into development plans for surface water percolation and habitat for wildlife typically found in urban settings.
- Design of stormwater facilities should incorporate long-term ability to support fish species.
- Continue to preserve native vegetative habitats as preservation areas or passive recreation areas at Mead Garden, Lake Sue/Virginia Conservation Area, and Howell Branch Conservation Area.
- Pursue state and federal grants to acquire land within redevelopment projects for parks and vegetative open space.
- Continue protection of existing remaining wetlands.

C. Potential for Preservation The City should evaluate any remaining vacant lands for potential purchase as open space or recreation areas. Environmentally sensitive lands within the City primarily represent wetlands and floodplains, most of which are located adjacent to lakes. City codes and ordinances together with SJRWMD regulations limit any adverse future impacts to such areas.

D. Citizen Involvement Conservation and preservation of natural resources are imp0ortant to Winter Park and its citizens. In order to facilitate citizen involvement on issues regarding conservation and natural resources, the City has established three permanent advisory boards to review and recommend ordinances and programs concerning the environment. The boards are as follows:

- The Lakes & Waterways Advisory Board is a seven member board that specifically advises the City Commission on matters involving the lakes of Winter Park, the aquatic plant management program, the Save Our Lakes Program, the stormwater management program and boating safety.
- The Parks & Recreation Advisory Board is a seven member board that advises the City Commission on matters related to the City's parks and open spaces.
- The Keep Winter Park Beautiful & Sustainable Advisory Board is a seven-member board that provides an overall perspective and advises on all types of environmental issues and programs.

These three advisory boards assist the City Commission and the administrative staff to be responsive and effectual on matters concerning conservation of the City's natural environment. These boards also provide important positions for citizens interested in being involved.

CURRENT & PROJECTED WATER NEEDS

Water Supply Sources The Public Facilities Element shows the projected water supply demand for the City and permitted withdrawals. The City of Winter Park has two existing water sources. The first is the lower Floridian Aquifer utilized for potable water purposes. The second is the Winter Park Estates Water Reclamation Facility which provides up to 0.615 mgd of reuse to the Cady Way athletic fields, Interlachen Country Club, Winter Pines Golf Course, and Glen Haven Cemetery.

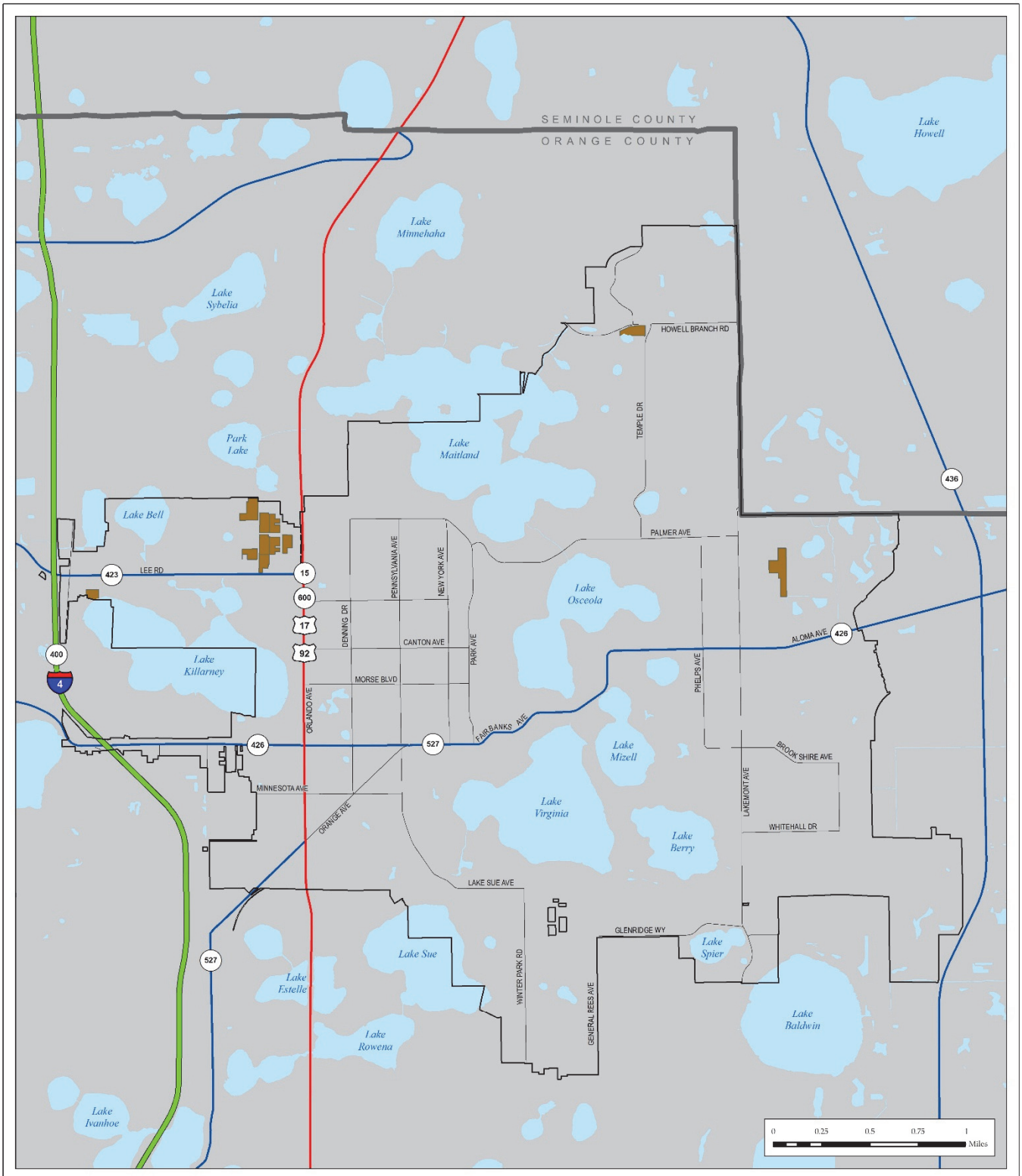
No additional sources of water including alternative water supply projects are required to serve existing or new development for the planning period of this work plan. The City has identified the following source of water produced by traditional and alternative water supply development projects:

1. Withdrawals from the Floridan Aquifer as permitted by the SRJWMD.
2. The Winter Park Estates Water Reclamation Facility of up to .615 mgd of reuse water.
3. The potential to expand and/or re-rate existing Winter Park Estates Water Reclamation Facility to produce an additional .35 mgd of reclaimed water to be used in the City of Winter Park to reduce potable water demand.
4. Continuation of the automatic meter reader system (AMR) which allows for the red flagging of customers that use large amounts of water or who may have a new water leak.
5. Investigate a Park Irrigation Efficiency System (PIES) program. Under this program, potable water that is used for irrigation in the City's parks will be replaced by surface water, storm water, lower quality stormwater, or reclaimed water. This program could be expected to save 0.7 mgd.
6. Continue to participate in regional water supply development projects planning and evaluation.

Existing & Projected Agricultural Water Demands Winter Park has no agricultural uses within the City.

CONSERVATION MAP SERIES

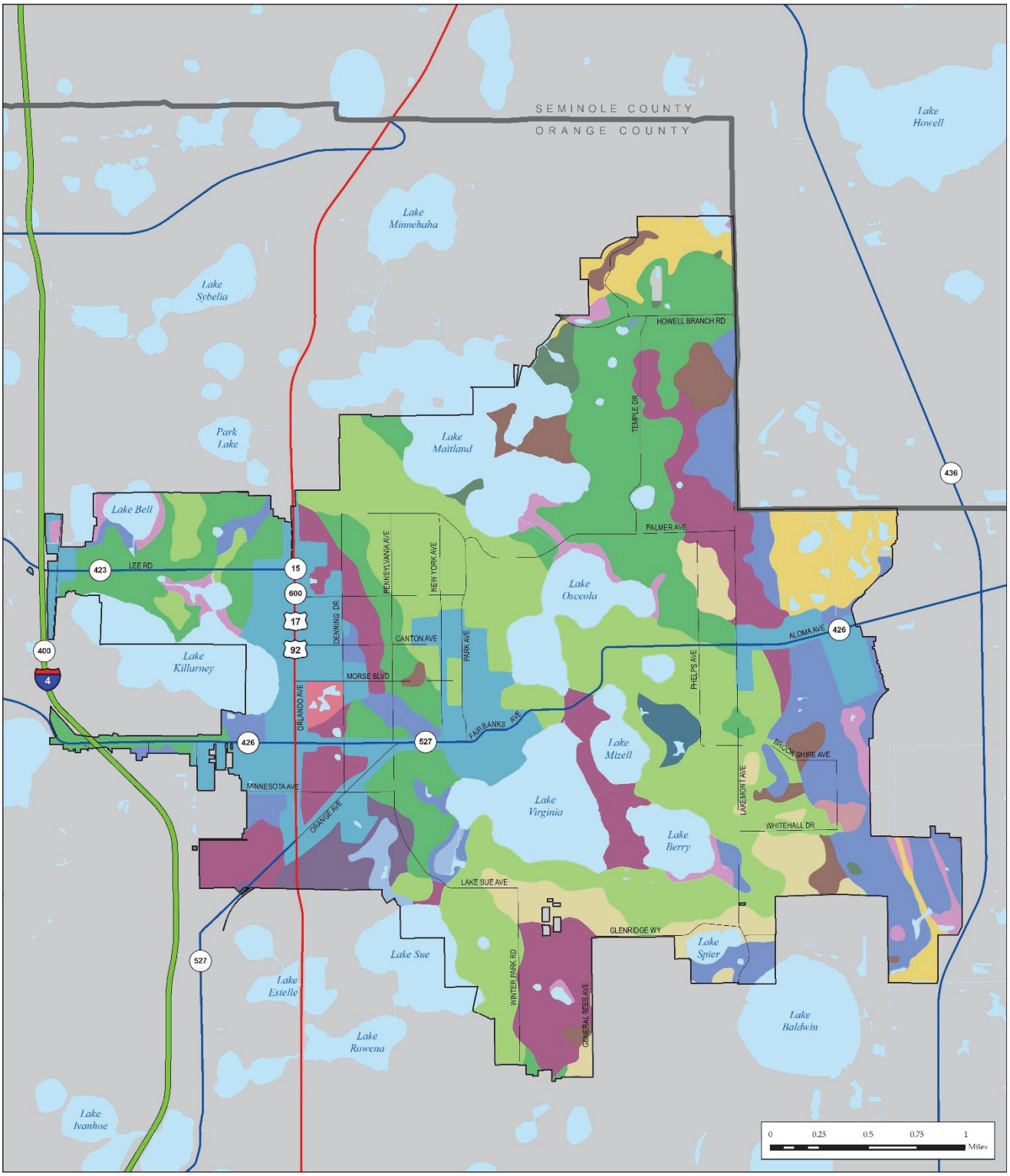
1. **CE-5-01:** Major Undeveloped Lands
2. **CE-5-02:** Soil Associations
3. **CE-5-03:** Floodplains & Water Bodies
4. **CE-5-04:** Wetlands Inventory
5. **CE-5-05:** Potential Wildlife Habitat & Listed Species Observations



MAJOR UNDEVELOPED LANDS
City of Winter Park
Florida

Legend
Undeveloped Land (>2 acres)
Winter Park City Limits

MAP
CE-5-01
August 2016



SOIL ASSOCIATIONS
City of Winter Park
Florida

Soil Survey Geographic Database (SSURGO) Soil Types

Arents	Hontoon	Pomello	St. Lucie
Basinger	Millhopper	Samsula	Taveres
Candler	Ona	Seffner	Urban Land
Florahome	Pits	Smyrna	Zolfo

MAP
CE-5-02
August 2016

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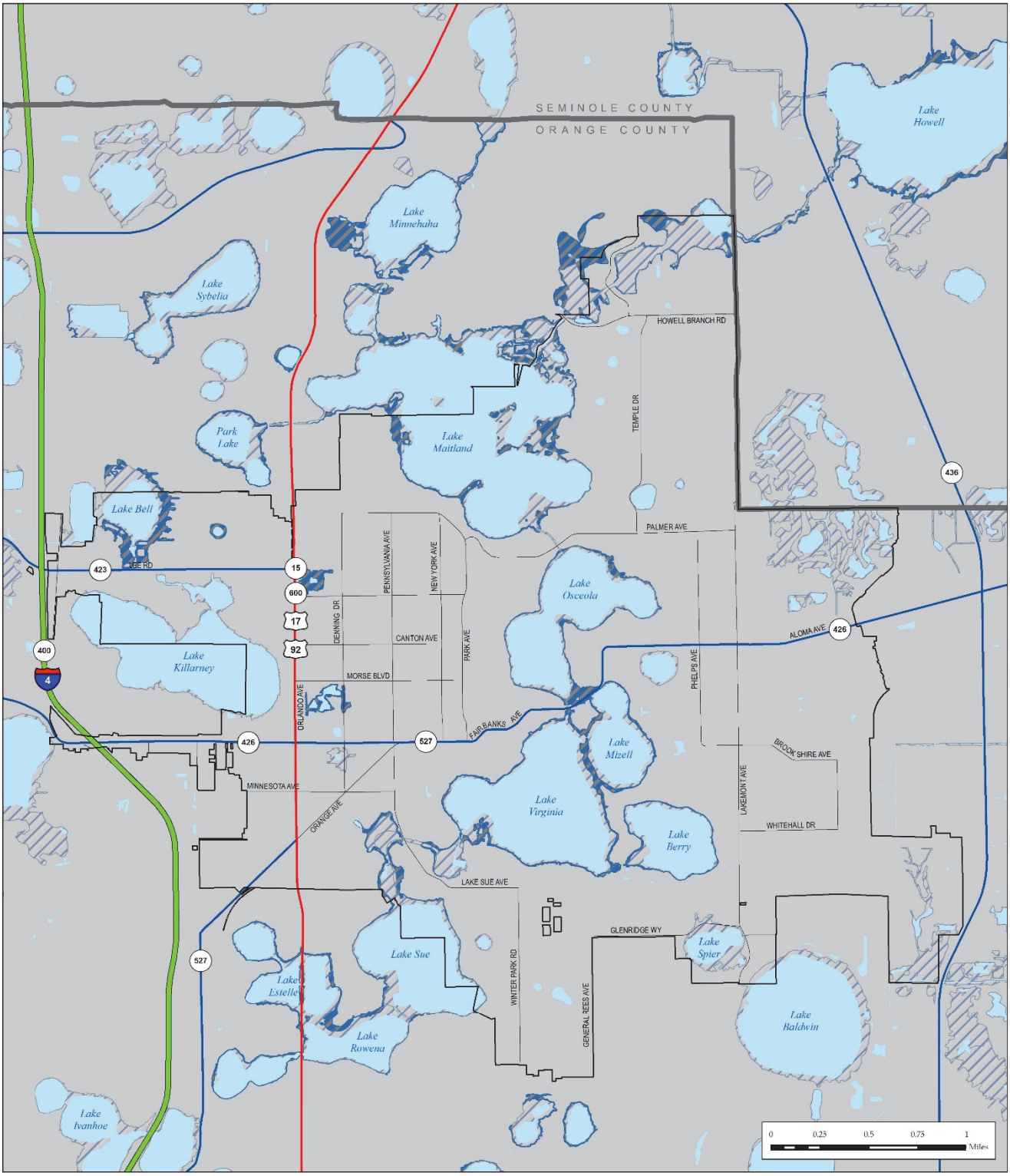
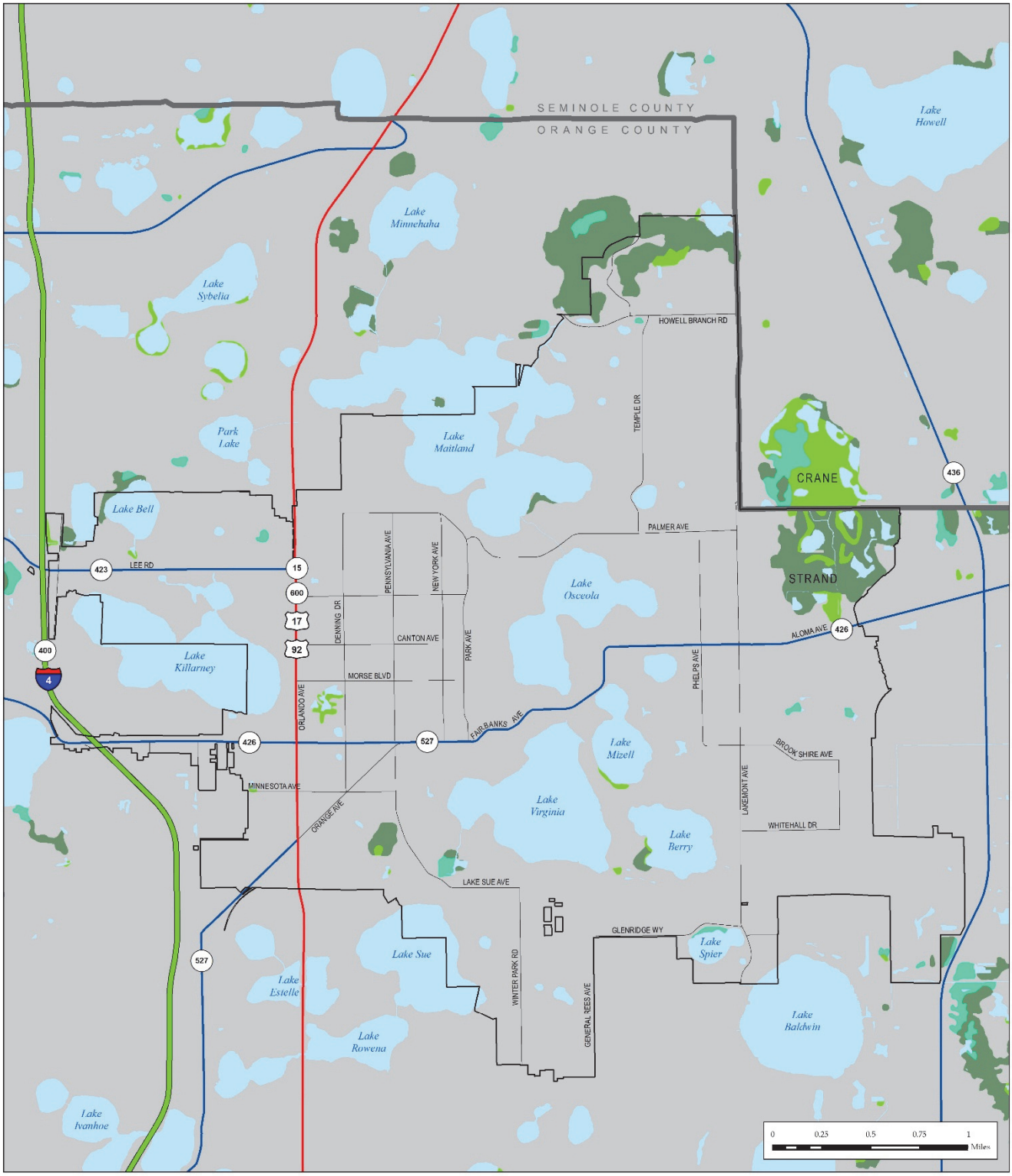


FLOODPLAINS & WATERBODIES
City of Winter Park
Florida

Legend
100-Year Floodplain
500-Year Floodplain
Source: Flood Insurance Rate Map (FIRM)

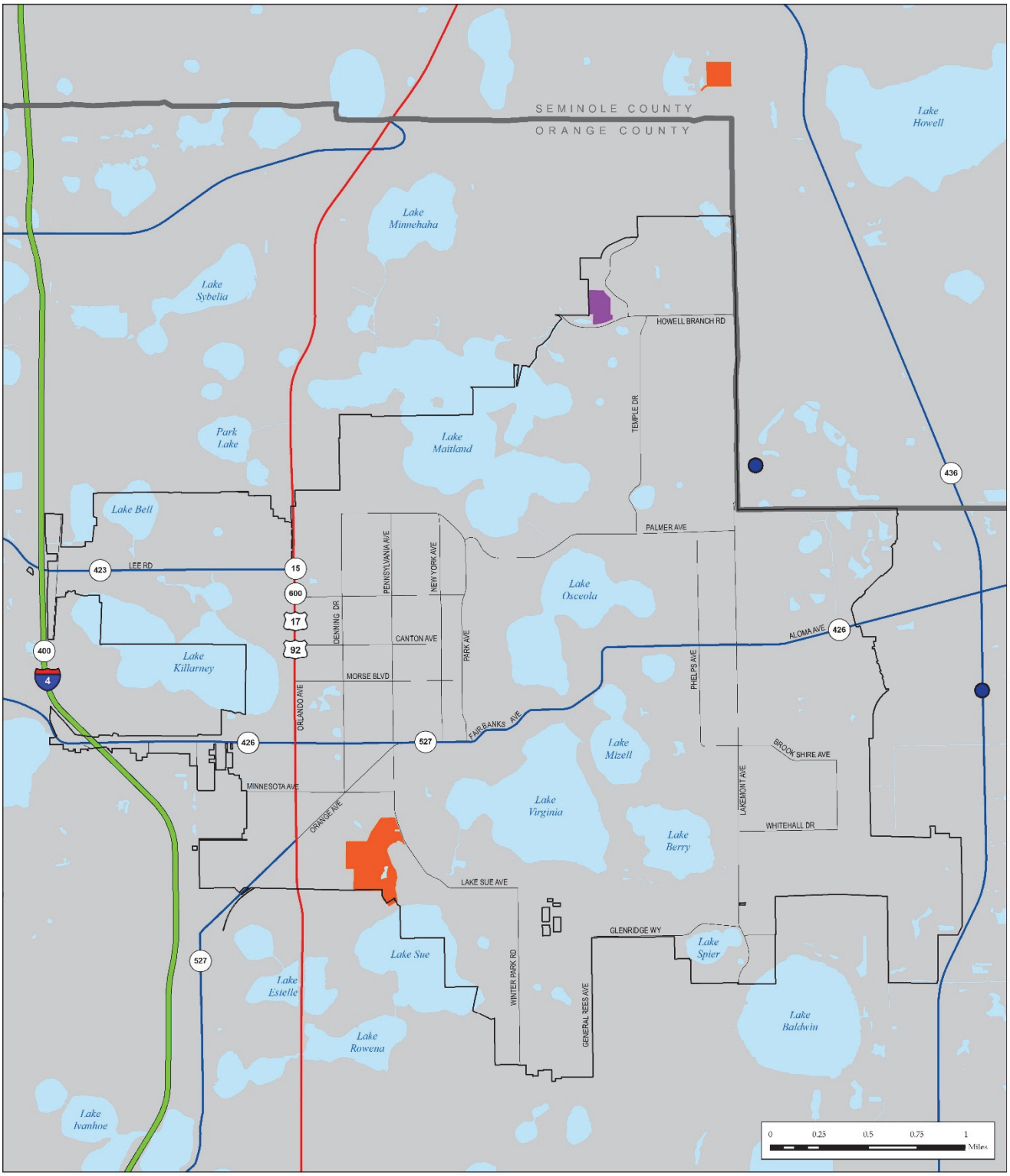
MAP
CE-5-03
August 2016



WETLANDS INVENTORY
City of Winter Park
Florida

Legend
Wetland Classification
Forested
Emergent
Scrub/Shrub
Source: National Wetland Inventory (NWI)

MAP
CE-5-04
November 2016



POTENTIAL WILDLIFE HABITAT AND LISTED SPECIES OBSERVATIONS

City of Winter Park, Florida

Legend

- Documented Wildlife Observation Area
- Florida Conservation Lands
- Florida Forever Lands

Source: Florida Natural Areas Inventory & Fish and Wildlife Conservation Commission

MAP
CE-5-05
August 2016